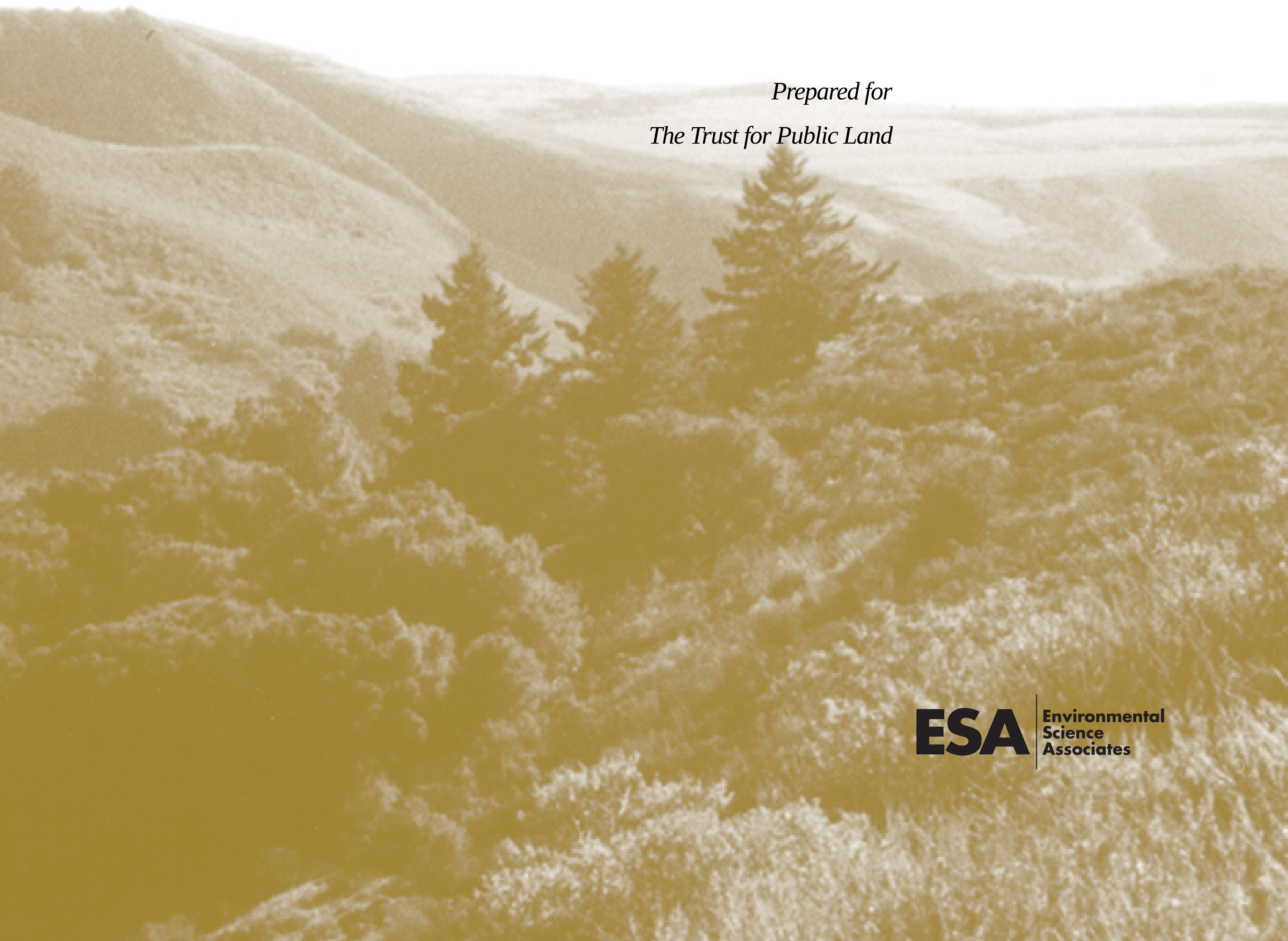
COAST DAIRIES LONG-TERM RESOURCE PROTECTION AND USE PLAN

Existing Conditions Report for the Coast Dairies Property

June 2001

Prepared for

The Trust for Public Land



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INTRODUCTION

EXISTING CONDITIONS REPORT FOR THE COAST DAIRIES PROPERTY

As described in detail in the following section, the modern history of the Coast Dairies Property began around the turn of the last century. Two Swiss families, the Respinis and the Morettis, formed the Coast Dairies & Land Co. (CDLC) and acquired in its name the lands of two entire Spanish grants, from Scotts Creek in the north to Laguna Creek in the south. The Swiss dairymen put cows on the hillside pasturelands; in 1906 a large cement plant was built at Davenport and supported by a system of quarries, an enterprise which survives today as the RMC Pacific Materials, Inc. (RMC) operation. By the 1920s, the families that owned the Coast Dairies & Land Co. had moved back to Switzerland – they and their heirs continued to lease land to local farmers and dairy operators. The hillsides were extensively logged. By midcentury, better refrigeration and transportation gave dairies east of the mountains competitive advantages, and the coastside dairies closed. In the 1950s, but for the cement plant and a few leased artichoke and Brussels sprouts fields, the stretch of coast from Santa Cruz to Half Moon Bay was more or less as it had been in the early nineteenth century, although in some ways it was less settled, populated and exploited. The redwoods resprouted in the higher canyons; streamsides stabilized. The landscape returned to something like the original mosaic of beach, creek and bluff, dun-colored scrub and deep green woodland, under the Central Coast blend of blue sky and restless fog.

But California was growing rapidly and in the 1960s Santa Cruz was poised to expand north toward Davenport. The absentee landlords were two generations removed from the coast, and selling the Property to a developer was tempting. In the 1970s, Pacific Gas & Electric Company acquired an option on the Property with a view to building a nuclear power plant, until the likelihood of a major earthquake eliminated the site from further consideration. In 1993, the California Coastal Conservancy secured an option on the Property, but when a 1994 statewide parks bond measure failed to pass, the Coast Dairies Property went back on the market.

Given the long list of parkland purchases awaiting funding, there seemed to be less and less chance that any public institution would be able to step forward to protect the land. Federal spending from the Land and Water Conservation Fund to buy parkland and wildlife habitat had dropped nearly 70 percent since 1980. In the same period, state funding for park expansion had fallen about 90 percent. In 1996, a Las Vegas developer held an option on the Coast Dairies Property with a plan to develop it as 139 separate parcels.

In 1997, the Save-the-Redwoods League acquired the option to purchase CDLC. Save-the-Redwoods League then assigned the option to the Trust for Public Land (TPL). The TPL exercised its option in October 1998, purchasing CDLC and its Coast Dairies Property with funds from anonymous donors, the David and Lucille Packard Foundation, the California Coastal Conservancy, the Land Trust of Santa Cruz County, and others. During the purchasing process TPL issued a Request for Proposals to locate an entity to receive the fee ownership of, and assume the long-term management and stewardship responsibilities for, the Property. Based on proposals received, two agencies, the USDI Bureau of Land Management (BLM) and California Department of Parks and Recreation (DPR), were chosen for ultimate ownership and joint stewardship. Upon successful completion of a *Coast Dairies Long-Term Resource Protection and Use Plan*, it is anticipated that fee title of the Property will be transferred and a new joint state and federal park will be established.

The Coast Dairies Long-Term Resource Protection and Use Plan (Plan) will be developed by the Coast Dairies Steering Committee under a Memorandum of Understanding (MOU) signed by BLM, TPL, CDLC and DPR on August 8, 2000, and in consultation with federal, state and local agencies and the interested public. The Steering Committee includes representatives of the Bureau of Land Management, California Department of Parks and Recreation, Trust for Public Land, the Save-the-Redwoods League, the Land Trust of Santa Cruz County and the California Coastal Conservancy. The Steering Committee's work has been guided since its inception by a Community Advisory Group (CAG), representing the largest practicable combination of potential user groups and concerned and knowledgeable individuals, to provide local input and access to information.

In January 2000, the Steering Committee selected Environmental Science Associates (ESA) of San Francisco as the prime consultants to prepare the Plan. ESA had assembled a team of other firms with specialized skills, (water rights, economics, etc.) and shortly after their selection began working on preliminary field assessments for seasonally-constrained biological resources. Members of the Steering Committee (see Table I-1) and the consultant team (see Table I-2) are collectively referred to as the *Planning Team*. Deliberations regarding the scope of work continued through the summer. These involved a variety of technical issues, but concentrated on the integration of additional documents to comply with the National Environmental Policy Act (NEPA) and the California Environmental Quality (CEQA). A final contract was signed on September 29, 2000 and work commenced on the first work product, this Existing Conditions Report (ECR). This report is the first step in the preparation of the Plan, and provides the basic reference document for planners. It also assesses and identifies data gaps and uncertainties in the scientific record for this part of the Central California Coast.

No plan can ever satisfy all its data needs. As a reference, the ECR information will be maintained (and updated) in hard copy and electronic form (through the use of a geographic information system [GIS]) so that it continues to grow and serves as tool for future managers of the land, becoming more accurate and useful as time goes by. The process that links an ECR to the future is called *Adaptive Management.* The ECR is a scientific document, but also serves as a consensus on what cannot be known before the Plan is completed, but must be known before the plan is fully effective. Adaptive Management describes the kind of studies and surveys which are performed over a longer period of time to help guide commitments of resources and identify appropriate types and levels of land use. The Adaptive Management program for the Coast Dairies will be a major feature of the Plan.

TABLE I-1
MEMBERS OF THE COAST DAIRIES STEERING COMMITTEE

Name	Affiliation	Address
Laura Perry	Executive Director Land Trust of Santa Cruz County	P.O. Box 1287 Santa Cruz, CA 95061
Ruskin Hartley Kate Anderton	Save-the-Redwoods League	114 Sansome Street, Rm 605 San Francisco, CA 94104
Patsy Heasly	California State Coastal Conservancy	1330 Broadway, 11th Floor Oakland, CA 94612
Dave Vincent	District Superintendent California Department of Parks and Recreation	600 Ocean Street Santa Cruz, CA 95060
Rick Hanks .	Hollister Field Office Bureau of Land Management	20 Hamilton Court Hollister, CA 95023
Darcey Rosenblatt	TPL Project Manager	116 New Montgomery Street, Suite 300 San Francisco, CA 94105
Liza Riddle	TPL Director of Projects	116 New Montgomery Street, Suite 300 San Francisco, CA 94105
Edith Pepper	Coast Dairies & Land Co. Project Manager	116 New Montgomery Street, Suite 300 San Francisco, CA 94105

TABLE I-2
MEMBERS OF THE COAST DAIRIES PLANNING TEAM

Name	Address	Phone/Fax/Email	Contact	Role
The Trust for Public Land, Western Region	116 New Montgomery Street, Third Floor San Francisco, CA 94105	Phone: 415-495-5660 Fax: 415-495-0541 darcey.rosenblatt@tpl.org	Darcey Rosenblatt	Planning Team Lead
Environmental Science Associates	225 Bush Street, Suite 1700 San Francisco, CA 94104	Phone: 415-896-5900 Fax: 415-896-0332 troberts@esassoc.com	Tom Roberts	Prime Consultant
Agland Investment Services, Inc.	711 Grand Avenue, #290 San Raphael, CA 94901	Phone: 415-460-1352 Fax: 415-460-5368 wmott@aglandinvest.com	Bill Mott	Subconsultant for Agriculture
Albion Environmental, Inc.	1414 Soquel Avenue, #205 Santa Cruz, CA 95062	Phone: 831-469-9128 Fax: 831-469-9137 cblount@albionenvironmental.com)	Clinton Blount	Subconsultant for Biological and Historical Resources
Dornbusch & Company, Inc.	2907 Claremont Avenue, #120 Berkeley, CA 94705	Phone: 510-841-1750 Fax: 510-841-1751 ddornbusch@ddorn.com	David Dornbusch	Subconsultant for Economics
Ellison, Schneider & Harris	2015 H Street Sacramento, CA 95814-3109	Phone: 916-447-2166 Fax: 916-447-3512 ajs@eslawfirm.com	Anne Schneider	Subconsultant for Water Rights

TABLE I-2 (Continued)
MEMBERS OF THE COAST DAIRIES PLANNING TEAM

Name	Address	Phone/Fax/Email	Contact	Role
Pacific Meridian Resources	5915 Hollis Street, Building B Emeryville, CA 94608	Phone: 510-654-6980 Fax: 510-654-5774 chendrix@pacificmeridian.com)	Chad Hendrix	Geographic Information Systems
Rana Creek Habitat Restoration	35351 East Carmel Valley Road Carmel Valley, CA 93924	Phone: 831-659-3820 Fax: 831-659-4851 ranacreek@earthlink.net	Paul Kephart	Restoration; RMC Liaison
Royston Hanamoto Alley & Abey ASLA	225 Miller Avenue Mill Valley, CA 94941	Phone: 415-383-7900 Fax: 415-383-1433 cordy@rhaa.com	Cordy Hill	Land Use and Recreation
Toyon Environmental Consultants	40 Quisisana Drive Kentfield, CA 94904	Phone: 415-456-5052 Fax: 415-456-4992 toyon@hooked.net	Sandy Guldman	Regulatory Issues
Center for Natural Lands Management	425 E. Alvarado Street, Suite H Fallbrook, CA 92028-2960	Phone: 760-731-7790 Fax: 760-731-7791 cnlm@cnlm.org	Sherry Teresa	Quality Control for Conservation Planning
Alfred Heller Professor of Agroecology Environmental Studies	University of California at Santa Cruz Santa Cruz, CA 95064	Phone: 831-459-4051 Fax: 831-459-2867 **gliess@zzyx.ucsc.edu**	Dr. Stephen Gliessman	Quality Control for Agricultural Planning

This ECR is organized to begin with the land-use "story" of the Coast Dairies Property, essentially the setting for all the data gathered expressly for the Plan. For example, a stream dammed for a half century may look natural a half century after a dam is removed, but the knowledge that the dam was there may illuminate water quality and fisheries information gathered in the two-year period covered by the ECR field studies.

This historical section is followed by sections describing the overall report methodology (including a review of existing information), natural resources; current human uses (including agriculture, mining and recreation); archaeological resources; economics; and local, state and federal regulation of the Coast Dairies Property. Each section contains its own references, describes unique aspects of its own methodology and concludes with an assessment of issues identified for the subject under discussion. In many cases large data sets or, in the case of the land use history lengthy transcripts of interviews, are contained in the project archives to make the ECR text more readable. Tables and simple graphics are integrated with the text, but larger format maps generated by GIS are included and referenced as "attachments."

In all that follows, the Planning Team adheres to the Coast Dairies Mission Statement:

> *It is the purpose of the Coast Dairies Steering Committee to protect and preserve in perpetuity those intrinsic natural and pastoral qualities that make this 7,000-acre±coastal area important to the people of the region, the local community, the state, and the nation.*
>
> *Sound long-term stewardship of this land will be achieved through cost-effective, adaptive management of the property designed to conserve and enhance its biological, open space and agricultural values, restore wetland, riparian, native grassland, forested and other sensitive habitats, and provide compatible recreation.*
>
> *Adaptive management – continual monitoring of the property's resources as the basis for decisions related to the land's use – will allow for responsive stewardship of the natural and economic resources of the property. It will also create valuable opportunities for education in the field of integrating traditional economic and recreational activities, including sustainable coastal agriculture, with programs designed to protect native biodiversity and other natural landscape values.*

SECTION 1.0
COAST DAIRIES: A LAND USE HISTORY

1.1 PREHISTORY

1.1.1 PHYSIOGRAPHY

The physical geography of the northern Santa Cruz coast—the North Coast, in local parlance—is marked by broad marine terraces that rise eastward from the ocean to the Santa Cruz Mountains. These terraces comprise two rock formations, including the Santa Cruz Mudstone Formation (a soft, eroding bedrock) and the Monterey Formation, a hard silica-rich deposit containing Monterey chert, an important source of toolstone for the Native Americans of the Central Coast.[1]

These terraces have been exposed to continuous wave action, resulting in the formation of the distinctive steep cliffs that stand sentinel along the coastline. Sandy "pocket" beaches occur intermittently where streams have cut through the marine terrace to meet the sea, and are often paired with the small estuaries formed by some of the larger streams such as Scott and Waddell Creeks.

The modern climate of the region is considered to be Mediterranean and is characterized by relatively dry summers and moist winters. Average annual rainfall is 27 inches and mean annual temperature is 59 degrees. In the summer months, seasonal upwelling of cold ocean waters generates morning coastal fog. On-shore north or northwesterly winds usually increase during the day, clearing off the fog, and die down again by evening when the fog returns.

Paleoenvironmental studies suggest that climatic conditions 30,000 to 5,000 years ago were slightly cooler and more moist than today. Pollen studies indicate that the climate was more like present day Fort Bragg in Northern California (Jones and Hildebrandt, 1990). Current conditions appear to have been in place by 5,000 years ago.

[1] The term "Central Coast" applies to the region between San Francisco and San Luis Obispo. In this report, the local term "North Coast" applies to the Coast Dairies Property before it was subject to historic boundaries, and may include areas from Point Año Nuevo to the modern day City of Santa Cruz.

1.1.2 TERRESTRIAL ENVIRONMENT AND RESOURCES

The Coast Dairies Property incorporates four major ecological zones[2] including coastal terrace, ridge system, riverine, and upland meadow (Hylkema, 1991). Modern vegetation was most likely present for many centuries before recorded history, and its diversity provided early inhabitants an array of plants and trees for food, medicine, tools and baskets.

For the first human inhabitants of the Property, there was a variety of natural resources that might have been the envy of more interior peoples. Plants bearing edible seeds and/or leafy greens are known to have been used throughout the year, as revealed by plant remains from archaeological sites. In the spring, lupine[3] was harvested for its edible green leaves, while chia provided edible seeds. During the late spring and summer a variety of seed-bearing plants were gathered including tarweed, goosefoot and elderberry. Soaproot was particularly important as it was used for food (edible root), fish poison, soap, and brushes (Fitzgerald and Ruby, 1997). Numerous species of trees and shrubs were also a source of edible nuts and berries including baynut, hazelnut, and tan oak, all of which were harvested in the fall (Fitzgerald and Ruby, 1997). Buckeye, California bay laurel, and coast live oaks are also considered to have been economically important (Hylkema, 1991).

Acorns and grass seeds constituted a significant proportion of the native diet. Ethnographic accounts indicate that the natives sought to increase seed production of coast grasslands through intentional burning. Rediscovered as "prescribed burning" in modern times, this prehistoric practice also served to increase forage and attract large mammals such as black tailed deer, which were regularly hunted (Jones and Hildebrandt, 1990). Other animals in the aboriginal larder came from the coastal scrubland and forests of the area, habitats for terrestrial mammals, reptiles, fish, and amphibians. Oak woodlands in particular harbor a large number of animals and birds for thermal cover, escape, dens, nests, and foraging (Barrett, 1980). Modern and historic use of the region has altered somewhat the ecology of the Central Coast and reconstruction of prehistoric conditions is at least partly by inferrence, but species known to have been important to native peoples include a wide variety of small to medium mammals including the jackrabbit, cottontail rabbit, kangaroo rat, ground squirrel and badger.

Studies have identified more than two hundred resident species of birds in the region but, perhaps more importantly, the cold and nutrient-rich waters immediately offshore lie astride the Pacific migratory waterfowl flyway. Avifaunal remains from archaeological sites on the Santa Cruz coast indicate that waterbirds such as canvasback duck, common merganser and blue winged teal were part of the prehistoric diet (Dietz et al., 1988).

2 Other classification systems, based on alternate vegetation or geological associations for example, will be used in subsequent sections.
3 Plant and animal lists, with scientific names, are included in Section 3.0.

1.1.3 MARINE RESOURCES

Offshore vegetal resources such as kelp, seaweed and sea palm are known to have been exploited prehistorically. Native peoples collected these plants on-shore and roasted them for immediate consumption or dried and stored them for future use (Jones and Hildebrandt, 1990). Shell refuse from an extensive menu of mussels, barnacles, limpets, chitons, abalone and clams are commonly found in coastal archaeological sites. Migratory marine mammals known historically on the Central Coast were probably present prehistorically, and no doubt harbor seals, northern elephant seals, and sea lions were sources of protein and fat. These species were attracted by the same fish exploited by humans: Pacific mackerel, night smelt, white croaker, righteyed and lefteyed flounder and anchovy (Jones and Hildebrandt, 1990).

1.1.4 ARCHAEOLOGICAL RESEARCH

The coastal region stretching from Santa Cruz to San Francisco has been the focus of numerous archaeological surveys and excavations since the early 1900s. The earliest of these investigations reflected the trophy-hunting mentality of the times, collecting museum specimens for display purposes from some of the largest prehistoric residential sites elsewhere in the San Francisco Bay region. These studies were extremely limited in scope and provided little understanding of prehistoric life-ways of people who inhabited this part of the Central Coast.

Beginning in late 1960s, academic research by students at San Francisco State University (and later San Jose State University) expanded the number of recorded archaeological sites along the coasts of San Mateo and Santa Cruz counties. While much of this research was limited to site recording and limited sampling, a few important studies provided valuable information for the development of a regional chronology and an integrated understanding of prehistoric life (Roop, 1976; Hylkema, 1991). Hylkema's 1991 thesis was particularity important, as it not only provided the first integrated examination of prehistoric adaptations along the San Mateo-Santa Cruz coast, but it also provided the basis for comparisons of local economies with those of surrounding areas including the San Francisco Bay, Monterey Bay and inland valleys.

Finally, studies driven by the requirements of the California Environmental Quality Act (CEQA) since the 1980s have also supplied invaluable chronological information, filling the gaps in archaeological data amassed from this part of the North Coast since the early 1900s (Jones and Hildebrandt, 1990; Fitzgerald and Ruby, 1997).

1.1.5 HUMAN OCCUPATION ALONG THE NORTH COAST

Archaeological and ethnographic studies indicate that the North Coast was possibly occupied from as early as the 10,000 years ago. The earliest evidence for occupation of the region comes from a site located in the Santa Cruz Mountains near Scotts Valley. This deeply buried site has been dated to 8000 BC and is the only evidence of what archaeologists refer to as the Paleo Indian period (Cartier, 1993), a designation that subsumes all occupations dating earlier than 5000 BC. Progressively rising sea levels documented for this period may have obliterated additional evidence for occupation of the coast during this time. As with the climate, sea levels appear to have stabilized to current conditions by 5000 years ago.

Evidence of habitation along the coast proper comes later, during the Lower Archaic period (3000-5000 BC) and from a site immediately adjacent to the Coast Dairies Property at Sand Hill Bluff (Jones and Hildebrandt, 1990). This locale appears to have been occupied over a span of time difficult for modern Californians to comprehend: 5000 years, beginning about 6000 years ago. Habitation of both the coastal and interior regions in and surrounding the Property is evidenced in numerous sites dating to the Middle Archaic (3000 - 1000 BC) and Upper Archaic (1000 BC – AD 1000). The latest prehistoric occupation appears to have occurred during what is known as the Emergent Period (AD 1000 - 1800) as evidenced at a site located at Davenport Landing (Fitzgerald and Ruby, 1997), and at a site about 5 miles inland in the Santa Cruz Mountains (Hylkena, 1991). Native inhabitants of the region were first encountered by Spanish explorers in 1602 and again between 1769 and 1776. Aboriginal groups of the San Francisco and Monterey Bay area came to be known collectively as Costanoan, a word derived from the Spanish word *Costaños* meaning 'coast people' (Levy, 1978).

During the mission period, AD 1770-1835, devastating changes occurred for the Costanoan people. The population was recruited into nearby missions and their traditional subsistence economy was replaced by an agricultural one. Analyses of mission baptismal records demonstrate that the last Costanoan tribelets living a traditional existence had disappeared by 1810 (Levy, 1978). As was true in much of the Americas, the population experienced a dramatic decline due to the introduction of European diseases, which consequently caused lower birth rates. And in a further blow, the mission culture that had absorbed and to some degree supported the Costanoans was short-lived. The secularization or abandonment of the missions by the Mexican government in 1832 caused people to relocate to different areas and establish small settlements, fragmenting the survivors and separating them farther away from their cultural heritage. It is believed that the Costanoan languages were probably not spoken after the year 1935 (Levy, 1978).

Most of what we know about native inhabitants of the region has been pieced together from the Spanish exploring expeditions, ethnographic accounts in the 1920s and 1930s (Krober, 1925), and archaeological research. The Costanoan territory was occupied by approximately 50 separate triblets, each one occupying one or more permanent village sites. The Coast Dairies Property is located within the boundaries of the area inhabited by the *Cotoni* tribe, which occupied the land from the mouth of the San Lorenzo River, north to Año Nuevo Creek, and east as far as Bonny Doon Ridge (Milliken, 1995).

The Costanoans encountered by the Spanish were hunter-gatherers who managed their resources to ensure a sustained livelihood. They lived in sedentary communities in domed structures covered with thatched roofs, and relied for subsistence on nuts and seeds from various trees and plants, local fauna, and fish, particularly salmon[4], from the rivers and Pacific Ocean. Materials

[4] Curiously, a cursory examination of fish remains from sites in and around the Coast Dairies properties reveals only a single steelhead trout element from a site at Davenport Landing (Fitzgerald and Ruby, 1997).

crafted by the Costanoans and used in subsistence activities included baskets, mortars, pestles, nets, net sinkers, anchors, and a variety of chipped stone tools. Trade with the surrounding Plains Miwok, Sierra Miwok and Yokuts allowed nonindigenous materials and food (i.e. piñon nuts) to be brought into the area as well. In exchange, the Costanoan are thought to have exported bows, salt, and salmon to neighboring groups (Levy, 1979). Economic reciprocity, in addition to intermarriage, is thought to have linked settlements together, some of which, by Spanish accounts, indicate stable and prosperous villages with as many as 200 people (Milliken, 1995). Overall population density along this part of the coast was nevertheless very sparse.

Archaeological research has helped us to understand what life was like prior to European contact, in at least some of its complexity and richness. For example, examination of numerous sites along the coast, adjacent terraces, and ridge systems of northern Santa Cruz County indicates that prehistoric inhabitants made use of a range of ecological zones including coast terrace, ridge system, riverine, and upland meadows, and that native inhabitants moved between these ecological zones to support a diverse human ecology. In what is referred to as a forager economic strategy, groups of people move from one location to another exploiting the resources in the immediate vicinity. Using their settlements as a base of operations, group movements were on a seasonal basis to optimize resource harvesting. It has been hypothesized that this strategy is extremely efficient in an ecological context like northern Santa Cruz County where resources are relatively dispersed, or not concentrated in one area. The distribution of marine and terrestrial mammals within a mosaic pattern of the coastal terraces and mixed hardwood forests are thought to have encouraged a foraging strategy until very late in time, possibly up until contact with Spanish explorers.

1.2 A HUMANIZED LANDSCAPE

Most discussions about Santa Cruz County's North Coast emphasize the scenic natural beauty of the coastline, and indeed many aspects of today's scenery have evoked the same reactions for many generations of residents and visitors. Yet, as we begin to review the historic period, we find a landscape heavily altered by long and often intensive human use. On the Coast Dairies Property, sunsets are viewed while standing on massive structures, now unrecognizable as railroad trestles, looking across fields of Brussels sprouts, to a western edge broken by the towers of the cement plant. Streams have been dammed, diverted through tunnels, flumed and in several instances encased in pipes and carried away to serve the citizens of Santa Cruz. Road cuts and fills slice the landscape, and everywhere one can see concrete abutments, truncated water pipes and bolts protruding from the earth, monuments to an industrial (or at least an entrepreneurial) past.

This section of the Existing Conditions Report is an effort to bring the human story to the forefront, to highlight the remarkable ingenuity and energy that came to the North Coast and tried to transform it—to put the human communities that lived or migrated here into the ever-changing landscape beside the animals, plants, and the physical environment.

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The story of the North Coast is really two histories, before and after the incorporation of the Coast Dairies & Land Co. in 1901. The combination of the Moretti and Respini family assets, together with the leadership of Louis Moretti, provided a catalyst for an explosion of activity more like the booms of the gold fields or Silicon Valley than the pastoral landscape we value today. The Coast Dairies Corporation was the major agent for change in the early twentieth century. The over-arching theme of both is that of a treasure trove of natural resources locked up and isolated by a formidably rugged landscape. Many who came to the North Coast marveled at its potential—the forests, limestone, bitumin, fresh water, rolling grasslands, terraces—all ripe for utilization, and then added "if only we had…" followed at different times by the phrase "dependable road," "protected harbor," "railroad," "straight highway," or even "freeway." The North Coast is dominated by the long, narrow coastal terrace perched a hundred feet or so above the ocean, offering little access when approaching by sea, while the rugged and irregular Santa Cruz Mountains provide a parallel barrier on the east. The northern end of the terrace was blocked by a mudstone bluff that comes down to the ocean's edge just north of Waddell Creek, which forced early travelers into the surf to get past. The only easy access to this terrace is from the southeast, but its length is so dissected by gullies and valleys that, until the coming of the railroad in 1905, it was extremely difficult to traverse. "*The road to Pescadero is thirty-six miles in length, follows along the coast, and is one of continuous ups and downs,*" wrote one observer in 1880. "*It would be a slander to say it is a comfortable road over which to ride." (Sentinel* 1/31/1880).

The natural landscape blunted the forces of development and forced them into slow motion, creating a thirty-year lag compared to areas north or south. While the railroad connection between Santa Cruz and the outside world was completed in 1876, the North Coast wasn't connected until 1906; likewise, the big sawmills came to the redwood canyons on the east side of Ben Lomond Mountain in the 1880s, but didn't reach the North Coast until 1909.

The North Coast's isolation became an asset when harried citizens from the San Francisco Bay Area sought relief in the sheltered campgrounds that grew up at every stream crossing. The "*secret recesses and wildest haunts*" lured fishermen, hunters and campers away from the "*comparatively bleak valley of Santa Clara*." (*Sentinel* 5/18/1872)

Finally, and fortunately for the future of the Coast Dairies Property, some developments never came at all. The coastal subdivision frenzy of the 1920s that saw the entire coastline from Santa Cruz to Aptos divided and sold into houselots was slowed enough that, when it finally arrived in the late 1960s, the community rose up and stopped it.

A Landscape for Everyone

There are a multitude of landforms compressed between the surf and the top of Ben Lomond Mountain. Rainfall amounts double in that distance and a mere turn in a canyon can change the visitor's experience from bright, open landscape to deep, redwood forest. The North Coast offered something for everybody; most immigrants could find a familiar niche within which to live and work. And for some, like the Swiss, for whom the coastal hills evoked Switzerland's

Canton Ticino, that was an impetus to settle. Azorean whalers worked from Pigeon Point, Japanese farmers tilled the coastal terraces, Chinese abalone hunters prowled the rocks, Swiss and Portuguese dairymen tended their herds, Filipino and Mexican farm laborers worked under the sun, and Italian farmers coaxed the land to grow artichokes and Brussels sprouts. Greek stonecutters risked their lives quarrying a living out of the San Vicente Canyon.

1.2.1 THE VIEW FROM THE SEA

Juan Rodriguez Cabrillo, November 1542

Cabrillo's account includes a brief mention of the North Coast including the fact that they saw "*neither Native Americans nor smokes*[5]" (Wagner, 1929). Cabrillo's emphasis that trees came right down to the water at other locations (Point Reyes, Point Pinos) suggests that the coastal terrace near present-day Año Nuevo had few if any trees.

Sebastian Cermeño, December 1595

In December 1595, Spanish explorer Sebastian Cermeño sailed southward along the coastline in a makeshift canoe. He was much more definite about the appearance of the land: "*In going along very close to land, frequently only a musket-shot from it, all that may be seen is bare land near the sea and pine and oak timber in the high country. No smokes or fires appeared*." (Wagner, 1929)

Francisco de Bolaños, 1603

Spanish pilot Francisco de Bolaños was with Cermeño and returned with Captain Sebastian Vizcaíno in the 1603 passage that was the occasion to name Año Nuevo. Bolaños wrote the description that would be the guide for all Spanish ship captains for the next 150 years. His description of the coastline south of Point Reyes: "*From the Punta de los Reyes about fourteen leagues*[6] *southeast a quarter south there is a point* [probably Pigeon Point]. *Before reaching it the country consists in places of sierra, bare to the sea and of medium height with some cliffs, but soon the country inside* [inland] *becomes massive and wooded until you reach a point of low land in 37 ½ degrees named the 'Punta de Año Neuvo."* To emphasis the distinctiveness of Point Pinos on the south side of Monterey Bay, Bolaños noted that the forests there covered the land "*down to the sea itself*." (Wagner, 1929)

Archibald Menzies, November 1792

One later account further confirms the view from the sea. In November, 1792 English scientist Archibald Menzies described the coastline south of San Francisco: "*In the afternoon we coasted along shore to the Southward* [from San Francisco] *with a fresh breeze, the land appearing much the same as to the Northward of Port San Francisco naked & hilly, with here & there perpendicular cliffs of a whitish appearance facing the Sea."* (Menzies, 1792) Since the Mission

5 Presumably, this is a reference to manmade fires.
6 A Spanish league was approximately 2.6 miles.

Santa Cruz had just been established (1791), the North Coast's barren appearance can not be attributed to grazing by mission livestock, and reflects instead the natural factors discussed in Section 3.0.

1.2.2 THE VIEW FROM THE LAND

The first Europeans to pass along the North Coast on land were Spaniards, members of the expedition sent northward from San Diego in 1769 to find the port of Monterey described by Vizcaíno in 1603. They passed along the North Coast twice.

The Portolá Expedition 1769

Led by Captain Gaspar de Portolá, the expedition became confused by the topography around the Monterey Peninsula and continued northward along the coast, looking for the right combination of harbor and pine trees coming "*down to the sea itself.*" Recognizing neither, they continued northward, passing the San Lorenzo River on October 18.

Marching along a mesa approximately three miles wide, they encountered a "toilsome" landscape: "*We traveled three hours and a half but only made two leagues during which we descended and ascended four deep watercourses carrying running water which empties into the sea. Only in the watercourses are any trees to be seen; elsewhere we saw nothing but grass, and that was burned*." (Bolton, 1966) Since they were looking for a shoreline pine forest and expecting to see many Native Americans as Vizcaíno had, the empty bare hills in the east were very disappointing. On October 19, Engineer Miguel Costansó wrote: "*To our right there were some whitish, barren hills that filled us with sadness, and there were days on which we missed the comfort of seeing natives.*" (Browning, 1992)

But it was the rugged terrace and the seemingly unending sequence of arroyos that made the Spaniards most disconsolate. Father Crespí, the Church's representative on this journey, noted that "*this march was very troublesome, on account of the frequent gulches along the way, for we crossed seven, and they caused a great deal of work in making them passable*." (Bolton, 1966) Their mules slipping and falling in the steep-sided arroyos, the Spaniards struggled ever northward along the terrace, finally camping at the mouth of present-day Waddell Creek on October 20. While at this campsite the expedition experienced a startling recovery from an earlier outbreak of scurvy[7], before slipping past the bluffs to the north and out onto the terrace behind Año Nuevo. Portolá's confusion increased when they saw San Francisco Bay; as winter deepened, they headed back southward along the coast.

Since the stream-crossings were still in place, the expedition traversed the North Coast terrace in less than half the time it had taken them going northward. On November 21 they camped at the mouth of present-day Majors Creek, and Father Crespí noted the abundance of geese: "*On this and the preceding days the soldiers killed a great many geese, the flocks of these birds that are*

[7] The Spaniards considered their recovery a miracle, but present-day botanists suggest that the scurvy might have been alleviated by their eating food containing large amounts of Vitamin C, perhaps either food given to them by the Native Americans, or blackberries and rose hips. See Browning, 1992, p. 113, note.

seen at every step being uncountable. Some of the soldiers' messes have twelve of them saved up. Blessed by the Divine Providence which relieves us in our direst need!" (Bolton, 1966)

Eventually, after returning to San Diego and then marching back up to Monterey Bay, they recognized the harbor and found the pine trees "*down to the sea itself.*" In June of 1770 the Spaniards established the capitol of Alta California at Monterey. The North Coast had been a diversion both worrisome and restorative.

The Third and Last Spanish Passage Along the North Coast – The Rivera Expedition 1774

The Spaniards made the journey from Monterey to San Francisco Bay several times, but their memory of the difficulty of traveling along the coastal terrace encouraged them to follow the route through the more level inland valleys, along the route of present day Highway 101. Over the intervening five years their North Coast stream crossings washed out and vegetation grew up to obscure the trail.

In December 1774, the Spaniards made their last journey of exploration along the North Coast. After exploring San Francisco Bay, the expedition crossed over the ridge of the Santa Cruz Mountains and paralleled the North Coast. The trip's two diarists, Captain Don Fernando Rivera and Padre Francisco Paloú left very detailed accounts. After waiting for low tide and making a dash across the sand at the base of the bluff at present-day Waddell, they followed the coastal terrace southward through land of "*pure earth covered with grass*." Though they saw few Native Americans during their passage, Paloú noted their presence: "*…at every step we have come upon paths well beaten by* [the Native Americans] *which descend from the mountains to the shore*." The constant crossing of arroyos was tiresome, and in some instances they were "*so precipitous that we were all compelled to go on foot*." (Bolton, 1966)

The 1774 trip decided the matter. The North Coast was not to be the route when going from Monterey to San Francisco, and in 1775 Spanish Lieutenant Pedro Fages officially recognized the inland passage from Monterey to Mission Santa Clara and San Francisco. He called it a "short cut" that "*traverses more passable ground* [than the coast], *and saves a matter of ten leagues of distance*." (Priestly, 1937)

The die was cast. The primary Spanish north-south route through Central California (later called the El Camino Real) did not come along the "tiresome" North Coast. The land that came to be known as Santa Cruz County's North Coast and ultimately the Coast Dairies Property remained isolated, rugged and forbidding.

1.2.3 THE SPANISH COLONIAL ERA (1770-1822)

Because the North Coast was off the beaten path and remote relative to the other mission establishments at Carmel and Santa Clara, the North Coast was not actively settled until 17 years after Lieutenant Fages made his travel recommendation.

Mission Santa Cruz, established 1791

The establishment of the Mission Santa Cruz beside the San Lorenzo River in August of 1791 marked the beginning of Spanish occupation of the North Coast. In its early years the mission looked eastward across the coastal terrace for its pasturage, but following the establishment of the Villa de Branciforte[8] on that terrace in 1797, the padres turned their attention to the North Coast.

North Coast Controlled by Mission Santa Cruz

Mission Santa Cruz eventually came to control a swath of the North Coast extending 11 leagues (28.6 miles) with a width of three leagues (7.8 miles) inland from the coast. The land was used to pasture mission livestock including cattle, sheep and horses. Three ranchos[9] are mentioned in the mission records: *El Matadero* which evolved into the Mexican-era Refugio grant located south and east of Laguna Creek; *El Jarro* which evolved into the Agua Puerca y las Trancas grant, centered on present-day Scotts Creek; and *Rancho Punta de Ano Nuevo*, centered on Ano Neuvo itself. Rancho El Jarro was mentioned in the Santa Cruz Mission inventory in 1835 as having 2,900 head of sheep (Kimbro, 1985).

The French Spy – February 1827

When M. Duhaut-Cilly's accounts of his visit to California in 1827-1828 were published, they were so detailed and vivid it was assumed by some that he was actually spying for France. Whatever his purpose his accounts are remarkable and would have served well as a military reconnaissance, albeit with a stylish French flair. Sailing south from San Francisco along the coast:

"There are eighteen leagues from the entrance to San Francisco Bay to the roadstead at Santa Cruz, and the way is south-southeast, without turns and dangers. All day we had spy-glasses in our hands to examine the coast, whose aspect the swift progress of the ship altered every minute. In general it is very high in the interior, and everywhere covered with forests of fir trees; it then grows lower by a gentle slope toward the shore; but before reaching it, it rises again to form a long ridge of hills, whence it descends finally to the sea, now bathing the foot of vertical rocky cliffs, now gliding in sheets of foam over sandy or pebbly beaches. Beautiful verdure clothed the plains and hills, where we constantly saw immense herds of cows, sheep and horses. Those belonging to Santa Cruz meet those, less numerous of San Francisco; so that this long strip of eighteen leagues is but one continual pasture." (Carter, 1940)

8 The Villa de Branciforte was one of three civilian (hence "villa" as opposed to mission) settlements established by the Spanish in Alta California, the other two being San José and Los Angeles. Located on the coastal terrace across the San Lorenzo River from Mission Santa Cruz, the town never received the support it needed from the Spanish government.

9 During the Spanish era, ranchos were lands used by the missions as pasturage for their herds. The boundaries of these tracts of land were generally vague and ill-defined. Later, during the Mexican era, the word rancho came to mean a clearly defined tract of land owned by a private individual.

1.2.4 THE MEXICAN ERA (1822-1848)

Following Mexico's gaining independence from Spain in 1821, Mexican citizens were allowed and even encouraged to apply for land grants on the lands formerly controlled by the missions. However, while Mexican citizens quickly applied for grants in easily-accessible coastal terraces to the east of Santa Cruz, they were slower to move up to the North Coast. By the 1840s there were three Mexican ranchos on the North Coast (Figure 1-1). The effect of the North Coast's isolation can be noted in the fact that the wide, well-watered valley we now call Waddell was not requested as a land grant. Getting to the coastal terrace was just too daunting, even when the land was free.

Rancho Arroyo de la Laguna

This one square league (4,418 acre) rancho was granted to Gil Sanchez in 1840, bounded by Rancho Refugio on the east and Rancho San Vicente on the west. Little is known about Sanchez or his occupation. We can assume that, like the adjacent ranchos, the rancho was used to raise cattle for the hide and tallow trade. The land quickly passed out of Californio (Mexican citizen) ownership in the early 1850s when it was aquired by the Williams brothers. Most of this property was eventually acquired by Jeremiah Respini and became part of the Coast Dairies Property (Clark, 1986).

Rancho San Vicente

This huge grant was originally made to Antonio Rodriquez in 1839, but was regranted to Blas Escamilla in 1846. Since it was laid out after the two neighboring ranchos, the shape has the look of being shoehorned into place between them. The ideal Mexican grant had a proportion of one part cultivatable land, six parts pasture and four parts brush or forest. In those instances where the cultivatable land or pasturage was limited, the grantee was often compensated by being given a greater proportion of brushland or forest. Rancho San Vicente reflects the feeling in Mexican California that brush and forest lands had little value: the cow was king, and by this point in time, livestock had been grazing the terraces for almost 60 years (Clark, 1986).

Rancho Agua Puerca y las Trancas

Bordered on the south by the Rancho San Vicente and the north by Arroyo las Trancas, this 4,422-acre grant went through a series of re-grants until it was finally given to Ramón Rodriguez and Francisco Alviso in 1843. The boundaries wrap around the coastal hills that separate Scotts Creek from the coast, reflecting the desirability of the open pasture land for Mexican Californians (Clark, 1986).

Figure 1-1
North Coast Ranchos

No communities grew up on or near the three land grants, and access to them was such that they do not play a central role in the history of Central California. Just as during the Mission Era, the land was used as pasture, with herds of cattle and sheep grazing across the coastal terrace. Hides and tallow were probably shipped off coastal landings. There is no evidence of any other economic activity on the North Coast prior to 1850.

In 1849, Justo Veytia, a Mexican citizen, set out on horseback for San Francisco via the North Coast. Neither of the local residents (both born near Santa Cruz) accompanying him had ever taken this route before, a testimony to the fact that in the 1840s the route of choice was either over the summit of the Santa Cruz Mountains directly north of Santa Cruz, or out through the Pajaro River gap and then north up the Santa Clara Valley. Passing the bluff at present-day Waddell:

"Two days of this expedition were the most difficult. The second day on the road one has to travel along the beach very close to the water and this can only be done when the tide is low. The day we passed the sea was quite choppy. Neither Arana nor I knew the road so when we went onto the beach we figured it was all right because when a very big wave came up, it only reached the horses' hooves. So we rode on about 300 varas[10], experiencing two very bad spots because of some rocks, when the very rough sea began to wash over us up to the pommel of our saddles. We didn't deliberate in making a decision—to go back was clearly dangerous because the rocks were now under water and we couldn't see the openings between them so we resolved to continue forward to look for some pass where we could go up, for the waves had us pinned against a fairly high cliff. We went on walking for about 200 varas until we found a foot path to ascend and as soon as we were safe we undressed completely to put our clothes to dry because the waves had knocked us down three times, horses and all, so we had to dismount and pull them forcibly. We got out at ten in the morning and as soon as we finished stretching out our clothing and the saddles, we sat down naked on the grass to lunch on the supplies we brought which were now also soup." (Veytia, 1975)

1.2.5 STATEHOOD (1850 – 1900)

The first 50 years of statehood witnessed continued slow and fitful development on the North Coast. Settlers struggled up the coast periodically and tried to carve out their livings, but the isolation made it extremely difficult. Nevertheless, the years immediately following the Gold Rush saw a surge of activity during which any locale which could produce and ship anything useful was brought into the economy. Products were shipped off the "landings." Without a dependable road connection in any direction, the residents of the North Coast had to transfer goods in and out across several stretches of beach, where in fact no ship could actually land, at the mouths of the coastal creeks. These coastal facilities were quite different than those to the east of Santa Cruz, within the relatively sheltered confines of Monterey Bay: the North Coast landings were exposed to the power of the open ocean. Wharves along the North Coast rarely

[10] A Spanish vara was 33 inches.

survived through one winter season, and most shipping was handled using combinations of buoys, winches and cables.

The landings operated with the ebb and flow of economic as well as natural tides. When the prices of commodities were high, such as in the early 1850s when San Francisco began to emerge from the sand dunes and gold dust flowed into that city from the Sierra Nevada, few expenses were spared to operate the North Coast landings. When prices dropped, the landings grew quiet, as during the depression of the mid-1870s when most of them ceased to operate. The North Coast continued to be a wild, rugged, and unforgiving place.

The Shape of Santa Cruz County

When Santa Cruz County was officially established on February 18, 1850, its northern boundary was the headwaters of San Francisquito Creek, many miles north of the troublesome bluff at Waddell. The county included the watersheds of Pescadero Creek and San Gregorio Creek as well as the settlements that had grown up there, such as the town of Pescadero.

The County Road between Pescadero and Santa Cruz

For the North Coast, having county neighbors to the north meant that they were *on the way to somewhere*. As long as Año Nuevo, Pigeon Point, Pescadero and San Gregorio were part of Santa Cruz County, efforts and resources might be expended to improve the run-it-at-low-tide situation at Waddell. Those who lived in Pescadero and wished to use the legal services at the county seat of Santa Cruz were 40 miles of bad road away.

The State of the Road in 1865

An article written in 1865 declared that the county road was a "*great hardship and injustice to the people living at Pescadero and its vicinity*." The writer described it as "*one of the most abominable roads this side of Kamchatka—a road, a portion of the distance must be traveled along the beach which is encompassed by a high bluff upon one side and the foaming billows upon the other…*" (*Pajaro Times* 1/20/1865)

North Coast Land Ownership Patterns

Where the Californios living along the California Coast to the south and east often lived on their Mexican land grants well into the 1870s, the three grantees on the North Coast seemed eager to dispose of their lands and move elsewhere. There were no Californios living on the North Coast by 1860 (Census of 1860). During the early years of statehood, the land that eventually became the Coast Dairies Property passed to newly-arrived settlers. The Aqua Puerca Rancho was bought by James Archibald, a native of Scotland; the San Vicente grant was purchased by Peter Tracy; the Rancho Laguna was bought by the Williams brothers (Clark, 1986).

The optimistic new Americans living in California operated at least four landings, mentioned frequently in the shipping records at the harbor of San Francisco.

Pigeon Point

The northernmost of the four landings was located on the south side of Pigeon Point in present-day San Mateo County. Pigeon Point served people living in the watersheds of Pescadero and Butano Creek as well as on the coastal terrace in the vicinity of Point Año Nuevo. By the early 1870s, the landing had a typical cable and winch system:

"At Pigeon Point there is a semicircular bay, partially sheltered from the northern winds, but the heavy swells rolling in from the southwest prevent any wharves being erected. Out about two hundred yards from the shore is a high monument-like rock, rising to a level with the steep rock bluff which half encloses the bay. From the bluff to the top of this rock stretches a heavy wire cable, kept taut by a capstan. A vessel rounding the reef runs into the sheltered cove under this hawser, and then casts anchor. Slings running down on the hawser are rigged, and her cargo lifted from her deck load by load, run up into the air fifty to one hundred feet, than hauled in shore, and landed upon the top of the bluff…This system is in extensive use along the coast…" (Evans, 1873)

Waddell's Landing

Several efforts were made to provide a shipping point on the south side of Franklin Point to ship the products from the dairies near Point Año Nuevo as well as the lumber and agricultural products from the valley of Waddell Creek. More will be said about this landing in the logging discussion below.

William's Landing

Located at the mouth of Liddell Creek, William's Landing was the most important of the early North Coast Landings. The Williams brothers owned the adjacent Rancho Arroyo de la Laguna and established the landing in the early 1850s (Clark 1986). The landing comprised a large hawser hanging over the water, its ends attached to the cliffs that formed a small cove. Small schooners would attach themselves to the hawser and loads of lime, lumber and agricultural produce would be lowered to the ship in a loading bin suspended from the rope. During the 1850s the harbormaster at San Francisco noted regular shipments from the landing including lumber, firewood and agricultural produce (*Alta* 5/10/1858).

An account published in 1867 provides a good description: *"It assumes quite a business air, on account of several fine roads from the timber region, and limestone quarries, north of the place. This port is the present shipping point of large quantities of lime and leather, tanbark, etc…Shipping is safe and easy, the vessel being moored to a large hawser extending across the estuary, from cliff to cliff."* (*Sentinel* 7/6/1867) William's Landing was not safe, in spite of the *Sentinel's* confident boosterism. On at least two occasions, lives were lost while attempting to load the wildly pitching ships. On July 12, 1857, two crewmen from the schooner *Harrison* drowned when they were knocked out of a small boat by the hawser (*Sentinel* 7/17/58) and in January of 1869, a small lime and lumber schooner named the *A. Crosby* was dashed on the rocks with her entire crew of five lost (*Sentinel*, 1/16/69) .

Davenport's Landing

In the fall of 1867, shore whaler John Pope Davenport[11] moved from Soquel to the small bay at the mouth of Molino Creek and began to build a wharf. A newspaper account in October of 1867 noted Davenport's early success: *"Already three schooners have cleared from the wharf with full freights of lumber, shingles and tanbark.* (*Sentinel* 11/23/1867)

By 1872, Davenport's Landing eclipsed William's Landing to become the primary shipping point on the North Coast, and a small community grew up beside the road that dipped down beside the beach. The landing boasted a hotel, saloon, general store, and blacksmith shop. A surprising variety of goods was shipped from the landing including lumber, posts, pickets, shingles, shakes, lime, tanbark, butter, cheese, dried venison and deer hides (*Sentinel* 9/21/1872).

The small community at Davenport's Landing was destroyed by a fire on April 26, 1913, and though some of the buildings were rebuilt, the town of Davenport that had grown up beside the cement plant took over as the commercial center of the North Coast (*Sentinel* 4/27/1913).

1.2.5.1 EARLY NORTH COAST AGRICULTURE

The dominant agricultural use of the North Coast up to 1900 continued to be livestock production. While the broader, flatter alluvial valleys of the Pajaro, San Lorenzo and Soquel Rivers were transformed from pasture to intensive agriculture (beginning with the potato boom in the early 1850s), the North Coast continued the pastoral tradition that had begun a century earlier. The coast's isolation and dearth of available labor certainly inhibited intensive farming practices, and the majority of the arable land was either of poor quality or too steep to grow anything but grasses or cereal grains.[12]

The North Coast's persistent summertime fog extended the growing season for perennial grasses well into the summer months (see Section 3.1.1), and the green hills above the coastal terrace became one of the Coast's emblematic views. Periodic droughts that often drove Central California's livestock industries into bankruptcy were not as severe here; during the drought of 1862-1864, for example, hundreds of thousands of cattle perished in the Salinas Valley and the adjacent hills. Enterprising North Coast ranchers bought Monterey County cattle for next to nothing and drove them into the hills and terraces of the North Coast, where enough survived to make selling them profitable once the drought ended.

[11] Shore whaling was the practice of hunting whales in thirty-foot whaleboats and then towing the carcass back to shore for processing. John Pope Davenport pioneered the practice on the Pacific Coast in Monterey in 1853 with a crew of Azorean whalers. Davenport moved his whaling operation to Soquel in 1865 and then moved to the landing at the mouth of Agua Puerca Creek. Though some historians have written that he whaled at this last location, there is no evidence to support that contention. He gave his occupation as whaler when interviewed by the census taker in Monterey in 1860, but he responded with the occupation of wharfinger when he was interviewed at the landing in 1870 (Census 1860, 1870; Orlando pers. comm., 2000).

[12] The Project Archives (interviews) contain a discussion of early dry farming and dairying. The pattern of dairies and hay fields described by Frank "Lud" McCrary is probably close to the pattern in the late 1880s. See especially the annotated 1928 aerial in the Project Airphoto Archives for a depiction of early dry farming operations.

The North Coast Dairies

Dairying was a logical next step and a perfect match for the North Coast. The land was still in large enough parcels to support extensive grazing, and grassland was abundant. Perennial streams to support the water requirements for a dairy operation transected the terrace at regular intervals, now an asset at least as much as an obstruction. By the 1850s, what we might call the North Coast Model had developed: herds of cows grazing across the terrace and hills, with a dairy tucked down in each coastal valley, beside the stream and out of the wind. The dairies produced cheese and butter, commodities that could be shipped relatively easily and had a high value by weight. Those dairies close enough to Santa Cruz could transport their butter and cheese to Santa Cruz by wagon, while farther up the coast, it was shipped off Williams' and Davenport's landings.

The Marin County Dairy Connection

In the 1850s Marin County was the primary butter and cheese-producing region for the San Francisco market and many of the pioneer dairymen in Santa Cruz County came from there. Mr. L. K. Baldwin, himself a dairyman who migrated from Marin County, noted in 1879 that the North Coast dairies "are mostly owned by men who have been residents of Marin County, and been engaged in dairying there." (Elliot, 1879) Santa Cruz soon developed a reputation for producing a sweeter butter that commanded higher prices in San Francisco (*Sentinel* 1/4/1871). L. K. Baldwin summed up the reasons that he established his dairy on the North Coast: "*…we find the climate, grass and temperature pretty much the same as Marin, which requires a cool temperature, fresh, breezy air, good sweet grasses, pure water from our numerous springs and streams, and with cleanliness are not excelled in the manufacture of good, sweet butter by any place in the state.*" (Elliott, 1879)

Early Immigrant North Coast Dairymen

Though the majority of these early dairymen may have come from Marin County, they had very diverse immigrant backgrounds. Some, like James Hall, were from originally from New England. James Archibald, the dairyman at Scotts Creek, was from Scotland, and the manuscript census of 1870 lists several from Ireland. One prominent diary operator was Antone Silva (sometimes spelled Silvy), a native of the Azores Islands, Portugal.

Early Swiss on the North Coast

Scattered through the 1870 manuscript census we can find the origins of what later will become the Swiss-dominated dairy industry on the North Coast: John Stauband and Jaques Martin were Swiss-born dairymen, as well as Ambrose Gianone, also listed as working in a North Coast dairy. At that point in time, however, the majority of the Swiss living on the North Coast in the 1870s worked in the lumber industry, and most listed their occupation as woodcutters (Census 1870).

1.2.5.2 EARLY IRRIGATION ON THE NORTH COAST

It took the Spanish several summers in Central California to learn that irrigation was the key to successful intensive agriculture in this land of little or no summer rainfall. Early missions, such as that in the Carmel Valley, were hampered by their inability to get water up onto the mission terraces. Since the Spanish had no pumps, the only way they could water terraces was by bringing water down from above, through ditches and canals. It is not surprising that Father Palou, a veteran of several difficult summers at Carmel, noted the potential for irrigation on Santa Cruz's North Coast. In December 1774, while passing Laguna Creek, he notes: "*We then continued on our way in sight of the beach by a wide plain which skirts the range of hills, all good arable land with fine pasture. In half an hour we crossed an arroyo of more than two bueys of water which flows with the slope of the land. By means of it, it would be easy to water the plain, more than half a league wide, which we passed, and another one as long which reaches from the hills to the cliff on the beach.*" (Priestly, 1937)

Horace Gushee's Laguna Creek Irrigation Project -1873

A century later, in August of 1873, the first major irrigation project was undertaken on Laguna Creek by Horace Gushee. A newspaper reporter attended the picnic marking the opening of the flume:

"*Mr. Gushee invited some fifty friends and neighbors to a picnic on the occasion, and a right jolly good time there was in the pleasant laurel grove on the creek, about a half mile above the crossing. We attended early, so as to angle for trout before the company arrived. On starting up the creek, trout bit freely and the water was cloudy and running at full force; but when half through the cañon, the water suddenly diminished about one-half in quantity and force, so that we knew the creek had been tapped; the gorge is very narrow and extremely rocky, yet we made good time, climbing over huge boulders and around hanging cliffs until the open stream was reached, and the flume was visible, hanging above us on the eastern hill-side like a golden thread, wove by some fairy-wand in a single night. We proceeded up to a short distance below the dam, and then left the creek and started back down the flume—a distance of two and one-half miles to the present end of the ditch. The flume was brimful of pure, clear, sparkling water, rolling in gladsome volume, as if hurrying to reach the termination, where its invigorating and fertilizing effects would be brought into requisition, and utility appreciated. We followed the flume—which is staunch and strong—alternately walking on it and in the side-path, until we reached the first piece of ditch, where a break occurred, which let one-half the water out; hence the flume and ditch winds around the head of a steep cañon to the hillside, opposite Butler's old residence, where it strikes across the divide and to its termination, to be distributed over some 200 acres of land by numerous branches.*

A portion of the water will be conducted to the dairy-house, and thence over another large field of over 200 acres, below the house.

It is the intention of the proprietor to grow alfalfa, sugar beets, carrots, corn, etc, for stock and at seasonable times, irrigate the land so as to furnish green food for his dairy cows. The flume, with a six-inch head, takes out of the stream 144 square inches of water, which is about one-half the creek's supply at this season of the year. The enterprise is a new feature in Santa Cruz county, and if successful, will add materially to the value of agriculture and dairy lands along the coast. Mr. Gushee has already spent about $5,000 in ditching and fluming, and calculates to run small ditches in various directions to water stock and irrigate the land." (*Sentinel* 8/9/1873)

A North Coast Irrigation Rush - 1873

Within a month several other North Coast landowners were planning to follow Gushee's example:

"*We are informed that the plan adopted for irrigating the coast land, by Mr. Horace Gushee and Claus Spreckles* [sic][13] *is working an entire change in the diary business along the coast. Every dairyman along the many streams which drain the western slope of the Santa Cruz range,* [is] *preparing to flume or ditch the banks of the stream to lead the water out over the table land for household purposes. Mr. J.P. Laird, will, during the coming Winter and Spring, flume the San Bicente* [Vicente] *creek, and others up the coast are talking of similar enterprises. At Gushee's ranch south of the Laguna creek, a fine opportunity is offered of the advantages of irrigation, for grazing purposes. Where heretofore, in this season of the year, everything was dry as powder, now the soil is moist and covered with a luxuriant growth of vegetation, nearly a foot high. The stock of milkers are grazing it, and the return is more than double in milk, butter and cheese, than that from the dry uplands. About 200 acres are irrigated and next year as much more will be brought within the scope of the zanzas or irrigation ditches, and small distributing flumes. Alfalfa will be sown on the sandy soil below the road, and all over the sea-coast plateau below the road. The burr clover, alfilera* [newsprint is smudged] *and other native clovers and grasses do well, but are not so permanent and durable, in food or production as the alfalfa or Chili clover. Timothy, (or herd's grass) red clover, Kentucky, blue grass and sweet vernal grass will also be tried, as an experiment, and if found successful with irrigation will be adopted. There are at least twenty-five streams along the coast south of Waddell's creek, to the Pajaro, inclusive, that might be utilized with their tributaries for irrigation purposes….Mr. Gushee's farm is more valuable, since irrigated, by a third. Mr. Laird estimates that his land would be improved in value one-half, if he had now the waste water flowing into the sea through the San Bicente creek, to irrigate his land with."* (*Sentinel* 10/4/1873)

[13] Claus Spreckels had just purchased most of the Aptos Rancho and was laying out an extensive farming operation there, east of present-day Aptos.

1.2.5.3 EARLY NORTH COAST LOGGING

North Coast Logging Potential

The most prominent products stacked on the landings awaiting shipment during these early years were lumber, pickets, posts, shakes, shingles, tanbark[14] and firewood. The terraces that faced the ocean may have been treeless, but around the first bend of each of the coastal streams, hidden from the desiccating effects of the salt air, were groves of stunted coast redwoods. And with each succeeding bend in the canyon, the trees grew larger and the groves more pronounced until, in the upper reaches of streams on the west flank of Ben Lomond Mountain, stood some of the most valuable timber stands in all of Santa Cruz County. Lumbermen marveled at the logging potential, but, from the 1850s into the 1880s, they did not have the technology to get the logs or lumber out of the canyons and out to market. None of the North Coast streams had a volume of water sufficient to carry logs down to the landing (as was practiced on the coast of California north of the Golden Gate), so the logs either had to be skidded down using oxen, or processed where they fell. The best the lumbermen could do was fell the redwoods closest to the landings and split them on site, carrying the posts, pickets or shakes out to the landing on mules or wagons. These “split-stuff” operations were episodic, blooming when the price of lumber was high, and wilting when the price dropped and the statewide economy was depressed. Because Marin County could get redwood lumber to San Francisco markets more cheaply, the North Coast timber industry remained relatively dormant until the end of the nineteenth century (see Photo 1-1).

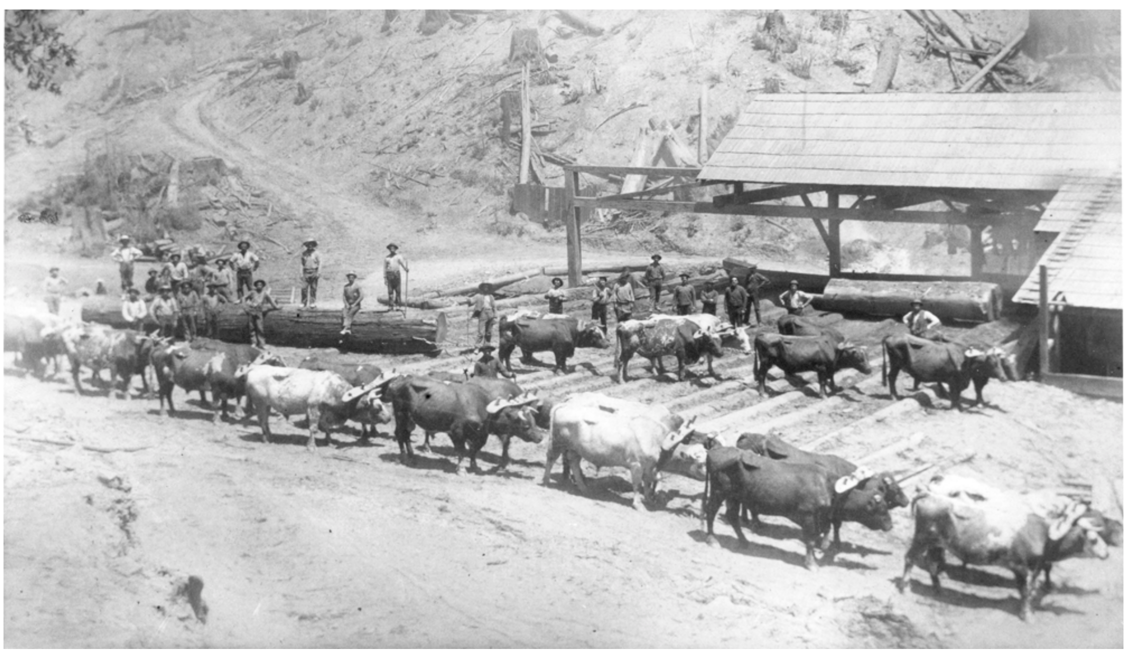
Courtesy Frank “Lud” McCrary

Photo 1-1: Grovers Mill on Laguna Creek. Date Unknown, ca. 1880

[14] The bark from the tanoak tree was the source of tannin for the early tanning industry in California. The trees were felled, the bark peeled from the logs and shipped off the landings. See Lud McCrary Interview, Appendix 1.2.1.

William Waddell's Mill and Landing

The major exception to the primtive aspects of North Coast logging was the construction of a steam sawmill in 1862 by William Waddell on the stream that eventually bore his name. Blessed with a stand of timber "more extensive and compact" than any other on the North Coast, Waddell built his sawmill about two miles inland, and then brought the finished lumber down on small railroad cars that rode on wooden rails (*Sentinel* 4/16/1864).

Waddell built a series of wharves near the mouth of the creek off which to ship his lumber, but the ocean always succeeded in turning them into kindling. The most successful method for off-loading lumber continued to be the system of winching it out to ships anchored offshore. An unfortunate encounter with a grizzly bear in October of 1875 permanently interrupted Waddell's operation.

1.2.5.4 THE EARLY LIME INDUSTRY

The other early industry, one that will have a direct bearing on the Coast Dairies story, involved the huge limestone deposits that underlay most of Ben Lomond Mountain. Isaac E. Davis and Albion P. Jordan developed those deposits closest to Santa Cruz beginning as early as 1849. As the local newspaper noted in 1856, "*The supply of lime rock is inexhaustible of the blue, grey and crystallized varieties; in most localities where the rock is found, the land is covered with timber, to be used in burning*" (*Sentinel* 7/26/1856).

Early Santa Cruz Lime Kilns

The limestone was heated ("burned") in high-heat kilns and the resultant lime was packed in barrels and sold throughout the West to make mortar and whitewash. Since the limestone deposits were located uphill from Santa Cruz, it was a relatively easy downhill trip for the heavy barrels of lime. A wharf was built where present-day Bay Street in the City of Santa Cruz intersects the coastal bluff, and a steep wharf extended into the Bay specifically for the shipment of lime. Davis and Jordan had a virtual monopoly on the state's lime industry and were able to control prices by restraining production. By 1870, the dollar value of lime shipped out of Santa Cruz was higher than any other commodity, even lumber (*Sentinel* 1/22/1870).

North Coast Lime

As it had with the lumber industry, the North Coast's isolation and lack of dependable shipping restrained the development of the lime industry. It had two of the necessary ingredients—limestone and forests—but it lacked the access to market enjoyed by the lime operators at Santa Cruz. There were several efforts made in the 1860s to ship lime off the landings at Williams, Davenport's and Waddell's, but they were usually brief and only marginally successful.

San Vicente Lime Company

Perhaps the most successful lime operation, and a harbinger for the later story of cement, was the establishment of the San Vicente Lime Company in June of 1875. The company built four lime kilns inland on San Vicente Creek and built a new, thousand-foot long wharf at Davenport's Landing. They planned to ship the barrels of lime on the coastal steamer *San Vicente* (*Sentinel* 6/19/1875). During the month of September, the lime company shipped over 4,000 barrels of lime from their new wharf, and the business appeared to be off and running (*Sentinel* 10/9/1875). In early October, however, as it had with all previous wharves along the North Coast, high waves shortened it by over 300 feet. With its wharf truncated by the sea and the economy in the grip of a serious depression, the company ceased operation (*Sentinel* 10/16/1875). The huge limestone deposits on the North Coast remained undeveloped, awaiting the arrival of dependable transportation.

1.2.5.5 NORTH COAST SHORE WHALING

The only documented shore whaling station on the North Coast was located just north of the landing apparatus at Pigeon Point. As noted earlier, there is no evidence that anyone ever whaled from the vicinity of Davenport's Landing or processed any whales on that beach.

Pigeon Point Whaling Station (1862 – 1900)

By the early 1860s, the Monterey shore whaling scene had become so crowded that two Azorean[15] whaling companies decided to move, one to Point Lobos (on Carmel Bay) in 1862 and a second to Pigeon Point[16] in 1864 (*Gazette* 9/23/1864). The whales were hunted for their oil, which was acquired by boiling the blubber in huge kettles, called trypots, set up on shore. Once the blubber was removed from the carcass, the remaining meat and bones were discarded, much to the delight of the grizzly bears living in the nearby mountains. Since California shore whaling was pursued only for whale oil, when the price of oil began to drop (following the advent of kerosene in the 1860s) the industry became less and less profitable. Even when the price of whale oil was at its highest, the Azoreans only saw the dangerous business as a part-time occupation. At Pigeon Point, as in the Azores, the whalers were half-time whalers and half-time farmers (Santos, 1995).

The shore whaling industry in Central California ended in the late 1880s, but not because of a dearth of whales. Within a season, the whales, who had been migrating well off the coast, moved their route back, and by 1890 they were cavorting in Monterey Bay in full view of the retired whalemen. A Monterey newspaper complained, *"Whales have been so thick in the bay of late as to make fishing exceedingly hazardous. They come into the bay about dusk and pursue the mackerel all night long, much to the detriment of the fishing industry."* (*Cypress* 8/9/1890)

[15] Though the Azores Island were part of Portugal and emigrants from there were technically Portuguese, they preferred (and continue) to be called Azoreans (Santos, 1995).
[16] Pigeon Point was named for the clipper ship *Carrier Pigeon* that wrecked there in 1853 (*Alta* 6/10/1853).

In the late 1890s, for reasons not yet understood, the shore whaling industry revived for a couple of seasons, and the Pigeon Point Whaling station followed suit: *"The Pigeon Point Whaling Co. have been making some fine hauls of their immense game lately. They captured several fine whales within a few weeks, chiefly 'California greys.' The boys are much encouraged at the prospect of a very profitable season."* (*Surf* 2/4/1898) Despite whalers' successes at Pigeon Point and elsewhere, by 1900 the old-fashioned shore whaling industry on the California coast was at an end. As the twentieth century dawned more modern methods were used to pursue a dwindling supply, and they supported a struggling industry elsewhere on the Central Coast until 1924 (Lydon, 1984).

Though no whaling ever occurred at present-day Davenport, the increasing popularity of whale-watching in the 1970s led to the town's adoption of a whaling motif. The large whale-shaped Davenport sign on the west side of the highway and the name "Whale City" that adorns the bakery and tavern in the center of town continue to be a cherished emblem of whaling at this spot.

1.2.5.6 EARLY NORTH COAST TOURISM

Isolation as an Asset

The very isolation that frustrated the development of the North Coast's forests and limestone deposits made it attractive to those seeking a place to camp, fish or hunt. In the 1860s a growing number of factories and mills lined the San Lorenzo River, and the stream became increasingly diverted, dammed and flumed. With the pollution caused by dumping effluent and sawdust directly into the river, it is easy to understand the decline in recreational potential on the San Lorenzo and nearby Soquel. Meanwhile, the North Coast streams continued to be relatively unspoiled.

San Vicente Creek

An article written in 1866 placed San Vicente Creek at the top of the county's streams:

"The best [trout fishing] stream probably, is the San Beicente [San Vicente], ten miles up the coast, a large creek emptying into the sea. In this stream, trout bite as rapid and as strong as in Eastern streams, and [are] even more abundant and delicious. The largest trout caught (by Mr. Begelow, the insurance agent), being over 22 inches long and weighing about four pounds. In this stream the largest average from ten to fifteen inches." (*Sentinel* 1/13/1866)

Laguna Creek

In a lengthy article meant to be a guide to the camping and fishing spots in the county, a trout season-opening article written in April, 1874 touted Laguna Creek:

"Probably the best known fishing and camping ground [in Santa Cruz County] is Laguna Creek, situated about nine miles up the coast…The beauty and attractiveness of this spot, the scenery and surroundings alone are sufficient without its fishing advantages to call forth a visit from all strangers. There are but few who visit Santa Cruz but also explore Laguna Creek. Starting, say two or three miles back from the coast and following the creek down to its mouth, ending in the lagoon, a day's fishing would probably give to the experienced angler from ***one hundred and fifty to two hundred trout****.* [emphasis added] *The trout, though very plenty [sic] in this stream, are not as large as in many of our other streams. Experienced anglers, however, prefer these smaller fish to the larger, being sweeter and daintier to the taste. Salmon trout, very large, are also frequently caught at Laguna Creek.* (*Sentinel* 4/4/1874)

"Trout Slaughtering"

Since there were neither limits on size or number of fish taken, the numbers of trout taken from the streams was often astonishing. The year 1891 was a tough one for North Coast trout. An article published in early June noted: *"Messrs. Tom Dakan and Rob Dudley whipped the San Vicente for trout Sunday with immense results. Eight hundred and fifty is the record they are willing to make their affidavit on, and all caught with a hook."* (*Surf* 6/2/1891) Later in June, 1891: *"Chas. B. Richardson drove a merry party to Scotts Creek Saturday and the trout slaughtering was a great one. Here it is, beginning at the largest catch.."* The article then listed a total of 1,516 fish taken between seven anglers with one named "Bootsie" taking 675 (*Surf* 6/30/1891).

Some North Coast residents didn't bother with the niceties of hook and line. As the fish populations began to decline, local Fish Patrol wardens [17]stepped up their efforts to stop the wholesale depopulation of local streams. A San Francisco newspaper noted in 1891 that, along the North Coast there was an "unpleasant state of affairs": *"The Portuguese, who live within close proximity to the streams, have been slaughtering young grilse by the thousands and salting them down for their own use. The law-breakers use giant-powder cartridges and seines which reach from bank to bank, thus preventing any possibility of the fish ascending the stream."* (*Surf* 10/5/1891)

Organizations to Foster Trout Planting and Habitat – 1875

From the early 1850s, trout fishing was a popular attraction to bring visitors to Santa Cruz County, and, as the streams became heavily encumbered with factories and mills, and fishing pressure increased, many saw the need for restocking the county's streams. In the late 1870s, an organization named "The Santa Cruz Organization for the Propagation and Protection of Fish" was formed. The organization was committed to helping catch game law violators as well as encouraging the stocking of local streams. In 1878 10,000 trout were brought in from a state hatchery and planted throughout the county. Described as the "McCloud River variety of trout" the fry were two months old and approximately one inch long (*Sentinel* 4/20/1878). A plant of

[17] The California State Fish Commission was established in 1870 and, as the Fish and Game Commission, began to hire wardens in 1878. The warden in Santa Cruz County reported to the county Board of Supervisors.

1,250 pounds of "Eastern trout fry" was made throughout the county in 1892, again under the auspices of a local fishing club (*Surf* 4/20/1892) (see Appendix 1.2.2, interview with Tom and Richard Dietz, for a description of hunting and fishing in the 1920s-50s).

1.2.5.7 NORTH COAST ABALONE

The two primary consumers of abalone—Native Americans and otters—were all but removed from the Central California coastline by the late 1840s, and the Yankees who came into California with the Gold Rush considered them to be nothing more than very large, inedible snails. For the Chinese, however, the mollusks were a delicacy, and they knew how to dry them for shipment across the Pacific. The California coast must have looked like heaven to a fisherman coming from the heavily fished Chinese coast, and they were the first to harvest abalone commercially in California. Using pry-bars, wedge-tipped poles and gaffs, the Chinese worked the intertidal zone (the Chinese never dove for abalone in California), gathered abalone, dried and baled the meat and shipped it to Chinese markets in San Francisco and across the Pacific. The shells were sold to button and jewelry manufacturers, and oftentimes they brought higher prices, per weight, than the meat (Lydon, 1985).

In the 1880s, harvesters and consumers began to change. John Carpy, the owner of a Santa Cruz seafood restaurant obtained a secret recipe "from an old Spanish woman at Monterey" which made the abalone meat "soft and tender." Carpy was reluctant to divulge the secret, but said that he was not only cooking and selling them in Santa Cruz, but also shipping abalone prepared with his "secret" to restaurants in San Francisco (*Surf* 11/10/1883).

Carpy was getting most of his abalone from the North Coast, which had heretofore been largely unexploited. An account in 1894: *"On Sunday a party of abalone gatherers drove into town* [Santa Cruz] *with an immense wagon load of abalones, which they had gathered some thirteen miles up the coast. They had 118 in all. They are gathered for the San Francisco market."* (*Surf* 1/2/1894) By 1898, the mollusk was evolving into a "toothsome univalve": *"Tom Amaya was on the streets* [of Santa Cruz] *today with a wagon load of abalones. These toothsome univalves, once so plentiful near Santa Cruz, have been 'hunted' out until a successful gatherer must now go some distance along the coast. Amaya's load was the result of a two day's trip as far as Pigeon Point."*(*Surf* 1/6/1898) In 1901: *"The extreme low tide yesterday afforded mussel and abalone gatherers to reap a large harvest. Perhaps the most successful in the latter line were Joe Perry and George Bowes who brought down two wagon loads gathered from the rocks near the Yellow Bank." The abalones were monsters in size and found a ready market."* (*Surf* 1/2/1901)

"Abalone Tides"

All three of the above occurred during January when the lowest tides occur on the North Coast. Low tides were locally known as "abalone tides" as they were most often associated with gathering abalone (Photo 1-2).

Courtesy Hulda Hoover McLean

Photo 1-2: Abalone Tide. Date Unknown

China Ladder

The Chinese presence on the terrace north of Davenport's Landing was persistent enough to name a local access point for them, and local Davenport residents remember a ladder leaning up against the coastal bluff down which Chinese abalone hunters climbed to have access to the isolated intertidal rocks. Donald Clark gives the following explanation for the name: *"The name applied to an access point along the shore of the Pacific about one-half mile southeast of Pelican Rock. On top of the bluff was a shack in which lived several Chinese, who obtained abalone from the rocks below and dried them for the Chinese trade. From the bluff they followed a trail, then down a rope, and finally a ladder to reach the beach."* (Hoover, 1966) *"The beach at the foot of China Ladder was known as China Ladder Beach, and the nearby gulch became known as China Ladder Gulch."* (Clark, 1986)

Japanese Abalone Divers and Hard-Hat Diving in Central California

In 1898, a group of Japanese immigrants imported the technique of hard hat diving to Point Lobos just south of Monterey. Since the Chinese had not ventured any deeper than they could reach with a pole at low tide, the abalone beds beyond that depth were virtually untouched. At first the Japanese fishermen dried the abalone as had their Chinese predecessors, shipping the dried meat back to Japan. But the Japanese soon added a modern cannery to their operation at

Point Lobos, and the canned product began appearing in local stores. As the business grew, the Japanese divers expanded their range, venturing ever-farther south along the California Coast, following the path that the Chinese intertidal gatherers had laid down decades earlier. (Lydon, 1997).

The Japanese immigrants not only inherited and modernized the abalone industry pioneered by their Chinese predecessors, they also fell heir to the anti-Asian racism that characterized so much of California's history. From their entry into the abalone business, the Japanese and their techniques became the targets of both county and state regulations. Between 1899 and 1939, the Japanese divers worked within an ever-tightening net of rules and regulations. By imposing minimum diving depths and closed areas, the Japanese were driven south down the coast from Monterey and deeper into the water.[18]

Meanwhile, increasing pressure was being brought on the abalone resource by non-Japanese abalone hunters. Several marine biologists argued that it was not the Japanese divers who were decimating the resource, but the "sportsmen" who used extremely low tides to harvest their huge catches. In January of 1912, for example, we have the following note in the local newspaper: *"A wagon piled high with abalones was on the street today. In it were a part of 800 of these shellfish that were gathered by Joe Fritz and L. Kelly at New Years Point."* (*Surf* 1/4/1912) In 1940 the leading abalone biologist in California noted that the disappearance of the abalone from the intertidal area should be laid at the feet of the sport fishermen, not the commercial divers (Bonnot, 1940). Following their forced internment during World War II, the Japanese did not return to the abalone industry.

1.2.5.8 DEVELOPMENT OF NORTH COAST WATER RESOURCES – THE 1890S

Water for the City

Beginning in the early 1850s, Frederick Augustus Hihn supplied water to Santa Cruz through his private water system, the Santa Cruz Water Company. The two main sources of water were the springs above the site of Santa Cruz Mission and upper Branciforte Creek. A second private system was developed on Majors Creek in the early 1880s and managed locally by W.H. Duke. In the mid-1880s the Duke system collapsed financially, and the City of Santa Cruz, seeking an alternative to the Hihn monopoly, began efforts to acquire the system. They waited too long, however, and Hihn bought the system before the city could act. In response, Santa Cruz then decided to develop its own water system. In 1889, after investigating the potential of a number of coastal streams (including Branciforte Creek, Carbonero Creek, and Majors Creek), the city decided that Laguna Creek had the greatest potential (*Surf* 9/17/1889; 9/18/1889; 12/7/1889).

Construction of the city's Laguna Creek water system began in the spring of 1890 and was completed in December of that year. A dam was constructed on the creek and a ten-mile water main, 14 inches in diameter, carried the water to a 60,000,000-gallon reservoir located above the

[18] For a complete list of the regulations, see Lydon, 1997, p. 85.

city on High Street. The system was able to deliver water at ninety pounds pressure at its hydrants on Cooper Street in downtown Santa Cruz (*Surf* 9/30/1890; 10/17/1890).

Big Creek Power – 1896

With their municipal water system in place, the City of Santa Cruz began to look for electric power, along with almost every other California municipality: *"In the 1890-1900 decade, the fever of hydroelectric development was sweeping California. Men everywhere were looking for sites where water could be dropped from higher elevations to drive wheels and turbines at streamside."* (Coleman 1952) In 1895 the transmission of hydroelectricity over a long distance was proven possible by the opening of an electric system between generators at Folsom and the City of Sacramento 22 miles away (Coleman, 1952). The Folsom system inspired others throughout the state to build similar systems, and not surprisingly, Santa Cruz leaders began looking toward the North Coast.

In 1896, Duncan MacPherson, the editor of the Santa Cruz *Sentinel*, urged the city to investigate the possibility of using Horace Gushee's irrigation dam on Laguna Creek to form the basis for a city-owned hydroelectric facility. Once again the city was outrun by an entrepreneur. Fred Swanton went farther up the coast to the Scotts Creek watershed, surveyed the hydroelectric potential of Big Creek, and in what he later claimed was a record fifty-eight working days, constructed a hydroelectric system from scratch. On June 12, 1896, the falling waters of Big Creek drove a generator that pushed electricity seventeen miles to Santa Cruz for a huge, public party in front of the Odd Fellows building on Pacific Avenue (*Surf* 6/13/1896). *Surf* Editor Arthur Taylor expressed mixed feelings about the system, recognizing the price that the creek had to pay for the power:

"*The stream known as Big Creek which empties into the ocean about twenty miles up the coast is one of the largest streams in the county and flows through a most picturesque and romantic canyon. It has been a favorite trout stream since American occupation of California, barring the obstruction of three falls, one 90 feet, one of 60 feet and one of 250 feet. Many an angler has questioned the wisdom of placing these obstructions in a good trout stream where distance, declivities and boulders combined to render them inaccessible to sightseers, but this is all solved now for we know that those falls are what has made the Bgt Creek Electric Light and Power Company's scheme a success."*(*Surf* 6/10/1896) (see Photo 1-3)

During the first two years, Big Creek power was off as often as it was on. Swanton and his engineers could not have timed their hydroelectric venture at a less opportune moment, as the seasons of 1897-1898 and 1898-1899 saw less than half of the typical rainfall. By the second year of the drought, the flow in Big Creek no longer had sufficient volume to drive the generator and Swanton had to purchase a steam generating plant and install it to supplement the hydroelectric equipment (*Surf* 12/21/1898). Meanwhile, the persistent wind and salt air of the North Coast played havoc with the transmission line into Santa Cruz. In 1900, when he was approached by several investors who wished to purchase the company, Swanton was ready to sell. The new owners refurbished the dams and flumes and re-routed the transmission line by running

Courtesy Frank "Lud" McCrary

Photo 1-3: Big Creek Powerhouse with Steam Generation Equipment ca. Late 1890s

it directly over the mountain to Ben Lomond and then down along the San Lorenzo River into Santa Cruz. (*Surf* 2/6/1900). Other improvements were made and the power plant continued to provide electricity through the 1930s. The wildfire in September of 1948 destroyed a considerable part of the flume work and dams, and the last owners (Coast Counties Gas and Electric) did not replace them. The power plant site is still marked on the current USGS. quadrangle.

1.3 THE COMING OF COAST DAIRIES: TRANSFORMATION

One afternoon in April, 1901, Louis Moretti and Jeremiah Respini shook hands at the Santa Cruz County courthouse, a defining moment for the Coast Dairies Property. The signing of the incorporation papers for the Coast Dairies & Land Co. formalized a relationship that had existed for a number of years. The corporation not only combined the considerable real estate owned by Louis Moretti and Jeremiah Respini, but it also had a liberating effect on the entrepreneurial energies in the two men. The words "dairies" and "land" suggest something bucolic: cows grazing lazily across the coastal hills being tended by patient, hardworking dairymen. There continued to be dairies on the property, of course, but the cows were soon sidelined by a surge in industrial enterprise. By the end of the first decade of the twentieth century the natural resources of the North Coast were unlocked and the peace and quiet replaced with the growl and whine of crushers, saws and steam locomotives (see Figure 1-2).

1.3.1 NORTH COAST BITUMIN MINING AND THE OIL RUSH OF 1901

Since the 1860s, geologists had been confidently predicting that there was oil on the North Coast. The early years were dominated by miners and engineers trying to extract oil from the black asphaltum that oozed from the surface of the earth just north of Majors Creek on Rancho Refugio. Using retorts to heat and distill the oil from the mixture of oil and sand, a series of oil companies worked unsuccessfully to make the process pay (*Sentinel* 5/28/1864). It was much easier to mine the asphaltum material and use it for paving, a practice that began in the early 1880s. By 1887, many of the primary streets in Santa Cruz had been paved with the black material, and sixty tons per day were being taken out of the surface mines:

"The material is found in enormous quantities in the section commonly known as the 'petroleum district' from eight to ten miles up the coast from [Santa Cruz]*, where it exists in stratas of from four to forty feet in thickness, to an extent not yet explored. There are abundant outcroppings over an area of about two miles. The rock quarried thus far has been taken from…the upper canyon of the Cajo or Majors creek, but last spring good indications were discovered near the ocean shore, along the same canyon on the property of Pio Scaroni*[19]." (*Sentinel* 10/6/1887) In 1889 the company shipped 300 tons from the North Coast mine to Seattle (*Sentinel* 2/14/1889). As with all North Coast resources, however, it was a continual challenge to get the bitumin to market. In the early 1890s a bitumin mine near San Luis Obispo could get their product to San Jose cheaper than the mine on the North Coast (*Sentinel* 11/9/1891). The bitumin was waiting for a railroad.

The first glimmer of the North Coast's transformation came in the opening months of 1901, when a gaggle of geologists began poking around the coastal terrace looking for oil. Logic suggested that, if oil-bearing sands emerged from the earth at that spot, there had to be pools of oil lurking underground somewhere in the vicinity. Spurred by reports of large oil deposits found throughout California and even larger fortunes earned by lucky investors, oil-drilling rigs popped up almost overnight throughout Santa Cruz County. The Santa Cruz Oil Company, funded by local investors led by the indefatigable Fred Swanton, negotiated a lease with a number of North Coast property owners (including Jeremiah Respini), and began drilling on the Scaroni property, very near the bitumin beds. Other companies quickly followed, and soon there were daily reports published in the Santa Cruz newspapers giving well depths and the cheerful predictions of the geologists.

[19] Swiss-born Pio Scaroni established a dairy on part of the Rancho Refugio, just south of Laguna Creek, in 1868 (Clark, 1986). He and his descendants owned and lived on the property until 1998, when the property was sold to become part of Wilder Ranch State Park.

INSERT FIGURE 1-2
THE NORTH COAST-THE MODERN PERIOD
(11 x 17 color page 1)

INSERT FIGURE 1-2
THE NORTH COAST-THE MODERN PERIOD
(11 x 17 color page 2)

Oil was found in some of the wells, but it was measured in buckets, not the barrels necessary to make the operations profitable. By early 1902, the *Santa Cruz Surf* said that the oil boom seemed to be busted" (*Surf* 1/8/1902). The Santa Cruz Oil Company ceased drilling on the North Coast and the leases ran out. But the miners continued to work the bitumin pits just as they had since the 1860s, loading the heavy dark rock into wagons and hauling it to Santa Cruz for shipment.

1.3.2 PORTLAND CEMENT

Lime and limestone-derived products usually led Santa Cruz County's annual list of industrial production throughout the nineteenth century, and the phrase "Santa Cruz lime" was known and respected throughout California .(*Sentinel* 10/15/1870) Most of the production was controlled by the company owned by Henry Cowell, with its kilns on the hill above Santa Cruz and its long, sloped wharf extending off the cliff just west of town. Other companies tapped into the limestone on both flanks of Ben Lomond Mountain (including several companies on the North Coast), but Cowell had the singular advantage over his competitors of easy access to a dependable wharf and outside markets.

One of the lime-based products that grew increasingly valuable as the twentieth century began was Portland cement. Construction using brick and mortar (lime was used in making mortar) was giving way to concrete, in which the main ingredient was cement. Portland cement was made by burning a combination of limestone and shale, and then grinding the result into a fine powder. Ben Lomond Mountain had both ingredients in abundance, and at least one Portland cement operation had been operating off and on about a mile upstream on the San Lorenzo River since the early 1880s.

Where lime could be produced using a relatively simple technology—all that was needed was limestone, a kiln, lots of firewood, and strong men—Portland cement required some sophisticated equipment to get the proper combinations of ingredients heated to exacting temperatures. In Santa Cruz County, capital was the only factor missing from the equation, but it arrived in 1903 in the satchel of William Dingee, commonly known as the "Cement King." Dingee, through his Standard Portland Cement Company, owned cement plants in Napa California, Bellingham, Washington, and Pennsylvania. He saw the potential offered by Ben Lomond Mountain and proposed to build a cement plant on the brow of the hill just above Santa Cruz.

The debate that raged in Santa Cruz over Dingee's cement plant proposal has a very contemporary feel to it. Some, like the editor of the *Santa Cruz Sentinel*, argued that the plant would bring dependable economic benefits to the community. With the redwood forests fast being turned into lumber, the cement plant could provide a stable economic base for years to come. Others, however, were fearful of the impact that the plant would have on the town's air and ears. Arthur Taylor, the Editor of the *Daily Surf*, suggested that the plant could very well ruin the quality of life in the town. By 1904, it appeared that Dingee might not get the necessary support from the Santa Cruz Town Council.

Meanwhile, Dingee and Louis Moretti of Coast Dairies & Land Company had been talking. It is not clear whether Moretti approached Dingee or vice versa, but by early 1905 there were rumors flying in Santa Cruz that Dingee was moving his proposed cement plant from noisy and contentious Santa Cruz to the isolated canyons of the North Coast. In May of that year, Taylor's *Surf* reported that Dingee had optioned 130 acres of Coast Dairies land on the north side of the mouth of San Vicente Creek for a factory. By moving the plant up to the North Coast, however, Dingee was leaving behind the necessary access to transportation afforded by Santa Cruz's wharves and railroads. Dingee's stated plan was to ship cement off a new wharf at Davenport's Landing, but Taylor hinted that there was something else in the offing: "*While independent shipping facilities will be provided, it is a moral certainty that if a cement factory is established a coast railroad will be constructed…*"(*Surf* 5/6/1905)

1.3.3 SOUTHERN PACIFIC RAILROAD

Apparently Dingee had been talking to a lot of people, including the leadership of the Southern Pacific Railroad (SPRR). Several weeks later, SPRR announced that it would be extending its line northward from Santa Cruz to San Francisco along the coast. In reality, as railroad historians have noted, the Southern Pacific had no intention of building all the way to San Francisco. Their goal was to build a twelve-mile line that would end at the cement plant. The freight generated by the cement plant would be enough to support its construction (Hamman, 1980).

The Ocean Shore Electric Railway

Meanwhile, in early 1905 and totally unrelated to the cement plant planned for the North Coast, a group of investors incorporated the Ocean Shore Electric Railway and began surveying for a railroad to run along the coast between San Francisco and Santa Cruz. Their plan was to begin at both ends and work toward the middle, planning to meet somewhere in San Mateo County. As originally planned, it was to be an electric-powered railroad and would have two sets of tracks. The Ocean Shore Electric was born on paper on May 18, 1905. At the beginning of 1905, the North Coast had no railroads, but within six months it had the prospects of two, with *three* sets of track (Wagner, 1974).

The thought of the fledgling Ocean Shore competing side-by-side with the gargantuan, state-controlling, infamously ruthless Southern Pacific was daunting, but very early on the two railroads reached a moderately cooperative arrangement. The Ocean Shore was the first to begin construction northward out of Santa Cruz, but it had to bring its equipment in over Southern Pacific track. The two companies decided to lay their tracks side by side with the Ocean Shore taking the outer (ocean) side of the right of way and the SPRR the inner. Since there were to be three sets of tracks, the original right of way and the cuts and fills[20] were much wider than usual.

[20] Cutting and filling was the process used by railroad and highway builders to achieve a level grade by digging a channel into a hill and pushing the loose material into the next depression to build it up. The resulting cavity through which the railroad or automobile runs is known as the cut, while the filled in area in the depression is known as the fill.

The Ocean Shore was the first on the ground and could take advantage of any of the freight being generated by the construction of the cement plant beside the San Vicente. However, the Ocean Shore also knew that, once its rival had completed laying their own track, they would lose all the cement plant freight and would have to depend on the revenues generated from daily traffic between San Francisco and Santa Cruz.

Construction of the Ocean Shore Electric Railway

While the Ocean Shore waited for materials to arrive, they leap-frogged a large crew of laborers up to Waddell Creek and blasted a railroad grade across the base of the historically pesky bluff: "*The Ocean Shore engineers, with audacity and dynamite, are doing in a few days what Nature has been lazily working at for ages. In other words, they are blasting down the bluff to make a clear grade for railway and highway at this hitherto perilous place*." (*Surf* 6/15/1905) Their reason for racing up to Waddell's was designed to block the Southern Pacific (or anyone else) from getting past that point without drilling a tunnel. They also purchased rights-of-way and made immediate cuts at other rocky points farther up the coast, San Gregorio Bluff and Mussel Rock Bluffs. The Ocean Shore believed that "[their] *control of these places makes it absolutely necessary for a competing line to resort to tunneling to get past these places, requiring approximately four miles of tunnel in a distance of fifty (50) miles of road."*(*Surf* 10/2/1907) Meanwhile, the railroad had to deal with the very issue they intended to solve: getting the necessary lumber delivered ahead of their northward march out of Santa Cruz. By August of 1905 large loads of Douglas fir poles were being loaded off ships and rafted to North Coast beaches and the trestle building began.

The Ocean Shore Trestles

The plan was to build the trestles across the gullies and lagoons and then fill them in with rock and earth. "*All these trestles except the one just beyond Wilder's are to be filled and must be filled before heavy trains can pass over them. This work is on joint account between the two companies, and the embankments, when complete will be 36 feet wide at the top, capable of accommodating three tracks*." (*Surf* 2/3/1906) Material taken from the cuts was loaded into special side-dumping gondolas and then dumped off the top of the trestles. The result was a string of huge earth-and-rock ramparts each one containing a reinforcing wooden structure as its heart (see Photo 1-4 and Photos 14, 15, and 16 in Appendix 1.3 for a depiction of the sequence of trestle filling).

CourtesyCovello and Covello, Santa Cruz

Photo 1-4: Filling the Trestle South of Davenport, View to the North to Davenport and the Cement Plant

The Ocean Shore Stream Tunnels

Rather than direct each stream through a culvert beneath the trestle, the railroad engineers chose to cut tunnels through the rock on the north side of each of the canyons. The engineers picked the north side of the canyons because they knew that the littoral drift on the coast was from north to south, and the tunnel mouths were much less likely to be filled with sand if they were on the "uphill" side of the beach drift. Further, each tunnel was drilled so that it emptied out a little above the land on the ocean side to insure that seasonal high sand levels did not block it. The pattern holds throughout the Coast Dairies Property: at each trestle fill there is a tunnel through the rock on the north side of the ravine.

One contemporary observer, Arthur Taylor of the *Surf* newspaper, was uncertain of the effectiveness of the tunnels, and in a remarkable article written in 1906, he expressed his skepticism: "*Tunnels have been excavated in the solid rock walls of the canyon into which the running streams will be conveyed as fast as the fills are complete. The Old Settler shakes his head when he looks at these holes in the wall, but the Civil Engineer says they are of capacity to carry all the water that can come. Time will tell.*" (*Surf* 2/3/1906)

Now, almost a century later, after repeated earthquakes and floods, the tunnels continue to gather the upstream water and deposit it on north side of each cove.

The Legacy: The Railroad Ramparts

The effect of these huge earthen walls on the coastal landscape was, and continues to be, dramatic. Because they were built with a 36 foot width at the top, their bulk is such that when one is standing on them, they appear as if they had been leveled out of the existing landscape.

When viewed from the ocean side, the ramparts make the coast appear as one continuous, level wall. Each of the beaches along the rampart is backed by a huge, steep, smooth-faced slope. Some, like the fill that crosses behind the San Vicente beach, still exhibit their unconsolidated heritage by confronting the hiker with an unclimable bank of scree. Since the fill slopes are too steep to walk, pedestrians have cut trails down to the beaches on the natural bluff faces, and many of them are precarious and rugged.

The effect on the landward side of the ramparts is even more dramatic. Standing at stream-level one cannot see the ocean at all, and the wall blocks the prevailing-onshore wind as well as the late afternoon sun. More importantly for the residents of the North Coast, the railroad fills blocked access to the beaches and lagoons, and since the original coast road looped in and out on the landward side of the railroad line, the residents in each of the coastal valleys were cut off from the immediate coast.

Even when the coast road was straightened and leveled with its own cuts and fills beginning in the late 1930s, the highway grade was below that of the railroad so that each time Highway 1 drops down into one of the valleys, there is a wall on the ocean side blocking any view of the beach. The tradition of hidden "secret" beaches is one of the railroad's legacies, with "clothing optional" beaches and homeless encampments dotting this coastline, effectively screened off from the highway by the walls of earth built by the Ocean Shore Railroad. It is possible to regularly drive along this coast and never know there are beaches at San Vicente, Liddell, Yellowbank or Laguna.

Editor Taylor of the *Surf* was particularly distressed with the effect of the railroad fill at Laguna Creek. Laguna was famous in the nineteenth century for a large stand of California laurel trees that grew upstream from its coastal lagoon, and many early accounts extol the virtues of the place as a picnic ground. Taylor expressed distress at what the railroad did to the grove: "*Laguna, grown sacred as a shrine of summer rest and joy to thousands has been cut in twain by a trestle, which will soon become a solid embankment hiding the ocean and shutting off the heavens from the remaining part of the grove.*" (*Surf* 2/3/1906) Laguna continued to be the social center for the North Coast community and even today, there are picnics in the laurel groves inland from the railroad line. And there are still several old, gnarled laurels on the ocean side of the rampart, their bark etched with initials and carvings that may date to those days before the railroad came marching inexorably through.

Taylor saved his strongest words for the effect of the railroad and the burgeoning cement plant on San Vicente Creek. San Vicente had been the crown jewel of Santa Cruz County's trout fishing streams, always listed first in comparison to the San Lorenzo and Soquel with their industrially-fouled waters. In 1906 the San Vicente was showing the effects of being launched into the Industrial Age: "*The San Vicente Creek, beloved of the angler and the artist, has its mouth stopped by a vast dyke, and its throat choked into a tunnel, a saloon on its border, and its bed for miles denuded of the granite cobbles and sand beds. A sawmill is swiftly cutting out the timber and dirt and debris defile the pools and clog the riffles where lurked the gamey trout.*" (*Surf* 2/02/1906)

Comparisons

Because there were no trestle-fill ramparts on the immediate coast north of Davenport, there are two beaches within the Coast Dairies Property that provide comparisons with the railroad rampart beaches. The beach at Davenport Landing was visible and accessible from the old coast road and only disappeared from view when the highway was straightened in the 1950s. Scotts Creek Beach is visible and accessible to the public because the modern highway drops down onto the sand itself. Both of these beaches are well known to the public and heavily used.

The Railroad Cuts

A word must be said about the cuts through which the present-day railroad makes its way between Santa Cruz and Davenport. By any measure, they are huge. From base to base they still measure around 30 feet, reflecting the original plan to have three sets of broad gauge rails run through them. Between 1907 and 1923, when both the Southern Pacific and Ocean Shore operated along the coast, there were two sets of rails in operation, but now the Union Pacific's rails are centered in the cuts, running on a raised platform of gravel ballast. From all appearances, the width of the cuts and the raised tracks are relatively easy to maintain. What few landslides have occurred in the cuts have fallen harmlessly at their base, well away from the tracks themselves.

Effects on Fishing

After 1906 the fish that had migrated freely up and down the streams were channeled through tunnels and in some places confronted with new obstructions that they could not surmount. By default, after 1906, rampartless Scotts Creek became an extremely important North Coast stream, a fact that was recognized by the State Fish and Game Commission when it declared the lower section a fish refuge. Scotts Creek's importance as a center of fish propagation on the North Coast is yet another legacy of railroad landscaping down the coast.

In a remarkable description written in early 1906, Arthur Taylor wrote of the immediate effects that the Ocean Shore's cuts and fills were having on the North Coast: *"Enterprise has outraged Nature until the human heart must bleed in sympathy with her prostrate, mangled form. The fields where once the grain waved, the kine fed and the poppies spread over the uncultivated corners, are seamed and scarred and gashed; huge embankments as high as tree tops stretch across the canyons where they debouch into the ocean; and the coastwise brooks have all been ruthlessly taken out of their beds and driven through dark, gruesome tunnels. The alluring byroads and by-paths that led from the coast road across the fields to the Natural Bridge and its nearby beach, to Parson's beach to the little pebbly beach and the other cozy nooks along the shore have all been severed by strips of steel or gouged out by that cruel steam shovel."* (*Surf* 2/3/1906)

Hundreds of laborers worked into the fall of 1905, and when the railroad's first locomotive arrived in October, the movement of materials and men to the railhead went much more quickly. Heavy rains in early 1906 slowed the work, but it was the earthquake on April 18 that captured everybody's attention.

The 1906 Earthquake

The early morning earthquake on April 18 interrupted all the North Coast construction projects. The Southern Pacific lost not only its corporate offices in San Francisco, but also suffered extensive damage along its Central California routes. Perhaps the most daunting was the blockage of the huge tunnel through the Santa Cruz Mountains on its South Pacific Coast branch line. It would take the railroad three years to re-open that section to traffic. With all the other challenges facing the Southern Pacific, the North Coast branch to San Vicente was delayed.

The effect on the stretch of Ocean Shore working toward the cement plant site north of Santa Cruz was minimal. There was some settling of the trestle fill just south of Laguna, but as one observer noted, the earthquake combined with the previous heavy rains probably accelerated the settling process all along the line. Since the Southern Pacific had not yet begun to build northward from Santa Cruz, the Ocean Shore immediately resumed work because of the promise of a temporary monopoly.

Work on the segment of the Ocean Shore building south from San Francisco halted for a time after April 18, and the earthquake would eventually prove to be fatal to the plans of the Ocean Shore's two-track electric railroad from San Francisco to Santa Cruz. The Ocean Shore's investors were never able to recover from the effects of the earthquake and its aftermath, economic recession of 1907. Ultimately the deeper pockets of the Southern Pacific corporation would prevail.

The first passenger train from Santa Cruz to San Vicente ran on June 15, 1906 just two months after the earthquake. Taylor described the day: *"There was an odor of new-mown hay in the atmosphere, poppies spattered the wayside with their daytime starts, and the uplands were just commencing to show a tinge of the brown of the dry season, and the ocean lay alongside all the way—placid, without a murmur or even a monotone that could be heard a hundred yards. The locomotive still attracts the attention of cattle up the coast, and many horses resent its appearance…"*(*Surf* 6/15/1906) In less than twelve months the Ocean Shore railroad had built twelve miles of improbable track and bed, spanning gulches, cutting down hills and leveling out Father Crespí's "tiresome" North Coast. Regular passenger service did not begin until the summer of 1907, but during the intervening year the Ocean Shore locomotives hauled equipment and building materials to the cement plant that was rising alongside the San Vicente. Two immediate effects of the Ocean Shore railroad were an increase in the value of real estate all along its completed and proposed route, as well as an estimated 20 percent increase in land being used for agriculture.

The Ocean Shore's monopoly on railroad traffic between Santa Cruz and San Vicente ended when the Southern Pacific completed its rails and began passenger service in July, 1907. With their hopes to build the railroad through to San Francisco still in place, the Ocean Shore was not overly concerned about losing the cement plant revenue. However, as the recession of 1907 deepened, and it became increasingly obvious that the railroad might never be completed, the Ocean Shore began to search for another source of paying freight to help support the cost of the branch north of Santa Cruz.

The Ocean Shore began working northward from San Vicente in October 1906, and to avoid a long trestle across the mouth of Scotts Creek, the railroad chose a route that followed the old coast road, running inland across Molino Creek and up the east side of Scotts Creek Valley. In October of 1907 the three-mile section between San Vicente and the junction of Scott and Little Creek was completed, and the construction crews departed for other projects while the railroad attempted to gather together enough funds to continue northward towards Waddell (*Surf*, 10/24/1906; 5/20/1907; 10/2/1907). One of the objectives of the Ocean Shore, were it completed between San Francisco and Santa Cruz, was to open the huge old-growth forests on the western slope of the Santa Cruz Mountains. The railroad estimated that over two billion board feet of lumber was standing in the canyons between San Francisco and San Vicente with over 700 million board feet in the watersheds of Waddell Creek, Scotts Creek, and the San Vicente (Wagner, 1974). Even if the railroad was not pushed northward beyond Scotts Creek, it was in a position to haul logs or lumber out of those canyons.

1.3.4 THE CEMENT PLANT AND THE QUARRY RAILROAD

Meanwhile, as the Ocean Shore was building its railroad to the San Vicente, the cement plant was rising on the treeless terrace. Using horses and an army of laborers, the San Francisco construction company of Healy and Tibbits leveled the site. The camp for the construction company was in the valley of the San Vicente upstream from the proposed Ocean Shore Railroad grade. Hauling granite from the creekbed and sand from the beach, the company made cement to build the factory. During a visit in February of 1906 Taylor described the rising cement factory "*a scene of extended walls, open arches and massive battlements* [that] *reminded one of pictures of ancient ruined cities*." (*Surf* 2/3/1906)

The 1906 earthquake may have been a problem for the Ocean Shore line, but it accelerated the demand for concrete construction. Brick and mortar construction was rendered unacceptable by the earthquake, and wooden buildings by subsequent fires, driving most architects toward what became known as "fireproof" concrete construction. Dingee and his associates worked toward the completion of the cement plant secure in the knowledge that there would be a strong market for Portland cement (see Photo 1-5, and Photos 3 through 11, Appendix 1.3). By the end of 1906, the plant was ready to begin limited operation, and six months later was producing 3,000 barrels of cement per day (*Surf* 8/14/1907).

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Courtesy RMC Pacific Materials, Davenport

Photo 1-5: Construction of the Santa Cruz Portland Cement Plant, View to the East, 1905

If the work the Ocean Shore Railroad was doing with its trestles and fills along the coast was impressive, the broad gauge railroad laid up the San Vicente Canyon to the limestone quarry site was almost equally so. The "snake-like" railroad was cut into three miles of the north wall of the canyon. The grade required almost continual blasting, and in one impressive instance, rocks thrown by an 8,000-pound blast landed over three miles away from the explosion. The cement company built eight trestles to bridge side canyons along the way, with one 300 feet long and 137 feet above the canyon floor (see Photo 1-6) (*Surf* 12/11/1905).

The tough, dangerous work was done mostly by crews of Greek laborers brought in by Healy and Tibbits just for that purpose. Several hundred Greeks cut the road into the canyon wall undertaking what one official termed "the hardest class of work"(*Surf* 9/23/05). The San Vicente gave up the railroad grade grudgingly, and injuries to the workers were a daily occurrence. Boulders crushed arms and legs and there was a steady stream of injured men taken into Santa Cruz for care. Confronted with what, to them, were unpronounceable Greek names, the newspapers often reported the injuries simply by giving the number that the man wore on his overalls: *"Two Greeks injured by falling rocks. Greek No. 573 and Greek No. 25, employed at the Santa Cruz Portland cement quarry, were treated lately by Dr. P.T. Phillips for injuries received by falling rocks. These Greeks all have numbers, a brass tag around their necks distinguishing them. No 573 received the most severe injury and had his leg badly cut open and No. 25 had his collar bone broken."* (*Surf* 12/2/1907)

Photo 1-6: Construction of the Santa Cruz Portland Cement Company's Trestle No. 1, 1905

Simultaneously with all of the other construction, the quarry was opened and a huge rock crusher installed to knock the limestone and shale down to a uniform size. The stone was then hauled down to the cement plant on the railroad to be processed. Another large crew of Greeks worked in the quarry, and a small town named Bella Vista was built downstream from the quarry to house the workers. Arthur Taylor visited the town in 1910: *"The quarrymen's boarding house perches against the cliff like a swallow's nest under the eaves. It is stable-like in appearance, but as moss grows on the decaying log, sentiment clings to the human heart, and amid these desolate surroundings the Greek grub house is blazoned with the name of 'Bella Vista Hotel."* (S*urf* 8/1/1910) The irony of having a town with an Italian name housing Greek workers was not lost on Arthur Taylor.

1.3.5 THE ROLE OF COAST DAIRIES – THE COMPANY TOWN OF SAN VICENTE

Casual visitors often assume that the company town that grew up south of the cement plant belonged to the cement company, but it did not. Bella Vista and San Vicente, as well as all the supporting infrastructure for the cement operation, were owned and managed by Coast Dairies & Land Co. The Standard Portland Cement Company made cement; Coast Dairies did everything else.

The isolation that Dingee needed for his noisy, dusty industrial creation meant that all of those working on the plant and later employed in it would have to live nearby. In 1905, when the construction on the plant began, there was nothing nearby save the small community at Davenport Landing. So, under the guidance of Coast Dairies manager Louis Moretti, a town grew up on the slope between the cement plant and San Vicente Creek. Since most of the workers were single men, the main feature of the little town was its hotels. Eventually there were two hotels to house the workers, along with buildings to house the other businesses necessary to support the men. By 1908, the town had two hotels, a general store (known as the "cash store"), a post office, butcher shop, barber shop, blacksmith shop, livery stable, public hall and public school. The businesses were either managed directly by Moretti or fellow Swiss or Italian immigrants. Initially called San Vicente (or San Vicente-by-the-sea) in 1905 to distinguish the town from Davenport's Landing just up the coast, the town soon came to be known simply as Davenport, a name that everyone used by 1908.

In 1909, to provide the cement plant managers a place for their families to live that was away from the predominantly male culture of Davenport, Coast Dairies & Land Company laid out a small sixteen lot town on the north side of the factory. Skeptics also noted that the little subdivision was upwind from the cement plant and thus suffered less cement dustfall than the larger town to the south. Originally called Morettiville in honor of the manager of Coast Dairies, the town eventually came to be known as the "New Town" to distinguish it from the older Davenport, and today it has been shortened to NewTown (Clark, 1986; Orlando pers. comm., 2000).

The Coast Dairies & Land Co.

During the early decades of the twentieth century, the company continued to operate five distinct dairies on their property, with an aggregate total of about 800 cattle. The progressive impulses that the company exhibited in its relationship with the cement plant were also evident in the dairy business. In 1902 they opened a direct-to-the-consumer retail outlet in downtown Santa Cruz with the most modern equipment fully visible through windows facing Pacific Avenue. However, selling butter and cheese in San Francisco supported the bulk of their business, and the completion of the Ocean Shore Railroad brought convenient transportation for their products (although "convenient" in North Coast terms meant via Santa Cruz). The company also raised hay and other farm products, in addition to renting the groves at Laguna and Liddell for picnics.

1.3.6 THE LAST EXTRACTION: THE SAN VICENTE LUMBER COMPANY

The cement plant, quarry and attendant railroad weren't quite enough to satisfy the turn-of-the-century entrepreneurial spirit, and there is still one more industrial story line to emerge from events early in the twentieth century. In the late 1890s, the Santa Cruz Lime Company purchased approximately 7,500 acres immediately upstream on the San Vicente from the land owned by Louis Moretti. The company then built and operated a lime kiln on the San Vicente and freighted their finished product down the creek and over to the old Davenport Landing. Not long after purchasing the site for their cement plant from Coast Dairies, the Standard Portland Cement Company purchased the entire property and kiln operation from Santa Cruz Lime, and it was there (adjacent to the current Coast Dairies Property) that they then established the limestone quarry for the cement plant (*Surf* 8/15/1906). William Dingee was not in the lumber business, however, and in 1907 he sold the timber rights (but not the land itself) to a group of Mormon lumbermen from Salt Lake City. By the spring of 1908 the group was incorporated as the San Vicente Lumber Company and had purchased a total of 16,000 acres of timber rights in the upper San Vicente and Scotts Creek drainages (Hamman, 1980).

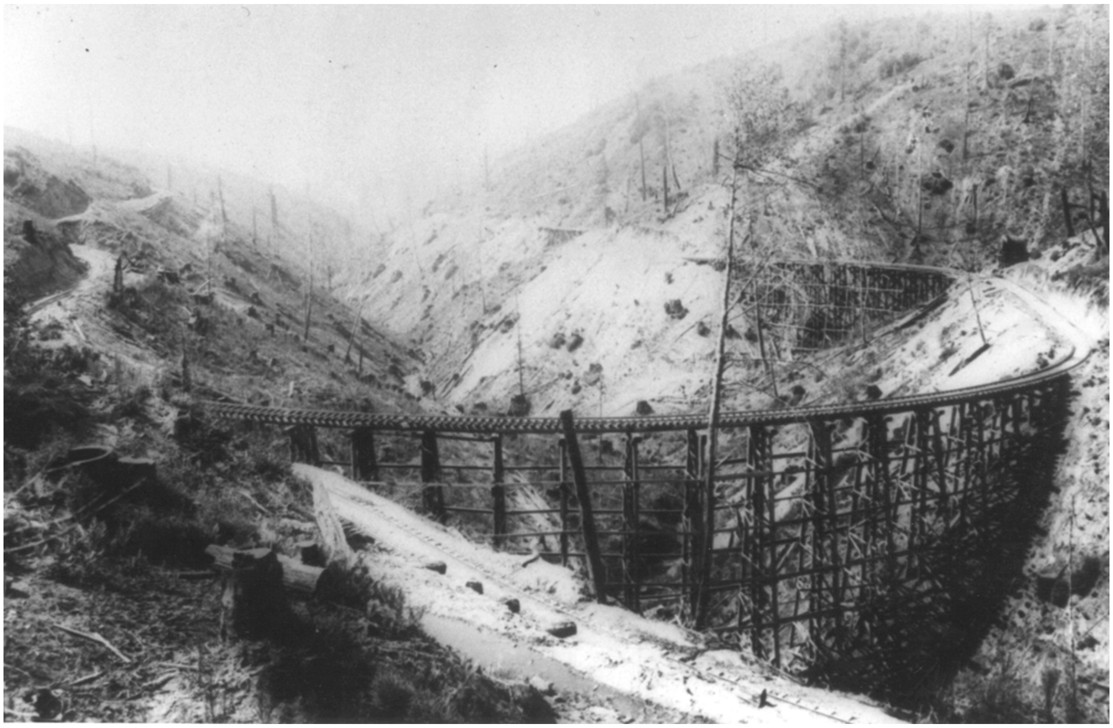
Blocked by the cement plant limestone quarry from access to the upper San Vicente, the San Vicente Lumber Co. used the Scotts Creek-Little Creek drainages as their access, coming around to the timber from the northwest. The company then decided to locate their mill on the northern edge of Santa Cruz beside Moore's Creek, and after some wrangling with the town council they received the necessary permission and began building the largest lumber mill in the history of the county. The mill had a daily capacity of 70,000 board feet. Moore's Creek was dammed to create their millpond (today's Antonelli's pond).

Over the next 14 years, the San Vicente Lumber Company built over nine miles of broad gauge railroad into the mountains behind Davenport, felled the trees and brought the logs down to their Santa Cruz mill on the Ocean Shore Railroad. The grades and switchbacks that enabled the San Vicente railroad to achieve 1,400-foot elevation rise were breathtaking, and would be even in 2001. In some places the railroad grade reached eight percent. Since the winter rainfall on that side of Ben Lomond Mountain could be prodigious at times, few of the long, spider-web trestles were ever filled in. It has been estimated that the San Vicente Lumber Company cut over 400 million board feet of lumber before it ceased operations in 1923 (Hamman, 1980). Several other timber operations worked smaller areas during this time, including the Loma Prieta Lumber Company that started a relatively small operation on Mill Creek in 1907. Since the Loma Prieta had a mill on site, they shipped finished lumber out on the Ocean Shore Railroad, while the San Vicente shipped raw logs (*Surf* 1/14/1907) (see Photo 1-7).

1.3.7 SANTA CRUZ NEEDS MORE WATER

The dry winters of 1897-1898 and 1898-1899, plus increased silt build up in Santa Cruz's Laguna Creek water system, compelled the city to undertake a series of studies between 1903 and 1912 to find an alternative or supplemental source of water.

Arthur Taylor, whose observations we have quoted before, was something of an amateur hydrologist and over the years he explored a number of North Coast streams and reported about those explorations in his newspaper, the *Surf*. In 1903 he wrote a series of articles describing the shortcomings of the Laguna Creek system. In one article he told of standing above the Laguna Dam and looking upstream: *"From this point there is little timber in sight above the dam on the Laguna and for some distance, half a mile or more the canyon is quite broad and open. Beyond the canyon sides rise from fifty to two hundred feet above the bed of the brook and are tolerably*



Courtesy Frank "Lud "McCrary

Photo 1-7: San Vicente Logging Company

well covered by second growth redwood and pine, with about the average amount of shrubbery.." (*Surf* 11/10/1903) The upstream logging had taken its toll on the ability of Laguna Creek to provide water to the city system:

"There is very little tall timber left on any part of the Laguna, but the channel of the stream is choked and filled in many places with huge masses of debris, left by the lumbermen and the woodchopper, and which in times of high water has floated down stream and lodged at convenient and inconvenient spots. Fire has swept over much of this, and in other places the redwood timber is lying in the bed of the brook and slowly decaying...The site of the old Grover Sawmill, is a sorry sight. There is a mass of badly burned, broken, tangled timbers, and a huge pile of sawdust still left by the bank, gradually decaying and percolating into the stream. From the mill site coastward the fall is more rapid, the banks crowd each closely, and big boulders, clog the channel..." (*Surf* 11/16/1903)

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The Ocean Shore's monopoly on railroad traffic between Santa Cruz and San Vicente ended when the Southern Pacific completed its rails and began passenger service in July, 1907. With their hopes to build the railroad through to San Francisco still in place, the Ocean Shore was not overly concerned about losing the cement plant revenue. However, as the recession of 1907 deepened, and it became increasingly obvious that the railroad might never be completed, the Ocean Shore began to search for another source of paying freight to help support the cost of the branch north of Santa Cruz.

The Ocean Shore began working northward from San Vicente in October 1906, and to avoid a long trestle across the mouth of Scotts Creek, the railroad chose a route that followed the old coast road, running inland across Molino Creek and up the east side of Scotts Creek Valley. In October of 1907 the three-mile section between San Vicente and the junction of Scott and Little Creek was completed, and the construction crews departed for other projects while the railroad attempted to gather together enough funds to continue northward towards Waddell (*Surf*, 10/24/1906; 5/20/1907; 10/2/1907). One of the objectives of the Ocean Shore, were it completed between San Francisco and Santa Cruz, was to open the huge old-growth forests on the western slope of the Santa Cruz Mountains. The railroad estimated that over two billion board feet of lumber was standing in the canyons between San Francisco and San Vicente with over 700 million board feet in the watersheds of Waddell Creek, Scotts Creek, and the San Vicente (Wagner, 1974). Even if the railroad was not pushed northward beyond Scotts Creek, it was in a position to haul logs or lumber out of those canyons.

1.3.4 THE CEMENT PLANT AND THE QUARRY RAILROAD

Meanwhile, as the Ocean Shore was building its railroad to the San Vicente, the cement plant was rising on the treeless terrace. Using horses and an army of laborers, the San Francisco construction company of Healy and Tibbits leveled the site. The camp for the construction company was in the valley of the San Vicente upstream from the proposed Ocean Shore Railroad grade. Hauling granite from the creekbed and sand from the beach, the company made cement to build the factory. During a visit in February of 1906 Taylor described the rising cement factory "*a scene of extended walls, open arches and massive battlements* [that] *reminded one of pictures of ancient ruined cities*." (*Surf* 2/3/1906)

The 1906 earthquake may have been a problem for the Ocean Shore line, but it accelerated the demand for concrete construction. Brick and mortar construction was rendered unacceptable by the earthquake, and wooden buildings by subsequent fires, driving most architects toward what became known as "fireproof" concrete construction. Dingee and his associates worked toward the completion of the cement plant secure in the knowledge that there would be a strong market for Portland cement (see Photo 1-5, and Photos 3 through 11, Appendix 1.3). By the end of 1906, the plant was ready to begin limited operation, and six months later was producing 3,000 barrels of cement per day (*Surf* 8/14/1907).

Courtesy RMC Pacific Materials, Davenport

Photo 1-5: Construction of the Santa Cruz Portland Cement Plant, View to the East, 1905

If the work the Ocean Shore Railroad was doing with its trestles and fills along the coast was impressive, the broad gauge railroad laid up the San Vicente Canyon to the limestone quarry site was almost equally so. The "snake-like" railroad was cut into three miles of the north wall of the canyon. The grade required almost continual blasting, and in one impressive instance, rocks thrown by an 8,000-pound blast landed over three miles away from the explosion. The cement company built eight trestles to bridge side canyons along the way, with one 300 feet long and 137 feet above the canyon floor (see Photo 1-6) (*Surf* 12/11/1905).

The tough, dangerous work was done mostly by crews of Greek laborers brought in by Healy and Tibbits just for that purpose. Several hundred Greeks cut the road into the canyon wall undertaking what one official termed "the hardest class of work"(*Surf* 9/23/05). The San Vicente gave up the railroad grade grudgingly, and injuries to the workers were a daily occurrence. Boulders crushed arms and legs and there was a steady stream of injured men taken into Santa Cruz for care. Confronted with what, to them, were unpronounceable Greek names, the newspapers often reported the injuries simply by giving the number that the man wore on his overalls: "*Two Greeks injured by falling rocks. Greek No. 573 and Greek No. 25, employed at the Santa Cruz Portland cement quarry, were treated lately by Dr. P.T. Phillips for injuries received by falling rocks. These Greeks all have numbers, a brass tag around their necks distinguishing them. No 573 received the most severe injury and had his leg badly cut open and No. 25 had his collar bone broken.*" (*Surf* 12/2/1907)

Courtesy RMC Pacific Materials, Davenport

Photo 1-6: Construction of the Santa Cruz Portland Cement Company's Trestle No. 1, 1905

Simultaneously with all of the other construction, the quarry was opened and a huge rock crusher installed to knock the limestone and shale down to a uniform size. The stone was then hauled down to the cement plant on the railroad to be processed. Another large crew of Greeks worked in the quarry, and a small town named Bella Vista was built downstream from the quarry to house the workers. Arthur Taylor visited the town in 1910: *"The quarrymen's boarding house perches against the cliff like a swallow's nest under the eaves. It is stable-like in appearance, but as moss grows on the decaying log, sentiment clings to the human heart, and amid these desolate surroundings the Greek grub house is blazoned with the name of 'Bella Vista Hotel."* (S*urf* 8/1/1910) The irony of having a town with an Italian name housing Greek workers was not lost on Arthur Taylor.

1.3.5 THE ROLE OF COAST DAIRIES – THE COMPANY TOWN OF SAN VICENTE

Casual visitors often assume that the company town that grew up south of the cement plant belonged to the cement company, but it did not. Bella Vista and San Vicente, as well as all the supporting infrastructure for the cement operation, were owned and managed by Coast Dairies & Land Co. The Standard Portland Cement Company made cement; Coast Dairies did everything else.

The isolation that Dingee needed for his noisy, dusty industrial creation meant that all of those working on the plant and later employed in it would have to live nearby. In 1905, when the construction on the plant began, there was nothing nearby save the small community at Davenport Landing. So, under the guidance of Coast Dairies manager Louis Moretti, a town grew up on the slope between the cement plant and San Vicente Creek. Since most of the workers were single men, the main feature of the little town was its hotels. Eventually there were two hotels to house the workers, along with buildings to house the other businesses necessary to support the men. By 1908, the town had two hotels, a general store (known as the “cash store”), a post office, butcher shop, barber shop, blacksmith shop, livery stable, public hall and public school. The businesses were either managed directly by Moretti or fellow Swiss or Italian immigrants. Initially called San Vicente (or San Vicente-by-the-sea) in 1905 to distinguish the town from Davenport’s Landing just up the coast, the town soon came to be known simply as Davenport, a name that everyone used by 1908.

In 1909, to provide the cement plant managers a place for their families to live that was away from the predominantly male culture of Davenport, Coast Dairies & Land Company laid out a small sixteen lot town on the north side of the factory. Skeptics also noted that the little subdivision was upwind from the cement plant and thus suffered less cement dustfall than the larger town to the south. Originally called Morettiville in honor of the manager of Coast Dairies, the town eventually came to be known as the “New Town” to distinguish it from the older Davenport, and today it has been shortened to NewTown (Clark, 1986; Orlando pers. comm., 2000).

The Coast Dairies & Land Co.

During the early decades of the twentieth century, the company continued to operate five distinct dairies on their property, with an aggregate total of about 800 cattle. The progressive impulses that the company exhibited in its relationship with the cement plant were also evident in the dairy business. In 1902 they opened a direct-to-the-consumer retail outlet in downtown Santa Cruz with the most modern equipment fully visible through windows facing Pacific Avenue. However, selling butter and cheese in San Francisco supported the bulk of their business, and the completion of the Ocean Shore Railroad brought convenient transportation for their products (although “convenient” in North Coast terms meant via Santa Cruz). The company also raised hay and other farm products, in addition to renting the groves at Laguna and Liddell for picnics.

1.3.6 THE LAST EXTRACTION: THE SAN VICENTE LUMBER COMPANY

The cement plant, quarry and attendant railroad weren’t quite enough to satisfy the turn-of-the-century entrepreneurial spirit, and there is still one more industrial story line to emerge from events early in the twentieth century. In the late 1890s, the Santa Cruz Lime Company purchased approximately 7,500 acres immediately upstream on the San Vicente from the land owned by Louis Moretti. The company then built and operated a lime kiln on the San Vicente and freighted their finished product down the creek and over to the old Davenport Landing. Not long after purchasing the site for their cement plant from Coast Dairies, the Standard Portland Cement Company purchased the entire property and kiln operation from Santa Cruz Lime, and it was there (adjacent to the current Coast Dairies Property) that they then established the limestone quarry for the cement plant (*Surf* 8/15/1906). William Dingee was not in the lumber business, however, and in 1907 he sold the timber rights (but not the land itself) to a group of Mormon lumbermen from Salt Lake City. By the spring of 1908 the group was incorporated as the San Vicente Lumber Company and had purchased a total of 16,000 acres of timber rights in the upper San Vicente and Scotts Creek drainages (Hamman, 1980).

Blocked by the cement plant limestone quarry from access to the upper San Vicente, the San Vicente Lumber Co. used the Scotts Creek-Little Creek drainages as their access, coming around to the timber from the northwest. The company then decided to locate their mill on the northern edge of Santa Cruz beside Moore's Creek, and after some wrangling with the town council they received the necessary permission and began building the largest lumber mill in the history of the county. The mill had a daily capacity of 70,000 board feet. Moore's Creek was dammed to create their millpond (today's Antonelli's pond).

Over the next 14 years, the San Vicente Lumber Company built over nine miles of broad gauge railroad into the mountains behind Davenport, felled the trees and brought the logs down to their Santa Cruz mill on the Ocean Shore Railroad. The grades and switchbacks that enabled the San Vicente railroad to achieve 1,400-foot elevation rise were breathtaking, and would be even in 2001. In some places the railroad grade reached eight percent. Since the winter rainfall on that side of Ben Lomond Mountain could be prodigious at times, few of the long, spider-web trestles were ever filled in. It has been estimated that the San Vicente Lumber Company cut over 400 million board feet of lumber before it ceased operations in 1923 (Hamman, 1980). Several other timber operations worked smaller areas during this time, including the Loma Prieta Lumber Company that started a relatively small operation on Mill Creek in 1907. Since the Loma Prieta had a mill on site, they shipped finished lumber out on the Ocean Shore Railroad, while the San Vicente shipped raw logs (*Surf* 1/14/1907) (see Photo 1-7).

1.3.7 SANTA CRUZ NEEDS MORE WATER

The dry winters of 1897-1898 and 1898-1899, plus increased silt build up in Santa Cruz's Laguna Creek water system, compelled the city to undertake a series of studies between 1903 and 1912 to find an alternative or supplemental source of water.

Arthur Taylor, whose observations we have quoted before, was something of an amateur hydrologist and over the years he explored a number of North Coast streams and reported about those explorations in his newspaper, the *Surf*. In 1903 he wrote a series of articles describing the shortcomings of the Laguna Creek system. In one article he told of standing above the Laguna Dam and looking upstream: *"From this point there is little timber in sight above the dam on the Laguna and for some distance, half a mile or more the canyon is quite broad and open. Beyond the canyon sides rise from fifty to two hundred feet above the bed of the brook and are tolerably*

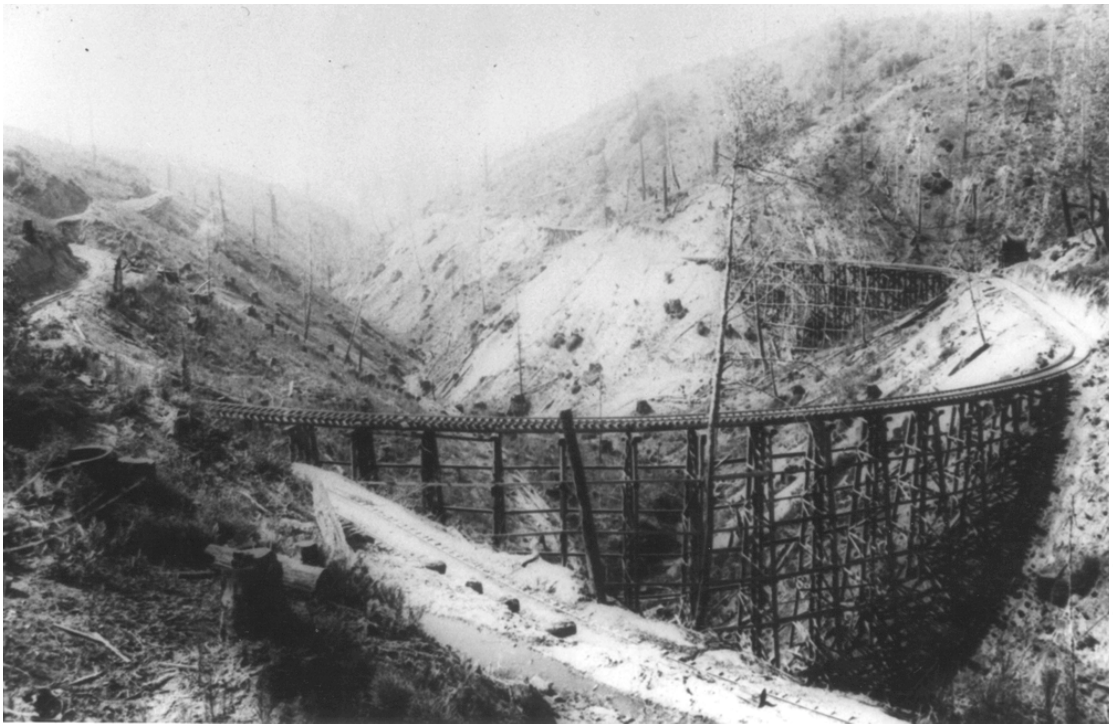

Photo 1-7: San Vicente Logging Company

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Photo 1-8: Davenport, with a Coating of Cement Dust, The Chapel Stands in the Right Background, 1965

By 1920 the shareholders of the Coast Dairies & Land Company were all back in Switzerland, and the property was being managed by local employees of the corporation. The departure of the Coast Dairies leadership and the closing of the San Vicente Lumber Company in 1923 marked the end of a remarkable 20 years of industrial activity. The Santa Cruz Portland Cement Company continued to operate, but the emphasis in the region turned once again to agriculture.

1.3.9 THE EFFECT OF THE RAILROAD ON NORTH SHORE AGRICULTURE

As we have seen, the Ocean Shore and Southern Pacific Railroads had a profound effect on North Coast industrial development. The effects on agriculture came more slowly, but were no less transformative. The keys to the development of the twentieth century crops that are most identified with the North Coast—artichokes and Brussels sprouts—were refrigeration, dependable seasonal farm labor, and the development of national and international markets.

Artichokes

Artichokes were the first major specialty crop in the agricultural revolution on the North Coast. Though there is considerable debate about who was the first to grow artichokes on the Central California Coast, it seems that they were first grown in large quantities in San Mateo County on the coastal terrace south of Pescadero Creek. The following newspaper item appeared in the *Surf* in March of 1916: *"F.H. Widemann of Pescadero has been here en route to King City. He has charge of the 10,000 acre Coburn ranch at Pescadero and has 1,000 acres in artichokes which are grown for the San Francisco and eastern market. The rest of the ranch is in beans and timber…Mr. Widemann states that artichokes are being grown in vast quantities there and that the entire country from Pescadero to Bean Hollow has been utilized for them and vegetables. It is now all irrigated from the Butano Creek…"* (*Surf* 3/10/1916)

Another source indicates that Mr. A.E. Morelli first grew a small plot of artichokes near Davenport in that same year (Watkins 1925). Regardless of who was first, by 1919, local resident Tom Majors attested to there being 600 acres of artichokes under cultivation between Santa Cruz and Davenport: *"At present there are about 600 acres leased to Italian vegetable men, along the coast between Santa Cruz and Davenport. About 100 acres on the Charles B. Younger ranch, 120 acres on the Pio Scaroni ranch, 120 acres on the Majors Brothers ranch and about 250 acres by the Coast Dairies & Land Co. These Italian gardeners find that the soil and climate are very well adapted to the raising of this fruit or vegetable. The artichoke plant wants a climate not too hot and not too cold, and the coast salt air keeps them free from bugs and lice…The Italian vegetable men are splendid gardeners, and very industrious workers. Besides the artichokes they raise peas, potatoes, Brussels sprouts, cabbage and other vegetables. The artichokes will be raised and shipped in carload lots from Godola or Majors station direct to Chicago and New York City, where they are selling at present for $5 per box, consisting of three and one-half dozen in a box which goes to show that the artichoke business is all right when once established."*(Surf 1/18/19)

The use of refrigerator cars for shipping vegetables long distances accelerated during World War I, and by 1920 several processing and packing sheds were established on the west side of Santa Cruz to handle the increasing amounts of produce being grown on the North Coast. A major Santa Clara County packing company built a cannery near Pigeon Point to handle produce coming from the Pescadero area in 1917 (*Sentinel* 4/8/1917). By the early 1920s the artichoke acreage began to spread southward onto the coastal terraces around Aptos and Castroville. Artichokes were enough of a commodity in Santa Cruz County that a 1923 newspaper article listed them among the three major agriculture products, the other two being apples and poultry (*Sentinel* 2/8/23).

Artichokes and Brussels sprouts are "niche" vegetables, and the markets are those places in the United States where large numbers of Southern Europeans have settled, particularly Chicago and the Northeast, or Europe itself. According to Ron Tyler, Farm Advisor emeritus of Santa Cruz County, the aging of the European immigrant community (and its replacement by immigrants from Asia and Latin America) has softened the market for both, particularly Brussels sprouts (see Appendix 1.2.4).

Farm Laborers

As the acreage of artichokes and other vegetables grew along the North Coast, so did the need for agricultural laborers. Filipino and Mexican farm laborers were the mainstay of the agricultural workforce on the North Coast from the 1930s well into the 1960s, and there are still several farm labor buildings located on the Coast Dairies Property that once housed Filipinos. Several informants specifically noted that the red-colored buildings on the ocean side of Highway 1 just south of Yellow Bank Creek once housed Filipino farm laborers.

The Dairies Decline

The North Coast dairies continued to do very well financially during the 1920s, but the coming of the Depression in the 1930s, coupled with new regulatory legislation, began to make it increasingly difficult to operate dairies on the coast. A 1938 law required testing of all dairy cattle for tuberculosis and the California Department of Agriculture's stringent sanitary inspections eventually put many of the North Coast Dairies out of business (Weldon, 1986).

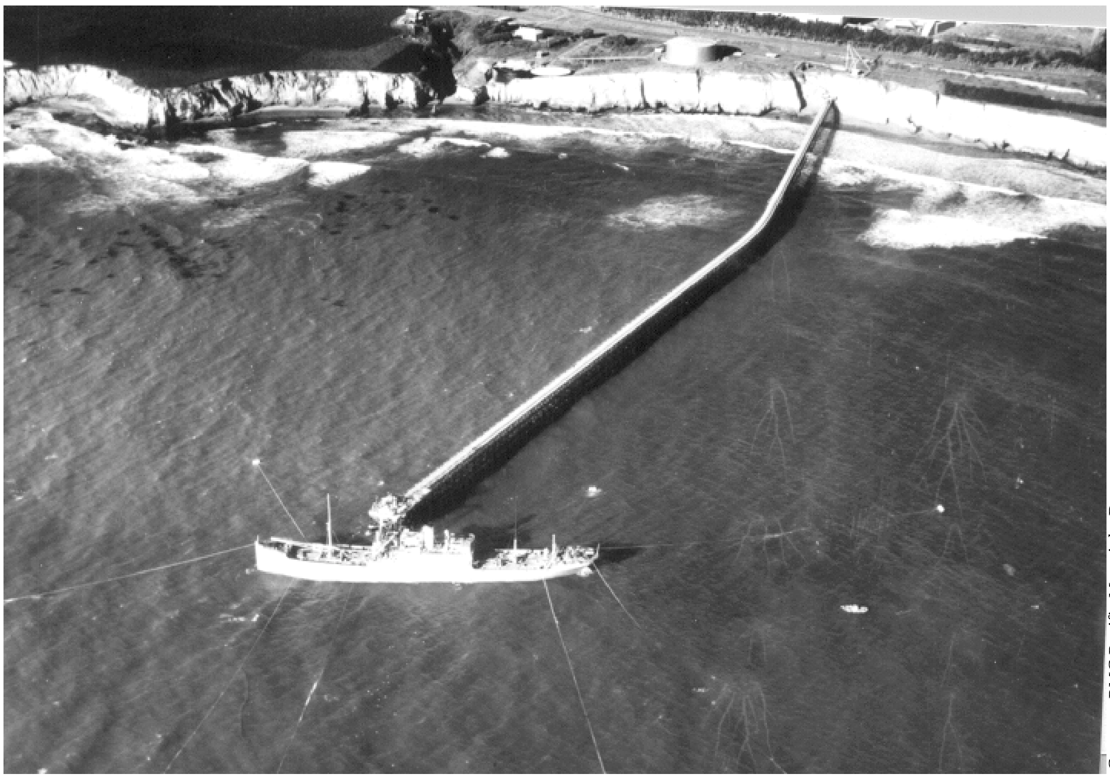
Santa Cruz Portland Cement Company Pier – 1934

The one major exception to a North Coast economic downturn during the 1930s was an expansion of the cement plant at an estimated cost of $1.5 million. Even with its dependable Southern Pacific Railroad connection, the cement company continued to chafe at its inability to get its product out to market. Finally, after studying all the possibilities, the company decided to build a pier out from the bluff adjacent to the factory and pump dry cement into a ship anchored off shore. The cement company, which had thrown all of its technological muscle into operations at Ben Lomond Mountain, now turned toward the sea. In light of all the failed efforts to set up shipping facilities on the North Coast, it was an audacious plan. The cement was to be stored in a nest of silos atop the bluff. A massive compressor would then suck the cement down through a huge tunnel and into two twelve-inch pipes and out along a half-mile pier into the waiting ship.

The key to the plan was the pier. As no pier on the North Coast had ever weathered a winter season without being ripped apart, it could not be of traditional wooden construction. It was to be a metal pier with its steel pilings driven deep into the coastal bedrock. All the joints were to be welded, and the pier's end was anchored with huge concrete-filled caissons also driven deep into the ocean floor. Construction of the pier began in December 1933, and during the winter of 1933-34 the ocean tested construction and design, with waves in excess of thirty feet. On several occasions the massive swells swatted the pile driver into the sea, but the construction continued until, in early October 1934, it was completed. Extending 2,327 feet into the sea, it was the first all-welded steel pier built on the Pacific Coast.[21]

[21] Company officials believed it to be the first all-welded steel pier in the world.

The company purchased a 400-foot freighter, aptly renamed it *Santacruzcement,* and on October 16, 1934, sent the first load of 45,000 barrels of cement to a special silo farm in Stockton (*Sentinel* 10/17/1934). The ship continued to carry cement from the plant into the 1950s, until the coast road was improved enough that trucks could take over transporting the company's product. Today, 67 years after the pier was built, several of the steel piers still defy the ocean off the Davenport bluff, marking one of the most brazen efforts to thwart the power of the ocean[22] (see Photograph 1-9).



Courtesy RMC Pacific Materials, Davenport

Photo 1-9: The Ship *Santacruzcement* Anchored off Davenport, Possibly 1940s

Concerns About Cement Dust

One of the local signatures of the cement plant at Davenport was the coating of dust that radiated out from the plant onto the surrounding countryside. Since the prevailing wind came from the north and northwest, the dust was thickest on the hills and fields south of the plant, but there was enough wind variation to cast all of the immediate vicinity in a gray shroud of dust. Houses, cars and buildings were all coated with the dust, and over the years there had been numerous complaints about the effects of the dust on the local agricultural community. The fact that the cement plant was the major employer in the area made it difficult for many local citizens to complain, but in 1935, a coalition of local farmers and ranchers organized to "*force the Santa Cruz Portland Cement Company to eliminate the causes of damage to the coast field crops by the*

[22] It is interesting to note that another similar ocean-defying monument, the "Cement Ship" *Palo Alto* that was sunk off Seacliff Beach (Santa Cruz County) in 1930 was built of Davenport cement.

cement dust." Twelve growers filed suit against the cement plant and they were joined by 42 more growers and dairymen (*Sentinel* 3/28/1935).

One of the complaints came from those raising dairy cows and cattle on the North Coast. Range animals that ate large amounts of the dust "did not develop properly" according to one animal husbandry expert working in the University of California Extension office at the time. "They just looked skinny and didn't put on any weight." The University of California at Davis sent a number of scientists to the North Coast to study the matter, but results were not conclusive (Lydon pers. comm., 2000). The suit against the cement company worked its way through the court system for many years.

In 1955, Davenport residents gathered in a public meeting to air their complaints about the dust. Many of those that testified brought exhibits to demonstrate just how pervasive the dust was, including a cross-section of lawn showing that the dust penetrated six inches into the earth. One auto mechanic brought a fifteen-pound bag of cement dust that he had collected in just one day while servicing the dust-covered automobiles of Davenport residents. Residents complained of being unable to get the family laundry clean, and one testified that they could not keep a television set because the dust always seeped into the cabinet and shorted it out (*Sentinel* 3/18/1955). Several dozen lawsuits were filed against the company following the meeting (see Photo 1-10).

Courtesy RMC Pacific Materials, Davenport

Photo 1-10: Cement plant, Pier and Dust, View to the Southwest, Date Unknown

Eventually, after the cement plant changed hands, all of the suits were settled out of court in 1961 and the company agreed to install equipment to minimize the dust emissions (Koch, 1973).

1.4 INTO THE PRESENT

The Davenport cement plant (it became Pacific Cement and Aggregates in 1956, Lonestar Cement Corporation in 1965 and RMC Pacific Materials in 1988), brought immediate military attention to the North Coast following the attack on Pearl Harbor in December 1941. Believing that Japan might attack the U.S. mainland, the military quickly posted guards and lookouts around Davenport and imposed stringent blackout requirements on its residents. Later in December, when the ship *Agiworld* was attacked by a Japanese submarine off Cypress Point south of Monterey, security along the coast was heightened (Lydon, 1997). A Japanese submarine was also sighted off the coast a few miles north of Davenport, resulting in a brief skirmish between the submarine and a single plane from the Army Air Corps (Lud McCrary Interview, Appendix 1.2.1). Eventually a segment of the all-black 54th Coast Artillery was stationed at Davenport and regular night canine patrols were instituted at all the area beaches. In addition, four shore mounted guns were placed strategically around the Cement Plant. Two 75mm guns were mounted overlooking the pier and two 155mm Howitzers were mounted just to the east of NewTown. Many of the young people living in the area at the time became airplane spotters, spending long hours in the lookout stations posted along the coastal hills (see Appendices 1.2.2 and 1.2.4, McCrary and Tomares Interview) (see Photo 1-11).

Courtesy Gianoni Family

Photo 1-11: World War II Observation Post above NewTown

Perhaps the most disruptive part of the early months of the war was the removal of many Italians from the coast, along with all persons of Japanese ancestry. Beginning in February of 1942, all Italian aliens living inland from Highway 1 south of Laguna Creek were required to move inland from the highway, and since many of the Italian families living on the North Coast had elderly unnaturalized parents and grandparents, the military orders brought extreme hardships to the farmers between Laguna Creek and the city limits of Santa Cruz. For the few families of

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Japanese present since the 1920s, the removal from the North Coast to a concentration camp in Arizona was devastating. Very few of the Japanese returned to the North Coast after the war.

Taking the Loops Out of Highway 1

During the 1920s and 1930s Californians developed their definite and persistent preference for automobile transportation over rail, and ridership began to decline on Santa Cruz County railroads. As truck and automobile traffic increased, the North Coast retreated back into its pre-railroad isolation, the meandering and dangerous Coast Road keeping out all but the most adventurous drivers. World War II interrupted the plans by the state of California to straighten out Highway 1 through the North Coast, but by the late 1950s, the various segments of the highway were realigned and the curves that used to loop back into each of the canyons became secondary roads, or in some cases, private roads with gates at both ends.

The realignment of Highway 1 both in Santa Cruz County and San Mateo County cut many minutes off the drive from Santa Cruz to Half Moon Bay. Continuing work on the Waddell bluff made it more passable, and by the late 1950s, Highway 1 had its current alignment.

Coast Dairies & Land Co. as Absentee Landlord

Under the management of Swiss-born Fred Pfyffer, the Coast Dairies & Land Company continued to lease its various ranches for livestock and agriculture. Income from the Property made it self-sustaining, but the profit sent back to the Swiss owners was never large, rarely exceeding $100,000 per year. According to Robert Bosso, there were two main reasons that the property continued to be managed as a single entity. First, the fact that it was structured as a corporation. As such, it was difficult to sell the property piecemeal; the options that were negotiated from the 1960s on were attached to the entire property. Corporate ownership also made the tax consequences of selling the land separately very costly. Proceeds would be taxed twice – first at the corporate level and second as personal income for the owners. Thus, any sale would have to involve the entire corporation, reducing the tax burden to just one event. Second, the fact that the owners all lived in Switzerland meant that negotiations of options and the sale of the Property had to involve all the owners (seven in 1998), and all this, exacerbated by the distance, made selling the Coast Dairies Property something of a challenge.

The owners were quite willing to entertain options on the Property, however, and the first came from the oil companies that returned to prowl Santa Cruz County looking to develop the oil that was certainly beneath the ground (Bosso pers. comm., 2000).

The Second Oil Boom

There had been periodic oil flurries along the North Coast (following the one discussed earlier in this section), but by far the largest and most serious occurred in the 1950s when Shell Oil Company and Texaco negotiated several oil leases on the North Coast. In the mid-1950s, Texaco negotiated an oil lease with Coast Dairies to drill on the terrace near Davenport. Between June and December of 1956 Texaco drilled the deepest exploratory well in the history of Santa Cruz

County, probing 9,135 feet down. Though they found periodic evidence of oil and gas, it was insufficient to warrant further exploration. The well is known to geologists as Poletti #1, named for the family that was farming that particular section of Coast Dairies at the time (Griggs and Weber, 1990; Weber, 2000). Shell Oil drilled in a number of North Coast locations in the 1950s and 1960s, including on property owned by the cement company, and on land south of Laguna Creek.

The Coming of the University of California to Santa Cruz, 1964

Meanwhile, the wider context of Santa Cruz was being transformed by the opening of the University of California campus northwest of downtown. The university community quickly discovered the scenic beauty and relative solitude of the North Coast. University faculty members built homes in the Bonny Doon area, and the beaches and canyons became the de facto recreation area for the university. And with the university came an attitude toward development that was quite different from that held by some old-time Santa Cruz residents. The university set off a mini-housing boom on Santa Cruz's Westside, and developers began to plan large-scale housing projects along the open coastline.

The PG&E Nuclear Power Plant Proposal

In the late 1960s, Pacific Gas and Electric approached Coast Dairies and negotiated an option to purchase the property. PG&E's intent was to build a nuclear power plant on El Jarro Point on the terrace north of Davenport. This impulse was not unlike that followed by William Dingee in 1905 when he sought out the isolated reaches of the North Coast to locate an industrial operation unpopular with the people of Santa Cruz. In this instance, the public perception of nuclear power plants required that they be located in remote places-– Diablo Canyon in San Luis Obispo County, for example. PG&E's plan was to build a 6,000 megawatt generating facility on El Jarro Point and then exercise its option and purchase all of the Coast Dairies Property.

The proposal acted as a lightning rod for the burgeoning environmental community in Santa Cruz County, and protests were launched against it. Many now see the protest against PG&E proposal as the beginning of the modern conservation/preservation movement in the county (Scott and Wayburn, 1974). Eventually, seismic studies suggested that the site would not be appropriate for a nuclear power plant, PG&E shelved its plans and let their option on the Coast Dairies Property expire.

Wilder Ranch

Meanwhile, just south of the Coast Dairies property another proposal, this one for housing, was floated in 1969. The Wilder family sold the 2,000-acre ranch to the Moroto Investment Company and in 1972 the company announced its plan to build between 9,000 and 10,000 housing units on the property over the next 30 years. Fresh from their success with the PG&E nuclear power plant proposal, environmentalists formed Operation Wilder, and by 1973 the State of California allocated $6 million to purchase the land for a state park. Wilder Ranch State Park opened in the late 1980s (Jones, 1999).

Publication of the North Coast Bible, 1974

Following the example of other large-scale environmental movements, such as the move to save the redwoods or the Grand Canyon, a group of local authors and scientists collaborated in a book titled *In the Ocean Wind: The Santa Cruz North Coast* published by the Glenwood Press in 1974. Laden with photographs, poetry and essays, the book was a paean of praise for the North Coast. It is difficult to measure the impact that the book had on public sentiment, but it certainly was a reflection of the opinion held by a number of county residents at the time.

The Coastal Act

Put on the ballot as Proposition 20 and passed in 1972, the Coastal Zone Conservation Act put wheels in motion that eventually lead to the establishment of the California Coastal Commission in 1976. The Coastal Zone Act and the Commission rendered any further developments (such as those proposed for the Wilder property) difficult at best; probably impossible. The manager of the Coast Dairies property, Fred Pfyffer, and the corporation's attorney, Robert Bosso, were convinced that any development proposals for their Property would be extremely difficult, and they believed that the property would be increasingly difficult to sell. However, as the shareholders aged, their interest in selling the property increased (Bosso pers. comm., 2000).

Over the next 28 years the Property entered into a number of option agreements, none of which resulted in sale. The following list was provided in an interview with Robert Bosso in December, 2000:

Outright Sale to Lonestar Cement, 1986

The Coast Dairies shareholders placed a price of $12 million on the Property and offered it to Lonestar, but the company was not in an economic position to purchase the Property and the opportunity passed.

Zemex

In 1988 a Texas development company secured a three-year option on the Property which contained an automatic accelerating sale: $11 million if they exercised the option the first year and up to $15,000,000 if they did so at the conclusion of the three years. When the economy softened in Texas, Zemex's option expired around 1993.

The Bond Act of 1994

The purchase price of $17,500,000 was included in a state bond act offered to the voters of California in 1994. Meanwhile, the Nature Conservancy purchased an option on the Property (for $1) to hold it until the bond act passed. The act failed, however, and the option expired.

Bryan Sweeney and Nevada Pacific

In 1996, Nevada developer/businessman Bryan Sweeney (Nevada & Pacific Coast Land) took out an option on the Coast Dairies Property for a sale price of $20,000,000. His intent was to swap the Coast Dairies for land under the control of the Bureau of Land Management in Nevada. Mr. Sweeney was not able to resolve the complicated details on the federal end of the transaction. His option to hold the Property was costing him approximately $1,000,000 a year.

Meanwhile, eager to sell the property outright, Sweeney promulgated the notion that there were 139 separate and distinct parcels within the 7,500 acres, and that he could and would sell those parcels to individuals for coastside homes (Sweeney, 1997). After a prodigious job of surveying each of the alleged parcels and preparing its history, Sweeney made the 139-parcel document, a blueprint for very high-end housing, public. Sweeney's document got everyone's attention, especially the Save-the-Redwoods League. Eventually, in a cooperative effort with the David and Lucile Packard Foundation, the Trust for Public Land, the Land Trust of Santa Cruz County, and the Nature Conservancy, the Coast Dairies Property was purchased from Nevada & Pacific Coast Land in October, 1998. The stage was set for its future as a unique natural and cultural asset, owned by those who will, hopefully, cherish both its present and its past.

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SECTION 2.0
EXISTING CONDITIONS REPORT METHODOLOGY

2.1 INTRODUCTION

2.1.1 PROJECT OVERVIEW

The Coast Dairies Property includes multiple distinct watersheds with complex water rights; biological and cultural resources of statewide importance; prime (and pristine) beachfront; farming and mining that engage not only revenues but agricultural traditions and community economic stability; and a public with expectations both intense and conflicting. The complexity of the Coast Dairies Property demands a deliberate and fully disclosed treatment of how the Planning Team[1] obtained and used information supporting the proposed management recommendations.

The purpose of this section of the Existing Conditions Report (ECR) is to provide that disclosure in general terms. Details of discipline-specific methodology will be included in each technical section that follows; the purpose here is to describe the information systems used (e.g. "analysis zones," GIS) and some sense of the state of knowledge about Coast Dairies Property as the planning process was begun in 2000 - 2001.

The Existing Conditions Report is the first of three phases in the preparation of the *Coast Dairies Long-Term Resource Protection and Use Plan*. Following the publication of the ECR, its information will be used to perform an *Opportunities and Constraints Analysis* to determine, in a general way, what opportunities are available and which uses are compatible with what areas of the Property. The different combinations of uses and use restrictions become the "alternatives" in a process governed by the requirements of the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA). Once a *preferred alternative* is selected from the range of alternatives, it becomes the Plan.

2.1.2 PROJECT LOCATION

The Coast Dairies Property (Property), as of August 31, 1998, was an estate with title vested in the Coast Dairies and Land Company, Inc. (CDLC), also shown of record as Coast Dairies & Land Co., Inc., a Corporation. The most recent title report was prepared by First American Title

[1] The Planning Team comprises the selected consultants, guided by Steering Committee and the Trust for Public Land.

Insurance Company, 330 Soquel Avenue, Santa Cruz, CA 95062 and issued on September 16, 1998.

The Property is situated in the State of California, County of Santa Cruz Unincorporated Area (approximately six miles north of the City of Santa Cruz), and on the coast between Laguna Creek at its southern boundary and Scotts Creek at its northern boundary. The Property extends inland approximately three miles and comprises nearly 7,000 acres. It is bisected by two public roads: State Highway 1 along the coast and Bonny Doon Road inland. The Property in 1998 was subject to 11 lease agreements varying from less than an acre (residential) to nearly 1,000 acres (RMC Pacific Materials) and several dozen easements and agreements. The Property is within the following Santa Cruz County Assessor's Parcel Numbers:

058-021-03	058-092-08	059-011-06
058-021-07	058-113-01	059-011-12 & 13
058-021-01	058-121-01	059-011-10
058-022-07	058-121-02	059-011-11
058-022-08	058-122-09	059-012-01
058-022-09	058-122-10	059-012-02
058-022-10	058-122-12	059-012-03
058-022-11	059-011-01	059-012-04
058-042-01	059-011-02	062-141-02
058-051-05	059-011-03	063-071-04
058-051-07	059-011-04	063-251-03
058-071-02	059-011-05	063-031-01

2.2 CONCEPTUAL METHODOLOGY

In the rapidly changing landscape of coastal California, exactly what are "existing conditions"? How do we measure them? The adequacy of scientific information is problematic for scientists and planners alike. Even if nature or society would sit still for us, any small fact - average local income or the number of deer on the Property or yearly sediment rate – reflects a land use history (e.g., timber harvest) and an interaction with other factors (e.g., global warming), any of which may be more important than the fact itself. It would seem obvious that many years of studies on various organisms or economic factors would yield better results, a more complete picture, but such is not always the case (Sprugel, 1991). And, in any event, the funding for exhaustive research is rarely available.

Instead, the general order that went out to the Coast Dairies consultants and team members early in the ECR process was to try to capture the natural and human environment not as a complete inventory, but in those subject areas or physical locations where:

- public ownership and management could conceivably result in a change in the status quo (e,g, agricultural operations);

- management would encounter a regulatory constraint (e.g., the status of species on the Property that are formally listed under the state and federal endangered species acts or the locations of valuable cultural resource sites);

- habitats are so diverse, productive, or sensitive that they deserve protection as a management priority (e.g., stands of native perennial grasslands); and

- the Planning Team identified significant issues, concerns and opportunities for restoration (e.g., watershed instability).

This last topic foreshadows the next step in the planning process, an analysis of *Opportunities* and *Constraints.* Generally, an *Opportunity* is a value judgement, a reflection of how important an analysis zone (see Section 2.5) is for the resource in question. This evaluates a current condition and not a hypothetical future state that could be obtained after management is applied. A *Constraint* is an assessment of compatibility with other uses within a given analysis zone. "Uses" as defined here are those reasonably foreseeable in managed, multiple use public land, such as recreation, grazing, and row crop agriculture. No assessment is absolute, but is made relative to other zones. The opportunities and constraints analysis is introduced as part of the Existing Conditions report phase, and is described in the subsections of these chapters entitled *Issues*.

2.3 ACQUIRING AND STORING INFORMATION

All the files compiled by the Trust for Public Land (TPL) during its period of tenure were reviewed and sorted, with technical information extracted and passed on to team members. All items in the files (including correspondence) were then entered into a database made available to all Planning Team members.

The database uses Microsoft Access to create bibliographic records. It contains information about reports, plans, contracts, applications, memoranda, letters, maps, charts, forms, telephone messages, and other documents either generated by TPL or the Planning Team in connection with the project. Bibliographic data on each document includes, to the extent available, titles, authors, sources, publication dates, the intended audience, inclusion of graphics and tables, references to associated documents within the project library, a brief explanation of the documents' contents, pagination, and other descriptive information.

The database was designed to provide:

- a system for cataloging documents in the project library;

- the ability to generate bibliographies;

- a means of searching the library's contents. Searches include, but are not limited to, titles, topical areas, dates, documents generated by or addressed to a particular person, agency, etc., associated with the project, or memoranda and letters associated with a particular date; and

- a catalogue of the project's administrative record.

As additional sources were identified (e.g., during meetings with the Community Advisory Group) these made their way into the database as well and, together with the files and bibliographic sources discussed below, formed the initial collection of the *Project Archives*. Establishing and maintaining Archives allows the project to store information (photographs, for example) which are too voluminous to include in the ECR or the Plan itself. The Archives will be turned over to the land managers when the Property transfer is complete. Much of this information will be in the form of compact disk (CD) and GIS (see Section 2.6) files.

2.4 REVIEW OF EXISTING INFORMATION

Beyond the sources obtained directly from TPL, the Planning Team prepared a bibliography for the Property, using such electronic search tools as:

- Wildlife Worldwide (searches technical journals, including California Fish and Game, Wildlife Review, Wildlife Information Service, Fish and Wildlife Reference Service, and Waterfowl and Wetlands Bibliography);

- Melvyl (searches UC Library catalogues; provides access to Current Contents);

- Biosis (searches Biological Abstracts);

- Dissertation Abstracts;

- Fish and Wildlife Reference Service (searches Government Printing Office documents).

Beginning in July 2000, and continuing throughout the project, members of the Community Advisory Group (CAG) were asked to provide anecdotal information (or source material the Planning Team had missed) using an *Information Source Record Form*. These submissions were in addition to the extensive personal interviews conducted for the land use history (Section 1).

2.4.1 PREVIOUS REPORTS PREPARED FOR CDLC OR ON ITS PROPERTY

General

Cultural and historical documents were cited in the previous section. The earliest comprehensive resource surveys for the Property were conducted and compiled by Pacific Gas & Electric, when in 1971 the utility considered building a nuclear power plant at El Jarro Point near Scotts Creek

Beach. PG&E published reports on geology, hydrology, water quality, biology (e.g., Craig and Drysdale, 1971), timber resources and agriculture. More recently, PG&E conducted surveys under its powerlines on the Property (Taylor, 1999).

RMC Pacific Materials, Inc. (RMC), which operates the cement plant, a limestone quarry, and a shale quarry on lands it owns or leases from CDLC, has commissioned multiple studies and surveys over the past two decades (see for example Engineering Science, 1991 and Madrone Landscape Group, 1992). Those involving streams flowing through the Property are cited below and in the appropriate sections of the ECR. As an outcome of an environmental review conducted by Santa Cruz County for RMC's operations in the mid-1990s, settlement ponds and culverts and potential effects on the California red-legged frog (*Rana aurora draytonii*) became the subject of a Habitat Conservation Plan (HCP). Several reports were submitted by Biosearch Wildlife Surveys in support of the HCP (Biosearch, 1996a-d), and the U.S. Fish and Wildlife Service prepared a Biological Opinion (USFWS, 1996).

In the early 1990's, the California Coastal Conservancy and Santa Cruz County began recording the success of nest protection for the snowy plover (George, 1993) on Property beaches, an effort that continues to the present. In 1994, the Conservancy commissioned a broader habitat assessment report (Josselyn et al., 1994), in support of its interest in purchasing the property. Josselyn mapped habitats and reported occurrences of special status species. Later that year (November), the Habitat Restoration Group (HRG, 1994) conducted biological surveys and a wetland delineation for a proposed (but never constructed) pipeline and reservoir on the Property. In response to a request from the County of Santa Cruz, HRG returned to the area in 1996 (HRG, 1996) for focused surveys for the San Francisco popcorn flower (*Plagiobothrys diffusus*) and the California red-legged frog (*Rana aurora draytonii*).

In the spring of 1999, volunteers participated in the first season of the Central Coast Riparian Bird Conservation Project. This project was initiated by the Point Reyes Bird Observatory (PRBO) and the Coastal Watershed Council (CWC) with the help and cooperation of a large network of agencies and individuals. Surveys included Liddell and San Vicente Creeks, and will continue indefinitely. PRBO also maintains the nesting exclosures for, and keeps data on, the snowy plover on Coast Dairies beaches.

Fisheries

In 1982, Harvey & Stanley Associates and John Gilchrist & Associates prepared *Fish Habitat Assessments for Santa Cruz County Streams* for the Santa Cruz County Planning Department. This study assessed habitat conditions and fishery populations in 15 Santa Cruz County streams including San Vicente, Liddell and Laguna Creeks. Two years later Creegan and D'Angelo (1984), who were principal investigators in the earlier work, provided similar information for Lone Star Industries (the precursor to RMC) in the report *Watershed Analysis: San Vicente Creek, Mill Creek, Liddell Creek, East Branch Liddell Creek.* The text discusses habitat conditions for migrating, spawning, rearing, and overwintering anadromous salmonids. The effects of water diversions are also addressed. The report also offers recommendations for the improvement of habitat conditions in these streams.

Marston (1992) compiled a stream survey report of lower Scotts Creek[2]. His report summarizes the results of aquatic habitat and fish population assessments conducted in the lower 0.5 mile reach of Scotts Creek. Investigators observed several thousand fish, comprised primarily of steelhead trout and coho salmon, and also including tidewater gobies. The aquatic habitat was found to be very productive when water was present.

Marston's work laid the foundation for Snider et al. (1995) to calculate.minimum flow requirements for the California Department of Fish and Game (CDFG) in their paper *The relationship between instream flow and coho salmon and steelhead habitat availability in Scotts Creek, Santa Cruz County, California*. This CDFG report discusses the life histories and habitat requirements of coho salmon (*Oncorhynchus kisutch*) and steelhead (*O. mykiss*) in detail before describing the approach, methodology, and results of the Department's minimum flow requirement study. The study recommends that no water withdrawals occur on Scotts Creek when instream flows are below 40 cubic feet per second (cfs) in January through March, 25 cfs in May, 10 cfs in May, 6 cfs in June through October, 8 cfs in November, and 12 cfs in December.

In addition to the two studies of Scotts Creek prepared by other investigators, McGinnis (1991) evaluated the anadromous fish spawning and parr rearing habitats of the Liddell and San Vicente Creeks for RMC. This report summarizes the results of habitat and population surveys for steelhead trout (*Oncorhynchus mykiss*), California red-legged frogs (*Rana aurora draytoni*), and foothill yellow-legged frogs in two major Coast Dairies watersheds. The study also included an analysis of the limestone content of stream sediment samples to ascertain whether RMC sedimentation ponds were functioning effectively. The report concludes that San Vicente Creek, while suffering from modest sedimentation and a lack of extensive deep pools, remains one of the most productive anadromous fishery creeks in the greater Santa Cruz/San Mateo County area. Liddell Creek also supports a small steelhead population. Red-legged frogs were observed in two locations.

University of California

Lastly, the Property has been the locus of several research projects conducted by students and faculty from the University of California. Perhaps the most recent of these was Scholar's (1998) Master's Thesis on sediment transport at Yellow Bank Beach. Research on the effects of grazing on coastal prairie at Coast Dairies is ongoing (Holl, 2000)

[2] Although Scotts Creek is not on the Property, CDLC owns a portion of Scotts Creek Beach and its tenants use creek water.

2.4.2 OTHER RELEVANT LAND USE DOCUMENTS AND PLANNING GUIDANCE

The beaches on the Property have long been considered a Santa Cruz County asset. Their condition and use for recreation were detailed in the County's *North Coast Beaches Master Plan* and in Nicholas Berman Environmental Planning (1989). The 1991 beach plan was itself a summary of other reports and public testimony between 1983 and 1989. Plan policies included preservation/restoration measures (e.g., exotic plant removal) and interpretive signing, but limited recreation amenities.

The two prospective land management agencies for Coast Dairies, the Bureau of Land Management (BLM) and the California Department of Parks and Recreation (DPR) have recently produced two planning manuals for areas under their jurisdiction. BLM's recent edition of the planning handbook (BLM, 1999) reconciles a variety of federal land use regulations and policy direction. This level of planning, the handbook states, identifies uses, or allocations, that are allowable or prohibited on subject lands and establishes certain administrative designations, such as Areas of Critical Environmental Concern. The handbook also appends the text of a recent Memorandum of Understanding between BLM and the U.S. Fish and Wildlife Service to facilitate compliance with the Endangered Species Act. The California State Parks, General Plan Improvement Team, (DPR, 1998) prepared a document describing the state's planning structure and content and format guidelines for state park plans. Of particular interest is the direction to produce a "statement of management intent" tailored to the needs and resources of specific park areas and the requirement that the plan integrate all information necessary to satisfy the California Environmental Quality Act.

2.5 ANALYSIS ZONES

2.5.1 PURPOSE

The challenge of information gathering and archiving leads to one of organizing and analyzing. It should not be surprising that the Plan does not treat all acres, and perhaps no single watershed alike. In the interests of protecting resources and, possibly, segregating different types of use, wildlands need to be zoned in much the same way cities and towns are. In the Plan, there will be *Management Zones*, areas for which management directions or "prescriptions" have been developed to determine what can and cannot occur in terms of resource management, visitor use, access, facilities or development, and park operations.

Since these decisions (with the exception of Stream Protection Zones) are not implied in the ECR[3], the information requires an interim zoning tool—the Analysis Zone--that breaks the property up into polygons (mapped areas) based on the *existing nature and condition of the resources*. A uniform system of designation is also advisable because it standardizes the way

[3] Management Zones are not described or delineated in this document.

different planning Team Members reference geography. For instance, an economist might call an easement by the holder's name; a recreation analyst might talk about a meadow by referring to the nearest road or trail. A zone label -- even one which is a collection of numbers and letters – eliminates any confusion.

At some point in the planning process, ECR information, Opportunity and Constraints determinations, public input and regulatory concerns are resolved within, and sometimes across the boundaries of, the analysis zones. This is the operational part of the Plan. The Plan will be organized by watershed, and then, finally, by management zones as described above. It is expected that the analysis zones will in some part retain their geographic identities when they become management zones, but will change from a way of organizing information to a way to implement management prescriptions for how the land will be used.

2.5.2 DESIGN

The Coast Dairies Property covers all or portions of six distinct watersheds. All are coastal watersheds with headwaters within the steep western slope of the Santa Cruz Mountains, and all are defined by coastal streams that descend through steep ravines to coastal bluffs and eventually discharge to the ocean. Each watershed differs in specific characteristics, however. Moreover, watersheds are natural "hard" boundaries for organizing natural resource issues, and are thus the first identifier for an analysis zone. The five major creeks on the Property **- Molino, San Vicente, Liddell, Yellow Bank** and **Laguna** Creeks - are the first letters of the analysis zone designation (**M, SV, L, YB, and LA**, respectively).

Within each of the watersheds on the Property, there are areas that comprise a roughly similar mixes of natural resources, as indicated primarily by their vegetation. Examples of these zones include: riparian areas, agricultural areas, and wetlands. The vegetation "signature" of a polygon was the first diagnostic for an analysis zone. Other resource bases apart from vegetation could have been used, of course, (for example, soil types) but the Planning Team considered extant vegetation as the best diagnostic for a variety of attributes, including the important one of recent land use history.

Although they begin with vegetation, the polygons of the zones are necessarily somewhat arbitrary and for practical purposes cannot be highly refined expressions of the ecologists' art. For example, when Josselyn et al. (1994) categorized habitats, he defined over 200 polygons, far too unwieldy a number for this ECR. If the possible ultimate use of an analysis zone as a management zone is considered, 200 sites averaging 35 acres each is not an efficient way to proceed. Rather, the planning team overlaid the Josselyn map on an orthophoto (an aerial photo which has been corrected to the same cartographic standards as a topographic map) and combined the Josselyn types in higher-order aggregations within watershed boundaries. "Lumping" habitat types in this manner -- grouping similar types and allowing predominant expanses to incorporate small islands of other types -- expresses the important assumption that the analysis zones will be similar in their response to both natural forces and human activities[4]. Thus the zones, while derived from vegetation mapping, are not intended as a substitute for it. For botanical classifications and detail, see Section 3.1

Each zone was then labeled (coded). The nomenclature of the codes is loosely based on habitat terms but substitutes a current condition term (e.g., right of way) where that is clearer. The Stream Protection Zones are the only designation which suggests the ultimate management direction. The zones labels are as follows:

Beach (B) - Coastal sandy beach and dunes.

Prairie (P) – Grasslands on benches, moderate (<20 percent) slopes. This is generally the “non-native grassland” as described by Josselyn or the "Coastal Prairie” as described by the Santa Cruz Chapter, California Native Plant Society (CNPS). Zones may contain stands of perennial bunchgrasses, but are mainly annual grasses and perennial forb species.

Coastal Terrace (CT) and Coastal Terrace Bluff (CTB). These two zone types contain all lands currently used for crop production. The Coastal Terraces are those areas which have been modified for agriculture (levelled). They may originally have been more like the “Prairie” type but are underlain by coastal terrace deposits younger Miocene-aged Santa Cruz Mudstone that occurs higher up. Where these terraces are at seaside, they end in steep coastal bluffs -- sandstone bedrock outcrops with their own unique features.

Woodland (W). These polygons comprise all the areas designated by Josselyn as Mixed Forest, Oak Woodland and Redwood Forest. The assumption is that these large areas, while not having exactly the same resources, will have the same types of sensitivities to visitor use.

Shrub (S). These area are steep (usually >30 percent slopes) and are roughly the same as the Santa Cruz CNPS “Coastal Scrub.” Plants are generally under six feet tall and include buckwheat, sagebrush, yarrow, lupine, and coyote bush.

Marsh (M). As defined by CNPS in Santa Cruz, these are seasonally or permanently flooded areas along streams, lakes, ponds, and springs. There is only a single analysis zone with this designation, at the lower end of Laguna Creek. It is characterized as a freshwater marsh, but is brackish at the mouth.

Developed/Disturbed (D) and Right-of-Way (ROW). Areas with little or no natural vegetation, dedicated primarily to human use.

[4] The use of this concept caused some concern among early ECR reviewers. It should be regarded as a simplified planning tool and not an instrument which is intended to carry complete, or even fully accurate information. It does not replace more elaborate models of wildlife habitat, vegetation, or watershed to be developed later in the ECR.

Stream Protection Zone – The SPZ designation is one exception to the rule that no prescriptions are implied for any analysis zone. Although this corresponds to "Riparian Woodland" (stream banks with a constant water supply) as the term is used by Santa Cruz CNPS, the priority role in water supply and endangered species habitat maintenance suggested it be declared protected in principal throughout the planning process, with a uniform 100-foot buffer on both sides of the stream.

On the Analysis Zone Map (Figure 2-1) the codes for the polygons are derived by adding the watershed designation to the second term, thus a coastal terrace in the Molino watershed would be labeled Molino Coastal Terrace or MCT. If there is more than one of the polygon type in the watershed (e.g., if a region of terrace is divided by a Shrub analysis zone) it is assigned a number, MCT-1; MCT-2, etc.

2.6 USE OF GIS

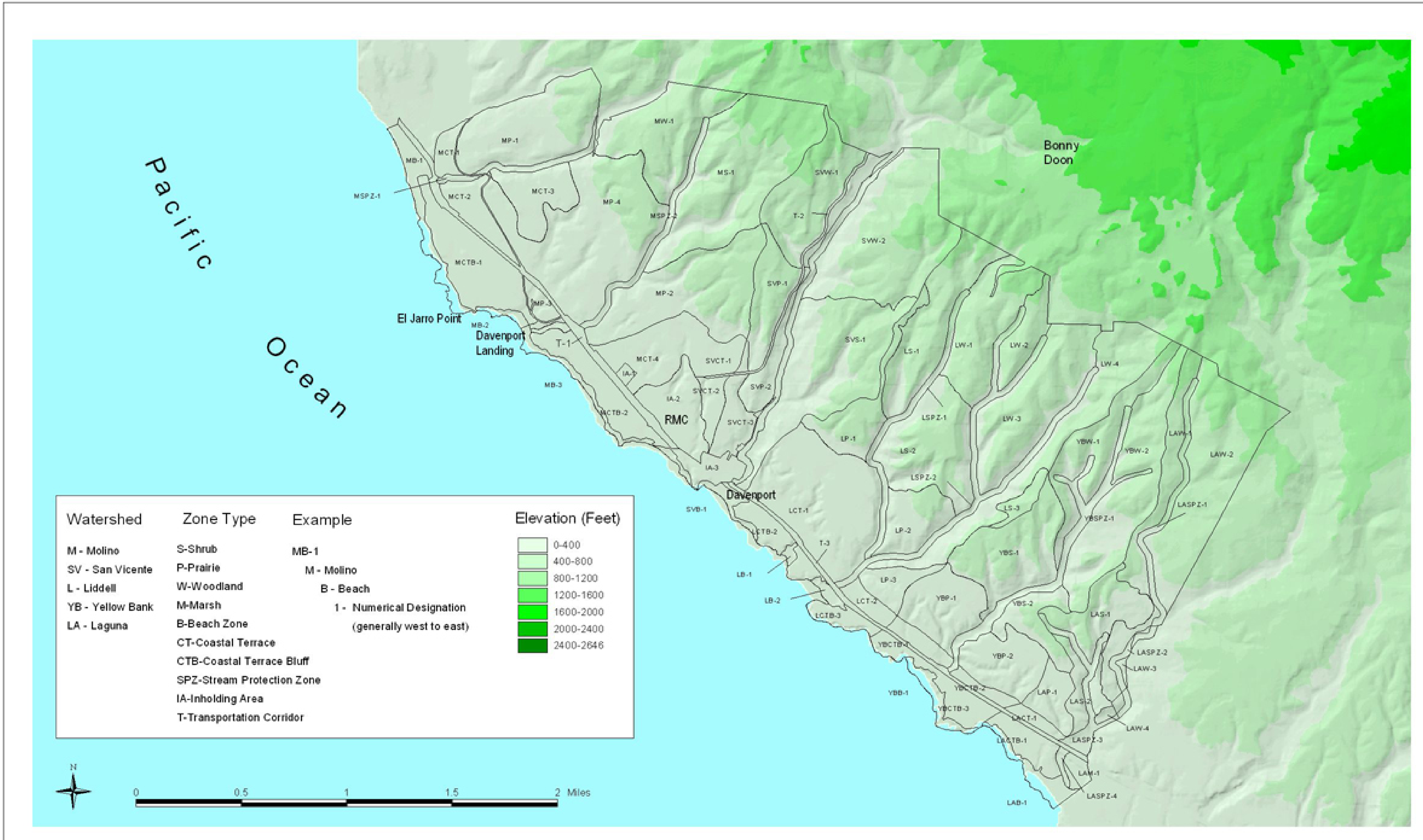
A key element of the Long-Term Resource Protection and Use Plan for the Coast Dairies Property will be documenting and understanding the spatial distribution and relationships among a wide variety of natural and man-made features. A major role in providing this understanding will be played by the Geographic Information System (GIS). GIS allows for accurate mapping and printing of maps by absorbing information in digital format. This information will be critical not only in this ECR phase, but in the preparation of the Opportunities and Constraints Analysis as well. In the longer run, it will be a tool for resource managers, linking all resource maps with much of the text information in the Plan and Project Archives

The GIS will be used to:

- assemble and standardize existing and newly collected digital map layers;
- provide easy access to these map layers for review and use in preparing maps;
- provide a tool for performing the Opportunities and Constraints Analysis and for evaluating land management alternatives; and
- provide a tool and associated database that can be refined and updated in the future by land management agencies for ongoing land management activities.

2.6.1 SYSTEM CONFIGURATION

The Planning Team uses ArcView GIS software (Environmental Systems Research Institute) for all GIS data and analysis applications. The software will include both ArcView and the ArcView Spatial Analyst extension. All GIS data will be delivered in ArcView shape file format. Applications will be built from ArcView/Avenue scripts and delivered as either ArcView projects



SOURCE: Environmental Science Associates, Pacific Meridian Resources, USGS

Coast Dairies / 200071

Figure 2-1
Analysis Zones on the Coast Dairies Property

or extensions. GIS data processing during the course of the project will be performed using both ArcView and ARC/INFO GIS software.

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SECTION 3.0
NATURAL RESOURCES OF THE COAST DAIRIES PROPERTY

3.1 BOTANICAL AND WETLAND RESOURCES

3.1.1 REGIONAL SETTING

The Santa Cruz coastal region has a Mediterranean climate and is a mosaic of upland oak, mixed evergreen, and redwood forests, native and exotic grasslands, upland scrubs, wetland communities, and riparian scrubs and forests. In the "bioregional" characterizations developed as part of California's Agreement on Biological Diversity (a multi-agency memorandum signed in 1993), the area is near the regional separation between the Bay Area-Delta and South-Central Coast Bioregions. This position makes Santa Cruz County within the range of several species common to either bioregion. In addition, proximity of the coastal mountains has partially isolated the area, and resulted in a high level of endemism (i.e., species restricted to this area alone).

Past and on-going human activities (e.g., logging, agricultural development, residential development, mining) in the region have reduced open space, limiting large expanses of most natural communities and altering natural vegetative patterns. These phenomena are evident at Coast Dairies and described further below.

3.1.2 METHODOLOGY

The emphasis of this section is to provide a description of existing vegetative and wetland resources on the Property. Data presented herein are based on existing reports and information, consultation with resource agencies and knowledgeable individuals and site reconnaissance. Floristic surveys of the property were conducted by Planning Team botanists and plant ecologists in June, August and October, 2000 and in February, March and April, 2001. On two occasions, the team was assisted by botanists from the Santa Cruz Chapter of the California Native Plant Society(CNPS), and their assistance is gratefully acknowledged.

The intent of these surveys was to identify species presence and composition on the Property. Although every analysis zone was visited, particular emphasis was placed on surveying areas with the highest potential to support rare species of plants or rare plant communities (e.g., areas of native grassland). Data were recorded in field notebooks and on Property maps.

3.1.3 VEGETATION

The Property currently supports 17 distinct native vegetative communities and three communities dominated by introduced non-native species.[1] These communities include: beach and foredune; two grassland communities (California annual grassland and purple needlegrass grassland); three scrub communities (central dune scrub, California sagebrush coyote brush scrub); five upland woodlands and forests (coast live oak woodland [occurring as both an upland and riparian community on-site], mixed evergreen forest, mixed conifer forest, redwood forest, and eucalyptus/Monterey cypress woodland); three riparian communities (coast live oak riparian, central coast arroyo willow riparian scrub, and red alder riparian forest); and various types of freshwater wetlands and seeps. These plant communities vary in terms of diversity.[2] Generally, high-diversity[3] vegetative communities are regarded as more ecologically stable and less common, and are therefore usually accorded a higher level of resource protection. For example, high-diversity vegetative communities typically support many plant species or equal abundance of plants that fill all or most available plant niches, and are less susceptible to exotic invasive species.

The California Department of Fish and Game (CDFG) has identified specific native plant communities within California as rare and/or sensitive. These natural communities are of special significance because the present rate of loss indicates that additional acreage reductions or further habitat degradation may threaten the viability of dependent plant and wildlife species and possibly hinder the long-term sustainability of the community or species dependent upon the community. As natural communities diminish, the need to list component plant and wildlife species as rare, threatened, or endangered under state or federal Endangered Species Acts increases. Loss of some significant natural communities can diminish valued ecosystem functions, such as the roles of marshes in water filtration, or of riparian woodlands in river bank stabilization. Some of these natural communities have a rich complement of sensitive species and species-oriented programs that will usually protect them. Other communities do not support rare species and, therefore, species-oriented protection cannot be invoked in these cases (CNPS, 1994).

Several significant vegetative communities, including northern maritime chaparral, northern coastal salt marsh, and Monterey pine forest are documented as occurring within the vicinity of

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[1] Natural communities are recurrent combinations of species that reflect parallel responses to similar combinations of environmental conditions and are not dependent on human intervention. For this discussion, native vegetation pertains to those species present in California prior to colonization by Europeans, while species such as wild oats and brome grasses, which dominate much of the current California landscape, are considered exotic or naturalized. Vegetative communities which are dependent on human intervention (i.e., sowing seeds, planting saplings, irrigation) such as irrigated agriculture or landscaping are considered introduced (non-natural) communities.

[2] The term ‘diversity’ is defined as the total number of plant species and their relative abundance present within a community type.

[3] For the purposes of this document, ‘high-diversity’ refers to many species or equal abundance of plants occurring within a specific vegetative community that is beyond that normally encountered for a particular community. ‘Medium-diversity’ refers to vegetative communities that are roughly equal to that normally encountered for that community and ‘low-diversity’ refers to vegetative communities that support fewer total species or unequal abundance than normal for a particular community.

the Property (CDFG, 2000). None of these documented vegetative communities have been observed on the Property. However, a number of other sensitive vegetative communities are present, including northern foredune, purple needlegrasss, and red alder riparian forest. Sensitive plant communities are listed in Table 3.1-1.

The following community descriptions include limits of distribution, habitat requirements, community sensitivities, and a list of characteristic plant species. Descriptions are based on observations of dominant[4] plant species and their common associates. Descriptions of vegetative communities in this report primarily follow classification guidelines set forth by the CDFG (Holland, 1986), the CNPS (Sawyer and Keeler-Wolf, 1995), and a local Santa Cruz CNPS task force (McPherson et al., 1995). These classification systems were modified to accurately describe site-specific conditions on the Property. Refer to Figure 3.1-1 for a map of vegetative communities on the Property. A full list of plant species observed on-site is included in the Project Archives.

3.1.3.1 BEACH AND FOREDUNE COMMUNITIES

Beach

The Beach community forms along the Pacific Ocean, where high wind speeds have deposited sand granules. This community is mostly bare due to environmental conditions, including salt spray deposition, high wind speeds, and full sun exposure. These environmental conditions gradually decrease moving away from the beach. The inland side of the beach can support a sparse distribution of low-growing plants, such as sun cup (*Camissonia cheiranthifolia*) and sand-verbena (*Abronia umbellata*, *A. latifolia*), that are able to tolerate a substantially harsh environment. These plants colonize sand blowouts and become stabilized in the soil as the wind-blown sand accumulates around the base of the plant. Major beach formations on the Property include Scotts Creek Beach, Davenport Landing Beach, Davenport Beach and Bluffs, Panther Beach, Bonny Doon Beach, Yellow Bank Beach, and Laguna Beach.

Northern Foredune. Northern foredune community is located in areas of sand accumulation along the coast as far south as Point Conception in Monterey (Holland, 1986). Northern foredune vegetation is adjacent to bare beach areas, where the environmental conditions are lessened relative to the beach. The plants in this community are sparsely distributed on sandy soils. In addition to the environmental conditions to which the beach is subject, plants in this community are exposed to periodic reburial of plant roots and sand blowouts due to high winds. As a result, foredune species are low-growing perennial forbs, grasses and subshrubs that respond to varying levels of environmental disturbance. Sand-verbena, sea rocket (*Cakile maritima*) and sun cup dominante this community. Associated species include dune sagebrush (*Artemisia pycnocephala*) and mock heather (*Ericameria ericoides*). Foredune vegetation intermixes with

[4] The term 'dominant' is defined as the overstory species that contributes the most cover or basal area to the community, compared to other overstory species. This definition is based on physiognomy (architecture of canopy layers and life form).

TABLE 3.1-1
SENSITIVE PLANT COMMUNITIES OCCURING ON OR WITHIN THE VICINITY OF THE COAST DAIRIES PROPERTY

Common Name	Listing Status (TNC/CDFG)	General Description	Site Occurrence
California sagebrush	G3, S3.3	Dominated by *Artemisia californica* and *Rhamnus californicus*, associates include *Mimulus aurantiacus, Castilleja ssp., and Eriogonum ssp.*	Primarily occurs on-site on south facing slopes with shallow soils of the upper coastal terraces.
Central coast arroyo willow riparian forest	G3, S3.2	Dominated by *Salix lasiolepis*. Associates include *Sambucus mexicana* and *Rubus spectabilis*.	Found primarily along the lower reaches of streams, including Ferrari and Yellow Bank Creeks (Analysis Zone YBSPZ-1).
Central coast live oak riparian forest	G2, S3.2	Dominated by *Quercus agrifolia*. Common associates include *Rosa californica*, *Artemisia douglasiana*, and *Rubus ursinus*.	Various.
Central dune scrub	G2, S2.2	Dominated by low growing shrubs, subshrubs, and herbs, such as *Artemisia pycnocpehala* and *Ericameria ericoides*	Beaches/coastal.
Coast live oak woodland	G4, S4	Dominated by *Quercus agrifolia* with *Umbellularia californica* as a common overstory associate. Understory associates include *Symphoricarpos mollis*, *Toxicodendron diversilobum*, and *Galium aparine*.	Occurs primarily in the upper canyons and on the upper terraces of the Property, in Zone LAW-2 for example.
Freshwater seep	G3, S3.2	Occurs in permanently moist or wet soils. Dominated by perennial herbs, including *Juncus* spp., *Carex* spp., and *Mimulus guttatus.*	The largest examples of this vegetation type occur in the Molino Creek (Zone MS-1)watershed and the Yellow Bank Creek watershed (Zone YBW-2).
Knobcone pine forest	G4, S4	Knobcone pine is the sole or dominant tree in the overstory canopy. Occurs on ridges, upper slopes in dry, rocky, infertile soils.	Located on-site in the upper reaches of the Liddell Creek watershed—Analysis Zones LW-3 and LW-4.
Maritime coast range ponderosa pine forest	G1, S1.1	Dominated by *Pinus ponderosa*	Both sides of Martin Road near Bonny Doon (not on Property).
Monterey pine forest	G1, S1.1	Dominated by native stands of *Pinus radiata* intermixed with *Pinus attenuata*	South of Waddell Creek—native stands not identified on the Property.
Northern coastal salt marsh	G3, S3.2	Dominated by *Salicornia virginica*	Mouth of Scotts Creek.

TABLE 3.1-1 (Continued)
SENSITIVE PLANT COMMUNITIES OCCURING ON OR WITHIN THE VICINITY OF THE COAST DAIRIES PROPERTY

Common Name	Listing Status (TNC/CDFG)	General Description	Site Occurrence
Northern foredunes	G2,S2.1	Dominated by perennial grasses and low growing, often succulant perennial herbs and subshrubs. Characteristic species include *Abronia latifolia*, *Cakile edulenta*, and *Elymus mollis*	Located on-site at a number of beaches, including those at Davenport Landing and Bonny Doon Beach.
Northern interior cypress forest	G2, S2.2	Dominated by *Cupressus abramsiana* intermixed with pines.	"Type locality" at Bonny Doon.
Northern maritime chaparral	G1, S1.2	Dominated by *Arctostaphylos silvicola, Arctostaphylos tomentosa, Pinus attenuata, Ericameria ericoides, and Baccharis pilularis*	Both sides of Martin Road near Bonny Doon(not on Property)..
Purple needlegrass	G3, S3.1	Contains *Nasella pulchra*, *Elymus glaucus*, non-native annual grasses, and a mix of herbaceous perennials, including *Sidalcea malvaeflora, Cholorgalum pomeridianum*, and *Muilla maritima*	Found on the uppermost terraces of the Property that have generally not been farmed. An example occurs in Analysis Zone YBS-1.
Red alder riparian forest	G2, S2.2	Dominated by *Alnus rubra*, stands near streams tend to be monocultural, those further removed from stream disturbance can include *Cornus* ssp. and a variety of shrubs, such as *Ribes* ssp. and *Physocarpus capitatus* as associates	Occurs along medium sized to large streams. An example occurs in Analysis Zone SVSPZ-1.
Redwood forest	G2, S2.3	Dominated by *Sequoia sempervirens*, with *Lithocarpus densiflorus* and *Polystichum munitum* as common associates	Occurs primarily on north-facing slopes within Zones LW-4, SVW-2, and LAW-2.

STATUS CODES:

The Nature Conservancy (TNC) – Global Heritage Program rarity ranks:

G1: Fewer than 6 viable occurrences worldwide and/or 2000 acres
G2: 6-20 viable occurences worldwide and/or 2000-10,000 acres
G3: 21-100 viable occurrences worldwide and/or 10,000-50,000 acres
G4: Greater than 100 viable occurrences worldwide and/or greater than 50,000 acres

State Rarity and Threat Ranks:

S1:	Fewer than 6 viable occurrences statewide and/or 2000 acres	0.1:	Very threatened
S2:	6-20 viable occurences statewide and/or 2000-10,000 acres	0.2:	Threatened
S3:	21-100 viable occurrences statewide and/or 10,000-50,000 acres	0.3:	Unknown
S4:	Greater than 100 occurrences statewide and/or greater than 50,000 acres		

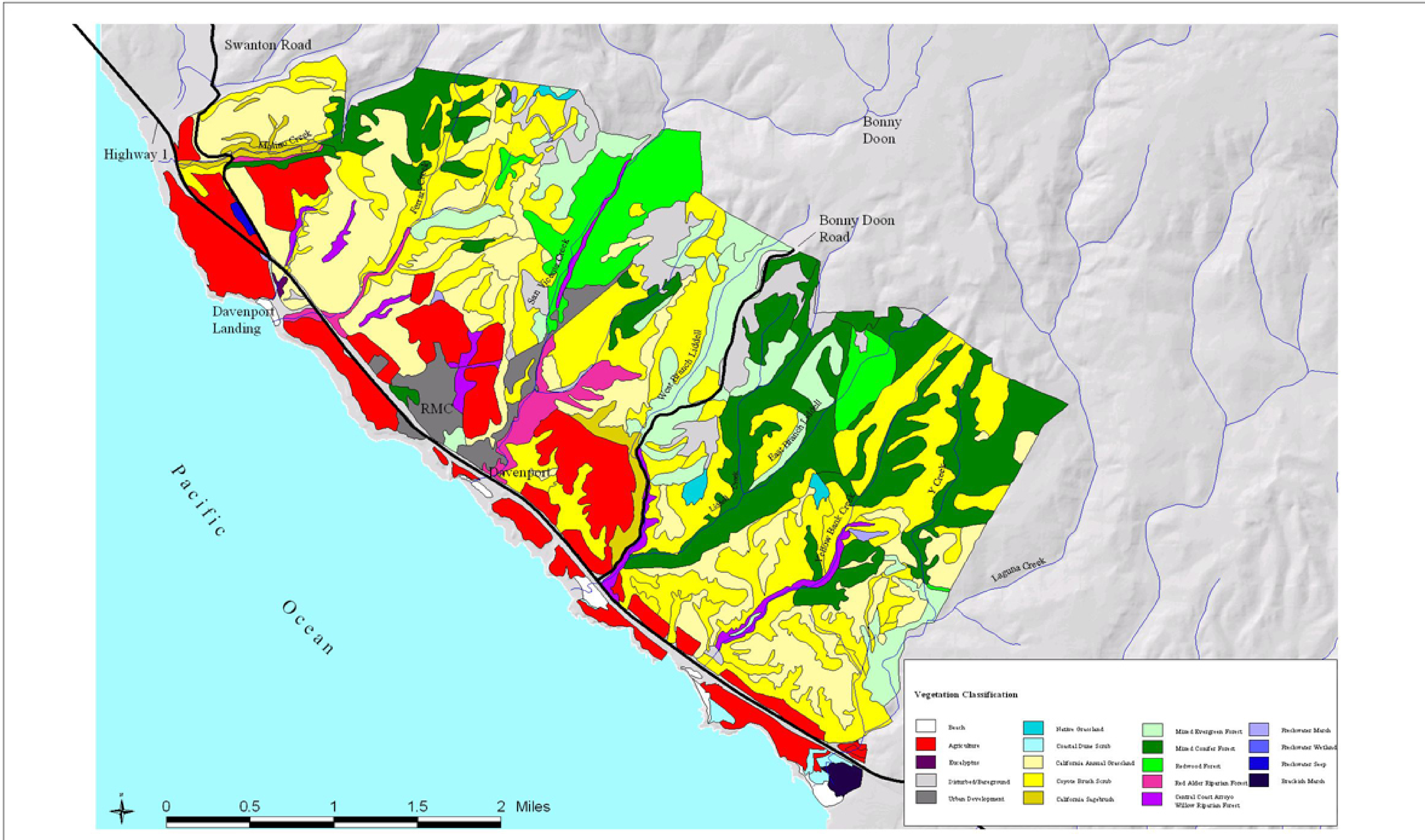
coastal dune scrub on inland sites. CDFG defines this community as very threatened, with only 1,000-3,000 individuals or 2,000-10,000 acres remaining (S2.1).

3.1.3.2 GRASSLAND COMMUNITIES

Grasslands on the Property occupy the tops of terraces and are described herein as two separate community types based on the dominant species present: California annual grassland and the native perennial purple needlegrass grassland. Distribution of these grassland communities is primarily dependent on soil composition and depth, as well as past and ongoing disturbance regimes, such as grazing. The presence of non-native annual grasses, which originate from the Mediterranean region, is a consequence of permanent alterations to once widely-distributed, pristine perennial grasslands in California. The conversion of native perennial grassland into non-native annual stands has resulted from a combination of invasion by exotic plant species, changes in the kinds of animals and their grazing patterns, cultivation, and suppression of fire (Heady, 1988).

California Annual Grassland. Non-native annual grasslands are distributed throughout the valleys and foothills of most of California, except for the north coastal and desert regions, usually below 3,000 feet (4,000 feet in southern California) and range from Oregon to northern Baja California (Holland, 1986). California annual grassland on the Property comprises a dense to sparse cover of non-native grasses often associated with numerous annual and perennial herbaceous forbs. These grasslands typically occur on fine-textured, clay-rich soils, which are moist to waterlogged during winter rains, and dry during the summer and fall (Holland, 1986). Species in this community usually germinate in the late winter, grow actively during the winter and early spring, then produce numerous seeds that remain dormant during the summer and early fall. Annual species favor disturbance events such as grazing. Species in this community include numerous common non-native grasses, including vulpia (*Vulpia myuros*), wild oat (*Avena barbata*) and bromes (*Bromus hordaceus*, *B. diandrus*, and *B. madritensis*). Associated forbs include a mixture of native and non-native species, including black mustard (*Brassica nigra*), thistles (*Centaurea calcitrapa*, *Carduus pycnocephalus*), California poppy (*Eschscholzia californica*), California buttercup (*Ranunculus californica*), clovers (*Orthocarpus* and *Trifolium* spp.), filaree (*Erodium botrys*, *E. cicutarium*) and bluedick (*Dichelostemma capitatum* ssp. *capitatum*).

Purple Needlegrass. Historically, native bunchgrasses, such as purple needlegrass, were much more widespread throughout California. The introduction of exotic grasses and forbs, overgrazing, and alteration of the community's natural fire regime are factors implicated in the displacement of native bunchgrasses and forbs by introduced species. On the Property, purple needlegrass grassland remains dominated by herbaceous perennial species. Native grasses include California oatgrass (*Danthonia californica*), blue wildrye (*Elymus glaucus*), purple needlegrass (*Nassella pulchra*), and California brome (*Bromus carinatus*). Associated herbaceous species include California poppy (*Eschscholzia californica*), checkerbloom (*Sidalcea malvaeflora*), soap root (*Chlorogalum pomeridianum*), Ithuriel's spear (*Triteleia laxa*)and common muilla (*Muilla maritima*). An integral part of this community is the high diversity of



SOURCE: Environmental Science Associates, USGS, Pacific Meridian Resources

Figure 3.1-1
Vegetation Classification on the Coast Dairies Property

wildflowers intermixing with grass species, which produce colorful blooms throughout the spring and early summer months. CDFG defines this community as very threatened, of which only 3,000-10,000 individuals or 10,000-50,000 acres remain (S3.1).

Scrub Communities

Three scrub communities, including central dune scrub, California sagebrush, and coyote brush scrub, are distributed throughout the Property.

Central Dune Scrub. Central dune scrub is restricted to the coast between Bodega Bay and Point Conception (Holland, 1986). Coastal dune scrub lies adjacent to and directly inland from dune vegetation. This community consists primarily of subshrubs (low-growing woody species). The distribution of plants is fairly dense, since this community is subject to wind and full sun exposure. Salt-spray deposition and sand blowouts are thus reduced by dense vegetation. Dominant species observed include dune sagebrush, mock heather, coyote brush (*Baccharis pilularis*), yellow lupine (*Lupinus arboreus*) and seaside woolly sunflower (*Eriophyllum staechadifolium*). Associated species include bush monkeyflower (*Mimulus aurantiacus*), California coffee berry (*Rhamnus californica*), and western poison oak (*Toxicodendron diversilobum*). CDFG defines this community as threatened, with 1,000-3,000 individuals or 2,000-10,000 acres remaining (S2.2).

California Sagebrush. This vegetation type occurs on south-facing slopes where temperatures are higher and soil conditions are dry, primarily in the northern portion of the Property. California sagebrush (*Artemisia californica*) is the dominant species and associated species include bush monkeyflower, deer weed (*Lotus scoparius*) and coyote brush. In some areas paintbrush (*Castilleja* spp.) and buckwheat (*Eriogonum latifolium*) are found.

Coyote Brush Scrub. Coyote brush scrub is distributed from southern Oregon to San Mateo County and from Pacific Grove to Point Sur (Holland, 1986). This scrub community occurs throughout the Property primarily on bluffs and hillside slopes of canyons, gullies and valleys. Coyote brush scrub consists of a dense to moderately open shrub canopy with a sparse herbaceous understory. Most growth and flowering of characteristic species occurs in late spring and early summer. The dominant shrub in this community is coyote brush. Common shrub associates observed on the Property include western poison oak, blue blossom (*Ceanothus thyrsiflorus*), and California coffeeberry. The understory consists of cow parsnip (*Heracleum lanatum*), false Solomon's seal (*Smilacina stellata*), bee plant (*Scrophularia californica* ssp. *californica*), California man-root (*Marah fabaceus*), common yarrow (*Achillea millefolium*), and soap plant (*Chlorogalum pomeridianum*). On some north-facing slopes of the Property native tree species, including Douglas fir (*Pseudotsuga menziesii*) and coast live oak (*Quercus agrifolia*), invade this community; while in the Yellow Bank watershed, French broom (*Genista monspessulana*), a non-native, invasive shrub is colonizing highly disturbed areas of coyote brush scrub.

Woodlands and Forests

Five tree-dominated upland communities are found on the Property: central coast live oak woodland, mixed evergreen forest, mixed conifer forest, redwood forest, and eucalyptus/Monterey cypress woodland.

Central Coast Live Oak Woodland. Central coast live oak woodland is distributed from Sonoma County to Santa Barbara County, generally below 3,000 feet. The growing season begins in winter and continues through spring, with a reduction in growth during the summer-fall drought (Holland, 1986). This woodland type occurs as a riparian community along ephemeral stream courses and as an upland community on the hilltop edges of conifer communities on the Property. Coast live oak is the dominant tree intermixed with toyon (*Heteromeles arbutifolia*), tan bark oak (*Lithocarpus densiflorus*), California bay (*Umbellularia californica*), red elderberry (*Sambucus racemosa* var. *racemosa*), California buckeye (*Aesculus californica*), and madrone (*Arbutus menziesii*). Understory species include bedstraw (*Galium aparine*), western poison oak, California blackberry (*Rubus ursinus*), mugwort (*Artemisia douglasiana*), coyote brush, and snowberry (*Symphoricarpos mollis*).

Mixed Evergreen Forest. Mixed evergreen forest is geographically and biologically transitional between the dense coniferous forests of northwestern California and the open woodlands and savannas of the interior (Holland, 1986). Growing season begins in late spring and extends into summer with characteristic species remaining dormant during the winter months. Mixed evergreen forest is more or less continuous from Santa Cruz County northward through the outer Coast Ranges into Oregon, usually away from the immediate coast (200 to 3,000 feet). Small patches of this community extend south through the Santa Lucia Mountains and Santa Barbara County (Holland, 1986). On the Property mixed evergreen forest is found on moist, well-drained slopes with coarse soils in primarily the Liddell, Yellow Bank and Laguna watersheds. Broadleaved trees generally extend from 30 to 90 feet in height often with taller conifers interspersed. Community dominants include coast live oak, madrone, and California bay. Associated species include California buckeye and red elderberry. Coast redwood (*Sequoia sempervirens*), tanoak, Douglas, and canyon live oak (*Quercus chrysolepis*) occur within this community at higher elevations.

Mixed Conifer Forest. Mixed conifer forest occurs primarily on the north-facing slopes of drainages, primarily in the upper watersheds of San Vicente, Liddell, Yellow Bank and Laguna Creeks. Conifers in this plant community include Douglas-fir, coast redwood, Monterey Cypress (*Cupressus macrocarpa*), Monterey pine (*Pinus radiata*) and knobcone pine (*Pinus attenuata*).

Redwood Forest. Redwood forest is regionally abundant from southern San Mateo County through Santa Cruz County (Holland, 1986). Redwood forest occurs primarily on the north-facing slopes of drainages in the San Vicente, Yellow Bank and Laguna Creek watersheds. Redwood is the sole or dominant tree, with Douglas-fir and Monterey pine as associates in most areas. Characteristic understory associates found on the Property include redwood sorrel (*Oxalis* *oregana*), elk clover (*Aralia californica*), white trillium (*Trillium, ovatum*), western sword fern (*Polystichum munitum*), and starflower (*Trientalis latifolia*)

Eucalyptus/Monterey Cypress Woodland. This community generally occurs as an ornamental woodland or forest in urban environments. There are no native communities of eucalyptus in California. There are two small natural stands of Monterey cypress forest located outside of the Property: one between Point Cypress and Pescadero Point on the north side of Carmel Bay, Monterey Peninsula and a smaller one near Point Lobos on the south side of Carmel Bay. Monterey cypress and eucalyptus have been widely planted, and have since naturalized, along the coast of California. Blue gum (*Eucalyptus globulus*) and Monterey cypress occur on the Property as dense, isolated stands near urban areas on the site. This is a conspicuous landscape element that was probably originally planted as a windrow. Due to the high acid content of blue gum leaf litter, understory vegetation is inhibited and generally absent or consists of limited exotic grasses.

Riparian Communities

Three riparian communities occur on the Coast Dairies Property: central coast arroyo willow riparian forest, red alder riparian forest, and coast live oak riparian forest.

Central Coast Arroyo Willow Riparian Forest. This community is distributed from Monterey south to Santa Barbara (Holland, 1986). Central coast arroyo willow riparian forest occurs as a dense, broadleafed, winter-deciduous thicket of arroyo willow (*Salix laseolepis*) along most Property creeks, such as Yellow Bank and Ferrari. Arroyo willow is associated with red alder (*Alnus rubra*), California blackberry, rush (*Juncus* spp.), and western sword fern. This community supports very little herbaceous understory due to low light conditions at the soil surface (suppressing seed germination). This early seral community may succeed to any of several riparian woodland or forest types in the absence of flooding disturbance. Central coast arroyo willow riparian forest intermixes with red alder riparian forest on most major creeks on the Property. CDFG defines this community as threatened, with 3,000-10,000 individuals or 10,000-50,000 acres remaining (S3.2).

Red Alder Riparian Forest. Red alder riparian forest is distributed within California along the immediate coast from northernmost San Luis Obispo County to Cape Mendocino, Humboldt County (Holland, 1986). On the Property, red alder riparian forest forms a dense structure along the banks of seasonally saturated and perennial streams, such as Ferrari and San Vicente Creeks. Red alder is strongly associated with big-leaf maple (*Acer macrophyllum*). The understory includes woody and herbaceous plants such as arroyo willow, red elderberry (*Sambucus racemosa* var. *racemosa*), western sword fern, and giant chain fern (*Woodwardia fimbriata)*. CDFG defines this community as threatened, of which 1,000-3,000 individuals or 2,000-10,000 acres remain (S2.2).

Central Coast Live Oak Riparian Forest. In general, this community occurs in canyon bottoms and floodplains of the South Coast and Transverse Ranges, from Sonoma County south to near Point Conception (Holland, 1986). On the Property, coast live oak riparian forest is similar in species composition to its upland coast live oak forest counterpart. This community is dominated by coast live oak trees. Associated species include western poison oak, California blackberry, mugwort, snowberrry, coyote brush, and red elderberry. CDFG defines this community as threatened, which 3,000-10,000 individuals or 10,000-50,000 acres remain (S3.2).

Wetland and Marsh Communities

Stream Channel. There are seven major perennial streams on the Property, including ScottsCreek (a small portion), Molino Creek, Ferrari Creek, San Vicente Creek, Liddell Creek, Yellow Bank Creek, and Laguna Creek. These streams occur in well defined, steep canyons, and primarily support red alder forest intermixed with central coast arroyo willow riparian vegetation. The upper reaches of San Vicente, Liddell, Yellow Bank, and Laguna Creeks support coast live oak riparian forest.

Freshwater Seep. Seasonal freshwater seeps are commonly found in grasslands at the heads of major creeks and tributaries. Figure 3.1-1 depicts freshwater seeps that were observed on the Property. Freshwater seeps form on soil surfaces underlain by Santa Cruz mudstone (the most abundant geologic type underlying the Coast Dairies Property – see Section 4.2), Santa Margarita sandstone, and Lompico sandstone. These are areas where water is present at or near the ground surface due to relatively permeable, poorly cemented, and friable sandstone formations. The two largest areas of observed seepage occurs in Analysis Zone MS-1 of the Molino watershed near Warnella Road Extension, and at YBW-2 of the Yellow Bank watershed near Liddell Pipeline Road. Dominant species observed in seeps on the Property include sedges (*Carex* spp.), California buttercup (*Ranunculus californicus*), perennial rye-grass (*Lolium perenne*), toad rush (*Juncus bufonius*), brown-headed rush (*Juncus phaeocephalus*) and spikerush (*Eleocharis macrostachya*).

Freshwater seeps are distributed through most regions of California. This community type has been severely restricted in acreage and habitat quality due to water diversion and urban and agricultural land conversions. CDFG defines this community as threatened, with 3,000-10,000 individuals or 10,000-50,000 acres remaining (S3.2).

Freshwater Pond. Several artificial ponds are present in and near creeks and seeps, and serve as water storage facilities throughout the Property. These ponds support primarily California bulrush (*Scirpus californicus*) and cattail (*Typha latif*olia).

Freshwater Marsh. A large freshwater marsh lies at the mouth of Laguna Creek. This marsh primarily supports California bulrush and sedges. Salinity levels may increase at high tide or during periods of low freshwater input from Laguna Creek. This freshwater marsh is similar in description to coastal and valley freshwater marsh as described by Holland (1986).

Urban Development, Disturbed, and Agriculture. Areas of urban development are highly disturbed and consist of residential housing, ornamental trees, landscaping plants, and/or rural vegetable gardens. Areas denoted as disturbed are mostly devoid of vegetation due to past activities such as mining. Agricultural fields are located primarily on coastal terraces adjacent to the Pacific Ocean. Many of these agricultural fields have displaced native plant communities that once included central dune scrub and native grasslands.

3.1.4 WETLANDS

Wetlands are among the most ecologically productive of habitats, supporting a rich array of plant and animal life. They sustain a great variety of hydrologic and ecological functions vital to ecosystem integrity. These functions include flood abatement, sediment retention, groundwater recharge, nutrient capture, and high levels of plant and animal diversity. Wetlands and riparian areas are relatively rare compared to the entire landscape. When wetlands are converted to systems that are intolerant of flooding (drained agricultural lands, filled developed lands), their storage capacity decreases and downstream flooding increases. Modification of even small wetland areas induces effects that are proportionally greater than elsewhere in an ecosystem

Aquatic and riparian systems are the most altered and impaired habitats of California (University of California, Davis, 1996). Wetlands in California have been drained since the earliest settlers attempted to "reclaim" meadows and other wet areas. Meadows were commonly drained with the intent of improving forage conditions and to permit agriculture (University of California, Davis 1996). Development and human alteration have profoundly altered wetland and stream-flow patterns and water temperaturPlanning Teamnd it is estimated that up to 90 percent of California's natural wetlands have been lost (Howell, 1970).

Recognizing the important ecological functions associated with wetlands and the extent to which these systems have been modified and destroyed nationwide, both the federal and state governments have promulgated protective regulations concerning these productive ecosystems. See Section 6.2 for a discussion of wetland regulations and definitions.

3.1.4.1 COAST DAIRIES WETLANDS

Wetland data presented in this section are descriptive in nature. The intent is to provide general descriptions, functions, and values of wetland and water-dependent communities at Coast Dairies. Details concerning actual extent (location on the ground, acreage) and jurisdictional determination are not included herein and are left for more specific planning and implementation documents. The Planning Team found only one documented formal wetland delineation for the Property, for the area immediately adjacent to and north of Highway 1, prepared by the Habitat Restoration Group in 1994 (HRG, 1994).

Riparian Wetlands

Wetlands within the Coast Dairies Property are most commonly riparian in nature and include aquatic, riparian, meadow, and floodplain communities. The riparian zone is the plant community adjacent to a river or stream channel and serves as the interface between the river and the surrounding meadows, floodplain, and upland plant communities. It may be best described as the zone of direct interaction between land and water. Riparian areas are characterized by the combination of high species diversity, high species density, and high productivity. Continuous interactions occur among riparian, aquatic, and upland terrestrial ecosystems through exchanges of energy, nutrients, and species. Compared to other wetland and aquatic types, riparian areas are "open," with large energy, nutrient, and biotic interchanges between aquatic systems on the inner margin and upland terrestrial ecosystems on the upland margin. Riparian ecosystems are further distinguished from other ecosystem types, as described below.

- Riparian ecosystems have a linear form as a consequence of their proximity to rivers, streams, and lakes.
- Energy and material from the surrounding landscape converge and pass through riparian ecosystems in much greater amounts than with any other ecosystem.
- Riparian ecosystems connect upstream and downstream ecosystems.
- Floodwater and subsequent groundwater levels are the main determinants of the type and productivity of the vegetation found in the riparian zone.

Floodwater also brings nutrient-rich sediment to the floodplain, exports organic and inorganic material from the floodplain, and serves as a primary agent for long-term aggregation and degradation of the floodplain.

The diversity and structural complexity of riparian vegetation creates a wide variety of habitats for animals. Both terrestrial and aquatic wildlife depend on riparian ecosystems with their year-round availability of water, nutrients, food sources, and organic matter. In additions to these critical components of food resources, riparian ecosystems provide wildlife with a structural complexity that includes mosaics of shade and sun, shelter, and protected corridors between adjacent plant communities. It is not surprising, that riparian ecosystems are centers of high biodiversity (Rundel and Stuner, 1998).

Riparian communities are among the most impacted on the Property due to the effects of logging and stream diversion, trampling, and placement of above- and below-ground infrastructure, including conveyor belts, dams, bridges, and pipelines.

Wetland Classes

Specific wetland classes identified on the Property include riverine (rivers, creeks, and streams), palustrine (shallow ponds, marshes, swamps, sloughs), and lacustrine (lakes and deep ponds).

Using the Cowardin classification, specific wetland and deepwater classes within the Property ecosystem include:

- **Riverine upper perennial** – seven major creeks (ScottsCreek [a small portion], Molino Creek, Ferrari Creek, San Vicente Creek, Liddell Creek, Yellow Bank Creek, and Laguna Creek);
- **Palustrine emergent** – emergent wetland (marsh, meadow) habitat underlain by Santa Cruz mudstone, Santa Margarita sandstone, and Lompico sandstone;
- **Palustrine forest -** the riparian forest habitats along the most of the major creeks and their tributaries subject to various flooding regimes; and
- **Palustrine scrub shrub** – riparian scrub (e.g., willow) habitat along the Merced River and South Fork along the lower reaches of six major creeks (San Vicente Creek, Ferrari Creek, Liddell Creek, Yellow Bank Creek, and Laguna Creek) and their tributaries subject to various flooding regimes.

The following discussion provides general descriptions for each wetland class identified as occurring on the Property.

Riverine Upper Perennial

Riverine upper perennial habitat within the Property includes the open and flowing water of the seven major creeks, including Scotts Creek (a small portion), Molino Creek, Ferrari Creek, San Vicente Creek, Liddell Creek, Yellow Bank Creek, and Laguna Creek. It is the permanently flooded rock-, cobble-, or sand-bottom channel with little to no in-stream vegetation. Occasional sandbars form within and at the channel edge and typically support willows and emergent (grasses and herbs) vegetation. Based on the Cowardin classification system, the majority of the creeks would be classified as wetland. Channel portions that lie at a depth of 2 meters below low water would be considered deepwater. These creeks would likely be considered as waters of the United States by the U.S. Army Corps of Engineers, and their status would be subject to jurisdiction under Section 404 of the Clean Water Act.

Palustrine Emergent

Palustrine emergent habitat includes grassland meadows and freshwater seeps. Soils generally remain saturated year-round or on a seasonal basis. Vegetation is dominated by grasses, sedges, rushes, and perennial herbs. These communities are typically considered wetlands under both the Cowardin classification system and U.S. Army Corps of Engineers wetland definition.

Palustrine Forest

Palustrine forests are found along the most of the major creeks and their tributaries on the Property. In the upper reaches of Coast Dairies' watersheds these are primarily coast live oak riparian forest. For example along San Vicente Creek, where the creek is broad, shallow, and slow-moving, California bay, willows, and coast live oak dominate the riparian corridor. Substrate under the palustrine forest community varies from rock, gravel, sand, clays, loams, and mud. Palustrine forests are classified as wetlands based on the Cowardin classification system. These areas are classified as either wetland or nonwetland waters of the United States by the U.S. Army Corps of Engineers, depending on site-specific vegetation, soils, and hydrologic conditions.

Palustrine Scrub Shrub

Palustrine scrub shrub is found in the riparian corridor along the lower reaches of the six major creeks (San Vicente, Ferrari, Liddell, Yellow Bank, and Laguna) and their tributaries, and is regularly inundated by normal high-water or flood flows. This habitat is dominated primarily by red alder forest intermixed with central coast arroyo willow riparian vegetation and often intergrades with grassland meadow and freshwater seep (palustrine emergent) and riparian (palustrine forest) communities. These communities are typically classified as wetlands under both the Cowardin Classification system and U.S. Army Corps of Engineers classification systems.

3.1.5 SPECIAL STATUS PLANT SPECIES

As discussed below, a number of species known to occur on or in the vicinity of the Coast Dairies property are accorded "special status" because of their recognized rarity or vulnerability to various causes of habitat loss or population decline. Some species are formally listed and receive specific protection defined in federal or state endangered species legislation. Other species have no formal listing status as threatened or endangered, but are designated as “rare” or “sensitive” on the basis of policies adopted by federal or state resource agencies, by local governmental agencies such as counties, cities, and special districts to meet local conservation objectives, or by organizations with acknowledged expertise such as the California Native Plant Society. These species are referred to collectively as "special status species" in this ECR, following a convention that has developed in practice but has no official sanction. See Section 6.1 for a discussion of special status species regulatory mechanisms.

3.1.5.1 SPECIAL STATUS PLANT SPECIES AND COAST DAIRIES

A list of special status plant species reported to occur on or within the vicinity of the Coast Dairies Property was compiled on the basis of data in the CNDDB (1999), CNPS Electronic Inventory (1999), and a review of regional botanical literature and previous site surveys (Amme D., 1999; Bonny Doon Quarries Revegetation and Reclamation Plan, 1996; CNPS Field Survey, 2001; Habitat Restoration Group, 1994; Josselyn et al., 1994; Willis pers. comm., 2001). A total of 55 special status plant species were identified as having the potential to occur on the Property. Listing status, general habitat, and nearby occurrences for these species are summarized in Table 3.1-2. Of these, eleven are either federally or state listed as threatened or endangered. These species will be discussed further in the next section. Fifteen species are considered Species of Special Concern by USFWS or CDFG, eight are CNPS List 1B species, and 21 are CNPS List 2, 3, or 4 species or are considered locally rare.

The following discussion presents a summary of survey results to date. Botanical surveys were completed by Planning Team botanists in October 2000 and on February 16, March 21, April 1 and 14 (with members of CNPS), and April 25, 2001. Surveys were comprehensive but it is highly likely that new species will be discovered on the property in the coming years. Plant surveys were floristic in nature, identifying every species to the point that its rarity could be confirmed or denied (see the Project Archives for a full list of plant species identified on-site). Certain special status species were eliminated from further consideration due to lack of available habitat(s) on the Coast Dairies property. Special status plant species that typically occur in habitats present on the Property that were not found during surveys are presumed present on the site. These species will remain "presumed present" within suitable habitats on the property until survey data prove otherwise.

To date, three special status species have been found during surveys conducted on the Property by Planning Team botanists and previous investigators (see Table 3.1-2). Santa Cruz clover (*Trifolium buckwestiorum*) is a CNPS List 1B species, and common muilla (*Muilla maritima*) and Michael's rein orchid (*Piperia michaelii*) are designated as locally rare.

3.1.5.2 FEDERAL AND STATE LISTED SPECIES WITH THE POTENTIAL TO OCCUR ON THE COAST DAIRIES PROPERTY

Based on an examination of general distribution and habitat requirements, as well as an assessment of available habitat on the Property, the following federal or state listed threatened and endangered species were determined to have a medium to high potential for occurrence on the Coast Dairies property.

Monterey Spineflower (Chorizanthe pungens var. pungens)

Species Status, Description and Habitat Requirements

Monterey spineflower is listed as federally threatened. A prostrate member of the knotweed family (Polygonaceae), this species flowers from April to June. Its perianth is white to rose and the involucral tube surrounding the flower has papery margins that are white to purple, with hooked awns on the tip of each lobe. Monterey spineflower is found in coastal strand, coastal dune, and coastal scrub habitat along the more northerly regions of California's central coast and in the coastal portions of the San Francisco Bay Area.

TABLE 3.1-2
SPECIAL STATUS PLANT SPECIES REPORTED TO OCCUR WITHIN THE VICINITY OF THE COAST DAIRIES PROPERTY

Common Name	Listing Status (USFWS/CDFG)	General Habitat	Site Occurrence
		FEDERAL OR STATE LISTED SPECIES	
Ben Lomond spineflower *Chorizanthe pungens var. hartwegii*	FE / - / List 1B	Zayante coarse sands in maritime ponderosa pine sandhills	Habitat not found on-site. Nearest known location--Bonny Doon Ecological Preserve.
Monterey spineflower *Chorizanthe pungens var. pungens*	FT/ - /List 1B	Coastal dunes and scrub	Not found on-site to date.
Scott's Valley spineflower *Chorizanthe robusta var. hartwegii*	FE/ - /List 1B	Xeric or sandy meadows or grasslands on mudstone or Purisima outcrops	Not found on-site to date.
Robust spineflower *Chorizanthe robusta var. robusta*	FE / - / List 1B	Sandy terraces and bluffs within cismontane woodlands, dunes or scrub	Not found on-site to date. Nearest documented location is Pogonip.
Santa Cruz cypress *Cupressus abramsiana*	FE / CE / List 1B	Closed cone coniferous forests on sandstone or granite derived soils	Not found on-site to date. Nearest documented location is north of Bonny Doon between Pine Flat Road and Martin Road – known from fewer than 10 occurrences in the Santa Cruz Mountains.
Santa Cruz (Ben Lomond) wallflower *Erysimum teretifolium*	FE / CE / List 1B	Chaparral or coniferous forests on inland marine sands	Not found on-site to date. Located within the Bonny Doon Ecological Preserve.
Santa Cruz tarplant *Holocarpha macradenia*	FT / CE / List 1B	Coastal prairie or grasslands (often associated with clays)	Not found on-site to date. Suitable habitat includes less disturbed grasslands of upper terraces.
White-rayed pentachaeta *Pentachaeta bellidiflora*	FE / CE / List 1B	Open dry rocky slopes and grassy areas – often on soils derived from serpentine	No serpentine soils on-site. Nearest reported occurrece for this species is on hillsides located above San Lorenzo Creek.
San Francisco popcorn-flower *Plagiobothrys diffusus*	FSC / CE / List 1B	Coastal prairie and grasslands	Not found on-site to date. Nearest known location is on the Bombay property.
Hickman's potentilla *Potentilla hickmanii*	FE /CE / List 1B	Coastal bluffs and scrub, mesic meadows, seeps, and marshes	Not found on-site to date.
Tidestrom's lupine (Clover Lupine) *Lupinus tidestromii*	FE / - / List 1B	Coastal strand, dune and other coastal habitats	Not found on-site to date.

TABLE 3.1-2 (CONTINUED)
SPECIAL STATUS PLANT SPECIES REPORTED TO OCCUR WITHIN THE VICINITY OF THE COAST DAIRIES PROPERTY

Common Name	Listing Status (USFWS/CDFG)	General Habitat	Site Occurrence
		FEDERAL OR STATE SPECIES OF CONCERN	
Blasdale's bent grass *Agrostis blasdalei*	FSC / CR / List 1B	Sandy or gravelly soils close to rocks with sparse vegetation	Ploughed and disturbed site 1.8 miles southeast of Swanton Road and Highway 1, west of Highway 1.
Santa Cruz manzanita *Arctostaphylos andersonii*	FSC / - / List 1B	Chaparral and coniferous forests – often associated with redwoods	Not found on-site to date. Nearest known locations are Pine Flat road in Bonny Doon and at the summit of Empire Grade – known from fewer than 15 occurrences in the Santa Cruz Mountains.
Schreiber's manzanita *Arctostaphylos glutinosa*	FSC / - / List 1B	Chaparral and coniferous forests underlain by diatomaceous shale outcrops – often associated with *Pinus attenuata*	Not found on-site to date. Nearest known locations are between Mill Creek and ScottsCreek ½ mile northeast of Seaside School and at Ben Lomond – known from fewer than 10 occurrences.
Pajaro manzanita *Arctostaphylos pajaroensis*	FSC / - / List 1B	Chaparral – only in Monterey and Santa Cruz Counties (may be extinct in Santa Cruz County)	Nearest documented location is 2.5 miles southeast of Eagle Rock along Ice Cream Grade north of Bonny Doon.
Bonny Doon manzanita *Arctostaphylos silvicola*	FSC / - / List 1B	Chaparral and coniferous forests underlain by inland marine sands	Nearest documented location is Bonny Doon Ecological Reserve – known from fewer than 20 occurrences.
Ben Lomond spineflower *Chorizanthe pungens var. hartwegiana*	FSC / - / List 1B	Marine ponderosa pine sandhills	Habitat has not been found on-site.
San Francisco gumplant *Grindelia hirsutula var. maritima*	FSC / - / List 1B	Coastal bluff scrub and grasslands – often associated with serpentine or sandy soils or rock outcrops	Not found on-site to date.
Kellogg's horkelia *Horkelia cuneata ssp. sericea*	FSC / - / List 1B	Coastal scrub and closed cone pine forests	Not found on-site to date.
Point Reyes horkelia *Horkelia marinensis*	FSC / - / List 1B	Coastal dunes, coastal terrace prairie and coastal scrub	Not found on-site to date. Known from fewer than 20 occurrences.
Smooth lessingia *Lessingia micradenia var. glabrata*	FSC / - / List 1B	Chaparral and cismontane woodland – generally associated with serpentine soils or road cuts	Not found on-site to date. Known from only 11 occurrences. Serpentine does not occur on-site.

TABLE 3.1-2 (CONTINUED)
SPECIAL STATUS PLANT SPECIES REPORTED TO OCCUR WITHIN THE VICINITY OF THE COAST DAIRIES PROPERTY

Common Name	Listing Status (USFWS/CDFG)	General Habitat	Site Occurrence
Gairdner's yampah *Perideridia gairdneri ssp. gairdneri*	FSC / - / List 1B	Dry bluffs and slopes of the Monterey Penninsula	Nearest documented location is ScottsCreek near Swanton
Scott's Valley polygonum *Polygonum hickmanii*	FSC / - / List 1B	Annual grassland and wildflower fields occurring on fine-textured, shallow, well drained soils over outcrops of Santa Cruz mudstone and Purisima sandstone	Not found on-site to date. Thought to be restricted to two sites in Scott's Valley.
Monterey pine *Pinus radiata*	FSC / - / List 4	Mesic places within broadleaved upland forests, chaparral, and grasslands	Only 3 native stands occur in California at Ano Nuevo, Cambria and the Monterey Peninsula.
San Francisco campion *Silene verecunda ssp. verecunda*	FSC / - / List 1B	Coastal scrub and grasslands	Located approximately 2/3 mile south of Swanton Road and 1/3 mile east of Highway 1.
Santa Cruz microseris *Stebbinsoseris decipiens*	FSC / - / List 1B	Open areas in loose or disturbed soil (generaly sandstone) on seaward slopes within broadleaved upland forests and coastal prairie	Not found on-site to date. Nearest locations are approximately 2 miles northwest of the Big Creek Fire Station and at the confluence of ScottsCreek and Mill Creek.
		OTHER SPECIAL STATUS SPECIES	
Bent-flowered fiddleneck *Amsinkia lunaris*	- / - / List 1B	Coastal bluff scrub, cismontane woodland and grasslands below 500 meters in elevation	Not found on-site to date.
San Francisco collinsia *Collinsia multicolor*	- / - / List 1B	Coastal scrub and woodlands	Not found on-site to date. Known from only a few populations in Santa Cruz County.
Loma Prieta hoita *Hoita strobilina*	- / - / List 1B	Chaparral, cismontane woodland and riparian woodlands – generally associated with mesic serpentine sites	Not found on-site to date. Serpentine does not occur on-site.
Marsh microseris *Microseris paludosa*	- / - / List 1B	Closed cone coniferous forests, cismontane woodland, coastal scrub, and grasslands	Not found on-site to date.
Ben Lomond buckwheat *Enogonum nudum var. decurrens*	- / - / List 1B	Chaparral and woodlands – especially maritime ponderosa pine sandhills	Not found on-site to date.
Santa Cruz Mountains beardtongue *Penstemon rattanii var kleei*	- / - / List 1B	Sandy shale slopes often in the transition from forest to chaparral	Not found on-site to date. Nearest locations are between Mill Creek and ScottsCreek and at Ben Lomond – known from fewer than 10 occurrences.

TABLE 3.1-2 (CONTINUED)
SPECIAL STATUS PLANT SPECIES REPORTED TO OCCUR WITHIN THE VICINITY OF THE COAST DAIRIES PROPERTY

Common Name	Listing Status (USFWS/CDFG)	General Habitat	Site Occurrence
Maple-leaved checkerbloom *Sildalcea malachroides*	- / - / List 1B	Woodlands and clearings near the coast – often in disturbed areas	Not noted from Santa Cruz County since 1932.
Santa Cruz clover *Trifolium buckwestiorum*	- / - / List 1B	Margins of broadleaved upland forests and coastal prairie	Located in a shallow depression near the Purdy aluminum barn in the vicinity of Swanton within the ScottsCreek Watershed.
		LOCALLY RARE SPECIES	
Reedgrass *Calamagrostis nutkaensis*	- / - / - (locally rare)	Wet areas of beaches, dunes or coastal woodlands	Not found on-site to date.
Large-flowered star tulip *Calochortus uniflorus*	- / - / - (locally rare)	Moist meadows	Not found on-site to date.
Santa Cruz Mountains pussypaws *Calyptridium parryi var. hesseae*	- / - / List 3	Chaparral and cismontane woodland	Not found on-site to date.
Johnny nip *Castilleja ambigua*	- / - / - (locally rare)	Coastal bluffs, salt marshes, and grasslands below 150 meters in elevatiaon	Not found on-site to date.
Purple owl's-clover *Castilleja exserta latifolia*	- / - / - (locally rare)	Coastal bluffs and dunes	Not found on-site to date.
California bottle-brush grass *Elymus californicus*	- / - / List 4	Coniferous forests	Not found on-site to date.
San Francisco wallflower *Erysimum franciscanum*	- / - / List 4	Coastal dunes, scrub and grasslands – often associated serpentinite or granitic soils	Not found on-site to date.
Large-flowered linanthus *Linanthus grandiflorus*	- / - / - (locally rare)	Open grassy flats – generally associated with sandy soils	Not found on-site to date.
Linanthus *Linanthus parviflorus*	- / - / - (locally rare)	Open or wooded areas	Not found on-site to date.
Mount Diablo cottonweed *Micropus amphibolus*	- / - / List 3	Coastal bluffs, grasslands and cismontane woodlands	Not found on-site to date.

TABLE 3.1-2 (CONTINUED)
SPECIAL STATUS PLANT SPECIES REPORTED TO OCCUR WITHIN THE VICINITY OF THE COAST DAIRIES PROPERTY

Common Name	Listing Status (USFWS/CDFG)	General Habitat	Site Occurrence
Santa Cruz County monkeyflower *Mimulus rattanii ssp. decurtatus*	- / - / List 4	Margins of chaparral and coniferous forests	Not found on-site to date.
Common muilla *Muilla maritima*	- / - / - (locally rare)	Grasslands, open scrub and woodlands – often associated with alkaline, granitic, or serpentine soils	Occurs on shallow soils on upper terraces in YBS-1
Rein orchid *Piperia elegans*	- / - / - (locally rare)	Generally dry open sites in coniferous forests or coastal scrub	Not found on-site to date.
Michael's rein orchid *Piperia michaelii*	- / - / List 4	Coastal bluff scrub, woodlands and coniferous forests	Observed on-site at unknown location.
Choris's popcornflower *Plagiobothrys chorisianus*	- / - / List 3	Mesic areas within chaparral, coastal scrub and coastal terrace prairie	Not found on-site to date.
Erect plantain *Plantago erecta*	- / - / - (locally rare)	Sandy, clayey or serpentine soils within grasslands or woodlands	Not found on-site to date.
Round woolly marbles *Psilocarphus tenellus globiferus*	- / - / List 4	Meadows and seasonally mesic portions of grasslands	Not found on-site to date.
Gray's clover *Trifolium (barbigerum andrewsii) grayii*	- / - / - (locally rare)	Wet meadows and slopes to coniferous forests	Not found on-site to date.
Clover *Trifolium appendiculatum*	- / - / - (locally rare)	Mesic sites in grasslands	Not found on-site to date.
Death camas *Zygadenus fontanus*	- / - / - (locally rare)	Grassy or wooded slopes – often associated with rock outcrops	Not found on-site to date.
Fremont's death camas *Zygadenus fremontii minor*	- / - / - (locally rare)	Grassy or wooded slopes – often associated with rock outcrops	Not found on-site to date.

STATUS CODES:

FEDERAL: (U.S. Fish and Wildlife Service)

FE=Listed as Endangered by the Federal Government
FT = Listed as Threatened by the Federal Government
FSC=Federal Species of Concern

STATE: (California Department of Fish and Game)

CE=Listed as Endangered by the State of California
CR = Listed as Rare by the State of California

STATUS CODES (continued):

California Native Plant Society

List 1B=Plants rare, threatened, or endangered in California and elsewhere
List 2= Plants rare, threatened, or endangered in California but more common elsewhere
List 3= Plants about which more information is needed
List 4= Plants of limited distribution

Scott's Valley Spineflower (*Chorizanthe robusta* var. *hartwegii*)

Species Status, Description and Habitat Requirements

Scott's Valley spineflower, an annual herb endemic to California, is a federally endangered species and is also a CNPS List 1B plant. This spineflower has rose-pink involucral margins confined to the basal portion of the teeth and an erect habit. Flower heads are medium in size (1 to 1.5 cm) and distinctly aggregate. The plant is endemic to the central California coast region and limited to Purisima sandstone and Santa Cruz mudstone. It is known from Scott's Valley in the Santa Cruz Mountains. Where the species occurs on Purisima sandstone, the bedrock is overlain with a thin, sandy soil layer that supports a meadow community comprised of herbs and low-growing grasses. The species can also be found in coastal scrub habitat. Numbers of this annual plant are expected to fluctuate from year to year, depending on climatic conditions.

Robust Spineflower (Chorizanthe robusta var. robusta)

Species Status, Description and Habitat Requirements

Robust spineflower is listed as federally endangered and also as a CNPS List 1B species. This species is similar in appearance to Scott's Valley spineflower but its stems tend to be decumbent rather than erect. It also lacks the pink involucral margins described above. Robust spineflower is found on sandy terraces and bluffs within cismontane woodlands or in coastal dune and scrub habitat. The nearest documented location for this species is in Pogonip.

Santa Cruz (Ben Lomond) Wallflower (*Erysimum teretifolium*)

Species Status, Description and Habitat Requirements

Santa Cruz or Ben Lomond wallflower is listed as endangered on both the federal and state levels, as well as designated a CNPS List 1B species. The species is a biennial, or occasionally an annual, belonging to the mustard family (Brassicaceae). Seedlings form a basal rosette of leaves. These leaves wither as the main stem develops flowers, which are clustered in a terminal raceme. The flowers are a deep yellow with petals 1.3 to 2.5 cm long; the fruit is a slender capsule that reaches 10 cm in length and is covered with three-parted hairs. Herbage is a dull purplish color. The leaves are simple and narrowly linear, a characteristic that separates this plant from other wallflowers. This wallflower is endemic to sandstone deposits in the Santa Cruz Mountains and is presently known from only a dozen scattered occurrences, seeming to prefer sites with loose, uncompacted sand in openings between scattered chaparral shrubs. The nearest documented occurrence is from Bonny Doon Ecological Preserve.

Santa Cruz Tarplant (*Holocarpha macradenia*)

Species Status, Description and Habitat Requirements

Listed by California as endangered, as federally threatened, and by CNPS as a List 1B species, the Santa Cruz tarplant is a rigid, glandular annual ranging from 1 to 5 decimeters in height. Because it occurs in colonies, it is easily observed, especially when it produces its yellow flowers between June and October. The key characteristics for the genus are: (1) the phyllaries enclose the ray flowers; and (2) the phyllaries and upper leaves are covered with stalked glands. The species is recognized by its black anthers and large number (40 to 90) disk flowers. It inhabits grassy flats underlain by heavy soils along the coast, and has been observed in Alameda, Contra Costa, Marin, Santa Cruz and Monterey Counties. CNPS reports that the species is threatened by urbanization, agriculture, non-native plants, and lack of appropriate ecological disturbance. Reports in 1993 from Santa Cruz indicate that the only populations maintaining themselves are those exposed to grazing.

White Rayed Pentachaeta (*Pentachaeta bellidiflora*)

Species Status, Description and Habitat Requirements

This species is federally and state listed as endangered and is also on CNPS List 1B. This small (2 to 8 inches) annual of the sunflower family has 5 to 16 white or purple tinged ray flowers, with a hairy stem and leaves and flowers March to May. The species often occurs on serpentine derived soils and has been found in the serpentine grasslands inland from Coast Dairies but Munz (1970) reports that it also occurs in northern coastal scrub and coastal prairie grassland. The nearest reported occurrence of this species is at San Lorenzo Creek.

San Francisco Popcorn Flower (*Plagiobothrys diffusus*)

Species Status, Description and Habitat Requirements

San Francisco popcorn flower is listed by the state as endangered, by the USFWS as a species of special concern, and by CNPS as a List 1B species. It is generally found in coastal prairie and grassland habitats. Its nearest documented location is on the Bombay property to the south of Coast Dairies. This species is currently known from fewer than ten occurrences throughout its range.

Hickman's Potentilla (*Potentilla hickmanii*)

Species Status, Description and Habitat Requirements

This species is on CNPS List 1B, state endangered, and federally proposed as endangered. This yellow flowered perennial herb, a member of the rose family (Rosaceae), occurs in northern coastal scrub, closed-cone pine forest, freshwater wetlands, and meadows and seeps. There are no documented occurrences of this species on the Coast Dairies Property, but suitable habitat does exist. The closest site with known occurrences of this potentilla was documented north of Moss Beach at Half Moon Bay.

Tidestrom's Lupine (*Lupinus tidestromii*)

Species Status, Description and Habitat Requirements

A federally endangered and CNPS List 1B species, Tidestrom's lupine belongs to the pea family (Fabaceae). This is a creeping perennial with a rhizomatous root system and white, shaggy herbage. This lupine's blue to lavender flowers appear from May to June. The species is found in beach and dune habitat and its known distribution is limited to dunes systems in Sonoma, Marin, and Monterey Counties.

3.1.6 ISSUES

3.1.6.1 ISSUES IDENTIFIED BY THE CITIZENS ADVISORY GROUP

Prior to the formation of the Planning Team, the Trust for Public Land was assisted in its early project scoping by members of the Community Advisory Group (CAG). In order to deal specifically with natural resource issues, a subcommittee of the CAG was tasked with identifying habitat preservation and enhancement concerns. The instructions for the subcommittee were to identify critical/sensitive habitats and their locations, and to discuss the special needs of each. The group did not find it appropriate at that point in the process to produce detailed maps or species lists, since it was assumed that the Planning would grapple with that level of analysis in the ECR. Rather, the group chose to identify missing pieces of information they felt necessary to have before evaluating any areas of concern and general resource management topics. The subcommittee presented to TPL a summary of an April 24, 2000 meeting, which listed the following priorities relevant to botanical resources:

- evaluating native plant species for re-introduction;
- rehabilitating mined areas; and
- establishing ongoing research programs for livestock grazing and similar uses.

These issues will be evaluated during the planning process for the Property.

3.1.6.2 NON-NATIVE PLANT SPECIES

Prior to the arrival of the first European settlers, the California landscape was made up of a variety of ecosystems, including prairies, oak woodlands, and wetlands. These ecosystems were home to abundant birds, butterflies and other animals. Increasingly, few acres of these original landscapes remain. Most of these areas have been transformed into the agricultural lands, urban centers, and industrial sites we see today. After European settlement, people planted gardens with plants brought from their home country. Gardens were tiny, comfortable plots set in a huge wilderness. Today, however, the reverse is true. Agricultural and garden plants introduced from all over the world dominate the landscape, while native plants are managed in small preserves.

Native plants (also called indigenous plants) are plants that have evolved over thousands of years in a particular region. They have adapted to the geography, hydrology, and climate of that region. Native plants occur in communities, that is, they have evolved together with other plants, as well as animals. As a result, a community of native plants provides habitat for a variety of native wildlife species such as songbirds and butterflies.

Non-native plants (also called non-indigenous plants, invasive plants, exotic species, or weeds) are plants that have been introduced into an environment in which they did not evolve. Introduction of non-native plants into our landscape has been both accidental and deliberate. Purple loosestrife, for example, was introduced from Europe in the 1800's in ship ballast and also as a medicinal herb and ornamental plant. It quickly spread and can now be found in 42 states.

In general, aggressive, non-native plants have no enemies or controls to limit their spread. As they move in, complex native plant communities, with hundreds of different plant species supporting wildlife, are often simplified. Most native plant species disappear, resulting in a reduction in diversity and plant populations dominated by non-native species. In the most extreme cases, a monoculture made up of a single non-native species completely replaces native diversity.

For example, French broom colonizes grassland and scrub areas, replacing native plants unable to compete for available sunlight, water, and nutrients. Areas infested with French broom can lose as much as 90 percent of their original native plant populations. This limits the variety of food and cover available to birds and may cause some to move or disappear from a region altogether. Non-native and invasive plants of concern on the Property include French broom, pampas grass (*Cortaderia jubata*), purple star thistle (*Centaurea melitensis*), yellow star thistle (*Centaurea solstitialis*), cape ivy (*Delairea odorata*), hemlock (*Conium maculatum*), and fennel (*Foeniculum vulgare*). Infestations of broom and pampas grass are centered around areas of mining activity, while populations of star thistle are commonly associated with agricultural or grazing lands.

Species that are native to California are considered non-native when they occur in areas that they did not occupy historically, before the advent of Europeans and large scale landscape disturbance. Two species found on the Property that belong in this category are Monterey pine (*Pinus radiata*) and Monterey cypress (*Cupressus macrocarpa*). Native stands of these species are highly limited in distribution, although they have been extensively planted worldwide. Native stands of Monterey pine occur at Ano Nuevo to the north of the Property, and Monterey to the south. The natural limits of distribution for this species are difficult to determine, since it has been planted throughout California and naturalizes easily. However, there is no documentation of native stands at Coast Dairies and there is no evidence that they occurred there historically. Natural stands of Monterey cypress are limited to two areas in Monterey County, to the south of the Property. This species has also been widely planted throughout California and naturalizes readily. When these species occur under favorable conditions, in areas where they are not native, they can pose a serious threat to native plant communities, invading grasslands, coastal scrub and oak woodlands, for example, and converting them to monotypic forests. Monterey pine and Monterey cypress have both been observed in mixed conifer and redwood forest on the Property.

3.1.6.3 FERAL PIGS

Wild (feral) pigs (*Sus scrofa*) occur on the Coast Dairies property and regularly damage (by rooting) areas of native vegetation. Approximately 30-acres of fresh pig disturbance is evident at any one time on the Property (Smith pers. comm., 2000). Pig damage over-turns soils and removes cover vegetation, increasing the potential for erosion and invasion of exotic plant species. Refer to Section 3.2.6.3 for additional discussion concerning feral pigs.

3.1.6.4 LIVESTOCK GRAZING

The Coast Dairies grazing program is described in Section 4.2 and can be found in the Project Archives. The report describes a program that grazes extensively but with defensible stocking rates, at least by conventional grazing assessment methods. Problems with livestock distribution, fencing, water availability, and purple star thistle infestation suggested to the author of the grazing program (David Amme) that a more complex, rigorously administered system of smaller pastures and more controlled rotation would improve the situation.

3.1.6.5 PLANT PATHOGENS

The following provides general information on major plant pathogens of concern for the Property. Although not confirmed, it is suspected that some trees on-site are currently affected by sudden oak death syndrome and pine pitch canker.

Sudden Oak Death Syndrome

Throughout California's coastal counties tanoaks (*Lithocarpus densiflorus*), coast live oaks (*Quercus agrifolia*) and black oaks (*Quercus kelloggii*) are dying in large numbers from sudden oak death syndrome (SOD) – an infestation of *Phytophthora* fungus. At this time it is unknown whether the fungus was recently introduced into California or if it is a native and has only recently increased in importance as a tree-killer. SOD was first seen on tanoak in Mill Valley (Marin County) in 1995. Since then, elevated levels of oak mortality have been reported as far north as Humboldt County and as far south as Monterey County. To date only seven counties have been confirmed as infested: Marin, Napa, Sonoma, San Mateo, Santa Clara, Santa Cruz and Monterey Counties. Of the currently known affected areas, three counties show particularly elevated levels of mortality - Marin, Santa Cruz and Monterey.

The unprecedented level of dieback of tanoak, coast live oak, black oak poses several immediate and future environmental threats. Dead and dying oaks have worsened the already severe fire hazard conditions in both wildland and developed hillside areas. Many wildlife species depend on these major acorn-bearing trees for forage and habitat. In addition, oaks are highly valued trees in urban settings, providing beauty, shade and property value to homes, and the loss of these trees can be both aesthetically and financially costly.

A consistent suite of symptoms have been identified in tanoak, coast live oak and black oak; the three species of trees currently known to be affected. Although symptoms are similar in these species, their appearance, both chronologically and physically, show some variation. In tanoak, leaf symptoms are usually the first to appear. New growth may droop or turn yellow to brown. Droop occurs on most or all of the crown, rather than in a localized area. In coast live oak and black oaks the earliest symptom is the appearance of a bleeding canker, burgundy-red to tar-black thick sap oozes on the bark surface. Similar bleeding is also seen on tanoak.

At this time there is no known cure for trees with symptoms of SOD. While anti-fungals can be applied to individual trees in an urban setting, there is no feasible treatment for trees in a woodland setting. Widescale use of chemicals in these environments is undesirable due to known and unknown negative impacts on native ecosystems. It is hoped that some trees will be resistant to, or tolerate, the pathogenand thus may escape infection.

Pine Pitch Canker

Pitch canker attacks several species of pine and is caused by the fungus *Fusarium moniliforme.* Cankers usually develop on the main trunk but can occur on lateral branches. Copious resin flows from trunk cankers and wood beneath cankers becomes resin soaked. It is expected that up to 25 percent of coastal California native and ornamental Monterey pine trees will be lost over the next 10 years due to pitch canker.

Annosus Root Rot

Annosus root disease is a widespread native fungus (*Heterobasidion annosum*). Symptoms of this fungal disease are stunted needle growth, thinning of needles in the crown and eventual death. Roots and butt of stems exhibit a soft, stringy white rot. The fungus may produce perennial conks or fruiting bodies at the base of the tree. The conks vary in shape from a bracket to flat layers. These are gray-brown to dark brown on the upper surface, creamy white underneath, and usually are not casually visible due to covering by needle accumulations. In pines, the fungus first spreads through the root system, attacking the inner bark and sapwood, killing these tissues. Within two to six years after initial infection, the fungus reaches the root crown and girdles the tree. The tree dies, but the fungus remains active as a saprophytic, wood-decaying organism within roots and the butt of the dead tree. Pines weakened by annosus root disease are often killed by bark beetles. Incense-cedars, however, are not affected by beetles and will stand green for many years until the disease finally weakens the structure enough to cause failure. Cedars are thought to act as a reservoir for annosus root disease because they take so long to die.

Fusiform Rust

Fusiform Rust (*Cronartium fusiforme*) is fungus disease with alternate reproductive stages on pine and oak. Symptoms on pine are spherical, oblong or linear swellings or galls on branches or trunks. Swellings on trunks may develop into open cankers. Galls rupture in early spring releasing masses of orange spores that infect developing oak leaves.

3.1.6.6 FIRE HISTORY AND FIRE ECOLOGY

Fire History

Greenlee (1983) studied fire history and ecology in the Santa Cruz Mountains, with particular emphasis on Big Basin Redwoods State Park, which lies about 12 miles north of the Property and several miles inland. Fire history from dated scars on redwoods at that location indicate Native American era fires in AD 1420, 1497, 1514, 1550, and 1631; Spanish and Mexican-American era fires occurred in 1671, 1753, 1853 and 1874.

Early accounts suggest that fall wildfires were frequent on the North Coast as well. Beginning with Father Crespí's description (see Section 1.2.2) of the coastal terrace being burned over by the Indians in 1769, there are references to fire scattered throughout the historical record. The practice of burning off the grasslands in the fall to encourage new growth carried into the Spanish period and occurred often enough that the Governor of Alta California found it necessary to issue an order in 1815 to prevent the practice of burning "so that new pasture grass grows" because of the danger it posed to nearby settlements. The fine for doing so was ten pesos (Branciforte, 1815).

In October of 1840, while sailing northward between Monterey and San Francisco, Captain William Dane Phelps of the ship *Alert* described the North Coast ablaze while off Año Nuevo: "*The mountains on fire and the Forests in the Valleys in a broad sheet of flame & presenting during the night a spectacle sublime & awful."* (Phelps, 1983) The tradition of setting fires on the North Coast passed to the loggers when they entered the mountains in the 1850s. It was the practice of loggers to burn off the waste materials (called "slash") after felling redwood trees to clear the forest floor and make it easier to move the logs out to the mills. As long as the mountains were sparsely settled, the fires were allowed to burn across the mountains. In October of 1861, the *Santa Cruz Sentinel* noted the entire range on fire from Soquel to Pescadero, a distance of forty miles: "*The smoke arising from the conflagration hangs like a dark pall over the whole chain of mountains as far as the eye can reach, and impregnates the atmosphere…last evening the red, glaring light of the fire, seen flashing high up in the air, and the reflection on the sky above, giving a livid, glowing appearance, presented a view fearfully grand and picturesque…These fires are periodical with us, and to go through the forests and see the large trees charred and blackened, one cannot but lament the cause that has robbed us of so much of our wealth."*(*Sentinel* 10/10/1861)

The increasing number of loggers in the woods combined with periodic dry years meant more fires. A huge fire in August of 1873 began beside a small mill on Scotts Creek and then roared northeast, eventually reaching Boulder Creek on the other side of Ben Lomond Mountain.

"*It was destroying everything combustible in its course, even large green redwood trees were consumed, together with wood, tan-bark, fencing and all fallen timber. Mr. Smith Comstock & Bro. lost 300 cords of bark, and smaller amounts were lost belonging to numerous other parties. It is estimated that over $20,000 worth of bark, shakes, pickets, shingles and fencing were consumed…[The fire's heat] was so intense that tall redwood and oak trees were in a moment stripped of their leaves and moss, searing the bark and charring the limbs to death…Our informant says it was the largest fire he has seen in those woods…Large amount of quail, rabbit, hare, deer and other wild game, were, no doubt, consumed in the flames, which sometimes rolled in waves and volume thirty feet high for miles in length."*(*Sentinel* 8/2/1873)

As fire suppression increased, fire frequency dropped but intensity seemed to rise. Five twentieth century wildfires left scars not only in the North Coast watersheds, but also on the memories of those who lived through them.

September 1904

The town of Santa Cruz recorded a high temperature of 98 degrees on September 6, 1904, and a fire started in a sawdust pit at a mill on Pescadero Creek, sweeping up onto Ben Lomond mountain with an extent that eyewitnesses could not even calculate. Louis Moretti's land near the summit of the mountain was swept by the flames, leaving behind charred buildings and dead livestock. The flames were driven down the canyons almost to the coast itself. *"At Laguna Creek the fire came down the canyon last night, ran over the picturesque camp grounds on the northerly side of the road, crossed the road at the point where the famous buckeye stood which has been a curiosity and a landmark ever since Americans came to the country and passed on through the grove in a channel."* In numerous locations along the North Coast the fire drove all the way to the ocean. By the third day the smoke was so dense over Santa Cruz that the sun was a "red ball of fire" as it shone through the haze. Finally, on September 10, the fog rolled in and helped dampen the flames, but not before the fire had raced over an area estimated at over twenty square miles. (*Surf* 9/7/1904-9/12/1904) The 1904 fire was unique because the fire came directly to the coastline in several places. Generally, North Coast fires were confined to the more heavily timbered canyons and higher ridges.

June 1917

Unusual because it occurred so early in the season, this fire began near a lumber mill on Gazos Creek and then spread south and eastward. Several days later, the fire had swept through the Waddell Creek watershed and ScottsCreek and was burning in the upper part of the San Vicente watershed.   The fire burned for ten days before the fog once again came in to reduce the intensity. It was estimated that the fire burned a total of twenty square miles of timber and brush. A motion picture company that was in the San Vicente canyon took the opportunity to alter the script and use the fire as a backdrop for filming new scenes for the movie (*Sentinel* 6/20/1917-6/30/1917).

September 1919

Long-time Waddell canyon resident Hulda Hoover McLean remembered a fire in September 1919 that burned through the headwaters of the Waddell canyon. According to a contemporary newspaper account, the front of the wildfire stretched a distance of sixteen miles (McLean 2000; *Sentinel*, 9/30/1919).

September 1936

Again, a period of high wind and low humidity drove a huge fire into the North Coast Mountains, threatening for a time the State Park at Big Basin. Men from local CCC camps, along with local residents and troops from Fort Ord, battled the flames for a week. At one point there were over one thousand men fighting the fire, but it was the return of the fog that did as much to suppress the fire as the firefighters. September 1936 was a particularly difficult fire season throughout California with losses eventually estimated into the millions of dollars (*Sentinel* 9/27/1936-9/30/1936; *Pajaronian* 9/26/1936-9/29/1936).

September 1948

Everyone living on the North Coast in 1948 remembers the 15,000-acre fire that burned across the canyons above Davenport that September. Though it was contained within three days, the conditions were such that it spread quickly, jumping from canyon to canyon in minutes. The fire destroyed piles of tanbark ready for shipment, standing timber, and erased many of the structures left from the San Vicente logging days and the Big Creek Power Company (see Section 1.2.6.6). The power company flumes were destroyed in the fire as were several of the remaining long trestles built by the lumber company in the early 1900s (*Sentinel* 9/2-9/9/1948).

Fire Ecology

Santa Cruz, San Benito and Monterey Counties have nearly the lowest number of lightning fires in the state: from 1893 to 1979, only 101 lightening storms were recorded (Greenlee, 1983). The redwood forests, here at the southernmost and driest part of their range, probably evolved in an environment characterized by infrequent but intense (hot, crowning) fires. Greenlee's (1983) thesis was that the mean fire interval (MFI) under natural conditions was on the range of 100 to 150 years in the southern redwood forests, and that the presence of humans for the last 10,000 years decreased the MFI to 25-50 years, up until the past few decades. For much of California, modern fire suppression has resulted in essentially abnormal conditions, with periodic fire denied its regenerative role in forest ecology. In contrast, fire suppression along the North Coast has re-created pre-human conditions, at least for redwoods, with longer fire intervals and more intense fire behavior. If the vegetation changes in Big Basin attributed to modern fire suppression can be extrapolated to the Coast Dairies Property, the result will be increased tree density and tree invasion of shrub (chaparral) areas.

3.1.7 SUMMARY OF VEGETATIVE CONDITIONS

While the Coast Dairies property supports a number of native vegetative communities many, if not all, have been impacted by the wide variety of uses the land has seen over the past 200 years. For example, the coastal terrace prairies, comprising a diversity of perennial bunchgrasses and wildflowers and historically covering much of the landscape, have been virtually eliminated by agriculture and grazing and replaced by low diversity non-native grasslands and crops. A reduction in fire frequency has resulted in shrub encroachment on grasslands, further reducing their extent. The human-altered fire cycle had changed the relative amount of shrub and tree canopy, reducing diversity in these vegetation types as well. The old growth redwood forest that once grew in the upper watersheds of the Property was clear-cut. The forest regenerated from old growth stumps, but is not yet mature enough to exhibit the old growth characteristics important to such species as the endangered marbled murrelet. Overall, past land uses have had a profound influence on the distribution, extent, and diversity of native vegetation on the Property.

Even though vegetative diversity has been reduced, the Property still supports a number of plant communities considered rare (see Table 3.1-1). Some are relatively intact, meaning that most, if not all, characteristic species are still present. Others, although still readily identifiable, are missing many of their typical components.

Non-native plant species pose the most serious current threat to native communities throughout the property. From iceplant (*Carpobrotus edulis*) in the beach and foredune communities, to Italian ryegrass on the coastal terraces, to French broom and pampas grass in the areas disturbed by mining and road building and maintenance in the upper watersheds, non-natives have established a foothold in every community. In an intact ecosystem, natural disturbance generates and maintains vegetative diversity by setting back the clock on plant succession. For example, a landslide can remove trees from a wooded slope, creating a gap in the tree canopy that can then be colonized by a different set of species than those that grow under the canopy, thus adding to the diversity found in that area. Many California natives are adapted to particular disturbance regimes. However, when invasive non-native species are present disturbance, whether natural or anthropogenic, tends to create new habitat for non-natives, since these species are highly competitive and particularly well adapted to take advantage of open ground. Thus, at this point in time, disturbance tends to further reduce native vegetative diversity on the Property by facilitating the spread of invasive non-native species. As discussed in Section 3.1.6, other factors contributing to vegetation degradation at Coast Dairies that need to be addressed include feral pigs, overgrazing, and fire regime.

3.1.8 BOTANICALLY SENSITIVE AREAS

The purpose of this section is to identify Coast Dairies Analysis Zones containing vegetation types that are unique, that are especially sensitive to further degradation, or that could benefit from specific management or restoration activities (see Table 3.1-3). These categories are not necessarily mutually exclusive.

Redwood forest occurs on the Coast Dairies Property in Analysis Zones YB-1, YB-2, SVW-1, and SVW-2. Although the distribution of redwood forest was once much more widespread, this vegetation type is presently essentially endemic to the coast ranges of central and northern California and is therefore rare on a global basis. Statewide there are fewer than 10-50,000 acres remaining. Although redwood forest is not rare on a regional basis and the Coast Dairies forest is comprised of second growth, it should be considered a unique resource. Another unique resource on the Property is the brackish marsh that occurs at the mouth of Laguna Creek in LAM-1 (see also Section 3.2.5).

The coastal prairie that once dominated the terraces and slopes has been extirpated from most of the Property. Purple needlegrass is a component of the coastal prairie and still occurs in Analysis Zones YBS-1 and MW-1, along with associated native herbaceous species such as Ithuriel’s spear and common muilla, as well as non-native annual grasses and herbs. These grasslands are sensitive to further disturbance, such as overgrazing or road maintenance, which have the potential to give the non-native species in this community a competitive edge over many of the natives.

On the other hand, purple needlegrass itself can benefit from a certain amount of disturbance, and where soils are thin, is able to outcompete non-native annuals. Therefore, Property’s purple needlegrass grasslands might be amenable to certain restoration activities, such as a grazing regime managed specifically for needlegrass or a combination of grazing and prescribed burns. Restoration of purple needlegrass or indeed, coastal prairie, might well be possible on any of the less disturbed upper terrace grasslands using the same techniques described above.

Riparian forests are among California’s most productive ecosystems (see Section 3.2) and their extent has been dramatically reduced in historic times. All of the Property’s riparian Zones (MSPZ-1 and 2, SVSPZ-1, LSPZ-1 and 2, YBSPZ-1, and LASPZ 1, 2, 3, and 4) should be considered sensitive to further degradation and there are many opportunities for restoration along Coast Dairies watercourses. Particularly vulnerable are the smaller headwaters drainages. Here cattle have had, in some cases, a devastating impact—resulting in vegetation removal and gullying (see Section 4.1.5).

TABLE 3.1-3
ANALYSIS ZONES WITH UNIQUE VEGETATIVE RESOURCES PRESENT

Analysis Zone	Vegetation Type
Molino Watershed	
MSPZ-1	Red alder riparian forest
MSPZ-2	Central coast arroyo willow riparian forest
MW-1	Purple needlegrass grassland
San Vicente Watershed	
SVSPZ-1	Red alder, central coast live oak, and central coast arroyo willow riparian forests
SVW-1 and 2	Redwood forest
Liddell Watershed	
LSPZ-1 and LSPZ-2	Red alder and central coast arroyo willow riparian forest
Yellow Bank Watershed	
YBSPZ-1	Red alder and central coast arroyo willow riparian forest
YBW-1 and 2	Redwood forest
YBS-1	Purple needlegrass grassland
Laguna Watershed	
LAM-1	Brackish marsh, unique
LASPZ-1, 2, 3, and 4	All riparian forest types

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3.2 TERRESTRIAL WILDLIFE RESOURCES

3.2.1 REGIONAL SETTING

The proximity of the coastal mountains has isolated the Santa Cruz County shore, and resulted in a high degree of endemism (i.e., species restricted to this area alone). The phenomenon has been noted by natural scientists for some time: one of the earliest animals to receive endangered species status was the highly localized Santa Cruz long-toed salamander (*Ambystoma macrodactylum croceum*), listed under the precursor to the Endangered Species Act in 1967; several of this area's insects have been listed in the past three years, and the U.S. Fish and Wildlife Service (USFWS) recently established critical habitat for three endemic plants (see Section 3.1).

Residential and agricultural development in the region has reduced open space, limiting large expanses of most of the natural communities. Smaller species such as reptiles, amphibians and invertebrates are often restricted to certain communities, but regional open space, with its diversity of communities, is an important consideration for animals whose home ranges encompass several habitats. The Coast Dairies Property can also be discussed as providing food and refuge for birds migrating along the Pacific Flyway and habitat for transient mammals, including travel corridors, denning areas and foraging grounds. Wildlife corridors are particularly important for larger predators such as bobcat (*Lynx rufus*) and mountain lion (*Felis concolor*), whose existence is more dependent on distribution of prey than habitat. Anecdotal evidence suggests that both of these species use the Property as part of larger hunting grounds[1]. Recent research (Beier, 1995) has indicated that mountain lion travel corridors need to average about 1,000 feet in width of natural vegetation. This requirement is increasingly difficult to meet in the California Central Coast region, except along the North Coast of Santa Cruz County.

Large blocks of single habitat types are important as well, and are an issue throughout California. Bender (1998) analyzed what is called the "patch size effect" on population decline and reviewed the results of 25 published studies that tested for a relationship between patch size and population density. He reached the same conclusion as earlier researchers, i.e., that for "interior" species – those needing large areas of relatively homogeneous habitat -- the decline in population size associated with habitat fragmentation *per se* will be greater than that predicted from pure habitat loss alone.

There are six state parks (California Department of Parks and Recreation [DPR]) in the region surrounding the Coast Dairies Property as well as the Bonny Doon Ecological Reserve, managed by the California Department of Fish and Game. Four of the state parks and the Reserve essentially surround the Coast Dairies Property; forming a constellation of conservation lands. The importance and the future of regional conservation open space, and Coast Dairies role in its preservation, is further discussed in Section 5.4.2.

[1] An observation of a mountain lion crossing Highway 1 about 10 miles north of the Property was reported to Planning Team staff in January, 2001.

3.2.2 METHODOLOGY AND OVERVIEW OF HABITATS

3.2.2.1 METHODOLOGY

General Considerations

A wide variety of sources will eventually be incorporated into the Coast Dairies Archives (see Section 2.3) but could not be included in this ECR, largely for reasons of sheer volume. For example, the Christmas Counts of birds conducted by the Santa Cruz Bird Club include a 15-mile diameter circle centered at Henry Cowell Redwoods State Park and extending to Davenport. Results are published by the National Audubon Society (*Field Notes* vol. 12-25, *American Birds* vol. 26-47, *Field Notes* vol. 48-51 and *American Birds* un-numbered vol. published 1998-2000) and are contained in the records of the Club.

The emphasis in this section is rather to be generally descriptive of the wildlife resource, and specific where:

- long-term management could encounter a regulatory constraint (e.g., species on the Property that are formally listed under the state and federal endangered species acts);

- habitats are so diverse, productive, or sensitive that they deserve protection as a management priority (e.g., beaches); and

- wildlife resources might be tallied in sufficient detail to use as indicators of long-term ecological stability in an adaptive management program (see ECR Introduction).

The “special status” species (see Section 3.2.3) selected for focused analysis were those most likely to constitute a management issue and also (serendipitously) present in each of three habitat aggregations: along the coast, the snowy plover (*Charadrius alexandrinus nivosus*); at lower elevation inland sites the California red-legged frog (*Rana aurora draytonii*) and in forested areas of the higher canyons, the marbeled murrelet (*Brachyramphus marmoratus*).

Peregrine falcon (*Falco peregrinus*) and other raptors are predators some ecologists consider indicative of general ecosystem health and stability. The peregrine’s restoration in the wild has been a subject of international and local importance, and there are known active peregrine eyries (nest sites) approximately 13 miles from the Coast Dairies northern boundary. One is along south Waddell Creek in Big Basin State Park and the other is along Bear Creek north of Boulder Creek (Linthicum pers. comm., 2001).

Winter use by a variety of raptors of Coast Dairies is a widely noted phenomenon. Local birdwatchers, ornithologists and raptor enthusiasts have recognized that large numbers of raptors can be regularly seen during the winter months on the North Coast (Scoping Meeting Minutes, March 10, 2001). The Planning Team considered that it merited quantification, since raptor species richness (total number of species in an area) has shown a strong positive correlation with size of open space preserves (Bosakowski and Smith, 1997) and a negative correlation with human disturbance (Fletcher et al., 1999).

Species-specific Surveys

California Red-legged Frog. Surveys for California red-legged frogs at Coast Dairies were geographically comprehensive in scope. They were conducted to identify presence of different life stages, and surveys at any one pond were suspended once breeding at that pond was established -- the results are not intended to reflect relative abundance. Diurnal surveys were conducted at Ponds 1-13 and 17-22 (see Figure 3.2-1) on May 17, 18 and 23, 2000 by walking the perimeter of each pond and searching for adult red-legged frogs. At each pond, data concerning pond characteristics, including size, depth and amount of emergent vegetation, were recorded. Aquatic sampling was carried out at all ponds on May 17 and June 26 using dip-nets, seines and minnow traps. Nocturnal surveys were conducted on June 26, 2000 at those ponds for which breeding status had not been established. Diurnal surveys for metamorphs were conducted on September 7 at those ponds at which red-legged frog breeding status had still not been established. Ponds 24-26, which had not previously been identified as being on Coast Dairies Property, were surveyed at night on March 20, 2001.

Data for those ponds on lands leased by RMC Pacific Materials (Ponds 14, 15, 16, 23 and 24) are taken from an annual report submitted to USFWS as required by a Habitat Conservation Plan (Biosearch Wildlife Surveys, 2001). Surveys included diurnal and nocturnal surveys in the winter, spring and fall as well as aquatic sampling in the spring and summer.

Snowy Plover. Planning Team personnel (Biosearch Wildlife Surveys) examined the nesting status of western snowy plovers at weekly intervals between late April and late May, 2000, and every two weeks in June, 2000. Surveys were conducted at Davenport Landing Beach, Davenport Beach, Bonny Doon Beach, Yellow Bank Creek Beach and Laguna Beach. Throughout the surveys, Point Reyes Bird Observatory (PRBO) personnel working at Laguna Creek and Scotts Creek were contacted to determine the timing and success of nesting efforts.

Marbled Murrelet. Between May and August, 2000 the Property was surveyed for potential marbled murrelet nesting habitat using habitat standards from Hamer and Nelson (1995). Aerial photos were reviewed to identify large stands of trees and the most extensive forested areas. On August 24, 2000 Bryan Mori, a wildlife biologist with extensive experience with the species, toured the site to visit the most promising areas. David Suddjian, record keeper for the Santa Cruz Breeding Bird Atlas project, was contacted for the nearest nesting records for the species.

Peregrine Falcon and General Raptor Surveys . The Planning Team surveyed selected areas of the Coast Dairies Property for nesting peregrine falcons on May 18, 22, 25 and 26, 2000. Team raptor specialist Jack Barclay was accompanied by Janet Linthicum and Brian Latta from the University of California at Santa Cruz Predatory Bird Research Group on May 18. Potential nesting sites on coastal cliffs and vertical-faced rock outcrops in the interior of the Property were identified from aerial photographs and topographic maps. All coastal cliffs on the Coast Dairies

Property were surveyed by walking along the coastal bluffs and scanning the cliff faces with binoculars from above for nest ledges. Interior cliffs were surveyed by scanning cliff faces, nearby prominent perches and the airspace within one-quarter mile for adult peregrines with binoculars and/or a spotting scope for 15 to 55 minutes. Surveys were conducted in late May, 2000 when nesting peregrines should be conspicuous at their nest sites. Based on local nesting phenology (Linthicum pers. comm., 2001) late May is the nestling phase of the reproductive cycle when defensive adults and approximately 4-week old nestlings should be present and conspicuously visible. Coastal cliffs or rock outcrops were surveyed in the following analysis zones:

LS-2, west side of Liddell Creek
YBW-1, cliff on west side of Yellow Bank Creek
YBW-2, cliff on north side of Yellow Bank Creek in YBW-2 on revised map
CTB-1, coastal cliffs in revised LCTB-1
LCTB-2
MCTB-1
MCTB-2.

For the general inventory of Coast Dairies raptor use, a biologist conducted weekly raptor point counts at six locations on the Property from December 5, 2000 to January 26, 2001. Count locations were selected that afforded a maximum unobstructed view of prominent perches and the surrounding airspace with minimum overlap between adjacent count locations. Three count stations were on paved roads (MP-4, MP-2, MP-4 PG&E Substation) while the remaining three (LCT-1, LP-3 and YBP-2) were on unpaved agricultural roads that afforded reasonably easy access when wet. All raptors visible from the count location during a 5-minute period were identified to species and tallied on a field data form. Counts were conducted while scanning with 10x40 binoculars in two 360-degree sweeps around the horizon. In addition, raptors seen within one-quarter mile of the count location when approaching or leaving were also counted if it was certain that they were not seen from the count location. Counts were conducted progressively during a session starting at the southernmost or northernmost count location and proceeding to the next nearest location. The start and end times of the count session, temperature, wind direction and velocity and percent cloud cover were recorded.

Analysis Zone Summaries

All the wildlife surveyors in the field, regardless of the intent of any individual species focus, completed a *Daily Wildlife Survey Summary Form*, which recorded incidental observations of any special status species or significant wildlife habitat elements (e.g., a snag with a cavity nest). Following the 2000 field season, these sheets were compiled, along with analysis zone photographs and interviews with local natural resource specialists (Bulger; Eyster; Suddjian; Westphal; Seymour; Miller; Morgan; Alley; Mori pers. comm., 2001) to perform what the Planning Team termed an *Analysis Zone Summary*.

The intent of the Summary was to rank the zones – in a qualitative way and based largely on professional judgement – for their value as wildlife habitat. Each analysis zone was evaluated for both wildlife resource opportunities and constraints. Each zone was given a score of 1-3 for opportunities related to the zone's current wildlife resource values, with 1 meaning there were limited wildlife resource attributes and 3 meaning there were unique wildlife resources present. Constraints scores were related to future uses that may affect wildlife in the zone, with 1 meaning there were minimal limits on future uses and 3 meaning there are sensitive wildlife resources that could be affected by changes in use/management of the zone. The summary analysis included the following:

- a general description of the biotic and abiotic features present in each zone including habitat for 27 special-status wildlife species that could occur on the Coast Dairies property;
- key wildlife resources such as listed species habitat;
- problem areas and enhancement potential;
- an Opportunity Score and explanation; and
- a Constraints Score and explanation.

An Opportunity Score of 3 represented the highest wildlife value of the area based on the diversity of native habitat(s) present and/or productivity for wildlife. Any zone with listed species habitat present (e.g., California red-legged frog breeding pond or snowy plover nesting habitat) automatically received an Opportunity Score of 3. A Constraint Score of 3 was given to a zone if any change in disturbance (especially human use) could diminish the wildlife resources present. A score of 1 was given to a zone if there were little or no native habitats present (e.g., a zone containing a high proportion of area in agricultural production) where future uses were least likely to diminish wildlife resource values.

3.2.2.2 OVERVIEW OF HABITATS

Wildlife habitats are not as delineated as vegetation communities, which are characterized by certain plant species adapted to specific environmental conditions. Wildlife habitats consist of an area where an organism lives, composed of various vegetative communities creating different areas for different life cycle needs, such as foraging areas, nesting areas, and shelter from predators. The variety of healthy, stable vegetative communities present, providing abundance and variety of foraging areas, nesting areas and shelter, defines the quality of the wildlife habitat present. High quality wildlife habitat on the Coast Dairies Property is present in all of those areas not directly impacted by agriculture and structures -- and even these can be important to certain species, as noted below.

Although the habitat for birds and mammals on the Property has been strongly influenced by the history of resource use and extraction (see Section 1.0) intact habitats are present in all of the vegetative communities, especially the riparian areas. The following habitat descriptions are categorized according to the California Department of Fish and Game Wildlife Habitat Relationships System (Zeiner et al., 1988; Mayer and Laudenslayer, 1988).

Under the 1972 Coastal Zone Conservation Act, the Coast Dairies Property ends at the mean high water line – hence the title of this section. However, actions taken under the Plan may impact oceanic resources, and for this reason a brief discussion is included below. From the coastal considerations, habitat descriptions proceed inland.

Marine, Beaches and Bluffs

Offshore. Gray whales (*Eschrichtius robustus*) were observed within 100 yards of the shore, which comes as no surprise to Davenport residents or the tourists who come to whale watch.[2] Planning team surveyors observed sea otters (*Enhydra lutris*) on multiple occasions. Sea otters are most common along rocky shores and are closely associated with the kelp bed ecosystem (USFWS, 1996).

Intertidal. There has been no documented inventory of the intertidal portion of this habitat on the Property but work at the Fitzgerald Marine Reserve near Half Moon Bay documented 164 species of invertebrates in this zone (Brady/LSA, 1999). The biological richness and vulnerability of these habitats is recognized closer to Coast Dairies, at Ano Nuevo Point and Island, dedicated in 1974 as an “Area of Special Biological Significance” under the State Water Quality Control Board. The habitat extent at Coast Dairies is limited, but both sensitive and valuable.

Beaches. Coast Dairies hosts significant numbers of wintering shorebirds (Gill et al., 1995), gulls, and wading birds, although there are probably more shorebirds that pass through the state as spring and fall migrants. Some shorebird species, such as black turnstones and black oystercatchers (the latter uncommon --Suddjian, 2000) winter only on the rocky portions of coastline. The importance of the beaches for snowy plover is discussed in Section 3.2.3.1.

Bluffs. Coastal bluffs are the seaward edges of marine terraces uplifted from the seabed (CCC, 1987). Composed mainly of sedimentary rocks such as sandstones and prone to erosion, caves, stacks, and arches form both inhospitable natural environments and a habitat for specialized nesting birds such as cliff swallows and black swift (*Cypseloides niger*).

Grasslands and Artificial Ponds

Grassland habitat attracts seed eaters as well as insect eaters. California quail (*Callipepla californica*), mourning dove (*Zenaida macroura*), and meadowlarks (*Sturnella neglecta*) are a few seed eaters that use grasslands for nesting. Insect eaters such as scrub jays (*Aphelocoma caerulescens*), barn swallows (*Hirundo rustica*), and northern mockingbirds (*Mimus polyglottus*) use the habitat for foraging only. Mammals such as California vole (*Microtus californicus*), deer

[2] Along the North Coast, the southbound migration is most evident in January but continues through February. The return migration passes the North Coast from late February through April.

mouse (*Peromyscus maniculatus*), broad-footed mole (*Scapanus latimanus*), and black-tailed jackrabbit (*Lepus californicus*) forage and nest within the grassland. Mule deer (*Odocoileus hemionus*) will use grasslands for grazing and for bedding at night. Small rodents attract raptors such as red-tailed hawks (*Buteo jamaicensis*) and red-shouldered hawks (*Buteo lineatus*). Southern alligator lizard (*Gerrhonotus multicarinatus*) and Pacific slender salamander (*Batrachoseps pacificus*) use the grasslands to forage for invertebrates found within and underneath fallen logs.

Within the Property grasslands are manmade ponds and fresh emergent wetlands that offers water, food and cover for a variety of species. Mammals are attracted to the water including meadow voles, raccoons (*Procyon lotor*), striped skunk (*Mephitis mephitis*), and gray fox (*Urocyon cinereoargenteus*). Reptiles and amphibians that use this habitat for feeding and breeding and were observed during red-legged frog surveys include common garter snake (*Thamnophis couchixxi*), western toad (*Bufo boreus*) and tree frog (*Hylla regilla*).

Coastal Marsh

Analysis Zone LAM-1 is the only natural expression of this habitat (there are artificial ponds along the coast), and important if only for its scarcity on the Property. It is largely a freshwater system with some tidal influence, as evidenced by the birds observed there, among them mallards and grebes. The pied-billed grebe (*Podilymbus podiceps*) forages in saltwater but, for the most part, inhabits freshwater ponds. The dominance of mallards (*Anas platyrhynchos*), a freshwater duck present in large numbers at LAM-1 and with young of the year (May, 2001) suggest this is used as a brood pond. Both cover and forage are plentiful.

Coastal Scrub

In some areas, Douglas fir trees (*Pseudotsuga menziesii*) and coast live oak invade this habitat, and it also contains scattered patches of grassland. The resulting overlap or "ecotone" contains species that are attracted to edges of two communities for foraging and nesting. Coastal scrub is less vegetatively productive than adjacent grassland or riparian habitats, but seems to support equivalent numbers of wildlife species (Mayer and Laudenslayer, 1988). Species commonly occurring in the coastal scrub include orange crowned warbler (*Vermivora celata*), bushtit (*Psaltriparus minimus*), and California horned lizard (*Phrynosoma coronatum*).

Riparian Forest

Riparian (streamside) areas provide nesting habitat and insect diversity attractive to a variety of migratory birds. Diverse foraging substrates, such as foliage, bark and ground substrates, increase feeding availability. The structure and composition of these areas is described above in Section 3.1.3. Riparian areas, due to their biological wealth and severe degradation, are vital habitat for the conservation of neotropical migrants and resident birds of the Western U.S. (RHJV, 2000). For this reason, and because detailed information has been gathered on riparian birds at Coast Dairies, the discussion below is more comprehensive than for other habitats on the

Property. Historically, there were a great many more species nesting in riparian habitats than at present, especially when the areas were wide enough to permit both a stable tree and brush canopy. Birds that forage for insects in the leaves of plants include Bewick's wren (*Thryomanes bewickii*), bushtit (*Psaltriparus minimus*), and black-headed grosbeak (*Pheuticus melanocephalus*). Bark-insect foraging species, such as downy woodpecker (*Picoides pubescens*) and white-breasted nuthatch (*Sitta carolinensis*) forage for insects in the bark. There are a few species that are adapted to foraging for insects in flight, such as western wood pewee (*Contopus sordidulus*) and tree swallows (*Tachicyneta bicolor*). Although insects are the primary food source for most species in the riparian habitat, ground dwelling species, such as California quail (*Callipepla californica*) and brown towhee (*Pipilo fuscus*), are also present in the riparian habitat, feeding primarily on seeds.

As with much of California, these areas at Coast Dairies suffered during the era of resource extraction (see Photo 1-7). Loss of riparian woodland habitat, which in many parts of the state may exceed 95 percent of pre-settlement range, is thought to be responsible for the decline in songbird populations on the West Coast (PRBO, 1994). Wilson's warbler (*Wilsonia pusilla*) has been documented as showing a 9.8 percent decline each year, from 1980 to 1992. Bewick's wren is of management concern in more than half of the nation's USFWS regions, due to documented or apparent population declines. The Swainson's thrush (*Catharus ustulatus*) is a proposed California Species of Special Concern (see Section 5.1.2) and the yellow warbler (*Dendroica petechia*) has already received this designation. Both of these species are declining in California and have been extirpated from parts of their former breeding range. Warbling vireo (*Vireo gilvus*) also show a decline in California.

Table 3.2-1 lists neotropical migrant species of management concern for the USFWS Pacific Coast Region, which includes the California Central Coast region, that were detected during surveys conducted along the Central Coast in 1999 as part of the Central Coast Riparian Bird Conservation Project[3] (CCRBCP). The right-hand column lists riparian associated species of conservation priority from the Riparian Bird Conservation Plan (RHJV, 2000) that were detected. Taken as a whole, the species are those for which long term viability has been identified as a concern and which are present in Central Coast riparian areas which have been sampled for the Project. The Planning Team considered these an informal standard against which to assess bird diversity at Coast Dairies.

By this standard, at least one analysis zone (SVSPZ-1) does very well, suggesting that it is a significant Property resource: along San Vicente Creek, four of the five most abundant species during the CCRBCP were those listed on Table 3.2-1: song sparrow, Wilson's warbler, Bewick's wren, and Pacific-slope flycatcher (*Empidonax difficilis*) (Scoggin pers.comm., 2001).

[3] This project was initiated by the Point Reyes Bird Observatory (PRBO) and the Coastal Watershed Council (CWC).

TABLE 3.2-1
SPECIES DETECTED IN RIPARIAN HABITAT DURING CENTRAL COAST POINT COUNT SURVEYS THAT HAVE DESIGNATED CONSERVATION STATUS.

Species of Management Concern	Species of Conservation Priority in Riparian Habitat
Allen’s Hummingbird	Warbling Vireo
Olive-sided Flycatcher	Swainson’s Thrush
Pacific-slope Flycatcher	Yellow Warbler
Bewick’s Wren	Common Yellowthroat
Lawrence’s Goldfinch	Wilson’s Warbler
California Thrasher	Yellow-breasted Chat
Song Sparrow	
Black-headed Grosbeak	

Source: Office of Migratory Bird Management of the USFWS, 1995.

Woodland and Forest Series

The tree-dominated habitats at Coast Dairies are amalgams of several habitats as described by Mayer and Laudenslayer (1988), including *Redwood* and *Hardwood-Conifer*. As described in Section 3.1, mixed evergreens are found on moist, well-drained slopes with coarse soils (Monterey Cypress, Monterey pine, and knobcone pine); redwood occurs primarily on the north-facing slopes of canyon drainages where it can be the sole or dominant tree.

This habitat is a usually fairly dense woodland, but since it is relatively young, snags and downed woody material are generally sparse throughout. Mixed evergreen forests contain food for species such as chestnut-backed chickadee (*Parus rufescens*), Steller's jay (*Cyanocitta stelleri*), and pygmy nuthatch (*Sitta pygmaea*). These species are bark gleaners and aerial feeders, catching insects in flight. Allen's hummingbirds (*Selasphorus sasin*) use vines growing around trees for nectar and for insects that are attracted to the nectar. Other species, such as the great horned owl (*Bubo virginianus*) and Cooper's hawk (*Accipter cooperi*), use the tall trees for roosting and foraging perches during the day. The western gray squirrel (*Sciurus griseus*) and gray fox (*Urocyon cinereoargenteus*) both feed on mushrooms, fruits, and nuts within the woodlands. A variety of bat species are known to occur in this habitat and include pallid bats (*Antrozous pallidus*), long-eared myotis (*Myotis evotis*), and fringed myotis (*Myotis thysanoides*).

3.2.3 SPECIAL STATUS SPECIES

As discussed below, several species known to occur on or in the vicinity of the Property are accorded "special status" because of their recognized rarity or vulnerability to various causes of habitat loss or population decline. Some of these receive specific protection defined in federal or State endangered species legislation (see Section 6.1). Others have been designated as "sensitive" on the basis of adopted policies and expertise of State resource agencies or organizations with acknowledged expertise, or policies adopted by local governmental agencies such as counties, cities, and special districts to meet local conservation objectives. These species are referred to collectively as "special status species" in this ECR, following a convention that has developed in practice but has no official sanction.

A list (Table 3.2-2) of special status animal species reported to occur within the vicinity[4] of the Property was compiled on the basis of data in the California Natural Diversity Data Base (CNDDB) (2000), review of biological literature of the region and consultation with local experts (see Section 3.2.7.2). The list is intended to be comprehensive and will be used as the basis for identifying impacts and mitigation during the environmental analysis phase of Plan development. At that time, special status animal species that typically occur within habitats present on the Property but were not specifically identified during surveys will be presumed present on the site.

[4] Defined as the North Coast from Ano Nuevo to Santa Cruz and inland to an elevation of 1000 feet

TABLE 3.2-2
SPECIAL STATUS ANIMAL SPECIES REPORTED TO OCCUR WITHIN THE VICINITY OF THE COAST DAIRIES PROPERTY

Common Name	Listing Status (USFWS/CDFG)	General Habitat	Site Occurrence
	FEDERAL OR STATE LISTED SPECIES		
INVERTEBRATES			
Longhorn fairy shrimp *Branchinecta longiantena*	FE / -	Vernal Pools	
Vernal Pool fairy shrimp *Branchinecta lynchi*	FT / -	Vernal Pools	
Ohlone tiger beetle *Cicindela ohlone*	PE / -		
Smith's blue butterfly *Euphilotes enoptes smithi*	FE / -		
Vernal pool tadpole shrimp *Lepidurus packardi*	FE / -	Vernal Pools	
Mt. Herman June beetle *Polyphylla barbata*	FE / -		
Zayante band-winged grasshopper *Trimerotropis infantilis*	FE / -		
Callippe silverspot butterfly *Speyeria callippe callippe*	FE / -	Grasslands supporting host plants *Viola pedunculata*	
AMPHIBIANS			
Santa Cruz long-toed salamander *Ambystoma macrodactylum croceum*	FE / CE	Temporary ponds and vegetated drainages	
California red-legged frog *Rana aurora draytonii*	FT / CSC	Lowlands or foothills in or near sources of water with shrubby or emergent riparian vegetation	**Present On-Site** California red-legged frog has been located in ponds and streams on-site
REPTILES			
San Francisco garter snake *Thamnophis sirtalis tetraenia*	FE / -		

TABLE 3.2-2 (Continued)
SPECIAL STATUS ANIMAL SPECIES REPORTED TO OCCUR WITHIN THE VICINITY OF THE COAST DAIRIES PROPERTY

Common Name	Listing Status (USFWS/CDFG)	General Habitat	Site Occurrence
Marbled murrelet *Brachyramphus marmoratus*	FT / -		
Aleutian Canada goose *Branta canadensis leucopareia*	FD / -	Breeds in marshes from the Arctic Slope to northeastern California	
Western snowy plover *Charadrius alexandrinus nivosus*	FT / CSC (nesting)	Sandy beaches on marine and esturaine shores – requires sandy, gravelly or friable soils for nexting	**Present On-site** Nesting colonies of western snowy plover occur at the mouth of Scotts Creek and the mouth of Laguna Creek
Mountain plover *Charadrius montanus*	FPT / -	Grasslands	
(Little) willow flycatcher *Empidonax traillii brewsteri*	- / CT	Riparian habitats	
American peregrine falcon *Falco peregrineus americanus*	FD / CE, CFP, 3503.5	Nests on cliffs and tall buildings	
Bald eagle *Haliaeetus leucocephalus*	FT / 3503.5	Nests on cliffs and snags near large bodies of water	
California black rail *Laterallus jamaicensis coturniculus*	FSC / CT	Nests and forages in dense pickleweed	
Brown Pelican *Pelecanus occidentalis*	FE / CE	Nests in islands off the coast of California and forages in open bay and ocean waters	
California Clapper Rail *Rallus longirostris obsoletus*	FE / CE	Nests and forages in dense pickleweed	
Bank swallow *Riparia riparia*	- / CE	Cliffs with friable soils near water	
California least tern *Sterna antillarum browni*	FE / CE	Nests and forages in sandy beaches and coastal wetlands	
MAMMALS			
Southern sea otter *Enhydra lutris nereis*	FT / -		

TABLE 3.2-2 (Continued)
SPECIAL STATUS ANIMAL SPECIES REPORTED TO OCCUR WITHIN THE VICINITY OF THE COAST DAIRIES PROPERTY

Common Name	Listing Status (USFWS/CDFG)	General Habitat	Site Occurrence
	FEDERALLY OR STATE PROPOSED OR CANDIDATE FOR LISTING SPECIES		
INVERTEBRATES			
Ohlone tiger beetle *Cincindela ohlone*	FPE/ -	Occurs in open spaces in native grasslands in the Santa Cruz area	
AMPHIBIANS			
California tiger salamander *Ambystoma californiense*	FC / CSC	Small mammal burrows and ponds	
	FEDERAL OR STATE SPECIES OF CONCERN		
INVERTEBRATES			
Opler's longhorn moth *Adella oplerella*	FSC/ -	Feeds on *Platystemon californicus* associated with grassland	
Empire cave pseudoscorpion *Fissilicreagris imperialis*	FSC/ -	Known only from Empire Cave – a metamorphosed limestone cave subject to intermittent flooding	**Presumed Absent** Suitable habitat for this species does not occur on the Coast Dairies Property.
Bridges' Coast Range shoulderband snail *Helminoglypta nickliniana bridgesi*	FSC / -	Costal dune and scrub habitat	
California linderiella fairy shrimp *Linderiella occidentalis*	FSC / -	Vernal Pools	
Dolloff cave spider *Meta dolloff*	FSC/ -	Known from caves in the Santa Cruz area	**Presumed Absent** Suitable habitat for this species does not occur on the Coast Dairies Property.
San Francisco lacewing *Nothochrysa californica*	FSC/ -	Woodlands and coastal scrub habitat	
Unsilvered fritillary *Speyeria adiasta adiaste*	FSC/ -	Feeds on *Viola pedunculata*, associated with grasslands	
Mackenzie's cave amphipod *Stygrobromus mackensiei*	FSC/ -	Known only from Empire Cave – a metamorphosed limestone cave subject to intermittent flooding	**Presumed Absent** Suitable habitat for this species does not occur on the Coast Dairies Property.

TABLE 3.2-2 (Continued)
SPECIAL STATUS ANIMAL SPECIES REPORTED TO OCCUR WITHIN THE VICINITY OF THE COAST DAIRIES PROPERTY

Common Name	Listing Status (USFWS/CDFG)	General Habitat	Site Occurrence
AMPHIBIANS			
Foothill yellow-legged frog *Rana boylei*	FSC / CSC	Freshwater ponds and streams	
Western spadefoot toad *Scaphiopus hammondii*	FSC / CSC	Freshwater ponds and streams	
REPTILES			
Silvery legless lizard *Anniella pulchra pulchra*	FSC / CSC	Upland scrub and chaparral	
Northwestern pond turtle *Clemmys marmorata marmorata*	FSC / CSC	Slow moving streams with open areas for basking	The nearest reported occurrence of this species is from Moore Creek.
California horned lizard *Phrynosoma coronatum frontale*	FSC / CSC	Friable soils in shrub habitat	
BIRDS			
Cooper's hawk *Accipiter cooperi*	- / CSC, 3503.5	Nests in dense forests, oak woodlands, riparian habitats	
Sharp-shinned hawk *Accipiter striatus*	- / CSC, 3503.5	Nests in dense forests, oak woodlands, riparian habitats	
Tricolor blackbird *Agelaius tricolor*	FSC / CSC	Nests in cattails and dense vegetation near water	**Present On-Site** This species is known to occur at Scotts Creek Marsh
Grasshopper sparrow *Ammodramus savannarum*	FSC / -	Grasslands	
Bell’s sage sparrow *Amphispiza belii belii*	FSC / -	Scrub and chaparral	
Great blue heron *Ardea herodia*	- / CSC (nesting)	Colonial nesting in large trees.	
Western burrowing owl *Athene cunicularia*	FSC / CSC, 3503.5	Nests in burrows of small mammals in grasslands	The nearest reported occurrences are located on property owned by the University of California Santa Cruz

TABLE 3.2-2 (Continued)
SPECIAL STATUS ANIMAL SPECIES REPORTED TO OCCUR WITHIN THE VICINITY OF THE COAST DAIRIES PROPERTY

Common Name	Listing Status (USFWS/CDFG)	General Habitat	Site Occurrence
Short-eared owl *Asio flammeus*	FSC / CSC	Nests in open grassland	
American bittern *Botarus lentiginosus*	FSC / -	Breeds in marshes	
Ferruginous hawk *Buteo regalis*	FSC / -	Woodlands	
Golden eagle *Aquila chrysaetos*	CSC, CFP, 3503.5/-	Open areas with associated cliffs or trees for nesting	
Costa's hummingbird *Calypte costae*	FSC / -	Scrub	
Lawrence's goldfinch *Carduelis lawtencei*	FSC / -	Forests, woodlands or scrub	
Vaux's swift *Chaetura vauxi*	FSC / -	Nests in cavities of snags.	
Lark sparrow *Chondestes grammacus*	FSC / -	Brush and trees	
Northern harrier *Circus cyaneus*	- / CSC (nesting), 3503.5	Nests in scrubby vegetation on edges of marshes	
Olive sided flycatcher *Contopus cooperi*	FSC / -	Forests and woodlands	
Black swift *Cypseloides niger*	- / CSC (nesting)	Breeds on cliffs behind or adjacent to waterfalls in deep canyons and bluffs	**Present On-Site** This species is known to nest at Coast Dairies.
Hermit warbler *Dendroica occidentalis*	FSC / -	Conifer forests	
California warbler *Dendroica petechia brewsteri*	- / CSC	Nests in riparian woodlands	
White-tailed kite *Elanus leucurus*	FSC / CFP, 3503.5	Nests in dense topped trees in vicinity of marshes and grasslands	
Pacific slope flycatcher *Epidonax difficilis*	FSC / -	Moist woods and forests	
California horned lark *Eremophila alpestris actia*	FSC / CSC	Breeds and winters in open grasslands and pastures	
Merlin *Falco columbarius*	- / CSC	Nests in oak savannah	
Common loon *Gavia immer*	FSC / -	Grassy edges near freshwater	

TABLE 3.2-2 (Continued)
SPECIAL STATUS ANIMAL SPECIES REPORTED TO OCCUR WITHIN THE VICINITY OF THE COAST DAIRIES PROPERTY

Common Name	Listing Status (USFWS/CDFG)	General Habitat	Site Occurrence
Saltmarsh common yellowthroat *Geothlypis trichas sinuosa*	FSC / CSC	Requires thick, continuous cover down to the water surface for foraging and tall grasses, emergent vegetation or willows for nesting	**Present On-Site** This species is known to occur at Scotts Creek Marsh
California gull *Larus californicus*	- / CSC	Nests on ground near bays and inland rivers east of the Sierra Nevada and Cascades	
Loggerhead shrike *Lanius ludovicianus*	FSC / CSC	Nests in open fields and woodlands	
Lewis' woodpecker *Melanerpes lewis*	FSC / -	Woodlands	
Alameda song sparrow *Melospiza melodia pusillula*	FSC / CSC	Nests on ground near freshwater	
Long-billed curlew *Numenius americanus*	FSC / CSC	Nests near water in prairies and grassy meadows	
Osprey *Pandion haliaetus*	- / CSC, 3503.5	Nests on tall snags and hunts over open water	
American white pelican *Pelecanus erythrorhynchos*	- / CSC	Nests on ground near bays and inland rivers in the Klamath Basin	
White faced ibis *Plegadis chihi*	FSC / -	Freshwater marshes	
Black skimmer *Rynchops niger*	- / CSC	Nests in coastal beaches or sandbars	
Rufous hummingbird *Selasphorus rufus*	FSC / -	Forest edges and meadows	
Allen's hummingbird *Selasphorus sasin*	FSC / -	Wooded or brushy areas	
Red-breasted sapsucker *Sphyrapicus ruber*	FSC / -	Woodlands	
Elegant tern *Sterna elegans*	FSC / CSC	Nests on salt marsh dikes and sand beaches in Mexico and extreame southern California	
Bewick's wren *Thryomanes bewickii*	FSC / -	Chaparral and pinyon woodlands	
California thrasher *Toxostoma redivivum*	FSC / -	Chaparral	
MAMMALS			
Pallid bat *Antrozous pallidus*	- / CSC	Caves, crevices, mines, open buildings	

TABLE 3.2-2 (Continued)
SPECIAL STATUS ANIMAL SPECIES REPORTED TO OCCUR WITHIN THE VICINITY OF THE COAST DAIRIES PROPERTY

Common Name	Listing Status (USFWS/CDFG)	General Habitat	Site Occurrence
Pacific western (Townsend's) big-eared bat *Corynothinus townsendii townsendii*	FSC / -	Buildings, caves, and cliffs	
Western mastiff bat *Eumops perotis californicus*	FSC / -	Crevices on cliff faces, high buildings, trees, and tunnels	
Long-eared myotis *Myotis evotis*	FSC / -	Crevices, under bark, snags, forests	
Small-footed myotis *Myotis leibii*	FSC / -	Caves, and crevices, sometimes bridges and bark	
Fringed myotis *Myotis thysanodes*	FSC / -	Caves, crevices, montane forest	
Long-legged myotis bat *Myotis volans*	FSC / -	Buildings, caves, and cliffs	
Yuma myotis bat *Myotis yumanensis*	FSC / -	Buildings, caves, and cliffs	
OTHER SPECIES OF SPECIAL STATUS			
INVERTEBRATES			
Monarch butterfly *Danaus plexipus*	/ *	Groves of eucalyptus and native trees along the coast	**Present On-Site** This species is known to occur within Monterey cypress and eucalyptus along Cement Road and near the intersection of Ocean and Marine View within the town of Davenport.
BIRDS			
Red-tailed hawk *Buteo jamaicensis*	- / 3503.5	Nests in large trees.	
American kestrel *Falco sparverius*	- / 3503.5	Nests in cavities of snags.	
Black-crowned night heron *Nycticorax nycticorax*	MB / -	Breeds in marshes	
MAMMALS			
Harbor seal *Phoca vitulina*	MPA /CFP	Open water and gently sloping gravel areas for resting	**Present on Site** found along coastline

TABLE 3.2-2 (Continued)
SPECIAL STATUS ANIMAL SPECIES REPORTED TO OCCUR WITHIN THE VICINITY OF THE COAST DAIRIES PROPERTY

STATUS CODES:

FEDERAL: (U.S. Fish and Wildlife Service)

FE = Listed as Endangered by the Federal Government
FT = Listed as Threatened by the Federal Government
FPE = Proposed as Endangered by the Federal Government
FD = Formerly listed as Endangered or Threatened by the Federal Government, now removed from that list “de-listed”
FC = Candidate for Federal listing
FSC = Federal Species of Concern
MB = Migratory Bird Treaty Act
MPA = Marine Mammal Protection Act

STATE: (California Department of Fish and Game)

CE = Listed as Endangered by the State of California
CT = Listed as Threatened by the State of California
CFP = Fully protected species under the Fish and Game Code of California
CR = Listed as Rare by the State of California
CSC = California species of special concern
* = Special Animals
3503.5 = no harm to raptor nests or eggs

Obviously, much could be and has been written about any of these species. In the subsections below, descriptions for known resident animals concentrate on legal status (degree of endangerment), a brief physical description and those aspects of natural history or habitat which are most vulnerable to the impact of management decisions.

The marbled murrelet was eliminated from further consideration, at least as an ECR issue, following habitat suitability surveys conducted in 2000. It was concluded that the Coast Dairies property does not currently support suitable nesting habitat for the species. The entire property was clear-cut in the early 1900’s, and there are no old-growth trees remaining. The woodland habitats that have re-grown do not contain large trees or groves with appropriate structure to allow for nesting by the species. Many of the forested habitats, particularly in the northern part of the site, are present only in small patches, which are not suitable for nesting by murrelets. In the Laguna and Liddell watersheds, there are extensive forests, but the trees are not large enough to provide the appropriate microhabitat for nesting sites. The closest confirmed nesting site for marbled murrelets is at Big Basin Redwoods State Park (Mori, Suddjian pers. comm., 2000). A radiotelemetry study was performed by CDFG along the Santa Cruz and San Mateo coasts in 2000. Results of this survey (currently unavailable) may indicate that the species flies over the Property to nesting sites further inland.

3.2.3.1 SNOWY PLOVER

Species Status, Description and Habitat Requirements

The snowy plover (*Charadrius alexandrinus nivosus*) was listed as Threatened in 1993, primarily because of poor reproductive success resulting from human disturbance and predation, combined with permanent or long-term loss of nesting habitat to urban development. It is a bird adapted to ground-nesting on sandy beaches, where the survival value of seeing predators coming can exceed the value of adequate cover to hide behind. Plovers are slightly over six inches long, and pale colored. Upperparts are the color of dry sand on California beaches; the underparts are white. There are dark marks on the forecrown, auriculars (ear coverts), and at the shoulder. Plovers have a short black bill.

The Pacific coast population of the western snowy plover, of which the Coast Dairies birds are a part, breeds primarily from southern San Francisco Bay to southern Baja California, in 157 identified current or historical locations on --5 in Washington, 19 in Oregon, and 133 in California (Federal Register: December **7**, 1999 [Volume 64, Number 234]). Snowy plovers are very local and erratic in occurrence inland (i.e., away from the coast) in northern California (McGill et al., 1995), and their preferred waterfront nesting habitat is sand spits, dune-backed beaches, beaches at creek and river mouths, and salt pans at lagoons and estuaries. Important components of the beach/dune/estuarine ecosystem include surf-cast kelp, sparsely vegetated foredunes (beach area immediately in front of a sand dune), interdunal flats (flat land between dunes), spits, washover areas, blowouts (a hole or cut in a dune caused by storm action), intertidal flats (flat land between low and high tides), salt flats, flat rocky outcrops, and gravel bars.

The parts of the beaches selected for nesting are generally open; however, areas surrounding plover nests can have up to 25 percent total cover. The majority of snowy plovers are site-faithful, returning to the same breeding site in subsequent breeding seasons. Three-quarters of the birds breeding in Monterey and Santa Cruz Counties in 2000 had been there the year before (Page et al., 2001).

The breeding/nesting season for western snowy plovers (courtship, copulation, nest scraping, egg laying, incubation, and rearing of the young to the fledgling) extends from early March to late September. Wintering habitat is also important, especially since birds breeding in interior areas of the Great Basin may spend the winters with coastal populations, and loss of wintering habitat has certainly contributed to the decline of the species. Wintering plovers are found on many of the beaches used for nesting but also on beaches not used for nesting. The wintering season generally extends from October to February but often overlaps the nesting season with birds arriving on wintering areas as early as midsummer.

Occurrence on the Coast Dairies Property

Shortly after the Property came under the interim management of the Trust for Public Land, the Pacific Coast population of the western snowy plover received the additional protection of a

Critical Habitat designation (Federal Register: December **7**, 1999 [Volume 64, Number 234]). Critical Habitat is defined by the Endangered Species Act as "essential to the conservation of the species," and imposes extensive responsibilities on any federal agency (e.g., the Bureau of Land Management [BLM]) whose policies might impact it. Two areas on or adjacent to Coast Dairies were identified: Scotts Creek Beach, northwest from the 60 foot contour line of the south end (straddling the Property boundary), and Laguna Creek Beach, essentially the entirety of the beach below the 20 foot contour (Santa Cruz USGS **7**.5 minute Quad 1981).

Three beaches in northern Santa Cruz County support nesting plovers and are regularly (since 1988) monitored by PRBO, including those on the Coast Dairies Property.[5] Scotts Creek and Laguna Creek beach nesting sites are protected only by what PRBO terms "symbolic fencing," i.e., a single rope and warning signs. In spring 2000, PRBO staff recorded a fledging success of 8 percent at Laguna Creek (Analysis Zone LAB-1) and 24 percent at Scotts Creek (Analysis Zone MB-1). The number of young birds leaving the nest is a clear measurement of how well any area is doing. It can be difficult to establish causes for low number, and the number for the Coast Dairies Beaches, especially Laguna Creek Beach, were low compared to an average fledging rate for all of Monterey and Santa Cruz Counties of 39 percent and 70 percent on a closed beach, Wilder Creek (see Table 3.2-3). Nests fail for a wide variety of reasons including natural predation and the physical effects of wind, but disturbance is a factor on these beaches.

TABLE 3.2-3
NEST SUCCESS OF SNOWY PLOVERS ON NORTH SANTA CRUZ COUNTY BEACHES IN 2000.

Beach	Adults	Nests	% Nests Hatching	Chicks	Juveniles	% Chicks Fledging	Juveniles per nest	Juveniles per male
Wilder Creek	12	7	57.1	10	7	70.0	1.00	1.17
Laguna Creek	10	7	71.4	13	1	7.7	0.14	0.25
Scotts Creek	14	11	90.9	29	7	24.1	0.64	1.00

Source: Carlton Eyster, PRBO.

[5] The Coast Dairies Planning Team surveyed all the beaches on Coast Dairies Property several times in April and May of 2000 to determine if nesting occurred in any area not under study by PRBO. No plovers were observed except at Scotts and Laguna Creek Beaches

3.2.3.2 CALIFORNIA RED-LEGGED FROG

The California red-legged frog is chiefly a pond frog that can be found in quiet permanent waters of ponds, pools, streams, springs, marshes, and lakes. Moist woodlands, forest clearings, and grasslands also provide suitable habitat for this species in the non-breeding season (Stebbins, 1985). Adult frogs seek waters with dense vegetation, such as cattails, along the shore that provide good cover (Miller et al., 1996), but may be found in unvegetated waters as well.

Frogs breed from January to May. Eggs are attached to vegetation in shallow water and are deposited in irregular clusters (Miller et al., 1996). Tadpoles grow to three inches before metamorphosing. Red-legged frogs are active year-long along the coast but will aestivate from late summer to early winter inland. Adults consume insects such as beetles, caterpillars and isopods, while tadpoles forage on algae and detritus.

They are found on the western slope of the Cascade-Sierran mountain system, in the North and South Coast Ranges, and the Transverse Range (Stebbins, 1985). Historically, red-legged frogs were found in the Central Valley and southern Sierra foothills, but habitat disturbance and the introduction of bullfrogs seem to have resulted in the extirpation of this species from these areas (Stebbins, 1985; Miller et al., 1996).

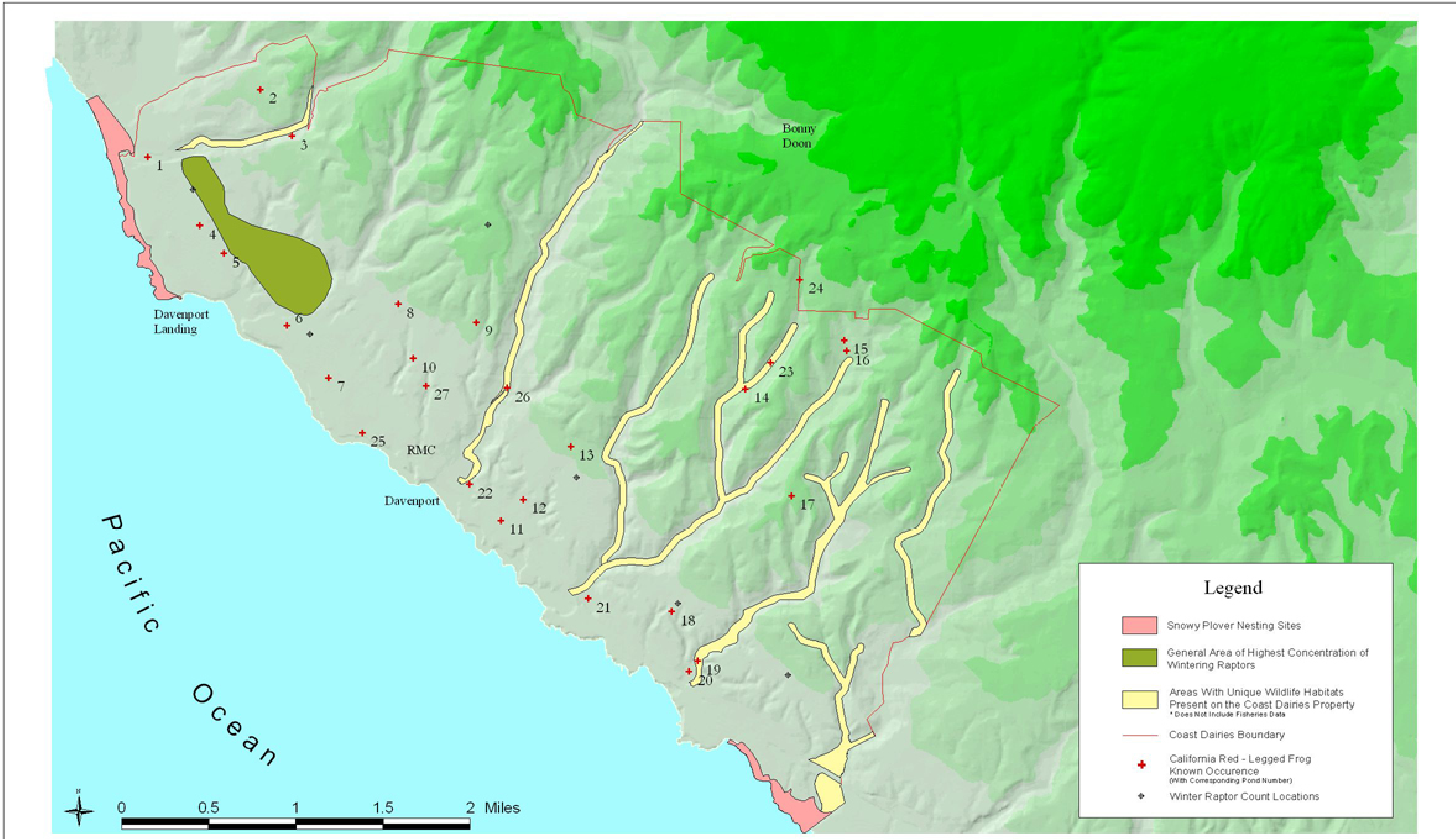
Occurrence on the Coast Dairies Property

Adult and/or sub-adult red-legged frogs were observed at 20 ponds on Coast Dairies Property (Table 3.2-4; Figure 3.2-1). Six of theses ponds (3, 4, 5, 9, 13 and 21) are agricultural ponds that are dependent upon water diversions to fill. Seven of the ponds (1, 8, 19, 20, 22, 26 and 27) are impoundments or diversions within creek channels, and fill naturally. One of the ponds (2) is an impounded spring and one of the ponds (10) is a seasonal wetland that forms near the Davenport cement plant. Three ponds (15, 16 and 23) are sediment basins at the Bonny Doon limestone quarry and are actively maintained as part of a Habitat Management Plan. One of the sites (Pond 24) is a sediment basin at the limestone quarry that is being managed for red-legged frogs as part of the HCP. One of the sites (Pond 14) is a wetland mitigation area constructed by RMC Pacific Materials near the quarry.

Breeding by red-legged frogs was documented at twelve ponds either by the presence of tadpoles (Ponds 2, 3, 5, 8-10, 14, 19, 21 and 24) or by the presence of calling adults (Pond 27). Surveyors (Biosearch Wildlife Surveys) suspected that breeding was successful at most of these ponds, although Pond 3 dried early in the season, and water diversions to Pond 23 were unreliable.

TABLE 3.2-4. RESULTS OF CALIFORNIA RED-LEGGED FROG SURVEYS AT PONDS ON COAST DAIRIES PROPERTY, MAY 2000 – FEBRUARY 2001

Pond #	Analysis Zone	UTM-N	UTM-E	CA Red-Legged Frog Adults	CA Red-Legged Frog Larvae	Pacific Treefrog	Western Toad	California Newt	Rough-skin Newt	SC Garter Snake
1	MSPZ-2	4099200	568925	X				X		
2	MP-1	4099850	569950	X	X	X	X	X		
3	MP-2	4099425	570250	X	X	X		X		
4	MCT-2	4098575	569425	X		X				X
5	MCTB-1	4098325	569650	X	X	X	X			X
6	MCTB-2	4097645	570250							
7	MCTB-2	4097200	570650							
8	MCT-4	4097900	571275	X	X			X		
9	SVP-1	4097750	572000		X	X				
10	MCT-4	4097400	571425	X	X	X				X
11	LCTB-1	4095925	572275							
12	LCT-1	4096125	572475			X				
13	LP-1	4096625	572900	X		X		X		
14	LSPZ-2	4097200	574500	X	X	X			X	
15	LW-3	4097675	575400	X		X			X	X
16	LW-3	4097575	575425	X		X			X	
17	YBS-1	4096225	574950			X				
18	YBP-1	4095125	573875			X	X			
19	YBSPZ-1	4094675	574125	X	X	X	X			X
20	YBCT-1	4094575	574050	X						X
21	LCT-2	4095225	573100	X	X		X			
22	SVS-1	4096250	571975	X		X				X
23	LSPZ-2	4097450	574725	X	X	X			X	
24	LW-2	4098225	574975	X	X	X			X	X
25	MCTB-2	4096700	570975			X				
26	SVSPZ-1	4097150	572300	X						
27	SVCT-2	4097150	571550	X		X				



SOURCE: Environmental Science Associates, Pacific Meridian Resources

Coast Dairies / 200071

Figure 3.2-1

Special-Status Wildlife Locations on the Coast Dairies Property

Of the seven ponds at which red-legged frogs were not observed, four (6, 7, 11 and 12) are cement-lined agricultural ponds that are drained periodically, two (17 and 18) are stock ponds that dry by the end of spring, and one (25) is very difficult to access, which influenced the effectiveness of surveys.

In summary, the California red-legged frog is widely distributed on the Coast Dairies Property, particularly in the lower elevation management zones. Sites at which breeding was documented are found in all watersheds except Laguna Creek. Although not surveyed as part of this effort, all named creeks and many of their tributaries provide non-breeding habitat. During the summer and fall, red-legged frogs are known to seek refuge in pools in coastal streams (Bulger 1999; USFWS 2001). California red-legged frogs have been documented[6] in San Vicente Creek (SVSPZ-1; McGinnis, 1990), in the West and Middle Forks of Liddell Creek (LSPZ-1 and LSPZ-2; Laabs, pers. obs.), in Yellow Bank Creek (YBSPZ-1; Alley, pers. comm.) and in Laguna Creek (LASPZ-3; Morgan, pers. comm.). Given the distribution of breeding and non-breeding habitats throughout the Coast diaries Property, the species could be found seasonally in most management zones during breeding migrations in the winter and spring. Activity during the summer is expected to center around aquatic habitats and those uplands within 300 feet.

It is important to note that no bullfrogs were observed on the Coast Dairies site. This non-native species has been implicated in the decline of the red-legged frog throughout much of its range. There are known populations of bullfrogs to the north at Año Nuevo State Reserve and to the south at Natural Bridges Beach State Park. Physical removal of adult bullfrogs has proven effective at reducing bullfrog populations and increasing red-legged frog populations (Stracken, Westphal pers. comm., 2000).

3.2.3.3 PEREGRINE FALCONS AND OTHER RAPTORS

Peregrines. No evidence of nesting peregrines was observed on the Coast Dairies Property during surveys in May, 2000. Cliffs containing the most suitable nest ledges in the interior of the Coast Dairies property are located along the upper reaches of Yellow Bank Creek in Analysis Zone YBW-1 and YBW-2.

Coast Dairies contains approximately six miles of coastal cliffs that range from 40-80 feet in height. The erosive nature of the rock on these cliffs does not support an abundance of large ledges that peregrines typically use for nesting. However, peregrine nesting on Coast Dairies coastal cliffs should not be totally unexpected. The bluffs contain a small number of marginally suitable nest ledges, and peregrines occasionally use abandoned stick nests constructed by other birds such as red-tailed hawks, ravens and cormorants, all of which occur on the Coast Dairies coastal cliffs. There was an active raven nest with at least one nestling in MCTB-2 in May, 2000.

Peregrines were observed twice during the 2000 nest surveys. A molting adult peregrine was observed from Swanton Road on May 22, 2000 soaring over the coastal cliffs and sloping terrain

[6] Bern Smith (Landsmiths) has also observed the species in Molino and Ferrari Creeks.

east of Molino Creek in Analysis Zones MP-1, MP-4 and MCTB-1. This bird disappeared from view to the northeast over Analysis Zone MP-1. The second sighting was a sub-adult (one-year old bird) observed soaring over the coastal cliffs north of Bonny Doon beach in Analysis Zone LACTB-1 on May 25, 2000.

General Raptors. A total of 405 individual observations of 10 species of raptors (9 diurnal, 1 nocturnal) were observed during seven surveys from December 5, 2000 to January 26, 2001. Red-tailed hawks (*Buteo jamaicensis*) were by far the most numerous raptor with 313 counted. Red-tailed hawks were nearly 10 times more numerous that the next most abundant species -- American kestrel (*Falco sparverius*) , which totaled only 33. The average red-tailed hawk count was 45 individuals per session compared to 5 kestrels. The total number of raptors counted per session for all six stations increased steadily from an initial low of 42 on December 18, 2000 and doubled to a high of 84 during the last count on January 26, 2001. The combined average count was 58 raptors per survey session. Since their distribution was not uniform throughout the Property, the Planning Team designated the area with the densest concentration a “unique habitat association”(see Section 3.2.4). Special status raptors observed are discussed by species below.

Cooper's hawk (*Accipiter cooperi*)

Listing Status: *California:* Species of Special Concern, California Code 3503-3503.5
Federal: None

The Cooper's hawk is a small bird hunter, hunting on the edges of forests in broken forest and grassland habitats where passerines forage for seeds and insects. This species nests in heavily forested areas near a water source. Some research studies on nesting Cooper's hawks rarely show the nests more than a quarter of a mile away from water, whether it is a cattle tank, stream or seep (Snyder, 1975). Typical trees used by Cooper's hawks are cottonwoods, coast live oaks and black oaks (Call, 1978). This species also nests in second growth conifer stands or deciduous riparian areas.

Northern harrier (*Circus cyaneus*)

Listing Status: *California:* Species of Special Concern, California Code 3503-3503.5
Federal: None

This species nests and forages along wet meadows, sloughs, savannas or prairies and marshes, feeding on small mammals. The territory for this species is often a minimum of 10-20 acres foraging area. The species is known to nest in Analysis Zone LAM-1.

White-tailed kite (*Elanus leucurus*)

Listing Status: *California:* California Code 3503-3503.5
Federal: None

This species is a California resident, but shifts regionally within the state based upon food availability. Prior to 1895 this species was common to widespread in valley and lower foothill territory, but is now rare in many sections of the state. This species forages in wetlands and open brushlands, usually near water and streams. Oak woodlands, valley oak or live oak, or trees along marsh edges are used for nesting sites. The nest made by this species is a frail platform of sticks, leaves, weed stalks, and similar materials located in trees or brush. A combination of habitats is essential, including open grasslands, meadows or marshes for foraging and isolated dense-topped trees for perching and nesting.

3.2.3.4 OTHER SPECIAL STATUS SPECIES LIKELY TO BE PRESENT

Table 3.2-2 comprised a list of special-status species with *any* potential to occur on the Coast Dairies Property. The table below (3.2-5) is more predictive (i.e., the Planning Team team considers them likely or has informal information, such as personal communications, that they do occur). It lists species by watershed and analysis zone. Other special status species known to occur on the Property include:

Rhinoceros auklet (*Cerorhinca monocerata*)

Listing Status: *California:* Species of Special Concern
Federal: None

This sooty-brown seabird dives for small fish and nests in coastal burrows where the soil is soft and friable from the Alaska Peninsula south along coast to central California. During the breeding season, a pale knob projects upward from the base of the upper mandible giving a rhinoceros-like appearance to its otherwise more narrow and shallower bill. This auklet probably winters in inshore and offshore waters from breeding colonies south to southern California. (Terres, 1991). The bird is a confirmed nester in Analysis Zone MB-3.

Grasshopper sparrow (*Ammodramus savannarum*)

Listing Status: *California:* None
Federal: Fish and Wildlife Service: Migratory Nongame Bird of Management Concern

This sparrow is a true grassland bird – probably diagnostic for that habitat type – and the only grassland sparrow without streaks or markings on the breast. It nests in loose colonies on the ground. It eats most insects and earthworms, but also consumes grass and sedge seeds (Terres, 1991). It nests in several of the Property grasslands, including MP-1 and MP-4.

San Francisco dusky-footed woodrat (*Neotoma fuscipes annectens*)

Listing Status: *California:* Species of Special Concern
Federal: Species of Concern

This species prefers hardwood forests and brushlands and often forages above ground. Food includes berries, fungi, leaves, flowers, and nuts. (Jameson and Peeters, 1988). It is probably well distributed in shrub, woodland and riparian habitats at Coast Dairies.

TABLE 3.2-5
SPECIAL STATUS SPECIES LIKELY TO OCCUR IN THE MOLINO CREEK WATERSHED

Common Name *Scientific Name*	**State/ Fed. Status**	**MB-1**	**MB-2**	**MB-3**	**MCT-1**	**MCT-2**	**MCT-3**	**MCT-4**	**MCTB-1**	**MCTB-2**	**MP-1**	**MP-2**	**MP-3**	**MP-4**	**MS-1**	**MSPZ-1**	**MSPZ-2**	**MW-1**
California red-legged frog *Rana aurora draytonii*	CSC/ FT					B		B*	B*	B	B*	B*				B, NB	NB	
Peregrine falcon (nesting) *Falco peregrinus*	SE, CFP, 3503.5/ FD	F	F	F														
Western snowy plover Charadrius alexandrinus	CSC/ FT	N*																
Western pond turtle *Clemmys marmorata*	CSC/ -					A			A		A					A		
Double-crested cormorant (rookery) *Phalacrocorax auritus*	CSC/ -			N														
Cooper's hawk (nesting) *Accipiter cooperi*	CSC, 3503.5/ -						F	F	F*	F	N	F	F	F	N	N	N	N
Sharp-shinned hawk (nesting) *Accipiter striatus*	CSC, 3503.5/ -																	N
Golden eagle *Aquila chrysaetos*	CSC, CFP, 3503.5/ -								F	F	F	F	F	F	F			F
Ferruginous hawk (wintering) *Buteo regalis*	CSC/ FSC				W	W	W	W	W	W	W	W	W	W				
Northern harrier (nesting) *Circus cyaneus*	CSC, 3503.5/-				F	F*	F*	F	F	F	F	F	F	F*				
White-tailed kite (nesting) *Elanus leucurus*	CFP/ FSC				F	F	F*	F	F	F	N	N	N	N	N	N	N	N
Merlin (wintering) *Falco columbarius*	CSC/ -	W	W	W	W	W	W	W	W	W	W	W	W	W				
Long-eared owl (nesting) *Asio otus*	CSC/ -															N		
Rhinoceros auklet *Cerorhinca monocerata*	CSC/ -	N	N	N*														
Vaux's swift *Chaetura vauxi*	CSC/ FSC														N			N

TABLE 3.2-5 (Continued)
SPECIAL STATUS SPECIES LIKELY TO OCCUR IN THE MOLINO CREEK WATERSHED

Common Name ***Scientific Name***	**State/** **Fed. Status**	**MB-1**	**MB-2**	**MB-3**	**MCT-1**	**MCT-2**	**MCT-3**	**MCT-4**	**MCTB-1**	**MCTB-2**	**MP-1**	**MP-2**	**MP-3**	**MP-4**	**MS-1**	**MSPZ-1**	**MSPZ-2**	**MW-1**
Black swift *Cypseloides niger*	CSC/ FSC	N	N	N														
Olive-sided flycatcher *Contopus borealis*	-/ FSC										N				N			N
Loggerhead shrike *Lanius ludovicianus*	CSC/ FSC					N	N				N	N	N	N	N			N
California horned lark *Eremophila alpestris actia*	CSC/ -										N	N	N	N				
Yellow warbler *Dendroica petechia brewsteri*	CSC/ FSC												N			N	N	
Saltmarsh common yellowthroat *Geothlypis trichas sinuosa*	CSC/ -																	
Grasshopper sparrow (nesting) *Ammodramus savannarum*	-/ FSC				N			N			N*	N	N	N*				
Tricolored blackbird (nesting) *Agelaius tricolor*	CSC/ FSC					N					N							
Pallid bat *Antrozous pallidus*	CSC/ -														R	R	R	R
Townsend's big-eared bat *Corynorhinus t. townsendii*	CSC/ -														R	R	R	R
Yuma (San Joaquin) myotis *Myotis yumanensis*	CSC/ -														R	R	R	R
S.F. dusky-footed woodrat *Neotoma fuscipes annectens*	CSC/ -										N	N		N	N*	N	N	N*

TABLE 3.2-5 (Continued)
SPECIAL STATUS SPECIES LIKELY TO OCCUR IN THE SAN VICENTE CREEK WATERSHED

Common Name ***Scientific Name***	**State/** **Federal Status**	**SVB-1**	**SVCT-1**	**SVCT-2**	**SVCT-3**	**SVP-1**	**SVP-2**	**SVS-1**	**SVSPZ-1**	**SVW-1**	**SVW-2**
California red-legged frog *Rana aurora draytonii*	CSC/ FT		B*	B		B*		B	NB		
Peregrine falcon (nesting) *Falco peregrinus*	SE, CFP, 3503.5/ FD	F									
Western snowy plover Charadrius alexandrinus	CSC/ FT	N									
Western pond turtle *Clemmys marmorata*	CSC/ -			A					A		
Double-crested cormorant (rookery) *Phalacrocorax auritus*	CSC/ -										
Cooper's hawk (nesting) *Accipiter cooperi*	CSC, 3503.5/ -			F		F	F	N	N	N	N
Sharp-shinned hawk (nesting) *Accipiter striatus*	CSC, 3503.5/ -								N		N
Golden eagle *Aquila chrysaetos*	CSC, CFP. 3503.5/ -		F	F	F	F	F	F		N	
Ferruginous hawk (wintering) *Buteo regalis*	CSC/ FSC						W	W			
Northern harrier (nesting) *Circus cyaneus*	CSC/-		F	F	F	F	F	F			
White-tailed kite (nesting) *Elanus leucurus*	CFP, 3503.5/ FSC		F	F	F	F	F	N	N	N	N
Merlin (wintering) *Falco columbarius*	CSC/ -	W	W	W	W	W	W	W			
Long-eared owl (nesting) *Asio otus*	CSC/ -								N		
Rhinoceros auklet *Cerorhinca monocerata*	CSC/ -										
Vaux's swift *Chaetura vauxi*	CSC/ FSC										N

TABLE 3.2-5 (Continued)
SPECIAL STATUS SPECIES LIKELY TO OCCUR IN THE SAN VICENTE CREEK WATERSHED

Common Name ***Scientific Name***	**State/** **Federal Status**	**SVB-1**	**SVCT-1**	**SVCT-2**	**SVCT-3**	**SVP-1**	**SVP-2**	**SVS-1**	**SVSPZ-1**	**SVW-1**	**SVW-2**
Black swift *Cypseloides niger*	CSC/ FSC	N									
Olive-sided flycatcher *Contopus borealis*	-/ FSC							N		N	N
Loggerhead shrike *Lanius ludovicianus*	CSC/ FSC					N	N	N		N	
California horned lark *Eremophila alpestris actia*	CSC/ -					N	N	N			
Yellow warbler *Dendroica petechia brewsteri*	CSC/ FSC								N		
Saltmarsh common yellowthroat *Geothlypis trichas sinuosa*	CSC/ -										
Grasshopper sparrow (nesting) *Ammodramus savannarum*	-/ FSC					N	N	N			
Tricolored blackbird (nesting) *Agelaius tricolor*	CSC/ FSC										
Pallid bat *Antrozous pallidus*	CSC/ -							R	R	R	R
Townsend's western big-eared bat *Corynorhinus t. townsendii*	CSC/ -							R	R	R	R
Yuma (San Joaquin) myotis *Myotis yumanensis*	CSC/ -							R	R	R	R
S. Francisco dusky-footed woodrat *Neotoma fuscipes annectens*	CSC/ -					N	N	N*	N	N*	N*

TABLE 3.2-5 (Continued)
SPECIAL STATUS SPECIES LIKELY TO OCCUR IN THE LIDDELL CREEK WATERSHED

Common Name ***Scientific Name***	**LB-1**	**LB-2**	**LCTB-1**	**LCTB-2**	**LCT-1**	**LCT-2**	**LP-1**	**LP-2**	**LP-3**	**LS-1**	**LS-2**	**LS-3**	**LSPZ-1**	**LSPZ-2**	**LW-1**	**LW-2**	**LW-3**	**LW-4**
California red-legged frog *Rana aurora draytonii*						B*	B						NB	B*, NB*			NB*	
Peregrine falcon (nesting) *Falco peregrinus*	F	F																
Western snowy plover Charadrius alexandrinus		N																
Western pond turtle *Clemmys marmorata*													A	A				
Double-crested cormorant (rookery) *Phalacrocorax auritus*																		
Cooper's hawk (nesting) *Accipiter cooperi*					F	F	F	F	F	F	F	F	N	N	N	N	N	N
Sharp-shinned hawk (nesting) *Accipiter striatus*													N	N	N	N	N	N
Golden eagle *Aquila chrysaetos*			F	F	F	F	F	F	F	F	F	F			F			
Ferruginous hawk (wintering) *Buteo regalis*							W	W	W									
Northern harrier (nesting) *Circus cyaneus*			F	F	F	F	F	F	F	F	F	F			F			
White-tailed kite (nesting) *Elanus leucurus*			F	F	F	F	N	F	F	N	N	F			N	N	N	N
Merlin (wintering) *Falco columbarius*	W	W	W	W	W	W	W	W	W	W	W							
Long-eared owl (nesting) *Asio otus*													N	N				
Rhinoceros auklet *Cerorhinca monocerata*																		
Vaux's swift *Chaetura vauxi*															N	N	N	N

TABLE 3.2-5 (Continued)
SPECIAL STATUS SPECIES LIKELY TO OCCUR IN THE LIDDELL CREEK WATERSHED

Common Name ***Scientific Name***	**LB-1**	**LB-2**	**LCTB-1**	**LCTB-2**	**LCT-1**	**LCT-2**	**LP-1**	**LP-2**	**LP-3**	**LS-1**	**LS-2**	**LS-3**	**LSPZ-1**	**LSPZ-2**	**LW-1**	**LW-2**	**LW-3**	**LW-4**
Black swift *Cypseloides niger*	N	N																
Olive-sided flycatcher *Contopus borealis*															N	N	N	N
Loggerhead shrike *Lanius ludovicianus*					N	N	N	N	N	N	N	N						
California horned lark *Eremophila alpestris actia*							N	N	N									
Yellow warbler *Dendroica petechia brewsteri*													N	N				
Saltmarsh common yellowthroat *Geothlypis trichas sinuosa*																		
Grasshopper sparrow (nesting) *Ammodramus savannarum*							N	N	N									
Tricolored blackbird (nesting) *Agelaius tricolor*																		
Pallid bat *Antrozous pallidus*										R	R	R	R	R	R	R	R	R
Townsend's western big-eared bat *Corynorhinus t. townsendii*										R	R	R	R	R	R	R	R	R
Yuma (San Joaquin) myotis *Myotis yumanensis*										R	R	R	R	R	R	R	R	R
S. Francisco dusky-footed woodrat *Neotoma fuscipes annectens*					N	N	N	N	N	N	N	N	N	N	N	N	N	N

TABLE 3.2-5 (Continued)
SPECIAL STATUS SPECIES LIKELY TO OCCUR IN THE YELLOW BANK CREEK WATERSHED

Common Name ***Scientific Name***	**State/** **Federal Status**	**YBB-1**	**YBCTB-1**	**YBCT-1**	**YBCT-2**	**YBP-1**	**YBP-2**	**YBS-1**	**YBS-2**	**YBSPZ-1**	**YBW-1**	**YBW-2**
California red-legged frog *Rana aurora draytonii*	CSC/ FT									B*, NB*		
Peregrine falcon (nesting) *Falco peregrinus*	SE, CFP, 3503.5/ FD	F										
Western snowy plover *Charadrius alexandrinus*	CSC/ FT											
Western pond turtle *Clemmys marmorata*	CSC, CP/ -									A		
Double-crested cormorant (rookery) *Phalacrocorax auritus*	CSC/ -											
Cooper's hawk (nesting) *Accipiter cooperi*	CSC, 3503.5/ -					F	F	F	F	N	N	N
Sharp-shinned hawk (nesting) *Accipiter striatus*	CSC, 3503.5/ -									N	N	N
Golden eagle *Aquila chrysaetos*	CSC, CFP, 3503.5/ -		F	F	F	F	F	F	F			
Ferruginous hawk (wintering) *Buteo regalis*	CSC/ FSC					W	W					
Northern harrier (nesting) *Circus cyaneus*	CSC/-		F	F	F	F	F	F	F			
White-tailed kite (nesting) *Elanus leucurus*	CFP, 3503.5/ FSC		F	F	F	F	F	N	N		N	N
Merlin (wintering) *Falco columbarius*	CSC/ -		W	W	W	W	W					
Long-eared owl (nesting) *Asio otus*	CSC/ -									N		
Rhinoceros auklet *Cerorhinca monocerata*	CSC/ -											
Vaux's swift *Chaetura vauxi*	CSC/ FSC										N	N

TABLE 3.2-5 (Continued)
SPECIAL STATUS SPECIES LIKELY TO OCCUR IN THE YELLOW BANK CREEK WATERSHED

Common Name ***Scientific Name***	**State/** **Federal Status**	**YBB-1**	**YBCTB-1**	**YBCT-1**	**YBCT-2**	**YBP-1**	**YBP-2**	**YBS-1**	**YBS-2**	**YBSPZ-1**	**YBW-1**	**YBW-2**
Black swift *Cypseloides niger*	CSC/ FSC	N										
Olive-sided flycatcher *Contopus borealis*	-/ FSC										N	N
Loggerhead shrike *Lanius ludovicianus*	CSC/ FSC			N		N	N	N	N			
California horned lark *Eremophila alpestris actia*	CSC/ -					N	N					
Yellow warbler *Dendroica petechia brewsteri*	CSC/ FSC									N		
Saltmarsh common yellowthroat *Geothlypis trichas sinuosa*	CSC/ -											
Grasshopper sparrow (nesting) *Ammodramus savannarum*	-/ FSC					N	N					
Tricolored blackbird (nesting) *Agelaius tricolor*	CSC/ FSC									N		
Pallid bat *Antrozous pallidus*	CSC/ -							R	R	R	R	R
Townsend's western big-eared bat *Corynorhinus t. townsendii*	CSC/ -							R	R	R	R	R
Yuma (San Joaquin) myotis *Myotis yumanensis*	CSC/ -							R	R	R	R	R
S. Francisco dusky-footed woodrat *Neotoma fuscipes annectens*	CSC/ -			N		N	N	N	N	N	N	N

TABLE 3.2-5 (Continued)
SPECIAL STATUS SPECIES LIKELY TO OCCUR IN THE LAGUNA CREEK WATERSHED

Common Name ***Scientific Name***	**State/** **Federal Status**	**LAB-1**	**LACTB-1**	**LACT-1**	**LAM-1**	**LAP-1**	**LAS-1**	**LAS-2**	**LASPZ-1**	**LASPZ-2**	**LASPZ-3**	**LASPZ-4**	**LAW-1**	**LAW-2**	**LAW-3**	**LAW-4**
California red-legged frog *Rana aurora draytonii*	CSC/ FT				B				NB	NB	NB*	NB				
Peregrine falcon (nesting) *Falco peregrinus*	SE, CFP, 3503.5/ FD	F														
Western snowy plover Charadrius alexandrinus	CSC/ FT	N*														
Western pond turtle *Clemmys marmorata*	CSC/ -				A				A	A	A	A				
Double-crested cormorant (rookery) *Phalacrocorax auritus*	CSC/ -															
Cooper's hawk (nesting) *Accipiter cooperi*	CSC, 3503.5/ -					F	F	F	N	N	N	N	N	N	F	F
Sharp-shinned hawk (nesting) *Accipiter striatus*	CSC, 3503.5/ -								N	N			N	N		
Golden eagle *Aquila chrysaetos*	CSC, CFP, 3503.5/ -		F	F		F	F	F								
Ferruginous hawk (wintering) *Buteo regalis*	CSC/ FSC					W		W						W		
Northern harrier (nesting) *Circus cyaneus*	CSC/-		F	F	N*	F	F	F								
White-tailed kite (nesting) *Elanus leucurus*	CFP/ FSC		F	F	F	F	N	F	N	N			N	N	F	F
Merlin (wintering) *Falco columbarius*	CSC/ -	W	W	W	W	W	W	W						W		
Long-eared owl (nesting) *Asio otus*	CSC/ -								N	N						
Rhinoceros auklet *Cerorhinca monocerata*	CSC/ -															
Vaux’s swift *Chaetura vauxi*	CSC/ FSC												N	N		

TABLE 3.2-5 (Continued)
SPECIAL STATUS SPECIES LIKELY TO OCCUR IN THE LAGUNA CREEK WATERSHED

Common Name *Scientific Name*	**State/ Federal Status**	**LAB-1**	**LACTB-1**	**LACT-1**	**LAM-1**	**LAP-1**	**LAS-1**	**LAS-2**	**LASPZ-1**	**LASPZ-2**	**LASPZ-3**	**LASPZ-4**	**LAW-1**	**LAW-2**	**LAW-3**	**LAW-4**
Black swift *Cypseloides niger*	CSC/ FSC	N														
Olive-sided flycatcher *Contopus borealis*	-/ FSC												N	N		
Loggerhead shrike *Lanius ludovicianus*	CSC/ FSC		N	N		N	N	N					N	N	N	N
California horned lark *Eremophila alpestris actia*	CSC/ -					N								N		
Yellow warbler *Dendroica petechia brewsteri*	CSC/ FSC															
Saltmarsh common yellowthroat *Geothlypis trichas sinuosa*	CSC/ -				N											
Grasshopper sparrow (nesting) *Ammodramus savannarum*	-/ FSC					N								N		
Tricolored blackbird (nesting) *Agelaius tricolor*	CSC/ FSC				N											
Pallid bat *Antrozous pallidus*	CSC/ -						R	R	R	R		R	R	R		
Townsend's western big-eared bat *Corynorhinus t. townsendii*	CSC/ -						R	R	R	R		R	R	R		
Yuma (San Joaquin) myotis *Myotis yumanensis*	CSC/ -						R	R	R	R		R	R	R		
S. Francisco dusky-footed woodrat *Neotoma fuscipes annectens*	CSC/ -			N		N	N	N	N	N	N	N	N*	N*		

TABLE 3.2-5 (Continued)
SPECIAL STATUS SPECIES LIKELY TO OCCUR IN THE LAGUNA CREEK WATERSHED

Status Codes:

Status -	State	SE	State-listed as Endangered under California Endangered Species Act (CESA)
		ST	State-listed as Threatened under CESA
		SCE	State candidate for listing as Endangered
		SCT	State candidate for listing as Threatened
		CSC	California Special Concern species designated by the Department of Fish and Game
		CFP	Fully Protected Species under the Fish and Game Code of California
		3503.5	No harm to raptor nests or eggs
Status -	Federal	FE	Federally-listed as Endangered under Federal Endangered Species Act (ESA)
		FT	Federally-listed as Threatened under ESA
		FPE	Federally proposed for listing as Endangered under ESA
		FPT	Federally proposed for listing as Threatened under ESA
		FD	Federally delisted
		FC	Federal candidate species (former Category 1 candidates)
		FSC	Federal Species of Concern

Potential Habitat Codes:

B	Breeding Habitat (Cal. Red-Legged Frog)
NB	Non-breeding habitat (Cal. Red-Legged Frog)
A	Aquatic habitat (Western Pond Turtle)
F	Foraging habitat (Raptors)
N	Nesting habitat (Birds, SF Wood Rat)
W	Wintering habitat (Special-status Raptors)
R	Roosting habitat (Bats)
*	Presence confirmed (CNDDB; pers. comm.; pers. obs.)

3.2.4 UNIQUE HABITATS AND ASSOCIATIONS

3.2.4.1 RAPTORS

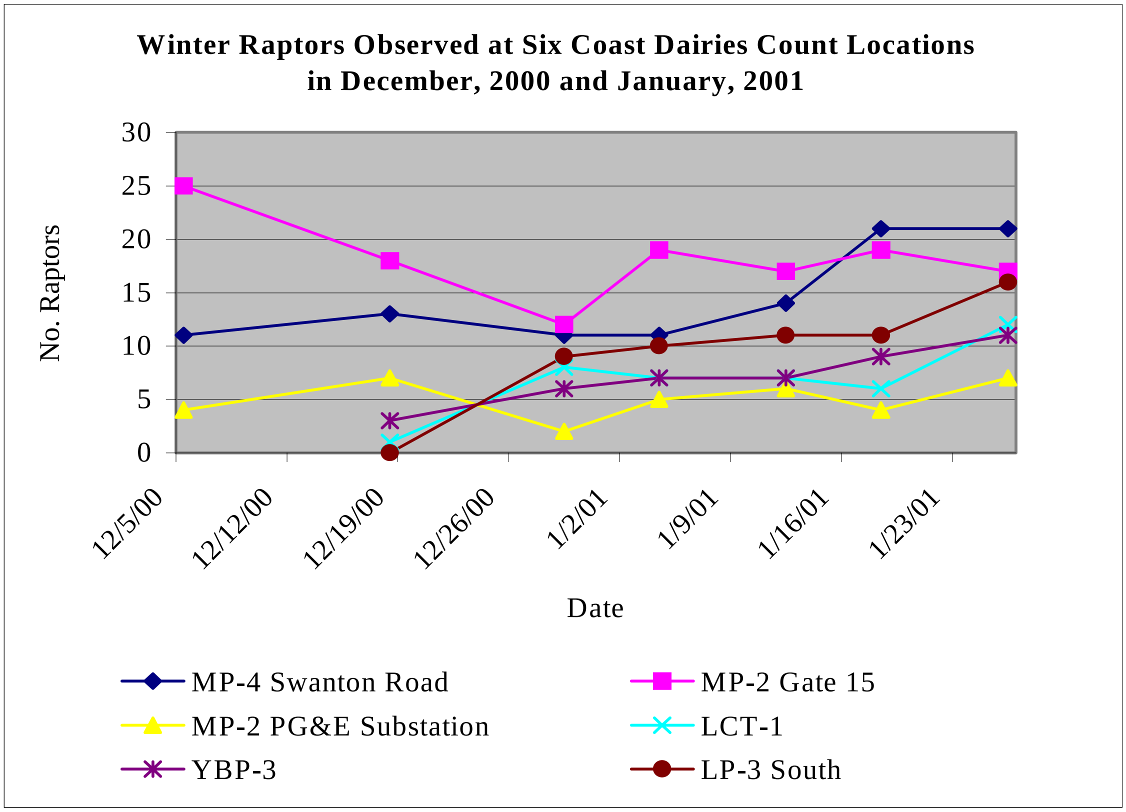
The area of highest raptor use observed from the MP-4 and MP-2 count locations were the fields in the elevation transition zone from the interior boundary of the first bench (which is roughly defined by Highway 1) to the second bench between Molinas Creek and the paved road through Gate 15 (see Figure 3.2-1).

This general area is under three different management regimes, which appear to have affected the vegetation, raptor prey base and raptor use in a fairly limited area. MP-2 was recently cultivated and had little raptor use. MCT-3 appears to have been cultivated in the recent past (perhaps in the 1999 growing season) and lay fallow in 2000. It contained tall, dense stands of herbaceous plant stalks. Raptor use of this area was intermediate between cultivated land and grazed areas. Habitat in the western “arm” of MP-4 consisted of dense grasses and moderate stands of herbaceous plant stalks. The main difference between MP-4 and MCT-3 was the grass layer, which was altogether absent in MCT-3. Raptors were clearly most abundant in MP-4. Many raptors were observed standing and foraging on the ground or perched on low fence posts. This behavior suggests that they were foraging on pocket gophers (*Thomomys bottae*).

Although we performed no statistical tests, the preponderance of raptor use in MP-2 and MP-4 as shown by Table 3.2-6 and the chart below suggested that it be deemed unique for the Property and a management priority (see Figure 3.2-1).

TABLE 3.2-6
WINTER RAPTORS OBSERVED AT SIX COAST DAIRIES COUNT LOCATIONS

Date	MP-4 Swanton Road	MP-2 Gate 15	MP-2 PG&E Substation	LCT-1	LP-3	YBP-2	Total
December 5, 2000	11	25	4				40
December 18, 2000	13	18	7	1	3	0	42
December 29, 2000	11	12	2	8	6	9	48
January 4, 2001	11	19	5	7	7	10	59
January 12, 2001	14	17	6	7	7	11	62
January 18, 2001	21	19	4	6	9	11	70
January 26, 2001	21	17	7	12	11	16	84



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3.2.5 SUMMARY ANALYSIS ZONE EVALUATIONS

Nine analysis zones out of a total of 70 had an opportunity score of "3" (*unique wildlife resources present*) on the five watersheds. All but two of these (MSPZ-1; LASPZ-3) also scored "3" in the constraints assessment (*disturbance could diminish the wildlife resource*). They are displayed in Table 3.2-7 below.

TABLE 3.2-7
ANALYSIS ZONES WITH UNIQUE WILDLIFE RESOURCES PRESENT

Analysis Zone	Descriptive Criteria
Molino Watershed	
MB-1 (Coast Daires' Portion of Scotts Creek Beach)	Snowy plover nesting and wintering habitat.
MSPZ-1 (Molino Creek riparian area)	California red-legged frog (CRLF) breeding habitat and riparian-associated resources.
San Vicente Watershed	
SVSPZ-1 (San Vicente Creek riparian area)	Riparian-associated resources.
Liddell Watershed	
LSPZ-1 (Liddell Creek riparian area – West Branch)	Raptor nesting, special status bat species, and riparian-associated resources.
LSPZ-2 (Liddell Creek riparian area – East Branch)	Raptor nesting, nearby CRLF breeding areas, and riparian-associated resources.

TABLE 3.2-7 (Continued)
ANALYSIS ZONES WITH UNIQUE WILDLIFE RESOURCES PRESENT

Analysis Zone	Descriptive Criteria
Yellow Bank Watershed	
YBSPZ-1 (Yellow Bank Creek riparian area)	Intact native habitats (alder riparian) throughout zone; potential yellow warbler nesting; nearby CRLF breeding area, and riparian-associated resources
LAM-1 (Laguna Creek Marsh)	Productive marsh habitat rare in region; nesting habitat for tricolored blackbird.
Laguna Watershed	
LAB-1 (Laguna Beach)	Snowy plover nesting and wintering habitat.
LASPZ-1 and 3 (Laguna Creek Riparian Areas)	Raptor and potential yellow warbler nesting, CRLF non-breeding habitat; S.F. dusky-footed woodrat; and riparian-associated resources.

3.2.6 ISSUES

3.2.6.1 ISSUES IDENTIFIED BY THE COMMUNITY ADVISORY GROUP

Prior to the formation of the Planning Team, the Trust for Public Land was assisted in its early project scoping by members of the Community Advisory Group (CAG) (see Section 3.1.5.1). The CAG Habitat Preservation and Enhancement Subcommittee presented to TPL a summary of an April 24, 2000 meeting, which listed the following priorities relevant to terrestrial wildlife resources:

- replacing livestock grazing with native herbivores (e.g., tule elk);
- rehabilitating mined areas; and
- establishing ongoing research programs for livestock grazing and similar uses.

3.2.6.2 FERAL PIGS

Wild pigs (*Sus scrofa*) in California have a long and (for them) successful history. There are two source populations for this non-native omnivore. They were first free-ranged in oak woodlands near the Spanish Missions in the late 1700s; then, in 1925 in Monterey County, Eurasian wild boar were released for sport hunting. More boar were released in the 1950s and apparently interbred with the wild pigs of Spanish descent. From 10 coastal counties in the 1960s, 49 of 58 California counties now have populations (Waithman et al., 1999); rooting can threaten endemic plant populations; and they can compete with native species for forage

Although studies of pig diets in California show them to be primarily herbivorous (Schauss, 1980; Baber, 1985) pigs are true omnivores. Moreover, although habitat use may show preferences for oak woodlands (acorns are a major food source) and cool canyon bottoms in summer (pigs have no sweat glands) they can move widely and essentially appear anywhere within a very extensive home range. Where they forage they inevitably "root" – probe with their snouts underground for roots, bulbs and invertebrates. Sediment yields from rooted plots can be two or three times as high as ambient erosion; non-native species increase (LCA, 1987). At least hypothetically, they compete with native wildlife for food and can be reservoirs of disease (Waithman et al., 1999). The species is also difficult and expensive to eradicate. A long-term plan for managing pig populations, perhaps in concert with other park jurisdictions, will be a priority for the future managers of Coast Dairies.

3.2.6.3 DATA GAPS

The ECR attempted to develop substantial baseline information in limited areas, and general information over all the Property, to assist planners and the ultimate land managers. Between the work of the PRBO and the Santa Cruz Bird Club, the area is ornithologically well studied. Large and small mammals, especially carnivores with extensive home ranges (fox, bobcat and mountain lion) have not been adequately inventoried.

There is little information on the invertebrates present at Coast Dairies. Of these, Ohlone tiger beetle (*Cicindela ohlone*), a species proposed for federal listing in February, 2000, is a species which may be present and be affected by management. The tiger beetle inhabits areas characterized by remnant stands of native grassland associated with sunny areas of bare or sparsely vegetated ground. The beetle was observed at two locations within 10 miles (ESA, 1997) and habitat appears generally suitable. Monarch butterfly (*Danaus plexippus*), a California "Special Animal" overwinters at Natural Bridges State Park, a major center for this activity, and uses wooded stands of mixed height and trunk diameter, as well as understory brush. There is a small overwintering population between Davenport and the RMC plant, in a stand of eucalyptus. San Francisco lacewing (*Northochrysa californica*), a federal Species of Concern, is reported throughout much of the Coast Range from Mendocino to Los Angeles, associated with woodlands and coastal scrub habitats. Little is known about its biology or the shrinking geographic range.

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3.3 FISHERIES RESOURCES

Fisheries are clearly a pre-eminent concern on the Coast Dairies Property. Of the six perennial watersheds situated partially or entirely within Coast Dairies Property lines, San Vicente Creek is arguably the most significant in terms of fisheries resources. San Vicente Creek not only supports a self-sustaining population of federally threatened steelhead (*Oncorhynchus mykiss*), but also contains one of the last remnant populations of the state endangered coho salmon (*Oncorhynchus kisutch*) south of San Francisco Bay. Although degradation of fish habitat on the Property has been substantial, significant habitat quality remains, and the potential for stream and riparian restoration on these creeks is high.

The six distinct Coast Dairies watersheds are, from north to south, Molino Creek, Ferrari Creek, San Vicente Creek, Liddell Creek, Yellow Bank Creek, and Laguna Creek[1]. Although anadromous (ocean-maturing) salmonids (salmon and steelhead) have been observed in only a few of the Coast Dairies streams during recent surveys, particularly San Vicente Creek and Liddell Creek, there is little doubt that (a) historic populations were significantly larger than those recently reported, and (b) most, if not all, of the six streams historically supported salmonid populations.

Various stream and fisheries surveys have been conducted on the Property over the past two decades. While the information gathered in these studies provides valuable background information, the different researchers typically used varying approaches to investigate varying issues. Until the preparation of this Existing Conditions Report(ECR), there has been no effort at a consistent, across-the-board approach at assessing all streams and watersheds located on the Coast Dairies Property. As such, the primary focus of this Fisheries Resources section is the evaluation of the aquatic habitat conditions prevalent throughout the Property. As mentioned above, all of the watersheds are almost certain to have supported anadromous salmonids in the past. In accordance with this assumption, the Planning Team did not conduct any fish surveys to inventory species and population sizes, an exercise that not only unnecessarily stresses fish, but also provides little information about a stream’s potential for supporting special status and common fish. While all observations of fish were noted during field surveys, we concentrated on determining the existing habitat suitability and diversity and identifying limiting factors that may prevent aquatic habitats from functioning optimally. Once restoration needs have been identified and planned, pre- and post-implementation fish surveys may be an appropriate method of determining the success (or lack thereof) of the restoration, and also be part of an Adaptive Management program. Until then, this report assumes that all Coast Dairies streams are capable of supporting a healthy and sustainable native fish population once adequately restored.

[1] Continuing uncertainty about the exact location of the Coast Dairies Property line has made it unclear whether or not portions of lower Scotts Creek, located north of Molino Creek, are within the boundaries. For the purpose of this chapter, we have assumed that it is not part of Coast Dairies.

3.3.1 REGIONAL SETTING

3.3.1.2 COASTAL WATERSHEDS SOUTH OF SAN FRANCISCO BAY

Factors such as topography, rainfall and temperatures of central California watersheds create somewhat different habitat characteristics for anadromous salmonids than those found in other regions of California. These natural conditions need to be taken into consideration when attempting to formulate effective fisheries management and restoration strategies for these streams.

The watersheds of the San Mateo and Santa Cruz County coast originate in the Santa Cruz Mountains, which are located relatively close to the Pacific Ocean. As such, the streams of this area typically drain small watersheds and, because of their relatively short length, are referred to as “short-run streams.” The San Lorenzo River watershed, one of the biggest in central California, encompasses only about 138 square miles and the mainstem is a little over 26 miles long. In comparison, San Vicente Creek watershed has a total area of only about 11 square miles and mainstem length of approximately 9 miles (CDFG, 1998). The small size of the watersheds provides less usable habitat for fisheries than the large watersheds of Northern California -- the Russian River, for example.

The Santa Cruz Mountains typically receive less rainfall than northern ranges and this, combined with the small watershed areas, provides for less run-off and thus limited water availability. Furthermore, the higher average summer temperatures encountered in central California, combined with limited stream flows, expose local fish to considerably higher temperatures than are experienced by northern populations. The reduction of riparian vegetation often associated with agricultural and residential developments reduces stream shading and exacerbates high water temperatures. Summer stream temperatures are one of the most prevalent limiting factors for salmonids in general and coho salmon in particular.

Not only do central California streams receive less total rainfall, but the typical wet season is also shorter than in the north. Significant storms that provide sufficiently high stream flows for adult salmonid spawning migrations usually do not occur until December or January. During the late summer, significant portions of some coastal streams dry out, with only subterranean flows persisting. Fish habitat during this time is often restricted to isolated pools.

These challenging natural conditions have historically made central California streams less hospitable to coho salmon and steelhead than watersheds located in Northern California. When anthropogenic disturbances such as water diversions and the destruction of riparian vegetation are superimposed on these environmental factors, the survival of anadromous salmonids and other native fish species becomes increasingly difficult.

3.3.2 METHODOLOGY

3.3.2.1 FIELD SURVEYS

Reconnaissance level stream surveys were conducted during late April/early May, 2001 on the mainstems of the six perennial watersheds (Molino, Ferrari, San Vicente, Liddell, Yellow Bank, and Laguna creeks), as well as on one major tributary to Laguna Creek (Y Creek). Only stream portions located within the Coast Dairies Property boundary were surveyed, although any pertinent, existing information on stream conditions upstream of the Property was also gathered and incorporated into the existing conditions analysis. The intent of these surveys was to provide a general overview of channel geomorphology and aquatic habitat conditions in these watersheds and to identify areas of disturbance (migration barriers, sedimentation, water withdrawals, etc.) as well as potential habitat restoration sites. While a far more time- and labor-intensive effort would be required to gather all the information collected during a typical stream survey using California Department of Fish and Game (CDFG) protocols, reconnaissance level surveys provide sufficient information to derive basic but important conclusions about the relative health of the aquatic habitats and allow land managers to focus future research efforts on identified problem areas.

The methodology for the reconnaissance surveys was adapted from the more detailed *California Salmonid Stream Habitat Restoration Manual* (Flosi et al., 1998) habitat inventory methods. Each creek was walked in its entirety (within the Property boundary) and divided into distinct reaches based on overall topography, channel geomorphology, and riparian vegetation. Each reach was then characterized using the following quantitative and qualitative parameters:

- overall geomorphology (channel width, depth, riffle/run/pool abundance),
- substrate characteristics (substrate size, embeddedness),
- riparian corridor (width, predominant species, percent channel shading),
- salmonid habitat type (migratory, spawning, rearing),
- cover availability (undercut banks, large woody debris, instream vegetation), and
- visible disturbances (e.g., erosion/sedimentation, water withdrawals, salmonid migration barriers, etc.).

While no specific fish surveys were conducted for this task, all coincidental streamside observations of fish were recorded. While most, if not all, observed fish appeared to be steelhead, we elected to refer to the observations as “salmonids”, since the differentiation of juvenile coho salmon, steelhead, and potential resident rainbow trout is difficult without capturing representative specimens.

Representative photographs and Global Positioning System (GPS) coordinates were taken at each stream reach and at identified sites of disturbance. For the purposes of this ECR, the data gathered during the surveys will be summarized in Section 3.3.4 below. The actual data sheets will be included in the Project Archives.

3.3.2.2 INSTREAM FLOW REQUIREMENTS

Various methodologies are available for determining instream minimum flow requirements for salmonids. These range from the highly time- and labor-intensive Instream Flow Incremental Methodology (IFIM) to the fairly rapid “60 percent of unimpaired mean annual flow” method. All methods appear to have advantages and disadvantages and typically result in somewhat different flow requirements. Recognizing the site-specific nature of existing and future diversion projects, we did not attempt to set finite minimum flow requirements for Coast Dairies streams. Instead, we used a relatively new methodology to derive preliminary bypass flow values that can be used as a screening tool to aid in future water rights negotiations.

The methodology used to estimate the instream flow requirements for Coast Dairies streams is currently under development by the National Marine Fisheries Service (NMFS) and has been proposed for adoption by the State Water Resources Control Board for use in processing water rights applications (SWRCB, 2001). The method consists of using the median February flow level, determined from historical flow records, as the level of bypass flows necessary for protecting fisheries resources. Two of the Coast Dairies streams, San Vicente and Laguna Creek, have had stream gauges operated by the U.S. Geological Survey (USGS) in the past. Data collected at these gauges (although located upstream of the Property boundary), as well as data from Scotts Creek just north of the Property and Majors Creek located immediately south of the Property, determined the regional February median flow. Stream-specific February median flows for the ungauged streams on the Property were then extrapolated from the regional data by adjusting for watershed runoff areas.

A further component of this methodology is the determination of the maximum cumulative instantaneous diversion rate (i.e., the maximum combined withdrawal rate of all diversion sites located within one watershed and operated at the same time). For the Coast Dairies streams, team biologists set this rate at 20 percent of the “20 percent winter exceedance flow” (Edmondson pers. comm., 2000-2001). The “20 percent winter exceedance flow” refers to the daily discharge (flow) level that is met or exceeded on only 20 percent of winter days (December 15 through March 31). For example, the historic flow records of a given stream may indicate that during an average winter year 20 percent of the days recorded a stream flow equal to or greater than 10 cubic feet per second (cfs). Thus the “20 percent winter exceedence flow” is 10 cfs and the allowable maximum cumulative instantaneous diversion rate is 2 cfs (20 percent of 10 cfs).

3.3.3 SPECIAL STATUS FISH SPECIES

3.3.3.1 COHO SALMON

Coho salmon (*Oncorhynchus kisutch*) that are part of the central California coast Evolutionarily Significant Unit (ESU) of the species are federally listed as threatened and state listed as endangered south of San Francisco Bay. Historically, coho were widespread, inhabiting most major river basins around the Pacific Rim from central California to Korea and Japan. Coho salmon exhibit a trait common to many species in being most abundant in the central portion of their range and less common in the northern and southern fringes of their natural distribution (CDFG, 1998). California represents the southern margin of the species' natural distribution and coastal streams of Santa Cruz County constitute the very southern extent of coho. Historically, coho salmon are believed to have used all or most of the accessible coastal streams along the San Mateo and Santa Cruz County coastline[2]. However, habitat destruction and degradation, as well as changes in oceanic conditions and increased pinniped predation, among other reasons, have brought coho salmon to the brink of extinction in this area (CDFG, 1998; Weitcamp et al., 1995). At present, natural and self-sustaining runs of coho south of San Francisco Bay are believed to occur only in Gazos, Waddell, and Scotts Creeks (CDFG, 1998)[3]. In response to the documented critical condition of native coho runs in San Mateo and Santa Cruz counties, CDFG (1998) has developed a draft restoration plan for the species in this area. The restoration plan states that:

"*Available information indicates that the southern coho are in great jeopardy. This group of fish has probably declined in overall abundance by more than 95 percent from historical levels, have been extirpated from most of the streams they once inhabited, and are still being exposed to a host of unfavorable conditions that threaten their continued existence*."

Coho spawning migrations from the ocean to freshwater streams or rivers usually begin after the first heavy rains in late fall or winter have opened sand bars (where present[4]) at the mouths of the creeks. The timing of their migration varies somewhat throughout their range, but in the short coastal streams of central California, coho typically return to freshwater during November through February. Females construct redds (spawning "nests") near the head of a riffle in substrate consisting of gravel and small cobble. Newly hatched fry (embryos) remain in the interstices of the gravel for approximately three weeks before emerging and schooling in still, shallow water along stream margins. As they grow and become known as parr during the spring, juvenile coho disperse to pools where they set up individual territories. After spending the following summer, fall and winter in the stream, the immature yearling coho begin to migrate

[2] In the spring of 2001, Dr. Kenneth Gobalet of California State University, Bakersfield wrote a brief, unpublished document discussing the absence of coho remains at archaeological sites south of San Francisco. One of the sites (SCR-117: see Section 5.6) was noted as containing steelhead but not coho. While emphasizing that "absence of evidence is not the evidence of absence" he stated that, "To this point the lack of data are consistent with the position that no coho or chinook salmon were prehistorically present in any streams south of San Francisco."

[3] More recent survey data collected on these three streams actually put the self-sustainability of these coho runs in serious doubt (Smith, 2001).

[4] San Vicente Creek is the only coho stream south of San Francisco Bay that does not have a sand bar at its mouth. This is due to its redirection through a bedrock tunnel.

downstream toward the ocean in spring. During this time, juveniles undergo smoltification, the process of adapting to the marine environment. After two years of growing and sexually maturing in the ocean, coho return to their natal streams as three-year-olds to begin the life cycle again.

This three-year cycle is fairly rigid among coho who, unlike steelhead, rarely spend less than two years in the ocean. Since all wild female coho are three years old when spawning, there are three distinct and separate maternal brood year lineages for each stream. For example, all coho produced in 1994 were progeny of females produced three years earlier in 1991, which in turn were progeny of females produced three years earlier in 1988, and so on. The three maternal brood year lineages are:

Brood Year Lineage I:	1988….1991….1994….1997.…2000….
Brood Year Lineage II:	1989….1992….1995….1998.…2001….
Brood Year Lineage III:	1990….1993….1996….1999.…2002….

This rigid life cycle has been cited as a major reason for coho salmon's greater vulnerability to catastrophic events compared to other salmonids (CDFG, 1998). Should a major event, such as El Niño floods or anthropogenic disturbance severely deplete coho stocks during one year, the effects will be noticed three years later when few or no surviving female coho return to continue the brood year lineage.

Occurrence on the Coast Dairies Property

Adult coho salmon have occasionally been observed in San Vicente Creek, one of nine streams south of San Francisco Bay identified by CDFG as potentially instrumental in restoring the region's coho runs to a state of sustainable viability. Currently, CDFG (1998) does not consider coho in San Vicente Creek as a reproducing and self-sustaining population. The following coho occurrences, listed in chronological order, have been recorded during the past two decades:

- an unknown number of coho were observed in 1981 by Harvey & Stanley Associates (1982);
- two migrating coho were observed in 1991 by McGinnis (1991); and
- CDFG found three juveniles of the 1993….1996 brood year in 1996, but observed none in 1997 (CDFG, 1998).

One of the long-term stream-specific goals of the CDFG restoration plan is the establishment of a viable coho salmon population of 50 naturally produced returning adults in San Vicente Creek (CDFG, 1998).

Regardless of whether or not coho salmon occur on any other Coast Dairies streams, NMFS has designated critical habitat for central California coast coho salmon in 1999 and all Coast Dairies streams are included in this listing. The designation covers "all waterways, substrate, and adjacent riparian zones below longstanding, naturally impassable barriers (i.e., natural waterfalls in existence for at least several hundred years)," as well as some major dams (Fed. Reg., 1999). A critical habitat designation offers a similar level of protection to the habitat as a threatened or endangered designation affords a listed species, where federal agencies are either the land managers or are involved in permitting.

3.3.3.2 STEELHEAD

The central California coast steelhead (*Oncorhynchus mykiss*) Ecologically Significant Unit (ESU) is federally listed as threatened, and is a California Species of Concern.

The species *O. mykiss* exhibits varying degrees of anadromy. Nonanadromous forms of the species are usually known as rainbow trout while the anadromous form is called steelhead. Although rainbow trout and steelhead have long been classified within the same species, the former is not protected by state or federal regulations. Distinguishing the two forms in the field is difficult at best, thus complicating the determination of whether or not a listed species occurs within the stream where the observation is made. However, it is unusual for the two forms to co-occur in coastal watersheds, where they are typically separated by migration barriers (Busby et al., 1996). In cases where *O. mykiss* occur upstream of relatively recent barriers, such as the reservoir dams on some Coast Dairies streams, these landlocked populations are believed to be able to resume their migrating life cycle if the barriers were to be removed (Busby, 1996), and thus retain their status as threatened steelhead.

Steelhead migrate to marine waters after spending up to seven years in freshwater, although two to three years is more common (Busby, et al., 1996). They then typically reside in marine waters one to three years prior to returning to their natal stream to spawn as three- or four-year olds. Unlike salmon, steelhead are iteroparous, meaning they can spawn more than once before they die; in California, females commonly spawn twice before they die. The spawning season can run from December through May, depending on the stream, with most spawning occurring in January through March. The spawning, hatching, and rearing life stages are similar to those of coho salmon and other anadromous salmonids, although steelhead typically utilize a greater proportion of the watershed for spawning while coho generally reproduce in the low gradient coastal portions of streams.

Two reproductive forms of steelhead are recognized, the "stream maturing" and "ocean maturing" forms (also termed summer-run and winter-run, respectively), which describes the level of sexual development following return to the freshwater environment. The central California coast ESU consists entirely of winter-run steelhead (Busby et al., 1996).

Occurrence on the Coast Dairies Property

Recent observations have confirmed the presence of steelhead in three Coast Dairies streams: San Vicente Creek, Liddell Creek, and Laguna Creek (Harvey & Stanley Associates, 1982; McGinnis, 1991; CDFG, 1996, CNDDB, 2000). Harvey & Stanley Associates conducted the only study in which steelhead population data were collected on all three creeks during the same season. Their surveys showed that San Vicente Creek contained the highest steelhead density while steelhead were least abundant in Liddell Creek.

In addition to these confirmed steelhead occurrences, Planning Team biologists made streamside observations of *O. mykiss* during the Spring 2001 stream reconnaissance surveys. Young-of-the-year and/or yearlings were observed in *all* surveyed creeks, including Y Creek. Some of these observations were made upstream of what appeared to be impassable or difficult-to-pass migration barriers, suggesting that some of the fish may be landlocked steelhead or resident rainbow trout.

NMFS also designated critical habitat for central California coast steelhead in 2000. The wording of the designation (Fed. Reg., 2000) is essentially identical to that used for coho salmon critical habitat and also includes all Coast Dairies streams.

3.3.3.3 TIDEWATER GOBY

The tidewater goby (*Eucyclogobius newberryi*) is listed federally as an endangered species and is a California Species of Special Concern. However, tidewater goby populations north of Orange County have been proposed for delisting by the U.S. Fish and Wildlife Service (USFWS) because more recent data collected on the species suggests that the original listing rule overestimated the species' risk of extinction (Fed. Reg., 2001). The delisting of the goby in northern and central California appears to be imminent and may take place prior to the completion of the Coast Dairies Long Term Resource Protection and Use Plan.

The tidewater goby is a benthic fish that inhabits shallow lagoons and the lower reaches of coastal streams. It differs from other species of gobies in California in that it is able to complete its entire life cycle in fresh to brackish water. This goby appears to be mainly an annual species, although individuals in the northern part of the range may live up to three years (Moyle et al., 1995).

Tidewater gobies typically inhabit areas of slow-moving water, avoiding strong wave actions or currents. Particularly important to the persistence of the species in lagoons is the presence of backwater, marshy habitats, as well as annual sandbar formation, to avoid being flushed out to the ocean during winter flood flows (J. Smith pers. comm., 1999). Preferred water temperatures generally range from 8-22°C and water depths are usually less than three feet.

The tidewater goby is endemic to California and is distributed in brackish water habitats along the coast from Agua Hedionda Lagoon, San Diego County, in the south to the mouth of the Smith River (Tillas Slough), Del Norte County, in the north (Moyle et al., 1995). Although the species was originally believed to be restricted to low-salinity waters (Fed. Reg., 1994), tidewater gobies are capable of living in saline waters reaching over 50 parts per thousand (ppt) (Moyle et al., 1995). Large populations have been observed in lagoons ranging from fresh water (e.g., Soquel Creek and Pescadero Creek) to ocean salinities (Corcoran Lagoon and Moran Lagoon) (J. Smith pers. comm., 2000-2001).

Occurrence on the Coast Dairies Property

Tidewater gobies are known to occur in the lagoon and downstream portion of Laguna Creek, as well as in Scotts Creek, just north of the Property boundary (CNDDB, 2000).

3.3.3.4 NON-LISTED FISH SPECIES

Several common and non-listed fish species have been observed on the Coast Dairies Property during past fisheries studies (Harvey & Stanley Associates, 1982; CDFG, 1996; CDFG, 1998). These include coast range sculpins (*Cottus aleuticus*), prickly sculpins (*Cottus asper*), and threespine sticklebacks (*Gasterosteus aculeatus*).

3.3.4 STREAM AND REACH INFORMATION

The following discussion of the Coast Dairies streams focuses on general stream characteristics and limiting factors for fisheries resources, primarily anadromous salmonids. Stream reach data collected during the April/May 2001 reconnaissance surveys are partially summarized in Table 3.3-1. The complete data sheets will be included in the Project Archives. The approximate locations of the stream reaches are depicted in Figures 3.3-1a through 3.3-1e.

The following terms are used throughout the stream reach discussion:

- *Embeddedness* refers to the degree to which larger substrate particles (boulders, cobble, gravel) are surrounded or covered by fine sediments (silt). A high degree of embeddedness creates sub-optimal spawning conditions.

- *Substrate* refers to the mineral and/or organic materials that form the bed (bottom)of the stream channel.

- *Large Woody Debris (LWD)* refers to large pieces of relatively stable woody material (e.g. fallen trees), having a diameter greater than 12 inches and a length greater than 6 feet, that intrude into the stream channel. LWD provides important cover for salmonids and may also create pool habitats.

3.3.4.1 MOLINO CREEK

Molino Creek represents the northern-most stream located on the Coast Dairies Property (see footnote on page 3.3-1) and empties into the Pacific Ocean at Scotts Creek Beach (Figure 3.3-1a). At the time of the survey, Reach 1 joined Scotts Creek prior to entering the ocean. Scotts Creek usually flows across the northwestern portion of the beach but its channel alignment shifted to the southeast during the 2000/2001 winter season. Based on visual inspection, the outlet of the concrete box culvert under Highway 1 (Reach 2) does not appear to present a migration barrier, although stream velocities during storm events are expected to be very high. Reach 3 is a natural channel with a good mixture of minor pools, riffles, and runs, providing both spawning and rearing habitat. Approximately 10 salmonids were observed in this section of the stream. An off-channel reservoir is located near the southern bank of Reach 3. The inlet to the reservoir (start of

TABLE 3.3-1
COAST DAIRIES STREAM REACH CHARACTERISTICS

Stream Reach #	Average Channel Width (ft.)	Average Channel Depth (in.)	Average Pool Depth (ft.)	Habitat Types			Cover Type & Availability[a]			Substrate Characteristics		Channel Shading (%)	Potential Disturbances
				Pools (%)	Riffles (%)	Runs (%)	Under-cut Banks	Large Woody Debris	Instream Vegeta-tion	Size[b]	Em-bedded-ness (%)		
Molino													
Reach 1	8.0	3.5	<1.0	5	75	20	absent	absent	absent	sa	100	0	none observed
Reach 2	2.5	3.0	NA	0	0	100	absent	absent	absent	concrete	NA	100	none observed
Reach 3	5.5	5.5	<1.0	30	50	20	high	low	high	co/gr/sa	20	70	diversion
Reach 4	5.5	5.5	1.0	30	45	25	high	mod.	mod.	co/gr	25	60	none observed
Reach 5	4.5	5.0	<1.0	30	50	20	high	low	high	co/gr	35	65	reservoir/barrier
Reach 6	3.5	3.5	<1.0	30	40	30	high	mod.	mod.	co	10	65	none observed
Ferrari													
Reach 1	5.0	1.5	1.5	95	0	5	absent	absent	absent	sa/co	90	50	none observed
Reach 2	5.0	9.0	2.0	5	80	15	mod.	low	high	gr/co/sa	10	85	Hwy 1 culvert
Reach 3	5.0	8.0	1.5	35	35	30	low	absent	mod.	gr/co/sa	15	5	some erosion
Reach 4	5.0	7.0	1.5	15	60	25	mod.	mod.	low	co/gr/sa	10	70	diversion/barrier
Reach 5	5.0	6.0	1.0	5	65	30	mod.	absent	mod.	co/gr/sa	5	15	erosion/cattle
Reach 6	3.0	6.0	1.0	10	60	30	mod.	mod.	high	co/gr/sa	10	85	none observed
Reach 7	3.0	5.0	<1.0	5	80	15	mod.	mod.	high	co/gr	5	95	bank failure
Reach 8	3.0	3.5	<1.0	10	80	10	mod.	mod.	high	gr/co/bo	5	55	bank failures
Reach 9	dry	dry	dry	dry	dry	dry	low	high	absent	bo/co/gr	5	90	none observed
San Vicente													
Reach 1	2.0	24.0	2.0	90	0	10	high	absent	absent	sa	100	0	none observed
Reach 2	10.0	1.5	2.0	10	10	80	mod.	absent	absent	co/gr/sa	55	90	bore
Reach 3	11.0	1.5	2.5	20	60	20	high	high	mod.	co/gr/sa	60	70	withdrawal
Reach 4	11.0	1.5	2.5	15	55	30	mod.	mod.	low	co/gr/sa	40	50	withdrawal

[a] Cover availability rated in relative terms: absent, low, moderate (mod.), high.
[b] Size classes: Silt (si), sand (sa), gravel, (gr), cobble (co), boulder (bo), bedrock (br); table lists size classes in order of abundance

TABLE 3.3-1 (Continued)
COAST DAIRIES STREAM REACH CHARACTERISTICS

Stream / Reach #	Average Channel Width (ft.)	Average Channel Depth (in.)	Average Pool Depth (ft.)	Habitat Types: Pools (%)	Riffles (%)	Runs (%)	Cover Type & Availability[a]: Under-cut Banks	Large Woody Debris	Instream Vegeta-tion	Substrate Characteristics: Size[b]	Em-bedded-ness (%)	Channel Shading (%)	Potential Disturbances
San Vicente (cont.)													
Reach 5	11.0	11.0	2.0	10	65	25	mod.	mod.	low	co/gr/sa	45	50	erosion/sediment
Reach 6	10.0	10.0	2.0	20	50	30	mod.	mod.	low	bo/co/gr	55	60	erosion/sediment
Liddell (Main Branch)													
Reach 1	9.0	4.5	<1.0	1	45	54	absent	absent	absent	sa/co	95	0	none observed
Reach 2	5.0	6.0	<1.0	0	0	100	absent	absent	absent	concrete	0	100	culvert/bore
Reach 3	7.0	9.0	2.0	35	40	25	high	high	mod.	co/gr/sa	40	75	sedimentation
Reach 4	6.5	7.0	2.0	30	50	20	high	high	mod.	gr/co/sa	55	70	bank failures
Reach 5	5.5	7.0	1.5	40	40	20	high	high	low	co/sa	65	75	bank failures
Reach 8	3.5	5.5	1.5	20	60	20	high	high	absent	gr/sa/si	75	90	sedimentation
Reach 9a	3.5	5.0	<1.0	40	40	20	mod.	mod.	low	sa/si/co	95	85	sediment./divers.
Reach 9b	2.5	3.0	NA	NA	NA	NA	high	high	low	sa/gr	75	85	none observed
Liddell (East Branch)													
Reach 6	5.0	5.5	1.5	35	35	30	high	high	low	sa/si/gr	85	85	sedimentation
Reach 7a	2.5	4.5	<1.0	45	45	10	high	high	mod.	gr/co/sa	90	55	sedimentation
Reach 7b	2.5	4.5	<1.0	40	40	20	high	mod.	absent	sa/si	100	85	sediment./divers.
Liddell (West Branch)													
Reach 10	4.5	6.0	<1.0	15	65	20	mod.	mod.	low	gr/co/sa	30	80	culverts
Reach 11	3.5	7.0	1.5	35	45	20	high	high	low	gr/co/sa	65	85	bank failures
Reach 12	2.5	5.0	1.0	30	50	20	high	high	low	co/gr/sa	60-100	80	sedimentation

[a] Cover availability rated in relative terms: absent, low, moderate (mod.), high.
[b] Size classes: Silt (si), sand (sa), gravel, (gr), cobble (co), boulder (bo), bedrock (br); table lists size classes in order of abundance

TABLE 3.3-1 (Continued)
COAST DAIRIES STREAM REACH CHARACTERISTICS

Stream / Reach #	Average Channel Width (ft.)	Average Channel Depth (in.)	Average Pool Depth (ft.)	Habitat Types			Cover Type & Availability[a]			Substrate Characteristics		Channel Shading (%)	Potential Disturbances
				Pools (%)	Riffles (%)	Runs (%)	Under-cut Banks	Large Woody Debris	Instream Vegeta-tion	Size[b]	Em-bedded-ness (%)		
Yellow Bank													
Reach 1	2.0	3.0	<1.0	50	40	10	mod.	absent	absent	br/sa	100	95	bore
Reach 2	2.0	3.0	<1.0	30	30	40	mod.	mod.	mod.	co/gr/sa	75	85	diversions/dam
Reach 3	3.5	6.5	<1.0	15	50	30	high	mod.	mod.	co/gr/sa	50	75	none observed
Reach 4	4.0	5.5	1.0	20	50	30	high	mod.	mod.	gr/co/sa	35	85	none observed
Reach 5	2.0	11.0	1.5	50	25	25	high	mod.	low	br/co/gr	45	90	channel incision
Reach 6	3.5	5.0	1.0	25	50	25	high	mod.	mod.	co/gr/sa	45	70	road failure
Reach 7	2.5	4.0	1.0	30	50	20	high	high	mod.	co/gr/sa	60	75	bank failures
Reach 8	1.5	2.5	<1.0	50	30	20	high	high	low	co/gr/sa	55	75	road failure
Laguna													
Reach 1	30.0	60.0	8.0	50	0	100	high	absent	low	sa	100	0	sand bar
Reach 2	15.0	12.0	2.0	20	20	60	high	low	low	co/gr/sa	75	30	none observed
Reach 3	5.5	6.5	1.0	20	60	20	mod.	low	low	co/gr/sa	35	50	diversion
Reach 4	6.0	5.5	1.0	15	60	25	mod.	low	low	sa/gr	50	85	none observed
Y (tributary to Laguna)													
Reach 5	5.5	7.0	2.0	45	45	10	high	mod.	low	bo/co/sa	20	85	waterfall
Reach 6	3.0	5.0	1.0	30	40	30	high	mod.	mod.	br/co/gr	30	75	cattle
Reach 7	3.5	4.5	1.0	40	40	20	high	low	mod.	co/br	50	75	cattle
Reach 8	2.0	2.5	<1.0	40	40	20	high	high	low	co/bo/gr	40	85	none observed

[a] Cover availability rated in relative terms: absent, low, moderate (mod.), high.
[b] Size classes: Silt (si), sand (sa), gravel, (gr), cobble (co), boulder (bo), bedrock (br); table lists size classes in order of abundance

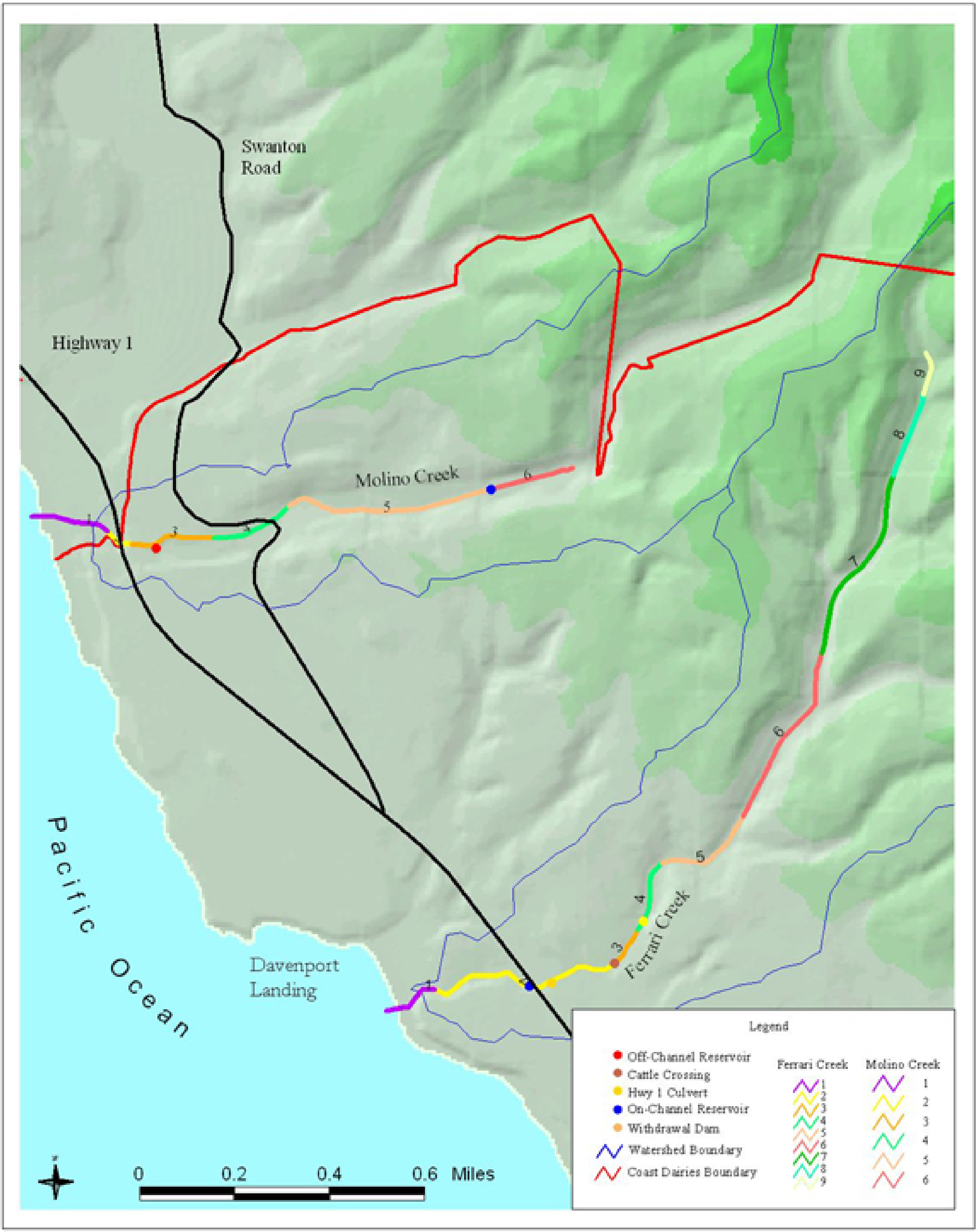
Reach 4) consists of an unscreened 12-inch culvert.[5] Bank undercut has resulted in localized failures in Reach 4. Reach 5 extends up to the foot of an on-channel reservoir, which is currently not being operated due to partial dam failure during the 1999-2000 winter. Even in its current flow-through condition, the reservoir presents a formidable migration barrier since the outlet culvert is located 6 to 7 feet above the downstream channel. Below the reservoir, the reach consists primarily of small riffles with some shallow pools. Although the channel flowing through the currently non-storing reservoir is incorporated into Reach 6, survey results summarized in Table 3.3-1 are based on the portion upstream of the reservoir, which becomes increasingly narrow with dense riparian vegetation of willows and alders. The predominant substrate size class in this reach is cobbles, which provide sub-optimal spawning habitat. The region upstream of Reach 6 was not surveyed due to its inaccessibility.

Although the stream length and watershed size of Molino Creek are relatively small compared to other coastal streams in the region (e.g., Scotts Creek, San Vicente Creek), the stream does provide limited habitat for anadromous salmonids and appears to contain no impassable barriers downstream of potential spawning and rearing sites (Reaches 3 through 5). The primary limiting factor on Molino Creek may be natural – the small watershed area does not appear to produce sufficient storm run-off to maintain optimal water depths throughout the spring, even with the upstream on-channel reservoir being operated as a flow-through system. Below average rainfall during the 2000-2001 wet season, combined with diversions to the off-channel reservoir may have contributed to the low water levels observed in May, 2001 but are not likely to be solely responsible for these conditions.

3.3.4.2 FERRARI CREEK

Ferrari Creek is also located in the northern portion of the Property and enters the ocean at Davenport Landing (Figure 3.3-1a) after flowing through the U.S. Abalone facility. Reach 1, the mouth of the creek, consists of an old concrete flume which was previously used by a fish farm to guide returning adult salmon back into the farm. Although this flume may not meet current hydrologic standards for fish passage, the structure contains baffles and functioned effectively enough to be used by the fish farm in the past and does not appear to present a significant obstacle to salmonids. The downstream portion of Reach 2 is located on the U.S. Abalone lease Property and was not surveyed. However, U.S. Abalone stated that there are no migration barriers located in that section (B. Smith pers. comm., 2000-2001). The abalone farm does use the flume to discharge sea water that has been cycled through their abalone tanks. This saline

[5] The inlet will be screened in the near future (Rosenblatt pers. comm., 2000)



SOURCE: Environmental Science Associates, Pacific Meridian Resources, USGS

Figure 3.3-1a
Stream and Reach Classification on the Coast Dairies Property

discharge may make it difficult for returning adult salmonids to identify the creek as a freshwater stream.

Upstream of U.S. Abalone, Reach 2 contains a small on-stream reservoir that is currently not used to divert water. Although water is flowing freely through a 4-foot culvert, enough water is retained behind the earthen dam to maintain a small pond. Thirty-five to fifty yearling salmoids were observed in the pond. The culvert appears passable to salmonids during winter upstream migrations but flows may be too low for successful smolt downstream passage during the late spring. Due to a partial dam failure that occurred during the 2000-2001 winter season, the dam is scheduled to be removed in the near future. Reach 2 also includes a far more difficult-to-pass migration barrier at the outlet of the Highway 1 culvert. The outlet creates a 7-foot waterfall into a pool that appears to be too shallow to allow salmonids to jump the fall. However, yearling salmonids were observed both downstream and upstream of Highway 1, suggesting that either the culvert is passable during very specific flow conditions, or that the upstream population consists of landlocked steelhead.

Reach 3 contains a fair amount of spawning gravels and some minor rearing pools. A cattle operation is located along the creek banks, but recent fencing has greatly reduced the amount of stream bank trampling and erosion. Cattle moving from their pastures on the north side of the creek to those on the south side are now confined to a 10-foot wide cattle crossing. Salmonid yearlings were observed in this reach. Reach 4 contains yet another migration barrier in the form of a concrete dam associated with a direct diversion site. The dam creates a 6- to 7-foot vertical drop with a shallow pool below. A culvert runs under the dam but appears to be either closed or non-functional. Nevertheless, over 50 juvenile salmonids were observed upstream of this barrier, suggesting a landlocked population. Reaches 4 through 8 are generally similar, contained within a fairly narrow channel consisting primarily of riffle habitats. Riparian vegetation becomes increasingly dense. Although isolated bank failures were observed in most reaches, erosion and sedimentation do not appear excessive. Reach 9 constitutes the headwaters of Ferrari Creek and was beginning to dry up at the time of the surveys.

With respect to the geomorphologic and biotic conditions of the stream, Ferrari Creek appears to provide adequate habitat for a small salmonid population. Clearly the primarily limiting factor on this creek is the presence of difficult-to-pass and/or impassable migration barriers located below Reach 5. As is the case with Molino Creek, the small watershed size of Ferrari Creek may also limit water availability.

3.3.4.3 SAN VICENTE CREEK

San Vicente Creek flows through the town of Davenport on its way to the ocean (Figure 3.3-1b). Reach 1 consists of the mouth of the creek flowing across the beach. Reach 2 includes the railroad crossing (an artificial bore through bedrock), the Highway 1 crossing (a box culvert) and the short, open stretch between the two. While detailed hydrological studies are required to determine the ease with which salmonids can migrate through the two crossings (Whitman pers. comm., 2001), they do appear passable during at least parts of the migration season. Tidal action extends approximately half way into the railroad bore. Reach 3 is relatively wide and consists primarily of riffles with a few pools approximately 2 to 3 feet deep. Slack water habitat for young-of-the-year salmonids is abundant and between 500 and 700 recently emerged steelhead were observed. Yearlings-and-older salmonids were also observed in some pools. An off-channel reservoir located in Reach 3 contained about 500 young-of-the-year steelhead and has been identified by previous researchers as excellent rearing habitat (Harvey & Stanley Associates, 1982; McGinnis, 1991). However, while small fish can easily enter this pond, escapement of smolts is not as certain. The inlet and outlet should be assessed further and if necessary should be reconstructed to either allow passage for all salmonid life stages, or screened to prevent fish access entirely.

Reach 4 has similar channel dimensions, habitat diversity, and substrate composition as Reach 3, although riparian shading in this section amounts to only about 50 percent. Young-of-the-year and yearlings were observed throughout. This reach also contains an off-channel reservoir. However, no fish were observed in this pond, suggesting that the inlet and outlet are sufficiently screened or that passage into and out of the area are unimpeded. The reach offers good salmonid habitat, including several deep pools associated with spider log structures installed with CDFG funding during a 1999 restoration project. In the fall of 1999 a large adult steelhead was observed in a pool under a bridge in the upstream portion of the reach. Several smolts were seen in the same location in the spring of 2001. Reach 5 continues with similar channel dimensions as the previous two reaches, but the vegetation quickly transitions from a deciduous riparian zone to mixed evergreens, primarily redwoods. Riffles and runs dominate the reach, with significant pools being fairly sparse (again, most significant pools are associated with CDFG restoration structures). Isolated bank failures have occurred adjacent to the access road running alongside the channel. The average width of Reach 6 is somewhat narrower than previous reaches, but substrate and embeddedness (50-60 percent) characteristics are similar. The reach also contains further bank failures associated with the access road.

SOURCE: Environmental Science Associates, Pacific Meridian Resources, USGS

Figure 3.3-1b
Stream and Reach Classification on the Coast Dairies Property

San Vicente Creek appears to be a relatively productive steelhead stream providing adequate spawning and rearing habitat for the species. However, a general lack of deep pools, which provide important coho rearing habitat as well as summer thermal refugia, was noted during the stream surveys and by previous researchers (McGinnis, 1991; CDFG, 1996). As mentioned above, CDFG has funded recent efforts to increase both woody cover features and pool availability. The total stream length available to salmonids has also been significantly increased through the removal of a concrete dam identified by McGinnis (1991). Further aspects of the stream that may create sub-optimal salmonid conditions are the generally high levels of sand and silt, and potentially high stream temperatures due to limited channel shading, particularly in the lower reaches. The source of sedimentation was not identified, but old quarries located upstream of the Coast Dairies Property may contribute to the observed conditions.

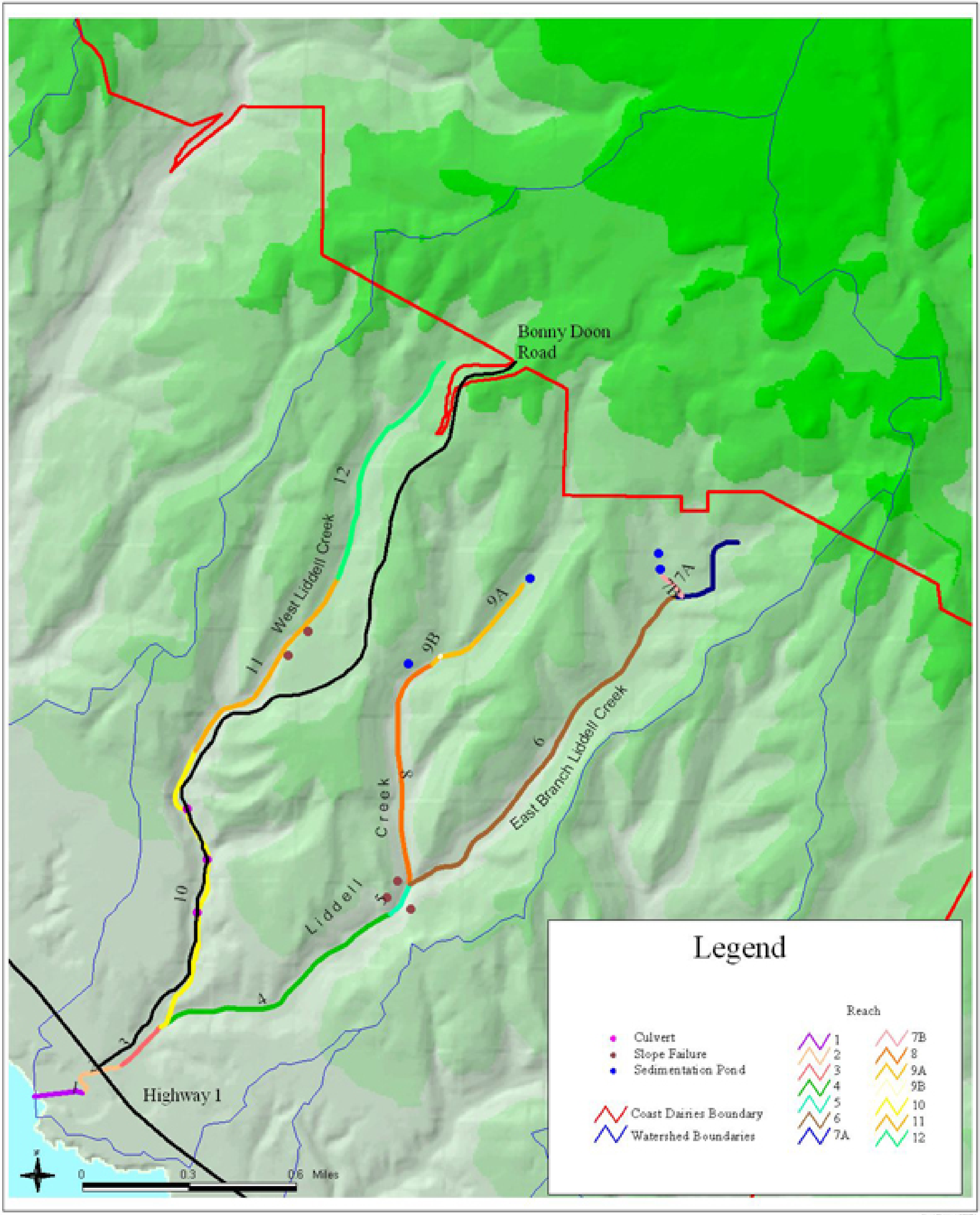
3.3.4.4 LIDDELL CREEK

Liddell Creek is located south of Davenport and enters the ocean via Bonny Doon Beach and consists of three distinct forks, the main, east, and west branches (Figure 3.3-1c). The branches are discussed separately below.

Main (Middle) Branch

Reach 1 forms the mouth of the creek across Bonny Doon Beach. Reach 2 consists of a bedrock bore (reinforced with concrete) passing under both Highway 1 and the railroad tracks. The outfall of the tunnel contains two concrete barriers partially closing the opening, presumably to prevent sand build-up inside the bore. This crossing appears to be marginally passable to migrating salmonids during certain hydrologic conditions. During the time of the surveys, the outfall and the creek bed across the beach were at approximately the same elevation, but at times when the ocean scours away sand from the beach, a vertical drop of up to 3 feet with no significant plunge pool forms at this location. This condition was observed during the 1999-2000 winter. RMC Pacific Materials and CDFG have been coordinating an effort to improve passage through the bore with the installation of baffles and a small fish ladder (Anderson pers. comm., 2000-2001). Construction for this project is likely to occur during 2001.

Reaches 3 and 4 are fairly wide and contain some minor pools. Sedimentation and minor bank failures are evident throughout the two reaches, which also contained about 50 yearling salmonids. Reach 5 also contained some yearlings and one young-of-the-year. Sedimentation is more pronounced in this reach. Road and bank failures are partially responsible for the relatively high levels of fine sediments, but the fact that the levels of sedimentation and embeddedness continue to increase throughout the upstream reaches (Table 3.3-1) suggest that quarry operations located in the headwaters are at least partially responsible for this condition. Reach 8 (Reaches 6 and 7 are located on the East Branch discussed below) becomes increasingly narrow and shallow, but several yearling salmonids were observed here as well. Reach 9A forms the outfalls of two sedimentation ponds operated by RMC Pacific Materials. The outlet of one pond via a 3-foot



SOURCE: Environmental Science Associates, Pacific Meridian Resources, USGS

Figure 3.3-1c
Stream and Reach Classification on the Coast Dairies Property

concrete culvert contained very little suspended solids (i.e., silt), but the water exiting the other culvert from a pond spillway carried large amounts of sediments. Embeddedness here is almost 100 percent and both the water and substrate contain a deep orange “ferric” color. Reach 9B is assumed to be the natural course of the creek but contained too little water for detailed characterization. However, evidence of sedimentation and embeddedness in this reach are considerably lower than those observed in Reach 9A.

East Branch

Reach 6 forms the confluence of the East Branch and the Main Branch. Again, this reach contains large amounts of fine sediments and an average embeddedness of 85 percent. Only a few yearling salmonids were observed in the lower portion of this reach. Access to the upstream portion of this reach may be impossible due to the presence of a logjam waterfall. Reach 7A appears to be the natural upstream continuation of this branch. A recent sediment flow appears to have come down the adjacent slope, depositing large amounts of sediments in the creek bed. Reach 7B forms the outfall channel connecting two quarry-related sedimentation ponds to the channel. During the week of February 26 to March 2, 2001 the lower of the two ponds failed (B. Smith pers. comm., 2000-2001). A rupture in the bottom/horizontal pipe caused accumulated sediments to drain out of the pond and into the creek, entirely covering the channel bed of Reach 7B. The sediment flow observed in Reach 7A also originated from the sedimentation ponds, and may have been a result of the ponds overflowing.

West Branch

Reach 10 forms the confluence of the West Branch with the Main Branch. This reach contains far less fine sediments than any reach located on the Main and East branches. The substrate consists primarily of gravel and cobble and provides adequate spawning habitat. Several yearling salmonids were observed in this section. The reach passes under Bonny Doon Road via culverts in three separate locations. The Santa Cruz County Department of Public Works is currently evaluating ways of repairing/upgrading two of the three culverts and CDFG is working closely with the Department to assure the new culverts meet current NMFS/CDFG standards (NMFS, 2000). However, the upstream-most culvert is currently not being addressed although it appears to present a significant migration barrier as well as threatening the integrity of the road (Whitman pers. comm., 2000-2001).

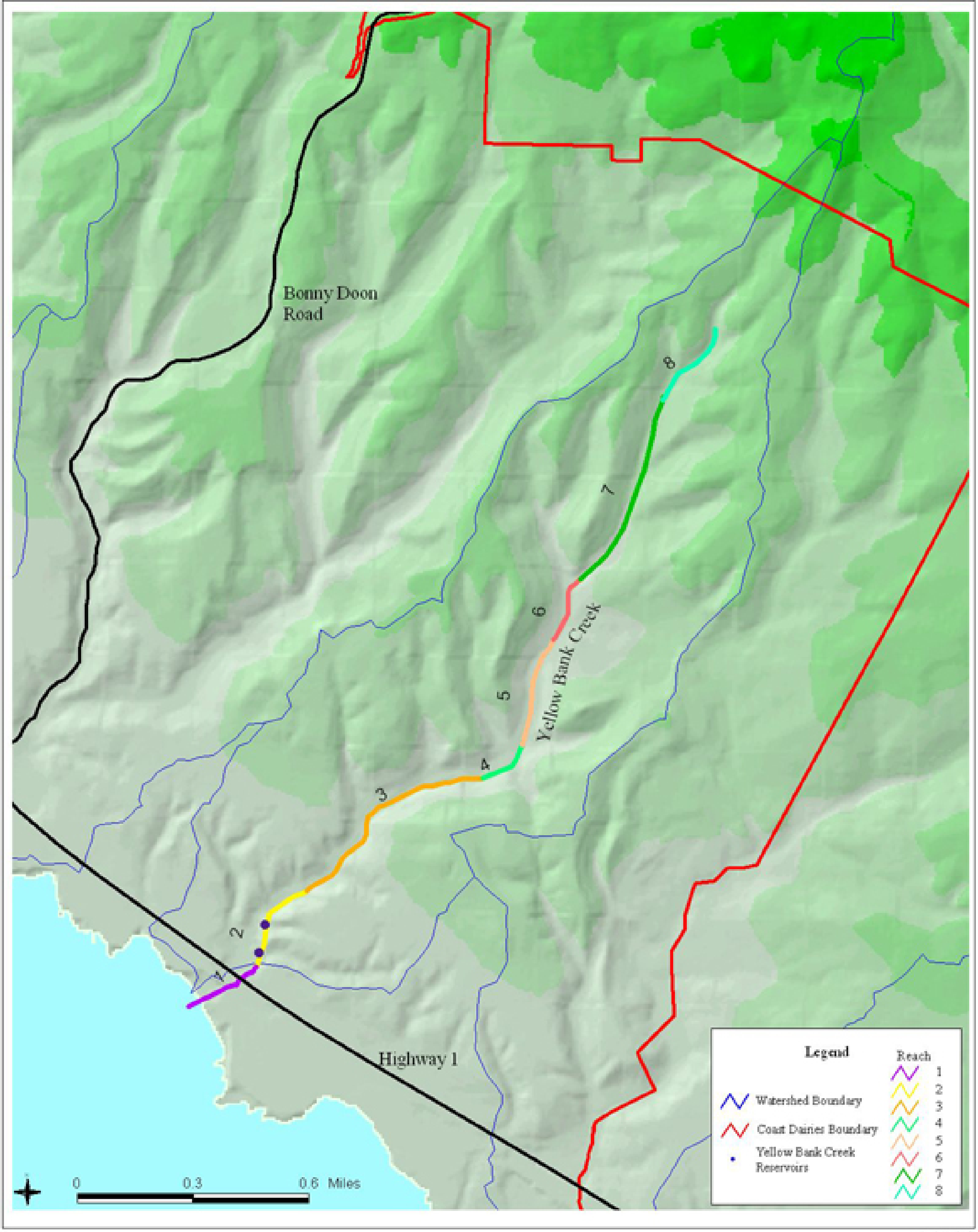
While Reach 10 is a gently sloped, low gradient reach, the West Branch of Liddell Creek becomes increasingly steep in Reach 11. This section contains many cascades and plunge pools. Two significant slope failures have occurred in this reach during recent years (Figure 3.3-1c), and may contribute to the high levels of sedimentation in this area. Some small salmonids were observed in the reach, but a 7-foot logjam with only a shallow plunge pool appears to present an impassable barrier to fish; none were observed upstream of this site. Reach 12 is similar to Reach 11. However, while the lower portion of the reach has an average embeddedness of about 60 percent, the upper portion contains abundant sediments and 100 percent embeddedness immediately downstream of the conveyor belt crossing. Access roads associated with the quarry operations in this area are very loose and drainage ditches are directed toward the channel. This results in a high degree of sediment input to the channel during storm events. Furthermore, mounds of fine materials spilling from the conveyor belt have accumulated next to the channel and are contributing to sedimentation in the creek. Two adjacent culverts, delivering water through the conveyor belt fill berm, are located in this reach. One culvert originates at a sedimentation pond while another one constitutes the upstream continuation of Reach 12. The latter culvert in particular has eroded significant amounts of fill material from the side of the berm. The culvert appears to be entirely impassable to salmonids.

As discussed above, all three branches of Liddell Creek are exposed to severe sedimentation, which appears to be the primary limiting factor in this watershed, although the dense canopy cover has also been shown to limit primary production, and thus food supplies for fish, in this system (McGinnis, 1991). While dense canopy cover is a natural condition, the input of fine sediments undoubtedly reduces available spawning habitat and should be addressed. A detailed study of the quarry operations that evaluates options for improving sediment containment should be a high priority for this watershed.

Another significant limiting factor appears to be the unlimited water rights the City of Santa Cruz holds for Liddell Springs #1 and #2. Withdrawals from Liddell Spring #1, located in the East Branch headwaters just upstream of the Property boundary, have been identified as particularly detrimental to summer and fall flows in that branch (McGinnis, 1991). CDFG is currently pursuing legal avenues to limit these withdrawals (Anderson pers. comm., 2000-2001).

3.3.4.5 YELLOW BANK CREEK

Yellow Bank Creek is located south of Davenport between the Liddell Creek and Laguna Creek watersheds (Figure 3.3-1d). Reach 1 forms the mouth of the creek. At the time of the surveys, there was no surface water connection to the ocean. This reach also includes two bore tunnels under the railroad tracks and Highway 1, as well as an open portion between the two. At the location where the creek exits the downstream bore onto the beach, a 3-foot drop with a very shallow plunge pool may present a migration barrier during parts of the year. Reach 2 contains two on-channel reservoirs and a cattle enclosure between the two. The outlets of both reservoirs were submerged at the time of the surveys, but both appeared to present impassable barriers. Upstream of the second reservoir, Reaches 3 and 4 are undisturbed, natural stream reaches that provide both spawning and rearing habitat for salmonids. Reach 4 actually contained salmonids, presumably landlocked steelhead. Reach 6 is very narrow and undergoing active incision. The channel bed is currently located 6 to 8 feet below the floodplain. Nevertheless, salmonids were observed in this reach as well. A road failure located in this reach is contributing significant amounts of fine sediments to the stream. Further signs of active incision were observed in Reach 7, which contained no fish. Several road failures are present in Reach 8, which contains large amounts of sediment (presumably from the failures) as well as further evidence of channel incision.



SOURCE: Environmental Science Associates, Pacific Meridian Resources, USGS

Figure 3.3-1d
Stream and Reach Classification on the Coast Dairies Property

The primary limiting factor in this watershed is the presence of the two reservoirs in Reach 2, which appear to be impassable. Upstream of the reservoirs, the watershed provides adequate spawning and rearing habitat. Removal of these barriers, combined with stabilization of the road and channel banks in the upper watershed, would almost certainly make Yellow Bank Creek a productive steelhead stream.

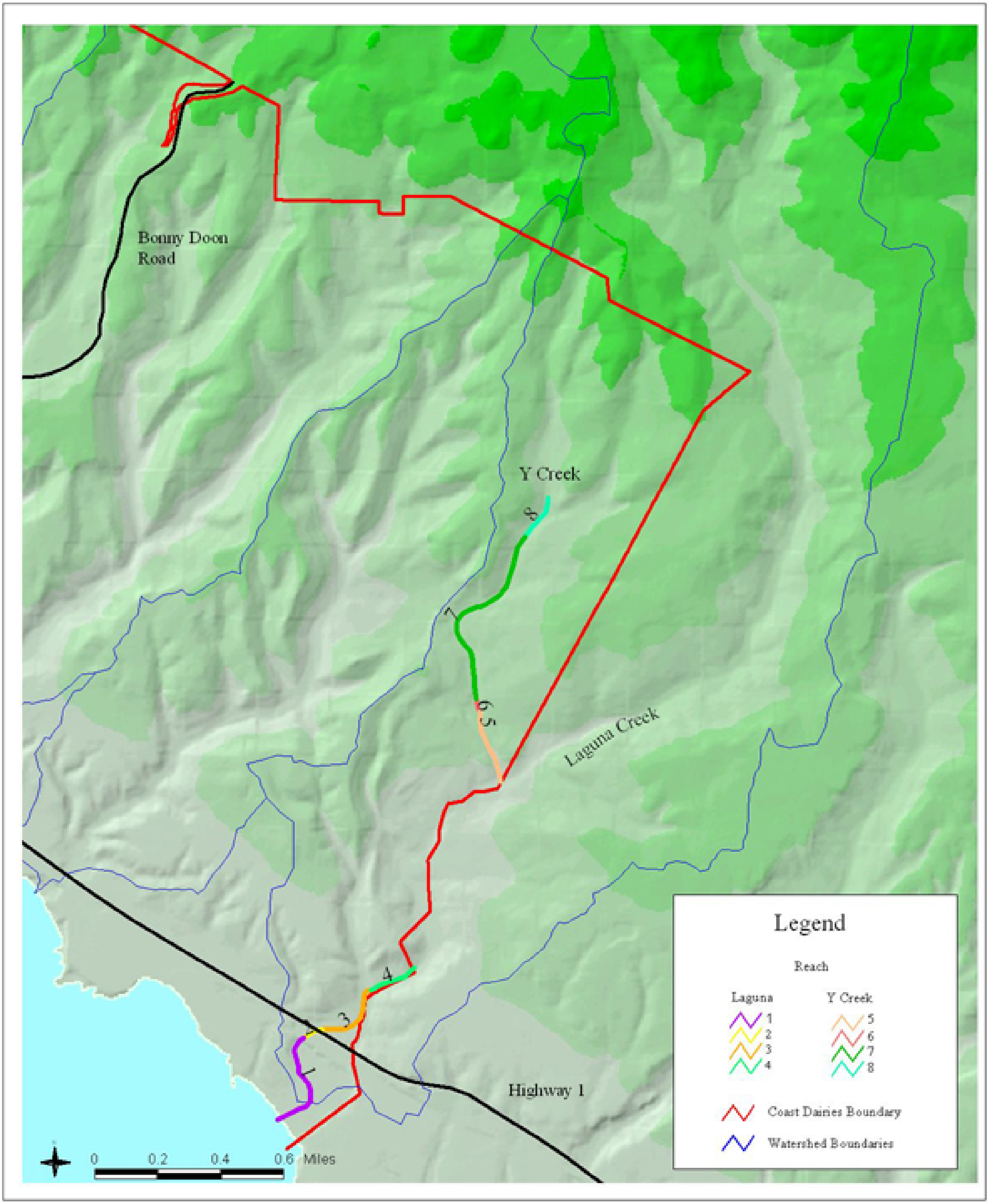
3.3.4.6 LAGUNA CREEK

Laguna Creek is located along the southern boundary of the Coast Dairies Property line and empties into the Pacific Ocean at Laguna Beach (Figure 3.3-1e). Reach 1 meanders through Laguna Creek Marsh, but a sandbar prevented the creek from flowing into the ocean at the time of the surveys. The lagoon present behind the sandbar provides habitat for salmonid smolts acclimatizing to ocean conditions prior to entering the ocean (when the sandbar is open). Reach 2 includes the culvert beneath Highway 1, which does not appear to present a migration barrier. This reach provides very good rearing habitat within a relatively deep channel containing an abundance of undercut banks. No significant disturbances were noted in this reach. Reach 3 is considerably narrower and shallower than the previous section, but provides potential spawning habitat. Reach 4 is similar to Reach 3, but contains a larger degree of fine substrate materials. The upstream end of Reach 4 forms the confluence with Y Creek (discussed below) and also represents the upstream extent of the part of the Laguna Creek located within the Coast Dairies boundary. Approximately 20 yearling salmonids were observed in this reach.

No significant limiting factors were identified in the surveyed downstream portion of Laguna Creek. However, the City of Santa Cruz operates a diversion site permitted for unrestricted withdrawals upstream of the Property. According to CDFG, the City diverts close to 100 percent of the headwater flows from Laguna Creek (Anderson pers. comm., 2000-2001) and the source of water flows observed on the Coast Dairies Property is believed to be entirely from tributaries such as Y Creek. As is the case with the Liddell Creek diversions, CDFG is attempting to reduce the City's diversion rates to allow some of the water to remain in the creek.

3.3.4.7 Y CREEK

Y Creek is a tributary to Laguna Creek and, in terms of reach enumeration, forms the continuation of Laguna Creek. Thus, Reach 5 includes the confluence of Y and Laguna creeks. At the confluence, a large boulder waterfall appears to present a formidable barrier to salmonid migration. Beyond the fall, the channel gradient is extremely steep. Nevertheless, close to 30 young-of-the-year and yearling salmonids were observed in this reach. The gradient of Reach 6 is considerably lower than the previous section and provides adequate salmonid habitat with a fairly even mix of riffles, pools, and runs. However, no fish were observed in this area. Largely uncontrolled cattle grazing occurs on both sides of the creek. Reach 7 is similar to Reach 6 but contains increasing amounts of boulders and bedrock. Cattle, but no fish, were observed in the channel. Reach 8 becomes increasingly narrow and contains evidence of active incision, as well as past redwood logging. Again, cattle have access to this reach, but no fish were observed.



SOURCE: Environmental Science Associates, Pacific Meridian Resources

Figure 3.3-1e
Stream and Reach Classification on the Coast Dairies Property

Y Creek is a relatively steep stream characterized by an abundance of cascades, boulders, and bedrock. Although there appears to be adequate habitat for a small steelhead population, all fish observations occurred near the creek's confluence with Laguna Creek. No significant limiting factors were identified, although exclusionary fencing for cattle, which has already been started along parts of the stream, should be completed.

3.3.5 INSTREAM FLOW REQUIREMENTS

Water withdrawals from streams have been identified by several researchers and agency personnel as a major limiting factor for fisheries resources throughout the Coast Dairies Property (Anderson pers. comm., 2000-2001; Harvey & Stanley Associates, 1982; Creegan & D'Angelo, 1984; McGinnis, 1991; CDFG, 1996). Instream flow requirements, also known as bypass flows or minimum flow requirements, are estimates of the amount of stream flow, measured in cubic feet per second (cfs), that is required to prevent the loss of aquatic life or habitat in a creek. The SWRCB, in consultation with CDFG and NMFS, typically sets instream flow requirements for water rights negotiations. These requirements establish a certain stream flow below which no water diversions are permitted. In streams that are capable of supporting anadromous salmonids, bypass flows are most commonly based on the amount of water thought to be necessary for fish to migrate through the stream during winter and spring months. In order to maintain sufficient over-summering habitat such as pools and thermal refugia, diversions during summer and fall are usually not permitted.

As discussed in the Methodology section above, the median February flow method used to derive preliminary instream flow requirements for the Coast Dairies creeks is still undergoing development by NMFS and has not been adapted to streams south of San Francisco[6]. Furthermore, the bypass flows established under this new methodology are typically applied to a permitted diversion period of December 15 to March 31. Proposed withdrawals outside this period are usually not permitted (SWRCB, 2001). Since most agricultural diversions on the Coast Dairies Property are believed to occur during the summer growing season, compliance with this restriction would require additional construction of off-channel reservoirs. Future water rights negotiations should be based on the most current version of the NMFS methodology (when adapted to central California streams) or should employ site-specific field surveys, such as a critical riffle passage methodology (HRG, 1997) below the proposed point of any diversion.

The results of the instream flow requirement calculations (Table 3.3-2) show the streams being separated into two clear categories. The two larger streams on the Coast Dairies Property, San Vicente and Laguna Creek, both appear to require between 13 and 20 cubic feet per second (cfs) of flow to provide sufficient migratory and spawning habitat, while all the other creeks require less than 3 cfs.

[6] NMFS is considering the use of the March median flow for determining bypass flows on creeks south of San Francisco Bay (Hearn, pers. comm.)

The larger size of San Vicente Creek and Laguna creeks also allow for greater cumulative diversion rates (approximately 6 to 8 cfs), while acceptable withdrawal rates on the other creeks are all below 1.5 cfs. In comparison, the CDFG set the instream flow requirements of Scotts Creek, which has a watershed area of about 27 square miles, at 40 cfs during the winter and early spring and at 6 cfs during the summer and fall. The CDFG did not address diversion rates (Snider et al., 1995).

TABLE 3.3-2
ESTIMATED INSTREAM FLOW REQUIREMENTS AND MAXIMUM CUMULATIVE INSTANTANEOUS DIVERSION RATES FOR COAST DAIRIES STREAMS

Creek	Approximate Watershed Area (sq. miles)[a]	Estimated Instream Flow Requirement (cfs)[b]	20% Winter Exceedence Flow (cfs)[c]	Maximum Cumulative Instantaneous Diversion Rate (cfs)[d]
Molino	1.5	2.1	5.5	1.1
Ferrari	1.3	1.8	4.5	0.9
San Vicente (downstream)	10.5	19.4	40.5	8.1
San Vicente (upstream)	9.9	18.1	38.0	7.6
Liddell (main branch)	1.9	2.8	7.0	1.4
Liddell (west branch)	1.3	1.8	4.5	0.9
Yellow Bank	0.6	0.7	2.0	0.4
Laguna	7.6	13.4	29.0	5.8
Y (tributary to Laguna)	0.8	1.0	3.0	0.6

Notes (see Section 3.3.2 *Methodology* for further explanation):
a. Based on watershed area upstream of water quality/hydrology sampling stations.
b. Based on estimated median February flow.
c. Flow level that is met or exceeded on 20% of the winter days (December 15 through March 31)
d. Based on 20% of the "20% winter exceedance flow".

3.3.6 ISSUES

Various issues regarding the fisheries resources were identified during the literature review and field surveys conducted for this existing Conditions Report. Some of the issues, such as water diversions and migration barriers, are deemed limiting factors to anadromous salmonids. Removing or improving these adverse conditions should be considered a high priority for future land managers. San Vicente Creek, where severely endangered coho salmon are known to occur, should be considered a unique biological resource, and carefully protected and restored. All of the streams on the Property are included in the Critical Habitat designations for both steelhead and coho, and should be managed as anadromous salmonid streams. Addressing other issues, such as riparian fencing and revegetation, and increasing the frequency and quality of pools, would add to the overall improvement of aquatic habitat conditions on the Coast Dairies Property.

3.3.6.1 WATER DIVERSIONS AND MIGRATION BARRIERS

Water diversion and migration barriers are discussed together since they are typically closely associated with each other, especially in situations of on-channel water storage facilities. While we recognize the importance of agriculture to the region in general and to the livelihood of the Coast Dairies farmers in particular, water diversions and migration barriers should be addressed in order to restore viable steelhead populations in all streams and coho salmon in San Vicente Creek. The most effective means of removing the permanent barriers on the Property, while maintaining the viability of irrigated agriculture on the Property, is through the replacement of the existing on-channel reservoirs and dams with off-channel storage facilities. Filling the off-channel reservoirs in a regulated manner during high flow winter periods (December 15 through March 31) and storing the water until it is needed during the summer would significantly increase the availability of summer rearing habitat for salmonids.

During field inspections in May, 2001 TPL staff and CDFG staff inspected the three off-channel reservoirs on San Vicente Creek. CDFG staff expressed their opinion that the two functioning reservoirs both pose hazards to anadromous fish. The lower reservoir, immediately upstream of Highway 1, may trap juvenile fish, as was noted in the description of San Vicente stream reaches earlier in this chapter. In addition, local residents have apparently been stocking this reservoir for many years with fish species that have not yet been determined. The stocked fish may prey on juvenile salmonids present in the reservoir. In addition, fishing in this reservoir likely results in the take of salmonid juveniles.

A second off-stream reservoir on San Vicente Creek is not currently functional and, in the opinion of CDFG staff, poses few problems for the fishery. A third reservoir, however, occupies part of the active stream channel, and was apparently built in a natural stream meander. This reservoir also was observed to harbor juvenile salmonids. Concerns with this reservoir include the possibility that it traps fish; and the high danger of damage during high winter flows, due to the fact that it is placed within the active stream channel.

CDFG, Santa Cruz County, and the previous owners of the Property have contemplated the issue of improving off-channel water storage in the past (B. Smith pers. comm., 2000-2001). Under this plan, several storage facilities would have been constructed on the coastal terrace located northeast of Swanton Road and south of Molino Creek. The water supply would then be presumed to come from winter flows diverted from Scotts Creek and Molino Creek. This plan never came to fruition, due in large part to the limited water availability from Scotts Creek. Revival of this plan should perhaps be considered. Water for the reservoirs should come from Coast Dairies streams only. Water budgets for the Coast Dairies streams should be combined with future minimum flow requirement assessments to determine the environmental and economic feasibility of off-channel reservoirs, and the amounts of water that would be available for agricultural use. Another water management method that has been contemplated in the past is the use of infiltration galleries to recharge groundwater during wet winter months, for withdrawal during the summer.

In addition to developing additional or alternative supplies of water on the Property, conservation of this resource should be a prominent feature of the Long-Term Resource Protection and Use Plan. The Long-term Resource Protection and Use Plan (Plan) should investigate and evaluate possible changes in farming practices, such as crop selection, cultivation practices, and the extent of irrigated fields on the Property in order to minimize the need for water withdrawals (see Section 5.2).

While the majority of diversions on the Coast Dairies Property are for agriculture, potentially more significant are the municipal water withdrawals located upstream of the boundary. The City of Santa Cruz has unlimited water rights for two diversion sites on Liddell Creek and one site on Laguna Creek. These diversions have been shown to significantly reduce summer and fall flows in these creeks. The CDFG is currently attempting to reduce the diversion rates at these sites in order to protect threatened steelhead and other aquatic species (Anderson pers. comm., 2000-2001).

3.3.6.2 DIVERSION SCREENING

The issue of diversion screening is closely related to the issues discussed above. Screening criteria have been established by NMFS (1997). Direct withdrawal sites need to be screened with a sufficiently small mesh size (3/32 inch) to prevent fish and amphibians from being entrained (sucked into the pumps). The screening design also needs to take sweeping velocity (water velocity running parallel to the screen) and approaching velocity (water velocity running perpendicular to the screen) into account in order to prevent impingement (aquatic organisms being pinned to the screen by the suction force of the pumps). In the case of the existing off-channel reservoirs, CDFG favors screening of the inlet/outlet of the reservoirs (B. Smith pers. comm., 2000-2001), thus excluding salmonids from these ponds and preventing them from getting trapped. The Plan should include careful investigations of all diversion systems and recommendations as to their improvement.

3.3.6.3 SEDIMENT MANAGEMENT

While some degree of sedimentation (the deposition of fine sediments such as sand and silt on the channel bed) is evident on most streams on the Coast Dairies Property, the Liddell Creek watershed contains the most significant amount of fine sediments and high degrees of embeddedness. Although the extent of sedimentation observed in the watershed during April/May 2001 may have been abnormally high due to the accidental failure of sedimentation ponds operated by RMC Pacific Materials in the headwaters, extensive evidence of sedimentation problems had been observed prior to the pond failure. However, the high level of erodibility of Coast Dairies soils in general, and of soils in the Liddell Creek watershed in particular, is doubtlessly an important source of erosion and consequent sedimentation in the streams. Nevertheless, all of RMC's quarry operations should be evaluated by an outside geotechnical expert and brought into line with current Best Management Practices (BMP) for this type of mining.

3.3.6.4 FENCING

Since TPL began its interim ownership of the Coast Dairies Property, several stream reaches have been fenced to exclude cattle from the channel. Examples of the exclusionary fencing can be found on Ferrari and Y creeks. However, cattle and/or fresh cattle evidence was still observed within or very close to unfenced channel reaches during the April/May stream reconnaissance surveys. Areas of San Vicente Creek and Liddell Creek are still accessible to livestock and should be fenced in the near future.

3.3.6.5 DATA GAPS

Summer Stream Temperatures

One of the most important habitat features for salmonids is the availability of cool stream temperatures. Coho salmon in particular are susceptible to water temperatures exceeding 16.5º Celsius, while steelhead are tolerant of maximum temperatures of 20.5º Celsius (Sullivan et al., 2000). Water temperatures in coastal streams of central California are typically sufficiently low during the winter and spring spawning migration period, but elevated summer temperatures during are more likely to reach stressful or detrimental levels for rearing juveniles. In order to determine average and maximum summer water temperatures, we have installed continuous temperature recorders for the 2001 summer season.

Stream Crossing/Passage Evaluation

As is evident throughout the discussion of the stream reaches, determining whether a given culvert or bore is passable to salmonids cannot be done visually with any degree of certainty. The NMFS and CDFG have jointly developed criteria for designing stream crossings to allow for adequate passage (NMFS, 2000). The same criteria guidelines, involving a detailed hydrologic analysis, can be used to determine to what extent existing crossings are passable to salmonids. All questionable stream crossings on the Coast Dairies Property should be studied using these criteria to determine the upstream extent of habitat available to steelhead and coho salmon. This is particularly important in cases where future restoration efforts may be planned upstream of such crossings. If a given culvert proved to be impassable, any upstream restoration would naturally be superfluous. The locations and types of potential migration barriers are discussed in Section 3.3.4 *Stream Reach Information* and are summarized in Table 3.3-1.

Another issue related to salmonid passage is the saltwater effluent that is discharged by U.S. Abalone via the concrete flume at the mouth of Ferrari Creek. While the discharge is believed to be uncontaminated (pure ocean water is only cycled through the abalone holding tanks), it is currently unclear whether the discharge is saline enough to prevent adults salmonids returning from the ocean from recognizing Ferrari Creek as a freshwater stream. Salinity levels in the flume should be monitored during the next migration season to determine whether the effluent merely creates brackish water conditions (which would presumably not interfere with salmonid migration) or if salt concentrations are close to ocean levels (which may interfere with migration).

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SECTION 4.0

PHYSICAL RESOURCES OF THE COAST DAIRIES PROPERTY

4.1 HYDROLOGY

There are six perennial streams on the Cost Dairies Property: Molino Creek, Ferrari Creek, San Vicente Creek, Liddell Creek, Yellow Bank Creek, and Laguna Creek. Several of these streams have their watershed entirely or almost entirely on the Property. The larger streams, Laguna Creek and San Vicente Creek, however, have watershed areas that extend well beyond the Property Boundary. As part of the Existing Conditions studies, the Planning Team investigated the hydrology of the region, the Property, and in particular these six streams. The objectives of this hydrologic assessment were to determine the physical characteristics of each stream and its watershed; the general condition of each stream and its watershed; the sensitivity of each of the six watersheds to disturbance; and the natural and human-induced disturbance conditions within each watershed that indicate the stream's suitability for salmonids.

4.1.1 REGIONAL SETTING

This section presents data on the hydrology of the Davenport region, with particular emphasis on regional precipitation and topographic features that affect the Property's hydrology.

4.1.1.1 REGIONAL HYDROLOGY

The Santa Cruz Mountains, like most of central California, are marked by winter rains and summer drought. The streams on the west side of the Santa Cruz Mountains drain relatively small watersheds. The largest, the Pescadero-Butano watershed several miles north of Coast Dairies, has a watershed of about 80 square miles; the largest of the Coast Dairies watersheds, San Vicente, has an area of just under 12 square miles. Most of the streams draining the west side of the Santa Cruz Mountains flow through steep-walled canyons to the Pacific Ocean. These streams tend to exhibit "flashy" (rapidly rising and falling) winter flows in response to storm events, which themselves are intensified by the orographic effect of the mountains. As the dry season progresses and the soil dries out, the streams continue to be fed by seeps and springs. Summer "base" flow at any point in a stream is therefore reflective of the cumulative rate of emergence of groundwater into the stream channel.

4.1.1.2 PRECIPITATION DATA

Figure 4.1-1 shows elevations for the area around Coast Dairies. The Coast Dairies property spans an area with a range of mean annual precipitation from about 25 inches near the coast to about 40 inches at the inland property line. The mean annual precipitation of the upper portions of San Vicente and Laguna Creek is about 50 inches per year.

A rain gauge was operated in Davenport from September 1960 to June of 1977. The average water-year precipitation was 26.27 inches for the period (National Climate Data Center, 1995). A rain gauge near Santa Cruz has been operating since 1905. Its average water-year precipitation, for the 1961-1977 period, was 28.59 inches. The following regression equation predicts the total water year precipitation in Davenport given the Santa Cruz precipitation:

Davenport Water-Year Precipitation = 0.9109(Santa Cruz Precipitation) + 0.2283

The relationship had an $R^2 = 0.9564$, which indicates that the annual precipitation in Santa Cruz explains about 95 percent of the variation in the annual precipitation at Davenport.

The upstream migration and spawning of salmonids, and the large flood events that change the form of stream channels, both occur in late fall through early spring. Therefore, rainfall during the months of December, January, February, and March have the greatest effect on salmonid migration and spawning. The following regression equation predicts the December through March precipitation in Davenport given the Santa Cruz precipitation for the same period:

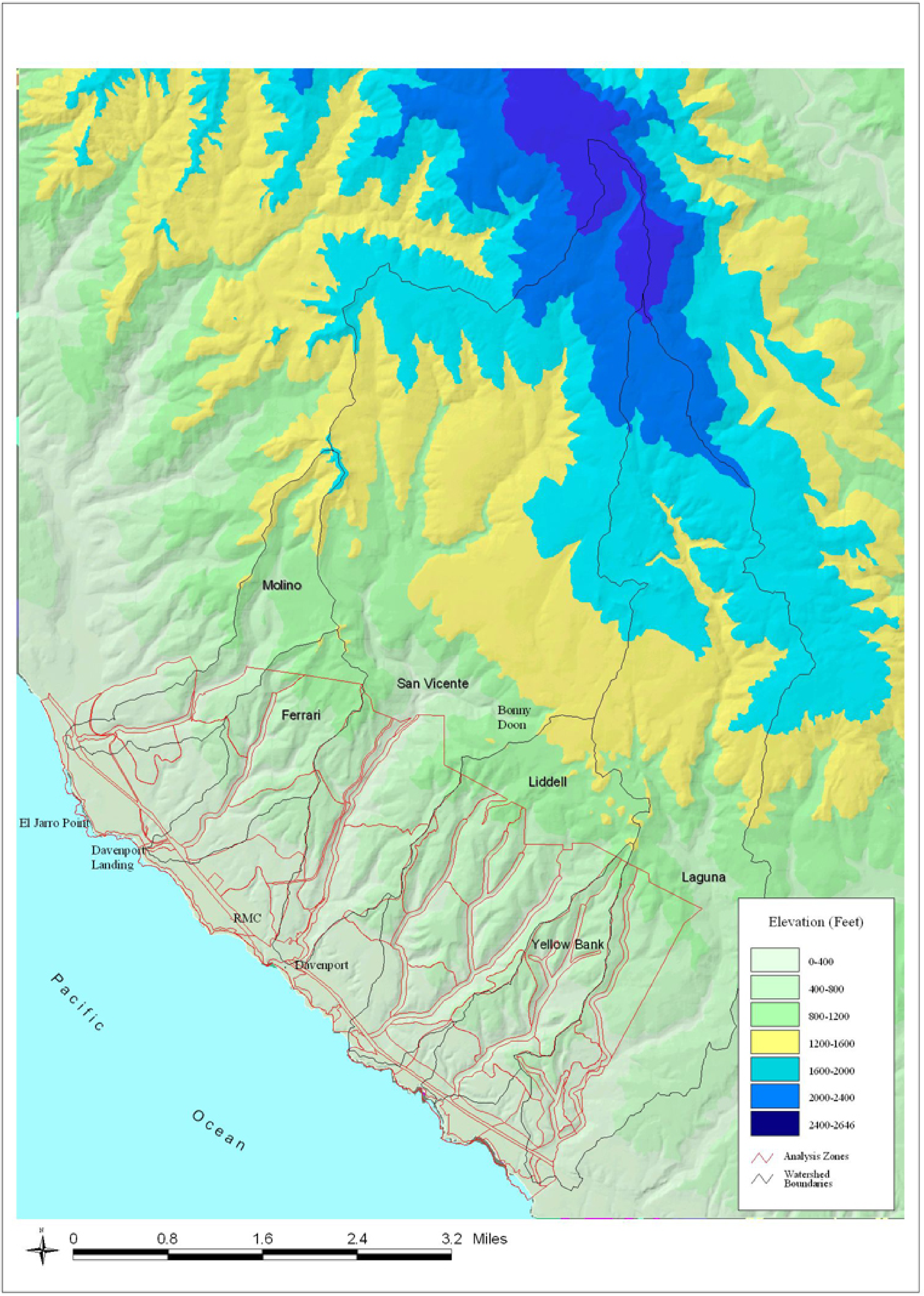
Davenport December-March Precipitation = 0.9046(Santa Cruz Precipitation) - 0.2838

The relationship had an $R^2 = 0.9538$, which indicates that the December-March precipitation in Santa Cruz explains about 95 percent of the variation in the December-March precipitation at Davenport. Figure 4.2-2 shows the December through March precipitation for Santa Cruz, the observed Davenport winter precipitation, and the estimated Davenport winter precipitation for the period 1905-2000. The average winter precipitation at Santa Cruz was 21.67 inches for the period 1905 to 2000. The estimated average winter precipitation for Davenport is 19.32 inches per year for the same period.

Over the period 1905-2000, February has had more rainfall than any other month. Figure 4.2-3 shows the total rainfall at Santa Cruz for each February from 1905 to 2000. The figure shows that the wettest February on record occurred in 1998.[1]

Other precipitation records for the region are also available, but were not used in this assessment. These stations include two rain gauges in Felton, a series of gauges near Ben Lomond, a station near Boulder Creek, and a station at the Chalks near Big Basin State Park. Real-time precipitation data are now available for the Ben Lomond and Chalks stations on the Internet. Data for several other precipitation stations in southern Santa Cruz County are also available.

1 The reservoir on Yellow Bank Creek failed in February of 1998. Culverts on Yellow Bank Creek and Y Creek may also have failed during the storms of February 1998.



SOURCE: Environmental Science Associates, Pacific Meridian Resources, USGS

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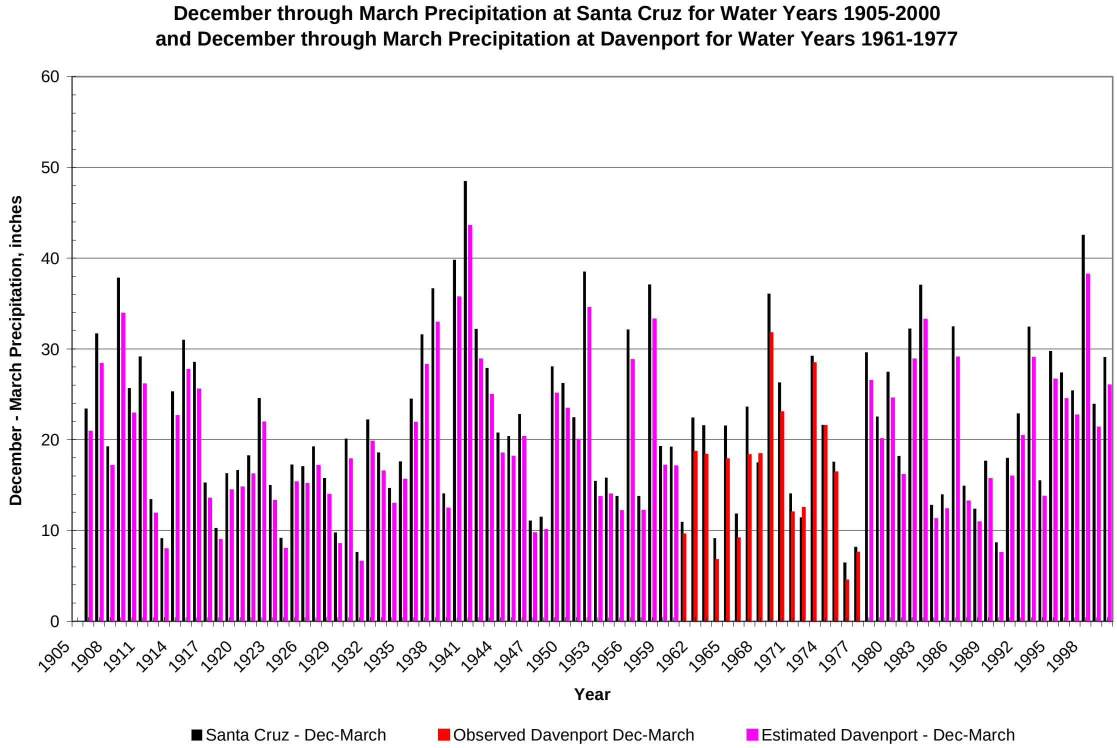
Figure 4.1-1
Elevations of the Coast Dairies Area



Note: The bar graph shows the December through March (winter) precipitation for Santa Cruz from 1905-2000. The precipitation observed at Davenport from 1961 to 1977 is also shown. Precipitation at Davenport for the periods 1905-1960 and 1978-2000 was estimated by linear regression with the Santa Cruz data.

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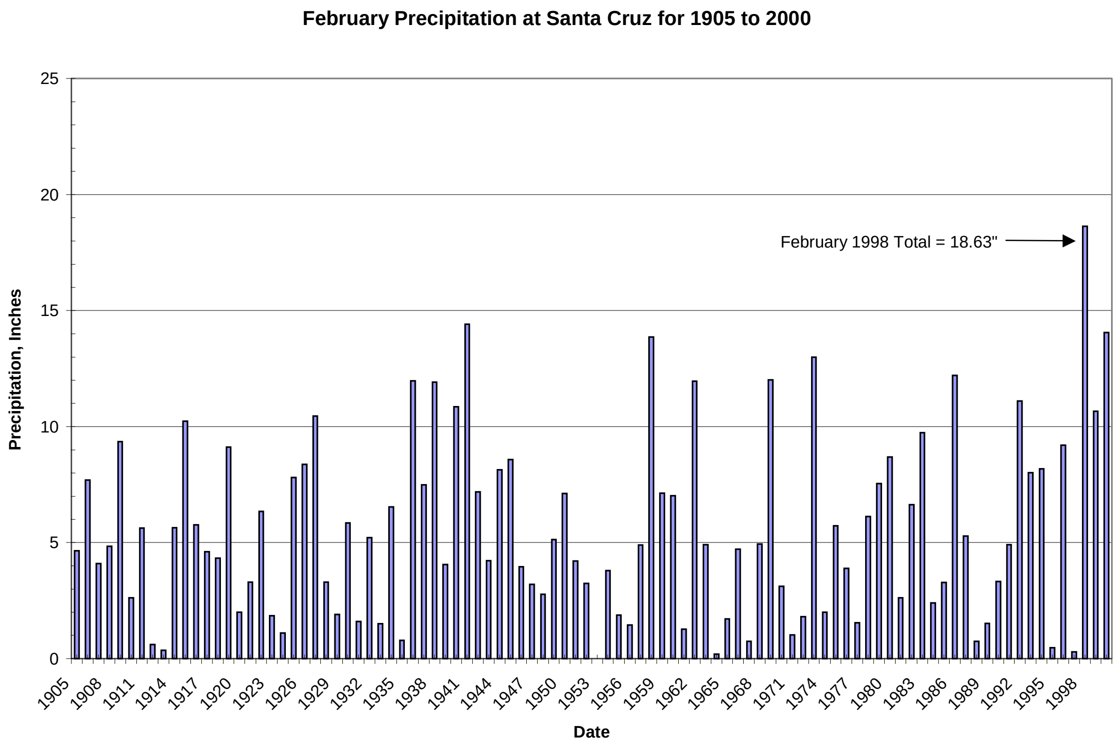
Figure 4.1-2
December through March (winter) Precipitation for Santa Cruz from 1905-2000

4.1.1.3 WATERSHED AREA AND ELEVATION

Figure 4.1-4 shows the cumulative percentage of watershed area in each 200-foot elevation class above each of the nine stream monitoring stations established on the Coast Dairies Property. Table 4.1-1 shows the watershed area upstream of each monitoring station. Table 4.1-1 also shows the 85th-percentile elevation, that is, the elevation below which 85 percent of the watershed lies. Since mean annual precipitation varies with elevation, the 85th-percentile elevation should indicate the relative amount of annual average precipitation each watershed receives.



Note: Santa Cruz total precipitation for the month of February from 1905 to 2000 is shown. The highest February precipitation occurred in 1998.

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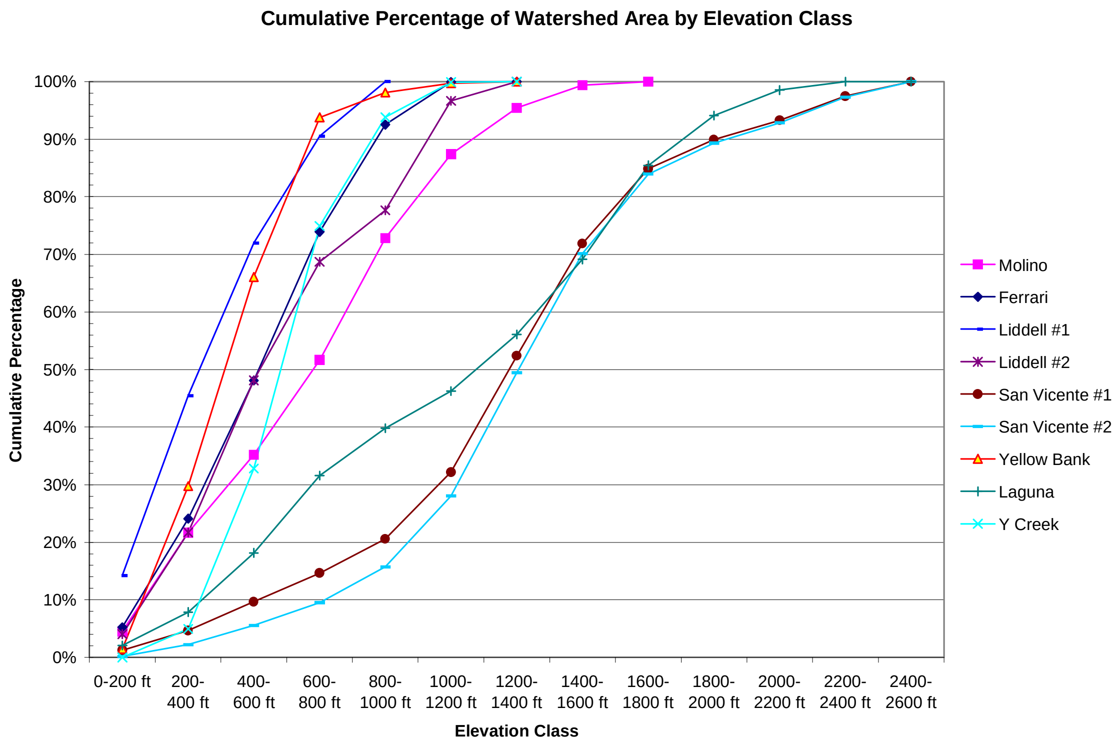
Figure 4.1-3
Santa Cruz total precipitation for the month of February from 1905 to 2000

Table 4.1-1 shows that San Vicente #2 station has 85 percent of its watershed area below 1,990 feet in elevation, and should have the highest mean annual precipitation per unit area of all the watersheds in this study.[2] Laguna Creek station has 85 percent of its watershed area below 1,610 feet in elevation, indicating that this station's watershed should have the second highest mean annual precipitation in the study. Liddell #2 and Molino Creek stations have similar, lower 85th percentile elevations, and Ferrari Creek and Y Creek stations have still lower 85th percentile elevations. Based on their 85th percentile elevations, Liddell #1 and Yellow Bank Creek stations can be expected to have watersheds with the lowest mean annual precipitation per unit area of the nine sampling stations.

[2] Please note that watersheds here are defined as the area that drains to each sampling station; these are not equivalent to the entire watershed of each stream.



Note: The cumulative percentage of watershed area in each 200' elevation class.

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Figure 4.1-4
Cumulative Percentage of Watershed Area in Each 200' Elevation Class

TABLE 4.1-1
WATERSHED AREA AND THE 85-PERCENTILE ELEVATION FOR THE COAST DAIRIES STREAM MONITORING STATIONS.

Monitoring	Total Watershed Area (sq. mi.)	85th Percentile Elevation (feet)
Molino	1.500	1,030
Ferrari	1.284	880
San Vincente	10.493	1,960
San Vincente	9.889	1,990
Liddell #1	1.292	660
Liddell #2	1.904	1,120
Laguna	7.603	1,610
Y Creek	0.794	890

Yellow	0.605	660

4.1.2 METHODOLOGY[3]

In the fall of 2000, the Planning Team established nine stream monitoring stations on the Property: two each on San Vicente Creek, Liddell Creek, and Laguna Creek, and one each on Molino Creek, Ferrari Creek, and Yellow Bank Creek (Figure 4.1-5). Throughout this section, these nine stations serve as the basis for analysis of water flow, water quality, and watersheds. In this way, land use, topography, geology, vegetation, and other factors can be related to the conditions observed in the stream channels themselves.

The evaluation of hydrologic existing conditions on the Property was hindered by the lack of historic records for the Coast Dairies streams, particularly records of stream discharge (rate of flow). The U.S. Geological Survey (USGS) has established gauging stations only San Vicente Creek and Laguna Creek, and the gauging records for these streams is relatively brief (Table 4.1-2). In order to make up for this, the Planning Team's hydrologist, Dennis Jackson, used data from gauging stations on other streams in the Santa Cruz Mountains, and extrapolated this data to the streams on the Coast Dairies Property.

TABLE 4.1-2
U.S. GEOLOGICAL SURVEY STREAM-GAUGING STATIONS
NEAR DAVENPORT CA

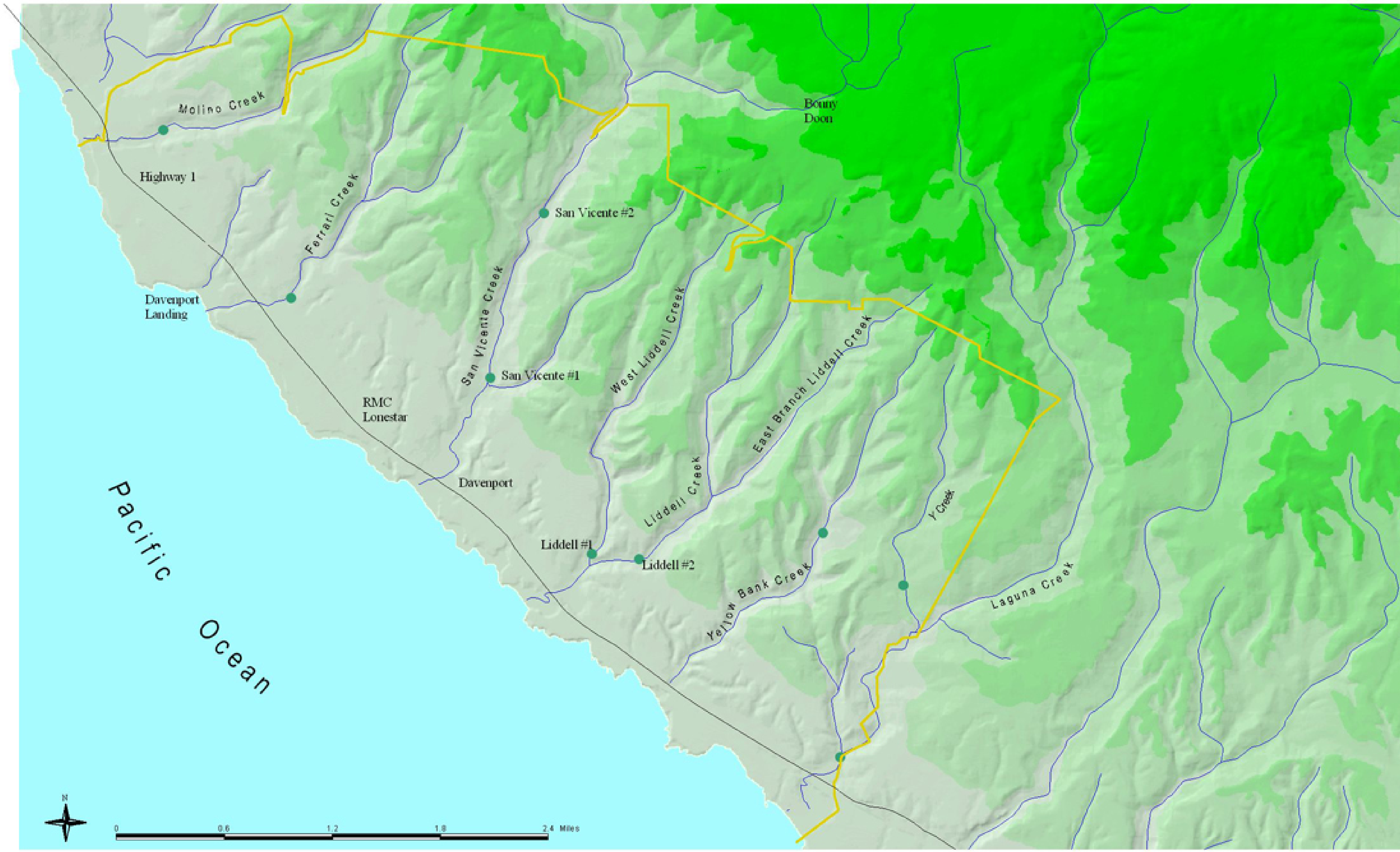
USGS Station Number	Station	Watershed Area	Period of Record	Years of Record	Mean Annual Flood	Unit Mean Annual Flood	1.5-Year Discharge
11161590	Laguna C Nr Davenport	3.07	1970 - 1976	7	137	44.8	83
11161570	Majors C Nr Santa Cruz	3.77	1970 - 1976	7	237	62.9	125
11161800	San Vicente	6.07	1970 - 1983	14	407	67.1	90
11161900	Scott C Ab Little C Nr Davenport Ca	25.1	1937 - 1973	19	1337	53.3	527
11162000	Scott C Nr Davenport Ca	27.3	1937 - 1941	4	2576	94.4	816

4.1.2.1 BANKFULL DISCHARGE

The concept of bankfull is central to understanding the morphology of stream channels. Bankfull discharge, the flow at which the active stream channel is just full, is the discharge that shapes the channel. Leopold, et al (1964) have pointed out that, over an extended period, moderate flood flows move the most sediment: while large flood events move great amounts of material, they are very rare; on the other hand, small floods occur frequently, but do little work. E. D. Andrews (Leopold, 1994 p. 127) demonstrated quantitatively that the "effective discharge," the channel

[3] This part of the Hydrology Section presents a condensed version of the description of the methodology used in the hydrology analysis that was prepared by Planning Team hydrologist Dennis Jackson. The full text of the methodology description is available in the Project Archives.

forming flow, was very close to bankfull discharge. For many rivers, the bankfull discharge occurs about every 1.5 years.



SOURCE: Environmental Science Associates, Pacific Meridian Resources, County of Santa Cruz

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Figure 4.1-5
Stream Monitering Stations
on the Coast Dairies Property

Leopold et al. (1964) observed that the initiation of movement of median size gravel in stream riffles requires a depth of flow equal to 75 percent of the bankfull depth. A flow of this depth has a recurrence interval of about one year. Leopold also noted that the depth of the average annual discharge is approximately 33 percent of the bankfull depth.

The bankfull discharge for each of the nine monitoring stations was estimated using a four-part procedure. First, records from U.S. Geological Survey stream guaging stations, both on the Property and in nearby locations, were used to develop a regional relationship for the 1.5-year discharge based on watershed area (Tables 4.1-2 and 4.1-3, and Figures 4.1-6 and 4.1-7).

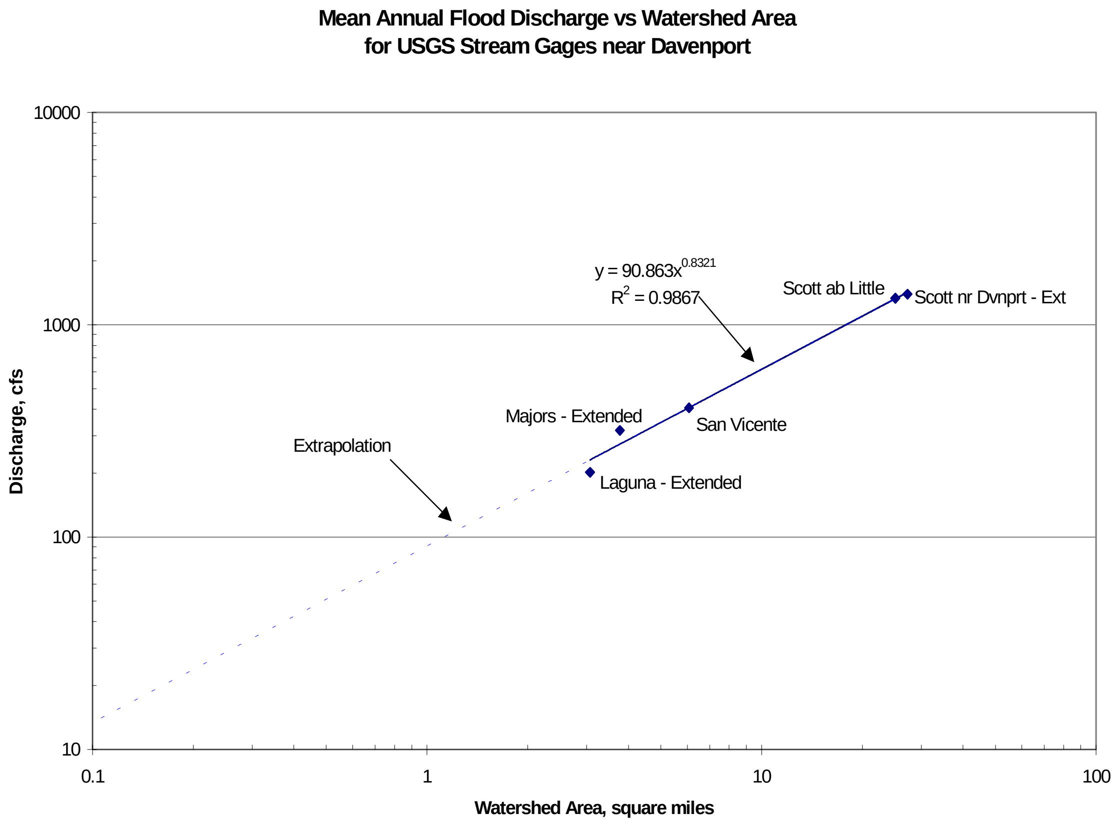
TABLE 4.1-3
CORRELATION OF ANNUAL PEAK FLOOD SERIES FOR NINE USGS GAUGING STATIONS

	San Lorenzo at Big Trees	*Pescadero Creek near Pescadero*	*Corralitos Creek near Freedom*	*San Lorenzo near Boulder Creek*	*Zayante Creek*	***Scott Creek Above Litte***	***Laguna Creek***	***Majors Creek***	***San Vicente***
San Lorenzo at Big Trees	1								
Pescadero Creek near Pescadero	0.9178	1							
Corralitos Creek near Freedom	0.8738	0.7825	1						
San Lorenzo near Boulder Creek	0.9481	0.9399	0.8509	1					
Zayante Creek	0.8384	0.8105	0.6773	0.8700	1				
Scott Creek Above Litte	**0.8304**	0.7375	0.7849	**0.8965**	0.7418	1			
Laguna Creek	0.5890	0.5591	**0.7982**	0.5830	0.4698	**0.7984**	1		
Majors Creek	0.3806	0.4639	0.6301	0.3991	0.2064	**0.7652**	**0.9076**	1	
San Vicente	**0.8592**	0.7598	**0.9160**	0.7123	0.5081	**0.8969**	**0.8487**	**0.9682**	1

TABLE 4.1-4
PREDICTIONS OF THE 1.5-YEAR DISCHARGE FOR THE NINE COAST DAIRIES STREAM MONITORING STATIONS

Monitoring Station	Watershed Area square miles	Lower Limit cfs	Predicted 1.5-Year Discharge cfs	Upper Limit cfs
Molino Creek	1.50	18.4	42.1	96.2
Ferrari Creek	1.28	15.6	36.7	86.3
Lower San Vicente #1	10.49	118.9	229.6	443.3
Upper San Vicente #2	9.89	113.0	218.0	420.5
Liddell #1 West	1.29	15.7	37.0	86.7
Liddell #2 Main	1.90	23.6	51.8	113.8
Y Creek	0.79	9.4	24.2	62.4
Laguna	7.60	89.9	173.3	334.3
Yellow Bank	0.60	7.0	19.1	52.2

Note: The watershed area for six of the stations is less than 3 square miles. Predictions for these six stations are actually extrapolations and may be subject to more error than is apparent from the regression statistics. The upper and lower limit for the 95 percent confidence interval for the predictions is also given.



Note: Mean annual flood versus watershed area for 5 USGS stream gauging stations near Davenport. The annual flood series forScotts Creek near Davenport was extended to 19 years by regression with the record forScotts Creek above Little Creek. The annual flood series for Laguna and Majors Creek were extended by regression with the San Vicente gauge record.

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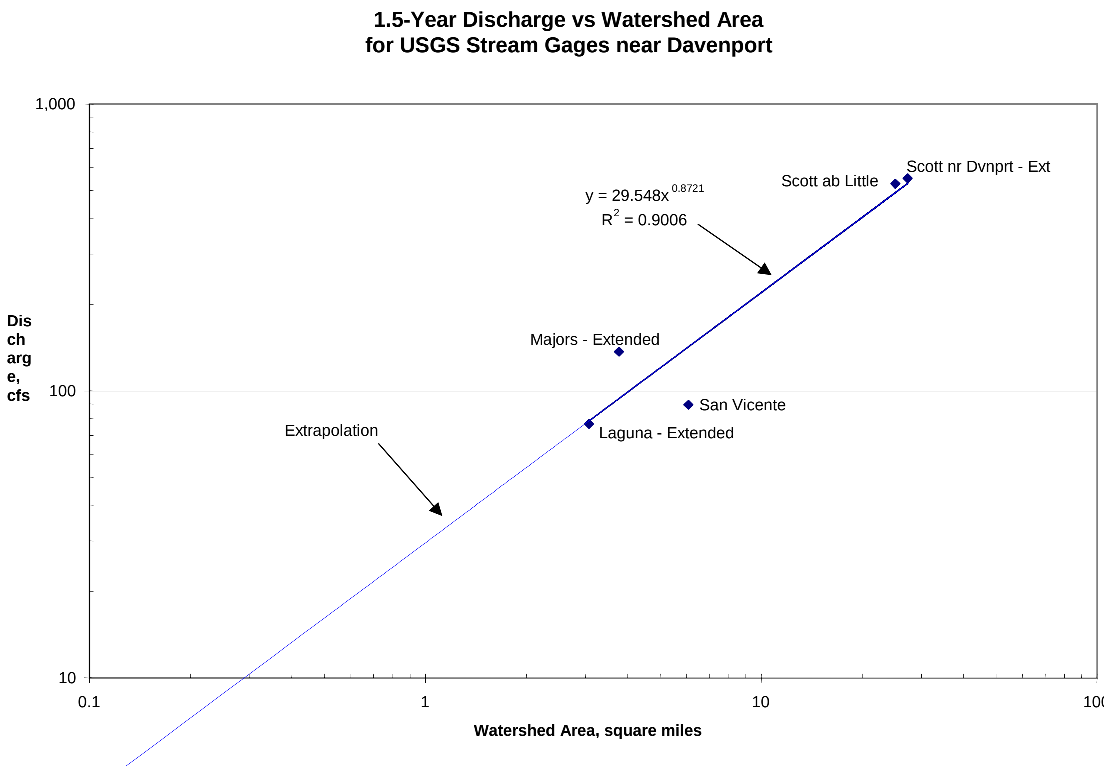
Figure 4.1-6
Mean Annual Flood vs. Watershed Area for
5 USGS Stream Gauging Stations Near Davenport

Second, the Planning Team conducted channel surveys at each station, including identification of bankfull indicators; a longitudinal-profile, approximately 10-bankfull widths in length; installation of a staff guage; a cross section at the riffle crest downstream of the staff gauge; and a survey of the top of the staff gauge. Planning Team hydrologist Dennis Jackson calculated regressions (statistical correlations) for the bankfull indicators, water surface, thalweg (low flow channel), and centerline versus profile distance, and graphed profiles and cross sections for each station (presented later in this section). In addition, a datum (locational coordinates and elevation) was established for each station.



Note: Flood data from the five USGS stream gauging stations near Davenport was used to develop a regional relationship between the 1.5-year discharge and watershed area. The flood records for Laguna Creek and Majors Creek were extended by regression against the San Vicente flood record. The flood record forScotts Creek near Davenport was extended by regression against the record fromScotts Creek above Little Creek.

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Figure 4.1-7
1.5-Year Discharge vs. Watershed Area for
5 USGS Stream Gages near Davenport

Third, Planning Team members took discharge measurements at each station monthly between fall of 2000 and spring of 2001, and also during several storm events during the winter of 2000-2001. Based on the discharge measurements and the depth of the water measured at the staff gauge at the time the discharge measurements were taken (Table 4.1-5), a rating curve was developed for each station. The rating curve can be used to determine discharge simply by measuring water depth at the staff gauge. Fourth, the Team combined information from the channel surveys and discharge measurements for each station. This included an estimate of the discharge associated with the observed bankfull indicators, and calculations of the elevation of the water surface for the estimated 1.5-year discharge. The final estimate for the bankfull discharge was based on a comparison of estimated water surface elevation of the 1.5-year discharge with the level of the bankfull indicators (Table 4.1-6).

TABLE 4.1-5
RANGE OF DISCHARGE MEASUREMENTS AND THE ASSOCIATED RANGE OF DEPTH AND STAGE

Monitoring Station	Watershed Area sq. mi.	Lowest Stage feet	Highest Stage feet	Lowest Depth feet	Highest Depth feet	Lowest Discharge cfs	Highest Discharge cfs
Molino	1.500	0.98	1.47	0.37	0.72	0.72	7.69
Ferrari	1.284	0.6	1.23	0.25	0.72	0.37	6.21
San Vicente #1	10.493	1.47	2.03	0.73	1.14	11.21	42.32
San Vicente #2	9.889	1.33	1.94	0.82	0.99	10.14	41.24
Liddell #1 (West)	1.292	0.94	1.2	0.57	0.75	1.72	5.55
Liddell #2	1.904	1.21	1.42	0.31	0.58	1.76	6.26
Laguna	7.603	0.93	1.35	0.64	1.12	5.75	22.15
Y Creek	0.794	0.54	0.84	0.35	0.64	0.48	5.14
Yellowbank	0.605	0.89	1.19	0.24	0.44	0.31	2.35

TABLE 4.1-6
COMPARISON OF THE ESTIMATED 1.5-YEAR DISCHARGE AND THE ESTIMATED BANKFULL DISCHARGE ADOPTED FOR EACH OF THE NINE MONITORING STATIONS

			Final Bankfull			
Monitoring Station	Watershed Area sq miles	Estimated 1.5-Year Discharge	Bankfull Discharge cfs	Stage feet	Velocity feet/sec	Depth feet
Molino	1.50	42.1	45.0	2.00	4.0	1.17
Ferrari	1.28	36.7	36.7	1.91	2.3	1.45
Lower San Vicente	10.49	229.5	252.0	3.13	5.0	2.09
Upper San Vicente	9.89	218.0	223.2	2.77	6.3	1.58
West Liddell	1.29	37.0	38.8	1.82	4.1	1.20
East Liddell	1.90	51.8	46.9	2.12	3.4	1.05
Laguna	7.60	173.3	238.9	2.59	5.6	2.94
Y Creek	0.79	24.2	24.8	1.64	3.2	1.22
Yellowbank	0.60	19.1	19.1	1.73	3.2	0.68

4.1.2.2 FISH FLOWS

Salmonids require different amounts of water for their various life stages. Recently, National Marine Fisheries Service (NMFS) has adopted a policy of recommending that the minimum bypass flow for new water rights diversions be set at the February median flow. NMFS recommends that the maximum instantaneous diversion rate not exceed 15 percent of the estimated winter 20 percent exceedence flow. In other words, the total of all diversions at any given point in time should not exceed 15 percent of the flow that is exceeded 20 percent of the time during the winter. For example, if winter flows in a given stream are greater than 10 cubic feet per second (cfs) only 20 percent of the time, then the maximum amount that could be diverted from this stream is 1.5 cfs, which is 15 percent of 10.

The Planning Team estimated February median discharge and the estimated winter 20 percent exceedence discharge by constructing regional exceedence curves. These show the relationship between flow and watershed area, and are based on four USGS stations near Davenport. These relationships were used to estimate the February median discharge and the winter 20 percent exceedence discharge at each of the nine stream monitoring stations.

4.1.2.3 REGIONAL FLOW DURATION CURVE

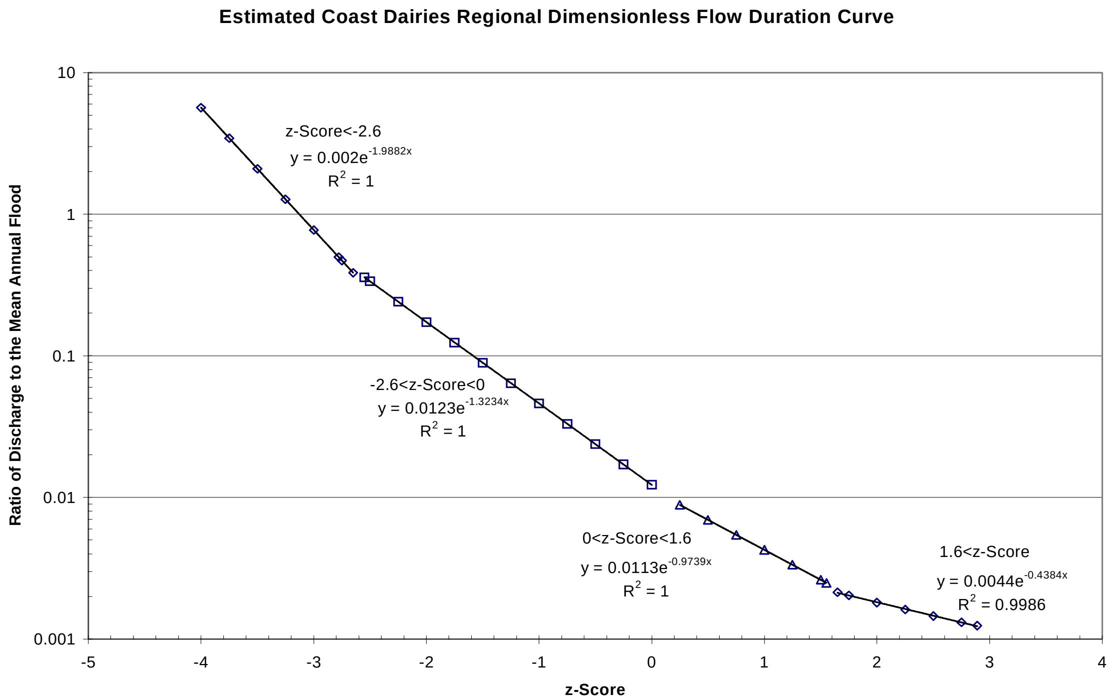
A flow duration curve for a stream gauging station gives the probability that a given discharge will be equaled or exceeded. Flow duration curves are used to predict the return frequency for a given sized flood event. A dimensionless regional flow duration curve for the Coast Dairies streams was created by averaging the dimensionless flow duration curves for the USGS stream gauges on San Vicente Creek and Laguna Creeks, using the Weibull Plotting Position (Figure 4.1-8).

Flow duration curves were constructed for each of the nine stream monitoring stations on the Coast Dairies property by multiplying the predicted dimensionless discharge by the mean annual flood for each station estimated from the watershed area. The flow duration curves for the Coast Dairies stations were then converted to exceedence probability, and are shown in Figure 4.1-9.

Multiplying the exceedence probability by 3,652.5 days gives an estimate of the flow duration for a theoretical ten-year period (Figure 4.1-10). The flow duration curve combines data from wet years and dry years, so it can not be used directly to estimate the number of days a discharge will be equaled or exceeded in a given year.

4.1.2.4 CONSTRUCTION OF HYDROGRAPHS

Of the six streams on the Property, only San Vicente Creek and Laguna Creek have had their flows gauged by the U.S. Geological Survey (USGS). San Vicente Creek has the longer gauging record, from 1937 to 1940, and again from 1969 through 1985; Laguna Creek was gauged for only seven years. In the absence of flow records for the other four streams on the Property, the Planning Team constructed synthetic hydrographs for each of the nine stream monitoring stations based on the USGS San Vicente stream gauging station and our calculation of the regional mean annual flood for a given watershed area. The synthetic hydrographs should be viewed only as a guide to the range of flows that may have occurred at the monitoring stations for the 1969 to 1985 period. It is assumed that stream flow during this period is representative of recent history conditions.



Note: The estimated regional flow duration curve for the Coast Dairies Property. The curve is the average of the data for the USGS stations on San Vicente and Laguna Creeks. A z-score of 0.0 indicates a 50 percent exceedence probability.

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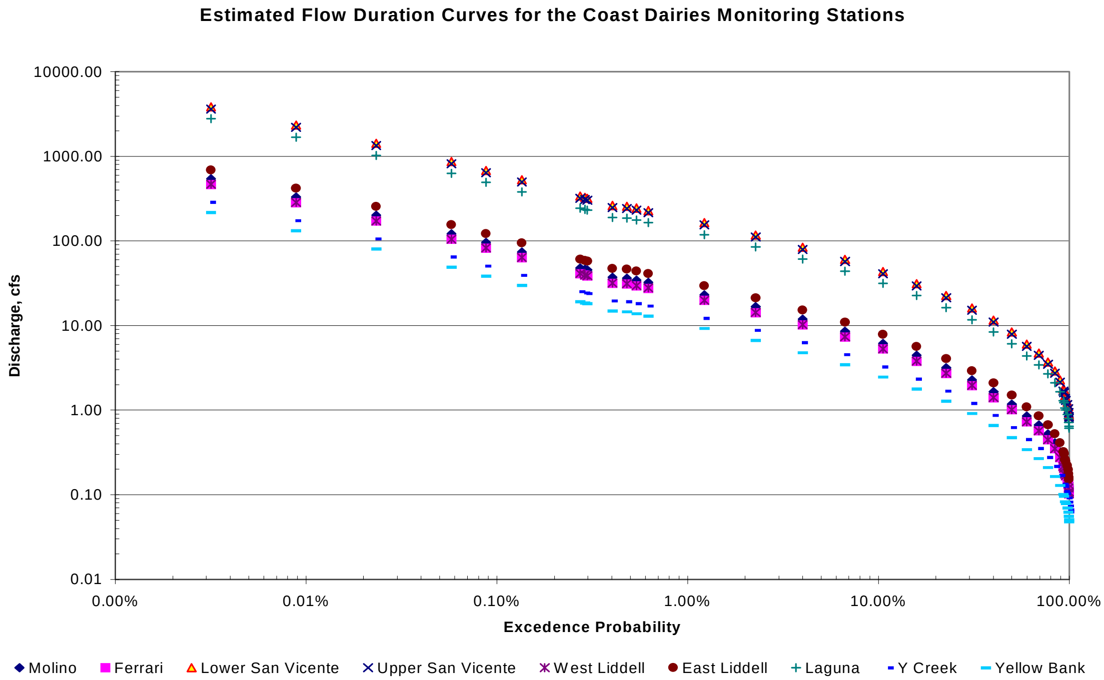
Figure 4.1-8
Regional Flow Duration Curve for the Coast Dairies Property

The Planning Team then converted the daily average discharge hydrograph for the San Vicente gauge to a dimensionless form by dividing each daily average discharge by the mean annual flood for the San Vicente gauge. The mean annual flood for the USGS San Vicente gauge is 407 cfs, based on data collected in the 1937 to 1940 and 1969 to 1984 water years. Figure 4.1-11 shows the dimensionless (relative discharge) hydrograph for the USGS gauge on San Vicente Creek.

Next, the synthetic hydrographs for each of the nine stream monitoring stations on the Coast Dairies Property were obtained by multiplying the relative discharge of the dimensionless hydrograph for USGS San Vicente gauge by the mean annual flood for each monitoring station estimated from its watershed area. All of the synthetic hydrographs will have the same shape and will differ only in the value of the predicted discharge; there will be no differences in the timing or the relative amplitude of the discharge peaks.



Note: Estimated flow duration curves for the nine Coast Dairies stream monitoring stations. The values on the x-axis have been converted from z-score to exceedence probability.

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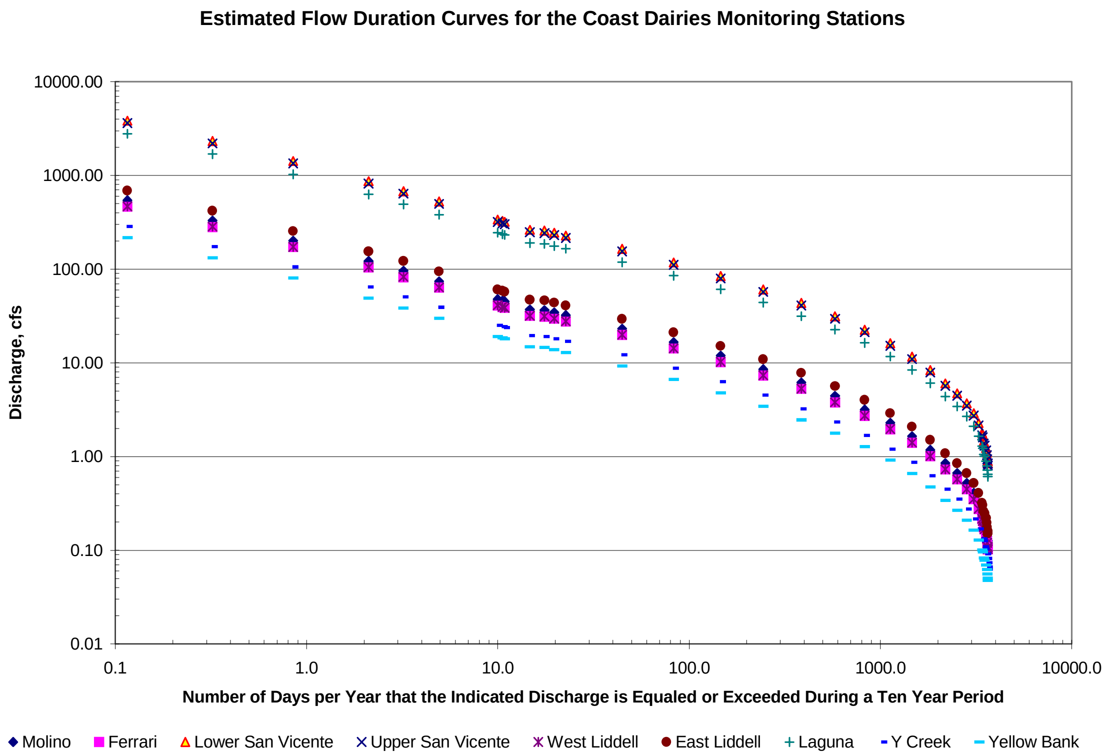
Figure 4.1-9
Estimated Flow Duration Curves
(Expressed as Exceedence Probability)
for the Nine Coast Dairies Stream Monitoring Stations

4.1.2.5 TURBIDITY AND SUSPENDED SEDIMENT

In hydrologic terms, turbidity is a measurement of the opacity of the water, and it is a direct indicator of the dissolved sediment load carried by a stream. Suspended sediment is sediment that is held in suspension by flowing water. Both turbidity and suspended sediment are relatively easy to sample, and together give a good indication of the amount of sediment carried by a stream.[4] When sampling of turbidity and suspended sediment is coupled with measurement of stream discharge, a statistical relationship can be developed between sediment load and flow. This allows researchers to compare the sediment loads of different streams; to relate water quality to the natural sensitivity to disturbance of a stream's watershed and to the level of disturbance in the watershed; and to monitor changes over time that may be attributable to new disturbances or to watershed restoration efforts.

4 Other components of a stream's sediment load are bedload and washload.



Note: Estimated flow duration curves for the nine Coast Dairies stream monitoring stations. The values on the x-axis have been converted from exceedence probability to the number of days during a *theoretical* ten year period that the indicated discharge is equaled or exceeded.

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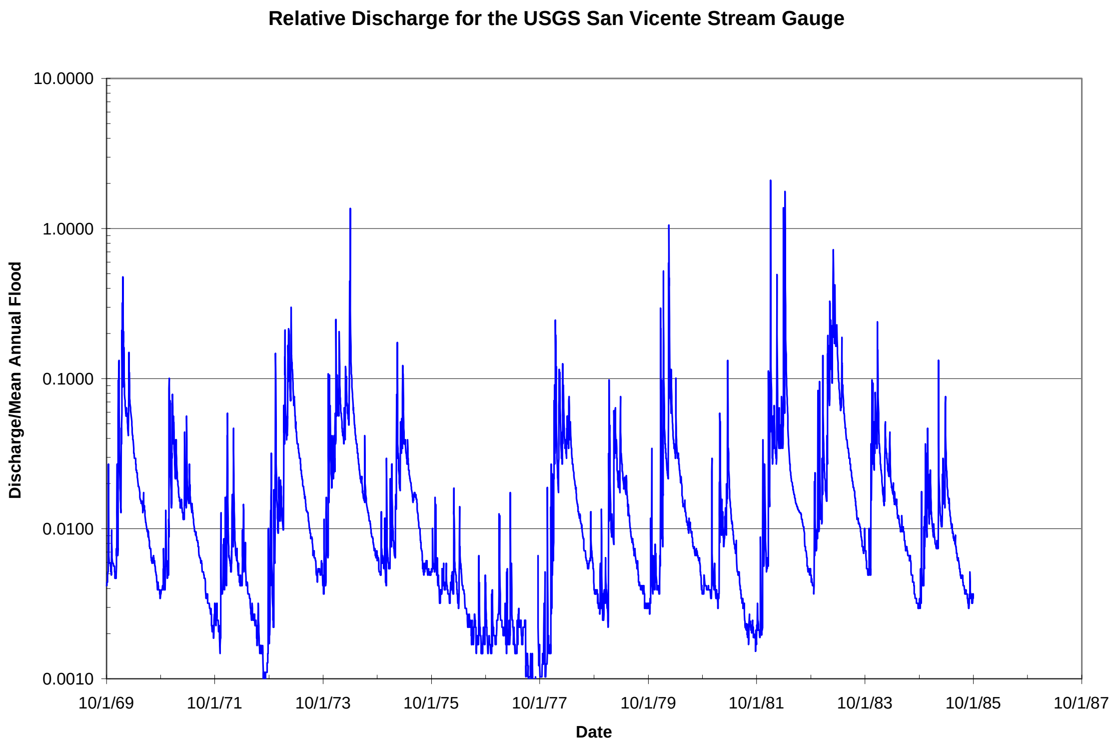
Figure 4.1-10
Estimated Flow Duration Curves
(Expressed as Number of Days in a 10 Year Period)
for the Nine Coast Dairies Stream Monitoring Stations

The Planning Team took turbidity and suspended sediment grab samples on a monthly basis between fall of 2000 and spring of 2001, and during several storm events during the winter of 2000-2001. If Planning Team members did not measure discharge at the time samples were collected, they instead measured the height of the water on the staff gauge (stage), which was later used to estimate the discharge. The turbidity readings (turbidity is measured in units of NTU, a measurement of the scattering of light) were made in the field with a portable Hach turbidity meter. A total of 81 turbidity measurements were made at the nine stream monitoring stations. The suspended sediment samples were sent to a laboratory for analysis. The procedure to determine the concentration of the suspended sediment had a no-detect limit of 5 milligrams per liter. A total of 66 suspended sediment samples were collected at the nine stations. However, 33 of the suspended sediment samples had concentrations below the no-detect limit. Thus, only 33 suspended sediment samples were available for use in linear regression against discharge or turbidity.



Note: The relative discharge is the daily average discharge divided by the mean annual flood. The graph shows the relative discharge for the USGS stream gauge on San Vicente Creek. The mean annual flood for USGS gauge on San Vicente Creek is 407 cfs. The mean annual flood is calculated from the data collected during the 1937-1940, and 1969-1984 water years.

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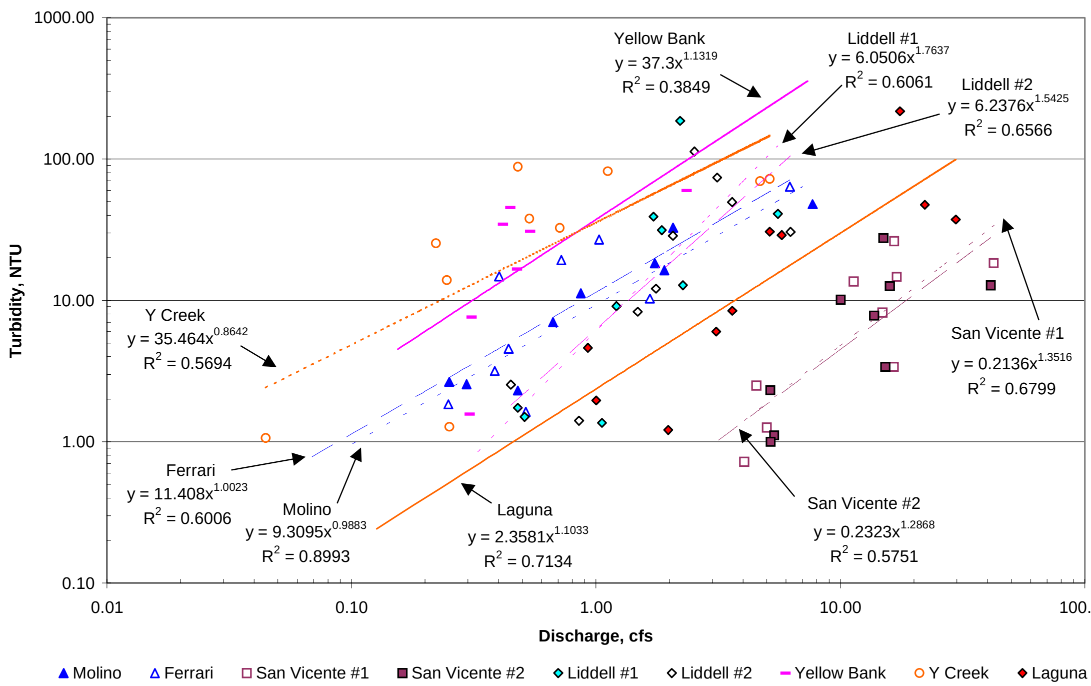
Figure 4.1-11
Relative Discharge for the
USGS Gauging Station at San Vicente Creek

Leopold et al. (1964) note that, "…the rising limb of the hydrograph is characterized by a larger sediment load, a higher velocity, and a smaller depth than the same discharge on the falling limb of the hydrograph." A large number of samples, taken before, during, and after the peaks of flood events, are required to define the true relationship between discharge and suspended sediment. Sediment sampling of the Coast Dairies streams was conducted only over a short period of time, and during a dry winter that never produced a large flood event. Clearly, the data collected for this study are insufficient to determine the true relationship between sediment load and discharge.

A rough guide to the relative magnitude of the sediment load at each of the nine monitoring stations can, however, be made with the data that were collected. While there were not enough suspended sediment samples to develop relationships between this parameter and discharge, turbidity itself is a good indicator of total sediment load, and a sufficient number of samples were taken to develop a reasonably accurate correlation of turbidity with discharge. Figure 4.1-12 shows the relationship between turbidity and discharge for each monitoring station. Six of the relationships are based on 9 observations. Seven turbidity samples were collected for Yellow Bank Creek. Ten turbidity measurements were made for Laguna Creek and Y Creek.

Turbidity vs Discharge for the 9 Coast Dairies Stream Monitoring Stations



Note: The turbidity versus discharge relationship for the nine Coast Dairies stream monitoring stations. Six of the relationships are based on 9 observations. Seven turbidity samples were collected for Yellow Bank Creek. Ten turbidity measurements were made for Laguna Creek and Y Creek.

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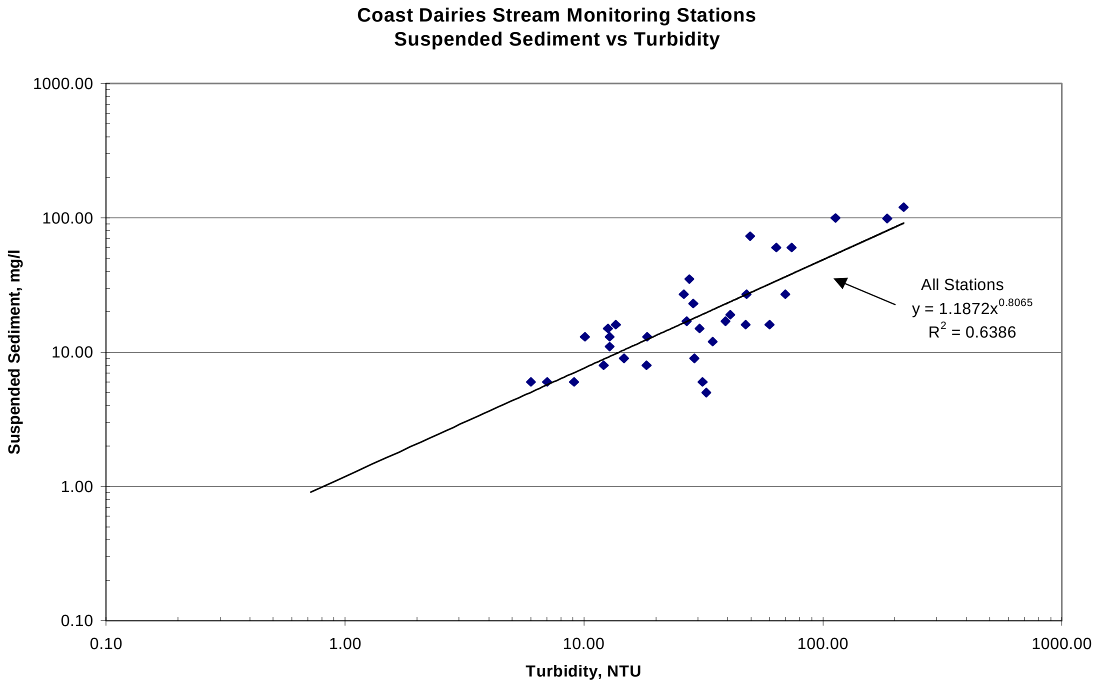
Figure 4.1-12
Turbidity Versus Discharge Relationship for the Nine Coast Dairies Stream Monitoring Stations

In addition, it was possible with the data collected to develop a regional relationship between suspended sediment and turbidity, based on the aggregated data collected at all of the monitoring stations (Figure 4.1-13) Turbidity explains about 64 percent of the variation in the suspended sediment value for the 33 available observations.[5] In other words, there is a fairly strong statistical

5 By comparison, the composite relationship for suspended sediment versus discharge explained only about 6% of the observed variation in suspended sediment values. This poor relationship is due to the limited number of suspended sediment samples that were above the no-detect limit.

correlation in the Coast Dairies streams between high turbidity levels and high suspended sediment levels.



Note: A relationship between suspended sediment and turbidity was developed from the data collected at all of the monitoring stations. Turbidity explains about 64 percent of the variation in the suspended sediment value for the 33 available observations. The composite relationship for suspended sediment versus discharge explained about 6 percent of the observed variation in suspended sediment values.

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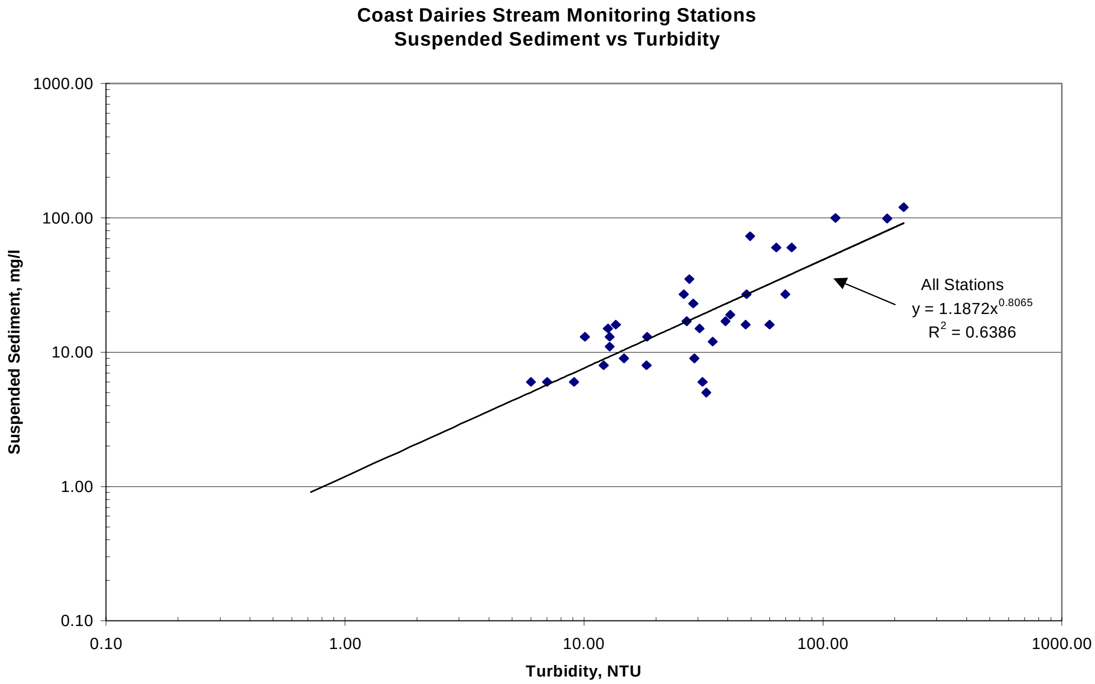
Figure 4.1-13
Relationship Between Suspended Sediment and Turbidity for Coast Dairies Streams

4.1.3 DISCUSSION OF THE NINE MONITORING STATIONS

In the fall of 2000, the Planning Team established nine stream monitoring stations on the Property (Figure 4.1-5). Two stations were established on each of San Vicente Creek, Liddell Creek and Laguna Creek, and one station was established on each of Molino Creek, Ferrari Creek, and Yellow Bank Creek.

Planning Team members collected water quality, discharge, and topographic survey information at each monitoring station beginning in October, 2000. The Planning Team will continue to collect water quality and discharge information through the summer of 2001. During the winter, Planning Team members collected water quality and discharge information during several storm correlation in the Coast Dairies streams between high turbidity levels and high suspended sediment levels.



Note: A relationship between suspended sediment and turbidity was developed from the data collected at all of the monitoring stations. Turbidity explains about 64 percent of the variation in the suspended sediment value for the 33 available observations. The composite relationship for suspended sediment versus discharge explained about 6 percent of the observed variation in suspended sediment values.

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Figure 4.1-13
Relationship Between Suspended Sediment and Turbidity for Coast Dairies Streams

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Planning Team members collected water quality, discharge, and topographic survey information at each monitoring station beginning in October, 2000. The Planning Team will continue to collect water quality and discharge information through the summer of 2001. During the winter, Planning Team members collected water quality and discharge information during several storm events. It should be noted, however, that the winter of 2000-2001 was exceptionally mild, with no large storm events.

In this section, information is presented for each of the nine stations, including a general description of the station and its watershed; the relationship between stage (water depth) and discharge that was used to develop a rating curve for the station; findings of the investigation of bankfull discharge; the results of the turbidity and suspended sediment sampling; and the statistical relationships between turbidity, suspended sediment, and discharge. Some of this information is summarized in Table 4.1-7. In addition, for each of the nine stations, graphs representing cross section and longitudinal profile are shown.

TABLE 4.1-7
SUMMARY OF DATA FROM NINE MONITORING STATIONS

Monitoring Station	Watershed Area square miles	Elevation feet	Estimated Bankfull Discharge cfs	Bankfull Water Surface Slope	Estimated Bankfull Width feet	Length of Channel Surveyed feet
Molino Creek	1.50	70	32	0.0103	9.3	150
Ferrari Creek	1.28	80	37	0.0259	11.1	106
Lower San Vicente #1	10.49	50	252	0.0129	24.3	224
Upper San Vicente #2	9.89	150	223	0.0189	22.2	309
Liddell #1 West	1.29	40	39	0.0133	7.9	80
Liddell #2 Main	1.90	50	47	0.0159	12.9	160
Laguna	7.60	20	239	0.0068	23.9	242
Y Creek	0.79	320	25	0.0166	6.3	69
Yellow Bank	0.62	160	19	0.0223	8.8	114

Note: The nine monitoring stations are located on six streams. Y Creek, a tributary of Laguna Creek, incised this winter. The slope given for Y Creek is the pre-incision slope.

4.1.3.1 MOLINO CREEK

For a general description of run-of-the-stream conditions, see Section 3.3.

The monitoring station for Molino Creek is located about 200 feet upstream of Swanton Road. There is a reservoir upstream of the monitoring station approximately 2,300 feet. The dam for the reservoir partially failed during February of 2000. The reservoir gates were kept open during the winter of 2000-2001 when the streamflow was monitored, so the reservoir probably did not affect the discharge of Molino Creek at the monitoring station during the study period.

About 84 percent of the 1.5 square mile watershed above the Molino Creek monitoring station is underlain by the Santa Cruz Mudstone formation (see Figure 4.2-2 in the next Section of this report). The Santa Margarita Sandstone underlies about 7 percent of the watershed. The outcrop of the Santa Margarita Sandstone lies along the upper 5,000 feet of Molino Creek. However, there is a ribbon of quartz diorite rock along the stream channel that is about 2,000 feet long and within the sandstone outcrop. The Santa Margarita Sandstone is very erosive if disturbed. Exposures of the sandstone in the creek have the potential to provide sediment directly to the creek. The highest point in the watershed is 1,690 feet (Figure 4.1-1). Eighty-five percent of the watershed lies below 1,030 feet in elevation.

The channel was surveyed on December 4, 2000. The elevation of the monitoring station is about 70 feet. The staff gauge is located in a deep pool, and the cross section is about 25 feet downstream of the staff gauge at an old road crossing, which does not appear to have been used recently. The channel below the riffle crest was filled with an aquatic weed, as was the riffle above the gauging pool. There is a large slide on the west bank that extends from the old highway to well past the monitoring station. The cross section and longitudinal profile are shown in Figure 4.1-14.

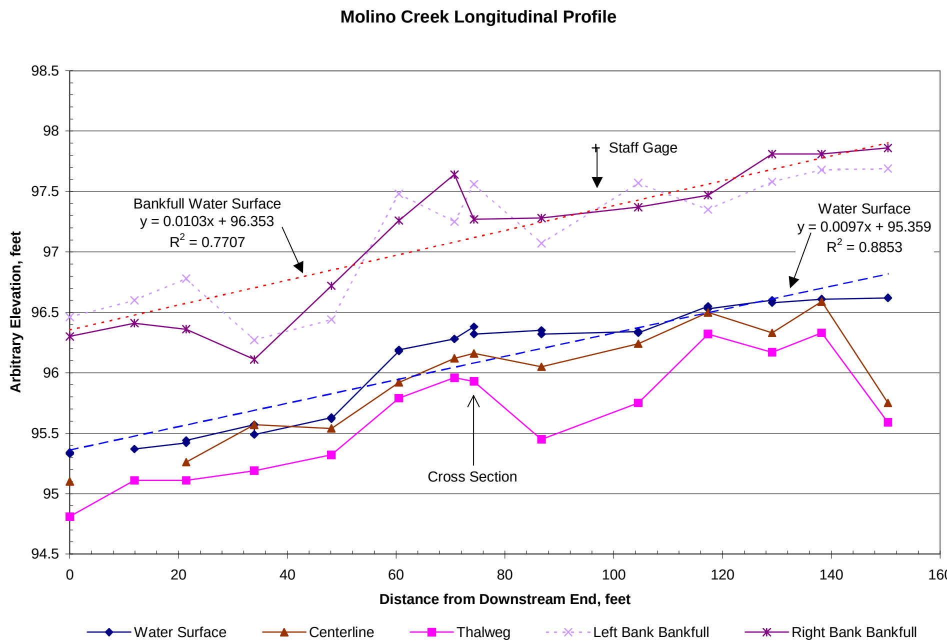
Stage-Discharge Relationship

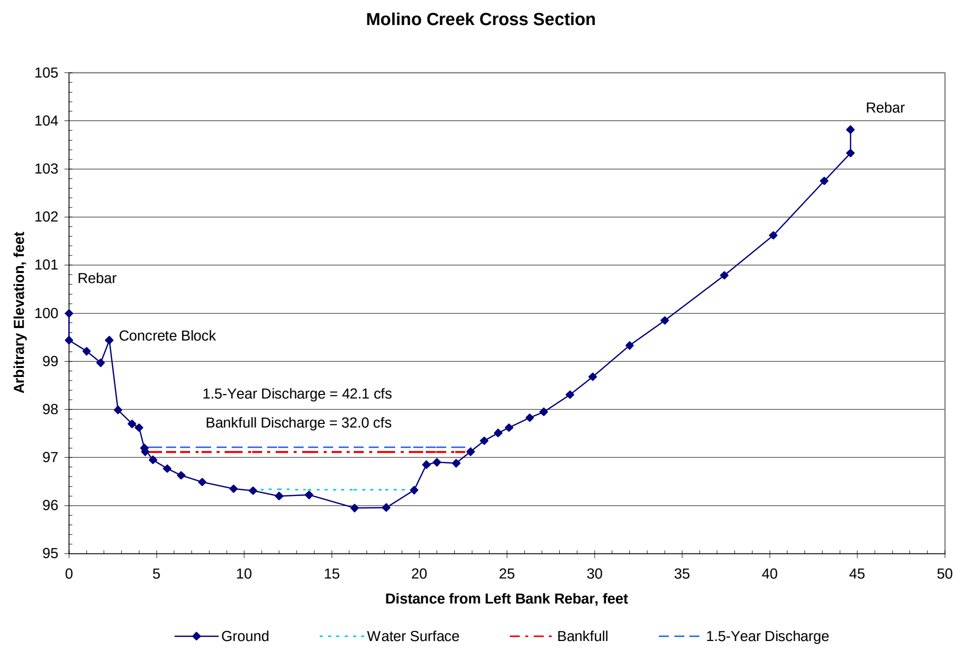
A total of four discharge measurements were made ranging from about 0.7 cfs to about 7.7 cfs. This corresponds to a range of 1.7 - 18.3 percent of the estimated 1.5-year discharge for the station. The discharge rating was determined to be:

$$\text{Discharge} = 0.8446(\text{Gauge Height})^{5.7572} \qquad R2 = 0.9992$$

Bankfull Discharge

The level of bankfull, determined by the regression on all of the indicators within the surveyed reached, gave an estimate of 32.0 cfs for the bankfull discharge with a velocity of 3.2 feet per second. The bankfull indicator on the right-bank gave a bankfull discharge of 62.2 cfs with a velocity of 4.9 feet per second. Both of these values are within the confidence band of the predicted 1.5-year discharge. The bankfull indicator on the left-bank gave a bankfull discharge of 124 cfs with a velocity of 7.5 feet per second, which was considered too high to represent bankfull. The velocity of the bankfull discharge from the regression procedure is below the expected range of about 4 to 6 feet per second. Therefore, the average of the stage of the right-bank indicators and the stage from the regression procedure was adopted as the bankfull level, yielding a bankfull discharge of 45.0 cfs with a velocity of 4.0 feet per second.





Note: The upper graph shows the longitudinal profile for Molino Creek. The lower graph shows Molino Creek in cross section.

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Figure 4.1-14
Longitudinal Profile and Cross Section for Molino Creek Monitoring Station

Turbidity and Suspended Sediment

Nine turbidity measurements were made (N=9), three of them at the same time that discharge measurements were made. The discharge for the other six turbidity measurements was estimated from the stage. Measured turbidity ranged from 2.3 NTU to 47.9 NTU. The following turbidity-discharge relationship was found by regression.

$$\text{Turbidity} = 9.3095(\text{Discharge})^{0.9883} \qquad R^2 = 0.8993 \qquad N = 9$$

Six suspended sediment measurements were made but three of them were found to be below the no-detect limit. The three suspended sediment samples with values greater than the 5 mg/l no-detect limit were used to estimate the relationship between suspended sediment and discharge.

$$\text{Suspended Sediment} = 6.8669(\text{Discharge})^{-0.6328} \qquad R^2 = 0.9529 \qquad N = 3$$

The R^2 value of 0.9529 indicates that the three measurements show a strong relationship between suspended sediment and discharge, but the high R^2 value is the result of the very small sample size.

Three paired measurements of suspended sediment and turbidity were available. A regression of suspended sediment versus turbidity gave the following equation.

$$\text{Suspended Sediment} = 1.1165(\text{Turbidity})^{0.7836} \qquad R^2 = 0.888$$

The R^2 value of 0.888 shows that turbidity explains about 89 percent of the variation in the suspended sediment values, in these three measurements. But again, the high R^2 value is affected by the small sample size, and many more samples are needed to define the relationship adequately.

4.1.3.2 FERRARI CREEK

Ferrari Creek is a local name for a the creek that drains to the east of Davenport Landing. For a general description of run-of-the-stream conditions, see Section 3.3.

The monitoring station on Ferrari Creek is in a pasture adjacent to a cattle-feeding area, about 150 feet upstream of Cement Plant Road. The cattle have free access to the creek near the monitoring station. The creek flows over several bedrock outcrops in the pasture upstream of the monitoring station.

The watershed area above the monitoring station is 1.28 square miles. The highest elevation in the watershed is about 1,200 feet. Eighty-five percent of the watershed has an elevation of less than 880 feet. About 23 percent of the Ferrari Creek watershed has slopes steeper than 20 percent (Figure 4.1-15). By this measure, Ferrari Creek has the steepest of all the watersheds. About 42 percent of the watershed is in the 0-10 percent slope class.

Approximately 90 percent of the watershed above the monitoring station is underlain by Santa Cruz Mudstone formation, a rock type with a low density that is relatively easily moved by flood flows. No Santa Margarita Sandstone is shown on the geology map above the Ferrari Creek monitoring station.

The channel was surveyed on December 4, 2000. The monitoring station has an elevation of about 80 feet. The staff gauge is in a shallow pool. The cross section is about 8 feet downstream of the staff gauge. The channel below the riffle crest narrows as it flows over a bedrock outcrop. The cross section and longitudinal profile are shown in Figure 4.1-16.

Stage-Discharge Relationship

A total of four discharge measurements were made ranging from about 0.37 cfs to about 6.2 cfs. This corresponds to a range of 1.1 - 16.9 percent of the estimated 1.5-year discharge for the station. The discharge rating was determined to be:

$$\text{Discharge} = 2.9591(\text{Gauge Height})^{3.8792} \qquad \text{R2} = 0.9807$$

Bankfull Discharge

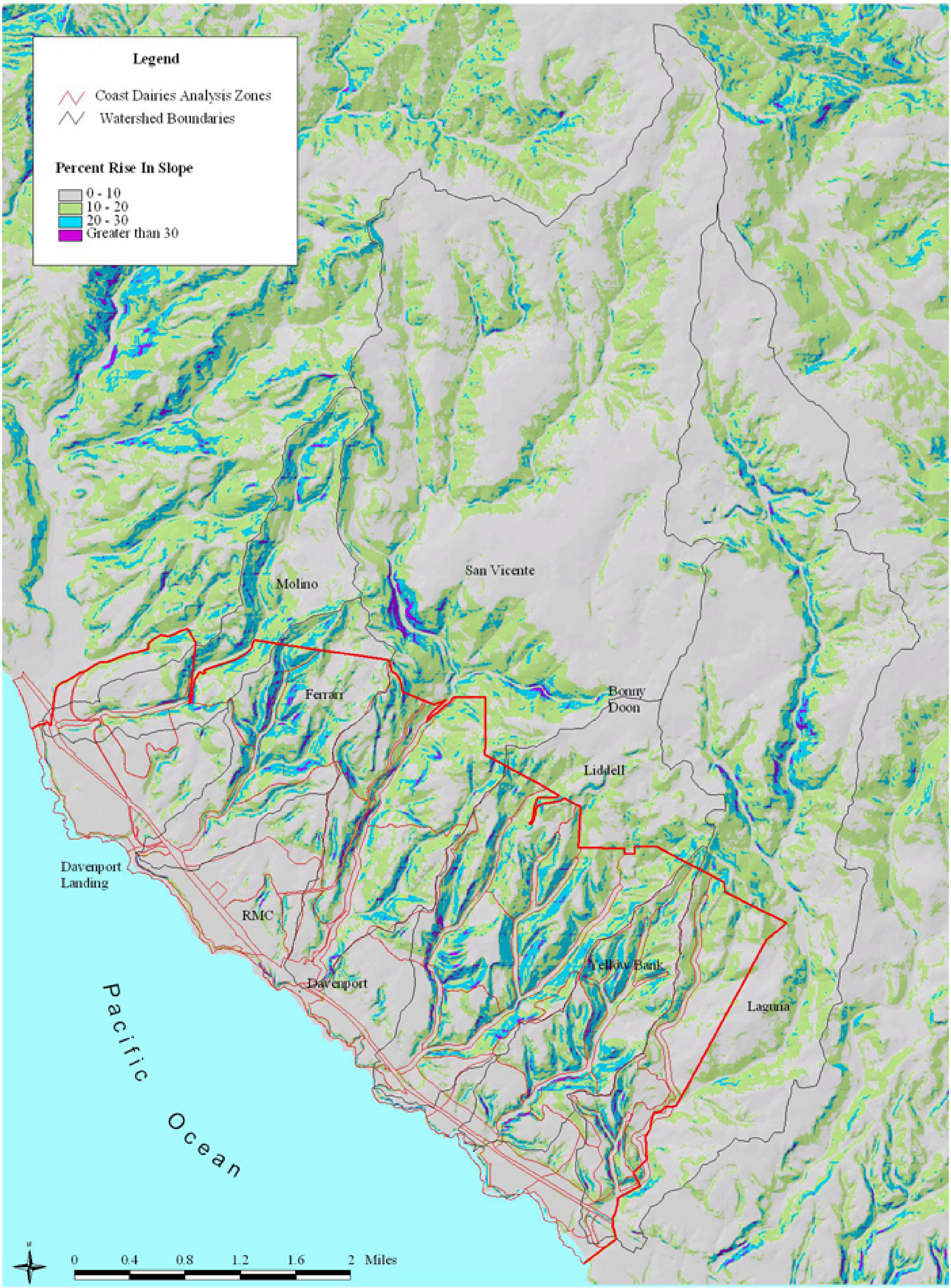
Only the regression of all bankfull indicators gave an estimate of the bankfull discharge that was within the confidence band around the estimate of the 1.5-year discharge. The estimate of bankfull discharge derived from the bankfull indicators at the cross section were below the confidence band for the 1.5-year discharge.

Two factors may have played a role in this outcome. First, numerous hoof-prints from cattle on the banks made it very difficult to identify possible bankfull indicators. The second factor was that the discharge measurements were taken upstream of a constriction. Debris caught in the constriction may have created backwater, which may have effected the velocity of the highest measured discharge. In light of these factors, the estimated 1.5-year discharge was adopted as the bankfull discharge.

Turbidity and Suspended Sediment

Nine turbidity measurements were made; three at the same time that discharge measurements were made. The discharge for the other six turbidity measurements was estimated from the stage. Measured turbidity ranged from 1.6 NTU to 63.8 NTU. The following turbidity-discharge relationship was found by regression:

$$\text{Turbidity} = 11.408(\text{Discharge})^{1.0023} \qquad R^2 = 0.6006$$



SOURCE: Environmental Science Associates, Pacific Meridian Resources, USGS

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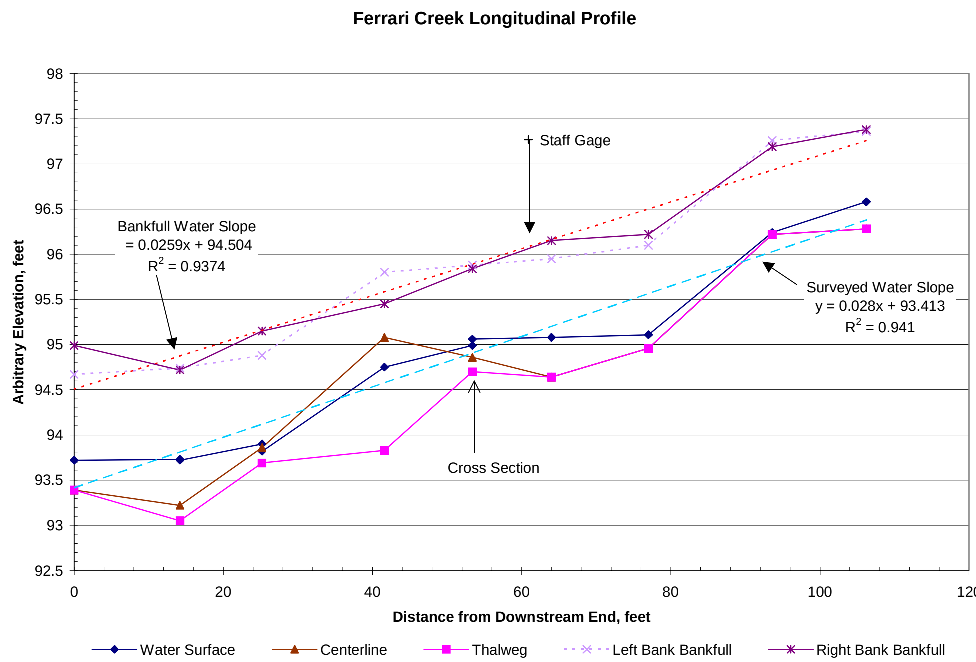
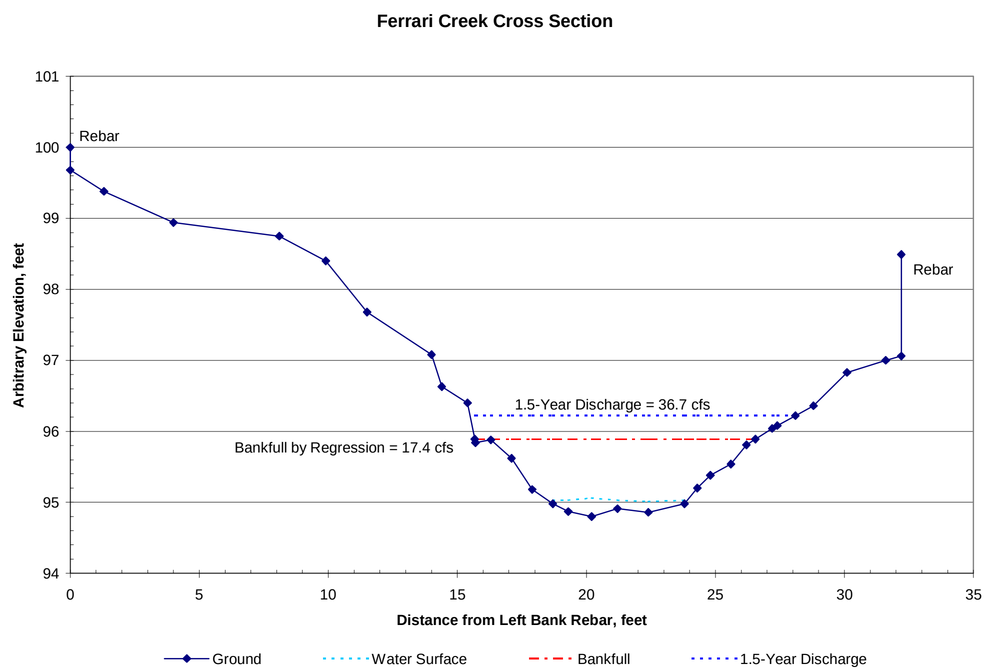
Figure 4.1-15

Slope Classifications of the Coast Dairies Area





Note: The upper graph shows the longitudinal profile for Ferrari Creek. The lower graph is a cross section.

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Figure 4.1-16
Longitudinal Profile and Cross Section for
Ferrari Creek Monitoring Station

Six suspended sediment measurements were made but four of them were found to be below the no-detect limit. Since only two suspended sediment samples had values greater than the no-detect limit, the relationship between suspended sediment and discharge and between suspended sediment and turbidity should not be used. The relationships are shown here only for completeness.

$$\text{Suspended Sediment} = 16.66(\text{Discharge})^{-0.7014} \qquad R^2 = 1 \quad N = 2$$

The R^2 value of 1 is an artifact of having only two measurements and can not be interpreted as showing a strong relationship between suspended sediment and discharge.

Two measurements of suspended sediment and turbidity were available. A regression of suspended sediment versus turbidity gave the following equation.

$$\text{Suspended Sediment} = 0.1389(\text{Turbidity})^{1.4603} \qquad R^2 = 1 \quad N = 2$$

Again, the R^2 value of 1 is an artifact of having only two measurements and can not be interpreted as showing a strong relationship between suspended sediment and discharge.

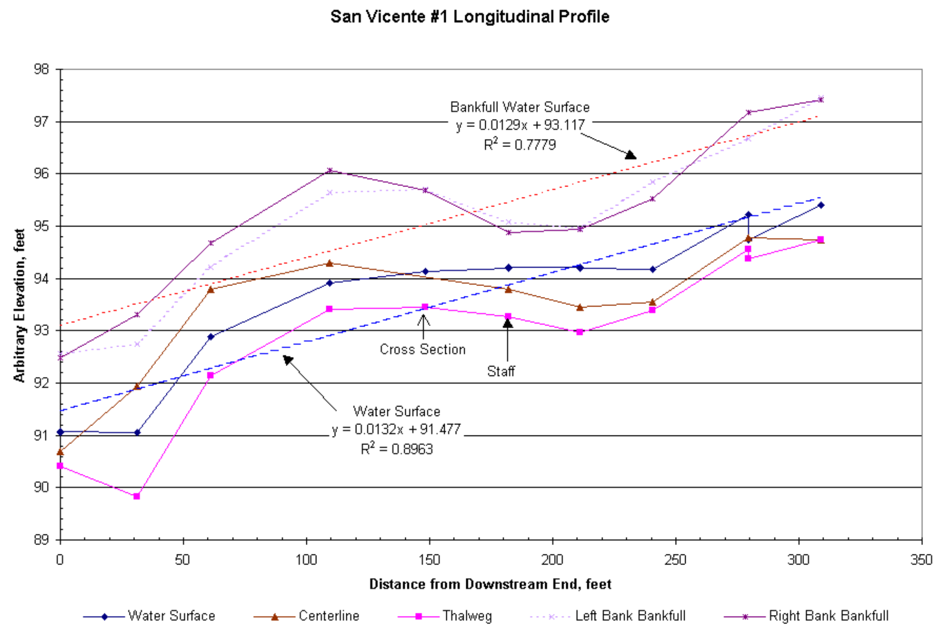
4.1.3.3 SAN VICENTE CREEK

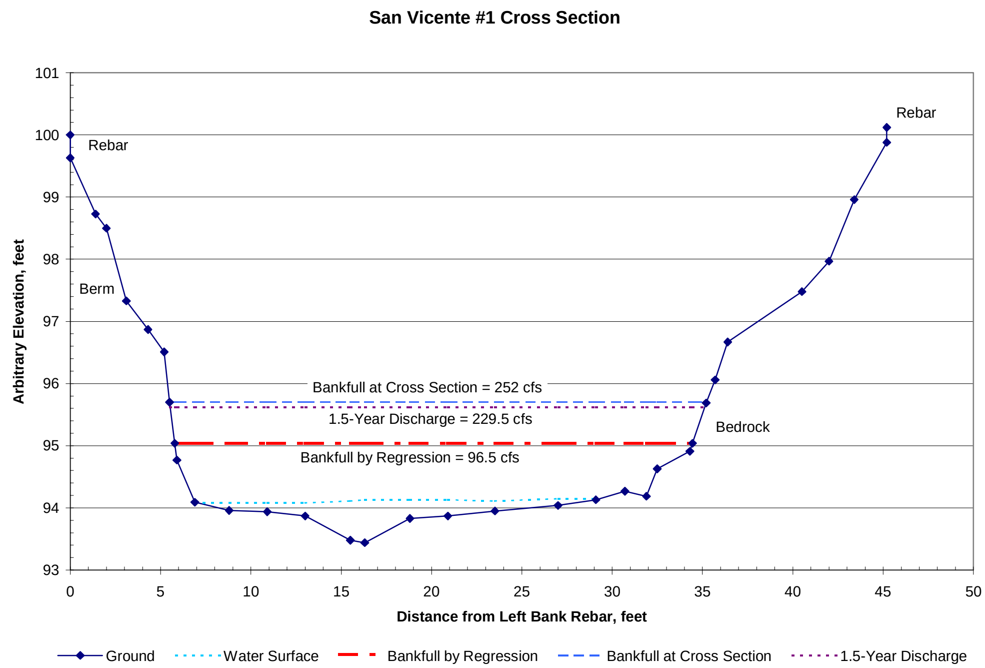
For a general description of run-of-the-stream conditions, see Section 3.3.

San Vicente #1 (Lower)

The monitoring station on lower San Vicente Creek was located about 4,200 feet from the mouth of the creek in a reach of the creek adjacent to San Vicente Road. The channel was surveyed on December 5, 2000. The staff gauge was located in a large pool. A bedrock outcrop forms the west (right) bank of the gauging pool. The east bank of the channel at the cross section is a berm. The berm separates the channel from the site of an abandoned diversion facility. The cross section is about 34 feet downstream of the staff gauge. The cross section and longitudinal profile are shown in Figure 4.1-17.

The elevation of the monitoring station is about 50 feet. The watershed above the monitoring station covers about 10.49 square miles, with a maximum elevation of about 2,642 feet. Eighty-five percent of the watershed has an elevation of less than 1,960 feet. About 64 percent of the watershed is in the 0-10 percent slope class. Only about 5 percent of the watershed has slopes in excess of 20 percent.





Note: The upper graph shows the longitudinal profile for San Vicente Creek station #1. The lower graph shows San Vicente Creek in cross section at station #1.

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Figure 4.1-17
Longitudinal Profile and Cross Section for San Vicente Creek Monitoring Station #1

Approximately 61 percent of the watershed is underlain by quartzdiorite, a dense rock that is similar in chemical composition and appearance to granite. Only about 10 percent of the watershed is underlain by the Santa Cruz Mudstone. Therefore, most of the rocks transported by San Vicente Creek will have a density of close to that of solid rock. Consequently, eggs laid by salmonids will be less likely be washed away by flood events compared to eggs laid in a stream dominated by mudstone. In general, a watershed dominated by igneous or metamorphic rocks supplies bed material to its streams that are more suitable for salmonids than a watershed dominated by sedimentary rocks. About 23 percent of the watershed is covered by the Santa Margarita sandstone. However, most of the sandstone is located in the upper watershed on slopes less than 10 percent. The low slope of the Santa Margarita sandstone helps minimize its susceptibility to erosion.

The conveyor belt from the quarry to the cement plant crosses San Vicente Creek about 1,600 feet upstream of the monitoring station. Cows were frequently seen between the monitoring station and the conveyor belt. The cows have free access to the creek. A bridge spans the creek about 2,800 feet upstream of the monitoring station. There is a heavy vehicle stream crossing just downstream of the bridge. There is a staff gauge on the bridge and the remnant of a flow measurement weir at the bridge.

Continuous large slide complexes cover both sides of the San Vicente canyon above the bridge. The road that parallels the creek cuts across these slides.

Stage-Discharge Relationship

A total of four discharge measurements were made ranging from about 11 cfs to about 42 cfs. This corresponds to a range of 5 - 18 percent of the estimated 1.5-year discharge for the station. The discharge rating was determined to be:

$$\text{Discharge} = 2.3399\,(\text{Gauge Height})^{4.0955} \qquad R2 = 0.9997 \qquad N = 9$$

Bankfull Discharge

The extensive bedrock outcrop at the gauging pool made identifying bankfull indicators difficult. There was a good set of bankfull indicators at the cross section. The bankfull indicators at the cross section gave an estimate of about 252 cfs for the bankfull discharge. The bankfull level from the regression of all indicators gave an estimate of 96.5 cfs, which is less than the lower limit of the confidence band of the 1.5-year discharge. Thus, 252 cfs was adopted as the bankfull discharge.

Turbidity and Suspended Sediment

Nine turbidity measurements were made, three of them at the same time that discharge measurements were made. The discharge for the other six turbidity measurements was estimated from the stage. Measured turbidity ranged from 0.72 NTU to 26.2 NTU. The following turbidity-discharge relationship was found by regression.

$$\text{Turbidity} = 0.2136(\text{Discharge})^{1..3516} \qquad R^2 = 0.6799 \qquad N = 4$$

For these nine samples, discharge explains about 68 percent of the variation in the turbidity readings.
Nine suspended sediment measurements were made but five of them were found to be below the no-detect limit. The four suspended sediment samples with values greater than the 5 mg/l no-detect limit were used to estimate the relationship between suspended sediment and discharge.

$$\text{Suspended Sediment} = 25.648(\text{Discharge})^{-0.1817} \qquad R^2 = 0.0491 \qquad N = 4$$

The R^2 value of 0.0491 indicates that the four measurements show no relationship between suspended sediment and discharge. Typically, the relationship between suspended sediment and discharge on the rising limb of the hydrograph is different from the relationship on the falling limb. Since the Planning Team did not attempt to collect information regarding the point on the hydrograph at which samples were take, it is reasonable that no relationship was not observed.

Four paired measurements of suspended sediment and turbidity were available. A regression of suspended sediment versus turbidity gave the following equation.

$$\text{Suspended Sediment} = 0.5247(\text{Turbidity})^{1.1685} \qquad R^2 = 0.5607 \qquad N = 4$$

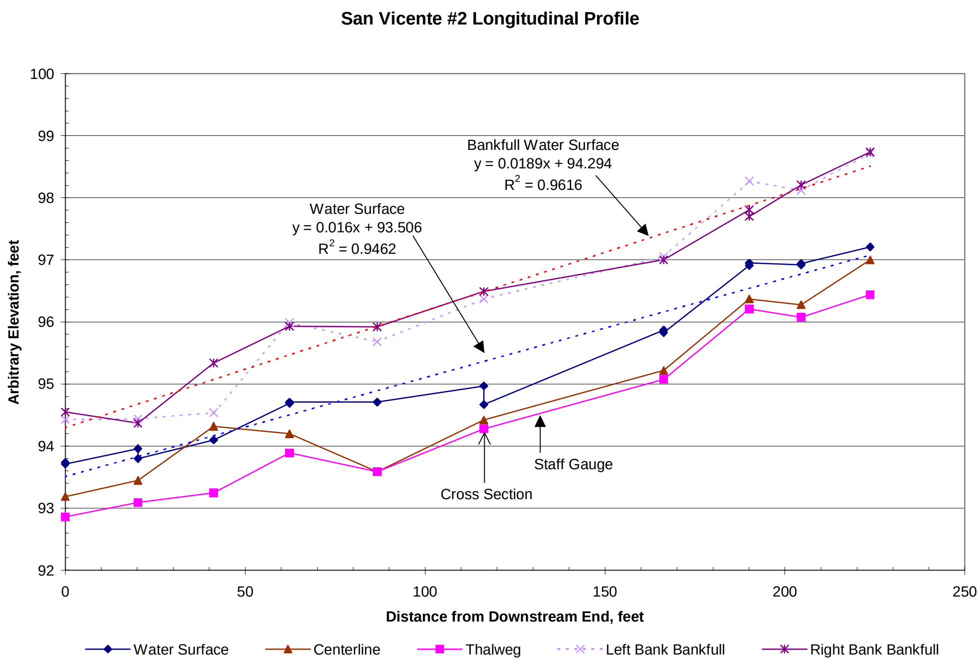
The R^2 value of 0.5607 shows that turbidity explains about 56 percent of the variation in the suspended sediment values, in these four measurements.

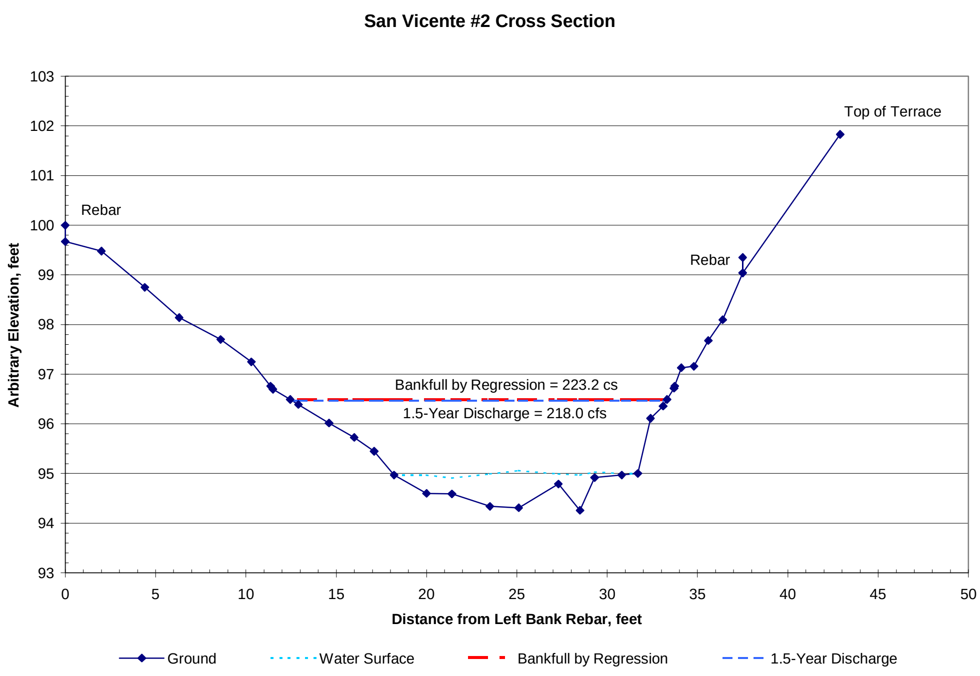
San Vicente #2 (Upper)

The upper monitoring station on San Vicente Creek was located about one mile upstream from the lower monitoring station, in the reach of creek adjacent to Upper San Vicente Road. The channel was surveyed on December 4, 2000. The staff gauge was located in a large pool. A group of alders and an undercut bank form the left edge of the gauging pool. The streambed is covered with granite boulders and large cobble. There is a deposit of sand on the bottom of the gauging pool. The cross section and longitudinal profile are shown in Figure 4.1-18.

The elevation of the monitoring station is about 145 feet. The watershed above the monitoring station covers about 9.89 square miles, with the highest elevation at about 2,642 feet. Eighty-five percent of the watershed has an elevation of less than 1,990 feet. About 65 percent of the watershed is in the 0-10 percent slope class; only about 5 percent has slopes in excess of 20 percent.

Approximately 65 percent of the watershed is underlain by quartzdiorite. Only about 5 percent of the watershed is underlain by the Santa Cruz Mudstone. Therefore, most of the rocks transported by San Vicente Creek will have a density of close to that of granite. About 25 percent of the watershed is covered by the Santa Margarita sandstone. However, most of the sandstone is located in the upper watershed on slopes less than 10 percent. The low slope of the Santa Margarita sandstone helps minimize its susceptibility to erosion.





Note: The upper graph shows the longitudinal profile for San Vicente Creek at station #2. The lower graph shows San Vicente Creek in cross section at station #2.

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Figure 4.1-18
Longitudinal Profile and Cross Section for
San Vicente Creek Monitoring Station #2

Stage-Discharge Relationship

A total of four discharge measurements were made ranging from about 10 cfs to about 41 cfs. This corresponds to a range of 5 - 19 percent of the estimated 1.5-year discharge for the station. Three of the discharge measurements were made in the tail-out of the gauging pool, just upstream of the cross section. The largest discharge was measured downstream on the riffle because a large portion of the flow was concentrated on the right-bank of the section where the other measurements were made.

The discharge rating based only on the discharge measurements appeared to underestimate the bankfull discharge. Therefore, the discharge rating was constrained by the cross section geometry from the survey. The discharge rating was determined to be:

$$\text{Discharge} = 2.7651\ (\text{Gauge Height})^{4.3099} \qquad R2 = 0.9997.$$

Bankfull Discharge

Both the regression of bankfull-indicators and the bankfull-indicators at the cross section give estimates of the bankfull discharge within the confidence band for the estimate of the 1.5-year discharge. The bankfull discharge based on the regression of all the bankfull indicators was the closest to the estimate for the 1.5-year discharge. Therefore, 223 cfs was adopted as the bankfull discharge.

Turbidity and Suspended Sediment

Nine turbidity measurements were made, three at the time that discharge measurements were made. The discharge for the other six turbidity measurements was estimated from the stage. Measured turbidity ranged from 1 NTU to 27.6 NTU. The following turbidity-discharge relationship was found by regression.

$$\text{Turbidity} = 0.2323(\text{Discharge})^{1..2868} \qquad R^2 = 0.5751 \qquad N = 9$$

For these nine samples, discharge explains about 58 percent of the variation in the turbidity readings.
Nine suspended sediment measurements were made but five of them were found to be below the no-detect limit. The four suspended sediment samples with values greater than the 5 mg/l no-detect limit were used to estimate the relationship between suspended sediment and discharge.

$$\text{Suspended Sediment} = 28.073(\text{Discharge})^{-0.1692} \qquad R^2 = 0.0453 \qquad N = 4$$

The R^2 value of 0.0453 indicates that the four measurements show no relationship between suspended sediment and discharge.

Four paired measurements of suspended sediment and turbidity were available. A regression of suspended sediment versus turbidity gave the following equation.

$$\text{Suspended Sediment} = 1.021(\text{Turbidity})^{1.0557} \qquad R^2 = 0.9508 \qquad N = 4$$

The R^2 value of 0.9508 shows that turbidity explains about 95 percent of the variation in the suspended sediment values in these four measurements.

4.1.3.4 LIDDELL CREEK

For a general description of run-of-the-stream conditions, see Section 3.3.

Liddell #1 (West Liddell Creek)

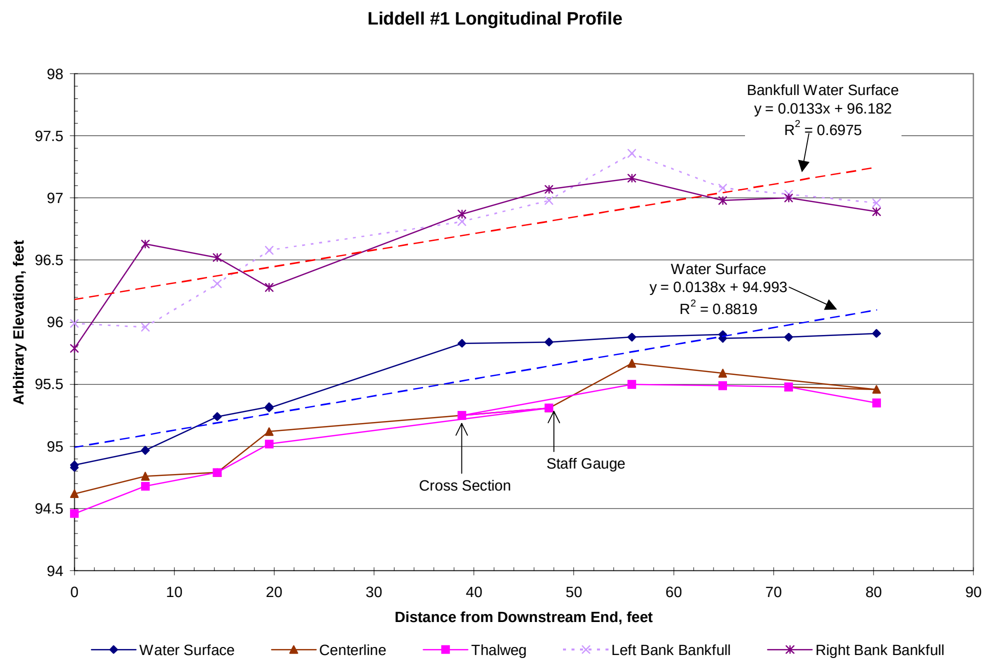
The Liddell #1 monitoring station is on West Liddell Creek, about 190 feet upstream of its confluence with Liddell Creek. The road that parallels Liddell Creek crosses West Liddell at the monitoring station. The start of the surveyed section is about 20 feet downstream of the bridge, ant the staff gauge is about 17 feet upstream of the bridge; the cross section is about midway between the bridge and the staff gauge. The cross section and longitudinal profile are shown in Figure 4.1-19. The channel was surveyed on December 5, 2000. The elevation of the monitoring station is about 40 feet.

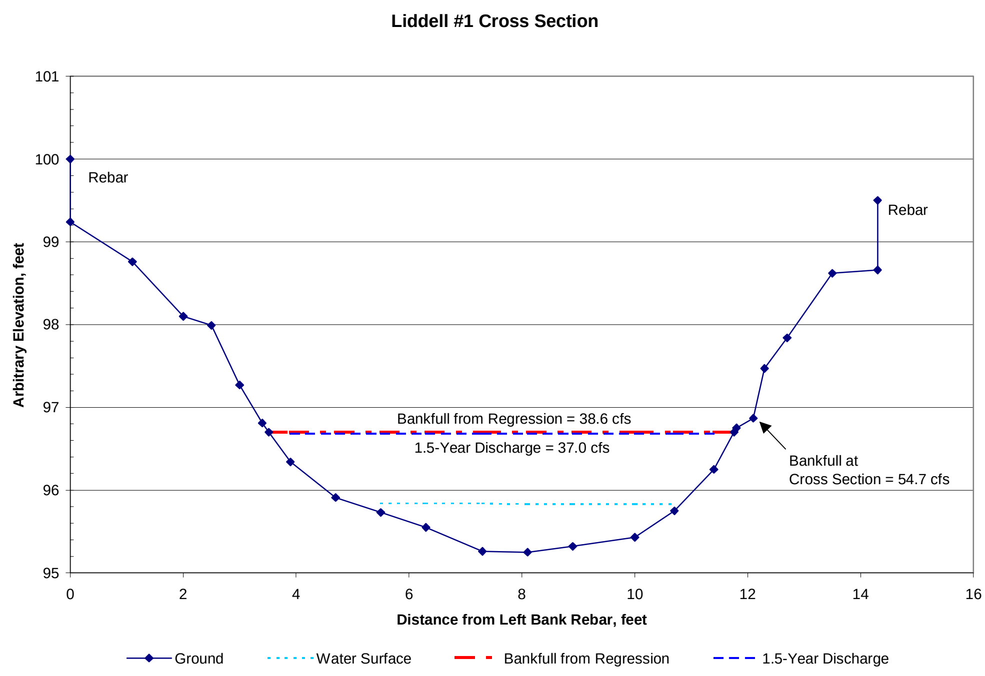
The banks of the stream are made of fine-grained material. The bed of the stream is covered by cobbles (2.5" to 10" in diameter) and a few small boulders (>10" in diameter).

The watershed area above the monitoring station encompasses about 1.29 square miles. The highest point in the watershed has an elevation of about 1,300 feet. Eight-five percent of the watershed has an elevation less than 660 feet. About 48 percent of the watershed is in the 0-10 percent slope class. Slightly more than 18 percent of the watershed has slopes greater than 20 percent.

The Santa Cruz Mudstone formation underlies about 58 percent of the watershed, and quartz diorite about 16 percent. The bed material in West Liddell Creek can therefore be expected be a mixture of normal rocks derived from the quartz diorite, and density rocks derived from the Santa Cruz Mudstone.

The Santa Margarita Sandstone formation covers about 14 percent of the watershed. Most of the sandstone is on the top of the ridge and is in the 0-10 percent slope class. However, a ribbon of sandstone crosses West Liddell Creek in the vicinity of the conveyor belt. A ribbon of sandstone follows the creek for about 1,600 feet and joins the ribbon that crosses the creek at about the conveyor. The Santa Margarita Sandstone is highly erosive if disturbed, and breaks down quickly into sand. The exposure of sandstone along the creek can be expected to contribute some sand to the stream. However, most of the Santa Margarita is away from the stream on the ridges and has a low slope so may not contribute much sand to the creek.





Note: The upper graph shows the longitudinal profile for Liddell Creek at station #1. The lower graph shows Liddell Creek in cross section at station #1.

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Figure 4.1-19
Longitudinal Profile and Cross Section for
Liddell Creek Monitoring Station #1

The conveyor belt crosses West Liddell Creek about 1.96 miles upstream of the monitoring station. Bonny Doon road parallels West Liddell Creek, and crosses the only large slide complex in the watershed.

Stage-Discharge Relationship

A total of four discharge measurements were made at Liddell #1 monitoring station, ranging from about 1.7 cfs to about 5.5 cfs. This corresponds to a range of 4 - 15 percent of the estimated 1.5-year discharge for the station. The discharge rating was determined to be:

$$\text{Discharge} = 2.4713\ (\text{Gauge Height})^{4.5997} \qquad \text{R2} = 0.9813$$

Bankfull Discharge

Both the regression of bankfull-indicators and the bankfull-indicators at the cross section give estimates of the bankfull discharge within the confidence band for the estimate of the 1.5-year discharge. The bankfull discharge based on the regression of all the bankfull indicators was the closest to the estimate for the 1.5-year discharge. Therefore, 38.8 cfs was adopted as the bankfull discharge.

Turbidity and Suspended Sediment

Nine turbidity samples were taken and analyzed, three at the same time that discharge measurements were made. The discharge for the other six turbidity measurements was estimated from the stage. Measured turbidity ranged from 1.36 NTU to 186 NTU. The following turbidity-discharge relationship was found by regression.

$$\text{Turbidity} = 6.0506(\text{Discharge})^{1.7637} \qquad R^2 = 0.6061 \qquad N = 9$$

For these nine samples, discharge explains about 60 percent of the variation in the turbidity readings.

Nine suspended sediment measurements were made but three of them were found to be below the no-detect limit. The six suspended sediment samples with values greater than the 5 mg/l no-detect limit were used to estimate the relationship between suspended sediment and discharge

$$\text{Suspended Sediment} = 8.9471(\text{Discharge})^{0.6848} \qquad R^2 = 0.1127 \qquad N = 6$$

The R^2 value of 0.1127 indicates that the six measurements show no relationship between suspended sediment and discharge.

Six paired measurements of suspended sediment and turbidity were available. A regression of suspended sediment versus turbidity gave the following equation.

$$\text{Suspended Sediment} = 0.7623(\text{Turbidity})^{0.8642} \qquad R^2 = 0.7768 \qquad N = 6$$

The R^2 value of 0.7768 shows that turbidity explains about 78 percent of the variation in the suspended sediment values, in these six measurements.

Liddell #2 (Liddell Creek)

The monitoring station on Liddell Creek is located about 1,300 feet upstream of the confluence with West Liddell Creek. The channel was surveyed on December 7, 2000. The cross section and longitudinal profile are shown in Figure 4.1-20.

The elevation of the monitoring station is about 57 feet. The highest point in the watershed has an elevation of 1,299 feet. The west flank of Bald Mountain (1,296 feet) is included in the watershed. Eighty-five percent of the watershed has an elevation of less than 1,120 feet. The watershed above the monitoring station has an area of about 1.90 square miles. About 39 percent of the watershed area is in the 0-10 percent slope class, and about 19 percent of the area has slope in excess of 20 percent.

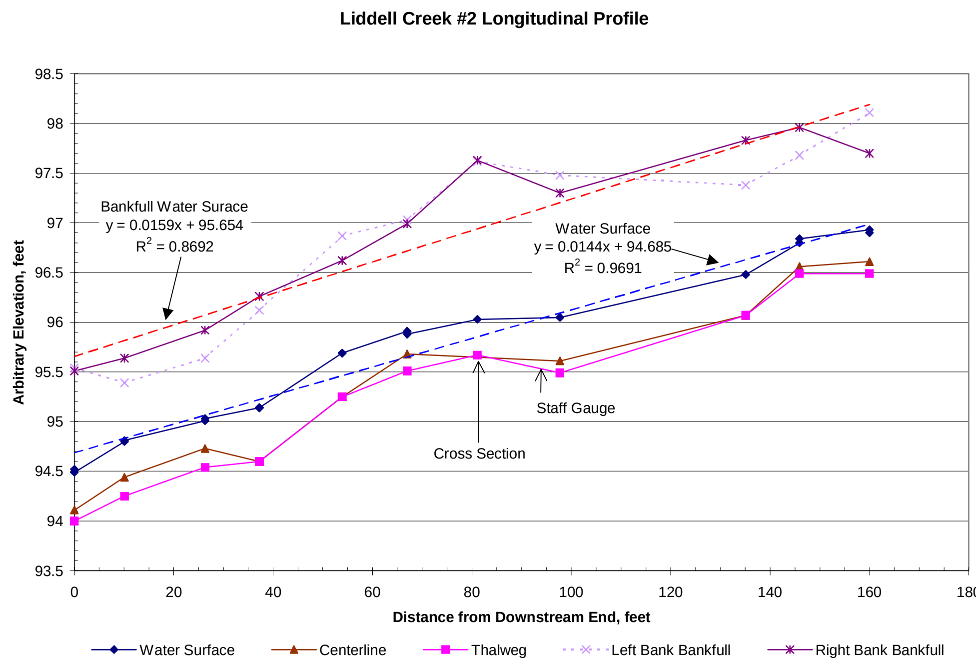
The Santa Cruz Mudstone formation covers about 48 percent of the watershed. The Santa Margarita sandstone covers about 26 percent of the watershed. Outcrops of Marble cover about 11 percent of the watershed, and is mined by RMC Pacific Materials. Quartz diorite covers about 6 percent of the watershed.

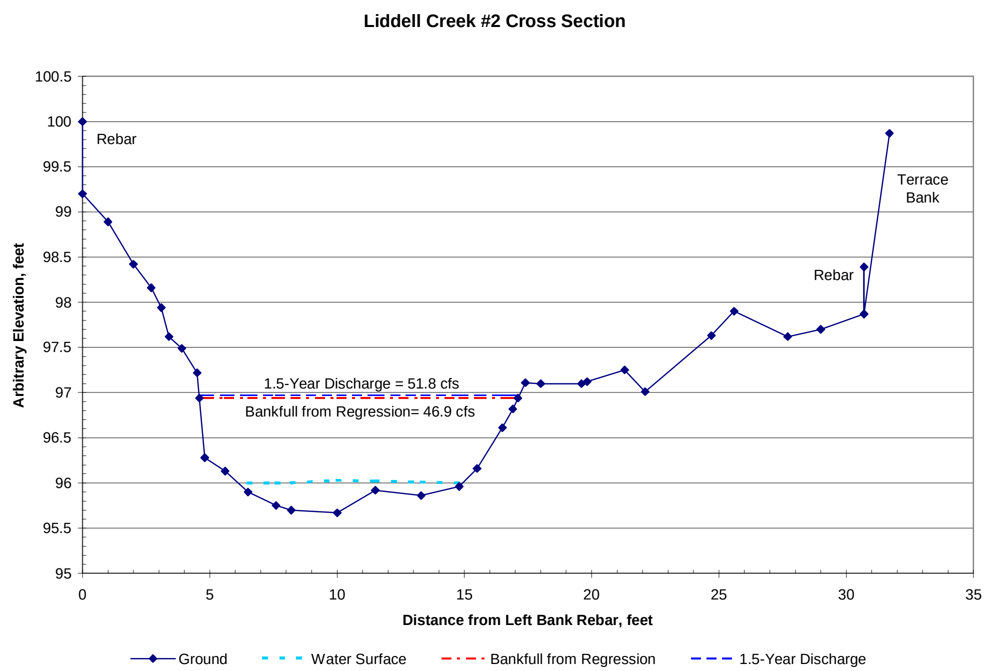
The Santa Margarita sandstone is concentrated in the East Branch of Liddell Creek. The sandstone is located on both sides of the upper East Branch watershed and on the valley bottom. The road that parallels the creek cuts through the sandstone. There are several locations where the roadside ditch is loaded with sand and there are san deposits on the road. It appears, therefore, that the sandstone is contributing a large sediment load to the creek.

As Liddell Pipeline Road climbs out of the East Branch drainage en route to Yellow Bank Creek and Y Creek, it crosses an area underlain by the Santa Margarita Sandstone. Although this road is extremely steep, it is constructed with frequent, deep waterbars that tend to direct runoff and any sediment that it is carrying onto the hillslope well away from the creek (see Roads in Section 4.2).

The marble quarry runoff is routed through two sediment detention basins in the upper East Branch watershed. The upper basin is much larger than the lower basin. The lower basin partially failed in the winter of 1999- 2000. It was reported to have failed again in March 2001. There is also an overburden dump in the upper Liddell Creek watershed, with a sediment basin below it. These sediment basins are located in the swales that form the headwaters of Liddell Creek and East Branch Liddell Creek. The beds of the creeks below the sediment basins are both filled with fine sediment, presumably from the sediment basins' failure or poor performance.

There is a large slide complex at the confluence of the East Branch and the mainstem of Liddell Creek. The creek cuts through the base of the slide complex on the east side of the creek. The road cuts through the base of the slide on the west side of the creek. Cattle graze in the watershed above the monitoring station, and the City of Santa Cruz obtains water from a large spring adjacent to the marble quarry.





Note: The upper graph shows the longitudinal profile for Liddell Creek at station #2. The lower graph shows Liddell Creek in cross section at station #2.

Figure 4.1-20
Longitudinal Profile and Cross Section for
Liddell Creek Monitoring Station #2

Stage-Discharge Relationship

A total of four discharge measurements were made ranging from about 1.8 cfs to about 6.3 cfs. This corresponds to a range of 3 - 12 percent of the estimated 1.5-year discharge for the station. A small rock wall was constructed below the measurement point to provide sufficient depth for the first measurement.

The discharge rating based only on the actual discharge measurements gave extremely high estimates of the discharge near bankfull. Therefore, the survey data were used to constrain the relationship between discharge and stage at higher flows. The discharge rating was determined to be:

$$\text{Discharge} = 0.3809\ (\text{Gauge Height})^{6.4043}$$

Bankfull Discharge

Only the regression of bankfull-indicators gave an estimate of the bankfull discharge within the confidence band for the estimate of the 1.5-year discharge. Therefore, 46.9 cfs was adopted as the bankfull discharge.

Turbidity and Suspended Sediment

Nine turbidity measurements were made, three when discharge measurements were also made. The discharge for the other six turbidity measurements was estimated from the stage. Measured turbidity ranged from 1.4 NTU to 113 NTU. The following turbidity-discharge relationship was found by regression.

$$\text{Turbidity} = 6.2376(\text{Discharge})^{1.5425} \qquad R^2 = 0.6566 \qquad N = 9$$

For these nine samples, discharge explains about 66 percent of the variation in the turbidity readings.

Nine suspended sediment measurements were made but three of them were found to be below the no-detect limit. The six suspended sediment samples with values greater than the 5 mg/l no-detect limit were used to estimate the relationship between suspended sediment and discharge

$$\text{Suspended Sediment} = 23.974(\text{Discharge})^{0.2859} \qquad R^2 = 0.0169 \qquad N = 6$$

The R^2 value of 0.0169 indicates that the six measurements show no relationship between suspended sediment and discharge.

Four paired measurements of suspended sediment and turbidity were available. A regression of suspended sediment versus turbidity gave the following equation.

$$\text{Suspended Sediment} = 0.3941(\text{Turbidity})^{1.1935} \qquad R^2 = 0.8919 \qquad N= 6$$

The R^2 value of 0.8919 shows that turbidity explains about 89 percent of the variation in the suspended sediment values in these six measurements.

4.1.3.5 YELLOW BANK CREEK

For a general description of run-of-the-stream conditions, see Section 3.3.

The monitoring station on Yellow Bank Creek is located just downstream of a failed road crossing about 1.15 miles (6,100 feet) above the reservoir near Highway 1. The channel was surveyed on December 11, 2000. The staff gauge was placed in a pool just below the road crossing. A cross section was surveyed across the riffle crest about 14.4 feet downstream of the staff gauge. The cross section and longitudinal profile are shown in Figure 4.1-21.

The watershed above the monitoring station encompasses about 0.60 square miles. The 1.5-year discharge is estimated to be 19.1 cfs. The elevation of the monitoring station is about 160 feet above sea level. Eighty-five percent of the watershed is below 660 feet in elevation. Bald Mountain (1,296') is the highest point in the watershed.

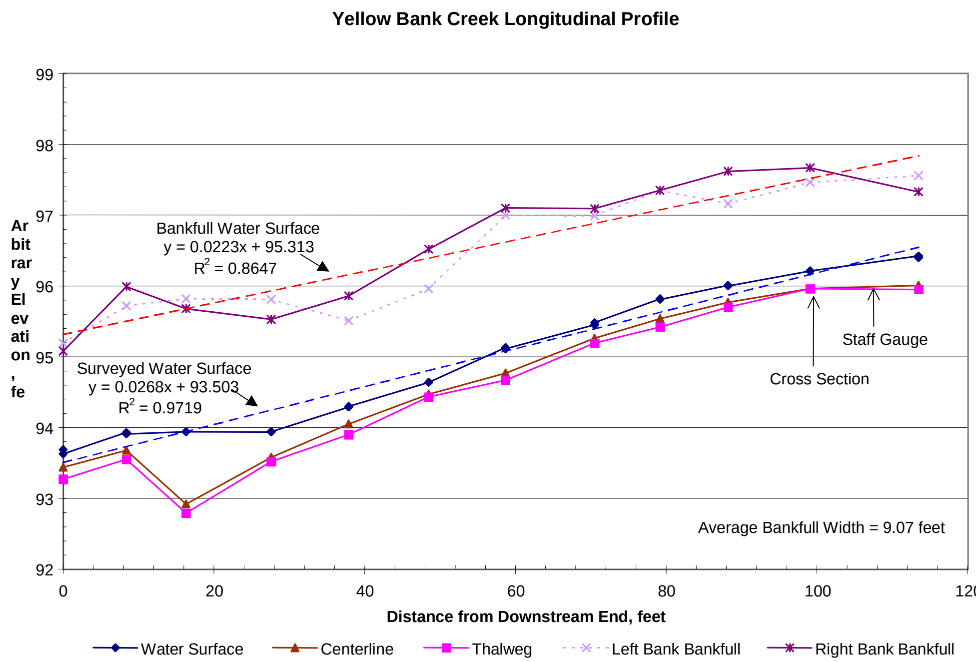
About 33 percent of the watershed area above the monitoring station consists of slopes in the 0-10 percent range. About 22 percent of the watershed has slopes in excess of 20 percent. Only Ferrari Creek has a higher percentage of land with slopes in excess of 20 percent.

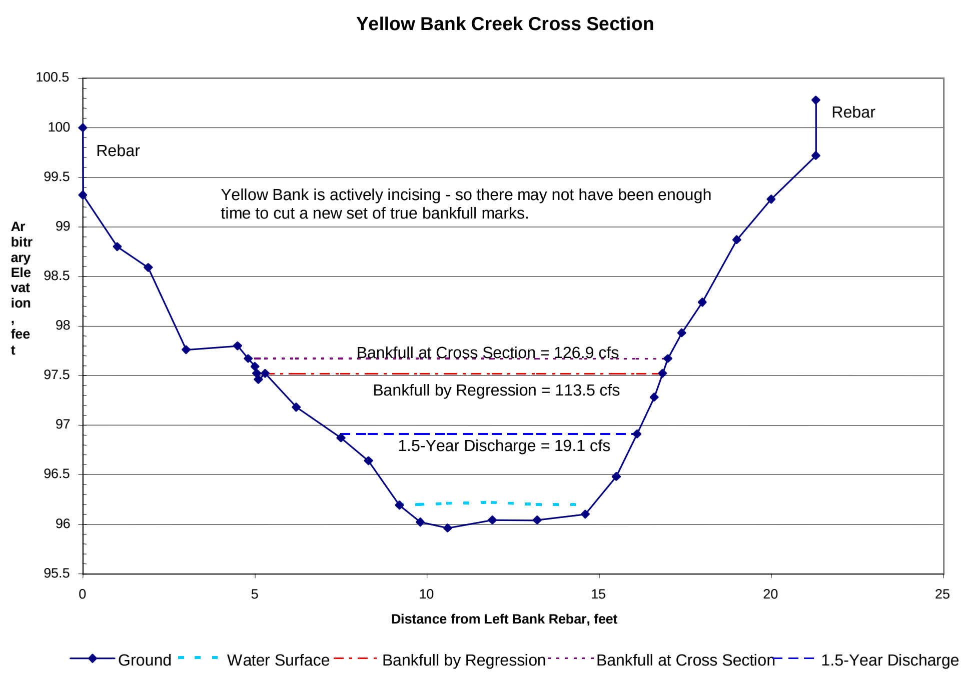
The Santa Cruz Mudstone formation underlies about 84 percent of the watershed above the monitoring station. Thus, the bed material in the creek will tend to have a low density and will move at lower discharges than similar sized material made of granite or quartzdiorite. About 13 percent of the watershed is underlain by the Santa Margarita Sandstone. All of the Santa Margarita Sandstone in the watershed is located above Liddell Pipeline Road. The stream channel traverses most of the length of the outcrop of Santa Margarita Sandstone. Therefore, the portion of Yellow Bank Creek above the pipeline road is very sensitive to disturbance.

The monitoring station is located adjacent to the largest landslide in the watershed.

Channel Incision

At the washed-out road crossing near the Yellow Bank Creek monitoring station, the culvert for the crossing is still in place, but it is no longer functioning. The stream has cut a path around the right side (looking downstream) of the culvert. Upstream of the crossing, the creek banks are collapsing. The base of a group of large alders (diameter > 24") has slid into the creek and the trees on the opposite bank are leaning over the channel. The channel at this point is a narrow slot with high banks. About 1,300 feet upstream of the monitoring station there is a set of nickpoints in the channel. The largest is about three feet high and the other two are each about a foot high. The nickpoint furthest upstream is only about 100 feet below the City of Santa Cruz's pipeline from Liddell Spring. The channel above the nickpoint has low banks and the bed of the channel is vegetated.





Note: The upper graph shows the longitudinal profile for Yellow Bank Creek. The lower graph shows Yellow Bank Creek in cross section.

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Figure 4.1-21
Longitudinal Profile and Cross Section for
Yellow Bank Creek Monitoring Station

The monitoring station is located just downstream of the washed-out road crossing. The staff gauge is in a pool directly below the culvert. The surveyed section of creek extends downstream about 114 feet. The surveyed section encompasses two sharp turns. Below the second bend, the channel is a narrow slot with dramatically undercut banks, suggesting incision has occurred in this section as well.

Inspection of the channel near the reservoir also revealed signs of channel incision. The first signs of incision were encountered a few hundred feet upstream of the reservoir, approximately near the point where the 60-foot-contour interval crosses the stream on the topographic map. The channel had a slot-like character and there were several leaning trees. Only a few hundred feet of channel were inspected near the reservoir.

The reservoir dam blew out in February of 1998. Figure 4.1-3 shows that the 1998 February rainfall (18.63") was the highest recorded February in Santa Cruz (1905 to 2000). Figure 4.1-2 shows that 1998 had the highest total precipitation for January and February (34.21") for the period of record. It is not known if Yellow Bank Creek was actively incising prior to the intense rainfall of 1998 or if the 1998 rainfall coupled with the lowering of the water behind the failed dam triggered the incision.

Neither could the Planning Team discern whether the road crossing at the monitoring station failed in 1998 or before. Bern Smith, Coast Dairies Property Manager, says that it had already failed before his first visit to the area. However, the rainfall record suggests that February 1998 is the time when the culvert was most likely to fail. It is possible that the intense rainfall of 1998 produced large magnitude runoff events. The USGS gauging station on Pescadero Creek recorded the largest flood of 1998 on February 3 with a return period (Gumbel Extreme value) of about 66 years. The USGS gauge at Big Trees on the San Lorenzo River also reported the largest flood event for 1998 on February 3. However, the return period of the February 3 event on the San Lorenzo River was only about 15 years. So the Pescadero flood record supports the occurrence of a large magnitude flood event in February 1998 but the San Lorenzo flood record suggests only a moderate event occurred. Of course, the high intensity rainfall cells that produced the record rainfall in Santa Cruz and that generated a 66-year-return-period flood in Pescadero Creek may have been confined to the coastal region.

The culvert in the road crossing was much too small to accommodate the large magnitude of flow. So, the road fill acted like a dam and eventually failed.

The three observed nickpoints are vertical drops. Planning Team hydrologist Dennis Jackson and geologist Peter Hudson examined this nickpoint. The nickpoint is cutting through cohesive material. The face of the nickpoint is concave and the back wall is recessed about eighteen inches from the lip. The lower face was damp. It is likely that the pressure of water seeping out of the face of the nickpoint is the principle mechanism causing the nickpoint to migrate upstream. The water falling over the lip removes the debris from the base of the nickpoint. In addition, the falling water contributes to the erosion of the face. The removal of the sloughed debris prevents sufficient material from accumulating at the base to support the collapsing face.

It is likely that the maximum rate of upstream migration of the nickpoint occurs after a flood event. During the flood, the soil on the lower face of the nickpoint may become saturated but the water in the channel probably supports the face of the nickpoint. After the water level recedes, the water flowing out of the saturated face causes it to collapse. Subsurface flow moving into the channel also contributes to saturating the face of the nickpoint.

The mechanism that caused the creation of the nickpoint on Yellow Bank Creek is not known. Regardless of the mechanism that generated the incision, the nickpoint is now only about 100 feet downstream of the City of Santa Cruz's water supply pipeline. It is possible that the nickpoint could migrate past the pipeline after a single large storm event. The pipeline is simply laid across the ground with no additional supports at the stream crossings. This simple crossing is reasonable since the channel is very small and well-vegetated at the crossing. However, the migration of the nickpoint past the pipeline crossing will erode the streambed away and leave the pipeline suspended about five feet in the air.

The pipeline crossing is only a short distance below Liddell Pipeline Road. A short distance above the road crossing there is an outcrop of the highly erosive Santa Margarita Sandstone along the streambed of upper Yellow Bank Creek. If the nickpoint migrates past the pipeline and road crossing it will probably enter the Santa Margarita Sandstone. There is a strong potential that the nickpoint will rapidly migrate up through the Santa Margarita Sandstone. The disturbance from the migrating nickpoint might cause the Santa Margarita Sandstone to deliver a large load of sand to the creek. The sand will eventually be transported down to the reservoir.

The incision process has apparently already delivered a substantial load of sediment to the reservoir. Inspection of the streambed near the reservoir revealed that the incision began some distance upstream of the reservoir. It is estimated that the incision begins somewhere near the point where the 60-foot-contour interval crosses the creek on the map. The distance up the channel to the nickpoint is approximately 6,900 feet. The nickpoint at the upstream end is about five feet high. The incision near the reservoir is zero; thus the average incision is about 2.5 feet. The width of the channel bottom at the monitoring station is about five feet, and, assuming that the average channel width is five feet, a rough estimate of the total volume of material eroded by the incision process so far is 6,900 feet x 2.5 feet x 5 feet = 86,250 cubic feet or 3,194 cubic yards, or 1.98 acre-feet.

The channel is in the process of adjusting to the passage of the nickpoint. The oversteepened banks can be expected to collapse into the channel. The material from the collapsed banks will eventually be transported down to the reservoir. This process will probably take from several years to several decades depending on the frequency of storm events large enough to transport the material. Thus, the rate of sedimentation in the reservoir will probably be well above historical rates for years to come.

Stabilizing the nickpoint, before it reaches the City's pipeline must be given the highest priority (see Section 4.2.5). The passage of the nickpoint may damage the City's pipeline and the road. If the nickpoint reaches the Santa Margarita Sandstone, it is possible that a significant amount of sand will be delivered to the creek. Stabilizing the nickpoint at its current location will limit the amount of channel bed erosion that will eventually be transported to the reservoir.

It is strongly recommend that the 1,400 feet of stream channel between the pipeline and the monitoring station be checked to determine if additional nickpoints are present. If additional nickpoints are present, there is the potential that they could migrate upstream and undermine any attempts to stabilize the set of nickpoints near the pipeline. Similarly, the mile of stream channel between the reservoir and the monitoring station should be checked to determine if additional nickpoints are present.

Stage-Discharge Relationship

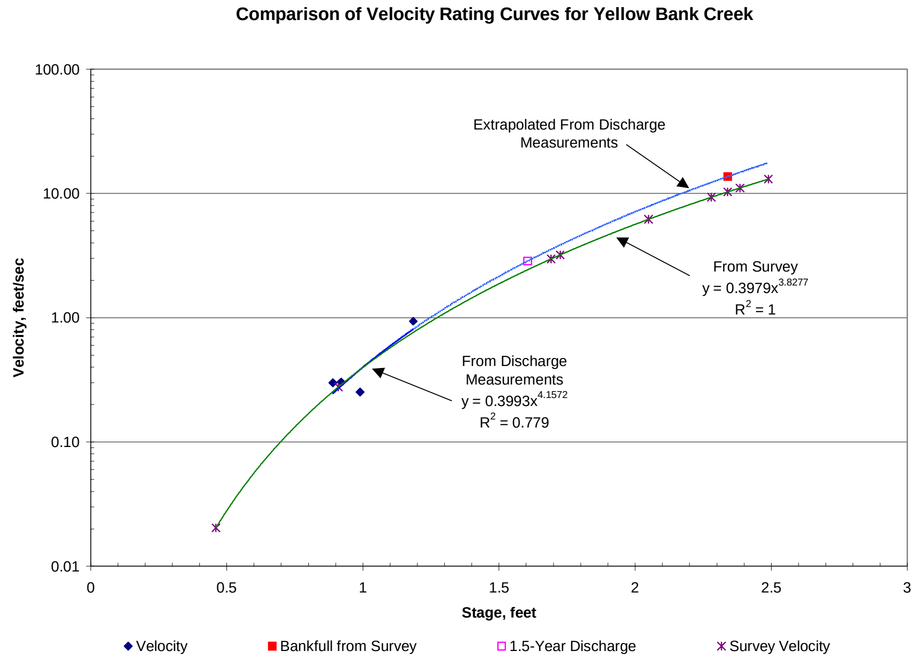
Four discharge measurements were made at the Yellow Bank Creek monitoring station. Measured discharges ranged from 0.31 cfs to 2.35 cfs or 1.6% - 12.3 percent of the estimated 1.5-year discharge. The discharge-rating curve developed from the four discharge measurements appeared to give unrealistic values for the discharge and velocity for large flows. Therefore, the survey data were used to constrain the discharge rating.

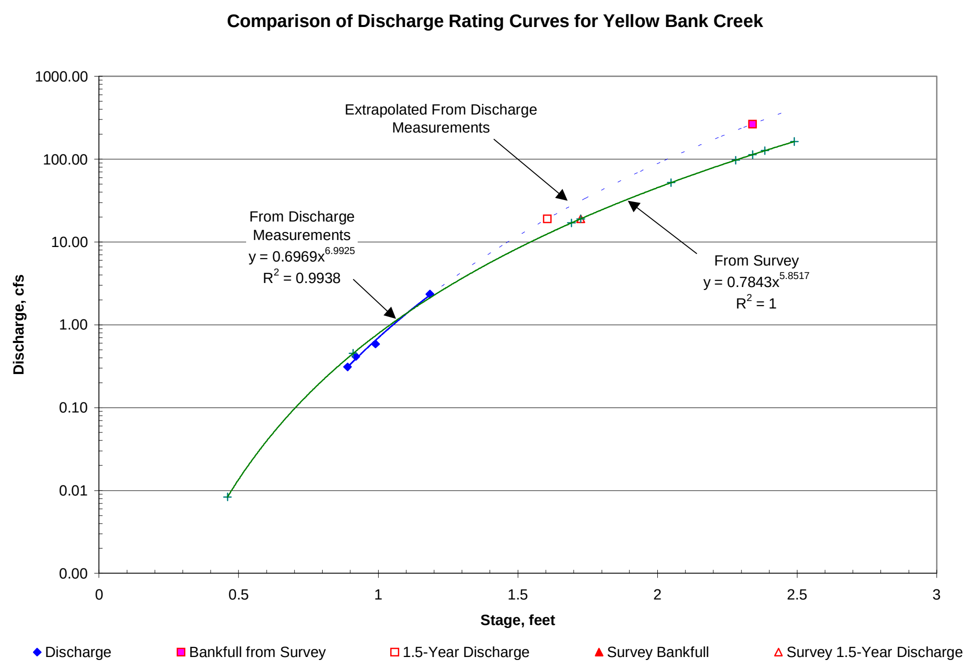
The survey data were input into the WinXSPRO computer program to analyze the cross section geometry. The survey data indicated that a change in the relationship between the cross section geometry and stage changed at 1.54 and again at 2.74 feet. Figure 4.1-22 compares the relationship of velocity-stage relationship developed from the discharge measurements to the relationship based on the survey data and the Manning equation. Figure 4.1-22 also compares the relationship of discharge-stage relationship developed from the discharge measurements to the relationship based on the survey data and the Manning equation. The discharge-rating curve, constrained by stage is: discharge = 0.7843(Gauge Height) $^{5.8517}$.

Bankfull Discharge

The bankfull discharge estimated from the indicators at the cross section and the estimate based on the regression of all the indicators in the surveyed reach turned out to be about six times larger than the estimated 1.5-year discharge. Since Yellow Bank Creek appears to be actively incising, it is possible that there has not been sufficient time for new bankfull indicators to develop. The obvious bankfull indicators that are visible probably represent the pre-incision bankfull level.

Since it appeared that good bankfull indicators have not yet been established for the present stream configuration, the estimated 1.5-year discharge (19.1 cfs) was adopted as the bankfull discharge.





Note: The upper graph compares the velocity rating based on the discharge measurements and the velocity rating developed from the flow resistance equation and the survey for Yellow Bank Creek. The lower graph compares the discharge rating based only the discharge rating for Yellow Bank Creek.

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Figure 4.1-22
Comparison of Velocity and Discharge Ratings for Yellow Bank Creek

Turbidity and Suspended Sediment

Seven turbidity measurements were made. Three of the turbidity measurements were made when the discharge measurements used to define the rating curve were made. The discharge for the other four turbidity measurements was estimated from the staff gauge reading. The turbidity measurements were made during discharges ranging from 1.6 percent of the 1.5-year discharge to 12.3 percent of the 1.5-year discharge. A regression of turbidity against discharge yielded the following relationship.

$$\text{Turbidity} = 37.3(\text{Discharge})^{1.1319} \qquad R^2 = 0.3849$$

The Yellow Bank turbidity-discharge relationship had the weakest R^2 value of all the stations. Five of the turbidity measurements were taken when the discharge was less than 3 percent of the 1.5-year discharge. The Yellow Bank monitoring station is the most remote station that was monitored. It also has the smallest watershed, which implies that its peak discharges will last for only a short amount of time. These factors suggest that if future stream monitoring is done a stage recorder and continuous turbidity monitor should be used at the Yellow Bank Creek monitoring station, or that the station should be re-located to a downstream location, perhaps just above the reservoir.

Six suspended sediment measurements were made, but four of them were found to be below the no-detect limit. Since only two suspended sediment samples had values greater than the no-detect limit, the relationship between suspended sediment and discharge and between suspended sediment and turbidity should not be used. The relationships are shown here only for completeness.

$$\text{Suspended Sediment} = 13.883(\text{Discharge})^{-0.166} \qquad R^2 = 1 \quad N = 2$$

The R^2 value of 1 is an artifact of having only two measurements and can not be interpreted as showing a strong relationship between suspended sediment and discharge.

Two measurements of suspended sediment and turbidity were available. A regression of suspended sediment versus turbidity gave the following equation.

$$\text{Suspended Sediment} = 1.8619(\text{Turbidity})^{0.5258} \qquad R^2 = 1 \quad N = 2$$

Again, the R^2 value of 1 is an artifact of having only two measurements and can not be interpreted as showing a strong relationship between suspended sediment and discharge

4.1.3.6 LAGUNA CREEK

For a general description of run-of-the-stream conditions, see Section 3.3.

Laguna Creek

Most of the Laguna Creek watershed is outside the Coast Dairies Property. The monitoring station is located about 600 feet upstream of old Highway 1. The channel was surveyed on December 7, 2000. The cross section and longitudinal profile are shown in Figure 4.1-23.

The watershed area above the monitoring station is about 7.60 square miles. The elevation of the monitoring station is about 20 feet. The elevation of the highest point in the watershed is about 2,400 feet. Eighty-five percent of the watershed has an elevation of less than 1,610 feet (Figure 4.1-1). About 65 percent of the watershed is in the 0-10 percent slope class. About 6 percent of the watershed has slopes in excess of 20 percent (Figure 4.1-15).

The Laguna Creek watershed has the most geologic diversity of the all the monitored watersheds (see Figure 4.2-2 in the next section of this report). Granite covers about 11 percent of the watershed. Schist covers about 32 percent of the watershed. The schist was formed by the metamorphism of siltstones and sandy mudstones, and contains large amounts of mica. The schist is deeply weathered. The rock is dense but is cut by fractures and joint planes. Clayey seams have developed along the fractures. Rocks of schist that make it to the streambed should have a density similar to solid rock.

Stage-Discharge Relationship

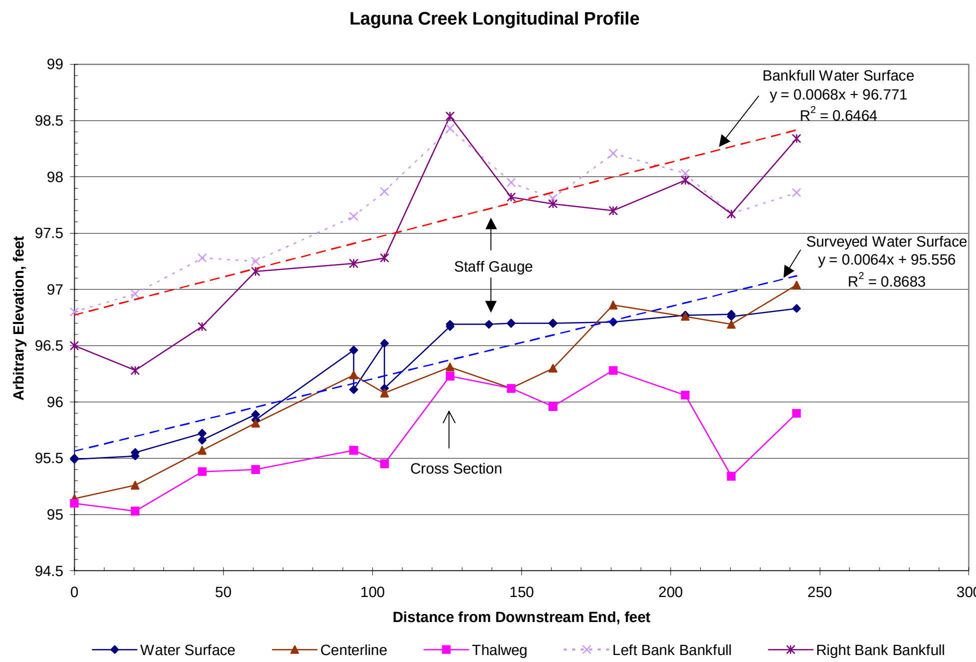
A total of four discharge measurements were made ranging from about 5.75 cfs to about 22.15 cfs. This corresponds to a range of 3% - 13 percent of the estimated 1.5-year discharge for the station.

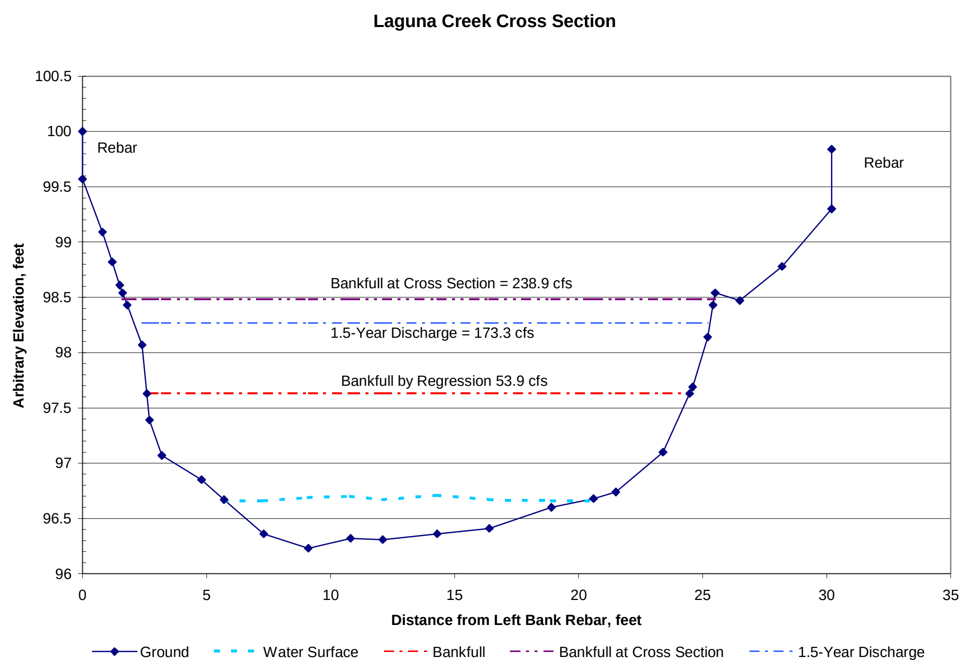
The discharge rating was determined to be:

$$\text{Discharge} = 7.4527\ (\text{Gauge Height})^{3.6488} \qquad R^2 = 0.9996$$

Bankfull Discharge

Only the bankfull-indicators at the cross section gave an estimate of the bankfull discharge within the confidence band for the estimate of the 1.5-year discharge. The bankfull indicators on both banks were close so the associated discharge was averaged to give the bankfull discharge of 238.9 cfs.





Note: The upper graph shows the longitudinal profile for Laguna Creek. The lower graph shows Laguna Creek in cross section.

Figure 4.1-23
Longitudinal Profile and Cross Section for
Laguna Creek Monitoring Station

Turbidity and Suspended Sediment

The Planning Team collected and analyzed ten turbidity samples from the Laguna Creek station.. Four of the turbidity samples were taken at the same time as discharge measurements. The discharge for the other six turbidity measurements was estimated from the stage. Measured turbidity ranged from 1.21 NTU to 218 NTU, the highest turbidity measured at any of the stations. The following turbidity-discharge relationship was found by regression.

$$\text{Turbidity} = 2.3581(\text{Discharge})^{1.1033} \qquad R^2 = 0.7134 \qquad N = 10$$

For these nine samples, discharge explains about 71 percent of the variation in the turbidity readings.

Six suspended sediment measurements were made, but two of them were found to be below the no-detect limit. The four suspended sediment samples with values greater than the 5 mg/l no-detect limit were used to estimate the relationship between suspended sediment and discharge

$$\text{Suspended Sediment} = 1.8819(\text{Discharge})^{1.0198} \qquad R^2 = 0.5078 \qquad N = 4$$

The R^2 value of 0.5078 indicates that the discharge explains about 50 percent of the variation in the suspended sediment concentration for these four measurements.

Four paired measurements of suspended sediment and turbidity were available. A regression of suspended sediment versus turbidity gave the following equation.

$$\text{Suspended Sediment} = 0.8817(\text{Turbidity})^{0.8367} \qquad R^2 = 0.8687 \qquad N = 4$$

The R^2 value of 0.8687 shows that turbidity explains about 87 percent of the variation in the suspended sediment values in these six measurements.

Y Creek

Y Creek is the informal name for a tributary to Laguna Creek that flows through the southeastern part of the Property. One of the branches of the City of Santa Cruz's water supply lines crosses the creek and joins the other branch of the supply line on the east bank of the creek. The creek became know as Y Creek because the pipeline junction or "Y" is on its bank.

There is a bedrock cascade just downstream of the road crossing. This cascade is assumed to be a barrier to salmonid migration. The surveyed reach starts just upstream of the road crossing. The City of Santa Cruz replaced the culvert under in the summer of 2000, as the old culvert had washed out. The previous crossing was constructed using four separate culverts laid along side one another. The channel constriction at these culverts probably created a backwater area where sediment was deposited.

The Planning Team surveyed the Y Creek channel on December 11, 2000. The staff gauge was placed in a pool approximately 40 feet upstream of the road crossing. A cross section was surveyed across the riffle crest about six feet downstream of the staff gauge. The cross section and longitudinal profile are shown in Figure 4.1-24

The watershed above the monitoring station encompasses about 0.79 square miles. The 1.5-year discharge is estimated to be 24.2 cfs. The elevation of the monitoring station is about 320 feet above sea level. Eighty-five percent of the watershed is below 890 feet in elevation. Bald Mountain (1,296') is the highest point in the watershed (Figure 4.1-1). About 59 percent of the watershed area has slopes from in the 0-10 percent range, and only 5 percent has slopes in excess of 20 percent (Figure 4.1-15).

The monitoring station is about 1,400 feet upstream of the confluence of Y Creek and Laguna Creek. The elevation of Laguna Creek at the confluence with Y Creek is about 195 feet. The elevation of the Y Creek monitoring station is about 320 feet. Therefore, the average channel gradient between the confluence and the monitoring station is over 8 percent.

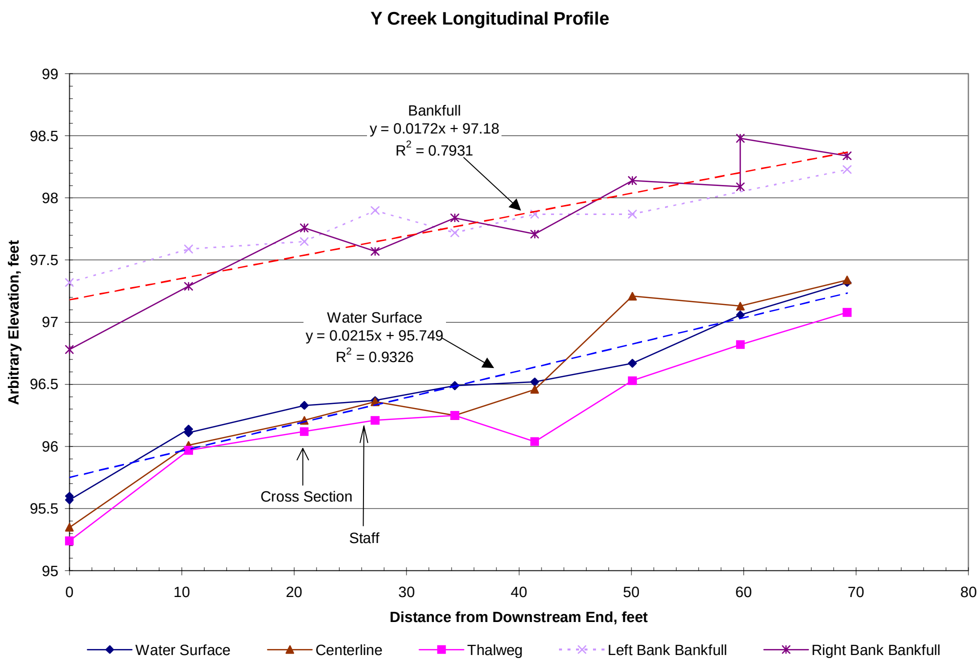
Bern Smith, the Coast Dairies Property manager, mentioned that the headwaters of Y Creek were logged in the past. A spur road, shown as Upper Y Creek Road in Figure 4.2-3 in the next section of this report, starts at the saddle between Y Creek and Yellow Bank Creek and ends in the upper Y Creek watershed. The road crosses Y Creek about 2,200 feet upstream of the monitoring station. The road crossing has washed out and the culvert is now lying in the streambed a distance downstream of the crossing. Near the crossing, the nearly vertical streambanks are five to six feet high. The culvert presumably failed during the February 1998 storms. Two more washed-out stream crossings on this road are located further up stream.

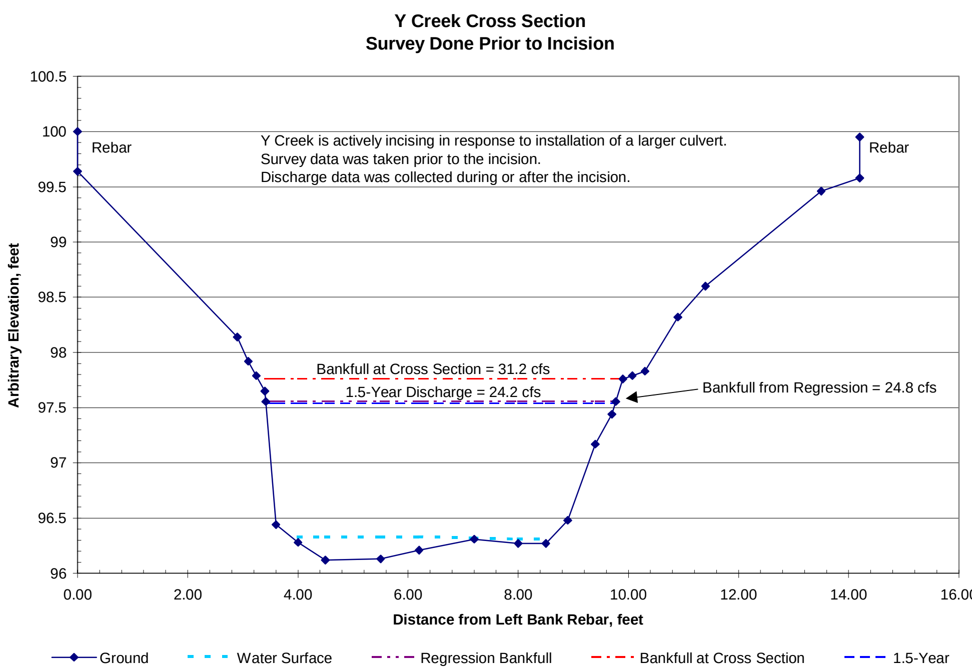
A ribbon of the highly erodible Santa Margarita Sandstone runs parallel to the creek along the flank of the ridge on the west side of Y Creek. The ribbon of Santa Margarita Sandstone starts about 1,400 feet upstream from the monitoring station and runs up to Bald Mountain.

There are several large slides on the ridge to the east of Y Creek that extend down to the creek. The Liddell Pipeline Road crosses the bottom of another slide on the ridge to the west of the creek.

Channel Incision

The Planning Team took the first measurement of stream discharge on Y Creek on January 12, 2001. Inspection of the channel revealed that the stream bed had eroded in the past month since the site was surveyed. The staff gauge was no longer in a pool but was on a riffle face. The lower end of the cross section had lowered about one foot. Subsequent visits showed that the incision appeared to stop after the bed at the staff gauge dropped about three-quarters of a foot, but the winter of 2000-2001 produced only small flood events, and it is reasonable to expect that large flood events could trigger further incision. The incision complicated the analysis since the slope of the channel is now much steeper than it was when the survey was done.





Note: The upper graph shows the longitudinal profile for Y Creek. The lower graph shows Y Creek in cross section.

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Figure 4.1-24
Longitudinal Profile and Cross Section for
Y Creek Monitoring Station

The Monterey Formation underlies about 68 percent of the watershed above the monitoring station, and Santa Cruz Mudstone lies under about 15 percent of the watershed (see Figure 4.2-2 in the next section of this report), so mudstone underlies about 83 percent of the watershed. The majority of the rocks on the streambed at the monitoring station appeared to be mudstone. Rocks derived from mudstone have low density and are more easily transported by streams than denser rocks such as granite.

The channel incision at Y Creek following the replacement of the inadequate culvert demonstrates the sensitivity of a channel whose bedload consists primarily of mudstone. The nature of a stream's bed load needs to be considered when undertaking any projects involving alteration of a streambed.

Stage Discharge Relationship

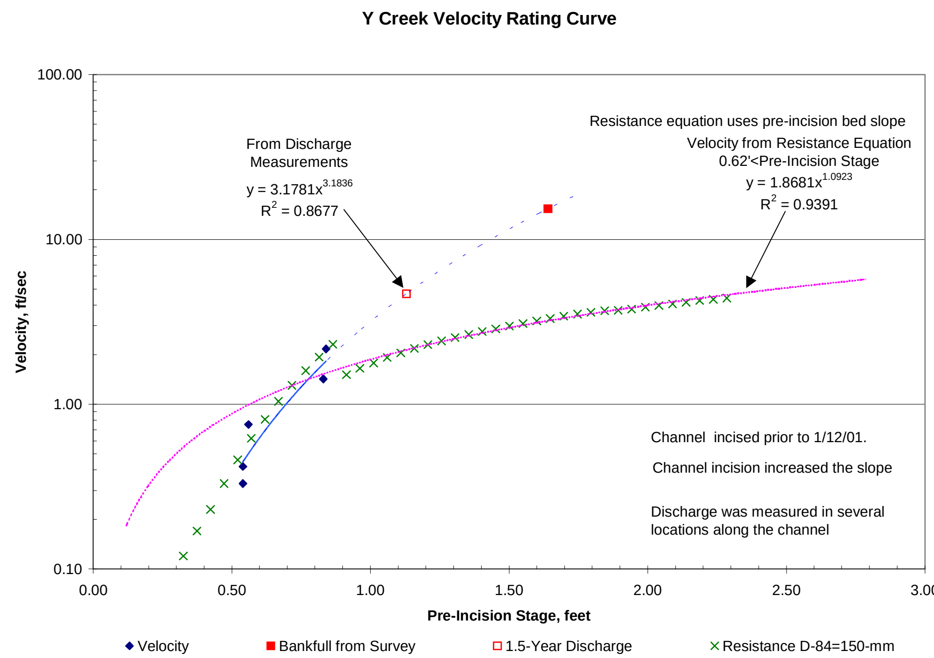
Five discharge measurements were made at the Y Creek monitoring station. The channel incision process began before the first measurement was made. The incision appeared to have stabilized prior to the second discharge measurement, but the first discharge measurement was made under different conditions than the other four measurements. In addition, the channel survey reflects a condition that is different from all of the discharge measurements.

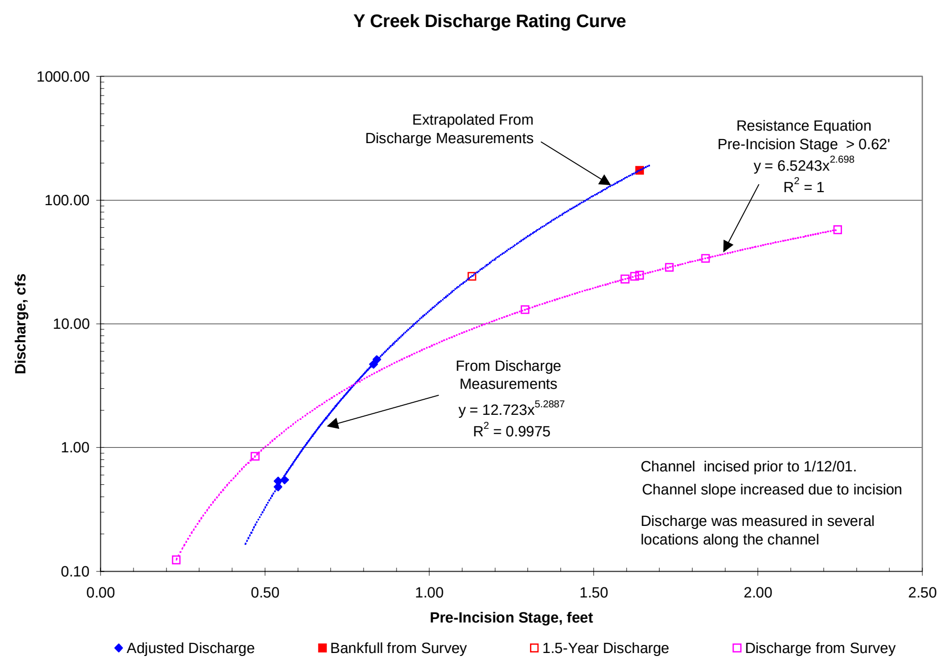
The stage readings were made by measuring down from the top of the staff. The distance to the streambed from the top of the staff was also measured. Therefore, it was possible to apply a correction to convert the observed stage readings to the equivalent pre-incision stage readings. Adjusting the stage, however, cannot correct for the increased slope through the reach. Predictably, the discharge versus adjusted stage relationship, based only on the discharge measurements, gave an unrealistic estimate of bankfull discharge (174 cfs).

The survey data were input into the WinXSPRO computer program to analyze the cross section geometry. The WinXSPRO program can apply the Thorne and Zevenbergen flow resistance equation, if the size of the bed material in known. The size of the bed material was estimated from photographs (D_{84} = 150 mm). The survey data indicated that a change in the relationship between the cross section geometry and stage changed at 0.62 and again at 1.79 feet. Figure 4.1-25 compares the relationship of velocity-stage relationship developed from the discharge measurements to the relationship based on the resistance equation. Figure 4.1-25 also compares the relationship of discharge-stage relationship developed from the discharge measurements to the relationship based on the resistance equation.

Bankfull Discharge

The 1.5-year discharge for Y Creek is estimated to be 24.2 cfs. The bankfull level at the cross section predicted from a regression on all bankfull indicators in the surveyed section estimated the bankfull discharge to be 24.8 cfs.





Note: The upper graph shows the compares the velocity rating based on the discharge measurements and the velocity rating developed from the flow resistance equation and the survey for Y Creek. The lower graph compares the discharge rating based only the discharge rating constrained by the survey data.

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Figure 4.1-25
Comparison of Velocity and Discharge Ratings for Y Creek

Turbidity and Suspended Sediment

Ten turbidity measurements were made at the Y Creek monitoring station. Four of the turbidity measurements were made when the discharge measurements used to define the rating curve were made. The discharge for the other six turbidity measurements was estimated from the staff gauge reading. The turbidity measurements were made during discharges ranging from 1 percent of the 1.5-year discharge to 20 percent of the 1.5-year discharge. A regression of turbidity against discharge yielded the following relationship.

$$\text{Turbidity} = 35.464(\text{Discharge})^{0.8642} \qquad R^2 = 0.5694$$

Six suspended sediment measurements were made but four of them were found to be below the no-detect limit. Since only two suspended sediment samples had values greater than the no-detect limit, the relationship between suspended sediment and discharge and between suspended sediment and turbidity should not be used. The relationships are shown here only for completeness.

$$\text{Suspended Sediment} = 6.7615(\text{Discharge})^{-0.8943} \qquad R^2 = 1 \quad N = 2$$

The R^2 value of 1 is an artifact of having only two measurements and can not be interpreted as showing a strong relationship between suspended sediment and discharge.

Two measurements of suspended sediment and turbidity were available. A regression of suspended sediment versus turbidity gave the following equation.

$$\text{Suspended Sediment} = 0.0023(\text{Turbidity})^{2.2103} \qquad R^2 = 1 \quad N = 2$$

Again, the R^2 value of 1 is due to the small sample size, and cannot be interpreted as showing a strong relationship between suspended sediment and discharge

4.1.4 COMPARITIVE ANALYSIS OF COAST DAIRIES STREAMS AND THEIR WATERSHEDS

This section presents the Planning Team's analysis of existing conditions in the six Coast Dairies streams and their watersheds. The analysis is based on data gathered at the nine monitoring stations, and on physical attributes of the watersheds garnered from the Geographic Information System (GIS) under development for the Long-Term Resource Protection and Use Plan. The analysis focuses on the physical aspects of the watersheds that affect the natural suitability of each of the Coast Dairies streams for salmonids; and on observed and calculated indicators of watershed disturbance that affect water quality, channel morphology, and salmonid habitat.

4.1.4.1 FISH FLOWS

The Planning Team's stream surveys report the presence of "steelhead-like" salmonids on all of the Property's streams, both above and below migration barriers. It is assumed that the fish above

Turbidity and Suspended Sediment

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4.1.4.1 FISH FLOWS

The Planning Team's stream surveys report the presence of "steelhead-like" salmonids on all of the Property's streams, both above and below migration barriers. It is assumed that the fish above the barriers are land-locked steelhead that would resume their anadromous behavior if the barriers were removed. As part of the hydrologic assessment, the Planning Team used discharge data to estimate if flow was adequate for migration.

National Marine Fisheries Service (NMFS) has recently adopted a policy recommending that the minimum bypass flow for water rights should be set equal to the median unimpaired February discharge. Table 4.1-8 shows the conditions at each monitoring station for the estimated median February discharge. This information can be used in the Long-Term Resource Protection and Use Plan as a basis for decisions regarding water use.

4.1.4.2 CONDITIONS AT BANKFULL DISCHARGE

Leopold et al. (1964) suggest that the median sized bed material on a riffle just begins to move when the discharge provides 75 percent of the bankfull depth. Leopold found that this discharge has a recurrence interval of about one-year. Table 4.1-9 gives the estimates for the discharge that has 75 percent of the bankfull depth. Bed material derived from sedimentary rock, which is found throughout the Coast Dairies watersheds to varying extents, is not as dense as solid rock. Therefore, the discharge that just mobilizes the median size bed material in some of the Property's streams may be less than that suggested by Leopold's rule-of-thumb.

The hydraulic conditions for bankfull discharge at each monitoring station are given in Table 4.1-10. The hydraulic conditions for the 1.5-year-discharge at each monitoring station are given in Table 4.1-11.

4.1.4.3 THE IMPORTANCE OF GEOLOGY TO SALMONIDS

The rocks, sand, and silt found on the bed of a stream (bed material) are derived from the various alluvial and bedrock units within its watershed. The nature and occurrence of the various geologic units in a watershed determines the quality of the bed material. The relative abundance, distribution, orientation and susceptibility to weathering of individual geologic units determine the relative amount of bed material derived from each geologic unit.

The nature of a stream's bed material is one of the factors that determine the suitability of the stream as salmonid habitat. Three aspects of the rocks on a streambed affect spawning success for salmonids: density, durability, and texture.

The density of the bed material plays a role in the success of salmonid spawning because density determines if a rock will be transported by a given discharge. Solid rock is generally assumed to have a density of 2.65 times that of water. Santa Cruz Mudstone has a porosity of about 35 percent (PG&E Power Plant Siting Study). Therefore, the density of rocks derived from Santa Cruz Mudstone should have about 65 percent of the density of solid rock. The lower density of mudstone rocks implies that a given size mudstone rock will be transported by the creek at a lower discharge than a similar sized rock of granite. The Shield's equation (CITATION) for shear stress

TABLE 4.1-8
HYDRAULIC CONDITIONS FOR THE FEBRUARY MEDIAN DISCHARGE

Monitoring Station	Watershed Area sq miles	Estimated February Median Discharge cfs	Estimated Average Depth of the February Median Discharge feet	Estimated Velocity of the February Median Discharge feet\sec	Estimated Width of the February Median Discharge feet	Width to Depth Ratio of February Median Discharge	Estimated Cross Section Area of the February Median Discharge sq feet	Percent of Estimated 1.5-Year Discharge	Estimated Exceedence Probability
Molino	1.50	2.09	0.51	0.60	6.89	13.52	3.51	6.0%	33.25%
Ferrari	1.28	1.75	0.42	0.69	6.08	14.61	2.53	6.0%	33.84%
San Vicente #1 (Lower)	10.49	19.40	0.86	1.24	18.24	21.23	15.68	6.3%	26.27%
San Vicente #2 (Upper)	9.89	18.13	0.93	1.34	14.47	15.52	13.48	6.3%	26.47%
Liddell #1 (West)	1.29	1.76	0.57	0.73	4.26	7.52	2.42	6.0%	33.82%
Liddell #2 (Main)	1.90	2.75	0.37	0.75	9.87	26.58	3.66	6.0%	32.36%
Laguna	7.60	13.42	0.88	1.21	12.57	14.25	11.09	6.2%	27.37%
Y Creek	0.79	1.01	0.38	0.69	3.88	10.31	1.46	5.9%	35.69%
Yellowbank	0.60	0.74	0.36	0.41	4.95	13.72	1.79	5.8%	36.75%

Note: Hydraulic conditions at each monitoring station for the estimated February median discharge. The National Marine Fisheries Service is recommending the February median discharge as the minimum bypass flow on salmonid streams.

TABLE 4.1-9
HYDRAULIC CONDITIONS FOR DISCHARGE WITH 75% OF BANKFULL DEPTH

Creek	Watershed Area sq miles	Stage feet	75% of Bankfull Average Depth feet	Hydraulic Radius feet	Width feet	Width to Depth Ratio	Cross Section Area sq ft	Velocity ft/sec	Discharge cfs	Exceedence Probability
Molino	1.50	1.66	0.87	0.75	8.6	9.8	7.5	2.07	15.5	4.57%
Ferrari	1.28	1.60	1.09	1.01	9.6	8.8	10.5	1.74	18.2	3.67%
San Vicente #1 (Lower)	10.49	2.56	1.56	1.51	22.1	14.1	34.6	3.17	110	2.56%
San Vicente #2 (Upper)	9.89	2.14	1.19	1.12	18.8	15.8	22.3	3.27	72.9	4.64%
Liddell #1 (West)	1.29	1.41	0.90	0.78	6.2	7.0	5.6	2.11	11.8	3.18%
Liddell #2 (Main)	1.90	1.88	0.79	0.75	12.2	15.5	9.6	2.27	21.9	2.14%
Laguna	7.60	2.14	2.20	1.94	14.1	6.4	31.0	3.88	120	1.40%
Y Creek	0.79	1.34	0.92	0.76	6.1	6.6	5.6	2.57	14.3	0.89%
Yellowbank	0.60	1.37	0.51	0.49	7.4	14.4	3.7	1.33	5.0	7.10%

Note: Hydraulic conditions at each monitoring station for discharge with 75% of the bankfull depth. This discharge is an estimate for the flow that initiates movement of the median size bed material on a riffle.

TABLE 4.1-10
HYDRAULIC CONDITIONS FOR BANKFULL DISCHARGE

Creek	Watershed Area sq miles	Stage feet	Average Depth feet	Width feet	Width to Depth Ratio	Cross Section Area sq ft	Velocity ft/sec	Bankfull Discharge cfs	Exceedence Probability
Molino	1.50	1.99	1.17	9.6	8.3	11.2	4.01	45.0	0.30%
Ferrari	1.28	1.91	1.45	11.0	7.6	16.1	2.28	36.7	0.33%
San Vicente #1 (Lower)	10.49	3.13	2.09	24.3	11.6	50.7	4.97	252	0.50%
San Vicente #2 (Upper)	9.89	2.77	1.58	22.2	14.0	35.2	6.34	223	0.58%
Liddell #1 (West)	1.29	1.82	1.20	7.9	6.6	9.5	4.08	38.8	0.30%
Liddell #2 (Main)	1.90	2.12	1.05	12.9	12.3	13.6	3.44	46.9	0.46%
Laguna	7.60	2.59	2.94	14.6	5.0	42.8	5.59	239	0.27%
Y Creek	0.79	1.64	1.22	6.3	5.2	7.7	3.21	24.8	0.27%
Yellowbank	0.60	1.73	0.68	8.8	13.0	5.9	3.21	19.1	0.26%

Note: Hydraulic conditions at each monitoring station for the estimated bankfull discharge.

TABLE 4.1-11
HYDRAULIC CONDITIONS FOR THE 1.5 – YEAR DISCHARGE

Monitoring Station	Watershed Area sq miles	Elevation of top of Staff	Datum feet	Stage feet	Average Depth feet	Width feet	Width to Depth Ratio	Cross Section Area sq ft	Velocity ft/sec	Estimated 1.5-Year Discharge cfs	Exceedence Probability
Molino	1.50	97.86	95.5	1.97	1.15	9.6	8.3	10.9	3.84	42.1	0.35%
Ferrari	1.28	97.27	94.5	1.91	1.45	11.0	7.6	16.1	2.29	36.7	0.33%
San Vicente #1 (Lower)	10.49	96.02	93	3.06	2.02	24.0	11.9	48.5	4.73	230	0.49%
San Vicente #2 (Upper)	9.89	96.61	94	2.75	1.57	22.1	14.1	34.8	6.26	218	0.49%
Liddell #1 (West)	1.29	97.89	95	1.80	1.18	7.9	6.6	9.3	3.98	37.0	0.33%
Liddell #2 (Main)	1.90	98.99	95	2.15	1.09	13.0	11.9	14.2	3.63	51.8	0.37%
Laguna	7.60	98.72	96	2.37	2.57	14.3	5.6	36.8	4.71	173	0.46%
Y Creek	0.79	99.06	94.5	1.62	1.21	6.3	5.2	7.6	3.17	24.2	0.28%
Yellowbank	0.60	98.93	95.5	1.72	0.68	8.8	13.0	5.9	3.21	19.1	0.26%

Note: Hydraulic conditions at each monitoring station for the estimated 1.5-year discharge.

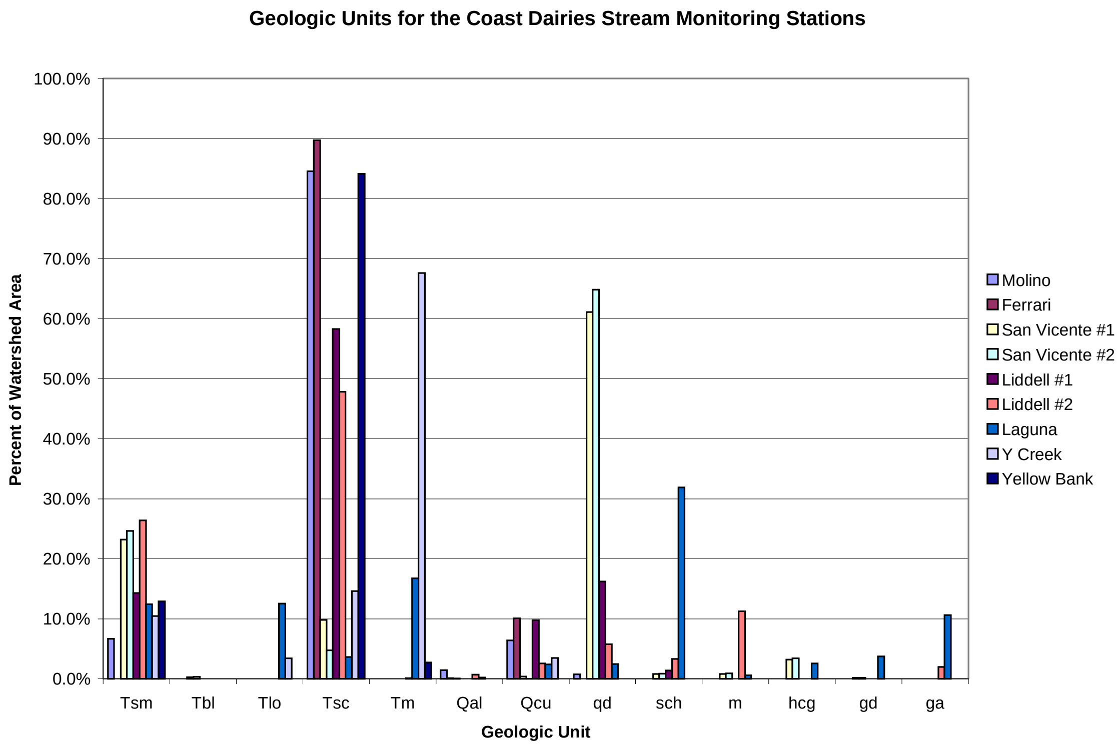
reveals that, for the same set of hydraulic conditions, a stream can move mudstone rocks that have a diameter of about 2.3 times the diameter of granite rocks. Therefore, smaller discharges are required to initiate bedload transport of mudstone compared to granite rocks of the same size. Hence, salmonid eggs laid on a stream bed composed mostly of mudstone derived rock are more likely to be scoured during periods of high discharge than eggs laid in a bed derived from granitic material under the same flow regime.

Durability of the rocks on the streambed also plays a role in determining the stream's suitability for salmonid spawning. The Santa Cruz Mudstone is not very durable and tends to shatter easily. Therefore, mudstone rocks are likely to be broken and wear down more readily while they are being carried along the bed of streams during flood events. Since the mudstone rocks tend to break easily, they will tend to retain their angular appearance and would likely disintegrate and breakdown to fine-grained materials before they achieve a well-rounded shape. Igneous rocks are much more durable, tending to resist breakage during the sediment transport process and develop a smooth, rounded appearance over time.

The Department of Fish and Game considers angular material to be of poor quality for spawning because the pieces fit together, making it more difficult for adult salmonids to move the material. In addition, the overlap of individual angular pieces has the potential to reduce the flow of water to eggs deposited in a redd. Finally, young fish have more difficulty leaving a redd constructed in angular material because there are fewer interstices for the young fish to wiggle through, compared to a redd in rounded material (Jones, 2001)

Texture refers to the size of the individual grains in a rock. The sedimentary Santa Cruz Mudstone is composed of relatively fine-grained material (silt and clay), compared to igneous or metamorphic rock that could include crystallized minerals of various sizes and hardness. The durability of the rock and its resistance to weathering determines the rate at which the "parent" rock can break down into its individual grains. Upon weathering, weakly consolidated, less dense, fine-textured rock will provide more fine material (clay, silt, and small sand) to a streambed than a hard, durable, fine-textured rock. The sedimentary rocks in the Coast Dairies watersheds are composed of mostly fine-grained material and are not very durable. The weathering and erosion processes that transport the sedimentary rocks to the stream will tend to break the rock and result in a mixture of fine and coarse particles being deposited into the stream channel. The sediment transport process will further transform the sedimentary rocks into fine materials. A streambed with a high percentage of silt and clay (fine material) is less suitable for salmonid spawning and rearing than one composed mainly of coarse material.

The bar graph in Figure 4.1-26 shows the percentage of watershed area covered by each geologic unit for the watersheds of the nine monitoring stations. The table in Figure 4.1-26 describes each geologic unit shown in the bar graph. The sedimentary rocks in the Davenport area have low density, are fine-textured, and have low durability. In general, conditions for salmonids are sub-optimal in streams dominated by sedimentary rock. The igneous and metamorphic rocks have normal density, are fine to coarse grained, are durable, and in general provide better conditions



Geologic Unit	Class	Mount's Erosion Susceptability Weighting	Description
Tsm	Sedimentary	10	Santa Margarita Sandstone (upper Miocene)
Tbl	Sedimentary	7	Lower Butano Sandstone Member (Eocene)
Tlo	Sedimentary	7	Lompico Sandstone (middle Miocene)
Tsc	Sedimentary	6	Santa Cruz Mudstone (upper Miocene)
Tm	Sedimentary	5	Monterey Formation (middle Miocene) shale
Qal	Mixed	5	Alluvial Deposits (Holocene)
Qcu	Mixed	5	Coastal terrace deposits (Pleistocene)
sch	Metamorhpic	4	Metasedimentary rocks - schist & quartzite (Mesozoic or Paleozoic)
m	Metamorhpic	4	Marble (Mesozoic or Paleozoic)
qd	Igneous	4	Quartz diorite (Cretaceous)
hcg	Igneous	3	Hornblende-cummingtonite gabbro (Cretaceous)
gd	Igneous	3	Gneissic granodiorite (Cretaceous)
ga	Igneous	3	Granite and adamellite (Cretaceous)

Note: The bar graph shows the percentage of watershed area covered by each geologic unit for the watersheds of the nine monitoring stations. The table shows the description of the mapping symbol of each geologic unit shown in the bar graph. The sedimentary rocks, in the Davenport area, have low density, are fine-textured and have low durability. In general, conditions for salmonids are sub-optimal in streams dominated by sedimentary rock. The igneous and metamorphic rocks have normal density, are fine to coarse grained and are durable. In general, conditions for salmonids are more likely to be optimal in streams dominated by sedimentary rock.

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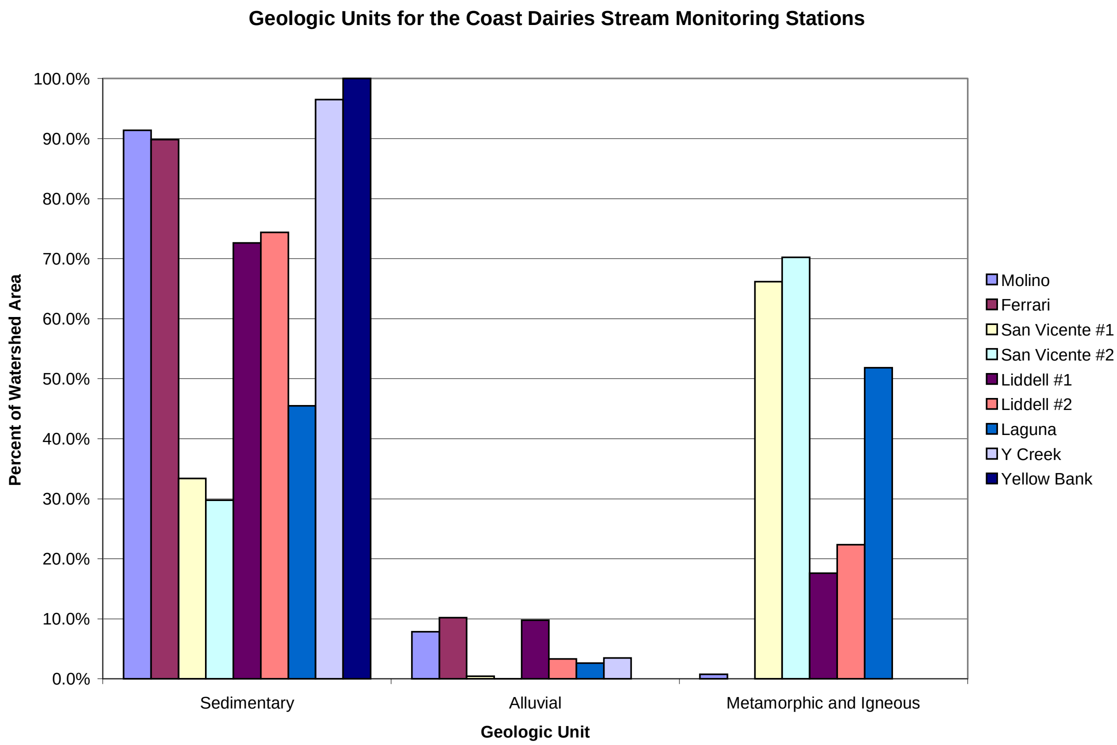
Figure 4.1-26
Geologic Units for the Coast Dairies Watersheds



Note: The percentage of each monitoring watershed covered by sedimentary, alluvial or igneous and metamorphic rock is shown in the bar graph. Streams whose watershed geology is dominated by igneous metamorphic rocks are more likely to provide optimal salmonid habitat than streams whose watershed geology is dominated by sedimentary rock. Alluvial deposits can be composed of material derived from sedimentary, igneous or metamorphic rocks.

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Figure 4.1-27
Sedimentary, Alluvial, Metamorphic, and
Igneous Rock in the Coast Dairies Watersheds

for salmonids. Figure 4.1-27 shows the percentage of the watershed above each monitoring station dominated by sedimentary rock.

Salmonid Suitability

San Vicente Creek watershed has the lowest percentage of sedimentary rocks and the highest percentage of igneous or metamorphic rocks. Therefore, based only on the geology, San Vicente Creek is expected to provide the most suitable bed materials for salmonids.

Slightly more than 50 percent of the Laguna Creek watershed is covered by igneous and metamorphic rock and just less than 50 percent of the watershed is covered by sedimentary rock. Therefore, based only on the geology, Laguna Creek is expected to provide bed material that is moderately suitable for salmonids. The Laguna Creek bed material should be less optimal than the San Vicente bed material but should be superior to the bed material found in Liddell Creek.

The geology of the Liddell Creek watershed is mostly sedimentary (>70 percent), but about 20 percent of the watershed is metamorphic or igneous. Therefore, based only on the geology, Liddell Creek is expected to provide bed material that is less suitable for salmonids than San Vicente or Laguna Creeks. However, the geology of Liddell Creek is expected to produce bed material that is more suitable for salmonids than a creek with little igneous or metamorphic rock such as Molino Creek (0.75 percent) or no igneous or metamorphic rock such as Ferrari Creek and Yellow Bank Creek.

4.1.4.4 WATERSHED SENSITIVITY

Part of the preparation of the Long-Term Resource Protection and Use Plan will include an evaluation of land-uses suitable for given portions of each of the Property's watersheds. Assessing the sensitivity of a watershed to various types of land management activities is a fundamental step in the planning process.

For the purposes of this report, *watershed sensitivity* is defined as:

> *… the sensitivity of a watershed to the disruption of its ecological or hydrological processes.*

One of the key indicators of disruption of the aquatic ecosystem and its supporting hydrologic processes is a change in the fundamental rate at which sediment is delivered to the stream network. Estimating the potential erosion hazard for each unit of the landscape is a first step in understanding how a watershed's rate of sedimentation will respond to disturbance. Such a measure is useful for regional planning decisions but is not a substitute for site specific fieldwork to address the needs of individual projects. This is because soils and geologic unit map boundaries are not precise, since they smooth differences in order to present a regional view.

The soil survey for Santa Cruz County includes an erosion hazard rating for each soil type. However, this erosion hazard rating was developed for agricultural land and is not suitable for the rugged topography of the Santa Cruz Mountains. As shown in Figure 4.1-28, most of the watershed area upstream of the nine stream monitoring stations has either a "high" or a "very high" erosion hazard rating, as assigned by the soil survey. An alternate method of estimating the erosion hazard rating, which is more sensitive to the actual conditions on the Coast Dairies Property, is desirable.

Santa Cruz County recognized the shortcomings of the soil survey erosion hazard rating during the preparation of the *San Lorenzo River Watershed Management Plan* (Santa Cruz County, 1979). In response, Mount (1977) developed an Erosion Hazard Potential for the San Lorenzo watershed. His method appears to be suitable for Coast Dairies, since portions of the San Lorenzo River watershed have soils and geology similar to those on the Property.

Mount's method combines information from geologic maps, soil maps, topographic maps and land-use maps. The method is essentially an equation of five factors and their weightings. Mount conducted extensive fieldwork to develop a system to estimate the value for each type of geologic unit, soil unit and so forth, which are presented in a series of tables. Different weighting factors were then tried until the resulting erosion hazard potential gave results similar to field measurements. The final equation for Mount's erosion hazard potential is:

$$EHP = (1) \times (Soil) + (4) \times (Geology) + (2) \times (Slope) + (30) \times (Landslide) + (1) \times (Land\ use)$$

The landuse factor includes vegetation. Mount expressly states that the magnitude of the different weightings does not imply the order of importance of the factor. Applying the EHP equation to each unique combination of soil, geology, slope etc. will result in a numerical rating for the erosion hazard of that area. Depending on the EHP value, watersheds can be placed into one of four classes of erosion hazard potential: low, moderate, high, or very high.

Presently, GIS layers for geology, soils, and topography are available for the Coast Dairies Property. However, the Planning Team could not locate a suitable digital landslide layer. Therefore, Mount's erosion hazard potential could not be implemented by the GIS system at this time.

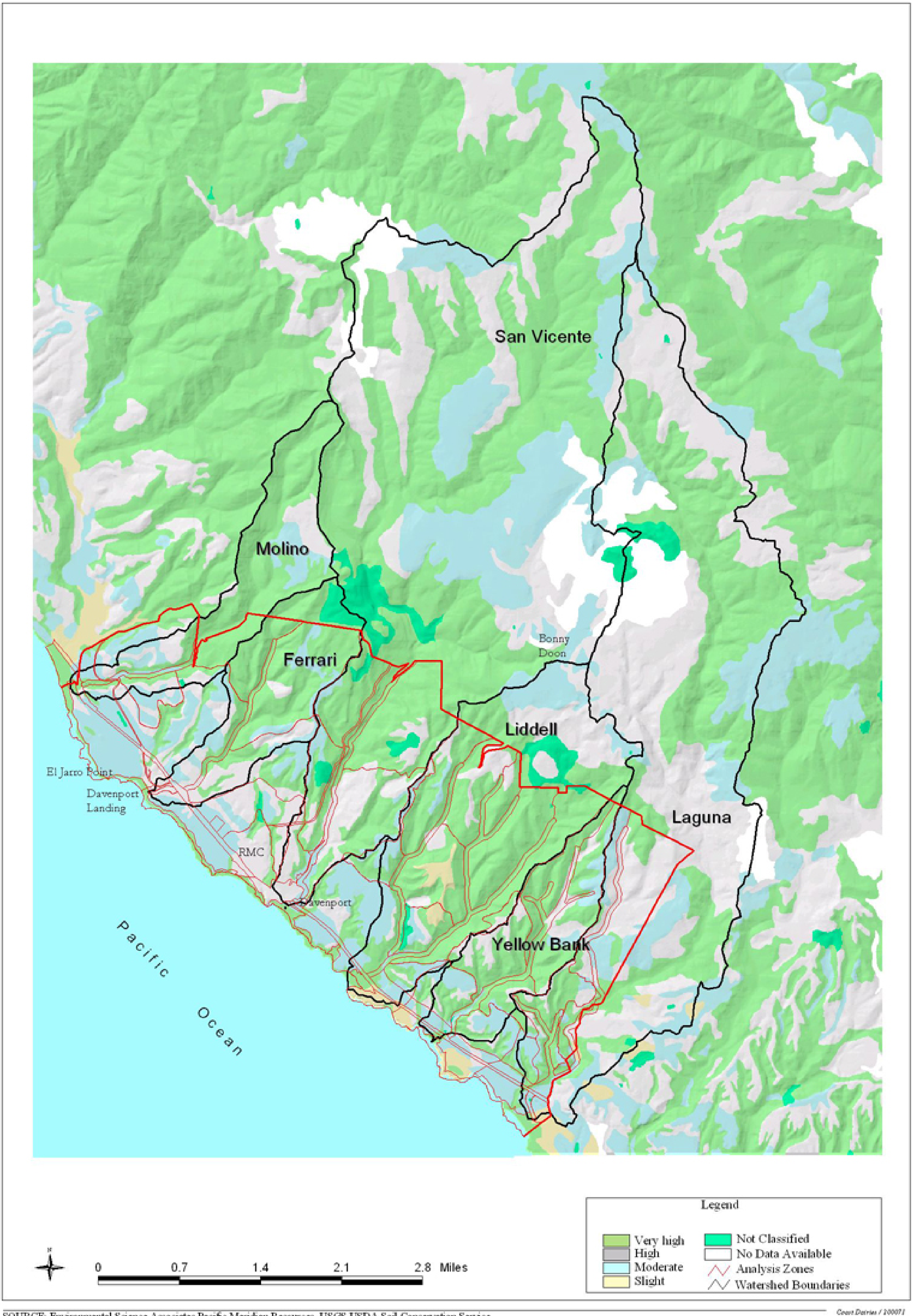
To help guide the discussion of the erosion hazard potential for the nine study watersheds, the Planning Team devised another rating scheme based on the information available for the Property. The method uses information about the soils, slopes, and geology of each watershed to assign an erosion hazard potential of low, moderate or high. The method does not use information about landslides, vegetation, or landuse, since the information was not available in GIS layers in time for preparation of this section of this report. The erosion hazard potential presented here is subject to revision, and should be revised when additional data become available. The derivation of the erosion hazard potential is described in the following sections.

Soils

The soil survey maps for Santa Cruz County were used to map the distribution of hydrologic soil groups in the watershed above each monitoring station (Figure 4.1-29). Hydrologic soil groups are used to estimate runoff from precipitation. Soils are placed into one of four groups on the basis of their ability to absorb additional water after they have been thoroughly wetted to simulate infiltration from long-duration storms. The soil groups are labeled A through D in descending order of infiltration rate:

- Group A soils have a high infiltration rate
- Group B soils have a moderate infiltration rate
- Group C soils have a slow infiltration rate
- Group D soils have a very slow infiltration rate

The hydrologic soil groups from the soil survey are based on the concept that precipitation in excess of infiltration rate results in overland flow (Hortonian flow) and thus generates runoff. Modern views of the rainfall-runoff process offer a more complex view in which overland flow is only one mechanism that provides storm runoff. The other pathways include subsurface flow and saturation-excess overland flow (Dunne and Leopold, 1978). The hydrologic soil group also does



SOURCE: Environmental Science Associates, Pacific Meridian Resources, USGS, USDA Soil Conservation Service

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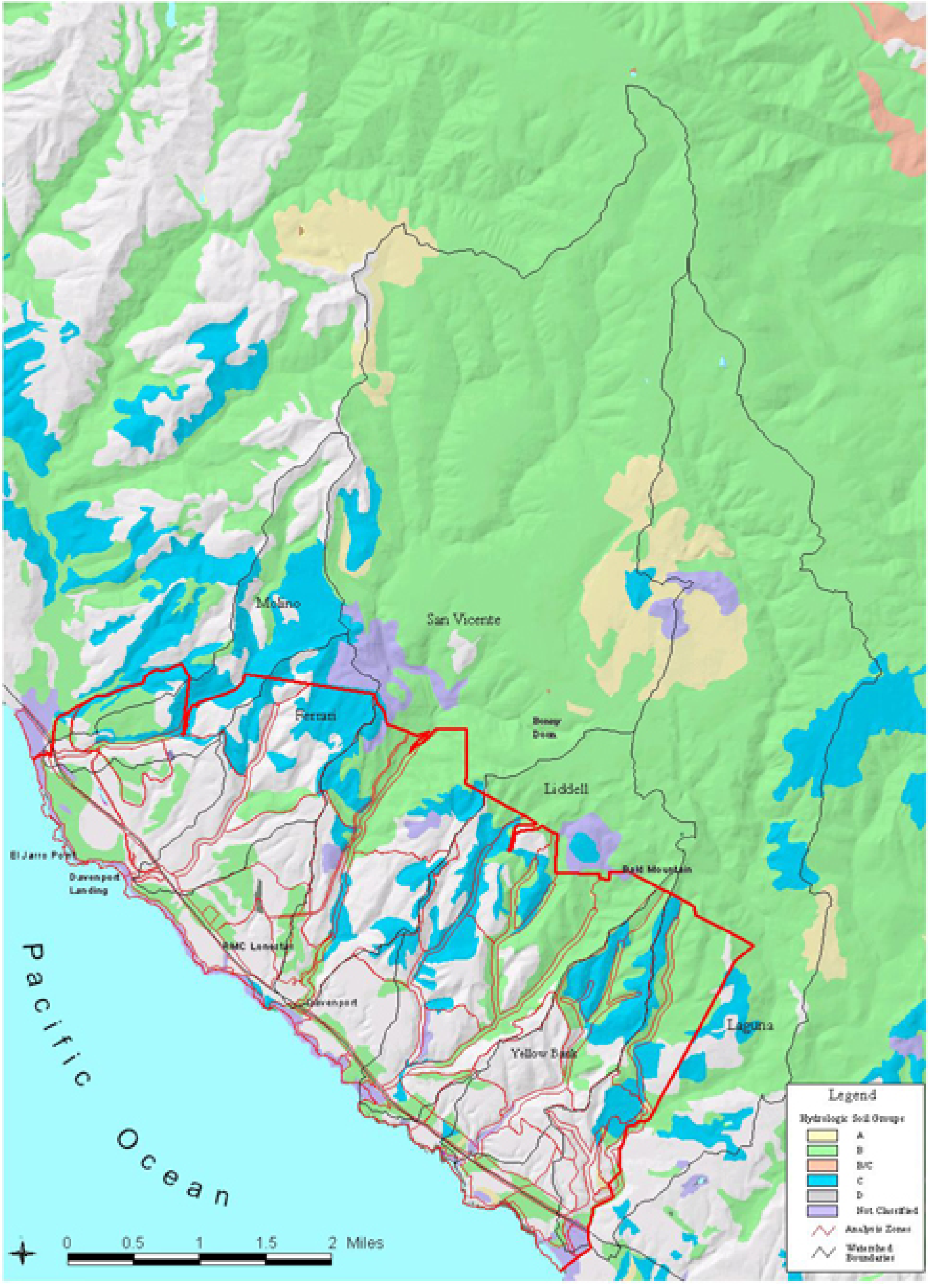
Figure 4.1-28
Erosion Hazard Ratings in the Coast Dairies Area



SOURCE: Environmental Science Associates, Pacific Meridian Resources, USGS

Figure 4.1-29

Hydrologic Soil Groups in the Coast Dairies Area

not account for the effect of vegetation on runoff. Despite these deficiencies, the hydrologic soil group can still be used a rough guide to the relative amount of runoff produced by each watershed.

Table 4.1-12 shows the percent of watershed, above each monitoring station, that is overlain by hydrologic soil groups C and D. A watershed with a high proportion of hydrologic soil groups C and D would be expected to produce more storm runoff than a watershed with a low proportion of its area covered by hydrologic soil groups C and D, all other factors being equal.

TABLE 4.1-12
EROSION HAZARD POTENTIAL FOR COAST DAIRIES WATERSHEDS

Monitoring Station	Percent of Watershed Covered by Hydrologic Soil Group C or D	Soil Rank	Percent of Area with Slopes > 20%	Slope Rank	Percent of Watershed Covered by Sedimentary Rock	Geology Rank	Sensitivity Rank	Erosion Hazard Potential
Molino	78	8	20	7	91	7	22	High
Ferrari	87	9	23	9	90	6	24	High
San Vicente #1	8	2	5	3	33	2	7	Low
San Vicente #2	4	1	5	1	30	1	3	Low
Liddell #1 (West)	65	7	18	5	73	4	16	Moderate
Liddell #2 (Main)	40	5	19	6	74	5	16	Moderate
Laguna	20	3	6	4	45	3	10	Low
Y Creek	36	4	5	2	96	8	14	Moderate
Yellow Bank	58	6	22	8	100	9	23	High

Note: The sensitivity rank for the nine study watersheds is calculated by summing the rank of each watershed for the soil, slope and geology factors. The erosion hazard potential is assigned depending on the value of the sensitivity rank as explained in the text.

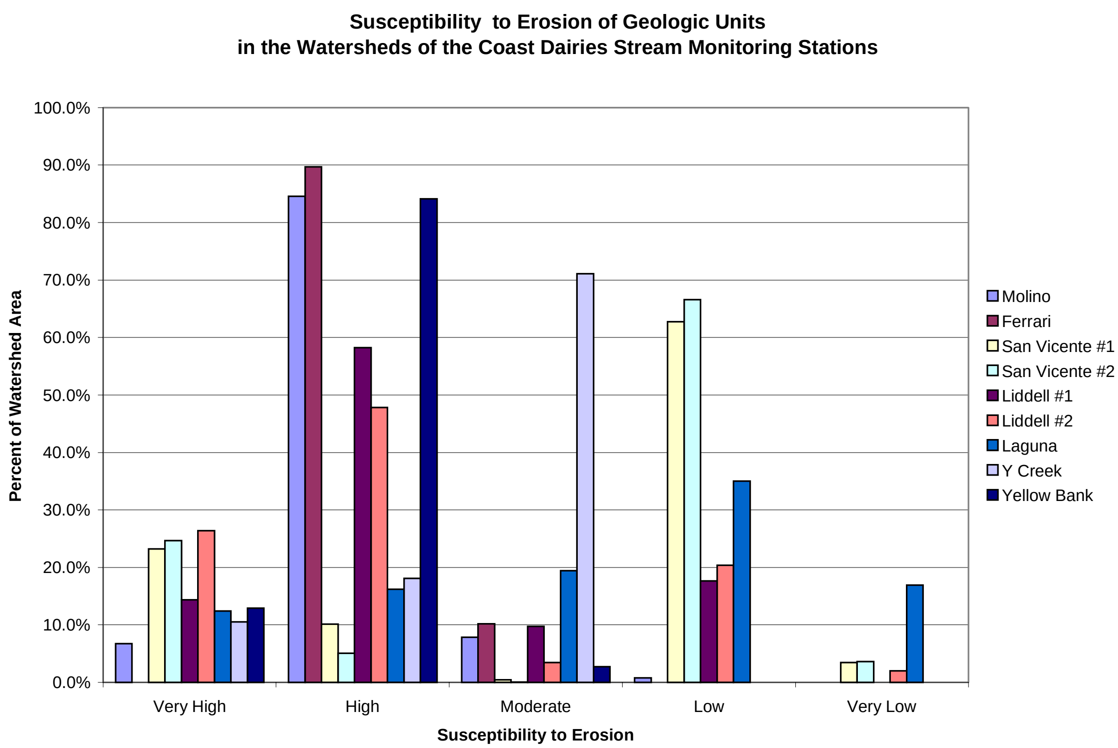
The watershed with the lowest proportion of area covered by soil groups C and D was assigned a rank of 1 and the watershed with the highest proportion of groups C and D was assigned a rank of 9. Table 4.1-12 shows the soil factor rank for each watershed.

Steep Slopes

Steep slopes provide the energy needed to move material down slope towards the stream system. The percentage of each watershed with slopes in excess of 20 percent is shown in Table 4.1-12. The watershed with the smallest percentage of steep slopes was assigned a rank of 1 and the watershed with the highest amount of steep slopes was assigned a rank of 9.

Geology

Mount (1977) rated the susceptibility to erosion of each geologic unit in the San Lorenzo River watershed. The Planning Team applied Mount's rating system to the geologic units in the Coast Dairies study watersheds. Mount's system assigned a numerical value to each unit (see Figure 4.1-26). Mount's values have been grouped into five classes ranging from very low susceptibility to very high susceptibility to erosion. Figure 4.1-30 shows the percentage of each study watershed in each erosion susceptibility class. Mount assigned a susceptibility to erosion rating of either high or very high erosion to the type of sedimentary rocks found in the Davenport area.



Note: Each geologic unit has been rated for its susceptibility to erosion. The graph shows the percentage of each watershed in each erosion susceptibility class.

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Figure 4.1-30
Susceptibility to Erosion of Geologic Units
of the Coast Dairies Watersheds

Table 4.1-12 shows the percentage of each watershed underlain by sedimentary rocks. The watershed with the lowest percentage of sedimentary rocks was assigned a rank of 1 and the watershed with the highest percentage of sedimentary rocks was assigned a rank of 9.

Calculating the Erosion Hazard Potential

The sensitivity rank was determined by summing the soil rank, slope rank and geology rank. The sensitivity rank can range from a low of 3 to a high of 27. Watersheds were assigned an erosion hazard potential according to the following scheme.

Sensitivity Rank	Erosion Hazard Potential
3 - 10	Low
11 - 19	Moderate
20 - 27	High

The results of the ranking of the watersheds for the nine Coast Dairies monitoring stations is presented in Table 4.1-12.

4.1.4.5 TURBIDITY AND SUSPENDED SEDIMENT

The relative magnitude of a stream's suspended sediment load (indicated by turbidity) can be used to determine whether water quality is causing conditions that are stressful to salmonids. There is an indication in the literature (Trush, 2001) that a chronic high sediment load interferes with the ability of juvenile salmon to find food. Dr. Trush's literature survey indicates that juvenile salmonids begin to have difficulty in finding food when the turbidity level is about 25 NTU. A 1963 study for the State Water Resources Control Board by J.E. McKee and H.W. Wolf found that turbidity in excess of 400 NTU might be harmful to some fish life stages. They also found that suspended sediment concentrations in excess of 90 mg/l could be lethal to individual fish (rainbow trout) and that concentrations in excess of 270 mg/l will kill 50 percent of a population when exposed for 2 to 12 weeks.

The number of days that the turbidity is equal to or exceeds the 25 NTU threshold can be taken as an indication of a chronic elevated turbidity and suspended sediment load. The number of days that the turbidity is equal to or exceeds the 400 NTU threshold is taken as an indication of short duration but very high (acute) turbidity and suspended sediment load.

In an effort to determine whether water quality conditions in the Coast Dairies streams are harmful to salmonids, the Planning Team applied the turbidity-discharge relationship for each monitoring station to the synthetic hydrograph (based on the San Vicente gauge for the 1969-1984 water years) for the station.[6] The number of days that the estimated turbidity exceeded 25 NTU and 400 NTU were counted. San Vicente #2 had the fewest number of days above each limit. The estimated number of days that the turbidity for each station was greater than 25 NTU and 400 NTU was then divided by the number of days the San Vicente #2 station exceeded each limit. The resulting relative number of days above each limit provides an estimate or index of the relative ranking of the nine study watersheds. This method eliminates the need to estimate accurately the turbidity for any discharge, and requires only that the turbidity-discharge relationship is good enough to discriminate between flows that produce turbidity below or above the 25 and 400 NTU levels.

6 The assumption used here is that the hydrograph constructed for the 1969-1984 period is representative of recent historic conditions at the Property.

Tables 4.1-13 and 4.1-14 show the estimated number of days that turbidity would be greater than or equal to 25 NTU and 400 NTU, respectively, during a hypothetical 10-year period. As an aid to comparison, the rank of each monitoring station relative to San Vicente #2 is shown in Tables 4.1-13 and 4.1-14, and summarized in Table 4.1-15. The relative rank has been rounded to the nearest whole number since the method cannot be expected to produce precise results. A lower relative rank is associated with lower turbidity levels.

Next, the relative ranks for chronic turbidity were converted into ratings from low (1 or 2) to high (5 or 6), and the relative ranks for acute turbidity were converted into ratings from low (1-3) to very high (23). Table 4.1-16 shows the acute and chronic turbidity rankings, along with the erosion hazard potential ranking described previously.

Comparing the EHP to the Observed Turbidity Measurements

The erosion hazard-potential (EHP) estimates the relative sediment load that an undisturbed watershed would be expected to deliver to the stream. Chronic turbidity is a measure of the suspended sediment load between storm events. Conditions producing chronic turbidity (turbidity$\geq$ 25 NTU) persist for an extended period after significant rainfall events. Acute turbidity is a measure of the suspended sediment load during large discharge events. Conditions producing acute turbidity (turbidity$\geq$ 400 NTU) should last for only short periods in response to significant rainfall events. The desired condition is for each watershed to have a low acute and chronic turbidity rating, regardless of its EHP. Only San Vicente Creek meets this goal.

Table 4.1-16 shows that Y Creek has a moderate EHP, a high chronic turbidity rating, and a moderate acute turbidity rating. This suggests that the source of the high chronic turbidity is not producing significant amounts of turbidity during storm events. There is a ribbon of Santa Margarita Sandstone that parallels Y Creek above the monitoring station. In some places it is very close to the creek, and it is possible that the creek actually flows through the sandstone in some spots. The location of the Santa Margarita Sandstone may result in it contributing a higher portion of the sediment load than would be expected from its total area of coverage. The upper Y Creek watershed has also been logged (Bern Smith, 2000), and Upper Y Creek Road has washed out in at least three locations.

Most of the Y Creek watershed (67 percent) is covered by the Monterey Formation, which is similar to the Santa Cruz Mudstone formation but breaks more easily. There are several slides in the Monterey Formation. All of the turbidity samples were collected in the incising section of channel above the new culverts. The channel incision appears to have stabilized, so it is possible that the local channel incision is generating part of the chronic turbidity. Further sampling should be done above the incising section to determine if the source of chronic turbidity is the incised section of the channel or if it is elsewhere in the watershed.

TABLE 4.1-13
CHRONIC HIGH TURBIDITY LEVELS AT THE NINE COAST DAIRIES MONITORING STATIONS

Water Year	Molino Number of Days with Turbidity >=25 NTU	Ferrari Number of Days with Turbidity >=25 NTU	San Vicente #1 Number of Days with Turbidity >=25 NTU	San Vicente #2 Number of Days with Turbidity >=25 NTU	Liddell #1 Number of Days with Turbidity >=25 NTU	Liddell #2 Number of Days with Turbidity >=25 NTU	Laguna Number of Days with Turbidity >=25 NTU	Y Creek Number of Days with Turbidity >=25 NTU	Yellow Bank Number of Days with Turbidity >=25 NTU
1970	128	131	64	44	130	147	145	211	188
1971	61	71	10	6	66	92	84	189	159
1972	8	8	1	0	8	12	9	34	21
1973	137	144	67	57	143	171	157	248	212
1974	215	226	101	73	225	251	241	296	277
1975	86	94	11	8	94	137	115	188	168
1976	0	0	0	0	0	2	1	8	6
1977	0	0	0	0	0	1	1	4	3
1978	136	142	36	28	142	158	155	203	185
1979	61	75	8	4	75	102	97	144	121
1980	127	134	42	35	134	141	137	212	172
1981	18	22	3	1	22	31	27	90	56
1982	152	162	60	50	161	182	172	260	232
1983	196	206	124	115	205	233	222	302	262
1984	113	123	18	14	121	152	139	227	191
1985	29	38	3	3	38	64	50	167	112
Total	1,467	1,576	548	438	1,564	1,876	1,752	2,783	2,365
					Number of Days Relative to San Vicente #2				
	3.3	3.6	1.3	1.0	3.6	4.3	4.0	6.4	5.4

Note: The estimated number of days that the turbidity is greater than or equal to 25 NTU for each of the nine Coast Dairies monitoring stations. The estimate is based on limited data from each station. Therefore, this information is only a guide to the relative amount of suspended load being produced by each watershed.

TABLE 4.1-14
ACUTE HIGH TURBIDITY LEVELS AT THE NINE COAST DAIRIES MONITORING STATIONS

Water Year	Molino Number of Days with Turbidity >=400 NTU	Ferrari Number of Days with Turbidity >=400 NTU	San Vicente #1 Number of Days with Turbidity >=400 NTU	San Vicente #2 Number of Days with Turbidity >=400 NTU	Liddell #1 Number of Days with Turbidity >=400 NTU	Liddell #2 Number of Days with Turbidity >=400 NTU	Laguna Number of Days with Turbidity >=400 NTU	Y Creek Number of Days with Turbidity >=400 NTU	Yellow Bank Number of Days with Turbidity >=400 NTU
1970	1	2	1	0	20	20	3	3	8
1971	0	0	0	0	1	1	0	0	0
1972	0	0	0	0	0	0	0	0	0
1973	0	0	0	0	34	34	3	2	14
1974	3	3	3	2	31	31	6	6	14
1975	0	0	0	0	3	3	0	0	1
1976	0	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0	0
1978	0	0	0	0	10	10	1	1	2
1979	0	0	0	0	1	1	0	0	0
1980	7	7	6	2	21	21	12	11	14
1981	0	0	0	0	1	1	0	0	0
1982	10	11	8	5	29	29	14	14	20
1983	4	8	3	1	75	75	17	16	50
1984	0	0	0	0	5	5	1	1	3
1985	0	0	0	0	1	1	0	0	0
Total	25	31	21	10	232	232	57	54	126
				Number of Days Relative to San Vicente #2					
	2.50	3.10	2.10	1.00	23.20	23.20	5.70	5.40	12.60

Note: The estimated number of days that the turbidity is greater than or equal to 400 NTU for each of the nine Coast Dairies monitoring stations.

TABLE 4.1-15
RELATIVE SCORES FOR CHRONIC AND ACUTE TURBIDITY

Monitoring Station	Relative Rank for Chronic Turbidity	Relative Rank for Acute Turbidity
Molino	3	3
Ferrari	4	3
San Vicente #1	1	2
San Vicente #2	1	1
Liddell #1	4	23
Liddell #2	4	23
Laguna	4	6
Y Creek	6	5
Yellow Bank	5	13

Note: The relative rank for chronic turbidity (≥ 25NTU) and acute turbidity (≥ 400 NTU) for each station is listed below. The relative rank is calculated by dividing the number of days with turbidity greater than the threshold by the number of days San Vicente #2 is above the threshold, see Tables 4.6 and 4.7. The relative rank has been rounded to the nearest whole number since the method can not be expected to produce precise results. A lower relative rank is associated with lower turbidity levels.

TABLE 4.1-16
RELATIVE RANKING FOR CHRONIC AND ACUTE TURBIDITY AND EROSION HAZARD POTENTIAL

Monitoring Station	Erosion Hazard Potential	Chronic Turbidity Rating	Acute Turbidity Rating
Molino	High	Moderate	Low
Ferrari	High	Moderate	Low
San Vicente #1	Low	Low	Low
San Vicente #2	Low	Low	Low
Liddell #1	Moderate	Moderate	Very High
Liddell #2	Moderate	Moderate	Very High
Laguna	Low	Moderate	Moderate
Y Creek	Moderate	High	Moderate
Yellow Bank	High	High	High

Note: The relative ranks for chronic and acute turbidity were converted into ratings from low to high. The acute turbidity rating is a measure of the suspended sediment load expected during storms. The chronic turbidity rating is a measure of the suspended sediment load expected between storms and chronic. The erosion hazard potential is a measure of the sediment load an undisturbed watershed would be expected to deliver to the stream.

Table 4.1-16 shows that Yellow Bank Creek has a high erosion hazard rating and high levels of chronic and acute turbidity. Yellow Bank is incising over a significant portion of its total length. It is suspected that high rainfall intensities in February of 1998 triggered the incision (more detail is given in the discussion of the individual creeks). The leading nickpoint of the incision process is about 1,500 feet upstream of the Yellow Bank sampling station. The three nickpoints observed are about five feet high. The banks are steep and undercut in places. The incision process is probably generating both chronic and acute turbidity. However, the stream flows over the Santa Margarita Sandstone upstream of Liddell Pipeline Road, which could be a source of acute turbidity. In addition, an abandoned road runs along Yellow Bank Creek, the upper watershed has been logged in the past, and the City of Santa Cruz's water pipeline and access road run along a steep tributary to Yellow Bank Creek upstream of the monitoring station. The roads and pipeline might also be a source of the chronic turbidity. It is recommended that an additional sampling station be established between the leading nickpoint and Liddell Pipeline Road to determine if the incision process accounts for all of the elevated turbidity.

Table 4.1-16 shows that Laguna Creek has a low EHP but moderate levels of chronic and acute turbidity. A small tributary joins Laguna Creek just a few feet upstream of the sampling station. Laguna Road parallels this small tributary. Both the road and the stream are shown to cut through the Santa Margarita Sandstone on the geologic map. The road and tributary could be contributing some of the chronic and acute turbidity observed in Laguna Creek. In addition, about 12 percent of the Laguna watershed is underlain by the Santa Margarita Sandstone and about 12 percent of the watershed is underlain by the similar Lompico Sandstone. So, about 25 percent of the Laguna Creek watershed is underlain by loosely cemented sandstone that is highly erosive, if exposed. A significant length of lower Laguna Creek is flanked on the eastern side by the Lompico Formation. There are several landslides marked on the map through the lower section of the creek. There is also a ribbon of Santa Margarita on both sides of Laguna Creek for about 2,000 feet a short distance upstream from the sampling station.

Table 4.9 shows that both Molino Creek and Ferrari Creek have a high EHP, a moderate chronic turbidity and a low acute turbidity. The low acute turbidity rating suggests that there are no major sediment sources, which are activated during storm events. The low acute turbidity rating suggests that the source of the moderate chronic turbidity is not producing significant amounts of turbidity during storm events. The monitoring station on Ferrari Creek is located next to a cattle-feeding area. The banks of the creek adjacent to the sampling station have been severely trampled by the cattle. Table 4.1-15 shows that Ferrari Creek has a slightly higher relative chronic turbidity rating than Molino Creek. This suggests that the banks of Ferrari Creek and Molino Creek should be examined for chronic turbidity sources. Exclusionary fencing to limit the cattle's access to the creek should also be considered. Additional turbidity samples upstream of the feeding area on Ferrari Creek should be taken to determine the contribution from the damaged banks.

There is a large landslide just upstream of the Molino Creek monitoring station. The base of this slide could be contributing a portion of the chronic turbidity. The upper reservoir on Molino Creek was not in operation during the sampling period. It is possible that fine material that had been previously deposited in the reservoir is being re-mobilized by the stream.

Table 4.1.16 shows that both Liddell #1 and Liddell #2 have moderate EHP rankings and moderate chronic turbidity rankings, but very high acute turbidity levels. Quarry operations are occurring in the watershed above both of these monitoring stations. There is a large landslide complex in the Santa Cruz Mudstone formation at the confluence of the East Branch and the main stem of Liddell Creek. The road adjacent to East Branch Liddell Creek cuts across the base of a portion of the slide complex. This complex is upstream of the Liddell #2 monitoring station. Cattle graze upstream of Liddell #2. It is possible that some of the chronic turbidity is the result of cattle damaging streambanks.

About 14 percent of the Liddell #1 watershed and about 26 percent of the Liddell #2 watershed is underlain by the Santa Margarita sandstone formation. The Santa Margarita sandstone is poorly cemented, and in some cases is essentially loose sand. It is subject to severe erosion where the topsoil has been removed (Earth Science Associates, Geotechnical appendix, 1971). The road along the canyon bottom of East Branch Liddell Creek (upstream of Liddell #2) cuts through the Santa Margarita Sandstone. Sand deposits were seen on the road and associated drainage ditches in December 2000. There are also two landslides in the Santa Margarita formation along East Branch Liddell Creek.

The very high rating for acute turbidity at the Liddell #1 and Liddell #2 monitoring stations is probably due to the quarry operations, especially those operations, such as roads, that disturb the Santa Margarita Sandstone formation. Landslides may also be contributing a portion of the sediment load during significant rainfall events.

Additional turbidity sampling stations should be established on Liddell Creek. Stations should be established below the outlet of the sediment detention ponds for the quarries. Another station should be established upstream of the slide complex and on the both the mainstem of Liddell Creek and on the East Branch of Liddell Creek. This would help determine if the slide complex at the confluence is contributing a disproportionate amount of turbidity to the stream.

The very high acute turbidity suggests that disturbed Santa Margarita Sandstone is capable of supplying a large sediment load. The evaluation of the Property’s roads, presented in Section 4.2, further discusses road-related sedimentation.

Table 4.1-16 shows that both San Vicente #1 and #2 have low rankings for EHP, chronic turbidity, and acute turbidity. Table 4.1-15 shows San Vicente #1 has a higher relative rank for acute turbidity than San Vicente #2. The watershed between San Vicente #2 and #1 seems to be contributing a higher load of sediment than the watershed above San Vicente #2. Most of the watershed between San Vicente #1 and #2 is underlain by the Santa Cruz formation. There is almost a continuous complex of landslides between San Vicente #2 and the bridge over San Vicente Creek. Below the bridge, it is common to see cattle grazing near the creek. The road along the creek, above the bridge, is cut into the canyon wall and crosses the bottom of the slide complex. One of the sediment detention basins for the quarry is located on the small tributary watershed that enters San Vicente Creek downstream of San Vicente #2.

The road along San Vicente Creek should be treated to control sediment (see evaluation of roads in Section 4.2). A turbidity sampling station should be established on the small tributary below the sediment basin.

4.1.4.6 CONCLUSIONS

The focus of this study has been to determine the sensitivity to disturbance, and the level of cumulative disturbance, of the streams and their watersheds on the Coast Dairies Property. The Santa Margarita Sandstone (in the Liddell Watershed analysis zones) stands out as a particularly sensitive geologic unit. Mount (1979) gave the Santa Margarita Sandstone the highest erosion susceptibility rating. The turbidity measurements made during this study support the notion that the Santa Margarita Sandstone is very sensitive to disturbance. Therefore, it is recommended that the Long-Term Resource Protection and Use Plan include provisions for preventing disturbance of the Santa Margarita Sandstone, especially on steep slopes. Caution should also be exercised in areas covered by the Butano Sandstone or Lompico Sandstone (Laguna Watershed analysis zones).

The underlying geology of an area plays a fundamental role in determining its sensitivity to disturbance. The soils and slope of an area are also of fundamental importance in determining sensitivity to disturbance. A watershed scale erosion hazard potential (EHP) was developed using these three factors. The EHP is a measure of the watershed's sensitivity to disturbance. Molino, Ferrari and Yellow Bank creeks had the highest erosion hazard potential. Y Creek, Liddell #1 and Liddell #2 had a moderate erosion hazard potential. Laguna Creek and San Vicente #1 and San Vicente #2 had a low erosion hazard potential.

Comparing the EHP of a watershed to the turbidity measurements made in the watershed is one method of assessing the cumulative disturbance from land use. The turbidity measurements and a synthetic hydrograph for each monitoring station were used to estimate the number of days the turbidity was greater than 25 NTU (chronic turbidity) and the number of days the turbidity was greater than 400 NTU (acute turbidity). Acute turbidity is a measure of the sediment load during storm events. Chronic turbidity is a measure of the sediment load between storm events. Table 4.1-16 shows the EHP, the chronic turbidity rating, and the acute turbidity rating for each of the nine study watersheds. The desired condition is for each watershed to have a low acute and chronic turbidity rating, regardless of its EHP. Only San Vicente Creek meets this goal.

Liddell Creek appears to have experienced the most disturbance. Both Liddell #1 and #2 have very high acute turbidity and moderate chronic turbidity. Disturbance of the Santa Margarita Sandstone is suspected to be responsible for at least a portion of the problem. Mining operations, roads, and the City of Santa Cruz’s water pipeline all occur on the Santa Margarita formation. Additional sampling is recommended (see below) to clarify the significant sediment sources in the watershed.

Yellow Bank Creek is the next most disturbed watershed. The channel near the monitoring station has incised and a nickpoint is migrating upstream. The nickpoint is about one hundred feet downstream of the City's pipeline. There is also evidence of incision near the reservoir. The incision process is probably the cause of the high chronic and acute turbidity. However, additional sampling upstream of the incision is recommended.

Y Creek has high chronic turbidity and moderate acute turbidity. A ribbon of Santa Margarita Sandstone parallels the creek and is suspected of playing a role in the problem. The watershed was logged in the past, and the Planning Team has identified problems associated with the roads in the watershed. The water quality samples were taken in the section of the channel that is incising so; the incision process could be contributing some of the turbidity.

Laguna Creek has a moderate level of chronic and acute turbidity. Most of the Laguna Creek watershed is outside of the Coast Dairies Property. Y Creek is a tributary of Laguna Creek and so its sediment load impacts the sediment load of Laguna Creek. A small tributary joins Laguna Creek just upstream of the monitoring station. The tributary parallels Laguna Road. Both the road and the tributary cut through the Santa Margarita Sandstone.

Both Molino Creek and Ferrari Creek have a low acute turbidity and moderate chronic turbidity. Cattle graze in these watersheds. It is possible that the cattle have damaged the streambanks enough to cause the chronic turbidity. The Ferrari Creek monitoring station is adjacent to a cattle-feeding area. The cattle have trampled the streambanks.

4.1.5 ISSUES

The very high turbidity rating for both Liddell #1 and #2 is a concern. Salmonids are known to use Liddell Creek. Evidence suggests that the roads in the Santa Margarita Sandstone are contributing to the problem. The roads evaluation in Section 4.2 identifies several specific problems associated with these roads. Treatments should be developed and implemented to reduce the impact of these roads on Liddell Creek.

Quarry operations may also contribute to the problem. The lower sediment detention basin above East Branch Liddell Creek failed twice recently. Information on the ability of all of the sediment detention ponds to reduce the suspended sediment load is not available. Therefore, it is recommended that turbidity and suspended sediment be monitored at the outlet of the lowest detention basins on all of the Liddell Creek branches for at least one winter.

The nickpoint on Yellow Bank Creek needs to be stabilized before it damages the City of Santa Cruz's water pipeline from Liddell Spring. The 1,400 feet of channel between the nickpoint near the pipeline and the Yellow Bank monitoring station needs to be inspected for additional nickpoints. In addition, the one-mile of channel between the monitoring station and the reservoir near Highway 1 also needs to be inspected for additional nickpoints.

The local incision on Y Creek and the system-wide incision on Yellow Bank Creek demonstrate the sensitivity of the streams with bed material derived from sedimentary rocks. Sedimentary cobbles and boulders are very light and easily transported by the stream. Any work in the streambed should consider the extreme sensitivity of the bed material to transport by the stream.

Limiting access of cattle to streambanks might reduce chronic turbidity.

The road evaluation should be used as a basis for developing treatments to reduce sediment input to all of the streams on the Property.

One-half of the suspended sediment samples had values below the 5-mg/l no-detection limit. It is recommended that a suspended sediment sample be taken only if the turbidity is greater than or equal to 15 NTU. This recommendation will decrease but not eliminate the number of samples with a value below the no-detection limit.

The erosion hazard potential used in this assessment was done at the watershed scale. It would be desirable to develop an erosion hazard rating for each parcel of land on the Property. The GIS system could be used to apply Jeffery Mount's method of erosion hazard potential.

4.1.5.1 ADDITIONAL DATA NEEDS

The winter storms of 2000-2001 did not produce any significant runoff events. Additional winter sampling might help improve the reliability of the turbidity-discharge relationships. Only two suspended sediment samples had values greater than the no-detect limit at three monitoring stations (Ferrari, Y and Yellow Bank). Additional winter sampling should be conducted to obtain statistically robust relationships between suspended sediment and discharge.

The relationship of suspended sediment and discharge changes through the course of a storm event. For a given discharge, the sediment load is higher before the flood peak than after the flood peak. So, knowing when samples were taken, relative to the flood peak, should improve the strength of the relationship between suspended sediment samples and discharge. Therefore, installing a water stage recorder at each monitoring station would improve the quality of the suspended sediment-discharge relationships.

Additional turbidity sampling stations should be established on Liddell Creek. One station should be established at the outlet of each of the sediment detention ponds for the quarry. Another station should be established upstream of the slide complex and on the both the mainstem of Liddell Creek and on the East Branch of Liddell Creek. This would help determine if the slide complex at the confluence is contributing a disproportionate amount of turbidity to the stream.

A small tributary enters Laguna Creek just upstream of the monitoring station that parallels Laguna Road. Both the road and the tributary appear to be in the Santa Margarita Sandstone. The small tributary should be sampled for turbidity and suspended sediment when Laguna Creek is sampled.

All future water quality sampling at Y Creek should be done above the incising section. This will remove the effect of the local incision on the samples.

An additional monitoring station should be established on Yellow Bank Creek upstream of the nickpoint. The sampling station should be downstream of the small tributary canyon that the pipeline follows to Liddell Creek. Sampling should continue at the existing Yellow Bank monitoring station. Installing a water-stage recorder at Yellow Bank Creek would be very desirable. The small watershed size (0.60 square miles) should produce short duration high discharge events. A stage recorder will provide valuable information on the size and duration of discharge events. The remoteness of the site increases the difficulty of sampling during a flood peak.

Future turbidity samples on Ferrari Creek should be taken upstream of the cattle feeding area to avoid the affect of the trampled streambanks, or cattle should be excluded from the stream.

A turbidity sampling station should be established on the small tributary of San Vicente Creek with the sediment basin.

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4.2 GEOLOGY

4.2.1 METHODOLOGY

Understanding the geologic history and processes that formed the landscape at the Coast Dairies Property is a key element in developing an appreciation for the Property as a whole. This section highlights dominant geologic structure, landforms, and processes responsible for shaping this unique coastal setting. From this exercise, the Planning Team developed particular geologic issues related to the preparation of the Long-term Resource Protection and Use Plan (Plan).

The first section discusses the existing geomorphic setting and is followed by a brief geologic history of California with emphasis on the Santa Cruz Mountains and the coastline to the west. Considering that underlying geology controls the formation of the landforms we see today, this section discusses the strata (stratigraphy) beneath the Property from the oldest bedrock to the youngest gravel deposits. In 1989, the Loma Prieta Earthquake on the San Andreas fault reminded the Bay Area that this is one of the most seismically active regions in California. This section, therefore, discusses regional and local seismicity and describes the primary faults that could potentially affect the Property. As with many coastal areas along the California coast, the Coast Dairies Property contains unique geologic features such as marine terraces and pocket beaches. The Geomorphic Features section discusses their occurrence and formation. This section also discusses mass wasting: an important geomorphic process in the development of landscape. Given the Property's rich agricultural heritage, the *Soil Resources* section discusses soils that cover the terrace deposits and form in the steeper, more hilly portions of the site. The final section summarizes the geologic issues that the Planning Team determined as significant to development of the Plan. Following the Soil Resources section, the next section is devoted to soil erosion and sediment delivery to the stream system. In particular, this section provides a discussion and data derived from the Roads Survey conducted within the boundaries of the Property by the Planning Team. The methodologies used for the Roads Survey are discussed in the next section.

The Team derived the geologic history information from several published sources, as listed in the references provided at the end of this report. The geologic history presented is derived from several sources and is accepted within the scientific community, however, current study of California historical geology may contradict portions of the geologic history presented. Stratigraphy data, including descriptions of rock units, were derived from published data and maps and confirmed in the field. Because of the wealth and availability of published geologic maps and reports, there was no formal field mapping; however, the team geologist did ground truth particular bedrock units, contacts, and features in the field. Published reports, data, field reconnaissance, and maps assisted with developing the discussion of particular Geomorphic Features. The Planning Team conducted the Roads Survey as a field exercise over a period of several months. The Soil Survey prepared by the National Resource Conservation Service for the County of Santa Cruz provided the data on soils and soil resources. The California Department of Conservation supplemented these data with their current list of soils considered Prime

Farmland and of Statewide Importance. Team geologists identified the significant geologic issues based on published data, maps and reports, field reconnaissance, and their knowledge and experience on the Coast Dairies Property.

4.2.1.1 ROADS SURVEY METHODOLOGY

Roads are an important feature of the Coast Dairies landscape, and there is an extensive network on the Property. Roads provide access to nearly all areas, including areas that are now or were once used for the various extractive and resource exploitative activities: logging, mining, cattle grazing, water diversions, irrigated and dry fields, and housing. Roads, in the aggregate, also rival in the extent and intensity of their environmental effects the other major land-disturbing uses of the Property, mining and agriculture. Nevertheless, many of the existing roads have the potential to support the goals of the Plan, in that they can provide access for increased recreation and habitat conservation and enhancement activities.

The goals of the road survey, undertaken as part of the Existing Conditions Report (ECR), were threefold: to map the existing road network on the Property; to document the condition of the existing road network; and to identify specific road features that have a detrimental effect on the Property's aquatic and terrestrial habitat. The Planning Team intends to use the results of the road survey in the forthcoming Opportunities and Constraints Analysis as a basis for planning access as well as habitat restoration and conservation. The data collected will also serve as a resource for the ultimate managers of the Property.

The method used for the road survey is a simplified version of a method developed by Pacific Watershed Associates (Weaver and Hagans, 1994). First, Team members searched historic air photos to determine the general sequence and history of road building on the Property and its vicinity. Then, all roads visible on a recent (1993) air photo were identified and traced as line features using ArcView® GIS software. Each road was categorized as one of five types: primary (e.g., Highway 1 and Bonny Doon Road), secondary (e.g., Warnella Road and San Vicente Road), tertiary (minor roads and tracks), railroad grades, and conveyor belt lines.

Planning Team members surveyed nearly all mapped roads, with the exception of public roads, the railroad grades, and some roads providing access to agricultural fields, between December, 2000 and May, 2001. Prior to field work, we developed two data sheets: one to be used for general descriptive information on each road surveyed; the other to record information on specific sites (points) identified in the field as problematic or potentially problematic, either in terms of road integrity, or the road's effects on the environment (completed data sheets are stored in the Project Archives). The numbered points in Figure 4.2-4 correspond to these sites. Surveyors also recorded recommendations for treatment of road-related problems. Description of treatments are general only; sites will need to be further investigated to develop cost estimates and construction plans for treatments. Information from datasheets was entered into an Access® database to facilitate data management, reporting, and merging into the GIS system through the relational database capabilities of ArcView® and ArcInfo®.

Few of the roads on the Property have proper names. The Planning Team consulted with the Coast Dairies & Land Co. (CDLC) land manager, Bern Smith, to ascertain the names of those roads that have them. For nameless roads, the Planning Team assigned either a logical or a descriptive name.

4.2.2 GEOMORPHIC SETTING

Geologists refer to the western portion of California, between the Pacific Ocean and the Great Valley and stretching from the Oregon border to the San Ynez River near Santa Barbara, as the Coast Ranges geomorphic province. This northwest-trending, 900-mile long province contains mountain ranges and associated intervening valleys that are relatively comparable in age and share somewhat similar history, geologic composition, and structure.

One such range, known as the Santa Cruz Mountains, forms the mountainous spine of the San Francisco Peninsula and extends from Daly City in the north, 80 miles southeast to the Pajaro River, near Watsonville, where is merges with the southern Gabilan range. The widest portion of the Santa Cruz range is about 20 miles in the southern portion near San Jose but generally the range is considered narrow, with widths less the 10 miles, especially on the northern San Francisco Peninsula. The maximum elevation of the Santa Cruz range is about 3,800 near New Almaden (San Jose) but the average summit height reaches 2,500 feet. The western margin of the Santa Cruz range between San Francisco and the city of Santa Cruz is distinguished by the dramatic coastline formed where the bedrock uplands of the range meets the Pacific Ocean. Landscapes along this portion of coast can be abrupt with steep coastal terrain and rocky shores or can be more gradual, formed on flat elevated marine terraces that slope gently downward from mountainous uplands to sandy beaches

The 7,000-acre Coast Dairies Property extends west from the steep bedrock uplands across older elevated marine terrace to the coastline that can either be open sandy beaches or rocky, resistant shoreline. The most characteristic feature of the shoreline along the Property boundary is the sheer cliff, which forms the seaward edge of the youngest marine terrace (sometimes referred to as the 100-foot terrace). This marine terrace, sometimes up to 1.5 mi in width, supports Highway 1, the City of Davenport, and the center of California's Brussels sprout production. Three other terraces ranging in elevation from 100 feet (youngest) to 850 feet (oldest) are easily recognizable on the Coast Dairies Property. Compared to the younger and lower marine terraces, older terraces located at higher elevations tend to be more heavily eroded and deformed. The Davenport marine terrace complex, as this feature is sometimes called, is unique for its complete erosional history and represents an important element to understanding the coastal geologic processes along the San Mateo and Santa Cruz county coastline. Other terraced coastal localities of similar importance include Crescent City, Trinidad, Cape Mendocino, Point Lobos, Morro Bay, and the Pismo Beach area.

The majority of the Coast Dairies Property is situated on marine terraces. As one travels east from the broad 100-foot terrace to older and higher marine terraces, the terrain steepens and displays a landscape formed of deeply incised canyons. Flowing water within the six primary watersheds (Molino, Ferrari, San Vicente, Liddell, Yellow bank and Laguna) on the Coast Dairies Property have continually down-cut through the older marine terrace to develop this relief. The ridge crests marking the eastern boundary of the Property, roughly defines the contact of the overlying marine terraces and older bedrock.

4.2.3 REGIONAL GEOLOGIC HISTORY

The following geologic history is derived from many sources and represents a summary of the currently accepted sequence of events that formed California's landscape. New discoveries and theories in the fields of Geoscience may contradict aspects of these events. A geologic time table is provided as Figure 4.2-2.

Scientists believe that beginning in the early Mesozoic Period (about 200 million years ago), the western coast of California was further east and water covered the area that would one day become the Coast Ranges of California. During this time, the western oceanic plate and the continental plate to the east (North American plate) collided, forcing the denser ocean sea floor under the continental plate in a process known as a subduction. As the plate was subducted, sea floor sediments were "scraped" off and accumulated westward from the edge of the existing continent, thereby providing material, including the Franciscan Complex[1], for the future Coast Range Mountains.

Subduction continued until about mid-Eocene time (40 million years ago) when those forces ceased and the plate boundary transformed and began the lateral "strike-slip" movement of the San Andreas Fault System. Rather than being dominated by subduction and vertical faulting, the plate boundary was now undergoing the forces of right-lateral displacement, forcing the North American plate in a northerly direction. Beginning at about the same time and continuing until the Pliocene-Pleistocene period (about 3 million years ago), folding and uplift occurred that eventually forced the rocks, previously accumulated during subduction (including the Franciscan Complex), upward to form the basement of the Coast Range Mountains that exist today.

From the time lateral northward movement along the San Andreas fault commenced, a large mass of rocks, including granites associated with the Sierra Nevada, have been moved northward through complex movements of faults within the San Andreas Fault System. This mass of rock, known as the "Salinian Block" contains granites that correlate in age with those of the southern Sierra Nevada and various metamorphic rocks[2] believed to have originated some 350 miles to the south. The Salinian Block has been moving northward along the west side of the San Andreas fault and associated rocks can be found as far north as Point Arena. In the southern portion of the Coast Ranges, the Salinian Block occurs between the Nacimiento fault and San Andreas faults. As the San Andreas Fault Zone roughly bisects the Santa Cruz range, the basement (underlying

[1] The Franciscan Complex is a general term for the mass of ancient, heavily folded rocks that form the bulk of the Coast Ranges.
[2] Metamorphic rocks are sedimentary or volcanic rocks altered by prolonged heating and deformation.

"core" rocks), is composed of rocks associated with both the Franciscan Complex and the "Salinian Block". Beneath the Coast Dairies Property, located to the west of the San Andreas, the underlying basement rocks are composed primarily of crystalline and metamorphic rocks of the "Salinian Block."

4.2.4 STRATIGRAPHY OF THE COAST DAIRIES PROPERTY

The geologic materials underlying the Coast Dairies Property range from Cretaceous-aged (beginning 136 million years ago) granitic and metamorphic rocks, to alluvial deposits laid down during the Quaternary Period (from about 2 million years ago to the present). This section briefly discusses each of the rock types found on the Property and includes a discussion of rocks found east of the Property within the upper reaches of the Property's watersheds. A Geologic Map is provided as Figure 4.2-1. Please note that some color tones displayed on the Geologic Map may differ slightly from those listed in the legend due to color alterations inherent with the process of printing the images on paper.

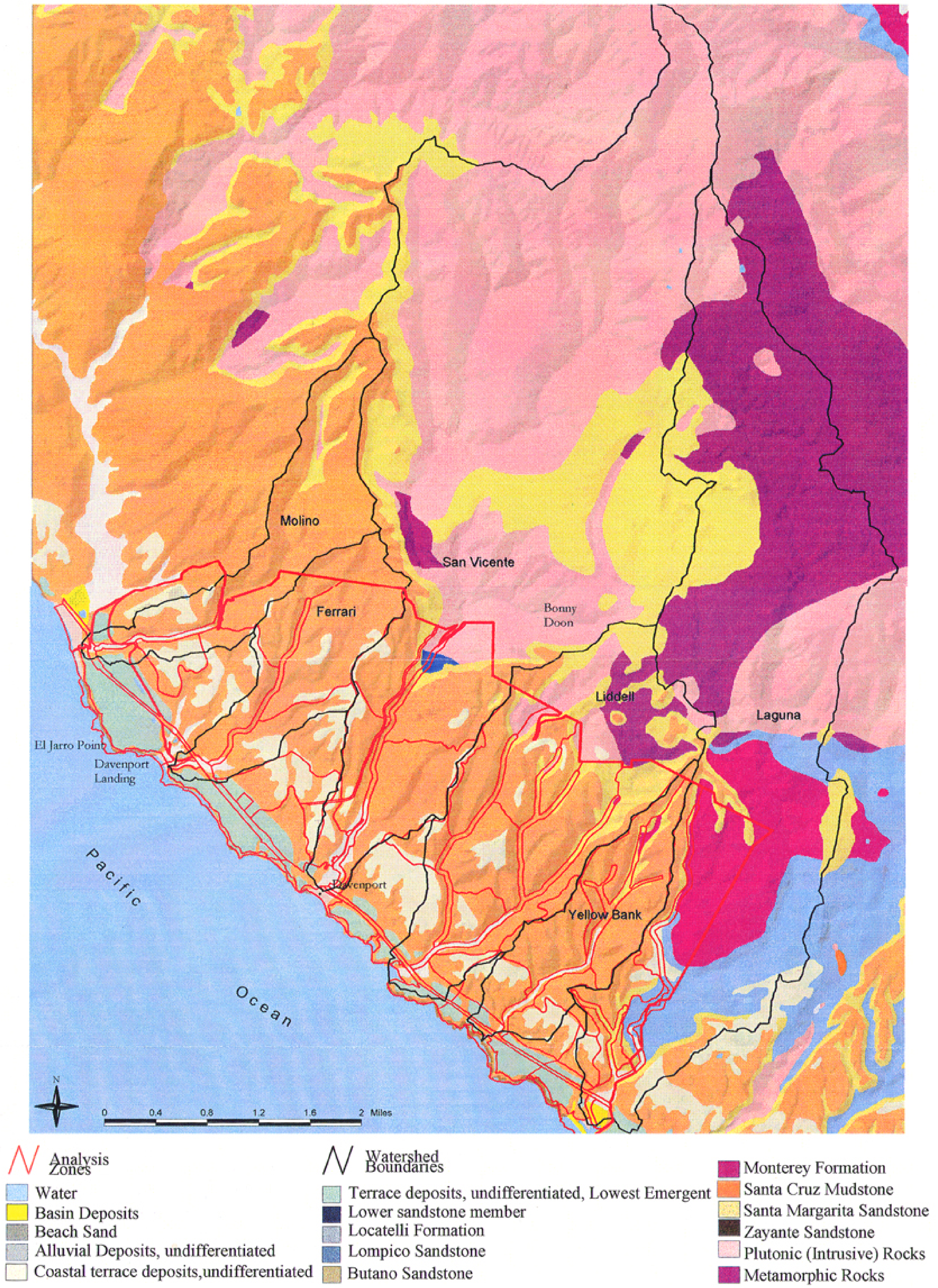
4.2.4.1 BASEMENT COMPLEX

Perhaps the oldest rocks exposed on the Coast Dairies Property and to the east towards Ben Lomond Mountain are the crystalline plutonic and metamorphic rocks that include schist and marble and that were intruded at one time by granitic rocks. As previously discussed, these basement rocks are part of the rock mass, or magmatic arc [3], known as the Salinian Block. Tectonic uplift of Ben Lomond Mountain is thought to have been responsible for uplift of the "Salinian Block" basement rocks in this area. The individual rock types included in the basement complex are briefly described below.

Schist

Schist crops out in several locations northeast of the Coast Dairies Property but does not appear in surface outcrops within the Property boundary. Formed by dynamic metamorphism of siltstones and sandy mudstones during the Cretaceous, schist contains fine-grained rock with visible platy mica. The mica plates are oriented in a single plane allowing the rock to split along the foliation planes. Schist observed in previous studies appears deeply weathered or exhibits a reddish brown to grayish color due to alteration. These rocks, although appearing to possess good in-place bearing strength, are relatively weak, and easily excavated (Earth Science Associates, 1971). Fragments of schist are present in the upper reaches of the Laguna and Liddell watersheds.

[3] A magmatic arc is a region of high volcanism and seismicity where the subducted plate lies below oceanic or continental crust.

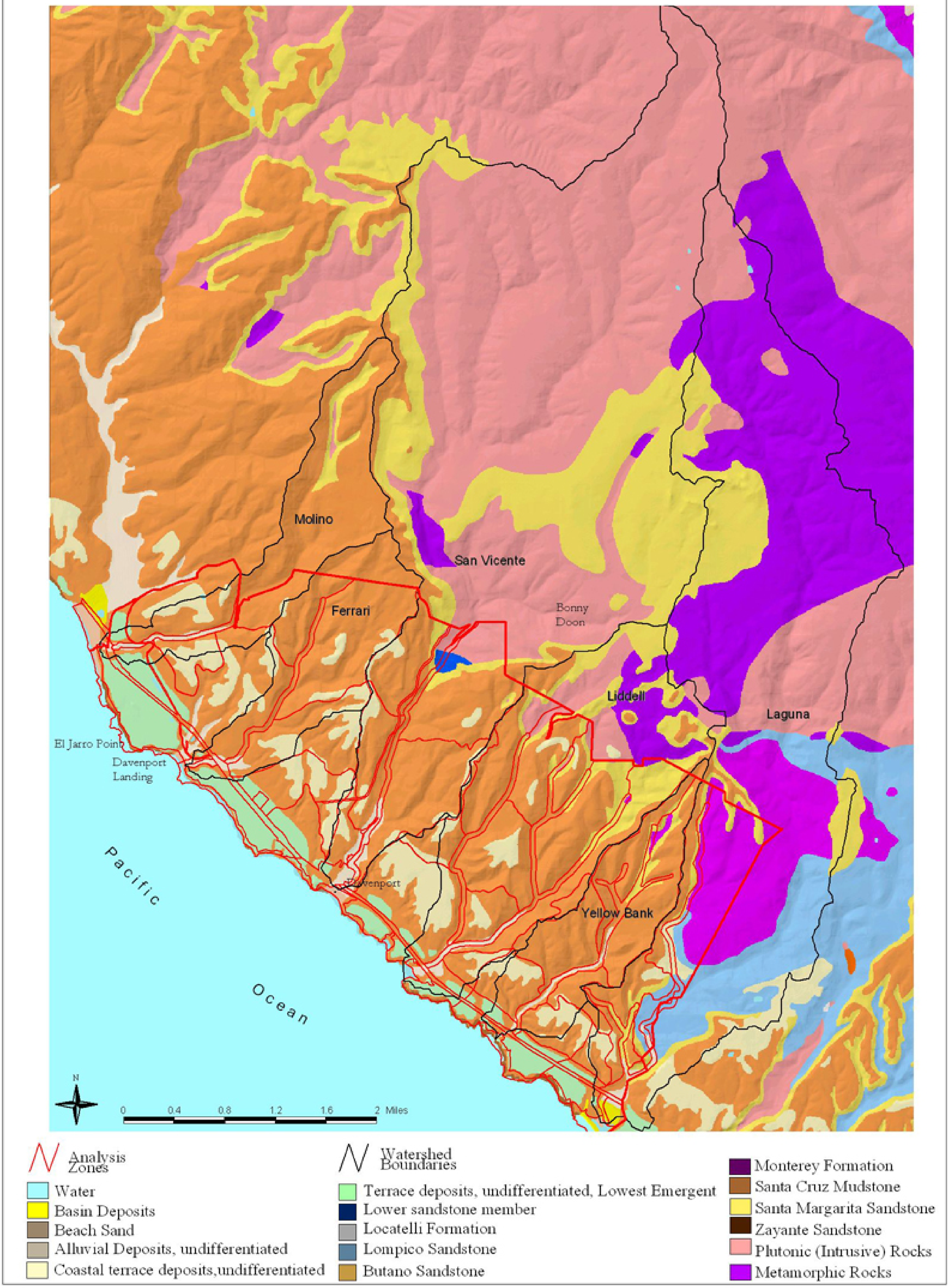


SOURCE: Environmental Science Associates, Pacific Meridian Resources, USGS

Coast Dairies / 200071

Figure 4.2-1

Geology in the Coast Dairies Area



SOURCE: Environmental Science Associates, Pacific Meridian Resources, USGS

Coast Dairies/ 200071

Figure 4.2-2

Geology in the Coast Dairies Area

Marble

Limestone that has been subjected to metamorphism and recrystallization is referred to as marble. Marble forms under the high temperatures and pressures of folding and shearing and occurs in masses within the schists. The age of the marble in the Santa Cruz area is not known but is thought to be derived from Permian aged (about 240 million years ago) limestone deposits. Marble outcrops are located throughout the University of California at Santa Cruz (UCSC) campus, where it was heavily mined before the University was built (Stoffer, 2001). The marble located in the mountains east of the Property is light gray, hard, and although a massive structure, contains fractures. Water percolates through the fractures dissolving portions of the rock and forming cavities that are eventually filled with clayey material containing marble fragments. As a result, hard blocks of marble can be observed separated by fractures and cavities filled by clay and rubble. Outcrops of marble have been observed at the boundary and just outside the Coast Dairies Property and are currently being mined for cement production at the RMC plant in Davenport (see Section 5.3.1) (Earth Sciences Associates, 1971). The mined limestone has been altered and metamorphosed to marble and is composed of crystalline, calcite [4] that is generally free of magnesium carbonate (CDMG, 1989). Fragments of marble are abundant in the upper San Vicente and Liddell watersheds.

Quartz Diorite (qd)

At some time during the formation of the Salinian Block, quartz diorite, a plutonic rock somewhat like granite, was molten and intruded into the metamorphic schist and marble. Intrusion is thought to have occurred during the Cretaceous Period (about 70 million years ago). Quartz diorite exposed on the Property contains fine to medium sized grains and occurs as massive blocks or intrusive “tonques” that penetrated through the surrounding metamorphic rock. This rock is generally massive and dense in-place, but is deeply weathered and well-fractured at exposed outcrops. Decomposition causes the weathered massive quartz diorite to become weak and friable and break down to a gravelly sand when excavated. The loose granular product of weathering is referred to regionally as D.G. (Decomposed Granite) and is commonly used for road base. Exposed quartz diorite and the D.G. material used for fills and road bases are highly susceptible to erosion (Earth Science Associates, 1971).

4.2.4.2 TERTIARY-AGE SEDIMENTARY ROCKS

As discussed in the geologic history, during the Tertiary Period, (from about 54 million years to 2 million year ago) the Coast Ranges were slowly rising above the sea and becoming dry land. During this time, it is believed that the seas periodically inundated the area, depositing a variety of sedimentary rocks over the crystalline basement rocks (described above). These rocks range from the older Lompico Sandstone, to the younger Santa Cruz Mudstone, which occupies a large portion of the Coast Dairies Property. Certain Tertiary rocks, underlying the eastern portion of the Property supplies the shale quarried by RMC for their cement production operations.

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[4] Calcite is the name for calcium carbonate ($CaCO_3$), a common rock forming mineral.

Although there are four distinct formations within the Coast Dairies Property, this section describes additional units located off the Property to the east but within the upper reaches of the Property's watersheds. The Geologic Map, provided as Figure 4.2-1, shows a variety of tertiary sediments in the region, some of which are not discussed below because they have not been mapped within the Coast Dairies Property or within the upper reaches of the Coast Dairies watershed.

Lompico Sandstone (Tlo)

The Lompico Sandstone, the oldest of the Tertiary sedimentary deposits with outcrops within the boundaries of the Coast Dairies Property, was laid down in the middle Miocene (about 18 million years ago). Exposures of the Lompico are limited to the Laguna Creek watershed in the southeast portion of the Property and are observed to be a small outcrop (Earth Science Associates, 1971). This unit is composed of well sorted, fine to coarse sand that is relatively weak and poorly cemented. It weathers readily because it is friable and tends to form gentle hillside slopes with poorly exposed outcrops. Some interbeds within the Lompico are poorly sorted and well-cemented coarse-grained sand. The Lompico can be excavated easily and because it is relatively permeable and poorly cemented, water flows easily through the formation, resulting in seeps and occasional failure of saturated near-surface hillside materials. Fossils of mollusks and barnacles found in this formation indicate that deposition of the Lompico Sandstone took place in a near-shore, shallow marine environment during a transgression when the area was re-submerged by the sea following a period of uplift and erosion (Clark, 1981 p.24). This sand unit represents the bottom (or basal) part of that Middle Miocene depositional sequence and is estimated to range in thickness from 200 to 2,000 feet.

Monterey Formation (Tm)

Overlying the Lompico Formation is the Monterey Formation. Like the Lompico, the Monterey was laid down in the middle Miocene, but followed deposition of the lower basal unit. Outcrops of the Monterey are visible on the Coast Dairies Property along the ridge in the southwestern portion and at the bottom of Laguna Creek, Yellow Bank Creek (upper watershed area) and the East Fork of Liddell Creek (Clark, 1981, p.24). The Monterey is described as a diatomaceous [5] organic mudstone and sandy siltstone that includes thick dolomite beds in certain locales (Brabb, 1997). Modern appearance of the Monterey Formation on the Coast Dairies Property is that of a fine-grained, well-fractured, light-colored, low density rock that ranges in color from olive-gray where fresh to a pale yellow when weathered. The Monterey is similar in appearance to the younger Santa Cruz mudstone, fractures, and can contain a greater abundance of fossils. Deposition of the Monterey Formation took place after the deposition of the Lompico Formation as the water depth increased due to subsidence (Clark, 1981 p.24). The estimated thickness of the Monterey Formation is 2,650 feet.

[5] Diatomaceous rocks contain numerous diatoms or single-celled plants.

Santa Margarita Sandstone (Tsm)

This sandstone unit was described in 1909 as a "distinctive formation consisting of pure white sand overlain by white shale"(Clark, 1981). The Santa Margarita is late Miocene in age (about 10 million years old) and is found in lower canyon outcrops in the upper portion of the Coast Dairies Property. In many locations throughout Santa Cruz County, the Santa Margarita sand is quarried for use as construction sand. The Santa Margarita formation consists of massive fine to coarse-grained arkosic sandstone[6] that is pure white but fades to orange-gray upon exposure on a weathered surface. The beds within the formation are thick and exhibit cross-bedded structure. Cementation of the sand grains is poor and therefore the rock is weak and friable, leading to a high rate of erosion upon removal of the overlying soil cover.

The Santa Margarita Formation in some locations is cemented by coal tar (sometimes referred to bituminous sands). Mining operations from 1878 to 1915 removed the coal tar for use as road surfacing material, especially for new streets in San Francisco. The coal tar sands display an obvious dark gray to black color. Prominent coal tar sand exposures are found to the south of the Coast Dairies Property and in the upper San Vicente Canyon but have not been observed within the Property boundary. Considering the permeability of this unit, it is possible that in some areas of the Property it serves as a groundwater-bearing aquifer.

The cross-bedding structures and fossil remains provide evidence that the Santa Margarita Sandstone was laid down in a high-energy marine environment characterized by surging waves and strong currents. It deposited as the basal (bottom) coarse-grained unit to the subsequent upper Miocene to Pliocene (about 8 million years ago) depositional sequence. Deposition occurred during a transgressive stage [7] when seawater covered the majority of the San Francisco Bay Area, southern Coast Ranges and portions of the San Joaquin Valley. The estimated thickness of the Santa Margarita Sandstone ranges from 0 to 426 feet.

Santa Cruz Mudstone (Tsc)

By far the most abundant rock tertiary rock unit underlying the Coast Dairies Property is the upper Miocene to Pliocene age (about 8 million years ago) Santa Cruz Mudstone. The Santa Cruz Mudstone resembles the Monterey Formation and was included as a unit within the Monterey Formation in previous studies. However, recent work (Clark, 1981) defines this unit as a separate distinctive formation which is younger than the Monterey formation (Earth Science Associates, 1971). As shown on the Geologic Map, Figure 4.2-1, the Santa Cruz Mudstone underlies the Coast Dairies Property from the coastline east to the upper ridges and is quite extensive north of the Property. This formation is approximately 8,860 feet thick and composed primarily of silica-rich (siliceous) mudstones and sandy siltstone. Most of this rock, similar to the Monterey Formation, is considered diatomaceous because it contains numerous diatoms or their siliceous remains.

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6 Arkosic sandstone is derived from coarse grained minerals of quartz such as feldspar.
7 Transgressive stage is one in which sea level is rising and encroaching landward, covering the land surface.

The appearance of the mudstone on the Coast Dairies Property is olive-gray to yellowish brown at fresh exposures but fades to a buff or beige on weathered surfaces. The bedding thickness varies and can contain shale between the bedding planes. Although the compressive strength of mudstone is considered comparable to that of concrete, the mudstone is weak and brittle with abundant, closely spaced fractures that produce small angular slabs when disturbed by slope failure or excavation. The strength and inherent stability of the mudstone is highest at the youngest, western-most terrace, and decreases eastward towards the older, more weathered terraces.

Deposition of the Santa Cruz Mudstone took place as the surrounding area submerged below the depth affected by wave and current action. During the deposition, the supply to the depositional basin of clastic rocks[8] was reduced and sediments of volcanic origin predominated while the population of diatoms increased dramatically.

4.2.4.3 QUATERNARY DEPOSITS

Younger quaternary sedimentary deposits overlie the tertiary age units, especially the Santa Cruz Mudstone. These were typically deposited starting about 2 million years ago and deposition of these young sediments continues to this day. They include both marine depositional units and non-marine, those deposited as recent alluvium from the upland sources to the east.

The oldest are the Pleistocene age coastal terrace deposits (Qcu) described as partially consolidated marine sand with discontinuous gravel layers. Rocks within this unit can include volcanic rocks, mudstones and silica-rich rocks such as chert. The Geologic Map, Figure 4.2-1 show the majority of these deposits inland within about one mile of the coastline, but smaller remnants are further east at higher elevations. These coastal terrace sediments were likely laid down as beach deposits when the sea level was falling during Pleistocene time (about 1 million years ago).

Younger than the Qcu unit, the lowest emergent coastal terrace deposits (Qcl) are located adjacent to the shoreline and are generally bisected by Highway 1. These deposits are similar in composition to the Qcu unit and contain well-sorted sand, with occasional continuous layers of gravel. However, these sediments can inter-finger into wind-blown sand dune deposits. The unit was likely laid down in a high-energy near shore marine environment similar to what is occurring presently along the beaches and rocky shorelines.

The upper time division within the Quaternary Period is the Holocene Epoch, which began about 11,000 years ago. The Holocene sedimentary deposits laid down on the Coast Dairies Property include beach sand and alluvium. Beach sand (Qbs) occurs along the shoreline of the Property in small pocket beaches and is derived from the material transported to the beach from inland sources and erosion of adjacent sea cliffs. Beaches generally form at the mouth of a creek, as

[8] Clastic Rocks contain broken, angular, coarse-grained rock fragments.

they do along the coastline of the Coast Dairies Property, unless human activity such as a culvert or a water diversion is restricting or reducing flow at the coast.

The youngest Holocene sedimentary deposits mapped at the Coast Dairies Property are undifferentiated alluvial deposits (Qal) and basin deposits (Qb). The alluvial deposits are unconsolidated and heterogeneous containing silt sand and clay, locally containing large amounts of gravel. These deposits can include flood plain sediments but are typically found associated with the various creeks and in the western portions of the creek drainages where culvert restrictions and reservoirs have resulted in the accumulated sediments. Basin deposits can consist of plastic, silty clay and sand deposited in lagoons, marshlands and sloughs.

Prior to the placement of fills and culverting of the stream channels, first for the construction of the railroad grade, and later for the construction of Highway 1, streams flowed unrestricted to their mouths and deposited sediment on the beaches. After culverts or bores were installed and flow was restricted, especially during flood events, Holocene-aged sediment deposited upstream of the culverts and bores east of the highway fills. Stream channels subsequently incised the loosely consolidated sedimentary deposits forming the steeply banked channel. This series of events is evident in the Molino watershed, in the area between Swenton Road and Highway 1.

4.2.5 SEISMICITY

The Coast Ranges of California contain both active and potentially active faults and are considered a region of high seismic activity. The 1997 Uniform Building Code (UBC) locates the entire Bay Area; including the Davenport area, within Seismic Risk Zone 4. Areas within Zone 4 are expected to experience maximum magnitudes and damage in the event of an earthquake (Lindenburg, 1998). The U.S. Geological Survey (USGS) Working Group on California Earthquake Probabilities has evaluated the probability of one or more earthquakes of Richter magnitude 6.7 or higher occurring in the San Francisco Bay Area within the next 30 years. The result of the evaluation indicated a 70 percent likelihood that such an earthquake event will occur in the Bay Area between 2000 and 2030 (USGS, 1999).

For the discussion within the ECR, an "active" fault is defined by the State of California as a fault that has had surface displacement within Holocene time (approximately the last 10,000 years). Surface displacements observable and can be measured either from rock outcrops or within a trench dug across a fault trace. A potentially active fault is defined as a fault that has shown evidence of surface displacement during the Quaternary (last 1.6 million years), unless direct geologic evidence demonstrates inactivity for all of the Holocene or longer. This definition does not, of course, mean that faults lacking evidence of surface displacement are necessarily inactive. "Sufficiently active" is also used to describe a fault if there is some evidence that Holocene displacement occurred on one or more of its segments or branches (Hart, 1997).

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4.2.5.1 REGIONAL FAULTS

The San Andreas Fault Zone to the east and the San Gregorio Fault Zone to the west represent the two principal active faults within the region (Figure 4.2-3). The San Andreas Fault Zone forms the eastern boundary to the Salinian Block and the San Gregorio Fault Zone runs parallel to the coast and represents the westernmost zone of active faulting in the San Francisco Bay Area. These faults are known as right-lateral strike slip faults or those with principal movement parallel to the trend of the fault. Right-lateral strike slip movement of the San Andreas Fault, for example means that the western portion of the fault is slowly moving north while relative motion of the eastern side is to the south.

Unlike the active faults in the region that have exhibited movement in historic time or within the last 11,000 years, the Zayante fault is considered a potentially active fault and shows evidence of movement within the last 1.6 million years. The Ben Lomond fault is a *Pre*-Quaternary fault in which evidence of movement is typically not recognizable but the fault is not necessarily inactive (Jennings, 1994).

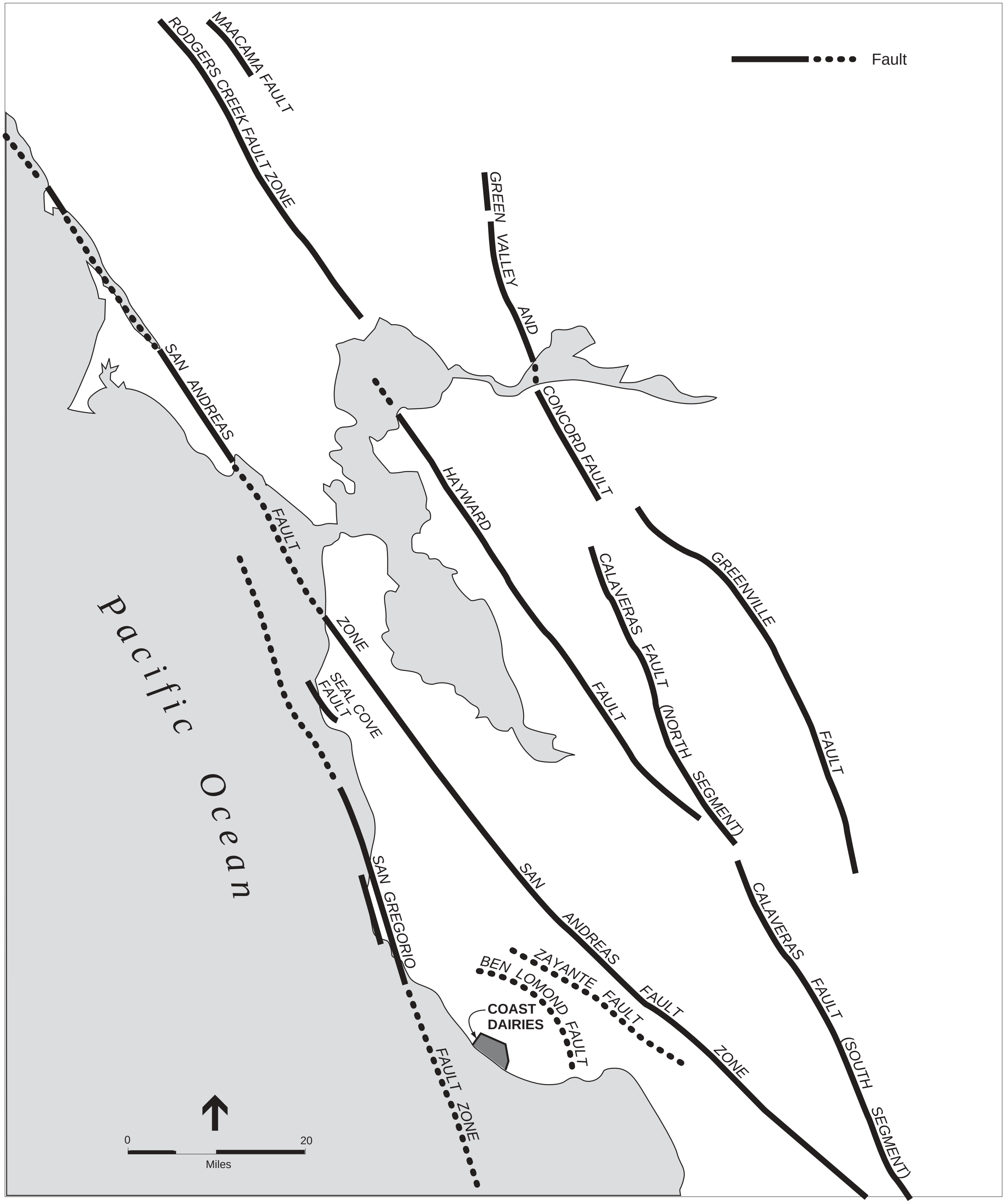
San Andreas Fault Zone

The San Andreas Fault Zone extends nearly the entire length of California and marks the plate boundary between the North American plate to the east and the Pacific plate to the west. The San Andreas is not represented by a single trace, but by a system of active faults that diverge from the main fault south of San Jose. Two of the active faults included in this San Andreas Fault "System" are the Calaveras and Hayward faults. These two faults extend through the eastern side of the San Francisco Bay. The main trace of the San Andreas follows a northwest trend cutting through the Santa Cruz Mountains and continuing along the eastern side of the San Francisco Peninsula. One dramatic surface expression of the San Andreas exists between Pacifica and San Mateo where Crystal Springs Reservoir and San Andreas Lake clearly mark the rupture zone.

Locally, the San Andreas fault was responsible for the Great 1906 San Francisco Earthquake (Magnitude 7.8) and the recent 1989 Loma Prieta earthquake (Magnitude 6.9). The Coast Dairies Property lies approximately 18 miles west of the 1989 epicenter of the Loma Prieta Earthquake. During recorded history, numerous California earthquakes of magnitude greater than a magnitude 6.5 have occurred on this fault from Los Angeles to Point Arena. [9]

The San Andreas fault lies about 15 miles to the northwest of the Coast Dairies Property and although it does not run through the Coast Dairies Property, groundshaking from earthquakes generated by the San Andreas System will surely affect this area sometime in the future.

[9] Magnitudes herein are expressed as Moment Magnitudes. Moment magnitude is related to the physical size of a fault rupture and movement across a fault while Richter magnitude scale reflects the maximum amplitude of a particular type of seismic wave. Moment magnitude provides a physically meaningful measure of the size of a faulting event (CDMG, 1997b). The concept of "characteristic" earthquake means that we can anticipate, with reasonable certainty, the actual damaging earthquake that can occur on a fault.



SOURCE: Environmental Science Associates

Figure 4.2-3
Principal Active Faults in
San Francisco BayArea

San Gregorio Fault

The San Gregorio Fault Zone is made up or several shorter faults and extends roughly parallel to the coast of California about 270 miles from the vicinity of Bolinas Bay south to Monterey Bay. The Palo Colorado fault mapped by Jennings (1994) to extend from the center of Monterey Bay about 24 miles to Big Sur may be a segment of the San Gregorio Fault Zone. The San Gregorio continues south through Big Sur and eventually connects with the Hosgri fault Zone in the south-central portion of the state.[10] Except for two small segments that pass through land, the San Gregorio Fault Zone remains off shore from San Francisco to Santa Cruz, and is about 2 miles off the shore at the Coast Dairies Property. These previously mapped onshore active fault segments are the Seal Cove fault that comes onshore at Pillar Point near Half Moon Bay and two parallel segments that come onshore at Pescadero Point. Previous studies have referred to these parallel strands as the Frijoles strand and the Coastways strand (Sedlock, 1998). While the other major faults in the San Francisco Bay Area have produced earthquakes greater than Magnitude 6.0, the San Gregorio has not provided scientists observable evidence of displacement on this fault. The 1989 Loma Prieta Earthquake did not appear to trigger secondary movement on the San Gregorio Fault Zone. The right-lateral “slip” or movement on San Gregorio is widely estimated to be between 1 to 10 millimeters per year (mm/yr) (Sedlock, 1998). Data on epicenters recorded in historic times indicate three small earthquakes, magnitudes ranging from 5.5 to 5.9, occurring offshore of the Coast Dairies Property between 1869 and 1931. Two larger earthquake (Magnitude 6.0 to 6.4) occurred of the shore of Carmel during the same time period (Toppozada, 2000).

Zayante and Ben Lomond Faults

The Santa Cruz Mountains in general and the Coast Dairies Property in particular, contain many small inactive faults that occur in isolated exposures. However, the Zayante fault and the Ben Lomond fault are traceable beyond localized areas and display some minor level of displacement.

At its closest location, the Zayante fault is approximately 7 miles east of the Coast Dairies Property, trends southeast from Big Basin State Park towards Scott’s Valley, and continues southward to the hills north of Aptos. This fault may have been an important geologic structural feature in this region during Tertiary time, but by the early Miocene, seismic activity had decreased. The area then underwent erosion and was later covered by middle Miocene age seas as the Monterey formation was deposited. This fault is not well-exposed and its trace has been mapped primarily by offset of rock outcrops. Some portions of the Zayante fault may be active and some scientists believe its southern section may be indirectly connected to the San Andreas Fault Zone.

The Ben Lomond fault, located about 6 miles east of the Coast Dairies Property, is not considered active and may be too old to be considered a potentially active feature. The fault trends southeast from Boulder Creek to the area around Felton, and is observed in small offsets of Miocene age

[10] The San Gregorio Fault Zone is sometimes referred to as the San Gregorio-Hosgri Fault Zone to include the system of northwest trending faults that parallel the coast from Lopez Point near Lucia to Point Sal near San Luis Obisbo.

rocks. Granitic rocks of Ben Lomond Mountain and the Monterey formation are divided at the contact of the Ben Lomond fault.

4.2.5.2 EARTHQUAKE INTENSITY

Strong ground movement from a major earthquake could affect the Coast Dairies Property within the next 30 years. Groundshaking may affect areas hundreds of miles distant from the earthquake's epicenter. Earthquakes on the active faults in the region are expected to produce a range of groundshaking intensities at the Property. The estimated (moment) magnitudes identified in Table 4.2-1 represent *characteristic* earthquakes on particular faults.

TABLE 4.2-1
ACTIVE FAULTS IN THE PROJECT SITE VICINITY

Fault	Distance and Direction from Coast Dairies	Recency of Movement	Fault Classification[a]	Historical Seismicity[b]	Maximum Moment Magnitude Earthquake (Mw)[c]
San Andreas (Santa Cruz Segment)	14 miles west	Historic (1989 ruptures)	Active	M7.1, 1989 Many <M6.0	6.9
San Andreas (Peninsula Segment)	24 miles north	Historic (1838, 1906; 1989 ruptures)	Active	M8.25, 1906 M7.0, 1838 Many <M6	7.1
San Gregorio	2.5 miles southeast	Holocene	Active Segments	Epicenters Plotted M5.5-5.9 1869-1931	7.5
Zayante	7.0 miles east	Quaternary	Possible active, potentially active segments	Not Expected	6.8

a An active fault is defined by the State of California as a fault that has had surface displacement within Holocene time (approximately the last 10,000 years). A potentially active fault is defined as a fault that has shown evidence of surface displacement during the Quaternary (last 1.6 million years), unless direct geologic evidence demonstrates inactivity for all of the Holocene or longer. This definition does not, of course, mean that faults lacking evidence of surface displacement are necessarily inactive. "Sufficiently active" is also used to describe a fault if there is some evidence that Holocene displacement occurred on one or more of its segments or branches (Hart, 1997).

b Richter magnitude (M) and year for recent and/or large events. Richter magnitude scale reflects the maximum amplitude of a particular type of seismic wave.

c Moment magnitude is related to the physical size of a fault rupture and movement across a fault. Moment magnitude provides a physically meaningful measure of the size of a faulting event (CDMG, 1997b). The Maximum Moment Magnitude Earthquake (Mw), derived from the joint CDMG/USGS Probabilistic Seismic Hazard Assessment for the State of California, 1996. (CDMG OFR 96-08 and USGS OFR 96-706).

SOURCES: Hart, 1997, Jennings, 1994, Peterson, 1996.

While the magnitude is a measure of the energy released in an earthquake, intensity is a measure of the groundshaking effects at a particular location. Ground movement intensity during an earthquake can vary depending on the overall magnitude, distance to the fault, focus of earthquake energy, and type of geologic material. Groundshaking can be described in terms of peak acceleration, peak velocity, and displacement of the ground.[11] Areas that are underlain by bedrock tend to experience less groundshaking than those underlain by unconsolidated sediments such as artificial fill or natural alluvium. The composition of underlying soils in areas located relatively distant from faults can intensify groundshaking. Portions of the Bay Area that experienced the worst structural damage due to the Loma Prieta earthquake were not those closest to the fault, but rather those with soils that magnified the effects of groundshaking.

4.2.6 GEOMORPHIC FEATURES OF THE COAST DAIRIES PROPERTY

4.2.6.1 MARINE TERRACES

As discussed above, one of the more distinct geomorphic features of the Coast Dairies Property is the marine terraces that stair-step from the coastline east to an elevation of about 800 feet above sea level. Through geologic history, the formation of marine terraces has dictated the landforms we see today.

The lowest and youngest terrace (commonly referred to as the “100-foot terrace”) is the best defined, which the oldest and highest of the four terraces, at approximately 840 feet above sea level) is heavily dissected and eroded. Understanding the formation of these terraces requires three basic assumptions: 1) no terrace is older than the Pleistocene in age; 2) all terraces visible today at the Coast Dairies Property were cut into Santa Cruz Mudstone; and 3) it is difficult to determine whether climatic fluctuation or tectonic uplift was predominantly responsible for successively lowering the sea level to facilitate their formation.

Marine terraces form by wave action that erodes away a relatively flat bench. Formation of these terraces is associated with high energy erosion of a sheer sea cliff and deposition of near-shore marine sediments on the newly eroded bench. As sea level falls or tectonic forces uplift the land surface, the wave cut platform is raised above sea level and exposed. This uplift also exposes the near-shore sediments that were deposited on the bench during formation of the bench. Examples of this type of deposits are observable today as the coastal terrace deposits (mapped as Qcu) and the lowest emergent coastal deposits (mapped Qcl) that mantle the two lower marine terraces.

Marine terraces were likely sculpted into the Santa Cruz Mudstone during the Pleistocene epoch when glacial periods had temporarily ceased and sea level was similar to what it is today. Also,

[11] Peak acceleration, peak velocity, and peak displacement values were measured by strong-motion detectors during the Loma Prieta earthquake in several ground and structure strong-motion stations in the Bay Area. For comparison purposes, the maximum peak acceleration value recorded was in the vicinity of the epicenter, near Santa Cruz, at 0.64 g. The highest value measured on the San Francisco Peninsula was 0.33 g, recorded in artificial fill soils at the San Francisco International Airport (CDMG, 1990). Peak Ground Acceleration is the maximum horizontal ground movement expressed as acceleration due to gravity or approximately 980 centimeters per second.

during the Cenozoic Era, tectonic activity raised the land along the Pacific coastal margin. In combination, the sea level rise and the periodic uplift of the land produced intermittent periods of fluctuating sea level relative to the land surface (Earth Science Associates, 1971).

Formation of the “100-year terrace” continued until the sea level was about 400 feet lower than it is today, during the Wisconsin glacial period (18,000 years ago). During this glacial period of low sea level, the lowest terrace extended a few miles east to the shoreline as a broad sloping plain. Streams formed across this plain and down-cut canyons up to 150 feet deep (Earth Science Associates, 1971). As the glacial ice melted and sea level rose, the canyons were backfilled by deposition of alluvium and the development of lacustrine environments along the shore line. About 10,000 years ago, the rate of sea level rise decreased and wave action began to cut into the plain, forming the sea cliff that is present today. The process of wave-cut marine erosion, deposition of near-shore sediments, and the slow but gradual rise of the land surface continues today off the coast of Davenport.

As the marine terrace is formed, streams begin to find their way to the sea across the exposed wave-cut terrace. As each new terrace is exposed, the stream flows over the previous wave-cut cliff. Streams in their route to the sea continue to flow across each uplifted terrace and continually down-cut to maintain grade, thereby dissecting and eroding the older terraces. As the elevation of the terrace increases (or sea level decreases) and more of the terrace is exposed, down-cutting and erosion cause the canyon to become deeper and wider. The sequence of these processes are obvious at the Coast Dairies Property: wide, dissected, steep-walled canyons further inland, and smaller, incised stream courses adjacent to well-defined flat-topped marine terrace surfaces towards the coast.

4.2.6.2 MASS WASTING

Mass wasting refers to the failure and downslope movement of soil and rock under direct forces of gravity. Mass wasting includes slow processes such as soil creep, as well as rapid dislodgment of large masses of material such as landslides, debris flows, and rockfalls. The susceptibility of land (slopes) to failure is dependent on the slope angle and geology, as well as the amount of rainfall, unnatural disturbances, and seismic activities. Processes of mass wasting can vary with location on the Coast Dairies Property.

Block landslides and shallow debris flows are evident to some degree in the upper reaches of the Property’s watersheds where steep canyons have down-cut into old terrace deposits. The weathering Santa Cruz Mudstone, with its blocky structure and prevalent fracture patterns, fails as block-slides while colluvial debris can fail as slumps on hillsides with less slope. Large masses of landslide debris are mapped along Scotts Creek (beyond the Property boundary); Molino Creek about one mile east of Highway 1, and along San Vicente Creek, near the eastern Property boundary (Clark, 1981). It is very likely that many small block slides occurred in the steeper portions of the Santa Cruz formation following the Loma Prieta earthquake in 1989. Undercut stream banks reduce slope stability along the upper stream and result in localized bank failures or slumping. In the upland canyons, continual weathering of exposed bedrock accumulates as talus and is deposited on lower slope reaches as angular, well-sorted colluvium.

Mass wasting in the form of soil creep and colluvial deposition dominate along the gently sloping terrain in the mid-region of the Property. Shallow debris flows occur on gently sloping hillsides capped by colluvial deposits or developed soil horizons. Debris flows and slumps typically occur in areas of springs or seeps or where the soil is saturated by water from a manmade source. Gully erosion and rilling, sometimes forming small, very steep canyons in an otherwise gently sloping hillside, are present in the upper reaches of stream channels where a sufficient amount of water can collect and concentrate flow across unconsolidated soil material or loose fractured bedrock, especially Santa Cruz Mudstone. Cattle, burrowing animals, desiccation cracks, and over-steepened channels, as well as headward erosion due to downcutting of a stream course can initiate severe gully erosion in the upper reaches of stream channels and on steep slopes, especially in areas where springs and seeps have saturated loosely consolidated colluvium and shallow soil horizons.

The dominating mass wasting process along the sea cliffs is the continual dislodgment of fractured Santa Cruz Mudstone and erosion of the overlying terrace deposits. This mass wasting is initiated by the various weathering mechanisms affecting the seacliffs including wind, wave action and water seepage. Occasional rockfalls vary in size but can dislodge large volumes of material. Undercutting from wave action, vegetation, water seepage, or human interference constitutes the primary mechanisms capable of triggering a sea cliff rockfall.

4.2.6.3 POCKET BEACHES

The coastline of the Coast Dairies Property represents the three major shoreline types that shape the coast of California: continuous beach, sea cliff and pocket beaches. Approximately one-third of the California’s coastline holds pocket beaches while the other two thirds contain continuous beach and sea cliffs. Pocket beaches are one of the many unique geomorphic features that enhance the dramatic coastline along the Coast Dairies Property. Typical pocket beaches are roughly concentric in shape, concave seaward, and are bounded at each end by a resistant rock outcrop. On the Property, the mouth of San Vicente Creek, Liddell Creek, and Yellow Bank are the best examples of pocket beaches. Sediment delivery from the onshore creeks as well as longshore coastal drift (littoral currents) provide these beaches a continual supply of sand.

During the Pleistocene, when sea level was lower than present-day, ancient (paleo) stream channels flowed along the wave-cut bench further west of the present coastline. The rock outcrops seen today are remnants of the wave–cut terrace that was continually down-cut by the stream as sea level fell and the land surface was gradually uplifted. These paleo stream channels were submerged when the sea level rose to present-day levels and began to fill with sediment carried down coast by currents and from upland sources. Today these channels provide a “storage area” for sediment that is delivered down the coast by littoral currents and for sediment transported offshore by the streams. Sediment is eroded from the beach during the winter and is deposited into the paleo channels while littoral currents assist in transporting the sand down the coast for summertime accretion on a down-current pocket beach.

4.2.7 SOIL RESOURCES

The types of soil on the Coast Dairies Property vary widely depending on location, slope and underlying parent material. This section discusses general soil conditions and Table 4.2-2 lists and summarizes soils on the Property according to the Natural Resource Conservation Service (NRCS) Soil Survey, completed in August 1980. Additional discussion of soils is provided in Chapter 5.2, Agricultural Resources. On the Coast Dairies Property, different types of soils form on the marine terraces, mountainous woodland areas, and mountainous areas with brush vegetation. The NRCS has mapped approximately 25 different soil types within the Property. Table 4.2-2 presents these different soil types by slope. Table 4.2-2 also identifies those soils that are considered by the U.S. Department of Agriculture (USDA) as “Prime Farmland” and those determined to be “Farmland of Statewide Importance Soils.” In general, these two classifications indicate that particular soil types meet the criteria used by the USDA to classify high quality, high yield soils that require especially diligent conservation.

Soils that form on marine terraces consisting of old alluvium or weathered shale are typically very deep and drain well because of their sandy-loam composition. These soils are mainly used for crops. On the Coast Dairies Property, these soils are typically found on the gentle slopes and flat-topped marine terraces in the lower portions of the Property and on the bluffs west of Highway 1. Some of these soils are classified by the USDA as Prime Farmland Soils and Soils of Statewide Importance. The high quality of these soils is largely due to their formation on relatively flat terrain 0 – 2 percent or gentle slopes 5 – 15 percent, over the younger, loosely consolidated Quaternary marine terrace deposits.

Soils that form on the steeper mountainous terrain dominated by brush vegetation are shallow, deep, and drain rapidly; these soils are composed of sand and loam with a gravel-loam surface layer. They form on slopes ranging between 5 percent and 30 percent over sandstone, shale, mudstone, and granitic rock at elevations of 100 to 3,000 feet above sea level. Vegetation supported by this soil is usually annual grasses and brush. These soils are used for timber, watershed and wildlife, while some are used for pasture. These soils would be found on the Coast Dairies Property in the upland terrain along the eastern boundary of the site.

Soils that form on the steeper mountainous terrain dominated by forest vegetation are moderately deep and drain rapidly, possessing a loamy to sandy surface layer. They form on slopes ranging between 5 percent and 30 percent over sandstone, shale, siltstone, and granitic rock at elevations of 400 to 3,000 feet above sea level. These soils are used for timber, watershed and wildlife, while some are used for pasture. These soils would be found on the Coast Dairies Property in the upland terrain along the eastern boundary of the site.

TABLE 4.2-2
PRIMARY SOILS ON THE COAST DAIRIES PROPERTY
(USDA Soil Survey)

SLOPE (%)	Soil Assn No.	Soil Association Series	Soil Association Name	Prime Farmland (USDA)	Farmland Statewide imp.	Permeability [a,b]	Shrink-Swell Potential	Erosion Factors[c]	
								K	T
0% to 2%	104	Baywood	Baywood, loamy sand	✓		6.0-20-moderately rapid	Low	-----	5
	129	Elder	Elder sandy loam	✓		0.6-2.0-moderate	Low	0.32	5
	132	Elkhorn	Elkhorn sandy loam	✓		0.6-2.0-moderate(21-61” deep)	moderate	0.28	5
	178	Watsonville	Watsonville loam, thick surface		✓	<0.06-very slow (26-41” deep)	high	0.28	3
2% to 9%	130	Elder	Elder sandy loam (2-9%)	✓		0.10-0.15-moderately slow (23-60” deep)	low	0.32	5
	133	Elkhorn	Elkhorn sandy loam (2-9%)	✓		0.10-0.15-moderately slow (23-60” deep)	low	0.32	5
	171	Soquel	Soquel loam (2-9%)		✓	0.2-0.6-moderately slow (21-37” deep)	moderate	0.43	5
0% to 15%	139	Fluvaquentic Haploxerolls-Aquic Xerofluvents complex*	Fluvaquentic Haploxerolls-Aquic Xerofluvents complex		✓				
2% to 15%	177	Watsonville	Watsonville loam (2-15%)		✓	<0.06-very slow (18-39” deep)	high	0.28	3
	179	Watsonville	Watsonville loam, thick surface (2-15%)		✓	<0.06-ver slow (26-41” deep)	high	0.28	3
5% to 15%	110	Ben Lomond	Ben Lomond sandy loam (5-15%)	✓		2.0-6.0-moderately rapid	low	0.17	3
9% to 15%	126	Diablo	Diablo clay (9-15%)		✓	0.06-0.20-slow	high	0.24	3
	131	Elder	Elder sandy loam (9-15%)			0.6-2.0-moderate	low	0.32	5
	134	Elkhorn	Elkhorn sandy loam (9-15%)			2.0-6.0-moderately rapid (top 21”)	low	0.32	5
	172	Soquel	Soquel loam (9-15%)			0.2-0.6-moderately slow (21-37” deep)	moderate	0.43	5
5% to 30%	116	Bonnydoon	Bonnydoon loam			0.6-2.0-moderate	moderate	0.32	1
	142	Lompico-Felton complex*	Lompico			0.6-2.0-moderate (5-37” deep)	moderate	0.17	2
			Felton			0.2-0.6-moderately slow (11-43” deep)	moderate	0.28	2
	154	Maymen Variant				2.0-6.0-moderately rapid (9-19” deep)	low	0.20	2
	167	Santa Lucia	Santa Lucia shaly clay loam			0.6-2.0-moderate (5-38” deep)	low	0.10	2

TABLE 4.2-2 (Continued)
PRIMARY SOILS ON THE COAST DAIRIES PROPERTY
(USDA Soil Survey)

SLOPE (%)	Soil Assn No.	Soil Association Series	Soil Association Name	Prime Farmland (USDA)	Farmland Statewide imp.	Permeability [a,b]	Shrink-Swell Potential	Erosion Factors[c] K	Erosion Factors[c] T
15% to 30%	100	Aptos	Aptos loam			0.6-2.0-moderate (18-24” deep)	moderate	0.20	2
	106	Baywood	Baywood, loamy sand			6.0- 20-rapid	low	0.15	5
	135	Elkhorn	Elkhorn sandy loam			2.0-6.0-moderately rapid (top 21”)	low	0.32	5
	147	Los Osos	Los Osos loam			0.06-0.2- slow (19-36” deep)	high	0.28	2
	159	Pfeiffer	Pfeiffer gravelly sandy loam			2.0-6.0-moderately rapid	low	0.17	3
	174	Tierra-Watsonville complex*	Tierra			<0.06-very slow (14-66” deep)	high	0.28	1
			Watsonville			<0.06-very slow (18-39” deep)	high	0.28	3
	180	Watsonville	Watsonville loam, thick surface			<0.06-very slow (26-41” deep)	high	0.28	3
30% to 50%	114	Ben Lomond-Felton complex	Ben Lomond			2.0-6.0-moderately rapid	low	0.17	3
			Felton			0.2-0.6-moderately slow (11-43” deep)	moderate	0.28	2
	117	Bonnydoon	Bonnydoon loam			0.6-2.0-moderate	moderate	0.32	1
	136	Elkorn-Pfeiffer complex*	Elkorn			2.0-6.0-moderately rapid (top 21”)	low	0.32	5
			Pfeiffer			2.0-6.0-moderately rapid (24-66” deep)	low	0.20	3
	143	Lompico-Felton complex*	Lompico			0.6-2.0-moderate (5-37” deep)	moderate	0.17	2
			Felton			0.2-0.6-moderately slow (11-43” deep)	moderate	0.28	2
	148	Los Osos	Los Osos loam			0.06-0.2-slow (19-36” deep)	high	0.28	2
	168	Santa Lucia	Santa Lucia shaly clay loam			0.6-2.0-moderate (5-38” deep)	low	0.10	2
15% to 75%	184	Zayante-Rock outcrop complex*	Zayante			6.0-20-rapid (top 30”)	low	0.10	5
			Rock outcrop						
30% to 75%	151	Maymen	Maymen stony loam			0.6-2.0-moderate (6-14” deep)	moderate	0.24	1
	152	Maymen-Madonna complex	Maymen			0.6-2.0-moderate (6-14”deep)	moderate	0.24	1
			Madonna			0.6-2.0-moderate (16-23” deep)	low	0.37	2

TABLE 4.2-2 (Continued)
PRIMARY SOILS ON THE COAST DAIRIES PROPERTY
(USDA Soil Survey)

SLOPE (%)	Soil Assn No.	Soil Association Series	Soil Association Name	Prime Farmland (USDA)	Farmland Statewide imp.	Permeability [a,b]	Shrink-Swell Potential	Erosion Factors[c] K	Erosion Factors[c] T
50% to 75%	112	Ben Lomond	Ben Lomond sandy loam			2.0-6.0-moderately rapid	low	0.17	3
	115	Ben-Lomond-Felton complex*	Ben Lomond			2.0-6.0-moderately rapid	low	0.17	3
			Felton			0.2-0.6-moderate (11-43” deep)	moderate	0.28	2
	144	Lompico-Felton complex*	Lompico			0.6-2.0-moderate (5-37” deep)	moderate	0.17	2
			Felton			0.2-0.6-moderately slow (11-43” deep)	moderate	0.28	2
	153	Maymen-Rock outcrop complex*	Maymen			0.6-2.0-moderate (6-14” deep)	moderate	0.24	1
			Rock outcrop						
	169	Santa Lucia	Santa Lucia shaly clay loam			0.6-2.0-moderate (5-38” deep)	low	0.10	2
	173	Sur-Catelli complex*	Sur			2.0-6.0-moderately rapid	low	0.1	1
			Catelli			2.0-6.0-moderately rapid	low	0.20	2
50% to 85%	118	Bonnydoon-Rock outcrop complex*	Bonnydoon			0.6-2.0-moderate	moderate	0.32	1
			Rock outcrop						
slope not specified	103	Aquents	Aquents, flooded						
	109	Beaches	----						
	128	Dune land	----						
	164	Pits-Dumps complex	----						

a Where a particular soil has more than two strata and characteristics for permeability, shrink swell potential and/or erosion factors vary between them, the table presents information on permeability, shrink-swell potential, and erosion factors for the second stratum from the soil surface (with depth of stratum indicated parenthetically). Where a soil has two strata information on the top strata is presented.

b Permeability is the quality that enables the soil to transmit water or air, measured as the number of inches per hour that water moves through the soil. Terms describing permeability are *very slow* (less than 0.06 inch), *slow* (0.06-0.20 inch), *moderately slow* (0.2 to 0.6), *moderate* (0.6 to 2.0 inches), *moderately rapid* (2.0 to 6.0 inches).

c Erosion factors are used to predict the erodibility of a soil and its tolerance to erosion in relation to specific kinds of land use and treatment. The soil erodibility factor (K) is a measure of the susceptibility of the soil to erosion by water. Soils having the highest K values are the most erodible. K values range from 0.10 to 0.64. To estimate annual soil loss per acre, the K value of a soil is modified by factors representing plant cover, grade and length of slope, management practices, and climate. The soil-loss tolerance factor (T) is the maximum rate of soil erosion, whether from rainfall or soil blowing, that can occur without reducing crop production.

4.2.8 SOIL EROSION

As discussed above, mass wasting provides talus and sediments from the weathering and erosion of steeply sloped areas with exposed bedrock and alluvium. These colluvial and alluvial materials can eventually find their way to streams and contribute coarse-grained material and fine-grained sediment to the stream system. Mass wasting triggered by natural occurrence alone would not significantly degrade the stream channels, due to the infrequency of landslide and debris-flow events. However, mass wasting initiated by human activity such as road cuts, unstable construction fill, poor drainage, and excessive run off from roads can deliver considerably more sediment to a watershed.

4.2.8.1 MASS WASTING - ROADS

Roads have a profound impact on the hydrology and surface processes of the land across which they are built. Where roads are built across slopes, they are usually constructed by first cutting a bench into the hillside, and then casting the spoil material on the hillside below the bench. The effects of this type of construction, known as *cut and fill*, are increased hillslope steepness (both in the cut slope above road and the fill slope below the road), an interruption of runoff and of any streams flowing down the slope, and in some cases, also an interruption of subsurface flow through exposure of subterranean channels. Unless care is taken to prevent it, roads tend to capture and concentrate runoff, both from rainwater hitting the road surface itself, as well as from runoff coming down slopes and small stream channels onto the road surface. Concentrated runoff gains erosive power with flow volume, slope angle, and distance. Typically, concentrated runoff from road surfaces and road ditches eventually finds its way into natural stream channels, either through direct discharge at a point where the road crosses the stream, or through gullies down the hillslope to the stream below. When this occurs, as it does frequently on the Coast Dairies Property, sediment, particularly fine material (clay, silt, and sand), eroded from cutbanks, road ditches, road surfaces, and gullies is delivered to the stream channel. Upper Quarry Road, in the Liddell Creek watershed, is an example of a road with frequent stream crossings, at each of which polluted runoff enters the stream system. All six of the perennial, fish-bearing streams on the Coast Dairies Property exhibit signs of excessive fine sediment in their beds, much of which can be attributed to roads. Effects of fine sediment on aquatic habitat is discussed in Section 3.3, Fisheries Resources, and in Section 4.1, Hydrology.

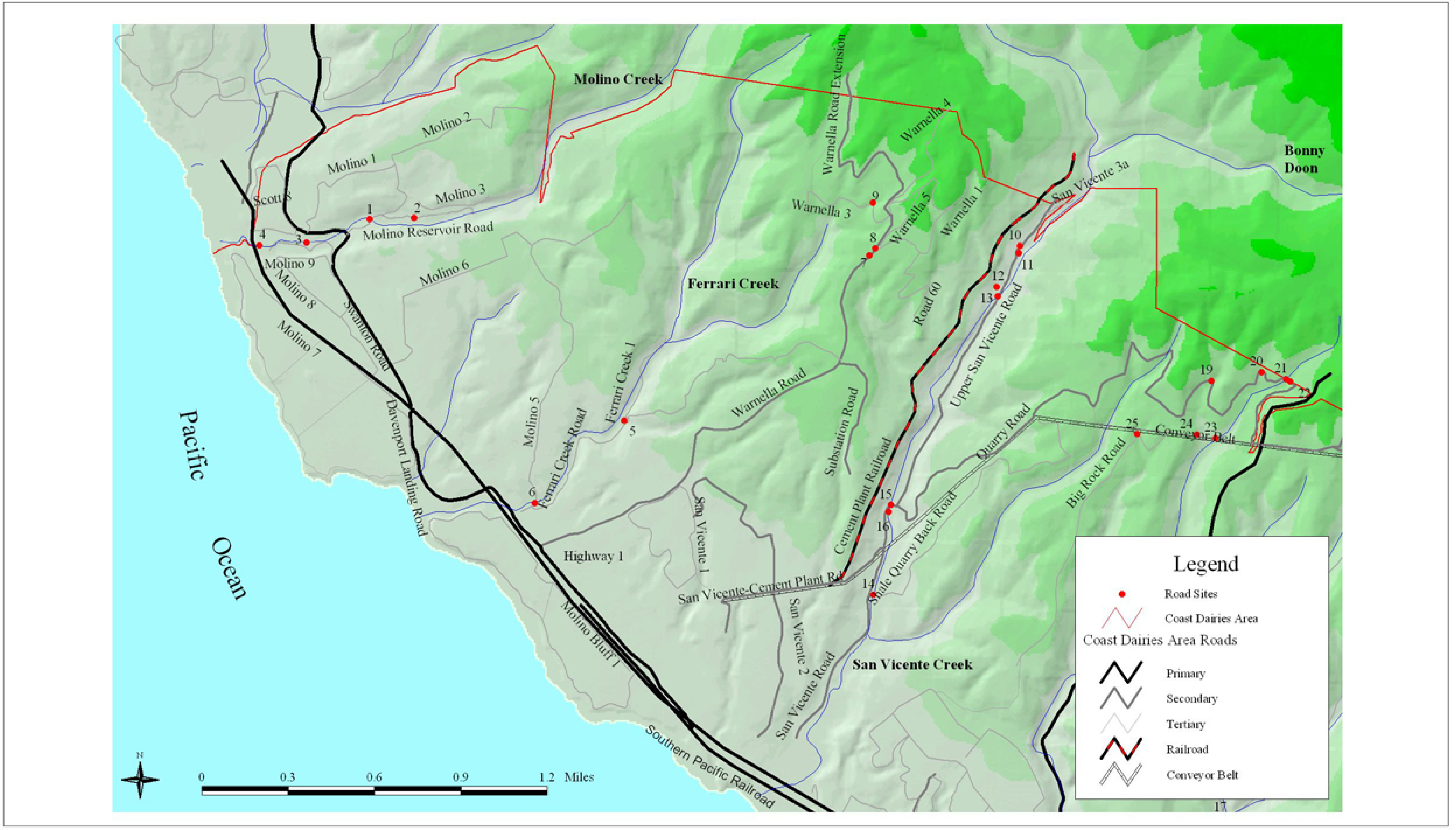
Roads constructed across slopes tend to encounter stream channels along their routes. Road builders have several options for constructing a road across a stream. The most common stream-crossing structures are bridges, culverted fills, armored sills, humboldt or log crossings, and ford (wet) crossings. All of these crossing structures are represented at Coast Dairies, but the most common are culverted crossings. To construct a culverted crossing, a road builder lays a pipe in the stream bed and fills the channel around and on top of the pipe. Often, in order to save on the cost of pipe, shorter lengths are used, and the pipe is laid not in the natural stream bed, but on top of some of the fill material. Consequently, the outlet of these culverts is onto the fill surface on the downstream side of the structure, which will erode unless a downspout is fitted to the culvert or the fill face is armored.

Typical problems with culverted crossings, all of which can be seen at Coast Dairies, include undersized pipes, plugged pipes, collapsed or rusted pipes, and erosion below the pipe's outlet. When culverts plug, which usually occurs during large storms when stream discharge is high and the capacity of a stream to transport large sediment and debris is at its maximum, the culverted crossing becomes a dam. Depending on the configuration and size of the structure and the volume and duration of the stream's flow, the stream may overtop this dam. This may result in a partial or complete washout of the structure, or in the diversion of the stream down the road alignment to the next stream or some other outlet, which will itself likely become a gully. Fill washouts and stream diversions are catastrophic events that may cause the delivery of hundreds or thousands of cubic yards of sediment to stream channels. Properly constructed and maintained culverted crossings reduce the possibility of washouts and prevent diversions. Examples of washouts at Coast Dairies include site 1 on Molino Creek and site 29 on Yellow Bank Creek (see Figure 4.2-4). Examples of streams that have diverted in the past due to plugged culverts are site 12 on a tributary to San Vicente Creek, and site 24 on a tributary to West Liddell Creek.

Where culverts are placed in fish bearing streams, particularly in anadromous streams such as the six major creeks on the Property, special care must be taken to ensure that the culvert does not present a barrier to fish migration. Culverts may prevent upstream migration of salmonids if they are too steep, too long, or if the outlet is perched too high above the natural channel. There are numerous culverts on the Property that may prevent migration of salmonids, from the culverts and bores beneath Highway 1 and the Union Pacific Railway grade, to an exceptionally long and poorly placed culvert beneath the RMC conveyor belt on West Liddell Creek (site 25).

The shape of the road surface itself determines the hydrologic effects of the road and to some extent defines the options for draining the road. The three techniques for shaping a road are insloping (grading the road surface so that it drains toward the cut bank or uphill side of the road); out-sloping, and crowning (grading the road so that the highest point runs down the middle of the road bed). Outsloped roads tend to sheet water off of their outside edge, and tend therefore not to cause accumulation or concentration of runoff. Outsloped roads still must be fitted with drainage structures to ensure that runoff does not flow down along the road grade, particularly on steeper gradient roads. This may be accomplished with waterbars, which are temporary structures often constructed on seasonal roads prior to the onset of fall rains; or rolling dips, which are broad, shallow depressions excavated into the road surface that catch any water flowing down the road surface and direct it to the outside edge of the road. An example of an outsloped, dipped road on the Coast Dairies Property is Warnella Road Extension (see Figure 4.2-4).

In order to drain an insloped or crowned road, it is necessary to construct a ditch along the inside (inboard) side of the road. The inboard ditch collects water from the road surface as well as from the cutslope. The ditch, which becomes a man-made stream during wet weather, may eventually drain to a stream at a crossing, or may drain through a ditch relief culvert, a small culvert that carries water beneath the road to the fill surface below the outside edge of the road. Typically,



SOURCE: Environmental Science Associates, Pacific Meridian Resources, USGS

Coast Dairies / 200071

Figure 4.2-4a
Roads on the Coast Dairies Property

SOURCE: Environmental Science Associates, Pacific Meridian Resources, USGS

Coast Dairies / 200071

Figure 4.2-4b
Access and Roads on the Coast Dairies Property

ditch relief culverts have watersheds of sufficient size to create gullying beneath their outlets. An example of an insloped road with ditch relief culverts and ditches that drain to stream channels is Upper Quarry Road in the West Liddell watershed.

Another common feature of insloped and crowned roads, though not a necessary part of their construction, is the outboard berm. Outboard berms, which are found on some outsloped roads as well, are continuous mounds of earth running along the outside edge of the road that may be from a few inches to several feet high. They may be created intentionally as a safety feature to prevent vehicles from running off of the road, or they may be an unintended consequence of periodic road grading. In either case, outboard berms on outsloped and crowned roads prevent water from sheeting off of the outboard edge of the road, and in essence create another ditch that accumulates and concentrates runoff. Outboard berms are commonly seen on the roads on the Property. In some cases, such as Warnella Road Extension, which is an outsloped, dipped road, the berm is breached at the axis of the dips to allow water to drain off of the road.

The Planning Team noted in the course of the road survey that Coast Dairies roads vary widely in their design, method of drainage, standard of construction, surface, and upkeep. Many roads on the Property have been abandoned, and some of these are overgrown and impassable, even on foot. Many lack any real shape: they are neither insloped, outsloped, nor crowned, and many lack any kind of drainage structure at all. These shapeless, un-drained roads are often minimally maintained and exhibit varying degrees of degradation. Most of the roads that provide access to the farm buildings and fields are adequately maintained for their purpose of providing egress and ingress for workers and equipment. Some are rock surfaced for all-weather use. Roads associated with the quarry operations and the conveyor belt tend to be well-maintained, all-season roads. Several are paved with concrete, while others are rock surfaced. These roads, however, tend to be insloped and ditched, and road drainage was designed with little regard to aquatic habitat. Paradoxically, while these roads may be the “best” on the Property in terms of their standards of construction and maintenance, they are among the worst in terms of their impact on biological resources; most are also located within the watersheds of San Vicente Creek and Liddell Creek, which contain the best salmonid habitat on the Property (see Section 3.3, Fisheries Resources).

Every one of the major streams on the Property has a road running along it. These riparian roads, some of which are abandoned, are of particular concern because of their potential and realized impact on aquatic habitat. Riparian vegetation is removed when riparian roads are constructed. The road surface may remain wet throughout the rainy season, and in areas of seeps and springs they may stay wet through the dry season. Vehicles traveling on wet, unprotected surfaces tend to churn the road surface, and subsequent runoff carries away loose soil particles. Because of their proximity to streams, it is very difficult, even on a well-designed road, to prevent sediment-laden runoff from entering the channel. Riparian roads tend also to require frequent stream crossings, both on the main channel of the stream they are following, and also on whatever tributaries they intercept along their route. Finally, riparian roads allow access of all kinds into sensitive stream protection zones.

Between the Property's streams, roads leading to the interior of the Property cross the marine terraces and climb the bluffs between them. These roads, which include Warnella Road, Molino 1, Molino 2, and Molino 6, and Yellow Bank Farm Road, are the most stable, lowest impact roads on the Property, even though several of them traverse its entire width. These roads experience minimal run-on, since they lack hillslopes above them, and they tend not to accumulate much runoff, but rather shed water onto the surrounding terraces. Where these roads climb the bluffs between terraces they may entrain water along their alignment, since most lack a defined shape and have no drainage structures, and the result is rutted surfaces. Typically, however, runoff from these stretches of road and the sediment it carries eventually spill onto the terrace at the bottom of the slope, and the sediment never enters a stream channel. These roads were for the most part constructed to avoid stream crossings. They provide excellent access to the interior of the Property, links to the regional road system of the Santa Cruz Mountains, spectacular views, and, except where they cut through sensitive habitat such as native grasslands (see Section 3.1), minimal environmental impact.

4.2.8.2 ROAD SYSTEM DESCRIPTION

This section presents a brief discussion of the road network within each of the Coast Dairies watersheds. For each watershed, there is a description of the larger roads and their uses, and the major road-related problems encountered in the course of the road survey. The public roads that pass through the Property, Highway 1, Swanton Road, Cement Plant Road, and Davenport Landing Road, were not surveyed and are not described in this section. Road conditions are summarized in Table 4.2-3. Data gathered on stream crossings and other "problem sites" are summarized in Table 4.2-4.

Molino Creek / Ferrari Creek Watersheds

There are few major roads in the Molino Creek and Ferrari Creek watersheds, apart from Highway 1, Swanton Road, Cement Plant Road, and Davenport Landing Road. As indicated in Figure 4.2-4, all of the other roads in these watersheds, with the exception of Warnella Road and Warnella Road Extension (parts of which are in the Ferrari Creek watershed), are categorized as tertiary roads. These roads provide access to the irrigated fields on the coastal terrace bluffs and the fields, pastures, and agricultural waterworks on the higher terraces. Molino Reservoir Road, Molino 9, Ferrari Creek Road and Ferrari Creek 1 are riparian roads that are infrequently, if ever, used by vehicles. Most of the roads in these watersheds are minimally maintained, have no designed shape, and lack drainage structures. However, there are few stream crossings along these roads (again, with the exception of the major public roads), and the Planning Team recorded few road-related problems. Sites 1-6 and 9 are within Molino Creek and Ferrari Creek watersheds (see Table 4.2-4 and Figure 4.2-4). As noted previously, Molino 1, Molino 2, Molino 6, and Warnella Road provide good access to the interior of the Property with minimal problems, due to their alignment along relatively stable marine terraces and the bluffs between them.

TABLE 4.2-3 SUMMARY OF ROAD SURVEYS ON THE COAST DAIRIES PROPERTY

Road Name	Class	Road Surface(s)	Aspect	Usage level	General condition	Necessity/ Used for	Road Shape(s)	Drainage Method(s)	Construction Method(s)	Sediment delivery	Gullying	Landsliding: fill failure	Landsliding: cutslope failure	Surface drains poorly?	Impassable?	Reason impassable	Notes
Big Rock Road	3	rocked unimp dirt	ridge slope	occasional	fair	useful cow pasture	no shape	dips	cut and fill	moderate	none	☐	☐	☑	☐		Upper part of road near quarry drains poorly. Road leads to stock watering tank and seems to dead-end there. Mostly stable ridge road with spectacular views.
Conveyor Belt Road 2	2	paved	slope	heavy	excellent	essential quarry						☐	☐	☐	☐		
Conveyor Belt Road 3	2	paved rocked	slope	heavy	good	essential quarry	outsloped	drc	cut and fill slot cut	moderate	moderate	☐	☐	☐	☐		Very steep road along conveyor line from near San Vicente Creek to conveyor junction. 1,500' of road ditch beneath conveyor exits at bottom of grade in 16" cmp directly to San Vicente Creek. Small stilling basin at CMP inlet. Much of road is through cut. Several drainage structures. May be a culvert at dip in road to accommodate trib to San Vicente Creek, but could not observe. At top, road drains into pipe system, which presumably drains to sediment basin.
East Fork Liddell Creek Road	3	unimproved dirt	riparian	occasional	poor	no apparent use	no shape	drc	cut and fill	moderate	moderate	☑	☐	☑	☑	Bridge out	Road accessible from quarry operation or Liddell Pipeline road; from below, foot access only. Riparian road without apparent use. Decomissioned bridge is Site 17.
Ferrari Creek 1	3	track	riparian	abandoned	poor	no apparent use	no shape	none	cut and fill	none	none	☐	☐	☐	☑	overgrown	Old farm road. Branches off Ferrari Creek Road, fork at curve in stream just before steep incline of Ferrari Road (at Class III confluence). Road is heavily overgrown, abandoned, impassable at N37.01854, W122.12078. Could be restored as trail, but sensitive location in riparian corridor.
Ferrari Creek Road	3	unimproved dirt track	riparian slope	abandoned	poor	none	no shape	none	cut and fill	moderate	moderate	☐	☐	☑	☑	overgrown	Unimproved dirt road trough ranch area, rapidly degrades to single track along creek. Cow use only, some clearing. Steep portion is where road veers off southe at unnamed trib. At top of slope road is impassable and trace lost. Gullying and washed out crossing at junction with Ferrari Creek 1. Deep incision in this section of creed; old car in fill. Road eventually connects with Warnella, though portion is impassable. Would make great trail, with spectacular views.
Laguna Beach Trails	3	unimproved dirt track	slope	heavy	fair	useful beach	outsloped	none	cut and fill	none	moderate	☐	☐	☐	☐		Foot traffic only. Good access for beach. Some erosion (gullying) on beach side of trail at drainage points, eroded material deposited on beach.
Laguna Road	2	paved rocked	riparian slope	Frequent	good	essential City water	outsloped	dips waterbars	cut and fill	moderate	moderate	☑	☐	☐	☐		Frequent waterbars or dips direct water off road on outside. Road needs stabilization (rip rap) to prevent erosion in places. A few relief ditches, but waterbars are the most frequently used drainage structure.

TABLE 4.2-3 SUMMARY OF ROAD SURVEYS ON THE COAST DAIRIES PROPERTY

Road Name	Class	Road Surface(s)	Aspect	Usage level	General condition	Necessity/ Used for	Road Shape(s)	Drainage Method(s)	Construction Method(s)	Sediment delivery	Gullying	Landsliding: fill failure	Landsliding: cutslope failure	Surface drains poorly?	Impassable?	Reason impassable	Notes
Liddell Bluff 2	3	unimproved dirt	terrace	occasional	good	essential ag fields	no shape	none	full bench	none	none	☐	☐	☑	☐		Berm between road and bluff prevents rrunoff from going over bluffs in most places. Ag fields are used presently so road is travelled often. Troughs of fields may prvent excessive amounts of runoff to drain over bluffs. Heavy agricultural machinery was in use on north end of this rod, so north end was not surveyed.
Liddell Pipeline Road	2	rocked	slope riparian	occasional	fair	essential pipeline	outsloped no shape	waterbars none	cut and fill	moderate	moderate	☐	☐	☑	☐		Road not shaped and drains poorly along Y-Creek allignment (toward Yellow Bank summit).This section is most problematic on road. Otherwise, road is frequently waterbarred, drains well. Section above E. Branch Liddell VERY steep.
Lower Liddell Creek Road	2	unimproved dirt	riparian	occasional	poor	no apparent use water diversion?	no shape	none	cut and fill	moderate	none	☑	☐	☑	☑	Seasonally flooded	Riparian road without apparent use, low use level. Makes nice trail, but should be re-shaped to drain better. Armored sill crossing at trib appears to be functioning ok, but DS side is very steep, may be active nick point. Areas of streambank instability, especially in upper portion of road near confluence with East Branch Liddell. Evidence of debris flow or slide depositing large quantity of sediment on surface near lower end of road, observed previously.
Molino 1	2	unimproved dirt	slope	occasional	poor	useful pasture	no shape	none	cut and fill	none	moderate	☑	☐	☑	☐		At N37.03825 W122.22249 gully erosion across road in saturated clays, possibly related to leak or overflow from concrete cistern above road. Cistern observed full to 1' from top. Otherwise, road is stable across terraces and sloping across bluffs. Road should be outsloped and dipped for proper drainage.
Molino 2	2	unimproved dirt	ridge slope	occasional	fair	useful pasture	no shape outsloped	none	cut and fill	none	;none	☐	☐	☑	☑	washout	Grade below junction w/Molino 1 is 15-30%. Site is is washed out ford crossing. Road should be outsloped and dipped for proper drainage.
Molino 3	3	Rocked	slope riparian	bandoned	fair	no apparent use	outsloped	none	cut and fil	none	none	☑	☐	☐	☑	Washout	Road appears very stable except washed out crossing at Class III stream. Road traversed slope above Molino reservoir; would make a nice trail.
Molino 6	2	unimproved dirt	ridge slope	occasional	fair	useful reservoir	no shape	none	cut and fill fill	none	moderate	☐	☐	☑	☐		Could not find junction with Molino 5. This road provides access to upper fields, now abandoned, reservoir, and waterworks. Position at top is N37.03603; W122.22158. At reservoir pipeline on concrete footing extents north side of reservoir. At N37.03252 W122.21683 400' of road drains to gully that spills out on terrace; no delivery to any stream. Possibly spring-fed seep at this point.

TABLE 4.2-3 SUMMARY OF ROAD SURVEYS ON THE COAST DAIRIES PROPERTY

Road Name	Class	Road Surface(s)	Aspect	Usage level	General condition	Necessity/ Used for	Road Shape(s)	Drainage Method(s)	Construction Method(s)	Sediment delivery	Gullying	Landsliding: fill failure	Landsliding: cutslope failure	Surface drains poorly?	Impassable?	Reason impassable	Notes
Molino 7	3	umimproved dir	terrace	occasional	poor	no apparent use	no shape	none	full bench	none	moderate	☐	☐	☑	☐		Flat road, not used often, tracks of road barely visible. Was used to access ag fields, but these are now abandoned. Sopme runoff directed to bluffs creating gullying.
Molino 9	3	unimproved dirt	riparian	occasional	good	useful reservoir	no shape	none	fill slot cut	severe		☑	☐	☐	☐		Very deeply incised stream in places (Molino Creek). Much of road is on a levee between stream and reservoir. Stream cutting levee fill with 100% delivery to stream.. DRC from Swanton Road empties onto road 200' below junction. No delivery of sediment from road gullying.
Molno Reservoir Road	2	unimproved dirt	riparian	occasional	fair	useful reservoir	no shape	none	fill	moderate	none	☐	☐	☑	☐		Driveable road is grassed over, ends at turnabout below reservoir. Road not passable in wet weather. Road is useful for reservoir access, but in absense of reservoir would have no use.
Quarry Road	2	rocked	slope	occasional	fair	useful quarry	insloped outsloped	berm break	cut and fill	severe	severe	☐	☐	☑	☐		Steep road cuts across slope above San Vicente Creek, provides alternate access to shale quarry and conveyor belt. Road is poorly constructed, has little shape, inadequate drainage. Large berm on OB edge, water flows down road surface or ditch. Not enough drainage points. Gullies below each drainage point presumably deliver to San Vicente Creek. Road should be either decommissioned, or if necessary to keep, re-built as outsloped, dipped road without berm.
Railroad Frontage Road	2	rocked	terrace	occasional	good	essential ag fields	outsloped	none	cut and fill slot cut	none	none	☐	☐	☐	☐		During growing season traffic may exceed 12 cars/day. Parts of road provide beach access or access to trails.
River Road	3	unimproved dirt		occasional	fair	no apparent use	no shape	none	cut and fill	moderate	none	☐	☐	☑	☐		Small road that veers off Laguna Rd. Road is passable but gets overgwon in spots. Road ends @ property line, did not observe a crossing over Laguna Ck. Road does cross over small trib to Laguna Ck as comes off Laguna Rd. No apparent drainge methods for this road.
Road 60	3	unimproved dirt	slope ridge	occasional	fair	useful PG&E Lines	no shape	waterbars	cut and fill	none	none	☐	☐	☑	☑	Overgrown	Well-designed and stable service road. Bedrock base and cut and fill construction. Portion over ridgeline. Drainage consists of occasional hand-placed waterbars. Crossing of Class III stream or swale is unculverted, no sign of erosion at this point. Road should be outslped and dipped or water-barred for stability and to improve drainage; however, road appears not to deliver sediment to stream.

TABLE 4.2-3 SUMMARY OF ROAD SURVEYS ON THE COAST DAIRIES PROPERTY

Road Name	Class	Road Surface(s)	Aspect	Usage level	General condition	Necessity/ Used for	Road Shape(s)	Drainage Method(s)	Construction Method(s)	Sediment delivery	Gullying	Landsliding: fill failure	Landsliding: cutslope failure	Surface drains poorly?	Impassable?	Reason impassable	Notes
San Vicente - Cement Plant Road	2	paved	slope	heavy	good	essential quarry	insloped outsloped	none	cut and fill	moderate	moderate	☐	☐	☐	☐		800' of ditch drains to road surface, crosses road near intersection w/San Vicente Road, and onto flood plain. Sediment probably delivered to stream during large storms, otherwise stored on floodplain beneath conveyor.
San Vicente Cow Pasture Road	3	umimproved dir track	slope riparian	ocassional	poor	useful quarry	no shape	none	cut and fill	severe	moderate	☐	☐	☑	☐		Road is overgrown but passable. 30' above San Vicente Creek spring and old reservoir; wetland below. Road cuts across slope, drains through meadow; gullying to San Vicente Creek. Some delivery from San Vicente Road via ford crossing. Road should be decommissioned, as cuts through riparian area, wetland. Decommissioning must include upper portion that cuts across slope, as this section currently entrains water and directs it to gully sysytem. Road may be used by RMC for quarry ops.
San Vicente Farmhouse Road	2	rocked unimp dirt	slope	frequent	good	useful farm bldgs	outsloped	none	cut and fill	moderate	none	☐	☐	☑	☐		First part of road above Highway 1 is rocked road in good hape. After farm bldgs road is overgown with high grass and does not go through.
San Vicente Road	2	rocked	riparian	heavy	good	essential quarry	no shape	dips	cut and fill	severe	moderate	☐	☐	☑	☐		Riparian road gets year-round use. Road drains via numerous delivery points to flood plain or channel with presumed delivery of sediment to San Vicente Creek. Road should be rebuilt to shed water continuously to floodplain buffer. Good candidate for paving.
Upper Ferrari Creek Road	3	unimproved dirt	ridge	occasional	good	useful PG&E lines	outsloped	none		none	none	☐	☐	☐	☑	overgrown	Road goes short way off Warnella road to cul-de-sac for PG&E line access, then becomes track into oak forest. Road is well defined through forest, along ridge, used to meet up with Ferrari Creek Road, now overgrown. Good trail possiblity.
Upper Liddell Creek Road	3	unimproved dirt	riparian	abandoned	fair	no apparent use	no shape	none	cut and fill	none	none	☐	☐	☐	☑	blockage	Road is blocked at ds end. Stable riparian road, no apparent problems, makes a nice trail. Sediment basin at head of stream leaking large volume of very fine material. Stream below dump full of orange goo and lots of sediment. Upper reaches of stream deeply incised, several nick points observed.
Upper Quarry Road	2	rocked	slope	frequent	fair	essential quarry	insloped	drc	cut and fill	severe	severe	☐	☐	☑	☐		Second drc drains 1,000 ft right ditch, 750 ft left ditch. Inlet collapsed; outlet is large shotgun. Some gullying to creek from this drc. DRC 3 is 16" pipe. Major gully to creek. DRC rustline = n2". Falls 40". Gully length est. 500-1,000 ft. DRC drains 250 ft right ditch 800 ft left ditch.

TABLE 4.2-3 SUMMARY OF ROAD SURVEYS ON THE COAST DAIRIES PROPERTY

Road Name	Class	Road Surface(s)	Aspect	Usage level	General condition	Necessity/ Used for	Road Shape(s)	Drainage Method(s)	Construction Method(s)	Sediment delivery	Gullying	Landsliding: fill failure	Landsliding: cutslope failure	Surface drains poorly?	Impassable?	Reason impassable	Notes
Upper San Vicente 1	3	unimproved dirt	slope riparian	abandonded	poor	no apparent use	outsloped	water bars	cut and fill	moderate	moderate	☐	☐	☐	☑	overgrown	Road can be walked, not driven. Road not mapped as not visible on air photo and no GPS reception in canyon. Old logging road parallels Upper San Vicente Road for several hundred yards, then bends away (uphill) and south at large Class III stream. Road then heads up to large logged over redwood grove. Above bend is some minor gullying of road surface and delivery to class III at water bar. Too large drainage area. Redwood grove has good potential for picnic or camping area.
Upper San Vicente Road	2	paved rocked	riparian	occasional	good	useful water diversion	no shape	dips drc	cut and fill	severe	severe	☐	☑	☑	☐		Gate at property line is at N37.01.230, W122.10.698. Road is dipped, not shaped, for about 300 feet below gate. Entire road should be outsloped and dipped, except through areas of seeps. Riparian road along San Vicente Creek should be winterized and closed during winter, if possible.
Upper Y Creek Road	3	Unimproved dir	riparian	occasional	poor	no apparent use	outsloped	waterbars none	cut and fill	moderate	none	☑	☐	☑	☐	washout	Road is washed out and overgrown. Washed out culverts have caused some erosion of banks and minor input of sediment. Road itself is stable and unused. Water sheets off with not many waterbars to direct flow to localized area. One landslide above 3rd crossing on right bank caused moderate to severe sedimentation at time of event. No input presently.
Upper Yellow Bank Creek Road	3		riparian	abandoned	poor	no apparent use	outsloped	none	cut and fill	severe	none	☑	☐	☐	☑	Overgrown	Lower part of road to humboidt (site 28) is stable, above channel, outsloped, no problems. Road crossing at humbodt is washed out. Road continues on filled-in channel, now incised. See notes for site 28.
Warnella 1	2	paved rocked										☐	☐	☐	☐		Data sheet incomplete; need to re-check road.
Warnella 3	3	unimproved dirt	slope	occasional	fair	useful stock water tank	no shape	none	cut and fill	moderate	moderate	☐	☐	☑	☐		See notes for site 9. Road is short, ends at stock watering tank. Stream crossing is problematic and requires treatment.
Warnella 4	2	paved	ridge slope	frequent	good	essential quarry	insloped	none	cut and fill	none	none	☐	☐	☑	☐		Road leads to old quarry area. Mysterious drainage at crossings over swale or filled tributary.
Warnella Road	2	paved	ridge slope	frequent	good	essential inland access	crowned	dips drc	cut and fill	moderate	moderate	☐	☐	☐	☐		200' down road from Substation Road 12" concrete drc, empties into head of arroyo, minor gullying below. Washout at N37.01.428, W122.12.497, pavement washed out across road, culvert above.

TABLE 4.2-3 SUMMARY OF ROAD SURVEYS ON THE COAST DAIRIES PROPERTY

Road Name	Class	Road Surface(s)	Aspect	Usage level	General condition	Necessity/ Used for	Road Shape(s)	Drainage Method(s)	Construction Method(s)	Sediment delivery	Gullying	Landsliding: fill failure	Landsliding: cutslope failure	Surface drains poorly?	Impassable?	Reason impassable	Notes
Warnella Road Extension	2	rocked	slope	frequent	good	essential other properties	outsloped no shape	dips	cut and fill siot cut	none	none	☐	☐	☐	☐		Series of dips drain to breeches in berm, spaced about 150' apapret. Road drainage goes underneath cattleguard acrsoss road and dissipates in large plat area. Road passes through headwaters of Ferrari Creek, but no apparent delivery of sediment to strem
Yellow Bank 1	3	unimproved dirt	ridge slope	occasional	fair	essential water tank	outsloped	none	cut and fill	none	none	☐	☐	☐	☐		Most of this road traverses across ridge above drainages to both Y Ck , Laguna Ck, and Yellow Bank Ck. Road is along divide. Large buffers filter runoff through meadow w/tall grass on either side. No erosion observed from road. Road is overgrown but passable.
Yellow Bank Creek Road	3	unimproved dirt	riparian	abandoned	poor	no apparent use	no shape	none		none	none	☐	☐	☐	☐		Road ends at N36.59.824 W122.09.882. Would make a good trail, at least to this point. Road runs along margin of floodplain, well away from creek. Road was completely overgrown in fall of 2000, but was cleared, probably by Bern Smith. Road used to go through all the way to Liddell Pipeline Road, but is now overgrown and obliterated in middle section.
Yellow Bank Creek Road	3	unimproved dirt	riparian	abandoned	poor	no apparent use	no shape	none	cut and fill	none	none	☐	☐	☐	☑	washout at site 29	Short road length from Liddell Pipeline Road to washout at site 29. Beyond road is overgrown, survey ends. Road drains poorly but does not deliver sediment to stream.
Yellow Bank Farm Road	3	unimproved dirt	ridge slope	occasional	fair	no apparent use	outsloped no shape	none	cut and fill	moderate	none	☐	☐	☑	☐		Road cuts across meadows, up a slope and along a ridge top. Road used very infrequently. Does not have drainage structures. Does not direct much runoff. Lots of filtration (grasses) for catching sediment.

SOURCE: Environmental Science Associates

TABLE 4.2-4

SUMMARY OF ROAD STREAM CROSSINGS AND OTHER PROBLEM SITES

Watershed	Site #	Road name	Abandoned?	Comment on Problem	Comment on treatment
Molino	1	Molino 2	☐	Stream has washed out ford crossing exposing 8' bank on left bank. Road is impassable at this point. Most of fill is gone. Stream will continue to erode left bank.	Road has little use, site should be properly decomissioned, loose fill removed, site stabilized and revegetated.
Molino	2	Molino Reservoir Road	☐	Undersized culvert with evidence of stream flowing over the road. Fill volume is very small on low gradient road. Pipe is 17' long.	Replace with properly sized culvert or construct ford crossing.
Molino	3	Molino 9	☐	Can't see how water is getting under road. Appears to be old cmp or humboldt. Distributary channel to reservoir. Main channel stays to right of road.	
Molino	4	Highway 1	☐	Poured concrete culvert beneath highway, through huge fill. Probable barrier to fish migration; 2' sill at outlet, no baffles. Flared inlet, probably undersized, may have caused major deposition in arroyo US, perhaps between time Higway 1 was buile (1939) and dam was built (1959).	Remove fill and construct bridge.
Molino	5	Ferrari Creek Road	☑	Stream cuts through undifferentiated fill, including old car body, rock, and debris. Appears to be stream incision through fill. Incision currently 9-10' deep, vertical banks exposing fill material.	Pull back fill and apply bioengineering treatments to stabilize banks and restore habitat.
Ferrari	6	Molino 5	☐	Cattle crossing of Ferrari Creek. Steep access (25%) on both banks, banks are eroded, sediment delivered to stream.	Exclude cattle from riparian area, relocate crossing to more stable site, or armor banks at this site if it is to remain a crossing.
San Vicente	7	Warnella	☐	Dirch relief culvert beneath Warnella Road, drains 400' of road ditch, discharging into ephemeral tributary to San Vicente Creek. Gullying beneath outlet, 100% sediment delivery to San Vicente Creek. Culvert is 12" concrete.	Difficult to disconnect ditch due to high berm and fact that road is nearly throughcut across terrace.
San Vicente	8	Warnella	☐	CMP culvert drains south side of road approx. 300' of ditch, discharges under Warnella 1 towards San Vicente Creek. Gullying below outlet, flow eventually joins with outlet of Site 7.	Disconnect ditch from stream system by breaking up drainage.
Ferrari	9	Warnella 3	☐	Fill crossing over little-used road. Springbox 75' US of crossing. Crossing is earth fill, partially washed out.	Some potential for additional loss of fill. Excavate or rebuild as armored sill.

TABLE 4.2-4

SUMMARY OF ROAD STREAM CROSSINGS AND OTHER PROBLEM SITES

Watershed	Site #	Road name	Abandoned?	Comment on Problem	Comment on treatment
San Vicente	10	Upper San Vicente Road	☐	Drainage pit excavated into hillslope above road, and 18" CMP installed to drain boggy area across road. Outlet in streambank 30' above San Vicente Creek. No gullying below, though looks like new installation. Culvert is about 25' long. Similar DRC 100' down road drains onto terrace, no sediment delivery.	Appears to be functioning okay as way of draining springs and seeps.
San Vicente	11	Upper San Vicente Road	☐	Landslide on Upper San Vicente Rd, near site 10. Toe of slope is undercut by Creek. Bank material and maybe some road fill have failed and entered stream. Scarp is about 78' long, 40 ft above stream, 85%.	Road grade is 15%. Road is dipped with runoff onto failure surface, should be re-directed away from landslide area.
San Vicente	12	Upper San Vicente Road	☐	Low gradient, undersized culvert 1/2 plugged at inlet, on very steep tributary, drains through 8' flume onto terrace. Probably no sediment delivery, though evidence of past diversion into ditch, 100' to bridge crossing then across flood plain and into creek.	Replace with larger CMP set at steeper gradient; install stilling basin and trash rack. Existing culvert is 18" x 20'. Road bed is 13' wide at crossing.
San Vicente	13	Upper San Vicente	☐	Bridge is 40' x14" wood decking on railcar w/ concrete abutments in stream channel. R. approach is built-up fill ; left approach is natural bank material. L abbutment rip-rapped with evidence of scour, may be sagging. Improper placement at bend in stream renders problem difficult to treat. Channel may be constricted by fill and abutments; loss of floodplain from road grade fill.	Bridge appears stable for moment, but should be evaluated by a civil engineer.
San Vicente	14	San Vicente Cow Pasture Road	☐	Occasional use ford crossing. Road carries sediment from both banks, including 1,000' of ditch and gully from L bank, 230' from R bank, including 130' from San Vicente Road.	Decommission crossing, revet banks and plant. Road needs to be decommissioned above left bank, as creating gully.
San Vicente	15	San Vicente Road	☐	Bridge is wood planking on I beams set on concrete abutments. Weir beneath. Weir has a low flow notch, not a fish barrier. Bridge is in good condition.	No treatment necessary.
San Vicente	16	San Vicente Road	☐	Ford crossing on San Vicente Creek just DS of site 15. Used by RMC for heavy equipment. Sandy approaches entrain sediment into stream.	Pave, rock, or otherwise stabilize approaches to prevent sediment from being entrained into creek.
Liddell	17	East Branch Liddell Creek Road	☑	Dismantled bridge on Liddell Creek near confluence with E. Branch. Bank erosion around buttresses causes input of sediment locally, but minimal. Bank erosion not active at this point. Bridge structure is stable, possibly serviceable if restored as a foot bridge.	None.

TABLE 4.2-4

SUMMARY OF ROAD STREAM CROSSINGS AND OTHER PROBLEM SITES

Watershed	Site #	Road name	Abandoned?	Comment on Problem	Comment on treatment
Liddell	18	East Branch Liddell Creek Road	☐	Small trib crosses level road, has taken out about 20 yards of fill delivered to E. Branch Liddell Creek. Potential for additional wash out. 12" corrugated plastic DRC drains left road approach into channel.	Pull or reconstruct crossing as proper armored fill. Disconnect ditch from stream system, drain onto terrace or floodplain well above creek.
Liddell	19	Upper Quarry Road	☐	Culvert on tributary to West Branch Liddell Creek. Approx. 8' drop at culvert outlet, but protected with rip-rap, some erosion of bank.	Disconnect ditch from stream, outslope road or install additional DRCs. Install critical dip at left hinge of crossing.
Liddell	20	Upper Quarry Road	☐	Culverted crossing of West Fork Liddell tributary. Minor erosion of bank at inlet. Flow beneath culvert through rusted-out bottom; no flow out outlet. Outlet is 4' above channel bed.	Culvert may need replacement soon. Should be checked for proper sizing. Install critical dip at left hinge; disconnect ditch from stream.
Liddell	21	Upper Quarry Road	☐	Culverted crossing on mainstem West Branch Liddell Creek. Culvert oval/collapsed at downstreamend under road. Makeshift dam, non-operational, 100' US of culvert inlet for past water diversion, now not functioning. Streambed filled with fines. Outlet is 8" above channel. All flow is through culvert.	Check for proper sizing and culvert condition. Eliminate diversion potential and disconnect ditch from stream channel. Investigate source of sediment above this point.
Liddell	22	Upper Quarry Road	☐	Small, perhaps not natural class III stream diverts into road ditch and flows 150' to W. Branch Liddell.	Install CMP through crossing or find source of water and redirect flow into natural channel.
Liddell	23	Conveyor Belt Road 2	☐	Culverted crossing on mainstem W. Branch Liddell Creek. Large trash rack above inlet and emergency inlet to culvert above main inlet. Huge fill for conveyor line. Outlet alonside outlet of site 24. Downspout has failed. Major washout of fill (100's of yards) Outlet of culvert is badly rusted. Drop to channel is about 20'. Outlet coordinates: N37.01648 W122.09945. Large amt of dust from conveyor accumulates @ crossing.	Culvert should be re-checked for integrity. Downspout should be re-fitted, but poor condition of CMP at outlet makes this difficult.
Liddell	24	Conveyor Belt Road 2	☐	Culverted crossing of tributary to W. Branch Liddell. Stream empties into sediment basin. Culvert tower inlet may be non-functional. Little evidence of inundation and no apparent outlet. Possible emergency outlet through notch and to main W. Liddell, where water has diverted recently. Outlet alongside outlet of site 23 has long downspout, only partly functional. Lost fill = 100' x 25' x 20' = 50,000 cubic feet or 2,000 cubic yards.	Sediment basin appears not to be functioning, with possible outlet through bottom of basin, though not visible. Probable delivery of large amount of sediment to W. Branch Liddell. Sediment basin and culvert need to be restored to funtionality. Source of sediment? Ask RMC.

TABLE 4.2-4

SUMMARY OF ROAD STREAM CROSSINGS AND OTHER PROBLEM SITES

Watershed	Site #	Road name	Abandoned?	Comment on Problem	Comment on treatment
San Vicente	25	Big Rock Road	☐	Small culverted crossing on little-used road. Culvert may drain area from other side of quarry, as this appears to be a dry swale.	Find CMP inlet and inspect.
Liddell	26	Liddell Pipeline Road	☐	Culverted crossing on mainstem of E. Branch Liddell Creek, near junction with E. Branch Liddell Road. CMP is oval: 60" wide, 32" tall. Outlet is perched 2' above channel; probably not a barrier at high flow. Small fill over culvert is armored w/ concrete bags. Some of fill over culverrt has failed -- small volume delivered to creek.	Seems okay, but should keep an eye on outlet in case stream incises, in which case may become barrier to fish passage.
Yellow Bank	27	Liddell Pipeline Road	☐	Culverted crossing of Yellow Bank Creek. Culvert is probably undersized. Culvert is filled with 11" of sediment. Minor collapse on top of culvert. Small full probably insufficient for heavy vehicles.	Check sizing and upgrade if necessary.
Yellow Bank	28	Upper Yellow Bank Road	☑	Humboldt or fill crossing of upper part of Yellow Bank Creek on abandoned logging road. Road probably cut and fill construction directly in stream channel. Stream has now incised down to or near original bed. Road appears to have been in stream for several hundred yards.	Banks now appear fairly stable. Should be further evaluated to determine whether treatment is advisable to stabilize to prevent excessive sloughing of banks.
Yellow Bank	29	Yellow Bank Creek Road	☑	Culverted crossing of Yellow Bank Creek has washed out. Old pipe in stream channel. Some fill still perched on L bank of stream.	Site could be restored by pulling back unstable fill and revegetating. This is also an area of active incision.
Yellow Bank	30	Liddell Pipeline Road	☐	Culverted crossing on small trib to Yellow Bank Creek. Culvert seems to be functioning okay. Trash rack in place above inlet.	Seems okay.
Laguna	31	Laguna Road	☐	New culverted crossing on Y Creek replacing old failed crossing. Culvert appears adequately sized. Oval culvert 7' wide and 5' high. Concrete blocks stabilize minimal fill over culvert.	None needed. Watch for changes in streambed level, as stream is incising in this area.
Laguna	32	Upper Y Creek Road	☑	Formerly culverted crossing of Y Creek on abandoned road, was probably undersized, now 100% washed out. No crossing possible for vehicles. Some bank erosion around washout out area. Old culvert lies in channel but not functioning.	Re-check site to see if it makes sense to pull back unstable banks and re-vegetate.

TABLE 4.2-4

SUMMARY OF ROAD STREAM CROSSINGS AND OTHER PROBLEM SITES

Watershed	Site #	Road name	Abandoned?	Comment on Problem	Comment on treatment
Laguna	33	Upper Y Creek Road	☑	24" culvert on Y Creek has washed out but is still in place. Channel diverted around old culvert to left and incised in channel around 2' below culvert. Culvert is obviously undersized. Diversion of flow around culvert caused bank erosion on left bank.	Evaluate site for possible stabilization and revegetation of banks.
Laguna	34	Upper Y Creek Road	☑	Old rusted 12" pipe lies in channel at crossing of Y Creek. May be old culvert. If so, definitely undersized. Channel has incised 2-3' at this point.	Evaluate site for possible stream bank stabilization and revegetation.
Laguna	35	River Road	☐	Culverted crossing of Class III tributary to Laguna Creek. Crossing is just off of Laguna Road. Right ditch includes portion of Laguna Road, which directs water to culvert. Outlet drops 4' to channel bottom. Not much flow at present.	Evaluate site for proper culvert sizing and diversion potential. Disconnect ditches from stream system and if necessary install critical dip.
Laguna	36	Laguna Road	☐	Double 16" culverts on Class III tributary to Laguna Creek, also drains large ditch, 2-3' wide that runs along road from upstream. Drainage area includes area off of Coast Dairies property.	Evaluate site for proper sizing of culverts and diversion potential. Disconnect ditch from stream, evaluate road to improve and break-up drainage.
Laguna	37	Laguna Road	☐	Tributary to Laguna Creek crosses under road through 30" CMP. Runoff from road up gradient enters culvert.	Evaluate for proper culvert sizing and diversion potential. Disconnect ditch from stream.

SOURCE: Environmental Science Associates

San Vicente Creek Watershed

The San Vicente Creek watershed contains a relatively high density of roads, most of which are associated with the RMC quarry operations. The major roads in this watershed include San Vicente Road and Upper San Vicente Road, San Vicente – Cement Plant Road, Conveyor Belt Road, and Lower Quarry Road. The alignment of the old San Vicente Railroad is still a prominent feature on the landscape, and is now used for a water pipeline. RMC maintains most of the roads in this drainage. The most problematic roads in the San Vicente watershed, in terms of impacts on aquatic resources, are San Vicente Road and Upper San Vicente Road, both of which are riparian roads; Lower Quarry Road, and San Vicente Cow Pasture Road, all of which were identified in the road survey as major contributors of sediment to the stream. The Planning Team did not survey the San Vicente Railroad alignment, but it is evident from air photos and from ground views that the old railroad grade, which cuts across the steep northern wall of the San Vicente canyon, has had and continues to have a major impact on the creek; numerous, large landslides are evident below much of the alignment, particularly in the vicinity of the old quarry operation. Sites 7-8, 10-17 and 25 are within the San Vicente watershed (Figure 4.2-4).

Liddell Creek Watershed

The major roads in the Liddell Creek watershed are Bonny Doon Road, Upper Quarry Road, Conveyor Belt Road 2, Quarry Office Road, and part of Liddell Pipeline Road. Each branch of Liddell Creek has a riparian road running along it; the lower mile or so of Bonny Doon Road itself is constructed in the riparian corridor of West Liddell Creek. Several of the roads in this watershed, including Upper Liddell Creek Road and East Branch Liddell Creek Road, are infrequently used or abandoned. Several roads in this watershed provide access to quarry operations and the conveyor belt. Upper Quarry Road and Conveyor Belt Road 2 both cut across the upper watershed of West Liddell Creek. The crossings of West Liddell and its tributaries are some of the most problematic sites on the Property. Sites 17-24 and 26 are within the Liddell Creek watershed (Figure 4.2-4).

Yellow Bank Creek Watershed

South of the Liddell Creek watershed, roads on the Property become smaller and more sparse. The Yellow Bank Creek watershed has only one road classified as a secondary road, Liddell Pipeline Road, which cuts across the upper part of the watershed and intersects with East Branch Liddell Creek Road near one of the Liddell Spring water diversions. The two riparian roads in this watershed, Yellow Bank Creek Road and Upper Yellow Bank Road, are both abandoned. The alignment of Yellow Bank Creek Road is completely overgrown above the reservoir, and impassable. The road is again visible intersecting with Liddell Pipeline Road, but a culverted crossing of Yellow Bank Creek about 100 yards below this point has washed out. Upper Yellow Bank Road is an abandoned logging road that is stable for the first half mile or so above Liddell Pipeline Road. At that point, the road once crossed the creek, but the old crossing structure, which may have been a humboldt crossing (a crossing constructed from logs placed across the stream channel and covered with soil), has completely washed out. It is evident that the road above this point was constructed by cutting the rock and soil from the toe of the canyon slope and using it to fill the stream channel. Remnants of the roadbed are still evident for several hundred feet, though the stream has incised back to its original bed. Yellow Bank Farm Road is a stable, though little-used road that cuts across the marine terraces and bluffs. The Planning Team found no access to the headwaters of Yellow Bank Creek, and there appear to be no roads through this part of the Property. Sites 27-30 are within the Yellow Bank Creek watershed. It should be noted that neither the bore that carries Yellow Bank Creek beneath Highway 1 and the railroad grade, nor the roads across and between the two reservoirs on Yellow Bank Creek, were included in the road survey.

Laguna Creek Watershed

The only major roads within the Laguna Creek watershed are Laguna Road and a part of Liddell Pipeline Road. West of Highway 1, a network of trails, some of which may once have been roads, provide access to Laguna Beach. Laguna Road, the westernmost part of which is a section of the old Coast Road alignment, provides access to the residences and agricultural fields within the "loop" formed by the road and Highway 1. Laguna Road continues for a short distance along Laguna Creek, then along the riparian corridor of an ephemeral tributary to Laguna Creek, over a divide to the junction with Liddell Pipeline Road, thence across Y Creek (a tributary to Laguna Creek) and off of the Property. Both Laguna Road and Liddell Pipeline Road provide access for the City of Santa Cruz Water Department for their Liddell Spring water diversions and pipeline. These roads are maintained by the City of Santa Cruz. They are outsloped with waterbars or rolling dips along their entire length. Stream crossings along these roads are built with very shallow fills over culverts. Upper Y Creek Road is a partially abandoned logging road. While much of the road is stable and walkable, the road features three washed out crossings that were once culverted. Like the upper Yellow Bank Creek watershed, the upper Y Creek watershed appears to be largely roadless. Sites 31-37 are within the Laguna Creek watershed.

4.2.9 SIGNIFICANT GEOLOGIC ISSUES

Overall, the geologic formations of the Coast Dairies Property have a relatively (for coastal California) high inherent strength and stability. The crystalline bedrock, and Tertiary sedimentary rocks do not exhibit excessive landsliding, and although other mass wasting processes such as soil creep, dislodgment of weathered rock slopes and slumping can be identified in particular areas, especially in the steeply sloped areas, that occurrence is not widespread. However, there are conditions on the Property that could present issues for long term planning, as discussed below.

Seismically, this region is active and earthquakes of considerable magnitude are expected to affect the Property sometime in the future. Although there are no active faults extending through the Property capable of surface rupture, considerable groundshaking would be expected from an earthquake along the San Gregorio or the San Andreas Fault Zones. The most significant impact of seismic groundshaking, other than the potential damage to buildings, would likely be caused by landsliding and rockfall in the areas with steep slopes underlain by Santa Cruz Mudstone or alluvium. In areas with more gradual slopes, shallow soil debris flows would likely occur, especially during the rainy season, but would not be expected to cause excessive damage.

The erosion on the coastal bluffs will continue as rocks dislodge and fall off the sheer weathered slopes along the coast. Retreat of the bluffs is inevitable and an element of the natural erosional processes in this environment. Seismically-induced landslides can accelerate cliff erosion. Bedrock on sheer cliffs are most susceptible to failure when saturated, and when undercut by wave action or manmade features.

Some soil classes located on gradual slopes at the Coast Dairies Property are considered by the USDA as Prime Farmland Soils and Farmland of Statewide Importance. Those on steeper slopes are shallower and are less suitable for crop cultivation. Protection of Prime Farmland Soils and Statewide Importance Soils should be addressed during the development of the Long term Protection and Use Plan (see also Section 5.2).

As indicated in the text of this section, roads are a major concern for the Property because of their historic and continuing impact on terrestrial and aquatic resources. While the road survey presents an initial view of the conditions and problems associated with the Property's road network, the survey was insufficiently detailed to develop site-specific treatments to reduce the impacts of roads. The Planning Team recommends use of the Opportunities and Constraints Analysis to develop a transportation plan for the Property. Based on this plan, existing roads should be slated for maintenance, upgrade, or decommissioning, depending on their congruence with the goals of the *Long-Term Resource Protection and Use Plan.* It will then be necessary to develop detailed plans for road treatments.

Several problems associated with the road system were identified which require immediate attention because of their potential impact on salmonid habitat. In the interim before the Plan is completed, it is recommended that the Coast Dairies and Land Company undertake a program to address these problems.

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SECTION 5.0
HUMAN USES OF THE COAST DAIRIES PROPERTIES

5.1 WATER RIGHTS AND DIVERSIONS

5.1.1 METHODOLOGY

The section was developed based on a file review at the California State Water Resources Control Board (SWRCB) by Ellison, Schneider, and Harris L.L.P., and interviews with individuals at RMC Pacific Materials, Landsmiths, and Agland[1]. Recommendations regarding future actions were generated by Ellison, Schneider, and Harris L.L.P. based upon available information regarding existing appropriations, permits, agreements, and water usage not documented with the SWRCB.

5.1.2 CALIFORNIA WATER LAW BACKGROUND

California water rights can be complex and confusing. Basically, this body of law recognizes two very different types of rights: riparian and appropriative. Other types of rights exist in California as well, such as reserved rights (water set aside by the federal government for the public domain) and pueblo rights (a right based on Spanish and Mexican law). California water law also allows an overlying landowner to pump groundwater, a right governed by an altogether different set of rules.

5.1.2.1 SURFACE WATER RIGHTS

Riparian Rights

Riparian water rights are derived from ownership of land that is adjacent to a source of water. A riparian right entitles the landowner to use a correlative share of the water flowing past his or her property. A riparian right owner does not need a permit from the SWRCB or any other type of governmental approval. Riparian rights apply only to water which would naturally flow in the stream and do not entitle a water user to divert water to storage for use at some other time (unless storage is less than 30 days) or on land outside of the watershed. Riparian rights remain with the property when it changes hands, although the right may be lost if the parcel is severed from the adjacent water source. Riparian rights have a higher priority than appropriative rights (see

[1] Landsmiths is the firm currently (at the time the ECR was prepared) contracted by the Trust for Public Land (TPL) for day-to-day operations at Coast Dairies. Agland is part of the consultant team (see Table I-2)

below). Amongst riparian right holders, however, priority is equal and during low flows all share the shortage of water, hence riparian rights are characterized as “correlative” rights.

Appropriative Rights

Appropriative rights derive from making a claim to divert water from the river or stream. An appropriative right allows storage of the water and reasonable and beneficial use of the water on land outside of the watershed. The dual water system created by recognition of both riparian rights and appropriative rights, and the inherent contradictions, prompted numerous legal disputes over many years and resulted in a California Constitutional amendment that requires all use of water to be “reasonable and beneficial”. California Constitution Article X, Section 2, states that “*Beneficial uses commonly include municipal and industrial use, irrigation, hydroelectric generation, livestock watering, recreational use, and fish and wildlife protection.*”

Pre-1914 Rights

Prior to 1914 there was no formal permitting system with which appropriators had to comply. At that time appropriators (mostly miners and nonriparian farmers) took control of and used whatever water they desired. These rights are recognized today and have priority over post-1914 rights. All appropriative rights are subject to the rule “first in time, first in right.” For instance, a pre-1914 right holder may be junior to another pre-1914 right holder, and both pre-1914 right holders would be senior to any post-1914 right holder.

Post-1914 Rights

The Water Commission Act of 1914 established the current permit system for the appropriation of water. Today provisions governing the appropriation permit system are set forth in the California Water Code, and the SWRCB has been granted the authority to administer permits and licenses for California’s surface water.

Post-1914 appropriative rights are governed by the hierarchy of priorities, and in times of shortage the most recent right holder is the first to be required to discontinue use. The date the permit application was filed with the SWRCB is the date which determines the priority of right. Post-1914 rights are subject to much greater scrutiny and regulation by the SWRCB than pre-1914 rights.

5.1.2.2 GROUNDWATER RIGHTS

California does not have a permit process which regulates groundwater use. In several areas, however, groundwater is subject to regulation in accordance with court decrees adjudicating the rights within groundwater basins. The reasonable use doctrine also applies to groundwater use. Overlying land owners may extract groundwater and put it to beneficial use. The rights of others with land overlying the same aquifer, however, must be taken into consideration and thus the right is a correlative right. Groundwater may be used outside the groundwater basin, although such use is subordinate to use by those with overlying rights.

A key issue relating to groundwater is whether water being pumped is so closely interconnected with a surface stream or lake that it could be considered pumping of surface water. Groundwater-surface water interconnection issues are not addressed in this section.

5.1.3 CURRENT APPROPRIATIONS, AGREEMENTS, AND WATER USAGE

5.1.3.1 APPROPRIATIONS DOCUMENTED WITH THE STATE WATER RESOURCES CONTROL BOARD

The documentation filed with the SWRCB to record appropriated water includes an Application to Appropriate Water when filed on the basis of a post-1914 right, and a Statement of Water Diversion and Use when filed on the basis of a pre-1914 right or a riparian right. Appropriations affecting the Coast Dairies Property and documented with the SWRCB are summarized in Table 5.1-1. Water diversion locations associated with these appropriations are shown in Figure 5.1-1.

Appropriations From Streams Directly on Property

The following streams flow through Coast Dairies' property: Scotts Creek (a small segment), Molino Creek, San Vicente Creek, Liddell Creek, Yellow Bank Creek, and Laguna Creek. Laguna Creek is the only stream for which there is documentation of appropriation at the SWRCB.

Documentation regarding Laguna Creek consists of Application 17329 and Application 19238. Application 17329 was filed October 17, 1956 by Coast Dairies & Land Company (CDLC). Permit 10897 was issued October 23, 1957 and License 5898 was issued December 7, 1959 to CDLC. Coast Dairies filed a Licensee Report with the SWRCB stating the prior three years' water use. Data on actual water use associated with this licensed right have not been located; therefore it is assumed that the Licensee Report is accurate. The license allows direct diversion of 0.33 cubic feet per second (cfs) from May 1 to December 1 of each year for the specified purpose of irrigation (Ellison, Schneider, and Harris 2000, 2001).

Application 19238 was filed February 16, 1960, and although the applicant's identity is currently unknown, the primary contact is listed as Stephanie Mills.[2] Permit 12529 was issued November 29, 1960, and License 7800 was issued August 3, 1966, assumedly to CDLC. The license allows 26 acre-feet for storage from January 1 to May 1 for irrigation purposes [3] (Ellison, Schneider, and Harris 2000, 2001). It has not been determined if Coast Dairies is actually exercising this licensed right through current land use practices.

[2] Stephanie Mills is a former employee of Bosso, Williams, Levin, Sachs & Book, who is former legal counsel for Coast Dairies. Based on this information, it is assumed Coast Dairies holds this license. It is anticipated that the future land managers will request that the SWRCB's records be corrected to reflect the new ownership.

[3] This information was only available electronically from the SWRCB's website. Documentation of this application, permit and license has not been located.

Coast Dairies also filed Application 30203 on December 21, 1992, requesting a right to divert water from Scotts Creek and Molino Creek. Approval for this application was not obtained from the SWRCB based on several issues, including a lack of available water (SWRCB, March 2000). These issues were never resolved, and Application 30203 was ultimately rejected and canceled by SWRCB on June 20, 2000, in accordance with the Trust for Public Land's request on May 30, 2000 to withdraw the application (SWRCB, June 2000).

Appropriations from Streams With a Point of Diversion beyond the Coast Dairies Property Line Which May Impact the Amount of Water Flowing on Coast Dairies' Property

The previously referenced streams were addressed for water being directly appropriated as it flowed through the Property. Scotts Creek is included because of its proximity—a small portion is within Coast Dairies as well. This section addresses the six Coast Dairies streams in the broader context of their point of origin: water is appropriated directly from the stream, but beyond the Coast Dairies Property boundary.

Scotts Creek

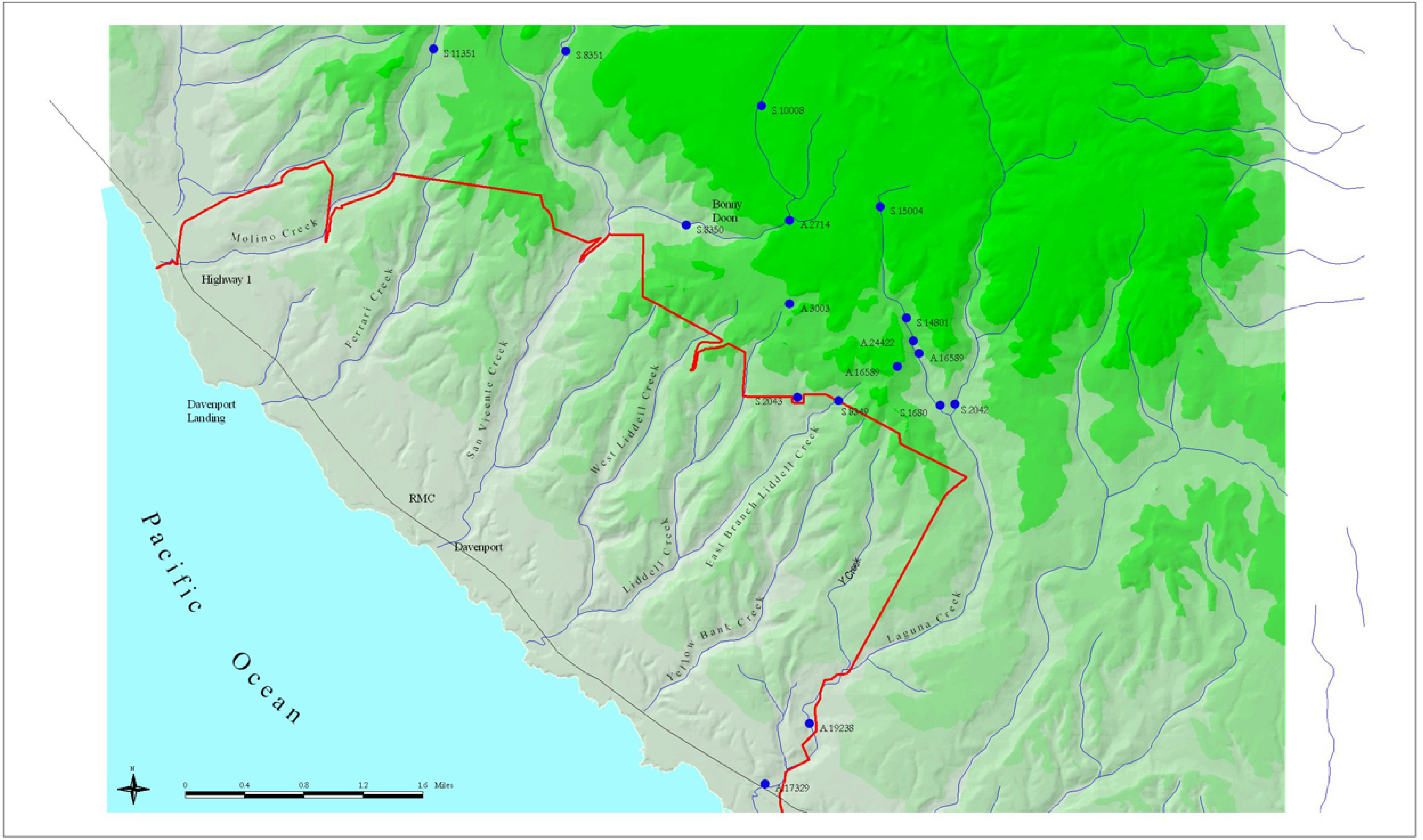
Scotts Creek originates near Big Basin Redwoods State Park and flows through the uppermost northern section of Coast Dairies' property before it terminates at the ocean. Three applications to appropriate water from Scotts Creek have been filed with the SWRCB: 2898, 2899 and 18335. Application 2898 was filed June 22, 1922 by William McGinley, although the current owner of record appears to be Pfyffer Ranch; Permit 3776 was issued September 4, 1931, and License 1462 was issued June 18, 1934. The license allows a direct diversion of 0.33 cfs from May 1 to December 1. The specified uses are domestic and irrigation (Ellison, Schneider, and Harris, 2000, 2001). However, the Pfyffer Ranch discontinued diversions from Scotts Creek during in the mid-1990's at the request of California Department of Fish and Game (Smith, 2001).

Application 2899 was filed June 22, 1922 by William McGinley, although the current owner of record is the Cal Poly State University Foundation; Permit 3777 was issued September 4, 1931, and License 1463 was issued June 12, 1934. The license allows a direct diversion of 0.28 cfs from May 1 to about December 1. The specified purposes are irrigation and domestic use. Application 18335, filed September 24, 1958, is a state filing.[4] It is a storage right for 20,000 acre-feet per year for domestic, industrial, irrigation and recreational purposes (Ellison, Schneider, and Harris, 2000, 2001).

Molino Creek

Molino Creek originates beyond the northeastern corner of the Coast Dairies Property, runs through the upper northern part of the property and eventually flows to the ocean. Up until the winter of 1999-2000, CDLC was appropriating water from the upper reaches of Molino Creek,

[4] The SWRCB is the current holder of state filings, many of which were done in 1927 and 1958. These state filings are "placeholders" for the area and can be assigned to others under certain conditions, or "released" from assignment.



SOURCE: Ellison, Schneider, and Harris, L.L.P, State Water Resource Control Board, County of Santa Cruz GIS Dept.

Coast Dairies / 200071

Figure 5.1-1
Water Rights in the Coast Dairies Area

claiming a riparian right documented by Statement of Water Diversion and Use 11351, and storing it in the Molino Creek diversion dam. The dam was largely destroyed during a storm during the winter of 1999-2000, and there are no currently no plans to repair the damage. Water is now being diverted downstream by Jim Cochrane of Swanton Berry Farms (Smith, 2001). When the dam was in place, between 65 and 75 acre-feet of water were used between April and October (Ellison, Schneider, and Harris, 2000, 2001). If storage does exceed 30 days, Coast Dairies could amend its Statement of Water Diversion and Use and, if possible, claim a pre-1914 right to use the water (see Section 5.1.4). Further analysis of prior use is necessary to determine Coast Dairies' options in this regard. If Coast Dairies has a pre-1914 storage right for the Molino Creek diversion dam, it will lose that right if it does not replace the dam and recommence diversions before five years has elapsed. If the dam only regulated water (holding water for less than 30 days), the right would not be lost by nonuse.

To provide a surrogate for the water supply lost from Molino Diversion Dam destruction, Jim Cochrane of Swanton Berry Farms diverts water downstream into a reservoir between Swanton Road and Highway 1, and a connected reservoir near the labor camps (Smith, 2001). A new Statement of Water Diversion and Use was subsequently filed by Coast Dairies on February 16, 2001. Coast Dairies is now claiming a riparian right to 241 acre-feet of water from Molino Creek for the purposes of irrigation and domestic use. Water is primarily utilized for irrigation, with domestic usage accounting for approximately 12,000 gallons a day. Diversions occur from Molino Creek between March and December, into two reservoirs on Coast Dairies property located near Swanton Road and the labor camp (Coast Dairies, 2001). Available agricultural information indicates Swanton Berry Farms currently uses only 51 acre-feet of water. Swanton Berry Farms is the only known party diverting water from the Swanton Road and labor camp reservoirs for agricultural purposes (Mott, 2001).

San Vicente Creek

San Vicente Creek has several (legal) points of origin, the uppermost near Ben Lomond Mountain. There are additional points of origin near Deadman Gulch. RMC Pacific Materials (RMC), the only San Vicente Creek water user documented with the SWRCB, operates an industrial plant with water appropriated by a claimed pre-1914 right: Statement of Water Diversion and Use 8351. RMC has constructed a reservoir located adjacent to the plant that is fed from diversion points at both San Vicente Creek and Mill Creek (the latter through Statement of Water Diversion and Use 8350). The diversions take place off both creeks from an area below dam spillways, through either a six inch or eight inch pipe, and are located in an area that is unaffected by seasonal stream fluctuations. In addition, a portion of RMC's water is used for irrigation by Seaside Ranch. The prior operator of Seaside Ranch, Ron Mondo, had a reservoir filled by overflow from RMC's reservoir and used to irrigate two adjacent fields. This reservoir, however, was not the sole irrigation source for these two fields (Reppert, 2001). Additional irrigation diversions came from an unnamed creek (referred to as Ferrari in this ECR) Additionally, Ron Mondo diverted water from RMC pipes that transport water from San Vicente (or Mill Creek) to RMC's reservoir. Ron Mondo has not continued his lease, and Seaside Ranch is currently fallow (Smith, 2001).

RMC is also the sole source provider of raw water for the cities of Davenport and New Town. A split pipe drawing from RMC's lines off San Vicente Creek and/or Mill Creek transports water to the County's Sanitation District for treatment prior to distribution. Residents at Davenport and New Town have an unmetered water source. Volume of use among these entities (RMC, Seaside Ranch, and Davenport and New Town) has not been quantified[5] (Reppert, 2001). The information available electronically from the SWRCB indicates direct diversion of 566 acre-feet from January 1 through December 31. Electronic information from the SWRCB, however, does not indicate what year(s) the water is used (Ellison, Schneider, and Harris 2000, 2001).

Liddell Creek

There are three branches to Liddell Creek: West Liddell Creek, Liddell Creek and the East Branch. Liddell Creek appears to originate and terminate on the Coast Dairies Property, and SWRCB records show no appropriations. The east and west branches originate just beyond the Coast Dairies Property line and eventually merge into Liddell Creek. Appropriation from Liddell Creek consists of appropriations from tributaries to Liddell Creek, which will be addressed in the following tributary appropriations section.

Yellow Bank Creek

Yellow Bank Creek appears to originate and terminate on Coast Dairies Property. There is no SWRCB documentation indicating appropriation from this stream at any point.

Laguna Creek

Laguna Creek originates near Ben Lomond Mountain and terminates just before it reaches the ocean.[6] The City of Santa Cruz claims a pre-1914 right to appropriate from Laguna Creek, recorded with the SWRCB as Statement of Water Diversion and Use 2042. The most recent statement reports that between approximately 287 and 715 million gallons of water were used from January 1 through December 1 in the period 1994 to 1996 for municipal purposes (Ellison, Schneider, and Harris, 2000, 2001).

Appropriations From Tributaries of Streams Running Through Coast Dairies' Property Which May Impact the Amount of Water Flowing on Coast Dairies' Property

There are tributaries associated with most of the streams flowing through the Property. Appropriations from these tributaries are addressed below.

Tributary to Scotts Creek

Mill Creek is the main tributary to Scotts Creek from which water is appropriated, although it appears unrelated to the Mill Creek that is a tributary to San Vicente Creek.

[5] Efforts should be made to retrieve information from the County Sanitation District to see if they have meters or estimates on the volume of water they receive from RMC.

[6] Laguna Creek may actually be a subterranean stream to the ocean; see Section 3.3.

Application 17627 was filed May 27, 1957 by Lockheed Missile and Space Company. Permit 11244 was issued March 6, 1958 and License 7092 was issued January 14, 1965. The license contains both a direct diversion and storage component. The amount directly diverted will not exceed 0.08 cfs from January 1 through December 31 for industrial use and fire protection; limits on stored amounts are 223 acre-feet from October 1 through June 1 for industrial use and fire protection. The source is Mill Creek, tributary to Scotts Creek.

Application 19376 was filed April 21, 1960 by Lockheed Missile and Space Company. Permit 12682 was issued March 9, 1961 and License 7093 was issued January 14, 1965. The license contains both a direct diversion and storage component. The amount directly diverted cannot exceed 0.04 cfs from January 1 through December 31 for industrial use and fire protection, and the stored amount shall not exceed 15 acre-feet from October 1 through June 1 for fire protection. The source is Mill Creek, tributary to Scotts Creek.

Application 19426 was filed May 9, 1960 by Lockheed Missile and Space Company. Permit 12683 was issued March 9, 1961 and License 7094 was issued January 14, 1965. The license allows storage of 6 acre-feet from October 1 through June 1 for fire protection. The source is Mill Creek, tributary to Scotts Creek (Ellison, Schneider, and Harris, 2000, 2001).

Tributaries to Molino Creek

There is no SWRCB documentation indicating appropriation or use from a tributary to this stream.

Tributaries to San Vicente Creek

Mill Creek is the main tributary to San Vicente Creek from which water is appropriated.

Application 2714 was filed January 4, 1922 by J.G. Welti; Permit 1501 was issued August 16, 1923, and License 730 was issued May 15, 1928. The license allows 0.23 cfs to be directly diverted from May 1 to October 1 for irrigation. The source of the water is Mill Creek, tributary to San Vicente Creek. The current owner of record is Andrew Davidson (Ellison, Schneider, and Harris, 2000, 2001).

Statement of Water Diversion and Use 8350 is filed under the name of RMC Pacific Materials with a claimed pre-1914 right. SWRCB records indicate direct diversion of 262 acre-feet from January 1 through December 31. The source is Mill Creek, tributary to San Vicente Creek (Ellison, Schneider, and Harris, 2000, 2001). Apparently, RMC uses this right in conjunction with Statement of Water Diversion and Use 8351 to operate its industrial plant (Reppert, 2001).

Statement of Water Diversion and Use 10008 was filed by W.G. Green claiming a riparian right. The most recent statement indicates that approximately 43,000 gallons were used between May and October for years 1996 through 1998. The stated purpose is irrigation, and the source is Mill Creek (Ellison, Schneider, and Harris, 2000, 2001).

Tributaries to Liddell Creek

Application 3003 was filed August 24, 1922 by Sidney and Frances Otter. Permit 1327 was issued March 6, 1923 and License 554 was issued November 12, 1926. The license allows direct diversion of 0.043 cfs from March 1 through December 1 for irrigation purposes. The source is an unnamed spring tributary to Liddel Creek. The current owner of record is RMC.

Statement of Water Diversion and Use 2043 was filed by the City of Santa Cruz claiming a pre-1914 right. The most recent statement represents between approximately 227 and 384 million gallons of water used January 1 through December 1 between 1993 and 1995 for irrigation and domestic purposes. The source is Liddell Spring, tributary to Liddell Creek (Ellison, Schneider, and Harris, 2000, 2001).

Statement of Water Diversion and Use 8349 was filed by RMC Pacific Materials (Ellison, Schneider, and Harris, 2000, 2001). The source is Liddell Spring #2, a tributary to the East Branch of Liddell Creek. RMC records indicate 3,940,000 gallons were diverted from Liddell Spring #2 between June and October 2000 for dust control associated with mining operations (RMC Pacific Materials, 2001).

Tributary to Yellow Bank Creek

There is no SWRCB documentation indicating appropriation or use from a tributary of this stream.

Tributaries to Laguna Creek

Reggiardo Creek appears to be the main tributary to Laguna Creek and the common source referenced in the following Applications and Statements of Water Diversion and Use.

Application 16589 was filed September 6, 1955 by Daniel Meaney, although the current record of owner is the Bonnymede Mutual Water Company, Permit 11031 was issued November 4, 1957, and License 9859 was issued January 13, 1972. The license has both a direct diversion component and a storage component. Water is directly diverted from Reggiardo Creek, tributary to Laguna Creek in an amount of 2000 gallons per day from January 1 to December 31 for recreational and domestic uses. Permitted storage is 2.3 acre-feet from January 1 to April 30 for recreational and domestic uses. Water for storage comes from an unnamed stream, tributary to Reggiardo Creek.

Application 24422 was filed July 27, 1973 by the Bonneymede Mutual Water Company and Permit 17526 was issued January 30, 1979. The permit allows 0.06 cfs to be directly diverted and 20 acre-feet to be stored from January 1 to December 31 for domestic use. The source of the water is both Reggiardo Creek and an unspecified spring tributary to Reggiardo Creek. A request for license was filed April 17, 2000 specifying 0.06 cfs to be diverted from January 1 to December 31, not to exceed 14.6 acre-feet per year; however, the total quantity diverted under this and License 9859 (A.16589) would not exceed 15.7 acre-feet per year. As of March, 2001, the license had not been granted.

Statement of Water Diversion and Use 8610 was filed by the City of Santa Cruz claiming a pre-1914 water right. The most recent statement indicates that millions of gallons were used from January 1 through December 31 for years 1992 through 1994, but the specific amount is not stated and was unavailable from the City. The specified uses are irrigation and domestic. The source is Reggiardo Creek.

Statement of Water Diversion and Use 14801 was filed by Margaret Kliegel, watermaster for the Bonnymede Mutual Water Company, claiming a riparian right. The statement indicates that 0.06 cfs is directly diverted between January 1 and December 31 for domestic use. The source is two unnamed streams tributary to Reggiardo Creek. Statement of Water Diversion and Use 15004 was filed by Michael Bigham claiming a riparian right. The statement indicates that 33,000 gallons were used in 1997 between January 1 and December 31 for domestic use. The source is Reggiardo Creek (Ellison, Schneider, and Harris, 2000, 2001).

For a summary of Coast Dairies water rights, see Table 5.1-1.

5.1.3.2 WATER USE DOCUMENTED BY AGREEMENTS AND LEASES

In addition to the documentation filed with the SWRCB on appropriation and use of water from the different streams on the Property, agreements exist between Coast Dairies and various entities provide additional information about water use and commitments. They are summarized below.

Agreements Between Coast Dairies and the City of Santa Cruz

Laguna Creek

There are agreements between Coast Dairies and the City of Santa Cruz whereby Coast Dairies uses water from Laguna Creek from four ¾-inch outlets (“faucets”). This agreement originates from an Indenture dated 1889 between the City of Santa Cruz and Jeremiah Respini, who quitclaimed to the City of Santa Cruz all of his riparian rights to Laguna Creek, excepting the faucets (Respini and City of Santa Cruz, 1889). The land was apparently deeded to Coast Dairies, although that document was unavailable. By agreement dated April 14, 1953 Coast Dairies granted to the City of Santa Cruz a perpetual right across the parcels known as Rancho

TABLE 5.1-1
SUMMARY OF WATER RIGHTS PERTAINING TO COAST DAIRIES AND LAND COMPANY

Application / Permit / License / Priority Date	Party or Entity	Source	Amount / Season / Use	Notes
A.2714 P.1501 L.703 January 24, 1922	Andrew Davidson	Mill Creek, tributary to San Vicente Creek	Direct Diversion: .23 cubic-feet/second May 1 to October1 Irrigation and Domestic	The point of diversion lies outside Coast Dairies' property line, but on a tributary to San Vicente Creek, which is on the Coast Dairies' property. The most recent licensee report pertains to years 1992-1994.
A.2898 P.3776 L.1462 June 22,1922	Former owner of record is Cal Poly State University Foundation. Current owner appears to be a ranch whose name is illegible.	Scotts Creek, tributary to Pacific Ocean	Direct Diversion: .33 cubic-feet/second May 1 to December 1 Irrigation and Domestic	The point of diversion appears to be right above the Coast Dairies Property line on Scotts Creek; however, because of the close proximity, further investigation may be required. The most recent licensee report pertains to years 1995-1997.
A.2899 P.3777 L.1463 June 22, 1922	Cal Poly State University Foundation	Scotts Creek, tributary to Pacific Ocean	Direct Diversion: .28 cubic-feet/second May 1 to December 1 Irrigation and Domestic	The point of diversion is beyond the Coast Dairies Property line, but is on Scotts Creek, a portion of which is on the Coast Dairies Property. The most recent licensee report pertains to years 1995-1997.
A.3003 P.1327 L.554 August 24, 1922	RMC Lonestar	Unnamed spring tributary to Liddell Creek thence Pacific Ocean	Direct Diversion: .043 cubic feet/second March 1 to December 1 Irrigation	The point of diversion lies outside the Coast Dairies Property line, but on a tributary to Liddell Creek, which is on the Coast Dairies Property. The most recent licensee report filed pertains to years 1994-1996.

TABLE 5.1-1 (continued)
SUMMARY OF WATER RIGHTS PERTAINING TO COAST DAIRIES AND LAND COMPANY

Application / Permit / License / Priority Date	Party or Entity	Source	Amount / Season / Use	Notes
A.6813 P.3683 L.1912 October 1, 1930	Oku, Inc.	Waddell Creek, tributary to Pacific Ocean	Direct Diversion: 1.8 cubic feet/second May 1 to October 31 Irrigation	This diversion is beyond Coast Dairies' property; it is referenced for information purposes only because it is within the vicinity of the Coast Dairies Property boundary. Because it is not tributary to any of the stream systems on the property, it should have no impact on Coast Dairies.
A.12763 P.7534 L.4195 October 26, 1948	Big Basin Redwoods State Park	Sempervirens Creek, tributary to Blooms Creek thence East Fork Waddell Creek	Storage: 46.2 acre-feet/year November 30 to April 30 Domestic and Recreation	This diversion is beyond Coast Dairies' property; it is referenced for information purposes only because it is within the vicinity of the stream systems on the Coast Dairies Property. However, because it is not tributary to any of the stream systems on the property, it should have no impact on Coast Dairies.
A.15938 P.9889 L.9866 June 30, 1954	California Department of Parks Services	Sempervirens Creek, tributary to Blooms Creek thence East Waddell Creek	Storage: 31.8 acre-feet/year November 30 to April 30 Domestic	This diversion is beyond Coast Dairies' property; it is referenced for information purposes only because it is within the vicinity of one of the stream systems on the Coast Dairies Property. However, because it is not tributary to any of the stream systems on the property, it should have no impact on Coast Dairies.

TABLE 5.1-1 (continued)
SUMMARY OF WATER RIGHTS PERTAINING TO COAST DAIRIES AND LAND COMPANY

Application / Permit / License / Priority Date	Party or Entity	Source	Amount / Season / Use	Notes
A.16589 P.11031 L.9859 September 6, 1955	Bonnymede Mutual Water Company	Reggiardo Creek, tributary to Laguna Creek, thence Pacific Ocean Unnamed stream, tributary to Reggiardo Creek, thence Laguna Creek, thence Pacific Ocean	Direct Diversion: 2000 gallon/day January 1 to December 31 Recreation / Domestic Storage: 2.3 acre-feet/year January 1 to April 30 Recreation / Domestic	The diversion is within close proximity to the Coast Dairies Property, and on a tributary to Laguna Creek, which is on the Coast Dairies Property. The most recent licensee report filed pertains to years 1994-1996. Note: On 9/6/1957, D.875 was issued, which addressed the City of Santa Cruz' protest to the application. The Board found in favor of the applicant, approving the issuance of a permit.
A.17329 P.10897 L.5898 October 17, 1956	Coast Dairies and Land Co.	Laguna Creek tributary to Pacific Ocean	Direct Diversion: .33 cubic-feet/second May 1 to December 1 Irrigation	This diversion is located on Coast Dairies Property. The most recent licensee report filed pertains to years 1996-1998.
A.17627 P.11244 L.7092 May 27, 1957	Lockheed Aircraft Corporation	Mill Creek, tributary to Scotts Creek, thence Pacific Ocean	Direct Diversion: .08 cubic-feet/second January 1 to December 1 Industrial and fire protection Storage: 223 acre-feet/year October 1 to June 1 Industrial and fire protection	The point of diversion lies outside Coast Dairies' property line, but on a tributary to Scotts Creek, which is on the Coast Dairies' property. The most recent licensee report pertains to years 1992-1994.

TABLE 5.1-1 (continued)
SUMMARY OF WATER RIGHTS PERTAINING TO COAST DAIRIES AND LAND COMPANY

Application / Permit / License / Priority Date	Party or Entity	Source	Amount / Season / Use	Notes
A.18335 September 24, 1958	SWRCB	Scotts Creek, tributary to Pacific Ocean	Storage: 20,000 acre-feet/year Domestic, Industrial, Irrigation, Recreational	The point of diversion lies outside Coast Dairies' property line, but on Scotts Creek, which is on the Coast Dairies' property. This is a state filing.
A.19238 P.12589 L.7800 February 16, 1960	Unknown	Laguna Creek, tributary to Pacific Ocean	Storage: 26 acre-feet/year January 1 to May 1 Irrigation	The file was not available at the SWRCB. The information referenced was available electronically. The point of diversion appears to be on Coast Dairies' property.
A.19376 P.12682 L.7093 April 21, 1960	Lockheed Aircraft Corporation	Mill Creek, tributary to Scotts Creek, thence Pacific Ocean	Direct Diversion: .04 cubic-feet/second January 1 to December 31 Industrial and Fire Protection Storage: 15 acre-feet/year October 1 to June 1 Industrial and Fire Protection	The point of diversion lies outside Coast Dairies' property line, but on a tributary to Scotts Creek, which is on the Coast Dairies' property. The most recent licensee report pertains to years 1989-1991.

TABLE 5.1-1 (continued)
SUMMARY OF WATER RIGHTS PERTAINING TO COAST DAIRIES AND LAND COMPANY

Application / Permit / License / Priority Date	Party or Entity	Source	Amount / Season / Use	Notes
A.19426 P.12683 L.7094 May 9, 1960	Lockheed Aircraft Corporation	Mill Creek, tributary to Scotts Creek, thence Pacific Ocean	Storage: 6 acre-feet/year October 1 to June 1 Fire Protection	The point of diversion lies outside Coast Dairies' property line, but on a tributary to Scotts Creek, which is on the Coast Dairies' property. The most recent licensee report pertains to years 1989-1991.
A.24422 P.17526 July 27, 1973	Bonnymede Mutual Water Company	Unspecified Spring, tributary to Reggiardo Creek, thence Pacific Ocean Reggiardo Creek, tributary to Laguna Creek, thence Pacific Ocean	Permitted for .06 cubic-feet/second direct diversion and 20 acre-feet/year for storage, January 1 to December 31 for domestic use. License request states .06 cubic-feet/second to be diverted January 1 to December 31. The maximum amount diverted shall not exceed 14.6 acre-feet/year. The total quantity of water diverted under this license and License 9859 (A.16589) shall not exceed 15.7 acre-feet/year.	A request for license was filed 4/17/2000. The points of diversion lies outside Coast Dairies' property line, but on a tributary to Laguna Creek, which is on the Coast Dairies' property.
A.30203	Coast Dairies			This application was canceled on June 26, 2000.

TABLE 5.1-1 (continued)
SUMMARY OF WATER RIGHTS PERTAINING TO COAST DAIRIES AND LAND COMPANY

Statements of Water Diversion and Use / Claimed Right	Party or Entity	Source	Amount / Season / Use	Notes
S.2042 Pre-1914	City of Santa Cruz	Laguna Creek, tributary to Pacific Ocean	Direct Diversion: .076 cubic-feet/second January 1 to December 31 Municipal	This diversion is within close proximity to the Coast Dairies' property. The most recent statement pertains to years 1994-1996.
S.2043 Pre-1914	City of Santa Cruz	Liddell Spring, tributary to Liddell Creek	Direct Diversion: .153 cubic-feet/second January 1 to December 31 Municipal	This diversion appears to be on the Coast Dairies' property. The most recent statement pertains to years 1993-1995.
S.8349 Claimed right is not indicated.	RMC Lonestar	Liddell Spring No.2, tributary to East Branch Liddell Creek	No indication if water is directly diverted or stored. Amount is either 7449 gallons or 7449 thousand gallons. Season: January 1 through December 31 Use: Irrigation, Domestic, Industrial	This diversion appears to be on the Coast Dairies' property. The most recent statement pertains to years 1986-1988.

TABLE 5.1-1 (continued)
SUMMARY OF WATER RIGHTS PERTAINING TO COAST DAIRIES AND LAND COMPANY

Statements of Water Diversion and Use / Claimed Right	Party or Entity	Source	Amount / Season / Use	Notes
S.8350 Pre-1914	RMC Pacific Materials	Mill Creek	Direct Diversion: 262 acre-feet January 1 through December 31 Use unknown	The information concerning this statement of water diversion and use was obtained electronically. The actual filing could not be located at the SWRCB. The diversion is within close proximity to the Coast Dairies Property.
S.8351 Pre-1914	Lone Star Industries, Inc.(earlier name of RMC)	San Vicente Creek	Direct Diversion: 566 acre-feet January 1 through December 31 Use unknown	The information concerning this statement of water diversion and use was obtained electronically. The actual filing could not be located at the SWRCB. The diversion is within close proximity to the Coast Dairies Property.
S.8610 Pre-1914	City of Santa Cruz	Reggiardo Creek, tributary to Laguna Creek	No indication if water is directly diverted or stored. Million gallons are used, but amount not stated. Season: January 1 to December 31 Use: Irrigation and domestic	The diversion is within close proximity to the Coast Dairies Property. The most recent statement pertains to years 1992-1994.

TABLE 5.1-1 (continued)
SUMMARY OF WATER RIGHTS PERTAINING TO COAST DAIRIES AND LAND COMPANY

Statements of Water Diversion and Use / Claimed Right	Party or Entity	Source	Amount / Season / Use	Notes
S.10008 Riparian	W.G. Green	Mill Creek, tributary to San Vicente Creek	No indication if water is directly diverted or stored. Amount: 42,300-43,300 gallons Season: May - October Use: Irrigation	The point of diversion lies outside the Coast Dairies' property line, but on a tributary to San Vicente Creek, which is on the Coast Dairies Property. The most recent statement pertains to years 1996-1998.
S.11351 Riparian	Coast Dairies and Land Co.	Molino Creek, tributary to Pacific Ocean	No indication if water is directly diverted or stored. Amount: 67-75 acre feet Season: April through October Use: Irrigation	The point of diversion lies outside the Coast Dairies' property line, but on Molino Creek, which is on Coast Dairies property. The most recent statement pertains to years 1996-1998.
S.14801 Riparian	Margaret Kliegel	2 unnamed streams tributary to Reggiardo Creek, thence Laguna Creek	Direct Diversion: .06 cubic feet/second January 1 to December 31 Domestic	The point of diversion lies outside the Coast Dairies' property line, but on an eventual tributary to Laguna Creek, which is on the Coast Dairies Property. This statement was first filed 5/9/1997 and pertains to 1997.

TABLE 5.1-1 (continued)
SUMMARY OF WATER RIGHTS PERTAINING TO COAST DAIRIES AND LAND COMPANY

Statements of Water Diversion and Use / Claimed Right	Party or Entity	Source	Amount / Season / Use	Notes
S.15004 Riparian	Michael Bigham	Reggiardo Creek, tributary to Laguna Creek	Direct Diversion: 33,000 gallons/year January 1 to December 31 Domestic	The point of diversion lies outside the Coast Dairies' property line, but on an eventual tributary to Laguna Creek, which is on the Coast Dairies Property. This statement was first filed 3/18/1998 and pertains to 1997.
Riparian	Coast Dairies	Molino Creek	Direct Diversion: 241 acre-feet March 1 to December 31 Irrigation and Domestic	The point of diversion lies within Coast Dairies property. This statement was submitted to the State Board on 2/16/01, but has not been finalized.

SOURCE: Ellison, Schneider, and Harris, 2000, 2001, Coast Dairies, 2001.

Arroyo da la Laguna and Refugio Rancho to repair, construct, maintain, etc. water pipes. The agreement also states that the City of Santa Cruz "*agrees to maintain and provide the present free water service presently provided Coast Dairies through four 3/4 inch faucets...*" (Coast Dairies & Land Company and City of Santa Cruz, 1953) An agreement dated July 1, 1964 supercedes the 1953 agreement, although the two agreements are similar (Coast Dairies & Land Company and City of Santa Cruz, 1964).

Coast Dairies tenants Jose Ramirez and Bill Wrankle use water from two faucets attached to Santa Cruz Water District ("SCWD") pipes in the Laguna watershed to fill a stock trough. They also take water through a pipe from an unnamed Laguna tributary that is pumped to a storage tank. Both are acknowledged by SCWD (Rosenblatt, 2001). The estimated quantity of water used by Jose Ramirez and Bill Wrankle from these two sources is summarized in Table 5.1-3. It is unclear how the other two faucets referenced in the above referenced 1889, 1953, and 1964 agreements are currently utilized.

Liddell Creek

By agreement dated March 22, 1913 CDLC sold to the City of Santa Cruz all the real property and water rights of a parcel known as Rancho Arroyo De La Laguna near the head waters of the East Branch of Liddell Creek. The agreement includes whatever Jeremiah Respini deeded to Coast Dairies on March 16, 1901 regarding Liddell Creek.[7] (Coast Dairies & Land Company and City of Santa Cruz, 1913) There are two subsequent documents, one untitled and undated and the other an Indenture dated December 18, 1916 which confirm the sale and reiterate what is in the 1913 agreement (Coast Dairies & Land Company and City of Santa Cruz, in.d, Coast Dairies & Land Company and City of Santa Cruz, 1916). The possibility exists that, pursuant to these agreements, the City of Santa Cruz filed Statement of Water and Use 2043.

Agreements Between Coast Dairies and RMC Pacific Materials (or Predecessors Thereof)

San Vicente Creek and Liddell Creek

A lease dated December 2, 1968 between Coast Dairies and Pacific Cement and Aggregates, a division of Lone Star Cement Corporation allows Pacific Cement (now RMC Pacific Materials) to conduct its operations on Coast Dairies land. Coast Dairies, however, is allowed to "*develop water on and in the water courses of the leased premises referenced as 'Area B'*". In addition, RMC is allowed to use water from "Area A3", for limited domestic, irrigation and industrial uses (Coast Dairies & Land Company and Lone Star Cement Corporation, 1968). RMC apparently does not use water drawn from Area A3, which is the existing Shale Quarry (Reppert, 2001). Pursuant to this agreement, it is believed that the following appropriations are taking place:

- Ron Mondo (Seaside Ranch) had a well adjacent to the riparian zone on San Vicente Creek, which may be on land that is leased from RMC. Water from this well is used for irrigation of

[7] There is a reference to this deed in the 1913 agreement, but copies of the deed were unavailable.

acreage located north of San Vicente Creek. The quantity of water being used is currently unknown.

San Vicente Creek

A memorandum of agreement dated August 15, 1905 between CDLC and the Santa Cruz Portland Cement Company (now RMC) grants to the cement company the water from San Vicente Creek that will flow through a pipe eight inches in diameter. Additionally, this agreement stated that if the cement plant ceases operations this water would revert to Coast Dairies (Coast Dairies & Land Company and Santa Cruz Portland Cement Company, 1905). It is unknown whether or not this agreement is the basis on which Statement of Water Diversion and Use 8351 was filed.

Groundwater

A license dated January 15, 1996 between Coast Dairies and RMC Lonestar allows RMC Lonestar to install groundwater wells (Coast Dairies & Land Company and RMC Lonestar, 1996). RMC has installed seven groundwater monitoring wells (not production wells). The purpose of these wells is to monitor groundwater quality and elevation. Data from these wells are submitted to the Regional Water Quality Control Board (Reppert, 2001).

Lease between Coast Dairies and Swanton Berry Farms

Effective July 1, 2000 this lease allows Swanton Berry Farms to use water from the *"two (2) reservoirs served by Molino Creek*" (Coast Dairies & Land Company and Swanton Berry Farms, Inc., 2000). The two reservoirs referenced in this lease agreement are those which Coast Dairies filed a Statement of Water Use and Diversion for on February 16, 2001. The point of diversion for the Highway/Swanton Road pond (Reservoir #1) is located on Coast Dairies property, a short distance from Swanton Road (Coast Dairies, 2001). There is also a pond by the labor camp (Reservoir #2) designed to hold extra water that is supplied by pump from the other pond (Smith, 2001). Water is stored in these reservoirs less than 30 days.

5.1.3.3 WATER USE NOT DOCUMENTED WITH THE SWRCB

There appears to be water use not documented with the SWRCB. Tables 5.1-2 and 5.1-3 summarize principle agricultural and livestock water uses, respectively, on Coast Dairies Property.

5.1.4 ISSUES

5.1.4.1 SWRCB DOCUMENTATION

As recently as 1999, Coast Dairies filed Statements of Water Diversion and Use with the SWRCB claiming a riparian right to Molino Creek, and filed Licensee Reports for License 5898. Based on the information currently being collected regarding use of water on the Property, Coast Dairies should re-examine those filings. If, based on the information collected by installation of meters, a more accurate estimate of water use can be made, then Coast Dairies (or the ultimate landholder) should consider filing amended Statements of Water Diversion and Use and Licensee Reports.

TABLE 5.1-2
AGRICULTURAL WATER USE ON COAST DAIRIES PROPERTY

Common Name	Acres	Estimated Seasonal Water Use[a] in acre-feet	Water Sources
Seaside Ranch [b]	175	219	a) Stream diversion San Vicente Creek, 1603 permit b) Well near conveyor belt c) Tertiary treated waste water, City of Davenport d) RMC Lonestar (see S.8350,8351)
Swanton Berry Farm (Jim Cochrane)	41	51	2 reservoirs filled from diversion of Molino Creek. Previous tenant utilized Molino Creek Diversion Dam until dam failure.
Mario Rodoni	36	36	Pond supplied by San Vicente Creek [c]
Ramon Rios	16	16	Pond supplied by San Vicente Creek [c]
Mark Bartle	11	0	Acreage dry farmed
John Fambrini	126	159	a) Well near Liddell Creek b) Pond near Liddell Creek (Maybe well-filled) c) Diversion pump in Laguna Creek b) Dam and diversion on Yellow Bank Creek [d] c) Diversion from Laguna Creek (Creek pump) d) Santa Cruz City Water (metered)

a. Water is not metered with the exception of city water use at Fambrini Ranch. Therefore, water use is estimated, and no information is available regarding break-down on amount taken from each source.
b. Seaside Ranch is not currently farmed, previous tenant was Ron Mondo.
c. Rodoni and Rios acreage are irrigated from one shared pond.
d. The dam on Yellow Bank Creek was damaged several years ago by floodwaters and repaired. A permit was not obtained to conduct these repairs and the dam has now been “red-tagged” by the County. Repairs will be carried out during the preparation of the Plan

Source: Smith, 2001, Mott, 2001

It is also recommended Coast Dairies file additional Statements of Water Diversion and Use to document the existing use of water on the Coast Diaries property which is not reflected by the existing filings with the SWRCB. As indicated above, Coast Dairies should also continue to obtain information regarding the historical use of water from Molino Creek. It is not clear whether Coast Dairies is exercising a riparian right to this water.

Coast Dairies appears to hold Licenses 5898 and 7800. Based on available information, it is unclear what water use is occurring pursuant to these rights. Agricultural lease agreements generally do not contain written references to water rights held by Coast Dairies. It is recommended that Coast Dairies continue its efforts to determine on what land these water rights are being used, and whether any use of water is being made pursuant to License 7800. Once that has been ascertained, Coast Dairies should report the use to the SWRCB, documenting the exercise of this right, if necessary.

TABLE 5.1-3
LIVESTOCK WATER USE ON COAST DAIRIES PROPERTY

Common Name	Acres	Estimated Seasonal Water Use	Water Sources
Pastarino	700[a]	4.9 acre-feet	a) Springs associated with Molino Creek, and Molino Creek. In the process of fencing off the creek, but will still require water from this source. b) Dam on Ferrari Creek[b], Springs associated with Ferrari Creek, and Ferrari Creek c) Storage pond on San Vicente Creek
Peter Arvelas	320	0.66 acre-feet	a) Seasonal ponds in quarry. b) Water trough filled from storage pond on San Vicente Creek, and directly from San Vicente Creek. c) Trough filled from Davenport town water pipe.
Jose Ramirez & Bill Wrangle	270	7.05 acre-feet	a) Molino Creek (trough) b) Three seasonal creeks and Bontadelli Reservoir (San Vicente Creek source.) c) Springs d) Two ¾" SCWD faucets from Laguna Creek e) Seasonal Creek tributary to Laguna Creek

a. Pastarino is planning on dry-farming 100 of his 700 acres.
b. Ferrari Creek dam was overtopped in the storms of 1997. This overtopping damaged facilities at U.S. Abalone and the dam is therefore being dismantled.

Source: Smith, 2001, Mott, 2001

5.1.4.2 INSTALLATION OF METERS

To the extent possible, Coast Dairies should place meters to record all water use on the Coast Dairies Property. The information collected from the meters is very useful in protecting the existing water rights, as it is used to provide accurate information in the Licensee Reports and in the Statements of Water Diversion and Use that are filed with the SWRCB.

Data collected from meters will also help to determine the extent of water use during different times of the year, as well as the amount of use when there is a dry year versus a wet year. This type of information is very helpful when dealing with other water users within the same watershed, the fishery agencies, and the SWRCB. In order to protect Coast Dairies' water rights, continued reasonable and beneficial use of the water and the amount of that use must be established. The data collected from metering provide this type of evidence.

5.1.4.3 COOPERATION WITH THE RESOURCE AGENCIES

Streams on Coast Dairies' Property and the surrounding area have attracted regulatory interest from state and federal fishery agencies (see Section 3.0). CDLC is in communication with the California Department of Fish and Game regarding future use and regulation of water in the streams; the Planning Team is currently collecting some information regarding stream flows, and making preliminary estimates of the minimum flows necessary to protect the fishery resource (see Section 3.3).

5.1.5 REFERENCES CITED

Coast Dairies and Land Company and Santa Cruz Portland Cement Company, Memorandum of Agreement, August 15, 1905.

Coast Dairies and Land Company and City of Santa Cruz, Agreement, March 22, 1913.

Coast Dairies and Land Company and City of Santa Cruz, Agreement, in.d.

Coast Dairies and Land Company and City of Santa Cruz, Indenture, December 18, 1916.

Coast Dairies and Land Company and City of Santa Cruz, Agreement, April 14, 1953.

Coast Dairies and Land Company and City of Santa Cruz, Agreement, July 1, 1964.

Coast Dairies and Land Company and Lone Star Cement Company, Lease, December 2, 1968.

Coast Dairies and Land Company and RMC Lonestar, License, January 1, 1996.

Coast Dairies and Land Company and Swanton Berry Farms, Inc., Agricultural Lease for Organic Purposes, June 30, 2000.

Coast Dairies and Land Company, Letter to Charles A. Rich of State Water Resources Control Board from Darcey C. Rosenblatt, Coast Dairies Project Manager. Re:363:CAR:262.0(44-14-01) and Statement of Water Diversion and Use, Dated January 16, 2001. February 16, 2001.

Ellison, Schneider, and Harris L.L.P., File Review (paper and electronic), California State Water Resources Control Board, Division of Water Rights, http://www.waterrights.ca.gov., 2000, 2001.

Mott, Bill, Agland, Agriculture Existing Conditions Report for Coast Dairies Property, Section 5.?.

Reppert, Harry, RMC Pacific Materials - Environmental Director, (Telephone interviews), February 23, 2001, May 3, 2001.

Respini, Jeremiah, and City of Santa Cruz, Indenture, May 6, 1889.

RMC Pacific Materials Inc., *Bonny Doon Quarries*, *2000 Annual Report to the County of Santa Cruz*, Robert C. Walker, Quarry Manager, March 13, 2001.

Rosenblatt, Darcy, Coast Dairies and Land Company (Telephone interviews and electronic mail), February 13, 2001, February 15, 2001, May 1, 2001.

Sheidenberger, Jim, RMC Pacific Materials – Property Lease Manager (Telephone interviews), February 13, 2001, May 22, 2001.

Smith, Bern, Landsmiths – Coast Dairies Property Manager (Telephone interviews), March 21, 2001, April 25, 2001.

State Water Resources Control Board, *Request for Extension of Time for Pending Application 30203 of Coast Dairies and Land Company – Scott and Molino Creeks in Santa Cruz County*, March 31, 2000.

State Water Resources Control Board, *Order Rejecting and Canceling Application 30203*, June 20, 2000.

5.2 AGRICULTURE

5.2.1 REGIONAL SETTING

The coastal lands north of Santa Cruz are formed by a series of marine terraces. At Coast Dairies, a series of two coastal terraces comprise the land base suitable for crops. The lands along the ocean bluff form the first terrace and are bisected in several places by Highway 1. The second terrace forms on a bluff just behind the first, and has some of the best agricultural soils on the Property. Portions of the third terrace were farmed in the l910-l920s, presumably plowed with teams of horses, but the lack of water and the availability of lands closer to the coast have mostly restricted use of this land to cattle grazing..

As described in more detail in Section 1.0, the dominant agricultural use of coastal lands along the Santa Cruz North Coast until the 1900s was livestock production. The shortage of labor and the difficulty of reaching urban markets made crop production a difficult proposition, but ranching and livestock operations were an attractive use of these lands. The summer fogs and cool coastal conditions extended the growing season for perennial grasses into the summer months, providing good pasture when most California grasslands were too dry. Beef cattle production and dairy operations could rely on both summer pasture and good hay production from dry-farmed fields.

In general, the group of dairies along the North Coast did well financially through the 1920s, but the Great Depression, coupled with changing transportation modes that allowed delivery of fresh milk to urban markets from more distant producers, made North Coast dairy operations increasingly marginal. Stringent sanitary regulations enacted in the late 1930s further hindered the ability of small dairies to compete with larger, better-capitalized operations. Currently, the vast majority of dairies in California are located in the San Joaquin Valley in “dry lots,” where the feed is brought to the cows, rather than allowing the cows to graze in pastures.

The production of high value vegetables on the North Coast, which began in the early part of the 20th century, was enabled by a series of irrigation projects a few years earlier (see Section 1.2.5.2), which allowed growers to convert land previously used for pasture and hay production to irrigated row crops. Vegetable growers, predominantly of Italian origin, found the unique summer climate suitable for specialty vegetables, especially artichokes and Brussels sprouts, that require a long, cool growing season. In 1919, it was reported that 600 acres of artichokes and other vegetables were being grown on the coast between Santa Cruz and Davenport (*Surf* 1/18/19).

The Coast Dairies & Land Co. (CDLC) was seldom involved directly in agricultural production. Instead, CDLC established early in the last century a practice of leasing suitable lands to dairies, beef cattle ranchers, and vegetable growers. In the case of beef cattle and vegetable production, this practice continues to this day.

5.2.2 METHODOLOGY

5.2.2.1 DATA COLLECTION

Historical and current information on the agricultural uses of the Property has been obtained from farm records, government agencies, and interviews with the current leaseholders. Outlined below are the principal sources of data and information collected for this section.

Soils

Information on soils was obtained from the Soil Survey of Santa Cruz County, California, through the USDA Natural Resources Conservation Service, Capitola, California. Major fieldwork for the soil survey was completed in the period 1970-76. The Soil Conservation Service, the University of California Agricultural Experiment Station, and the County of Santa Cruz developed the survey cooperatively. The report and maps were issued in August 1980. In addition to specific soil structures and characteristics, the survey provides indications of rangeland productivity and characteristic plant communities, woodland management and productivity, and the applicability of the soils for other uses.

Water Sources and Uses

Information on water usage for agricultural purposes is obtained primarily from interviews with the lessees and from the California Department of Fish and Game (CDFG). There is no metering of water except as it may relate to the use of City of Santa Cruz water by the Fambrini Ranch.

Sources of information on agricultural and non-agricultural water use and water diversions come from CDFG permits, the farm lessees and prior land mangers (Bosso, 2001). The stream flows, historic water rights, and the diversion of water for agricultural uses and other uses are discussed in other sections of the report.

Farm Practices and Crops

Information on common farm practices and crops produced on the Property come from discussions with Landsmiths, the firm currently contracted by CDLC to manage day-to-day operations on the Property, the Santa Cruz County Agricultural Extension Office, County Agricultural Commissioner, and current and past lessees.

Field (farm) Maps

Field maps that were originally developed for the Property prior to the purchase by the Trust for Public Land (TPL) were utilized to identify individual fields and current and past lessees.

5.2.2.2 INTERVIEWS

A listing of names, addresses and contact information for individuals and organizations interviewed in preparation of this Section is included at the end of the Section.

5.2.2.3 ANALYSIS ZONES

Over time, the size, configuration, and names of leaseholds on the Property have changed. The designation of leases and conservation contracts to specific analysis zones is an attempt to reduce confusion in the use of historic names or lessees names.

5.2.3 COAST DAIRIES PROPERTY AGRICULTURAL RESOURCES

This section discusses the unique climatic conditions and land resources found on the Coast Dairies Property that have enabled the development of two distinct agricultural systems: one based on production of high-value specialty crops; and the other on livestock.

5.2.3.1 CLIMATE

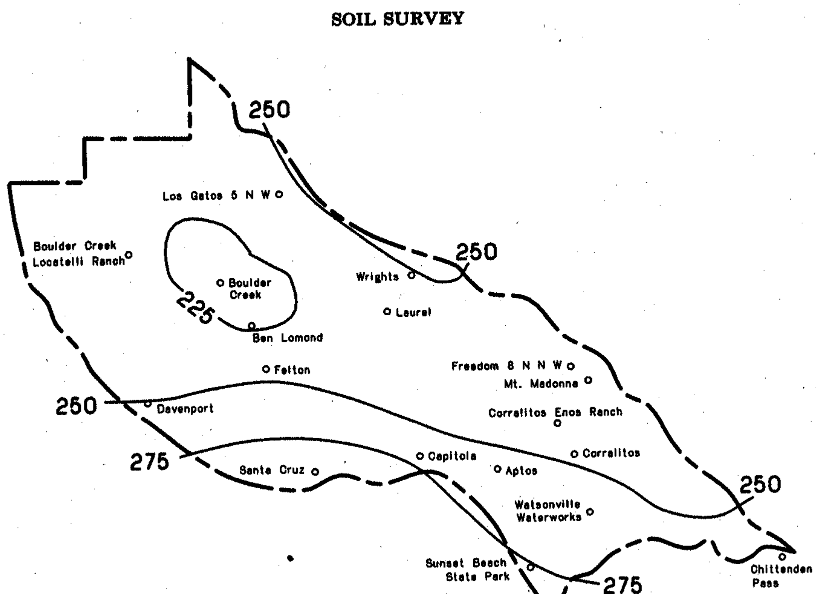
The cool summer Mediterranean climate, coupled with a long growing season of 250-275 days, is the principal factor that makes Coast Dairies' crop production environment unique not only in California, but nationwide. Table 5.2-1 summarizes monthly temperature and rainfall data and Figure 5.2-1 indicates the average growing season for the county. Average growing season is defined as the time between the last killing frost in the spring and the first killing frost in the fall or winter.

TABLE 5.2-1
MONTHLY TEMPERATURE AND RAINFALL NORMS IN SANTA CRUZ, CALIFORNIA

Temperature (deg F)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Average Max.	59.5	62.3	64.1	67	70.8	74	75	75.4	77	73.7	66.1	60.5	68.8
Average Min.	38.4	40.4	40.7	41.9	45.3	48.4	50.5	50.9	49.9	46.5	41.9	38.6	44.5
Mean	49	51.4	52.4	54.5	58.1	61.2	62.8	63.2	63.4	60.1	54	49.6	56.6
Rainfall	6.51	4.81	3.79	2.47	0.49	0.19	0.15	0.14	0.39	1.25	3.58	5.21	28.98

Source: NOAA

FIGURE 5.2-1
SANTA CRUZ, CALIFORNIA, AVERAGE GROWING SEASON



Source: Soil Survey of Santa Cruz County, California, USDA, 1980

5.2.3.2 SOILS

Several soil types are found on the areas of the Property that have been used historically for crops and pasture. The soils on lands utilized for crops are predominantly in the Elkhorn sandy loam and the Watsonville loam series. There can be considerable soil variation within a 20-30 acre field, with some portions of the field very well drained, while other areas portions have clay or impervious layers. There are also areas behind the city of Davenport where Pfeiffer gravelly sandy loam soils occur, and that were at one time farmed by Seaside Ranch. The most common soils found on the grazing lands and at higher elevations are Bonny Doon loams, Aptos loams and Los Osos loams. Each of the major soil series found on the crop and range areas of the Property are further described below.

Elkhorn Sandy Loam Series

Elkhorn Sandy Loam series soils are generally very deep, well-drained soils in old alluvial fans and plains and are found on marine terraces. Elevation ranges from about 20 to 400 feet. Typically, the surface layer is very dark grayish brown to brown, slightly acid and medium acid sandy loam about 21 inches thick. The subsoil ranges to a depth of 61 inches and is pale brown and variegated light gray and very pale brown, neutral sandy clay loam. Effective rooting depth is approximately 60 inches. Soils suitable for crops range in slope from 2 to 15 percent.

Watsonville Loam Series

Watsonville Loam series soils are very deep, somewhat poorly drained soils located on coastal terraces. They are formed from alluvium. Elevation ranges from 20 to 1,000 feet. Typically, the surface layer is very dark grayish brown, slightly acid loam, about 12 inches thick. The subsurface layer is light gray, slightly acid sandy loam, about 6 inches thick. The subsoil is pale brown, mixed light gray and very pale brown, slightly acid clay, about 21 inches thick. The effective rooting depth is as much as 60 inches.

Elkorn and Watsonville soil series are of good quality for crop production, and with sufficient water up to 900 acres of these soil types could be utilized for irrigated crops on the Property.

Bonny Doon Loam Series

Bonny Doon Loam series soils are shallow, somewhat excessively drained, and are mainly found on south-facing side slopes of hills and mountains at elevations of 100 to 2,100 feet. These soils are predominantly used for range (livestock production).

Aptos Loam Series

Aptos Loam series soils are moderately deep and well-drained. They are found on hills and mountains at elevations of 400 to 1000 feet. They are formed from weathered sandstone, siltstone, or shale. These soils are used mainly for range.

Los Osos Loam Series

Los Osos Loam series soils are moderately deep, well drained, and found on hills and mountains. They are formed from material weathered from sandstone, siltstone, mudstone or shale. They are often found in areas with the Bonny Doon and Aptos loam series. They are found at elevations of 100 to 2,000 feet and they are typically used for range.

5.2.3.3 CROPPING PATTERNS

The principal crop historically grown on the Property is Brussels sprouts, closely followed by artichokes. Currently, with the cancellation of the Pfyffer lease, artichoke production on the Property is minor. Other crops are also being utilized in rotation with Brussels sprouts, such as leeks, peas, cabbage and beans. Beans are particularly useful as a rotation crop because they increase soil fertility by fixing nitrogen in the soil. In many cases the leaseholders do not practice crop rotation, and Brussels sprouts are grown on the same land in successive years. Figure 5.2-2 shows the areas of the Property leased for crops and grazing when the ECR was prepared.

The cancellation of the 281-acre Pfyffer lease in 1999 reduced the crop year 2000 farmed/ irrigated land area to approximately 327 acres. With Seaside Ranch not renewing a lease, irrigated lands could be as low as 179 acres in 2001. A portion of the old Pfyffer lease is scheduled to be dry-farmed for hay.

In crop year 2000, a lease was initiated with an organic producer, Swanton Berry Farm, on two agricultural lots totaling 41 acres just north of the town of Davenport. This operation hopes to further expand organic crop production by establishing other satellite organic farms in the area.

Livestock Operations

Historically, livestock operations, both beef cattle and dairy, have been the primary agricultural activity on the Property. The operation of small dairies in the region is no longer practiced (nor is it economic), but the grazing of beef cattle, continues on the Property and adjoining ranches. Figure 5.2-2 indicates generally the areas used for grazing by the various leaseholders as of the year 2000.

5.2.3.4 MARKETS

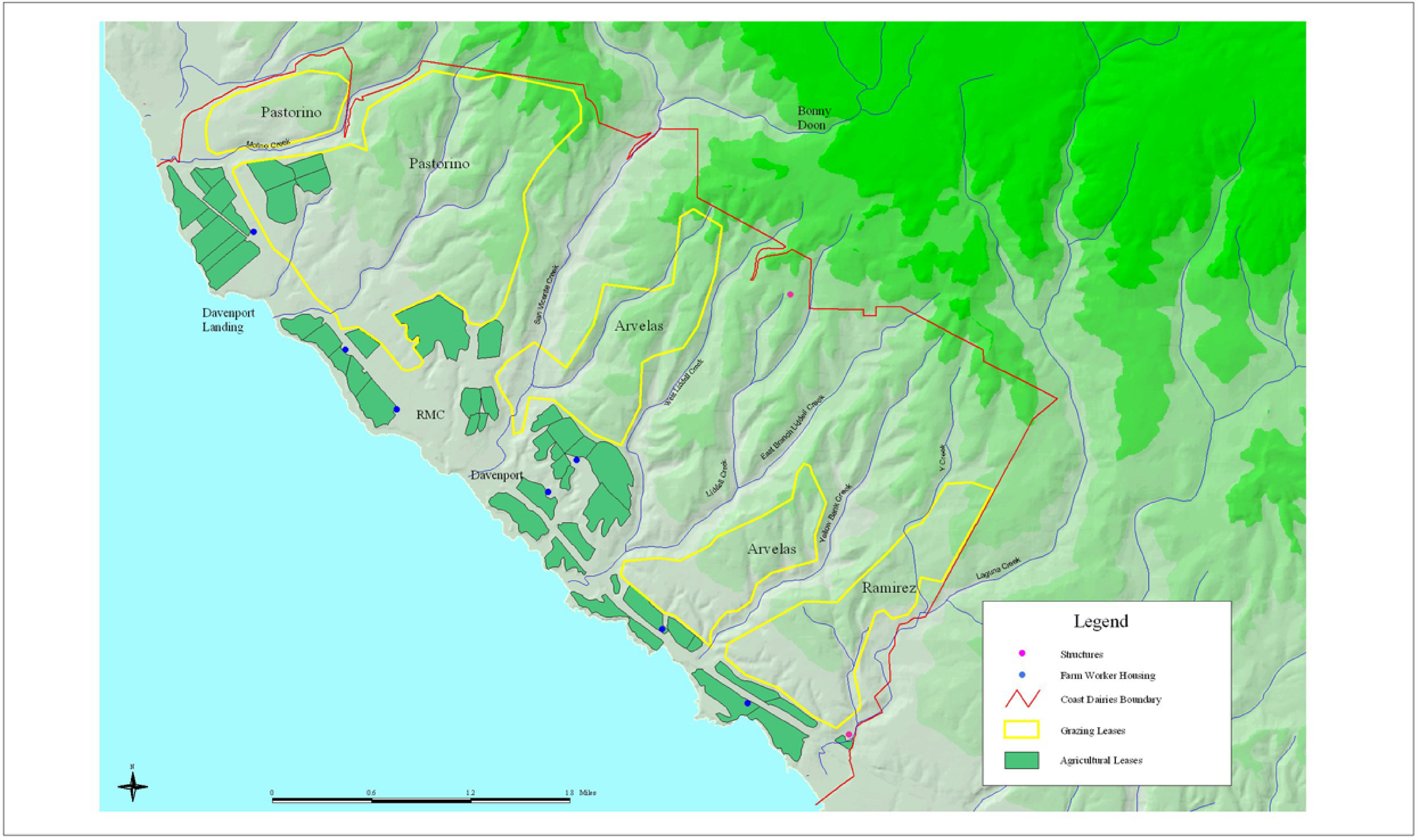
Conventional Crops and Markets

The production of Brussels sprouts has a long history, and a market for the product is well-established with both food processors (freezers) and purveyors of fresh produce. Santa Cruz County, and to a lesser extent Monterey County, are the principal commercial sources of Brussels sprouts for the entire U.S. market; Santa Cruz County alone meets half the total demand. Crop production statistics for Santa Cruz and Monterey Counties (see Table 5.2-2) indicate that the market for the crop produced in California is fairly stable, but is gradually declining; unfortunately for Santa Cruz and Monterey county growers, Brussels sprouts have not won the same importance to the American diet as has their cruciferous cousin, broccoli. Furthermore, the advent of the global market and NAFTA have increased competition by allowing importation into the U.S. of both frozen and fresh Brussels sprouts from Baja California, Guatemala, and Belgium.

Statistics from the California Department of Food and Agriculture indicate that Brussels sprouts production in 1999 was valued at $14,731,000 and was produced on 3,200 acres. (Siebert, 2000).

Historically, approximately 80 percent of the Brussels sprouts grown in the region were processed and delivered to freezers. With the increasing demand for fresh fruit and vegetables, approximately 60 percent of the crop is now frozen, and the remainder sold as fresh produce (Bontadelli, 2001).

The harvest season, utilizing a combination of early and late varieties, can be extended from the end of June into January. Hand harvest is practiced in the summer months and machine harvesting of the major portion of the crop takes place in the fall.



SOURCE: Environmental Science Associates, Pacific Meridian Resources, Landsmiths

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Figure 5.2-2

Agricultural Leases and Farm Worker Housing on the Coast Dairies Property

Artichokes also have been grown on the Property and in the region for a number of years, although the center of artichoke production remains in Castroville, Monterey Country. The market for artichokes has recently become more complex and unstable due to the introduction of an artichoke grown from seed and treated as an annual crop. The traditional green globe artichoke from Castroville is a perennial and a field may last for 5-7 years. In 1999, California artichokes had a crop value of $63,673,000 produced on 9,800 acres (Siebert, 2000).

TABLE 5.2-2
PRINCIPAL VEGETABLE CROPS IN THE COAST DAIRIES AGRICULTURAL REGION

Year	Acreage	Yield/Acre	Tons	Price/Ton	Crop Value
Artichokes (Monterey County)					
1994	6,680	6.47	43,230	$828.87	$35,832,000
1999	6,720	8.06	54,150	$794.35	$43,014,000
Brussels Sprouts (Santa Cruz County)					
1983	1,876	7.03	13,188	$409	$5,394,007
1984	1,985	7.28	14,451	$392	$5,664,714
1985	1,849	7.97	14,737	$360	$5,305,151
1986	1,490	6.26	9,327	$390	$3,637,686
1987	1,669	7.61	12,701	$410	$5,207,447
1988	1,037	9.58	9,934	$396	$3,934,046
1989	1,538	8.52	13,104	$410	$5,372,542
1990	1,712	8.61	14,740	$420	$6,190,934
1991	1,702	8.27	14,076	$435	$6,122,860
1992	1,845	8.39	15,480	$471	$7,290,868
1993	1,890	9.0	17,010	$441	$7,501,410
1994	1,700	10.0	17,000	$450	$7,650,000
1995	1,565	8.53	13,345	$425	$5,670,000
1996	1,642	8.9	14,614	$415	$6,065,000
1997	1,332	8.6	11,455	$362	$4,147,000
1998	1,374	9.6	13,190	$543	$7,162,000
1999	1,396	9.8	13,681	$479	$6,553,000

Source: Monterey County Annual Crop Report
Santa Cruz County Annual Crop Report

Note: Santa Cruz County does not publish data on artichoke production due to the limited number of growers. Recent data on artichoke production in adjoining Monterey County is provided as a reference.

Distribution

Once harvested, the Brussels sprouts and artichokes can either be packed in the field or sorted in a shed, and shipped to market. Product packed at the farm is usually size graded, but not hydro-cooled, and shipped directly to regional markets, principally within California. Product destined for processors and distant fresh markets is most often delivered to a packing shed (such as Pfyffer Brothers in Santa Cruz), graded, and hydro-cooled. The industry trend is toward hydro-cooling, which improves the shelf life and shipping quality of the product.

Smaller Brussels sprouts and artichokes are sent to processors, while larger sizes are sold in the fresh market. Once graded and packaged, fresh product is either shipped directly to customers throughout the U.S, transported to vegetable distributors in Santa Cruz, Watsonville, or Salinas for shipment with mixed loads, or shipped directly from packing facilities. Due to longer distances traveled, vegetable producers at Coast Dairies have higher farm-to-distribution point transportation costs than many of the vegetable growers in Watsonville or Salinas.

Organic Crops and Markets

The market for organically grown fruits and vegetables continues to grow rapidly in California. Some of California's larger fruit and vegetable producers have ventured into organic products, and compete with longer established smaller organic growers. In 1993-94, a study conducted by the UC Davis Agricultural Issues Center identified 1,129 registered organic farmers who reported sales of $78.3 million. At that time, the figure was considered to be artificially low, and currently farm production of organic crops in California could exceed $250 million. While this is still a small portion of the total fresh fruit and vegetable market, production and demand has continued to grow at the rate of 20-25 percent annually. Major supermarket chains, particularly national chains focused on natural foods such as Whole Foods and Wild Oats, and specialists such as Bell Markets, carry a full line of organic fruits and vegetables. Some of the larger supermarket chains have indicated that they cannot purchase sufficient supplies of some organic fruits and vegetables to serve their vast customer bases.

If a center for organic crop production could be defined within California, it would likely be Santa Cruz County. It was in the area around Santa Cruz that some of the first organic crops were grown in California, often sold in farmers markets. California Certified Organic Farmers, the State's leading registered organic certification organization, is headquartered in Santa Cruz, and it reports that it has certified 81 growers in Santa Cruz County and 45 growers in Monterey County. Certified growers meet a rigorous set of standards and inspection procedures that include no use of chemical fertilizers or pesticides. In addition, there are more organic growers registered with the two counties' Agricultural Commissioners' Offices, but who have chosen not to apply for certification, or who are certified by other State-registered certification organizations (as of 1997, there were eight such organizations registered by the California Department of Food and Agriculture, including CCOF).

Coast Dairies has recently leased 41 acres of land to a well-established organic producer, Swanton Berry Farm. The company is owned and managed by Jim Cochran, who is also producing organic crops on leased land from Wilder Ranch State Park south of Coast Dairies. In crop year 2000, the farm had about seven acres of strawberries, and about twenty acres of vegetables, plus land in cover crops. Much of Swanton Berry Farm's research and trials in developing organic strawberry production over the past 12 years were through collaboration with U.C. Santa Cruz. There are plans to expand the operation significantly, to create a retail farm market at the site of the former Pfyffer Ranch barn, and to include educational programs as part of an overall marketing program.

While many organic producers grow and sell small volumes, the unit price that organic produce fetches is usually significantly higher than the equivalent conventionally farmed and marketed product. A specialized grower such as Swanton generally receives significantly higher prices per pound than conventional growers by retailing through farm stores and farmer's markets, and also by wholesaling to supermarkets specializing in organic foods and produce. For example, Swanton Berry Farms has an active, year-round sales program through farmer's markets. Swanton estimates that, currently, 60 percent of their crops are sold to retail chains, and 40 percent are marketed directly to consumers through several farmers markets in the greater Bay Area.

Organic production and marketing, like conventional farming, is capital intensive and subject to a variety of risk factors. It is not easy for a grower to find suitable land and water, as well as access to the capital needed to develop and operate a small farm. In addition, conversion of existing croplands to organic production is often difficult, and in some cases may not be feasible. Some crops are not well suited to organic production methods when grown on a large scale. Bob Scowcroft, Executive Director of the Organic Farming Research Foundation, commented that, "Brussels sprouts is one example of a vegetable that is difficult to grow on a large scale using organic production techniques" (Scowcroft pers. comm., 2001).

Competition

The relatively stable production and market for central California Brussels sprouts and artichokes, long guaranteed by the requirement of unique growing conditions and steady, though limited demand, are now being eroded by the opening of the global market to imported product and, for artichokes, the introduction of the seeded varieties planted as an annual crop. This new competition has led to falling prices and general uncertainty of markets. This uncertainty has affected artichokes more than Brussels sprouts, and may be one of several reasons that two long-time Coast Dairies lessees have not renewed their leases.

The expanding market for organic crops is likely to increase opportunities to lease Coast Dairies lands to organic growers, who are in search of long-term leasehold properties (5 to 10 years) suitable for conversion to organic production.

5.2.4 CURRENT CONDITIONS AND TRENDS

This section provides detail on the essential elements of the current agricultural use of the Coast Dairies Property: a description of the various crop and range operations; the existing infrastructure for agricultural operations; water supply and water usage; current use of agricultural pesticides and fertilizers; and common problems with erosion on the Property's agricultural lands.

5.2.4.1 CURRENT LESSEES-CROPS

Historically, Pfyffer Brothers was the largest grower at Coast Dairies. Until recently, Pfyffer Brothers farmed 373 acres of Brussels sprouts and artichokes, and held one of the oldest leases on the Property, dating back to the early 1950's.

Seaside Ranch, owned by the Mondo family, initiated farming on the Property in the mid-1950s, with a cropping pattern similar to Pfyffer. When Seaside Ranch left the Property in 2001, the company was farming 175 acres. The Fambrini family also initiated farming on the Property in the 1950s and currently farms 127 acres. Swanton Berry Farm is a new lessee with 41 acres in two parcels. The firm specializes in organic crop production, particularly strawberries.

The historic lessees for cropland are listed in Table 5.2-3 and the current lessees for cropland and conservation contracts for cattle operations are listed in Table 5.2-4. There is limited information on the crop history of specific land parcels, but the majority of croplands have been utilized for only two crops, Brussels sprouts and artichokes.

5.2.4.2 CURRENT LESSEES-LIVESTOCK

When TPL purchased CDLC they developed and began instituting a Conservation Grazing Program (Amme, 1999). The primary goals of the Conservation Grazing Program are: (a) to utilize livestock under controlled conditions to enhance and restore native grasslands and oak woodland habitat; (b) to increase habitat diversity; (c) to control the dominance of exotic annuals and invasive weeds; and (d) to protect wetland and riparian areas. The current management of grazing lands on the Property is governed by these goals and by the specific prescriptions contained in the Conservation Grazing Program.

The current contractors for grazing lands on the Property are Peter Arvelas and Jose Ramirez-William Wrankle. Recently, Gene Pastorino has agreed to utilize both grazing and crop (dry farmed) land for beef cattle production. The area that will be used by Pastorino is in the northern portion of the Property; the Arvelas pasture is in the middle and the Ramirez-Wrankle pasture is in the southern portion of the Property (Figure 5.2-2). The CDLC contracts with these ranchers call for the tenant to improve the ranch infrastructure and grasslands according to the Conservation Grazing Plan. The ranchers are required under the terms of their contracts and the Conservation Grazing Plan to protect grasslands and oak woodland habitat, and

TABLE 5.2-3
COAST DAIRIES: CROP LEASES 1999-2000

Lessee Name	Analysis Zone	Total Acres	Predominant Soil Types [a]	Storie Index [b]
Pfyffer	MCT-3	156	133	66
	MCTB-1		177	36
Seaside	MCTB-2	175	133	66
	MCT-4		159	49
			179	42
Swanton Berry Farm	MCT-2	41	133	66
			177	36
Pfyffer	LCT-1	217	177	36
	CTB-2			
Fambrini	LCT-2	127	133	66
	LCTB-3		177	36
	YBCTB		134	59
	YBCT-2		178	50
	LACT-1		179	42
	LACTB-1			
	LAM-1			
	LASPZ-3			

a. Key to Soil Types

	DESCRIPTION
133	Elkorn sandy loan, 2-9% slopes
134	Elkorn sandy loan, 9-15% slopes
159	Pfeiffer gravelly sandy loan, 15-30% slopes
177	Watsonville loan, 2-15% slopes
179	Watsonville loan, thick surface, 2-15% slopes
178	Watsonville loan, 0-2% slope

b. Storie Index: The Storie Index rates soils based on productivity data collected when soil maps are prepared. The system was conceived in l933 by Professor Earl Storie, University of California. The Index is used primarily when detailed field surveys of an area's soil are not available, and this Index can be used as a general guideline. It has the advantage of being a quantitative measure, but the system does not consider issues of water availability or climate or other crop productivity factors. In California, factors such as climate and water availability for irrigation can be very important in measuring the productivity and agricultural value of lands.

Four factors, A, B, C and X, are used to give a soil rating of 0 to 100. Factor A is a development category that rates a soil on its depth and origins. Factor B rates surface texture and Factor C ranks slope. Factor X measures several properties, including drainage, salinity, alkalinity, acidity, and degree of erosion. Each factor is ranked and then all factors are multiplied together. A rating between 80-100 usually indicates prime farmland.

TABLE 5.2-4
COAST DAIRIES: CURRENT LAND USE (April 2001)

A. Crop Land Lessees	Total Acres	Primary Crops
Mark Bartle	11	Organic herbs
Swanton Berry Farm	29 12	Organic strawberries, bush berries and mixed vegetables
Ramon Rios	16	Artichokes
Mario Rodoni	36	Brussels sprouts
R. Fambrini & Co.	126.5	Brussels sprouts
Wayne and Gene Pastorino	144	Dry farmed hay
Total, all	374.5	
Total, currently irrigated	230.5	

B. Grazing Contractors	Total Acres	Predominant Use
Gene Pastorino Borego Pasture 150 ac Lower New Town Pasture 500 ac Upper New Town 100 ac	750	Year-around grazing
Peter Arvelas San Vicente 120 ac Yellow Bank Pasture 180 ac	300	Cow/calf operation
William Wrankle & Jose Ramirez: Marina pasture 190 AC Delones Ranch pasture 80 AC	270	Seasonal yearling/stocker operation

Source: Trust for Public Land.

to increase habitat diversity. In return, Coast Dairies does not charge grazing fees. A contract would be terminated if a rancher fails to implement the required improvements.

Table 5.2-5 summarizes the estimated livestock grazing capacity, expressed in Animal Unit Months[1], for the Arvelas (Contractor A) and Ramirez-Wrankle (Contractor B) allotments. In a favorable year the Arvelas leaseholding can support 35 cows and in an average year 21 cows. The Ramirez-Wrankle leaseholding can support 275 cows in a favorable year and in an average year 183 cows. Currently these lands are utilized to pasture cattle for a six-month grazing season. Overall, the Coast Dairies grasslands can support 846 calves in a favorable year and 564 in an average year. In the most recent study of the grazing operations, it was concluded that the grasslands were being grazed at maximum capacity (Amme, l999).

TABLE 5.2-5
LIVESTOCK GRAZING CAPACITY AT COAST DAIRIES

Allotment	Grassland Acreage	Favorable Year	Average Year
Arvelas	320 acres	960 AUM	600 AUM
Ramirez/Wrankle	270 acres	810 AUM	500 AUM

Source: 1999 Range Survey and Conservation Grazing Program, Prepared by David Amme, Resource Restoration and Management

5.2.4.3 AGRICULTURAL INFRASTRUCTURE

Each lessee is responsible for providing and maintaining their own water collection system, water distribution lines and pumps, structures for equipment storage, buildings for grading and storage, and worker housing. Each of the three historic lessees has a centralized equipment building and worker housing and/or bunkhouses.

The principal agricultural structures on the three historic crop leases are shown on Figure 5.2-2, and are listed below[2]:

Pfyffer Brothers (assumed by Swanton Berry Farm and Ramon Reiz)

Farm Buildings

2	Equipment storage barn and shed (at Swanton lease)
2	Bunkhouse and a commissary (capacity 25, at Swanton lease)

[1] An Animal Unit Month (AUM) is a measure based on the amount of forage a cow and her calf eat in a month, estimated at 1,000 pounds dry weight.

[2] Capacity information from The Davenport/North Coast Farm Labor Camp Survey, 1999.

Single family houses (divided among Swanton and Reiz)

1 Single family house (at Swanton lease). A second single family house is un-repairable.

Seaside Ranch

Farm Buildings

1 Sorting shed

Fambrini Farm

Farm Buildings

1 Equipment Storage Barn

1 Roadside retail stand

Bunkhouses (capacity 25)

Fambrini Farm continues to utilize its structures and housing. The Farm also operates a roadside market located on Highway 1 that adjoins a house. With the recent termination of the Seaside Ranch lease, future use of the Seaside Ranch structures is uncertain. Seaside Ranch had also historically leased and utilized three small structures on RMC property (the Depot Ranch) for worker housing.

Roads

The farms and pastures of the Coast Dairies Property are accessed by a network of roads. These include several paved roads, but most of the farm and ranch roads on the Property are unimproved dirt, single-lane roads. Section 4-2 includes information on all roads on the Property; roads are also shown in Figure 4.2-5.

Worker Housing

The farms on the Property have historically provided housing for some of their permanent employees, as well as seasonal workers. As a general rule, seasonal Brussels sprout and artichoke care and harvesting will require 1 worker per 10 acres. Fambrini Farm, Swanton Berry Farms and Seaside Ranch have dormitory housing for seasonal workers (see Figure 5.2-2 for location of housing and structures). Some of the housing on Seaside Ranch is located on land that CDLC leases from RMC, and some is on CDLC land.

5.2.4.4 WATER SUPPLY AND USAGE

The Property contains six distinct watersheds that drain into streams that provide water for crop production and livestock. Of these, the most important creeks in terms of volume of irrigation water for crop production are Molino and San Vicente Creeks. A variety of streams, minor stream diversions, and springs provide water for livestock.

Water for irrigation and cattle grazing is by far the most important component for successful farming on the Property. The principal use of agricultural water is for crop production; water for livestock is currently limited to stock watering only (there are currently no irrigated pastures on the Property), occurs at many diverse points, and is delivered in small volumes.

Usage of water from the principal streams (i.e., Molino, Ferrari, San Vicente, Liddell, Yellow Bank, and Laguna Creeks) has a long history at the Property. Historically, it has been the responsibility of the lessee to develop a source of water and transport it to the field. Table 5.2-6 contains a list of lessees of water sources and uses. The figures are estimates only: water is not metered with the exception of use of city water at Fambrini Ranch, and Table 5.2-6 is based on information from lessees (Fambrini, Mondo pers. comm., 2001). As indicated, a variety of sources are utilized. While the majority of water used in agriculture and pastures comes from streams, water is also obtained from several wells, the tertiary treated wastewater from Davenport, and surplus water from the RMC Pacific Materials cement plant.

Typically, water is pumped from the water source to small holding reservoirs prior to irrigation (Figure 5.2-3). Water is moved from the holding ponds with electric pumps, providing pressure for the overhead sprinkler systems made up of movable aluminum pipes with sprinklers on standpipes. This irrigation system is used almost exclusively for both Brussels sprouts and artichokes. In contrast, strawberry growers use overhead sprinkler irrigation at certain times of the year (early transplant and cover crop periods), but use water conserving drip irrigation systems during the main production period.

In recent years, lessees have applied to the California Department of Fish and Game (CDFG) for a 1603 Streambed Alteration Agreement to divert water from streams for agricultural uses. The general, informal rule followed by lessees was that up to 50 percent of the stream flow could be diverted. The placement of coho salmon and steelhead trout on the state and federal endangered species lists (see Sections 3.3 and 6.0) now requires an environmental compliance process to approve water diversions, and future diversions can be expected to be limited or prohibited during the low-flow summer period.

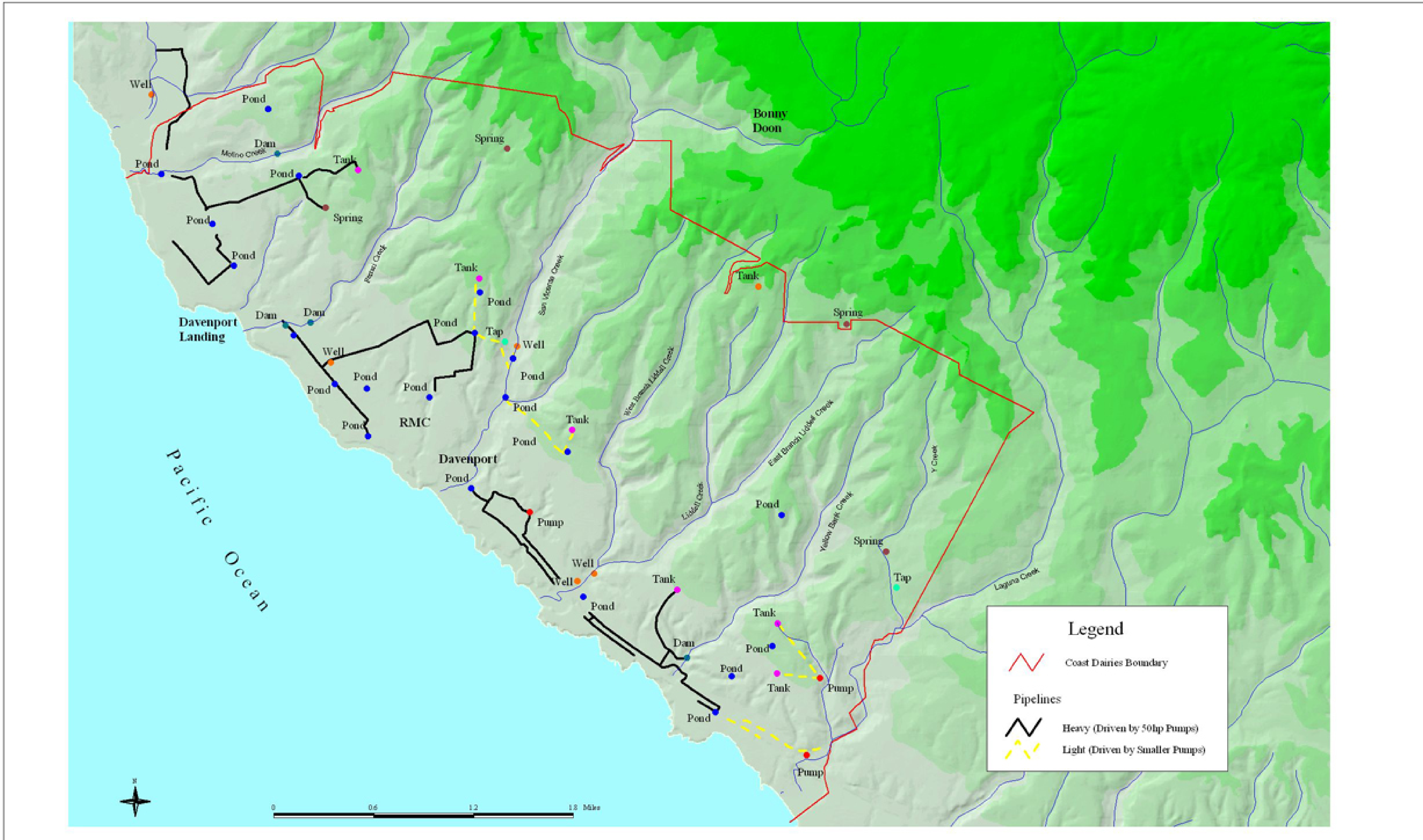
Water for Livestock

According to the 1999 Range Survey and Conservation Grazing Program report (Amme, l999), water for the Arvelas allotment for a small ridge top pasture west of San Vicente Creek comes from a trough near the conveyor belt, which is connected to an un-metered pipe that provides the town of Davenport with drinking water (Figure 5.2-3). Water for the main 85 acre pasture comes from small seasonal ponds in the quarry areas and one main water trough located at the south end of the pasture overlooking the eastern Pfyffer Farms reservoir. The water in this trough is pumped from the Pfyffer Brothers ponds adjacent to San Vicente Creek. There is no fence or gate to keep the cows in the 95-acre pasture, and the animals are allowed to work their way down to San Vicente Creek for water and grazing. The water trough in the corral is fed from the pipe that serves the main Seaside Ranch reservoir that is also pumped from San Vicente Creek.

The Pastorino pastures are divided into a three grazing areas (Borego, Lower New Town and Upper New Town) and an eastern grazing area (Yellow Bank, Marina and Delones Ranch). Water for the Borego pasture comes from an old farm reservoir and connected water trough and from Molino Creek. Water for the Lower New Town pasture comes from three seasonal creeks, one water trough adjacent to the western Pfyffer Farm reservoir, and a metal tank/water trough system on a hilltop above Seaside Ranch. Water for this last trough is pumped from the Seaside Ranch reservoir that, in turn, is pumped from San Vicente Creek. In the past, water was pumped from the western Pfyffer reservoir to a redwood tank/water trough system at the top of the highest hill. A water trough connected to the western Pfyffer water system in the narrow pasture along Swanton Road is not presently functioning. A spring-fed trough is the only water source for the Upper New Town pasture.

TABLE 5.2-6
COAST DAIRIES AGRICULTURAL WATER: PRINCIPAL SOURCES AND USES

Common Name	Analysis Zone	Acres	Estimated Seasonal Water Use (acre-ft)	WATER SOURCES
Pfyffer (north)	MCT-3	156	195 (3)	Molino Creek: (a) Up-stream diversion (b) Diversion to stream-side reservoir
Seaside Ranch	MCTB-2 MCT-4	175	219	(a) Stream diversion San Vicente Creek, 1603 permit (b) Well near conveyor belt (c) Tertiary treated waste water, City of Davenport (d) RMC Pacific Materials Davenport cement plant surplus water (e) Ferrari Creek
Swanton Berry Farm	MCT-2	41	51	Reservoir on Molino Creek and reservoir on the Property
Pfyffer (south)	LCT-1 CTB-2	217	271 (3)	Stream diversion from San Vicente Creek
Fambrini	LCT-2, LAM-1 LCTB-3 YBCTB YBCT-2 LACT-1 LACTB-1 LASPZ-3	126	159	(a) Well near Liddell Creek (b) Dam and diversion on Yellow Bank Creek (c) Diversion from Laguna Creek (d) Santa Cruz city water



SOURCE: Environmental Science Associates, Pacific Meridian Resources, Landsmiths, USGS

Coast Dairies / 200071

Figure 5.2-3

Agricultural Water Works on the Coast Dairies Property

Arvelas' pastures and corrals north and south of San Vicente Creek are supplied by water from the creek, primarily through sharing of farmer's diversions. Water for the Marina and Yellow Bank terrace pastures and the corral in between comes from three troughs that are connected to the City of Santa Cruz water line that originates from a pipe system in the Laguna Creek watershed. A seasonal stock pond serves the upper part of the Yellow Bank pasture. The upper part of the Marina pasture is served from a redwood tank/water trough system also connected to the City of Santa Cruz water line through a pipe and booster pump. Water for the Delones Ranch pasture comes from a seasonal tributary to Laguna Creek. Delones Ranch once had a water trough connected to the City of Santa Cruz water line near the eastern Property boundary, but this connection is no longer functioning. Irrigation takes places primarily between mid-April and October, and the timing and amounts vary from year to year.

5.2.4.5 AGRICULTURAL CHEMICAL USAGE

The principal agricultural chemicals applied to fields used for crops are plant nutrients, pesticides, and herbicides. The farm operators on the Property all use a licensed pest control applicator that applies all fertilizer, pesticides, and herbicides, usually on an annual basis. The principal application service in the area is Western Farm Services. Application of agricultural chemicals is typically done in conjunction with preparation of beds for planting in the spring. The current lessees report that the cost for soil preparation, fertilizer, and all the spray applications now ranges from $850 to $1,250/ acre annually.

In l987, the California Department of Food and Agriculture initiated a program requiring detailed reporting of the use of pesticides and herbicides. Growers must maintain a record of all applications of pesticides and herbicides by farm, field, and date of application. These data are sent to the County Agricultural Commissioner, who then sends the information to the California Environmental Protection Agency. There is not a similar reporting program for fertilizers.

5.2.4.6 PLANT NUTRIENTS

Both Brussels sprouts and artichokes require pre-plant and annual application (usually once annually) of a balanced fertilizer, usually "triple 18" (equal parts of NPK - Nitrogen, Phosphorus and Potassium) at the rate of 1,000 lbs per acre. Also, foliar applications are often applied in conjunction with the application of pesticide. Foliar applications usually consist of a combination of NPK plus iron and zinc. Also a combination of micronutrients may, from time to time, be applied. Micronutrient combinations usually include iron, copper and zinc plus other micronutrients required by plants.

5.2.4.7 PESTICIDES AND HERBICIDES

Brussels sprouts, as well as artichokes, are long growing season crops, thereby providing the opportunity for the build-up of insects and pests. Both crops also have exacting cosmetic standards, prompting higher pesticide use in order to ensure meeting specifications at harvest time. Brussels sprouts are planted from transplants in March through May, depending on the distribution and intensity of spring rainfall. The first harvest of early varieties can occur in late June, with most mechanical harvesting of Brussels sprouts occurring from October through January.

Traditional artichoke production is based on the planting of a perennial root division that will remain in the field from 4 to 7 years. More recently, new artichoke varieties are produced as an annual crop (transplant) from seed, and planted in April. Peak artichoke harvest occurs in April or May for the perennial variety, and the planting and location of the planting of the seeded varieties can stretch out the harvest for the annual variety.

The principal materials applied are indicated by parenthesis. A list of all chemicals utilized in the Pfyffer Brothers (l999), Seaside Ranch, and Fambrini Farm (2000) are included in the Project Archives. The principal applications of pesticides for Brussels sprouts and artichokes is discussed below.

Planting Period

A soil fumigant (Telon, Vepam, or Nemacare, or combinations) is applied in the spring prior to transplanting. Application is principally to control nematodes. Granular Lorsban is often applied to control root maggot (McKaig, 2001).

Growing Season

During the growing season, 5-7 sprays are applied (Lorsban, Pounce, Metasystox, Provado) to control aphids and worms. The principal pests are cabbage aphids and cabbageworms. Application of a fungicide (usually “Bravo”) may be needed, particularly when wet and cool days persist (McKaig, 2001).

Throughout the season, an estimated 4.5 lbs/acre of organophosphates (active ingredients) of various brand names and 2 lbs/acre of fungicides (active ingredients) are applied to each acre of Brussels sprouts each year by a ground applicator (McKaig, 2001). Actual requirements vary from year to year.

Artichokes usually only require 3-4 sprays annually, and depending on pest conditions may only need 2 sprays. In Castroville, because of the concentration of artichoke production, 7-8 sprays annually may be required. The principal pest is the artichoke plume moth (*platyptilia carduidactyla*). Artichokes grown on an annual basis may only need one spray per year (Superside, Dupont, Asana).

Another problem, particularly with perennial artichokes, is adequate control of gophers, mice, and slugs. Trapping is used to control gophers and mice, as well as aluminum phosphid pellets placed in the burrow, and slugs are controlled with baits approved by CAL EPA. The principal slug bate used is Metaldehyde (Deadline) (McKaig, 2001).

At the Coast Dairies Property, there is an abundance of raptors that prey on gophers and mice. Efforts that encourage the raptor population provide an opportunity for biological control (see Section 3.2). Due to annual plowing of the soil, artichokes grown from seed on an annual basis significantly reduce the rodent population.

5.2.4.8 EROSION

Erosion is a natural process that can be accelerated by any land use that removes vegetative cover and disturbs the soil. At Coast Dairies, agriculture may increase erosion in several ways, including overgrazing of pasturelands; wind action, which can be a source of gradual soil depletion; and heavy winter storms, especially those that occur before crops or annual grassland species have had an opportunity to grow and provide soil cover.

Heavy soil erosion is sometimes observed in strawberries during November and December, since this is shortly after the plants have been transplanted, and very little plant cover exists to protect the soil. Runoff from fields can cause severe channeling. Erosion is also observed during the harvest time for Brussels sprouts, since harvest tractors can cause severe rutting in the fields, exposing the soil to splash and runoff erosion. In almost all cases Brussels sprouts are planted in rows that run up and down hill, increasing the chance of erosion, and most of the prior lessees have not utilized winter cover crops. Conservation and range management plans, tied to annual rainfall and available biomass, are utilized to minimize erosion on grasslands used for cattle grazing.

Feral pigs are an increasing problem on the Property, and in Santa Cruz County in general. They often run in packs, and can cause extensive damage to a field, destroying any crop for that year (see Section 3.2.6.2). Feral pigs also root-up large areas, making the area subject to accelerated soil erosion.

Two on-stream reservoirs, one on Molino and one on Yellow Bank Creeks, have been damaged in recent years during large winter storms. The failure of these dams caused severe erosion, both of the dams themselves and also of stream channels above the reservoirs that have experienced downcutting, perhaps as a result of the lowering of the local base level (the low point of the stream). Stream channel downcutting is discussed further in Section 4.1.

5.2.5 ECONOMICS OF AGRICULTURAL OPERATIONS

5.2.5.1 CULTIVATED LAND

The primary source of agricultural income for the Property is the leasing of land utilized by vegetable producers. Since the late l950’s there have been three principal lessees: Pfyffer Brothers, Seaside Ranch and Fambrini Farm.

Together, the three lessees utilized approximately 700 acres of irrigated cropland. Recent annual rental income from these three sources was reported to be between $120,000-$130,000. (Mondo, Fambrini, 2001.)

Pfyffer Brothers terminated their lease at the end of 1999. Factors that contributed to Pfyffer Brothers' decision not to renew their lease included the necessity for extensive work to obtain an assured water source for irrigation, and an inability to finalize a water delivery plan (Bontadelli, 2001). Other factors may also have entered into the decision. Seaside Ranch did not renew its lease in 2001. A portion of land farmed by Pfyffer is scheduled to be dry farmed for hay by Pastorino, and another portion (41 acres) was leased for organic farming. TPL is actively seeking to lease other fields that are now lying fallow. In 2001, there are approximately 230.5 acres of leased, irrigated land.

Land is leased on a cost-per-acre per year basis depending on the intended use of the land. Coast Dairies agricultural lands currently lease for between $40 and $250 per acre, as shown below:

Irrigated	
Conventional farming	$250 per acre
Organic land in transition[3]	$100 per acre
Certified organic land	$250 per acre and above
Dry Farmed	
Hay and grain	$ 40 per acre

At nearby Wilder Ranch State Park, 600 acres of irrigated lands are being leased for approximately $250 per acre (Roth, 2001).

Land Lease Market

The annual report on agricultural land leases by the California Chapter of the American Society of Farm Managers and Rural Appraisers includes current rental data on land leases, although the survey principally focuses on Monterey County. Rental rates in the Salinas Valley are:

Chualar-Gonzales	$400 - $1,100 per acre
Soledad-Greenfield	$350 - $ 700 per acre
Rangeland	$ 6 - $ 12 per acre

In general, the market for good quality vegetable land is reported as strong, although this is based on land principally in the Salinas/Watsonville area.

The lease value of Coast Dairies land is lower in relation to equivalent vegetable cropland in Monterey and Santa Cruz Counties due to three important conditions:

[3] Land designated for organic crops requires a period of three years without use of agricultural chemicals before the crops grown on the land can be certified as organic.

- lack of an assured water supply;
- distance to agricultural service and support centers i.e., Watsonville and Salinas; and
- wind conditions.

By far, the most important condition adversely affecting lease values is the lack of an assured water supply (see further discussion in Section 5.2.6, Issues). There is little that can be done about the other two factors, and without an assured water supply they are minor by comparison. Brussels sprouts and artichokes are not significantly affected by the wind, but strawberries exhibit lower yields in windy areas. Based on the comparable rents listed above, with an improved water supply for 700-800 acres, land rents have the potential to range from $350 to $400 per acre ($245,000 to $320,000 total), a significant improvement in revenue generation. Comments from one artichoke grower in the Watsonville area indicated that equivalent quality land near Watsonville with a good supply of water rents for $500 to $800 per acre (Bargetto pers. comm., 2001). The smaller field size and the lack of level land also restrict use of the land, particularly by the larger, conventional vegetable growers.

5.2.5.2 PASTURELAND

The low level of profitability in cattle grazing is likely to continue, although there are opportunities developing for premium sale of grass fed, hormone-free cattle. It is still likely that the cost to manage and monitor the conservation grazing operation will exceed financial returns. The primary return to CDLC from grazing is not financial, but funds spent on the management of the grazing program may be considered part of the cost to maintain and improve grasslands, increase biodiversity, reduce the growth of brush/biomass and reduce the fire hazard on the Property.

5.2.5.3 CROP PROFITABILITY

Changes in ownership, new competition in the markets for crops traditionally grown on the Property, and recent regulatory actions are calling into question the long-term viability of the extent and type of agriculture that has been practiced at Coast Dairies for much of the past century. Even in good times, the profitability of conventional vegetable crops follows wide swings, depending on production costs and market price. In some years, artichoke and Brussels sprouts growers lose money. For example, in l997 there was an outbreak of diamondback moths (*Plutella xylostella*), which devastated some fields of Brussels sprouts and required the extraordinary expense of additional chemical applications. Consequently, gross and net income in l997 was significantly below more recent years (see Table 5.2-2).

Organic growers, particularly growers with niche and direct sales programs, have opportunities to dramatically increase gross income per acre. A relatively small (by conventional farming standards) organic farm of 40-80 acres can support a farm operator, even with higher production and marketing costs per acre. Some organic growers have established farms in both Northern California and Southern California or the desert in order to produce and market year-around. Although there is little published data on the cost of leasing certified organic irrigated cropland, there are indications that it could be worth $350-$500 per acre, particularly in the future, as the demand for organic produce continues to increase. Approximately 150 acres of land at Wilder State Park are leased to three organic growers. The Property manager agrees that higher rents are possible and warranted for land suitable for producing certified organic crops (Roth pers. comm., 2001).

On the other hand, the ultimate managers of the Coast Dairies Property may want to encourage organic agriculture on the Property by continuing CDLC's current practice of initially charging lower rents to organic growers. Organic growers are often small operators, with restricted capital, and are often relative newcomers to farming as an enterprise. A reduced rent arrangement for small organic growers, similar to that for conservation grazing, may be justified on both economic and non-economic grounds, since this kind of agriculture protects and builds the soil, promotes healthy wildlife, and does not put recreational users at risk.

There are some tradeoffs in the profitability of organic farming. As a general rule, the cost per acre to farm organically is higher than conventional farming, but most often a higher price is received for the end product. An organic farm often requires more acres for a given amount of production, as land is often fallowed for a year with cover crops in order to build soil fertility, but fallow land may serve the dual purpose of rebuilding soil fertility and providing wildlife habitat.

5.2.6 ISSUES

The Coast Dairies Plan will endeavor to integrate rural agricultural uses, resource conservation, and public enjoyment. The history of Coast Dairies is generally one of resource extraction, and very little has been "put back". A primary purpose of this Plan is to balance sustainable use and resource conservation with historically conventional views of the productivity of the land. Maintaining and enhancing the feasibility of continued agricultural use in ways that are consistent with protection of natural resource values is a specific management objective of this Plan.

5.2.6.1 AGRICULTURAL WATER SUPPLY

Among the issues facing agricultural production on the Coast Dairies Property, water availability, delivery, and reliability is by far the most important. The l999 listing of coho salmon and steelhead trout on the federal and State endangered species lists will surely result in restrictions on the summer diversion of water from the six fish-bearing streams on the Property. The Long-Term Resource Protection and Use Plan Environmental Impact Report/Environmental Impact Statement must provide assurance that water diversions for agricultural purposes do not adversely affect coho salmon and steelhead trout.

Dams and Reservoirs

Currently there are dams and reservoirs on several of the Creeks on the Property. Some of these are used as water diversion and storage structures for agricultural purposes (see Table 5.2-6).

A dam used to impound agricultural water on Yellow Bank Creek was damaged several years ago by floodwaters, and was subsequently repaired. Further investigation indicated that a permit was not obtained to conduct the repairs, and the dam has now been “red tagged” (an order repair) by the County. The resolution of this problem through proper planning and biological evaluation of the effects of dam reconstruction have been initiated and are ongoing at the time of publication of the ECR.

Heavy rains damaged an agricultural diversion dam/reservoir on Molino Creek in February 2000, and it has not been repaired. Furthermore, CDFG has raised questions as to whether construction within Molino Creek would be detrimental to the fish habitat.

On December 21, 1992, the Coast Dairies and Land Company filed an application with the State Water Resources Control Board to divert 213 acre-feet of water from Scott and Molino Creeks for storage in reservoirs. The water was to be used to irrigate 238 acres of artichokes and Brussels sprouts on land then leased to Pfyffer Brothers. The process went through various planning processes, hearings, and studies. The final plan was to build three 50-acre-ft earthen reservoirs. The planned sale and ultimate purchase of the Property by TPL slowed the approval process, and it was finally decided to abandon the project until the overall resource plan was in place. In the meantime, at least partly due to the absence of assured water, Pfyffer Brothers elected not to renew their lease.

Improvement of the agricultural water supply on the Property remains an important issue, if there is to be continued use of the land for irrigated crops. There are two opportunities for improving water usage on the Property: construction of additional off-stream reservoirs and conservation of water.

One solution to increased summer water availability that may have both environmental benefits and provide irrigation water is the construction of small to medium size reservoirs on the Property that can be filled with water from winter run-off or tertiary treated waste-water, for use in the summer. The construction of small reservoirs in the vineyard areas of Sonoma and Napa Counties has been essential to the expansion of premium wine grape vineyards and a world-class wine industry, as well as agrotourism.

Significant new, water conserving irrigation techniques developed over the past twenty years include drip irrigation and utilization of micro-sprinklers. Perennial crops, such as artichokes, are well suited to drip irrigation. Most strawberries now utilize drip irrigation, both because it saves water and because it improves productivity. Micro-sprinklers save water, but are most often utilized for permanent planting of tree crops. Low value crops generally cannot support the added capital investment in a drip or mini-sprinkler irrigation system.

Water Rights

With new, long-term ownership it is important that clear documentation of water rights is established. Historically, lessees were responsible for developing and permitting water sources needed for their farms. This system can be used for well water, but with the current regulatory climate and changes in the lessees, it is appropriate for landowners and managers to take an active interest in water rights.

Agricultural land has been under public management for up to 20 years at Wilder Ranch State Park. The land, soil type, and crops are similar at Wilder Ranch and Coast Dairies, and it would be appropriate and efficient for lands at both locations to be managed in a coordinated manner. A significant difference in the two sites is that Wilder Ranch land is primarily irrigated from wells, whereas Coast Dairies lessees utilize stream diversions as well as wells located near streams.

5.2.6.2 FUTURE OF PASTURELAND

As previously indicated, pastureland management for grazing purposes is likely to require careful management, and the cost of managing the lands is not likely to be recouped from rental income. Still, livestock maintains the grasslands by providing a surrogate for ungulates, probably Tule elk, which grazed the land previously. Also, in the absence of cattle, high fuel load, in combination with high recreational use, can develop into a fire hazard. In the interest of efficiency, consideration should be given to combining the management of pastureland in the adjoining Cal Poly Swanton Pacific Ranch with the Coast Dairies pasturelands. There may be a need for further investment in grazing infrastructure such as fences and water supply that may be beyond the financial capacity of the lessees and would have to be born by the Property owners.

A broader pasture management issue is whether to continue cattle grazing on the lands. California State Park policy is most often to ban grazing. As indicated, carefully managed grazing can preserve grasslands and wildflowers and prevent the long-term conversion of some grasslands to brushfields. Historically, fire was utilized as an effective means for the preservation and management of grasslands, and there is evidence that this practice was followed along the coast. Controlled burns are also utilized for this purpose and have been carried out at the UCSC campus. Carefully controlled grazing will require additional fencing and most likely, the use of portable electrical fences, which may conflict with recreational uses.

Of particular, acute concern is the accessibility of the Property’s creeks to cattle. Cattle in creeks cause accelerated erosion, destroy riparian vegetation, pollute the water, and in general are incompatible with the imperative to protect and restore aquatic habitat. Attention should continue to be given to fencing cattle out of the Property’s creeks.

5.2.6.3 AGRICULTURAL HOUSING

The existence of approximately eight single-family residences and bunkhouses for seasonal agricultural workers raises a number of long-term issues. The ability of a lessee to provide worker housing is increasingly important to the sustainability of the farm enterprise.[4] It may be

[4]Existing housing is not owned by CDLC, except temporarily. Lease terms make these the de facto property of the lessee.

beneficial to consider setting aside 10-15 acres near Davenport for affordable housing for agricultural workers and for future land management staff, rather than to maintain some of the older structures. Consideration should be given to utilizing the construction of new structures as a demonstration of using natural building materials, such as straw bale construction.

Santa Cruz County has an active committee working on the issues of agricultural worker housing, and multiple past studies have proposed a range of potential solutions. Coast Dairies could become a model program for dealing with this critical issue for agriculture in the region.

5.2.6.4 AGRICULTURAL COMPATIBILITY

Crop and livestock production on the Property raises a variety of issues that impact the sustainability of agricultural production, as well as the interface of agriculture with the sustainability of the natural resource. Listed below are compatibility issues.

Chemical Usage, Runoff, Silt, and Dust

There is little evidence that the application of agricultural chemicals is creating an acute human health risk on the Property. The majority of pesticide applications are conducted at night with ground equipment, when the air is still, and there is little other human activity in the area. Spraying is delayed during windy periods. Growers alert persons living in Davenport when spraying will take place (usually 3-4 times per year). As with night spraying, pesticide applicators generally have to be vigilant and guard against drift, as homes, people, and neighboring growers are located in close proximity to areas being sprayed.[5] Drift of agricultural chemicals can be expected to become more problematic if more of the Property's agricultural lands are given over to organic production (i.e., drift between conventional and organic fields). The waiting period for re-entry to fields following spraying with certain chemicals is 48 hours, which could conflict with increased recreational use of the Property.

Agricultural chemical application is done predominantly on a contract basis with registered agricultural chemical application companies such as Western Farm Supply in Watsonville. These companies are closely monitored and have strict reporting requirements to County and State agencies.

Discussion with the managers of agricultural lands in Wilder Ranch State Park indicate little problem at the interface with agricultural operations and the public use of parklands along the beach, coastal terraces, and trails.

There is some indication that fertilizer run-off from fields causes accelerated growth of non-native species along the edges of fields.

[5] CDLC required that the fields surrounding Newtown and adjacent to the Pacific School be left fallow or planted organically. The Plan is likely to prescribe a similar requirement.

Wind and Dust

The coastal area is often windy, and historically non-native trees such as eucalyptus were planted as windbreaks. The most popular native species used for windbreaks is the Monterey Cypress, although prior to pitch canker problems, Monterey Pine was also utilized. Monterey Cypress has been used very successfully at the UCSC farm, planted more closely at the outset, and thinning and topping the trees as the tree matures. (Gliessman, 2001). Non-native species include Casuarina, which has an open growth habit, filtering the wind instead of blocking it.

Dust problems are minimized by the moist soil conditions and air along the coast. Growers do utilize composted chicken manure and ground gypsum as soil amendments in the spring. This activity can create dust and odor problems. Wind erosion can be a problem during periods when perennial artichokes are scalped back to the ground, or when fields are deep plowed.

Recreation and Conservation

Historically, people have gained access to the Coast Dairies beaches, and there seems to be little problem in the interface with agricultural operations. Again, Wilder Ranch State Park indicates little problem, particularly with proper staffing and signage. In addition, Wilder Ranch retains 10 percent of the lease receipts in an environmental fund to be used to mitigate any historical or current environmental problems caused by the agricultural use of the land (Roth pers. comm., 2001). Special consideration will have to be given to farming practices if ocean bluff trails are developed, and where trails cross grazing lands where electric fences may be in use.

Buffers

Buffer zones between agricultural operations and recreational uses will likely be necessary along the coastal terrace bluffs. A 50-foot buffer for a trail or dirt roadway provides access for agricultural equipment and harvesting crews, as well as public use. A buffer of this kind will, however, be difficult to accomplish on the Fambrini lease, where several narrow fields exist (see Analysis Zone map) and the establishment of a buffer zone may make the field un-economical to farm. Additional buffers may be required in the future, if population pressures and recreational uses increase in the area.

Theft, Vandalism, and Liability

Farms near large urban areas, such as avocado growers in San Diego County and farm operations in the San Joaquin Valley, have had problems with theft of crops and with equipment vandalism (California Farmer, 1999). Theft occurs most commonly with high-value crops. At harvest time, some growers of high-value fruit crops have resorted to use of hired security services. Fencing of equipment yards or dangerous sites is the most common method of controlling vandalism.

Theft may eventually become a problem on fields along Highway 1, particularly if strawberries and other attractive, ready-to-eat crops are being grown. If the beach and coastal lands are managed by California Department of Parks and Recreation, the presence of rangers and patrols may be beneficial in the prevention and control of theft and vandalism. Clear signs delineating accessible areas and trails is also an important element in creating a mixed use of the area.

Natural Hazards

Several lessees mentioned the problem of feral pigs being a serious pest to cropland as well as forest and grasslands. The pigs are not native, and often form in packs that move and feed at night. There have been numerous problems with environmental damage by the feral pigs throughout Santa Cruz County. Swanton Berry Farm is very concerned because strawberries are one of the most expensive annual crops to cultivate and one of the most vulnerable to pig "rooting" or soil disturbance. Swanton Berry Farm has placed a fence along Swanton Road to guard against this problem.

5.2.6.5 AGRICULTURAL REGULATORY CONSTRAINTS

Regulatory constraints are an issue with farm operations. Of continuing concern, particularly for small farm operators, are the regulatory and reporting requirements imposed on operations having limited administrative support functions. Any overall reporting or regulatory support that can be offered by a landowner or land manger is both helpful and valuable. The cost of such support can be built into the rent to a lessee.

California Department of Fish and Game

Of primary importance for water availability, along with the establishment of water rights, is the acceptance and approval of 1603 permits for the "Lake and Streambed Alteration Program" for the modification and diversion of water for agricultural use, particularly on Molino and San Vicente Creeks, as well as Liddell and Yellow Bank Creeks. Historically these permits were issued locally on an annual basis. These diversions will require environmental compliance with the Federal Endangered Species Act and CEQA. It is understood that temporary approvals are being sought for 2001.

California Department of Conservation and the California Coastal Commission

The majority of lands on the Property that have been cultivated and irrigated over the past 5 years have been classified by the California Department of Conservation as a combination of *Prime Farmland*, *Farmland of Statewide Importance*, and/or *Unique Farmland* (see Figure 5.2-4 and Section 4.2.7 for additional information on soil types and definitions). This classification gives to them a high level of impact significance under CEQA. The terms are also considered and defined by the California Coastal Commission, whose jurisdiction extends inland approximately 5 miles.

The Coastal Commission has several tests for determining *Prime Agricultural Land*, the most straightforward being the $200 per acre economic return and the grazing capacity criteria of the Coastal Act (the County of Santa Cruz considers land under all the above categories “Prime”).

The Coastal Act states that the maximum amount of prime agricultural land should be maintained in agricultural production, in order to preserve the agricultural economy of the area. Therefore, utilizing a variety of criteria established by the Coastal Commission, and County of Santa Cruz, every effort must be made to conserve use of these lands for agriculture. The type of agriculture that takes place on the Property, however, may change while maintaining compliance with the spirit of the Coastal Act. The land managers of Coast Dairies will have a unique opportunity to show creativity and ingenuity in working with growers to develop more sustainable and compatible alternatives to the current agricultural methods.

County of Santa Cruz

The County role in land use planning and approvals has already been discussed. The County also has jurisdiction and an inspection role related to worker housing, along with approval of new construction, dams, and other civil works.

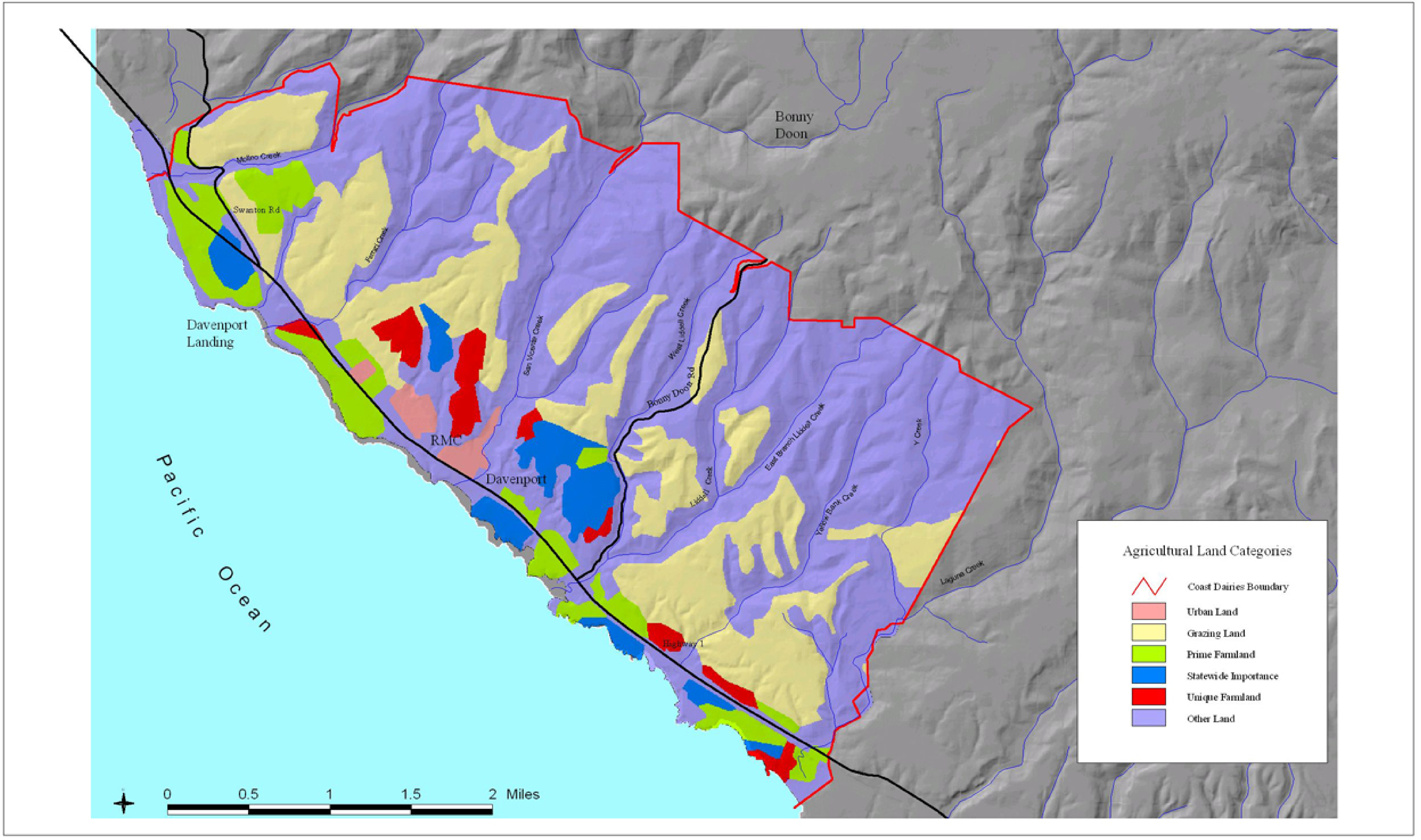
Santa Cruz County, through the Commissioner of Agriculture, maintains statistical records of crops produced and collects data on the application of agricultural chemicals. Indications are that lessees at Coast Dairies are compliant.

California Organic Food Act of 1990

The California Organic Food Act of 1990 establishes the definition of organically grown produce and provides the basis of certification as conducted by California Certified Organic Farmers and other registered certifying organizations. It is under these regulations that Swanton Berry Farm operates. At the federal level, the USDA has recently enacted its own rules defining organic food production.

5.2.6.6 ALTERNATIVE AGRICULTURAL METHODS AND PRACTICES

Agriculture and crop production, as well as demand for specific crops and food products, is always changing, sometimes slowly and sometimes quite rapidly. For example, the increased demand and market expansion at 15-20 percent per annum of organic fresh produce and food products has been a trend for more than ten years. The substitution of fresh fruits and vegetables in the diet for the equivalent canned and frozen product is another important long-term trend. The utilization of Coast Dairies land for new crops or production systems more compatible with the overall goals of protecting resources and enhancing multiple uses of the Property needs to be taken into consideration.



SOURCE: USGS, Pacific Meridian Resources, California Department of Conservation

Coast Dairies / 200071

Figure 5.2-4

California Department of Conservation Agricultural Land Categories on the Coast Dairies Property

For the past 30-40 years, the croplands on the Property have been used primarily for the production of two crops, Brussels sprouts and artichokes. Consumer demand for these crops is changing at the same time that broader use for the property is planned, particularly increased recreational use. The purpose of this section is to discuss possible new agricultural uses or cropping methods, such as organic agriculture, agrotourisum, education and research, opportunities that go beyond the strict use of the land for a commercial crop. The new, public ownership and management of the property provides an opportunity to initiate innovative programs in concert with farm operators, in order to create new production and marketing models.

Organic Agriculture

Until recently, the cultivated land on the Coast Dairies Property has been farmed utilizing conventional methods, although Fambrini has farmed organic strawberries. Organic farming is a production system that sustains agricultural production by avoiding the use of synthetic fertilizers and pesticides in the management system, and employing instead the use of alternative inputs. The addition of more organic growers to the Property can potentially neutralize any negative public perception issues or problems with long-term residues in the soil related to the application of agricultural chemicals and pesticides. Organic production often requires the use of cover crops and fallowing of lands, in order to build-up nitrogen (as opposed to the chemical application of nitrogen), as well as building soil organic matter that improves soil structure and reduces erosion.

As previously discussed, Santa Cruz County is considered one of the most important centers of organic farming, not only in California but also in the U.S. Efforts should be made to attract organic farmers to the Property. Ultimately, certified organic farmland may, because of the scarcity of certified organic lands, generate higher rents than conventional farmland. Coast Dairies can increase lease income by offering reduced rate leases during the initial three years, followed by higher lease rates as the land generates more income after certified organic production has commenced.

Brussels sprouts and artichokes are some of the most difficult crops to grow organically in large quantities. However, there are a number of cool season vegetable and fruit crops, such as a wide range of lettuces, broccoli, cabbage, peas, snap beans, strawberries, bush berries, herbs, etc., that can be produced using organic methods.

Reduced Agricultural Plot Sizes and Crop Diversity

While conventional farming generally views small plots as a liability from both economic and operations perspectives, small plots can be a positive benefit for growers of specialty vegetable and organic crops. There is often a shortage of small (10-80 acre) parcels of well-located, irrigated land for both conventional and organic farming, especially for more resource limited growers or growers just starting out in farming. Much of Coast Dairies cropland is already divided into small fields with farm road access. Small plots also facilitate the planting of diverse crops (rather than large concentrations of one crop such as Brussels sprouts), which usually has a beneficial effect on reducing the build-up of specific plant pests and enables growers to reduce applications of pesticides.

The key to being able to offer small plots is closely tied to the establishment of a water delivery plan for the entire Property. Small growers cannot be expected to develop their own water sources; therefore water supply needs to be planned. The location of the Property near a city and a major tourist route (Highway 1) provides an opportunity for direct roadside or u-pick marketing from small plots.

Increased Use of Cover Crops

Most often, organic agriculture requires time for soil regeneration through the application of compost, animal manure, organic matter and cover crops, particularly crops such as nitrogen-fixing legumes. Most studies indicate that cover crops improve soil fertility, levels of organic matter in the soil, biodiversity, attraction of beneficial insects, and that cover crops lead to a more sustainable use of the soil. The growing of organic crops and the use of cover crops would improve, over the long term, soil organic matter and longevity, reduce problems of erosion, and even improve water holding capacity and reduce irrigation requirements.

Agrotourism and Consumer Demonstration Plots/Products

Along with agriculture, recreation is one of the key elements in the planned use of Coast Dairies. Opportunities exist to integrate and enhance recreational opportunities with agriculture and food production. A relatively new form of tourism has developed around the attractiveness of some crops and food products to persons wanting to see first hand their source and production procedures, and at the same time to stay in pleasant accommodations in attractive surroundings. Napa, Sonoma, and Mendocino Counties have been successful in developing wine-related agrotourism (though Napa County has recently taken steps to limit tourist activities in an effort to preserve agricultural lands). Countries such as the United Kingdom and New Zealand have extensively developed their agrotourism opportunities.

The Santa Cruz/Monterey region also draws a large volume of tourists to the area, providing opportunities to offer agrotourism amenities. Most people from out-of-state who drive down Highway 1 have probably never seen how Brussels sprouts (or artichokes) are grown. Tourists are likely to be attracted to a publicized site that both explains the “lifecycle of an artichoke” or organic agricultural production systems coupled with tasting. Opportunities exist to create a visitor center built around organic agriculture. Swanton Berry Farm is already planning to provide a roadside farm market with facilities that demonstrate food preparation and provide interpretation. The site could be particularly useful to elementary schools. The planned Swanton Berry Farm and Fambrini stand will provide two retail farm-to-consumer sites.

Public Education, Collaborative Agriculture Research, and Training

Plans are well under way on the adjoining CalPoly Swanton Pacific property to create a new building to house an education center, principally for use in the CalPoly education program.

There also may be some joint public educational uses, such as a tour of a livestock ranch. Similarly, at Wilder Ranch State Park to the south an historic dairy may be established. The park has historic barns and structures, and it is located just off of Highway 1. Picnic and day use facilities are already available.

The University of California at Santa Cruz is in close proximity to the Property. The University has established, internationally-recognized educational and research programs in Agroecology. There are two organic demonstration centers on campus. Coast Dairies may be able to integrate educational programs with the University, such as internships for students who could provide tours, demonstrations, or educational programs on organic farming and food products.

Farmscaping

Both irrigated crop production and the grazing program need to be planned and managed to provide scenic and environmentally balanced activity on the Property. There are scenic vista points, both on the coast and at higher points. Coast Dairies has the "feeling" of farming as it was practiced in the mid-1950s, and it may be important to maintain the historical basis of the Property. However, there has been considerable deferred maintenance of buildings, and agreements will have to be reached between lessees and Coast Dairies over this issue. Similarly, the need for new barns, residences, and support structures should be considered in the Long-Term Resource Management Plan. Factors such as the type, design, and ownership of structures must be considered.

Agroforestry

Agroforestry is the practice of maintaining forest species and even a forest canopy while collecting or producing crops in the understory. It is a term not well known in the U.S., since it has been most widely applied in tropical regions. An example is the use of bananas and timber tree species as a source of shade for the production of coffee.

Agroforestry incorporates four characteristics:

- Structure: unlike modern agriculture and forestry, agroforestry combines trees, crops, and animals.
- Sustainability: Agroforestry optimizes the beneficial effects of interactions between woody species, crops, and animals.
- Increased Productivity: By enhancing complementary relationships among forests, crops, and animals, maximum productivity is achieved from the resource.
- Socioeconomic/Cultural Adaptability: Agroforestry is particularly adapted to small farms with minimal capital investment needed.

Examples of agroforesty in the U.S. include the collection of wild mushrooms in forested areas, or the harvest of some types of berries in forested areas. The maintenance of a forest (woodlot) on a farm provides the farm with fuel for heating and construction materials as well as providing windbreaks, habitat reserves with trees inside farm areas, and ornamental trees with horticultural value. There is considerable interest in the collection of wild mushrooms, and a program could be created to educate the public by hosting a mushroom collection “season” on the Property.

Another concept is to set aside a portion of the Property and as a research plot to create a specific type of agroforestry project, perhaps in conjunction with UCSC (which has already carried out such projects on campus). One example could be utilizing trees as windbreaks alongside irrigated fields. A tree might be selected that has a specific commercial value. Afternoon, gusty winds are harmful to certain crops, and increase windblown soil erosion

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5.3 MINING

5.3.1 METHODOLOGY

The purpose of this section is to describe RMC Pacific Materials (RMC) existing operations at Bonny Doon Quarries and the Davenport Cement Plant. This section was developed based on interviews with RMC employees and reviewing existing documentation on operations at the RMC Davenport Cement Plant and Bonny Doon Quarries. Primary reference documents include the existing Reclamation Plan for Bonny Doon Quarries, the Environmental Impact Report prepared for the Reclamation Plan, RMC's Annual Report to Santa Cruz County, RMC and Davenport Cement Plant marketing materials, and information on current and historical leases and property sales associated with Coast Dairies and RMC.

5.3.2 REGIONAL SETTING

Mining is one of the existing land uses at the Coast Dairies Property. RMC conducts mining operations in a shale quarry and limestone quarry, and transports the mined materials from these quarries to their cement plant on a conveyor belt system. RMC's Davenport Cement Plant is located along Highway 1 approximately 70 miles south of San Francisco, just north of the town of Davenport, and has been in operation since 1906. The Davenport Cement Plant is located on RMC-owned land, and is largely surrounded by Coast Dairies land (see Figure 5.3-1). The RMC RMC landholding also incorporates a historic railroad line that bisects the Coast Dairies Property. At one time the historic rail line connected the plant to formerly active limestone and shale quarries. Sustained yield forestry operations are currently conducted on a large portion of other RMC land holdings, which total 9,350 acres (Sheidenberger, 2001). The Coast Dairies Property is partially bordered to the east by land owned by RMC (see Figure 5.3-1).

5.3.3 BACKGROUND

On August 15, 1905, Mr. William Dingee, the "Cement King" and owner of the Standard Portland Cement Company, purchased 97 acres from the Coast Dairies and Land Company for the purpose of constructing the Davenport Cement Plant. The selection of the plant site was based on nearby limestone deposits in Ben Lomond Mountain, and the anticipated construction of a railroad line to the site by Southern Pacific (Santa Cruz Museum of Art and History, 2001). Standard Portland Cement Company purchased additional acreage from Coast Dairies on September 26, 1905, for the purpose of constructing a railroad linking the proposed plant to quarry locations. Construction began on the plant in October, 1905 shortly after the U.S. Government announced plans to construct the Panama Canal and Pearl Harbor Naval Base. Both of these federal projects would require vast quantities of cement. Devastation associated with the 1906 San Francisco earthquake and fire increased the regional demand for building materials, causing construction on the plant to accelerate. The plant began operation in late 1906, although construction continued until May 17, 1907. At the time, it was the second largest cement facility in the United States (Dupras, 1989)

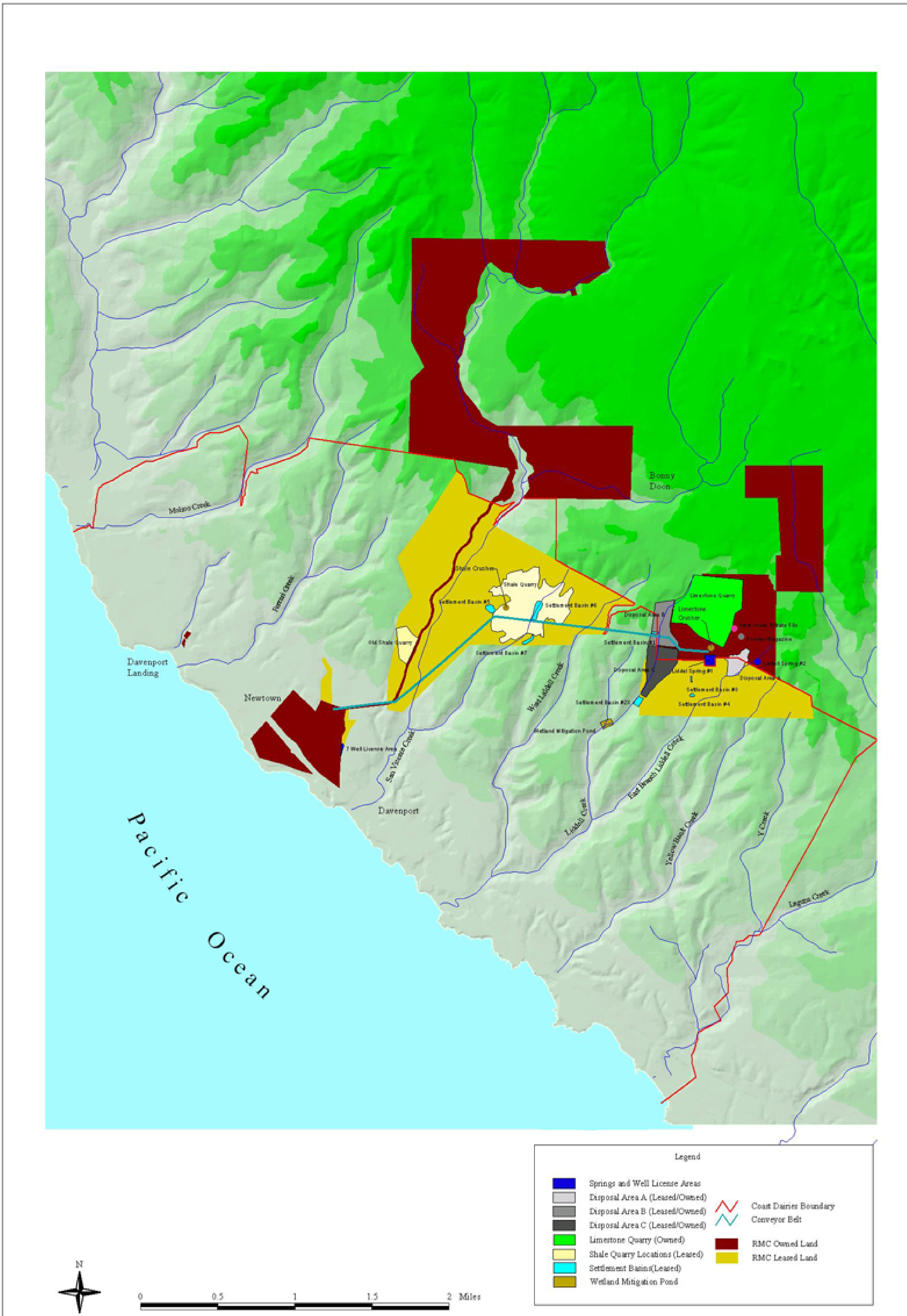
The Standard Portland Cement Company was purchased by Pacific Coast Aggregates in the 1960's, whom in turn were acquired by Lonestar Industries in the late 1960's. During the 1970's, Lonestar undertook a modernization of the Davenport Cement Plant to increase operating efficiency and improve environmental standards at the plant. This modernization included installation of air quality control equipment to reduce emissions of cement dust, and a partial redesign of the plant to increase production efficiency, and lower energy consumption. The remodeled plant began production in August 1981 (Dupras, 1989). Lonestar's Davenport Cement Plant was then purchased by RMC in 1995. RMC is headquartered in Pleasanton, California, while its parent company, RMC Group, p.l.c., is located in the UK. In addition to the cement produced by the Davenport Cement Plant, RMC products include ready-mix concrete, aggregates, asphalts, and industrial sands (RMC Pacific Materials, in.d).

5.3.4 DAVENPORT CEMENT PLANT

The Davenport Cement Plant is a highly visible part of the communities of Davenport, Newtown, Davenport Landing, and Bonny Doon. The Davenport Cement Plant produces Portland cement, which is a fundamental binding ingredient of concrete. RMC produces approximately 900,000 tons of Portland cement annually (Sheth, 2001). Portland cement is made from a specific mix of calcareous material, such as limestone or chalk, and from alumina, iron, and silica-bearing materials, such as clay, shale, iron ore, and laterite. The manufacturing process of Portland cement consists of grinding the raw materials, blending them in specific proportions, and burning the mixture in a large rotary kiln at high temperatures. The mixture is mixed with gypsum and pulverized into a fine powder. Portland cement powder can then be mixed with water, sand, and gravel to make durable concrete (Dupras, 1989).

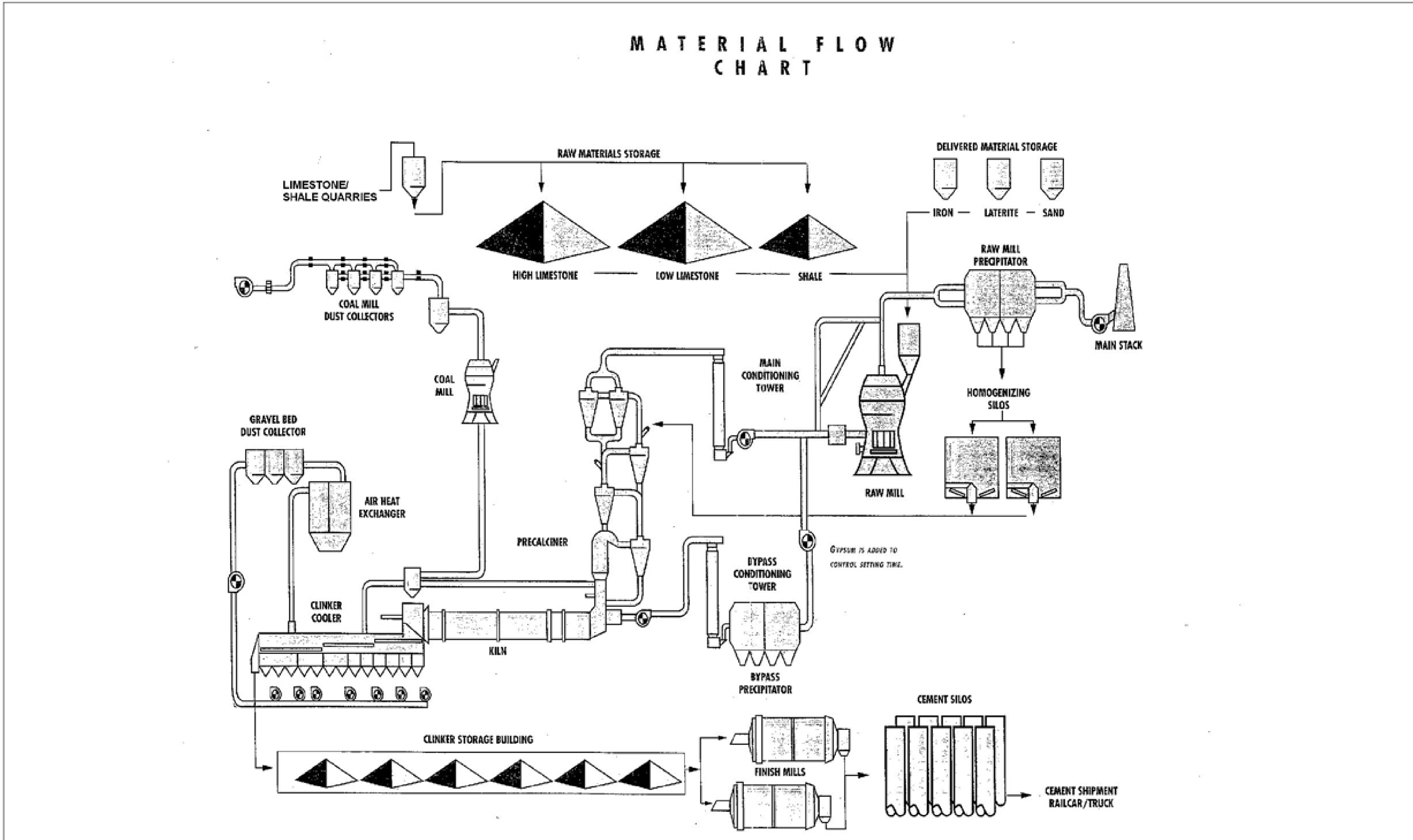
5.3.4.1 CEMENT PRODUCTION

The cement plant has six primary systems in the manufacturing process of Portland cement, including the roller mill, preheater/precalciner, kiln, clinker cooler, coal mill, and finishing mills (see Figure 5.3-2). Limestone, shale, and other raw materials are conveyed to the roller mill at the plant. The roller mill performs drying, secondary crushing, fine grinding, and size classification. The roller mill utilizes hot exhaust gas from the kiln system and grinds rock as large as four inches in diameter into powder the fineness of flour. The ground powder is then separated from the gas stream by the main precipitator, and conveyed to homogenizing silos where materials are blended using forced air. Materials are then conveyed by an airlift system from the silos the top of a 245-foot high preheater tower, where the temperature of materials is increased from 100 degrees Fahrenheit to 1,650 degrees Fahrenheit in approximately 20 seconds. Preheating evaporates water from the materials and begins the process of calcination, whereby carbon dioxide is removed from the limestone. To accomplish this, hot combustion gases are



SOURCE: RMC Pacific Materials, Madrone Landscape Group, Santa Cruz County GIS Dept., USGS

Figure 5.3-1
Mining Operations in the Coast Dairies Area



SOURCE: RMC Pacific Materials

Figure 5.3-2
Cement Making Process

transferred by a specially-designed precalciner (also called a flash calciner). The flash calciner uses 60 percent of the total fuel consumed at the Davenport Cement Plant. Cement production is an energy-intensive industry, requiring approximately 1.4 million BTU (or 418 pounds of coal) to produce 1 ton of cement.

After passing through the calciner, powdered materials are fed into the kiln burner. The kiln burner is fired by powdered coal, and raises the temperature of the powdered materials to approximately 2,700 degrees Fahrenheit. In the kiln, high temperatures and a series of chemical reactions cause the powdered calcium, silica, aluminum, and iron to combine and produce clinker, a rock-like substance. As temperatures reach 1,100 to 1,650 degrees Fahrenheit, calcining is completed, with carbon dioxide completely removed from the calcium carbonate in limestone to produce lime (calcium oxide). Between 2,220 to 2,700 degrees Fahrenheit, the calcium oxide reacts with the silica to produce di- and tricalcium silicate, and with alumna- and iron-bearing materials to produce tricalcium aluminate and tetracalcium alumnioferrite, respectively. The compounds produced by mixing calcium oxide with alumna- and iron-bearing materials are liquid which melt other solid materials to produce clinker. Heating the powdered materials to produce clinker takes approximately 30 minutes. After passing through the kiln, the hot clinker is dropped onto moving perforated grates where it is cooled to 250 degrees Fahrenheit by forced air. The heat radiating off the cooling clinker is captured, and then reused in the roller mill. In the last stage of cement production, clinker is ground into a fine powder and combined with gypsum in a finish mill. Finish mills are large rotating cylinders containing steel balls for grinding, producing a powder finer than flour or face powder. After passing through the finishing mill, the cement is transported to storage silos by pneumatic pumps (RMC Pacific Materials, in.d).

5.3.4.2 BY-PRODUCTS AND EMISSIONS

Cement kiln dust consists of the dust removed from kiln exhaust gases by pollution-control devices, and is a by-product of cement manufacturing. More than 75 percent of cement kiln dust produced is recycled back into the kiln as raw materials. A portion of cement kiln dust cannot be recycled, and is managed onsite in a monofill, or sold for use in construction as a road sub-base material, or as a stabilizer to reduce the expansive properties of clayey soils. Currently, all cement kiln dust that is not being recycled is sold, and existing stockpiles of cement kiln dust in the monofill are gradually being sold (Sheth pers.comm., 2001).

Stockpiled cement kiln dust is managed in the monofill by RMC in accordance with Waste Discharge Order #99-23 from the California Regional Water Quality Control Board – Central Coast Region (RWQCB). Management practices include covering the monofill with plastic tarps to minimize wind-blown particulates. Additionally, 15 groundwater monitoring wells and piezometers are installed adjacent to the monofill for the purpose of monitoring groundwater elevations and quality. A portion of the existing monofill is located on land leased from Coast Dairies by RMC (Arkfeld, 2001). Two of the 15 groundwater monitoring wells are located on

Coast Dairies land leased by RMC, and an additional 5 wells are located on Coast Dairies land that is not leased by RMC (Adenhuysen pers. comm., 2001).

Cooling water and storm water runoff from the plant is discharged to an unnamed stream adjacent to the Davenport Cement Plant that flows into the Pacific Ocean. Water released from the plant goes through a neutralizing system, whereby carbon dioxide is bubbled into the water to lower the pH prior to discharge. Water quality is monitored for toxicity, pH, and minerals in accordance with RMC's National Pollution Discharge Elimination System (NPDES) permit from the RWQCB (Arkfeld, 2001).

Air pollutants generated through cement manufacturing include sulfur dioxide, nitrogen dioxide and particulates. Air pollution control equipment at the plant includes a sulfur dioxide removal scrubbing system, and electrostatic precipitator to control stack emissions. Sulfur dioxide removal is accomplished by an alkaline slurry injection system, whereby a slurry of alkaline materials (calcium hydroxide) are combined with kiln exhaust gases within cooling towers. Sulfur-dioxide combines with the calcium hydroxide to produce calcium sulfate and sulfide, thereby removing the sulfur dioxide stack emissions. An electrostatic precipitator minimizes dust emissions by providing particulate and opacity control. Air emissions are continually monitored for sulfur dioxide, nitrous oxide and opacity (Sheth, 2001).

5.3.5 MINING OPERATIONS

RMC leases approximately 780 acres from Coast Dairies for its shale quarrying operations, associated waste disposal areas, settlement basins, and covered belt conveyor corridor from the shale and limestone quarries to the cement plant (Schmidt, 1997). The limestone quarry, and a portion of the waste disposal areas are located on RMC-owned property. The limestone and shale quarries operate Monday through Friday between 7:30 a.m. and 5:00 p.m. The covered belt conveyor system operates between 7:00 a.m. and 11:00 p.m. The shale and limestone quarries are classified as mineral resources areas by the Santa Cruz County General Plan (Santa Cruz County, 1994). However, these quarries are not classified as mineral or aggregate resources by the California Department of Conservation, Division of Mines and Geology (CDMG, 1983).

5.3.5.1 MINING FACILITIES

Limestone Quarry

RMC conducts mining operations in its limestone quarry, located within its 9,000-acre property east of Coast Dairies, a few miles from the Davenport Cement Plant. The limestone quarry is located near the East and Middle branches of Liddell Creek, and has been identified through hydrologic studies as being within a groundwater recharge zone (Thomas Reid Associates, 1996). The limestone quarry consists of 272 acres, and has been in operation since 1969.

Limestone is the primary ingredient of Portland cement, comprising approximately 85 percent of total input materials. The quality of limestone in the quarry varies due to faulting, fracturing, and the intrusion of inherent impurities throughout the limestone ore body, therefore limestone is often extracted from different areas of the quarry to achieve a blend with the desired chemical characteristics.

Limestone is extracted from the quarry by blasting. Blasting is performed using ammonium nitrate fuel oil (ANFO), which acts as both the explosive agent and electrical initiator of the blast. ANFO is loaded in staggered groupings of three-quarter inch diameter shot holes, approximately 40 to 50 feet in depth, that are created an air-rotary drill rig (Thomas Reid, 1996). Blasting is performed using modern millisecond delay techniques, whereby detonation of the ANFO in each bore hole is delayed by a few fractions of a second to minimize ground vibrations and assure proper breakage (Walker, 2001). In accordance with County permits, blasting occurs twice a week. Limestone is then hauled to an impact crusher in the quarry, which can reduce rocks the size of a piano to pieces smaller than a softball. About 6,500 tons of limestone are mined daily from the quarry, and transported three miles to the Davenport Cement Plant on a covered belt conveyor system. Approximately 15-20 percent of the rock mined is not suitable for Portland cement, and is directed into waste disposal areas (Walker, 2001).

Blasting Materials

An ammonium nitrate storage silo, containing solid pearls of the blasting substance, is located on a road southeast of the quarry area. A powder magazine is located near the ammonium nitrate storage silo, where gel tubes of explosives are stored (see Figure 5.3-1). The gel tubes, measuring approximately 5 inches wide by 30 inches long, are used for blasting during wet conditions (Walker, 2001).

Groundwater

Groundwater beneath the limestone quarry restricts the depth of blasting activity and quarry operations. The floor of the quarry cannot exceed depths of 750 feet above mean sea level (feet amsl) to avoid potential interaction with groundwater. Santa Cruz County Mining Regulations requires a minimum 20-foot separation between the groundwater table and mining activities. RMC’s quarry floor limit is located 65 feet above the highest recorded groundwater elevation in the area, amply satisfying Santa Cruz County regulations (Thomas Reid, 1996).

Multiple groundwater monitoring wells have been installed upgradient and downgradient of the limestone quarry to monitor potential impacts to groundwater from limestone quarry operations (Reppert pers. comm., 2001). Seven groundwater monitoring wells within the limestone quarry are tested for turbidity, nitrates, iron, manganese, and total coliform. Groundwater monitoring is conducted in accordance with a December 1, 1964 agreement between RMC and the City of Santa Cruz. Under this agreement, RMC has indemnified the city against diminution of the quantity or deterioration of the quality of water issuing from Liddell Spring #1, which is used by the city as a municipal water supply source and is located downgradient of the limestone quarry.

The city has agreed not to contest limestone quarry operations under the terms of this agreement, which sets forth minimum flow rates to be met each month at Liddell Spring #1, and water quality parameters governing bacteria, turbidity, color, taste, odor, and chemical constituent concentrations (Thomas Reid Associates, 1996).

Reclamation and revegetation of the limestone quarry is not scheduled to begin until the quarry is closed.

Shale Quarry

Shale is the second largest component of Portland cement, comprising approximately ten percent of total input materials. Shale is a sedimentary sandstone which is naturally high in silica, a necessary component of cement. RMC mines shale from its shale quarry, located on 183 acres of land leased on the Coast Dairies Property approximately one mile east of the Davenport Cement Plant. The shale quarry is located between San Vicente Creek and the West Branch of Liddell Creek. Approximately 76 acres of the shale quarry are in production, and RMC is utilizing silica-rich rock originating from the limestone quarry. When in production, shale is typically mined from the quarry only two or three days a week.

Rather than blasting techniques, shale is mined using bulldozers equipped with ripper teeth that scrape layers of rock from the hillside. A crusher is located on the quarry site that reduces the mined rock into softball sized pieces prior to its transport to the Davenport Cement Plant via the covered belt conveyor system. Approximately 1,400 tons to 3,000 tons of shale are mined from the quarry each week when it is actively mined. Overburden materials and unusable rock mined from the shale quarry are used as cover material, and not directed to a waste disposal area.

Reclamation

Reclamation of the Shale Quarry is ongoing, with existing reclamation efforts focusing on inactive quarry areas. Final reclamation will include stabilization of cut slopes and benches to minimize the potential for future rockfalls and slope instability. Disturbed areas, cut slopes, benches, and certain access roads will be ripped and de-compacted prior to revegetation. Available information does not specify which Shale Quarry access roads are included in reclamation plans (Madrone Landscape Group, 2001). Reclamation of the shale quarry began in 1997, and is slated to continue through quarry closure (Madrone Landscape Group, 2001).

Covered Belt Conveyor System

The covered belt conveyor system transports raw materials from the quarries to the Davenport Cement Plant. There are seven conveyor lines that link together to transport material approximately 3.5 miles from the quarries to the Davenport Cement Plant (see Figure 5.3-1).

The eastern end of the conveyor line is located at the limestone quarry, where material is transported to a transfer station at the shale quarry. At the transfer station, RMC has the option to transport either limestone or shale from the transfer station to the cement plant. From the shale quarry transfer station, the conveyor system crosses San Vicente Creek, passes through an agricultural field and terminates at the Davenport Cement Plant. The belt conveyor system traverses filled, narrow ravines, steep slope gradients in larger ravines, cut bedrock, agricultural fields, and existing quarried areas (Thomas Reid Associates, 1996). Conveyor belt operations are allowed to take place between the hours of 7:30 a.m. to 11:00 p.m. Monday through Friday.

In accordance with RMC's Reclamation Plan, the conveyor belt system will be completely removed following closure of quarry activities. The former conveyor belt corridor will then be revegetated (Madrone Landscape Group, 2001).

Waste Disposal Areas

Unusable rock, fines, and overburden materials from the limestone quarry are directed into waste disposal areas (Thomas Reid Associates, 1996). Three waste disposal areas (A, B, and C) have been created for storage of overburden and unusable materials, however only one Waste Disposal Area (Area C) is currently in use. These waste disposal areas are partially located on RMC- and Coast Dairies-owned land (see Figure 5.3-1). Waste Disposal Area A is almost evenly divided between Coast Dairies and RMC property. The majority of Waste Disposal Area B is on RMC property, while the majority of Waste Disposal Area C is located on the Coast Dairies Property (Thomas Reid Associates, 1996).

Waste Disposal Area A consists of approximately seven acres, and has not been used since the early 1970's. Reclamation of Waste Disposal Area A was undertaken in the 1980's. Original reclamation included the planting of exotic species; RMC's current Reclamation Plan includes exotic species eradication, native species revegetation, and ongoing erosion control measures (Madrone Landscape Group, 2001).

Waste Disposal Area B covers approximately 16.5 acres, and is currently at its final topographic contour level (Thomas Reid Associates, 1996). Revegetation plantings relied exclusively on native species, although exotic grasses and forbes are now invading the site. Current remediation efforts are therefore focused on exotic species eradication (Madrone Landscape Group, 2001).

Waste Disposal Area C is the only actively used waste disposal area. It is currently 24 acres in size and ranges in elevation from 500 to 700 feet mean sea level. A portion of Waste Disposal Area C has been filled, with approximately 10 to 15 feet wide benches that are generally flat or sloped downhill. The average slope profile of the benches is 2:4:1 based on a 1993 othophoto contour map (Thomas Reid Associates, 1996). Waste Disposal Area C will remain active until quarry closure (Walker, 2001).

Current reclamation of Waste Disposal Area C includes revegetation and erosion control of previously filled areas, and endemic species collection, site stabilization of cut slopes and banks, and erosion control measures in future fill areas (Madrone Landscape Group, 2001).

TABLE 5.3-1
WASTE DISPOSAL AREAS

Waste Disposal Area	Surface Area (acreage)	Activity Status
A	7	Inactive
B	16.5	Inactive
C	24	Active

Source: Madrone Landscape Group, 2001

Sedimentation Basins

RMC has four active sedimentation basins for its limestone quarry operations: Settlement Basins 1, 2X, 3, 4, 5, 6, and 7 are in the vicinity of the shale quarry. All settlement basins are located on property leased from Coast Dairies (see Figure 5.3-1).

The limestone quarry and its waste disposal areas are divided into three tributaries. Storm runoff from Waste Disposal Areas B and C is directed toward Settlement Basins 1 and 2X, respectively. These drain into the Middle Branch of Liddell Creek. As shown in Table 5.3-1, Settlement Basin 1 has a storage capacity of 435,000 cubic feet and a surface area of 71,600 square feet. Settlement Basin 1 is located at the toe of Waste Disposal Area B, with pond levee banks approximately 6 to 8 feet high. Settlement Basin 2X is located at the toe of Waste Disposal Area C. The largest of the settlement basins, it has 182,610 cubic-feet storage capacity, and a surface area of 22,386 surface square feet.

Storm runoff from the limestone quarry pit area is directed toward Settlement Basins 3 and 4, which drain into the East Branch of Liddell Creek below Liddell Spring #1. As shown in Table 5.3-1, Settlement Basin 3 has a storage capacity of 290,000 cubic feet and a surface area of 47,000 square feet. Settlement Basin 4 is located directly below Settlement Basin 3; has a storage capacity of 115,000 cubic feet and a surface area of 15,000 square feet (Thomas Reid Associates, 1996).

Settlement Basin 5 incorporates 0.57 acres west of the shale quarry. Within the perimeter of the shale quarry is Settlement Basin 6. Settlement Basin 6 has a storage capacity of 243,360 cubic-feet, and surface area of approximately 39,600 square feet. Settlement Basin 7 includes 0.68 acres located south of the shale quarry. Basins 5 and 7 do not hold seasonal moisture and have naturally revegetated. No further reclamation is proposed in these areas.

TABLE 5.3-2
SEDIMENT BASINS

Settlement Basin	Storage capacity (cubic feet)	Surface area (square feet)	Receives run-off from	Drains into
1	435,000	71,600	Waste Disposal Area B	Liddell Creek, Middle Branch
2X	182,610	22,386	Waste Disposal Area C	Liddell Creek, Middle Branch
3	290,000	47,000	Limestone Quarry	Liddell Creek, East Branch
4*	115,000	15,000	Limestone Quarry	Liddell Creek, East Branch
5:	59,000	7,700	NW Shale Quarry	San Vicente Creek
6*	243,360	39,600	Shale Quarry	San Vicente Creek
7*	77,760	21,000	Shale Quarry	San Vicente Creek

*Inactive
Source: Thomas Reed Associates, 1996

SMARA and County Mining Regulations require a written program for maintenance of settlement basins, drainage structures, and provisions for protection of ground and surface water quantity and quality (Santa Cruz County Code). A Drainage and Erosion Control Plan was subsequently prepared by Engineering Sciences in 1991. In accordance with the existing reclamation plan, all basin levees and banks will be left intact following quarry closure, and monitored for structural integrity and control of exotic species (Madrone Landscape Group, 2001).

5.3.5.2 WETLAND MITIGATION PONDS

Three ponds have been constructed adjacent to Liddell Creek, as shown on Figure 5.3-1. These ponds are wetland mitigation areas to compensate for the loss of wetland habitat associated with the creation of Waste Disposal Area C and Settlement Basin 2X. These ponds are maintained and monitored in accordance with RMC's Habitat Conservation Plan, which was developed to monitor California red-legged frog populations, and minimize potentially adverse impacts to frog populations and habitat resulting from RMC operations (Madrone Landscape Group, 2001).

5.3.5.3 PLANT PRODUCTION

The majority of materials required for cement production are generated onsite from quarry operations. Portland cement is comprised of approximately 85 percent limestone, and 10 percent shale. The remaining five percent of materials are gypsum, iron oxide, sand, and laterite that are imported to the Davenport plant via railroad or truck transport. For a short period from 1935 until the end of World War II, the plant also exported cement by ship on a 2,357-foot pier that was constructed adjacent to the Davenport Cement Plant (see Section 1.3.9). The Davenport Cement Plant is now serviced by a rail spur operated by Union Pacific. Freight trains originate from the Wastonville rail yard, and arrive at Davenport via Santa Cruz. The Davenport Cement Plant has rail service three times per week, on Monday, Wednesday, and Friday. The Davenport rail spur services both the Davenport Cement Plant and Big Creek Lumber. The Plant produces approximately 875,000 tons of Portland cement annually, with 15 transported out by rail and about 85 percent by truck. One rail car carries about 100 tons of cement product, while a cement truck carries approximately 26 tons. Approximately 20 to 30 rail cars arrive and depart at the cement plant weekly, although rail service varies depending on plant production levels.

TABLE 5.3-3
MATERIALS TRANSPORTED TO THE DAVENPORT CEMENT PLANT

Material	Annual Amount (tons)	Percent by Rail	Percent by Truck
Iron Oxide	8,000 to 20,000	60	40
Sand	10,000 to 30,000		100
Laterite	40,000		100
Gypsum	40,000	50	50
Low Sulfur Coal	100,000	100	

Source: Sheth, 2001.

Portland cement is distributed to three types of users: baggers, ready mix companies, and roofing/piping contractors. Per day, approximately 100 to 150 trucks enter and exit the plant. The Davenport Cement Plant operates 24 hours per day. The cement trucks also make trips 24 hours per day. Peak truck trips occur between 2:00 a.m. and 5:00 a.m. Cement loading commonly occurs at 1:00 a.m. to 2:00 a.m., in order to get cement to construction job sites by 7:00 a.m.

5.3.5.4 FACILITY ACCESS

The Davenport Cement Plant is located immediately adjacent to Highway 1 and Union Pacific's rail spur. The cement plant is connected to Highway 1 by Cement Plant Road, as shown on Figure 4.3-1. Materials departing and arriving at the plant by truck must travel along Highway 1, the only public road that connects to the plant. Primary access to the quarries is through Bonny Doon Road, which connects to Conveyor Belt Road 2. Roadways between the cement plant, conveyor belt line, quarries, waste disposal areas and settlement basins all terminate within either RMC or Coast Dairies properties.

Roadways

Numerous roadways are used on RMC and Coast Dairies properties for mining and quarry operations. These roads allow for transportation of equipment, materials, and vehicular traffic between the Davenport Cement Plant, shale and limestone quarries, waste disposal areas, sedimentation ponds, explosives storage areas, and wetland mitigation areas[1] (see Figure 4.3-1).

[1] Not all roads are driveable at all times.

A portion of these access roads predate RMC mining operations (Madrone Landscape Group, 2001).

Large trucks travel between the Davenport Cement Plant and the shale quarry or limestone quarry on Cement Plant Road to San Vicente Road, Upper Quarry Road, and Conveyor Belt Roads 1 and 2. However, primary access to the quarries is through Bonny Doon Road, with trucks connecting to the Limestone Quarry via Conveyor Belt Road 2, and to the Shale Quarry via the Upper Quarry Road. Maintenance trucks make about ten trips per day, including the luber, welding mechanic, mechanics truck, etc. Maintenance trucks can travel on these roads any time, seven days per week, 24-hours per day. Most maintenance trips occur on weekdays between 7:30 a.m. and 5:00 p.m., and also on Saturdays between 7:00 a.m. and 3:00 p.m., as mechanics are sometimes scheduled to work on machinery when the quarries are not in operation.

Waste and overburden materials from the quarries are transported to Waste Disposal Area C on haul roads by dump truck. Large trucks, including loaders and two hauling trucks, travel between the limestone quarry and the shale quarry. These trips include the initial trips in and out to the shale quarry site, and truck trips between the shale extraction area and the shale crusher. Additionally, pickup trucks travel from the quarry office to the various settlement basins to perform maintenance activities. Annual sediment clean-out operations require these settlement basin access roads be used by excavators and haul trucks. Trucks and equipment in the quarries generally travel in opposite lanes for safety purposes.

All roads associated with quarry operations, waste disposal areas, and settlement basins are unpaved, with the exception of Conveyor Belt Roads 1 and 2. RMC has an on-site security officer who travels RMC rights of way by jeep. Security operates 24 hours per day. Access to the wetland mitigation ponds is restricted to an unmaintained branch of Upper Liddell Creek Road. This access road was decommissioned by RMC, in accordance with an agreement with the California Department of Fish and Game, and is restricted to vehicular use associated with monitoring of Wetland Mitigation Ponds adjacent to Liddell Creek and access for emergency fire-fighting equipment.

Available information indicates that roadway reclamation efforts will be limited to the Wetland Mitigation Road, San Vicente to Cement Plant Road, Upper Quarry Road, and Conveyor Belt Roads 1 and 2. Many of the other roadways currently used by RMC, such as the roadways linking the quarry sites and the plant will be decommissioned and maintained for property and fire access purposes (Madrone Landscape Group, 2001).

5.3.5.5 LEASES AND LAND USE AGREEMENTS

RMC currently leases approximately 780 acres from Coast Dairies for cement plant and mining operations. Leased areas include the shale quarry, waste disposal areas, conveyor belt system, settlement basins, and acreage surrounding the Davenport Cement Plant as summarized below in Table 5.3-3 and depicted on Figure 5.3-1.

An agreement dated January 15, 1996 allows RMC to install groundwater wells on the Coast Dairies Property. As discussed in Section 5.3.4, RMC monitors groundwater quality and elevations in accordance with their waste discharge permit requirements. The approximate location of these wells is depicted on Figure 5.3-1. Two of these wells are located on land leased by RMC from Coast Dairies, and five of these wells are located on land owned by Coast Dairies which is not leased from RMC (Aldenhuysen, 2001).

An inactive shale quarry is located on the Coast Dairies Property adjacent to RMC's former railroad line. This quarry was historically leased by RMC for mining purposes, but was abandoned following the opening of the existing shale quarry in 1969 and the associated construction of the covered conveyor belt system (Sheidenberger, 2001).

Additionally, RMC owns 30 acres west of Highway 1 that is leased to Coast Dairies for agricultural purposes.

TABLE 5.3-4
EXISTING LEASE AGREEMENTS BETWEEN COAST DAIRIES AND RMC

Owner / Tenant	Acreage	Existing Usage of Leased Land
Coast Dairies / RMC	750	Shale Quarry Disposal Areas A, B, C Settlement Basins 1, 2X, 3, 4, 5, 6, 7 Conveyor Belt Cement Plan Operations
Coast Dairies / RMC	29.75	General Quarry Operations
RMC / Coast Dairies	30	Agriculture

Source: Coast Dairies Land Company, 2001.

Water Rights

Water utilized at the Davenport Cement Plant is drawn from San Vicente Creek and Mill Creek on RMC property, to which RMC holds pre-1914 water rights. Water utilized for dust control and mining operations at the shale and limestone quarry is drawn from Liddell Spring #2, located on RMC property (see Figure 5.3-1). For a more detailed discussion on water rights and water use on Coast Dairies Property and surrounding areas, please see Section 5.1.

5.3.5.6 PUBLIC HEALTH AND SAFETY

Due to public safety concerns and Mining Safety Heath Administration (MSHA) regulations, public access must be restricted from RMC properties. Blasting occurs at the limestone quarry, located of off the Coast Dairies Property. This activity can occur two times per week, between 7:30 a.m. and 5:00 p.m. Pre arranged blasting times are 11:40 a.m. or 3:00 p.m. RMC can blast at other times, but must call the Santa Cruz County Planning Department in advance. RMC has an Alcohol, Tobacco and Firearms (ATF) license in order to blast limestone.

RMC has several procedures in place to protect public health and safety during blasting activities. Along the access road to the limestone quarry an entrance gate has been installed adjacent to the office building to block public access. At the entrance gate a sign is installed alerting employees and visitors of potential blasting activities, and a blue flashing light above the sign is activated in the morning prior to detonation. Before blasting, guards are placed at all entry points into the blast area, and standard audible warnings are used prior to and during the countdown (Thomas Reid, 1996). MSHA regulations require a clearance zone of 50 feet for blasting (Walker, 2001).

Explosives used in blasting are stored on RMC property, in the ammonia nitrate storage silo and powder magazine. These facilities are not guarded, although access is restricted by the entrance gate that blocks the only roadway connected to these facilities. As an additional safety measure, RMC has security personnel who patrol the their facilities 24-hours a day.

Public health and safety concerns associated with RMC operations occurring on the Coast Dairies Property includes the rock crusher located on the shale quarry, and the covered conveyor belt system. The conveyor belt system is 3.5 miles long, and consists of numerous moving parts that could raise public safety issues. In accordance with MSHA regulations, an emergency pull cord has been installed along the length of the conveyor belt system, as the conveyor is not guarded (Mine Safety and Health Administration). This cord has the capability of halting the entire conveyor belt system.

5.3.6 MINING ECONOMICS

Mining is a very small portion of Santa Cruz County's economy, constituting less than 4.5 percent of jobs county-wide (California Employment Development Department, 2000). There are seven active mining operations in the county, however many of these mines have reached the limits of their boundaries or the mineral resources have been exhausted, indicating that the number of active mines is likely to drop in the near future. The potential for new mines to be developed in Santa Cruz County is low, as federal, state, and local regulations in the area are not supportive of this type of land use. Limestone, shale, sand, gravel, and granite are the primary materials mined in Santa Cruz County.

RMC employs approximately 170 people for operations at the cement plant and quarries. The majority of these employees work exclusively in the Davenport Cement Plant. Mining operations employ 16 to 20 people. RMC's Davenport Cement Plant is one of three major producers of Portland cement in Northern California; two additional cement plants are located in Cupertino and Red Bluff. Approximately 14 million tons of cement were used in California in the year 2000; 12 million tons of this cement were produced inside the state. Demand for cement in California has surpassed in-state production capacity only within the last two to three years, although limits in production capacity have not been the sole factor creating a market opening for cement produced outside the state. Transportation costs historically gave in-state producers a comparative advantage over out-of-state producers, as cement could only be economically transported less than 1,000 miles. However, rising energy and labor costs and tighter environmental restrictions in California have eroded in-state producers competitive advantage (see also the discussion of mining in Section 5.7.2.2).

5.3.7 REGULATORY COMPLIANCE

5.3.7.1 FEDERAL

Mine Safety and Health Administration

The Mine Safety and Health Administration (MSHA) is a division of the U.S. Department of Labor. MSHA administers the provisions of the Federal Mines Safety and Health Act of 1977 (Mine Act), and enforces compliance with mandatory safety and health standards as a means to eliminate fatal accidents, reduce the frequency and severity of nonfatal accidents, minimize health hazards, and promote improved safety and health conditions in the Nations' mines (Mine Safety and Health Administration, 2001).

U.S. Fish and Wildlife Service

California red-legged frogs, a federally endangered species, were identified at the limestone quarry in 1996. Following consultation with U.S. Fish and Wildlife Service (USFWS), RMC developed a Habitat Conservation Plan (HCP) for the California red-legged frog in the Bonny Doon Quarries settlement basins. This plan will remain in effect until August 4, 2009; an annual status report is submitted annually to the USFWS. RMC holds an incidental take permit (#TE844-722-0) from the USFWS, issued on August 5, 1999. The permit is subject to compliance with the HCP. Elements of the HCP include inspections of settlement basins by a qualified biologist prior to sediment removal activities. Should any frogs or larvae be identified during this inspection, sediment removal work will not commence. Surveys for red-legged frogs are conducted at active quarry Settlement Basins 2X, 3, and 4, as well as mitigation pond 1 and three mitigation ponds near Liddell Creek. Winter surveys for adults and egg masses, spring and summer surveys for adults and larvae, and summer and fall surveys for adults and metamorphs were conducted. Settlement Basins 5, 6, and 7 are inactive, do not hold water past early spring, and are therefore not included in surveying activities (RMC, 2001).

5.3.7.2 STATE OF CALIFORNIA PERMITS AND CONDITIONS

Surface Mining and Reclamation Act

The Surface Mining and Reclamation Act of 1975 (SMARA) provides for the reclamation of mined lands as necessary to prevent or minimize adverse effects on the environment and to protect the public health and safety. Surface mines operating within the State of California are required to have lead agency approved reclamation plans, financial assurances, and permits prior to conducting mining activities (State of California, 1975).

Reclamation Plan and EIR

Reclamation Plans are required for all mining operations under SMARA regulations. The State Mining and Geology Board has jurisdiction over the Final Reclamation Plan. The Bonny Doon Quarries Revegetation and Reclamation Plan was produced in 1996 and revised in February 2001 by the Madrone Landscape Group for RMC. The Reclamation Plan was prepared in compliance with SMARA, and County of Santa Cruz Mining Regulations. An Environmental Impact Report has been prepared for the Reclamation Plan in accordance with CEQA requirements (RMC, 2001). These documents will reside in the Project Archives.

The Reclamation Plan includes reclamation and revegetation of native plant communities of land impacted by RMC mining operations, including the existing shale and limestone quarry, covered conveyor belt system, waste disposal areas, sedimentation ponds, wetland mitigation areas, and roads utilized for mining purposes. Revegetation includes erosion control of disturbed soils, exotic species removal, and collection of endemic seeds and plants for the purpose of revegetation using native species. Additionally, the Reclamation Plan proposed long term monitoring of reclaimed areas (Madrone Landscape Group, 2001).

As required by SMARA, RMC has posted a bond to the County of Santa Cruz for the estimated cost of reclamation plan implementation. The value of this bond is updated annually to reflect evolving labor and material costs. The current Surety Bond is dated June 8, 1999, at a value of $3,573,753.

California Regional Water Quality Control Board

As required by the State of California Water Quality Control Board, RMC has an industrial storm water pollution prevention plan (SWPPP) for mining operations, WDID #3 44S010829, and submits an annual report to the RWQCB. In accordance with RMC's SWPPP, storm water run-off water quality is monitored. Samples are collected at out-fall of Settlement Basin 2, and the combined out-fall for Settlement Basins 3 and 4. Samples are then analyzed for pH, total suspended solids, total organic carbon, and electrical conductivity. Additionally, inspections are performed of settlement basin winterization, quarterly erosion control inspection of settlement basins, monthly inspections of industrial areas for signs of poor housekeeping, spills, or leaks.

RMC's cement kiln dust monofill is regulated by Waste Discharge Order #99-32 from RWQCB.

Cooling water and storm water run-off from the plant is discharged to an unnamed stream that flows into the Pacific Ocean. Water released from the plant goes through a neutralizing system, whereby carbon dioxide is bubbled into the water to lower the pH prior to discharge. Water quality is monitored for toxicity, pH, and minerals in accordance with RMC's NPDES permit #CA0048682 from the RWQCB.

Monterey Regional Air Quality Control Board

RMC has multiple permits with the Monterey Regional Air Quality Control Board for quarry operations that require the use of dust suppression equipment and watering to minimize fugitive dust generated by quarry operations (RMC, 2001). These permits are briefly summarized below:

- Permit 4373, Shale Quarry System
- Permit 4374, Overland Conveyor System
- Permit 4398, Mobile Rotary Drill Rig #2
- Permit 4403, Limestone Quarry Drilling Dust Collection System
- Permit 9265, Limestone Quarry Crushing and Screening System
- Permit 10010, Limestone Quarry Mobile Drilling Rig

California Department of Fish and Game

RMC holds a 1603 Lake and Streambed Alteration Permit with the California Department of Fish and Game for work associated with sediment removal in Settlement Basins 2X, 3, 4, 5, 6, and 7. This 5-year permit was obtained in 1999. The permit requires RMC to conduct inspections of settlement basins for the presence of California red-legged frogs prior to commencing work. Should either frogs or larvae be identified during these inspections, sediment removal work is not to occur. Conditions of sediment removal include allowing the ponds to drain below gate level and dewatering via evaporation. Additionally, it requires that sediment be dried to the maximum extent possible prior to transport to waste disposal areas (RMC, 2001).

5.3.7.3 COUNTY OF SANTA CRUZ PERMITS AND CONDITIONS

The Santa Cruz County Mining Ordinance requires that all existing mining operations obtain a Certificate of Compliance. The purpose of this requirement is allow the county to review existing operating and impose mitigating measures as necessary to achieve compliance with approved quarry plans, SMARA, and county policy standards. RMC has a Mining Certificate of Compliance (#89-0492) issued by Santa Cruz County for operations associated with RMC's Use Permit #3236-U. This certificate is for the extraction, processing, storage and transfer of quarried materials from the limestone and shale quarries to the Davenport Cement Plant (Santa Cruz Planning Department, 1997). The certificate covers reclamation of existing, proposed, and previously mined lands, as described in RMC's Reclamation Plan and Mitigation Monitoring Plan (RMC, 2001).

Santa Cruz County Mining Regulations state that noise resulting from mining operations cannot exceed 60 dBA; the noise limit as defined as the L_{25}; the noise level exceeded 25 percent of the time or for a cumulative period of 15 minutes during any hour of operation. Mining operations were in compliance with Santa Cruz County noise regulations during the year 2000 (RMC, 2001).

As a condition of the Certificate of Compliance, RMC is required to conduct groundwater monitoring in accordance with a December 1, 1964 agreement between RMC and the City of Santa Cruz. Under this agreement, RMC has indemnified the city against diminution of quantity or deterioration of quality of water issuing from Liddell Spring #1, which is used by the City as a municipal water supply source and is located downgradient of the limestone quarry. The City has agreed not to contest limestone quarry operations under the terms of this agreement, which sets forth minimum flow rates to be met each month at Liddell Spring #1, and water quality parameters governing bacteria, turbidity, color, taste, odor, chemical constituent concentrations.

5.3.8 ISSUES

5.3.8.1 PUBLIC HEALTH AND SAFETY

RMC's ongoing mining operations may create public health and safety issues should the Coast Dairies Property be made more accessible to the public. The covered conveyor belt system spans 3.5 miles of Coast Dairies Property, effectively bissecting it, and operates between the hours of 7:30 a.m. to 11:00 p.m. Monday through Friday. It has multiple moving parts that have the potential to seriously injure individuals who tamper with the system. The emergency shutdown cord provides some level of protection, however this safety device does not restrict access to the system and could easily be subject to vandalism that would disrupt RMC operations. Mining activities at the shale quarry could also create safety concerns. The shale crusher and storage silo do not operate when the shale quarry is inactive, however public access to this equipment should be restricted to minimize potential injuries or vandalism. These measures could include installing warning signs alerting the public of the potential for injury, and detouring the public away from existing roads that access RMC leased land. The latter measure would address health and safety concerns associated with the public using roads that are frequented by large trucks transporting equipment or waste materials.

The limestone quarry and explosives storage areas are located on RMC-owned property. RMC's existing policies appear to meet MSHA regulations designed to protect the public from mining activities. These regulations include maintaining a 50-foot clearance zone from blasting activities. RMC has controlled vehicular access to its property by installing an entrance gate on the only road connecting Coast Dairies land to the limestone quarry and explosives storage areas (see Figure 4.3-1). Public health and safety issues associated with explosives, mining and blasting activities therefore include insuring that public access from Coast Dairies' land to RMC's property is restricted. These measures could include installation of warning or trespassing signs, and minimizing the creation of trails or roads in the immediately surrounding areas.

RMC's settlement basins are designed to minimize sediment run-off from mining operations and waste disposal areas into local waterbodies by controlling surface water discharge. Public use of these ponds could create safety issues, as these ponds are equipped with inflow, discharge, and overflow piping systems.

Over all, public use and access of the quarried areas is a risk to public safety and should be minimized.

5.3.8.2 ENVIRONMENT

Potential environmental impacts resulting from RMC's mining operations were analyzed in the EIR prepared for the Bonny Doon Quarries Certification of Compliance and Reclamation Plan. The mitigation measures set forth in the EIR, together with the multiple criteria set forth in state, county, and local permits, rules, and regulations (see Section 5.3.4) minimize adverse environmental impacts resulting from quarry operations. However, mining activities intrinsically affect the environment. Quarry pit operations and creation of waste disposal areas alter the natural topography and vegetation of Coast Dairies Property. Additionally, these topographic and vegetative changes result in altered surface water run-off patterns and water quality, as surface adsorption rates of precipitation are modified, and run-off is channeled into sediment settling ponds prior to creek discharge (further information on the stability of these ponds is contained in Section 4.2). Other environmental issues, aside from these inherent effects, are addressed below.

Regulatory Compliance

Historically, insufficient environmental protective measures resulted in multiple adverse environmental impacts on the Coast Dairies Property. For example, inadequately designed settlement basins resulted in overflow of sediment-laden water and levee failure, subsequently causing erosion, sedimentation, and degradation of water quality in Liddell Creek and San Vicente Creek. However, the mitigation and monitoring program contained in the county's Certificate of Compliance included measures intended to decrease adverse environmental impacts from RMC operations. For example, settlement basins have been redesigned in accordance with the Drainage and Erosion Control Plan prepared by Engineering Science in 1991 (County of Santa Cruz Planning Department, 1997). Noise and dust from quarry operations have also been reduced. The Draft Environmental Impact Report prepared by Thomas Reid and Associates in 1996 determined limestone quarry activities resulted in dust levels that exceeded California's 24-hour PM-10 standard off site, and noise levels at the property boundary exceeded the Santa Cruz County Code, Mining Ordinance 60dbA standard[2] (Thomas Reid, 1996). However, RMC's most recent Annual Report stated quarry operations met the County's noise standard, and off-site dust from blasting were within acceptable limits (RMC, 2001).

Modifications are currently being undertaken to further reduce impacts from RMC operations. Emergency spillways were constructed for Settlement Basins 3 and 4 in 2000, with permanent modifications to be constructed in Summer 2001 (RMC, 2001). Additional modifications to quarry operations may be required. For example, a bridge has been constructed over San Vicente Creek on Conveyor Belt Road 1. However, this bridge is not large enough to support all truck traffic, resulting in trucks bypassing the bridge and driving through San Vicente Creek.

Reclamation

A revised Reclamation Plan was recently prepared detailing past, current, and future reclamation of Bonny Doon Quarries. This Reclamation Plan does not incorporate reclamation and revegetation of all roads that are currently used by RMC. Additionally, a comprehensive roadway map is not included in the Reclamation Plan. For example, reclamation plans for the shale quarry state that certain access roads will be revegetated. However, a map delineating all of the roads that access the shale quarry is not included in the reclamation plan, nor is there a map available that simply shows the roads to be revegetated. The plan further states that roads not included in revegetation plans will be decommissioned, and then retained for general property access. However, no description is provided describing road decommissioning procedures.

Future Recreation Use

As stated earlier, RMC's settlement basins are designed to minimize sediment run-off from mining operations and waste discharge areas into local waterbodies. Public use of these ponds could interfere with this process by stirring up sediments, potentially resulting in higher turbidity levels in water being discharged to creeks.

Mining operations, such as blasting, rock crushing, and truck transport are far from silent. The existing buffer provided between RMC's privately owned property and the Coast Dairies Property that separates the public from exposure to noise from mining could be reduced should the Coast Dairies Property be opened to public use. Recreational users, especially those not anticipating industrial activities, may therefore be disturbed by noise levels resulting from mining operations (public safety issues are addressed above).

[2] Santa Cruz County standards state that noise from mining operations cannot exceed 60 dBA; the noise limit as defined as the L_{25}; the noise level exceeded 25 percent of the time or for a cumulative period of 15 minutes during any hour of operation.

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5.4 RECREATION, ACCESS, AND VISUAL RESOURCES

5.4.1 METHODOLOGY

In the analysis of recreation, visual resources, and access for the Coast Dairies Property, the emphasis has been on qualitative and descriptive research. As a private landholding, the Property has not been formally administered for public recreation or appreciation and there is no clearly defined baseline -- although use, especially on the beaches, does occur. Equally, access and activity has been associated with the practical needs of agricultural management and not the accommodation of visitors, which has generated quite distinct use patterns in Coast Dairies' unique combination of the rural and the industrial.

Therefore, unlike the other human uses discussed in this section, "recreation" use is out of necessity somewhat subjective and conjectural. The process involved field research, review of existing publications and maps, interviews with agencies and organizations, and input from the Community Advisory Group (CAG). As much as possible, the discussion makes reference to the system of analysis zones described in Section 2.5.

5.4.1.1 EXISTING RECREATION USES

Due to limitations in the process of site observation and interviews, much of the information on existing formal and informal recreation uses of the Property was derived from the County of Santa Cruz and Landsmiths, the firm currently contracted by Coast Dairies & Land Co. (CDLC) for day-to-day operations, as well as file information from Wilder Ranch, the nearest state park, and The Forest of Nisene Marks, another coastal state park south of Santa Cruz.

The paucity of studies and surveys about recreation needs on the North Coast is in inverse proportion to the area's importance in the consciousness of the local communities. The value of open space has a psychological dimension, and includes intangibles such as traditional rural character; implicit access to the shore; contributions to "quality of life" and ambient healthful living conditions; aesthetics; and a strong sense of community (Miller, undated). Recreation in its broadest sense is more than surfing or hiking; it is all those things which relax and renew us. Therefore, an interpretation of community perceptions of recreation value or open space was included, in an effort to arrive at a better understanding of community expectations about uses of the Coast Dairies Property.

5.4.1.2 EXISTING ACCESS ROUTES AND POINTS

During the process of site analysis, it was necessary to classify current types of access routes and points for vehicular pullouts or parking throughout the Property. Existing access routes range from a two-foot wide grass cow path to the two-lane paved Highway 1. For purposes of clarity, and for use during the Opportunities and Constraints phase of the Plan (see Section 2.1.1) analysis zone designations have been provided to locate the beginning and end of all access routes discussed in Section 4.2.8.2.

The characteristics of existing access points were equally varied, ranging from grass to asphalt parking areas.

5.4.1.3 VISUAL RESOURCES

The Bureau of Land Management's Visual Resource Inventory was used to characterize the visual resources of the Coast Dairies Property. Visual Resource Inventory (VRI) provides a useful framework for determining visual resource values of varied landscapes. The inventory consists of a scenic quality evaluation, sensitivity level analysis, and delineation of distance zones. Based on these three factors, areas are placed into one of four visual resource classes. These classes represent the relative value of the visual resources. Classes I and II represent the most valued visual resources, Class III represents moderately valued resources, and Class IV represents least-valued resources (Bureau of Land Management, 1986).

Highway 1, Bonny Doon Road, and Swanton Road are all considered Scenic Roads by the County of Santa Cruz. The scenic vistas from these roads are afforded the highest level of protection by Santa Cruz County (Santa Cruz County, 1994).

Scenic vistas were identified on the Coast Dairies Property with the assistance of Bern Smith, Coast Dairies Property Manager. Scenic vistas were identified based on accessibility, topography, and the quality of the viewshed from the vista. The scenic vistas provide expansive views of the Property, the Pacific Ocean, or interior areas that have unique landforms, vegetation, or trail corridors.

Scenic Quality Evaluation

The scenic quality evaluation characterizes the visual appeal of a tract of land. The Coast Dairies Property was divided into scenic quality rating units, based on similarities among physiographic and vegetation characteristics. The scenic quality rating units were given an A, B, or C rating depending upon the apparent scenic quality based on a variety of factors, including landform, vegetation, prominence of water, color, adjacent scenery, relative scarcity, and harmony of cultural modifications. In the ratings scale, A is the most scenic, and C is the least scenic. The Coast Dairies Property was assessed using the evaluation criteria provided in the Bureau of Land Management's *Visual Resource Inventory* handbook (1986). An "A" rating was assigned to an area with a numerical score of 19 or more points, a "B" rating was assigned to an area with a numerical score of 12 to 18 points, and a "C" rating was assigned to an area with a numerical score of 11 or fewer points. The numerical scoring is developed in Table 5.4-9 in Section 5.4.6.1, below.

This evaluation also included the identification of “Special Areas," which are areas where the current management situation requires maintaining a natural environment essentially unaltered by humans.

Sensitivity Level Evaluation

The sensitivity level evaluation measures assumed public concern for scenic quality. The Coast Dairies Property was divided into sensitivity level rating units, based on the type of user, the amount of current use, public interest, and adjacent land uses. The sensitivity level rating units were assigned a value of high, medium, or low sensitivity based on the evaluation criteria provided in the Bureau of Land Management’s *Visual Resource Inventory* handbook (1986). The Planning Team acknowledges that the sensitivity level evaluation is *not* a surveyed measure of public concern for the scenic quality of the Coast Dairies Property, but rather an estimation of “public concern” as defined by criteria provided by BLM’s *Visual Resource Inventory* methodology. BLM’s system is provided only as a methodology to standardize evaluations across the Property.

The current users of the Property are Davenport residents, RMC Pacific Materials and agricultural growers, and recreational sightseers who view the property predominantly from Highway 1 and Bonny Doon Road. Since workers who pass through an area on a regular basis are not as sensitive to visual quality changes, recreational sightseers were used as the driving factor for the sensitivity level evaluation. It is assumed that Davenport community residents share similar viewsheds of the Coast Dairies Property from their homes as those experienced by recreational sightseers from Highway 1, Bonny Doon Road, and Swanton Road. As recommended by the VRI methodology, the scenic quality rating units utilized distance zones (discussed below) as a gauge for public sensitivity, because the distance zones indicate areas visible from Highway 1, Bonny Doon Road, and Swanton Road. The assumption was made that areas that are visible from these Scenic Roads are more visually sensitive to the public than areas that are not.

Distance Zone Evaluation

The Coast Dairies landscape was subdivided into three distance zones based on relative visibility from Scenic Roads (Highway 1, Bonny Doon Road, and Swanton Road). The three distance zones are Foreground-Middleground, Background, and Seldom Seen. These distance zones are defined as follows:

- The **Foreground-Middleground** zone is an area that is visible from the Scenic Roads, and within a one-mile buffer of the identified roadways. The VRI methodology recommended a three- to five-mile buffer for the Foreground-Middleground distance zone, however, this scale was not appropriate given the size of the Coast Dairies Property.

- The **Background** zone is an area that is visible from the Scenic Roads, and outside of a one-mile buffer of the identified roadways (but within the Coast Dairies Property).

- The **Seldom Seen** zone is an area that is not visible from the identified roadways, regardless of the one-mile buffer.

The distance zones were developed using GIS visibility analysis data from Santa Cruz County for Highway 1, Bonny Doon Road, and Swanton Road. The county GIS data were supplemented with a GIS-based visibility analysis performed by the Planning Team.

Visual Resource Classes

The scenic quality, sensitivity level, and distance zone analyses were combined to create visual resource classes. As discussed above, these classes represent the relative value of the visual resources. Classes I and II represent the most valued visual resources, Class III represents moderately valued resources, and Class IV represents least-valued resources. The VRI methodology was used to determine how the scenic quality evaluation (A, B, and C, and "Special Areas"), visual sensitivity evaluation (high, medium, and low), and distance zone evaluation (Foreground-Middleground, Background, and Seldom Seen) should be combined to create the visual resource classes (Class I, II, III, and IV). This is shown in Table 5.4-1 below.

TABLE 5.4-1
VISUAL RESOURCE CLASS DETERMINATION

		VISUAL SENSITIVITY LEVELS						
		High			**Medium**			**Low**
"SPECIAL AREAS"		I	I	I	I	I	I	I
SCENIC QUALITY	**A**	II	II	II	II	II	II	II
	B	II	III	III	III	IV	IV	IV
	C	III	IV	IV	IV	IV	IV	IV
		F/M*	**B***	**S/S***	**F/M***	**B***	**S/S***	**S/S***
		DISTANCE ZONES						

* F/M refers to the Foreground-Middleground distance zone, B refers to the Background distance zone, and S/S refers to the Seldom Seen distance zone.

SOURCE: Bureau of Land Management, 1986.

5.4.2 REGIONAL SETTING

The Coast Dairies landscape is exemplary of California's even-terrain terraces, uplifted 40 to 100 feet above sea level, separated from the Pacific Ocean by steep bluffs, and bound on the east by redwood-mantled ridges.[1] The diverse topography of the North Coast, combined with

[1] Information is derived from The *North Coast Beaches Master Plan*, County of Santa Cruz (1991). This publication was based on the summation of five previous reports, plus public testimony at three Board of Supervisors' hearings and various public workshops and Committees dealing with the North Coast Beaches of Santa Cruz County. The five previous reports include: *The 1983 Santa Cruz County Transportation Commission Report, The 1985 North*

environmental anomalies such as heavy fogs but modest rain, has resulted in distinct plant communities with clear, and sometimes dramatic edges. Coastal scrub, coastal bluff scrub, coastal dunes and cliffs, brackish marsh/lagoon, riparian, and agricultural fields all are evident throughout the Coast Dairies Property in a visual mosaic, and to some extent define its interest.

Furthermore, the North Coast of Santa Cruz County is an important habitat area for a diversity of watchable wildlife, including the annual California gray whale migration, the elephant seals at Año Nuevo and the southernmost extent of Coho salmon runs. Given such natural and physical variety, the Coast Dairies Property serves as a popular attraction for an equally diverse group of users: it is referred to on websites as disparate as the California Cafe Racers (a motorcycle group) and *Friends of the North Coast* (conservation advocates). Especially for day users, simple travel along State Highway 1 is a distinctive experience.

The coast and mountains between Santa Cruz and Año Nuevo contain an arc of conserved public lands centering on Coast Dairies (see Figure 5.4-1). Many of these are described in greater detail below in Section 5.4.2.2; a few have purely a biological conservation role (e.g., the Bonny Doon Ecological Reserve). The ends of the arc around Coast Dairies are strung together with the pearls of the beaches. Beaches are either dedicated public lands or are considered semi-public, since access to them is largely secured through the 1972 Coastal Zone Conservation Act and the legal principle of "implied dedication," which essentially validates historical use. Taken as a whole, these points and polygons are the gradually realized vision of a generation of citizen's groups, and state and local planners.[2]

5.4.2.1 REGIONAL BEACHES

The North Coast beaches generally occur where the uplifted terrace is dissected by creek drainage. Each beach has a character of its own, pebbly or sandy, with signature streaks and ripples of iron rich black sand. Each changes character throughout the year, from wide and sandy in summer to a display of beach bedrock in the winter (Griggs, 1974). For all its daily variety, the climate along the North Coast beaches is generally mild throughout the year. The mean temperature for July is 70 degrees Fahrenheit, and summer weather is cool and breezy, with early morning and evening fog. Prevailing winds are from the west and northwest and are most prevalent during Winter and Spring. Major beaches north of the Property include Greyhound Rock Beach, Waddell Creek Beach (part of Big Basin Redwoods State Park), Año Nuevo State Reserve, and Gazos Creek Beach. Major beaches immediately to the south of the Property

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Coast Today and Tomorrow Report, The 1987 General Plan for the North Coast Beaches, The 1989 Davenport Beach and Bluffs Addendum, and *The 1989 Draft and Final Environmental Impact Report.*

2 The goal of coastal parks and a North Coast greenbelt was part of the County's *Recreation and Open Space Plan* and the *Tri-County Coastline Plan* as early as the 1970's (Griggs, 1974). An even more majestic vision was reported in the *Santa Cruz Sentinel* on April 19, 2001. A $200 million program, with initial funding by the David and Lucile Packard and the Gordon and Betty Moore Foundations, has been launched by the Peninsula Open Space Trust to acquire the 20,000 coastal acres between Half Moon Bay and the Santa Cruz County line. According to the *Sentinel*, together with public holdings in Santa Cruz County, this would be the largest protected coastal area near a major city in the world.

include Red, White and Blue Beach, Four-Mile Beach, Three-Mile Beach, Strawberry Beach, Sand Plant Beach, Fern Grotto Beach, and Wilder Beach (see Figure 5.4-1).

According to the North Coast Beaches Master Plan, almost all recreation activities along the North Coast beaches occur during the day, but a persistent (and growing) amount of unregulated camping and informal gathering takes place at night. The peak season of use and larger group activities usually begins with spring (Easter) break for Bay Area colleges and ends in October. Area beaches can also provide a solitary and personal experience. Visitor use of regional beaches generally includes walking, jogging, nature study, picnicking, swimming, surfing, wind surfing, fishing and unregulated camping. Although there is no existing data documenting specific use patterns at the North Coast beaches, a consistent increase in visitors has been observed over the past two decades. Between 1981 and 1986, for example, visitor-days at Santa Cruz County beaches went from an estimated 2.1 million to 3.3 million.[3]

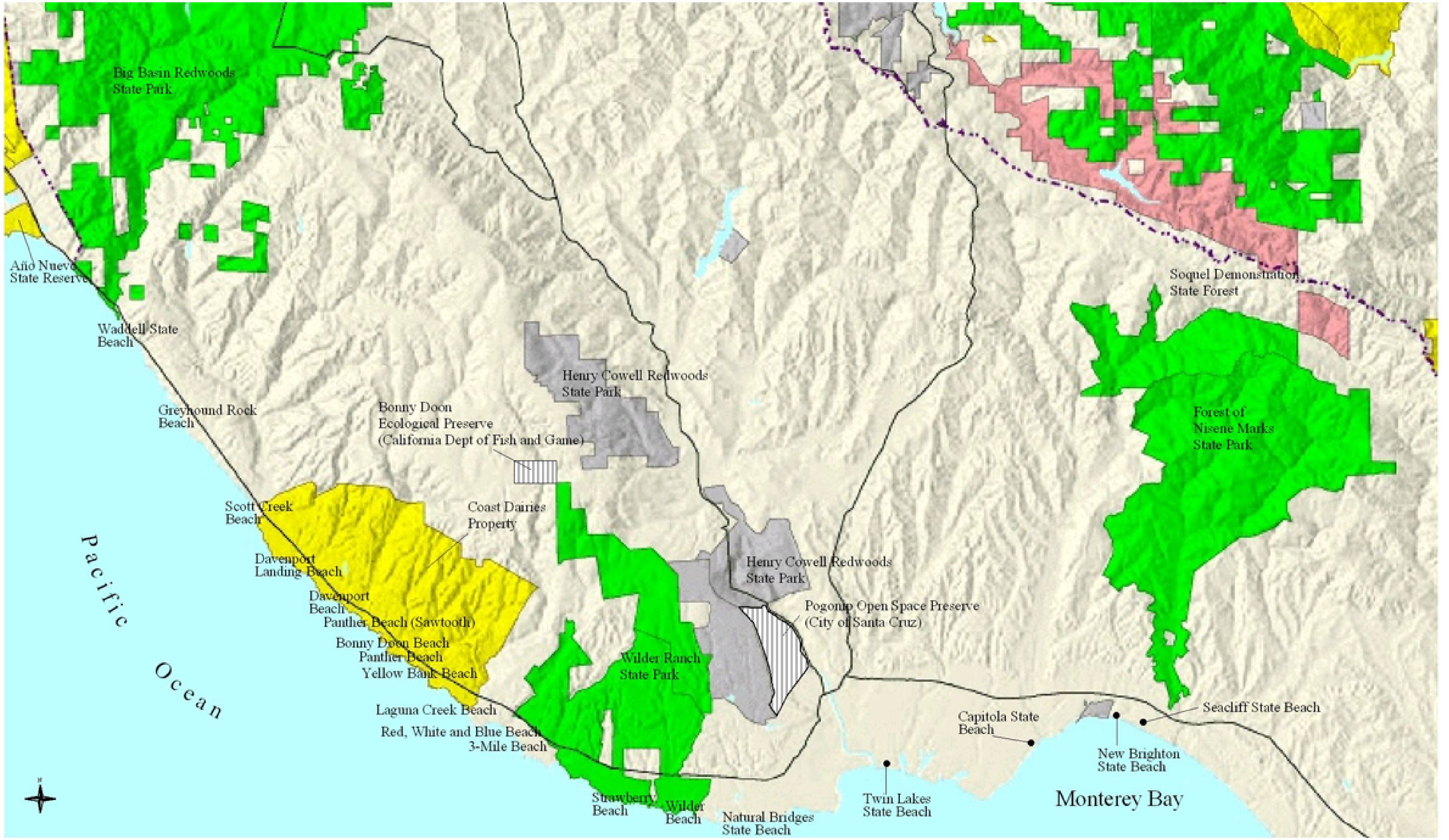
5.4.2.2 REGIONAL PARKS AND OPEN SPACE

Regional parks and open space include beaches (described above), seven state parks, and open-space lands administered by the City of Santa Cruz. Three state parks and one state reserve – Big Basin, Año Nuevo, Henry Cowell Redwoods, and Wilder Ranch – lie to the north, east, and south of the Coast Dairies Property respectively. Gray Whale Ranch, a public open space administered by the California Department of Parks and Recreation (DPR), lies between Wilder Ranch and Henry Cowell Redwoods. City administered open space includes properties such as the Pogonip (see Figure 5.4-1). Although there is no existing documentation of formal or informal trail accesses between the Coast Dairies Property and these area state parks and open space (California State Parks, Santa Cruz, CA), there are two potential linkages provided by secondary roads. At the southern end of the Property, the road along the east branch of Liddell Creek, Yellow Bank and Y Creek Roads accesses Smith Grade, which in turn reaches Gray Whale Ranch via Woodcutter's Trail. At the northwest end, a spur to Warnella Road approximately three miles north of the property boundary dead-ends above Big Creek drainage, and is mirrored, on the opposite side of the drainage about a mile away, by a trail from the southeastern corner of Big Basin Redwoods State Park. The following provides background data on State Parks in the vicinity of Coast Dairies.

Big Basin State Park

Big Basin State Park is located northwest of the Coast Dairies Property. As California's oldest state park, Big Basin has increased its original 3,800 acres to over 18,000 currently. Park activities include interpretive programs, inland fishing sites along creeks, museums, a visitors' center, family and group campsites, and backpacking areas. The park also is in close proximity to

[3] The number of visitors at the less developed San Mateo County beaches declined temporarily when a fee payment system based on voluntary cooperation was initiated in the early 1980's. Paid visitor attendance records indicate that use increased annually until 1985 when manned kiosks were installed to maximize the effectiveness of the fee collection system. Information is derived from the County of Santa Cruz, *North Coast Beaches Master Plan*, 1991.



SOURCE: Bay Area Open Space Council

Coast Dairies / 20071

Figure 5.4-1
Public and Conservation Lands
Near the Coast Dairies Property

facilities and amenities such as grocery stores, gas stations, antique shops, laundromats, restaurants, and a library, in Boulder Creek, nine miles southeast of the park where Highway 236 meets Highway 9 (California State Parks Publication, Big Basin Redwoods State Park Map Publication, 1999).

Publications on the Big Basin State Park activities and programs do not mention coastal beach activities, but there are two linkages to the coastal-bluff beach system that continue southward to Coast Dairies. Mountain bikes can only access the sea via the Gazos Creek Road (to Gazos Creek Beach); hikers have a more direct route along the Skyline to the Sea Trail to Waddell Creek Beach. The Santa Cruz Metro (bus) line No. 40 connects Waddell south along Highway 1. Due to this proximity, coastal beaches within the Coast Dairies Property may serve as an extended recreation opportunity for Big Basin State Park users.

Año Nuevo State Reserve

Año Nuevo State Reserve lies 10 miles to the north of Coast Dairies. Punta de Año Nuevo (New Year's Point) is so named because Spanish maritime explorer Sebastian Vizcaino sailed by the point on January 3, 1603. Elephant seals, sea lions, and other marine mammals come ashore to rest, mate, and give birth in the sand dunes or on the beaches and offshore islands.

This 4,000 acre Reserve is the largest mainland breeding colony in the world for the northern elephant seal, which may be seen year-round. The females give birth to their young on the dunes. During the breeding season, December 15 through March 31, daily access to the Reserve is available only via guided walks. The interpretive program has attracted increasing interest every winter for the past 19 years. Most of the adult seals are gone by early March, leaving behind the weaned pups who remain through April. The elephant seals return to Año Nuevo's beaches during the spring and summer months to molt and can be observed during this time through a permit system.

A visitor center features natural history exhibits and a bookstore offering educational items such as books, postcards and posters. Restrooms, drinking water and picnic tables are available near the visitor center. Food and beverages are not sold at the reserve. Pigeon Point Light Station State Historic Park and Butano State Park occur to the north of Año Nuevo in San Mateo County.

Henry Cowell Redwoods State Park

Henry Cowell State Park is approximately 18,000 acres and features old growth redwoods, lush stream canyons, open sunny meadows, and dense pine and oak forests. The park has an estimated 20 miles of trails, ranging from 0.4 miles to 3.3 miles long in length. Some trails are very steep, and the terrain varies from forest to chaparral. The two entrances to Henry Cowell – one on Highway 9 in Felton and the other on Graham Hill Road – are three miles apart and can be accessed via Highway 9 or Highway 17. Activities in the park include hiking, camping on campgrounds, biking, dog walking with leashes, and horseback riding (California State Parks Publication, Henry Cowell State Park Map Publication, 2000).

Due to its location in the forested coastal mountains, it is less likely that Henry Cowell State Park visitors would have direct access to the North Coast beaches, although it is possible through the Gray Whale Ranch connection described above. Visitors could, of course, access Coast Dairies beaches and other nearby coastal beaches via Highway 9 or Highway 17, which meets Highway 1 in the town of Santa Cruz.

Wilder Ranch State Park

Located five miles south of Coast Dairies Property, Wilder Ranch State Park has approximately 6,000 acres. Approximately 900 acres of the coastal lands are under cultivation and 5,100 acres of backcountry are located on the north side of Highway 1. The park has a multi-use trail system consisting of an estimated 33 miles. Trails wind through coastal terraces & valleys, and are open to hikers, mountain bicyclists, and horseback riders (California State Parks Publication, Wilder Ranch State Park Map Publication, Undated).

Wilder Ranch State Park has a trail connection to area beaches south of the Coast Dairies Property, which include Four-Mile Beach, Three-Mile Beach, Strawberry Beach, Sand Plant Beach, Fern Grotto Beach, and Wilder Beach. There is limited (discontinuous) trail access between these beaches along the Old Cove Landing Trail.

5.4.2.3 REGIONAL ACCESS

State Highway 1 and, to a lesser extent, Bonny Doon Road are the main travel corridors that provide direct access to the Coast Dairies Property from regional destinations north, east and south of Santa Cruz County. The California Department of Transportation (Caltrans) maintains the Highway 1 right-of-way which varies in width. Existing parking areas along Highway 1 are located either partially or wholly within this right-of-way. Caltrans therefore has jurisdiction over any improvements made at these parking areas and has the right to require encroachment permits for proposed ingress and egress to the parking lots connecting with the highway (County of Santa Cruz, 1991).

For example, in 1993 Santa Cruz County, through the Scotts Creek Beach Enhancement Plan, proposed a boardwalk, signage, fencing, and bus stop improvements along Highway 1. Caltrans became the effective “lead agency” for the project and negotiated on behalf of the County and its federal partner (the Federal Highway Administration) to ensure that the project would not jeopardize the nesting sites of the endangered snowy plover (see Section 3.2.3.1)(USFWS, 1996b). This project has recently been completed.

Other than arriving by personal vehicle, the Coast Dairies Property can be accessed via public transportation by Santa Cruz Metro Line No. 40 and SamTrans Line No. 96C (to and from Half Moon Bay) servicing the town of Davenport. The Property is also accessible via the Union Pacific Railroad (the original operator, Southern Pacific, merged with Union Pacific in 1996), which does not have passenger service at this time. The railroad right-of-way, however, is being considered as a possible route for a future multi-purpose trail that would connect with pedestrian and bicycle routes into the City of Santa Cruz (Information from *Successful Strategies for Trail Development*, Rails-To-Trails Conservancy, 2000).

The Union Pacific Railroad has a narrow right-of-way along the railroad tracks at Davenport Beach and Bluff, Panther, Bonny Doon, Yellow Bank, and Laguna Creek. Trains pass through the area several times a week, hauling sand and coal to the RMC Pacific Materials Company, and hauling out processed cement (County of Santa Cruz, 1991).

5.4.3 COAST DAIRIES PROPERTY RECREATION

5.4.3.1 AUTHORIZED RECREATION USES

Coast Dairies Beaches Description, Access, and Recreation Use

There are a dozen or so beaches at the Coast Dairies Property (Refer to Table 5.4-2 and Figure 5.4-1). However, information on the existing conditions, access, and recreation uses, are presented only for the seven major Property beaches. Descriptions are derived principally from site reconnaissance and the, *North Coast Beaches Master Plan*. The seven major beaches include the southern portion of Scotts Creek, Davenport Landing, Davenport Beach, Panther, Bonny Doon, Yellow Bank, and Laguna Creek, listed from north to south.

Scotts Creek Beach

Scotts Creek beach is located ten miles north of Santa Cruz, adjacent to Highway 1. The County of Santa Cruz owns and maintains both the beach and portions of the north and south bluff areas of Scotts Creek beach. The main beach is about one-half mile long, and can be seen from the highway as one crosses the bridge at Scotts Creek, and from vistas as one descends to the creek from the north or south. Scotts Creek flows across the beach most of the year, creating a lagoon and a large stream. In some years this stream limits access from north to south along the beach. Molino Creek also crosses the south end of the beach on Coast Dairies Property. This is an open beach and receives the brunt of the spring and summer northwest winds. At such times the only shelter is in the northeast corner of the beach. There are anadromous fish in Scott and Molino Creeks, and a portion of Scotts Creek is Critical Habitat for the western snowy plover (see Section 3.2.3.1). The north bluff also has fairly well preserved coastal scrub vegetation.

At Scotts Creek Beach, visitors must park on the narrow shoulders of Highway 1 and climb down a sand slope or over rip/rap. This access is difficult when Scotts Creek flows along the north end of the beach. According to the *North Coast Beaches Master Plan*, during sunny days with little or no wind, the beach is used to the extent that parking allows. Beach activities include

TABLE 5.4-2
COAST DAIRIES BEACHES PROFILE[4]

Name of Beach	Size in Square Ft.	Carrying Capacity (a)	Average Demand (b)	Available Space (c)	Targeted Supply (d)	Access Land Owner (e)
Scotts Creek	609,000	609	90	10	18	County
Davenport Landing	92,000	92	35	20	50	CDLC
Dav. Bluffs & Beach	65,000	79	40	60	26	CDLC
Panther	13,320	13	15	55	0**	CDLC
Bonny Doon	238,514	239	100	50	60	CDLC
Yellow Bank	122,826	123	80	80	80	CDLC
Laguna Creek	303,000	303	50	30	0**	CDLC

(a) Optimum number per 1,000 square feet of beach as measured between high and low tides.
(b) Number of vehicles based on observations made during summer weekends in 1987.
(c) Off-highway parking areas only.
(d) Number of parking spaces represented in the N.C. Beaches Plan – total of 353.
(e) Access trail, surrounding areas and sandy beach areas not covered by the State Land Commission, under the Coastal Act of 1972.
* Five Recreational Vehicle spaces allowed under County Code
** No change to existing parking conditions

sunbathing, reading, picnicking, surf-fishing, kite flying, hang-gliding, and occasional large beach parties. At the north end of the beach, a submerged reef creates one of the best surfing formations on the North Coast. This area is commonly used by windsurfers during periods of moderate to high winds.

Davenport Landing Beach

Davenport Landing Beach is located about one mile northwest of Davenport. The county has no management responsibilities for the beach, except for maintaining Davenport Landing Road, the restroom and ramp. The beach is about 200 yards long and 50 yards wide. The sandy area is bounded on both ends by low rocky terraces and backed by vertical cliffs 30 to 40 feet high. The water directly offshore of the center of the beach is deep and free of surf, with submerged reefs on either side. The north end of the beach is sheltered from the prevailing northwest winds and is preferred by sunbathers and picnickers. There are three private residences directly behind the beach, and two other homes on the inland side of Davenport Landing Road. There is a small aquaculture facility (abalone) next to the residences, and a large, open concrete channel from this

4 Revised table from the County of Santa Cruz, *North Coast Beaches Master Plan*, 1991.

facility crosses the south end of the beach. The terraces bordering the beach are farmed. On the inland side of Davenport Landing Road is a low-lying marshy area.

At Davenport Landing, several informal trails lead from the parking area across a low intervening terrace to the beach. Beach facilities include a toilet and a disabled access ramp. The beach is about 50 yards from the road. The terrace is mostly level, but ends in a four foot drop-off. An earth berm and several large boulders have been placed between the shoulder of the road and the terrace to keep vehicles off the beach and the terrace area. According to the *North Coast Beaches Master Plan*, Davenport Landing Beach is used year-round and has one of the most consistent use patterns of any of the beaches. It is easily accessible from the road, which encourages its use by families with children, older and disabled persons. Because it is near the road, many visitors feel safer here than on the more isolated beaches. Fisherman, windsurfers and surfers also use this beach. During the fall and winter months, surfers are often the largest single user group.

Davenport Bluffs and Beach

Davenport Bluffs and Beach extends for approximately one-half mile south of Highway 1 across from the Town of Davenport and the RMC Lonestar Cement Plant. Because the bluffs, main parking area and access trails to the beach are on private property, the county has no responsibility to maintain this area. The site averages 100 yards in width and is bisected lengthwise by the Union Pacific Railroad. The railroad cuts through the coastal plateau in the larger, northwestern portion of the beach. In this area, getting from the main parking areas to the 80 to 100 foot high bluffs involves descending and ascending embankments on either side of the railroad tracks. At the southeast end, the railroad crosses a small valley on a raised railroad bed, hiding Davenport Beach from Highway 1 and the town. The beach is broad and approximately 300 yards in length (County of Santa Cruz, 1991).

Davenport Bluffs and Beach can be also be reached from both the north and south. The trail is poor and steep, winding up and over the railroad tracks, and then down to the beach. The north access originates from the main parking area, goes along the tracks and enters the beach just above San Vicente Creek. According to the *North Coast Beaches Master Plan*, the beach is generally used for unregulated camping, picnicking, sunbathing, and sight-seeing, but not for swimming or surfing. There is some surf-fishing from the sand beach and good rock-fishing from the exposed shelf at the southern end. This rock area is safe to fish only during low tides with calm seas. The bluff provides an excellent site from which to view the annual gray whale migration and the extensive marine bird and mammal life of the area. The cypress grove is a popular day use area and is also used for unregulated overnight camping.

Panther (a.k.a. Shark Tooth) Beach

Panther Beach is the smallest of the beaches and its size can vary from year to year. The access trail to this beach is on CDLC Property and the Union Pacific right-of-way, while the parking area is within the Caltrans' right-of-way. The beach is surrounded by 40-foot high cliffs. In the center of the cove is a large pinnacle rock isolated from the shoreline, even at low tide. The steep slopes adjacent to the beach are well vegetated, although the area near the path has been eroded (County of Santa Cruz, 1991).

According to the *North Coast Beaches Master Plan*, the only way to get to this beach is by walking around a metal gate, walking down a slight incline to the railroad tracks, and climbing down a steep and dangerous path. The path is badly eroded and some side trails end in impassable drops. It is known that young and middle-aged adult sunbathers use the beach. Water activities such as swimming, surfing, and fishing are rare or non-existent, but some people do use the beach for unregulated camping. The cliffs above the beach are used for whale watching.

Bonny Doon Beach

Bonny Doon Beach is located approximately seven miles north of Santa Cruz at the intersection of Highway 1 and Bonny Doon Road. The beach is about 250 yards long, with a wind-protected cove at the north end. The access to the beach is on CDLC land and therefore the county has no management responsibilities. The current parking areas are located within the Caltrans or county rights-of-way. The sandy cove, which is reclaimed by the sea during winter months, is the most popular portion of the beach. The north and central portions are surrounded by high cliffs. Liddell Creek crosses the southern end of the beach during winter and spring, emerging from a culvert beneath Highway 1 and the railroad tracks. At the south end of the beach a dune rises about 60 feet above the sand. The south end of the beach is encompassed by steep slopes of sand and earth, and the land above is cultivated. The dune system at the southern end of the beach is badly deteriorated as a result of indiscriminate foot traffic. Stabilizing vegetation has been virtually eradicated. Erosion has occurred on the steep slopes leading to the beach, again because of foot traffic (County of Santa Cruz, 1991).

Visitors must climb the steep fill slope supporting the railroad tracks, cross the tracks, then descend the berm on the other side to reach paths leading to the beach. Several trails are in use. All but the northernmost trail are badly eroded. Bonny Doon Beach is used mainly by nude sunbathers with some family use. Most beach users are young to middle-aged adults. Sunbathing, socializing, and sports such as volleyball and frisbee are popular activities. Scuba, surfing, fishing, and other water sports are less common. Hang gliders use the dune area at this beach.

Yellow Bank Beach

Yellow Bank Beach lies about six miles north of Santa Cruz. Again the land surrounding this beach is owned by CDLC and therefore the county has no obligation to maintain it. The beach has two sections separated by a narrow rock archway that is only passable at low or medium tides. The north (main) beach is bounded by the embankment of the railroad/highway fill that separates the Yellow Bank Creek Canyon from the beach. The main beach is approximately 100 yards long and up to 70 yards wide. The south beach is bounded by vertical cliffs, and ends in a rock shelf and point. South of this, low rock shelves continue for several hundred yards. Yellow Bank Beach is still relatively unused, at least the south section. Shorebirds use the north and south beaches, and nest on the cliffs bordering the south beach. Low brush covers portions of the slopes behind the beaches (County of Santa Cruz, 1991).

According to the *North Coast Beaches Master Plan*, one principal trail serves the main beach. It begins at the north end of the parking lot, crosses the railroad tracks, and drops directly to the beach. The trail is steep, braided, eroded and contains loose rocks and dirt. There is no trail access to the south beach. Several seldom used trails descend to the beach on either side of the main trail. Informal trails follow the top of the bluffs, and a well-used trail extends to the tip of the promontory separating the two beaches. These trails afford excellent overlooks of the beaches and the coast to the north and south. Sunbathing is the principal activity at this beach, but fishing and camping area also common. The main beach receives the most use due to its proximity to the parking area and because access to the south section is only safe at low tide.

Laguna Creek Beach

Laguna Creek Beach is about five miles north of the Santa Cruz City limits, and is one of the least disturbed beaches on the Coast Dairies Property. Because access to the beach, the wetlands and surrounding lands are owned by CDLC, the county has no responsibilities to maintain this area. The parking area is located within the Caltrans' right-of-way. The main beach is about one-sixth of a mile long, widening at the south end. A large lagoon lies inland, and Brussels sprout fields cover the terraces to the north and south. North of the main beach is a narrow cove that is sheltered from the prevailing summer breezes. Laguna Creek Beach is still relatively pristine, and the large lagoon is its most significant natural feature. The lagoon is a wintering area for many bird species and is a valuable nesting site. Laguna Creek Beach, essentially the entirety of the beach below the 20 foot contour, is designated Critical Habitat for snowy plovers (see Section 3.2.3.1).

According to the *North Coast Beaches Master Plan*, there are two main access routes to the beach. The main route follows a bedrock-surfaced farm road. This road leads to several small and eroding footpaths down the low bluffs at the north end of the beach. The second route is an eroded trail that runs close to the north end of the lagoon and emerges at the middle of the main beach. Laguna Beach is used by a wide variety of people, including sunbathers, families, fishermen, musselers (in winter), unregulated overnight campers (some long-term), and surfers. Off-road vehicle use is relatively infrequent. The north end of the beach and the areas surrounding the wetland are most heavily used, because they provide shelter from summer winds.

Miscellaneous Public Access and Use in Non-Beach Areas

Technically speaking, all activities in the inland areas of the Coast Dairies Property require permits, even though many on-site activities from outside visitors proceed regardless. Landsmiths, the interim property manager, and the Trust for Public Land (TPL) are responsible for answering public requests for various recreation activities and permits on the Property. Throughout the inland areas of the Coast Dairies Property, there are miscellaneous recreation uses informally authorized. For example, San Vicente Trail and Warnella Road are two major trailheads used by the community and visitors to the Coast Dairies Property. According to Landsmiths, RMC issues permits to access their lands and these permits are honored on the Coast Dairies Property. These activities such as walking, jogging, bicycling, dog walking, and motorcycling. Tours of the Property are regularly offered and conducted by Landsmiths.

5.4.3.2 UNAUTHORIZED RECREATION USES

For the most part, information on activities that take place on the Coast Dairies Property is available only through on-site observations.[5] Trespassing, criminal behavior, and other unauthorized activities on the Coast Dairies Property do occur throughout inland portions of the Property and the scenic coastal beaches. Such behavior may range from beach goers crossing over lands which are leased to farmers, to poaching, littering and trampling on sensitive habitat areas.

Beaches

There are a variety of unauthorized recreation uses on the beaches. At Scotts Creek Beach, off-road vehicle use occasionally occurs (County of Santa Cruz, 1991). Littering is evident at most beaches and can be a serious problem. Portions of Scott Beach, for example, are heavily littered with broken glass, particularly along the south bluff, despite the availability of sanitation facilities. With no sanitation facilities at Davenport Bluffs and Beach, tremendous amounts of debris have accumulated along the south beach access trail as well as in the cypress grove, along bluff trails, and near parking areas. Similarly, at Panther Beach, both trash and large pieces of concrete are scattered throughout the beach. The southern end of Bonny Doon Beach is particularly littered with garbage and broken glass. In general, litter on the main beach of Yellow Bank is moderate, most of it lying at the back of the beach. The south beach is considerably cleaner than the main beach although some areas are blackened by campfires. On special occasions, such as the July 4, 2000 beach party at Yellow Bank Beach, littering can be a serious situation affecting public health and safety. Laguna Creek Beach does not have the serious litter and sanitation problems that some beaches have, but there is enough existing debris to warrant attention (Smith pers. comm., 2001).

Unregulated camping on the beaches is a complex and persistent phenomenon. It is discussed in the “Issues” section below (5.4.7.3).

Miscellaneous Activities in Non-Beach Areas

Miscellaneous trespassing and criminal behavior have been observed inland as well. According to Landsmiths, upland camping with no prior approval occurs throughout the Property, as evidenced by remnants of camp fires, litter or direct contact with campers. Evidence of hunting is another type of unauthorized activity; empty cartridge casings have been discovered near wild boar tracks.

[5] Landsmiths served as the primary resource for all such information.

5.4.3.3 COMMUNITY RECREATION NEEDS AND EXPECTATIONS FOR THE COAST DAIRIES PROPERTY

Assessments Made for this Report

Specific information referencing the Coast Dairies Property and reflecting the Davenport and Santa Cruz communities is limited and difficult to "track" (Interviews with agencies and organizations, February 2001; Davenport Town Meeting, Meeting Notes, April 19, 2001). In the *Santa Cruz Sentinel*, for example, there has been only one article published within the past few years that refers to the Coast Dairies Property (*Interview with Santa Cruz Sentinel*, February 2001).

Documentation of community perceptions of the Coast Dairies Property, however, is available in the form of minutes taken at Community Advisory Group (CAG) meetings and public hearings for the Coast Dairies Plan, and in the long and well documented history of local preservation efforts (see following sections).

The Coast Dairies Community Advisory Group

The Steering Committee's, and later the Planning Team's, work has been guided since its inception by a Community Advisory Group representing the largest practicable combination of potential user groups and concerned and knowledgeable individuals, to provide local input and access to information.

At the CAG Recreation Subcommittee Meeting in April of 2000, the following preliminary list of recreational opportunities was developed. The list was intended to be comprehensive and did not constitute a formal endorsement.

- beach use
- bird watching
- camping
- dog walking
- farm stays
- fire rings
- fishing
- handicap access
- hang gliding; parasailing
- hiking
- horseback riding
- jogging
- kayaking
- motorcycling
- mountain biking
- multi-use trails
- painting and photography
- picnicking
- providing interpretive services
- public art
- public gardens (e.g. native plants or organic plants)
- radio-controlled airplanes
- surfing
- use of vista areas
- hiking
- whale watching
- water sports

Public Scoping

At the March 10, 2001, public scoping meeting for the project, a representative from the Santa Cruz Hostel Society, expressed a desire for more recreation opportunities for visitors to the coastal area (Santa Cruz Hostel Society, Inc., Scoping Meeting Minutes, March 10, 2001). It was further noted at the meeting that preservation efforts could be made for buildings that have potential to be used by groups such as schools and the handicapped (Santa Cruz Hostel Society, Inc., Scoping Meeting Minutes, March 10, 2001). Other public comments, some received before or after the meeting by letters, included a proposal to regulate motorcycle use, a desire to integrate intertidal and underwater aspects into visitor use and enjoyment of the Property (along the lines of the Fitzgerald Marine Reserve Master Plan[6]); and reintroduction of tule elk.[7]

In the Ocean Wind: a Grass Roots Vision

Section 1.4 described (as history) the events leading up to the Coast Dairies purchase. Embedded in the meetings, writings, exhibits and articles are a remarkably consistent message about community expectations for Coast Dairies. A group of local authors and scientists collaborated in a book titled *In the Ocean Wind: The Santa Cruz North Coast* published by the Glenwood Press in 1974. By the late 1960s,[8] community activism had defended the North Coast from PG&E's intent to build a nuclear power plant on El Jarro Point (the terrace north of Davenport), and was looking forward to future conservation struggles. In an unsystematic way, *In the Ocean Wind* is the most robust source of information on local consensus – the grass roots vision – for Coast Dairies. The science, poetry, polemics and policy discussions of the work are best summarized by Cynthia Weyburn in the Preface: *"It would seem that the optimum use of the land for the majority of people would be to maintain its present state by whatever means possible."*

The book was in no way self-congratulatory and community interest did not wane. *Friends of the North Coast* was formed in the autumn of 1991, as an outgrowth of the activities of another group, Save the Gray Whale Parklands (Gray Whale Ranch is an inland tract less than a mile from Coast Dairies' northeastern boundary). For its first effort, *Friends of the North Coast* produced, in November of 1991, a series of lectures, poetry readings, hikes, concerts and art exhibits, called **In Praise of the North Coast**. A number of the individuals initially active in *Friends of the North Coast* lent strategic support to the effort that led to the acquisition of the Coast Dairies Property. In July of 1997 over 200 Friends of the North Coast (in conjunction with the Environmental Council, the Sierra Club, and Save the Gray Whale Parklands[9]) gathered at the Louden Nelson Center in Santa Cruz (Scott, 1997) to concentrate on the future of Coast Dairies.

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6 The Draft Fitzgerald Marine Reserve Master Plan was published in August, 1999, and outlines interpretive uses and protection standards for 370 acres of intertidal and subtidal marine habitats along the San Mateo coast.

7 Tule Elk, (*Cervus elaphal nannodesis*), is a subspecies of elk which was once abundant in the grassy habitats within the Central Valley and along the coast of California.

8 In the fall of 1969 the sale of the nearby Wilder and Scaroni Ranches to corporate investors from New York and Canada was announced. Celia Von der Muhll (1974) considered this the moment when "...it was obvious that time had finally caught up with the North Coast."

9 Gray Whale Ranch is an inland tract less than a mile from Coast Dairies' eastern boundary.

Davenport

Davenport's situation, a hamlet in the midst of the Property to be "planned," has generated interest and concern in equal measure. Marc Wennberg, Davenport Resource Service Center Program Director, captured some of the local ambivalence in a 1998 article regarding sale of the Property to TPL: *"The cultivation of Brussels sprouts is, in many ways, synonymous with the "flavor" and the history of the North Coast. With large scale cultivation, however, comes the indispensable use of pesticides. How then do you reconcile pesticide spraying with the concerns of Davenport homeowners living close to the fields, or the unspoken needs of the watersheds and local animal life? ...Which brings us to Davenport. ... Davenport occupies a unique place within Coast Dairies and Land. The announcement of the sale, therefore, has generated a lot of local support and excitement, as well as a small dose of anxiety. How then, might the residents of Davenport count themselves amongst the "happy" in the design of the Coast Dairies plan?"* (Wennberg, 1998).

Other issues for the community are the lack of formal open space playfields for recreation activities such as soccer or baseball for both children and adults, and the desire for more control of traffic on present and future trailheads (Smith pers. comm., 2001). A representative of the Planning Team attended a Davenport town meeting in April, 2001. There were a variety of local land-use issues under discussion, among them cellular telephone towers and a new dwelling under County Planning review. The overall impression was of a town aware of the value and vulnerability of an outpost that has more in common with a Greek village than a California beach town -- the dwelling proposed would be first built in Davenport since 1992, and cellular service was not an overriding priority (Davenport Town Meeting, April 19, 2001). Several at the meeting expressed the desire that Davenport not play the role of a "gateway" community (in the sense that El Portal is a gateway to Yosemite National Park) for Coast Dairies.

Lessons from Wilder Ranch

One of the coastal state parks in Santa Cruz County discussed above is approximately the same size as Coast Dairies, with roughly analogous histories of resource extraction, an evolution from private to public land, and a user community that blends and regional and strong local interests. It shares the kind of devoted public following that was so passionately characterized in *In the Ocean Wind*.

Wilder Ranch is extensively used -- 263,000 visitors in 1999. Recorded uses from park files (Buchanan, pers. comm., 2001) have attempted to categorize the hiking/mountain bike proportions and find an overwhelming majority of mountain bikers (a ratio of 3.4:1).[10] The predominant bike use is variously attributed to the adjacency of the University of California Santa Cruz campus and to the perception that other types of users simply stay away because of it -- a situation where a perceived conflict of uses may have the same effect as an actual one.

[10] Forest of Nisene Marks (FNM) State Park, on the south side of the City of Santa Cruz, began a General Plan process early in 2001. Public scoping meetings for FNM were held on March 11 and April 7. Information presented at these meetings (Miller pers. comm.) suggests a much more balanced use between hikers, runners and bikers, although others characterized trail bike use as extreme and omnipresent.

All Wilder Trails are multi-use -- open to hikers, mountain bicyclists and equestrians. The more wide-open policies of Wilder Ranch suggest that, in that context, it might be harder to maintain zones of public exclusion, but this has not been the case. Wilder Ranch also has been able to successfully enforce the improbability of a beach completely closed to public use. Wilder Beach, fully visible (and accessible) from the Old Cove Landing Trail, is signed as a natural preserve. Wilder Beach is the only completely closed beach in the state park system (Roth pers. comm., 2001) and also has the second highest snowy plover nesting success (percentage of chicks fledged) of all the beaches studied by the Point Reyes Bird Observatory in 2000 (Page et al., 2001). One of Wilder's greatest attractions is its historical homestead display, houses and farm buildings from the 1850s when the ranch was a prosperous dairy. Park docents lead regular tours. The presence of its agricultural lands offers another as yet undeveloped attraction. As was discussed in the agriculture section (5.2), there are very few places in California where non-farmers can see how food is actually produced. At Wilder Ranch, both the agricultural lessees and their trade group the California Farm Bureau have expressed willingness to help integrate the park experience with exposure to modern commercial farming (Roth pers. comm., 2001).

Wilder Ranch receives an array of use requests that provide valuable insights into what may be expected of or hoped for at Coast Dairies. These are:

- competitive events
- coastal fishing
- community gardens
- weddings
- llamas
- "raves"
- small commercial or concession ventures
- scattering of ashes
- film companies
- university research
- hang gliding
- company picnics
- group camping
- spelunking

Wilder's most problematic use is associated with its most dramatic feature and one it shares with Coast Dairies: the rocks and bluffs that define its seaward identity. The dangers of climbing rocks and waves action are well advertised, but falls and occasional drownings are serious concerns for park staff.

5.4.4 COAST DAIRIES PROPERTY ACCESS ROUTES AND ACCESS POINTS

5.4.4.1 ACCESS ROUTES

In the Coast Dairies Property, there only two or three major trailheads and county-maintained roads. Those major routes are Warnella Road and San Vicente Road. The majority of existing access routes documented are either farm roads/paths used by agricultural and grazing leaseholders, maintenance roads used by the Santa Cruz Water Company or private roads for the RMC Pacific Materials. It is evident that these three entities currently use and maintain these varied types of access routes, as some unimproved paths would otherwise be indistinguishable, especially to the outside visitor. See Section 4.2.8.2 (Road System Description) and Figure 4.2-4 for an overview of the road network at Coast Dairies.

5.4.4.2 ACCESS POINTS

There are very few available access points for vehicles to park or pull out for temporary stops within the Coast Dairies existing road network. In most cases, those parking options are available in unimproved dirt areas off Highway 1 or graded dirt/gravel buffer spaces between Highway 1 and the coast. These access points include those areas where it is relatively safe or convenient for cars to stop and pull over, but most are not established parking spaces.

Paved Parking Lots

Paved parking opportunities in general are scarce throughout the Coast Dairies Property. There are only two existing paved parking areas along Highway 1 – one located within the Town of Davenport within the San Vicente Watershed (Analysis Zone IA-3) and the other within Caltrans' right-of-way at Bonny Doon Beach (Analysis Zone LCTB-1). The paved area in Davenport holds approximately 20-25 vehicles and serves a short strip of commercial activity that includes restaurants and shops. At the Bonny Doon Beach, the parking area is a long, narrow strip within the Caltrans right-of-way with a capacity of up to 80+ cars.

Unpaved Parking Areas

In the southern part of the Laguna Watershed, there is a frequently used graded dirt parking area off Highway 1 (Zone LACT-1). This graded parking area has relatively easy access for vehicles coming from north of the property, and is directly off Highway 1 near the head of Laguna Road. This access point conveniently sits at the southern most tip of the Coast Dairies Property, and has a capacity for eight to ten vehicles. At the Davenport Bluff and Beaches in the San Vicente Watershed, the main parking area holds approximately 60 cars. It is level and unpaved.

At the Bonny Doon Beaches, there are three parking areas at present: a graded lot below the railroad embankment, the shoulders of Highway 1, and the shoulders of Bonny Doon Road. The small to medium sized graded dirt parking lot sits west directly off Highway 1 (Zone LCTB-2). This access point offers moderate access through some semi-rugged trails to beaches and has an approximate capacity of 50 cars. On the west side of Highway 1, not too far north from Davenport Landing, there is a dirt parking area that is frequently used by vehicles (Zone MCTB-1). This parking area has a capacity of approximately ten cars. Due to its size and proximity to Davenport Landing beaches, this dirt parking area is another major access point with potential to become an established parking lot.

Unimproved Parking Areas

At the south end of Davenport Bluff and Beaches in the San Vicente Watershed, an existing grassy dirt area is frequently used by visitors to the Davenport Beaches as well as by community members (Zone IA-3). This access point is a convenient pull out area off of Highway 1, and is valued by community members for its seasonal wildflower blooms as well as its accessibility to the Davenport Bluff and Beaches. The parking at Panther Beach (a.k.a. Shark Tooth) and at the "other " Panther is along the west side of the highway adjacent to gated farm roads that access the rail line and the fields.

Miscellaneous Access Points

There are a few discernible access points where visitors and farmers have pulled over for convenience and accessibility to Coast Dairies beaches and farms. These access points mostly include gravel or dirt shoulders off of the road.

In the Molino Watershed, for example, a small grassy area sandwiched between Highway 1 and the head of Swanton Road offers space for vehicles to pull over (Zone MCT-2). This access point sits on a fallow land and has been at times used by cars, especially maintenance vehicles, as a convenient space to pull over before heading into the grasslands of the Molino Watershed. The capacity at this access point is approximately five cars.

At Davenport Landing, parking is available on both sides of the county road in front of the beach. There is room for approximately 20 vehicles on the road shoulders, which is unpaved, rutted, and deteriorating in places. Access from Highway 1 onto Davenport Landing Road, a side road, is reasonably safe at both intersections (see Figure 4.3-1 a,b, etc., Zone MP-3). Again, in the Molino Watershed at Scotts Creek Beach, parking often occurs mainly along the shoulders of Highway 1, as well as in two small turnouts at the south end of the beach (see Figure 4.3-1 a,b, etc., Zone MB-1) These parking areas can hold an estimated 60-100 cars, but are filled only during peak-use periods. As mentioned earlier, at the Bonny Doon Beaches, there are also road shoulders for parking off of Highway 1, and Bonny Doon Road.

5.4.5 EXISTING ACCESS AND RECREATION OVERVIEW

5.4.5.1 ACCESS

Independent of other considerations, i.e., viewed strictly as an expression of the status quo, those areas with the highest potential to establish site-specific recreation centers are in zones LASPZ-3, LB-2, and MCT-2. Such recreation staging areas could be envisioned as developed trail–heads with signage, scenic interpretive areas, or visitors' centers with parking. These potential sites are situated near multiple access routes, and have proximity to potential parking spaces. In zone LASPZ-3, for example, the potential site identified is the Old Laguna Inn and the surrounding structures. Here, one has access via Laguna Creek Road, and the access route continues inland, connecting into other trails and paths. This area could serve as an important service entry point for visitors approaching the Coast Dairies inland areas from the south.

5.4.5.2 ACCESS ROUTES AND POINTS

To date, the Coast Dairies Property, particularly the inland zones, has few direct access routes off Highway 1. Bonny Doon, Swanton, and Laguna Roads are among the more discernible access routes off Highway 1 inland. Several graded dirt roads provide moderate access within the watersheds on the inland property, and have potential to become more developed trails or paths. Generally, access crossing the watersheds is limited to unimproved paths such as cow paths across grasslands as in zone LP-3, and the winding graded dirt roads found in the Molino Watershed zones. The potential to connect these unimproved paths within their respective zones suggests trail systems working together to create inter-watershed loops.

In terms of access points, there are very few existing parking options available for vehicles coming from either the north or south on Highway 1. Existing (already heavily used) paved parking areas can be found in places such as outside restaurants/shops in the Town of Davenport. Existing graded parking areas as well as unimproved parking areas off Highway 1 have potential to become key longer-term parking lots and/or shorter-term scenic pull outs. Currently, cars park where it is relatively safe or convenient to stop, regardless of whether or not an area is an established parking area.

The following are tables (5.4-3 through 5.4-7) for each of the five watersheds on the Coast Dairies Property. In the tables, a value of one to three has been assigned to each analysis zone where three represents the highest value for recreation, when viewed as a possible resource use. Again, these are presented as a way to summarize the recreation inventory and *do not* represent planning direction. Categories for the uses are based mainly on access routes and access points, but include some of the visual ("Vista Points") information described in more detail in Section 5.4.6. The listed analysis zones generally covered all those zones which were traversed by a trails or roads taken during Planning Team field visits.

TABLE 5.4-3
COAST DAIRIES PROPERTY
EXISTING RECREATION ASSESSMENT IN ANALYSIS ZONES
LAGUNA WATERSHED

Zone	Vista Points	Access Routes: Trails and Paths	Access Points: Misc. Parking Areas	Recreation Uses
LACT-1	3	2	2	
LAS-1	3	2		3
LAW-1	3	1		1
LAW-3	3	2		
LACTB-1	3	2	2	
LASPZ-4	3	1		3
LAM-1	3	2		3
LASPZ-3	3	3	2	2
LASPZ-2	3			3
LAS-2	3	1		2

TABLE 5.4-4
COAST DAIRIES PROPERTY
EXISTING RECREATION ASSESSMENT IN ANALYSIS ZONES
YELLOWBANK WATERSHED

Zone	Vista Points	Access Routes: Trails and Paths	Access Points: Misc. Parking Areas	Recreation Uses
YBB-1	3	3	2	2
YBCT-2	3	2		2
YBCTB-1	3		2	3
YBS-2	3	1		3
YBP-2	2	2		
YBCT-2	2			
YBSPZ-1	2	1		2
YBW-1	3	1		2

TABLE 5.4-5
COAST DAIRIES PROPERTY
EXISTING RECREATION ASSESSMENT IN ANALYSIS ZONES
LIDDELL WATERSHED

Zone	Vista Points	Access Routes: Trails and Paths	Access Points: Misc. Parking Areas	Recreation Uses
LCT-1	2	3		
LW-1	2	3		
LB-2	3	3	2	3
LP-2	3	2		2
LW-3	3	3		2
LSPZ-2	2	1		3
LW-2	3	1		1
LW-4	3			
LP-1				
LS-1	3	2		2

TABLE 5.4-6
COAST DAIRIES PROPERTY
EXISTING RECREATION ASSESSMENT IN ANALYSIS ZONES
SAN VICENTE WATERSHED

Zone	Vista Points	Access Routes: Trails and Paths	Access Points: Misc. Parking Areas	Recreation Uses
IA-3		2	3	
SVW-1	3	2		3
SBB-1	3	3	3	3
SVP-2	2	2		
IA-2			1	
SVCT-2			2	
SVCT-1				
SVP-1	3	2		3
SVPZ-1	3	2		3

TABLE 5.4-7
COAST DAIRIES PROPERTY
EXISTING RECREATION ASSESSMENT IN ANALYSIS ZONES
MOLINO WATERSHED

Zone	Vista Points	Access Routes: Trails and Paths	Access Points: Misc. Parking Areas	Recreation Uses
MCT-4	3	3		3
MS-1	3	3		3
MP-4	2	2	2	2
MP-1	3	2		2
MP-3	3	3	3	
MP-2	3	2	2	3
MW-1	3	1		2
MCT-3	3	1		2
MCTB-1	3		2	3
MCT-2	2	1	2	
MB-1	3		2	3
MSPZ-2				
MCT-1		2		2

5.4.6 VISUAL RESOURCES

The visual resources of the Coast Dairies Property comprise a scenic interface of rugged coastline, sandy beaches, coastal agricultural terraces, pastoral grasslands, and densely forested uplands and riparian corridors. The dominant built feature on the Coast Dairies landscape is the RMC Pacific Materials Davenport Cement Plant, with a tower that rises 245 feet above the landscape. The Davenport Cement Plant serves as one of the primary built landmarks for the Coast Dairies Property as one travels south on Highway 1, a designated Scenic Road, towards the small community of Davenport. Highway 1, Bonny Doon Road, and Swanton Road are all considered Scenic Roads that are valued for their scenic vistas. The public vistas from these roads are afforded the highest level of protection by Santa Cruz County (Santa Cruz County, 1994).

TABLE 5.4-7
COAST DAIRIES PROPERTY
EXISTING RECREATION ASSESSMENT IN ANALYSIS ZONES
MOLINO WATERSHED

Zone	Vista Points	Access Routes: Trails and Paths	Access Points: Misc. Parking Areas	Recreation Uses
MCT-4	3	3		3
MS-1	3	3		3
MP-4	2	2	2	2
MP-1	3	2		2
MP-3	3	3	3	
MP-2	3	2	2	3
MW-1	3	1		2
MCT-3	3	1		2
MCTB-1	3		2	3
MCT-2	2	1	2	
MB-1	3		2	3
MSPZ-2				
MCT-1		2		2

5.4.6 VISUAL RESOURCES

The visual resources of the Coast Dairies Property comprise a scenic interface of rugged coastline, sandy beaches, coastal agricultural terraces, pastoral grasslands, and densely forested uplands and riparian corridors. The dominant built feature on the Coast Dairies landscape is the RMC Pacific Materials Davenport Cement Plant, with a tower that rises 245 feet above the landscape. The Davenport Cement Plant serves as one of the primary built landmarks for the Coast Dairies Property as one travels south on Highway 1, a designated Scenic Road, towards the small community of Davenport. Highway 1, Bonny Doon Road, and Swanton Road are all considered Scenic Roads that are valued for their scenic vistas. The public vistas from these roads are afforded the highest level of protection by Santa Cruz County (Santa Cruz County, 1994).

5.4.6.1 SCENIC QUALITY EVALUATION

The scenic quality evaluation characterizes the visual appeal of a tract of land. The Coast Dairies Property was divided into eight Scenic Quality Rating Units (SQRUs) based on similarities among physiographic, vegetation, and development characteristics (see Figure 5.4-2). The areas delineated by the SQRUs include the beaches, coastal agricultural terraces, open grasslands and scrub, forested uplands, and developed areas such as Davenport, New Town, and RMC Pacific Materials' areas of operation. The SQRUs are discussed below, and the rating summary is included in Table 5.4-8.

TABLE 5.4-8
SCENIC QUALITY RATING SUMMARY

SCENIC QUALITY RATING UNITS	Landform (1 to 5)	Vegetation (1 to 5)	Water (0 to 5)	Color (1 to 5)	Adjacent Scenery (0 to 5)	Scarcity (1 to 5)	Cultural Modification (-4 to 2)	Total Score	Scenic Quality Rating	EXPLANATION
SQRU-1	5	3	5	5	5	5	0	28	A	Beaches
SQRU-2	3	3	3	3	5	3	2	22	A	Coastal agricultural terraces and Davenport Landing
SQRU-3	3	5	2	3	5	3	0	21	A	Open grasslands and scrub
SQRU-4	1	3	2	1	5	1	-1	12	B	Developed areas: Davenport, RMC Pacific Materials Davenport Cement Plant, and New Town
SQRU-5	3	5	2	5	5	3	0	23	A	Forested uplands
SQRU-6	3	3	2	3	3	1	-4	11	C	Shale quarry
SQRU-7	3	5	2	5	5	3	2	25	A	Densely forested uplands
SQRU-8	1	3	3	3	3	1	-4	10	C	Mining Disposal Area C and Settlement Basins #3 and #4

SOURCE: Bureau of Land Management (1986) and Environmental Science Associates

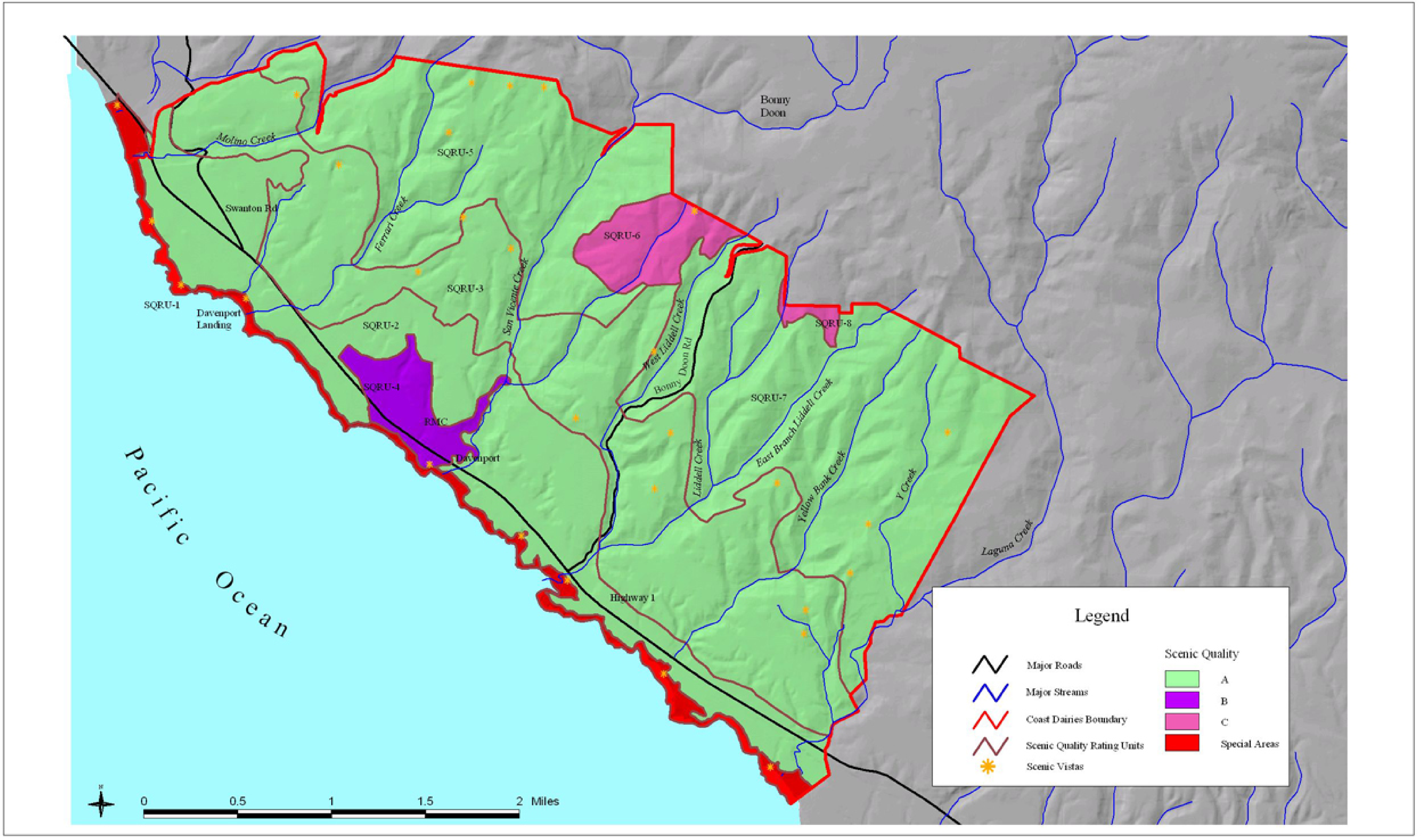
Scenic Quality Rating Unit #1

Scenic Quality Rating Unit #1 (SQRU-1) includes the coastal area and beaches of the Coast Dairies Property. This area is characterized by rugged rocky outcroppings and sandy pocket beaches. Based on the BLM rating system shown in Table 5.4-8, the dominant visual features in the coastal area are the striking landforms and views of the Pacific Ocean. The landform of the coastline exhibits high vertical relief as expressed in prominent cliffs and massive rock outcrops. The beach area exhibits some variety of vegetation, although vegetation is not one of the prominent features of this area. The Pacific Ocean is clearly a dominant water feature in the coastal area, introducing a great deal of movement and variation in color to the viewshed. Pleasing color contrasts are also evident in the interface of vegetation, rock, sand, and water. The adjacent scenery of the Pacific Ocean and the pastoral Coast Dairies marine terraces greatly enhance the visual quality of the area. Cultural modifications, such as constructing the trestles across the gullies and lagoons of the coastline to support Highway 1 and the railroad, have substantially altered the landscape, but in their present form do not introduce discordant elements to the landscape. As shown in Table 5.4-8, SQRU-1 has an “A” scenic quality rating indicating that the coastal area is a highly scenic area.

Special Areas

“Special Areas” are areas for which management objectives frequently require special consideration for the protection of visual values. As shown in Figure 5.4-2, the beaches (SQRU-1) on the Coast Dairies Property have been characterized as “Special Areas.”

Photo 5.4-1: Rugged Coast Dairies coastline at Yellow Bank Beach



SOURCE: Environmental Science Associates / Pacific Meridian Resources, USGS

Coast Dairies / 200071

Figure 5.4-2
Scenic Quality of the Coast Dairies Property

Scenic Quality Rating Unit #2

Scenic Quality Rating Unit #2 (SQRU-2) includes the coastal agricultural terraces of the Coast Dairies Property. This area is characterized by expansive agricultural fields atop marine coastal terraces, and related agricultural developments including barns and farmworker housing. This SQRU also features the small developed area of Davenport Landing, which includes U.S. Abalone's aquaculture operation and a small number of residential structures. The dominant visual features of the coastal agricultural terraces are the symmetrical visual lines of soil and crops, with the Pacific Ocean as a visually striking backdrop.

The landforms of the coastal marine terraces provide visually interesting features. The vegetation is a dominant visual feature of the agricultural fields providing a visually pleasing element in harmony with the surrounding area landscape. Water elements are present in SQRU-2 in the form of agricultural reservoirs and creek segments, but the influence of water is not a dominant feature of the landscape. The agricultural fields provide some color contrast between the maturing crops, fallow fields, and newly tilled fields. The adjacent scenery is one of the more striking visual features of the coastal agricultural terraces, with views of the rugged pacific coastline from the agricultural fields. Views of agricultural fields are not particularly scarce in the region, but they are distinctive visual elements. Cultural modifications in the form of the agricultural operations and developed features contribute harmoniously to the visual variety of the landscape. As shown in Table 5.4-8, SQRU-2 has an "A" scenic quality rating indicating that the coastal agricultural terraces are highly scenic areas.

Photo 5.4-2: Agricultural field in the Molino Creek watershed

Scenic Quality Rating Unit #3

Scenic Quality Rating Unit #3 (SQRU-3) includes the expansive open grasslands and scrub areas of the Coast Dairies Property. SQRU-3 is primarily located on the second and third terraces of the Property. Uniform rolling hills and low-lying vegetation with intermittent trees characterizes this area. The landform and vegetation are the dominant visual features of the grassland and scrub areas.

The landform of the open grassland and scrub area is characterized by rolling terraces of roughly uniform height. The creeks on the Coast Dairies Property have formed interesting erosional features in the landscape. The grass and scrub vegetation is a dominant visual feature of SQRU-3. A variety of vegetation types are expressed in interesting forms, textures, and patterns. Water is not a prominent feature in the grassland and scrub areas. The creeks traverse the grasslands, but are largely not visible due to dense vegetation in the canyons. The variety of vegetation types provides some contrast in the colors visible in this area of the Property. The adjacent scenery, including the Pacific Ocean, agricultural fields, and densely forested uplands, visually enhance the grassland and scrub area. In terms of scarcity, views of grassland and scrub are distinctive, though somewhat similar to others within the region. Cultural modifications in the form of utility lines and roadways add little or no visual variety to the area, and in the context of the surrounding region introduce no discordant elements. As shown in Table 5.4-8, SQRU-3 has an “A” scenic quality rating indicating that the open grasslands and scrub areas are highly scenic.

Photo 5.4-3: Open grassland and scrub in the Liddell Creek watershed

Scenic Quality Rating Unit #4

Scenic Quality Rating Unit #4 (SQRU-4) includes the developed areas of Davenport, the RMC Pacific Materials Davenport Cement Plant, and New Town. The landforms in the vicinity of the developed areas have no particular visual appeal. The landform is predominantly flat with few interesting landscape features. The vegetation in the developed areas exhibits some variety, but only two or so major types of vegetation. Water is not a prominent feature in the developed areas; although San Vicente Creek borders the southeast side of Davenport, the creek is not a visually dominant feature of the landscape. In terms of the visual landscape, color variations in the developed areas are subtle and muted and do not visually enhance the scenery. The scenery adjacent to the developed areas, including views of the Pacific Ocean and the Coast Dairies Property, greatly enhance the visual quality of these areas. In terms of scarcity, the developed areas are interesting within their setting, but are fairly common within the region. Cultural modifications, in the form of buildings and other built structures, in the context of the surrounding region do not introduce discordant elements, with the exception of the RMC Davenport Cement Plant tower. This 245-foot tower is the largest built element on the Property, and visually intrudes on the scenic landscape. As shown in Table 5.4-8, SQRU-4 has an “B” scenic quality rating indicating that the developed areas are moderately scenic.

Photo 5.4-4: View of developed areas of the Coast Dairies Property: New Town in the middleground and the RMC Pacific Materials Davenport Cement Plant in the background

Scenic Quality Rating Unit #5

Scenic Quality Rating Unit #5 (SQRU-5) includes the forested uplands on the northeast side of the Coast Dairies Property. The landform of the forested uplands is characterized by steep hillsides that drop sharply into canyons formed by the creeks traversing the area. There are a variety of vegetation types in the forested uplands that provide visually interesting forms, textures, and patterns. The creeks that traverse the uplands are not a dominant water feature of the landscape. They are largely not visible due to the dense vegetation in the canyons. Rich color combinations are a dominant visual feature as a result of the variety of vegetation types in the forested areas. The scenery adjacent to the forested uplands, including views of the Coast Dairies Property and somewhat long-range views of the Pacific Ocean, substantially enhance the visual quality of the forested areas. In terms of scarcity, the forested areas are distinctive, though somewhat similar to other scenery in the region. Cultural modifications in the forested uplands include utility lines, the conveyor belt system, and roadways. These modifications add little to the scenic quality of the area, however, in the context of the surrounding region they do not introduce discordant elements. As shown in Table 5.4-8, SQRU-5 has an “A” scenic quality rating indicating that the forested uplands are highly scenic.

Photo 5.4-5: Forested uplands in the Molino Creek watershed

Scenic Quality Rating Unit #6

Scenic Quality Rating Unit #6 (SQRU-6) includes RMC Pacific Materials' shale quarry. The landform of the shale quarry has been substantially modified by the mining operations. The resulting landscape has moderate visual appeal. The vegetation in the shale quarry has been similarly modified as a result of the quarry operations. The quarry area exhibits some variety in vegetation, but due to extensive disturbance the vegetation does not greatly enhance the scenery at the quarry. Water is not a dominant element of the shale quarry. The creeks and other water bodies are not visible from this area. The contrast of colors of the soil, rock, and vegetation in the quarry introduce visually interesting elements. In terms of the adjacent scenery, views of the Coast Dairies Property enhance the visual quality of the shale quarry. With respect to the scarcity of the landscape, the quarry operation is somewhat unique to the region, however, the scarcity of the quarry does not enhance its visual appeal. Cultural modifications resulting from the mining operations are visually discordant in the context of the surrounding property and detract from the scenery in the form of a negative intrusion. As shown in Table 5.4-8, SQRU-6 has a "C" scenic quality rating indicating that the shale quarry has little scenic value.

Photo 5.4-6: RMC Pacific Materials' shale quarry on the Coast Dairies Property

Scenic Quality Rating Unit #7

Scenic Quality Rating Unit #7 (SQRU-7) includes the densely forested uplands on the southeastern side of the Coast Dairies Property. The landform of the densely forested uplands is characterized by steep hillsides that drop sharply into canyons formed by the creeks traversing the area. There are a variety of vegetation types in the forested uplands that provide visually interesting forms, textures, and patterns. The creeks that traverse the uplands are not a dominant feature of the landscape. They are largely not visible due to the dense vegetation in the canyons. Rich color combinations are a dominant visual feature as a result of the variety of vegetation types in the forested areas. The scenery adjacent to the forested uplands, including views of the Coast Dairies Property and somewhat long-range views of the Pacific Ocean, substantially enhance the visual quality of the forested areas. In terms of scarcity, the forested areas are distinctive, though somewhat similar to other scenery in the region. Cultural modifications in the forested uplands include utility lines, the conveyor belt system, and roadways. These modifications add little to the scenic quality of the area, however, in the context of the surrounding region they do not introduce discordant elements. As shown in Table 5.4-8, SQRU-7 has an “A” scenic quality rating indicating that the densely forested uplands are highly scenic.

Photo 5.4-7: Densely forested uplands in the Yellow Bank Creek watershed

Scenic Quality Rating Unit #8

Scenic Quality Rating Unit #8 (SQRU-8) includes RMC Pacific Materials' Disposal Area C and Settlement Basins #3 and #4. The landforms of the mining areas have been substantially modified by the mining operations. The resulting landscape has little visual appeal. The vegetation in the disposal area and settlement basins has been similarly modified as a result of the development of these areas. The settlement basins exhibit some variety in vegetation and the disposal area exhibits little vegetation, as a result the vegetation does not enhance the scenery at these areas. Water is not a dominant element of the disposal area, but is a prominent feature at the settlement basins. There is little color contrast in the mining areas resulting in few visually interesting elements. In terms of the adjacent scenery, views of the Coast Dairies Property enhance the visual quality of the mining areas. With respect to the scarcity of the landscape, the mining operation is somewhat unique to the region, however, the scarcity of the operation does not enhance its visual appeal. Cultural modifications resulting from the mining operations are visually discordant in the context of the surrounding property and detract from the scenery in the form of a negative intrusion. As shown in Table 5.4-8, SQRU-8 has a "C" scenic quality rating indicating that the disposal area and the settlement basins have little scenic value.

Photo 5.4-8: RMC Pacific Materials' Disposal Area C on the Coast Dairies Property

Photo 5.4-9: RMC Pacific Materials' Settlement Basin #3 on the Coast Dairies Property

Scenic Vistas

The Coast Dairies Property has many scenic vistas from which expansive views of the Pacific Ocean and the Property can be seen. A total of 29 scenic vistas have been identified (see Figure 5.4-2), based on accessibility, topography, and the quality of the viewshed from the scenic vista. The vistas provide examples of views of and from the Coast Dairies Property, and are not intended to be an exhaustive catalogue of the scenic vistas of the Property. The vistas are predominantly located along the coastal bluffs and on areas of high topography on the Coast Dairies Property. Vistas located along the coastal bluffs provide short-range views of the Pacific Ocean, beaches, and rugged coastline, and medium- and long-range views of the Coast Dairies Property. Scenic vistas located in the upland areas of the Coast Dairies Property provide expansive views of the Property, as well as medium- to long-range views of the Pacific Ocean and the surrounding region. Scenic vistas in the upland areas of the Coast Dairies Property also provide visually interesting views of interior Property features including wet meadows and unique trail corridors.

Photo 5.4-10: Scenic vista of a unique trail corridor in Analysis Zone MP-2

5.4.6.2 SENSITIVITY LEVEL EVALUATION

The sensitivity level evaluation measures assumed public concern for scenic quality. As mentioned in the visual resources methodology section, the Planning Team acknowledges that the sensitivity level evaluation is not a surveyed measure of public concern for the scenic quality of the Coast Dairies Property, but rather estimation of public concern guided by criteria provided by BLM's *Visual Resource Inventory* (VRI) methodology. Using the VRI methodology, the Coast Dairies Property was divided into three Sensitivity Level Rating Units (SLRUs) (see Figure 5.4-3). The areas delineated by the SLRUs include the areas visible from Highway 1, Bonny Doon Road, and Swanton Road, all of which are county-designated Scenic Roads; the areas not visible from Highway 1, Bonny Doon Road, and Swanton Road; and the areas of the active shale quarry, Disposal Area C, and Settlement Basins #3 and #4. Each of the Sensitivity Level Rating Units is mutually exclusive. The SLRUs are discussed below, and the rating summary is included in Table 5.4-9.

Sensitivity Level Rating Unit #1

Sensitivity Level Rating Unit #1 (SLRU-1) includes the areas visible from Highway 1, Bonny Doon Road, and Swanton Road, all of which are county-designated Scenic Roads (see Figure 5.4-3). Since public recreation currently is largely prohibited on the Coast Dairies Property (with the exception of the beach areas), the public's primary experience with the Coast Dairies Property is as recreational sightseers from Highway 1, Bonny Doon Road, and Swanton

Photo 5.4-10: Scenic vista of a unique trail corridor in Analysis Zone MP-2

5.4.6.2 SENSITIVITY LEVEL EVALUATION

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Road. The primary type of user for SLRU-1, therefore, is a recreational sightseer or local resident. Maintenance of the visual quality of the area is likely a major concern for most users. Since Highway 1, and to lesser degrees Bonny Doon Road and Swanton Road, are highly traveled corridors, these viewsheds receive a high level of use. Maintaining the visual quality of these viewsheds from the Scenic Roads is of high public interest, and is a major public issue. In terms of adjacent and nearby land uses, such as Wilder Ranch State Park, Henry Cowell Redwoods State Park, Big Basin State Park, and the Davenport and Bonny Doon communities, maintaining the visual quality of the Coast Dairies Property to sustain the recreational and residential objectives of these adjacent land uses is very important. As shown in Table 5.4-9, SLRU-1 has a "High" sensitivity level rating indicating that there is high public concern for maintaining the visual quality of the viewsheds from Highway 1, Bonny Doon Road, and Swanton Road.

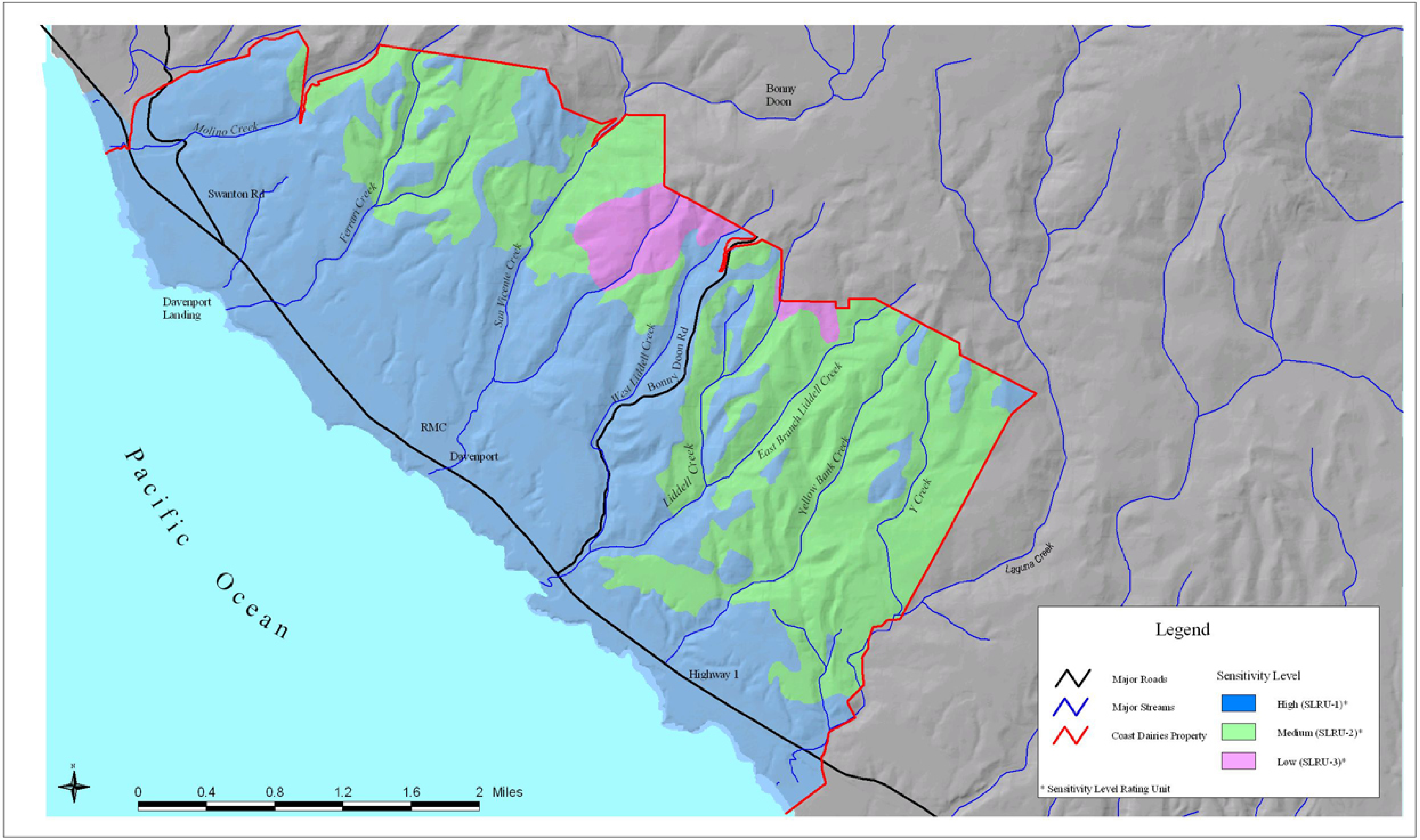
TABLE 5.4-9
SENSITIVITY LEVEL RATING SUMMARY

SENSITIVITY LEVEL RATING UNIT	Type of User	Amount of Use	Public Interest	Adjacent Land Uses	Overall Rating	EXPLANATION
SLRU-1	H	H	H	H	H	Areas visible from Highway 1, Bonny Doon Road, and Swanton Road
SLRU-2	M	L	M	M	M	Areas not visible from Highway 1, Bonny Doon Road, and Swanton Road, not included in SLRU-3
SLRU-3	L	M	L	M	L	Active Shale Quarry, Disposal Area C, and Settlement Basins #3 and #4.

SOURCE: Bureau of Land Management (1986) and Environmental Science Associates

Sensitivity Level Rating Unit #2

Sensitivity Level Rating Unit #2 (SLRU-2) includes the area on the Coast Dairies Property not visible from Highway 1, Bonny Doon Road, and Swanton Road (see Figure 5.4-3). SLRU-2 also excludes RMC Pacific Materials' shale quarry, Disposal Area C, and Settlement Basins #3 and #4, all of which constitute SLRU-3. Similar to SLRU-1, the primary type of user for SLRU-2 is a recreational sightseer or local resident. Maintenance of the visual quality of SLRU-2 is likely a moderate concern for most users, because this area of the Property is not visible from current public access routes, but the public derives some benefit from the knowledge that the visual quality of the area is being maintained. SLRU-2 currently receives a low level of public use since public access to this area of the Coast Dairies Property is not permitted and the area is not visible



SOURCE: Environmental Science Associates / Pacific Meridian Resources, USGS

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Figure 5.4-3
Visual Sensitivity Level of the Coast Dairies Property

from the Scenic Roads. In terms of public interest, maintaining the visual quality of SLRU-2 is likely a moderate public issue. With respect to adjacent and nearby land uses, such as Wilder Ranch State Park, Henry Cowell Redwoods State Park, Big Basin State Park, and the Davenport and Bonny Doon communities, maintaining the visual quality of SLRU-2 to sustain the recreational and residential objectives of these adjacent land uses is moderately important, due to the limited visibility of the area. As shown in Table 5.4-9, SLRU-2 has a "Medium" sensitivity level rating indicating that there is moderate public concern for maintaining the visual quality of this area of the Coast Dairies Property.

Sensitivity Level Rating Unit #3

Sensitivity Level Rating Unit #3 (SLRU-3) includes RMC Pacific Materials' shale quarry, Disposal Area C, and Settlement Basins #3 and #4. The primary types of user for SLRU-3 are the RMC workers. Maintenance of the visual quality of SLRU-3 is likely a low concern for RMC workers, because the workers likely expect the visual quality of this area to change due to the nature of the mining work conducted in SLRU-3. In terms of the amount of use of the area, SLRU-3 currently receives a moderate level of use from the activities of the workers. Maintaining the visual quality of SLRU-3 is likely of minor public interest to the users. With respect to adjacent and nearby land uses, including the remainder of the Coast Dairies Property, RMC's privately owned property east of Coast Dairies, and the Bonny Doon community, maintaining the visual quality of SLRU-3 to sustain the open space, forestry and mining, and residential objectives, respectively, of these adjacent land uses is moderately important, due to the limited visibility of the area and the varied types of uses nearby. As shown in Table 5.4-9, SLRU-3 has a "Low" sensitivity level rating indicating that there is low public concern for maintaining the visual quality of this area of the Coast Dairies Property.

5.4.6.3 DISTANCE ZONES

Distance zones evaluate the relative prominence of viewsheds on the Coast Dairies Property. The Coast Dairies landscape was divided into three distance zone classifications based on relative visibility from county-designated Scenic Roads, which include Highway 1, Bonny Doon Road, and Swanton Road. The three distance zone classifications are Foreground-Middleground, Background, and Seldom Seen. Figure 5.4-4 shows the distance zones of the Coast Dairies Property. The distance zones are discussed below.

Foreground-Middleground Distance Zone

The Foreground-Middleground distance zone is the area of the Coast Dairies Property that is visible from Highway 1, Bonny Doon Road, and Swanton Road, all of which are county-designated Scenic Roads, and within a one-mile buffer of the identified roadways (see Figure 5.4-4). The Foreground-Middleground distance zone encompasses the majority of the Coast Dairies Property, including much of the first and second terraces of the Property. The Foreground-Middleground distance zone is the area where management activities on the Coast Dairies Property may be viewed in detail from the Scenic Roads. This distance zone is the area where the texture and form of individual plants and other visible features are easily discernable on the landscape.

Background Distance Zone

The Background distance zone is the area of the Coast Dairies Property that is visible from Highway 1, Bonny Doon Road, and Swanton Road, but outside a one-mile buffer zone of the Scenic Roads (see Figure 5.4-4). The Background distance zone encompasses a minor portion of the Coast Dairies Property, predominantly comprising areas of high elevation in the forested uplands of the Property. The Background distance zone is the area where long-range views of management activities on the Coast Dairies Property may be seen from the Scenic Roads. The Background distance zone is the area where the texture and form of individual plants and other visible features are not discernable on the landscape. Vegetation types are visible, however, in patterns of light and dark.

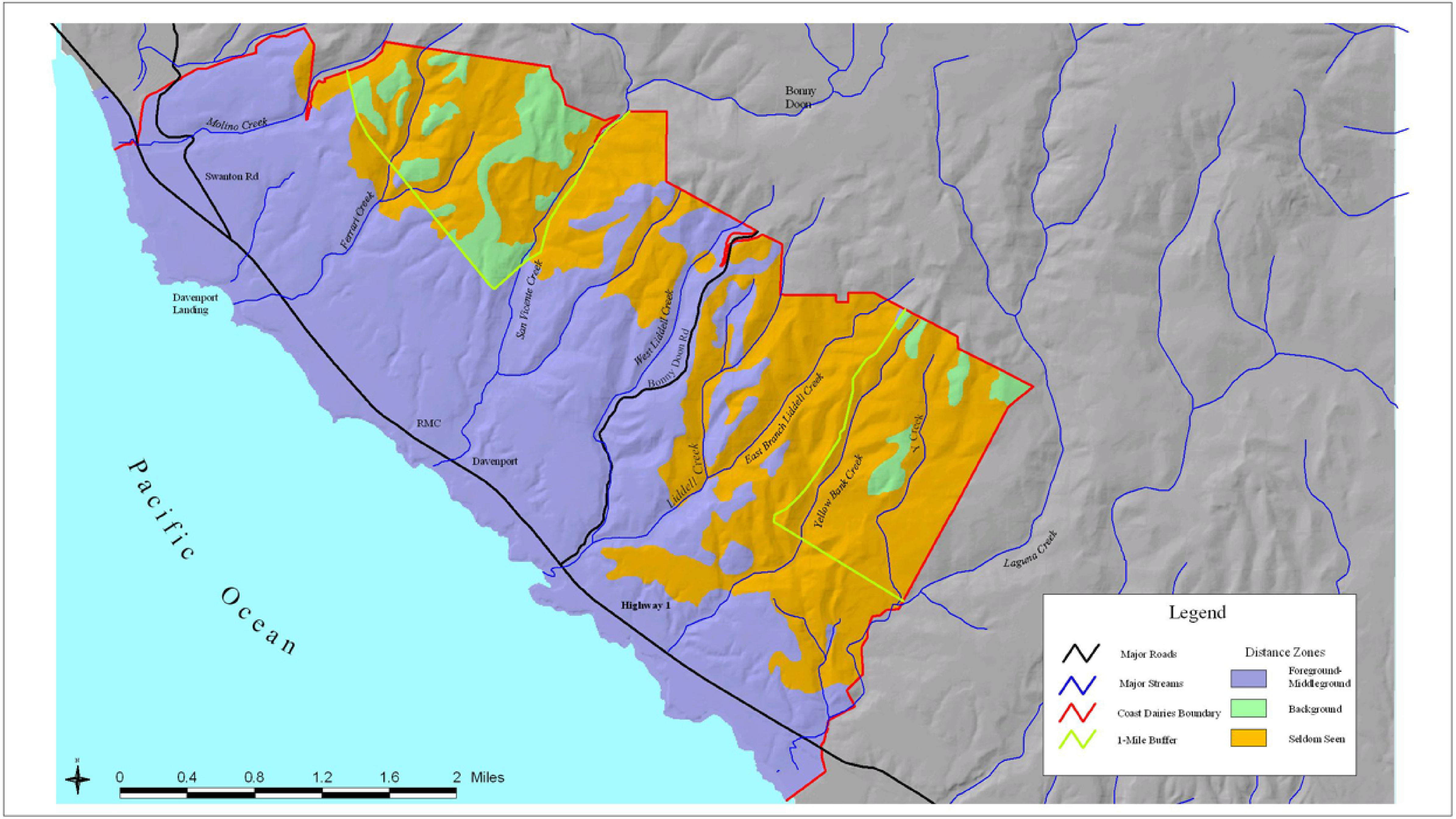
Seldom Seen Distance Zone

The Seldom Seen distance zone is the area of the Coast Dairies Property that is not visible from Highway 1, Bonny Doon Road, and Swanton Road, regardless of the one-mile buffer (see Figure 5.4-4). The Seldom Seen distance zone is not visible from these Scenic Roads largely due to topography. The Seldom Seen distance zone encompasses about one-third of the Coast Dairies Property. This distance zone is largely located in the forested upland areas of the Coast Dairies Property. The steep canyons in which the creeks are located in the upper terraces of the Property are among the areas included in the Seldom Seen Zone. This is not surprising since they are areas of low elevation. The Seldom Seen distance zone is the area where management activities on the Coast Dairies Property are not visible from the Scenic Roads.

5.4.6.4 VISUAL RESOURCE CLASSES

The visual resource classes for the Coast Dairies Property are an inventory tool that portray the relative value of the Property's visual resources, and can be used as informational tools in planning efforts to portray the visual management objectives of the area. These visual resource classes do not establish management direction and should not be used as a basis for constraining or limiting surface disturbing activities.

There are a total of four visual resource classes: Class I, Class II, Class III, and Class IV. These classes were developed based on the scenic quality, sensitivity level, and distance zones analyses (see the visual resources methodology in Section 5.4.1.3 for a description of how the visual resource classes were developed from these analyses). The Coast Dairies Property includes three of the four classes: Class I, Class II, and Class IV (see Figure 5.4-5). The visual resource classes are discussed below.



SOURCE: Environmental Science Associates, Pacific Meridian Resources, USGS

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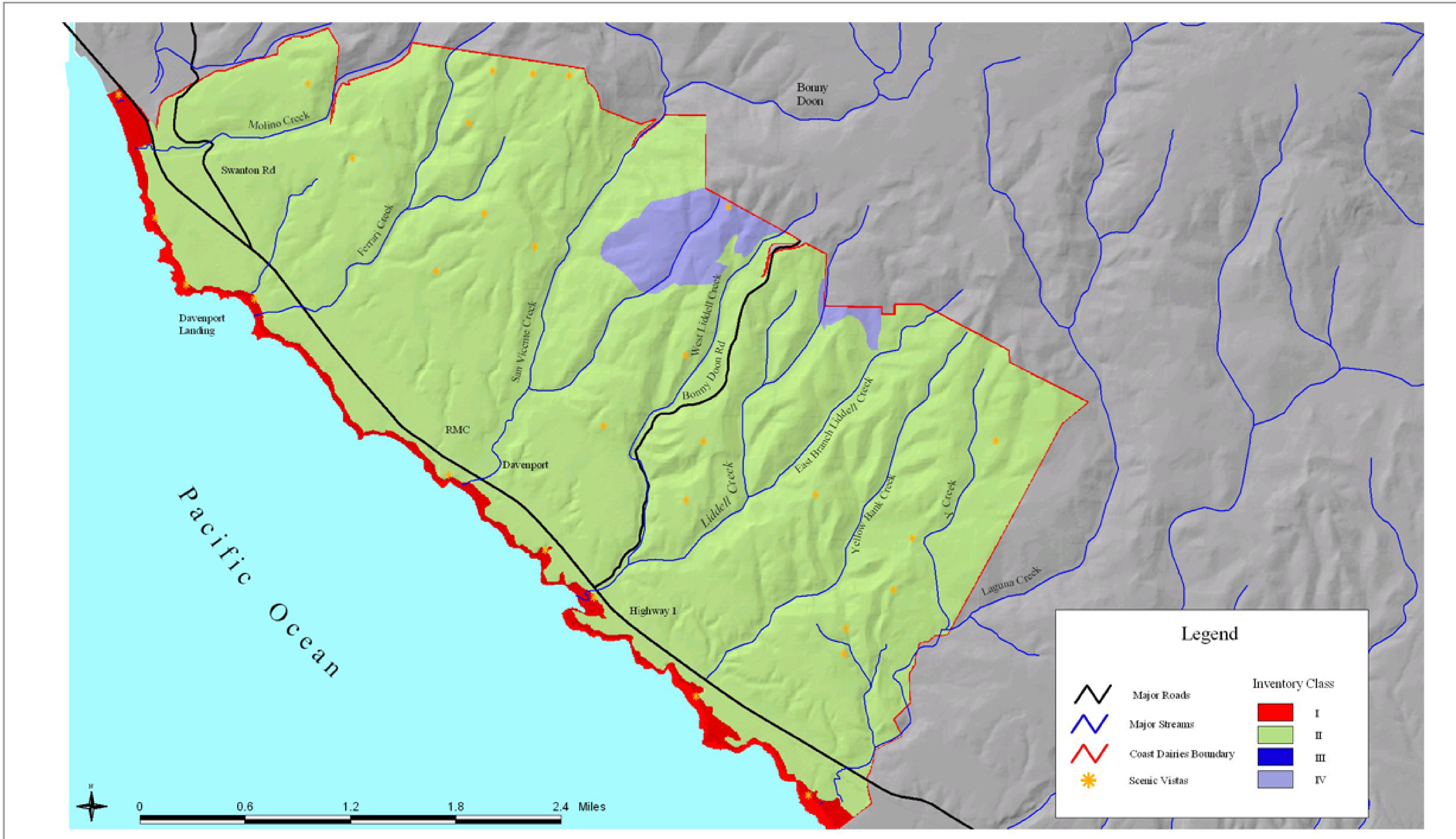
Figure 5.4-4
Visual Distance Zones of the Coast Dairies Property



SOURCE: Environmental Science Associates / Pacific Meridian Resources, USGS

Coast Dairies / 200071

Figure 5.4-5
Visual Resource Inventory of the Coast Dairies Property

Visual Resource Class I

Visual Resource Class I represents the most valued visual resources. The Class I designation is limited to "Special Areas" where management objectives frequently require special consideration for the protection of visual values. As shown in Figure 5.4-5, the beaches on the Coast Dairies Property have been characterized as "Special Areas" and therefore as a Class I visual resource requiring special consideration for the protection of visual values. The intent of Class I is to preserve the existing character of the landscape. The class provides for natural ecological changes, however, it does not preclude very limited management activity. The level of change to the characteristic landscape should be very low.

Visual Resource Class II

Visual Resource Class II represents highly valued visual resources. The Class II designation encompasses the majority of the Coast Dairies Property, recognizing the high scenic quality of the Property. From its densely forested uplands and steep riverine canyons, to the expansive grassland and scrub and coastal agricultural terraces, the Coast Dairies Property is visually remarkable. The intent of Class II is to retain the existing character of the landscape. The level of change to the characteristic landscape should be low. Management activities may be seen but should not attract the attention of the casual observer. Changes in the landscape should repeat the basic elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape.

Visual Resource Class III

Visual Resource Class III represents moderately valued visual resources. There are no Class III visual resources on the Coast Dairies Property. The intent of Class III is to partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate. Management activities may attract attention but should not dominate the view of the casual observer. Changes in the landscape should repeat the basic elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape.

Visual Resource Class IV

Visual Resource Class IV represents the least-valued visual resources. The Class IV designation encompasses a small part of the Coast Dairies Property in the vicinity of the RMC Pacific Materials' active shale quarry, Disposal Area C, and Settlement Basins #3 and #4 (see Figure 5.4-5). These areas have a low scenic quality rating and a low sensitivity level rating. The intent of Class IV is to provide for management activities that require major modifications to the existing character of the landscape. In Class IV, the level of change to the characteristic landscape can be high. These management activities can dominate the view and be a major focus of attention, although every attempt should be made to minimize the impact of these activities through careful location, minimal disturbance, and repeating basic visual elements. It is important to note that this visual resource class is a designation for the existing condition and not the future potential of these areas.

Summary

As shown in Figure 5.4-5, the majority of the Coast Dairies Property is designated as a Visual Resource Class II area. This characterizes Coast Dairies as a highly valued visual resource, in recognition of the high scenic quality of the Property. The Coast Dairies beach area is designated as a Visual Resource Class I area. This is the most highly valued visual resource area, and is limited to "Special Areas" where management objectives frequently require special consideration for the protection of visual values. RMC Pacific Materials' active shale quarry, Disposal Area C, and Settlement Basins #3 and #4 are designated as a Visual Resource Class IV area, which represents least-valued visual resources. These areas have low scenic quality and sensitivity level ratings.

The visual resource classes provide the basis for assessing the visual values in the resource management planning process. The visual resource classes are a useful informational tool in planning efforts to characterize visual resources and portray the visual management objectives of the area. During the resource management process, the visual resource class boundaries and objectives may be adjusted as necessary to reflect the resource allocation decisions made in the resource management planning process (BLM, 1986).

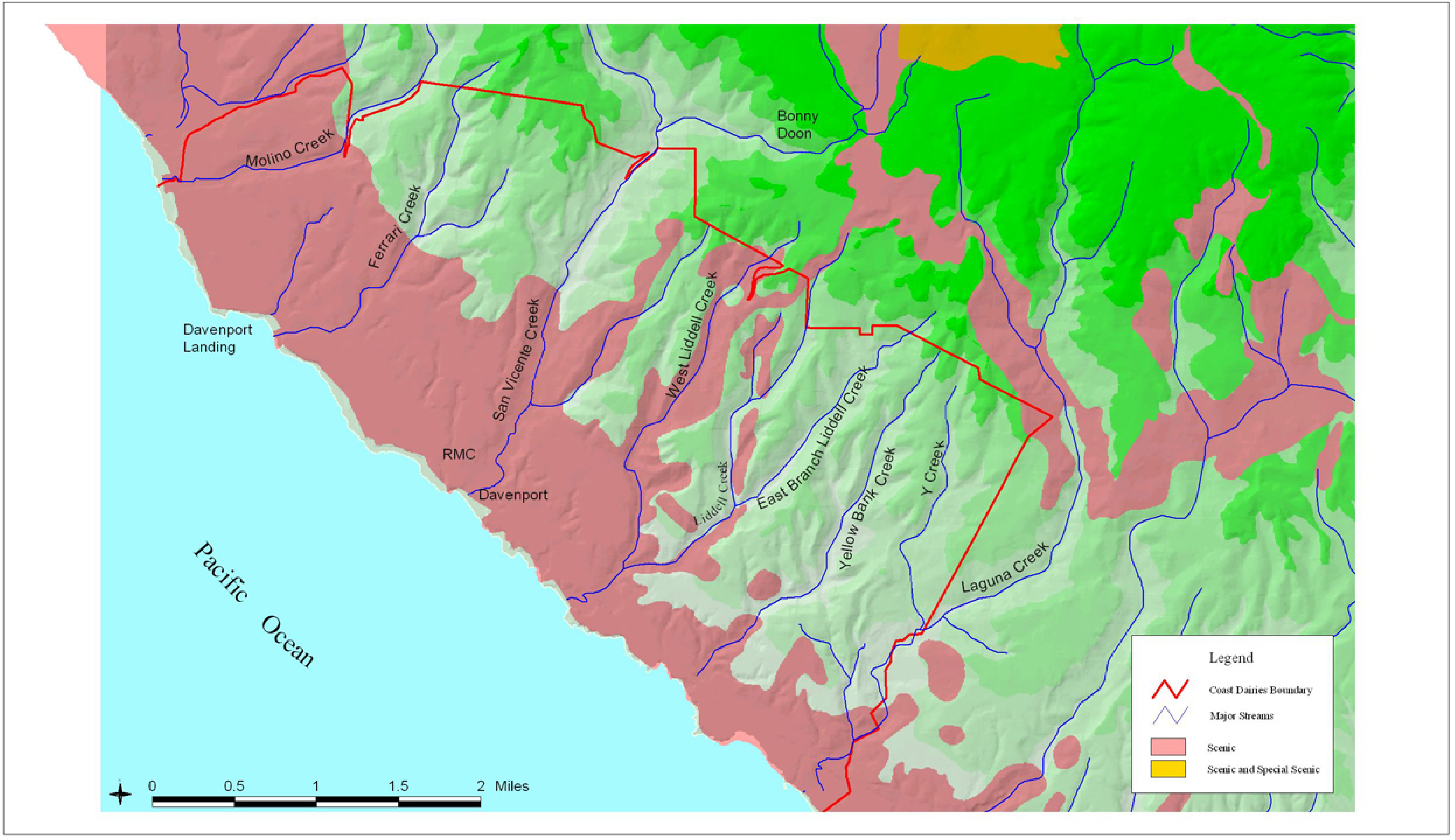
5.4.6.5 SANTA CRUZ COUNTY VISUAL RESOURCES POLICIES

The Santa Cruz County General Plan (1994) identifies specific objectives for the protection of visual resources in the county. These include:

- To identify, protect, and restore the aesthetic values of visual resources.
- To ensure that new development is appropriately designed and constructed to have minimal to no adverse impact upon identified visual resources.

Santa Cruz County identifies Scenic Roads in the county, including Highway 1 from San Mateo County to Monterey County, Bonny Doon Road from Highway 1 to Pine Flat Road, and Swanton Road from Highway 1 at Davenport Landing to Highway 1 at Greyhound Rock. The county-designated Scenic Roads are valued for their scenic vistas. According to the county, public vistas from these roads shall be afforded the highest level of protection. The visual resource classes designated for the Coast Dairies Property (described above) are consistent with this management policy.

Figure 5.4-6 shows the county-designated visual resources in the Coast Dairies area. This data was used as a base layer in the sensitivity level and distance zone analysis above, but was expanded upon using a GIS-based visibility analysis from the Highway 1 and Bonny Doon Road corridors.



SOURCE: Environmental Science Associates, Pacific Meridian Resources, USGS, Santa Cruz County GIS Dept.

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Figure 5.4-6
Designated Santa Cruz County Visual Resources in the Coast Dairies Area

The county recognizes that visual resources in Santa Cruz County possess diverse characteristics, and that the resources worthy of protection may include, but are not limited to, ocean views, agricultural fields, wooded forests, open meadows, and mountain hillside views. The county requires discretionary review for all development within the visual resource area of Highway 1, outside of the Urban/Rural boundary.

The county protects public vistas, agricultural vistas, ocean vistas, open beaches and blufftops, viewsheds of rural scenic roads, and views in the North Coast and Bonny Doon areas, as discussed below:

- Public Vistas. Significant public vistas (e.g., ocean views, agricultural fields, wooded forests, open meadows, and mountain hillside views) from all publicly used roads and vista points are protected by minimizing disruption of landform and aesthetic character caused by grading operations, timber harvests, utility wires and poles, signs, inappropriate landscaping and structure design. Landscaping must be provided to screen development that is unavoidably sited within these vistas.

- Agricultural Vistas. The aesthetic value of agricultural vistas is to be preserved. The county encourages development consistent with the agricultural character of the community.

- Ocean Vistas. Where public ocean vistas exist, the county requires that these vistas be retained to the maximum extent possible as a condition of approval for any new development.

- Open Beaches and Blufftops. The county prohibits the placement of new permanent structures that would be visible from a public beach, except under certain circumstances (Santa Cruz County, 1994).

- Viewsheds of Rural Scenic Roads. In the viewsheds of rural scenic roads, the county requires new discretionary review of development, including development envelopes in proposed land divisions, that development be sited out of public view and obscured by natural landforms and/or existing vegetation.

- Views in the North Coast and Bonny Doon Areas. In order to preserve the agricultural and coastal grassland vistas of the North Coast and Bonny Doon Highway 1 view corridor, the county prohibits the division of all grassland habitat as mapped on the county's resources and constraints maps.

The county identifies Coastal Special Scenic Areas in the 1994 *General Plan*. The Coast Dairies Property does not include any Coastal Special Scenic Areas. The Coastal Special Scenic Areas are identified below:

- Bonny Doon sandstone formations, generally found within the borders of Pine Flat Road, Laguna Creek, Ice Cream Grade, and Martin Road.

- The area enclosed by Swanton Road and Highway 1 scenic roads. In the Swanton Road Coastal Special Scenic Area (north of Last Chance Road toward Highway 1), the county requires new development to be hidden from public view.

Summary

The county has designated three Scenic Roads in the vicinity of the Coast Dairies Property, including Highway 1, Bonny Doon Road and Swanton Road. The Scenic Roads have been incorporated into the visual resources analysis. The county protects public vistas, including agricultural vistas, ocean vistas, open beaches and blufftops, rural scenic road vistas, and the agricultural and coastal grassland vistas of the North Coast and Bonny Doon Highway 1 view corridor. The visual resource classes developed in the visual resource analysis are consistent with the county's visual resource policies.

5.4.7 ISSUES

5.4.7.1 PUBLIC HEALTH AND SAFETY

Cliffs and Surf

One of the most serious and intractable recreation-related issues is part and parcel of the landscape itself (Roth pers. comm., 2001). People of all ages and physical abilities are on or near the edges of the cliffs, and signage does not seem to decrease the urge to scramble or peer over. In high surf conditions the dangers and the attraction increase together. "Rock-and-wave" incidents (falling or being swept away by waves) are the major search and rescue activity for park rangers at Wilder Ranch (Buchanan pers. comm. 2001).

RMC Operations

The working quarry, the trucks and conveyor belt that move the stone, and the plant itself have all the dangers associated with mining and heavy machinery. Although the operation has some potential for interpretive tours, it is a part of the Coast Dairies experience from which almost all visitors will be excluded for safety reasons.

5.4.7.2 PERCEIVED CONFLICTS

CAG-Identified Conflicts

In April, 2000, the CAG listed the following as potential problems in managing Coast Dairies as public land:

- It may be a challenge to achieve boundary control between grazing/farming/mining and recreational users;
- Good agricultural lands are in the lower areas that are most likely to be best suited for recreation; and
- Reducing agriculture (in extent and to the benefit of recreation uses) may conflict with agriculture that is economically feasible.

Summary

The county has designated three Scenic Roads in the vicinity of the Coast Dairies Property, including Highway 1, Bonny Doon Road and Swanton Road. The Scenic Roads have been incorporated into the visual resources analysis. The county protects public vistas, including agricultural vistas, ocean vistas, open beaches and blufftops, rural scenic road vistas, and the agricultural and coastal grassland vistas of the North Coast and Bonny Doon Highway 1 view corridor. The visual resource classes developed in the visual resource analysis are consistent with the county's visual resource policies.

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Mountain Bikes and Hikers

Mountain biking had its origins in the Bay Area in the 1970s (the "clunker" riders of Marin County) and Specialized Bicycle Components introduced the first mass-produced mountain bike in 1981. The sport has become widely popular as Americans have sought more demanding forms of physical exercise and for the simpler reason that the bikes are comfortable, durable, versatile and fun (MMWD, 1994). By the mid 1980s the opinion of other users had taken a definitely negative tone against trail bikes: they crowded the trails; they went too fast; they were not courteous (Watson et al., 1991). When trail uses appear to conflict, sociologists use phrases like "spatial, temporal and cognitive affective overlap which effects the user experience" (MMWD, 1994), but in plain language people walking in the woods are frequently made uncomfortable by people on bicycles regardless of any real rudeness, loud noise or physical danger.

A heavily used mountain bike park like Wilder Ranch may simultaneously record a 3.4:1 ratio of bikers to hikers and report that there have been no formal complaints by the latter against the former (Buchanan pers. comm., 2001). Depending on the agenda of the person hearing this, it can be sound evidence for coexistence or proof that hikers simply stay away from Wilder Ranch. Resource impacts must be analyzed separately and, like most land use decisions at Coast Dairies, will be decided in favor of protecting the resource. The perceived conflict between separate users is a complex and difficult problem that the Plan must address.

5.4.7.3 ESTABLISHED UNAUTHORIZED USES

Beach Camping

Beach camping is of two types. At any time of the year and on almost any beach, coast travelers find their way down to the beach and erect the usual colonies of brightly colored backpacking tents. In a more permanent way, the beaches attract those with nowhere else to go, and there are cases where individuals have persisted for months or even years.

Both uses are technically not illegal (Santa Cruz County Sheriff's Department pers. comm., 2001) and fall into a gray area of enforcement. Parking restrictions are signed and enforced, but none of the beaches are posted. In cases where a complaint is made and action taken, the camper only is violating the law when he or she refuses to leave after being informed. There has been no concerted effort to discourage this type of use along the North Coast. Moreover, since camping bans in San Mateo County and in metropolitan Santa Cruz have been enacted, Coast Dairies Beaches have probably (no data are available) experienced more campers, and campers who stay longer.

The associated litter and noise, and the "spill-over" onto Davenport town streets, is a major concern to local residents (Davenport Town Meeting, April 19, 2001), many of whom take it upon themselves to pick up and dispose of trash. Unlike many of the other recreation opportunities at Coast Dairies, where the Planning Team will be tasked with evaluating future uses, camping is an established use which be much harder to change without close cooperation with Santa Cruz County and a broad public consensus.

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5.5 LAND USE AND LAND TENURE

5.5.1 METHODOLOGY

The Coast Dairies Property encompasses a variety of disparate uses. From the highly visible coastal agriculture, mining, and beach use to the major transportation corridors, these often contrasting uses co-exist harmoniously to the degree they do largely owing to the size and topography of the Property.

The information in this chapter's land use discussion is drawn from more detailed discussions in other chapters of this document as well as from other references. In particular, this chapter refers to Chapter 5.2 - Agriculture; Chapter 5.3 - Mining; Chapter 5.4 - Recreation, Access, and Visual Resources; Chapter 5.7 - Socio-economics; and Section 6.0 - Local, State, and Federal Regulation of the Coast Dairies Property. The discussions of each of the above land uses in this chapter will necessarily be more general and concise than in the source chapters.

5.5.2 REGIONAL SETTING

The mosaic that is the Coast Dairies Property landscape includes sandy beaches, coastal dunes and cliffs, coastal bluff scrub, brackish marshes, riparian corridors, and redwood forests, as well as agricultural fields and grasslands. The relative isolation of this stretch of coast have left the Property and its environs in a largely undeveloped state. Santa Cruz County land use designations, such as Agriculture and Mountain Residential, have also promoted rural-style development.

Topographically, the Property is composed of a series of three marine terraces, the lower two of which are especially suited for crops. The first terrace lies along the ocean bluffs and is bisected by Highway 1. Moving inland and up in elevation from the coast, the second terrace features some of the best soils on the Property. The third terrace has primarily been used for cattle grazing and mining operations.

Portions of the Property are leased to RMC Pacific Materials (RMC) for shale quarrying, associated spoils dumpsites, sediment ponds, and a covered-belt conveyor corridor. RMC also owns a cement plant just to the north of the town of Davenport, on land that is outside of but surrounded by the Coast Dairies Property. In addition to these operations, RMC owns approximately 9,000 acres adjacent to the Property that it uses for limestone quarrying and sustainable forestry activities.

Two major transportation corridors, State Highway 1 and the Union Pacific Railroad, traverse the coast and divide the Property, running in parallel and crossing shortly before the railroad ends, just past the cement plant. Along their route, they pass the hamlets of Davenport, NewTown, and Davenport Landing.

Inholdings around the Property must enter discussions of the land uses on the Property due to their proximity and potential for influence on the Coast Dairies lands. Private inholdings include the communities of Davenport, residences in Davenport Landing and NewTown, the Davenport Cement Plant, a PG&E power substation along Warnella Road, two residential parcels along San Vicente Road, Union Pacific Railroad parcels along the railroad corridor, and land owned by state and local governments.

The Property's immediate surrounding land uses consist of a combination of agriculture, open space, rural-scale residential development, and some mining and timber activities to the north and west of the site (Bowman and Williams, 1989).

Further afield, but within a distance reasonable for understanding the context of the Property in its surroundings, lie several state parks and rural communities. The closest parks are Wilder Ranch State Park, Henry Cowell Redwoods State Park, and Fall Creek State Park; the nearest community is Bonny Doon. A larger radius takes in Big Basin State Park and the communities of Boulder Creek, Brookdale, Ben Lomond, and Felton (County of Santa Cruz, 2000).

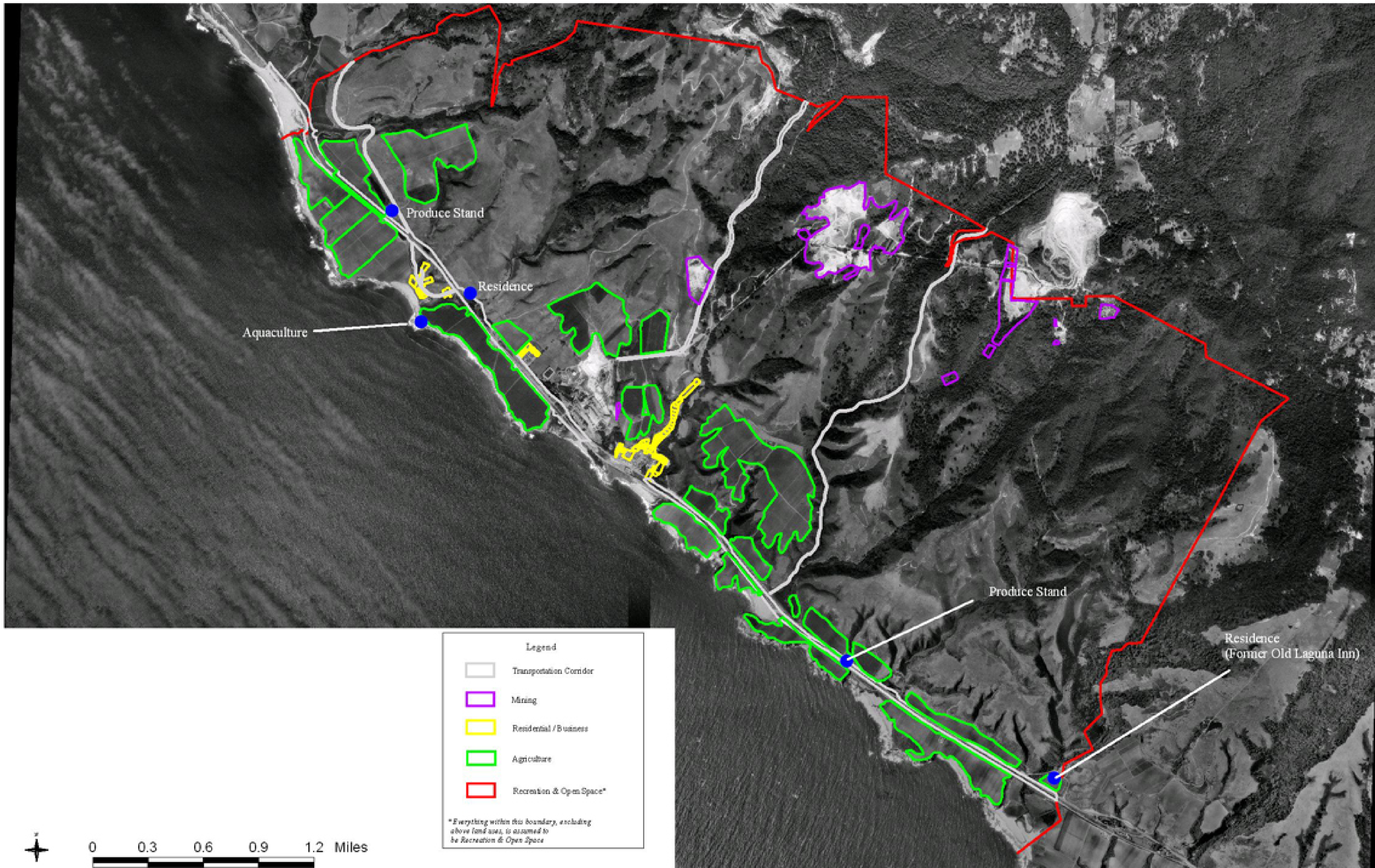
5.5.3 LAND USE

The *1994 Santa Cruz County General Plan and Local Coastal Plan* divides the land into large land-use designations that are then further subdivided into zoning districts. In general, the land use designations provide long-term guidance, and specific guidance is incorporated in the zoning districts.

Five land-use designations cover the Coast Dairies Property: Agriculture (AG), Resource Conservation (O-C), Quarry/Mining (Q), Mountain Residential (R-M), and Urban Residential, Low Density (R-UL). Within those designations, there are nine zoning districts on the Property: Commercial Agriculture (CA), Commercial Agriculture - Historical (CA-L), Light Industrial (M-2), Public Facilities (PF), Parks and Recreation (PR), Single-family Residential (R-1-6), Residential Agriculture (RA), Special Use (SU), and Timber Production (TP). For maps of the land-use designations and zoning districts on the Coast Dairies Property, refer to Figures 6-1 and 6-2.

While this document describes the County designations already overlain on the Property, it is important to recognize that agencies such as the Bureau of Land Management (BLM) and the California Department of Parks and Recreation (DPR)—which manage properties similar in size and use to this one and may ultimately share management of this property—have different land-use classifications. Some of these overlap with Santa Cruz County's designations, and some vary from them. These will be discussed in greater detail in the Land Use Issues subsection.

The following land uses are mapped in Figure 5.5-1.



SOURCE: Environmental Science Associates, Pacific Meridian Resources, USGS

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Figure 5.5-1
Land Use on the Coast Dairies Property

5.5.3.1 RECREATION AND OPEN SPACE

The cool, somewhat isolated beaches along the Coast Dairies Property's coastline are the sites of most of the recreation that takes place on or near the Property. Recreation on other parts of the Property includes some unauthorized camping and hunting, which has resulted in littering and the trampling of sensitive resource areas. Although the entire Property has the potential to be used for recreation, only the beaches are accessible for public recreation.

Beaches

A dozen or so beaches along the shore of the Coast Dairies Property provide unique opportunities to experience the interface of land and sea along the north coast. The main beaches will be described in this chapter—*Scotts Creek Beach, Davenport Landing Beach, Davenport Bluffs and Beach, Panther Beach, Bonny Doon Beach, Yellow Bank Beach*, and *Laguna Creek Beach*-following the coastline from north to south.

Coast Dairies owns access to all of these beaches, with the exception of Scotts Creek Beach and the main access to Davenport Beach, which is largely owned by Santa Cruz County. Coast Dairies, however, does own a small portion of that beach at the far southern end.

Scotts Creek Beach is located ten miles north of Santa Cruz, adjacent to Highway 1. The main beach is about one-half mile long, and can be seen from the highway as one crosses the bridge at Scotts Creek, as well as from vista points as one descends to the creek from the north or south. This is an open beach and receives the brunt of the spring and summer northwest winds (County of Santa Cruz, 1991).

Davenport Landing Beach is located about one mile northwest of Davenport. The County maintains and operates the beach access and restroom facilities, as well as maintaining Davenport Landing Road. The beach is about 200 yards long and 50 yards wide, and sits about 50 yards from the road. It is easily accessible, which encourages its use by families with children, as well as by older and disabled persons (County of Santa Cruz, 1991). Fishermen, windsurfers, and surfers also use this beach.

Davenport Bluffs and Beach extend for approximately one-half mile south of Highway 1 across from the Town of Davenport and the Davenport Cement Plant. The main parking area and access trails to the beach are on Coast Dairies and other private property; the County has no responsibility for maintaining this area. The site averages 100 yards in width and is bisected lengthwise by the Union Pacific Railroad. The beach is broad and approximately 300 yards in length (County of Santa Cruz, 1991).

Panther Beach is the smallest of the beaches, though its size varies from year to year. The access trail to this beach is on the Coast Dairies Property, while the parking area is within the CalTrans right-of-way. The beach is surrounded by 40-foot high cliffs. In the center of the cove is a large pinnacle rock, separated from the shoreline even at low tide (County of Santa Cruz, 1991).

Bonny Doon Beach is located approximately seven miles north of Santa Cruz at the intersection of Highway 1 and Bonny Doon Road. The beach is about 250 yards long, with a wind-protected cove at the north end. The access to the beach is owned by Coast Dairies, so the County has no management responsibilities. The current parking areas are located within the CalTrans or County rights-of-way (County of Santa Cruz, 1991).

Yellow Bank Beach lies about six miles north of Santa Cruz. Again, the land surrounding this beach is owned by Coast Dairies, so the County has no obligation to maintain it. The beach has two sections separated by a narrow rock archway that is only passable at low or medium tides. The main beach is approximately 100 yards long and up to 70 yards wide. The south beach is bounded by vertical cliffs, and ends in a rock shelf and point (County of Santa Cruz, 1991).

Laguna Creek Beach is about five miles north of the Santa Cruz City limits, and is one of the least disturbed beaches on the Coast Dairies Property. Access to the beach, the wetlands and surrounding lands sits on the Coast Dairies Property, and the County has no responsibilities to maintain this area. The main beach is about one-sixth of a mile long, widening at the south end (County of Santa Cruz, 1991).

Forest

The forested uplands of the site consist of oak/mixed woodland and redwood/Douglas fir forest, as well as riparian corridors with alder and willow riparian forests. Although rare, there is a knobcone pine forest on the uppermost ridges of the middle and east forks of Liddell Creek, an area that is the least disturbed wooded area on the site. Some grazing takes place in the areas where the grasslands reach into the woods, and various roads wind through the forests. In the RMC leaseholds, the forests, including the riparian stands, are subject to complete removal to accommodate quarry operations (Smith, 2001).

Grasslands

Non-native grasslands cover approximately half the Coast Dairies Property, primarily in the first and second terraces. Historically, the grasslands have been used for cattle grazing, a use that continues on most of the grasslands today. Some native perennials mix with the non-native grasses, and the areas that have not been grazed are susceptible to invasion by non-native thistles. In the past year and a half, a few hundred acres of the grasslands on the Property have been damaged by wild pigs (Smith, 2001).

There is a series of roads running through the grasslands that provide some of the best access to the interior of the property (Smith, 2001).

Chaparral

The chaparral/scrub zone, ubiquitous to this part of the California coast, lies relatively undisturbed on the steepest slopes of the site—areas where it is impossible to farm or graze (Smith, 2001).

Ponds/Streams/Marshes

The Property and its immediate vicinity contain diverse wetland types, including marshes, ponds, creeks, wet meadows and seeps. Over 100 acres of wetlands have been mapped by aerial photo interpretation. Because aerial photo interpretation does not account for wet meadows and seeps, the actual acreage of wetlands on the Property is likely much higher (Schmidt, 1997).

Coast Dairies Property's streams provide valuable habitat for anadromous, freshwater, and estuarine fish species, including three special-status species—Tidewater goby, Steelhead and Coho salmon. There has been significant degradation of fish habitat from the various activities and land uses on the site (Schmidt, 1997). No particular land-use activities take place within the water bodies on the Property, with the exception of the manmade sedimentation ponds (see Mining, below), which receive runoff from the quarry pit areas.

5.5.3.2 AGRICULTURE

Although the land of the Coast Dairies Property was historically leased to dairy farmers, beef cattle ranchers (for grazing) and vegetable and fruit growers, today only the last two types of agriculture remain on the Property.

Grazing/Rangeland

Pasture lands are managed under three contracts for the grazing of beef cattle in the northern, central, and southern portions of the Property, over a total area of 1.340 acres. These contracts stipulate that the tenants follow a Conservation Grazing Plan, prepared and reviewed annually, that protects grasslands and oak woodland habitat and increases habitat diversity.

Row Crops

Crops grown on the Property range from Brussels sprouts and artichokes to leeks, peas, cabbage and beans. Swanton Berry Farms, an organic producer of organic strawberries, bush berries and mixed vegetables, has leased a 41-acre parcel to the north of the town of Davenport, and hopes to further expand organic crop production by establishing other satellite organic farms on the Property.

In total, 323 acres of the Property are leased to four fruit and vegetable growers. Three of the lessees farm on irrigated land; one dry-farms hay on 144 acres.

Currently under management of the Trust for Public Land (TPL), the Coast Dairies and Land Company (CDLC) which owns the Coast Dairies Property is in transition in terms of ownership, management, lessees, and water usage. A difficult agricultural economy and the listing of Coho salmon and Steelhead as endangered species in 1999 have limited the renewal of crop leases.

5.5.3.3 MINING

Cement Plant

While not on the Coast Dairies Property, the Davenport Cement Plant has a prominent presence in the area. In operation since 1906, it produces approximately 875,000 tons of Portland cement annually, and is fed raw materials from its shale quarry on the Coast Dairies Property and the limestone quarry on the adjoining, 9,000-acre parcel owned by RMC Pacific Materials.

Quarry

RMC leases just under 1,000 acres of Coast Dairies Property land (Schmidt, 1997), of which approximately 115 acres are currently in shale-mining production. Once scraped from the hillside, the shale is crushed at the quarry and carried to the cement plant on a covered-belt conveyor system. Limestone is mined on RMC's parcel to the east of the Coast Dairies Property, blasted free, crushed, and transferred to the cement plant on a three-mile-long, covered-belt conveyor system that bisects the Property. Seven conveyor lines linked together form the material transport system between the quarries and the cement plant.

As part of the two quarrying operations, RMC has established several waste-disposal sites and sedimentation ponds. One disposal area, Waste Disposal Area C, is in active use on RMC-leased land on the Coast Dairies Property, and covers about 24 acres. All of RMC's seven sedimentation ponds are on the Property, also on land leased by RMC.

5.5.3.4 RESIDENTIAL AND COMMERCIAL

Residential

Onsite housing is limited to two habitable residences with associated structures, and dormitory housing for seasonal agricultural workers. One of the residences is east of Highway 1 at Laguna Creek (Peña residence), and the other (Ham/Salinas residence) sits on Cement Plant Road.

At the inholdings of Davenport and its surrounding community (Davenport, NewTown, and Davenport Landing), there are approximately 60 mostly single-family, detached residential units. Newfound interest in the region by residents of the Bay Area and a housing supply limited from expansion by a lack of space have created a spike in housing prices in Davenport in recent years, with homes selling for $700,000 and more. Only two vacant residential lots remain in Davenport; a few more still exist on Swanton Road, though not on Coast Dairies property.

This sharp increase in the price of housing in Davenport has limited the ability of farm workers from the Coast Dairies Property to find housing in the area.

Commercial

No commercial activity per se takes place on the Coast Dairies Property, with the exception of two seasonal produce stands on Highway 1 operated by Fambrini and Swanton Berry Farm.

While the agriculture and mining on the Property generate materials that contribute to commercial activities, those activities take place offsite.

U.S. Abalone, one of the largest abalone producers in the country, leases three acres at Davenport Landing for abalone aquaculture (Schmidt, 1997). The operation yields both abalone meat and cultured abalone pearls.

Numerous small businesses exist in the town of Davenport. Restaurants, a bed-and-breakfast, and a grocery store complement artisans producing glassware, knives, paintings and other crafts. Many of these businesses profit from the tourist traffic Davenport gets throughout the year.

There are three commercial properties in the town of Davenport that were available for redevelopment at the time of this report’s preparation. The Bailey Building, site of the former Odwalla juice plant; the Old Barn, a former factory; and the Forester’s Hall have all been considered as retail sites catering primarily to visitors, but potentially also to residents.

5.5.3.5 TRANSPORTATION CORRIDORS

Highway 1 hugs the coastline as it passes through the Property, nearly parallel to the Union Pacific railroad. The two rights-of-way vary greatly, with CalTrans’ ranging from 100-300 feet, and Union Pacific’s from 60-240 feet. Heading inland from the coast, the County-maintained Bonny Doon Road also crosses through the Coast Dairies lands.

5.5.4 LAND USE COMPATIBILITY

There are several places on the Property where the County’s land-use designations appear to be incompatible with some of the actual land uses. For instance, portions of RMC-leased land (analysis zones SVW-1, SVP-1 and SVP-2) have Mountain Residential land-use designations but actually surround mining uses—in this case, the conveyor lines for RMC’s operations. Similarly, next to the Davenport Cement Plant (analysis zones IA-2/SVCT-2), a parcel leased by RMC is designated Mountain Residential but supports the cement plant operations. These apparent inconsistencies are resolved by the more specific County zoning districts, which name the former areas as Special Use and the latter as Light Industrial. Several parcels are also designated as TP-Timber Production, however the conditions under which TPL purchased CDLC require that no commercial logging take place on the Property.

County zoning districts present one potential land-use incompatibility on the site. The Residential Agriculture zoning district is generally set aside for single-family dwellings outside the Urban and Rural Services Lines. RMC leases a portion of a canyon adjacent to the cement plant that is zoned Residential Agriculture. Contrary to the residential zoning district, the company has filled the canyon with cement kiln dust. This former canyon is now level with the adjacent farmland and is incapable of supporting plant growth, even with a layer of topsoil. Its setting, surrounded by agricultural uses and a mountain of dust, makes it an unlikely choice for residential uses of any type (Smith, 2001 and Simonds, 2001). This incompatibility in use is explained by the fact that, with approval, the County allows for a variety of non-residential activities in the Residential Agriculture zoning district.

With the exceptions of this non-residential use of a Residential Agriculture parcel and the ban on timber production, the more precise zoning districts do reflect the real uses taking place on the entire Coast Dairies Property, and remove any incompatibilities that appear in a comparison of the County land-use designations and actual land uses on the site.

5.5.5 LAND USE ISSUES

Future land planning may necessitate the combining or refining of land-use terms used by the County, the Bureau of Land Management (BLM) and the California Department of Parks and Recreation (DPR). County land-use designations and zoning districts on the Property are discussed briefly in this chapter and in more detail in Section 6.0 - Local, State, and Federal Regulation of the Coast Dairies Property. Section 6.0 will also expand on the discussions of BLM's and DPR's planning processes summarized below.

BLM normally identifies site-specific uses and use levels during implementation planning for a particular site, after a land-use plan has been prepared. The *Coast Dairies Long-term Resource Protection and Use Plan* will be considered a land-use plan in the sense that the term is used by the Bureau. BLM's land-use plans identify reasonable development scenarios for allowable uses, establishing administrative designations such as Areas of Critical Environmental Concern (ACEC), visual-resource management class designations, and off-highway vehicle (OHV) designations.

In addition to those designations, BLM's land-use plans identify lands available for certain uses and those that are closed to certain uses, and recommend or make findings of suitability for congressional or administrative designations. Congressional designations include National Conservation Areas and National Recreation Areas, among others, while administrative designations include Wilderness Study Areas, Watchable Wildlife Viewing Sites, and others.

Because BLM's designations vary from the County's, the planning process will have to include some resolution of how to accommodate both approaches, either by using both overlain on one another, combining them into new designations that work with both systems, or choosing one set of designations and fitting it into the other.

DPR's method of land-use designations works a bit more closely with local jurisdictions'. DPR classifies and names each park unit, identifying its primary values and intended purpose and providing the broadest management guidelines. Categories of classification include State Recreation Areas, State Beaches, Historical Units, and State Reserves, among others. Beyond that naming, DPR generally uses local land-use designations for the properties it owns and manages. However, it also creates sub-categories to those designations that are tailored to the needs of each property. In some cases, such as at Wilder Ranch State Park, DPR receives waivers to certain local zoning districts, in order to accommodate the land uses it selects for the site.

Regardless of the land-use-designations approach used, restrictions in the definitions of certain Santa Cruz County zoning districts may affect future use of the site. The majority of the site is currently designated as the Commercial Agriculture zoning district, which does not allow recreational uses, the construction of new facilities in support of non-agricultural activities, or a substantial change in agricultural activities. This designation clearly limits the potential for future uses of the Property, particularly the options for access or recreation, and will need to be addressed as the planning process proceeds.

As mentioned above, there are three large parcels zoned as Timber Production lands. This zoning district allows the growth and harvesting of timber, as well as any non-timber-growing uses that are physically compatible with the growing and harvesting of a sustained-yield tree crop. However, when the Coast Dairies & Land Co. (CDLC) and the Property were transferred to TPL, conditions for that transfer included no harvesting of timber on these parcels, and called for thinning only when it is necessary for the health of the resource.

The issue of adjoining land uses affecting one another has not been a significant one to date, due to the size of the site and the relative distance between what might be seen as incompatible activities. As planning for the Coast Dairies Properties proceeds, the uses that take place on both the inholdings and leased portions of the site—uses that include mining, cement manufacturing, and commercial and residential activities—will have to be considered when determining how and by whom the remainder of the Property will be used.

Although not a zoning issue, the town of Davenport has expressed interest in the use of several acres of Coast Dairies land for a town park. Two sites—one adjacent to the school and one adjacent to NewTown—are being discussed.

5.5.6 LAND TENURE

Land tenure encompasses private inholdings, leases and easements of the Coast Dairies Property. This section discusses the inholdings of private landowners other than Coast Dairies adjacent to or surrounded by the Coast Dairies Property. In addition, this section addresses leases and easements within the property boundary of the Coast Dairies Property.

5.5.6.1 METHODOLOGY

This section was developed based on interviews with employees of Pacific Gas and Electric (PG&E), RMC Pacific Materials, the California Department of Transportation (Caltrans), and Santa Cruz City and County offices. The planning team also reviewed existing documentation on land tenure of the Coast Dairies Property. Primary reference materials include a collection of agreements, deeds, and leases with respect to the Coast Dairies Property.

5.5.6.2 Inholdings

The inholdings include land holdings of RMC Pacific Materials, the community of Davenport, an aquaculture farming operation, the State of California, the County of Santa Cruz, Union Pacific

Railroad, and a PG&E substation. See table 5.5-1 for a description of all of the inholdings in the vicinity of the Coast Dairies Property. The Assessor Parcel Numbers (APN) listed are generally ordered from north to south on the Property throughout this report.

RMC Pacific Materials

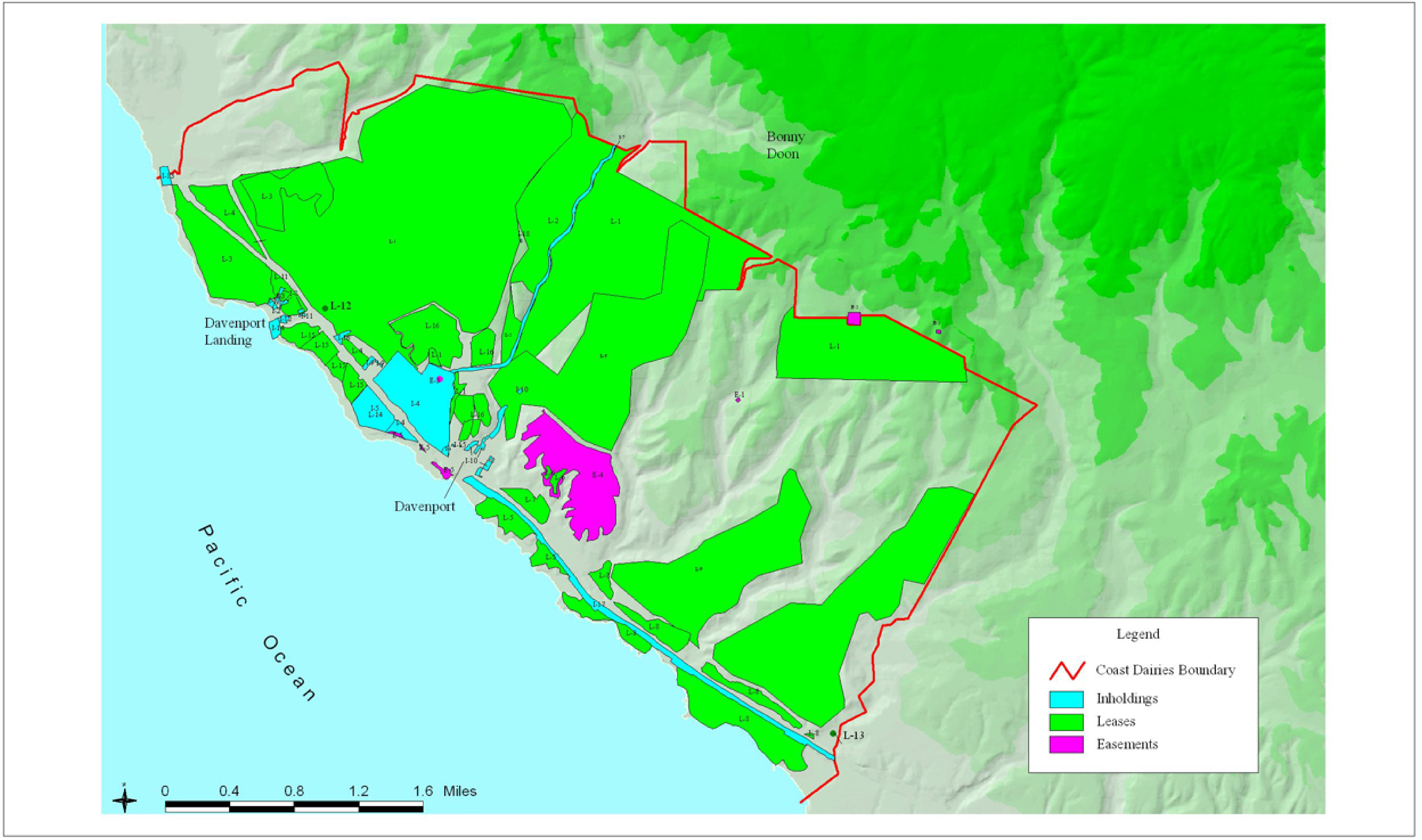
Historically, RMC Pacific Materials (formerly RMC Lone Star) has been the owner of the largest landholding on the Coast Dairies Property, which includes the RMC Davenport Cement Plant. The plant is located along Highway 1, approximately 8 miles north of Santa Cruz, just north of the town of Davenport, and has been in operation since 1906 (mining operations are identified as I-1, I-2, I-3, I-4 and I-6 in Table 5.5-1 and Figure 5.5-2). The Davenport Cement Plant is largely surrounded by Coast Dairies land. The RMC property also incorporates a historic railroad line that bisects the Coast Dairies Property and connects the plant to formerly active limestone and shale quarries (identified as I-7) The Coast Dairies Property is partially bordered to the east by approximately 9,000 acres of land owned by RMC. In addition to these holdings, RMC Pacific Materials also leases land to The Coast Dairies and Land Company for agricultural use (identified as I-5). Coast Dairies, in turn, leases this land to growers. This land is located in the vicinity of the cement plant and would usually sustain such crops as artichokes, Brussels sprouts and strawberries. This land is currently not leased.

Community of Davenport

The community of Davenport includes Davenport, Davenport Landing and New Town. These historic towns have a combined population of 200 and contain both residential and commercial uses, including art galleries, a hotel, restaurants and a convenience store. Davenport (identified as I-10) is bordered by RMC Davenport Cement Plant to the north. Davenport Landing (identified as I-8) is bordered by U.S. Abalone to the south, while New Town (identified as I-9) is bordered by the RMC Davenport Cement Plant to the south.

U.S. Abalone

U.S. Abalone, a division of Silver King Oceanic Farms, is located west of Highway 1 in the northern section of the Coast Dairies Property. U.S. Abalone is the primary abalone farm in Santa Cruz County and one of the largest producers in the U.S. The company owns three separate parcels of land in Davenport Landing. One parcel consisting of 1.8 acres (identified as I-12) is used primarily for food processing. The other two parcels consisting of a total of 0.3 acres (identified as I-11) are listed as vacant lots with the Santa Cruz County Assessor's Office. In addition to these inholdings, U.S. Abalone also leases land from Coast Dairies, as discussed in section 5.5.6.3.



SOURCE: Environmental Science Associates, Pacific Meridian Resources, USGS, Santa Cruz County GIS Dept.

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Figure 5.5-2
Land Tenure on the Coast Dairies Property

TABLE 5.5-1
INHOLDINGS IN THE VICINITY OF THE COAST DAIRIES PROPERTY

Map Key	Owner[a]	Assessor Parcel Number (APN)	Acreage
I-1	RMC Pacific Materials	058-131-08	1.0
I-2	RMC Pacific Materials	058-131-07	0.5
I-3	RMC Pacific Materials-Vacant	058-052-01	0.4
I-4	RMC Pacific Materials	058-071-04	109.3
I-5	RMC Pacific Materials-Farm Lease	058-072-01	35.3
I-6	RMC Pacific Materials	058-071-03	1.2
I-7	RMC Pacific Materials	058-022-14	14.9
I-8: Davenport Landing	Private Landowner	058-051-01	0.02
I-8	Private Landowner	058-051-02	0.7
I-8	Private Landowner	058-051-03	0.8
I-8	Private Landowner	058-051-04	0.1
I-8	Private Landowner	058-051-06	0.5
I-9: New Town	Private Landowner	058-063-01	0.2
I-9	Private Landowner	058-063-02	0.2
I-9	Private Landowner	058-063-03	0.2
I-9	Private Landowner	058-064-01	0.5
I-9	Private Landowner	058-064-02	0.2
I-9	Private Landowner	058-065-04	0.2
I-9	Private Landowner	058-066-04	0.2
I-10: Davenport	Private Landowner	058-092-03	0.1
I-10	Private Landowner	058-092-07	1.2
I-10	Private Landowner	058-092-09	0.8
I-10	Private Landowner	058-093-01	0.2
I-10	Private Landowner	058-093-03	0.2
I-10	Private Landowner	058-101-03	0.2
I-10	Private Landowner	058-101-04	0.2
I-10	Private Landowner	058-101-05	0.3
I-10	Private Landowner	058-101-06	0.3
I-10	Private Landowner	058-101-08	0.2
I-10	Private Landowner	058-103-08	0.3
I-10	Private Landowner	058-103-09	0.2
I-10	Private Landowner	058-103-10	0.2
I-10	Private Landowner	058-103-12	0.1
I-10	Private Landowner-Church	058-103-14-retired-new APN: 058-103-29	0.4
I-10	Private Landowner	058-103-20	0.2
I-10	Private Landowner	058-103-21	0.1
I-10	Private Landowner	058-103-22	0.1
I-10	Private Landowner	058-103-25	0.4
I-10	Private Landowner	058-103-26	0.4
I-10	Private Landowner	058-103-27	0.3
I-10	Private Landowner	058-111-08	0.3
I-10	Private Landowner	058-111-09	0.3
I-10	Private Landowner	058-111-10	0.3

TABLE 5.5-1 (Continued)
INHOLDINGS IN THE VICINITY OF THE COAST DAIRIES PROPERTY

Map Key	Owner[a]	Assessor Parcel Number (APN)	Acreage
I-10	Private Landowner	058-111-11	0.3
I-10	Private Landowner	058-111-12	0.4
I-10	Private Landowner	058-111-17	0.3
I-10	Private Landowner	058-111-18	0.4
I-10	Private Landowner	058-111-21	0.5
I-10	Private Landowner-Convent	058-113-02	0.5
I-11	Silver King Oceanic Farms (U.S. Abalone)	058-053-01	0.1
I-11	Silver King Oceanic Farms (U.S. Abalone)	058-053-02	0.1
I-12	Silver King Oceanic Farms (U.S. Abalone)	058-131-19	1.8
I-13	State of California	058-021-08	4.2
I-14	State of California	058-131-20	3.9
I-15	Santa Cruz County, Storage Tanks	058-122-05	N/A
I-16	Union Pacific Railroad	058-022-12	2.1
I-17	Union Pacific Railroad	058-121-03	23.6
I-17	Union Pacific Railroad	059-012-05	37.0
I-18	PG&E Substation	058-022-06	0.1

[a] Individual landowners that are not government or corporate entities are identified as “Private Landowner.”

SOURCE: ESA, May 2001

State of California and the County of Santa Cruz

The State of California owns two parcels of land within the Coast Dairies Property (identified as I-13 and I-14). Both parcels are leased to Silverking Oceanic Farms, Inc. (i.e., U.S. Abalone) and are further discussed in Section 5.5.6.3.

The County of Santa Cruz owns one parcel in the town of Davenport that is occupied by an above-ground storage tank that is currently not in use (identified as I-15).

Union Pacific Railroad

Union Pacific Railroad owns three parcels within the Coast Dairies Property associated with its railway operations. Two parcels include railroad tracks and run parallel to Highway 1 (both identified as I-18), while one parcel (identified as I-17) is used for train turnouts.

PG&E Substation

The PG&E Substation on the Coast Dairies Property is located west of Highway 1 off of Waranella Road (identified as I-19). The substation occupies about 1,600 square feet (40 feet by 40 feet) of an 0.11 acre parcel owned by PG&E. The substation is connected to a 60,000-volt transmission line that originates in the City of Monte Vista by two wood pole power lines that parallel each other. The substation, which provides electricity to the RMC Cement Plant and to the majority of the town of Davenport, has been operating on the property since 1938 (Ferrara, 2001).

5.5.6.3 LEASES

The Coast Dairies and Land Company leases land to private entities for a variety of uses, including, mining, agriculture, aquaculture, and residential use. See Table 5.5-2 for a description of all of the leases in the vicinity of the Coast Dairies Property, and Figure 5.5-2 for their locations. The private inholdings on the Coast Dairies Property that are leased to entities have been noted in the discussion above.

RMC Pacific Materials

RMC leases approximately 783 acres from Coast Dairies for its shale quarrying operations, associated waste disposal areas, sediment ponds, and the covered belt conveyor corridor from the quarry to the cement plant (identified as L-1 and L-2 in Table 5.5-2 and Figure 5.5-2). The limestone quarry is located on RMC-owned property outside of the Coast Dairies Property. The main leasehold, which includes the covered belt conveyor corridor, occupies approximately 766 acres of land. The current leasehold started December 2, 1968 and extends until December 2, 2018, with options to renew for 25 years and then for an additional 24 years. Also included within the main leasehold, RMC leases an additional 12.8 acres for mining purposes; this lease term is from July 1, 1997 until June 30, 2002 (identified within L-1). Another RMC lease for 16.9 acres commenced on June 1 1999 and extends until May 30 2004 (identified as L-2).

Agriculture

Engaged in beef cattle production and dairy operations, Coast Dairies leases 2,613.5 acres of land to agricultural producers. The land in agricultural use is located along the coastal bluffs and is bisected in several places by Highway 1.

Wayne and Gene Pastorino are leasing 144 acres to grow hay and 750 acres are under contract for year-around grazing purposes. Their lease will utilize both grazing and crop (dry-farmed hay) land for beef cattle production. The Pastorino lands are in the northern portion of the property. This combined lease (for grazing and hay) commenced October 20, 2000 and extends until October 20, 2003 (identified as L-3).

TABLE 5.5-2
LESSEES ON COAST DAIRIES PROPERTY

Map Key	Lessee	Assessor Parcel Number (APN)	Lease Acreage	Type of Use
L-1: Main leasehold	RMC Pacific Materials	058-122-10[a]	750.0	Mining
L-1	RMC Pacific Materials	058-022-10	9.9	Mining
L-1	RMC Pacific Materials	058-071-02	6.0	Mining
L-2	RMC Pacific Materials	058-022-08	16.9	Mining
L-3	Pastorino	058-021-01	129.0	Dry Farming-Hay
L-3	Pastorino	058-022-11[a]	765.0	Grazing and Dry Farming-Hay
L-4	Swanton Berry Farms	058-022-11[a]	41.0	Organic fruit and vegetable Farming
L-5	Rodoni	058-121-01	24.9	Brussels sprouts
L-5	Rodoni	058-121-02	11.3	Brussels sprouts
L-6	Bartle	058-122-09[a]	11.0	Organic Herbs
L-7	Rios	058-122-09[a]	16.0	Artichokes
L-8	Fambrini	059-011-06[a]	1.0	Brussels sprouts
L-8	Fambrini	059-011-13[a]	22.0	Brussels sprouts
L-8	Fambrini	059-012-03	15.6	Brussels sprouts
L-8	Fambrini	059-011-11[a]	26.0	Brussels sprouts
L-8	Fambrini	059-012-04	12.8	Brussels sprouts
L-8	Fambrini	059-012-02[a]	49.1	Brussels sprouts
L-9	Arvelas	058-122-09[a]	320.0 total	Grazing
L-9	Arvelas	059-011-11[a]		Grazing
L-9	Arvelas	059-011-04[a]		Grazing
L-10	Wrankle & Ramirez	059-011-05[a]	270.0 total	Grazing
L-10	Wrankle & Ramirez	059-011-03[a]		Grazing
L-10	Wrankle & Ramirez	059-011-04[a]		Grazing
L-10	Wrankle & Ramirez	059-011-13[a]		Grazing
L-11	U.S. Abalone	058-051-08[a]	14.0	Aquaculture
L-12	Salinas/Ham	058-021-01[a]	N/A	Residential
L-13	Pena	059-011-06[a]	N/A	Residential
L-14	RMC Farm Lease	058-021-07[a]	30.0	Unleased
L-15	Coast Dairies	058-02-107[a]	63.0	Unleased
L-16	Coast Dairies	058-022-11[a]	101.0	Unleased

[a] Lease does not encompass entire parcel.

SOURCE: ESA, May 2001

On July 1, 2000, Coast Dairies leased 41 acres of land just north of the town of Davenport to an organic producer, Swanton Berry Farms (identified as L-4). Swanton Berry Farms grows organic strawberries, bushberries, and mixed vegetables on the Property. This lease terminates December 31, 2002 with an option to renew for three years. The lessee intends to expand organic crop production by establishing other satellite organic farms on the Property and in the area.

Mario Rodoni leases 36 acres west of Highway 1 (identified as L-5), just south of Davenport to grow Brussels sprouts. This lease commenced April 1, 2001 and extends through March 31, 2004.

Ramon Rios leases 16 acres just north of Rodoni's leased property (identified as L-7), to grow artichokes. His lease commenced January 1, 2001 and extends through December 31, 2002.

R. Fambrini and Company leases 126.5 acres of agricultural land on both sides of Highway 1(identified as L-8) to grow Brussels sprouts. This lease commenced February 1, 2001 and extends through December 31, 2003.

Peter Arvelas contracts for 300 acres for cow/calf grazing operations (identified as L-9). This lease commenced January 1, 2001 and extends through December 31, 2002.

William Wrankle and Jose Ramirez contract for 1,200 acres for seasonal yearling/stocker operations (identified as L-10). Their lease commenced October 20, 2000 and extends until October 20, 2003.

Mark Bartle leases 11 acres of the agricultural land (identified as L-6), for the production of organic herbs. His lease commenced March 1, 2001 and extends until February 28, 2004. This lease is also described in section 5.5.6.4.

As mentioned in Section 5.5.6.2, RMC leases land for agricultural use near its cement plant to the Coast Dairies and Land Company, which in turn leased the land to farmers who cultivated row crops (identified as L-14). This land is currently unleased but has been used to grow artichokes, Brussels sprouts, and strawberries.

Currently, Coast Dairies and Land Company holds plots of land to lease to agricultural tenants (identified as L-15 and L-16). A total of 164 acres[1] are available to lease.

U.S. Abalone

In addition to U.S. Abalone's inholdings, the company leases a 14-acre parcel from Coast Dairies for aquaculture (identified as L-11). This lease commenced January 1, 1997 and extends until December 31, 2006. This parcel is south of Davenport Landing. U.S. Abalone leases a second parcel from Coast Dairies between Davenport Landing and Highway 1 (identified as L-11) which is not actively used. The State of California owns two parcels on the coast that are leased to U.S.

Abalone as well. One parcel consisting of 3.9 acres is described as vacant. The other parcel, which consists of about 4.2 acres, maintains current operations.

Residential

The Coast Dairies Property also includes parcels that are leased to residential tenants who had previously lived on the Property for many years. Isabel Ham and Milano Salinas reside at 1000 Cement Plant Road (identified as L-12). Their lease commenced September 1, 2000 and extends until September 30, 2001. Robert and Sharon Pena reside at 6008 Laguna Road (identified as L-13). Their lease commenced September 1, 2000 and extends until September 30, 2001.

5.5.6.4 EASEMENTS

Within the overall boundary of the Coast Dairies Property, certain groups and agencies have rights-of-ways that permit use of the Coast Dairies Property. These rights-of-way, which are referred to as easements in this report, belong to the California Department of Fish and Game, the City and County of Santa Cruz, RMC Pacific Materials, California Department of Transportation (CalTrans), Pacific Gas and Electric (PG&E), and the California Coastal Conservancy (CCC). See Table 5.5-3 for a description of all of the easements in the vicinity of the Coast Dairies Property, and Figure 5.5-2 for their locations.

California Department of Fish and Game

RMC inholdings and leased lands contain wetlands subject to the jurisdiction of the U.S. Army Corps of Engineers. The California Department of Fish and Game (DFG) has mandated that RMC must have an approved maintenance and monitoring plan for current projects involving these wetlands (identified as E-1 in Table 5.5-3 and Figure 5.5-2). A Memorandum of Understanding was reached between DFG and RMC in March of 1998 and is described as follows. As mitigation for the effects on wetlands of its quarrying operations, RMC is to undertake three biologically interrelated projects in the Liddell Creek drainage system. Project 1

TABLE 5.5-3
EASEMENTS ON THE COAST DAIRIES PROPERTY

Map Key	User	Assessor Parcel Number (APN)	Type of Use
E-1	California Department of Fish and Game	058-122-09[a]	Wetland Mitigation
E-2	City of Santa Cruz	063-25-103[a]	Water Rights
E-3	County of Santa Cruz	058-071-04[a]	Wastewater Treatment
E-4	County of Santa Cruz Agricultural Conservation	058-122-09[a]	Agriculture (11 acres currently leased)
E-5	RMC Offer to Dedicate Public Access	058-072-01[a]	Public Access
E-5	RMC Offer to Dedicate Public Access	058-072-02[a]	Public Access
N/A	CalTrans		
N/A	PG&E		Utility Lines
N/A	CCC Irrevocable Offer to Dedicate	058-021-03[a]	Public Access
N/A	CCC Irrevocable Offer to Dedicate	058-021-07[a]	Public Access
N/A	CCC Irrevocable Offer to Dedicate	058-021-01[a]	Public Access
N/A	CCC Irrevocable Offer to Dedicate	058-022-07[a]	Public Access
N/A	CCC Irrevocable Offer to Dedicate	058-022-08[a]	Public Access
N/A	CCC Irrevocable Offer to Dedicate	058-022-09[a]	Public Access
N/A	CCC Irrevocable Offer to Dedicate	058-022-10[a]	Public Access
N/A	CCC Irrevocable Offer to Dedicate	058-022-11[a]	Public Access
N/A	CCC Irrevocable Offer to Dedicate	058-051-08[a]	Public Access
N/A	CCC Irrevocable Offer to Dedicate	058-071-02[a]	Public Access
N/A	CCC Irrevocable Offer to Dedicate	058-092-08[a]	Public Access
N/A	CCC Irrevocable Offer to Dedicate	058-113-01[a]	Public Access
N/A	CCC Irrevocable Offer to Dedicate	058-121-01[a]	Public Access
N/A	CCC Irrevocable Offer to Dedicate	058-121-02[a]	Public Access
N/A	CCC Irrevocable Offer to Dedicate	058-122-09[a]	Public Access
N/A	CCC Irrevocable Offer to Dedicate	058-122-10[a]	Public Access
N/A	CCC Irrevocable Offer to Dedicate	058-122-12[a]	Public Access
N/A	CCC Irrevocable Offer to Dedicate	059-151-01[a]	Public Access
N/A	CCC Irrevocable Offer to Dedicate	059-151-01[a]	Public Access
N/A	CCC Irrevocable Offer to Dedicate	059-151-02[a]	Public Access
N/A	CCC Irrevocable Offer to Dedicate	059-011-03[a]	Public Access
N/A	CCC Irrevocable Offer to Dedicate	059-011-04[a]	Public Access
N/A	CCC Irrevocable Offer to Dedicate	059-011-05[a]	Public Access
N/A	CCC Irrevocable Offer to Dedicate	059-011-06[a]	Public Access
N/A	CCC Irrevocable Offer to Dedicate	059-011-12[a]	Public Access
N/A	CCC Irrevocable Offer to Dedicate	059-011-13[a]	Public Access

TABLE 5.5-3 (Continued)
EASEMENTS ON THE COAST DAIRIES PROPERTY

Map Key	User	Assessor Parcel Number (APN)	Type of Use
N/A	CCC Irrevocable Offer to Dedicate	059-011-10[a]	Public Access
N/A	CCC Irrevocable Offer to Dedicate	059-011-11[a]	Public Access
N/A	CCC Irrevocable Offer to Dedicate	059-012-01[a]	Public Access
N/A	CCC Irrevocable Offer to Dedicate	059-012-02[a]	Public Access
N/A	CCC Irrevocable Offer to Dedicate	059-012-03[a]	Public Access
N/A	CCC Irrevocable Offer to Dedicate	059-012-04[a]	Public Access
N/A	CCC Irrevocable Offer to Dedicate	059-141-02[a]	Public Access
N/A	CCC Irrevocable Offer to Dedicate	063-071-04[a]	Public Access
N/A	CCC Irrevocable Offer to Dedicate	063-251-03[a]	Public Access
N/A	CCC Irrevocable Offer to Dedicate	058-031-01[a]	Public Access

[a] Lease does not encompass entire parcel.

SOURCE: ESA, May 2001

is a newly created wetland (three small ponds) in the upper drainage of the middle branch of Liddell Creek. This project provides mitigation for the loss of a jurisdictional wetland on the site of the RMC quarry property. The new wetland is intended to enhance vegetation and habitat values for aquatic animal species in the drainage region. Its function is to replace the loss of the jurisdictional wetland with at least equivalent quality or higher habitat, and to reestablish breeding, life-supporting, and refuge habitat for native wetland animal species (e.g., the California newt (*Taricha torosa*) and red-legged frog (*Rana aurora draytonii*) and their prey species. Downstream of the existing mitigation ponds is Project 2, a stream enhancement project intended to improve salmonid fish habitat. This project is to be carried out in conjunction with a sediment, water quality, and calcium deposit monitoring program in the east fork of the middle branch of Liddell Creek. Project 3 is a fish passage project near the mouth of the Liddell Creek drainage. The project is being undertaken to ease salmonid fish migration into and out of the Liddell Creek drainage and the ocean (RMC, 1998). To date, the terms of this agreement are not yet being carried out due to unresolved issues with DFG and RMC (Shipper, 2001).

The City and County of Santa Cruz

The City of Santa Cruz has had rights to Liddell Spring and Liddell Creek, on the Coast Dairies Property, since 1917. The City's easement (identified as E-2) also includes a water pipeline and access to the waterline for maintenance purposes (Santa Cruz County, 1999). This includes an access road with a 10-foot right of way around the pipes (Bentley, 2001). Water rights on the Coast Dairies Property are discussed in Section 5.1.

The County of Santa Cruz easement includes an agreement dated January 9, 1996 for the sale of tertiary-treated wastewater. The agreement was entered into between the Davenport County Sanitation District, which owns the sewage treatment plant, and Coast Dairies and Land Company. The wastewater is generated by RMC Pacific Material's operations, which divert water from San Vincente and Mill Creek, and is given primary treatment in a plant located just above the cement plant on RMC property (identified as E-3). The Santa Cruz County Department of Public Works has a general easement with RMC that allows them to access the Property to perform maintenance on the tanks as needed (Jesberg, 2001).

Pursuant to the agreement, the Davenport County Sanitation District delivers tertiary-treated wastewater for the purpose of providing irrigation water to Coast Dairies and Land Company for agricultural use. The agreement thus provides for treatment and disposal of RMC Pacific Materials effluent consistent with applicable regulations and standards. At the same time the agreement produces water for irrigation purposes that Coast Dairies and Land Company has made available to its agricultural leasees. Under the terms of the existing agreement, the Coast Dairies and Land Company has first priority in terms of use of effluent treated by the Davenport County Sanitation District. Delivery of the treated effluent to Coast Dairies commenced, and may be terminated, at the sole discretion of Coast Dairies. The Davenport County Sanitation District is contemplating performing a cost-benefit study regarding the treated effluent at some undetermined future date. After three years, the existing agreement calls for determining a reasonable charge for the treated effluent and whether it would be economical to continue the project (Santa Cruz County, 1999).

County of Santa Cruz Agricultural Conservation

In May 1999, the County of Santa Cruz purchased development rights to approximately 164 acres of land for $76,000 within the Coast Dairies property from the Coast Dairies and Land Company. The purchases are located east of Davenport (identified as E-4). The purchase agreement stipulates that the land can only be used for agricultural purposes, and allows tenants to live on the land only if it is used for agricultural conservation purposes. Agricultural conservation uses include: breeding, raising, pasturing, and grazing of animals; harvesting, and producing agricultural, aquacultural, horticultural, and forestry crops; and processing, storage, and sale (including direct retail sale to the public) of crops and products harvested and produced principally on the property. The purchase agreement prohibits any nonagricultural use, specifically, major alteration of land, erecting signs or billboards, use of motorized vehicles off of the roadway, division of the property, tree cutting and trash dumping (Coast Dairies and Land Co., 1999). Currently, Mark Bartle leases 11 acres of land for agricultural production (LCT-1). His lease commenced March 2001 and extends until February 2004.

RMC Pacific Materials Offer to Dedicate Public Access

Currently, RMC Pacific Materials has offered to dedicate five discrete areas of parcels 058-072-01 and 058-072-02 (identified as E-5) for public accesses. RMC's Offer to Dedicate Public Access was offered in January of 1981 and was accepted by the Santa Cruz County Land Trust in February of 2001. Had the Santa Cruz County Land Trust not accepted the RMC Pacific

Materials' offer to Dedicate the offer would have terminated in 2001 and the land would have reverted back to RMC. The five areas are described as follows. Area One includes the bluff top and trail in a continuous segment from RMC's property line at the east end to the west end of the trail where it meets Union Pacific property. This area would be at least 50 feet wide. Area Two of the dedication land would include the trail leading from the Union Pacific right-of-way, down a ravine to the mean high tide line and the rocky areas above the mean high tide line at the base of the bluffs. Area Three would include the bluff top including the cypress grove and the existing trail. Area Four would include the entrance way to the turnout area located next to the Union Pacific railroad tracks. The dedication would be at least as wide as the existing unpaved turnout. Area Five would include the trail, the bluff top and beach area to the mean high tide line and would be at least 10 feet wide. A variety of improvements are proposed for this property before the public can have access to it. (Lone Star Industries, 1981).

CalTrans

Highway 1 extends along the western edge of the Coast Dairies Property. CalTrans holds and maintains a right-of-way for Highway 1 and the immediate surrounding area in order to perform maintenance when necessary. Temporary easements are sometimes required to allow for maintenance structures, such as sound walls, to be placed along Highway 1 (Zambo, 2001). Currently, no maintenance is occurring. The Caltrans easement is not mapped on Figure 5.5-2.

PG&E

PG&E maintains power line easements on the Coast Dairies Property that originate at the substation. These power lines connect to and serve the RMC Davenport Cement Plant exclusively. PG&E is permitted to remove any trees or brush that is within the easement area or that otherwise may be endangering the facility. Maintenance within the easement is performed once a year however, CDLC has worked with PG&E to selectively remove only those trees that are clearly causing a hazard (Chavez, 2001). The PG&E easement is not mapped on Figure 5.5-2.

California Coastal Conservancy Irrevocable Offer to Dedicate

In 1997, The California Coastal Conservancy (CCC) offered $6 million to dedicate a public access agreement for a segment of the Coast Dairies Property coastal lands by February 12, 2002. The CCC may purchase these sections (mostly bluffs) west of Highway 1 between Davenport Landing and Davenport Beach, primarily for purposes of providing and maintaining public access. The dedication parcel would be used to preserve open space as well as to provide public access to, and along, the coast, and to protect the natural and agricultural resources of the Property. The CCC will specify its intent in a management plan authored by the CCC for the property which will draw from material developed under the Long-Term Management Plan (California Coastal Conservancy, 1997). Numerous state agencies have expressed support for this proposal. An issue that requires resolution before a management plan can be completed is the question of potential conflict between agricultural use of the land and public access. This easement is not mapped on Figure 5.5-2.

5.5.6.5 LAND TENURE ISSUES

California Department of Fish and Game

As mentioned in section 5.5.6.4, the status of the frog pond mitigation is currently unknown due to the absence of a signed agreement between DFG and RMC. Furthermore, it is important to note that the RMC mitigation ponds are located on Coast Dairies Property, outside the RMC leasehold.

County of Santa Cruz Agricultural Conservation

The agricultural conservation easement issued by Santa Cruz County to the Coast Dairies and Land Company has questionable water security. This presents a risk to the current lessee, Mark Bartle, who may not have sufficient irrigation to sustain his current crops. This water shortage may also limit the types of crops that can be grown on this agriculture land from Coast Dairies and Land Company.

California Coastal Conservancy Irrevocable Offer to Dedicate

As described is section 5.5.6.4, the California Coastal Conservancy has issued an irrevocable offer to dedicate public access agreement. The agreement would require public access to the land that extends west of Highway 1 to the coastline. Because the land is zoned primarily for coastal agricultural use, public access would not be permitted without amending the current zoning designation. This zoning conflict also exists on the land east of Highway 1. The planning team plans to request such a zoning change from Santa Cruz County (Perry, 2001).

5.5.7 REFERENCES CITED

5.5.7.1 PUBLISHED REFERENCES

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5.5.7.2 PERSONAL COMMUNICATIONS

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5.6 HISTORICAL, CULTURAL AND ARCHAEOLGICAL RESOURCES

5.6.1 METHODOLOGY

The inventory of cultural resources for the Coast Dairies Property is largely incomplete. Coast Dairies has been in unbroken ownership for 100 years, and there has been little or no reason or requirement to engage the matter of cultural resource identification and management. A very small percentage of the Property has been subjected to archaeological surveys. Several prehistoric archaeological sites have been recorded; however, the site recording techniques and documentation are woefully inadequate by current standards. Apart from the information presented in Section 1.0, the historic archaeological record is almost completely unknown, although it is safe to assume that the long history of use has left some record in the form of subsurface deposits. The built environment, comprising objects, structures and buildings, is more accessible, and is represented on the Property by extant buildings, (including a striking cheese barn) remains of dairies, and the wide variety of structures that are part and parcel of a rural, agricultural land use pattern.

The general history of the Property in Section 1.0 was the product of an intensive review, based on both historical documents and oral testimony. It references a number of items in the Project Archives containing oral history transcripts, collections of historical photographs, and historical aerial photographs. Finally, the cultural resource inventory includes a less tangible set of resources, specifically places that are of importance to groups or communities, and tied to traditions integral to them.

The Planning Team used a variety of methods to determine the location and nature of known resources, arrive at an assessment of the quality and coverage of the cultural resource record, and to predict, albeit in a very limited fashion, the nature and location of as yet unidentified resources. While specific methods are discussed more fully in the sections that follow, the general methods used to understand the resources may be summarized as follows.

The investigation of the archaeological record (in this case largely the prehistoric record) began with a search of the records at the Northwest Information Center, Sonoma State University (NWIC)[1]. This yielded a variety of material comprising archaeological records, map coverage of past surveys, and reports of past investigations. The records search included the Coast Dairies Property and an area of 0.5 mi outside the Property boundary. The team also visited 12 previously recorded sites to assess the condition of the site and the quality of the site record against actual field observations. Finally, the team reviewed the remaining site records for quality. The team used current recording techniques as the standard against which the site

[1] The records search yielded site records, research reports, survey area and site location maps, and related information. These materials have been entered into the Project Archives, and the site locations have been plotted on Archive maps in confidential GIS layers. Locational data in this text is general, in order to avoid damage to these sensitive and legally protected resources.

documentation was evaluated. As noted above, inventory coverage is poor, and with some exceptions site recording is inadequate by current standards.

The Coast Dairies Property contains concentrated areas of development specifically related to the agricultural, logging, and mining and manufacturing uses of the Property. Past inventories and site recording efforts have identified some historic archaeological materials, but the larger historical complex (i.e. the large dairies or substantial community trash dumps) have not been identified, recorded or evaluated as historical properties. The cultural resource specialists on the Planning Team used the documentary record, (including newspaper accounts), historical ground and air photographs, and oral testimony to develop a list of “predicted historic archaeological resources.” This list is not exhaustive and also not based on any systematic field inventory. A small sample of the locations was visited during oral history interviews.

The built environment at the Property contains a number of complexes of structures of varying age and use. Many of these correspond to the “predicted historic archaeological resources” (e.g. the location may have both historic buildings and structures, and the potential for historic archaeological deposits). An architectural historian visited each building on the Property, determined if the building was historical (over 50 yeas in age) and recorded the buildings on appropriate California Department of Parks and Recreation forms. Each structure was also photographed. The architectural historian also developed a preliminary list of structures that have the potential for rehabilitation and reuse.

5.6.1.1 FIELD INVENTORY

A limited surface survey was conducted as part of the Existing Conditions Report (ECR) effort, to aid in predicting archaeological site locations on the Coast Dairies Property. Given the environmental variables associated with known sites, two different ecological zones were considered for examination, as it was deemed important to determine whether site patterning could be predicted for certain landforms on the Property. The first was along the northwest – southeast trending coastal terrace zone that extends for about six miles along its long axis and encroaches inland up to 0.5 mi at its widest point (generally the Analysis Zones designated as CT or CTB). The area contains a number of archaeological sites situated along either side of Highway 1 within the Property.

The second environmental zone comprises creek drainages and related tributaries that eventually empty into the Pacific Ocean (Analysis Zones designated SPZ). Five major drainages lie within the Coast Dairies Property, Laguna Creek, Yellow Bank Creek, Liddell Creek, San Vicente Creek and Molino Creek. A small portion of Molino Creek towards the northwestern end of the Property has been surveyed, but no cultural remains were observed (Jackson, 1996). In the 1950s, five sites were recorded along the south bank of Laguna Creek and two more have been identified along the drainage since. None of the other drainages within the boundary have been surveyed. Laguna Creek (LASPZ-1, 2 and 3) is therefore the only drainage on the Property that exhibits known cultural resources, but this also suggested that other (unsurveyed) drainage zones might be equally rich. Taking the coastal terrace sites and the Laguna Creek discoveries into consideration, the flat coastal terrace between Yellow Bank Creek and Liddell Creek drainages (LCT-2, LP-3; YBP-1) and the Liddell Creek drainage itself (LSPZ-2) were surveyed.

In March 2001, a non-intensive surface survey with 30 meter wide spacing was conducted by two archaeologists on the coastal terrace and a similar survey with 5-10 meter wide spacing was conducted in the creek drainage. The initial field effort entailed the survey of approximately 125 acres on two contiguous terraces between Yellow Bank and Liddell Creeks. The area is open with very few to no trees and supports a variety native and nonnative forbes and grasses typical of the area. The two terraces consist of an upper terrace situated at an elevation of 200 feet and a lower coastal terrace at an elevation of approximately 100 feet. At the time of the survey, cattle were grazing on the upper terrace area and cultivated fields were in use to the south on the flat coastal terrace abutting Highway 1. Annual forbs and grasses inhibited surface visibility on the upper terrace, which was estimated at a low 30 percent. In contrast, a good portion of the agricultural fields supporting Brussels sprouts on the lower coastal terrace had an excellent surface visibility of roughly 90 percent. However, the southeastern field appeared to have been fallow for some time and was heavily overgrown; surface visibility was effectively zero.

The second and final field effort consisted of a surface survey of approximately 35 acres along Liddell Creek drainage. Liddell Creek flows east-west meandering through rolling hills bordered with redwood, bay laurel, and oak trees eventually emptying into the Pacific Ocean. The drainage supports a variety of understory vegetation, creating impassable areas with virtually no ground surface visibility. Where possible, areas on either side of the drainage were surveyed, but for the most part only the north bank of the creek was accessible. Due to these conditions, only about one mile was surveyed along Liddell Creek.

5.6.2 REGIONAL SETTING

The Coast Dairies Property undoubtedly hosts a full range of cultural resources, representing the long span of occupation and land use that began in prehistory and has continued into the present. The resource inventory comprises prehistoric and historic archaeological deposits, objects, structures and buildings (the built environment) historical landscapes, and places of traditional value to groups in present day society. The Coast Dairies Property has a remarkably robust history, and the cultural resources discussed in this section are its tangible remains.

The regional setting, both prehistoric and historic, is presented in Section 1.0, *Coast Dairies: A Land Use History*, specifically subsections 1.1 through 1.3.

5.6.3 SECTION OVERVIEW AND STRUCTURE

The development of the ECR includes a limited amount of primary research, and some historical and archaeological fieldwork. Since prehistoric archaeological resources pose some of the greatest concerns for long term planning and development, the majority of Section 5.6 focuses on that issue. The section first provides a summary of known prehistoric resources, the results of limited survey and visits to known sites, an assessment of the "state of the archaeological record" and recommendations.

Subsequent sections address anticipated (e.g., predicted) historic archaeological resources referred to above. This "presumptive" inventory is based on historical research, particularly the review of historical ground and aerial photographs, a summary of the inventory of standing buildings and an assessment of the interpretive and reuse potential of a portion of the buildings. Finally, Section 5.6 discusses the broad historical themes represented on the landscape, with reference to the interpretive potential of the historical landscape.

5.6.4 ARCHAEOLOGICAL RESOURCES

5.6.4.1 PREVIOUS RESEARCH

Since the 1970's, only a handful of surveys and a few test excavation projects conducted under California Environmental Quality Act (CEQA) guidelines have occurred within the Coast Dairies boundaries. Of the 7,000 acres of Coast Dairies land, only about three percent (240 acres) has been surveyed for archaeological resources. Major projects within the area have been conducted by a range of professional consultants, including Far Western Anthropological Research Group, Inc. (Jones and Hildebrandt, 1994), Garcia and Associates (Fitzgerald and Ruby, 1997), Pacific Legacy, Inc. (Jackson, 1996), David Chavez and Associates (Chavez, 1989) and Jean Stafford in 1997. Researchers from several academic institutions, including San Jose State University (SJSU), San Francisco State University (SFSU), University of California at Santa Cruz (UCSC), and Cabrillo College, have implemented smaller-scale projects within and adjacent to Coast Dairies boundaries. Most archaeological work on the Property has consisted of records searches and/or surface surveys, performed either for the Coast Dairies & Land Co. (CDLC) or the County of Santa Cruz.

Only two archaeological sites on the Property have been a concentrated focus of archaeological attention. Site CA-SCR-117[2], also known as the Davenport Landing Site, has been the subject of a number of surveys, trenching, and test excavation projects during the last 25 years (Stafford, 1975; Roop, 1976a; Chavez, 1989; Clark, 1994, 1996; Fitzgerald and Ruby, 1997). It is the only archaeological site within Property boundaries where professional excavation has taken place and an intact cultural deposit unearthed. Radiocarbon dates place the site's occupation between ca. A.D. 1680 and A.D. 1505, making this one of the more unique sites in Santa Cruz County, by virtue of its depiction of Native American life just prior to and perhaps during the time of Euro American contact (Fitzgerald and Ruby, 1997) (see Photo 5.6-1).

The other site, CA-SCR-18, is in the modern town of Davenport. This site was first discovered and recorded in 1950 when three burials were unearthed during construction of a bakery (UCAS,

[2] The sites are assigned unique codes, called "trinomials" by the Northwest Information Center, both to avoid confusion and to mask the actual location.

1950). In 1977, it was again the venue of a major salvage project by UCSC following an unauthorized excavation of a house foundation (Edwards, 1978). All back dirt from the excavated area was screened, with numerous artifacts and the remains of one burial discovered. The recovered cultural materials were analyzed and later stored at UCSC.

Also notable are larger-scale archaeological projects that have taken place in close proximity to the CDLC Property boundaries. One project in particular was conducted by Hylkema (1991) and is the first synthesis of archaeological sites in the Santa Cruz area. His study involved the analysis of temporally diagnostic artifacts from excavated sites in San Mateo and Santa Cruz Counties and fostered the development of predictive models for prehistoric Native American adaptations in the region.

In 1993, Far Western Anthropological Research Group, Inc. (Jones and Hildebrandt, 1994) conducted archaeological investigations at sites CA-SCR-10, CA-SCR-17, CA-SCR-304 and CA-SCR-38/123 (Wilder Ranch). Three of the sites are located southeast of the Coast Dairies Property boundary and CA-SCR-17 is located within the boundary. Test excavations at CA-SCR-38/123 identified intact components that produced radiocarbon dates of ca. 4000 years Before Present (B.P.) and ca. 300-1300 B.P. A similar late component was inferred at CA-SCR-10, although extensive disturbance to the site prohibited any definitive conclusions (Jones and Hildebrandt, 1994).

Site CA-SCR-7, also referred to as Sand Hill Bluff, is located just beyond the southernmost boundary of the Coast Dairies Property overlooking the mouth of Laguna Creek. The site has witnessed archaeological investigations since the late 1800's (Saxe, 1875) and continuing through the 1990's. In 1988, Far Western performed data recovery excavations to mitigate adverse effects from development within the site area (Jones and Hildebrandt, 1990). This project removed some 20.2 cubic meters of soil and returned one of the oldest radiocarbon dates reported for an open coast occupation site anywhere from Monterey to the northern California border (6000 B.P.). Farther south, the Brown site (CA-SCR-20) is located in the foothills near the town of Bonny Doon. Since 1972, crews from SFSU, Cabrillo College and UCSC have excavated over 100 cubic meters of soil at the site. A plethora of artifacts was retrieved from these excavations; these findings are briefly discussed in a Master's thesis by Roop (1976b). An abundance of diagnostic, late period artifacts at this site has led Hylkema (1991) to identify it as having the best assemblage of this age in the Monterey Bay Area.

The resources described above are only a few of many that suggest a potentially high degree of archaeological sensitivity for the Coast Dairies Property. Considering the number of major archaeological sites found along the periphery, there is a high probability that many significant sites exist inside.

5.6.4.2 FIELD SURVEYS

No cultural remains were observed on either of the two terraces. In the drainages, no prehistoric remains were located, but evidence of historic logging activities was observed. Several large cut redwood trees were observed within the actual creek itself and one logging area with cut stumps and skid trails was located on the south bank of Liddell Creek. This area is most likely associated with logging practices that took place in the area in the early 1900's (see Section 1.2.5.4).

5.6.4.3 SITE ASSESSMENTS

The main goal of the assessment effort was to assess the quality of existing site records and to verify site locations as plotted on USGS 7.5 Minute Topographic Maps (Davenport and Santa Cruz Quadrangles) by the Northwestern Information Center. At the outset of the project, a records search requested by Albion (The Planning Team's cultural resource subcontractor) disclosed 23-recorded archaeological sites existing within and along the periphery of the CDLC Property boundaries. Each site record was examined thoroughly for content and clarity as to the subject site's description and location. Various survey, excavation, monitoring and environmental impact reports involving these 23 sites were also reviewed to obtain additional information about site presence and location. This review indicated that all of the site records, with the exception of one, are of very low quality; provide little information, and some even present conflicting site locations (see Table 5.6-1). In contrast, available technical reports referencing the sites are more useful, and reveal that many sites have been relocated during recent archaeological investigations, verifying their existence and location.

A representative sample (11 of 23) of sites were visited and analyzed to assess each site record's validity, verify location and determine site integrity. Sites were selected which had not been relocated during recent investigations, and were visited in February 2001. The 12 sites that were not visited have been relocated during recent surveys and/or excavation projects conducted under CEQA guidelines or academic research projects.

Sites visited in 2001

"Shell Midden"

This site was plotted on the USGS topographic map received from the NWIC, but no site record exists for the location and no permanent trinomial has been assigned. There may be a discrepancy between this site and the subsequent site labeled "BRM" located approximately 200 meters to the south-southwest.

The "Shell Midden" site is located along the western Laguna Creek terrace. The site consists of a midden concentration, a bedrock milling feature with 11 visible cups, a scant Monterey chert lithic scatter, and a historic dump. The bedrock milling feature is covered in a thin layer of duff and is flush with the ground. However, it has three exposed areas revealing seven mortar cups. The removal of surface duff from adjacent areas on the feature disclosed the presence of four

TABLE 5.6-1
SUMMARY OF CULTURAL SITE ASSESSMENTS, COAST DAIRIES AREA

Sites Number or Name	Analysis Zone	Record Quality	Map Quality	Site Type	Condition/ Integrity	References
Shell Midden	LASPZ-1	-	-	-	good	
BRM	LAW-1	-	-	-	?	
CA-SCR-55	LCTB-3	poor	poor	debitage	good	MaMagnusson 1971
CA-SCR-56	LCTB-3	poor	poor	debitage	?	Marsh 1970
CA-SCR-45	MCTB-1	poor	poor-good	debitage, artifact scatter	good	Rick 1970a
CA-SCR-50	MCTB-2	poor	poor-good	debitage	good	Rick 1970f
CA-SCR-194H	IA-3	poor	poor	debitage, historic debris	good	Stafford 1978a
CA-SCR-169	IA-3	poor	poor	debitage, historic	poor	Stafford 1978b
CA-SCR-46	MCTB-1	poor	poor-good	debitage, artifact scatter	good	Rick 1970b
CA-SCR-48	MCTB-1	poor	poor	debitage, artifact scatter	good	Rick 1970d
CA-SCR-197 (CA-SCR-47)	MCTB-1	poor	poor	debitage	good	Rick 1970c; Stafford 1978c
CA-SCR-13	LAW-3	poor	poor	midden		UCAS 1950d; Vallier 1977d
CA-SCR-14	LAW-3 and LASPZ-2	poor	poor	midden, berm		UCAS 1950e; Vallier 1977e
CA-SCR-15	LAW-3	poor	poor	midden, artifact scatter		UCAS 1950f; Vallier 1977f
CA-SCR-16	LAW-3 and LASPZ-2	poor	poor	midden, artifact scatter		UCAS 1950g; Vallier 1977a
CA-SCR-17	LASPZ-3	poor	poor	midden, human remains		UCAS 1950a; Vallier 1977b; Chavez 1989; Jones and Hildebrandt 1994
CA-SCR-58	LACTB-1	poor	poor	midden, debitage		O’Donnell 1971; Vallier 1977c; Chavez 1989
CA-SCR-57	YBCTB-1	poor	poor	debitage		Carter 1971

TABLE 5.6-1 (Continued)
SUMMARY OF CULTURAL SITE ASSESSMENTS, COAST DAIRIES AREA

Sites Number or Name	Analysis Zone	Record Quality	Map Quality	Site Type	Site Condition/ Integrity	References
CA-SCR-117	MSPZ-1 or MCTB-1	poor	poor	debitage		Stafford 1975; Roop 1976a; Chavez 1989; Clark 1994, 1996; Fitzgerald and Ruby 1997
CA-SCR-18	IA-3	poor	poor	midden, human remains		UCAS 1950b; Edwards 1978
CA-SCR-227	IA-3	poor	poor	artifact scatter		Cartier 1980
CA-SCR-19	LP-3 and LSPZ-2	poor	poor	midden, artifact scatter		UCAS 1950c
CA-SCR-36	YBP-1	poor	poor	midden, human remains, artifact scatter		Meighan 1951; Chavez 1989
CA-SCR-49	MCT-2	excellent	good	debitage, artifact scatter		Rick 1970e; Chavez 1989; Jackson 1996

more deep mortars. In total, the feature contains 11 mortar cups; seven smaller starter mortars and four deeper cups. In addition, several Monterey chert flakes were observed in the duff on top of the bedrock milling feature. More debitage[3] and mortar cups are likely to exist underneath the thin layer of duff.

Historic and recent materials appear to be concentrated east of the barbed wire fence on the western terrace of Laguna Creek and have eroded into the drainage. No cultural debris was observed within or around the redwood grove on the east side of the drainage, although the duff from the trees is extremely thick and inhibits ground surface visibility. Materials noted during the field visit include three whole Pismo clam shells, shoe parts, glass shards, a wine bottle base, white earthenware fragments, a wash basin, red brick fragments, several milled planks approximately five feet long and two inches thick, metal wire, large metal paint cans, barbed wire, and miscellaneous bits of rubber. Some materials appear to be more recent than others but it is unclear as to whether the age of any of these items are in fact pre- A.D. 1950 in age. None

[3] Debitage is lithic debris and discards found at the sites where stone tools and weapons were made.

retained any diagnostic attributes to clarify their age and positively identify them as historic, though an intensive inspection of the area and its artifacts was not within the scope of the ECR.

South of the main dump area, two wooden trellises are situated across the drainage from one another. The trellis on the west side of the creek is still intact and standing but that on the east is completely dilapidated. These features appear to be remnants of an old water conveyance system; a modern water line of similar construction lies about 15 meters to the south. This old water system may be associated with irrigation systems that were set up in the late 1800's to supply water to farms and dairies in the area (see Section 1.2.5.3). Also, several large concrete slabs with a systematic texture on one side were located within the drainage and a few were noted along the west terrace above the trellis and intermingled with the milled wood. These are probably the remains of an old structure, possibly a pump house associated with the trellises.

The site appears to be in good condition. All cultural materials and the bedrock milling station are located east of the barbed wire fence and are protected from cattle grazing and vehicle traffic. There are a few other rock outcrops along the western terrace of the creek and appear to be highly weathered. These outcrops should be inspected further for evidence of cultural use. No shell midden was encountered during the current effort and it is possible that this site and the site labeled "BRM" have been confused.

"BRM"

Albion staff surveyed the designated area and the adjacent creek bank but no cultural materials, features or rock outcrops were encountered. Ground surface visibility was fair (about 50-60 percent) and cattle grazing in the area had kept the grasses low. Several possibilities exist as to why the site was not relocated, the most likely being mapping error or the confusion with "Shell Midden" site.

CA-SCR-55

The information provided in the original site record (Magnusson, 1971) for CA-SCR-55 describes it as having a low shell density and a Monterey and Franciscan chert and obsidian lithic scatter[4] situated atop a natural mound within an agricultural field. It also depicts several abandoned autos lying between the site and Highway 1. No mound exists presently and all autos have been removed from the area.

Site CA-SCR-55 was relocated during the current project and appears to be in moderate condition. It is situated within a field of Brussels sprouts and is bordered by dirt access roads to the west and east. There is plant residue from crop harvest, covering the ground to about knee height; thus, only 0-5percent of the ground surface was visible. As a result, only a few Monterey chert flakes and abalone shell fragments were observed. The information in the 1971 record appears to be accurate.

[4] A "lithic scatter" is the remains of stones that have been modified for human use.

CA-SCR-56

Site CA-SCR-56 was not found. The description in the original site record indicates that CA-SCR-56 is a light lithic and tool scatter situated on a slight natural knoll (Marsh, 1970). No knoll was observed in 2001 during the ECR survey, and it is possible that the site may have been destroyed by cultivation activities. In an effort to find this site, the entire area from CA-SCR-55 southeast to the point where the field becomes very narrow out to the north cliff above Bonny Doon beach was surveyed, but no cultural materials were observed. As at CA-SCR-55, the supposed site area of CA-SCR-56 is covered with Brussels sprout plants, thus affording only about 0-5 percent visibility.

CA-SCR-45

Site CA-SCR-45 was successfully relocated and is situated atop a coastal terrace just north of Davenport Landing. The terrace hosts an agricultural field where artichokes have been cultivated and a few stranded plants still exist from the last crop harvest. Ground surface visibility within the field is 0-3 percent, but is 100 percent within the roadbed. The area is littered with natural sections of friable shale.

The site record states that bone, fire cracked rock, a projectile point, hammer stones and a mano are present (Rick, 1970a), but none of these items were seen during the revisit. Rodent backdirt piles within the field contained a few Monterey chert flakes and some shell fragments, but the majority of cultural material was found within the dirt access road that borders the field and leads up to the terrace. Artifacts include banded Monterey chert flakes and chunks, core fragments, one chert biface, abalone and mussel shell, one cobble with a flaked margin, and several raw, possibly battered cobbles. A few of the Monterey chert flakes observed in the roadbed were fire altered. The extent of the site cannot be determined due to poor visibility, but it appears to extend at least 100 meters east to west judging by the distribution of artifacts within the roadbed. Overall, the site appears to be in good condition apart from agricultural disturbance.

CA-SCR-50

Site CA-SCR-50 is situated on a creek terrace adjacent to the railroad tracks along Highway 1, lying within a cultivated field (Brussels sprouts). A large cement reservoir sits on the margin of the field and is accessed by a dirt road that continues along the fields' periphery. Ground surface visibility is zero within the field, but the dirt access road bordering the field is well exposed. Natural chunks of Monterey chert along with small-to-medium sized gravels and mudstone were observed within the roadbed.

The site is described in the original record as a lithic scatter (Rick, 1970f). During the current effort, cultural materials were observed within the access road and consisted of Monterey chert debitage, mostly primary reduction chunks, two choppers (split cobbles with flaked margins), one crude biface, one possible pestle, and some shell. One Franciscan chert projectile point was collected within the roadbed. Some possible historic materials such as glass, a ceramic shard, and sewer pipe fragments were also observed.

The site appears to be in good condition but has been impacted by cultivation of the field and construction of the reservoir. Information in the existing site record seems accurate, although a new updated record with more descriptive information needs to be completed.

CA-SCR-194H

Historic site CA-SCR-194H is situated on a coastal terrace near Davenport. The area has been subjected to heavy foot traffic but some historic debris still exists. Three large concrete foundations, all parallel to one another, are approximately ten feet from the cliff edge. Each foundation measures about 2.5 feet tall, 1.5 feet wide at the base, and 4 feet long. Two or three huge metal screws protrude from the top of each slab. A red brick foundation is located directly in front of the concrete foundations, approximately five feet to the south. Some of the bricks retain mortar and in one area the bricks are piled six courses high. The feature appears to be the corner of a building structure and its longest section measures 10 feet. A sparse amount of glass and some shell fragments were observed across the site area.

Upon review, it seems the original site record (Stafford, 1978a) contains information that may be incorrect. The site description states that the concrete foundations are probably related to whaling activities. However, there is other evidence suggesting that the foundations may have been related to the San Vicente Lumber Company and to the construction of the Santa Cruz Portland Cement Plant in 1905. Photo 1-4 in Section 1.0 depicts a large tower located on the bluff across from the town of Davenport; this tower looks to be situated at or near the same location as the cement foundations observed at the site. The site appears to be in good condition considering the amount of pedestrian traffic on the bluff.

CA-SCR-169

The site is located on a coastal bluff south of a grove of introduced cypress trees and supposedly consists of a sparse lithic scatter (Stafford, 1978b). Only three Monterey chert flakes were noted during the current visit, but ground surface visibility was poor (estimated at about 50 percent). Further research should be conducted as to when the cypress grove was planted because the trees appear on 1928 aerial photos, which would indicate an historic age component for the site. The site appears to be in decent condition despite unauthorized camping and heavy foot traffic across the bluff.

CA-SCR-48 (C-1451)

This site is located just north of a drainage ditch in the middle of an agricultural field that lies on a coastal terrace. A dirt access road runs adjacent and parallel to the ditch and a power line runs perpendicular 80 meters to the west. A wooden pump house is located 133 m @ 282º from the site. According to the site record (Rick, 1970), the site contains a chert lithic scatter. Approximately 15 Monterey chert flakes were noted during the present effort, most found within the access road. The site appears to extend at least 20 meters into the field to the north, although ground surface visibility was poor in that area (10 – 15 percent) and it may extend farther. The site is in decent condition and the site record by John Rick (1970d) is accurate.

CA-SCR-46 (C-1452)

Site CA-SCR-46 is located on an elongate, northwest – southeast trending sand dune that is situated atop a cultivated coastal terrace. A dirt road provides access to the northern portion of the dune as well as to the periphery of the field. Ground surface visibility on the dune is estimated at 80-90 percent, but visibility in surrounding areas is obscured by heavy vegetation. Three loci of cultural material are spaced across the dune. The first is located along the eastern flank and contains a dense cluster of primary Monterey chert flakes, battered cobbles, one definite and one possible handstone, and at least one large piece of mussel shell. Artifacts appear to be in primary context at this location. The second locus is a small artifact scatter on top of the dune and includes at least 15 Monterey chert flakes. The third locus is located along the north and western edges of the dune and comprises a variable scatter of Monterey chert debitage. This last deposit is densest along the north end of the dune within the access road, gradually thinning to the south along the dune perimeter. The site is in good condition and the site record by John Rick (1970b) is accurate. The dune appears to be undisturbed and in good condition with the exception of an excavated ditch along the southwest edge and some agricultural debris abandoned near the first locus.

CA-SCR-197 (CA-SCR-47)

John Rick first recorded archaeological site CA-SCR-47 (Rick, 1970c) and described it as a very small chert lithic scatter located on the bluff overlooking Molino Creek. The site actually lies south of Molino Creek in an agricultural field. A dirt access road borders the field and it appears that large volumes of gravel were imported to aid in road stabilization. The field itself has very poor to no surface visibility, but the access road has 90 percent visibility. Approximately 15 Monterey chert flakes were observed in the road and one large Monterey chert projectile point fragment were collected.

Information contained in the original site record (Rick, 1970c) seems to be correct. As noted earlier, Stafford (1978c) plotted site CA-SCR-197 on the same bluff overlooking Molino Creek, and her site record provides a description similar to Rick's. In 1989, Chavez and Associates visited CA-SCR-197 and concluded that this site and SCR-47 are in fact the same site (Chavez, 1989); based on our reconnaissance this appears to be the case. An accurate UTM coordinate reading was acquired with a hand held GPS unit.

As mentioned above, an inaccurate sketch map plotting several local archaeological sites is attached to the CA-SCR-197 site record, placing CA-SCR-47 north of Scotts Creek. This is incorrect; the plot should be ignored and the trinomial retired to prevent confusion in the future. At present, it is unclear whether or not an archaeological site actually does exist on the bluff north of Scotts Creek. This area is outside of the Coast Dairies Property boundary and thus was not surveyed.

Other Sites

Twelve of the 23 known archaeological sites were not selected as part of the representative sample for the ECR field visits, either because they had been relocated during recent archaeological investigations or because, in the case of CA-SCR-49, their updated records provide an adequate amount of information (Jackson, 1996). Excluding site CA-SCR-49, the remaining 11 sites were assessed by the quality of information provided within each record. Their assessments and recommendations are as follows.

Archaeological sites CA-SCR-13, CA-SCR-14, CA-SCR-15, CA-SCR-16 are midden concentrations located along Laguna Creek. All five sites were originally identified and recorded in the early 1950's and revisited and updated in 1977. The area is highly regarded for the many historical events that took place within the Laguna Creek drainage, and in the 1970s it was nominated as a district for inclusion on the National Register of Historic Places (Edwards pers. comm., 2001). Sites CA-SCR-13 and –14 are not located on the Coast Dairies Property.

Sites CA-SCR-15, -16 and –17 are all midden sites situated along Laguna Creek. Site CA-SCR-15 is located within the boundary and CA-SCR-16 appears to straddle the boundary, but the latter may no longer exist due to its proximity to the creek. In the original site record for CA-SCR-16 (Vallier, 1977a), it is noted that the small midden area is almost totally eroded away by the creek. Site CA-SCR-17, a large midden with known human burials, has been subject to some archaeological investigations in the past (UCAS, 1950a; Vallier, 1977b; Chavez, 1989; Jones and Hildebrandt, 1994). In 1994, a surface reconnaissance and eight shovel probes conducted on a portion of site CA-SCR-17 revealed only a few shell fragments on the surface and a subsurface deposit of modern debris (Jones and Hildebrandt, 1994). It is evident from these investigations that modern disturbances such as houses, cultivated fields, and paved and dirt roads have disturbed the site to a large extent.

All five of these sites need to be relocated to assess their presence and integrity and should be recorded properly. There is a high potential that more archaeological sites exist within the Laguna Creek drainage. It is also possible that some of the sites may be destroyed due to their proximity to the creek or modern disturbance. Considering the fact that the drainage has not been subject to an official survey, these aspects should be investigated further and the area should be intensively surveyed.

As for other sites, CA-SCR-58 was first recorded in 1971 (O'Donnell) and later in 1977 (Vallier, 1977c) and it is described as a midden with a moderate lithic scatter located south of Highway 1 to the west of Laguna Creek. The site was relocated during a survey by Chavez and Associates (Chavez, 1989) who suggested that existing trails across the site could adversely affect its cultural deposit in the future. The site needs to be fully recorded and any impacts assessed.

Site CA-SCR-117, also known as the Davenport Landing Site, has seen the most investigations of any site on Coast Dairies (Stafford, 1975; Roop, 1976a; Chavez, 1989; Clark, 1994 and 1996; Fitzgerald and Ruby, 1997). The site was originally recorded in 1975 (Stafford) and described as a very light lithic scatter. It is the only site professionally excavated within the Coast Dairies Property and it is an extremely important and significant resource. Unfortunately, no updated site record has been compiled since Stafford's 1975 initial recordation of the site. From the excavation completed in 1996 by Garcia and Associates (Fitzergerald and Ruby, 1997) for U.S. Abalone, Inc., the site was found to retain a culturally rich intact midden deposit with a varied artifact assemblage.

In the 1970's Silverking Oceanic Farms used the area encompassing CA-SCR-117 as a salmon hatchery. Today U.S. Abalone Inc. uses the area as an abalone farm; mariculture tanks are located adjacent to the site area and sustain abalone until they are harvested and exported. Because of these impacts, much of the site has been destroyed and it is not known if any portion of the site remains intact. The site needs to be recorded properly, taking into consideration the amount of archaeological work conducted at the site through the years and the level of disturbance.

Sites CA-SCR-18 and CA-SCR-227 are adjacent to one another, both located within the town of Davenport. The first is described as a midden with human burials (UCAS, 1950b) and the latter evidently consists solely of two Monterey chert scrapers (Cartier, 1980). The sites are situated within a residential area. The construction of houses, paved roads, sewer and phone lines, among other residential modification and repair activities, has degraded the site for at least 50 years. According to the 1950 site record for CA-SCR-18, it was reported that three burials were unearthed while a bakery was being built, which lead to its initial recording (UCAS, 1950b). In 1977, students from a Cabrillo College archaeology class participated in a salvage screening effort for an unauthorized excavation of a house foundation on the site (Edwards, 1978). All back dirt from the excavated area was screened, revealing numerous artifacts and one burial. In 1980, CA-SCR-227 was discovered while an archaeologist was monitoring the construction of a sewer tank (Cartier, 1980). Within the site record for CA-SCR-227, it is suggested that because of its close proximity to CA-SCR-18, it is likely that the two are in fact smaller portions of one large site. Unfortunately, several houses occupy this area and it is difficult to assess the current status of the site. Efforts are needed to determine the current extent of each site and to decide whether or not they are in fact parts of the same deposit.

Sites CA-SCR-19 (UCAS, 1950c) and CA-SCR-36 (Meighan, 1951) are both described as large shell middens located on the northeast side of Highway 1. Site CA-SCR-57 (Carter, 1971) is described as a lithic scatter located due south of CA-SCR-36 situated along the coastal terrace on the south side of the highway. All three sites were relocated during a survey in 1989 (Chavez) thus verifying their existence.

Lastly, site CA-SCR-49, first recorded in 1970 (Rick, 1970e), is a midden located approximately 150 meters northeast of Highway 1. Previous work on this site has been conducted (Chavez, 1989) and a more recent survey provided an updated site record (Jackson, 1996). The record for this site is adequate, although the site does contain a historic component and therefore should be referred to as CA-SCR-49/H.

5.6.5 PREDICTED HISTORIC ARCHAE0LOGICAL RESOURCES

5.6.5.1 REVIEW OF RESEARCH METHODS

The historic period began when the Spanish missionaries and explorers made the first slow journey up the north coast of what is now Santa Cruz County. Development of the area was not to begin in earnest until after the middle of the 19th Century, but from that point on the historic record indicates a steady growth and diversification of uses (see Section 1.0).

Historic archaeological deposits constitute an additional important class of resource. These resources age generally subsurface deposits that developed over the course of the historic period (e.g. privies or dumps), or the buried remains of structural features such as foundations, footings, and cellars. Unlike the built environment, historic archaeological resources are best understood by using the archaeological techniques of careful recording, controlled exploration, and analysis. The following resources are identified in confidential GIS maps in the Project Archives. The locations have been left general to discourage damage to the predicted sites.

5.6.5.2 RANCH AND DAIRYING COMPLEXES

The Coast Dairies Property was most extensively used during the late 19th and early 20th centuries for livestock production and dairying (see Section 1.2.5.3). Dairy operations were by necessity complex. In addition to large dairy barns, the local operation usually included residences, bunkhouses, milk sheds, equipment storage sheds, and corrals and pens. The dairy ranches also operated large haying operations, incorporating hundreds of acres of nearby fields into the ranch.

Photos in the Project Archives demonstrate the formation of an historic site. Portions of four aerial photographs taken in 1928, 1940, 1956, and 1967, display the development of the site and changes over time. This dairy ranch (unnamed) is located on Coast Dairies Property. It is very likely that the original buildings at the site predate the turn of the century. None of the buildings in the air photos are now standing, although a recent ground check did reveal a scatter of diverse historic materials on the ground surface. It is safe to assume that buried deposits such as privies, trash dumps, cellar remains and the like are present in the area of the former dairy operation.

Several of these operations existed on the Coast Dairies Property. Each was based on a lease arrangement with CDLC, although many operations probably predated the formation of the Company in 1901. Lessees over time made capital improvements on the lease holdings, including structures, buildings, roads, cultivated fields for hay and truck crops and water holding and irrigation systems. Some of these sites are marked by standing buildings or remains of buildings and other structures, others are devoid of any standing reminder of these past land uses.

A description of known ranch complexes follows. Only the Molino Creek Dairy site was visited. Other sites are predicted based on historical air photographs and oral history testimony (in Project Archives).

Molino Creek Dairy

Also known as Davenport Dairy, and Cuclis Dairy or Ranch, this site is marked by several degraded structures, a standing concrete milk house, and a large storage cellar presumably used to store and age cheese (later to store wine). The dairy was operated until the beginning of World War II by the Cuclis family (Jack Cuclis was a Greek émigré form Crete, who had first worked in the quarries at the Cement Plant). The dairy operation is visible on the 1928 aerial photographs (Project Airphoto Archives, Flight 1928D) and probably dates to the 1880s. The site comprises the structure remains and almost certainly buried deposits. The information and interpretive potential of the site is heightened by the availability of excellent oral history testimony (Project Archives, *Maria Cuclis Tomares Interview*).

Big Ranch

This ranch complex was operated most recently by Fred Pfeiffer, the rancher who ran cattle in much of the upland area of the Coast Dairies Property. The complex is visible on air photos from 1928 (Project Airphoto Archives, Flight 1928D, Frame 16, and Project Archives, *Lud McCrary Interview No. 1, Note B*). Some buildings are still standing at the site.

Ferrari Creek (Muchitini) Ranch

This is a ranch complex located on Ferrari Creed east of Davenport Landing. Oral history respondents recalled that the ranch was upstream from Davenport Landing, had a hog pen over the creek, and also recalled a fish hatchery (Project Archives, *Tom and Richard Dietz Interview*). There are no remaining structures at the site and the potential for historic archaeological deposits is unknown. The complex is visible on the 1928 aerial photograph (Project Airphoto Archives, Flight 1928D, Frame 16).

The Charlie Pinkham Place and Agua Puerca School

This complex of buildings near the Southern Pacific Railroad included the Pinkham residence and the Agua Puerca Schoolhouse. Charlie Pinkham was a county road foreman and in addition to his residence the county maintained two or more buildings as maintenance garages (Project Archives, *Lud McCrary Interview No. 1*).

Yellow Bank Creek and Dairy

This dairying complex is near the mouth of Yellow Bank Creek and, like the Molino Creek (Cuclis) Dairy, is one of the best remembered operations on the North Coast of Santa Cruz County. The complex probably dates to the late 19^{th} Century, had at one time at least 10 structures and buildings, and was the headquarters for the Coast Dairies & Land Co., from the

Company's formation in 1901. In later years the operation was known as the Grossi Place. Helen Grossi, a member of the family recalls her family moving buildings from the complex to Davenport (Helen Grossi, pers. comm. to Sandy Lydon, 2000). The complex is clearly visible on the 1928 aerial photographs (Project Archives, *Lud McCrary Interview No. 1*, 1928D, Frame 13, Note D). No structures from the dairy operation are visible, although a reconnaissance revealed a scatter of historic debris over a wide area at the site. The potential for historic deposits is high, and the interpretive potential for the site is enhanced by the availability of oral history testimony.

Trash Dumps

Two trash dumps were identified during oral history research for the ECR (Project Archives, *Tom and Richard Dietz interviews*). Two dumps in the vicinity of Davenport were said to have been used for several years, beginning at least in the 1920s, but probably as early as the early 20th Century. These were described as community disposal areas, and probably contain the full range of domestic, commercial and possibly industrial refuse. The disposal sites probably served the communities of Davenport, Newtown, and possibly the cement plant. It is less likely that they served the outlying dairy and ranch complexes. The sites are now covered, leaving no evidence on the ground surface. The respondents indicated that the contents were not removed before the dumps were covered.

Other Potential Sites

Davenport Landing

Peter Davenport developed Davenport Landing as a shipping point for the North Coast in 1867. A small community built up around the pier, including both commercial and residential structures (See Section 1.2.5 *Davenport's Landing*). The town was destroyed by fire in 1913 and while some structures were rebuilt, the fire effectively marked the end of the community. There is a high potential for historical archaeological materials along the entirety of the loop formed by what is now called Davenport Landing Road. A few buildings are visible on the 1928 aerial photograph (Project Archives, *Lud McCrary Interview No. 1*, 1928D, Frame 16).

5.6.6 THE BUILT ENVIRONMENT

The built environment at the Coast Dairies Property comprises a wide variety of both buildings and structures. These represent the predominant historical themes represented at the Property, including agriculture, transportation, and recreation. Buildings include residences, bunkhouses, barns, storage and curing buildings, and the necessary assortment of structures associated with an agricultural operation. Structures that make up the remainder of the built environment include such things as corrals, dams, trestles, and, again, the variety of human artifacts that inevitably accompany any farming or ranching operation.

As part of this study, investigators conducted a full survey and inventory of buildings (excluding structures) and prepared California Department of Parks and Recreation forms for each. These are included in the Project Archives. Examples from this inventory are discussed below to illustrate the variety and interpretive potential of these elements of the historical record.

5.6.6.1 THE VALAUE OF THE BUILT ENVIRONMENT

The buildings and structures on the Coast Dairies Property may be understood in the context of the major historic themes represented there. It is from these connections that these buildings and structures may be said to have value (or importance or significance). These values may be described as research potential, interpretive value, and the potential for reuse.

Research Potential

The complexes of buildings and structures found in or associated with the coastal creek drainages represent the long span of the agricultural history of the property. These complexes have the potential to provide data to help understand that history. The Cuclis Dairy (a.k.a. Molino Creek or Davenport Dairy) on Molino Creek (described above) provides an excellent example of a research potential at Coast Dairies. This settlement area now contains the collapsed or nearly collapsed remains of three buildings, (bunkhouses and a milk house) and a large stone-lined storage structure carved into a nearby hillside. The remains of other buildings and structures, as well as the remnants of daily activities, are almost certainly part of this complex in the form of archaeological deposits. Through the remains of the built environment, in combination with oral testimony and documentary evidence (particularly historic aerial photography) the chronology of the development of the local dairy industry can be described, with its important interactions with the social life, subsistence economy, and ethnicity of the community and the larger society.

Interpretation Using the Built Environment

The standing buildings and structures (even though in various states of disrepair or collapse) provide the most immediate avenue for interpreting the history of the Property. The built environment is tangible and engaging, unlike less accessible archaeological deposits which by virtue of their abstraction require a more complex level of interpretation. Perhaps the most striking structure on the Property, the “cheese house” or “cheese barn” on Swanton Road, north of Davenport, provides an excellent example of the potential of a single building in its setting. The large barn-like structure was originally a cheese storage facility, representing the dominant dairying activity of the late 19th and early 20th centuries -- hard milk products for the distant urban markets. The building’s function is clearly marked by the ventilating cupola and the construction shows a level of detail and finish work not seen in the ordinary dairy barns of the region. This building alone would provide an excellent vehicle to describe the origins of the early cheese and butter industry, the history of the Italian-Swiss dairying families, and changes in the industry (see Section 1.0). Since the building is in its original setting (i.e., not surrounded by non-agricultural development) it is a natural springboard to describe broader patterns of land use associated with dairying-hay operations, truck and subsistence farming, water management, and transportation.

Use and Reuse of the Built Environment

The buildings and structures on the Coast Dairies Property provide limited, though real opportunities for reuse for interpretative purposes or as part of the long range management infrastructure at the Property. Buildings such as the cheese barn or buildings in the Laguna Creek complex may retain sufficient integrity to be used in a number of ways, including interpretive displays, offices, or even equipment storage. Many buildings however, do not appear to possess (and perhaps never did possess) sufficient structural integrity to be fitted for reuse. Professional structural evaluation of these structures is a necessary first step before considering any reuse.

Public safety is also an important issue in reuse of buildings and structures. Farming practices, particularly after 1930 were heavily dependent on the use of pesticides (including rodenticides) and herbicides. Oral testimony documented the use of the pesticide Paraquat, and it is likely that DDT, 1080 and even the heavy element thallium were used to control pests such as ground squirrels. It is possible or even probable that residues or accumulations of these hazardous materials will be found in or around structures and buildings or in the soil or groundwater in the vicinity of farming complexes.

5.6.7 ISSUES

5.6.7.1 THE RESOURCE RECORD

The single most important cultural resource issue is the lack of systematic, reliable resource inventories for the Coast Dairies Property. Those archaeological resources that have been identified are very poorly recorded (with one exception). Many of the site locations are inaccurate, and generally, the records do not identify the nature or extent of the resource. The poor quality of the archaeological record has a direct effect on the management of these resources. Until the resources are better understood it is difficult to develop realistic cultural resource protection for specific management actions on the Coast Dairies Property. This situation is exacerbated by the presence of a number of potentially important historic resources (i.e.) ranch and dairy complex, historic Davenport Landing) that have received no systematic treatment (either identification or evaluation). As an example, we provide a discussion of the situation for sites in Analysis Zone MCTB-1.

During the ECR preparation, a major discrepancy became apparent between the site records for CA-SCR-46 and –48. In 1970, John Rick first recorded both CA-SCR-46 and -48 and their locations were plotted on NWIC's USGS quadrangle. It appears that in 1996, the location plots of CA-SCR-46 and –48 were inaccurately moved on the Davenport Quadrangle to the north approximately 0.5 mi. This discrepancy originated in 1978 when Jean and Don Stafford recorded site CA-SCR-197, which is approximately 500 meters to the north-northwest of SCR-46 and 600 meters to the north-northwest of SCR-48. In the record for SCR-197 (Stafford, 1978c), the Staffords supplied an inaccurate rough sketch of archaeological sites within the surrounding area. Unfortunately, on this sketch map they plotted SCR-46 and SCR-48 to the north of SCR-197, in between Molino and Scotts Creeks. These are incorrect locations for SCR-46 and SCR-

48. It is unclear as to whether or not actual sites did exist at the location where SCR-46 and SCR-48 were plotted on the Stafford's 1978 record. It is possible that two sites did in fact exist and the Stafford's gave them an incorrect designation. Consequently, in January 2001, the areas were surveyed as part of the ECR preparation and no cultural material was observed within the area designated by the Stafford's as SCR-46 on the 1978 site record. However, one flake was observed on the dune where SCR-48 was plotted.

On the same day, archaeologist Bob Cartier of Archaeological Resource Management was monitoring the removal of a cement foundation for a habitat restoration project conducted by Santa Cruz County. The dune was within the "site" area designated SCR-48 by the Stafford's. He noted that no flakes had been observed but he did see a few natural chunks of Monterey chert and one cobble that may have been assayed (Cartier pers. comm., 2001). According to attachments included with the site records, the Stafford's 1978 sketch map resurfaced sometime in the 1990's causing NWIC to inaccurately move the locations of the two sites. NWIC left a marker designation on the topographic map where the sites were originally plotted by Rick in 1970 and designated the areas C-1451 and C-1452. To add to the confusion even more, NWIC designated SCR-46 as C-1451 and SCR-48 as C-1452, but in reality the location of the sites is actually reversed. C-1452 is really CA-SCR-46 and C-1451 is actually CA-SCR-48. Sites CA-SCR-46 and -48 were relocated during the current program. Sketch maps attached to both of the original site records (Rick,1970c and d) correlates with the cultural materials, area topography, and site placement observed in 2001. Plots for these sites should be moved on the Information Centers maps from their incorrect locations near Scotts Creek back to the areas designated C-1452 and C-1451 on the Davenport Quadrangle. The correct UTM coordinates are as follows: CA-SCR-46 is located at 10S 569076m E / 4098399m N and CA-SCR-48 is located 10 S 569347m E / 4098255m N.

Cultural resource inventory, specifically background research, and field survey will provide the range of information needed to approach management decisions. Whether the inventory is conducted on an individual project-by-project basis or under a programmatic agreement, obtaining reliable data about the resources is the necessary first step in aligning development plans, management goals, and the need to preserve, protect, and interpret the cultural resources on the Coast Dairies Property.

5.6.7.2 HISTORICAL INFORMATION

The Coast Dairies Property has a long and complex history, despite its present day appearance of isolation. Several important themes are represented on the Property, including early American period agriculture (dairying and cattle ranching), mining and manufacturing (the cement plant), transportation, immigration and ethnicity, and the rural life of historic coastal California. A portion of the written record was explored to create the land use history in Section 1. Much more remains, material that will add immeasurably to our understanding of changing land use and development of the Property.

The limited oral history program instituted for this project (five transcribed interviews with five respondents) resulted in very valuable information not available in any other form. Additional interviews will provide information on immigration, ethnicity and ethnic communities, recreation and social life, agriculture and land use patterns. The excellent oral history program headed up by Alverda Orlando and the Davenport Community Resource Center has also collected valuable information that could be brought into the Coast Dairies management plan archives.

5.6.7.3 INTERPRETIVE POTENTIAL

The Coast Dairies Property presents virtually unlimited opportunities for interpretation of the important themes in prehistory and history. On-site or off-site interpretation, and active or passive interpretation might address the following

- The prehistory of the central coast of California changes in resource use, settlement, and organization through the periods of prehistory.
- Early exploration of California, particularly the route and travails of the early Spanish explorers.
- Agricultural development in the early American period, specifically livestock operations and dairying and the production of hard dairy products for urban areas.
- Immigration, ethnicity, and ethnic communities, including the prominent, and not so prominent Greek, Italian, Swiss Italian, Filipino, Chinese, Japanese, and possibly Azorean peoples who lived, and or worked in the area.
- Redwood logging and the effects, long and short term of clear-cut logging techniques.

5.6.7.5 AREAS OF ARCHAEOLOGICAL SENSITIVITY

The archaeological record is insufficient for the creation of a reliable predictive model, i.e., a means to presume resources are present in an area, and restrict management actions to protect them. Such models rely on a sample of reliable data, usually stratified by environmental variables such as slope, aspect, proximity to water. Without such data, a fine grained model must give way to a coarse, less complex model, in the case of the Coast Dairies Property a geographic predictive model based on three levels: known or expected high sensitivity, expected low sensitivity, and areas of unknown sensitivity. This model is based on four facts. First, known cultural resources on and around the Coast Dairies Property occur on the coastal terrace and along streams courses. Second, resources are likely to be present at sites developed and used during the historic period. Third, resources are not likely to be found in inhospitable landforms, such as steep slopes, or deep ravines. And, fourth, without benefit of an adequate sample inventory it is not possible to predict the frequency of occurrence (or even presence or absence) of cultural resources in moderate landforms. The following predictive statements might best be characterized as “rules of thumb” until more reliable data are available for the Property.

High Sensitivity

Three areas are at present considered highly sensitive for cultural resources.

1. The full coastal terrace from the northern to southern boundary of the Property.

2. Riparian corridors, including estuarine or former estuarine environments at the mouths of the creeks, upstream to the head of each watershed. The sensitivity zone extends up to all terraces above the creeks.

3. The locations of all known (recorded) sites, and all predicted historic sites.

Low Sensitivity

Low sensitivity areas include areas of steep slope (30º or greater), rocky open shores (the full intertidal zone) , and washes, gullies, and eroded areas.

Unknown Sensitivity

All remaining areas fall into an unknown sensitivity classification. It is not possible at this time to a apply a rank to the possibility of finding resources in these areas.

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5.7 SOCIO-ECONOMICS

5.7.1 METHODOLOGY

The following section examines the socio-economic setting of the Coast Dairies Property. Specifically, the section characterizes the socio-economic conditions and trends in Santa Cruz County and the community of Davenport to provide the Planning Team with a socio-economic baseline to evaluate future development potential of the Coast Dairies Property and the implications associated with a transition from private to public land.

The baseline focuses on the economic variables most relevant to planning on the Coast Dairies Property. These include demographics (i.e., population), housing, employment, and income. The baseline also focuses on specific industry sectors already active in Davenport and on the Coast Dairies Property, as well as sectors that may offer future development potential and/or are important to the regional economy. These sectors include agriculture, aquaculture, timber, mining, and tourism/recreation. While some activities (e.g. timber harvest) are either explicitly excluded or will prove inappropriate at Coast Dairies, the examination of specific industries identifies historical trends and provides a context for understanding the impact of the Long-Term Resource Protection and Use Plan (Plan) on these sectors. Consideration of agriculture on the Coast Dairies Property is limited, as it is covered in detail in Section 5.2.

To prepare this socio-economic baseline, relevant information was obtained from a number of federal, state, and local agencies that record and disseminate data on Santa Cruz County and its communities. These sources include, but are not limited to, the U.S. Bureau of Census, the California Department of Finance (DOF), the California Employment Development Department (EDD), and the Association of Monterey Bay Area Governments (AMBAG).

Several data limitations should be recognized at the outset. Most important, data specific to the Davenport community from the 2000 Census were unavailable when this baseline was prepared, even though the census was complete. For example, during the 1990's, Davenport underwent fairly significant demographic change, invalidating many of the demographic statistics reported in the 1990 census. In a larger community, this obstacle may have been overcome by using regional and state agency information to update census statistics. However, given Davenport's small size, regional and State agencies do not separately monitor its economic activity. As a result, in order to adjust for demographic changes that occurred after the 1990 census, the data were reconciled with more recently published regional statistics, direct observation of the community, and information gathered through informal interviews with town residents. These interviews included representatives of the Davenport Community Action Board.

A second data limitation relates to the scope of existing economic activity in the Davenport community and on the Coast Dairies Property. Specifically, the limited nature of the mining industry in Santa Cruz County affects the accuracy and availability of economic statistical data for that sector. The availability of data on small economic sectors is further constrained by disclosure restrictions on confidential (firm-specific) information.

A third data limitation relates to the limited availability of data for large privately held businesses in the area. Unfortunately, even the larger businesses operating in Davenport and on the Coast Dairies Property, including RMC Pacific Materials cement plant, are not publicly traded. As such, profitability and other financial data on those enterprises are not available to the public. Accordingly, financial and employment information for current enterprises in Davenport and on the Coast Dairies Property was limited to third party sources and phone discussions with representatives of those enterprises.

5.7.2 REGIONAL SOCIO-ECONOMY

5.7.2.1 DEMOGRAPHIC CHARACTERISTICS

Population

According to the California Department of Finance, the population of Santa Cruz County was 255,800 at the beginning of 2001. The county seat is located in the City of Santa Cruz. The City itself has a population of 56,000 (California Department of Finance, 2001). Other major cities in the county include Watsonville, Scotts Valley, and Capitola. Table 5.7-1 shows the population of the incorporated cities and unincorporated areas of Santa Cruz County. The table indicates that approximately 50 percent of the county's population live in its unincorporated areas.

TABLE 5.7-1
CURRENT POPULATION OF SANTA CRUZ CITIES AND COUNTy
January 2001

Jurisdiction	Population
Santa Cruz	56,000
Watsonville	37,400
Capitola	11,100
Scotts Valley	10,650
Unincorporated areas	138,800
Total Santa Cruz County	255,800

Source: California Department of Finance and Santa Cruz County, 2001

Santa Cruz County is more densely populated than the State of California as a whole. In the year 2000**,** the county had an estimated 516 residents per square mile, compared to 191 residents per square mile for all of California. Despite Santa Cruz's more dense settlement patterns, over the last twenty years the county's average population growth has lagged behind the rest of the state.

From 1980 to 2000, the county's population increased 36 percent. During this same period, the population of California increased 45 percent (Santa Cruz County, 2000). Table 5.7-2 summarizes the trend in population for the county and state by ten-year intervals during this 20-year period.

TABLE 5.7-2
POPULATION CHANGE 1980 – 2000

Santa Cruz County			California (thousands)		
Year	**Population**	**Ten-Year Change**	**Year**	**Population**	**Ten-Year Change**
1980	188,141		1980	23,668	
1990	229,734	22%	1990	29,758	26%
2000	255,800	11%	2000	34,336	15%

Source: Santa Cruz County, 2000

From 1990 to the year 2000, the population of Santa Cruz County grew at an average annual rate of about 1.0 percent (Santa Cruz County, 2000). During this same period, the second and fourth most populated cities in the county, Watsonville and Scotts Valley respectively, experienced population growth more than twice this level. From 1990 to the year 2000, while the larger towns increased, the population of unincorporated areas grew at a slower pace: less than 0.7 percent annually (Santa Cruz County, 2000). This finding indicates recent population growth in the county has been concentrated in the more urban areas. Table 5.7-3 illustrates the varying rates of population growth in different parts of Santa Cruz County.

Not surprisingly, it is anticipated that Santa Cruz County's population will continue to grow. In the year 2000, AMBAG projected the county's population was likely to increase 18 to 20 percent through the year 2020, an effective annual rate of growth lower than that realized during the preceding ten years (AMBAG, 1997). Jurisdiction-specific population projections developed by AMBAG are shown in Table 5.7-4. A comparison of tables 5.7-3 and 5.7-4 reveals that population growth in Santa Cruz County between 2000 and 2020, in Capitola and to a lesser extent Santa Cruz, is expected to be lower than growth experienced during the 1990s. AMBAG cites water treatment and supply as potential constraints on future population growth in the county (AMBAG, 1997). AMBAG did not, however, account for these constraints in developing their population growth projections. It assumed the county will make the infrastructure investments necessary to address water treatment and supply requirements. If this investment is not implemented then future population growth projections are unlikely to be realized.

TABLE 5.7-3
CHANGES IN SANTA CRUZ COUNTY POPULATION 1990-2000

Year	Capitola	Santa Cruz	Scotts Valley	Watson -ville	Incor-porated	Unincor-porated	County	State (000s)
1990	10,171	49,711	8,667	31,099	99,648	130,086	229,734	29,758
1995	10,700	52,100	9,625	33,450	105,875	134,100	240,000	31,910
2000	11,200	56,000	10,850	38,100	116,150	138,800	255,800	34,336
Avg. Annual Growth	**1.0%**	**1.2%**	**2.3%**	**2.1%**	**1.5%**	**.65%**	**1.0%**	**1.4%**

Source: Association of Monterey Bay Area Governments, 1997

TABLE 5.7-4
FORECAST OF POPULATION GROWTH

Jurisdiction	2005	2010	2015	2020	Average Annual Growth (%)
Capitola	11,375	11,500	11,625	11,750	0.24%
Santa Cruz	60,299	63,866	64,193	64,386	0.70%
Scotts Valley	12,218	13,284	14,294	15,615	1.84%
Watsonville	50,495	51,881	53,816	55,875	1.93%
Unincorporated	135,673	141,183	149,060	156,020	0.59%
County Total	270,060	281,714	292,988	303,646	0.86%

Source: Association of Monterey Bay Area Governments, 1997

Ethnicity

Table 5.7-5 characterizes the changing ethnic composition of Santa Cruz County in two-year intervals from 1994 through 2000.

TABLE 5.7-5
POPULATION BY ETHNICITY

Ethnic Group	1994	1996	1998	2000	Average Annual Change (%)
Caucasian	173,072	174,196	177,471	181,594	0.8%
Latino	53,067	56,642	59,907	63,699	3.0%
Asian	8,822	9,370	9,978	10,692	3.2%
African American	2,509	2,622	2,741	2,871	2.2%
Native American	1,349	1,359	1,378	1,392	0.5%
Total	238,819	243,657	251,475	260,248	1.4%

Source: Santa Cruz County, 2000

The table demonstrates that the ethnic composition of Santa Cruz County changed during the period of study. The county's Latino, Asian, and African American populations grew faster than the Caucasian and Native American populations. As in California as a whole, Latinos in Santa Cruz County represent the second largest ethnic group behind Caucasians.

Poverty Rates

Pending the availability of poverty statistics from the 2000 Census, the most recent data on poverty rates for Santa Cruz County are from 1995. As displayed in Table 5.7-6, these data indicate that from 1990 through 1995, poverty in Santa Cruz County increased at a rate similar to the nation, but lower than the state.

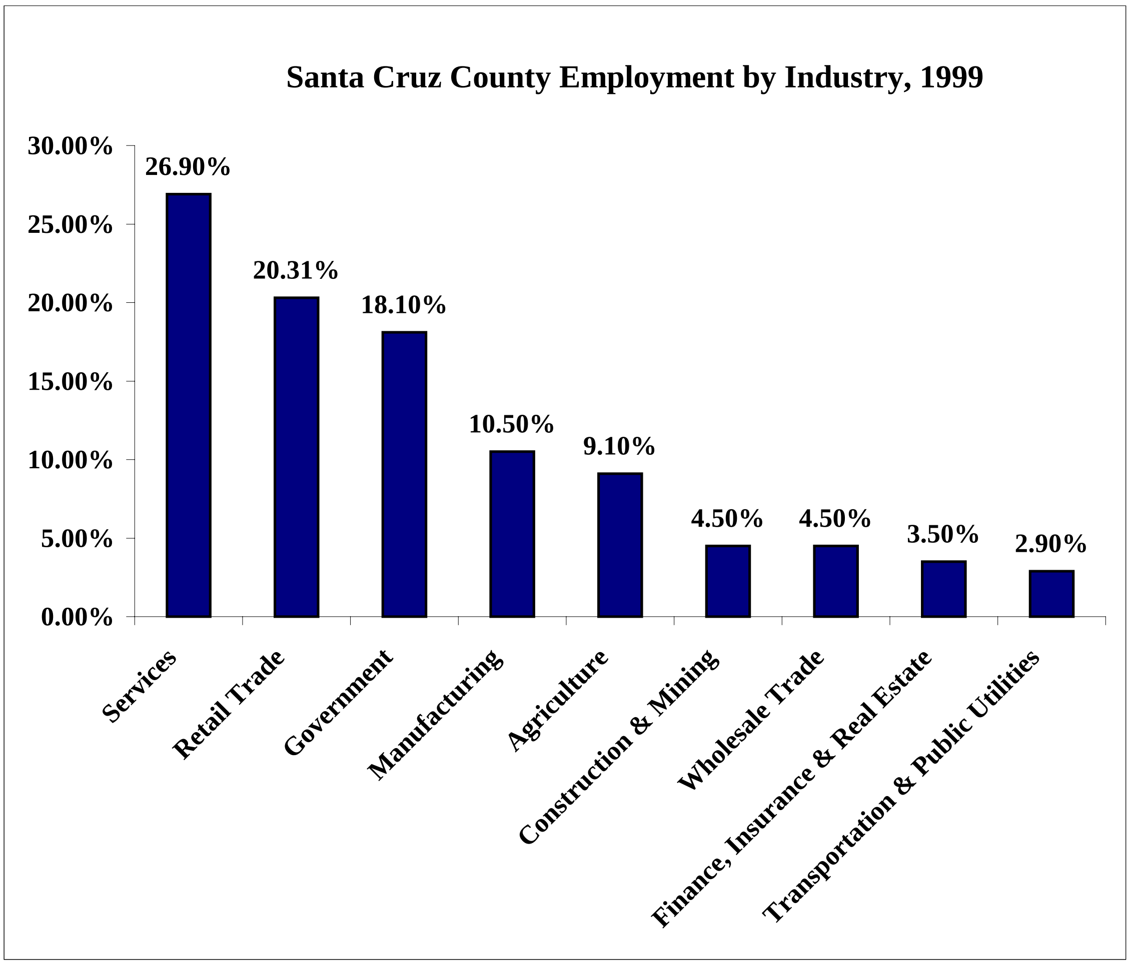
Education

The population of Santa Cruz County ranks above both state and national levels for educational attainment. About 19 percent of Santa Cruz County residents hold a bachelor's degree compared with 15 and 13 percent for the state and nation, respectively. Santa Cruz residents also rank favorably when compared with state and national levels for graduate degree attainment. Over 10 percent of Santa Cruz County residents have graduate or professional degrees, whereas only eight percent of state and 7 percent of national residents have graduate degrees (Santa Cruz County, 2000).

TABLE 5.7-6
PERCENT OF POPULATION UNDER POVERTY LEVEL

	1990	1993	1995
Santa Cruz County	11.1%	13.8%	13.3%
State	12.7%	17.4%	16.5%
National	12.8%	15.1%	13.8%

Source: Santa Cruz County, 2000



Source: California Employment Development Department, 2000

Table 5.7-7 summarizes the number of jobs and job growth in Santa Cruz County by major industry sector from 1994 through 1999. The county's fastest growing sector was construction, realizing double-digit job growth during the period. The table also shows that manufacturing, and to a greater extent agriculture, unlike other sectors of the county economy, experienced declining employment.

TABLE 5.7-7
NET JOB GROWTH BY INDUSTRY

Industry	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**	**Avg.. Change(%)**
Agriculture	12,200	11,700	11,700	11,200	11,000	9,100	**(5.7%)**
Mining	0	0	100	100	100	100	**N/A**
Construction	2,800	3,200	3,400	3,700	4,000	4,600	**10.4%**
Manufacturing	12,000	12,800	12,700	12,200	11,500	10,900	**(1.9%)**
Transportation	1,900	1,800	2,100	2,100	2,200	2,100	**2.0%**
Communications and Public Utilities	900	700	900	900	900	900	**-**
Trade	22,900	23,400	24,600	24,600	24,700	25,600	**2.3%**
Finance, Insurance and Real Estate	3,200	3,100	3,300	3,300	3,500	3,600	**2.4%**
Services	24,400	24,200	25,900	25,900	27,200	28,000	**2.8%**
Government	16,300	16,700	17,600	17,600	18,000	18,800	**2.9%**

Source: Santa Cruz County, 2000

5.7.2.2 EMPLOYMENT AND INCOME

Santa Cruz County has a diversified economy. The services (as opposed to manufacturing) sector is the largest employer, accounting for approximately 27 percent of jobs in the county in 1999. Retail trade and government are the next two largest employment sectors, accounting for 20 and 18 percent of the county's job base, respectively (California Employment Development Department, 2000). The following chart presents a breakdown of employment by industry in the county in 1999.

Mining is a very small part of the region's economy and accordingly accounts for only a small number of jobs in Santa Cruz County. While the table indicates that none of the jobs in the county were attributed to mining in 1994 and 1995, the ongoing mining activities of RMC Pacific Materials on the Coast Dairies Property would suggest this statistic to be inaccurate. According to Regional Economic Information System (REIS) data published by the U.S. Bureau of Economic Analysis (BEA), mining jobs in Santa Cruz County held steady around 160 during the mid 1990's (Bureau of Economic Analysis, 2001). The disparity between the EDD and REIS data is likely the result of differences in how each allocates economic data across industry sectors in reporting those data. In the mining sector, for example, many jobs may be inappropriately attributed to the manufacturing sector when the mine operators also have processing facilities on site (such as RMC Pacific Materials in Davenport).

A comparison of Tables 5.7-3 and 5.7-7 suggests that job growth in Santa Cruz County has roughly kept pace with population growth.

Based on a review of EDD job-specific projections, employment in Santa Cruz County is expected to increase at rates equal to those experienced in the recent past (California Employment Development Department, 2000). EDD also projects that approximately 85 percent of job growth in the county will occur in the government, retail, and services sectors. The most recent EDD employment projections for the county do not account for the very recent slowdown in the economy, particularly the technology sector, which may affect Santa Cruz County job creation trends and unemployment levels in the fairly near-term.

The EDD projects that retail sales and cashiers, teachers and educational assistants, general managers, computer support specialists, police officers, computer engineers, and system analysts are the individual occupations likely to experience the greatest job growth in Santa Cruz County.

At the time this analysis was prepared, the largest 15 employers located in Santa Cruz County were:

University of California, Santa Cruz	(Education)
County of Santa Cruz	(Government)
Seagate Technology	(Disc Drives)
Pajaro Unified School District	(Education)
Dominican Santa Cruz Hospital	(Health Care)
N.T. Giargiulo, L.P.	(Agricultural Products)
Santa Cruz Seaside Company	(Recreation)
Borland International	(Software)
Watsonville Community Hospital	(Health Care)
Santa Cruz Operations	(Software)
City of Santa Cruz	(Government)
Cabrillo Community College	(Education)
Silicon Systems International	(Semiconductors)
Monterey Mushrooms, Inc.	(Agricultural Products)
Watkins Johnson	(Electronic Equipment)

In the year 2000, there were 141,800 residents of Santa Cruz County in the labor force. In that same year, the county's unemployment rate was 5.6 percent (California Department of Finance, 2001). Table 5.7-8 summarizes the unemployment situation in Santa Cruz County by jurisdiction from 1994 through 2000. The table shows that the unemployment rate decreased substantially during the period; nonetheless, the county's unemployment rate has persistently exceeded state and national averages.

The table also shows that Watsonville had a much higher level of unemployment than the rest of the county. High unemployment in Watsonville may be attributed to the relatively low level of education and job training of its residents. Residents of Watsonville are more dependent on seasonal and low-paying agricultural jobs than are residents in other parts of the county. In addition, Watsonville has seen a decline in the food processing and other blue-collar jobs that have traditionally provided employment for many of its residents. Furthermore, natural disasters,

TABLE 5.7-8.
UNEMPLOYMENT BY JURISDICTION

	1994	1995	1996	1997	1998	1999	2000
Aptos	4.7	4.5	4.0	3.7	3.5	3.0	2.7
Ben Lomond	7.1	6.9	6.1	5.6	5.3	4.6	4.1
Capitola	7.2	6.9	6.2	5.6	5.4	4.6	4.2
Live Oak	4.5	4.3	3.8	3.5	3.3	2.9	2.6
Rio del Mar	5.2	5.0	4.4	4.0	3.9	3.3	3.0
Santa Cruz	8.5	8.2	7.3	6.7	6.4	5.5	4.9
Scotts Valley	5.4	5.2	4.6	4.2	4.0	3.4	3.1
Soquel	6.8	6.6	5.9	5.3	5.1	4.4	3.9
Watsonville	19.6	18.9	17.1	15.8	15.2	13.2	11.9
Santa Cruz County	**9.7**	**9.3**	**8.3**	**7.6**	**7.3**	**6.3**	**5.6**
State	**8.6**	**7.8**	**7.2**	**6.3**	**5.9**	**5.2**	**4.9**
National	**6.1**	**5.6**	**5.4**	**4.9**	**4.5**	**4.2**	**4.0**

Source: Santa Cruz County, 2000

such as the 1989 Loma Prieta earthquake and flooding in 1995, caused millions of dollars of damage and resulted in the permanent closure of many Watsonville businesses.

The steady decrease in unemployment in Santa Cruz County was accompanied by an increase in per capita income. From 1994 through 1998, per capita income in Santa Cruz County increased 28 percent at an average of 6.3 percent per year (Santa Cruz County, 2000). The per capita income in Santa Cruz County during this period was consistently higher than state and national averages. This phenomenon can largely be attributed to the significant number of Santa Cruz County residents employed in higher paying technology-related jobs in the Silicon Valley. Santa Cruz County Housing Authority Director, Frank Brunings, cited studies by AMBAG that indicate that about one-third of Santa Cruz County workers commute to the Silicon Valley (Brunings, 2001). Table 5.7-9 shows the change in the county's per capita income during this five-year period.

Agriculture

Agriculture is an important component of the Santa Cruz County economy. According to the most recent Agricultural Census (1997), there are 722 farms in the county operating on about 70,000 acres with almost 28,000 acres in crop production (U.S. Agriculture Census, 1997). In 1999, agriculture accounted for about 9 percent of the county's employment base and contributed almost $250 million to the county economy (California Department of Finance, 2001). Santa Cruz County ranks 26th in agricultural production value among California's 58 counties. The county's southern neighbor, Monterey County, which like Santa Cruz County grows primarily

TABLE 5.7-9
PER CAPITA PERSONAL INCOME

Area	1994	1995	1996	1997	1998	Avg. Annual Change (%)
Santa Cruz County	$24,486	$26,059	$28,225	$30,093	$31,302	6.3%
State	22,953	23,983	25,142	26,314	27,579	4.7%
National	22,058	23,059	24,164	25,164	26,482	4.7%

Source: Santa Cruz County, 2000

crops amenable to a coastal climate and soils, ranks 3rd in the State in agricultural production value.

The Pajaro Valley is the main agricultural production area in Santa Cruz County. In 1999, the three leading agricultural commodities produced in the county based on production value were strawberries, raspberries, and iceberg lettuce (Santa Cruz County Farm Bureau, 2001). Artichokes and Brussels sprouts were also important components of the county's cropping pattern.

Although agricultural land in Santa Cruz County is protected by zoning regulations from the pressures of development and urban sprawl that seriously threaten farms in other parts of California, it is increasingly threatened by water supply shortages, market competition and price inflation for agricultural inputs (see Section 5.2).

Farmers in the county depend on both surface and ground water to meet their irrigation needs. The county receives the majority of its surface water supplies from the Central Valley Project (CVP) operated by the U.S. Bureau of Reclamation (BOR). The CVP's main canal traverses the west side of the Central Valley. Santa Cruz does not have adequate capacity in its existing pipeline connection to the CVP canal to take delivery on its full entitlement of CVP water (Schmidt, 2001). Furthermore, changes in Bureau of Reclamation management of the CVP (primarily for environmental mitigation) may reduce the reliability and increase the cost of Santa Cruz's CVP entitlement.

Growers currently meet surface water supply shortfall by pumping water from groundwater. However, this is not a viable long-term solution to the county's agricultural water needs. Growers have consistently pumped more groundwater from the region's aquifers than is naturally replenished by rainfall. As a result, saltwater intrusion, which threatens crop production, has become a serious problem in the Pajaro Valley (Schmidt, 2001).

Given the lack of additional land for agricultural production, protection of existing farmland, and water constraints, the current cropping pattern and level of production in Santa Cruz County is unlikely to change in the near term. However, even growers of relatively high valued crops such as lettuce and strawberries face a myriad of cost factors that could threaten the continued feasibility of farming. These factors include rapidly rising energy, labor, and chemical costs, as well as environmental constraints that limit production flexibility. In the long run, as agricultural land values decline and water scarcity becomes an increasingly critical issue, the viability of commercial agriculture in the county is uncertain.

Manufacturing

Manufacturing is becoming increasingly less important to the Santa Cruz economy. According to the Economic Census, in 1992 the value added by manufacturing was almost $1.4 billion, nearly half of which was the result of electronics manufacturing (U.S. Economic Census, 1992). By 1997, the value added from manufacturing had declined to about $1.15 billion (Department of Finance, 2001). Based on employment trends in the County's manufacturing sector, it is likely that manufacturing continued to decline in 2000.

The decline can be attributed to a number of factors, primarily local shortages of several key inputs into the manufacturing process: power, water, and labor. Companies such as Texas Instruments and Giro, a bicycle helmet manufacturer, have closed regional operations due to shortages and associated rising prices of inputs. The recent California energy crisis has created costly blackouts and energy price inflation, while the shortage of fresh water that continues to plague the region has made water expensive and difficult to obtain for manufacturing purposes. Furthermore, the local labor supply has been negatively impacted by the rapid escalation of the cost of living in the region.

Aquaculture

In 1997, the California aquaculture industry produced about 30 million pounds of foodfish, shellfish, ornamental fish, and aquatic plants. Together, these goods had a wholesale value of $70 million (Western Regional Aquaculture Center, 1999).

The primary aquaculture activity along the central California coast is the production of abalone. According to Jim Webb of U.S. Abalone, abalone is a $500 million annual market (Silicon

Valley Business Journal, 2000). Although much of the abalone produced in the state is shipped to overseas markets in Japan, Taiwan, and Hong Kong, domestic demand is for abalone is growing, in upscale restaurants, seafood restaurants, sushi bars, and resorts. California's primary overseas competitors in the abalone marketplace are located along the Pacific Rim in Asia, Australia, New Zealand, and South America. In California and the U.S., the largest abalone producer is Abalone Farms located near Cayucos in Monterey County. In 1999, Abalone Farms sold about two million pounds (Silicon Valley Business Journal, 2000).

The limited supply of natural abalone has led to an increased demand for cultured abalone,[1] and currently the market for farmed abalone is strong. Given increased demand, decreased supply due to depleted and protected natural stocks, and the higher prices that naturally occur when demand outpaces supply, cultured abalone production is expected to increase.

U.S. Abalone, located adjacent to the Coast Dairies Property, is the primary abalone farm in Santa Cruz County and one of the largest producers in the country. A permit to culture abalone adjacent to Pillar Point Harbor was issued several years ago; however, that venture has not yet been initiated (Conte, 2001). Although the delay may be due to the significant local opposition to the project -- driven largely by concerns as to the potential impact on the harbor area's kelp stocks -- other factors may also be involved.

Timber

Lumber production in the western U.S. reached a seven-year high in 1999, before decreasing in 2000 (Western Wood Products Association, 2000). Lumber production is expected to decrease again in 2001 due to reduced housing starts and a slower economy (Western Wood Products Association, 2001). Despite a predicted slowdown in short-term timber demand, the long-term outlook for the timber industry is positive. A report by Shasta County projects that over the next 50 years the demand for timber products will grow faster than available supplies and that prices, and the value of lands suited for timber production, will increase (Shasta County Department of Resource Management, 1998).

Santa Cruz County accounts for approximately one percent of California's annual timber production. In 1998, a little over 22 million-board-feet were extracted from county lands (California State Board of Equalization, 2000). Most of the timber produced in Santa Cruz County is cut from private land. There are 63,163 acres of timberland within Timber Production Zones designated by the County of Santa Cruz (California State Board of Equalization, 2000). Table 5.7-10 summarizes recent timber production trends in the county.

[1] According to the University of California, Davis, over-fishing and disease have caused a decline in natural abalone populations (Conte and McBride, 1996). In 1997, about 112,000 pounds of abalone were landed in California, compared to about 1.2 million pounds in 1982 (Western Regional Aquaculture Center, 1999). In 1997, following the examples of Alaska and British Columbia (who closed their abalone fisheries in 1996 and 1990 respectively), the State of California attempted to restore the abalone fishery by banning abalone fishing in coastal waters for a minimum ten-year period (Western Regional Aquaculture Center, 1999).

Overall, demand for timber is increasing. Average timber prices reached a peak in 1999 at $1,000 per thousand-board-feet (McCrary, 2001). Despite this increase in prices, falling harvest volumes and decreased quality caused the value of Santa Cruz County timber production to decline for the fourth consecutive year in 1999 (Santa Cruz County Agricultural Commissioner, 2000). Timber harvesting is strictly regulated in Santa Cruz County. Timber restrictions drive up the cost of production and hamper the ability of local producers to efficiently respond to increases in demand.

TABLE 5.7-10
TIMBER PRODUCTION IN SANTA CRUZ COUNTY

Year	MBF Harvested	Value of Harvest
1990	19,760	$4,204,923
1991	20,721	4,978,265
1992	17,373	6,588,330
1993	23,719	12,570,342
1994	22,835	12,190,062
1995	26,596	11,034,193
1996	25,394	11,508,367
1997	26,465	10,450,097
1998	22,366	8,928,905
1999	16,162	7,862,890

Source: California State Board of Equalization, 2000

Big Creek Lumber is the only company operating a mill in the county. Big Creek Lumber's main office is located seven miles north of Davenport on Highway 1. They have six locations in the region and employ 235 people (McCrary, 2001). Most of the company's employees reside in Santa Cruz, Bonny Doon, and the Santa Cruz Mountains.

Mining

Construction sand and gravel sales accounted for the largest portion of the California's total mineral value in 1999 (U.S. Geological Survey, 2000). The state is expecting a steady increase in the demand for aggregate due to the passage of the Federal Transportation Equity Act. As a result of this act, $15 billion will be spent on highways in the California through 2004 (Legislative Analyst's Office, 1998).

Historically, mining has been an important industry in Santa Cruz County. Today, however, it plays a very small role. There are currently seven active mining sites, many of which have been effectively mined out or are nearing the limits of their boundaries (Baldzikowski, 2001). Mining in Santa Cruz County comprises primarily limestone/shale, sand/gravel and granite. As federal, state and local environmental and land use regulations increasingly encumber mining activity in the county, it is unlikely that any new mines will be developed in the near future. In order to avoid disclosure of proprietary information, production and revenue figures for specific mine operators are not made available to the public.

Cement

Cement is an important construction input. In the year 2000, California used 14 million tons of cement, 5 million of which went to projects in Northern California. Of the 14 million tons of concrete consumed in California, 12 million were produced inside the state and 2 million were imported from out-of-state (Holman, 2001). During the last two to three years, demand for cement in California exceeded in-state production capacity. As a result, the volume of imported cement has grown.

Despite increased demand for cement, competition from out-of-state cement producers has constrained in-state cement producers from raising their prices enough to fully mitigate the rising costs of production, costs are expected to increase significantly in 2001 as a result of higher energy rates. In the past, because cement can be only be shipped economically 250-300 miles by truck and 500-1,000 miles by train, in-state producers enjoyed a transportation-driven comparative advantage over out-of-state producers. Today, however, lower transportation costs are less able to offset higher power and labor costs and tightening environmental restrictions. Since cement produced at different plants (aside from differences in color) is considered to be interchangeable, pressure from out-of-state markets could significantly threaten the profit margins of California cement producers in the near future.

The outlook for the cement industry in California is therefore mixed. On a positive note, the robust California economy, statewide population growth, and the continued need for seismic retrofitting are expected to fuel growth in both the public works and private construction sectors in the coming years. Industry groups predict 2-3 percent growth in sales over the next three years, with demand leveling off in about four years (Holman, 2001). The Construction Industry Research Board predicts that construction markets in California will be strong through 2002 and beyond (Construction Industry Research Board, 2001). However, given the current economic slowdown, predicted increases in demand may not materialize. Furthermore, environmental restrictions on expanding cement production may limit the growth of the industry as a whole.

There are eleven cement plants currently operating in California, three of which are in Northern California. RMC Pacific Materials, in Davenport, is one of these. Generally, larger cement producers realize average profit margins of about 4 percent of sales (Risk Management Associates, 2000).

Recreation/Tourism

A 1997 survey conducted by the California Department of Parks and Recreation indicated that 40 percent of Californians prefer natural and undeveloped recreation areas, 30 percent prefer nature-oriented parks, while the preferences of the remaining 30 percent were split between developed parks, historical/cultural sites, and private outdoor recreation areas (California Department of Parks and Recreation, 1998). When asked about their favorite activities, Californians listed walking, driving for pleasure, use of open grass areas, bicycling, beach activities, trail hiking and nature viewing among their top ten favorite activities.

A Yesawich, Pepperdine and Brown survey shows that families, in particular, are interested in outdoor activities that can be enjoyed with children. A survey of travel patterns of Californians showed the most popular activity to be touring by auto or bus. The number of participants in this activity rose 63 percent between 1998 and 1999 (Yesawich, Pepperdine, and Brown, 1999). A similar increase was seen for non-resident travelers. Beach and waterfront activities attract the second largest number of travelers. Another survey showed 19 percent of California family travelers plan to attend beach and waterfront destinations. The Travel Industry Association reported that 33 percent of all travelers enjoy shopping as part of their vacation, making retail an important component of the tourism industry (Travel Industry Association, 1999). Santa Cruz County's 29 miles of coastline, beach access, 42,334 acres of state-owned parks and parkland, and 850 acres of county-owned parkland make it uniquely equipped to meet consumer recreation needs and preferences (Santa Cruz County Department of Economic Development, 1999).

Although Santa Cruz County draws national and international visitors, the majority of its tourists originate from the San Joaquin Valley. Visitors from these regions are especially prevalent when residents of California's interior seek an escape from summer's heat. According to the California Division of Tourism, visitors to Santa Cruz County from outside of California account for only about 5 percent of total tourism/recreation visitation to Santa Cruz County (Hook, 2001).

Since 1996, the Santa Cruz/Monterey area has experienced a 100 percent increase in visitation (California Trade and Commerce Agency, 2000a). Visitation to Santa Cruz state parks by all visitors, both tourists and locals, increased an average of 24 percent annually between 1991 and 2000, and state parks in the county currently draw about 6 million people. The amount of money spent in Santa Cruz County by travelers has increased at an average of annual rate of 5.6 percent since 1992 (California Trade and Commerce Agency, 2000b). As the population of California, and the Central Valley in particular, continues to grow, recreation visitation and tourism in Santa Cruz County is expected to increase. The employment and revenue generated by tourism makes it an important part of the Santa Cruz County economy. The number or jobs generated by travel in the County has been steadily increasing. Table 5.7-11 illustrates these increases from 1992 through 1999.

TABLE 5.7-11
TRAVELER-RELATED EMPLOYMENT AND EARNINGS

	1992	1993	1994	1995	1996	1997	1998	1999
Earnings ($ millions)	106.8	108.9	109.7	117.3	127.8	141.4	149.1	168.6
Employment	7,240	7,070	6,910	7,590	8,050	8,470	8,620	9,140

Source: California Travel and Tourism Commission, 2000a

Housing

Approximately 97 percent of the land in Santa Cruz County is developed (Schmidt, 2001). The remaining open land is conserved in land trusts, parks, or greenbelts. Given that six new jobs are created for every one new housing unit constructed in the county, home prices and rents are rising rapidly. In fact, according to the National Association of Home Builders based on the percentage of residents earning the median income in the County that could afford a home, Santa Cruz County ranks as the second-least affordable county in the nation after San Francisco County (Santa Cruz County, 2000). In the year 2000, only 14.2 percent of Santa Cruz families earning the median income of $61,700 could afford to buy a home. This was a sharp decrease from 1999, in which 32 percent of homes were considered affordable for a family earning the median income (Santa Cruz County 2000). This rapid upward trend in home values, and accompanying decline in housing affordability, has not been matched by the nation as a whole. Rents in Santa Cruz have also been subject to heavy upward pressure commensurate with increases in housing prices.

Housing pressure in Santa Cruz County is primarily the result of upper-middle and upper-income groups who are moving to Santa Cruz from the Silicon Valley. Additional housing pressure comes from the University of Santa Cruz, which is adding approximately 500 students a year.

Lower and middle-income groups are suffering the most from escalating home prices. As upper-middle and upper-income individuals and families employed in Silicon Valley move to Santa Cruz, many lower and middle-income families have been forced to leave the county. Many of these families have relocated to more affordable areas such as Monterey and Salinas. The commute to Santa Cruz work centers from the Monterey border or Salinas is about a half-hour.

Regional zoning laws favor construction of single-family units over multi-family dwellings. For example, many areas have height restrictions on new construction. Although city planners are looking into in-fill strategies and zoning changes to increase the region's housing stock, it is unlikely the housing situation in the county will substantially improve in the near-term. Housing is a significant factor constraining the long-term economic vitality of the Santa Cruz County region.

5.7.3 LOCAL ECONOMY

5.7.3.1 DEMOGRAPHICS

The community of Davenport (Davenport) includes the town of Davenport, Newtown, Davenport Landing, and Swanton Road. According to the 1990 Census, the population of the community of Davenport was 42 households in 1990. The most recent estimate of total population is closer to 200, but pending the release of 2000 Census data for unincorporated parts of Santa Cruz County, the 1990 census is the most recent official estimate of Davenport's population. According to the 1990 data, the population of Davenport had a high level of educational attainment -- About 80 percent of the population had a Bachelor's degree or a graduate/professional degree (U.S. Census, 1990b). In 1990, Davenport's level of educational attainment exceeded that of both Santa Cruz County and the State of California.

5.7.3.2 EMPLOYMENT AND INCOME

In 1989, the per capita income of Davenport residents was $30,840 (U.S. Census, 1990b). The breakdown of household income in 1989 shows that eight households in Davenport had an income of $17,500 - $19,999, eight had incomes between $75,000 - $99,999, and 20 had incomes between $100,000 - $124,000 (U.S. Census, 1990b). The disparity in household incomes is consistent with the pattern of migration to Davenport over the last 20 years. The original inhabitants of Davenport were employees at the cement plant who had relatively lower income levels (Wennberg, 2001). Over time, the coastal appeal of the Davenport area has attracted inhabitants who commute to high-paying job centers such as Silicon Valley. As the Silicon Valley economy continues to grow and push demand for housing farther outside the boundaries of the valley, household incomes in the Davenport area are likely to continue to increase.

Although Davenport was originally built as a company town for the cement plant, very few Davenport residents currently work at the plant (Pallin, 2001). Some residents are craftspeople that work in town, while others are employed in local businesses. The majority of Davenport's residents, however, commute to Santa Cruz. Some of the newer residents, those who moved to Davenport during the mid-to-late 1990s, work in the Silicon Valley. The commute to Santa Cruz takes about 15 minutes. The commute to the Silicon Valley can take between 50 minutes and an hour and a half, depending on traffic.

Cement

The RMC Pacific Materials (RMC) cement plant is located north of the town of Davenport (south of Newtown). RMC is the largest private landowner in Santa Cruz County: in addition to the land it leases on the Coast Dairies Property for shale extraction for the cement plant, RMC owns approximately 10,000 acres of property in the immediate vicinity. About 90 percent of the RMC-owned land is timbered (Highlander, 1998). The remainder comprises a quarry located just east of the Coast Dairies Property that provides limestone to the cement plant. RMC Pacific Materials is a private holding company that employees approximately 150 people at its Davenport cement production facility (Sheth, 2001).

RMC Pacific Materials cement produced in Davenport is shipped all over Northern California. Cement from this location has been used in such notable construction projects as the Golden Gate Bridge, Bay Bridge and New Melones Dam near Sonora (RMC Pacific Materials, 2001). More recent projects that used cement produced in Davenport include the San Francisco Airport, Pac Bell Park in San Francisco, the Transamerica Building, and BART. In addition, Davenport cement can be found in many of the State's highways and bridges. RMC Pacific Materials sells aggregate, ready-mix, and cement throughout Northern California. In 1998, they produced approximately 875,000 tons of cement at their Davenport facility and realized about $40 million in revenues from that production (Highlander, 1998). Less than 20 percent of RMC's total U.S. sales are from cement produced at its Davenport cement facility (RMC Pacific Materials, 2001).

RMC is currently soliciting an expansion of the mining area for its limestone quarry (see also Section 5.3). Specifically, they seek to extend the mining area by 17.5 acres on the northeast side of the quarry. The land targeted for extension is already owned by RMC but is not included in their original mining plan. The Santa Cruz County Planning Department estimates that the existing limestone quarry could operate until 2006 without expansion. The amendment would make mining the site feasible until 2017 (Baldzikowski, 2001). Air and water quality are the primary considerations affecting the outcome of the application, especially since the expanded mining area could potentially affect the City of Santa Cruz's water supply. To address this issue, RMC is establishing monitoring wells to determine the location of aquifers and estimate the potential impact of expanded mining on the area's groundwater. At the time of this analysis, the RMC expansion proposal was under environmental review. If the expansion is not approved, RMC must seek alternative reliable sources of limestone in order to continue cement production at its Davenport site. Faced with narrowing margins resulting from higher energy and labor costs and increased out-of-state competition, the cost of locating an alternative limestone source could be prohibitive and would likely jeopardize the long-term viability of cement production in Davenport.

Aquaculture

US Abalone is located on Davenport Landing on the west side of Highway 1. According to publicly available information, U.S. Abalone was founded in 1990, when the venture took over a site previously occupied by a salmon farm. In 1999, the company had 11 employees and generated about $1 million in sales. Several years ago, the company raised $2 million dollars through a private sale of stock options via the Internet. This sale of options was to precede an initial public offering (IPO). As of the date of this report, U.S. Abalone had yet to file IPO paperwork with the Securities and Exchange Commission. In 1999, there were 400 options shareholders in the company.

In 1999, U.S. Abalone was the country's second largest abalone farm. The company focuses not only on the sale of abalone meat, but also on the production of cultured abalone pearls. According to Jim Webb, as cited in the Silicon Valley Business Journal, "For a better-quality pearl, we can get $200 to $300 each and the meat can still be sold for $5" (Silicon Valley Business Journal, 2000). A pearl from an abalone cannot be removed without killing the abalone, but prepared abalone is generally preferred to live abalone in the U.S. (in Japan, live abalone drives the abalone market).

U.S. Abalone uses about a quarter of its four-acre site for abalone production and plans to expand as its business grows (Silicon Valley Business Journal, 2000). Currently, jewelry using pearls produced by U.S. Abalone can be purchased in Davenport at the David Boyes Gallery. They can also be viewed and purchased on the Internet.

Despite strong demand for farmed abalone, the long-term prospects for U.S. Abalone are uncertain. With rising energy and labor costs and a slowing U.S. economy the company's long-term financial success will likely depend on the nascent cultured pearl component of its business. The company has yet to go public and given the retraction of public stock markets, may find it difficult to meet its cash flow needs as it seeks to expand its business.

Commercial

Many of the small businesses within the Davenport community are owned and operated by Davenport residents. Local-owned businesses include the New Cash Store, Whale City Bakery, and the Davenport Bed and Breakfast. Residents of Santa Cruz own other businesses, such as the La Cabana Taquería and Lundberg Glass Studios. These businesses employ both residents of Davenport and non-residents.

Davenport has a strong local artisan industry. Primary outputs of the local artisan industry are glassware, knives, paintings, and other crafts. The Lundberg Glass Studios and the David Boyes Knives Gallery are well known throughout the local community, Santa Cruz, the neighboring Bay Area, and the nation. Their main customer base is comprised of visitors to Davenport. At present, David Boyes plans to discontinue the sale of knives at the gallery and sell knives only through the Internet. The gallery will continue to sell etchings and other products. Whale Hedge Watercolors and the Gallery of Eden are also located in Davenport. Like Lundberg Glass Studios and the David Boyes Knives Gallery, their primary customers are non-locals, especially tourists. At Aeolus Boat Company, owner Bill Grunewald has been building rowboats and dories in a former livery stable for 35 years, with a lengthy waiting list of customers.

There are several restaurants in Davenport catering to locals, tourists, and workers coming to the Davenport area from other parts of Santa Cruz County. The New Davenport Cash Store, La Cabana Taquería, and the Whale City Bakery, Bar, and Grill are located on Highway 1. The owner of La Cabana Taquería reports a strong lunchtime crowd of tourists, travelers, and workers (Landeros, 2001).

The New Davenport Cash Store, a restaurant and gift shop, and the Davenport Bed and Breakfast have been in Davenport for almost 25 years. Of the 75 to 80 people employed by the New Davenport Cash Store and the Davenport Bed and Breakfast, approximately 15 are Davenport residents. Ten years ago the restaurant served approximately 75 people a day in the summer. Today, the owners estimate, they serve about 800 people a day on popular holidays. The Bed and Breakfast has 12 units, most with ocean views (McDougal, 2001).

Arro's Country Store is another business on Highway 1 that caters to both locals and tourists. Arro's is a grocery and convenience store. Most Davenport residents do their grocery shopping in the City of Santa Cruz and patronize Arro's for small items in between trips to Santa Cruz. Arro's Country Store also has a deli that is a popular local meeting place.

The community of Davenport is surrounded by the Coast Dairies Property on the south, east, and north sides, and the Pacific Ocean on the west. Further commercial development in Davenport and Newtown is constrained by the Coast Dairies Property. Accordingly, limited space and the fact that most of the useable land within the Davenport community has already been developed, strongly limits opportunities for further commercial development. Nonetheless, some opportunities for commercial development still may still exist through redevelopment of lots or unused buildings within the town of Davenport and Newtown. In addition, undeveloped land along Highway 1 and/or Swanton Road may, in the future, provide favorable opportunities for additional visitor-related, commercial services. At a town meeting in Davenport in April 2001, a local resident reported on his proposal to construct storage buildings on his property, with plans to eventually create a hostel for windsurfers (Town Meeting, Meeting Notes, April 19, 2001).

At the time the ECR was prepared, there were three commercial properties in the town of Davenport available for redevelopment. The first building, the Bailey Building on Highway 1, is the former site of the Odwalla plant. Odwalla closed its Davenport plant because it could not get approval for its expansion plans from the Coastal Commission. The current owner of the property is interested in converting the building into a gift shop, restaurant, or overnight accommodation. This development proposal has created some local controversy, since it could require use of the adjacent meadow for parking and the addition of a second story to the building. The second building, the Old Barn, is a former factory that sits on the east side of Highway 1, almost directly across from the Bailey Building. This building may also be converted into a gift shop or other retail facility. The third building, the Forester's Hall, also on the east side of Highway 1, may be converted to retail use (Deming, 2001). Conversations with Davenport residents suggest that it is difficult to establish new businesses in Davenport because of county and Coastal Commission regulations and resistance to development from Davenport residents. Informal conversations with residents did not reveal a general opposition to development, only opposition to development that might substantially alter the character of the town or threaten special areas such as the meadow on Highway 1.

Existing commercial enterprises, especially those involving tourism, are profitable and have future potential growth as area tourism continues to increase. Informal conversations with resident business-owners suggest that there is potential for new commercial operations to prosper in Davenport. Tourist-oriented commercial services along California's coast generally pay high ground lease rents due to the high sales volumes generated by their location.

Recreation and Tourism

Davenport is well known for its scenic location, artisan studios, and whale watching. It is a convenient rest stop for travelers on Highway 1. The most common visitors to Davenport, as measured by sheer numbers, are tourists on buses passing through the area. Currently, three to four tour buses stop in Davenport each day. Tourists generally eat in the restaurants, shop in the gift and artisan shops, and enjoy the picturesque charm of the area. Some visitors stay overnight in Davenport. The Davenport Bed and Breakfast caters to these visitors.

The California Department of Transportation (Caltrans) records the number of vehicles on California highways. Caltrans has two counters near Davenport. One is located at Bonny Doon Road, which intersects with Highway 1 and is located about one mile south of town. The other counter is located on Davenport Landing/Swanton Road, just to the north of Davenport. A review of data from these counters and discussions with Caltrans representatives revealed the data to be inaccurate and of limited use. However, general indications from discussions with Davenport area residents indicate significant increases in traffic and visitation to the area over the past several years.

Clearly, tourism is important to local businesses. The owners of the Davenport Bed and Breakfast note that, over the last ten years, Davenport has increasingly become a destination in and of itself. They base this conclusion on the steadily increasing average length of stay by their guests. Several years ago one night stays formed the core of their business. Today, however, most visitors stay several nights. Visitors enjoy biking, whale watching, and hiking. According to the Bed and Breakfast's owners, most visitors come from within 100 miles. The Bed and Breakfast performed a survey of their visitors ten years ago and found that 80 percent of their guests were repeat customers (McDougal, 2001).

Anecdotal information from the owners of the Davenport Bed and Breakfast corresponds with state and regional trends in tourism. The trend most likely to affect Davenport is the increased demand for outdoor activities such as visiting parks, hiking, and water recreation, which are abundantly available in the Davenport area.

5.7.3.3 HOUSING

Although the 1990 Census recorded 36 housing units in the community of Davenport, an informal, on-site survey in early 2001 indicated that this figure is now higher (U.S. Census, 1990b). This change suggests an increase in population since the 1990 Census.

The majority of houses in Davenport are single-family detached units. The land area of Davenport has not changed since the town was originally founded. Lack of space for growth, limited housing supply, and increased interest in Davenport by residents of the Bay Area have caused housing prices to increase sharply in recent years. There are two vacant residential lots that remain in Davenport (one under proposed development at the time the ECR was prepared), but all the other residential lots in the town have been developed. Although lots on Swanton Road have steadily been developed over the years, a few sites still remain. According to data obtained from the Santa Cruz County Assessor, in 1999 a home-site in the community of Davenport of between one and five acres sold for approximately $725,000 (Santa Cruz County Assessor, 2001).

Additional review of Santa Cruz County Assessor data indicates rapid escalation in the price of residences in the community of Davenport. For example, a single-family residence that sold in 1985 for $325,000 was sold in 1993 for about $880,000. This translates to an average annual increase in price of about 15 percent during the period. A second single-family residence that sold in 1984 for $130,000 was purchased in 1999 for $700,000, which translates to an average 12 percent annual increase during the period (Santa Cruz County Assessor, 2001). While no major remodels of these residences were recorded with the Assessor, improvements to the structures may have influenced this price escalation. Nonetheless, these examples support the general finding that the cost of housing in Davenport has been rapidly on the increase.

Farm worker housing is an important issue in Davenport, and a major problem in agricultural areas throughout the county, such as Watsonville and the Pajaro Valley. Increased demand for housing in the Davenport area and the associated price escalation has severely limited the ability of agricultural workers on the Coast Dairies Property to secure local housing. Lack of affordable housing for farm and other low-wage workers has important implications for future agricultural production at the Coast Dairies Property.

5.7.4 ISSUES

Viewed from the narrow perspective of economic activity, housing and water supply constraints are impediments to development locally. The primary socio-economic issue constraining the development and sustainability on the North Coast is the high cost of living, which is driven in large part by the cost of housing. An unrelenting shortage of housing has led to rapid escalation of home prices and rental rates both in Davenport and throughout the Santa Cruz region. Furthermore, the high cost of living in the area has forced area business to pay higher wage rates to attract and retain a quality workforce making the cost of labor a significant cost of doing business. Therefore, while aquaculture, mining, and other industrial and commercial development alternatives may have some revenue-generating potential for the Coast Dairies Property, high labor costs could limit the feasibility of such developments, particularly in lower paying fields such as agriculture. A Bureau of Labor Statistics (BLS) analysis of consumer pricing trends in the state of California between 1995 and 2000, indicates that the Bay Area region, as defined by the BLS to include Santa Cruz County, is experiencing more rapid consumer price inflation than any other area of the state (Bureau of Labor Statistics, 2001).

Rising labor and other input costs, particularly energy following the state's unsuccessful deregulation of the electricity market, is likely to limit the development and sustainability of existing and potential future economic activity on the Coast Dairies Property. It is difficult to have workers who have no place to live, or to pay them enough to afford places to live, a state of affairs which will limit any lease income that enterprises would be willing to pay, for example, to become concessionaires in a publicly managed park.

RMC Pacific Material's mining operation, should it be allowed an amendment to expand the area of its limestone quarry, could operate until at least 2017. However, without an expansion of the quarrying area, quarrying could cease as early 2005 (Baldzikowski, 2001). This would present a severe difficulty for the cement plant, which relies on limestone as a chief input to the cement production process. The amendment process is currently undergoing environmental review and the outcome of the application is uncertain.

Perhaps the greatest economic development potential of the local region lies in tourism and recreation. Demand for outdoor recreation along the central coast is rising rapidly and tourist and recreation-related spending is an ever-increasing factor in both the regional and local economy. The major constraints to additional development of visitor-associated services on the Coast Dairies Property -- should the Plan prescribe such development -- are lack of transportation infrastructure and potential opposition from local residents concerned about the impacts on their community.

Water availability is also an important consideration for both existing enterprises and any possible recreational infrastructure on the Coast Dairies Property. Moreover, the cost of water development, funding sources for such development, and the extent of the water rights to which the Coast Dairies Property is entitled is uncertain (see Section 5.1). With respect to water rights, certainty can only be ascertained by submitting a water rights claim and water development plan to the state, thereby obligating other stakeholders to assert their water claims as well.

Overall, the lack of hard socio-economic data specific to the Davenport community and business enterprises operating in the area limits the ability to provide a robust general baseline to evaluate the future development potential of the Coast Dairies Property.

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SECTION 6.0

FEDERAL, STATE, AND LOCAL REGULATION OF THE COAST DAIRIES PROPERTY

This section of the Existing Conditions Report (ECR) is a discussion of the major constraints on the planning process for the Coast Dairies Property (Property) imposed by federal, state, and local regulations. "Existing conditions" at the Property include not only the physical state of the land and its present uses, but also the regulatory context in which any change in management will take effect. A legal restriction on a portion of the land based on the federal Clean Water Act, or the provisions of county zoning, may not be as obvious as its slope or soils but may have equal or greater effect in defining the options for its future land use decisions.

Over 70 laws, regulations, code sections and ordinances apply to the Property and are listed at the end of the section (Table 5-2). To simplify the presentation somewhat, five categories are called out in the text as being likely to place the strongest regulatory constraints on the planning process and are described in detail. These are regulations dealing with biological resources, water quality , water rights law, cultural resources, and land use and zoning. The section concludes with a review of the specific requirements of the planning processes for the Bureau of Land Management (BLM) and the California Department of Parks and Recreation (DPR). These potential ultimate owners and managers of the Property have their own regulations, procedures and internal mandates which, although not applicable at present, will become part of the regulatory environment as soon as the planning process is completed.

The constraints may affect Plan evaluation of potential uses by disallowing them or by changing their location, their intensity, or their duration. For example, the locations of trails or season of use for a particular trail may be modified by laws protecting sensitive species or important cultural resources. Garages where vehicles and equipment are stored and maintained may be constrained by water quality considerations that are mandated by regulations governing releasing oils or hazardous materials into the environment. As another example, the intensity of an activity could affect whether it is included in the Plan. Some areas may be appropriate for light use without engaging further legal authority (e.g., a riparian zone for foot traffic), but a higher density for farm labor quarters than normally allowed by county ordinance would normally involve consideration and action by the Board of Supervisors.

It is important to recognize that in order to operate within these parameters, the Plan will often make decisions only on a broad scale, with site-specific implementation decisions deferred to the ultimate land managers. A public agency might not be able to accept title to a property with overly specific encumbrances. Plan decisions *can* be definite where certain kinds of uses are excluded for a legally-based resource reason, but where other uses are not excluded (camping, for example) the final “go/no-go” action will be taken by the managers and may be subject to additional public scrutiny.

6.1 BIOLOGICAL RESOURCES

6.1.1 FEDERAL ENDANGERED SPECIES ACT

Under the Federal Endangered Species Act (FESA), the Secretary of the Interior and the Secretary of Commerce, jointly have the authority to list a species as threatened or endangered (16 USC 1533(c)). Pursuant to the requirements of FESA, a federal agency reviewing a proposed project within its jurisdiction--in this case BLM-- must determine whether any federally listed threatened or endangered species may be present in the project area and determine whether the proposed project will have a potentially significant impact on such species. In addition, the agency is required to determine whether the project is likely to jeopardize the continued existence of any species proposed to be listed under FESA or result in the destruction or adverse modification of critical habitat proposed for such species (16 USC 1536(3), (4)).

The U.S. Fish and Wildlife Service (USFWS) also publishes a list of species of concern. Species on this list receive "special attention" from federal agencies during environmental review, although they are not protected otherwise under the FESA.

6.1.2 CALIFORNIA ENDANGERED SPECIES ACT

Under the California Endangered Species Act (CESA), a species list for the State of California is established using criteria similar to the federal statute and under the auspices of the California Fish and Game Commission. The California Department of Fish and Game (CDFG) has the responsibility for maintaining the list (Cal. Fish and Game Code 2070). The CDFG also maintains lists of "species of special concern" which serve as "watch lists." Pursuant to the requirements of CESA, an agency reviewing a proposed project within its jurisdiction must determine whether any state-listed endangered or threatened species may be present in the project area and determine whether the proposed project will have a potentially significant impact on such species.

6.1.3 ENDANGERED SPECIES LAW AND THE COAST DAIRIES PROPERTY

FESA and CESA provide strong protections for listed species. Several species are known to occur on the Property, and others are possible: known residents include the California red-legged frog and steelhead; a state-listed species that may occur is the San Francisco popcorn-flower (these species are discussed in Sections 3.1.2 and 3.2.2). Any action called for by the

Plan (even those actions taken to *benefit* the listed species) that could result in a "take"[1] of any of these species requires a permit from the appropriate agency. For federally listed species, the National Marine Fisheries Services (NMFS) is the responsible agency for anadromous fish and the USFWS for other species. For activities undertaken by the BLM (as co-managers of the Property), the BLM would consult with the USFWS and/or NMFS under section 7 of the ESA (section 7 describes the responsibilities of agencies other than NMFS and USFWS) to obtain concurrence that their actions are compliant. The federal permitting mechanism for the DPR would be a Habitat Conservation Plan and the take authorization is provided in a section 10(a)(1)(B) permit. Take of state-listed species requires an incidental take permit, issued by the California Department of Fish and Game and provided through section 2081(b) of the California Fish and Game Code.

The relevance of these laws to Coast Dairies is complex but important, potentially driving much of the planning outcome. Neither DPR nor BLM can proceed with programs that result in breaking state or federal laws. A breach of FESA or CESA is obvious when someone hunts a snowy plover for sport; less so when walking across the dunes causes the same species to abandon its nest. Yet both actions may result in a "taking." Both laws have been amended to deal with this problem by establishing ways to permit a take if: 1) it is incidental to an otherwise legal activity, and 2) does not jeopardize the continued existence of the organism. Some form of take authorization will likely be required if the Property is managed as anything other than a conservation area with no public use, although application for the permits may be deferred until implementation actions are better defined.

When and if these permits are required, a Biological Assessment (BA) (submitted for the section 7 consultation) or a Habitat Conservation Plan must describe the covered activities, alternatives to those actions, the impacts, how impacts will be avoided and minimized, and what compensation for impacts will be provided. There are a number of additional requirements for Habitat Conservation Plans described in the *Habitat Conservation Planning Handbook* (U.S. Fish and Wildlife Service and National Marine Fisheries Service,1996) and the "Five-Point Policy," an addendum to the *Handbook*.

The Habitat Conservation Planning process is time-consuming, but is the only instrument for a non-federal entity to obtain take authorization. At Coast Dairies, the presence of BLM would likely allow for resolution of listed species issues in a Biological Assessment, essentially a document with a similar content as an HCP, but with a considerably simpler administrative process. If permits are required for impacts to state-listed species, the permit application must include the same kind of information as for incidental take authorization for federally listed species.

[1] "Take" is defined somewhat differently in federal and state ESA law. However, the term is intended to have a broader definition than simply killing an organism outright, and deliberately. Actions which make it more difficult for the species to survive are also included. An attempt to monitor a species for its own protection may have a deleterious effect (by attracting predators, for example) and must be analyzed as well.

6.1.4 CALIFORNIA FULLY-PROTECTED SPECIES

The California Fish and Game Code (sections 3511, 4700, 5050, and 5515) names several “fully-protected species” for which no incidental take authorization can be provided by CDFG. Until state law is changed, compete avoidance of take for all of these species is a constraint for the planning process. The fully-protected species most likely to require careful consideration in developing the Plan is the San Francisco garter snake. Other fully-protected species that may occur on the Property are: American peregrine falcon, brown pelican, California least tern, golden eagle, white-tailed kite, and southern sea otter.

6.1.5 CALIFORNIA ENVIRONMENTAL QUALITY ACT

CEQA GUIDELINES SECTION 15380

Although threatened and endangered species are protected by specific federal and State statutes, CEQA Guidelines section 15380(b) provides that a species not listed on the federal or State list of protected species may be considered rare or endangered if the species can be shown to meet certain specified criteria. These criteria have been modeled after the definition in FESA and the section of the California Fish and Game Code dealing with rare or endangered plants or animals. This section was included in the Guidelines primarily to deal with situations in which a public agency is reviewing a project that may have a significant effect on, for example, a "candidate species" that has not yet been listed by either the USFWS or CDFG. Thus, CEQA provides an agency with the ability to protect a species from a project's potential impacts until the respective government agencies have an opportunity to designate the species as protected, if warranted.

6.2 WATER QUALITY AND WETLANDS

Approximately a hundred acres of the Property will likely be classified, and protected, as “wetlands” of one kind or another (see Section 3.1). Wetlands are ecologically productive habitats that support a rich variety of both plant and animal life. The importance and sensitivity of wetlands has increased as a result of their importance as recharge areas and filters for water supplies and widespread filling and destruction to enable urban and agricultural development. Analogous to the legal situation for endangered plants and animals, there are two definitions of a wetland, one adopted by federal agencies and a separate definition by the State of California. The definitions differ, but both classify areas so defined as subject to state and federal laws. The different definitions are reviewed below.

6.2.1 FEDERAL WETLANDS

Wetlands are a subset of “waters of the United States” and receive protection under Section 404 of the Clean Water Act (CWA). The term "waters of the United States" as defined in the Code of Federal Regulations (33 CFR 328.3[a]; 40 CFR 230.3[s]) includes: 1) all waters which are subject to the ebb and flow of the tide; 2) wetlands (33 CFR, Section 328.3[b]) inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions; and 3) all other waters such as intrastate lakes, rivers, streams (including intermittent streams), mud flats, sand flats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, the use, degradation, or destruction of which could affect interstate or foreign commerce including any such waters.

6.2.2 CALIFORNIA WETLANDS

CDFG and the California Coastal Commission have adopted a slightly more inclusive standard (Cowardin, 1979) for the definition of wetlands, allowing inclusion if one or more of the following three attributes are present: 1) at least periodically, the land supports predominantly hydrophytes[2] (at least 50 percent of the aerial vegetative cover); 2) the substrate is predominantly undrained hydric soil; or 3) the substrate is nonsoil and is saturated with water or covered by shallow water at some time during the growing season of each year.

Under normal circumstances, the federal definition of wetlands requires all three wetland identification parameters to be met, whereas the Cowardin (1979) definition requires the presence of only one of these parameters. For this reason, identification of wetlands by CDFG and the Coastal Commission consists of the union of all areas which are periodically inundated or saturated, *or* in which at least seasonal dominance by hydrophytes may be documented, *or* in which hydric soils are present. The CDFG does not normally have direct jurisdiction over wetlands unless they are subject to jurisdiction under a Streambed Alteration Agreement (Cal. Fish and Game Code 1600-1605) and/or they support state-listed endangered species. Within the Coastal Zone, CDFG has primary authority over degraded wetlands.

6.2.3 WATER QUALITY LAW AND THE COAST DAIRIES PROPERTY

The U. S. Army Corps of Engineers (Corps) implements Section 404 of the CWA, which applies when fill is placed in many water bodies.[3] It states:

> "No discharge of dredged or fill material shall be permitted if it:
>
> 1. Causes or contributes, after consideration of disposal site dilution and dispersion, to violations of any applicable State water quality standard;
> 2. Violates any applicable toxic effluent standard or prohibition under section 307 of the Act;
> 3. Jeopardizes the continued existence of species listed as endangered or threatened under the Endangered Species Act of 1973, as amended, or results in likelihood of the destruction or adverse modification of a habitat."

2 Plants adapted to and dependent on moist soil conditions.

3 The Supreme Court of the United States recently ruled (January 8, 2001: *Solid Waste Agency of Northwestern Cook County v. United State Army Corps of Engineers et al.*) that certain isolated wetlands do not fall under the jurisdiction of the CWA.

As with FESA and CESA, there is a permit process under which wetlands not meeting the above criteria be filled or otherwise adversely impacted. The U.S. Environmental Protection Agency (EPA), USFWS, NMFS, and several other agencies provide comment on Corps permit applications. Several other provisions of the Clean Water Act have been delegated to the Regional Water Quality Control Board (RWQCB), which also enforces portions of the California Water Code. For the Property, the Central Coast RWQCB will issue NPDES permits for stormwater discharge and monitor releases of hazardous substances, prohibited oil products, and sewage.

Much of the Property is located within the Coastal Zone, and thus it is subject to the California Coastal Act and the Santa Cruz Local Coastal Program (see below). Within the Coastal Zone,[4] applicants for Section 404 permits must include a certification of consistency with the California Coastal Management Program.[5]

It is unlikely that the *Coast Dairies Long-Term Resource Protection and Use Plan* will make specific proposals involving the filling of wetlands, although management of agricultural water storage ponds may be included. As large-scale general allocations are made in the prescriptions for management zones, wetlands will probably be identified as zone “attributes” which must be avoided when final management decisions are made. Careful consideration of equipment storage and maintenance, drainage patterns, and pest management will be necessary to meet CWA standards.

6.3 WATER RIGHTS LAW

Please refer to Section 5.1.2.

6.4 CULTURAL RESOURCES

Constraints on Plan actions may be necessary to protect cultural resources. For portions of the Property managed by the BLM, the Bureau will be the lead agency, in coordination with the State Historic Preservation Officer (SHPO). Criteria used for assessing historic significance of any feature are those developed and used by the U.S. Department of the Interior for the National Register of Historic Places pursuant to 36CFR Part 800. Generally, these comprise an assessment of the quality of significance in American history, archaeology, and culture. These may be present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and:

- are associated with events that have made a significant contribution to the broad patterns of our history; or

[4] The Coastal Zone is defined as areas 1,000 yards inland from the mean high tide except in significant coastal estuarine, habitat, and recreational areas, where it extends inland to the first major ridge line paralleling the sea or five miles from the mean high tide line, whichever is less (California Coastal Act 1976).

[5] Under the Federal Coastal Zone Management Act 1972 (16 USC 1451), federal permit applicants must obtain a certification that activities proposed within the Coastal Zone are consistent with state Coastal Zone management programs.

- are associated with the lives of persons significant in our past; or
- embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
- have yielded, or may be likely to yield, information important in prehistory or history.

In addition to the eligibility criteria of the National Register of Historic Places, there are laws, acts, and regulations specific for the protection of Native American resources. These generally include Native American participation if Native American resources are affected or if human remains are encountered (through the provisions of the Native American Graves Protection and Repatriation Act), and consultation with the Native American Heritage Commission.

For other portions of the property, the SHPO takes the lead on cultural resources. Requirements are similar to those for areas with federal involvement.

6.5 PLANNING FRAMEWORKS OF BLM, DPR, AND SANTA CRUZ COUNTY

This section describes the planning processes of BLM, DPR, and Santa Cruz County, with emphasis on aspects that are especially pertinent in interpreting the regulatory environment during the preparation of the Plan. The Coast Dairies planning document will be a unique amalgam of federal, state, and local authority. The BLM and DPR, the potential future co-managers, have long and somewhat disparate histories in the field of land management planning, sometimes serving very different publics. Their own internal regulations, procedures and organizational experience have been distilled into plan preparation standards and guidelines. Part of this stage of the Coast Dairies effort is devoted to isolating the common elements of two planning frameworks, and building these into the Plan for Coast Dairies. An equally important part is finding those elements which may differ, but which are mandatory for each agency before it can meet its own requirements. Santa Cruz County, which will not be a land manager, plays a different role in the process by virtue of its regulatory authority through the Local Coastal Plan (LCP).

This complex planning environment is reflected in the purposes the Plan must serve, namely:

- an amendment to the BLM Resource Management Plan for the Hollister Resource Area,
- a General Plan for DPR,
- a stand-alone management plan for the property if BLM and DPR do not manage it, and
- a potential amendment to the Santa Cruz County LCP, which embodies local land use and zoning regulations.

6.5.1 BUREAU OF LAND MANAGEMENT PLANNING

The BLM has three levels of planning relevant to the Property. A Draft *Strategic Plan* (BLM 2000) provides a planning framework organized around three broad categories, or goals: to serve the public, restore and maintain the health of the land, and improve organizational effectiveness. The first two goals are particularly relevant to the planning effort for the Property and both are entirely consistent with the goals of the planning process for the Property as set out in the Mission Statement and the Memorandum of Understanding.

Another document, the *Land Use Planning Handbook* (BLM undated) provides guidance for the next two levels of planning, namely preparing a Resource Management Plan (RMP) and developing subsequent implementation plans and decisions. As used by the *Handbook*, the term “land use plan” encompasses all levels of planning, from broad region-wide planning to detailed plans for implementation of small construction projects. Most of the following discussion is taken from the *Handbook*.

The *Handbook* provides guidance that:

1. encourages planning on a variety of scales, including planning across different land ownerships and jurisdictions;

2. encourages greater public participation throughout the planning process and facilitates multi-jurisdictional planning;

3. clarifies the relationship between land use plans and implementation plans;

4. provides the minimum procedural requirements for completing land use plans and implementation plans;

6. clarifies the relationships between land use plan and National Environmental Policy Act (NEPA) requirements;

6. addresses new requirements and approaches for managing public lands or resources; and

7. addresses how to deal with new information and circumstances, such as new listings of threatened and endangered species, and new requirements and standards for the protection of air and water quality.

Land use plan decisions establish goals and objectives for resource management, measures needed to achieve the goals and objectives, and parameters for uses of BLM lands. They identify lands that are open or available for certain uses, including any applicable restrictions, and lands that are closed to certain uses. Land use plan decisions ordinarily are made on a broad scale and customarily guide subsequent site-specific implementation decisions. It is BLM policy to make decisions on a broad scale in the land use plan, with site-specific implementation decisions normally deferred to planning for individual sites. Implementation decisions made through the land use plan process are normally limited to those required by regulation, such as designating off-highway vehicle (OHV) areas, roads and trails. The *Coast Dairies Long-Term Resource*

Protection and Use Plan will be an amendment to the Resource Management Plan for the Hollister Resource Area (BLM, 1984).

Desired Outcomes

Land use plans must identify goals, standards, and objectives to identify the desired outcomes BLM wishes to achieve. These are identified to direct BLM actions in a manner to best achieve legal mandates, such as FESA and BLM Strategic Plan goals.

Goals are generally broad statements of desired outcomes (e.g., maintain ecosystem health and productivity or promote community stability). Standards describe the physical and biological condition or degree of function a resource must meet in order to sustain ecological processes (e.g., land health or water quality standards). All subsequent land management decisions would then be carefully considered for compatibility and conformance with the standards. Objectives identify specific desired conditions for resources. Objectives have established time frames for achievement and are quantifiable and measurable.

Allowable Actions

Land use plans must identify uses that are allowable on the public lands. These allocations identify lands where uses are allowed and they include any restrictions that may be necessary to meet goals, standards, and objectives. Land use plans also identify lands where specific uses are excluded to protect resource values.

Although site-specific use levels are normally identified during subsequent implementation planning, the land use plan must set the stage for identifying and calculating them. At the land use plan level, it is important to identify reasonable development scenarios for allowable uses (for example, a trail system) to enable the orderly implementation of future actions. These scenarios provide context for the land use plan decisions and an analytical base for the NEPA analysis. BLM may also establish criteria in the land use plan to guide the identification of site-specific use levels for these activities during plan implementation.

Land use plans also identify actions necessary to restore or protect land health. While protection and restoration opportunities and priorities are often related to managing specific land uses, they can be independent of uses as well. In certain instances, it is insufficient to simply remove or limit a certain use, because unsatisfactory resource conditions may have developed over long periods of time and will not correct themselves without management intervention. Land use plans establish administrative designations, such as Areas of Critical Environmental Concern (ACEC), recommend proposed withdrawals, and recommend or make findings of suitability for congressional designations, such as for wild and scenic rivers or wilderness preservation.

Integration with National Environmental Policy Act (NEPA) Requirements

The BLM planning process is fully integrated with the NEPA process. The *Handbook* states: "Land use plan decisions are made according to the procedures in the BLM planning regulations, which incorporate NEPA analysis into the land use planning process." Narrative accounts of the planning and NEPA processes in Chapter III of the *Handbook* and flow charts in Appendix G show the two processes occurring concurrently, as will be the case at Coast Dairies (see Section 6.6.4).

Consistency with State and Local Plans

BLM plans should be consistent with state and local plans to the maximum extent consistent with federal law. Also, BLM plans or plan amendments must undergo a 60-day Governor's "consistency review" prior to final approval.

Implementing Land Use Plans

When the approved land use plan or decision document is signed, many of the land use plan decisions are effective immediately and require no additional planning or NEPA analysis. Examples of land use plan decisions that become effective immediately include:

- resource objectives,
- ACEC designations,
- visual resource management class designations,
- OHV designations.

However, on occasion program-specific requirements are needed for some decisions to become effective. Upon approval of the land use plan, subsequent implementation decisions are often put into effect through implementation plans. These plans have traditionally been referred to as "activity plans" (habitat management plans, grazing allotment management plans, recreation management plans, etc.). In the *Handbook*, these types of plans are referred to as "implementation plans" to reflect their role in implementing land use plan decisions. Implementation decisions are made with the appropriate level of NEPA analysis along with any procedural and regulatory requirements for individual programs.

Examples of implementation decisions include establishment of:

- livestock grazing systems,
- vegetation treatment practices, including weed control,
- hazardous fuels reduction and restoration projects,
- forest stand treatments,
- right-of-way grants.

Combined Planning and Implementation

Including implementation as part of the planning document in a single, integrated effort can be useful when the BLM is collaborating with other federal agencies, or state and local governments, on plans of mutual interest. However, the land use plan decisions must follow all

BLM planning requirements. At the decision stage, the land use plan decisions must be separated from the implementation decisions because the authority to make the decisions differs. Land use plan decisions are made by the BLM State Director, whereas most implementation decisions are made by the BLM Field Managers. The BLM State Director may, however, make the decision for both levels.

Monitoring and Adaptive Management

The *Handbook* describes in considerable detail the requirement to monitor the results of plan implementation and to evaluate the results of the monitoring. The outcome of that process can lead to changes in the plan. This process is consistent with, and was the source of, the adaptive management emphasis explicit in the Coast Dairies Mission Statement.

Plan Maintenance

BLM regulations provide that land use plan decisions and supporting components can be refined to reflect minor changes in data. In BLM procedural language, this is how the plan is "maintained." Examples of maintenance actions include:

- correcting minor data and typographical, mapping, or tabular data errors in the planning records, following development of a plan or plan amendment,
- refining the boundary of an archaeological district based on new inventory data,
- refining the known habitat of a special status species addressed in the plan based on new information.

Maintenance must not expand the scope of resource uses or restrictions or change the terms, conditions, and decisions of the approved plan. These maintenance actions or updates cannot change land use plan decisions. Plan maintenance is not considered a plan amendment and does not require formal public involvement, interagency coordination, or the NEPA analysis required for making new land use plan decisions. Maintenance actions must be documented in the plan or supporting components (i.e., recorded so that the change is evident). Plan maintenance must occur continuously so that the plan and supporting records reflect the current status of decision implementation and knowledge of resource conditions relevant to the approved decisions.

Plan Revisions

Land use plan decisions are changed through a plan amendment or plan revision. Plan amendments change one or more of the terms, conditions, or decisions of the approved land use plan. These decisions may include those relating to desired outcomes; measures to achieve desired outcomes, including resource restrictions; or land tenure decisions. Plan amendments are most often prompted by the need to consider a proposal or action that does not conform to the plan; implement new or revised policy; respond to new, intensified, or changed uses on public land; or consider new information from resource assessments, monitoring, or scientific studies. As was stated above, the Plan for the Property will be an amendment to the RMP for the

Hollister Resource Area. The process for conducting plan amendments is basically the same as the land use planning process used in creating the plan in the first place, and therefore all of the BLM guidance reviewed above applies to the Coast Dairies Plan.

Plan revisions involve preparation of a new plan to replace an existing one. Plan revisions are necessary if monitoring and evaluation findings, new data, new or revised policy, or changes in circumstances indicate that decisions for an entire plan or major portion of the plan no longer serve as a useful guide for resource management. Plan revisions are prepared using the same procedures and documentation as for new plans.

6.5.2 CALIFORNIA DEPARTMENT OF PARKS AND RECREATION PLANNING

The DPR planning structure is described in a draft *Planning Handbook* (California State Parks 1998), which describes a tiered planning structure. The Unit Data File (UDF), used in all planning efforts, is the organized body of information about a unit.

Plans with the broadest scope are Systemwide Planning and Policies. Increasingly detailed planning documents include Classification and Naming, General Plans, Management Plans, and specific Project Plans. Preparation of one of the more detailed planning documents, such as a specific project plan, do not necessarily depend on the completion of planning documents higher in the tier. The remainder of this section, unless another citation is provided, is based on information from the *Planning Handbook.*

Classification and Naming

State law requires that each park unit be classified and named, a process that identifies the unit's primary values and intended purpose and provides the broadest management guidelines for a unit. Classification is done according to the *Guidelines for Resource Documents* (California State Parks, 1987). After public review of the classification and naming, it must be approved by the State Parks and Recreation Commission. General Plans

The general plan for a unit defines the ultimate purpose of unit management through goal statements, but stops short of defining specific objectives, methodologies and timelines to accomplish the goals. The *Coast Dairies Long-Term Resource Protection and Use Plan* will function as a DPR general plan. A general plan is required by law before a unit can be developed and it also serves as a programmatic Environmental Impact Report (EIR) for the development of the unit. The level of detail in a general plan is determined by the Public Resources Code, California Environmental Quality Act (CEQA) requirements, the *Planning Handbook*, and the Project Agreement. The Project Agreement is a collaborative effort of the general plan team and the General Plan Policy Committee, a state-wide planning oversight body. The State Parks and Recreation Commission adopts the plan and the EIR.

Management Plans

Management plans are developed, according to the *Planning Handbook*, "as staffing is available and opportunities or urgency dictate." Examples of management plans include resource management plans, operation plans, interpretive plans, and concession plans. Some management plans can be completed before the general plan for a unit is in place, but others must be developed following completion of the general plan. The District Superintendent approves management plans.

Specific Project Plans

Specific Project Plans are detailed implementation plans needed to carry out provisions of a specific management plan, prepared when funding is imminent for the particular action. Each specific project plan describes the research, staff work, and costs associated with implementing the project and for regulatory compliance. The District Superintendent approves specific project plans, which may also require regulatory review and approval.

6.5.3 SANTA CRUZ COUNTY PLANNING FRAMEWORK

Santa Cruz County (County) is a major player in the planning process, because both federal and state agencies have policies of conforming to local general plans and ordinances to the extent they are consistent with applicable laws. For the Coast Diaries Property, Santa Cruz County has jurisdiction through its General Plan and zoning ordinances. The following three sections of the document describe land use designations and zoning, the LCP, and finally, the North Coast Beaches Master Plan, another part of the General Plan.

6.5.3.1 SANTA CRUZ COUNTY LAND USE DESIGNATIONS AND ZONING REGULATIONS

The land use designations and zoning districts for the Property are presented in Table 6-1, with land use designations shown in Figure 6-1 and the zoning districts in Figure 6-2. If the Plan proposes uses for portions of the Property that are inconsistent with the current land use and zoning, it will be necessary to apply for an amendment to the LCP. This is likely to be the case for at least a portion of the Property, because it is zoned Commercial Agriculture, a zoning district that does not readily accommodate all the goals of the Plan implicit in the Mission Statement.

The Santa Cruz County Land Use Element of the General Plan describes the proposed general distribution and general location and extent of the uses of the land for housing, business, industry, and open space (including agriculture, natural resources, recreation, and enjoyment of scenic beauty) education, and public buildings and grounds, along with many other categories. Policy 2.22.1 of the Land Use Element establishes agriculture and coastal-dependent industry as the first priority for the portion of the Coastal Zone comprising the Property. The second priority is recreation, including public parks, visitor-serving commercial uses, and coastal recreation facilities; and third priority is given to private residential, general industrial, and general commercial uses. Policy 2.22.2 prohibits the conversion of any existing priority use to another use, except for another use of equal or higher priority. In general, the land use designations provide long-term guidance, and specific guidance is incorporated in the zoning code. There are six zoning districts delineated on the Property:

- Commercial Agriculture,
- Parks, Recreation, and Open Space;
- Special Use; and
- Timber Production.

The zoning code describes the permitted uses (and in some cases prohibited uses) and these are summarized here in the order they appear in Table 6-1 The notes in Table 6-1 provide parcel-specific information as well.

Commercial Agriculture (CA)

CA zoning is intended to preserve commercial agricultural activities and to maintain the economic integrity of farming. It allows activities necessary to support current agricultural activities. It does not allow recreational uses, construction of new facilities in support of non-agricultural activities, or a substantial change in agricultural activities.

Parks, Recreation, and Open Space (PR)

PR zoning is used to preserve undevelopable land and park land as open space; to provide for commercial recreation facilities; to provide for federal, state, and local parks; and to designate and preserve coastal bluffs, beaches, lagoons, wetlands, riparian corridors and buffer areas, flood ways and flood plains, wooded ravines and gulches that separate and buffer areas of development, steep slopes, sensitive wildlife habitat and biotic resource areas. Many activities are permitted in areas zoned PR, including all activities allowed in land zoned CA. The table of uses in the zoning code does not identify specific prohibited uses.

Agriculture Preserve (A)

This type of agricultural zoning is used to encourage and provide for noncommercial agricultural uses and to allow limited commercial agricultural activities on land that is not designated as commercially suitable, but which provides a productive natural resource. This zoning is also intended to maintain options for a diversity of farm operations and to implement the agricultural preservation policies of the county.

Residential Agriculture (RA)

RA zoning provides for single-family dwellings in areas outside the Urban Services Line and Rural Services Line. Prohibited uses include multi-unit housing, lodging houses, mobile-home parks, and visitor accommodations that require new structures. Many other uses may be allowed, subject to a variety of county approvals.

Special Use (SU)

SU zoning is used to deal with land where flexibility of use and regulation are necessary to ensure consistency with the General Plan, where there are a variety of physical constraints, and where there are mixed uses or uses are undefined.

Timber Production (TP)

TPZ zoning provides for the growth and harvesting of timber, watershed management, fish and wildlife habitat management, agriculture, and one single-family dwelling per parcel. Any non-timber growing uses must be physically compatible with the growing and harvesting of a sustained yield tree crop.

6.5.3.2 CALIFORNIA COASTAL ACT AND LOCAL COASTAL PLAN

The California Coastal Act, as presented in the California Public Resources Code §30600, states that any person ("person" is later defined as including government entities) wishing to perform or undertake development in the coastal zone must obtain a coastal development permit. As was discussed above, for Coast Dairies the Coastal Act operates through zoning actions at the county level. The coastal zone in Santa Cruz County encompasses all of the Property and therefore the Plan must be evaluated for compliance with the Coastal Act, as embodied in the LCP and implemented by Santa Cruz County. The LCP is part of the County General Plan. The LCP is described in Chapter 13.03 of the Santa Cruz County Code, summarized in the remainder of the following discussion. The Santa Cruz County LCP comprises the following components.

The Land Use Plan

This plan, which consists of policy text and the adopted Land Use, Resource, Constraint, and Shoreline Access maps and charts, is part of the County General Plan. Specific maps included in the LCP are those designating Sensitive Habitats, Biotic Resources, Prime Agricultural Land, Timber Resources, Geologic Hazards, Water Resources, and Visual Resources. The North Coast Beaches Master Plan (Santa Cruz County, 1991) has been incorporated into the General Plan.

The Land Use Plan takes precedence within the Coastal Zone over any conflicting General Plan policies, programs, or maps that had been previously adopted. Although federal and state land owners are not required to comply with local laws, it is common for them to incorporate local requirements in deference to the local community standards, a point made in the planning guidelines for the BLM and DPR and discussed previously in this section.

Implementing Ordinances

These cover numerous topics and issues and are listed in Table 6-2, presented at the end of this section. A third LCP component is any specific plan that affects a portion of the coastal zone, but there are no Specific Plans in effect for the Property.

TABLE 6-1
SANTA CRUZ COUNTY LAND USE DESIGNATIONS AND ZONING DISTRICTS FOR THE COAST DAIRIES PROPERTY

Zone District [1]	Land Use Designation [2]	Assessor's Parcel Number	Estimated Acreage	Notes
CA and CA-L	AG	58-021-01 58-021-03 58-021-07 58-022-11 58-121-01 58-121-02 58-122-09 59-011-03 59-011-04 59-011-05 59-011-06 59-011-10 59-011-11 59-011-13 59-012-02 (part) 59-012-03 59-012-04	129.0 8.9 49.9 1775.1 24.7 11.3 1470.2 418.4 579.6 77.9 5.4 12.7 128.9 291.3 97.5 15.6 12.8	These parcels are under a Williamson Act [3] contract recorded in December 1998 and effective July 1, 1999. Parcel 58-021-07 is leased to U.S. Abalone.
CA	AG	58-122-12	75.5	Leased by RMC
M-2	R-M	58-071-02	6.0	Leased by RMC
PR	AG	59-012-02 (part)	1.1	Laguna Creek wetland and beach
PR	O-C	59-012-01	27.9	Laguna Creek wetland and beach
R-1-6	R-UL	58-092-08 58-113-01	0.34 1.64	
RA	AG	58-022-10	9.9	Leased by RMC
RA	AG	58-022-09 58-051-08	7.9 18.4	
SU	Q	58-122-10 (part)	98.3	Leased by RMC
SU	R-M	58-022-07 58-022-0858- 031-0158-122-10 (part) 59-151-01 62-141-02	183.6 18.1 15.3405.3 170.9 111.1	
TP	R-M	59-151-02 63-071-04 63-251-03	256.2 70.1 249.4	

TABLE 6-1 (continued)
SANTA CRUZ COUNTY LAND USE DESIGNATIONS AND ZONE DISTRICTS FOR THE COAST DAIRIES PROPERTY

1. Zone Districts:
   - CA Commercial Agriculture
   - M-2 Heavy Industrial
   - PR Parks, Recreation and Open Space
   - R-1-6 Single-family Residential
   - RA Residential Agriculture
   - SU Special Use
   - TP Timber Production
2. Land Use Designations:
   - AG Agriculture
   - O-C Open Space: Resource Conservation
   - Q Quarry/Mining
   - R-M Mountain Residential
   - R-UL Low Density Urban Residential
3. The California Land Conservation Act of 1965 – commonly referred to as the Williamson Act – enables local governments to enter into contracts with private landowners for the purpose of restricting specific parcels of land to agricultural or related open space use. In return, landowners receive property tax assessments which are much lower than normal because they are based upon farming and open space uses as opposed to full market value.

Actions that require an amendment to the LCP include changes to the Land Use Plan, the implementing ordinances, or to Specific Plans. A new Specific Plan that affects the Coastal Zone would also trigger an LCP amendment. The *Coast Dairies Long-Term Resource Protection and Use Plan* will be prepared in close coordination with both county and Coastal Commission staff to ensure consistency with the Coastal Act. This procedure will allow for smooth processing of the Plan, if necessary, as an LCP amendment, by both the county and the Coastal Commission. The approval process calls for the County Planning Commission to act first, followed by the Board of Supervisors and then the Coastal Commission.

6.5.3.3 NORTH COAST BEACHES MASTER PLAN

The North Coast Beaches Master Plan, adopted by the Board of Supervisors in 1991, is the culmination of a planning effort that began in 1983. It responds to Coastal Act requirements that public access to the coastline be provided. The focus of the Master Plan is to provide public access while preserving the coastline's fragile environment. The following beaches covered by the Master Plan have access across the Coast Dairies Property: Davenport Landing, Panther, Bonny Doon, Yellowbank, and Laguna Creek. For all of these beaches, the Master Plan describes improvements in access (e.g., vehicle parking, bus stops, trails to the beach), restroom and trash facilities, and signage and interpretation. Many of the proposed improvements are in the Highway 1 right-of-way, i.e., they will be implemented and designed by Caltrans.

6.5.4 IMPLICATIONS FOR ENVIRONMENTAL REVIEW AND PLAN APPROVALS

Both the BLM and the DPR have required that environmental review occur concurrently with preparation of the Coast Dairies Long-Term Resource Protection and Use Plan and that the process incorporate public participation. This means that preparation of the Environmental Impact Report (EIR) and the Environmental Impact Statement (EIS) prepared under CEQA and NEPA, respectively, cannot be deferred until the Plan is written. These processes are described briefly below and in Sections 6.6.1. and 6.6.2.

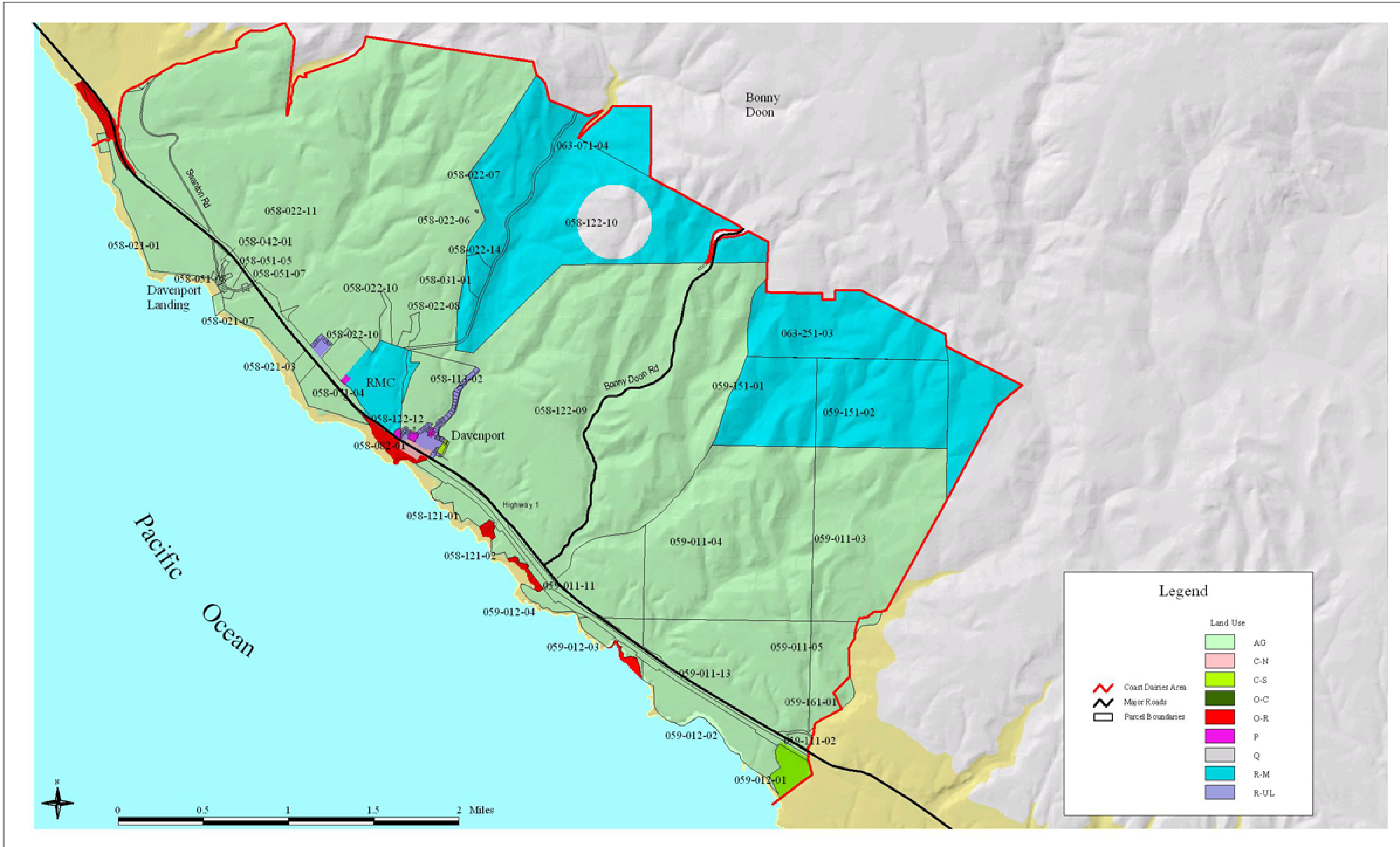
Pursuant to §21092.2 of the California Public Resources Code, §15082(a), §15103 and §15375 of the California Administrative Code, Title 14. §102(2)(c) of the National Environmental Policy Act of 1969 (Public Law 91-190) and Council on Environmental Quality regulations (40 CFR 1502.9(c)), DPR and BLM will prepare a joint EIR/EIS. During the planning process, alternatives will be developed that will identify a reasonable range of options for protecting resources while allowing certain specified sustainable uses. The public will be invited to participate in the scoping process, review of the Draft EIR/EIS, and attend public comment meetings.

Availability of the Draft EIR/EIS for review and written comment will be announced by formal Notice of Availability in the Federal Register, through local and regional news media, project websites, and direct mailing. Comments on the Draft EIR/EIS will be fully considered, and incorporated into a Final EIR/EIS as appropriate. At this time it is anticipated that the Final EIR/EIS will be completed in winter 2002. It is anticipated that notice of an approved Notice of Determination / Record of Decision will be published in the *Federal Register* in winter 2002/2003.

Implications of NEPA and CEQA for Plan Format

There are two principle consequences of NEPA/CEQA compliance. First, that the Plan will appear as one of a number of alternatives in the EIR/EIS. While somewhat awkward for the general reader, this presentation not only provides the legal niceties, but makes the overall plan process transparent and secures (for those not satisfied) access to a formal process of appeal and litigation.

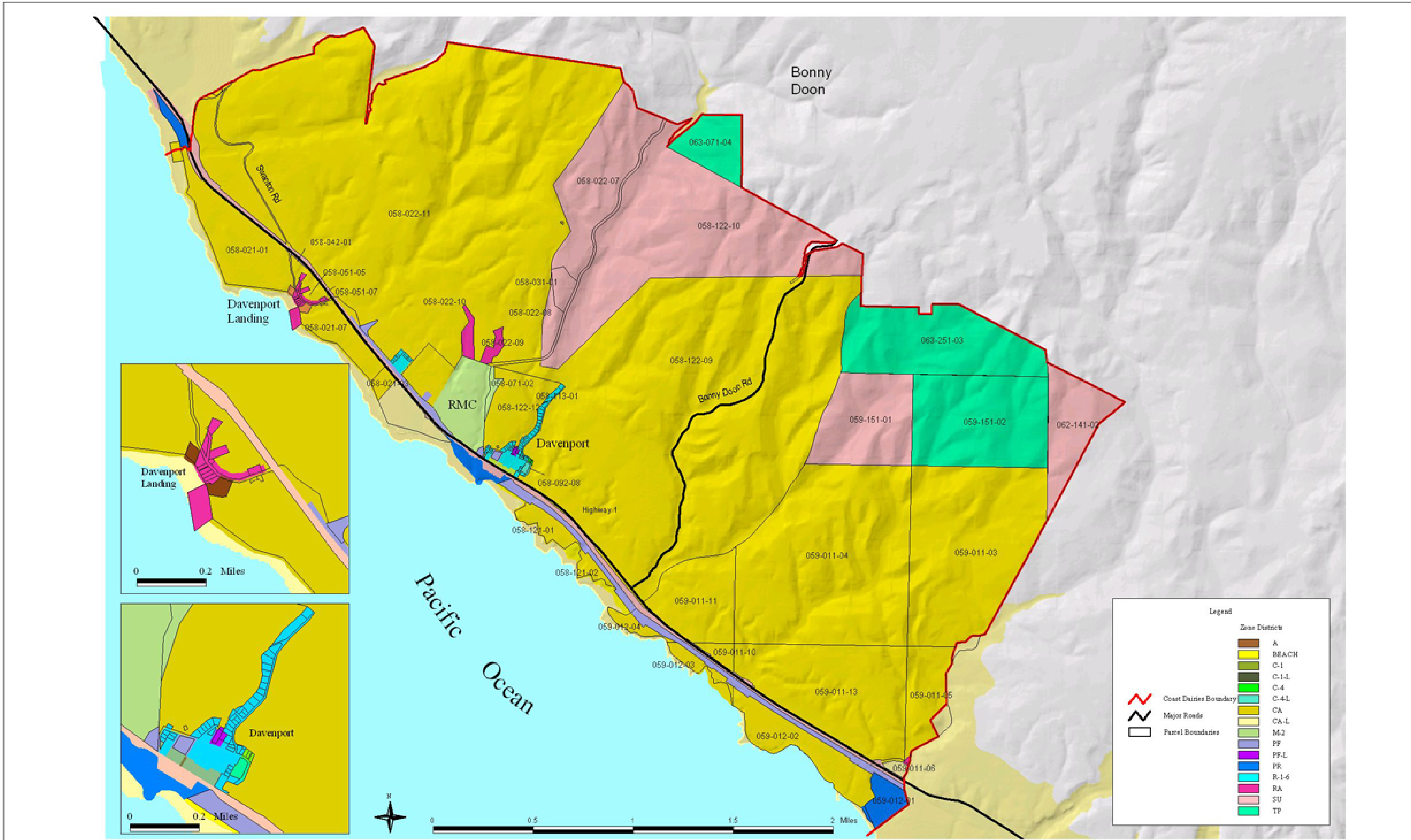
Secondly, to avoid having to do frequent updates of the general plan-level document, both agencies also expect that the Plan will provide a framework for planning, but that implementation will be presented in separate implementation plans. To put this in simpler terms, the Plan will leave most of the actual land-use decisions to those who will come to know it best and who will have to face the consequences: the future managers of the Coast Dairies Property.



SOURCE: County of Santa Cruz, USGS

Coast Dairies / 200071

Figure 6-1
County Land-use Designations
in the Coast Dairies Property



SOURCE: Santa Cruz County GIS Dept., USGS

Coast Dairies / 200071

Figure 6-2
County Zoning Districts
in the Coast Dairies Property

6.6 LIST OF LAWS, ORDINANCES, RULES AND STANDARDS

Table 6-2, presented at the end of Section 6, describes a wide range of requirements that must be met for compliance with laws, ordinances, regulations, and standards imposed by federal, state, and local entities with authority over the project or some portion of it. Means of complying with each requirement are discussed in the appropriate section of the report, but the table summarizes them for all subject areas. Very few of the entries in Table 6-2 present a challenge for the planning process, but the Plan must be evaluated for compliance with all of them[6].

6.7 REFERENCES CITED

BLM. *Draft Strategic Plan Fiscal Years 2000-2006.* U.S. Department of the Interior, Bureau of Land Management. July 22, 2000. 95 pages.

BLM. *Draft Land Use Planning Handbook.* U.S. Department of the Interior, Bureau of Land Management. Undated. 92 pages.

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Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe, *Classification of Wetlands and Deepwater Habitats of the United States.* U.S. Department of the Interior, Fish and Wildlife Service, Washington, D.C. 131 pp., 1979.

Fish and Wildlife Service and National Marine Fishery Service. *Habitat Conservation Planning Handbook.* U.S. Department of the Interior, Fish and Wildlife Service and U.S. Department of Commerce, National Marine Fisheries Service. Eight chapters and 18 appendices. 1996

Santa Cruz County. North Coast Beaches Master Plan. 1991.

[6] The list includes numerous Santa Cruz County ordinances, not because they apply in the strict sense, but because federal and state agencies usually take local regulations into account in their planning processes.

TABLE 6-2
APPLICABLE LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Regulatory Topic	Jurisdiction	Citation	Administering Agency	Requirements/Compliance
Biological Resources	Federal	Endangered Species Act of 1973, as amended; 16 USC § 1531 et seq.; 50 CFR parts 17 and 222	U.S. Fish and Wildlife Service (USFWS); National Marine Fisheries Service	Protect and manage federally-listed species (see Section ##)
	Federal	Migratory Bird Treaty Act	USFWS	Protect migratory birds and their nests (see Section ##)
	Federal	Clean Water Act of 1977; 33 USC § 1344; 30 CFR § 330.5(a)(26)	U.S. Army Corps of Engineers	Protect waters of the U.S. (see Section ##)
	State	California Species Preservation Act of 1970; California Wildlife Preservation Act of 1990; California Fish and Game Code §§ 900 – 903	California Department of Fish and Game (CDFG)	Protect and enhance the birds, mammals, fish, amphibians, and reptiles of California (see Section ##)
	State	Native Plant Protection Act of 1977	CDFG	Protect rare and endangered plants (see Section ##)
	State	California Endangered Species Act of 1984, California Fish and Game Code §§ 2050 - 2098	CDFG	Protect state-listed plants and animals (see Section ##)
	State	California Fish and Game Code §§ 3511, 4700, 5050, and 5515	CDFG	No taking of fully-protected birds, mammals, reptiles, amphibians, or fishes /1/ (see Section ##)
	Local	Santa Cruz County Code § 16.32 (Sensitive Habitat Protection)	Santa Cruz County Planning Department	Comply with requirements to protect sensitive habitats (also part of the LCP) (see Section ##)
	Local	Santa Cruz County Code § 16.34 (Significant Trees Protection)	Santa Cruz County Planning Department	Comply with requirements to protect significant trees (also part of the LCP) (see Section ##)

(continued)

TABLE 6-2 (continued)
APPLICABLE LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Regulatory Topic	Jurisdiction	Citation	Administering Agency	Requirements/Compliance
Biological Resources (continued)	Local	Santa Cruz County Code § 16.30 (Riparian Corridor and Wetlands Protection)	Santa Cruz County Planning Department	Comply with requirements to protect riparian corridors (also part of the LCP) (see Section ##)
Water Quality	Federal	Clean Water Act § 402; 33 USC § 1342; 40 CFR parts 122 – 136	RWQCB, EPA Region IX	As necessary, obtain NPDES permits for stormwater discharge and prepare SWPPPs for construction projects (see Section ##)
	Federal	Clean Water Act § 311; 33 USC § 1321; 40 CFR parts 110, 112, 116, and 117	RWQCB, EPA Region IX, and California Office of Emergency Services	Report any prohibited discharge of oil or hazardous substances (see Section ##)
	State	California Water Code § 13271 – 13272; 23 CCR 2250 – 2260	RWQCB and California Office of Emergency Services	Report releases of reportable quantities of hazardous substances or sewage and releases of specified quantities of oil or petroleum products (see Section ##)
	State/Local	California Public Resources Code § 25523(a); 20 CCR §§ 1752, 1752.5, 2300 – 2309, and Chapter 2 Subchapter 5, Article 1, Appendix B, Part (1)	CEQA Lead Agency	Provide information concerning proposed water resources and water quality protection (see Section ##)
	Local	Santa Cruz County Code §§ 7.38 (Sewage Disposal) and 7.78 (Preservation of Monterey Bay and Coastal Water Quality)	Santa Cruz County Planning Department	Comply with regulations for protecting water quality (also part of the LCP) (see Section ##)
	Local	Santa Cruz County Code § 7.73 (Individual Water Systems)	Santa Cruz County Planning Department	Comply with regulations for protecting water resources (also part of the Local Coastal Program) (see Section ##)
	Local	City of Santa Cruz ##	City of Santa Cruz ##	Comply with requirements for use of hazardous materials on public land (see Section ##)

(continued)

TABLE 6-2 (continued)
APPLICABLE LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Regulatory Topic	Jurisdiction	Citation	Administering Agency	Requirements/Compliance
Geology	State/Local	Alquist-Priolo Fault Zone Act; Santa Cruz County Code § 16.10	Santa Cruz County Planning Department	Meet requirements for protection from seismic and other geologic hazards (see Section ##)
	Local	Santa Cruz County Code § 16.10 (Geologic Hazards)	Santa Cruz County Planning Department	Comply with requirements to mitigate for geologic hazards (also part of the LCP) (see Section ##)
Soil Conservation	Federal	Clean Water Act	RWQCB: Central Coast Region under the direction of the Water Resources Control Board	Meet discharge requirements relative to sediment (see Section ##)
	Federal	Soil Conservation Service *National Engineering Handbook* (1983)	Natural Resources Conservation Service	Implement standards for soil conservation (see Section ##)
	State	California Public Resources Code § 25523(a); CCR §§ 1752, 1752.5, 2300 - 2309, and Chapter 2, Subchapter 5, Article1, Appendix B, part (I)	CEQA lead agency	Submit information about potential environmental impacts (see Section ##)
	State	Guidelines for Implementation of CEQA, Appendix G; 14 CCR § 15000-15387	CEQA lead agency	Evaluate erosion and sediment deposition; evaluate conversion of agricultural lands (see Section ##)
	State	Porter-Cologne Water Quality Control Act of 1972; California Water Code §13260 – 13269; 23 CCR Chapter 9	CEQA lead agency, RWQCB and Water Resources Control Board	Provide adequate protection of water quality by appropriate design, sizing, and construction of erosion and sediment controls; meet waste discharge requirements concerning potential surface water pollution from runoff (see Section ##)
	State	Williamson Act	Department of Conservation, Office of Land Conservation	Comply with provisions of Williamson Act contracts (see Section ##)
(continued)	Local	Santa Cruz County Code §§ 16.20 (Grading Regulations) and 16.22 (Erosion Control)	Santa Cruz County Planning Department	Comply with regulations for grading and erosion control (also part of the LCP) (see Section ##)

TABLE 6-2 (continued)
APPLICABLE LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Regulatory Topic	Jurisdiction	Citation	Administering Agency	Requirements/Compliance
Cultural and Paleontological Resources	Federal	National Historic Preservation Act, as amended; 16 USC § 470 et seq. and § 106; 36 CFR 800	Lead Federal Agency and State Historic Preservation Officer (SHPO)	Obtain formal finding by the lead Federal agency for cultural resources in consultation with the SHPO and the Advisory Council on Historic Preservation; implement procedures for dealing with cultural resources discovered during surface-disturbing activities (see Section ##)
	Federal	National Environmental Policy Act (NEPA); 42 USC § 4321 – 4327; 40 CFR § 1502.25	Lead Federal Agency	Include analysis of potential environmental impacts on federal lands (see Section ##)
	Federal	1978 Memorandum from the Associate Director of the BLM	Lead Federal Agency	Implement significance criteria for paleontological resources (see Section ##)
	Federal	Federal Antiquities Act of 1906; 16 USC § 432, 433	Lead Federal Agency	Comply with basic legislation for preservation of cultural properties on Federal lands (see Section ##)
	Federal	Executive Order 11593	Lead Federal Agency	Directs Federal agencies to inventory and nominate properties to the National Register of Historic Places and protect cultural resources (see Section ##)
	Federal	Archaeological and Historic Preservation Act of 1976; 16 USC § 469	Secretary of the Interior and Lead Federal Agency	Provides for coordination with the Secretary when a Federally licensed undertaking may cause irreparable damage to significant cultural resources (see Section ##)
	Federal	Archaeological Resources Protection Act of 1979; 16 USC § 470a et seq.	Secretary of the Interior and Lead Federal Agency	Provides for felony-level penalties for destruction, damage, or removal of cultural resources on Federal lands (see Section ##)

(continued)

TABLE 6-2 (continued)
APPLICABLE LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Regulatory Topic	Jurisdiction	Citation	Administering Agency	Requirements/Compliance
Cultural and Paleontological Resources (continued)	Federal	American Indian Religious Freedom Act of 1979; 42 USC § 1996	Lead Federal Agency	Established US Government policy to protect and preserve traditional religious beliefs and practices (see Section ##)
	Federal	Native American Graves Protection and Repatriation Act of 1990; 25 USC § 3001	Lead Federal Agency	Established mechanism for Native Americans to claim ownership of human remains and certain cultural items (see Section ##)
	Federal	Secretary of the Interior's Standards and Guidelines, September 29, 1983	Secretary of the Interior and Lead Federal Agency	Establishes standards for the gathering and treatment of data related to cultural resources (see Section ##)
	State	California Environmental Quality Act (CEQA) § 15064.5; California Public Resources code § 5024, 5024.5, and 21083.2; Title 14 CCR § 15126	Lead State Agency	Directs the State Lead Agency to determine significance of project-related effects on important cultural resources and unique paleontological resources to develop appropriate mitigation measures (see Section ##)
	State	California Public Resources Code § 21083.2	Lead State Agency	Directs the State Lead Agency to provide special consideration of unique historical, archaeological, and cultural sites as defined under CEQA (see Section ##)
	State	California Health and Safety Code § 7050.5	County Coroner (Medical Examiner)	Determination of origin of human remains and coordination with NAHC (see Section ##)
	State	California Public Resources Code § 5024.1	State Historical Resources Commission	Establishes the California Register of Historical Resources and procedures for nominating sites to the Register (see Section ##)

(continued)

TABLE 6-2 (continued)
APPLICABLE LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Regulatory Topic	Jurisdiction	Citation	Administering Agency	Requirements/Compliance
Cultural and Paleontological Resources (continued)	Local	California Public Resources Code § 5097.5	Santa Cruz County Planning Department	Prevent unauthorized removal of archaeological resources or paleontological remains on public lands (see Section ##)
	Local	Santa Cruz County Code §§ 16.40. (Native American Cultural Sites), 16.42 (Historic Preservation), and 16.44 ({Paleontological Resource Protection)	Santa Cruz County Planning Department	Comply with requirements to protect cultural and paleontological resources (also part of the LCP) (see Section ##)
Land Use	Federal	Bureau of Land Management (BLM) *Land Use Planning Handbook*	Lead Federal Agency	Ensure consistency with proposed actions and BLM land use policies (see Section 6.3)
	Federal/State/ Local	Federal Coastal Zone Act/Coastal Conservation Act of 1976 (California Public Resources Code § 30000 et seq.)	Coastal Commission and Santa Cruz County	Comply with regulations for Coastal Zone (see Section 6.5)
	State	Department of Parks and Recreation (DPR) Draft *Planning Handbook*	Department of Parks and Recreation	Ensure consistency with proposed actions and DPR land use policies (see Section 6.4)
	State	CEQA Appendix G	State Lead Agency	Evaluate significance of conflicts with adopted community plans or conflicts with established recreational, educational, religious, or scientific uses of the area (see Section ##)
	State	CEQA Appendix G	State Lead Agency	Evaluate the significance of project impacts on prime agricultural land (see Section ##)
	State	California Land Conservation Act (Williamson Act)	Santa Cruz County Planning Department	Comply with regulations for Coastal Zone (see Section ##)

(continued)

TABLE 6-3 (continued)
APPLICABLE LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Regulatory Topic	Jurisdiction	Citation	Administering Agency	Requirements/Compliance
Land Use (continued)	State	California Streets and Highway Code § 670	Caltrans	Encroachment permits (see Section ##)
	Local	Santa Cruz County General Plan and LCP	Santa Cruz County Planning Department	Comply with provisions of General Plan (see Section 6.5)
	Local	Santa Cruz County Zoning Code and LCP	Santa Cruz County Planning Department	Adjust zoning to be consistent with proposed land use (see Section 6.5)
	Local	Santa Cruz County North Coast Beaches Master Plan	Santa Cruz County Planning Department	Maintain consistency with Plan (see Section 6.5)
	Local	Santa Cruz County Code, §§ 12.01 Building Permit Regula-tions, 12.06 Demolition of Habitable Residential Structures Suitable for Relocation, 13.03 LCP Administration, 13.10 Zoning Regulations, 13.11 Site, Architectural and Landscape Design Review Ordinance, 13.14 Rural Residential, 13.20 Coastal Zone Permits, 13.36 Development Agreements, 14.02 Condominium Conversion Regulations, 16.01 Park Dedication and Public Access Requirements, 16.10 Roadway and Roadside Improvements, 16.50 Agricultural Land Preservation and Protection, 17.02 Urban Services Line and rural Services Line, 17.04 Annual Population Growth Goals for Santa Cruz County, 18.10 Permit and Approval Procedures	Santa Cruz County	Comply with regulations for Coastal Zone (see Section 6.5)

(continued)

TABLE 6-2 (continued)
APPLICABLE LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Regulatory Topic	Jurisdiction	Citation	Administering Agency	Requirements/Compliance
Aesthetic/Visual Resources	State	CEQA Appendices G and I	State Lead Agency	Evaluate impacts using significance criteria (see Section ##)
	Local	Santa Cruz County guidelines for implementation of CEQA	Santa Cruz County Planning Department	Comment on EIR (see Section ##)
Noise	State	CEQA Appendix G	State Lead Agency	Ensure that project activities do not substantially increase ambient noise in adjacent areas (see Section ##)
Air quality	State/Local	CEQA Appendix G	State Lead Agency	Evaluate project compliance with ambient air quality standards, substantial contributions to an existing or projected air quality violation, or exposure of sensitive receptors to substantial pollutant concentrations (see Section ##)
Health and Safety	State	California Health and Safety Code §§ 25500 – 25541; 19 CCR §§ 270 – 2734	Santa Cruz County Office of Emergency Services and Rural Fire Protection District	Comply with inventory, reporting, and area planning requirements with respect to hazardous materials (see Section ##)
	Local	CBC and National Fire Code	Santa Cruz County Department of Public Works and Planning Department	Obtain building and grading permits as needed (see Section ##)
	Local	Santa Cruz County Code § 16.10 (Geologic Hazards)	Santa Cruz County Planning Department	Comply with requirements to mitigate for geologic hazards (also part of the LCP) (see Section ##)
Water Supply	State	California Water Code § 1602	SWRCB	File for permits for water diversions (see Section ##)
	Local	Santa Cruz County Code § 7.70 (Water Well Control)	Santa Cruz County Planning Department	Comply with requirements to protect water resources (also part of the LCP) (see Section ##)

(continued)

TABLE 6-2 (continued)
APPLICABLE LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Regulatory Topic	Jurisdiction	Citation	Administering Agency	Requirements/Compliance
Timber Resources	Federal	Federal land management Policy Act	Bureau of Land Management	Comply with federal requirements for timber harvest and management as appropriate (see Section ##)
	State	Z'Berg-Njedly Forest Practice Act of 1973	Department of Forestry, North Coast Region	Comply with requirements for timber harvesting plans and timberland conversion permits as appropriate (see Section ##)
	Local	Santa Cruz County Code § 16.52 (Timber Harvesting Regulations)	Santa Cruz County	Comply with requirements for timber harvesting (also part of the LCP) (see Section ##)
Mining	Federal	Federal land management Policy Act	Bureau of Land Management	Comply with federal requirements for mining and reclamation as appropriate (see Section ##)
	State/Local	Surface Mining and Reclamation Act (SMARA)	Division of Mines and Geology/Santa Cruz County	Implement provisions of SMARA (see Section ##)
	Local	Santa Cruz County Code § 16.54 (Mining Regulations)	Santa Cruz County	Comply with requirements for mining (also part of the LCP) (see Section ##)
Transportation	State	California Streets and Highway Code § 670	Caltrans	Encroachment permits (see Section ##)
	Local	Santa Cruz County Transportation Plan	Santa Cruz County Department of Public Works	?? (see Section ##)

Notes:

/1/ List of fully protected species for the Property
Birds (Fish & Game Code 3511)
American peregrine falcon
Brown pelican
California least tern
Golden eagle
White-tailed kite
Mammals (Fish & Game Code 4700)
Southern sea otter
Amphibians and Reptiles (Fish & Game Code 5050)
San Francisco garter snake