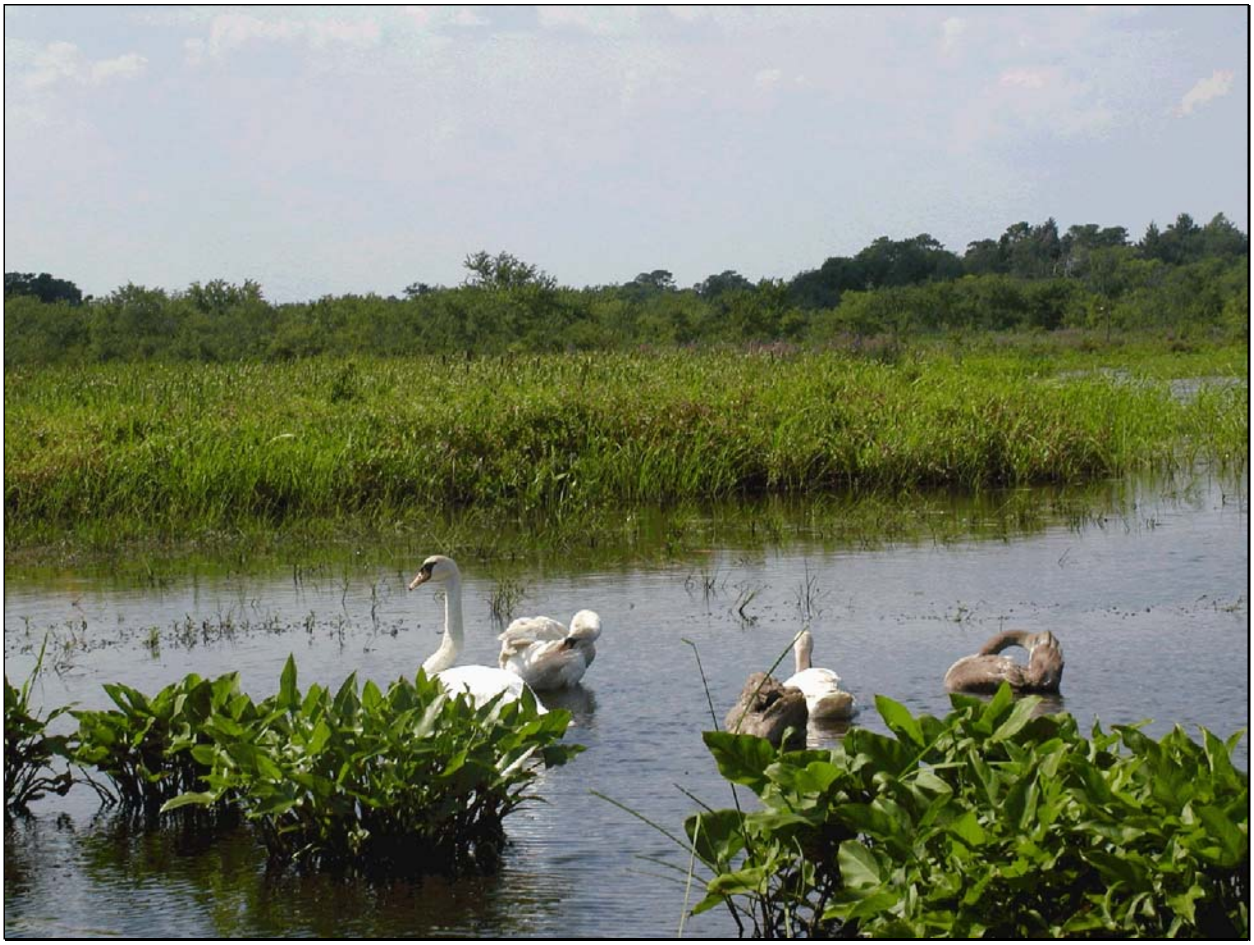

METEDECONK WATERSHED

SOURCE WATER STEWARDSHIP EXCHANGE TEAM REPORT

DECEMBER 2003

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INTRODUCTION

THE STEWARDSHIP EXCHANGE WEEK AND TEAM MEMBERS

The Trust for Public Land (TPL), in partnership with the University of Massachusetts and the USDA Forest Service, is conducting Source Water Stewardship Projects in four pilot watersheds throughout the Eastern United States to demonstrate land conservation and forest management practices for source water protection. This project is designed to integrate and build-upon work already underway in each of the four watersheds, such as state source water assessments and other local planning efforts. Although the partners have been funded to provide technical project support, the Source Water Stewardship Project in each watershed is locally led and driven by a committee representing a broad range of watershed interests.

Each Source Water Stewardship Project consists of three phases:

- Phase I: Analysis and Assessment
- Phase II: Stewardship Exchange
- Phase III: Implementation

During Phase II of this Source Water Stewardship Project, a team of five experts (the "Exchange Team"), with the backgrounds requested by the local committee, volunteered to participate in a one-week Stewardship Exchange in the Metedeconk River Watershed. (Biographies for each of the Exchange Team Members can be found in Appendix A.) The purpose of the exchange, which was held the week of June 8th, 2003 was to:

- Conduct a broad-based assessment of the watershed,
- Identify actual and potential impacts to water quality and quantity, and
- Develop suggested strategies and actions to address existing and possible future impacts.

Exchange Team Members included:

Josh Briggs – a Civil/Environmental Engineer with a professional background in low-impact design.
Ted Harrison – Senior Vice President for the Trust for Public Land and Director of TPL's Greenprinting GIS program with 17 years experience in land conservation.
Joe Pantalion - Assistant Director, Watershed Protection and Development Review Department for the City of Austin, with 15 years experience in stormwater management planning and finance.
Robert Perani – Director of Environmental Programs for the Regional Plan Association, with expertise in developing and directing projects in parks, land use management and water quality protection.
Phillip Rodbell – Program Manager for the U.S. forest Service Northeastern Area Urban and Community Forestry Program.

The local committee coordinated roundtables and meetings during the week that exposed the team members to extensive information on source water issues affecting the watershed. Throughout the week, local committee members worked closely with the Exchange Team to inform them on source water and watershed challenges. Based on the information gathered from the roundtables, the local steering committee and the resources provided, the team developed a set of recommended strategies to protect drinking water in the Metedeconk River Watershed. The Exchange Team's recommendations will be the basis for Phase III, the implementation of recommended strategies.

BACKGROUND

The team reviewed a number of studies, reports, and other documents and was briefed by a wide range of local officials and other stakeholders in developing its assessment. It should be noted that the team was impressed with the level of cooperation, support, openness, and leadership from local organizations and individuals associated with the Stewardship Exchange Week, and appreciated the level of preparedness and involvement demonstrated prior to and during the week of study. A summary list of information provided to the team included:

- Brick Township Municipal Utility Authority Monitoring Program
- The Century Plan, a study conducted by the Trust for Public Land of 100 conservation sites in the Barnegat Bay Watershed, 1995.
- Economic Profiles for EPA's National Estuary Program
- Barnegat Bay Estuary Program Characterization Report, Barnegat Bay-Little Egg Harbor Estuary and Watershed, www.bbep.org/char_rep.html
- Camp Dresser & McKee, Metedeconk River Watershed Management Plan, BTMUA, Phase I: Watershed Characterization and Preliminary Analysis, December 2000.
- Preliminary Metedeconk River Watershed Study, by Owen, Little & Associates, October, 1989.
- Watershed Management Plan for Barnegat Bay, Volume 1: Action Plan.
- Watershed Presentation to Monmouth County by Brick Township MUA and Camp, Dresser and McKee.
- New Jersey 2002 Integrated Water Quality Monitoring and Assessment Report 305(B) and 303(D).
- Ocean County Data Book, 10th Edition.
- Watershed Management Plan, parcel mapping – Metedeconk River North Branch, Freehold, Lakewood, Howell and Jackson.
- Revised Manual for New Jersey – Best Management Practices for Control of Nonpoint Source Pollution from Stormwater, Fifth Draft, May 3, 2000.
- Township of Howell – official documents supporting preservation.
- Revised Ordinances of Freehold, Howell, Jackson, Lakewood.
- Stafford Township Ordinances, 2002.
- New Jersey Forestry Program Materials.
- Monmouth County Build-out Analysis, Metedeconk Watershed Municipalities, June 2003.
- Funding analysis, conducted by TPL's Conservation Finance Department.
- Watershed modeling conducted by the University of Massachusetts.

THE WATERSHED

The Metedeconk River Watershed is located in east central New Jersey, covering 70 square miles and flowing through seven towns and two counties. The Metedeconk River forms a portion of the boundary between Ocean and Monmouth County and flows into Barnegat Bay. The Metedeconk watershed is a sub-watershed of the Barnegat Bay Watershed which covers most of Ocean County and has been widely studied in the last ten years for its recreational and ecological value. The Barnegat Bay Watershed was designated by the U.S. Environmental Protection Agency (EPA) in 1995 as a National Estuary Program (NEP) site.

The topography of the Metedeconk Watershed is characterized by low relief (sea level to 320 ft.) and the river receives most of its baseflow (60% – 80%)from the shallow, unconfined Kirkwood-Cohansey aquifer system. During periods of low precipitation, baseflow makes up 100 percent of the flow. The fine sands of the aquifer system make for high conductivity and high potential yields of water.

According to 1995 NJ DEP land cover estimates, the watershed is about 60% forest and wetland (30% each), 40% urban, with total impervious cover at 17%. The percent of developed land has likely increased since 1995, with a resulting loss of forests and wetlands.

According to the New Jersey Department of Labor, between 1998 and 2008, the coastal region of the state, which includes Ocean and Monmouth Counties, has a projected employment growth of 14 percent, making it the fastest growing region in New Jersey. Between 1990 and 2000, population in Monmouth County increased 11 percent, with a number of townships in the County growing significantly faster: Howell and Freehold Townships populations increased over 25 percent, while Millstone Township increased 77 percent. Both Ocean and Monmouth counties are experiencing regular growth in subdivision and site plan approvals, with over 5000 new housing units planned or permitted in Howell and Freehold townships in Monmouth County between 2000 and 2020.[1]

Urbanization has led to the loss of forests and small isolated wetlands across the watershed. Most of the new development in the central and eastern portion of the watershed (relative to Route 9) has occurred on relatively small patches of forest, barren lands, or wetlands that were already surrounded by residential, commercial, and industrial land. By contrast, new residential subdivisions in the western portion of the watershed have converted larger areas of forest and farm land into low and medium density house lots.

Several attributes of the Metedeconk River watershed offset or counterbalance what otherwise would be a challenging situation: (1) a large portion of the watershed is wetland, (2) riparian forests are relatively intact, (3) the topography is gentle with few slopes exceeding 5%, and (4) soils are sandy, deep, and well-drained. As a result, stormwater runoff is slower and infiltrates more easily, and the large wetland forests in the headwaters contribute significantly to water quality and quantity.

[1] Ibid., Ocean County Department of Planning; Monmouth County Development Board.

TEAM RECOMMENDATIONS

The team organized their recommendations into seven sections:

- Act now to manage water resources: use current opportunities to shape and protect watershed;
- Establish coordinated leadership: manage watershed as a shared resource;
- Understand your watershed: create a shared understanding of watershed functioning and threats in order to inform and support sound land protection and management strategies;
- Educate watershed community: create an informed, involved and influential public;
- Protect and restore critical natural land: protect land with high resource value and low acquisition costs;
- Manage growth: absorb and direct growth so that there is minimal impact on the environment;
- Fund conservation and restoration strategies: create and sustain dedicated funding.

Throughout the recommendations, the team refers to a series of maps produced by the University of Massachusetts as part of the Source Water Stewardship Project. These maps, included in Appendix B, highlight high priority areas in the Metedeconk Watershed for conservation, restoration and stormwater management. They were created using models that score each parcel for its importance based on a set of characteristics, including soil, slope and land use, among others. As with all mapping and modeling tools, these maps are intended as a guide to assist local watershed managers in targeting areas for on-the-ground assessment and potential action. They do not replace the need for physical inspection of potential high priority parcels. Large printouts of these maps will be available at the Brick Municipal Utility Authority, and electronic versions can be downloaded at www.tpl.org/landandwater/.

The following recommendations provide a guide to local communities for prioritizing actions that will protect water resources into the future. Where possible, we have offered links to websites and other resources to assist you in planning the specific actions that will help you achieve your goals.

ACT NOW TO MANAGE WATER RESOURCES

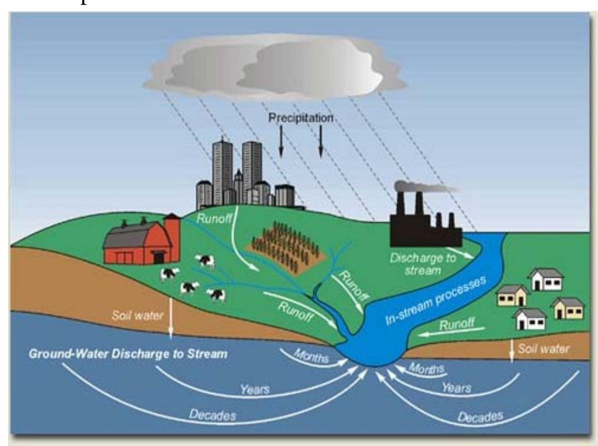
The consulting team's most important message for the Metedeconk Watershed community is that elected officials, public agency staff, water resource professionals, landowners and other stakeholders must act now to ensure the long-term health and vitality of the basin's water resources. The decisions that you make today will shape your watershed forever. There are critical time and place-based opportunities that will be lost if you do not act now.

Shared water resource – The high quality water that residents currently enjoy is threatened and will degrade if not protected.
Accelerating development pressure – Lands critical to high water quality are being developed and land prices are on the rise. New development presents opportunities to grow in a sustainable way, if implemented strategically and combined with conservation.
Changing regulatory environment - Changing state stormwater regulations will require action and investment by local governments in the near future. Inter-jurisdictional coordination upfront will save money and maximize investments over time.
Funding opportunities - Support for land protection and funding programs has never been stronger in New Jersey. These opportunities may not last and should be taken advantage of now.

SHARED WATER RESOURCE

The Metedeconk Watershed is a shared resource that currently provides safe, reliable water supply to residents in Brick Township, Point Pleasant Borough, Point Pleasant Beach Borough, Howell Township, Lakewood Township, Jackson Township, Millstone Township and Wall Township, serving over 200,000 residents with groundwater and surface water. The watershed supports growth by supplying sufficient water to meet growing demands, attracts tourists and businesses by providing regional recreational amenities and adding to the natural and traditional character of the watershed communities, and provides wildlife and aquatic habitat.

Whether drawing water from public or private wells, or from rivers or other surface water sources, residents in the Metedeconk Watershed are drinking the same water. The terms surface water and groundwater refer to the same resource, they just clarify where the water is at a particular time. Because the soil in the Metedeconk Watershed is sandy, porous and highly permeable, water and pollutants flow easily between the surface and groundwater. The vast majority (60 to 80 percent) of the water found in streams comes from groundwater, not overland flow. When precipitation is low, 100 percent comes from groundwater.



Because ground and surface water supplies are so closely related in the Metedeconk, drinking water supplies must be managed as one interconnected resource. As groundwater supplies decrease, so do surface water supplies. As groundwater supplies become contaminated, so do surface water supplies. Therefore, threats to groundwater supplies in Howell or Jackson are similar to the threats to surface water supplies in Brick.[2]

ACCELERATING DEVELOPMENT PRESSURE

The watershed is rapidly approaching a threshold after which development impacts on water quality and quantity could increase significantly. Research in watersheds around the country has shown that if impervious cover exceeds 10 percent,[3] or if forest cover declines much below 75 percent, there can be a measurable decline in water quality.[4]

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[2] Kennish, M.J., 2001. Characterization of the Barnegat Bay-Little Egg Harbor Estuary and Watershed. Journal of Coastal Research, SI(32), 3-12.

[3] Booth, D.B. an dC.R. Jackson, 1997. Urbanization of aquatic systems: Degradation thresholds, stormwater detection, and the limits of mitigation. *Journal of the American Water Resources Association* 33(5):1077-1090. and Schueler, T., and R. Claytor. 1997. Impervious cover as an urban stream indicator and watershed management tool. In: Effects of Watershed Management and Development on Aquatic Ecosystems. Proceedings of an Engineering Foundation Converence. L.A. Roesner (Editor), Snowbird, Utah, 4-9 August 1996, pp: 513-531.

[4] Hornbeck, J.W., C.W. Martin, and C. Eagar, 1997. Summary of water yield experiments at Hubbard Brook Experimental Forest, New Hampshire. *Canadian Journal of Forest Research*27:2043-2052. (also presented first year water yield increase data for the Fernow, Leading Ridge, Marcell, Nashwaak, and Quabbin Forests)

In 1995, estimated impervious cover in the Metedeconk Watershed was about 17 percent and forests, wetlands and water covered about 60 percent of the watershed, with only 25 percent of that land forested. Factors such as the sandy soils, flat terrain and the large percent of wetlands in the headwaters have contributed to continued high water quality, but it is unclear how long these natural assets can continue to mitigate the impacts of development and increased urban stormwater runoff. According to Dr. Paul Barten, with the University of Massachusetts, who studied the watershed for this project, "it appears the Metedeconk watershed is precariously balanced at a threshold after which development impacts on water quality, biological diversity, and public health could increase exponentially."

Ocean and Monmouth Counties are located in the fastest growing region in New Jersey, with an annual growth rate twice the national average. Further compounding the impact of development is the fact that, nation-wide, land is being consumed at three or four times the rate of population growth. This means that urbanized land, which covered about 40 percent of the Metedeconk in the 1990s, now could overlay as much as 52-55 percent of the watershed.

A build-out analysis for the watershed anticipates that two-thirds of the existing open space lands will be converted into urban and suburban uses at full build-out. Primarily intact riparian buffers throughout the watershed currently help to mitigate impacts from urban runoff; however, 86 percent of the riparian corridor is zoned for residential development and 13 percent for commercial or industrial development. At full build-out, present zoning would allow most of the open space in the watershed to be developed.[5]

Only 7 percent of the Metedeconk Watershed is permanently protected from development, making it one of the most vulnerable sub-basins in the Barnegat Bay.[6] Inconsistent stormwater ordinances throughout the watershed and no coordinated approach to water resource management make the lack of protection an even greater threat. Unmanaged growth threatens both water quality and quantity.

According to Governor McGreevey in a call-to-action made in January, 2003, "The drought emergency taught us a lesson about the vulnerability of our precious water resources. The short-term crisis is over, but the long-term threat remains. I call upon all citizens to join with me in this battle to stop the over-development that threatens our water resources and the quality of our lives."[7]

Threats to Water Quantity

The two primary threats to water quantity in the Metedeconk are (1) excessive withdrawal from the shallow aquifer (Kirkwood-Cohansey), and (2) decreasing quantities of stormwater infiltrating to recharge groundwater. The construction of Brick MUA's reservoir creates the perception of adequate supply for the towns served by Brick, but reservoir capacity will only supply additional water during critical drought periods for projected population increases until 2020.

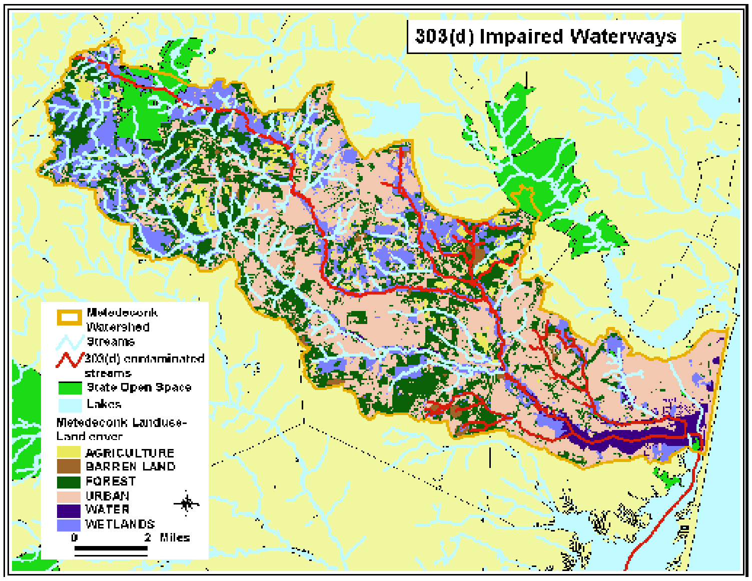
Threats to Water Quality

Current water quality is generally good throughout the watershed, primarily because the groundwater that provides baseflow to streams is of generally high quality; however, short flow paths in the Metedeconk

[5] Camp, Dresser & McKee, Metedeconk River Watershed Management Plan, Phase I Watershed Characterization and Preliminary Analysis, December 2000.
[6] Kennish, M.J., 2001. Characterization of the Barnegat Bay-Little Egg Harbor Estuary and Watershed. Journal of Coastal Research, SI(32), 3-12.
[7] "Drought crisis over, but threat persists," *Asbury Park Press,* Thursday, January 9, 2003, A-1.

(groundwater can flow up to 150' per day) can carry pollutants quickly from septic systems, parking lots, underground storage tanks and urban runoff, making streams vulnerable to local pollution sources. Also, due to rapid groundwater flow, water resources throughout the watershed are very vulnerable to contamination from spills, which can reach intakes quickly and with very little warning.

Over 11 stream reaches in the watershed are included on EPA's list of 303(d) impaired waterways. Most of these waterways are impaired with fecal coliform and pathogens, which increase significantly after rainfall and are likely from urban runoff. Other pollutants of concern include lead and cadmium, likely from roads and parking lots, and phosphorous, likely from residential development. The following image highlights waterways on EPA's 303(d) list for impairment. Although the entire stream reach is highlighted, only segments of it may be impaired, such as the North Branch of the Metedeconk.



CHANGING REGULATORY ENVIRONMENT

Changing state stormwater regulations will require action and investment by local governments in the near future to manage the impacts of stormwater. Inter-jurisdictional coordination upfront can save local governments' money and maximize their investments over time.

The National Pollutant Discharge Elimination System (NPDES) permit program, which was authorized by the Clean Water Act in 1987, controls water pollution by regulating point sources that discharge pollutants into waters of the United States. In 1999, the USEPA's Phase II stormwater rules were published to address pollutants entering waters from storm drainage systems owned or operated by local, state, interstate or federal government agencies and large public institutions.

As a result of the Phase II stormwater rules, NJ is developing the Municipal Stormwater Regulation Program and new rules to facilitate the implementation of the program. These regulations, enforced via NJPDES permits, are expected to go into effect in the Fall of 2003. The new stormwater regulations will affect towns and counties, and to a lesser degree Water and Sewer Authorities, by requiring them to perform certain activities.

To manage stormwater from new development or redevelopment, municipalities will be required to adopt and enforce a Stormwater Management Plan (SMP) and ordinance in accordance with N.J.A.C. 7:8. The municipality's SMP and ordinance must incorporate the new State Stormwater Management design and performance standards, including:

- How to develop a master plan,
- Proper site design
- Protecting groundwater recharge
- Improving water quality by reducing suspended solids by 80%, and
- Revised standards for flood control.

To address stormwater from existing development, they will be required to implement programs, such as:

- Public education,
- Improper disposal of waste and illicit connections,
- Solids and floatable controls,
- Maintenance yard operation, and
- Employee training.

Municipalities may already be implementing strategies that meet these requirements; however, it is likely that many municipalities will need to make some changes to their design and performance standards for new development, or will need to expand or initiate new programs to address stormwater from existing development. By sharing best practices, coordinating implementation strategies, and where it makes sense, implementing joint programs and subcontracts, municipalities can realize significant cost savings. Coordinated efforts in the initial phases of compliance can reduce long-term investments.

The other regulatory change that may affect townships and counties in the Metedeconk Watershed is the potential classification of the Metedeconk as a Category I Stream. If a waterway is designated by the state as Category One, all streams that drain to the Category One waterway must meet special water resource protection criteria. In general, designation as a Category One stream will mean that all new development will have to meet anti-degradation standards, and townships and counties will be responsible for working with developers to meet the standards.

Category One designation for the Metedeconk will greatly benefit water quality throughout the watershed. This special conservation designation will not only protect drinking water resources, but also recreational amenities (such as fishing, swimming and hiking), wildlife habitat and the natural beauty of the watershed. By coordinating efforts, municipalities can streamline processes for establishing, implementing and enforcing anti-degradation standards and minimize potential costs.

FUNDING OPPORTUNITIES

Support for land protection and funding programs has never been stronger in New Jersey. Currently, there is broad political support for conservation at all levels of government. Excellent county and municipal acquisition programs are in place in many Metedeconk communities, and unlike many other states, New Jersey's grant and loan programs are still available and are well-financed. New Jersey has created innovative funding strategies, specifically for land conservation that protects drinking water, by linking its Clean Water State Revolving Fund with its Green Acres Program, and by making land critical for drinking water protection its highest protection priority.

These funding opportunities may not last and should be taken advantage of now. At present, the state of New Jersey is facing a significant fiscal crisis that has led to sizable budget cuts to the state land conservation program. In the fiscal 2002 budget approved earlier last year, $35 million was cut from Green Acres and the Farmland Preservation Program. Although these were presented as one-time cuts, local supporters of land conservation in the Metedeconk need to work diligently to preserve the state funds that are critical to leveraging local (and private) land conservation dollars.

ESTABLISH COORDINATED LEADERSHIP

CHALLENGE: MANAGE WATERSHED AS A SHARED RESOURCE

There is insufficient coordination among jurisdictions and suppliers to manage the water supply as a single shared resource affected by land use and management throughout the watershed. Everyone benefits from clean water, and everyone is negatively impacted by degraded water. Each jurisdiction brings capability to the table and all the jurisdictions can benefit in-terms of cost-savings and cleaner water through cooperation and shared services.

Interjurisdictional coordination is not easy, but there are a number of models from New Jersey and around the country that can offer best practices and strategies for success, such as the Spruce Run Initiative – www.raritanbasin.org, the Great Swamp Watershed Management Committee - http://www.tentowns.org/10t/, and the Rockaway River Cabinet – www.morris2000.org/programs.html. The Baltimore Reservoir Agreement is another example of multiple counties and towns working together to protect shared drinking water resources -- http://www.epa.gov/owow/watershed/Proceed/andrsonj.html

The Brick Municipal Utility Authority (MUA)is in an excellent position to take a lead role in inter-jurisdictional coordination. The MUA has the technical and staffing capability and the initiative and commitment to provide leadership, facilitation and coordination within the watershed. The townships should take advantage of having this excellent resource.

RECOMMENDED STRATEGIES:

Establish Metedeconk Watershed Forum

A forum needs to be created for coordinating watershed management activities and implementing watershed-wide strategies that require pooled resources. This entity would likely have a different title (i.e. Executive Watershed Committee, or Initiative) but we will refer to it throughout this document as the Forum. Forum members should primarily be elected officials from all seven towns, two counties and municipal utility authorities. An Environmental Commission member sub-committee could be established to work on the water quality and land protection strategies.

The existing steering committee should convene the forum and should conduct outreach to elected officials to secure their involvement, with Brick MUA taking the lead in coordinating this outreach. The steering committee should be expanded to include staff from additional jurisdictions and representatives from nonprofits that have a stake in improved watershed management. Involving citizen-based nonprofit groups adds political weight to the request for elected official participation. As the forum becomes established, steering committee members can provide staff support, propose agendas and work products.

Develop a Regional Stormwater Management Plan for the Metedeconk

The development of a Regional Stormwater Management Plan for the Metedeconk would be an excellent way for municipalities to create a set of shared objectives for watershed management. The state's new stormwater management rules recommend (but do not require) the development of Regional Stormwater Management plans and provide guidelines on how to implement such plans, including coordination of stakeholder involvement and the designation of a committee and "lead agency." The committee must be recognized by the NJDEP and should manage the plan's development, make sure all stakeholders have been represented, and provide technical assistance where appropriate. The Metedeconk Watershed Forum could serve as the committee, with BTMUA as the lead agency.

Develop a Shared Agenda

Securing elected official commitment to such a forum over the long term requires developing an agenda that reflects the interests of residents in all local jurisdictions. The process of creating a Regional Stormwater Management Plan could be an excellent tool for developing a shared agenda. Whether or not a regional plan is created, it may be necessary to outreach to elected officials, town boards and commissions, business leaders, conservationists, and other stakeholders in each town to identify needs and opportunities from a local perspective. An initial meeting of forum members can also be used to identify common concerns and opportunities. Although the issues that are critical to residents in each jurisdiction may differ, they will likely overlap in some areas. It's the overlapping interests and needs that are critical to identify up front.

Draft Memorandum of Agreement (MOA)Among Forum Participants

An MOA creates a commitment to work together on shared issues. An MOA can be used to identify and define specific and manageable actions and to secure funding and other commitments from participants and other public and private partners. Shared resources will provide glue to the agreement and make action strategies implementable. All participants should have some stake (preferably financial) in the success of the forum.

Pursue Stormwater Utility

In New Jersey, state enabling legislation is required to establish stormwater utilities. With the new NJPDES rules, local jurisdictions should be making the case to the state legislature that they need the ability to establish stormwater utilities in order to fund compliance activities to meet the new regulations.

A stormwater (or drainage) utility is a "user fee" funding mechanism that provides a stable, dedicated revenue source for stormwater management activities to protect water quality and manage flooding. (For more information on what a stormwater utility is and how it is funded see "Establish a new watershed protection fee on water utility rate payers," under the section on Funding.)

Passing state enabling legislation should be a key agenda item for forum participants. Strategies for moving forward on such an effort could include:

- Getting state enabling legislation from other states to use as examples,
- Creating and distributing a white paper characterizing the need for (NJPDES compliance, etc) and the contents of enabling legislation,
- Having local elected officials contact State elected officials and agencies.
- Garnering support letters and phone calls from the NJ League of Municipalities, the Association of NJ Environmental Commissions, and Congressional representatives.

UNDERSTAND YOUR WATERSHED

CHALLENGE: UNDERSTANDING WATERSHED FUNCTIONING AND THREATS IN ORDER TO INFORM AND SUPPORT SOUND LAND PROTECTION AND MANAGEMENT STRATEGIES.

Scientific data is essential to inform and justify voluntary and regulatory protection strategies and to raise awareness among the public as to the need for implementing those strategies. Conservation strategies, although voluntary, usually require public funding and public funding requires public support. Zoning and other public policy changes need to be both technically and legally justifiable and require political support from elected officials and their constituencies. Best management practices require individual landowners to be aware of the impact of their actions on water resources and what actions they can take to protect those resources.

For all of these reasons, it is critical that the past and current watershed conditions be clearly understood and that the public is made aware of those conditions and the need for action.

RECOMMENDED STRATEGIES

Consolidate existing watershed data and fill data gaps

Currently multiple organizations are collecting data, often for multiple purposes, and much of that data has not been consolidated into a holistic picture of water resources and watershed functioning: Brick MUA has an extensive database of surface water samples from multiple locations upstream of their intake, in Forge Pond, and from groundwater in the shallow Kirkwood-Cohansey aquifer; water suppliers drawing from groundwater should have monitoring data of their raw water supplies; and the USGS maintains a gauge on the North Branch, from which flow measurements are recorded.

There needs to be an analysis of all existing data that can serve as a single resource describing the health of the watershed. And with that analysis, there should be an assessment of critical data gaps. This analysis should guide protection and restoration actions to specific locations, tributaries or sub-basins of the watershed and should be the basis for a comprehensive monitoring plan

Make data and analysis accessible to local officials and the public

In order to create a shared understanding of threats to water resources and to increase public awareness, monitoring data and analyses need to be made easily accessible to the public and important local stakeholders. Perhaps the most versatile and powerful research and analytic tool available to the Metedeconk community is the Internet. There are multiple examples of communities, watershed associations and others who have developed informative websites for public education and information exchange. Brick MUA should look to these examples as ways to expand their website as more of a public education tool. One example is the Mill River Watershed initiative in Connecticut – http://www.millriverwatershed.org/project_overview/assessments.html,

Add additional parcel data to UMass maps

The University of Massachusetts produced a set of maps that identify high priority areas for protection, restoration and stormwater management, based on characteristics, such as soil, slope and land cover. In order to target place-based strategies, the maps need to have parcel data for all jurisdictions in the watershed. At the time the analysis was completed, UMass was only able to get digitized data for Jackson Township. Since that time, digitized parcel data has been made available for Brick, Freehold and Millstone, and Howell data should be completed by the end of 2003. Because of the importance of parcel data, it should be a high priority to digitize parcel data in Lakewood and Wall Townships and to add all parcel data to the maps.

Make GIS data and maps available to all municipalities and the public

It is important that mapping and Geographic Information System data be made available to key stakeholders in the watershed. The University of Massachusetts has completed a first round of maps that will be useful in targeting on-the-ground actions, but those maps will need to be updated and new data sources will need to be added as they become available, such as parcel maps.

As a long-term strategy, Brick MUA or one of the local jurisdictions with advanced technical capabilities should consider creating an internet-based GIS application. Such an application would allow users to select the data layers that are most important for their analysis and create maps based on those layers. This would allow local jurisdictions to create a shared tool for mapping data critical to watershed protection planning. The Trust for Public Land's GIS staff is working on developing an internet-based GIS technology and service for TPL, which is still in a beta phase, but would be happy to talk with local participants about what this entails and what assistance TPL may be able to provide.

EDUCATE THE WATERSHED COMMUNITY

CHALLENGE: CREATE AN INFORMED, INVOLVED AND INFLUENCIAL PUBLIC

In order for watershed protection efforts to be sustained long-term, the public needs to be informed about watershed issues, involved in protection projects, and influential in the community's investment decisions around watershed management.

There is a critical and immediate need to sensitize residents, policy makers and commercial interests to the threats and opportunities in the Metedeconk Watershed. The focus should be to build knowledge and support for activities over time that are necessary to protect water quality and enhance stormwater retention and infiltration.

There are many excellent model activities across the country, and in neighboring communities, that have proven successful in 1) informing residents and other stakeholders about watershed issues, 2) involving residents in projects that support watershed goals and objectives, and 3) influencing short and long-term behavior of individuals as well as new and innovative directions for watershed protection.

RECOMMENDED STRATEGIES

Join with Manasquan River Watershed Association, or other successful nonprofit, to implement education and watershed protection activities in Metedeconk Watershed.

A citizen-based, nonprofit organization is needed to implement public education and volunteer restoration activities. Such an organization could coordinate activities watershed-wide and pool available resources. If an existing organization, such as the Manasquan River Watershed Association, is interested in expanding their activities into the Metedeconk Watershed, efforts could be focused on expanding their capability to serve the additional territory. If an organization does not exist that has the capacity and interest in serving as a watershed association in the Metedeconk, a new nonprofit should be formed. Whether starting a new watershed association or expanding an existing organization, it is critical to have an existing umbrella organization to support and direct nascent groups to formalize and expand their activities.

Activities could include periodic neighborhood or community-wide stream clean-up, wetland restoration, tree planting, hazardous waste collection and school events. More vigorous efforts could involve weekly/monthly water monitoring activities or school curricula development. Watershed posting through signage or storm drain stenciling has proven effective in building community awareness and modifying behavior toward oil disposal and short dumping. Activities such as these can have a dramatic impact over time on the health of a watershed and in building a greater sense of community connected by shared resources.

Provide challenge grants through the watershed association for targeted actions in Metedeconk

Challenge grants could be funded by water and sewer utilities for education, restoration and enhancement activities that are highest priority for protecting and improving water quality. The challenge grants could be used to leverage additional federal and state grants that require local match. Community groups and municipalities could further leverage these funds through volunteer and in-kind contributions.

One source of grants that could be used to engage citizens in the care and planting of trees is the State Urban Forestry Program. Information on their programs and the availability of grants, go to: http://www.nj.gov/dep/parksandforests/forest/community/index.html.

PROTECT AND RESTORE CRITICAL NATURAL LAND

CHALLENGE: PROTECT LAND WITH HIGH RESOURCE VALUE AND LOW ACQUISITION COSTS

With only 7 percent of the watershed permanently protected and growth encroaching quickly on undeveloped land, permanent protection of hydrologically sensitive lands in the watershed should be a high priority. As more land succumbs to development, the cost of protecting the remaining undeveloped land will likely increase, and the integrity and connectivity of the existing open space network will be more difficult to sustain.

Recommended Strategies

Protect land with highest values for both water resource protection and quality of life, and with lowest acquisition cost.

Land conservation strategies hold greatest public appeal when they can meet multiple community priorities, such as recreation, historic and cultural preservation, and protection of quality of life and community character. The maps produced by UMass are an excellent tool for identifying land with high water resource value. As we continue in this effort, new GIS analyses will need to be pursued that target properties which serve water quality and community development purposes (i.e., rural properties that can serve water quality, recreation, viewshed protection and cultural resource conservation values).

Using the UMass GIS work as a foundation layer, new datasets (i.e., open space plans, farmland protection objectives, community redevelopment enterprise zones) will need to be collected from counties and towns so as to identify synergies and overlaps in public policy and public investment objectives. The UMass GIS should also be integrated with the statewide plan produced by Green Acres that identifies state habitat protection and recreation priorities. By leveraging water quality protection acquisitions (and water supply and water quality protection regulations) with other open space, community development, and quality of life goals, public investment in land will yield measurably higher value to the people and environmental resources of the region. For an excellent example of how to overlay these varied protection priorities to develop a "greenprint" for land conservation, see the Cherry Creek project at: www.tpl.org/cherrycreek/.

By crafting far-sighted, intelligently linked land conservation plans for the region, the cities and counties associated with the Metedeconk Watershed will be able to achieve their water resource protection goals with powerful effect at a (more) affordable cost. To wait until development threatens a particular property or section of the watershed is to fall into the trap of "emergency room conservation" ~ a tried but wholly ineffective strategy for preserving the land, cultural and water resource values of a region.

Partner with existing land trust, or establish land trust, to hold easements and manage protected land

There is a need for a nonprofit entity to serve as a third party to hold conservation easements and manage protected land in the Metedeconk Watershed. Nonprofit land trusts, with their strong volunteer base and ability to attract private dollars, can be excellent long-term stewards of protected land. They can also take on an advocacy role – promoting the need for land protection. If a local land trust exists that has the capacity to expand its services to include the Metedeconk Watershed, a partnership should be formed with that organization to hold easements and manage protected land. If such an organization does not exist, a nonprofit land trust should be formed to provide these services.

Forge partnerships with nonprofit acquisition facilitation organizations

Nonprofit transaction facilitation organizations such as the Trust for Public Land, The Nature Conservancy, The Conservation Fund and others have developed tremendous expertise in the practice of planning, negotiation, deal structuring, public finance, project management and, in some cases, stewardship and programming.

For many counties and cities, the most cost efficient and effective means of accomplishing the goals and objectives of a resource protection plan involves partnerships with nonprofit organizations for whom land acquisition is the primary focus of their business. The value of nonprofit collaboration is especially productive in cases where facilitation organizations can negotiate below market purchase prices (i.e., "bargain sale purchases") that create opportunities for public agencies to buy priority properties at less than appraised value.

Nonprofit transaction facilitation organizations have also proven effective helping city and county government leverage local capital improvement funds with state and federal monies – funds that are often unknown or inaccessible to local agencies, otherwise overburdened by day-to-day management and planning responsibilities. In other instances, nonprofit partners can provide "bridge financing" to local and county agencies that seek to "land bank" properties at current market prices, so as to minimize the fiscal risks associated with longer-term price appreciation in rapidly developing communities.

Collaboratively pursued – where the financial goals and policy objectives of a conservation acquisition program are clearly and completely articulated – partnerships with the nonprofit sector can afford public agencies and other stakeholders an opportunity to focus their skills and resources to educational, community organizing, and/or long-term management activities which leverages their knowledge and experience to greatest effect.

CHALLENGE: RESTORING WATERSHED HEALTH IN A HIGHLY DEVELOPED WATERSHED

In urbanizing watersheds, such as the Metedeconk, stream corridors increasingly run through marginal land – small tracts of open space or abandoned land between commercial and residential development or urban infrastructure. This land is often ignored and allowed to degrade; however, the increasing percent of marginal land in urbanizing watersheds makes it an important resource for watershed restoration and water quality improvement efforts. Because they often serve as the only buffer between streams and nonpoint source pollution sources, such as parking lots, roads and businesses, they can provide the critical function of filtering stormwater runoff if they are well designed and maintained regularly.

RECOMMENDED STRATEGY

Restore riparian forests on "marginal" land

A local watershed association should work with towns, businesses, homeowner associations, utilities and other institutions to restore riparian corridors on marginal land and install stormwater runoff controls in parts of the watershed that have been identified as high priority for stormwater management (see UMass maps). Implementing a number of demonstration projects as part of new Low Impact Developments or in the process of redevelopment, could help raise awareness of the need to restore and manage these critical urban lands. These efforts could be funded through stormwater management fees instituted by utilities (see funding).

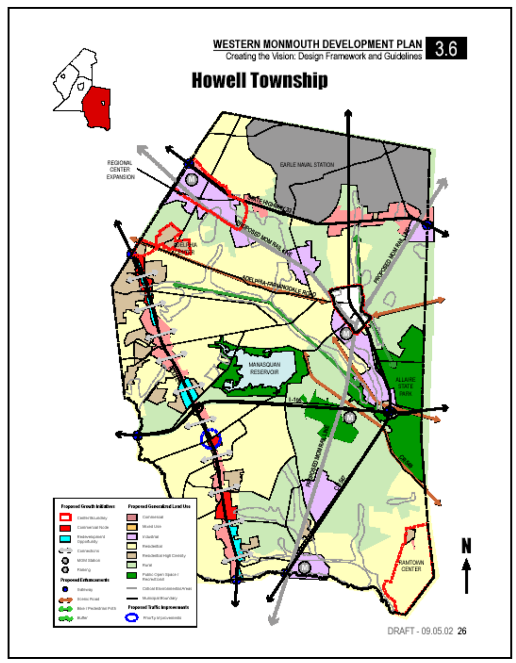
MANAGE GROWTH

CHALLENGE: ABSORB GROWTH WITH MINIMAL IMPACT ON ENVIRONMENT AND QUALITY OF LIFE

Growth is inevitable. Decreasing density through zoning can help slow growth, but may only push it to other parts of the watershed, having the same net impact on water resources. Communities need to find ways to manage growth and absorb it with minimal impact on the environment and quality of life. Innovative Low Impact Development and Conservation Development techniques can minimize impacts of new development, and when used to retrofit existing development, can actually improve water quality and groundwater recharge. By building in the right places and directing growth away from hydrologically sensitive areas, communities can continue to grow while protecting water resources.

At a community-wide level, this means finding ways to direct development away from sensitive land and toward existing infrastructure and areas in the watershed that will not impact water resources as significantly. At the site level, this means implementing Low Impact and Conservation Development practices that reduce stormwater runoff and maintain critical natural landscapes.

RECOMMENDED STRATEGIES



Update zoning and amend Master Plans to encourage growth around existing infrastructure and away from sensitive land.

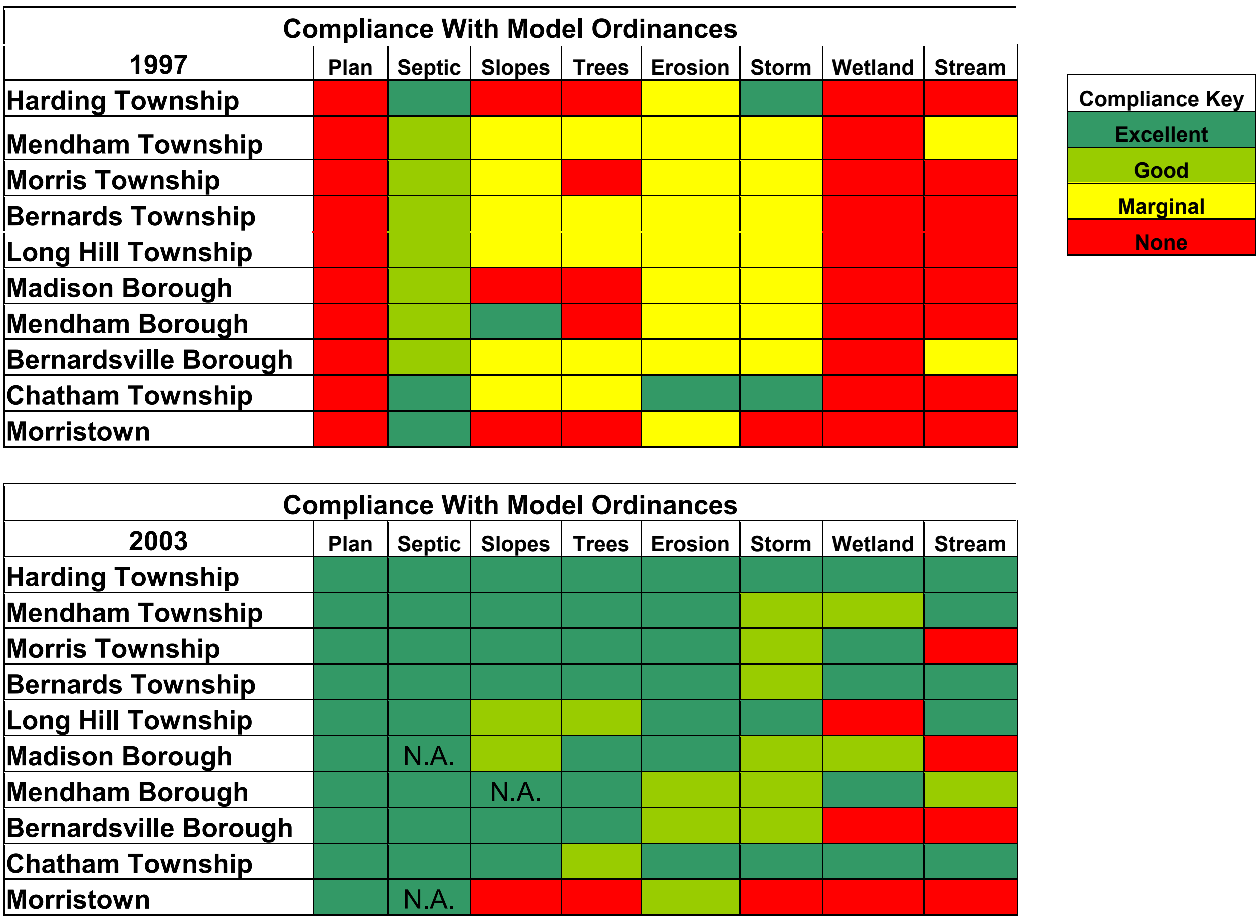
Communities need to identify areas where new development will have the least impact on water resources and where infrastructure and development already exist, and provide incentives for growth in those areas, such as increased density allowances and targeted infrastructure development. Additionally, they should identify areas that are particularly sensitive (porous, sandy soils, aquifer recharge areas, riparian corridors) and provide disincentives for growth in those areas, such as decreased density allowances, impact fees, etc.

Howell Township is in the process of making some of these changes to its general plan and encouraging multi-use areas in their zoning code. They could be looked to as a model for communities interested in exploring these options. Stafford Township also provides an excellent model in New Jersey. Their Town Code (ordinances) are available on-line at http://twp.stafford.nj.us.

Inventory and update town ordinances to enable Low Impact and Conservation Development practices in all communities in the watershed.

Currently, township ordinances, particularly subdivision and site improvement standards, in many of the Metedeconk Watershed communities discourage the use of low-impact and Conservation Development practices by mandating wider roads and curbs, zoning for larger lots, and creating parcel boundaries based entirely on acreage, not on natural features.

The Metedeconk Watershed Forum (see Establishing Leadership) should inventory existing town ordinances, identify model ordinances and promote implementation in all communities in the watershed to create more consistent approaches to water resource protection and growth management. The following chart shows how communities in Morris County in the Great Swamp Watershed inventoried ordinances in all 10 communities in the watershed and over a 6 year period got the towns to implement over 90 percent of the model ordinances.



As so many other communities have already gone through this process, the Metedeconk Watershed does not need to reinvent the wheel. In particular, you can look to the Center for Watershed Protection ~ http://www.stormwatercenter.net/ ; The Low Impact Development Center – www.lowimpactdevelopment.org, and the US EPA -- http://www.epa.gov/owow/nps/ordinance/index.htm. All of these sites have model ordinances and technical resources to assist communities in promoting Low Impact Development and other watershed protection practices.

Build the knowledge and interest of the development community in Low Impact and Conservation Development practices.

The Metedeconk Watershed Forum should partner with Builders Associations to provide training for developers on low-impact and conservation design practices. In particular, training should be provided on how many of these design strategies can save the developer money while improving the value of the properties. The Low Impact Development Center should be looked to as a resource for trainers and training materials. In particular, they have a "Builders Guide to Low Impact Development" and a "Municipal Guide to Low Impact Development." One resource that is being promoted by the American Planners Association is the book, "Best Development Practices: Doing the Right Thing and Making Money at the Same Time," by Reid Ewing, published in 1996. Trainings could be sponsored and paid for by the Builders Association.

Implement Low Impact Development Demonstration Projects

Look for opportunities to demonstrate Low Impact Development Practices, such as bioretention, vegetated swales, infiltration trenches and filter strips, on high-profile projects. A number of national big-box stores, such as Target, are implementing LID practices at some of their new sites. Townships should work with corporations developing new sites in their community to incorporate LID practices into their design. New residential developments also offer excellent opportunities for demonstrating LID practices.

Successful LID demonstration projects will require the willingness of the local jurisdiction to work closely with developers to get approval for innovative strategies that existing ordinances may not allow for. An extensive media and public education campaign should be built into any demonstration effort to promote the benefits.

Although stormwater retrofits can be more expensive and difficult to implement, local jurisdictions should consider partnering with a developer on the redevelopment of a vacant urban lot that incorporates LID strategies. The route 9 corridor could be an ideal location and funding could potentially come from Section 319 or watershed fees.

FUND CONSERVATION AND RESTORATION STRATEGIES

CHALLENGE: CREATE AND SUSTAIN DEDICATED FUNDING SOURCES

The central ingredient to implementing a successful long-term conservation strategy is substantial, reliable funding from a wide range of sources. By drawing upon a range of funding sources -- local, state, federal and private-- it will be possible to make steady progress on achieving conservation goals. Relying upon the occasional federal or state grant will mean that only occasional conservation projects can be undertaken, with development threatening the protection of important lands identified as part of this project.

RECOMMENDED STRATEGIES

Assemble a funding quilt that combines a broad range of funding sources, ensures maximum leverage and puts the heaviest reliance on local funding.

A funding quilt is the combination of funding sources —state, local, federal and private— that are brought together to help achieve conservation objectives, such as the protection of land critical to source water protection. Central to the funding quilt is the role that one funding source plays in leveraging other sources. In the Metedeconk Watershed there are a wide variety of funding sources that can be combined to reach conservation goals. At the state and local level, these include:

- New Jersey Environmental Infrastructure Trust – Clean Water State Revolving Fund
- NJ Green Acre funding
- Ocean and Monmouth County Open Space Funds
- Township Open Space Funds

More information on each of these sources and current levels available can be found in the Metedeconk Issues Report at www.tpl.org/landandwater/, under Demonstration Sites, Metedeconk.

Secure passage of open space bond funds(open space tax) in Lakewood and Wall Townships and explore increased bonding capacity for other communities (Ocean County, Howell, Jackson and Brick)

The most reliable form of funding to achieve conservation objectives over the long-term is local funding. Due to the competition for state, federal and private funding, these sources must be viewed as supplements or incentives, but not as the central funding sources for a program.

Both Monmouth and Ocean Counties have open space taxes, along with five other communities in the Metedeconk watershed. Ocean County approved an open space tax of 1.2 cents per $100 of assessed value in 1997, which raises $5.5 million per year. In November 2002, Monmouth County voters approved an increase in their open space tax to 2.7 cents, with 72% support. This levy will raise $16.1 million per year.

At the municipal level, five of the seven municipalities that comprise the source water supply area of the watershed have open space taxes. Brick (1 cent) and Jackson Townships (1.5 cents) in Ocean County, along with Freehold (3 cents), Howell (1 cent) and Millstone Townships (5 cents) in Monmouth County all have open space taxes. In 2001, these communities each raised between $260,000 and $450,000.

Establishing open space taxes in the two communities that lack them —Lakewood and Wall Townships— would be an important step to expand protection of open space in the Metedeconk Watershed. Increasing the existing taxes in Brick, Howell and Jackson Townships, as well as Ocean County would also help expand funding for open space and drinking water source protection

Establish a new Watershed Protection Fee on water utility rate payers

A stormwater (or drainage) utility is a "user fee" funding mechanism that provides a stable, dedicated revenue source for stormwater management activities to protect water quality and manage flooding. There are over 360 operating stormwater utilities across the United States. A stormwater utility is a cost-of-service based system that distributes the costs of providing stormwater services within a community, based on a user's impact to the drainage system -- usually measured by the amount of impervious cover or land area associated with a parcel of land. Residential customers are commonly charged a uniform fee, ranging from $2.00 to $10.00 per residence, with nonresidential customers receiving a parcel specific charge. The revenue stream can generate millions of dollars to cover such items as stormwater planning, engineering, construction, maintenance, public education and administrative costs. Lenexa, Kansas is an example of a city that has successfully used its stormwater utility to acquire land for open space; their practices could serve as a model for the Metedeconk.

Since there is not currently enabling legislation for the creation of a stormwater utility, it may be more practical in the short-term for the existing municipal utilities (water and sewer) to establish a Watershed Protection Fee on water utility rate payers. A common alternative to creating a stormwater utility is to have existing water and sewer utilities or departments of public works provide stormwater management and to levy a stormwater management fee.

One additional option would be for the local water suppliers to levy a fee on monthly water utility bills to acquire land for watershed protection. This has been successfully used by a number of water suppliers across the country, including Salt Lake City, Utah. With at least four primary water suppliers —Brick MUA, Jackson and Lakewood Township Utility Authorities, and NJ American Water Company — it may be a challenge to establish such a surcharge uniformly, but should be considered.

The funds raised from such a fee could be allocated for both land and water conservation initiatives in order to address both water quality and quantity concerns:

- Allocate 70% of the new funding to open space/natural land protection projects
- Allocate 30% to a water conservation incentive program that will generate rebates to property owners for:
    - Installation of low-flow water fixtures (toilets, showerheads, faucets)
    - Water harvesting capital improvements
    - Multi-flow wastewater treatment systems

APPENDIX A: METEDECONK SOURCE WATER STEWARDSHIP EXCHANGE TEAM BIOGRAPHIES

JOSHUA BRIGGS– Civil/Environmental Engineer. Mr. Briggs spent the past two years with The Bioengineering Group (TBG) in Salem, Massachusetts. While working with TBG, he acted as Technical Lead for a Low Impact Development (LID) stormwater retrofit project in Prince George's County, Maryland. This project is the first of its kind to include stormwater retrofits of an existing apartment complex and school. As a member of the Alewife Master Plan team, he conducted a detailed hydrologic assessment of the Alewife Reservation and Parkway in Cambridge, Massachusetts. From 1997 to 2000, Mr. Briggs worked as an Environmental Engineer for IT Corporation in Martinez, California. He worked primarily on groundwater and soil investigation/remediation projects for commercial sites contaminated with chlorinated hydrocarbons. His educational background includes a B.S. in Engineering & Environmental Science and a B.A. in History from University of Notre Dame. He will start a M.S. degree in Civil Engineering at University of New Hampshire this fall, specializing in Water Resources & Hydrology.

TED HARRISON - Senior Vice President, The Trust for Public Land
Mr. Harrison serves as director of The Trust For Public Land's (TPL) Greenprinting GIS Program, as well as an "at large" national project coordinator. Mr. Harrison's 17-year career with TPL has included a diverse array of project management, regional management and national program development responsibilities. In 1981, Mr. Harrison secured BA degrees in Anthropology and Political Science from the University of California at Berkeley. In 1985, Mr. Harrison earned a Masters of City and Regional Planning from the University of North Carolina at Chapel Hill. In June 2003, Mr. Harrison will complete the post-graduate requirements of Harvard University's Advanced Management and Development Program.

JOE PANTALION, P.E. - Assistant Director, Watershed Protection and Development Review Department, City of Austin, Texas. Mr. Pantalion has over 15 years of municipal and private consulting experience in the field of stormwater management planning, regulatory compliance, engineering and financing. He currently helps manage a 400-person City department and a $32 million Drainage Utility budget that funds watershed protection and land development review services. Recently, Mr. Pantalion helped implement several billing changes to Austin's drainage fee based on a cost-of-service study that he worked on before joining the City. He also managed the creation of the City's first Watershed Protection Master Plan that integrates and prioritizes flood, erosion and water quality management needs. Working ten years with a private consultant firm, Mr. Pantalion assisted primarily municipal and county governments on watershed master planning, financing and regulatory compliance issues in diverse urban and rural geographic conditions including the coastal plains of Texas and Florida, the pine forests of Arkansas and the arid regions of Oklahoma. In the area of financing, Mr. Pantalion has helped implement new stormwater utilities in several states addressing such issues as funding needs identification, billing rate policies, parcel data verification, and stakeholder involvement.

ROBERT J. PIRANI - Director, Environmental Programs, Regional Plan Association
Mr. Pirani is Regional Plan Association's Director of Environmental Programs. His responsibilities include developing and directing projects in parks and open space, land use management, water quality protection, and solid waste management. Mr. Pirani's long list of publications include New York- New Jersey Highlands Regional Study and Regional Study Update (USDA Forest Service, 1992 and 2002) and Keeping the Green Promise: An Action Plan for New York City's Urban Forest (RPA and Environmental Action Coalition, 1998). Before coming to RPA in 1986, Mr. Pirani worked as a county planner in western Massachusetts

and for several national and regional environmental organizations, including the National Audubon Society, the Sierra Club, and the Connecticut River Watershed Council. Mr. Pirani received his undergraduate degree from Hampshire College and his master's in regional planning from Cornell University. He is an adjunct faculty member of the Pratt Institute Graduate Center for Planning and Environment.

PHILLIP RODBELL - Program Manager, Urban & Community Forestry, USDA.
Mr. Rodbell is staff specialist for the U.S. Forest Service Northeastern Area urban and community forestry program located in Newtown Square, PA. He joined the 21-state region after nearly five years as urban forestry coordinator for the Massachusetts Department of Environmental Management. In that role, he assisted communities and nonprofit organizations in building support for the long-term management and protection of community trees and forests. Phillip has a Master of Science degree in Forestry from North Carolina State University and a B.S. in Forest Resources from the University of Washington in Seattle. Prior to his state work he served as urban forester and Global ReLeaf coordinator for the nonprofit American Forests, and science editor of *Urban Forests* magazine, a national bimonthly magazine of community trees published throughout the 1980s. He has 20-years of experience in nonprofit action, municipal planning, public administration, and consulting arboriculture including more than three years international experience with the Peace Corps in Honduras where he worked in both urban and agro-forestry.

Appendix B: University of Massachusetts Maps

Available in a separate appendix.