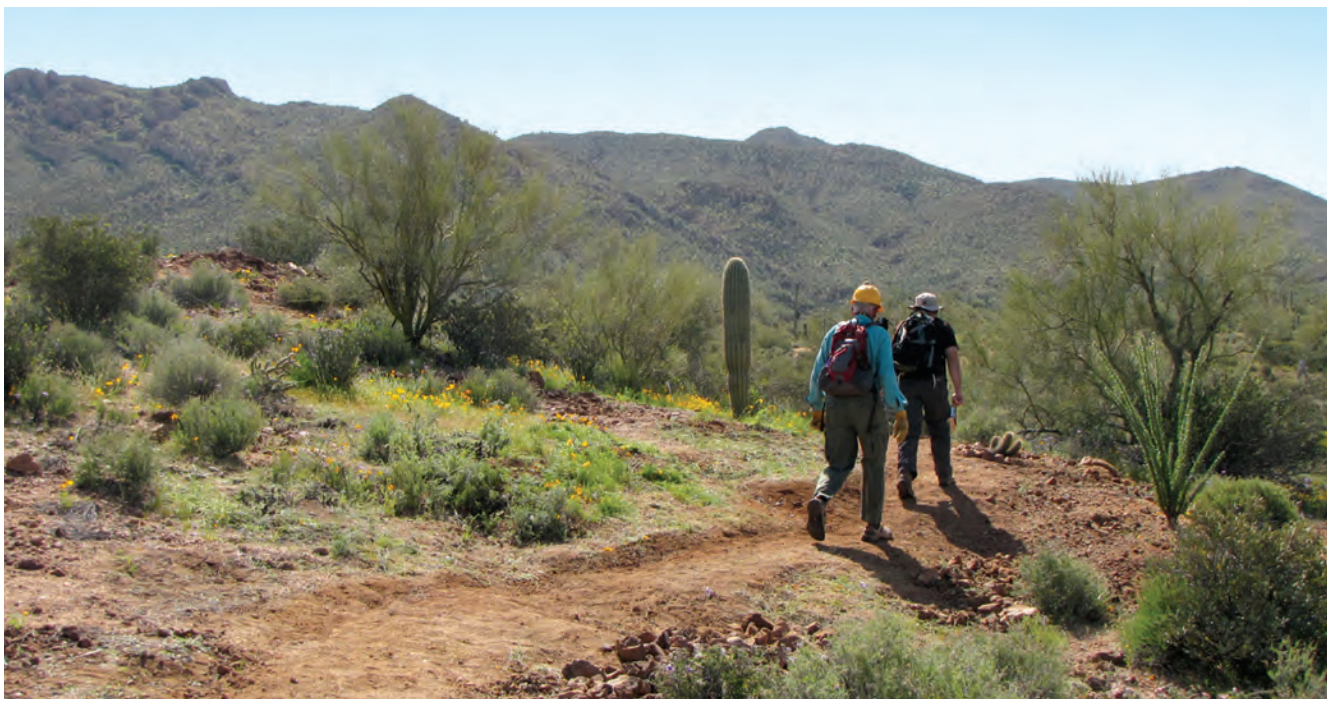
The Economic Benefits of Open Space and Trails in Pinal County, Arizona



THE TRUST *for* PUBLIC LAND

CONSERVING LAND FOR PEOPLE

The Economic Benefits of Open Space and Trails in Pinal County, Arizona

THE TRUST *for* PUBLIC LAND

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Dear Pinal County Resident:

We have the good fortune to live in the midst of many diverse landscapes and natural and cultural resources. Pinal County is also home to one of the last free-flowing rivers in the west, the San Pedro. Our natural abundance is part of what makes it so attractive to live here, and what attracts new businesses and residents.

With a large county that is almost 5,400 square miles, it may appear that we have an unending amount of wide open spaces, but this openness can be misleading. Pinal County is facing tremendous growth pressure as part of the Sun Corridor region. In fact, we were the second fastest-growth county in the nation between 2000 and 2010, increasing our population by 109 percent.

As the growth pressures increased over the past decade, Pinal County took steps to reach out to citizens and stakeholders to get their input into how Pinal County should develop in the future. These citizen outreach efforts were evident in reports and plan documents such as the Morrison Institute's report The Future at Pinal and the award-winning planning efforts of the Pinal County Comprehensive Plan and the Pinal County Open Space and Trails Master Plan. These efforts enable us to plan for that growth and continue to create the "wide-open opportunity" that makes Pinal a special place to live.

During citizen and stakeholder engagement in each of these plans, participants showed a keen understanding of the importance of park, trail, and open space assets as a critical ingredient of a high quality of life in Pinal County. Up until recently, though, these quality-of-life resources were often considered intangible in nature, with benefits that were difficult or nearly impossible to quantify.

Thankfully, we were presented with the opportunity to quantify the value of Pinal's open space and natural areas by The Trust for Public Land (TPL). With the assistance of a grant from The William and Flora Hewlett Foundation, TPL set out to produce a pilot study on the economic benefits of parks, trails, and open space, focusing specifically on counties in the western United States. TPL held an open application for this study and received many quality applications. Ultimately, Pinal County was chosen as the recipient.

The research that is detailed in this study gives Pinal County quantifiable information on the economic benefits of parks, trails, and open space within the county. This information is an important tool for Pinal County as we continue to work toward implementation of the aforementioned plans.

Pinal County is fortunate to have partnered with TPL and is grateful for the support from The William and Flora Hewlett Foundation for making this report possible. We hope that you will find this information both educational and useful and that it will add depth to discussions of why Pinal County is such a great place to live, work, and play.

Sincerely,

Fritz A. Behring
County Manager, Pinal County

PINAL • COUNTY
wide open opportunity

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Introduction

In 2008, The Trust for Public Land (TPL) held an open application process for an economic analysis of open lands pilot study in the West. TPL received many well-qualified applications from counties across the West. TPL selected Pinal County, Arizona, for the pilot study. This report presents our findings.

Pinal County is the epicenter of growth in Arizona and the Southwest. According to the U.S. Census Bureau, Pinal County was the second fastest-growing U.S. county in the nation from 2000 to 2010—increasing by an astounding 109 percent from 180,000 to 376,000 people. The Arizona Department of Commerce estimates that the county will reach a population of 732,000 by 2025 and 1.3 million by 2050. As the county's Comprehensive Plan states how Pinal County responds to and plans for this projected growth, the Comprehensive Plan will change the course of Pinal County, and perhaps the entire state of Arizona, for generations. An important factor in this planning is the role and value of land conservation in Pinal County's future.

Land conservation is an integral element of the Pinal County economy, a fact reinforced by residents during the process of adopting the Pinal County Open Space and Trails Master Plan. However, an assessment of the economic impact of these lands is needed. To better understand the economic benefits provided by parks, trails, and open space, TPL conducted a thorough and transparent analysis for the county that included considerable original research. It did so by calculating the following:

- **Recreation and tourism.** Parks, trails, and open space are a key component of Pinal County's recreation and tourism industry. This report determines visitor spending and sales tax generated in the local economy because of parks and trails, as well as the direct use value and the health benefits gained by residents recreating.
- **Government cost savings.** Parks, trails, open space, and trust lands provide services that would otherwise have to be provided by local governments. This report estimates benefits from enhanced property values, water supply, and preventing and fighting wildfires.
- **Agriculture industry.** Farm- and ranchland preservation helps sustain the agriculture industry in Pinal County. This report considers the market value of Pinal County's agriculture industry.
- **Economic development.** Land conservation is an economic development tool. Open space, parks, and trails are strongly linked to high quality of life, which attracts well- educated and talented workers and the businesses that rely on those workers.

TPL is extremely well positioned and qualified to conduct a complete analysis of the economic benefits of Pinal County's parks, open space, and trails. TPL conserves land for people to enjoy as parks, gardens, and other natural places, ensuring livable communities for generations to come. TPL has a long history of estimating the economic benefits of parks, trails, greenways, open space, and farmland preservation in reports such as the following:

– *The Economic Benefits of Parks and Open Space,* 1999

– *Community Choices: Thinking Through Land Conservation, Development, and Property Taxes in Massachusetts,* 1999

– *The Benefits of Parks,* 2005

– *The Economic Benefits of Land Conservation,* 2007

– *Conservation: An Investment That Pays,* 2009

– *Measuring the Economic Value of a City Park System,* 2009

– *A Return on Investment: The Economic Value of Colorado's Conservation Easements,* 2010

– *The Economic Benefits and Fiscal Impact of Parks and Open Space in Nassau and Suffolk Counties, New York,* 2010

– *Return on the Investment from the Land and Water Conservation Fund,* 2010

– *North Carolina's Return on the Investment in Land Conservation,* 2011

TPL has also published extensively on the economic benefits of urban parks across the county. TPL contracted with six economist teams to construct methodologies for how green space makes for successful communities and is putting these methodologies to work in cities. Research has been conducted in Philadelphia, Pennsylvania; Boston, Massachusetts; Sacramento and San Diego, California; Washington D.C.; Wilmington, Delaware; Denver, Colorado; Charlotte, North Carolina; and Seattle, Washington.

What Is the Difference between Parks, Open Space, Protected Open Space, and State Trust Lands?

For the sake of clarity, in this report we make distinctions between parks, open space, protected open space, and state trust lands. These definitions may be slightly different from those used in past open space publications; however, they are necessary to the economic analysis of open space and trails in Pinal County. The economic benefits generated by these categories of lands are clearly identified throughout the report.

Parks are defined as all publicly accessible trails and recreation areas (not including schools, golf courses, cemeteries, or community centers). National forests, monuments, and wilderness areas; state parks; and rare cases of privately held lands that are publicly accessible are also included. Parks do not include homeowner association areas; however, subdivision open space that was identified by the town as a park is included.

Open space is defined as undeveloped privately owned lands that are not publicly accessible and may include natural areas, cultural resources, and agricultural land. Although these lands are not publicly accessible, they continue to provide natural goods and services (e.g., wildlife habitat).

Protected open space is defined as undeveloped publicly owned lands that are not publicly accessible (e.g., San Carlos Irrigation Project [SCIP] and Central Arizona Project [CAP] lands) and conservation, agricultural, and historic preservation easements held by any government entity or land trust.

State trust lands represent two-thirds of Pinal County. Trust lands are currently undeveloped, however, under state charter; the Arizona State Land Department has the responsibility on behalf of beneficiaries to assure the highest and best use of trust lands. Development can and does occur on state trust lands; therefore, these lands cannot be considered protected.

Executive Summary

Pinal County's parks, trails, open space, and trust lands provide enjoyment, recreation, cost savings, and local revenues. These benefits include direct savings provided to Pinal County residents, such as no- or low-cost access for residents to parks and trails, and direct revenue generation from Pinal County's tourism and farming industries. For the first time, we can quantify the value of the benefits that parks, trails, open space, and trust lands generate for Pinal County.

Recreation and Tourism

- Tourism is one of Pinal County's largest industries, producing revenues of $461 million in 2008.
- Parks and trails contribute to this industry. Approximately 7.9 percent of Pinal County tourists come for the purpose of visiting the outdoors, such as parks, heritage sites, and so on. In 2008, these visitors spent $36.5 million in the local economy and generated $672,000 in Pinal County sales taxes (see Table 1).
- State parks in Pinal County are an important economic engine. Nonresident state park visitors spent $8.35 million in Pinal County in 2007. Their direct spending generated $735,000 in state and local tax receipts.
- Residents also enjoy Pinal County's parks and trails. Residents are able to save money by using the county's parkland and recreation opportunities at no- or low-cost instead of having to purchase these activities in the marketplace. The value of this recreation was $100 million in 2010.
- Independent research shows that park use translates into increased physical activity, resulting in medical costs savings. Approximately 31,500 Pinal County residents engage in physical activity at parks and trails at a level sufficient to generate measurable health benefits, yielding annual savings in medical costs of $12.1 million.

Government Cost Savings

- Parks and protected open space increase the value of nearby residential properties because people like living close to parks and protected open spaces and are willing to pay for the privilege. In Pinal County, parks and protected open space raise the value of nearby residential properties by $190 million (2009); this increase in property value results in an increase in property tax revenues of $2.7 million a year.
- Land conservation helps protect the water supply by allowing for natural recharge and discharge, and not contributing to groundwater withdrawals. In addition, as Pinal County develops, the urban heat island (UHI) effect will increase and expand across the county, increasing both energy and water demands. This change could potentially cost Pinal households anywhere from $20 to $28 per 1°F increase per household per year. Conserving open space, parks, and trust lands will help counteract UHI effects.
- Parks, open space, and trust lands provide fire protection. Hundreds of thousands of acres in the wildland urban interface (WUI) of Pinal County are designated high risk for wildfires. Pinal's WUI includes over 299,000 residents and 137,000 housing units—a 60 percent increase since 2000. Conserving land can serve as a relatively inexpensive and effective method for preventing and fighting wildfires and reducing their damage. Currently, 147,000 acres of parks and protected open space are at high risk of wildfire, and an additional 159,000 acres of state trust land are at high risk.

Agriculture

- Agricultural lands are often an important component of open space. Well-managed agricultural land provides important natural goods and services. Farm- and ranchlands provide food and cover for wildlife, help control flooding, protect watersheds by absorbing and filtering wastewater, provide groundwater recharge, and maintain air quality.
- Agriculture is an important industry for Pinal County. Agriculture is and has been a strong component of the cultural heritage in Pinal County.
- In 2007, Pinal's livestock and poultry products were valued at more than $500 million, and crops were valued at more than $200 million.
- In 2009, farming, fishing, and forestry supported 3,050 jobs, or 2.6 percent of employees, in Pinal County.

Economic Development

- Open space, parks, and trails are strongly linked to residents' quality of life, which has a major impact on a place's ability to attract well-educated and talented workers. These workers look at more than just a paycheck when picking places of employment. One survey of high-tech workers showed that a job's attractiveness increases by 33 percent in a community with a high quality of life.
- Businesses also recognize the importance of quality of life. There are many examples of major employers moving to places with a high quality of life because they will have better success in recruiting the best workforce. These include Dell moving to Austin, Boeing going to Chicago, and Volkswagen building in Chattanooga.

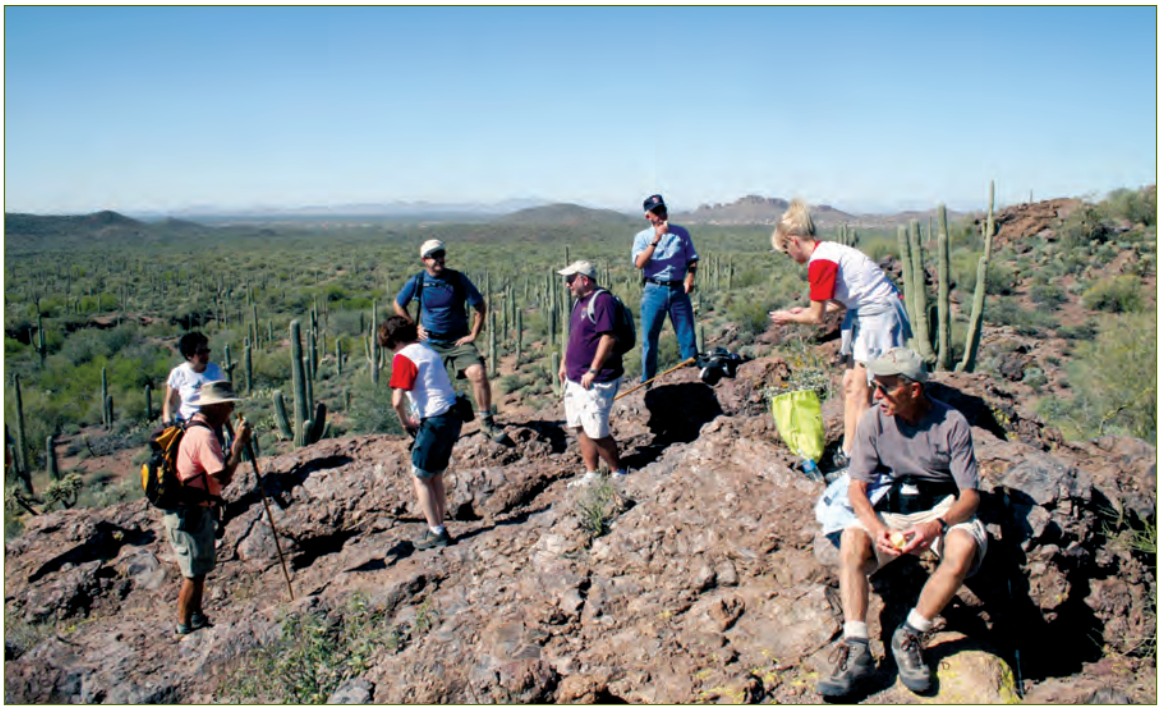


Table 1. Summary of Estimated Annual Benefits of Parks, Trails, and Protected Open Space in Pinal County

Benefit Category	Benefit Subcategory	Land Category	Pinal County Total
Recreation and Tourism			
Outdoors tourism value	Tourist spending	Parks and trails	$36,500,000
	Sales tax on tourist spending*	Parks and trails	$16,200,000
Direct use value		Parks and trails	$100,000,000
Human health value		Parks and trails	$12,100,0000
Government Cost Savings			
Enhanced property value	Additional property value*	Parks and protected open space	$190,000,000
	Additional property tax	Parks and protected open space	$2,720,000
Water Supply		Parks, protected open space, and trust lands	Land conservation can protect and conserve drinking water supplies.
Preventing and fighting wildfires		Parks, protected open space, and trust lands	147,000 acres of parks and protected open space are at high risk of wildfire, an additional 159,000 acres of state trust land are at high risk.
Agriculture			
Agricultural value	Sales of agricultural products	Open space	$700,000,000

* Additional property value is a one-time boost to the properties' value and does not accumulate each year. Sales tax on tourist spending is a subset of tourist spending. All other benefits accrue annually.

Recreation and Tourism

Park Tourism

Tourists come to Pinal County to visit the rugged landscapes of its parks, the cultural facilities, the historical sites, and vibrant festivals. Apache Junction draws thousands of tourists during the Lost Dutchman Days Festival, which includes a rodeo, parade, and music. The town of Florence is steeped in the living memory of the Old West, possessing more buildings listed on the National Historic Register than any other town in Arizona. Picacho State Park is home to a prominent peak composed of lava flow remains that looms large over the site of the westernmost battle of the Civil War. And just west of the town of Superior, Boyce Thompson Southwestern Arboretum is an outdoor museum containing over 10,000 different species of flora from across the world.

Though not always recognized, parks play a significant role in the tourism economy of Pinal County. Tourists' activities, the number of visitors, and tourist spending determine the contribution of parks to the tourism economy. In Pinal County, park management runs the gamut from city and town park divisions to the Bureau of Land Management. Only some of these park entities and agencies actually track park visitor numbers and tourist expenditures. Thus, it is not possible to extrapolate the number of visitors to all of Pinal's parks based on those numbers alone.

Nonetheless, we have utilized several valuable state sources to measure the value of parks in the tourism economy in Pinal County: *Arizona Travel Impacts: 1998–2009, Arizona State Parks Economic Impact Report*, and the *Office of Tourism's Arizona Visitor Profile 2008*. Applying the percentage of those visitors whose primary reason to visit Arizona is the outdoors to the 2008 direct travel expenditures (e.g., visitor spending on lodging, food, and gas) and tax receipts within Pinal County produces a useful picture of how much money is spent and tax revenue is earned in Pinal due to the parks in the county.[1] As shown in Table 2, we estimate that overnight residents and nonresidents whose primary reason to visit Pinal County is the outdoors spent $36.5 million in 2008. Their spending generated $672,000 in tax receipts for Pinal County and an additional $1.33 million in tax receipts for the State of Arizona.

Table 2. Tourism Spending and the Outdoors in Pinal County

Total Direct Travel Spending[2] (2008)	$461,000,000
Percentage of tourists whose primary reason to visit is the outdoors	7.9%
Approximation of the spending of tourists whose primary reason to visit is the outdoors	$36,500,000
Pinal County total tourism tax receipts	$8,500,000
Pinal County tourism tax receipts attributable to parks	$672,000
State of Arizona total tourism tax receipts in Pinal County	$16,800,000
State of Arizona park tourism tax receipts in Pinal County	$1,330,000

An important component of outdoor tourism in Pinal County is state park visitation. While state park spending is only approximately 2 percent of all total direct travel spending in Pinal County, the economic impact of parks as a whole is far greater. As shown in Table 3, state park visitors spent $8.35 million in Pinal County in 2007. Their spending generated $735,000 in state and local tax receipts. In addition, over one hundred jobs are linked to state parks in Pinal County.

Table 3. State Parks and Tourism Spending in Pinal County

Total Direct Travel Spending (2007)	$450,000,000
Direct spending by state parks visitors in Pinal County[3]	$8,350,000
State park visitor spending as a percentage of total direct travel spending	1.9%
Number of visitors in Pinal County state parks	218,000
Spending per park visitor	$38.30
Total state and local tax receipts of state park visitor spending	$735,000
Total jobs in Pinal County state parks	101

Direct Use Value

While Pinal County's parks, open space, and trails provide direct recreational value to residents through such activities as visiting a public playground, picnicking, using ramadas, walking on trails, watching wildlife, and biking.

[1] Visitors are defined as "persons that stay overnight away from home, or travel more than fifty miles one-way on a non-routine trip." The term may include residents of the State of Arizona in addition to nonresidents. Arizona Office of Tourism. 2010. Arizona Travel Impacts 1998-2009. Dean Runyan Associates.
[2] Includes the total visitor spending at destination and spending on travel agencies and resident air travel (other spending).
[3] The spending of visitors with ZIP codes in the county or within miles of the park was excluded.

Most direct uses in public parks are free of charge, but economists can still calculate value by determining the consumer's "willingness to pay" for the recreation experience in the private marketplace. In other words, if parks were not available in Pinal County, how much would the resident (or "consumer") pay for similar experiences in commercial facilities or venues? Rather than income, the direct use value represents the amount of money residents save by not having to pay market rates to indulge in the many park activities they enjoy. Any user fees that are paid for a recreational experience at parks are subtracted from the willingness to pay value.

The model for quantifying the benefits received by direct users is based on the "Unit Day Value" method as documented in Water Resources Council recreation valuation procedures by the U.S. Army Corps of Engineers. The Unit Day Value model counts park visits by specific activity, assigning each activity a dollar value. For example, playing in a playground is worth $3.50. Running or walking on a park trail is worth $4.00, as is playing a game of tennis on a public court. For activities for which a fee is charged, like camping at a public campground, only the "extra value" is assigned (e.g., if camping costs $15 at a public campground and $30 at private campground, the direct use value would be $15). In addition, we applied the law of diminishing returns to park use (i.e., each additional repetition of a park use in a given period is slightly less valuable than the first use). For example, playground value diminishes from $3.50 for the first time to $2.25 for the sixth time in a week. We also estimated an average "season" for different park uses to take into account reduced participation rates in the off-season. Although some people are active in parks 365 days a year, we eliminated seasons during which participation rates drop to low levels. Finally, for the few activities for which a fee is charged—such as swimming at a public pool and the use of fields for team sports—we subtracted the per-person fee from the imputed value, based on fees for such services in Pinal County.

We determined the number of park visits and the activities engaged in through a professionally conducted telephone survey of 900 residents in Pinal County. This random-digit-dialed survey had an accuracy level of plus or minus 5 percent. Residents were asked to answer for themselves; for those adults with children under the age of 18, a representative proportion was also asked to respond for one of their children.[4] The calculation includes only residents of Pinal County; the value from nonresident uses of parks is measured by the income to local businesses from what these visitors spend on their trips. This is covered under income from out-of-town visitor spending (see above). The result of the Direct Use Calculator for Pinal County is $100 million for 2010 (see Table 4).

Table 4. The Annual Economic Value of Direct Use of Parks, Trails, and Protected Open Space in Pinal County

Facility/Activity	Person-Visits	Average Value per Visit	Value
General park uses (playgrounds, trails, walking, picnicking, wildlife watching, etc.)	26,400,000	$2.19	$57,700,000
Sports facilities uses (bicycling, running, swimming, etc.)	11,100,000	$4.02	$31,000,000
Special uses (festivals, concerts, camping, etc.)	1,570,000	$5.58	$11,300,000
Total			**$100,000,000**

The survey did not explicitly state that trust lands are not included. Some respondents may have reported activities that they had participated in on trust lands because trust lands areas can be designated as open for recreation (e.g., the Desert Wells Multi-Use Area). The extent of activities reported occurring on trust lands is unknown.

[4] Respondents were reminded that for the purposes of our study, parks are defined as all publicly owned land and recreational facilities within their community that are maintained for public use. They may include recreation centers; tennis courts; walking, hiking, or biking trails; playgrounds; gardens; performance spaces; subdivision, town, city, county, state, or national parks; national forests or monuments; and wilderness areas. They do not include golf courses, private clubs or gyms, school properties, and regular streets.

Helping to Promote Human Health

Several studies have documented the large economic burden related to physical inactivity. One report released in August 2009 by the U.S. Centers for Disease Control and Prevention (CDC) estimates that obesity cost the U.S. economy $147 billion in 2008 alone. Lack of exercise is shown to contribute to obesity and its many effects, and for this reason experts call for a more active lifestyle. Recent research suggests that access to parks can help people increase their level of physical activity. The Parks Health Benefits Calculator measures the collective economic savings realized by residents of Pinal County who use their parks for exercise.

We created the calculator by identifying the common types of medical problems that are inversely related to physical activity, such as heart disease and diabetes. Based on studies that have been carried out in seven states, we assigned a value of $350 as the annual medical cost difference between those who exercise regularly and those who do not. For persons over the age of 65, that value has been doubled to $700 because seniors typically incur two or more times the medical care costs of younger adults.

The key data input for determining medical cost savings is the number of park users who are engaging in a sufficient amount of physical activity. The CDC defines this as at least 150 minutes of moderate activity per week or at least 75 minutes of vigorous activity per week. The same telephone survey that carried out the direct use valuation also determined residents' activities and their frequency, grouped by age. In accordance with CDC guidelines, we eliminated low-heart-rate activities (e.g., picnicking, sitting, strolling, and birdwatching). Next, we removed respondents who engaged in strenuous activities fewer than three times per week because they were not being active enough to gain a health benefit. Likewise, we removed respondents who engaged in activities fewer than four times per week that were less strenuous but still healthful. The remaining users engaged in enough physical activity to warrant health care cost savings. We found that about 31,500 residents in Pinal County improve their health in parks. In 2010, the combined health savings from park use for the residents of Pinal County was $12.1 million (see Table 5).

Table 5. Estimated Health Benefits of Physical Activity in Parks in Pinal County

Cost Description	Value
Adults Younger Than 65 Years of Age	
Average annual medical care cost difference between active and inactive persons	$350
Physically active in parks*	28,800
Subtotal of health care benefits	$10,100,000
Adults 65 Years of Age and Older	
Average annual medical care cost difference between active and inactive persons over 65 years of age	$700
Physically active in parks*	2,740
Subtotal of health care benefits	$1,930,000
Subtotals combined	$12,000,000
Regional multiplier	1.01
Total annual value of health benefits from parks	**$12,100,000**

*Calculations are based on persons engaging in moderate or vigorous activity as defined by the CDC.

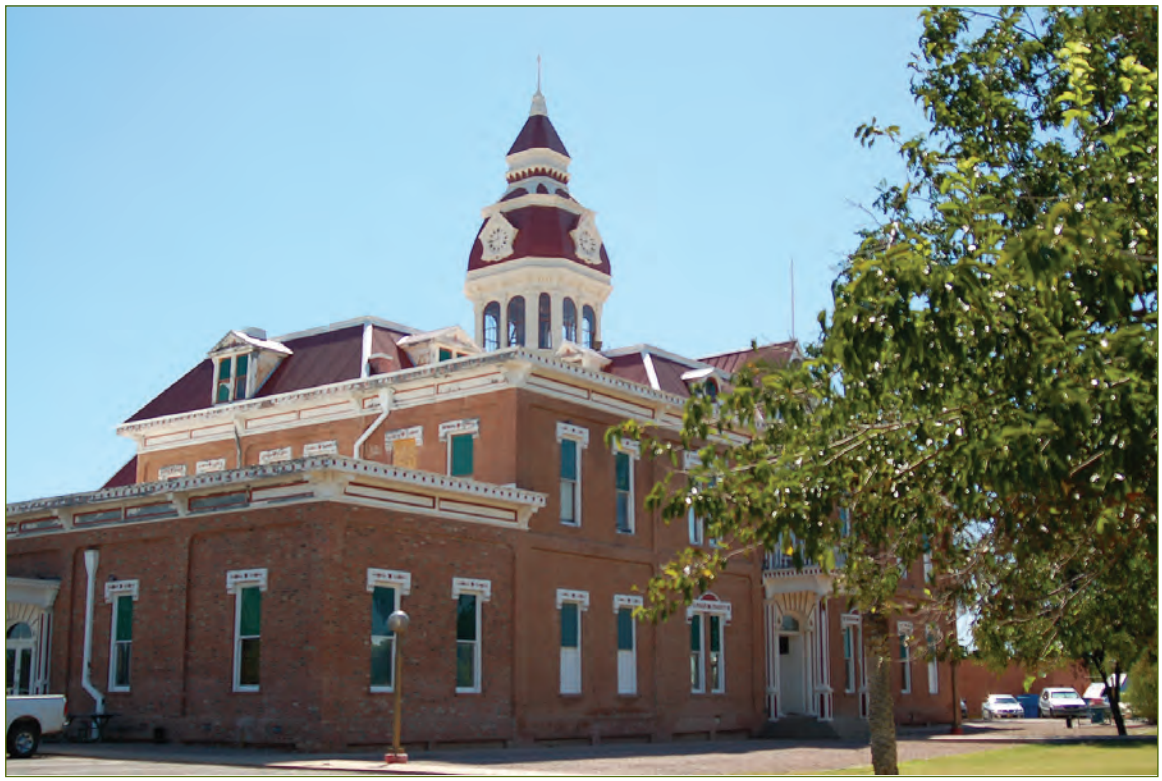
Government Cost Savings

Enhanced Property Value

Study after study has shown that parks, trails, and open space have a positive impact on nearby residential property values. All things being equal, most people are willing to pay more for a home close to a nice park, trail, or protected open space. The property value added by a park, trail, or protected open space, incidentally, is separate from the direct use value gained; property value goes up even if the resident never visits the park, trail, or protected open space.

Property value is affected primarily by two factors: the distance from and the quality of the park, trail, or protected open space. While proximate value ("nearby-ness") can be measured up to 2,000 feet from a large park or protected open space, most of the value—whether such spaces are large or small—is within the first 500 feet. Therefore, we have limited our analysis of enhanced property value to 500 feet. Moreover, people's desire to live near a park, trail, or protected open space also depends on the quality of the park, trail, or protected open space. Beautiful natural resource areas with access, vistas, rivers, and mountains are markedly valuable. Those with excellent recreational facilities are also desirable (although sometimes the greatest property value for a residence comes from its being a block or two away from a park rather than directly adjoining it, depending on issues of noise, lights, and parking). However, less attractive or poorly maintained parks, trails, or protected open spaces can be only marginally valuable, and those with dangerous or frightening aspects can actually reduce nearby property values.

Determining an accurate view of every property next to every park or protected open space is technically possible but prohibitively time-consuming and costly. Therefore, we formulated an extrapolative methodology to arrive at a reasonable estimate. We identified all residential properties



within 500 feet of every significant public-park and recreation area in Pinal County. We did this separately all other protected open spaces, such as those with conservation easements. "Significant" was defined as a space of one acre or more; "park" included every park in the county, whether owned by a municipal, county, state, federal, or other agency; and other open space lands included those nonpublicly owned but legally protected and designated conservation lands.

Based on information collected by Pinal County, TPL was able to identify most public parks and protected open spaces in the area. A residential property consists of a structure that is owned and taxed; thus, a single-family house is one property and a five-unit apartment building is one property. The residential units next to parks and protected lands in Pinal County had a total market value of $190 million in 2009.

Typically, we determine the amount conservation lands add to the value of a property based on the quality of the park or protected open space. That is, high-quality lands add significant value, average-quality lands add slight value, and low-quality lands reduce value to surrounding residences. We have not been able to assess the quality of these spaces. We have chosen to assign the conservative value of 5 percent as the amount that these conserved lands add to the market value of all dwellings within 500 feet of them. A 2009 from the National Association of Realtors found the premium for homes near parks and open space can extend three blocks and start at 20 percent for those homes directly adjacent. We estimate that in 2009 an added $190 million in value exists because of proximity to parks and protected lands (Table 6).

Table 6. Enhanced Residential Property Value due to Proximity to Parks and Protected Open Space in Pinal County

Protected Lands	Total Market Value	Additional Market Value	Additional Property Tax Revenue
Parks	$3,780,000,000	$189,000,000	$2,710,000
Protected open space	$13,900,000	$508,000	$6,900
Total	**$3,800,000,000**	**$190,000,000**	**$2,720,000**

We then used the residential property tax rate to determine how much additional tax revenue was raised by local units of government, from both incorporated and unincorporated areas in the county. While property tax rates differed by district, we found that the total value captured in property tax revenue derived from parks and protected lands within Pinal County is $2.72 million each year.

The robustness of this estimate is grounded in the following. First, it does not include the effects of any spaces under an acre, although it is known that even minor open spaces have a property value effect. Second, the estimate leaves out all the value of dwellings located between 500 feet and 2,000 feet from a park or protected open space, even though evidence exists for marginal property value at such distances. Third, as mentioned, it only measures a 5 percent marginal value, though studies have shown up to a 20 percent premium and marginal values up to distances of 2,000 feet.

Water Supply

Pinal County is the epicenter of growth in Arizona and the Southwest. According to the U.S. Census Bureau, Pinal County was the second fastest-growing U.S. county in the nation from 2000 to 2010—increasing by an astounding 109 percent from 180,000 to 376,000 people. The Arizona Department of Commerce estimates that the county will reach a population of 732,000 by 2025 and 1,300,000 by 2050. Pinal's astounding growth places a significant burden on water supplies. Population booms of the magnitude that Pinal County is experiencing require sufficient residential and commercial development to accommodate newcomers. Roughly 650,000 housing units in Pinal County, mostly single-family homes, have already been entitled on private land.[5] And since over 35 percent of Pinal County is designated land in trust, the sale of such land to developers may augment those development entitlements.[6] For example, in 2007, the Arizona State Land Department sold 1,800 acres of trust land in Apache Junction (Morrison Institute of Public Policy, 2007). In the context of this type of growth and development, the sale of state lands and subsequent conversions from desert shrub and farmland to urban and suburban developments can lead to stresses on water availability.

According to the U.S. Geological Survey, while most of the water resources available to Pinal County are used for irrigation purposes, use for public consumption has more than doubled between 1990 and 2005. Increases in consumption of limited water resources ultimately increase prices for consumers. Groundwater depletion for potable use can increase energy use and costs: increased depth of drilling wells; greater heights at which water is pumped; and increased frequency of treatment for degraded water due to a lower water table (Lamberton et al., 2010). In fact, the extraction of groundwater for potable use consumes 30 percent more electricity than surface water source diversions. Costs of groundwater replenishment are also on the rise—and will continue to do so in the foreseeable future. The rate structure for the Central Arizona Groundwater Replenishment District (CAGRD) indicates increased assessment rates across the board for the Active Management Areas (AMAs) in Pinal. In fact, the assessment rates for the Pinal AMAs are projected to rise 21 percent from the current rate for 2009/2010 to the advisory rate for 2013/2014.

The Urban Heat Island Effect and the Cost of Water: An Illustration

Continued growth and increased temperature projections portend significant consequences for water quantity in Pinal County. The Phoenix metropolitan area is currently enveloped in an urban heat island (UHI), experiencing higher temperatures at night and increased rates of evaporation (Eden and Megdal, 2006). As urban areas develop, infrastructure replaces open land and vegetation. Formerly permeable and moist surfaces become impermeable and dry, causing urban regions to warm relative to their surroundings and forming an "island" of higher temperatures.

A recent regional study tracks the effects of land use changes on temperatures in urbanized areas. Since the early 1970s, the landscape of the Phoenix metropolitan area increasingly has become more urban and suburban at the expense of irrigated agriculture plots and scrubland (Georgescu et al., 2009). As a result, mean temperatures for the regional landscape in 2001 were warmer than they were for the landscape in 1973. Moreover, maximum temperature differences were located over the most urbanized regions. Land use conversions, such as from irrigated agriculture to urban land, affect near-surface temperatures by increasing maximum daily temperatures by 1°C.

[5] The Morrison Institute for Public Policy describes "entitlement" as the process by which the government approves new projects "through municipal or County plans, zoning, and development agreements, the maximum number and density of residential units are fixed, commercial and industrial parcels identified, and general road layouts approved."

[6] State trust lands are not public lands, but lands managed by the Arizona State Land Department for the benefit of 14 trust beneficiaries, including public schools and prisons, pursuant to a statutory mandate to achieve the highest and best use of the land in order to maximize revenues to the beneficiaries.

As Pinal County develops, and agricultural and natural landscapes are converted, the UHI effect will increase and expand across the county. This will increase energy and water demands (Eden and Megdal, 2006). For example, a 2007 study examining the effects of Phoenix's UHI on water use demonstrated that increasing daily low temperatures by 1˚F is associated with an average monthly increase in water use of 290 gallons for a single-family unit (Guhathakurta and Gober, 2007). This process also affects water quality. Pavement and rooftop surface temperatures can heat stormwater runoff, which drains into storm sewers and raises water temperatures as it is released into the watershed. This phenomenon has a negative impact on the overall health of the water system.

UHI Effect # 1

An increase in daily low temperatures increases water use for a single-family unit. For example, a section of residential Apache Junction might experience a change in the daily low temperature from 70˚F to 72˚F.

This change of two degrees would cause a single family in the area, on average, to use over **580 gallons** of additional water per month.

The application of this study to a Pinal municipality provides an excellent illustration of the extent of the impact of urbanization on water supplies. The study examined the effects of Phoenix's UHI on water use and demonstrated that (1) an increase of the daily low temperature by 1˚F is associated with an average monthly increase in water use of 290 gallons for a single-family unit; and (2) a decrease in the difference between the high and low temperatures of 1˚F increases average monthly water use in single family units by 681 gallons. With this model we can illustrate both the additional gallons of water used and the additional cost to the Pinal County taxpayer as a result of both UHI effects. Based on the relationships described above, it is possible to calculate the increase in water use for single-family residential units for an area of Pinal County that is considered to be similar to the Phoenix metropolitan area.

UHI Effect # 2

As a result of warmer nighttime temperatures, there is less difference between the day's high and low temperatures.

For example, a section of residential Apache Junction might experience a change in the difference of the daily high and low temperatures from ten degrees (high, 92˚F; low, 82˚F) to 9 degrees (high, 92˚F; low, 83˚F).

Such a change would cause a single family in the area, on average, to use over **681 gallons** of additional water per month.

Apache Junction has experienced the high rates of growth that have characterized the Phoenix metropolitan area over the past decade. Located just east of Mesa, the town straddles the border between Maricopa and Pinal Counties, and most of its residents live in Pinal. For the sake of this illustration, it is assumed that development patterns of both localities are comparable, whereby new development is constructed at roughly six or seven homes per acre. To illustrate the potential UHI effects in Apache Junction, this analysis makes the following assumptions:

- The difference in population density between Apache Junction and Phoenix will decrease in the future with the increased development of Apache Junction. The population density of Apache Junction is currently about half that of Phoenix.
- The daily low temperature will increase by 1°F due to the UHI effect.
- Based on rates provided by the Arizona Water Company for 2008, the cost of water in Apache Junction is $0.20/100gal for 0 to 10,000 gallons; $0.30/100gal for greater than 25,000 gallons; and $.044/100gal for arsenic surcharge.
- On the low end of the cost estimate all customers pay at the 0 to 10,000 gallon rate, while on the high end of the estimate all customers pay at the greater than 25,000 gallon rate.

Table 7 illustrates the costs associated with the effects of UHI:

Table 7. Costs of the UHI Effect in Apache Junction

	UHI Effect #1	UHI Effect #2
Occupied single-family housing units (2009 estimates)	16,200	
Average consumption per residential service connection (12 months ending May, 2010) (gal/ month)*	8,350	
Increased gallons per month per single-family housing unit	290	681
Cost range for single-family housing units (total amount/month)	$11,300–$15,900	$26,500–$37,300
Cost range Per 1°F increase per household per year	$8.37–$11.80	$19.70–$27.70

*Regina Lynde, environmental compliance supervisor, Arizona Water Company, written communication, June 17, 2010.

Given that there were an estimated 16,200 occupied single-family units in Apache Junction in 2009, each one-degree increase in temperature (induced by the urban heat island effect) increases total water consumption by 290 gallons per month, or about 3.5 percent of the monthly average of residential consumption. In this scenario, a single-family household could pay up to nearly $12 dollars more per year on a water bill. That may not seem like much, but these costs are sensitive to increases in the daily low temperature and increases in the water rate. For example, the Arizona Water Company proposed a 22.5 percent increase in water rates for 2010. If Apache Junction experienced a 2°F increase in the daily low temperature and a 22.5 percent water rate increase, the cost to a single family could more than double to $30 per year. And that is just due to the first UHI effect.

Development will have a significant impact on the cost of additional water use owing to the UHI effect. And in fact it already has—Apache Junction's population increased 17 percent between 2000 and 2009. In a 2007 study of the Phoenix area, buildup around weather-monitoring sites resulted in average increases in the June monthly mean low temperature of 2°F per 1,000 home completions (Brazel et al., 2007). If parts of Apache Junction experienced similar rates of home completions, even without an increase in monthly mean high temperatures, the results would be costly.

At these rates of development in Apache Junction, the impact of the second UHI effect on water costs will be significant. Each one-degree decrease between the high and low temperature difference (induced by the UHI) increases total water consumption by 681 gallons per month, or about 8.9 percent of the monthly average of residential consumption. So a decrease of 2°F between the daily high and low temperatures could cost a family in Apache Junction over $55 per year at current water rates. If we factor in the proposed rate increase, that cost totals over $67 a year.

Conservation and Cooling

- Peak air temperatures in tree groves are 9°F cooler than over open terrain.
- Air temperatures over irrigated agricultural fields are 6°F cooler than air over bare ground.
- Suburban areas with mature trees are 4°F to 6°F cooler than new suburbs without trees.
- Temperatures over grass sports fields are 2°F to 4°F cooler than over bordering areas.

Source: U.S. Environmental Protection Agency, Reducing Urban Heat Islands: Compendium of Strategies: Trees and Vegetation, http://www.epa.gov/heatisland

The urban heat island and its effects are a direct result of the replacement of open space with infrastructure. Conserving open space and parklands will help counteract UHI effects. The conservation of open space and parklands will help to decrease temperatures based on the type of vegetation on the conserved land. In Pinal's desert terrain, shrubs and native plants, while not as effective as tree cover, would help mitigate the UHI effects. Within Apache Junction, conserved parklands and greenways could do the same. The resulting cooling temperatures will reduce water use associated with the UHI effect. In turn, reduced water use would lead to savings for rate payers.

Land Conservation as a Water Supply Strategy

As an alternative to water-intensive urban and developed lands, parks and open space serve to protect source water supplies by allowing for natural recharge and discharge, and not contributing to groundwater withdrawals. Currently, of the total land in Pinal County, 17.8 percent is parkland

(defined as any publicly accessible, federal and nonfederal public lands) and 1.3 percent is protected open space (any nonpublicly accessible, nonfederal protected land). With the high percentage of land in Pinal County designated as state trust land (over 1 million acres)—and over 74 percent of that trust lands covering source waters—there is a unique opportunity to dedicate some of that land for parks and open space in order to protect source waters. The end result would be not only the protection of water supplies, but also potential savings for Pinal residents on utility bills.

Preventing and Fighting Wildfires

Pinal County is growing by leaps and bounds—new residents arrive to enjoy the hot, dry climate and scenic beauty. Often, the most sought-after properties are those located adjacent to or within natural landscapes. However, the development of homes within or near the desert scrublands, shrublands, riparian corridors, semidesert grasslands, and conifer forests of Pinal County exposes residents to the hazards of wildfires (Carter and Culp, 2010). And while population growth has impacted the emergence of the wildland-urban interface (WUI) in the West, housing sprawl, amenity-driven population growth, and an interregional population shift west ensures the continued impact of wildfires on the residents in the WUI (Hammer, Stewart, and Radeloff, 2009).

The Wildland-Urban Interface and At-Risk Communities

In 2009 the Arizona State Forestry Division designated Dudleyville, Kearny, Oracle, and Top of the World as at-risk communities within Pinal County. The Pinal County Community Wildfire Protection Plan (CWPP) goes one step further and identifies the cumulative risk of wildfire in WUI areas based on fuel hazards, wildfire ignition points, wildfire occurrence, and community values. The plan found that nearly a quarter of Pinal County's WUI is at high risk of wildfire. The plan further breaks down Pinal County's WUI in to 21 sub-WUI designations. Table 8 lists the sub-WUIs with the highest percentage of high or moderate risk areas.

The **wildland-urban interface** (WUI) is an area where houses meet or intermingle with undeveloped wildland vegetation. WUI areas must contain at least 6.17 housing units/km2 (or 1 house/40 acres). Intermix WUI consists of areas where houses and wildland vegetation intermingle, while interface WUI comprises areas that abut wildland vegetation.

An **at-risk community** refers to an area consisting of an interface community or group of structures with basic infrastructure and services within or adjacent to federal land. At-risk communities are situated in areas with conditions conducive to a large-scale wildland fire disturbance event with a significant threat to human life or property.

Sources: Federal Register 66, no. 3 (January 4, 2001):
751–777, (U.S. Department of Agriculture);[How does the Dept. of Agriculture relate to the FR?] V. C. Radeloff et al., "The Wildland-Urban Interface in the United States," Ecological Applications 15, no. 3 (2005): 799–805; Health Forest Restoration Act of 2003, § 101.1 (A)-(C).

Table 8. Highest Cumulative Risk Levels by Percentage of the WUI Area in Pinal County

Community Sub-WUI	High Risk (%)	Moderate Risk (%)	Low Risk (%)	Total Acres
Top of the world	97	1	2	14,300
Superior	79	5	16	42,300
Galiuro Mountains	67	2	31	95,200
Kearny	56	<1	44	62,100
Gila River Indian Community	52	12	35	279,000
Oracle	34	4	62	41,400
Apache Juntion	23	29	48	40,700
Pinal County	**23**	**6**	**71**	**1,990,000**

Source: Pinal County, Pinal County Community Wildfire Protection Plan, February 2009.

Pinal's WUI includes over 299,000 residents and 137,000 housing units—a 60 percent increase since 2000. The continued growth of the WUI will challenge at-risk communities and fire departments as they work to provide fire response services to an increasing number of constituents.

Fire Trends

The presence of nonnative grasses has led to the increased frequency of large wildfires in the desert vegetation zones of Pinal County's WUI. Since 1980, over 3,900 wildfire ignitions have been recorded within the WUI. Since 2000, 21 large wildfires, burning over 161,700 acres of wildland, have occurred in or adjacent to the WUI. For example, in 2002 and 2003, three catastrophic wildland fires—burning nearly 140,000 acres—threatened the town of Oracle.

Wildfire may be more volatile in the future. High temperatures, low relative humidity, and high winds—factors that control wildfire behavior during wildfire events—are predicted to change with increasing temperatures and changing global circulation patterns (Arizona Cooperative Extension, 2006). A 2004 study indicated that the number of low relative humidity (< 30 percent) days in the Southwest might increase by up to two weeks with increasing temperatures (Brown, Hall, and Westerling, 2004). The increasing frequency of extreme fire weather conditions and drought-stressed vegetation may contribute to more volatile wildfire activity in light of this changing southwestern climate (Arizona Cooperative Extension, 2006).

Costs of Fire

The costs of fire are shouldered by the taxpayer at the local, state, and federal levels. In Pinal County, local fire departments and districts provide fire response within the WUI (Pinal County, 2009). The Bureau of Land Management (BLM), Tonto National Forest (TNF), Coronado National Forest (CNF), and local fire departments and districts provide support for initial wildland fire attack for areas within and adjacent to the WUI. Initial response from additional local fire departments and districts is available through mutual-aid agreements or under intergovernmental agreements (IGAs) with the Arizona State Forester and adjacent departments and districts. The State Forester has the authority to prevent and suppress any wildfires on state and private lands located outside incorporated municipalities and, if subject to cooperative agreements, on other lands in Pinal County.[7]

[7] Ariz. Rev. Stat. § 37-623 (A).

Costs incurred during or immediately following a fire include suppression costs such as expenditures on aviation, engines, firefighting crews, and agency personnel and other direct costs such as private property losses, damage to public utilities, damage to recreational facilities, loss of timber, and aid to evacuees (Dale, 2010). For the Pinal County WUI, suppression expenditures are made at local, state, and federal levels, while losses are borne by residents and local governments. Land rehabilitation costs, both short and long term, are shouldered by federal, state, and local agencies. Indirect wildfire costs impact state and local governments in the form of lost tax revenues, and private business in the form of revenue and long-term property loss. Finally, loss of life and adverse health effects are rarely quantified but are borne by the families scarred by fire.

Federal efforts to suppress wildfires have dominated agency budgets. Between 2002 and 2006, the federal government spent $6.3 billion fighting wildfires (Land and Water Conservation Fund Coalition, 2010). Firefighting costs accounted for 13 percent of the 1991 Forest Service budget, while today they are roughly half the entire agency budget. The escalating cost of fighting fires is largely due to the efforts of the Forest Service to protect private property in the WUI bordering its lands (Office of Inspector General, 2006). The increase in federal firefighting costs is directly linked to housing development in the WUI. Between 1950 and 2000, houses built within national forests increased threefold from 500,000 to 1.5 million. If homes are built in 50 percent of the private lands bordering our national forests and other public lands, annual firefighting costs could reach as much as $4.3 billion—nearly the entire Forest Service budget (Headwaters Economics, 2009).

In June 2002, the largest wildfire in Arizona history, the Rodeo-Chediski fire, burned 463,000 acres (Dale, 2010). Most of the fire burned on the Fort Apache Indian Reservation, while much of the rest burned on two National Forests. Though private land accounted for only 2 percent of the burn area, over 490 structures were destroyed, and more than 30,000 residents were evacuated. Estimates of all the costs exceeded $308 million.

Suppression costs for the Rodeo-Chediski fire ran between $43 million and $50 million. The Western Forestry Leadership Coalition estimated that other direct costs, such as property loss, amounted to $122.5 million, while rehabilitation costs, generated from immediate postfire expenditures and projected over three years, were $139 million. Job losses followed the fire—two local timber mills were unable to recover to prefire production—and, coupled with the loss of sales tax revenue, resulted in $8.1 million of indirect costs. Additional costs included public health expenditures to deal with air quality and physical and mental needs. From job loss to property damage, wildfires can have prolonged and high costs to residents in the WUI.

Land Conservation as a Fire Management Tool

Although the costs of fire management have skyrocketed, there are solutions to the problem. In addition to more traditional fuel treatment measures, conserving land can serve as a relatively inexpensive and effective method of preventing wildfires and reducing their costs.

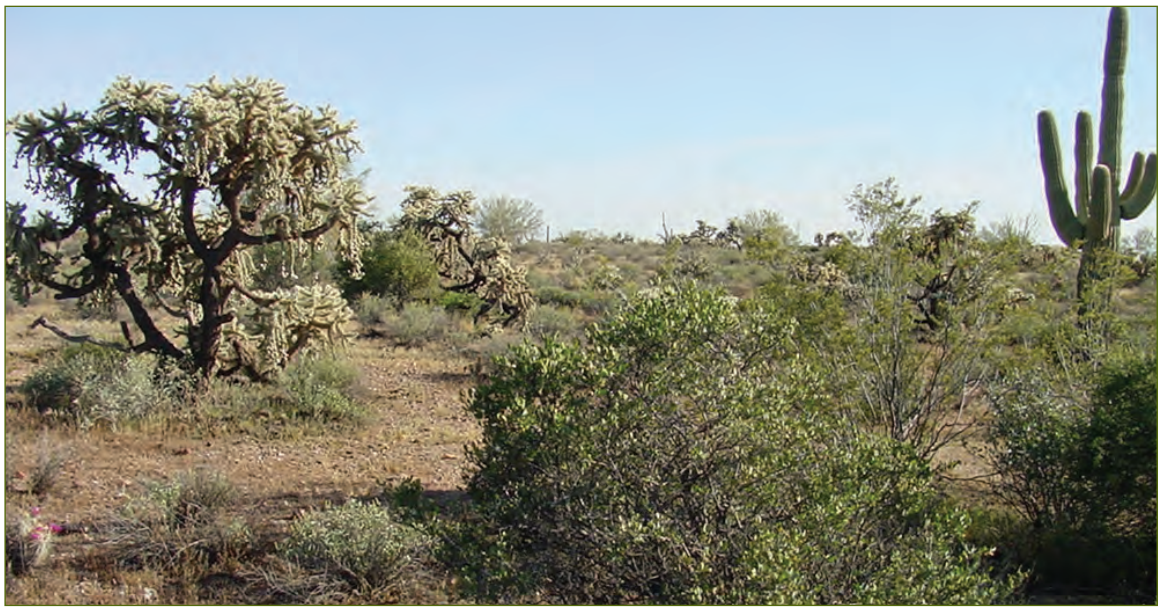
A recent report by Headwaters Economics highlights the cost-effectiveness of land conservation as a fire prevention tool in the WUI. Over the last decade, Plum Creek Timber Company began selling its lands in northwest Montana for residential development, placing those lands at risk of subdivision and fragmentation. In fact, the conversion of traditional timber companies into real estate investment trusts—and the subsequent divestiture of timber for residential and commercial real estate aims—are precipitating large-scale industrial forest conversion. In Montana, recreation properties and second homes began replacing working forests and open space. In response to the loss of working forests and habitats, The Nature Conservancy and The Trust for Public Land

negotiated to acquire 310,000 acres of that forestland. In turn, during the 2009 session, the Montana legislature voted to issue a bond for $21 million to purchase a block of these lands in Missoula County (known as the Montana Working Forest Project).

Assuming that the lands in the Working Forest Project were developed at 1 unit per 160 acres and threatened by wildfire, Headwaters Economics demonstrated that the long-term reduction in firefighting costs outweighed the initial investment in purchasing the land. New residential development on Working Forest Project lands has the potential to increase wildfire suppression costs by up to $73.7 million in the long term. Even if only 25 percent of those lands were developed, costs might still have reached $18.4 million. In light of this analysis, issuing the $21 million bond was far less expensive than paying to fight fires.

In a recent study in the Lassen Foothills, California, where The Nature Conservancy holds thousands of acres of mostly publicly funded conservation easements on ranchland, a land use model demonstrated the impact of conservation easements on fire management (Byrd, Rissman, and Merenlender, 2009). The authors determined that the easement program may increase options for fire management by preserving large landscapes. Easements serve to cluster development and protect large landscapes, selectively allowing for some naturally occurring wild fires to burn, and prescribed burns. Scattered development patterns, where there are no conservation easements, affect more fire management units. This is likely to increase the costs of fire suppression and impede efforts to implement prescribed fires and to control wildfires. Firefighting logistics become more challenging in a region with scattered homes, requiring firefighting forces to disperse, preventing protection resources from organizing, and making rescue and evacuation efforts more difficult.

Hundreds of thousands of acres of WUI lands in Pinal County are designated high risk. State trust lands are situated on the periphery of communities and often surround developed land. Those lands account for 30 percent (597,000 acres) of the WUI, of which 159,000 acres are considered high risk. An additional 292,000 acres of WUI lands are outside parks, open space, and state lands that are designated high risk by the CWPP. Designating strategic high-risk lands as parks or open space so that they could serve as a buffer to communities in and adjacent to existing WUI lands could prove to be a cost-effective method for preventing and fighting wildfires.



Agriculture

Pinal County is characterized in part by its agricultural legacy. Agriculture is and has been a strong component of the region's cultural heritage. The area has a long history of agriculture with the four Native American tribes that have a presence. The San Pedro and Gila River valleys converge in the county and provide miles of land suitable for irrigated crop farming as well as range for livestock. Geographically, the county has been predisposed to a rural lifestyle in part because of the suitability of the land for agricultural purposes and the inevitable utility of those lands. With surrounding mountains affording both scenic views and a rustic skyline from the valleys below, the county's natural landscape complements the rural endeavors of those who work the land.

Agricultural lands are often an important component of open space. Well-managed agricultural land provides important natural goods and services. Farm- and ranchlands provide food and cover for wildlife, help control flooding, protect watersheds by absorbing and filtering wastewater, provide groundwater recharge, and maintain air quality. For these reasons, open space programs across the country incorporate farm- and ranchland conservation, often in the form of conservation easements. Conservation easements allow for the continued production of the farm- and ranchland without further development. Often the revenues generated by the sale of the conservation easements are used by farmers to improve operations, such as financing the purchase of additional farmland, upgrading facilities and equipment, and hiring new staff.

The employment gains from agricultural related work in Pinal County are steady. The 2009 total civilian occupation group for farming, fishing, and forestry positions in Pinal County, that is, age 16 and over, makes up 2.6 percent, or 3,050 employees. This labor force is over 90 percent male and earns roughly $30,608 annually. The principle operators for farms in Pinal are in their mid-50s, are predominantly white, and averaged more than $106,000 in net income in 2007.

Pinal County has a strong agricultural land base. According to the 2007 Agricultural Census, there are more than 780 farms in Pinal County covering more than 1 million acres. Approximately half of all farms in the county are fewer than 50 acres in size and about a quarter of all farms are fewer than 9 acres. Of the total acreage under farms, 71 percent is pastureland and 24 percent is cropland.

From the same census, livestock, poultry, and their products were valued at more than $500 million. Crops, including nursery and greenhouse products, were valued at more than $200 million. Cattle and calves, as well as cotton and forage, are the largest respective livestock and crop categories in the county. The production of cattle and cotton in Pinal County ranks higher than any other county in the state. Cattle production in Pinal County ranks tenth in the country.

The agricultural industry in Pinal County is a major economic contributor in the local economy, providing more than $700 million in market value. However, large land use conversion from agriculture to residential development could threaten the sustainability of the industry. The intact natural landscape that the agricultural industry maintains affords present and future economic opportunity as well as continued preservation of environmental systems. These lands can be protected as working lands with tools such as conservation easements through multiple funding sources from the local level to federal agencies. The open space that agricultural uses provide supports more than cultivated fields or rangeland; it reflects a local history and identity.

Economic Development

Many communities recognize the economic benefits of conservation and have adapted related strategies to use land conservation as an economic development tool. Open space, parks, and trails are strongly linked to residents' quality of life, which has a major impact on a place's ability to attract well-educated and talented workers. These workers look at more than just a paycheck when picking places of employment. One survey of high-tech workers showed that a job's attractiveness increases by 33 percent in a community with a high quality of life.[8]

Businesses also recognize the importance of quality of life. According to CNBC, air and water quality and perceived livability are the second most important consideration for locating a business after cost of doing business. There are many examples of major employers moving to places with a high quality of life because they will have better success in recruiting the best workforce. These include Dell moving to Austin, Boeing going to Chicago, and Volkswagen building in Chattanooga.[9]

Communities can also increase the benefit from their investment in trails and land protection by advertising and promoting through signs, websites, guides, and maps or through special events.[10] These types of activities are usually low-cost ways of attracting larger numbers of visitors who spend money locally. By investing in trails, greenways, parks, and open space and working to promote these amenities, communities can more effectively attract workers and businesses and draw new visitors.

[8] American Planning Association. 2002. How Cities Use Parks for Economic Development. http://www.planning.org/cityparks/briefingpapers/economicdevelopment.htm

[9] Michaels, Dave, "Panel Backs Aid for Downtown, Victory; Task Force Pushes Tax Dollars for Projects, Asks Developers to Cooperate," *Dallas Morning News*, January 24, 2002.John Warner, head of Boeing's site selection committee, cited in Bob Cox et al., "Boeing to Move Headquarters to Chicago", *Fort Worth Star-Telegram*, May 11, 2001.Crompton, John L., *Strategic Options Available to the Trust for Public Land in Texas 2000-2004* (Austin, Texas: The Trust for Public Land, 1999), p. 8, cited in John L. Crompton, Parks and Economic Development (Chicago: American Planning Association, 2001), p. 52. Volkswagen Group of America Announces It Will Produce Cars in Chattanooga; Decision Marks Company's Ongoing Commitment to North American Market. July 15, 2008. www.news.tn.gov

[10] Green Infrastructure Center, *Conservation-Based Economic Development*, http://www.gicinc.org.

Conclusion

Pinal County residents have long valued their parks, open space, and trails but may have wondered just how much they are worth. This study shows that Pinal County's parks, open space, and trails are major economic drivers that contribute to the local economy.

This report found that parks, protected open space, and trails provide recreation opportunities and attract tourism to Pinal County. In 2010, residents gained $100 million in direct use value and medical cost savings of $12.1 million, because of recreational use of parks and trails. In addition, outdoor tourists spent $36.5 million in the local economy and generated $672,000 in Pinal County sales taxes.

Parks and protected open space provide government cost savings. Parks and protected open space raised the value of nearby residential properties by $190 million and increased property tax revenues by $2.7 million a year. Land conservation helps protect the water supply by allowing for natural recharge and discharge, and not contributing to groundwater withdrawals. Parks and open space provide fire protection. Currently, 147,000 acres of parks and protected open space are at high risk of wildfire, and an additional 159,000 acres of state trust land are at high risk.

Open space helps support Pinal County's important agriculture industry. Agriculture is and has been a strong component of the cultural heritage in Pinal County. In 2007, Pinal's livestock and poultry products were valued at more than $500 million, and crops were valued at more than $200 million.

The conservation of lands in Pinal County will become more difficult as pressures from residential development increase. While the development pressures persist, the importance of conservation increases. Some maintain that the best way out of the housing crisis in Pinal County is to push for further economic development. Whether or not this is the case, the need to conserve land while the opportunities exist becomes more urgent. Pinal's scenic open spaces continue to attract and sustain the residents and business opportunities that are the future of Pinal County.

As the county continues its investment in transportation and utility infrastructure to accommodate this growth, it may be appropriate to consider a companion investment in its natural resource infrastructure. Rapid development will continue to alter wildlife habitat, watersheds and groundwater systems, outdoor recreation, and traditional livelihoods. The county may wish to take steps to seize opportunities to protect key lands.

Over the years, Arizona has been the beneficiary of an array of federal funding programs that have been used to address development pressures and provide important monies to secure key lands at crucial times. To complement federal funding, 14 local jurisdictions in Arizona have also asked their voters to support dedicated funding for conservation. Since 1988, 28 measures have gone to the ballot; only one has failed. These 27 successful state and local measures have created $2.7 billion to be able to protect the landscapes that are important to its residents and that define their communities.

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