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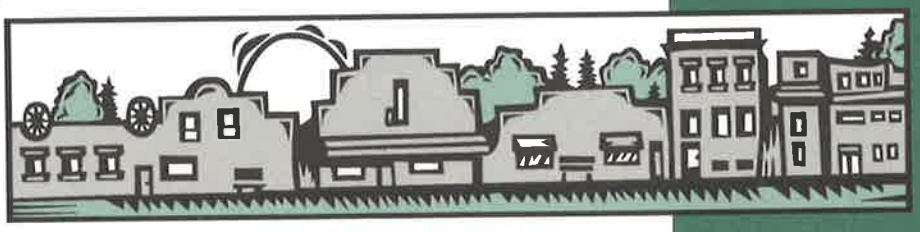
EPA 903-R-95-018

CHESAPEAKE BAY COMMUNITIES



MAKING THE CONNECTION

A Catalog of Local Initiatives to Protect and Restore the Chesapeake Bay Watershed

Chesapeake Bay Program

COMMONWEALTH of VIRGINIA

Office of the Governor

George Allen
Governor

Dear Stewards of the Chesapeake Bay:

Chesapeake Bay Communities - Making the Connection features the accomplishments of local governments and citizens to improve the quality and condition of the Chesapeake Bay. The publication catalogs more than 100 locally initiated efforts in which private citizens have undertaken projects or developed their own policies to help continue the positive trends occurring in this dynamic and resilient natural resource.

The people who live and work in communities throughout the Bay basin are the true stewards of this tremendous natural resource. The fate of the Chesapeake Bay and its tributaries holds a direct bearing on the quality of life of those who live, work and recreate in a huge area comprising three states. The people of the Bay basin, therefore, have a deep and abiding motivation to conserve and improve this valuable resource. It is this incentive, more than any other factor, which leads people to engage in the wise resource management practices that are improving water quality and bay habitats.

I am pleased, therefore, to commend this publication to your attention. It offers some excellent examples of what communities can do to enhance their particular section of a river or the Bay while contributing to the overall Bay restoration.

With warm regards, I remain,

Sincerely,

George Allen

George Allen
Chairman, Chesapeake
Executive Council

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Chesapeake Bay Communities

MAKING THE CONNECTION

December 1995

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Editor's Note

Without the assistance of local government officials and staff and community organizations and associations, this publication would not have been possible. Their participation provided the basis for the 100 case studies featured in this book. When further information was required, the contacts fulfilled these requests beyond expectations. We thank them for their efforts. Thanks also go out to the Chesapeake Bay Local Government Advisory Committee and the Land, Growth, and Stewardship Subcommittee members and their staff, as well as the publication workgroup which provided assistance in the organization of this publication and provided invaluable guidance and support during the preparation of *Chesapeake Bay Communities - Making the Connection.*

Editor
Kerry Hodges

December 1995

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PREFACE

This compilation of case studies is a significant indication of the range of important environmental activities occurring within the nearly 2,000 communities in the Chesapeake Bay watershed. Local governments and community organizations have been and will continue to be an essential part of Chesapeake Bay restoration efforts. The intent of this publication is to share the knowledge and experience gained through specific projects among communities who will appropriate these strategies into their own development plans for environmentally-sensitive areas.

Protection and restoration actions taken at the local level have a significant impact on overall water quality and living resources of the watershed. Achieving nutrient reduction targets begins upstream in the many tributaries within the Bay watershed. With the growing awareness that improvements originate in "local backyards", local governments have risen to meet new challenges. It is exciting to witness the increased involvement of local officials and community organizations in the Chesapeake Bay watershed's protection and restoration efforts. We are pleased to share these local initiatives with others through this publication.

The enthusiasm of local government officials for the restoration efforts must be supplemented by the knowledge and resources to produce change. Information and technical assistance are the means to successful project implementation. Constituents, as well, need to be aware of the state of the Bay and its tributaries which will help foster a sense of community and encourage cooperation in working towards a more healthy environment. The health of the Bay impacts on a locale's economic well-being, recreational possibilities, and community pride. Thus, even the smallest restoration project contributes to the larger picture of economic vitality and quality of life in the entire watershed.

Recognizing the goal of encouraging cooperation and communication between communities, the title of the publication evolved into *Making the Connection.* The more local governments "connect" their efforts to the larger Bay goals, the more positive the end results will be for the entire watershed. When communities sponsor effective projects and gain expertise of their implementation, their work deserves to be shared. High turnover rates of elected officials lead to a limited institutional memory. It is my hope that this publication will supplement each local government official's effort to provide leadership for sustainable, environmental policies in his or her county, municipality, or township. Local governments and community organizations need not work in isolation in the essential task of protecting and restoring this most valuable resource — the Chesapeake Bay.

Gary Allen
Mayor, City of Bowie
Chairman, Chesapeake Bay Local Government Advisory Committee

The Chesapeake Bay Program - Leading the Restoration

The Chesapeake Bay Program is considered a national and international model for estuarine restoration and watershed protection. Now in its twelfth year, the Chesapeake Bay Program is the unique, regional, federal-state-local partnership which has directed and coordinated Chesapeake Bay restoration since the signing of the historic 1983 Chesapeake Bay Agreement. The Chesapeake Bay Program partners are the State of Maryland, the Commonwealths of Pennsylvania and Virginia, the District of Columbia; the Chesapeake Bay Commission, a tri-state legislative body; the U.S. Environmental Protection Agency, representing the federal government; and participating advisory groups.

The Chesapeake Bay is the largest estuary in the U.S. and one of the most productive in the world. In the mid-1970s, the Chesapeake was the nation's first estuary targeted for restoration and protection. This scientific and estuarine research identified three areas requiring immediate attention: nutrient over-enrichment; dwindling underwater Bay grasses; and toxic pollution. Based on the sound science of the ten year research effort, the Chesapeake Bay Program evolved as the management means to restore this exceptionally valuable resource.

The Bay Program's highest priority has been and continues to be the restoration of the Bay's living resources and significant results have been achieved. Indicators of that progress are evident in the recent resurgence of the striped bass and increased acreage of Bay grasses, as well as reductions in nutrients reaching the Bay. The Bay Program has also been instrumental in introducing agricultural best management practices, biological nutrient removal, and a public education campaign emphasizing the role each of the watershed's 14 million residents play in the restoration effort.

In 1987, the Chesapeake Bay Program partners signed the Chesapeake Bay Agreement which set a goal to reduce the nutrients, nitrogen and phosphorus, entering the Bay by 40 percent by the year 2000. Achieving the 40 percent reduction will dramatically improve the water quality of the Bay and improve the health and abundance of the Bay's living resources.

To achieve the 40 percent reduction goal the Bay Program recognized the need to move up into the tributaries, to attack the nutrients at their source. In 1992, the Chesapeake Bay Program partners agreed to establish nutrient reduction targets for the Bay's ten major tributaries. As a result Maryland, Pennsylvania, Virginia and the District of Columbia have developed "tributary strategies" to achieve the nutrient reduction targets. This action has literally moved the Bay Program's emphasis into the communities and neighborhoods of the Chesapeake Bay Program. This action is also an opportunity for the Bay Program to work with local governments and community groups in their efforts to help restore and preserve the Chesapeake Bay.

The Bay Program's Executive Council, consisting of the Governors of Pennsylvania, Maryland, and Virginia, the Mayor of the District of Columbia, the U.S. Environmental Protection Agency Administrator, and the Chairman of the Chesapeake Bay Commission, a tri-state legislative body, has signed results-oriented commitments to ensure the success of the Bay restoration effort. In 1993 the Council signed five directives addressing key areas of the restoration, including the tributaries, toxics, underwater Bay grasses, fish passage, and agricultural non-point source pollution. In 1994 the Executive Council signed three additional directives addressing the establishment of a riparian forest policy, reciprocal agricultural certification between Bay Program states and a framework for habitat restoration, as well as the Chesapeake Bay Basinwide Toxics Reduction and Prevention Strategy which emphasizes the reduction and prevention of chemical contaminants.

The Local Government Advisory Committee of the Chesapeake Bay Program

Upon signing the Chesapeake Bay Agreement in 1987, the Chesapeake Executive Council determined that an integral part of achieving its goals would come through a reliance on local governments. They therefore established the following commitment to achieve these goals: "By March 1988, to establish a local government advisory committee to the Executive Council and charge that committee to develop a strategy for local government participation in the Bay program."

The Chesapeake Bay Local Government Advisory Committee (LGAC), consisting of 20 local government officials, represents the diverse interests of several thousand governments from the 64,000 square mile Bay watershed. Upon its creation, the committee was charged with communicating information about the on-going and evolving Chesapeake Bay Program activities to local governments. In addition, the committee was given the responsibility of communicating the opinions, concerns, and recommendations of local governments to the Executive Council. Since its creation, the LGAC has actively established the foundation for local government participation in the Bay Program. It works to broaden the Bay Program's understanding of local perspectives concerning Bay restoration and protection efforts.

In working to meet the goals of the Executive Council, the LGAC balances proactive and reactive responsibilities and activities. The committee provides comments on numerous strategies and other documents, giving a local perspective on Bay issues. It also fulfills a role in communicating to the Executive Council on issues that are of special concern to local governments. In turn, the committee provides a direct channel for the Executive Council to disseminate information to local governments.

Contact

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The Land, Growth and Stewardship Subcommittee of the Chesapeake Bay Program

The Land, Growth and Stewardship Subcommitteewas originally established as the "Population, Growth and Development Subcommittee" to be an information forum to identify issues of population, growth and development in the Chesapeake Bay watershed. The subcommittee was reformed as the Land, Growth and Stewardship Subcommittee, with the adoption of the December 5, 1994 mission statement, which expanded the subcommittee's activities to include: 1) promoting sound land management decisions; 2) providing growth projections addressing the impacts of existing growth on the Bay and its tributaries; and 3) encouraging public and private actions to reduce the impacts of growth on the Chesapeake Bay and its tributaries.

The activities of the subcommittee will be pursued in support of the 1987 Chesapeake Bay Agreement which commits the signatories, among other things, to implement tributary-specific strategies that meet mainstem nutrient reduction goals and achieve water quality requirements necessary to support living resources in both the mainstem and the tributaries of the Chesapeake Bay. Furthermore, the 1992 Amendments commit the signatories to explore opportunities to further reduce airborne sources of nitrogen which enter the Chesapeake Bay and its tributaries, beyond that which is captured under the 1990 Amendments to the Clean Air Act.

In accomplishing its new mission, the Land, Growth and Stewardship Subcommittee seeks to provide technical assistance to local governments in their efforts to manage growth and to create public forums and form alliances with other organizations for the exchange of ideas and strategies for land conservation, stewardship and growth management.

Contact

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How-to-Use this Catalog

The catalog has been organized into nine chapters, each with its own identifying icon. Due to the fact that a project does not necessarily apply to only one category, smaller icons are used to demonstrate a sub-section for a case study. For example, a project that is primarily focusing on Water Quality/Nutrient Reduction may also be linked to Public Information and Education through the use of a small icon.

Please find below a description of each chapter's contents and their respective icons.

Local Land Use Management/Policy

- Comprehensive Local Government Planning
- Land Use Regulation/Zoning and Subdivision
- Growth Management Techniques
- Designating Urban Growth Boundaries
- Linking Infrastructure to Land Use Patterns
- Technological Advances Applied with GIS/Mapping
- Financing Land Use Management
- Fostering Efficient/Environmentally-Sensitive Patterns of Development
- Neo-traditional Development
- Cluster Development

Watershed Management

- Watershed Restoration and Monitoring
- Stream Corridor Protection

Water Quality/Nutrient Reduction

- Advanced Wastewater Treatment
- Agricultural Nutrient Management Practices
- Managing Nutrients on Developed Lands
- Stormwater Management

Living Resource Protection/Habitat Restoration

- Wetlands Protection/Restoration/Mitigation
- Non-Regulatory Approaches to Wetland Protection
- Submerged Aquatic Vegetation Restoration
- Fisheries Management

Pollution Prevention

- Household Hazardous Waste Management/Education Programs
- Toxics Reduction
- Groundwater Protection
- Stormwater Management
- Pollution Prevention Projects
- Beneficial Use of Dredge Materials
- Agricultural Integrated Pest Management

Forest Conservation/Riparian Forest Protection/Restoration

- Forest Conservation Programs
- Riparian Forest Buffer Protection/Restoration
- Greenways

Agricultural Preservation/Conservation

- Agricultural Preservation/Conservation Programs
- Purchase and/or Transfer of Development Rights Programs
- Cluster Development Programs and Projects

Land Stewardship

- Greenspace (Tree planting, Landscaping, BayScaping)
- Conservation Easement Programs
- Public Access
- Heritage Areas Protection/Eco-Tourism
- Countryside Stewardship Exchange
- Stewardship Practices

Public Information and Education

- Local Government Education Programs
- "Hands-on" Environmental Education
- Public Information/Outreach
- Environmental Education Curriculum
- Continuing Education Programs

Local Land Use Management/ Policy

An Introduction

The Chesapeake Bay Issue

The Chesapeake Bay Region is one of the fastest growing regions in the United States. In fact, several of the counties in the watershed are among the ten fastest growing counties in the nation. The region's cultural activites, strong economic growth, accessibility, and unique natural environment are just a few of the reasons that the watershed is enjoying such a high rate of growth. The Chesapeake Bay Watershed's population now totals 14.2 million people and is predicted to grow to about 15 million by the turn of the century. The Baltimore-Washington-Richmond corridor is experiencing unprecedented growth and development.

This exceptional growth presents localities with tremendous challenges, not the least of which is ensuring proper stewardship of the Chesapeake Bay.

County, municipal, and township governments are countering the effect of poor development patterns by strategically assessing their growth patterns, and creating comprehensive plans to promote better land use patterns for development, protect natural habitats, and revitalize existing develpment centers. In addition, responsible land use decisions often take into consideration transportation policy, and farm preservation as a component of their comprehensive plan. By encouraging wise resource management,, these land use policies can contribute to improving the Chesapeake Bay.

The Local Challenge

Local government's role in the Bay clean-up effort has been defined by efforts to manage the use of land. Local government land use controls manage development form, density, and the impact of develpment on environmental resources.

Local governments' role as manager of development entails sediment control, stormwater management, and zoning and subdivision authority. These responsibilities place local government at the front lines in the effort to improve Bay habitat and water quality.

The recent emphasis on enhancing water quality in the Bay's tributaries has brought the Bay Program upstream and into local governments' backyards.

Traditional local government land management efforts in the form of comprehensive planning-related acitivities are evolving. Today, watershed plans and greenway programs established at the local level are common planning activities. These programs and activities have come to supplement the traditional planning activities and provide more focus than ever before on conserving and enhancing environmental resources and tributary stream water quality.

The Chesapeake Bay Program and the Local Government Advisory Committee are assisting local communities with technical assistance in establishing planning policies that take an integrated approach to their development plan. These community planning technical assistance activities have been successful in preserving natural areas, increasing economic opportunities and revitalizing the quality of life of a community.

State governments in the Chesapeake Bay watershed and the U.S. Environmental Protection Agency (EPA) are also providing technical, informational, and financial assistance to local government decision-makers. State assistance programs, including Virginia's Chesapeake Bay Local Assistance Department, Maryland's Office of Planning, and Pennsylvania's Department of Environmental Protection, provide local governments with the tools to formulate sound land use policy decisions. U.S. EPA's Office of Regional Operations and State/Local Relations assists local governments by introducing environmental planning techniques to small communities.

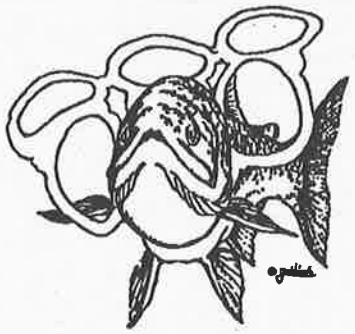
The following section describes selected Chesapeake Bay watershed land use policies and implementation techniques to help protect and restore the Chesapeake Bay region. These policies and techniques include cluster development, tax incentives, transfer of development rights, and other innovative provisions to incorporate into comprehensive plans and zoning ordinances. The objective is to encourage growth in appropriate locations and protect resources.

Environmental Indicators of Local Land Use Management/Policy

Problems in the Bay

Causes of Decline in the Bay's Health:

- Air pollution
- Algae Blooms
- Deforestation
- Disease
- Excessive Nutrients
- Lack of Public Education and Involvement
- Loss of SAV
- Overharvesting
- Poor Use of Water Resources
- Toxics
- Uncontrolled development



City Island and Riverfront Park

Harrisburg, Pennsylvania

Background

Riverfront Park was created in the early 1900s as part of a program to preserve and enhance the health and beauty of the railroad and industrial center which was Harrisburg. The city acquired all the property along the Susquehanna River which forms the five mile Riverfront Park. In the years following the City Beautiful movement, the area fell into a state of disrepair. It was not until 1985 that efforts to enhance the City Island and the Riverfront Park began in earnest.

Project Description

Since 1987, the program has resulted in the successful transformation of a once blighted island into a major regional recreation facility. The program has also complemented and supported city initiatives to revitalize the downtown and improve the economic environment of the city.

Improvements include the 6,300 seat Riverside Stadium, the Skyline sports complex, Riverside Village Park, the Pride of the Susquehanna riverboat, the Harrisburg Marina, a nature trail featuring wetlands and wildlife, sunken gardens, and more. Additionally, many improvements were made to the waterfront's infrastructure. On City Island, bank stabilization has been accomplished in areas where erosion from ice and floods was prevalent. Riprap and vegetation has successfully stabilized problem areas. A sewage collection and pumping station delivers wastewater across the river through the Market Street Bridge and conveys it to the Advanced Wastewater Treatment Plant in South Harrisburg.

Neighborhood and civic groups such as the Riverfront Peoples Park support the city's activities in the Park. The Riverfront Peoples Park is a non-profit volunteer organization which helps the city maintain and improve Riverfront Park. Members have been responsible for installing an exercise course in the park, planting 250 trees to restore the park's shade tree population, and organizing several clean-up sessions which have included raking leaves, trimming trees, painting park benches, and repairing overviews.

Benefits/Results

While the program has fulfilled its objectives of enhancing recreational opportunities, complementing economic development initiatives, and providing free public access to the river, these gains have not come at the expense of the environment. Careful planning was undertaken to preserve environmental quality while achieving the objectives. When trees are removed in park areas, the city's policy is to plant three trees for each removed.

Enhancement of the waterfront posed many obstacles including compliance with the local floodplains management ordinances, complex environmental regulations concerning water quality, wetlands, fish and wildlife, and historical and cultural resources. Wetland areas have been preserved, eroded areas stabilized, and stormwater and wastewater systems improved.

The restoration of the city's waterfront has also increased the focus of the city and other local communities on preserving and enhancing the environmental quality of the river and its environs. This focus will directly and positively influence restoration of the Chesapeake Bay.

Costs/Funding Source

The city utilized a combination of funding sources, including federal and state grant programs, interest earnings from tax-exempt bonds issued by the city, and revenues generated from park permits issued by the city. Most projects involved a public-private partnership that shared the costs of construction. No city tax dollars were used for the program's construction and revenues generated by the projects and special events help defray the cost of maintenance.

Contact

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Coastal Program Special Area Management Plan for Sustainable Development

Northampton County, Virginia

Background

Northampton County, the southernmost county on Virginia's Eastern Shore, forms the gateway to the Chesapeake Bay. This is a place rich in natural and cultural assets — beaches, marshes, barrier islands, woodlands, tidal creeks, and historic villages. Despite this wealth of resources, Northampton County among the poorest in Virginia and suffers from a depressed, declining economy and chronic unemployment.

The area has been designated a World Biosphere Reserve by the United Nations due to the habitat it provides for over 260 species of birds, as well as other wildlife. The bayside and southern end of Northampton County provide critical habitat during fall migration for songbirds which funnel into the tip of this peninsula to rest and feed before crossing vast open waters on their way to the Caribbean or Central and South America. The seaside marshes and barrier islands also provide a coastal wilderness for huge numbers of colonial birds, shorebirds, waterfowl, finfish and shellfish.

Project Description

In 1991, Virginia Coastal Zone Management Program approached the county with a four-year, match-free grant proposal to create new enforceable policies to protect coastal habitat and promote sustainable growth. A federal, state, and local partnership of agencies was formed. In 1992 the National Oceanic and Atmospheric Administration (NOAA) awarded Virginia's Coastal Program $800,000 to carry out the Plan.

The grant enabled the community to hire a project coordinator and begin to create a Sustainable Development Action Strategy based on the Plan. The Strategy targets six sustainable development industries for promotion, linking them with asset protection policies of the Plan:

- Develop Heritage Tourism Industry/Protect Natural and Cultural Assets
- Develop Seafood and Aquaculture Industries/Protect Water Quality
- Develop Agriculture Industry/Protect Productive Land
- Develop New Industry/Protect Sense of Place, Quality of Life, and Groundwater
- Develop Research, Education Industry/Protect Natural and Cultural Systems
- Develop Arts, Crafts, Local Products Industries/Preserve Culturally-Diverse, Authentic Community

Benefits/Results

- Research on bird habitat requirements needed for policy development completed by the Virginia Department of Conservation and Recreation and Department of Game and Inland Fisheries and The Nature Conservancy. Landowners guide in preparation. County Geographic Information System established.

- Virginia Coastal Program initiated the Eastern Shore Birding Festival as part of the Plan. Annual Festivals hosted by local Chamber of Commerce since 1993 celebrating the fall migration. Festivals created major interest among birdwatchers nationally and brought in several hundred thousand ecotourism dollars.
- County received the National Association of Counties' Presidential Leadership Award for the Strategy and was chosen as one of four sites by the President's Council on Sustainable Development for an eco-industrial park. A community design charette was held and a master plan for the Port of Cape Charles Sustainable Technologies Industrial Park (STIP) was created.
- Northampton's aquaculture industry expanded form one company and less than $1 million in sales in 1991 to four companies with $5 million in sales in 1995.
- The Plan has leveraged an additional $740,000 from the Department of Transportation for a project to restore historic sites and create a Heritage Trail within the county; $200,000 from EPA for brownfields/greenfields project; $70,000 from the Chesapeake Bay Program for habitat restoration project. The county is in the process of trying to leverage an additional $800,000 from USDA and EPA for infrastructure construction at the STIP and the Coastal Program is trying to leverage $800,000 from U.S. Fish and Wildlife Service for critical habitat acquisition.

Costs/Funding Source

Work has been funded by the Virginia Coastal Resources Management Program of the Virginia Department of Environmental Quality through NOAA's Office of Ocean and Coastal Resources Management. Funds expended or allocated to date total $1,119,000.

Contact

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Development Evaluation Process

Arlington, Virginia

Background

Arlington County officials established a development evaluation process to provide a coherent and concurrent process by which county staff and citizens can examine a project and provide information and comment so that the County Board will make informed decisions about the project. It is a streamlined process for evaluating a whole range of environmental impacts, including water quality, of publicly-funded projects.

Project Description

The Administration Regulation was adopted in February 1994. What has been learned is that if environmental issues arise and are dealt with early, the potential for consensus is enhanced and changes are more easily incorporated at a time when the project is not already "cast in stone."

The major features of the process include: factors to be considered in deciding when the environmental assessment is required; how to establish and operate the staff working group for each assessment; when, who and how to notify citizens and other interested groups; a tracking procedure for the assessments so that staff and citizens have access to basic information about each environmental assessment; and establishing the Environment and Energy Conservation Commission as a link between staff and public comment activities.

Benefits/Results

Environmental assessments are an important part of the total information considered in evaluating a project. The process is designed to make county agencies aware of potential impacts, to provide them a basis for weighing adverse impacts against the benefits of the proposed project, and to assist them in incorporating design features which improve the environment or lessen adverse environmental impacts.

The process is uncomplicated and easily replicable. It can be modified to suit other jurisdictions and would be especially helpful to jurisdictions that seek citizen involvement.

Costs/Funding Source

The process itself does not require additional funding. Staff have replaced an earlier process with a new and more inclusive and efficient process.

Contact

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Development Guidance System

Charles County, Maryland

Background

Charles County's Zoning Ordinance establishes floating zones to permit certain land use activities within a "planned development". The county's Development Guidance System (DGS) is a tool used to evaluate larger residential development and mixed use development projects proposed for "planned development" zoning. The DGS evaluation is made on the basis of points assigned and awarded to those proposals which meet predetermined criteria which correlate to County Comprehensive Plan objectives and/or provide specific amenities that benefit the county or neighborhood in which the development is proposed.

Project Description

Under the DGS, the development proposal which best achieves plan objectives will accrue the highest points which translates into development approval. Projects which provide certain amenities and features, including environmental protection measures, above and beyond those normally required by ordinance may be granted density increases as a bonus. The system rewards projects located near existing developed areas of the county and penalizes those located in more rural areas. The DGS provides a tool to clearly and objectively measure the connection between a proposed development and the degree to which it is consistent with county land use and environmental planning objectives. Examples of county objectives for which points are awarded include:

Community Character	Points can be added for meeting certain design criteria associated with achieving traditional neighborhood design objectives.
Community Facilities	A greater number of points are awarded for proximity to existing or developer provided facilities.
Environment	Points are awarded for greater percentages of forest cover protected, steep slopes avoided, expanded buffers from sensitive resources, etc.

The County DGS was conceived as part of the process to update the County Comprehensive Plan in the late 1980s and incorporated into a new county zoning ordinance adopted in August 1992. A critical component of the DGS is the built-in evaluation system which requires the County Planning Commission to review the established criteria and point scoring system annually. This review permits re-calibration of points awarded to assure the system adapts to changes in policy that may occur over time.

Contact

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Environmental Resources Plan

Carroll County, Maryland

Background

On October 1, 1992, the Maryland Economic Growth, Resource Protection, and Planning Act of 1992 took effect. The Planning Act is designed to encourage economic growth, limit development sprawl, and protect the state's natural resources. The Act recognizes local comprehensive planning processes undertaken by counties and towns as the most effective and suitable method to establish priorities for resource conservation. It also establishes requirements for local government preparation of "Sensitive Areas" elements in local Comprehensive Plans and requires such plan elements and corresponding implementation regulations to be adopted by both county and municipal local governments by July 1, 1997.

Project Description

In 1993, Carroll County and the eight incorporated municipalities within the county, executed formal agreements to work cooperatively in developing amendments to the Carroll County Master Plan, in the form of an Environmental Resources Element and to amend the environmental protection elements of the Master Plans for each of the eight municipalities. The effort included the development of related implementation measures to assure protection of sensitive areas as defined by the Planning Act. The Carroll County Planning Department and a local "Interjurisdictional Steering Committee" facilitated the exchange of ideas and information between the municipalities and the county as new plan elements were reviewed and existing plans modified. Municipal governments represented in the interjurisdictional project include the city of Westminster and the towns of Hampstead, Manchester, Mount Airy, New Windsor, Sykesville, Taneytown and Union Bridge.

This cooperative effort lead to the creation of one planning document that could be adopted by all nine jurisdictions. Although the exact wording and format of the implementation measures may vary between jurisdictions, the intent is that each jurisdiction will also adopt the same amendments to its respective subdivision regulations and zoning ordinances, thereby creating uniform and consistent protection to environmental resources.

Since environmental resources do not recognize jurisdictional boundaries, the Interjurisdictional Steering Committee determined that a uniform plan and implementation measures would provide greater protection to environmental resources than nine individually developed plans. Thirty meetings were held for purposes of disseminating information and obtaining input.

Benefits/Results

In general, this plan does not recommend any changes that would prohibit the development of land, with the exception of land within a stream buffer or wellhead buffer. Rather, the plan makes recommendations on designing development to reduce impact on environmental resources. All jurisdictions are recommended to adopt a uniform Environmental Resources Element, uniform definitions, uniform implementation measures, and a more streamlined review process. Protection of resources is to be accomplished through adoption of the definitions in the subdivision regulations, adoption

of stream and wellhead buffers, requiring subdivisions and site plans for development to be designed following *Guidelines for Development in Environmental Resources Areas*. Guidance maps using data mapped on a GIS system have been developed to support this effort and an additional staff person hired by the county reviews development proposals for consistency with guidelines for development in both the county and the towns.

Costs/Funding Sources

This project was funded entirely through the Carroll County operating budget.

Contact

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Geographic Information System

Adams County, Pennsylvania

Background

Adams County is an agricultural community of 526 square miles located in south-central Pennsylvania adjacent to the Mason-Dixon line. All of the waters of the county drain into the Chesapeake Bay either through the Potomac or the Susquehanna Rivers.

Project Description

One of the goals of the Adams County Geographic Information System (GIS) is to improve the quality and availability of the information that is used for decision-making. By developing inventories of water-related resources and registering the features to a common base map, the Adams County GIS will assist those programs concerned with protecting the quality of water entering the Chesapeake Bay. By establishing the baseline conditions, the effect of land use changes on the quality of the water entering the Chesapeake Bay system will be measured.

Benefits/Results

The Adams County GIS Development Plan was adopted in June 1995 and numerous relevant data sets have been collected. By 1996, parcel mapping should be complete so that parcel specific land use decisions can be considered using the water resource inventories.

Some of the benefits that the county expects from the use of a GIS in Adams County are:

- improved access to ownership, taxation and regulatory records;
- improved understanding and responsibility for the impacts of development upon air and water quality;
- a decrease in duplication of effort and redundant data sets through the sharing of data; and
- improved ability to answer geographic feature inventory related questions.

Costs/Funding Source

Primary data acquisition and system hardware and software has been paid for by the Adams County Commissioners from the general fund. Resource sharing and assistance has been obtained from the Natural Resources Conservation Service, PennDOT, other state and federal agencies and some of the townships and boroughs.

Contact

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Model Zoning Regulations for the Lackawanna Valley

Scranton, Pennsylvania

Background

A draft land use plan for the Lackawanna Valley, released in the spring of 1995, provided a foundation for decisions concerning future development. The plan is a blend of the best features of several development scenarios explored by the Lackawanna County Regional Planning Commission (LCRPC) and reviewing committees. This plan also serves as the basis for an outline of changes to development regulations for Valley communities. Twelve municipalities are located in the land use study area, each with its independent authority for implementation of land development ordinances, including zoning and subdivision regulations.

Project Description

Achieving the desired future pattern of development in the Lackawanna Valley is dependent on land use regulatory programs administered by the twelve municipal governments in the study area. While each municipality is unique, there are a number of common traits among Valley communities, including the impending arrival of the Lackawanna Valley Industrial Highway (LVIH). These common characteristics suggested that a "menu" of zoning districts and regulations would cover the most important aspects of the recommended land use plan for the Valley and would be widely applicable in the twelve municipalities.

To facilitate needed land use reforms to implement the plan, the LCRPC prepared a set of model zoning districts for Lackawanna Valley municipalities. These regulations can be adopted by Valley municipalities to support the vision of the future contained in the Comprehensive Plan. While all districts will not be appropriate in all communities, the common circumstances of most valley municipalities should mean that many of the districts will be appropriate in many of them. For example, seven out of the twelve communities have:

- the LVIH passing directly through them;
- an LVIH interchange location;
- areas of mature residential and mixed-use development; and
- undeveloped "sides" of the valley.

Three more communities share the last two characteristics. Model ordinance provisions are organized into five major zoning districts and their related regulations. The Resource Conservation District, establishes limitations on the percentage of a tract permitted to be disturbed for development, so as to preserve trees and steep slopes. Incentives in the form of density bonuses would also be included, to encourage developers to proceed under cluster and compact cluster provisions of the ordinance, further reducing the potential land area disturbed.

Results/Benefits

Ordinance changes will ultimately need to be tailored to the precise needs of each municipality, reflecting community wants and aspirations and the circumstances of its existing settlement pattern and development regulations. Nevertheless, the model will

facilitate their efforts to update land use regulations in the future and offer potential to bring greater uniformity or consistency in zoning treatments and increase the likelihood of concerted action toward achieving the desired pattern of land use in the Lackawanna Valley.

Costs/Funding Source

Funding for the Lackawanna Valley Plan is being provided by the: Federal Highway Administration; PA Departments of Transportation and Community Affairs; and the County of Lackawanna.

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Neighborhood Planning for the Future

Manheim Township, Pennsylvania

Background

Manheim Township is a populated suburb of Lancaster City in Lancaster County, Pennsylvania. The township, nestled between the Conestoga River on its east and the Little Conestoga River on its west, has a population of 29,000, and covers approximately 22 square miles. It is in one of the fastest growing counties in Pennsylvania, where farmland is the predominant land use.

Project Description

The Manheim Township Department of Planning and Zoning, in coordination with the Parks, Public Works and Police Departments, spearheaded the development of a comprehensive zoning ordinance. The goal of the ordinance is to provide a safe community, promote economic prosperity without compromising the township's character, provide for the use of land within the township for residential housing of various dwelling types, and accommodate reasonable overall community growth. The ordinance emphasizes mixed dwelling types, higher densities and the development of commercial infrastructure in new developments. Public access through the creation of bike paths and main street type development enhances the traditional development scenario.

In addition to traditional development incentives, the township also included agricultural districts in order to promote the continuation and preservation of agricultural activities in those areas most suitable for such activities. The protection and stabilization of the agricultural economy by eliminating uses that are incompatible with farming, but permitting limited agriculture-supporting businesses was essential to the development of the agricultural districts.

Benefits/Results

The non-regulatory ordinance was adopted in June 1992. Although development has slowed in the region, two developers have submitted plans for a 400 dwelling-units development and a 160 unit development. Both developments have commercial use in their plans.

The township is providing a simple guide book on Purchase of Development Rights (PDR) and Transfer of Development Rights (TDR) which will be available in 1996. The ordinance was funded by the township.

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Northridge

Prince George's County, Maryland

Background

Northridge is a 344 acre planned unit development of 855 homesites located in the City of Bowie, Prince George's County, Maryland. Developer Michael T. Rose designed a community with a mixture of densities for residents seeking to live closer to nature in a rural-like atmosphere. The goal was to combine human habitat and wildlife habitat in a compatible manner.

Project Description

The design team responded to the unique site of the community — the contours of the land, its natural environment — and devised a plan that lets the community interact with nature. The Northridge plan has three steps: 1) Establish a series of development design standards that complement each other and the land to create a rural-like atmosphere. These design standards are essential because the ability to preserve and enhance the natural vegetation is dependent upon their approval. 2) Establish landscape guidelines that respond to the native vegetation. The guidelines for trees, driveways, street lights, and intersections all are designed to foster a more natural feeling throughout the community. 3) Utilize the services of an urban forester to survey the site to delineate significant trees and vegetation areas. By avoiding those areas by design, avoiding them during construction, and transplanting trees when necessary, mature vegetation areas were preserved.

In order to achieve this plan, the cooperation of local government officials with an understanding of development regulations was required. Some of the county ordinances adapted to the designers' recommendations were:

- Curbs and gutters eliminated in favor of grassed drainage swales with a natural, country-like look.
- Sidewalks replaced by forest trails.
- Setbacks for building pads reduced from ten feet to four feet in order to preserve more of the existing environment.
- Road width is 22 feet instead of 30, saving eight feet of trees throughout the site.

Benefits/Results

The waivers to local and county regulations created a community with country lanes, mature trees, and a rural feeling. Northridge received an Urban Wildlife designation from the Urban Wildlife League and the Izaak Walton League Chesapeake Bay Conservation award. A full range of housing from affordable entry level through luxurious executive housing has been provided in a environmentally-sensitive manner.

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Park Progress...For The Next Generation

Fairfax County, Virginia

Background

Fairfax County, a jurisdiction encompassing 399 square miles and over 800,000 residents, set out to provide a county park comprehensive plan. Responsibility fell to the Fairfax County Park Authority, a local government agency whose mission includes setting aside public spaces for the protection and enhancement of environmental values, diversity of natural habitats and cultural heritage to guarantee that these resources will be available for future generations.

Project Description

The comprehensive plan sets forth countywide policies, planning recommendations and programs intended to guide park progress for the next generation. One policy is to identify Biodiversity Conservation Areas to promote ecosystem management and, in conjunction with the Greenways Program, identify larger stream valleys outside these areas which afford opportunities to protect areas of sensitive riparian habitat, water quality and aesthetic values.

The plan is in final draft form and is being circulated for review and comment from other county agencies and key constituency groups. Formal adoption of the plan will precede preparation of the County Policy Plan during the 1996 Policy Review Year.

Benefits/Results

Key issues have been identified, data has been gathered and analyzed concerning resource supplies and needs, key constituency groups have been involved, criteria and standards have been established for resource protection, land acquisition, facility development and program service delivery, and policies and priorities have been determined. The plan provides the foundation and framework for long range planning decisions.

Costs/Funding Source

Funding comes from the Fairfax County Park Authority budget.

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Primary Development Boundary

Spotsylvania County, Virginia

Background

Spotsylvania County encompasses over 400 square miles between Washington, D.C. and Richmond. According to the 1990 Census, it is the fastest growing county in Virginia with over 60,000 residents. As part of the Code of Virginia, the county is required to review the Comprehensive Plan every five years. The current Plan is the culmination of two and half years of intensive work by the Board of Supervisors, the Planning Commission, the Planning Advisory Committee, the Technical Advisory Committee and the consultants, Mary Means and Associates. The Planning Advisory Committee developed planning goals for economic development, housing, community facilities, transportation, natural and cultural resources, and land use that formed the basis for establishing the Primary Development Boundary.

Project Description

The Primary Development Boundary defines the areas of the county in which sewer and water service will be provided. By establishing such a boundary, the county will be able to encourage more efficient uses of land while preserving the rural character of those portions of the county outside of the boundary.

Two land use planning districts are of special significance to the Comprehensive Plan since they have the most impact on the future of the county. The Primary Settlement District represents the portion of the county that is already substantially developed and is slated to receive additional public services. The Transition District surrounds the Primary Settlement District. It contains some of the same development patterns found in the Primary Settlement District and will eventually support a similar density. However, the county does not plan to fund extensions of sewer and water service. Public facilities will be the responsibility of the developer.

By creating these two districts, the Plan encourages the development of mixed-use centers surrounded by residential neighborhoods. This type of development adds to a sense of community and creates viable town centers located in compact clusters.

The county also employs mechanisms to protect water quality. A zoning ordinance is in effect that includes two overlay districts, the River Protection and Reservoir Protection Districts.

Benefits/Results

The Comprehensive Plan is the result of a broad-based citizen participation process that focuses on the county's future and provides a framework for future decision-making. Public participation included workshops, vision forums, a citizen-based Planning Advisory Committee, and surveys. The Plan sets the goals that guide more detailed planning for long- and short-term objectives. The county's ultimate development pattern will be based on the long-term commitment to maintain distinct suburban and urban areas.

In order to achieve the goals and realize the visions, the Plan provides for specific refinements to existing subdivision and zoning controls, planning methods that incorporate flexible techniques, and construction standards for public facilities. The Plan also seeks to promote increased participation by the private development sector in paying for costs associated with the provision of public facilities.

Costs/Funding Source

The county received a Chesapeake Bay Local Assistance Department grant and a National Park Service Battlefield Protection Program grant. Other costs were absorbed by county government funds.

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Quarter Century Committee

Wicomico County, Maryland

Background

Wicomico County is experiencing rapid population growth in both the City of Salisbury and the smaller townships. It is expected that by the year 2025, there will be an additional 40,000 to 75,000 persons living in the county which will call for at least twice the present level of public and private services.

With this awareness, the County Council appointed 31 people to serve on the Wicomico County Quarter Century Committee. Over a three year period, this county-wide Committee examined the significant problems facing the community in the coming decades. The Committee's mission was to study the major development issues, assess the county's long-term needs, and develop a strategic plan of action.

Project Description

Four strategic issues were targeted for examination — growth management, economic development, infrastructure and governance, and education. The 1995 Quarter Century Report, *New Directions for a New Century*, presented the findings of the Committee on each of these topics. A video by the same name was developed to target a wider audience and to encourage community concern for the consequences of the dramatic growth occurring in the county.

Growth Management	The Report stresses the need to preserve the unique attributes of the county — open space, rural atmosphere, rivers and marshes — that contribute to the quality of life of the region. Suburban sprawl is to be avoided by promoting growth within urban areas and rural towns.
Economic Development	A diverse economy equals a strong economy which means that Wicomico County must be able to adapt to market changes and business fluctuations. This has direct consequences for land use, transportation, housing, and community facilities and services.
Infrastructure and Governance	The Committee pointed to the fact that as long as policies encourage growth beyond urban services, implementing the solutions will become more difficult politically and more costly.
Education	Improving the quality of life in the county means expanding the educational opportunities for its children. Technology will play a major role in improving the return on investment in education.

Benefits/Results

The Quarter Century Report was presented to the Wicomico County Council on August 15, 1995. The Council accepted the Report and the Chamber of Commerce later endorsed it. Presently, the Greater Salisbury Committee is reviewing both the Report and the video.

Both products will be used for a Wicomico County speaker's bureau that will promote sound growth management for the county. By bringing the message to the people, more pressure will be exerted on public officials to make the proper decisions for Wicomico County.

Costs/Funding Source

The County Council provided funding for the project out of its budget. Committee members served voluntarily.

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Rural Clustering & Density Exchange Option Overlay Districts

Howard County, Maryland

Background

Howard County has grown very rapidly in the past twenty-five years due to growth pressures from both the Washington and Baltimore markets. By the late 1980s, Howard County's rural character was rapidly becoming suburban and there was strong public concern about the impact of continued growth on the county's remaining rural character and natural resources. Consequently, the County's General Plan was amended in 1990 to include an integrated package of new land use and growth management policies. Central to this new approach was the concept of clustering new development to preserve agricultural land and sensitive environmental resources.

Project Description

Three new rural cluster zoning districts were established in September 1992 to guide development in rural western Howard County. The county's objectives for these areas, which are located outside beyond planned water and sewer service areas, are:

- to preserve agricultural land in large blocks;
- to direct rural residential development to locations that will minimize conflicts between agricultural and residential uses; and
- to cluster residential development so as to protect agricultural, environmental, and scenic features.

Key elements or features of the three rural cluster districts are:

RC - Rural Conservation

Agricultural uses have priority in this district. Residential use is permitted at a density of 1 dwelling unit (du) per 4.25 acres, however, clustering is mandatory on all parcels 20 acres or greater. Cluster lots may be no larger than 60,000 square feet and may be as small as 33,000 square feet, if a shared septic drainfield is used. Cluster lots are to be located where they least impact important agricultural or natural features. These resources must be protected by a permanent preservation easement, which covers 60 to 80 percent of the property, depending on lot size.

RR - Rural Residential

This district is one wherein extensive subdivision has already taken place. It is intended to accommodate much of the demand for rural residential development as infill. Clustering is optional, at the same density as the Rural Conservation district, but not mandatory. Non-cluster subdivision is permitted utilizing the three acre minimum lot size of previous zoning. However, non-cluster subdivisions typically only achieve densities of 1 du per 4.5 acres due to soil qualities and septic drainfield limitations. Thus, the cluster and

non-cluster options are comparable in terms of yield or number of lots generated.

Density Exchange Option

The DEO district is an overlay district that covers all lands zoned RC and RR. In order to permanently protect large agricultural parcels, density may be exchanged between qualified sending and receiving parcels. A slight density bonus is offered (one dwelling unit per 3 acres) if density is exchanged to the RR district or to small parcels which are infill between existing subdivisions in the RC district. Density may be exchanged (without the density bonus) to other parcels in the RC district. The intent is to give farmers considerable flexibility in transferring density away from the best farms to those locations which have the least long term viability for agriculture.

Benefits/Results

There are approximately 40 subdivisions currently in process in western Howard County. Most of these are cluster subdivisions. Even in the RR district where clustering is optional, property owners and developers have generally chosen clustering for four reasons:

1) There is strong demand for cluster lots (most people do not enjoy mowing three to five acres). Lot prices vary much more by location than by size.

2) Cluster and non-cluster subdivisions generate roughly the same number of lots, but cluster subdivisions have less development costs (reduced road construction, stormwater management and grading).

3) The property owner still retains (or may sell) a large percentage of the property, which is permanently protected as a farm or estate lot.

4) Everyone (owner, buyer, neighbor, government) feels better when a property's unique features are protected, rather than destroyed by development.

There are five DEO subdivisions currently in process. These are defining the market in terms of both the purchase price for the lots which may be exchanged and the acceptability of slightly increased density in the receiving subdivision (maximum of 1 du per 2 acres).

The application of these three zoning districts in combination serve to concentrate development on the least environmentally sensitive locations. The most sensitive features (streams, wetlands, riparian buffers, floodplains, 25 percent or greater slopes and priority forests) are permanently protected either as county open space or via a permanent easement.

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Rural Village Community Design Guidelines

Loudoun County, Virginia

Background

Loudoun County was interested in establishing a framework to provide for the development of new rural villages at a scale intended to continue Loudoun's traditional rural land use pattern and to promote its traditional concept of villages. Loudoun County adopted its first rural village policies and zoning ordinance district in 1991. On December 21, 1994, the revised Rural Village Community Design Guidelines were adopted by the Board of Supervisors as amendments to the Loudoun County Choices and Changes General Plan and the Loudoun County Zoning Ordinance.

Rural villages represent one of the county's preferred rural development options due to their ability to enhance the natural landscape and scenic vistas of the region, while retaining, preserving, and protecting farmland, open space, natural resources, and environmentally-sensitive areas from three acre by-right development. Their creation is intended to provide physical, social, and economic centers for Loudoun County.

Project Description

Rural villages are envisioned to be self-sustaining communities. Villages are a minimum of 300 acres, with no less than 80 percent of the gross land area being subject to a permanent open space easement and no more than 20 percent of the gross land area constituting the village center. A village center and a village conservancy, which is the open space surrounding the village center, constitute the two subdistricts of the rural village.

The maximum residential development potential of a village is no greater than one dwelling unit per three-net acres. To reach the 300 unit cap, a 35 percent dwelling unit bonus is provided as an incentive for selecting the village option. An additional 15 percent bonus density is provided if a mix of unit types within a village is developed.

The village center includes residential neighborhoods, complemented by civic and business users, and parks, squares, and greens. Land for the development of retail services is required to be reserved until the development of such services are marketable and/or economically viable.

The village conservancy consists of farms, forest, and open space which act as a buffer between village centers and the surrounding rural areas. The land is permanently protected from subdivision of lots averaging less than 50 acres with one principal structure per lot, and subject to the dedication of common open space conservation easements. Bonus density in excess of the 300-net cap can be achieved by developing 100 acre conservancy lots.

A key component of the village is the requirement that the village center be served by a communal water supply system and wastewater system. The cost for developing the system is financed by the owner and is operated by the Loudoun County Sanitation Authority.

The preservation of existing trees, hedgerows, and other natural vegetation during design is encouraged. Landscaping is another important component of the village. Trees are planted along streets to complement housing.

Benefits/Results

The guidelines are serving to protect the rural environment of Loudoun County. Two development proposals have been submitted since the ordinance was revised. Both designs attempt to protect the environmentally-sensitive portions of the sites.

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Sustainable Technologies Industrial Park

Northampton County, Virginia

Background

Between the Chesapeake Bay and the Atlantic Ocean, lies the narrow peninsula Cape Charles, also known as Virginia's Eastern Shore. The southern tip of the peninsula is within Northampton County. The county has created and adopted a Sustainable Development Action Strategy and is working to simultaneously invest and protect its assets in order to build a strong and lasting economy and preserve one of the unspoiled places on the Atlantic coast.

One of the actions called for by the Strategy is development of the Port of Cape Charles Sustainable Technologies Industrial Park (STIP) at the historic Chesapeake Bay town of Cape Charles. The Park has been chosen as a national prototype by the President's Council on Sustainable Development. The industrial park's planning, design and development process serves as a model for community sustainable development.

Project Description

The Sustainable Technologies Industrial Park is being developed jointly by Northampton County and the Town of Cape Charles to meet the high standards of national and multi-national businesses which have made a commitment to profitability with environmental and social integrity. It will demonstrate advanced facilities in resource efficiency and pollution prevention and will model symbiotic relationships among industrial processes. The Sustainable Technologies Industrial Park is set to support existing local enterprises while also attracting new industry which models sustainable products and sustainable means of producing such products Located in a critical area in the Chesapeake Bay watershed, the industrial park is designed to protect and enhance the cultural and natural systems of the area.

The Cape Charles site is one of four model industrial park designations nationally. The Eco-Industrial Park (EIP) concept integrates economic and environmental management strategies — the goals of which have sometimes worked against one another when used independently to solve isolated environmental problems. Some of the strategies include:

Pollution prevention	The park builds upon the foundation of pollution prevention, which evolved in an attempt to reduce the production of waste at the source.
Industrial ecology	In the EIP, interconnected materials and energy flows reduce both wastes exported and resource inputs needed.
Sustainable development	The park minimizes the use of limited natural resources and strives to achieve high per capita consumption and distributional equity.

Ecological economics

The park's development will be enhanced by the integration of traditional economic and business analysis concepts with an in-depth understanding of natural systems.

Benefits/Results

To facilitate park design and development, Northampton County and Cape Charles hosted an initial design and development community workshop in February 1995 and an April community design workshop which brought together local citizens; prospective industry tenants; potential public and private investors; local, region, state and federal officials; regulatory agencies; and design professionals.

An overall master plan was designed for a 500-acre site that includes roads, storm and sanitary sewers, water and stormwater management, and wetland tertiary treatment for water recycling. The design integrates the industrial park with the historic town and harbor and includes redevelopment of former industrial areas. Fully half of the site is "ecological infrastructure", including a Chesapeake Bay Coastal Dune Habitat Preserve, natural and created wetlands, and historic/archaeological sites.

As plans are finalized, local sponsors are working on an detailed master plan elements, infrastructure design, and STIP development standards for incorporation into public zoning and private covenants.

Costs/Funding Source

Existing: $500,000 county funds for land acquisition; $65,000 National Oceanic and Atmospheric Administration (NOAA) funds for community workshop and design; ($55,000 part of $700,000 NOAA County-wide Special Area Management Plan/Sustainable Development Initiative); $267,000 county funds for infrastructure construction; $60,000 NOAA funds for habitat restoration/nature trail; $5,000 NOAA funds for wetland park design; $46,000 NOAA funds for education/public information; $200,000 EPA funds for environmental assessment of brownfield redevelopment areas.

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Transfer Development Rights Program

Calvert County, Maryland

Background

Calvert County was the first county in the state to adopt an Agricultural Preservation Program. The county has a goal of preserving 80 percent of the remaining farm and forest land and has identified areas considered unique and sensitive in the area. The long range goal for the program is to preserve 20,000 acres by the year 2000. A method of safeguarding these areas is through the use of Transfer Development Rights (TDR), which has been in effect since 1978.

Project Description

Under the terms of the program, owners of prime farm and forest land may sell their rights to develop their property while retaining the land for farming and forestry. A major feature of the program is that owners may sell their development rights on the open market, but the total number of lots does not increase. For every five TDR's, the purchaser may create one lot. Density may not exceed two acres per lot except within a mile of Town Centers where a one acre density is permitted.

In 1993, this program was expanded to include a Purchase and Retirement Fund (PAR) for the purchase of certified development rights. This is a matching fund of county and state monies from the Agricultural Transfer tax. Once "purchased and retired", the acres become permanently preserved. Additionally, once the TDR's are purchased, through any means, they become permanently preserved.

In 1993, Calvert County also adopted a Mandatory Clustering Provision. Under the terms of this program, residential density remains the same, but 50-80 percent of the land in all new subdivisions is preserved as open space. The three new overlay districts are 1) a Farming Community District intended to help maintain large, contiguous, unfragmented farming and forested areas; 2) a Resource Conservation District intended to protect areas having unique or significant environmental features; and 3) a Rural Community District intended to provide for a balanced mix of farming, forestry, wildlife habitat and low density residential development.

Benefits/Results

Since the implementation of the TDR Program, over 7,000 acres have been permanently preserved through the county program and an additional 3,580 acres have been permanently preserved through the state program.

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Transit District Overlay Zone

Prince George's County, Maryland

Background

The Transit District Overlay Zone (TDOZ) is used to designate areas suitable for transit-oriented development and redevelopment. The overlay encourages coordinated and integrated development schemes for certain properties within a half-mile distance of existing and planned transit stations.

Project Description

The TDOZ is intended to insure that the development of land in the vicinity of Metro stations maximizes transit ridership, serves the economic and social goals of the area, and takes advantage of the unique development opportunities which mass transit provides. The TDOZ is a mapped zone which is superimposed over other zones in a designated area around a Metro station, and which may modify certain requirements for development within those underlying zones. This designated area is called a Transit District.

A Transit District Development Plan must be approved by the District Council, and all development is subject to the approval by the planning board of a Detailed Site Plan. This process coordinates public policy decisions, supports regional and local growth and development strategies, and creates conditions which make joint development possible.

Benefits/Results

The TDOZ ensures that developments within the Transit District possess a desirable urban design relationship with one another, the Metro station, and adjoining areas. Costs of extending or expanding public services and facilities are minimized by encouraging appropriate development in the vicinity of transit stations.

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Woodlake Residential Community

Richmond, Virginia

Background

East West Partners has been developing environmentally sensitive residential communities for more than 20 years. The company is particularly committed to preserving and integrating mature forest stands into its development projects. Admittedly, monetary gain is important to the company, which understands that beyond providing important environmental benefits such as reducing runoff velocities, filtering pollutants, and producing CO2, mature trees can enhance the marketability of a residential development. The company has developed notable projects across the United States, some in the Chesapeake Bay Watershed.

Project Description

The Woodlake residential community development, located near Richmond, is one such project. Located on the shores of a 1,700-acre fresh water reservoir which provides more than 12 million gallons of drinking water daily to Chesterfield County, development objectives for this 4,000-acre site included both protection of significant tree stand and the reservoir. Measures taken by East West Partners throughout the development process stressed reduction of impacts to the reservoir and surrounding environment. These measures included establishment of an advisory committee to identify and assess potential impacts to the drinking water reservoir, and application of environmental guidelines to the development that were more stringent than those required by the local planning department, conservation of significant forest stands is a key part.

Advisory Committee. East West Partners initiated the development process by convening an advisory committee to identify and assess potential development-related impacts to the drinking water reservoir. The advisory committee, comprised of technical professionals and academics, made recommendations on setback and stormwater runoff requirements. Issues of concern and resultant recommendations put forth by the committee were incorporated into project design, including Best Management Practices for the control of stormwater runoff.

The Development Process-Environmental Guidelines. Environmental objectives were subsequently integrated into each phase of Woodlake's development process which includes: planning; siting; construction of utilities; and post-construction.

Planning Phase. During the planning phase, areas with significant tree cover were identified. Other physical characteristics identified include wetlands, flood plains, steep slopes, water courses, and highly erodible soils. This information was mapped then used to establish buffer areas and open space; typically, 20 percent of the development is designated as buffer or open space. Once buffer/open space was established, access roads, amenities, and neighborhoods were mapped.

Siting. East West Partners stipulate that siting decisions made at the lot-level must minimize removal of significant trees. An architectural review committee aids in this process. Prior to constructing a home, the builder or homeowner is required to submit a site plan to the architectural review committee showing location of the house, driveway, any decks, porches, or outbuildings as well as significant trees. A member of the review committee visits each site before construction begins to ensure that the site's layout results in minimal impact to the natural resources.

East West Partners policy specifies that significant trees be located at least 15 feet from the house's foundation. Previous experience showed that trees located between 8 and 10 feet of the foundation resulted in either death to trees or significant structural problems with the foundation.

Construction of Utilities. Contractors are instructed to clear the minimum right-of-way width and are prohibited from running their equipment elsewhere. Sewer and water lines, gas, electric and telephone lines are placed in the road right-of-way whenever possible. Utilities are placed to minimize the need to run them cross country.

Post-Construction/Homeowner Covenants. Protection of significant trees carries on through the covenant process after the homeowner has occupied the home. East West Partners routinely establishes covenants that are passed onto the Community Association after the development company has completed its process. The covenants require that any trees larger than six inches in diameter at a point two feet above the ground be removed only with the consent of the Community Association. Consent to remove the trees will only be granted if they are dead, jeopardizing a foundation, or on a site where an approved addition to the home will be constructed.

Benefits/Results

The Woodlake development has received recognition from the Urban Land Institute as an outstanding example of residential, planned community design. Particularly notable benefits of the development process include:

- protection of environment
- integration of wooded areas and built areas
- preservation of significant tree stands

Water quality monitoring, conducted for more than ten years at this site, has shown that post-development pollutant loads are relatively low.

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Watershed Management

An Introduction

The Chesapeake Bay Issue

The Chesapeake Bay watershed, which includes parts of six states and the District of Columbia, is the largest and most productive estuary in the nation. The 64,000 square mile drainage basin or watershed is host to a number of ecologically and economically valuable aquatic species such as blue crabs, striped bass and oysters. The Bay's freshwater originating from springs, streams, and rivers mixes with the saltwater of the ocean to form the watershed's esturine system. The system is highly productive, providing spawning habitat and food sources for a diverse number of aquatic and terrestrial species. The intricate relationships between those organisms and their habitats play a vital role in the overall health of the Bay.

The focus of the Bay Program's watershed management effort is on the restoration and protection of the Bay's living resources. In meeting this objective, the Bay Program is reducing nutrients and toxics, restoring habitat, addressing land stewardship issues and providing public information to increase Bay awareness. The Bay's watershed management effort has reduced nutrients and toxics, and increased the populations of certain living resources including the striped bass. The Bay Program is supported by an innovative monitoring program and a state of the art modeling program. These tools provide the Program with the necessary information to make decisions that improve the overall quality of the watershed.

The Chesapeake Bay program is the model for watershed management nationwide. A diverse group of stakeholders, including scientists, managers, citizens and local governments jointly establish the goals and objectives of the program. They work cooperatively to restore and protect the Bay. These partnerships are at the foundation of the program which draws on people's expertise to make sound watershed management decisions.

The watershed management approach is an integrated strategy for more effectively restoring aquatic resources. This approach focuses on hydrologically defined drainage basins rather than on areas arbitrarily defined by political boundaries. Thus, for a given watershed, the approach encompasses not only the water resource, such as a stream, river, lake, estuary, or aquifer, but all the land from which water drains to the resource. To conserve water resources, it is increasingly important to address the condition of land areas within the watershed. As water drains off the land or leaches to the groundwater, it carries with it pollution and nutrients that are ultimately harmful to Bay life.

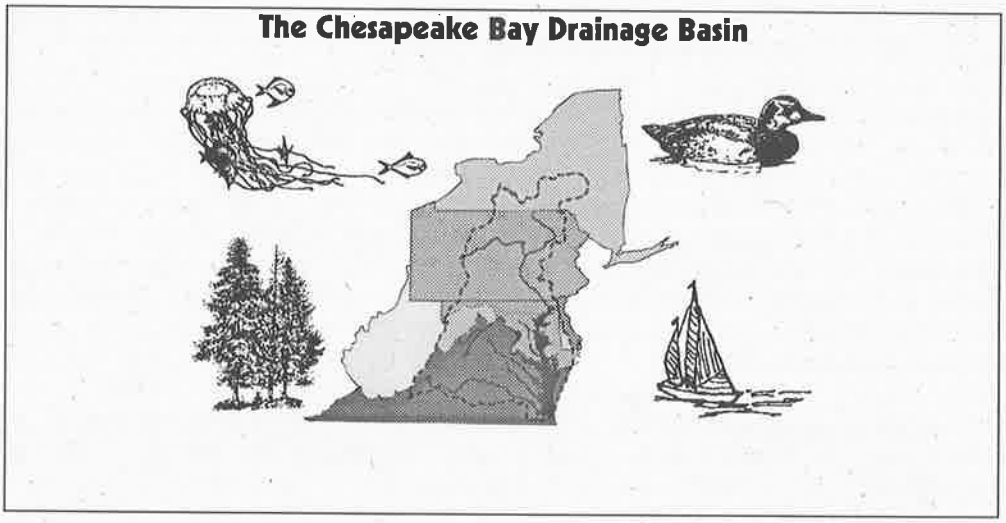
The Local Challenge

The watershed management approach is characterized by being action oriented, driven by broad environmental objectives, and involving key stakeholders. Watershed management emphasizes a cross media approach, addressing water quality issues through the protection of biological and physical systems and the reduction of pollution.

Local governments and citizen groups are recognizing the need to take an integrated approach to environmental protection activities. For instance, stream clean-ups now include tree planting and other preventive activities to ensure a sustainable environment. This recognition at the local level supports the overall goals of the Bay Program and assists in the protection of neighborhood watersheds, as well as the Chesapeake Bay.

The following case studies depict selected watershed protection efforts in the Chesapeake Bay Watershed. The efforts address not one issue, but several issues to restore and preserve the local watershed.

Environmental Indicators of Watershed Management



Anacostia Watershed Society

Washington, D.C.

Background

The Anacostia River begins inauspiciously at the confluence of several creeks in a working class section of suburban Maryland and flows past some of the poorest neighborhoods in the District of Columbia. The Anacostia Watershed Society (AWS) was formed six years ago with the goal of mobilizing volunteers for tree plantings and clean-ups, persuading local governments to change their priorities to save the environment, and pressuring polluters to clean up their act.

Project Description

The goal of the AWS is a swimmable and fishable Anacostia River by the year 2000. It also strives to restore and protect its local environment for the health and enjoyment of everyone in the community and build a constituency of local citizens to support the agenda of the AWS.

The group is currently working with the U.S. Army Corps of Engineers to dredge mudflats at the Anacostia's edges to tune them into wetlands. By planting moisture-loving plants such as pickerel week and arrow root, the area of wetlands adjacent to the river will double from 30 to 60 acres.

Benefits/Results

The Anacostia Watershed Society has removed 109 tons of debris from the Anacostia River, which involved the participation of 7,000 volunteers from the surrounding neighborhoods. Since 1989, more than 5,760 trees, shrubs and wetlands vegetation have been planted. On Earth Day 1995, the AWS removed 7 tons of garbage from the National Arboretum with the help of 350 volunteers.

The Society's work in restoration, preservation and pollution prevention won it the prestigious United Nations Achievement Award, Sierra Club Outstanding Achievement Award and President's Volunteer Action Award.

Cost/Funding Source

The AWS is funded and supported primarily through membership fees and contributions.

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Big Annemessex River Non-Tidal Wetlands Watershed Management Plan

Somerset County, Maryland

Background

Somerset County is the southernmost county on Maryland's Eastern Shore. The county possesses over 600 miles of shoreline along the Chesapeake Bay, and its character varies from fishing villages and summer homes to marshland and wilderness.

The Big Annemessex River is located entirely within Somerset County, and palustrine non-tidal wetlands occur throughout the watershed, including forested, shrub-scrub and emergent systems.

The development of this non-tidal wetlands management plan for the Big Annemessex River watershed was accomplished with the intent of adhering to the certification standards of the Water Resources Administration of the Maryland Department of the Environment (MDE). The management plan, which was certified by MDE in September 1995, will be the basis of state non-tidal wetland permitting decisions and approval of mitigation in the watershed. The non-tidal wetland management plan supports a commitment of the 1987 Chesapeake Bay Agreement and satisfies a regulation from Maryland's Non-Tidal Wetlands Protection Act, a derivative of the 1987 Chesapeake Bay Agreement.

Project Description

The purpose of developing the watershed management plan for the Big Annemessex River is to protect valuable non-tidal wetlands and habitat for threatened and endangered species; to provide a measure of economic and social stability by offering guidance to where development might best occur; to direct mitigation to suitable sites; to address issues of flood management and water supply as applicable; and to protect the water quality of the watershed. Watershed protection has become the management technique for preserving vital habitat, including wetlands, and reducing toxics, nutrients and other harmful contaminants entering the Annemessex and the Chesapeake Bay. The goals of the Big Annemessex watershed management plan are:

- identify non-tidal wetland resources, and develop appropriate protection strategies based on a functional assessment;
- establish recommendations for development activities related to non-tidal wetlands;
- identify potential non-tidal wetland mitigation sites;
- address issues related to flooding within the watershed, and develop recommendations; and
- address issues related to water supply and develop recommendations.

Benefits/Results

The Big Annemessex Management Plan, intended as a State of Maryland model for non-tidal wetland management, has been successful in identifying wetlands in an entire watershed and identifying the functional values of those wetlands. Those functional values were characterized and placed in one of the following categories: ecological integrity, wildlife habitat, finfish habitat, flood control, sediment trapping, nutrient attenuation, groundwater discharge or production export. In addition to establishing the functional values of wetlands, a criteria was developed to rate each wetland in the watershed. These ratings were dependent on a number of criteria including historical records of endangered species inhabiting the site, location of state champion plant specimen; and if the wetland is within the County Groundwater management area "A". With this criteria the Management plan was able to determine what non-tidal wetlands have the highest value.

Somerset County has proposed including the Big Annemessex River Watershed as a "Sensitive Area" in its Comprehensive Plan which is currently being revised to comply with Maryland's Growth, Economic Development and Resource Protection Act of 1992. The county's objectives for this area and other areas where non-tidal wetland watershed management plans may be prepared in the future are to:

- encourage development design that first avoids and then minimizes adverse impacts to the non-tidal wetlands based on consideration of existing topography, vegetation, fish and wildlife resources, and hydrological conditions;
- encourage development design that minimizes degradation of ground water of surface water;
- encourage development design, and mitigation when required, that is consistent with non-tidal wetland watershed management plans certified by MDE.

In addition, the county and MDE have agreed to a joint permitting process that will streamline non-tidal wetland permitting in the watershed. Development projects that meet criteria established in a special overlay zone being proposed for the Big Annemessex River Watershed and that are found to be consistent with the Big Annemessex River Non-Tidal Wetlands Watershed Management Plan will be eligible for this accelerated review and approval process.

Costs/Funding Source

Funding for the study came from the Maryland Department of Natural Resources, through a grant provided by the Coastal Zone Management Act, administered by the National Oceanic and Atmospheric Administration. The management plan was developed with the help of state and county agencies and community participation in the form of a citizen's task force.

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Chesapeake CARE - Pennsylvania

Octoraro Creek Basin, Pennsylvania

Background

Octoraro Creek is located in Lancaster and Chester Counties, Pennsylvania, and reaches the Susquehanna River at Octoraro, Maryland, about eight miles upstream from the head of the Chesapeake Bay. The watershed covers approximately 208 square miles between the neighboring states. Studies have shown that the basin's drainage is highly impacted by agriculture. The drainage was rated as having the third worst agricultural pollution potential index in the state. The Octoraro Creek Basin represents one of the most significant examples of the loss of wildlife habitat to intensive agriculture in the nation.

Project Description

CARE is an acronym for Conserving Agricultural Resources and the Environment. CARE- Pennsylvania is an on-going wetland and riparian restoration program that will reduce agricultural non-point source pollution and improve fish and wildlife habitat in the Susquehanna River basin over a proposed four year period. The program will include streambank fencing and restoring riparian areas, restoring wetlands, and reestablishing stands of native warm season grasses. The emphasis in wetland areas will include fencing out cattle and the restoration of hydrology by blocking tile drains, filling ditches, and constructing dikes to recreate wetlands. In-stream measurements of sediments, macrovertebrates, and fish populations will be taken before and after the project is implemented as well as on-going monitoring of water quality at selected wetland restoration sites.

Benefits/Results

The primary goal of the project is to demonstrate the effectiveness of combining proven habitat restoration and improvement techniques in a watershed treatment program. Wetland and riparian vegetation will start to develop as soon as the areas are protected and will dominate the sites by the end of the first growing season. Wildlife use of the areas will parallel the development of the vegetation. Invertebrates rapidly colonize restored wetlands and form the basis of much of the avian food chain. Native grasses take about two years to fully dominate the site.

Costs/Funding Source

The cost of fencing riparian areas will average approximately $5,000 per mile of protected stream. Wetland restoration will average about $500 per acre, depending on size and topography. The approximate cost to establish one acre of warm-season grasses is $125. Estimated total cost of the four year project is $1.5 million. The primary sources for funding are Ducks Unlimited, National Fish and Wildlife Foundation, Pennsylvania Department of Environmental Protection and tentatively, a section 319 grant from the U.S. Environmental Protection Agency.

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Chickahominy Watershed Project

Chickahominy River Watershed, Virginia

Background

The Chickahominy River Watershed is a 470 square mile watershed which drains through extensive forested wetlands and tidal marches and empties into the James River. The River is one of the cleaner tributaries to the Bay, providing important wildlife habitat in the marshes, swamps, river and surrounding lands. The Chickahominy Watershed Alliance is a group that works to restore habitat, sponsors river clean-ups, and conducts field trips and educational meetings.

One such as activity is the Chickahominy River Watershed Project, a cooperative effort with the Alliance for the Chesapeake Bay and the U.S. Fish and Wildlife Service to identify how natural occurrences and human activities affect biotic diversity over time.

Project Description

The project is supported by a Technical Committee and Citizens Steering Committee. The Citizens Steering Committee is composed of residents of the watershed who share a common interest in the Chickahominy River. It uses the information from the project to promote conservation and stewardship of the natural resources of the Chickahominy River watershed. The Committee organizes educational events and field days to inform the public about the Chickahominy River watershed, its natural resources, the watershed project, and conservation activities.

The Technical Committee, documents the relationships between hydrology, water chemistry, and biotic diversity. It analyzes the effects of human-induced and natural changes from the 1950s to the 1990s using GIS. This information is provided to the Citizens Steering Committee and local, state and federal agencies, so that they may ensure the long-term sustainability of biotic diversity and economic prosperity in the watershed.

Benefits/Results

Five community informational/organizational meetings have been held. During the spring of 1995, the Chickahominy Watershed Alliance organized several activities, including a canoe/field trip, a river clean-up, and a habitat restoration project. The GIS mapping of land cover is expected to be integrated with other information by late 1995.

Costs/Funding Source

The U.S. Fish and Wildlife Service receives assistance from the Alliance for the Chesapeake Bay for GIS based research integration and bird and vegetation studies. The U.S. Geological Survey and the City of Newport News provide assistance for water quality data. The Virginia Department of Game and Inland Fisheries assists in the fish survey. The Virginia Coastal Program provides $45,000 for reforestation projects.

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Dragon Run

Dragon Run Watershed, Virginia

Background

The Dragon Run is a unique watershed that borders four counties in the southwest portion of the Chesapeake Bay Watershed in East-Central Virginia — Middlesex, Essex, King and Queen, and Gloucester Counties. The Dragon Run or Dragon Swamp flows into the Piankatank River then directly to the Chesapeake Bay. The river meanders through the counties and into the Piankatank, hosting the occasional canoeists enjoying the River's pristine natural habitats and unique wildlife.

Project Description

The natural qualities of the River is the reason the Middle Peninsula Planning District Commission (MPPDC), in conjunction with the six counties and three towns that make up its membership, worked cooperatively to provide reasonable public access and a Dragon Run Conservation District.

The Dragon Run Public Access Plan was developed to provide hikers and canoeists with adequate access without disturbing the balanced ecological relationship that now exists along the Dragon. The plan itself has been a success and more people than ever are enjoying the Dragon without disturbing its delicate natural balance.

The Conservation District has been a challenging regional effort. The Conservation District provides overlays to certain counties and is part of the zoning district in other counties. The Conservation District protects the Dragon's valuable wetlands from development pressures. Planning for development is essential in the Dragon because of its accessibility to Route 17, which has become a main transportation artery.

The MPPDC is now in the process of developing a watershed management plan that incorporates open space provisions and encourages cluster housing. The watershed management plan will also include an ecological component that establishes the option to protect riparian zones, wetlands and significant habitat.

Costs/Funding Source

In the late 1980s, the Conservation District was adopted which provided staff support and enabled other conservation and protection activities for the river to be developed. However, when financial support came from the National Oceanic and Atmospheric Administration through Virginia's Coastal Resources Management Program (VCRMP), the resource management unit expanded from the river to the entire watershed. The Dragon Run Watershed continues to receive support from VCRMP and the Middle Peninsula Planning District Commission. A recent VCRMP grant provided funds for a canoe access site.

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Environmental Guidelines

Gaithersburg, Maryland

Background

The City of Gaithersburg is located the State of Maryland's technology corridor. Its proximity to the District of Columbia and outlying areas makes this suburban community a desirable place for both businesses and families. Land uses such as business parks, commercial, and residential are common. The city's natural resources, particularly stream systems, have become increasingly degraded with development pressures.

In 1994, the city recognized that existing development standards did not adequately protect the city's undeveloped riparian corridors. This recognition stemmed from a residential development proposal which, while meeting all city development standards, would have encroached significantly on a tributary of the Potomac, the Muddy Branch. Upon review, the City Council noted that Gaithersburg's environmental ordinances were not as comprehensive as the county's (Montgomery), and, subsequently directed staff to develop comprehensive environmental guidelines for development. The Council expressed a commitment to the protection of natural resources being adversely affected by construction activities during the development process.

At that time, the city had in place numerous environmental ordinances, including forest conservation, sediment/erosion control, stormwater management, and floodplain management. While these ordinances provided some protection to the city's environmental and riparian resources, protection was fragmented.

Project Description

In December 1994, the City of Gaithersburg convened a committee of local professionals to work with city staff in the development of comprehensive environmental guidelines. Bi-weekly meetings were attended by local developers, representatives of the Planning Commission and City Council, environmental consultants, regional and county environmental professionals, and city staff. Environmental guidelines developed by Montgomery County in 1993 provided the basis for analysis of the city's existing guidelines. The county guidelines were selected as a model not only because of their comprehensive nature, but to also ease the development process for developers operating in both the city and county.

Over a period of five months, the committee developed draft guidelines for development based on the principles of comprehensive watershed management and protection. The resulting guidelines are more comprehensive, however, in that they relate to other important environmental concerns, including:

- stream valley protection;
- limiting increases in watershed imperviousness;
- protection of both upland and riparian forest resources;
- recognition and protection of the ecological significance and functions of headwater areas;
- the need for baseline monitoring to understand and protect the city's streams;
- the consideration of cumulative impacts;
- protecting wildlife corridors;
- managing for wildlife problems;

- mitigating adverse affects of noise;
- protection of existing cultural resources; and
- protection of important views and vistas.

Management strategies identified to minimize adverse impacts to the city's natural resources, including stream systems, include:

- the application of judicious land uses which allow for limiting impervious surfaces and maintaining wetlands, floodplains, seeps, bogs, in their natural condition;
- the establishment of protected slope areas which address slope gradient, soil erodibility, and proximity to stream channels;
- the use of stream buffers; and
- the protection of healthy forest and tree cover for the purpose of maintaining water quality, preserving wildlife habitat, preventing erosion, mitigating air pollution, controlling temperature, and enhancing community amenities in an urbanizing environment.

Guidelines for the development of a Natural Resources Inventory (NRI) were also established by the committee. The NRI, required prior to development, is a complete analysis of existing natural resources and must contain specific information covering the development site and the first 100 feet of adjoining land. Information pertaining to streams and drainage courses on or within 200 feet of the property must also be provided along with the off-site drainage areas for all streams entering the property.

Benefits/Results

What started with a concern for inadequate protection of riparian buffer systems during the development process, resulted in development of comprehensive environmental guidelines for development in the City of Gaithersburg. Not only will stream corridors be protected, but so will other important natural resources. The guidelines set minimum standards for developers with the hope that even higher standards will met.

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Instream Flow Incremental Methodology

Front Royal, Virginia

Background

The Shenandoah River is extremely important to the municipalities within the Lord Fairfax Planning District Commission (LFPDC) for the purpose of providing a source for domestic water supplies and assimilation of waste materials. As the population within the Shenandoah Valley continues to grow, so does the importance of maintaining the Shenandoah River at its current quantity and quality. An increasing population means that there will be increasing demands for drinking water supplies, industrial water needs, and quality recreational opportunities.

The LFPDC recognized the need for an objective study of the Minimum Instream Flows that are needed to sustain the various uses. The study would provide the specific data that could be used for future planning related to municipal withdrawals, recreational needs, fish and wildlife habitat, and many other river uses. By developing management plans and conducting appropriate studies for critical resources today, future crises may be avoided.

Project Description

The Instream Flow Incremental Methodology (IFIM) is the method that is proposed for the Minimum Instream Flows study. An IFIM study includes six steps:

Step 1	Scoping involves the definition of study objectives, delineation of the study boundaries, determination of the characteristics of the variables, and designation of species of focus and evaluation.
Step 2	Reach delineation and site selection involves identification of major points of interest on maps while taking into consideration the targeted instream values that are the focus of the protection efforts. Attributes and physical geography that will allow for the inclusion of water quality concerns are also considered at this point.
Step 3	Within each study site, transects are selected to characterize the hydraulic and instream habitat conditions. Detailed procedures are specified in IFIM documents for data collection, compilation, and reduction.
Step 4	Processed field data are entered into specific computer programs in order to generate data that describes the reach as a series of small cells. Velocity, depth, substrate, and cover are examples of some of the field data that are input into the model.

Step 5	An assessment of the total habitat of each sampled stream segment for each life stage of a particular species at specific flows is one of the results that can be achieved. Total habitat is expressed as a relationship between habitat availability, water quality, and stream flow.
Step 6	Based on primary interpretation by a biologist, managers and decision-makers can negotiate flow regimes suitable for the evaluation of a particular species of concern while meeting the needs of all users.

Benefits/Results

The overall objective of the project is to complete a scientific study of the levels of instream flow needed to achieve different goals related to instream uses of the Mainstem of the Shenandoah River and its tributaries. The completion of the study will allow for better decisions to be made regarding the goal of striking a balance between instream flow needs and off-stream flow needs during drought conditions. Instream uses include aquatic life protection and water-based recreation. Off-stream uses include municipal water supply, power generation, and agricultural irrigation. The IFIM is a field intensive instream flow method that will allow detailed information concerning water quality and aquatic life to be incorporated into the study.

Costs/Funding Source

The LFPDC received $25,000 in local funds, a $25,000 grant from the Virginia Environmental Endowment, and $40,000 from the U.S. Geological Survey for a total of $90,000. Due to the phased approach of the study, additional funds will be required for future action.

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Parkers Creek Watershed Management Plan

Calvert County, Maryland

Background

The Parkers Creek watershed contains some of the largest unbroken woodlands remaining in Calvert County. These surround non-tidal wetlands and the only pristine saltwater/freshwater marsh on the Western Shore. The creek flows through the woods and marsh, across a barrier beach and into the Chesapeake Bay. The development of the Parkers Creek Watershed Management Plan is the result of a local, state and federal partnership to preserve, protect and manage the natural resources in a watershed that is experiencing rapid growth. The county is experiencing greater than a 4 percent growth rate (the highest in Maryland), but the Parkers Creek Watershed has experienced very little growth except in its northwest section which encompasses part of the Prince Frederick Town Center. It is a goal to preserve as much of this watershed, especially its wetlands, outside of the town center as possible. In addition, the plan seeks to continue to enhance the town center's economic viability. Reaching a balance of sound economic growth with a strong land stewardship ethic is at the center of the Parkers Creek Watershed Plan.

The county's interest in watershed management planning rose out of permitting issues related to development in the county's town centers. The concept of a comprehensive approach to the watershed was an appropriate solution, and with the assistance of Coastal Zone Management Grant funding, the county conducted the Watershed Management Plan.

Project Description

The goals of the Watershed Management Plan are to:

- protect natural resources;
- facilitate economic development in town centers;
- address wetland loss and mitigation on a watershed scale;
- assure public health and safety; and
- encourage public participation.

The county inventoried the natural resources in the region, created a Parkers Creek Watershed Task Force, conducted a functional analysis of wetlands, and drafted the Watershed Management Plan. The functional analysis of wetlands was expanded with the assistance of the U.S. Environmental Protection Agency and Maryland Department of Natural Resources. During the second year of plan development, the county conducted a flood study on a portion of the Parkers Creek watershed which was and is expected to continue to be impacted by development. The U.S. Army Corp of Engineers is currently conducting a hydrologic and hydraulic study on the results of the flood study survey.

Benefits/Results

The plan is in its second and final stage of development. There are already a number of successes, including the creation of a local, state and federal partnership, successful fundraising, and completion of an extensive research effort which includes an inventory of the watershed's natural resources. The Parkers Creek Watershed Management Plan will provide greater protection of the watershed's resources and preserve ecologically sensitive areas in the town center.

Costs/Funding Source

The studies, surveys, and draft watershed plan were funded primarily through the Coastal Zone Management Grant support and with the assistance of the U.S. Army Corp of Engineers and the U.S. Environmental Protection Agency.

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Rappahannock River Watershed Plan

Fredericksburg, Virginia

Background

The Rappahannock River originates at a spring in the Blue Ridge Mountains and flows east to the Chesapeake Bay. At one end it is typical of the streams that course through the farmland of Piedmont Virginia, whereas downstream, the river flows quietly like others in Tidewater Virginia. It is joined in the secluded middle section by the Rapidan River, also a relatively untouched waterway.

In 1969, the City of Fredericksburg acquired nearly 4,800 acres of land from the Virginia Electric Power Company (VEPCO) located along the Rappahannock and Rapidan Rivers and their tributaries. A small portion of these lands (approximately 124 acres) is located within the city. The bulk of the property is in Stafford and Spotsylvania Counties, with portions located in Culpeper, Fauquier, and Orange Counties. Since the City of Fredericksburg is dependent on this river system for its raw water supplies, this acquisition was prompted to protect water quality and sensitive areas from development through public ownership. Lands owned by the city have been maintained in a natural state to provide limited recreational opportunities, preserve cultural resources, and allow the natural ecosystem to mitigate the impact of pollutants and provide flood control.

Project Description

In September 1991, prompted by signs of encroachment by adjacent properties on those riparian lands owned by the city, Fredericksburg adopted the "City Watershed Property Management Policy". This management policy provides for public recreational use of city owned lands, but provides for restrictions on such uses as may be necessary to assure that the lands continue to perform their vital water quality function of restricting non-point source pollution, retarding erosion and sedimentation, and protecting the riverine ecosystem. Uses consistent with these water quality criteria may be allowed by the city manager, but permission must be in writing, must indemnify the city from any liability or cost associated with such use, and must be consistent with the city's Chesapeake Bay Preservation Ordinance.

The city's lands management policy also specifies a degree of regional cooperation. The city manager, for example, is to maintain a liaison with the chief administrative officers of each of the jurisdictions where city owned riparian lands are located. This on-going communication ensures enforcement of regulations related to use of city watershed property and facilitates monitoring of development on lands adjacent to city holdings located.

The benefits of limited regional cooperation which the City of Fredericksburg has derived from its Watershed Property Management Policy led to an interest by the city in establishing an expanded scope of liaison with remaining upriver jurisdictions to begin the process of developing a regional and multi-jurisdictional watershed management policy.

In 1992, a group of interested jurisdictions and organizations began meeting to define issues and needs in the upper Rappahannock basin. The Rappahannock River Watershed Committee was formed to provide a foundation for effective and mutually

beneficial water resources management. The group's guiding principle is to provide for current water needs without compromising the ability of the Rappahannock to provide for the needs of future generations. The Committee continues to meet quarterly to share ideas and exchange information. Under its auspices, the Rappahannock River Watershed Plan was completed in October 1994.

Benefits/Results

The plan is 99 pages in length and pulls together disparate information concerning water quality issues in the Upper Rappahannock Basin under one cover. It is intended to serve as a platform for the continued evolution of a broader regional watershed policy and basis for on-going regional cooperation and interjurisdictional agreements concerning the management of shared watershed resources. The plan emphasizes the need to protect the Fredericksburg-owned land in its natural state as a priority, but clearly sets the stage for a broader base of support for shared regional watershed protection interests.

Cost/Funding Source

None. Costs to prepare the plan were absorbed within the city's budget with work performed by the staff of the Planning and Community Development office.

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Stream Team

Lancaster County, Pennsylvania

Background

The Lancaster Stream Team formed in 1993 to promote the protection and restoration of streams in Lancaster County, Pennsylvania, particularly those flowing through farmland. Despite the rural atmosphere of Lancaster County, the area lacks the substantial forests that help maintain good water quality. The largest river in the county, the Conestoga, carries the highest concentrations of nutrients and sediment of any monitored stream in the Susquehanna River watershed.

Project Description

The Stream Team helps to disseminate information, coordinate programs for landowners, discuss developing technologies, and bring government agencies together with private volunteer organizations which actively promote stream protection. It coordinates the various programs available to landowners who are interested in practices such as stream bank fencing and forest buffers. For example, the group recently completed a flyer describing all the available financial assistance programs for stream bank fencing projects in the county. The group has also initiated a mapping project to record the many stream projects completed throughout the county to better gauge progress. Possibly its most important function is to match potential stream projects with the agency best-equipped to provide assistance.

In its efforts to bring together the public and private sectors, the Stream Team arranged materials for a local fishing group and a dairy farmer who were interested in fencing a pasture stream and planting trees, but had found no assistance that fit their needs. As a follow-up activity, the group will host a public open house to recognize the project.

Benefits/Results

Several streams in the county are targeted for intensive assistance to improve biological and chemical status. A database is compiled as the stream projects are completed. A Stream Team publication lists organizations which provide interested farmers with up to 100 percent funding of streambank fencing. Future projects include a hands-on stream restoration workshop and a section 319 program grant application to target stream BMPs to the entire stretch of Donegal Spring Creek.

Costs/Funding Source

The Stream Team is totally volunteer-sponsored. The possibility is being explored of creating a "Stream Team Protection Fund" for Lancaster County which would help local volunteers finance projects.

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Tiber-Hudson Watershed Partnership

Ellicott City, Maryland

Background

The Tiber-Hudson River has been the backbone of the Ellicott City area since the Ellicott family founded mills along it in the 1700s. The Tiber-Hudson Watershed surrounds the historic district of Ellicott City, flowing through several miles of residences and the historic district into the Patapsco River and the Chesapeake Bay.

Project Description

The Tiber-Hudson Watershed Partnership is an outgrowth of a citizen's task force convened in September 1994 by the Howard County Board of Public Works, in cooperation with the Ellicott City Restoration Foundation. The original focus of the citizen's group was to evaluate and make recommendations about study findings of repairs needed along the course of the Tiber-Hudson River and means of paying for the work. The group addressed these issues in enough detail to realize that improving the flooding, erosion and pollution situations along the river would require unusual cooperation between citizens and government.

The partnership is composed of citizens who meet monthly to discuss needed actions, decide priorities and organize activities to address projects such as stream clean-ups, water quality monitoring, stream buffer plantings, pollutant runoff, and citizen education. Partners from the non-profit, historical, business, and government sectors attend meetings and provide technical information and advice.

Citizens schedule and conduct meetings and events such as stream clean-up in cooperation with Save Our Streams, water quality monitoring in cooperation with Howard County Department of Parks and Recreation and the Chesapeake Bay Trust, storm water management techniques in cooperation with the Howard County Board of Public Works, and erosion control with the Natural Resources Conservation Service.

Benefits/Results

Five teams of citizens doing water quality management are conducting the first multiple point monitoring along the Tiber-Hudson. In the most recent stream clean-up project, 70 citizens removed 6,600 pounds of trash and debris from the river. Funding has been approved in the 1997 budget for additional flood control measures to be done in cooperation with the U.S. Army Corps of Engineers.

The partnership assures that the area expands in accordance with zoning standards currently assigned to it without variances which could harm the watershed.

Citizens have become much more involved in the environmental well-being of their community by engaging in a variety of volunteer projects and being informed of best practices for the locale.

Costs/Funding Source

Funding has been provided by the Ellicott City Restoration Foundation, the Chesapeake Bay Trust, and donations from local businesses. In-kind technical assistance is provided

by organizations such as the Audubon Society of Central Maryland, National Wildlife Federation, Irvine Natural Science Center, Shriver Center at UMBC, Villa Julia College, and Volunteer Maryland.

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Upper Susquehanna Coalition

Bradford County, Pennsylvania

Background

Bradford County has been actively involved in the Chesapeake Bay restoration program since 1987. Early in 1993, with the recognition that 23.3 percent of the Susquehanna watershed is in the state of New York, the Bradford County Conservation District took the initiative to propose developing a coalition of northern Pennsylvania counties along with their neighboring New York counties for the purpose of developing a strategy to address water quality improvement issues common to the region

Project Description

The Upper Susquehanna Coalition developed the "Strategic Plan for Strengthening the Coordinated Regional/Bi-state Approach to protecting and Improving Water Quality in the Upper Susquehanna River Basin". The Plan represents a joint effort between local agencies in Pennsylvania and New York to address non-point pollution problems in the Upper Susquehanna River Basin. Agencies involved include: New York Soil and Water Conservation Districts, Pennsylvania Conservation Districts, Water Quality Coordinating Committees, Environmental Management Councils, Cooperative Extensions, Regional Planning Boards and Resource Conservation and Development Councils. The plan serves to coordinate, stimulate, and secure financial and technical resources for water quality protection efforts in the region. Local governments participating in the development of the plan include three Counties in Pennsylvania (Bradford, Tioga, and Susquehanna) as well as ten Counties in New York (Broome, Chemung, Chenango, Cortland, Delaware, Madison, Otsego, Schuyler, Steuben and Tioga). The Strategic Plan was completed over a period of one year in 1993 through a series of meetings among local government representatives. The Plan defines four major objectives for the region including:

Organization:	to further strengthen the coordinated regional/bi-state approach to protecting and improving water quality in the upper Susquehanna River Basin.
Education:	to foster an increased awareness in the public and private sector of the importance on non-point source pollution and its impact in the upper SRB.
Implementation:	to accelerate the implementation of local strategies that address identified priority non-point source pollution problems in SRB.
Evaluation:	to annually evaluate the effectiveness of the regional/bi-state approach in reducing non-point source pollution in SRB.

The strategic plan identifies actions to be taken and budgets necessary to underwrite the cost of undertaking a number of initiatives to accomplish each of these four objectives.

Benefits/Results

The project has resulted in an active working bi-state coalition of grass roots, local agencies and organizations dedicated to improving water quality in the upper Susquehanna River Basin. Agencies involved are the delivery mechanisms for a host of programs that address water quality improvement. The Strategic Plan has received endorsements from dozens of local governments, agencies and organizations and has raised the importance of the region in the eyes of both New York and Pennsylvania. An associated result has been the organization of a Susquehanna River Conference, "Susquehanna Neighbors: Exploring New Connections", sponsored by the coalition which was held in October 1994.

Costs/Funding Source

At the present time, all coalition members directly contribute to the strategy's implementation. The U.S. Environmental Protection Agency provides support through the CWA 319 Program. The Pennsylvania Department of Environmental Protection funded the conference in 1994.

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Watershed Action Team

Elizabeth River Watershed, Virginia

Background

The Elizabeth River watershed is located in southeastern Virginia. The River runs through the harbor ports of Norfolk, Portsmouth, Chesapeake, and Virginia Beach and is both a sub-estuary of the Chesapeake Bay and busiest port for foreign shipping on the East coast.

The Elizabeth River Project (ERP) is an independent, non-profit organization founded in 1992 to build broad community involvement in restoring the environmental health of the Elizabeth River. The project received funding in fall 1993 from the U.S. Environmental Protection Agency (EPA) and the private Virginia Environmental Endowment to begin a two-year "comparative risk" assessment of the river. Comparative risk is a tool the EPA's Office of Policy, Planning and Evaluation is developing to wed science with public values for better policy decisions. The Elizabeth River basin is the first watershed to become the target of EPA assistance for a comparative risk assessment.

Three Comparative Risk Committees were named in spring 1994 to bring to the table the broadest possible spectrum of civic, military, business, research and regulatory interests. Over a nine-month period, the Citizen/Industry, Government/Agency and Science/Technical committees identified an initial list of areas of concern, analyzed existing data and then sought consensus on a ranking of ten problem areas. They judged each by its relative impact on human health, the ecosystem and quality of life in a 300-square-mile watershed stretching from the Dismal Swamp wildlife refuge to the busy port of Hampton Roads, Virginia. Results were announced at a public conference in Norfolk, Virginia on January 10, 1995.

RANKING

High

Sediment Quality
Non-Point Source Pollution
Habitat Loss
Point Source Pollution (not unanimous)

Medium

Dredging & Dredged Material Placement
Altered Hydrology
Contaminated Groundwater
Hazardous Material Transportation and Storage

Low

Vessel Discharges
Non-Indigenous Species

Phase II was initiated with the formation of the Watershed Action Team in spring 1995.

Project Description

A total of 110 stakeholders are seated on the four task forces of the Watershed Action Team. They began work by drafting a vision statement and taking a boat tour of the river. The group then divided into four task forces which drafted initial goals and developed problem identification and are working on developing an array of state-of-the-art restoration strategies. The four work groups are: Habitat & Living Resources, Water Quality, and Sediment Quality Task Forces and Toxics Reduction Team.

The team's goals are to develop an integrated Watershed Action Plan by February 1996 which will provide recommendations on 1) restoring habitat and living resources, 2) improving water quality, specifically addressing point-source and non-point source pollution and 3) improving sediment quality.

One of the four work groups, the Toxics Reduction Team, was specifically formed to link the Watershed Action Team with the Chesapeake Bay Program's (CBP) Basinwide Toxics Reduction and Prevention Strategy. The CBP's toxics strategy, revised in October 1994, contained a strong regional focus element aimed at cleaning up toxics "hot spots", or Regions of Concern. In the strategy, the Bay jurisdictions agreed to develop and implement Regional Action Plans for the three Bay regions where a significant threat from toxics was well-established. The Elizabeth River, one of these three Regions of Concern, is heavily impacted from decades of industrial, military, and urban contamination.

The Toxics Reduction Team, with technical support provided by the Commonwealth and EPA's Chesapeake Bay Program Office, is developing recommendations which the Commonwealth will utilize in its Elizabeth River Regional Action Plan for Toxics Reduction. ERP hopes to assist the Commonwealth with Regional Action Plan implementation by coordinating community-based initiatives and monitoring progress using environmental indicators.

Benefits/Results

The team will present the final report of their recommendations in spring 1996. Phase III will be a public conference at which the team will present the recommendations and solicit support for implementation.

Costs/Funding Source

Funding comes form both public and private sources. The U.S. EPA provided start-up funds of $74,000 for the two-year Comparative Risk assessment leading to formation of the Watershed Action Team. The toxics work group is being funded jointly by the Elizabeth River Project and the Virginia Department of Environmental Quality ($18,000 from DEQ matched by $16,000 from ERP in private donations). The Virginia Environmental Endowment and the Mary Reynolds Babcock Foundation have contributed significantly, as have local business organizations and environmental groups.

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Watershed Management Program

Prince William County, Virginia

Background

Increased development pressures, and the subsequent effect on the county's water resources, alarmed local Prince William County officials into action. Residential and commercial development was already affecting the rural landscape and wetland and stream habitats of the county, so to deter further degradation, officials developed an environmentally sensitive watershed-wide stormwater management plan. A consortium of federal, state and local partners, including Virginia's Chesapeake Bay Local Assistance Department have worked together to reduce and prevent pollution and improve water quality standards in three contiguous watersheds in the county. These three creek watersheds drain into the Potomac River and eventually into the Chesapeake Bay.

Project Description

The county's stormwater management program addresses four major tasks: drainage, water quality, erosion and pollution control, and flooding.

Three watersheds, Neabsco Creek, Powells Creek and Quantico Creek, each creek in a different stage of development, have been the sites for innovative stormwater control efforts. Neabsco Creek has had the largest loss of vital habitat and reduced water quality because of significant commercial and residential development pressures. Retrofitting innovative stormwater approaches through riparian buffers and stream channel restoration is the focus of this effort.

Powells Creek is just starting to see the effects of some development pressures in its watershed. To prevent the negative ecological effects of development on the natural resources of the region, experts are developing protective measures that can be implemented prior to development.

Quantico Creek runs through a National Park and is the most pristine of the three creeks. The focus in this watershed is to evaluate the quality of water and determine obtainable environmental measures that the other two creeks will eventually achieve through the project's continued efforts.

Benefits/Results

Prince William County's stormwater management program is a success in building partnerships to complete a cross-cutting initiative that serves to satisfy a number of agencies' goals and commitments. The federal, state and local partnership that has been built to complete the project has done just that.

The county's program has also protected and restored valuable stream habitat, improved drainage, water quality and erosion, and established erosion and pollution controls. In completing and continuing to complete these efforts, the partnership has also enhanced the quality of the aquatic system to better support valuable fish and waterfowl species. Finally, the county has instituted a citizen education effort to inform citizens how they can best assist the program in improving water quality and natural habitats.

Costs/Funding Source

The project received funding and technical assistance from Virginia's Chesapeake Bay Local Assistance Department, as well as the U.S. Fish and Wildlife Service and the U.S. Environmental Protection Agency.

In addition, the county has initiated a "fair and equitable source of funding" approach to sustain the effort. Residential and nonresidential owners of developed property will pay based on the amount of impervious area the property has. For instance, single detached homeowners will pay a $1.50 per month or $18.00 a year, whereas townhome and condominium owners will pay just $1.13 per month or $13.56 per year. Fee adjustments or credits may be available if stormwater management already exists on that property. Agricultural croplands and undeveloped properties will not be charged a fee. Using an alternative financing approach to fund the county's stormwater management program has made the program a successful, sustainable activity.

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Water Quality/ Nutrient Reduction

An Introduction

The Chesapeake Bay Issue

The Chesapeake Bay Program recognized early on that to revive the once abundant living resources of the Bay, water quality would have to dramatically improve. The 1987 Chesapeake Bay Agreement committed the Bay Program to six steps to restore the Chesapeake Bay. One of the six specific areas outlined in the Agreement is water quality improvements. The agreement also calls for the 40 percent reduction of nutrients (phosphorus and nitrogen) reaching the Bay by the turn of the century. This commitment was reaffirmed in 1992 with the signing of the Bay Agreement Amendments.

Today, the Bay Program is working to improve water quality by reducing nutrients, improving dissolved oxygen levels and restoring vital habitat. The nutrient reduction effort has been a Bay-wide effort and a key Bay Program commitment.

There are essentially three nutrient reduction priorities being addressed by the Bay Program to reduce the nutrient flows to the Bay: 1) analysis of cost benefits of nutrient reduction technologies and approaches including Best Nutrient Management techniques; 2) urban issues in terms of turf management, combined sewer overflows, and other stormwater discharge impacts; and 3) density issues related to septic systems. These three issues are key to the Bay Program meeting its year 2000 goal of a 40 percent reduction of nutrients to the Bay. These efforts are also essential components to improving the water quality of the Chesapeake Bay's ecosystem.

Recently, the Bay Program focused on tributary strategies which target nutrient reduction, by establishing measurable nutrient reduction goals, in the Bay's major tributaries. With this effort, the Bay Program has literally gone up river to help solve the problem.

The Local Challenge

The water quality of a region such as the Bay watershed has intense ramifications in terms of the economic stability and human health considerations of communities. Local governments can play, and are playing, an integral role in preserving and improving the water quality in local communities and the Chesapeake Bay. Reducing nutrients through landscaping techniques, responsible farming practices, and habitat restoration can be completed with strong community involvement and with the technical assistance from the Bay Program and others promoting the protection of water resources in the watershed. Local strategies for reducing nutrients are being implemented throughout the watershed. The following models will assist your community in addressing the water quality issue to restore the living resources of the Chesapeake Bay and preserve the water resources in your community.

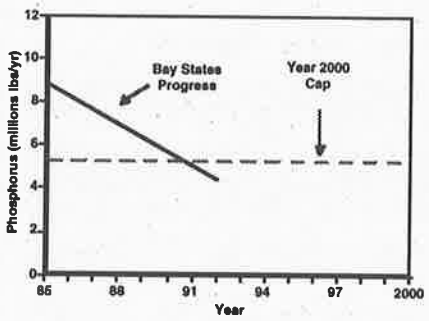
Environmental Indicators of Water Quality/Nutrient Reduction

Point Source Phosphorous Loadings

GOAL: 40% reduction in the 1985 delivered goods by the year 2000.

STATUS: Controllable point source phosphorus discharges, delivered to the Bay, have been reduced by over 40%.

More controls will be necessary to hold this level as the population and wastewater flows in the Bay's basin increases.



Water Quality Monitoring Program Highlights

OBJECTIVES:

- Characterize existing conditions
- Detect changes in water quality
- Understand processes and linkages between water quality and living resources.

APPLICATIONS:

- Evaluate water quality managment programs
- Calibrate and verify water quality models
- Characterize SAV habitat requirements
- Establish a baseline for environmental assessments
- Stimulate research projects on hypoxia, phytoplankton, & fish recruitment

Citizens Water Quality Handbook

Fairfax County, Virginia

Background

The *Citizens Water Quality Handbook* was conceived as the Northern Virginia Soil and Water Conservation District (NVSWCD) prepared to work with citizen watershed groups in Fairfax County. A handbook was needed to educate citizens about non-point source pollution and water quality and to give practical guidelines for improving the quality of water and reducing non-point pollution in their own neighborhoods. The handbook was designed to provide citizens with basic information concerning actions they could take to make a difference and to feel connected to larger watersheds.

Project Description

The *Citizens Water Quality Handbook* is a practical guide to water quality containing a variety of information to aid citizens in the understanding and stewardship of water resources in Northern Virginia. The Handbook clearly explains watersheds, water conservation, non-point source pollution causes and effects, stream management, wetlands protection, water quality monitoring, environmentally friendly lawn and yard care, and the process of organizing watershed groups. Each chapter contains specific steps for "Making a Difference." These steps suggest ways citizens can reduce water pollution, and restore, protect and enhance the water quality in streams and rivers. Individuals and groups interested in learning more about water quality and watersheds or starting watershed initiative projects will find the handbook an excellent resource and guide. For more help, there is a two-page listing of agencies and organizations that provide specific services and information related to water quality in the region.

Benefits/Results

Work on the *Citizens Water Quality Handbook* began in June 1993 and was completed in June 1994. Since the handbook is a new publication, its effectiveness at this point can only be reflected in the enthusiastic and positive comments it has received and the substantial number of requests for copies. The first citizens group to receive the handbook was the "Friends of Sugerland Run", a group founded in 1992 to protect and enhance the greenway surrounding Sugarland Run and to protect the quality of the stream's water. The handbook provided everyone working on this watershed initiative a common knowledge base and source of ideas. The "Friends of Sugarland Run" believe it will help members to be more effective planners, implementers, and spokespersons for watershed protection. It also will be used as a tool to recruit new members.

Because information in the handbook is generic and not site-specific, it has been distributed to every soil and water conservation district in Virginia.

The handbook is also available on the Internet computer network through the Chesapeake BIOS database. The address is gopher.gmu.edu. After accessing the gopher (Mason-Link), select item 9 from the first menu. At the next menu select item 1—Biology Department, then select item 2—Chesapeake BIOS.

Costs/Funding Source

Publication of the *Citizens Water Quality Handbook* was funded by a $1,000 grant from the Virginia Department of Conservation and Recreation, Division of Soil and Water Conservation.

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Conservation District

Adams County, Pennsylvania

Background

The Chesapeake Bay Program formed in Pennsylvania in 1985 in order to reach the 40 percent nutrient reduction goal set by the 1983 Chesapeake Bay Agreement. At that time, the northeastern portion of Adams County, that portion of the county that drains into the Conewago Creek and then into the Susquehanna, was one of the original watersheds given the opportunity to take part in the Bay Program.

Project Description

Farmers in Adams County are eligible for financial and technical assistance to solve nutrient problems including erosion control, barnyard runoff and manure management. Funds are made available to pay for 80 percent of the cost to a maximum of $30,000 for the installation of Best Management Practices (BMP) to control these nutrient problems. The County Conservation District administers this program at the local level for Pennsylvania Department of Environmental Protection (DEP) with technical assistance being provided by the Natural Resources Conservation Service (NRCS).

In 1989, the District did an assessment of the southwest portion of the county, which is part of the Potomac River Watershed, to determine if there was sufficient need to expand the program to this watershed as well. Shortly after submitting the findings to DEP, the southwestern portion of the county was opened to the Bay Program. This in essence, opened the entire county for eligibility in the program.

Through twilight meetings, farm open houses, countless news releases and public speaking engagements, the Conservation District has educated the farming community about the benefits and assistance provided by the Bay Program. Support of the agricultural community is necessary so that the program can become "self-promotional".

Benefits/Results

To date, 63 farmers in Adams County have participated in the Chesapeake Bay Program. The Conservation District has allocated over $1,000,000 to these farms with over $913,000 already spent for the installation of BMPs. Several new applicants are now being proposed and two to three new contracts are expected to be signed by year's end, adding another $60,000 to the amount allocated.

Since 1985 the Chesapeake Bay Program has been quite successful in Adams County. To date the following BMPs have been installed through the Bay Program:

Counter strips	1,458.5 acres
Grassed waterways	43,345 feet
Diversions	24,206 feet
Water control structure	411
Underground outlet	37,413 feet
Subsurface drainage	276,312 feet
Terraces	9,700 feet
Manure storage systems	35
Soil tests	502

Manure tests	37
Nutrient management plans	4,000 plus acres

The estimated savings from these BMPs is quite extensive. Below are the expected savings as determined by District and NRCS staff:

Total Nitrogen (lbs.)	145,362
Total Phosphorous (lbs)	146,524
Total Potassium (lbs)	149,375
Total Erosion Reduction (tons)	11,494
Total Sediment Reduction (tons)	6,910*

** the amount of soil not reaching a watercourse*

Costs/Funding Source

The Conservation District administers the Chesapeake Bay Program locally for DEP who provides a portion of the funding for the program with a larger portion coming from the EPA. Over the years, the county has been more than willing to provide some additional funds for supplies, salary increases and the like. The District has also sought grants offered through DEP's Clean Water Funds to fund a stream monitoring and clean up project being run by two local teachers with high school students. Funding has also been obtained from DEP for promotional meetings and educational displays designed to raise not only the agricultural community's awareness of improving water quality, but all residents of Adams County.

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Donegal Creek Restoration Project

Lancaster County, Pennsylvania

Background

The Donegal Creek watershed is 17.2 square miles of 11,008 acres. The watershed has been identified by the Commonwealth of Pennsylvania "State Water Plan" (SWP) as a *high priority* area for "non-point source pollution" (NPS) clean-up. The intense agricultural land use within the watershed is credited as the main cause of stream degradation. Due to the poor quality of the stream, the Lancaster County Conservation District and the Donegal Fish and Conservation Association formed a cooperative partnership for the purpose of restoring or 6.67 miles of impacted stream corridor. The Partnership refers to its undertaking as the "Donegal Creek Restoration Project".

Project Description

The Partnership is currently working with four landowners in the Donegal Springs area, and has contacted the remaining 19 landowners in the 6.67 miles of project target area.

The Donegal Creek is a prime example of the impact of cattle on streams. At Donegal Springs (the headwaters of the west branch), the streamwidth at water level measured 3.66 meters and had an average depth of 27.94 cm. These measurements were taken where the stream was in an unimpacted, wooden condition, just before entering one of the pastures that was to be restored. The stream width and depth was then measured inside the pasture 30.48 meters downstream of the wooded location. In this pasture condition, the stream width had increased to 8.53 meters and was only an average of 10.16 in depth. It was obvious that dairy cattle with free access to the stream had made the difference. Within this same pasture (which contains a 304.8 meter corridor), only a single tree was found along the stream margin.

Benefits/Results

Stream bank fencing and cattle crossing:

Stream bank fencing was installed in 15 different cattle pastures. This fencing will protect approximately 7.88 km of the total 10.74 meters of project target areas from free cattle access to the stream. Fences will be installed as far back as the landowner will allow, but not less than 3.03 meters. Also, 21 stone ford cattle crossings will be installed in combination with stream bank fencing.

Fish enhancement structures:

Approximately 134 rock frame and log frame deflections, three porcupine deflectors, 24 Jack Dams, 15 wood slat fish houses, 40 half-log houses and 100 tones of boulder replacement will be installed.

Riparian buffer strips:

Forest buffer strips were installed and re-established along the project's stream corridor. Normally, the forest buffer strip is at least 3.04 meters wide because of it being confined to the limits of the stream bank fencing, but in other circumstances exceeds 15.24 meters in width. This involved the planting of more than 27,733 tree seedlings. Tree protectors will occasionally be utilized on the following hardwood seedlings: red maple, shagbark

hickory, shellbark hickory, white ash, slippery elm, American planetree and flowering dogwood. The labor for all forest buffer strip establishment was provided by the Partnership and other volunteer groups (i.e., scouts, schools, churches).

Streambank stabilization:

The stabilization of eroded stream banks along the project's stream corridor. Where appropriate and necessary, sections of eroded streambanks will be stabilized by the utilization of the following techniques:

- bio-engineering
- rip-rapping
- mud sill installation
- use of porcupine, rock frame and log frame deflectors

Re-establishment of the trout population:

The Partnership believes natural trout reproduction will be possible in the Donegal Springs area where a propagation area has been established on two of the landowner's property. In this area, sport fishing is not allowed. Any adult fish, either living in this area or traveling to it, should be undisturbed during spawning season.

A "Preliminary Water Chemistry and Biota Report" for the upper reaches of the west branch (Donegal Springs area) has been completed. The Partnership has begun corrective improvements in this area and was interested in seeing how the restoration efforts influenced the water chemistry and the volume and variety of aquatic life.

Costs/Funding Source

The project received $900 from a District tree seedling sale. Local contractors have donated materials and volunteers have been involved in the planting and fencing. Trout Unlimited supplied a $1,500 grant.

Currently, there is a 319 grant application for $110,00 that has received first phase approval and is under review with the U.S. Environmental Protection Agency.

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Evitts Creek Watershed Restoration Project

Bedford County, Pennsylvania

Background

The Evitts Creek Watershed is located in south-central Bedford County, Pennsylvania. It is rural with some farming, timber harvesting, and scattered development. The Creek is a tributary to two reservoirs, Koon Lake and Gordon Lake, that provide water for the City of Cumberland, Maryland.

The Evitts Creek Steering Committee was established to help facilitate the watershed remediation project. The twelve member committee consists of six members each from Pennsylvania and Maryland.

Project Description

The Steering Committee was formed to implement a watershed project to improve water quality for the City of Cumberland's public supply system and to increase the recreational opportunity associated with the two public water supply reservoirs. The first item of concern is to minimize non-point pollution from sources such as agriculture, silviculture, and urban-type situations. The next step will be to deal with sewage problems in the watershed. Concurrently, information is being collected to develop a watershed-wide management plan to maintain water quality in the drainage basin.

Technical assistance is being rendered through various service agencies such as the natural Resources Conservation Service, the Maryland Department of Environment, and the Pennsylvania Department of Environmental Protection.

Benefits/Results

Methods to reduce non-point pollution will include two manure pits, streamside fencing, riprap to stabilize banks, the purchase of a manure pump and spreader for rental to farmers, cattle and equipment rock crossings in streams, and concrete loafing pads for animals. There will also be vegetative stabilization in areas where plants have been disturbed and paddock fencing for rotational grazing.

Costs/Funding Source

Financial assistance has been received from the Pennsylvania Department of Environmental Protection.

A Clean Water Act-Section 319 grant of $150,000 from the Environmental Protection Agency was recently approved to implement Best Management Practices in the watershed. The EPA money would leverage a $56,000 cost share from landowners, while an additional $43,000 will come from a Farm Service Agency conservation program.

Contact

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Regional Septic Pump-out Notification and Tracking Project

Fredericksburg, Virginia

Background

The Rappahannock Area Development Commission (RADCO) region is the fastest growing area in the state. The region includes watersheds of the Rappahannock, Potomac, and York Rivers. Rural land throughout the district is being rapidly transformed to subdivisions and commercial development that is not being serviced by public sewer. Much of the growth that has occurred has been dependent on the use of individual septic systems.

Project Description

RADCO aims to establish a septic pump-out notification and tracking program for all of its member localities. The program will provide the localities with the method and means to implement the five year septic pump-out requirements in the Chesapeake Bay Preservation Act Regulations. RADCO is responsible for developing the program to the operational stage, and the localities are responsible for maintaining the program. Implementation of this program would result in significant water quality improvements and protection for approximately 1,300 square miles of Tidewater, Virginia.

Benefits/Results

Compliance forms will be completed by septic owners at the time of pump-out and returned to the locality. The locality will track when each septic system is pumped out through the receipt of compliance forms and will notify the owner every five years that a form is due.

Costs/Funding Source

RADCO will apply for grants to conduct this project until it is completed (approximately 2-3 years). A grant from the Chesapeake Bay Local Assistance Department (CBLAD) for $30,000 was awarded for FY95.

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Swan Creek Restoration Initiative

Harford County, Maryland

Background

The Swan Creek Restoration Partnership is a consortium of local, state, and federal agencies that are working together to improve aquatic resources in Swan Creek. Participants include the cities of Aberdeen and Havre de Grace, Harford County, Maryland Department of Resources, Maryland Department of Environment (MDE), Baltimore District U.S. Army Corps of Engineers, and Aberdeen Proving Grounds.

Project Description

During its first year, the Partnership identified and categorized environmental problems in and along Swan Creek. Volunteers walked 96 miles of stream and identified 365 potential problems. Excessive bank erosion and fish migration barriers were the most common. Data was entered into Harford County's Geographical Information System.

Water quality, fish, and benthic surveys were done in 1994. Results indicate that the overall quality of aquatic resources is fair to good. Fecal coliform levels in the watershed were elevated at several sites and at one location, manure discharge from a dairy farm was found to be causing significant water quality degradation.

Benefits/Results

Actions to correct identified problems have begun. Harford County received $60,000 from MDE to identify sites where stormwater management in the Swan Creek watershed can be improved. Two stream bank stabilization projects have been completed and a culvert which blocked fish migration has been removed.

Additionally, members of the Partnership are working with middle and high school environmental education teachers to incorporate information on stream ecology and watershed management into their school curriculum. A one day teacher training session on stream management techniques was held.

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Terrapin Park Wetlands Project

Stevensville, Maryland

Background

In 1989, Queen Anne's County, the Chesapeake Wildlife Heritage, and Ducks Unlimited initiated a biological nitrogen removal (BNR) wetlands project at Terrapin Park, Stevensville, Maryland. In January 1995, facility construction was completed and the process of data assembly and analysis commenced. One wetlands site and two ponds are in operation providing a natural filtering system for the Stevensville sewer plant. Once the effectiveness of the project has been evaluated, further construction of 20-30 acres of new wetlands will proceed.

Project Description

According to the 1987 Chesapeake Bay Program Agreement, the nitrate level of effluents released from sewage plants must be reduced by 40 percent by the year 2000. The Terrapin Park wetlands project provides a cost effective means of achieving this goal. The one acre project filters 100,000 gallons per day and removes approximately 75 percent of the nitrogen present in the effluent from the local sewer plant. The wastewater enters the wetlands area through the roots of the plant life. The plants either take in nitrogen for food or cause nitrogen to be released into the air, essentially removing all traces of nitrogen from the wastewater.

The project not only improves water quality, it also provides a habitat for local wildlife. The County and the Maryland Department of Environment are allowing the Chesapeake Wildlife Heritage to use the wetland effluent to flood an existing waterfowl impoundment. This provides a stable, managed wetland environment for wildlife species.

Benefits/Results

From initial data, the project can already claim significant nutrient reduction and increases in wildlife activity. The nature of the project supports collaboration and cooperation between organizations and governments which encourages better utilization of limited resources. This type of natural filtering system can be applied to communities of all sizes — the acreage requirements of the wetland can be adapted to the location.

Costs/Funding Source

Funding has come from four major sources: Maryland Department of the Environment; Queen Anne's County; Chesapeake Wildlife Heritage; and Ducks Unlimited. Terrapin Park is unique in that it is the first project of its kind that includes federal, state, local and private funding to benefit Chesapeake Bay wildlife, support nutrient removal, and provide educational value.

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Vegetative Practices to Reduce Nutrient Runoff

Hampton Roads Planning District Commission, Virginia

Background

The Hampton Roads Planning District Commission (HRPDC) includes fifteen cities and counties encompassing over 3,000 square miles and having a population of approximately 1.5 million people.

In developing approaches to meet the Chesapeake Bay Preservation Act (CBPA) stormwater and land development performance criteria, Hampton Roads Local Governments identified the need for guidance on non-traditional Best Management Practices (BMPs) that could be implemented and maintained by the homeowner. It was recognized that vegetation could and should be used to meet this need through appropriate site design and maintenance practices.

Project Description

An assistance guide entitled *Vegetative Practices for Nonpoint Source Pollution Prevention Management* was completed in 1992. The guide is a compilation of research on how proper vegetative and other environmentally sensitive landscaping applications, proper nutrient and pest management, landscaping with regionally native plants, and water use minimalization can be used to achieve measurable water quality benefits. The guide contains: an overview section on the relationship between vegetation and water quality; a discussion of various ways to rethink traditional approaches to landscaping; a survey of vegetative BMP's for onsite stormwater management; special land use and planning consideration for CBPA; and, appendices, including plant lists targeted at conditions in the Hampton region and sample landscaping plans.

Benefits/Results

The guide was distributed throughout the region, and well-received by property owners and others. The project is a model for the entire East Coast. It has assisted with an Alliance for the Chesapeake Bay demonstration project and was requested by other municipalities and developers. The guide received a 1993 Chesapeake Bay Program Local Government Advisory Committee's Innovation Award, and was featured in the *Bay Journal*, ASPA Newsletter, NARC Newsletter and the *Hampton Roads Review*.

Costs/Funding Source

The Guide received funding and technical assistance from the Hampton Roads Planning District Commission and Virginia's Chesapeake Bay Local Assistance Department.

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Living Resource Protection/ Habitat Restoration

An Introduction

The Chesapeake Bay Issue

Living resource protection and habitat restoration are clearly the ultimate goal of the Bay Program. Improvements of living resources and habitat serve as indicators of the success of the Bay restoration effort. In 1987, the Chesapeake Bay Program signed the Chesapeake Bay Agreement which affirmed the commitment to restore living resources, the estuary's plants and animals, and water quality.

The Bay Program has recognized the importance of restoring habitat, not only to sustain living resources, but also to serve as pollution buffers to protect the Bay's water resources. The Bay Program has helped to restore valuable habitat and living resources in the watershed. For example, the striped bass was once a prime recreational and commercial catch and a valuable economic resource to local Bay communities. However, only a few years ago the striped bass fishery was severly stressed and record low populations were measured. Today, striped bass have strongly rebounded and have surpassed all restoration expectations. There are several reasons for this rebound, but most attribute the success to fishing moratoria, improved water quality and restored spawning habitat.

Several of the Chesapeake Bay Program Subcommittees and Workgroups focus on certain habitat and living resource issues. The Living Resources Subcommittee helps manage fisheries in the watershed in hopes that moratoria and other drastic restoration activities will not be required. In addition to these activities, the Subcommittee is committed to restoring 114,000 acres of Submerged Aquatic Vegetation (SAV) and removing fish blockages on tributaries to restore 731 miles of historical spawning grounds for a number of migratory fish species by 1998.

In addition to these efforts, work is being initiated to restore aquatic reef habitats, protect wetlands and preserve and restore forests and riparian forest buffers.

The Local Challenge

Local governments play a vital role in restoring living resources and habitat to the Bay watershed. Local governments throughout the Bay are working with citizen groups to restore streams, create and restore wetlands, plant Bay grasses to prevent shore line erosion and improve habitat, and plant trees to create natural pollution prevention buffers and improve the biodiversity of a region.

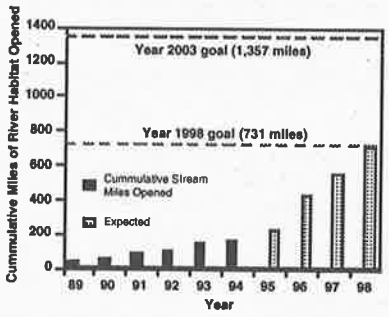
These local government and citizen action efforts are invaluable additions to the Bay protection and restoration effort. The following case studies are examples of local programs and projects that support the living resources and habitat restoration effort.

Environmental Indicators of Living Resource Protection/Habitat Restoration

Stream Miles Opened for Miagratory Fish

GOAL: To restore access to historical spawning grounds for migratory fish.

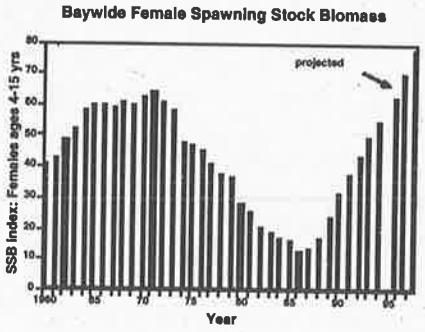
STATUS: 173 miles made accessible since 1988.



Striped Bass Spawning Stock

GOAL: The goal for a recovered fishery is a spawning stock biomass (SSB) equal to the average SSBs recorded during the 1960s and early 1970s.

STATUS: Successful management measures led to decreased harvest pressure. The Atlantic States Marine Fisheries Commission has declared the fishery restored as of January 1, 1995.



American Shad Restoration Program

Nanticoke River Watershed, Maryland

Background

Once the dominant commercial fishery in the Bay and the Nanticoke, the American shad has fallen on hard times. A total moratorium on the fishery entered its fifteenth year in Maryland. In spite of these circumstances, the outlook is improving for rebuilding shad populations and recovering the substantial social, cultural and economic benefits of a healthy fishery. The shad population in the Nanticoke is currently "quite low" according to a recent assessment by the Maryland Department of Natural Resources (DNR). Bringing the fish back will require a multi-faceted approach including attention to habitat and fishery management. At this low level, however, it will probably also require a hatchery stocking effort to help "jump start" the population — current densities of adult fish may be too low for significant reproductive success. The good news is that the DNR hatchery program was able to collect sufficient Nanticoke fish in the spring of 1995 to produce larvae which will be raised in the Delmarva Power and Light pond at Vienna and released later this year into the River.

Project Description

A major challenge in restoring the shad will be rebuilding the public awareness of this formerly abundant fish. Reviving public consciousness and creating a constituency for restoration is the overall goal of the American Shad Restoration Program.

A shad festival is currently planned for April 1996 when shad return to spawn. A school program to raise shad is now being explored. Delmarva Power and Light is currently raising 20,000 Nanticoke brood stock shad to be released this year as fingerlings. Shad bush plantings will occur in the spring of 1996. Other projects may develop as the program evolves.

Benefits/Results

The return of the commercial shad fishing to the Nanticoke River will signify the success of this project. Bringing the shad back to a healthy, self-sustaining level could take up to nine years.

Costs/Funding Source

To date, costs have been minimal and each organization has covered their own. The shad festival is not expected to cost more than a minimal amount to cover basics such as display items the first year. An application will be made to the Chesapeake Bay Trust to assist with the high school shad raising. The shad bush plantings may also be funded through the Chesapeake Bay Trust, with seedlings from the MD State Nursery and volunteers to heal them in, pot them and distribute them.

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Chesconessex Creek Watershed Project

Accomack County, Virginia

Background

Accomack County teamed up with the Alliance for the Chesapeake Bay, Virginia's Chesapeake Bay Assistance Department and the U.S. Environmental Protection Agency's Chesapeake Bay Program to establish a multi-faceted environmental project that is providing valuable data and restoring vital habitat and living resources on Virginia's Eastern Shore.

Project Description

The goals of the project are to:

- provide data to the scientific community, including the Chesapeake Bay Program Submerged Aquatic Vegetation (SAV) Workgroup;
- identify where water quality is adequate to support SAV growth;
- determine if water quality is improving, declining, or stable;
- correlate water quality data with land use activities within the watershed; and,
- monitor the effects of best management practices on the water quality of the watershed.

Three sites on the Chesconessex Creek are monitored for a number of biological indicators to determine the quality of the watershed's aquatic system. The water quality data is then analyzed and the results compiled in an Alliance for the Chesapeake Bay report to be used by the Chesapeake Bay Program and the county's Department of Environmental Affairs. In addition, data will be compiled on land use trends in the watershed. This data will support the goal of correlating water quality data with land use activities in the watershed.

Benefits/Results

The Chesconessex Creek Watershed project has already proven itself as an innovative and successful Chesapeake Bay preservation project. The project established an on-going water quality monitoring program supported by a network of professionals and volunteers. The project provides valuable and previously unavailable data to the scientific community and to land use planning professionals. The project established a procedure for long-term monitoring of land use within a watershed. The project educates participants about issues related to the watershed's living resources and habitat as well as land use activities and its effects on water quality.

To date, necessary monitoring equipment has been procured, volunteers have been trained in monitoring procedures, and three months of monitoring information has been collected. The first set of reports of monitoring results and land use in the watershed will be completed by the end of the calendar year. These efforts were made possible through the establishment of a partnership with local, state and Federal governments and the nonprofit sector.

Costs/Funding Source

Accomack County Department of Environmental Affairs has leveraged funding and technical assistance from the Alliance for the Chesapeake Bay, EPA Chesapeake Bay Program and Virginia Chesapeake Bay Local Assistance Department.

The Alliance for the Chesapeake Bay provided volunteer training, and continues to provide lab analysis of sample data, monitoring data and other services required to administer and run the SAV monitoring program. The funding for the monitoring program came from an EPA Chesapeake Bay Program grant. The EPA Chesapeake Bay Program also provides guidance and technical assistance to the project. Virginia's Chesapeake Bay Local Assistance Department funded the purchase of all monitoring equipment. The Chesconessex Creek effort is a model approach to protecting and preserving the vital resources of a watershed.

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Kenilworth Marsh Restoration

Washington, D.C.

Background

Kenilworth Marsh is a tidally influenced freshwater wetland on the Anacostia River in Washington, D.C. It is a National Park located directly east of the National Arboretum and bordering the Distric of Columbia/Maryland line to the north.

The goal of the Kenilworth Marsh Restoration was to revitalize a portion of the once emergent tidal wetlands that historically characterized the Anacostia River. The Kenilworth area once existed as one of the last unfilled areas where tidal marshes thrived. The project's expectation was to recreate an ecologically-sound, freshwater tidal marsh.

Project Description

The Kenilworth Marsh Restoration concept began with the mandated dredging of the Anacostia River by the U.S. Army Corps of Engineers. A lack of suitable upland disposal sites and a long-standing intention by the National Park Service to rebuild the Kenilworth Marsh lead to the proposed "innovative" use of dredge material and the subsequent filling of the marsh mud flats with the material to create favorable conditions for emergent plant growth.

Preliminary tests were conducted with dredge material "cells", consisting of plants of different species, grown under varying degrees of tidal inundation in the marsh. These tests determined that substrate elevation and resulting tidal inundation were the limiting factors in emergent vegetative growth.

The physical marsh reconstruction and revegetation of Kenilworth was completed in July 1993. A workgroup and advisory committee, the Kenilworth Marsh Monitoring Committee, planned and initiated a detailed physical, chemical, and biological monitoring program to track the development of the newly recreated marsh.

The project involved the input of several federal and local agencies. The primary group conducting the restoration was the U.S. Army Corps of Engineers with the National Park Service taking the lead on the planning coordination. The District Government's Environmental Regulation Administration, Water Resource Management Division, the Metropolitan Council of Governments, and the Interstate Commission on the Potomac River Basin were the primary local level agencies.

Benefits/Results

Surface sediment bioassy studies found the sediments to be clean after filling and planting was complete. The first season of vegetative growth saw a "dense greening" of the major areas planted. It was determined that plants from an expected seed bank in the fill sediments contributed greatly to the rapid growth and in some areas eliminated planted species. Second year growth saw barren areas begin to green up. Bird, fish, plankton, benthic macroinvertebrate, and nutrient studies are all on-going.

The monitoring of the restored Kenilworth Marsh is anticipated to be a 3 - 5 year effort that is expected to afford valuable insights into the early successional stages of large

scale wetland reconstruction efforts. The findings from the restoration and monitoring effort are intended to better develop future wetland restoration projects on the Anacostia River.

Costs/Funding Source

The physical restoration of the Kenilworth Marsh was funded by the U.S. Army Corps of Engineers. Monitoring efforts and studies conducted on the marsh are undertaken by the individual groups using internal funding sources.

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Non-Tidal Wetland Protection Program

Prince George's County, Maryland

Background

In recent years, state governments implemented wetland regulatory programs separate from the 1971 federal Clean Water Act. In addition, some local governments implemented their own wetland regulatory programs separate from both state and federal laws. Prince George's County recognized that separate involvement in wetland regulation could result in three levels of government review which might result in conflicts in policy. Concerned that such results would not benefit the resource nor the regulated community, the county initiated a program that pulls federal, state and local resources and experiences into a cohesive and comprehensive program.

Project Description

Prince George's County acts on behalf of the Maryland Department of Natural Resources to implement the State's Non-tidal Wetlands Protection Program under a Memorandum of Understanding which went into effect on September 23, 1991. In general, the county acts as the state's agent for the review of applications and verifications of wetland delineations. It acts as a clearinghouse for federal and state agency comments on each application to assure consistency, clarity, and effectiveness when corresponding with applicants and in reducing impacts before authorization is granted.

This program also includes a voluntary Wetland Concept Plan review process. Through this element, the applicant is given the opportunity to explore development options on a site before substantial financial resources are invested or committed to project design. Since September 1991, 677 applications have been submitted under the Wetland Concept Plan review process.

Benefits/Results

The county indicates that the regulated community is benefitting from the Concept Plan review process. Developers have the chance to amend their projects around wetlands and create buffers in order to avoid impacts. The result is two-fold: the wetland resources are preserved and in many cases, the applicant avoids disturbing the wetlands and, therefore, does not have to apply for a wetland permit. Through ten of the 677 projects submitted for review as a wetland Concept Plan, the county has assisted the regulated community in averting developemnt on approximately ten acres of wetlands.

Costs/Funding Source

This Program is fully funded through a county *ad valorem* tax managed by the Department of Environmental Resources under the Stormwater Enterprise Fund. This funding source is on-going and the current budget for the non-tidal wetland protection program is approximately $213,000.

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Small Habitat Improvement in Urban Areas

Anacostia Watershed, Washington, D.C.

Background

The Small Habitat Improvement Program (SHIP) was established in 1990 by the Anacostia Watershed Restoration Committee (AWRC) as a pilot program to package small-scale environmental restoration projects for citizens and volunteers. SHIP provides opportunities for Anacostia watershed residents in the District of Columbia, Prince George's and Montgomery counties to actively participate in local stream restoration efforts. Typical SHIP projects include reforestation, wetland plantings, stormdrain stenciling, stream cleanups, erosion control, biological monitoring, and small-scale stream restoration work.

Goals of SHIP include restoration of the Anacostia watershed's stream systems, education of the citizens, and reclamation of streams for local neighborhoods. Public education, outreach and restoration projects implemented at the local level are key components of objective achievement. Re-establishment of streams as a community resource, particularly in neighborhoods where streams have become dumping grounds, is an important objective of the program.

Program Description

In 1994, the Metropolitan Washington Council of Governments joined the U.S. Environmental Protection Agency, AmeriCorps, and a local service corps to implement SHIP projects in the District of Columbia portion of the watershed. Other project partners included federal and local government agencies, citizens groups, schools and non-profit organizations, as follows:

- District of Columbia's Regulatory Authority, Planning Agency, Department of Public Works, Department of Recreation and Parks, and Fisheries Program;
- American Rivers;
- Garden Resources of Washington;
- Earth Conservation Corps;
- U.S. Department of Agriculture's Natural Resources Conservation Service; and
- Cook, Backus, and Birney Elementary schools.

Working in a cooperative effort, SHIP was implemented in one of the poorer, more degraded subwatersheds - Watts Branch - with the assistance of 15 local AmeriCorps participants.

Efforts to implement SHIP in Watts Branch resulted in the establishment of the Adopt-a-Neighborhood Program. Through this program, environmental and stream restoration work was implemented at the neighborhood level and, in doing so, watershed restoration occurred in a cohesive and organized fashion. The following steps comprised Project Adopt a Neighborhood:

- identify geographical boundaries of neighborhood;
- assess neighborhood for project potential (reforestation, stormdrain stenciling, stream cleanup, education and outreach, etc.);

- develop action plan; and
- implement action plan.

This organizational structure allowed Corps members to make a thorough and demonstrable difference in a sub-section of the Watts Branch subwatershed before moving to another neighborhood. Within the framework of this project, Corps members made significant contributions to the watershed community. They provided education and outreach to area residents, stenciled stormdrains and planted trees along denuded sections of the stream. The community also benefited from a series of tree plantings by other volunteer groups and local schools, resulting in the re-establishment of forest buffers along Watts Branch.

Benefits/Results

During the nine-month project, program participants implemented the Adopt-a-Neighborhood program throughout much of the Watts Branch subwatershed. This comprehensive and coordinated application of SHIP boasted results that will have long-lasting, positive impacts both for the watershed community and the stream. Watershed residents received environmental education materials. More than 1,000 stormdrains were stenciled with the message "Don't Dump -Anacostia River Drainage". Trash was removed both from neighborhood streets as well the stream system. At the subwatershed level, significant progress was made: a series of tree plantings resulted in re-establishment of nearly two linear miles of riparian buffer. Approximately 1,500 trees, all native species, were planted during the nine-month project.

Costs/Funding Sources

An AmeriCorps grant awarded through EPA provided funding for this project. Numerous District staffers and local professionals donated their time as well.

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Stream and Buffer Protection Overlay Zone

Charles County, Maryland

Background

The Charles County Comprehensive Plan Citizen's Advisory Committee, consisting of 65 members representing both resident and business interests, identified protection of stream valleys and natural resources as an issue to be addressed in the 1990 County Comprehensive Plan. To achieve this goal, several objectives were established, including the "adoption and enforcement of development performance standards to protect sensitive areas and environmental features and the establishment of a stream valley protection and acquisition program." The goal of protecting stream valleys and their associated sensitive areas was achieved with the implementation of a "Resource Protection Overlay Zone" (RPZ) in a new County Zoning Ordinance adopted in 1993.

Project Description

The overlay zone is superimposed on the County Zoning maps. Its location corresponds with the location of the major stream valleys/corridors in the County and includes adjacent sensitive features including: floodplains, adjacent non-tidal wetlands, steep slopes, and other habitat areas associated with stream valleys. Performance standards for protection of these sensitive areas are defined in the County Zoning Ordinance. All new development activities are required to comply with Resource Protection Zone (RPZ) requirements.

The primary goals of the RPZ is to protect water quality. Non-tidal wetlands and associated floodplains are required to have forested buffer along stream valleys. To enhance and preserve the integrity of stream valleys, the removal of vegetation is prohibited and disturbances to streambeds are to be minimized. The RPZ requires compliance with a combination of performance standards and established buffer widths based on stream order. First and second order streams must have a 50 foot minimum buffer width; third and fourth order streams, a 100 foot minimum buffer. The minimum buffer is extended outward to include all adjacent 100-year floodplains, adjacent non-tidal wetlands or contiguous wetlands within 25 feet, and steep slopes greater than 15 percent that are adjacent to the buffer. In the case of adjustment for steep slopes, the buffer is expanded to the top of the slope or is doubled, whichever is less. The performance standards are clearly defined and allow for easy application.

There are several uses permitted in the buffer, provided that certain conditions have been met and that the RPZ is not compromised. These uses include: agriculture, provided an approved soil conservation and water quality plan is approved; and timber harvesting. Utility transmission lines, recreational access, and non-motorized trails are permitted in the buffer, subject to compliance with performance criteria.

During the first two years of implementing RPZ requirements, the county found it necessary to provide a more comprehensive definition of stream order and establish policy regarding the location of lot boundaries outside the RPZ area. The definition of stream now contains criteria for surface flow and water originating from a groundwater source during a portion of the year. In cluster subdivisions, where lots range from 15,000 to 30,000 square feet, an amendment was proposed requiring the RPZ area to be located outside the boundaries of the lot (excepting lots greater than 40,000 square feet in size)

to protect the integrity of the buffer and the possible loss of function if the buffer was encroached upon by homeowners.

Benefits/Results

County officials note the implementation of the RPZ requirements has resulted in greater protection of stream valleys and associated sensitive areas through better subdivision design and management of the location of public facilities. For example, the siting of stormwater management facilities outside the RPZ results in improved water quality, while maintaining streambed integrity. The County's Forest Conservation Ordinance identifies forested RPZ areas as a high priority for retention and protection through conservation easement. Public officials, the development community, and the citizens of the county have become aware of the importance of preserving streams and their buffer since the program's inception. RPZ notification on final plats has also assisted in notification of a stream's resource value to current and future property owners.

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Ulmstead Point Oyster Reef/Sanctuary

Anne Arundel County, Maryland

Background

The Magothy River Association is rebuilding river bottom habitat for oysters and associated reef animals in the Magothy River. At Downs Park, community volunteers grow sand grain size oysters to 1.5 inch oysters.

Project Description

The Magothy River Association built oyster reef habitat over a ten acre area at the Proposed Reef Sanctuary at Ulmstead Point in the summer of 1995. The shell was placed in "piles" ten feet in diameter and three feet high, providing best possible oyster habitat. The 100,000 young oysters being grown at the Downs Park nursery will seed the sanctuary.

This site is a historical reef location and old lease. It was selected based upon substrate, depth, salinity, availability for leases and survival of individual oyster systems as reported by residents in the last four years.

The Maryland Department of Natural Resources Shellfish Division allocated oyster shell to be delivered by barge to the sanctuary site. There is approximately 220 piles clustered about the area.

Benefits/Results

The Association will host a seminar on topics relating to the Bay ecology and oyster reefs. Volunteers will transfer the oysters to secondary oyster growing systems and relay the oysters to the reefs in the fall. Volunteer divers will monitor the effectiveness of the "piles", as well as place oysters on the reef next summer.

Costs/Funding Source

The Chesapeake Bay Trust provided some funding. Magothy River Association volunteers built the nursery, P. Cummins Oyster Company provided design and technical advice, and Anne Arundel Community College students will monitor the oysters.

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Pollution Prevention

An Introduction

The Chesapeake Bay Issue

Pollution prevention, like preventive health care, works to reduce the risk of major problems through the early identification of potential issues or problems. This reduction often eliminates the opportunity for critical and/or more expensive problems to occur down the road. The Chesapeake Bay Program recognizes pollution prevention as the preferred approach to reducing risks to human health and living resources due to exposure to chemical contaminants within the Chesapeake Bay watershed.

Pollution prevention is a hierarchy of approaches ultimately directed towards reducing or eliminating the amount of chemical contaminants at the source of production or preventing them from entering the environment. Source reduction is the preferred method when practical; safe disposal is a last alternative. Source reduction addresses all sources: point and non-point, industrial and agricultural, urban and suburban.

The Chesapeake Bay Program is addressing prevention in a recently signed Chesapeake Bay Basinwide Toxics Reduction and Prevention Strategy. The strategy focuses on a number of pollution prevention methods including facility based pollution prevention, integrated pesticide management, and consumer/household waste reduction. Each of these programs has a local government or community component. For instance, the objective of the Facility-Based Pollution Prevention Program is "to promote pollution prevention education and technical assistance programs within all levels of government - federal, state and local throughout the Chesapeake Bay Watershed." This objective is a clear commitment to assist local governments with pollution prevention activities at local government facilities.

The Pesticide Management and Consumer/Household Waste programs also set clear commitments to assist municipalities and communities. The Pesticide Management program's goal is to have a voluntary integrated pest management practices on 75 percent of all agricultural, recreational and public lands within the Chesapeake Bay basin. The Consumer/Household Waste program commits to developing and implementing a basinwide communication and education program directed towards reducing consumers' use of harmful or contaminated products.

In addition to the pollution prevention issue, it is important that local governments and community groups are aware of some of the toxic issues in the Bay watershed. Significant toxic problems in the Bay are limited to three "Regions of Concern": Baltimore Harbor, the Anacostia River and the Elizabeth River. The problems that are occurring in these regions may effect human health, as well as the health of the living resources in the Bay watershed. These issues are being addressed by the Bay Program and other groups and agencies, as part of the Basinwide strategy to ensure that human health and the health of living resources are protected and preserved.

The Local Challenge

In order to fulfill these and other commitments in the Strategy, the Bay Program must ensure the active participation of local governments and community groups. Today, communities are organizing efforts to reduce waste, educating each other on toxic issues, and forming grassroots organizations to counter the debilitating effects toxic pollution may have on local communities. From confronting polluting businesses to creating community recycling programs, locals are organizing themselves for action.

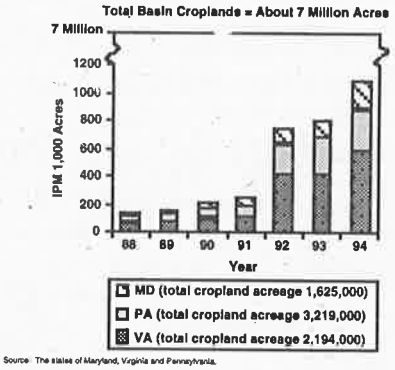
The following case studies illustrate some of today's most effective pollution prevention projects occurring at the local level. These activities include hazardous waste education, recycling programs and other actions that support the prevention of contaminants in the watershed. These and other activities have a direct influence on human health and the health the Chesapeake Bay.

Environmental Indicators of Pollution Prevention

Acres Under Intergrated Pest Management

GOAL: By 2000, establish voluntary integrated pest management (IPM) practices on 75% of all agricultural, recreational, and public lands with the basin. By 1995, establish a goal for implementation of IPM practices on commercial and residential lands within the basin.

STATUS: 1,086,764 acres of agricultural land under IPM as of 1994.



Source: The states of Maryland, Virginia and Pennsylvania.

Regions of Concern

GOAL: Minimize and eventually eliminate adverse impacts on living resources within the Regions of Concern by reducing and preventing chemical contaminant loadings and releases.

STATUS: Action Plans for the Elizabeth River, Anacostia River and Baltimore Harbor have been implemented.

Regions of Concern:
Areas with known chemical contaminant-related impacts.

Source: Chesapeake Bay Program Toxics Reduction Strategy Reevaluation Report

Gut Road Clean-up Project

East Manchester Township, Pennsylvania

Background

With the help of area volunteers and businesses, East Manchester Township, members of York Chapter 67 of the Izaak Walton League and the Pennsylvania Fish Commission began efforts in 1990 to clean-up a four mile stretch of East Manchester Township Susquehanna riverbank between Wago Junction and Blouse's Landing. Portions of this reach of riverbank were considered the worst example of illegal dumping in the county, strewn with furniture, televisions, appliances, empty drums, cans, roofing shingles, wood, glass, metal and plastic, all within reach of Susquehanna floodwaters.

Project Description

The Gut Road Clean-up Project is a hands-on restoration effort involving local government and citizen volunteers. In 1990, with its inception, the township in cooperation with the Izaak Walton League and citizen volunteers, removed over 237 tons of refuse, white goods, car parts, etc. from the four mile stretch of river bank frontage targeted for removal in three phases by Mr. William Shaffer, project chairman.

The final phase of the initial three phase clean-up was completed on June 2 and 9, 1990 and demanded 400 man-hours of labor, donated by members of the Izaak Walton League, Met-Ed (power company) employees, township supervisors, Fish Commission representatives, representatives from area civic clubs including the Lions and Jaycees, and the Manchester Cub Scouts. Both time and materials needed for this effort were donated by utility companies, environmental groups, state representatives, food/vending companies, refuse collection companies and concerned citizens.

Since the initial effort in 1990, the clean-up project has become an on-going community event. In 1991, 34.5 tons of material were collected and disposed of and 6.1 tons were collected and disposed of in 1993. The township supplies a backhoe and front end loader in support of the community effort. The township also promotes volunteer participation and informs citizens of event results in the township newsletter. Met-Ed donated a boom truck during the initial cleanup. A number of groups and organizations donate necessary items such as garbage bags, food/drink/snack items, rags, bug spray, gloves, jiffy-johns, promotional signs, dumpsters and money to defray costs. One dozen 30 cubic yard dumpsters were donated by Waste Management, Inc. to support the initial clean-up effort and the "Modern" Landfill waived the estimated $3,000 disposal, or tipping fees to help with the clean-up effort

Benefits/Results

The Gut Road project has demonstrated that local support for conservation is indeed flourishing. Township officials, as well as the local police department, receive calls from concerned citizens when dumping occurs or after trash has been discovered. Citizens attend township meetings to discuss the environmental issues within the project area and manifest a much greater stewardship interest in the area as a result of their efforts.

Costs/Funding Source

East Manchester Township is a rural township of the second class with a population of 3,714. The township budget is incapable of funding a project of this magnitude. Organizers estimate the cost of this project may well have been between $40,000 to $50,000 had it been performed by private contractors. Through the efforts of all involved, the total cost for cleanup for this area was given a value of $6,627 which included some costs allocated for dumpsters and tipping fees and backhoe/loader expenses. The actual fees for the dumpsters, tipping fees, and backhoe/loader use were waived, but utilized as a basis for cost analysis. Funding sources were many and varied with each participating organization donating to the cause.

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Municipal Solid Waste Co-Composting Project

Adams County, Pennsylvania

Background

Adams County is located in south-central Pennsylvania along York County in Pennsylvania and Carroll and Frederick Counties in Maryland. The county is divided between two major watersheds: the Susquehanna River and the Potomac River.

Composting of municipal solid waste has been identified by the U.S. Environmental Protection Agency as preferential to landfilling and waste-to-energy. This project provides the opportunity to demonstrate that municipal waste composting is both technically and economically feasible for many municipalities in Pennsylvania.

Project Description

Adams County provides a unique opportunity for the Commonwealth because many elements for a successful composting project are already in place. Waste system economics with disposal at an in-county composting facility are favorable. Within the county there is increased awareness and interest in a more environmentally acceptable solution for waste disposal than landfilling and both residents and commercial parties have expressed support for such a project.

The project began in 1992 and to date, two phases have been completed. Phase I detailed the feasibility of the co-composting project and Phase II focused on a revision to the County's Waste Management Plan. Currently, Adams County is in Phase III which involves a site selection process for the location of the co-composting facility and a Request for Proposals Development and Evaluation.

Benefits/Results

The goal is to construct a centrally located in-county municipal waste co-composting facility by 1996 or 1997 to derive the following benefits:

- to provide a waste processing technology that is well-suited to the highly degradable municipal and agricultural organic portion of the county wastestream and will make beneficial use of a waste product;
- to provide a long-term solution to the disposal of municipal wastewater treatment plant sludge and septic tank pumpings;
- to provide a strategy for increasing the rate of recycling in Adams County while minimizing the cost, and at the same time, reducing the county's reliance on landfilling;
- to provide a strategy for collection of household hazardous waste materials;
- to reduce the transportation costs incurred by Adams County residents in hauling wastes to out-of-county disposal sites; and
- to provide a long-term wast management strategy that will respond to and serve the county's needs and reduce projected waste disposal system costs.

Costs/Funding Source

Grant funding of 80 percent of the costs associated with the various composting facility activities was received through the Pennsylvania Department of Environmental Protection's Act 101-section 901 Municipal Waste Planning Grants. Two grants have been utilized and Adams County is preparing to submit a third planning grant for the final phase of the project.

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Nonpoint Source Pollution - Be Part of the Solution

Hampton Roads, Virginia

Background

The Hampton Roads Planning District Commission (HRPDC) represents fifteen cities and counties covering 3,000 square miles in Virginia. Preserving water quality in the region is vital to maintaining the area's quality of life and thus, the Commission set out to increase citizen awareness of non-point source (NPS) pollution problems. The citizen's guide, *Nonpoint Source Pollution - Be Part of the Solution*, was distributed in 1993 to teach citizens alternatives that reduce their contribution to the NPS problem.

Project Description

The guide was developed in cooperation with the Hampton Roads Chesapeake Bay and Stormwater Committees, comprised of local government staff planners and public works engineers. Committee members provided HRPDC staff with commonly asked questions regarding activities that lead to water pollution and what can be done about them.

Following a general primer on what NPS pollution is, where it comes from, and its effects on water quality, these questions were each treated as a separate chapter in the guide. Suggestions for alternative ways to avoid potential water pollution problems are given for household hazardous wastes, waste reduction, proper disposal and recycling, water conservation, septic systems and managing pet wastes, controlling stormwater runoff, environmentally-friendly lawn care and landscaping practices, home auto care, streambank erosion, and recreational boating and swimming activities.

Benefits/Results

The publication was so successful that it is currently in its second printing. Member local governments have used it as a basis for developing brochures on stormwater management, water conservation, and other subjects, and have used excerpts from if for inserts in utility bills.

The HRPDC continues to receive requests for copies and plans to use the guide as the framework for a regional environmental education program during FY 95/96.

Costs/Funding Source

The HRPDC received a Water Quality Management Planning Grant from the Department of Environmental Quality (DEQ), Water Division to undertake the project. Reprints of the publication were made possible by the Virginia Department of Environmental Quality's Coastal Resource Management Program.

Contact

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Sand Filter for Urban Runoff Control

Washington, D.C.

Background

The Washington, D.C. Department of Consumer and Regulatory Affairs is responsible for regulating, monitoring, and enforcing the federal, state and local laws dealing with the protection of human health and the environment from environmental pollutants. It is involved with local issues and programs through either EIS-type assessments of local construction/renovation of land disturbing activities or through environmental education activities.

Project Description

The sand filter is a best management practice that controls non-point source pollution particularly hydrocarbon and heavy metal in urban runoff from sites such as parking lots, gas stations, vehicle maintenance facilities and other commercial and industrial facilities. Activities and operations include: review of engineering design plans for compliance with specifications and codes; inspection during construction; and monitoring the long-term operation of the facility.

Benefits/Results

Since the program started in 1988, over 200 development projects have been approved in which the sand filter has been employed to provide control for urban non-point source pollution control. To date, 108 of these sand filters have been completed and are in operation. It has been adopted by several states and is currently under consideration by EPA for adoption in a national storm water Best Management Practices handbook.

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Water Quality Monitoring Program

Nanticoke River Watershed, Maryland

Background

Although the Nanticoke River is one of the cleanest rivers flowing into the Chesapeake Bay, there are various threats to the watershed including many non-point sources of pollution. To determine the current and future health of the Nanticoke River Ecosystem, a continuous record of the physical, chemical, and biological nature of the river needs to be established. The Nanticoke Watershed Alliance, the National Park Service, and Salisbury State University are working in a partnership to provide this data.

Project Description

Water quality and biological sampling stations that collect data will be established along the axis of the Nanticoke River. At a minimum, important plant nutrients (nitrogen, phosphorous, and silicon, chlorophyll (algae) concentrations, and water clarity parameters (total suspended solids, light extinction coefficients, and secchi depths) will be assayed. Additional factors such as fish and wildlife species abundance along with associated habitat characteristics will be determined.

The project will provide training for college students in environmental sampling, as well as an appreciation for proper watershed management. There is also a possibility of sharing this data with high school students throughout the watershed who will be able to follow trends in water quality in their specific area and design related projects.

Benefits/Results

The Program will establish baseline data from which to assess the efficacy of measures to reduce nutrient pollution entering the Chesapeake Bay. Using this data, trends in water quality and the biology of the Nanticoke will enable various agencies and organizations to provide better management for the preservation of the river's ecosystem.

Costs/Funding Source

A grant of $10,481.50 was made available from the National Park Service for this Program. Participants in this project will include not only students from Salisbury State University, but also many volunteers from the Nanticoke Watershed Alliance.

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Forest Conservation/ Riparian Forest Protection

An Introduction

The Chesapeake Bay Issue

The presence of forest land cover is considered to be a critical element in the resilience of the Chesapeake Bay watershed and is integral to an array of important Bay Program issues: reaching nutrient and sediment reduction goals; achieving nutrient level maintenance; protecting ecological function and health; and important economic and social ramifications.

The last 300 years have brought significant changes to the region's forests. In 1607, when John Smith and the first colonists arrived on the shores of the Chesapeake, they found a vast forest covering 95 percent of the watershed. By the late 1800s, the Bay's forest had been reduced to a low of 40 percent total forest. These changes in land use resulted in a fragmented forest landscape that has impacted the Bay, its streams and rivers, as well as its fish and wildlife.

Today, although many forests have returned or have been replanted, less than 60 percent of the watershed remains forested. With 14 million people living in the Bay watershed, forests are under pressure from urban expansion, lost to sub-urbanization at an average rate of 100 acres per day.

Today's forests are important to maintaining a healthy ecosystem for living resources, and a quality of life essential to the people of the region. As urban areas grow, riparian zones have been permanently altered or destroyed. Flood control and stormwater control measures have resulted in substantial and often irreparable damage to miles of streams and their riparian area.

The Local Challenge

Local governments are at the front lines in efforts to protect and restore the Chesapeake Bay and forest land in developing areas. Often a landowner will be more receptive to working with a locally-organized program in the development of a riparian easement zone. Today, watershed plans, forest conservation programs, greenways, and other activities supplement the traditional planning and zoning functions. These provide more focus than ever before on the protection of environmental values and water quality. Although initiatives demonstrate that local governments have great capacity for innovation, the range of issues they face today and will face tomorrow continues to broaden.

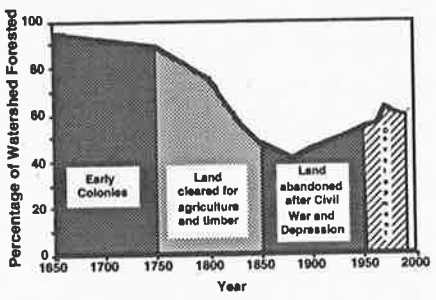
Environmental Indicators of Forest Conservation/Riparian Forest Protection

Chesapeake Basin Forests

GOAL: No goal determined.

STATUS: The forest that regrew from the 19th century to the mid-20th century is declining.
Current losses represent permanent conversions.
Forest quality may be as important as quantity:

- proximity to water
- species diversity
- ecosystem sustainability
- habitat fragmentation

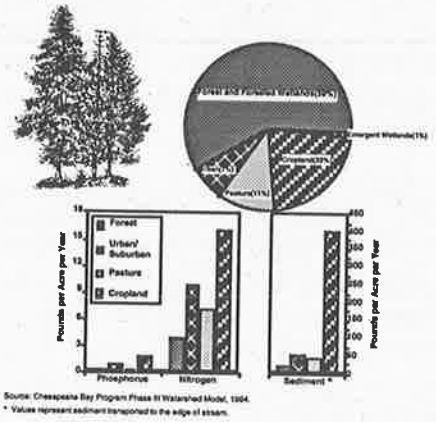


Source: US Forest Service

Chesapeake Basin Forests and Water Quality

GOAL: Land use goals may be tributary specific.

STATUS: In the 1600s, 95% of the basin was forested. In 1992, 59% was forested.
Forests and wetlands provide a natural filtering system that prevents pollutants and soil from reaching the Bay.



Difficult Run Stream Valley Park Reforestation

Fairfax, Virginia

Background

The Difficult Run Watershed was designated as one of 134 "environmentally critical areas" in Virginia in 1970. It is the largest watershed in Fairfax County, covering 58 square miles. The Fairfax County Board of Supervisors adopted the watershed and began the Difficult Run Project in order to educate and involve the community to help reduce the amount of pollution entering the stream.

Project Description

The reforestation project, which was completed the end of April 1995, included planting a 150 foot buffer on both sides of the stream. Sixteen hundred native seedlings were planted along the one side of the stream bank at Wolf Trap Meadows subdivisions at the intersection of Days Farm Drive and Black-Eyed Susan Lane owner by the Park Authority with the help of volunteer groups.

Benefits/Results

This buffer will provide wildlife corridors which allow wildlife to move safely from place to place. The buffer vegetation is capable of slowing surface runoff which allows sediments, nutrients and pesticides to be filtered out before the water reaches the streams. The buffer's leaf canopy will provide shade that keeps the water cool, retains more dissolved oxygen and encourages the growth of diatoms, nutritious algae and aquatic insects. Leaves that fall into the stream will provide food and habitat for small bottom dwelling creatures which are critical to the aquatic food chain. Lastly the buffer's woody debris (fallen trees and limbs) will serve as cover for fish while stabilizing stream bottoms thereby preserving habitat over time.

Costs/Funding Source

The Fairfax ReLeaf and Virginia Department of Forestry received a grant from the Environmental Protection Agency for $5,000 through the Virginia Department of Conservation and Recreation to conduct the reforestation of the Difficult Run Watershed in Fairfax County.

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Fairfax ReLeaf's Urban Forest Benefits Analysis

Fairfax County, Virginia

Background

Fairfax ReLeaf, Inc. is a non-profit organization of volunteers who preserve and restore trees and native habitat in Northern Virginia. ReLeaf is comprised of approximately 700 individuals who volunteer to plant trees on public and common lands, assist in natural resource projects and distribute educational material about trees. Educating the public about the importance of trees is a major component of ReLeaf's mission.

Project Description

In 1994, the Fairfax County Board of Supervisors formed the Tree Preservation Task Force. ReLeaf felt a strong obligation to supply reliable quantitative information to the Task Force for its use in formulating policy recommendations to the Board of Supervisors. ReLeaf asked the Board to help purchase QuantiTree software, a computer program developed to calculate and to value quantifiable benefits of community trees. Using environmental and socioeconomic inputs, QuantiTree provides current dollar values for the following tree functions: annual air pollution mitigation; annual carbon storage; annual stormwater runoff reduction; and annual energy conservation.

ReLeaf volunteers collected data from 220 randomly selected sample plots located within Fairfax County, the cities of Fairfax and Falls Church, and the towns of Herndon and Vienna. To ensure quality of data used, teams were led by professional foresters, horticulturists, and natural resource managers. The first phase of the benefits analysis provided a baseline snapshot of the nature of Fairfax County's tree cover in terms of health, size and number.

Benefits/Results

ReLeaf estimates that there are 57 million trees growing on 239,915 acres of Fairfax County and associated jurisdictions. An average tree provides a total of $7.03 in services annually for air pollution control, storage of atmospheric carbon, stormwater runoff mitigation, and utility energy conservation. They are a vital component of infrastructure that deliver multiple benefits to help sustain the quality of life in a community.

Costs/Funding Source

ReLeaf is a volunteer organization. However, the Fairfax County Board of Supervisors was asked to contribute $2,500 to help purchase the QuantiTree software.

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Headwaters Soil and Water Conservation Service

Augusta County, Virginia

Background

The American Farmland Trust (AFT) emphasizes the urgent farmland preservation needs in the Shenandoah Valley and other agricultural powerhouses of the nation. The valley is identified as an area where extremely productive farmland coincides with population growth far above national rates. With this in mind, the protection of riparian zones along streambanks is essential to both curbing development and growth pressures and protecting farmland. The Headwaters Soil and Water Conservation District (SWCD) in Augusta County, in coordination with local citizens, is working to repair and maintain forested riparian buffers and establish a voluntary easement program in perpetuity for long-term water quality improvement and habitat protection.

Project Description

The Headwaters SWCD riparian easement program began in 1993. Participation in the program encourages streamlining the easement process, which now just takes thirty days. By contrast, other easement programs may take up to one year. The landowner releases or gives up the right to destroy the riparian zone and works with the SWCD to develop a management plan to ensure the protection of that zone. In return, the landowner qualifies for tax deductions as for any charitable contribution.

The focus of the management plan is to keep the streambanks vegetated and prevent cattle from degrading the stream. Cattle are permitted in the easement zone, but must be given alternative water sources or limited access to rivers. Headwaters SWCD provides the technical assistance to implement the requirements.

Benefits/Results

The easement program has met with very positive results which may be attributable to the fact that landowners feel more comfortable working with a local organization.. Five easements have been established in three counties of the Shenandoah region. The riparian easement program prevents soil loss and flood damage which protects resources and wildlife habitats. Over time, benefits can be increased further if easements are placed on consecutive parcels, resulting in the establishment of riparian buffer corridors.

Costs/Funding Source

The Valley Conservation Council and the Natural Resources Conservation Service have provided technical and financial assistance to the Headwaters SWCD.

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Herring Run Watershed Association

Baltimore County, Maryland

Background

Herring Run is a 25-mile stream system in northeast Baltimore which runs through both the City and County. Its watershed is 45 square miles and contains 120 communities, 80 schools and 65 churches.

The Herring Run Watershed Association (HRWA) is a grassroots, volunteer-based environmental group formed in January 1993 after a stream survey of the Herring Run and its major tributaries was conducted by citizen volunteers. These volunteers found that there was much to be done to restore this urban stream. Notable problems identified in the survey included sewage overflow points, fish migration barriers, and unshaded areas.

A primary goal of the Herring Run Watershed Association is to improve water quality in the Herring Run and Chesapeake Bay. It is the Association's hope to restore the herring fishery before the year 2000.

The large human population in the Herring Run watershed has placed significant stress on this ecosystem, and has influenced the direction that the Association's restoration efforts have taken. Initially, the Association functioned primarily as a group of volunteers that worked together on stream clean-ups and tree plantings. Over time, however, Association members realized that a strong education and outreach program would more effectively promote their goal of improved water quality in the Herring Run. An organized and effective public outreach program would reach a larger public and result in the implementation of restoration projects. For the past year, the Herring Run Watershed Association has been working with the Department of Natural Resources TREE-MENDOUS MARYLAND and the Chesapeake Bay Foundation on a major educational and reforestation effort in the Herring Run watershed.

Project Description

In 1995, the Herring Run Watershed Association initiated a tree nursery program. The nursery program, run in cooperation with TREE-MENDOUS Maryland, National Tree Trust, Baltimore Municipal Golf Corporation (BMGC), Baltimore City Department of Recreation and Parks, and individual communities, will provide free trees to watershed community groups committed to restoration of the Herring Run watershed.

A key aspect of the nursery program is the unique relationship between HRWA and the Baltimore Municipal Golf Corporation — golf corporation staff care for the trees and the HRWA provides administrative support for the program. The tree nursery program is structured as follows:

- Seedlings are provided to the Baltimore Municipal Golf Corporation by TREE-MENDOUS Maryland's National Tree Trust Program.
- The BMGC maintenance crew pots, weeds and waters the seedlings with assistance from HRWA volunteers.
- HRWA promotes availability of free trees for Herring Run watershed plantings, all which occur on public lands.
- HRWA maintains an inventory and manages the distribution of trees.

- HRWA advises communities on which trees are best for specified species.

HRWA has also established a Tree Planting Program which provides education and tools needed for successful tree plantings. Mulch and special watering systems are provided to support these volunteer planting projects.

Benefits/Results

As designed, the six-month-old tree nursery program will provide numerous benefits both to the Herring Run watershed and the community that lives there. Through this program, 25 acres of riparian forest buffer will be reestablished. This year alone, more than 400 trees will be distributed to neighborhood groups committed to restoring the ecological integrity of the watershed. Citizen groups receiving trees will be encouraged to attend watershed educational workshops provided by HRWA members. These educational programs include information on the values of trees, planting and maintenance techniques, and watershed management.

The HRWA Nursery and Tree Planting programs are designed to promote citizen-based restoration of Herring Run. These programs encourage watershed residents to become actively involved in restoring the resource by providing them with the knowledge and tools necessary. The HRWA has developed other programs in this effort including stream and watershed surveys, water quality monitoring, stream clean-ups and a quarterly newspaper highlighting what schools are doing to help Herring Run. A successful Walkathon and Festival to build community support and provide education was held this spring with more than 1,500 people attending.

Costs/Funding Source

The Chesapeake Bay Program provided a Challenge Grant for $40,000. Other funding sources came from: the Maryland Department of Natural Resources/TREE-MENDOUS Maryland; Maryland Save Our Streams; Baltimore Municipal Golf Corporation; the Chesapeake Bay Foundation; and the U.S. Forest Service.

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Hollywood Branch Restoration Project

Montgomery County, Maryland

Background

The Hollywood Branch is located in Montgomery County, Maryland, just north of Washington, D.C. The watershed drains approximately 1.3 square miles. Hollywood Branch flows into Paint Branch, a major tributary of the Anacostia River that supports a population of wild trout. The trout live upstream of the Hollywood Branch confluence. The restoration demonstration project is located in Martin Luther King, Jr. Regional Park, one-half mile above the confluence of Hollywood Branch and Paint Branch in a non-tidal wetland, characterized by lush growth of rushes, sedges and other types of frequently encountered wetland vegetation.

The predominant land use in the Hollywood Branch watershed is residential housing. Most homes are single family dwellings on approximately 1/4-acre lots. The area is heavily crisscrossed by roads and several large roads serve as major arteries for the area. Because of the development in the watershed and the conveyance of stormwater into the stream channel, streambank erosion is an obvious problem in many parts of the watershed. Banks are vertical and sloughing into the stream. Many large trees have exposed roots and are leaning precariously toward the stream channel. The Hollywood Branch Restoration effort was performed by twelve environmental educators participating in the Save Our Streams Summer Water Institute. Also participating were Montgomery County teachers from Kensington Parkwood Elementary School and Rockville High School.

Project Description

The restoration project, which took place on July 12, 1995, repaired approximately 110 feet of streambank. One entire day was devoted to sloping the bank and placing riprap along the toe of the bank. During the remaining half day on July 13, volunteers planted streambank vegetation, seeded and mulched the site and secured the streambank with erosion control fabric. All work was performed on the south bank which is on the inside of a curve and received the brunt of erosive force in this reach of stream.

Volunteers also planted a total of 50 black willow and silky dogwood saplings. The entire site, including the areas disturbed by the heavy equipment were seeded with a mix of annual and perennial rye grass. Volunteers covered the entire site with straw mulch to provide immediate protection against rain. The straw will serve an important erosion protection function until the grass becomes established as a permanent soil cover.

The project utilized bioengineering techniques that rely on strategically placed plant materials to bind streambank soil, reduce erosion during storm surges and enhance the stream's ability to support aquatic life. Unlike channelization and other "high-tech" approaches to river management, bioengineering is comparatively inexpensive, creates a living, self-repairing system and, with proper consultation with environmental experts, can be executed by lay persons.

Benefits/Results

The project will serve as a demonstration site for citizen activists, environmental educators and others interested in natural approaches to river management.

Until the plants become well established, a process that may take two to three growing seasons, a local Montgomery County Stream Team has been set up to water the plants. Structurally, the maintenance requirements are minimal. The silt fence must be watched until the grass and woody plants are established to stop any sediment-land overland runoff from entering the stream. The woody plants may require pruning in the future to stimulate accelerated lateral growth in the form of new roots and shoots. Eventually, with proper management, this site can provide a large number of cuttings for future streambank projects in the county.

Costs/Funding Source

The streambank restoration project received a grant for $8,354 from the Chesapeake Bay Trust. In addition, Save Our Streams also received an additional $8,000 from Montgomery County Department of Environmental Protection (DEP), Water Resources Planning Division. The DEP grant was awarded to support public education and participation in county natural resource management issues.

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Riparian Buffer Initiatives

Baltimore County, Maryland

Background

Baltimore County, Maryland exemplifies a proactive local approach to the protection of its water resources and management of its riparian forest buffers. With 2,000 miles of streams that drain to the region's three drinking water reservoirs, tidal creeks, and the Chesapeake Bay, the county has employed multiple mechanisms for the management of its riparian ecosystems. The mechanisms utilized by the county include regulation, restoration, and citizen education and participation. Baltimore County's efforts to protect streams and forests began in the 1980s with an initiative to broaden riparian buffer measures. The Department of Environmental Protection and Resource Management (DEPRM) implemented buffer regulations by Executive Order starting in 1989.

Program Description

In 1991, the regulations were codified for the Protection of Water Quality, Streams, Wetlands and Floodplains. As implied in the title, the regulations provide for the delineation and reservation of areas along streams and their associated floodplains, wetlands, and steep or erodible slopes. The legislation intends that the riparian areas are left undisturbed to the extent possible in order to encourage growth of existing vegetation. Termed "forest buffers," the sensitive riparian areas are protected through post-construction of developments through delineation of buffer areas on record plats and recordation of standard no-disturbance restrictive covenants.

Baltimore County lists four reasons why its regulations are distinctive, effective, and innovative. First, the concepts contained in the legislation were developed through consensus of a steering committee with broad and diverse interest. Second, the standards apply to all streams, including intermittent and perennial, and mapped and unmapped streams. The regulations protect the reaches most essential to the ecological health of the river system. A third feature of the regulations is that the degree to which forest buffers are applied to a site is dependent on the environmental sensitivity of that site. Finally, the legislation is an integral part of Baltimore County's overall strategy for water resource management which includes watershed management planning; water quality monitoring; citizen education and volunteer activities; and a $24 million, six year capital program for stream restoration, stormwater retrofits, wetland creation, forest establishment, waterway clean-ups, dredging, and shore erosion control.

Benefits/Results

The resource management planning is providing invaluable information on resource conditions and effectiveness of regulatory and restoration components. The county is also tracking the effectiveness of the stream buffer regulation on a resource tracking database developed for land development projects reviewed by DEPRM. The tracking system communicate the progress and effectiveness of the regulation to the public, resource managers, and developers.

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Riparian Greenway System

Newport News, Virginia

Background

In November 1993, the Newport News City Council adopted the *Framework for the Future* as the City's new Comprehensive Plan. One of the Framework's unique qualities is the way it features a future vision of the city's riparian greenway system on the Comprehensive Plan Map. While many local governments include greenway, stream corridor, and open space language in discussions of long range goals, the Framework targets city objectives in clearer terms by placing the future greenway system on the Comprehensive Plan Map.

Project Description

The city's treatment of greenways underscores the profound difference between stating a goal and placing a land use element on the official Comprehensive Plan Map. While goals stimulate discussion of land use planning principles, mapped elements become incorporated on site plans through public and private development over time. Elements shown on the Frameworks Comprehensive Plan Map must be addressed in master plans for development proposals requiring changes of zoning or conditional use permits. Development proposals are expected to accommodate the Comprehensive Plan Map elements in the overall design. This approach has historically been used to protect rights-of-way for future roads, sites for parks and schools and other necessary public facilities. Under the city's new program, this same approach is applied to riparian greenways.

Previously acquired greenway property and easements provide the basis of the City Greenway Plan. A number of stream segments are already protected and additional sections will be added to the system as developments are proposed or expanded. The system is 10 percent complete at present and is anticipated to grow approximately 10 percent per year during the coming decade. The greenways network will be expanded primarily through easements, both donated and purchased, which will be administered by an urban conservancy program within the Department of Planning and Development. Public access facilities will be developed and managed by the Department of Parks and Recreation.

The City's Greenway Plan currently incorporates the Salter's Creek Greenway which was previously established by purchase, and is now being developed for public access as part of the City's Waterfront Parks Master Plan. This greenway includes more than 7,000 linear feet of the stream and its banks on both sides. Plans for access facilities along the Stony Run Creek Greenway, in the northern portion of Newport News, are currently being designed by the Department of Planning and Development. Many contiguous parcels are in city ownership and several easements on large adjacent parcels should be among the first donated when the Conservancy procedures are finalized.

Benefits/Results

The city was prompted to establish its greenways system due to concerns that, given the degree of urbanization which has taken place, further intensive development without

them would reduce streams to mere drainage conveyances. With the program, the city anticipates several benefits including:

- Maintenance of wooded boundaries between neighborhoods;
- An improved recreational system with linear connections developed between parks;
- Increased opportunities for nature study;
- A major contribution to the ecological health of the James River and Chesapeake Bay.

Costs/Funding Source

All funding for acquisition to date has been from the Newport News General Fund. The city expects to continue expansion of the system by receiving donated easements, or purchasing them when necessary to connect segments. Physical improvements for public access to riparian greenways have been funded from a variety of sources including the general fund, bonds, and grants from state and federal agencies.

The city indicates that the task of getting a specific greenway or a network onto a newly adopted comprehensive land use plan requires extensive public involvement.

"At some point in the development of every jurisdiction the environmental and quality of life concerns of the resident population seek a voice in the planning of future patterns of growth. When that time arrives, elements like greenways, bike trails, open space, historic sites, scenic views and habitat preservation become part of the discussion. When it appears that a lack of specific action will result in loss of these resources", the City of Newport News contends, "the community will commit to their preservation and impose their vision of the city on future development".

Contact

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Riparian Task Force

Hampshire County, West Virginia

Background

The Hampshire County Riparian Task Force met for the first time in March 1992 with one common goal: "To improve the water quality of Hampshire County West Virginia." Members who volunteer to serve on the task force are either local natural resource management agency personnel, volunteers of the same agencies, or local private organization staff who contribute significant technical assistance. The multi-agency group has developed educational materials and demonstration sites to promote the importance of protecting water quality in the Potomac River basin.

Hampshire County has lost an estimated 35 percent of streamside vegetation because of human activity and natural disasters, such as floods. Expansive housing development in forested lands, logging, and livestock grazing have all contributed to the destruction of stream bank ecology. Without the stabilizing effect of plants, soil erosion from streambanks reduces fish populations and adds excessive nutrients that contaminate water supplies.

Project Description

The Hampshire County Homemakers' Environmental Committee invited the public to meetings in order to provide educational information on best forest management practices used by today's loggers. Presenters focused on development and use of practices that have minimum impact on stream water quality and the environment. This activity led to the formation of the task force.

The long range goal of the task force is to maintain a quality living environment by using, managing, and preserving essential natural resources.

An educational program designed to give the layman an understanding of the value of stream buffer zones is of critical importance. Many people in the general population do not have an understanding of how buffer zones can impact water quality or wildlife and fisheries. The task force took responsibility of pursuing the development of forest buffer educational programs, including a brochure, a speakers bureau, and demonstration sites.

Benefits/Results

The task force has completed the following products and activities:

- Riparian Placemats: A full color placement was developed and distributed to over 10,000 people.
- Riparian Brochure: A full color 4-panel brochure was distributed to over 25,000 people.
- Riparian Demonstration Site: A 1/4 mile stream bank on the Cacapon River was replanted to woody vegetation. A 6x10 foot sign was erected along the highway to explain the site.
- Hampshire High School Earth Day: As a result of the task force's activity, the high school Environmental Club applied for and received a state grant to have a one-day observance of Earth Day.

- Hampshire High School Water Quality Monitoring and Geographical Information System (GIS): An advanced biology class along with the Environmental Club applied for and received a grant to 1) implement a one-year water quality monitoring program and institute a long-term change toward water quality education and 2) purchase and install a GIS for school use (water quality data, etc.).

With several agencies joining forces on the projects, the potential for educating the general population is greatly increased. This awareness will help ensure the future of the Potomac River Basin.

Costs/Funding Source

In-kind contributions are worth approximately $50,000. Actual dollar contributions have included: $30,000 plus match from West Virginia Education Grants; $2,000 from West Virginia Extended Service Grants; $2,000 from U.S. Forest Service Grants; and $5,000 from Potomac Headwaters RC&D Grants.

Contact

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River Front Park and the Charles Greenway

East Donegal Township, Pennsylvania

Background

East Donegal Township in Lancaster County received $25,000 from the state to purchase 35 acres of forestland along the Susquehanna River. Working with neighboring Marietta Borough which also received $25,000, the land is being preserved as a natural area with a walking trail.

Project Description

The family of a deceased owner approached the township to see if it would be interested in the land. Before the township could apply for funds from the state's Keystone Recreation, Park and Conservation Fund (Key 93), it had to get appraisals and conduct an engineering and land survey of the property. Besides the $50,000 the municipalities received from the state, each had to come up with matching funds to purchase the property.

Working in cooperation with another municipality greatly improved the chances of receiving funding for the project, which is a part of a larger greenway project in Lancaster County.

Benefits/Results

This link in the project means that only one segment is left for the greenway to be complete. A final link will have the greenway running the entire length of East Donegal Township.

The township wanted to ensure that residents could continue to enjoy boating, fishing, and recreational activities along the Susquehanna.

Costs/Funding Source

Funding came from the Pennsylvania Key 93 Grant, Lancaster County Planning Commission, Lancaster County Commissioners, state representatives, and township funds.

Contact

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Union County Greenways

Lewisburg, Pennsylvania

Background

In Union County there are numerous natural resources that are of significance from a local, state, and national perspective. Since the region has been experiencing steady growth, the need has arisen to design and implement innovative measures to maintain and enhance the environmental integrity of the region.

Project Description

The county, through its Planning Department, is in the process of developing a comprehensive greenway plan and program to address issues related to protecting water quality, wildlife habitat, open space for recreation, and environmentally sensitive lands, such as wetlands and floodplains. The intention is to create and maintain vegetated corridors that will interconnect throughout the county. The primary areas scheduled for greenway creation will be along the major tributaries to the West Branch of the Susquehanna River, particularly those where there is intense agricultural production and a good deal of development pressure. In particular, Buffalo Creek, Penns Creek, White Deer Creek, and White Deer Hole Creek. The goal is to get voluntary participation by landowners whereby they will donate easements and/or development rights on these future buffer areas. The property owner will determine whether or not the property will be open for public access. The Planning Department is currently working with the Union County Assessment Office to devise a tax schedule for landowners who donate land to be put into a greenway.

Benefits/Results

The benefits will be to reverse decades of degradation caused from deforestation, intense farming, and questionable development patterns which have historically exacted a heavy toll on the small streams in the county and on the Susquehanna River and ultimately on the Chesapeake Bay. One of the greatest problems faced in a rural county is the issue of non-point source pollution that is attributed to increased storm water runoff and the erosion process. Greenways or riparian zones should reduce the amount of sediment and nutrients entering local watercourses since the plants act as natural filters. Protected wetlands within these areas also serve a similar function.

In addition to improving water quality, these areas will provide travel routes for wildlife and may strengthen survival rates for rare, threatened, and endangered plant and animal species that are indigenous to the aquatic ecosystem and adjacent landscape. Moreover, there is the potential for increased recreational opportunities, as well as a higher level of consciousness among citizens for natural resources protection. Greenways also aid in cultural and historic resource protection as much of our early heritage, as was the case in the majority of the nation, took place in close proximity to the water. There are remnants of earlier civilizations and sites significant to the history of Union County and America found along local streams and the West Branch of the Susquehanna River.

The long range plan is to connect the stream corridor greenways to other belts of open space throughout the county. Some municipalities are already formulating ideas as to where greenways should extend. This process will be aided by local governments

amending current land use ordinances to allow for more flexible types of development that will encourage and provide incentives for contributing land to the greenway system. Traditional zoning and land development and subdivision ordinances currently in place in many municipalities do not allow this.

Costs/Funding Source

The initiative is being supported through the budget of the Planning Office and is utilizing two individuals enrolled in the Federal AmeriCorps program. Local conservation and other local government agencies have been supportive and have offered on-going assistance for planning and implementation. Once the planning work is completed, the county will seek additional assistance for the intensified implementation.

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Agricultural Preservation/ Conservation

An Introduction

The Chesapeake Bay Issue

There are many challenges facing the agricultural industry within the Chesapeake Bay watershed. Farmers are faced with crop pests, eroding lands and development pressures. Historically, we blame farmers for their disproportionate contribution of pollutants that flow into the Chesapeake Bay. Farmers are addressing these issues through the development of sustainable agricultural programs, agricultural best management practices, integrated pest management, streambank fencing, and other new and innovative techniques in farming practices that protect the Chesapeake Bay.

Since 1970, more than 40 million acres of farmland in the U.S. have vanished. Many local farmers are bowing to the development pressures that offer economic incentives. The physical transition that occurs in communities from one that was a predominantly farming area to an urbanizing district, has serious ramifications on a local community's economy and cultural heritage. Ironically, these development pressures are often the result of environmental protection policies that limit the areas which can be developed. This development limitation on environmentally sensitive areas often leaves no other viable option but to develop on farm lands. As farmers work to protect and restore their local watersheds and the Chesapeake Bay through innovative farming practices, it is important to keep in mind the policies that often lead to the development of these farming regions.

The Chesapeake Bay Program is providing farmers with the technical assistance to implement agricultural best management practices, streambank fencing (which reduces nutrient flows into rivers and streams), and riparian forest buffers. In addition the Chesapeake Bay Program is establishing, in each of the Bay states, an Agricultural Nutrient Management Initiative. This initiative focuses on the development of basin-wide strategies for education and outreach for individuals engaged in the application of nutrients to agricultural and other private and public lands. The project includes the continuation of training programs, certification exams for nutrient management consultants, and analysis of the test results. These activities all support the Bay Program's 40 percent nutrient reduction goal.

The Local Challenge

Local governments, private farmers and agriculture cooperatives are initiating a number of agricultural best management techniques throughout the watershed. In addition,municipalities are creating ordinances and zoning regulations to protect and preserve agricultural lands. Finally, there is a concerted effort by many federal, state and non-profit organizations to protect and preserve the most vital farm properties.

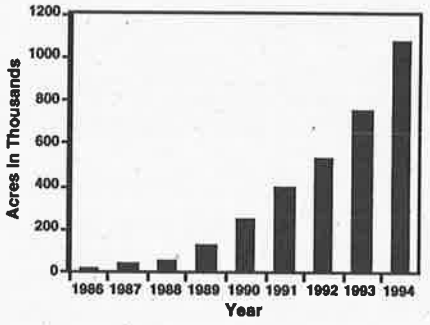
The following case studies illustrate model Bay watershed programs and projects that preserve agricultural lands and projects that limit the environmental effects of agricultural activities on local water resources and the Chesapeake Bay.

Environmental Indicators of Agricultural Preservation/Conservation

Acres Under Nutrient Management

GOAL: Establish nutrient management measures on cropland in the Bay's basin to reach the year 2000 nutrient reduction goal.

STATUS: Over one million acres in PA, MD, and VA have been placed under nutrient management since 1985. While this number is just 15% of the total cropland in the Bay's basin, many farmers have voluntarily begun nutrient management efforts that are not accounted for.



Source: Chesapeake Bay Program Office

Agricultural Land Preservation Program

Adams County, Pennsylvania

Background

Adams County is the fourth fastest growing county in Pennsylvania. A survey published in 1991 expressed the preservation of farms, orchards, and the Gettysburg battlefield as a top priority of its residents. The nine member Agricultural Lands Preservation Board has been actively working towards preserving approximately 600 acres of farmland per year. Programs key on clustering around currently preserved farmland, as well as on higher quality farmland in the county.

Project Description

The Agricultural Land Preservation Board administers the Agricultural Conservation Easement Program for the county. The Board acts to:

- protect viable agricultural lands by acquiring agricultural conservation easements which prevent the development or improvement of the land for any purpose other than agricultural production;
- encourage landowners to make a long-term commitment to agriculture by offering them financial incentives and security of land use;
- provide compensation to landowners in exchange for their relinquishment of the right to develop their private property;
- protect normal farming operations in agricultural security areas from incompatible non-farmland uses;
- protect farming operations from complaints of public nuisance against normal farming operations; and
- assure conservation of viable agricultural lands in order to protect the agricultural economy of the Commonwealth.

Benefits/Results

To date, Adams County has preserved over 5,100 acres at a cost of $8.8 million. The Board works closely with the Natural Resource Conservation Service (NRCS) to insure that efficient conservation practices are used.

An important strategy is the modern Agricultural Zoning Ordinance, with Transfer of Development Rights. This approach requires the commitment and leadership of township governments. As part of its preservation program, Adams County makes sample zoning ordinances available to interested townships and provides other technical support.

The Board, as well as County Commissioners, are also exploring the formation of a private, non-profit county land bank or conservancy, which will be able to accept donations of land or easements for conservation, recreational, and other associated purposes. Such a conservancy would provide the Board with another important tool to use in its preservation efforts.

Costs/Funding Source

Funding is based on county and state allocations. Currently, the county allocations directly out of the General Fund. The state allocation is derived from a 2 cents/pack cigarette tax revenue.

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Agricultural Preservation District

Essex County, Virginia

Background

Essex County, located on Virginia's Middle Peninsula is bounded by King George County to the north and Caroline County to the west. The northeast boundary of the county is the Rappahannock River. The Town of Tappahannock (County seat) is centrally located along the county's riverfront and serves as the major center of development within a several county region of Tidewater Virginia. As part of its update of the Comprehensive Plan in 1992, the county became concerned about the long term protection of agricultural lands to support its agricultural industry. With 261 square miles (167,200 acres) in land area and a county population of under 10,000 residents, the county's character is quite rural. Most farmland protection measures are instituted in communities where agricultural lands are threatened by substantial development pressures and rapidly growing population. A concern for protection of farmland resources in such a rural county is quite rare.

Project Description

In 1991, the Essex County Commissioners and Planning Commission formed a Comprehensive Plan Advisory Committee to update the County Comprehensive Plan.

Although development pressures had not been significant in the past, the Plan Advisory Committee determined that the likelihood of future increased growth pressures was greatest from its northwestern border. Since the northern area of the county has traditionally been dominated by agricultural uses, the Committee elected to establish a number of objectives to protect farmland resources. While protection of the farmland base to support the agricultural economy was a primary objective, the county determined that removing lands from the threat of development also supported the policy of concentrating growth in the Town of Tappahannock where demand for public facilities and services could be satisfied in a more cost effective manner.

To achieve their objective, the plan identified land area for application of a new Agricultural Preservation District which included approximately 41,500 acres, representing some 26 percent of the total land area in the county. This district is located at the northern end of the county straddling both sides of the Route 17 corridor and essentially serves as a gateway to the county from the north. The County Plan notes, "this district is currently dominated by agricultural use and is remote in its location from existing county services...To minimize future impacts on the county for costs of services, and to maintain the agricultural land base necessary to support a continued viable agricultural economy this district substantially limits residential development". The County Zoning Ordinance was amended in 1992 to implement plan objectives and establishes provisions limiting development within the district. Within the district, for the first twenty acres owned and for all parcels under twenty acres in size, a property owner is permitted one homesite for each five acres. Beyond the first twenty acres owned, the property owner is entitled to one additional development right for each additional twenty acres owned. By way of example, a property owner with one hundred acres would be permitted eight lots. Four lots for the first 20 acres (1 per 5) and four homes for the remaining eighty (1 per 20). The ordinance permits a one acre minimum lot size offering the potential to retain roughly 90 percent of the farmland in an undeveloped state even if the owner decides to fully utilize the properties development potential.

Results/Benefits

The Comprehensive Plan has served to increase protection of 41,000 acres of farmland, as well as to protect wildlife resources adjacent to the Rappahannock River and several tributary streams. This program provides the county with opportunity to minimize future costs in infrastructure and delivery of services.

Costs/Funding Source

The program is administered as part of the County Planning program. Costs are not appreciably greater than those associated with zoning administration absent such a program.

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Eastern Shore Land Conservancy

Queenstown, Maryland

Background

The Eastern Shore Land Conservancy (ESLC) is a private, non-profit organization dedicated to the preservation of productive farmland and natural resources on the Eastern Shore. It faces the challenges of farmland conversion, sprawling urbanization and unplanned development which are rapidly consuming the special landscape of the Eastern Shore of Maryland. Since its inception in 1990, the ESLC has preserved over 12,000 acres of farmland and natural areas. It works towards this goal in partnership with private landowners through community based preservation programs.

Project Description

Using voluntary land protection techniques such as conservation easements, Maryland's farmland preservation program, and Transferable Development Rights programs, the ESLC works with willing landowners to determine and protect the future use of valuable agricultural, historic, scenic, natural and habitat properties. Through conservation easements, landowners work with the Conservancy to design restrictions that will protect the environmental and cultural resources of their property, while allowing reasonable use for the future.

The Maryland Agricultural Land Preservation Foundation is a state funded program which purchases restrictive easements on productive farmland. The Conservancy works closely with county program administrators to tailor the program to individual farmland, tax, and income needs.

Benefits/Results

Using a computer mapping system, the Conservancy has inventories of all lands on the Eastern Shore which are exceptional for their farm soils, habitat features, scenic quality, or historic resources. This information is helping the ESLC to focus efforts on the highest priority conservation areas. The Conservancy's Community Stewardship Programs promote broad based community understanding of the value of land resources and protection mechanisms and encourage widespread participation in land use decision-making. A variety of educational programs and activities are utilized which encourage involvement while respecting the interests of private property owners and fostering sound economic growth.

Costs/Funding Source

The ESLC relies on volunteers and membership dues to promote its message.

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Farm Link

Harrisburg, Pennsylvania

Background

In collaboration with the Rodale Institute and *Pennsylvania Farmer* magazine, the Center for Rural Pennsylvania established the Farm Link program in 1994. The Center was concerned that over 1,000 farms were being lost a year in Pennsylvania. The concept is to link new or prospective farmers with landowners who are interested in ensuring that their land remains in agricultural production. Over a period of time, the new farmer assumes greater responsibilities, and eventually, full ownership of the farm.

Project Description

Start-up financing for new farmers is difficult to obtain. Thus, through creative agreements designed through the Farm Link program, options are made available to farmers wishing to enter or retire from the farming industry. Each link match is different, but the end result will be to increase the number of new family farmers in Pennsylvania.

A workshop with over 40 participants was held in September 1993 to determine the level of interest in the concept. Based on a strong statement of support, the Center and its partners invited prominent agricultural leaders to participate in a task force assisting in the establishment of an operational link.

Benefits/Results

The Farm Link database includes over 450 entering and retiring farmers and is regularly reviewed and updated. Workshops are held throughout the state to facilitate meetings of perspective matches.

Costs/Funding Source

Staff and funding for Farm Link are provided from the Center for Rural Pennsylvania, the legislative agency of the Pennsylvania General Assembly. The mission of the Center is to ensure that rural communities have their needs addressed according to their own priorities.

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Piedmont Reserve

Albermarle, Clarke, Culpeper, Fauquier, Greene, Loudoun, Madison, Orange, and Rappahannock Counties, Virginia

Background

The Piedmont Environmental Council (PEC) was established in 1972 to promote positive planning for the future of rural areas by encouraging growth when and where it is desirable. In 1984, the PEC called for the establishment of a "Virginia Piedmont Reserve", a permanently protected rural area of one million acres in the nine-county region. Private landowners assumed the leadership role and by mid-1988, more than 325,00 acres of private farms and forests were designated by their owners for special protection.

Project Description

The most utilized mechanism selected by Piedmont landowners for the protection of land is the agricultural and forestal district. The districts are established for renewable periods of up to ten years by contracts between groups of landowners and their county governments.

The PEC, however, stresses that open space easements constitute the preferred approach, since they provide permanent protection to rural land by placing development restrictions on that land in perpetuity. These easements are created within limits set by the Commonwealth and then donated to a government agency or private non-profit organization. The easements limit the extent to which land may be subdivided and developed in the future. It also puts restrictions on property use — no junkyards or strip-mines, for example.

The creation of agricultural and forestal districts and the donation of easements are voluntary mechanisms for protecting the countryside. They provide tax benefits to landowners and preserve open space, wildlife habitats, watersheds, and other community values while maintaining land in private ownership and productive use.

Benefits/Results

The Reserve has several key benefits:

- A stabilized economic base encouraging long term investments in Virginia's three major economic sectors: agriculture, forestry, and tourism.
- Protection of local tax rates for farm and town properties alike.
- Retention of Virginia's Northern Piedmont as a special place to be enjoyed by both residents and visitors for outdoor activities.
- Protection of local and distant natural resources - mountain slopes to Chesapeake Bay.

Of the 400,000 acres being voluntarily protected in the Piedmont Reserve, 80,000 acres are protected by permanent easements.

Costs/Funding Source

Most financial support comes from annual PEC membership fees, both individual and organizational. Foundation support plays a small role in funding and occasionally government grants are awarded.

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Remington Farms Project

Kent County, Maryland

Background

The Remington Farms Project is sponsored by Prosper (Practical Research on Sustainable Practices and Economic Return), an organization formed by farmers, non-profit groups, and representatives from government agencies, universities, and the agricultural industry. The Project's objective is to build understanding and acceptance of on-farm sustainable agricultural practices within the scientific community and among the general public. The project's location in Kent County provides a unique opportunity to study the effects of farming methods on water quality in conjunction with groups that are working to preserve the delicate eco-system of the Chesapeake Bay.

Project Description

In the five-year sustainable agriculture research and demonstration project, four diverse farming systems are compared for their impact on economics, water quality, soil characteristics and wildlife. The four farming systems are conducted side-by-side on ten acres and represent production options currently in use in the Mid-Atlantic region. Each is subject to a distinct rotation scheme, tillage practices, fertility programs and methods of pest control. All systems employ Best Management Practices (BMPs) to help keep materials on the field and out of the water.

Each ten acre block occupies a discrete watershed, so that runoff of water, soil, nutrients, and pesticides can be monitored. Each watershed is tested using shallow wells for groundwater sampling. Water flumes and automatic monitoring and sampling equipment are used to test the runoff.

A replicated, small-lot experiment is being conducted in an adjacent field of similar soil type. This experiment compares data on yield, soil tilth and fertility, pest populations, and nutrient movement through the soil profile. Treatments duplicate the four cropping systems.

In order to ensure that the project adheres to real-world concerns of farmers, a farmer advisory panel has been involved from the beginning. Local farmers offer advice as new challenges arise.

Benefits/Results

The first years results were reported in 1995. The completion date is expected for October 2000.

The long-term research and demonstration project will break new ground in the pursuit of sustainable agriculture systems. The project will also test existing knowledge and theories on the agronomic, economic, and environmental impacts of the crop rotation systems. Results will be shared with farmer, scientific, and public audiences as the information becomes available.

Costs/Funding Source

Funding is being provided by DuPont Agricultural Products, USDA, EPA, the University of Maryland, the University of Delaware, Cornell University and the Rodale Institute.

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Rural/Agricultural Conservation District

Isle of Wight, Virginia

Background

Isle of Wight County is a mostly rural jurisdiction located on the western fringe of the Greater Hampton Roads Metropolitan Area. Since its founding in 1634, it has grown at a gradual, yet steady pace. In recent years, however, population growth and development have been increasing in direct response to the urbanization and expansion of the Hampton Roads area. This expansion will cause the county's population to grow by an anticipated 46 percent during the next twenty years.

In order to effectively manage this rapid growth, a cooperative three year effort between citizens, public officials, and staff culminated in the adoption of the Isle of Wight County Comprehensive Plan in May 1991.

Project Description

A key element of the Plan is the designation of three strategically located Development Service Districts which represent 30 percent of the county's land area, as well as the designation of a Rural/Agricultural Conservation District (RAC) which represents the remaining 70 percent of land area. Growth will be concentrated in the Development Service Districts so that a compatible mixture of land uses can be economically provided with utilities and services. The RAC is intended to preserve the County's rural character, minimize conflicts between farming and rural residential development, and prevent suburban sprawl. However, through two options of "Rural Density Incentive Zoning", some low density residential development is allowed.

The first density option is based on a sliding scale approach. Using this option, density is determined by the overall size of the tract to be developed. The second option provides a property owner or developer the incentive of higher possible densities if certain standards of rural residential development are satisfied, such as development clustering, rural highway access controls, and conservation easements. In effect, the greater the open space on a site and the more compact the development design, the higher the density that can be achieved.

The designation of these planning areas and districts has evolved from a synthesis of factors including: existing land use patterns; projected growth and development trends; the natural capacity and suitability of the land to support development; the availability and adequacy of infrastructure such as roads, sewer, and water; and the citizens' desire to preserve the rural character and quality of life while accommodating growth.

Benefits/Results

By using the innovative planning approaches embodied in the Development Service Districts and the Rural/Agricultural Conservation District, the county proposes to guide and manage future growth in a manner which will maintain and enhance the quality and character of the natural and man-made environments in both urban and rural settings. As a growth management guide, the Comprehensive Plan is a flexible document utilizing a twenty year planning period and requiring a review of the planning policies every five years. A significant number of the goals and objectives will be realized in a short period

of time. This is because the Plan provides that the county's Zoning and Subdivision Ordinances be rewritten in order to statutorily implement its growth management principles. Furthermore, the Plan requires the adoption of a water quality and sensitive lands protection program.

In order to preserve and improve the environmental quality of the county, the Plan sets forth rigorous standards for land use and development. These standards include: the protection of sensitive lands and water quality through a local Chesapeake Bay Preservation Area program which addresses non-point source pollution; requiring environmental impact assessments for significant development proposals; administration and enforcement of wetland and floodplain ordinances; and the use of zoning incentives to promote cluster development and the preservation of open space.

Costs/Funding Source

Funds expended by the county to develop and print the Plan were approximately $100,000. Of this amount, approximately 50 percent was funded by the Virginia Coastal Resources Management Program under the Coastal Zone Management Act administered by the National Oceanic and Atmospheric Administration.

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Land Stewardship

An Introduction

The Chesapeake Bay Issue

The qualities of the Chesapeake Bay region make it attractive for new development. Development has concentrated in sensitive waterfront and riparian areas which offer access to the Bay and its tributaries. Close to 100,000 miles of interconnected streams, wetlands, and their riparian areas serve as a circulatory system or natural infrastructure for the Bay.

Land use decision-making within the Bay region is the responsibility of local and state governments. Local governments, private landowners, and other community interests vigorously support the traditions of home-rule. Most local land use authorities are designed to accommodate development.

Central to the discussions about land and water management and use of the Chesapeake Bay region is the premise that the Chesapeake Bay is viewed as a public "commons". The Bay's watershed, however, is a mosaic of state and local home-rule jurisdictions largely within private landownership. The traditions and human values of the region require that the restoration of the Bay must be done with sensitivity, flexibility and provisions to allow people to prosper as well as protect.

The 1987 Chesapeake Bay Agreement includes the goal to, "Plan for and manage the adverse environmental effects of human population growth and land development in the Chesapeake Bay watershed". This goal is carried out by the Bay Program's Land, Growth & Stewardship Subcommittee. The Subcommittee and its workgroups are responsible for a variety of activities including identifying growth and land use issues of a Bay-wide nature, addressing development topics, and forging alliances with other organizations and interests. The ultimate goals are to: 1) promote sound land management decisions; and 2) encourage public and private actions to reduce the impacts of growth.

The Local Challenge

Many local governments and communities within the watershed are working cooperatively to find solutions to the complex land management problems of the Chesapeake Bay region. These solutions reflect a growing understanding of the fundamental interdependency between environmental quality, community vitality and economic health. This integration of goals, with a strong reliance on local leadership, represents a fundamental shift in the philosophy and conduct of Chesapeake Bay protection and restoration work.

This locally based integration of multiple goals, with its reliance on voluntary participation by all local stakeholders, represents a commitment and an obligation by landowners, government decision-makers, business leaders, citizens, and others to meet community and economic needs without compromising the environmental values

and functions of the Chesapeake Bay ecosystem. Private, and public, landowners act as "stewards" of their portion of the Bay region and work to protect characteristics of their own land worth saving, while enjoying financial benefits as well.

The land stewardship examples which follow attempt to illustrate that protection, restoration and enjoyment of the Chesapeake Bay region can be combined with sound land development and management decisions.

Annapolis Summits

Annapolis, Maryland

Background

The Alliance for Sustainable Communities was formed to educate and stimulate public participation on issues of growth, ecological planning, ecosystem health and community viability. Today, the Alliance has put together a partnership with the City of Annapolis, County Planning Office, State Planning Office, Maryland Department of Natural Resources and the Environmental Protection Agency's Chesapeake Bay Program Office. In 1992, the State of Maryland put into effect the Economic Growth, Resource Protection, and Planning Act. The Act directs local and state governments to streamline regulations to assure achievement of certain growth management and resource protection goals. Specifically, the Act asks counties and local municipalities to revisit their comprehensive plans to adhere to the "visions" established by the state. The Alliance inspires participation in the planning process to create a vision for communities.

Project Description

The Alliance for Sustainable Communities projects are based on the principal that sound ecological policies create jobs and address social issues. The Alliance has spread its philosophy of community revitalization via the Annapolis Summits (conference/workshops) that have brought together outstanding speakers, innovative planners, authors, philosophers, and environmentalists. The Summits have focused on the public process in terms of local planning issues.

The Alliance has held three summits which addressed three specific subjects that are interconnected in the planning process. The first Summit, "Toward a Community Vision," gave a broad overview and discussed the philosophy of the community level movement. It was well attended and initiated projects including "Green Gardens," which trained the minority community the art of ecological gardening. The second and third Summits respectively addressed "sacred cultural places" and the watershed approach. The last two Summits were able to identify community values and sacred places and inspired the action of the public to plan for the preservation of those community characteristics.

Smaller workgroup meetings between Summit attendees and city, county and state planning personnel have taken place and Summit recommendations have been taken under consideration, and in some cases incorporated, in comprehensive plans.

Benefits/Results

The Alliance for Sustainable Communities has been effective on a number of environmental and community based fronts. The Summits have been identified as community contributors in a number of ways including:

- Communicating the big picture to the public;
- Fostering community participation on a broad level;
- Creating alliances between groups, especially those that traditionally have not communicated with one another; and
- Creating new ideas, concepts and visions to the community.

The organization has also been successful in creating an ecological business start-up with minority communities in areas previously associated with crime and poverty. A core of volunteers is increasing in all segments of the Alliances work and Summits have averaged 150 - 200 participants. Finally, the Alliance has been successful in having Summit and workgroup planning recommendations incorporated in the City Comprehensive Plan, including the preservation of sacred places and innovative transportation concepts.

Costs/Funding Source

The Alliance has received financial and technical assistance from private foundations, the Chesapeake Bay Trust, local citizens, Maryland Department of Natural Resources and the EPA's Chesapeake Bay Program Office.

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Canal Place Preservation and Development Authority

Cumberland, Maryland

Background

At the upper end of the C&O Canal lies the city of Cumberland, Maryland. The steep terrain of the Appalachian ridges forces the river, roads, canal, and the railroad to converge. The Baltimore and Ohio Railroad and Chesapeake and Ohio Canal linked the city with points east. With coal and iron mining in nearby valleys, Cumberland was a thriving seat of commerce and industry in western Maryland. The decline of manufacturing in the late 20th century resulted in the decline of the city. City, state, and federal officials are now working to revitalize Cumberland using the C&O Canal as a centerpiece.

Project Description

The C&O Canal and the Western Maryland Railroad Station are the focal points of the Canal Place Project, a cooperative effort under the direction of the Canal Place Preservation and Development Authority established in 1993 as an independent agency of the State of Maryland. The project is working to develop the land around the historic train station. The station has been refurbished in part and contains a C&O Canal Visitor's Center, the Allegany Arts Council, the Allegany County Visitor's Bureau, an Industrial and Transportation Museum, and a gift shop. The Crescent Lawn will be an open space area used for major recreational events. The Wills Creek Esplanade will provide a major pedestrian access point to Canal Place, linking the train station, the C&O Canal, Station Square Plaza and Crescent Lawn with downtown Cumberland.

Benefits/Results

Canal Place is a "heritage area" combining economic development, tourism, historic preservation, recreation and education to help revitalize Cumberland's economic climate, utilizing the natural attractiveness of local historical and cultural resources. This planning, along with resulting public and private investment, will rejuvenate the area and represent a new future for downtown Cumberland.

Costs/Funding Source

Estimates to include all work associate with Canal Place during the next ten or more years are currently being prepared. Canal Place is a partnership between the public and the private sectors. Costs for actions such as rewatering the canal and building roads, sidewalks and visitor facilities will be borne by a combination of federal, state, city, and county governments. Private investment will be encouraged by publicly offered incentives.

Contact

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Chester River Watershed Case Study

The Chesapeake Bay Countryside Stewardship Exchange

Background

The Chesapeake Bay Countryside Stewardship Exchange is a project that provides an opportunity for individuals who want to change aspects of their community to define issues of concern and to find ways to implement solutions to those issues. Led by the Alliance for the Chesapeake Bay and the Countryside Institute, an international team of experienced professionals immerse themselves in a community for a week. The team provides an objective view of the community and the issues with which it deals. Team members are experienced professionals who bring a fresh perspective to the community. The mix of professional and national backgrounds stimulates creative problem solving and facilitates the development of innovative ideas.

The team visit is just on phase of the process, however. At the heart of the Exchange is the local organizing committee within each community. Committees are formed involving local elected officials, county and municipal administrators, civic interest groups, real estate interests, farmers, business interests, tourism officials, and planners. Members volunteer their time. Their first task is to submit an application to the Exchange. Once selected, they must define and implement the case studies. After the visiting team leaves, the local organizers identify recommendations or ideas that are of the most interest and should be implemented.

Project Description

The Chester River watershed in Maryland was the site of a 1994 case study. A team of eight U.S. and U.K. representatives worked with a local organizing committee of 25 community representatives and a range of volunteers.

Local representatives expressed concern with growth patterns and economic development and design issues. Their focus was on three issues:

- Encouraging growth patterns that preserve the rural character of the working landscape, protect open space and wildlife habitats;
- Encouraging diversified, sustainable economic growth and the protection of traditional, resource-based industries;
- Creating a common vision and consensus for goals of planned land use, economic growth, and the conservation of natural resources.

The initial findings of the team were presented at a public meeting. Among the observations were a list of seven critical issues that the team felt were interrelated and fundamental to developing a sustainable future for the Chester River. These issues were:

- Recognize the clear interdependence of communities, economies and the environment;
- Raise the level of public awareness;
- Create a shared vision;
- Dispel the perceived inability to control own destiny;
- Create a framework to support the shared vision;

- Build better communication and cooperative approaches; and
- Change the belief that all land is a marketable commodity.

Benefits/Results

The Local Organizing Committee (LOC) prioritized recommendations and, in January, met with recently elected County Commissioners from both counties to discuss those priorities. The Commissioners reacted favorably and implemented one of the recommendations — the appointment of a Bi-County Forum to provide a communication link between the two counties. County planning staff who participated in the LOC have recommended that the mission of the Forum be the implementation of the Exchange Report.

Key LOC members will visit the New Jersey Pinelands to study projects that provide examples of alternative incomes for farmers. The Queen Anne's County Visitor Service and Farm Bureau are collaborating on a project at Kent Narrows to provide tourism opportunities and to enhance the profile of the agricultural alternative crops for local farmers. A new partnership between the Eastern Shore Land Conservancy and Chesapeake Wildlife Heritage is resulting in a broader, more comprehensive watershed approach to the preservation and acquisitions of agricultural land.

A steering committee of thirty government agencies and private organizations helps the local organizing committees to implement their recommendations.

Costs/Funding Source

The Chesapeake Bay Program and other government agencies and private groups have contributed funding for the Exchange program.

Contact

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Conservation Directory

Nanticoke River Watershed, Maryland

Background

The Nanticoke River Watershed encompasses Wicomico, Dorchester, and Caroline counties in Maryland and Sussex county in Delaware. All total, the watershed covers approximately 400 square miles on the Delmarva peninsula. The Nanticoke River is an exceptional natural resource which has remained clean and quiet, although subject to non-point sources of pollution and other environmental threats. The Nanticoke Watershed Alliance works to preserve the watershed.

Project Description

In October 1994, the Alliance, in cooperation with the National Park Service, published the *Nanticoke River Conservation Directory*. The goal of the Directory is to provide a reference guide for those interested in the conservation of the Nanticoke watershed. The guide describes many of the public agencies and private organizations involved in conserving the river, projects that are proposed or under way, and Nanticoke River publications. It also outlines some of the technical and financial conservation assistance programs available for use in the watershed. A matrix of organizations and their activities indicates where efforts have been overlapped or ignored.

Benefits/Results

Reaction to the publication has been extremely favorable. The Directory continues to be a valuable tool at fairs and festivals and at presentations to civic organizations, schools, and planners. When its shelf life has expired, an update is planned.

Costs/Funding Source

The National Park Service financed the printing of the Directory. Distribution has been handled by various member organizations of the Nanticoke River Watershed Alliance.

Contact

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Cumberland County Case Study

The Chesapeake Bay Countryside Stewardship Exchange

Background

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Project Description

With the assistance of the Alliance for the Chesapeake Bay and the Countryside Institute, an Exchange team traveled to Cumberland County, Pennsylvania. Questions to the team focused on land use and resource protection. The team from France, Wales and the United States delved into the issues through meetings, site visits, and conversations. Throughout these meetings, the organizers emphasized several recurring issues:

- Water resources;
- Farmland protection;
- Transportation;
- Sustainable economic growth;
- Local government roles; and
- Quality of life.

The visiting specialists looked at those issues and presented preliminary observations and recommendations at a public meeting. The team observed a number of strengths within the community – the pleasant countryside, fertile agricultural areas, an active economy, sufficient water resources, a strong sense of place within the community, a strategic geographic location, and recreational space.

However, two factors are allowing unmanaged growth in the county. First, the county is not viewing growth management as a regional issue. It needs to be addressed as a joint effort by the county, the townships, and the boroughs. Second, land use plans, capitol improvement programs, resource inventories, monitoring programs, and other growth management and resource protection programs are insufficiently developed to match current and projected growth. The municipalities were urged to act soon to change the situation.

Benefits/Results

The Cumberland County Conservation and Open Space Task Force that resulted from the Exchange adopted the recommendations of the Exchange as part of its own recommendation to the County Planning Commissioners. The Commissioners expressed a commitment to hiring additional staff to implement the recommended planning components (i.e. preserving open space, agricultural zoning, and water resources protection).The Pennsylvania Department of Community Affairs has committed its interest in assisting Cumberland County to complete a natural resources inventory, one of the recommendations identified as a priority. The county has committed additional resources to planning through an increase in funding to the Tri-County's Planning Commission. As a result, two to three new planners and a GIS system will be provided. A member of the Local Organizing Committee, the Chesapeake Bay Foundation, conducted a field trip for county and municipal officials to discuss farmland preservation, visioning and Chesapeake Bay ecology.

Costs/Funding Source

The Chesapeake Bay Program, and other agencies and organizations, has provided funding for the Exchange program.

Contact

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Cypress Park Nature and Exercise Trail

Pocomoke City, Maryland

Background

The Pocomoke River Swamp is an important feature of the Chesapeake Bay watershed, known for its variety of plant and animal species. Several years ago Pocomoke City purchased seventy eight acres of cypress forest and wetlands adjacent to the Pocomoke River. All of the acreage was located within the city's corporate limits and close to the downtown business district and park. The site was acquired with the intent of preserving a unique cypress swamp. Subsequent site visits by environmentalists and naturalists confirmed that a wide and unique variety of plant and animal species was present on the site. The city was advised that no better environmental teaching tool could be found anywhere in the region because the species present on the site were representative of both northern and southern climactic zones. The city initiated plans for an educational nature trail project, but economic belt tightening prompted by the last recession required the project to be eliminated from the budget. A Pocomoke City family physician, Dr. Ritchie Shoemaker, was not deterred by a lack of funding.

Project Description

In 1993, the city, in cooperation with volunteers from the "Pocomoke River Alliance" (PRA) under Dr. Shoemaker's leadership, built a handicapped accessible nature trail through the 78 acre tract. The trail features 1,000 feet of floating boardwalk, 9 exercise stations and a 67 foot long pedestrian bridge. The trail begins in Cypress Park, linking 700 feet of cypress wetland by boardwalk, and winds its way on higher ground pathways which circle Stevenson's Pond (a popular fishing spot). The trail crosses the bridge (flown in and dropped by an Army Reserve chinook helicopter from Fort Meade), leads to a fishing pier, and culminates at Winter Quarters Boat Ramp. An optional trail loops back along a forest canal to the Pocomoke River. With information plaques, exercise stations, and areas for quiet observation, the Trail achieves its main functions of education, exercise and relaxation. Guard rails and modern construction provide safety for children and the physically disadvantaged.

In 1994, the PRA built a demonstration wetland garden, began a botanical trail in Cypress Park, and completed a two mile cross country course. The town received a $15,000 project open space grant to help build a combined 250 feet fishing pier and canoe launching ramp. This unit also connects the two completed halves of the new nature and exercise trail.

Benefits/Results

The primary goal of this project was to create environmental awareness for both visitors and residents alike. Both the product and the innovative fund-raising efforts have served to accomplish this objective. The exercise stations and trail itself provide recreational benefits to its users.

Currently, the city and the Pocomoke River Alliance are seeking funding assistance to construct a multi-purpose building that will provide a center for the trail complex and a base for educational program modules that will be developed to present the features of

this unique environment and its contributions to the qualities of the Chesapeake Bay watershed.

Cost/Funding Source

The trail was constructed on city land using private funds and volunteers. It was funded from donations in excess of $60,000 raised under the leadership of Dr. Shoemaker. Successful fund-raising items included two varieties of T-shirts. One features the title "The Pocomoke is a Bloomin River" and identifies/illustrates a number of native plant species. Additionally, a supporter could pay for a "foot of the boardwalk" with his name on it.

The project was assisted by staff and a grant from EPA's Wetlands Protection Office and a team of students from the Student Conservation Assistance Program.

Contact

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Eastern Shore of Virginia Case Study

The Chesapeake Bay Countryside Stewardship Exchange

Background

The Chesapeake Bay Countryside Stewardship Exchange is a project that provides an opportunity for individuals who want to change aspects of their community to define issues of concern and to find ways to implement solutions to those issues. An international team of experienced professionals immerse themselves in a community for a week and provide an objective view of the community and the issues with which it deals. Team members are experienced professionals who bring a fresh perspective to the community. The mix of professional and national backgrounds stimulates creative problem solving and facilitates the development of innovative ideas.

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Project Description

A 1994 case study focused on the Eastern Shore of Virginia. The local organizers sought a strategy for defining a comprehensive vision for the Shore. The organizers identified several key issues to address as part of that vision: sustainable economic development, surface and groundwater protection, protection of historical and natural assets, the declining seafood industry, and wastewater treatment.

The team participated in an intensive round of meetings, tours, lectures, and informal opportunities to discuss the Eastern Shore, its opportunities, and its problems. The team also facilitated a preliminary visioning session with 80 residents at the beginning of the case study week. The residents developed a blue print for a vision, or preferred future, that emphasizes improved employment opportunities and income while retaining the quiet rural character of the countryside. The members of the Exchange team were impressed by the opportunities as well as the challenges faced by the Eastern Shore of Virginia. The team met many talented citizens with pride in their community who were not content to merely react to developments and changing circumstances.

The Team identified five priorities with the greatest potential benefit for the Eastern Shore:

- development of an Eastern Shore Water Management Strategy;
- development of a comprehensive Route 13 plan;
- development of an Eastern Shore Economic Development Strategy and Plan;
- development of and Eastern Shore Tourism Development Strategy and Plan;
- effective cooperation between the counties and towns of the Eastern Shore.

Benefits/Results

Once the Exchange team completes its visit, it is the responsibility of the Local Organizing Committee (LOC) to implement strategies for the community. The Eastern Shore LOC has been actively pursuing funding for various projects that utilize the recommendations of the Exchange.

The LOC has received a grant for $10,000 from the U.S. Environmental Protection Agency (EPA) for a "sustainable development business center" demonstration project. The purpose of this demonstration project is to develop a process and method for the prevention, reduction, and elimination of water pollution related to the development of new small and medium-size businesses.

EPA has also completed an assessment of public and private assistance available for groundwater protection and management.

The National Trust for Historic Preservation will determine what technical assistance will be needed for the historic preservation area.

An architectural charette conducted by University of Virginia architecture students to identify alternatives to constructing a new courthouse on Route 13 was a success. It was decided that the courthouse will stay in Accomac with the possibility of being built in vacant buildings. This was a positive result step for environmental protection, as well as community and cultural heritage.

Costs/Funding Source

The Countryside Institute acts as the leading source of funding for the Exchange program, with assistance from regional offices depending on the areas being examined.

Contact

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Gwynns Falls Trail

Baltimore, Maryland

Background

"This is truly an exciting project for Baltimore and is another step in our efforts to revitalize neighborhoods on all levels," said Mayor Kurt Schmoke at a recent Trail Master Plan ceremony. He went on to say, "The Gwynns Falls Trail will provide new recreational opportunities, improve the quality of life and allow Baltimoreans to experience the natural environment in our own backyards." The trail is designed to give access and to promote the natural beauty of Baltimore's new and old neighborhoods.

Project Description

The 14 mile trail is a cooperative project of the Mayor and City Council of City Baltimore, the Trust for Public Lands, the Parks and People Foundation and the State of Maryland. The trail will connect neighborhoods with each other and suburban areas with urban areas. The design team explored a variety of issues relating to trail development including trail alignment, neighborhood access points, water quality and trash control, public safety and security, bridge design, incorporating community gardens, and ideas for programming such as a science/social studies curriculum for students from adjacent schools. The design team met with more than 40 community organizations, public agencies and institutions to collaborate on the trail's development.

Benefits/Results

The design, partnership building, and fundraising activities associated with the 14 mile trail are marks of success. However, there have been several activities beside the design of the park and the community meetings that are considered significant. In the spring of 1995, the Parks & People Foundation together with Maryland Save Our Streams and 25 community residents conducted a stream survey of the Gwynns Falls. The purpose of the Stream Survey was to expose residents to the area, help to identify pollution sources and locate potential access points to the trail. The trail project coordinator, Ellen Y. Smith, will soon begin the implementation of a neighborhood stewardship program that will focus on volunteer activities and community participation in park improvements. The trail is expected to be completed in three phases over the next three years.

Costs/Funding Source

Over $1.3 million in funding the Phase I was received from the Intermodal Surface Transportation Enhancement Act (ISTEA). Other construction funding was received from the City General Funds and private funding sources. Funding for Phase II and III is still needed. The entire project will cost an estimated $7.481 million.

Contact

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James River Task Force

Chesterfield, Hanover, Henrico Counties and the City of Richmond, Virginia

Background

The James River Task Force was created by the members of the Boards of Supervisors in Chesterfield and Hanover Counties, and the Richmond City Council at their 1993 Regional Summit by formal resolution. Henrico County, while not a participant at the first Summit Meeting, has since supported the resolution and assigned a member of the Board of Supervisors to the Task Force. The resolution binds the localities to work together to, "insure the best quality development, maximum utilization of resources, and protection of the environment" along reaches of the James River in and near the Richmond Metropolitan Area.

Chesterfield County, with approximately 30 miles of riverfront on the James, sharing common borders with Henrico across the river and Richmond to the north, was designated lead agency for the Task Force.

Project Description

The primary objectives of the Task Force are to:

- Preserve the major scenic and historic resources of the James River for the entire Richmond Metropolitan area.
- Communicate plans developed by each affected locality to ensure the best quality development, maximum utilization of resources, and protection of the environment.
- Help to guide future development along the James River to ensure the lasting quality of the River; and
- Cultivate the James River as a "Highway of History" tourist attraction that will further the historic character of the region and further the City of Richmond's riverwalk development plans.

The Task Force consists of a Regional Commission (which includes the 4 voting members of the elected County Boards and City Council and an Honorary Chairman), a Steering Committee, and local committees in each jurisdiction. The Steering Committee is composed of the Honorary Chairman, two representatives from each participating locality, and other representatives who have interests in the goals of the Task Force. Emphasis in the membership of the Steering Committee is on having representation from all stakeholders with an interest in the orderly growth, development, and use of the James River.

The Task Force's efforts to date have focused on sponsorship of river based activities to focus attention to the river, to educate the public in the availability of resources, and to actively seek public support in the care and control of development and the ecology of the river. Activities have included:

- Citie of Henricus Publick Day at the Dutch Gap park.
- James River Parade of Lights (decorated boat parade).
- Heritage Tourism Week Historic Hike at Henricus.
- 130th Historical Re-enactment of digging of Dutch Gap Canal.

- Sponsorship of week-long visit of the Nina, a replica of the Columbus sailing vessel, which was docked in Richmond.

Benefits/Results

The task force serves as an effective forum to bring together a wide variety of interest groups who share interests in the health and welfare of the James River. Members have met with officials from Hopewell, Prince George's County, Colonial Heights and Petersburg, telling them of plans for the James River, and planting the seed for a similar cooperative effort with them for the Appomattox River.

Costs/Funding Source

Organizational costs are supported by funding from participating jurisdictions and fund-raising activities. Chesterfield County has promised $50,000 to support a Riverfront Study for the county if the local Chesterfield County Committee can raise matching funds from major industries in the county.

Contact

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Jenkins Creek Environmental Research Center

Crisfield, Maryland

Background

Jenkins Creek Environmental Research Center is a private, non-profit organization dedicated to increasing public awareness of environmental issues. The seven member board of directors consists of local businessmen and educators. The Center successfully petitioned for grants and loans to purchase the 300 acre salt marsh in Crisfield to be used as an environmental education and research facility for students of all levels.

Project Description

The goal of the project is to preserve the area in its current state and make an effort to restore some of the wildlife habitat that has been lost. As the project progresses, the area will be made available to students and teachers for study and research and to the general public for environmental awareness programs.

The Chesapeake Bay Trust has provided a Challenge grant to be matched with local money that will provide the necessary funds to begin work on the planned boardwalk, observation platforms, and temporary office facilities. Additional grants are being written to purchase more land, build a permanent facility, a boat facility, a crab shanty, and purchase an existing structure at Jenkins Creek.

Benefits/Results

The first section of the boardwalk will be installed in September 1995. The curriculum is currently being developed for a program, "Salt Marsh - Nursery for the Bay".

Costs/Funding Source

The Center purchased the land with a revolving loan fund offered by the Maryland Environmental Trust, a loan from a local businessman, and a grant from the National Fish and Wildlife Foundation and the U.S. Fish and Wildlife Service. The U.S. EPA Chesapeake Bay Program Office provided technical assistance for the toxics issue and in fund-raising The Chesapeake Bay Trust's Challenge grant was worth $15,000.

Contact

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Lackawanna River Corridor Association

Lackawanna Valley, Pennsylvania

Background

The Lackawanna Valley watershed is comprised of a number of ecologically unique resources, cultural heritage areas and a history entrenched in the nation's electric revolution of the 19th and early 20th centuries. The relationship between the natural systems and the region's industries has done more to characterize the Lackawanna Valley than anything else. The interrelated complex industries of the region, including coal mining, transportation, textile, iron/steel and diverse manufacturing, were the staples of the early economy. These industries did much to support a strong community; however, their effects on the region's natural system is evident in the degradation of the watershed. The poor water quality can be attributed to years of coal mining and other heavy industry that has lead to the leaching of old, abandoned mines which add a disproportionate amount of acid into the water systems. This is called acid mine drainage and, along with combined sewer overflows and urban stormwater flow problems, has lead to the need for improvements in the Lackawanna Valley watershed.

Project Description

These water quality problems, as well as larger socio-economic and community recreational concerns, are being addressed in a project called the Lackawanna River Basin Initiative, a partnership action lead by the Lackawanna River Corridor Association (LRCA). The projects goals include: improving water quality by addressing the acid mine drainage, combined sewer overflows and urban stormwater flow problems; developing a river recreational trail from 40 miles of old abandoned rail line to restore public ownership, improve public access and public safety and improve community aesthetics; providing public education that focuses on the environment and the values of the local resources; and establishing a land trust called the Lackawanna Valley Conservancy to protect pristine natural systems in the region.

Benefits/Results

The LRCA has several successes to date and a number of future benchmarks that are envisioned. The primary success of the project has been its ability to build partnerships that leverage resources and expertise. In this way, the project has been able to focus on a number of cross cutting issues. The project has initiated a citizen monitoring program, which has been collecting significant water quality data for five years. This data is being analyzed and trends determined so a comprehensive water quality strategy can soon be developed. Public involvement has long been a key to the success of the project. In addition to the citizen monitoring program, a watch dog group has been reporting sewer overflows to the sewer authorities to ensure proper measures are taken to reduce the effects of overflows on the river's resources. The project is also working with community and neighborhood groups to secure a 40 mile recreational river trail.

Future benchmarks include a feasibility study and an implementation strategy that makes specific recommendations to counter the acid mine drainage issue. Efforts past and present will ensure that the Lackawanna Valley River basin continues to protect and restore the natural resources of the region, improve the local economy, and build public

access and participation. The Lackawanna Valley River Basin Initiative is truly a model of land stewardship in the Chesapeake Bay watershed.

Costs/Funding Source

The federal, state, local and non-profit partnership comprised of the U.S. Army Corp of Engineers, the Environmental Protection Agency, the National Park Service, Federal Highway Administration, Lackawanna County, Heritage Authority, National Institute of Environmental Renewal, Scranton Area Foundation and private memberships have all contributed to the progress of the Lackawanna Valley project.

There are a number of publications that can assist communities in better understanding the Lackawanna Valley effort including a three volume report by the U.S Army Corp of Engineers on the River Trail, a Citizen Master Plan, and a summary entitled *Lackawanna River Guide* available through the Association.

Contact

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Lower Eastern Shore Heritage Plan

Princess Anne, Maryland

Background

Worcester and Somerset Counties are part of a region in the southeast corner of Maryland known as the Lower Eastern Shore, adjacent to Delaware on the north and Virginia on the south. Somerset County borders the Chesapeake Bay and Worcester County lies along the Atlantic Ocean. The Pocomoke River and Sound originates in Delaware, flows through Maryland and empties into the Chesapeake Bay.

Project Description

The residents of Worcester and Somerset Counties committed to improve the local economy through well-planned conservation and the promotion of natural, historic and cultural resources. Economic development through tourism was selected as a means to preserve and enhance the Pocomoke River, one of the region's most valuable resources. The concept generated strong interest in the public and private sectors that has since grown into a regional partnership. A first workshop in June 1990 attracted over 90 people, including local government officials, landowners, sportsmen, business representatives, and recreational users. Subsequently, meetings have been held among representatives of many public and private sector interests, leading to the formation of the Lower Eastern Shore Heritage Committee.

Initial activities of the Committee focused on "heritage tourism" — tourism based on ecology and culture of different places. The Committee works for broad and continuous community involvement based on environmental, cultural, and historical awareness in the region.

The purpose of the planning effort by the Lower Eastern Shore Heritage Committee is to enrich the quality of life in the region through coordination of activities among Lower Eastern Shore citizens, organizations, and governments that 1) conserve the cultural heritage, living resources, and natural features of the area; 2) promote an understanding of the region's natural, cultural, and recreational attributes through a variety of passive and active educational opportunities; and 3) enhance the economic development of the area through community-based activities.

Benefits/Results

Since the fall of 1991, the Lower Eastern Shores Heritage Committee has been providing "heritage tourism and conservation" services to the communities of the area. With over 100 participants, many actively serving on subcommittees dealing with education, marketing, and consensus building, the committee has completed a variety of specific actions. Three major workshops and follow-up activities have resulted in:

- Establishment of the Pocomoke River Alliance, a private, non-profit citizens organization pursuing the conservation and revitalization of the Pocomoke River and Sound;
- Funding of a newsletter, construction of a Pocomoke Nature and Exercise Trail, and publication of a new Beach-to-Bay Indian Trail brochure;
- Assistance to Crisfield with the development and implementation of a short-term heritage conservation plan; and

- Participation in the Maryland Division of Historical and Cultural Programs' documentation of the culture of Smith Island and an effort to develop a heritage center.

Costs/Funding Source

The project was initiated with in-kind services from local operators and a grant from the U.S. Environmental Protection Agency's Wetland Office. The Committee has recently received funding to carry out the plan from the Maryland Historic Preservation Office and the National Park Service.

Contact

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Marshyhope Creek Greenway

Federalsburg, Maryland

Background

The town of Federalsburg along with the Central Federalsburg Development Corporation completed a plan for a hike and bike trail along the Marshyhope Creek beginning at the Federalsburg Marina and traveling north approximately 3,000 feet. The plan is in the implementation stage with final completion due in 1996.

Project Description

The Marshyhope Creek Greenway is a multi-phase project designed to accomplish several goals simultaneously:

- to integrate pedestrian, biking and boating activities through the town of Federalsburg;
- to develop a trail system designed to enhance and to encourage more recreational activities around Federalsburg;
- to promote downtown revitalization by taking advantage of an underutilized tributary system to encourage multi-use recreational activities;
- to incorporate a non-structural erosion control system for preventing further shoreline erosion into the trail system;
- to incorporate the rehabilitation of a major storm stream system in the town into the trail system for reducing storm stream sediment being discharged into the Marshyhope Creek.

Benefits/Results

As of July 1, 1995, approximately 67 percent of the project was complete. Significant results are the planting of 122 trees along the proposed trail system; the completion of 2,000 feet of the the trail system; the construction of two open air pavilions and a gazebo; and the completion of the rehabilitation of the storm stream.

By December 1996, construction of the bridge over the creek will be completed. In addition, the trail system inside the marina and the shoreline erosion control project will be in effect.

Costs/Funding Source

Funds came from various sources including the Intermodal Surface Transportation Efficiency Act of 1991, the Department of Natural Resources the Chesapeake Bay Trust, Program Open Space, the Maryland Department of Environment, and town funds.

Contact

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Monkey Bottom Wetland Walkway

Norfolk, Virginia

Background

Monkey Bottom is one of the largest man-made wetlands in Virginia. It was built in 1984-85 after the U.S. Navy dumped dredged material into the Willoughby Disposal Area, displacing seven acres of tidal wetlands. The U.S Army Corps of Engineers and the Norfolk Wetlands Board required the Navy to build another wetland to compensate for the loss.

The City of Norfolk received a $20,000 Virginia Coastal Resources Management Program (VCRMP) grant in 1988 to conduct a comparison study of the value of the created Monkey Bottom wetland to a natural marsh located on the Lafayette River. The study was undertaken by the Virginia Institute of Marine Science and Old Dominion University. The final reports confirmed that the man-made wetland was functioning very similarly to the comparative natural wetland.

In 1992, the City of Norfolk broke ground on an elevated wetland walkway and observation platform which was dedicated in May 1994.

Project Description

The walkway extends approximately 100 feet into the wetland. Interpretative displays detail the wetland flora and fauna, as well as providing information on the unique history of the wetland. Signage and informational materials at the adjacent Information Center identify the walkway for local citizens and visitors of Norfolk.

Benefits/Results

The walkway has resulted in greater public access to a unique wetland environment. Over 13 million motorists passed by the wetland site last year. The interpretive materials serve to educate the public on the science of wetlands creation. The current federal issue of "no net loss" of wetlands will create pressure to compensate for unavoidable wetland losses by creation of similar systems to the Monkey Bottom marsh. Though not a panacea for continued development of natural wetlands, it is nevertheless important that the public has an opportunity to view and evaluate representative mitigation/compensation areas, such as the Monkey Bottom Wetland Walkway.

Costs/Funding Source

The project was funded by a $30,000 grant from the VCRMP under the Coastal Zone Management Act, match funding and in-kind services from the City of Norfolk, and a local donation from the Willoughby Civic League.

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Revolving Loan Fund for Acquisition of Open Space

Calvert County, Maryland

Background

In 1993, the Maryland General Assembly approved legislation giving Calvert County Commissioners authority to set up a special fund to preserve open space. The purpose of the bill is to:

- establish a Revolving Loan Fund for non-profit land trusts;
- authorize the County Commissioners to accept contributions for the Fund;
- provide that money in the fund may be invested as other county revenues;
- authorize the County Commissioners to adopt certain regulations;
- amend a certain title and subtitle designation; and
- assist land trusts to preserve open space in Calvert County.

Project Description

The Revolving Loan Fund is designed to provide funds to non-profit organizations wishing to preserve open space within Calvert County. The goal is to assist these organizations in meeting their objectives, while furthering the county's goals for open space preservation and public access without the additional burden of operating and maintaining the land.

The Revolving Loan Fund provides financial assistance for the following efforts:

- acquisition of land for active and passive recreation for the general public;
- preservation of natural areas where limited public access is allowed;
- acquisition of land which "buffers" existing county parks and natural areas; and
- preservation of historically significant land or structures where controlled public access would be allowed.

Benefits/Results

The purchase of open space by non-profits will ensure the protection of valuable habitat, productive and vital riparian buffer areas, and create public access areas for recreation activities. Revolving Loan Fund acquisitions in Calvert County will support the restoration and preservation of the Chesapeake Bay watershed.

Costs/Funding Source

Funding for the initial loan was made by Calvert County. Those borrowers who can demonstrate that leveraging funds of other private or public funds will occur will be given priority.

Contact

Greg Bowen
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Stoney Run Park Committee

Baltimore, Maryland

Background

The Stoney Run Park Committee, part of the Evergreen Community Association, strives to restore native woodland in Stoney Run Park. The park is a long, narrow, twelve acre park on both sides of a stream in Baltimore city. It stretches from Cold Spring Lane to Wyndhurst Avenue.

Project Description

The aim is to establish a woodland comprising of a wide variety of native trees, shrubs, and wildflowers. In addition, the Committee attempts to enhance the community's awareness of environmental issues through lectures, discussions and communications on a bulletin board.

What was once a mowed park with some trees has been converted to a woodland with 200 species of native trees and shrubs, in addition to those that already grew there. The work was done entirely by volunteers from the community. Five area schools have begun joint projects along the stream combining environmental education with local action.

Benefits/Results

In 1993, native plants from a woodland about to be bulldozed for a development project were moved to Stoney Run Park. In the state of Maryland, there are approximately 400 species of native trees and shrubs which the Committee eventually hopes to represent in Stoney Run (except for those not able to grow outside their natural range).

Costs/Funding Source

Funds were donated by residents, community associations and from solicitations in newsletters. The Chesapeake Bay Trust awarded two grants.

Contact

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Trails and Greenways Master Plan

Prince William County, Virginia

Background

Prince William County is a rapidly urbanizing jurisdiction located less than 30 miles from Washington, D.C. The county's land area is 347 square miles with topography ranging from coastal plain at the Potomac River to 1,311 feet above sea level at Bull Run Mountain. The diversity of land uses, population and topography provides an opportunity for a comprehensive system of trails to be developed that can serve many different functions including providing transportation and recreation opportunities to county residents and visitors.

The goal of the project is to establish a system of trails and greenways that link the county's natural, cultural, historic and recreational resources with residential, commercial and community facilities for the benefit of the citizens of the county.

Project Description

In early 1992, the Planning/Engineering Division of the Prince William County Park Authority convened a Trails Committee made up of representatives from local, state and federal agencies and private citizens. The Committee was responsible for reviewing a draft trails map and for developing goals and strategies. The result was a comprehensive trails and greenways plan identifying ten possible sites for greenways trails.

This greenways and trails system is very complex as it traverses both private and publicly held lands through a variety of terrains. Therefore, it is expected that implementation of the system will happen slowly and will require the cooperation of the Park Authority, Prince William County, surrounding jurisdictions, the Virginia Department of Transportation, local clubs, and private citizens.

The first step in implementing the plan is acquiring the land or easement. Acquisition can occur through a variety of mechanisms including fee simple purchase, regulatory mechanisms, and dedication mechanisms. Regulatory mechanisms include federal, state and local laws that require open space, parkland or recreation facilities from private developers, as well as regulations that protect natural resources and endangered species. Dedication mechanisms include voluntary gifts of land or easements for tax purposes.

Benefits/Results

Developers have begun to set aside stream valley land through the Virginia proffer system. The plan concentrates open space land acquisition in the major watershed leading to the Potomac where the Park Authority is preparing to implement the first greenway. This trail will include open space protection, riparian restoration and public access.

Costs/Funding Source

The plan was completed by in-house planning and design staff. There are several sources of funds for the design and construction of trail facilities: Six-year Road Plan of the Virginia Department of Transportation; Bond Referendum; Proffers; State Grant Funds; Capital Improvement Program; and private donations.

Contact

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Public Information and Education

An Introduction

The Chesapeake Bay Issue

Citizens across the watershed care about the Bay, its rivers and its tributaries. In fact, according to a recent survey of the people living throughout the watershed, more than 90 percent of those contacted support the restoration and believe it is among the most important public and private sector priorities — and support does not vary with distance from the Bay. People living within 50 miles of the Bay, between 50 and 100 miles of the Bay, and over 100 miles from the Bay, all shared a strong belief in the importance of the Bay clean-up. The Chesapeake Bay Program provides a continuous flow of resources for people who want to learn more about the Bay and the issues which impact its restoration.

An informed and caring public is essential to a sustained Bay restoration and preservation effort. The Chesapeake Bay Program uses a variety of tools to help citizens play their part in cleaning up the Bay. Educational materials, community outreach, and media relations are integrated to best inform the public. The Chesapeake Bay Attitudes Survey found that, although there is high concern about pollution in the Bay, the public perception of the Bay's problems differs from the realities. For example, the majority of people named chemicals from business and industry as the primary cause of pollution in the Bay. Only 25 percent correctly identified nutrient pollution as causing the greatest harm to the Bay and its living creatures. Only 7 percent felt that individual actions play a major role in Bay pollution.

The Chesapeake Bay Program's Communications Subcommittee helps provide public information and encourages involvement in the Bay restoration. The Bay Program offers a range of educational materials, including the popular primer, *Chesapeake Bay: Introduction to an Ecosystem*, and *Touch the Bay*, a interactive computer program. The Bay Program also works in partnership with the Alliance for the Chesapeake Bay to sponsor a variety of outreach projects, including: Watershed Watch, a program to help individuals and community organizations initiate their own projects to help local streams and rivers; the Chesapeake Regional Information Service, or "CRIS." Thousands of citizens, students, and teachers have used the CRIS Hotline to find a wealth of publications, fact sheets, technical reports, referrals, and personal assistance in learning about the Bay. You can reach the CRIS Hotline at 1-800-662-CRIS; The Citizen Monitoring Program, which directly involves hundreds of volunteers from local communities across the watershed in caring for their streams and rivers; BayScapes, a program promoting landscapes and gardens that work with Mother Nature, rather than against her. BayScaping saves time, energy, and money by requiring less mowing, fertilizer, and pesticides — and prevents pollution that could otherwise reach the Bay.

The Local Challenge

Local communities are utilizing information from the Bay Program to implement their own restoration projects. The following section catalogs activities being initiated at the local level that promote Chesapeake Bay education and public awareness.

Bay Attitudes Survey Results

Support for the Clean-Up

- 91% believe that the Bay restoration is important or one of the most important problems government must resolve.

Support for the Living Resources and a Healthy Ecosystem

- 67% believe that the highest water quality safety priority of the restoration should be to make the Bay safe for fish and aquatic life.

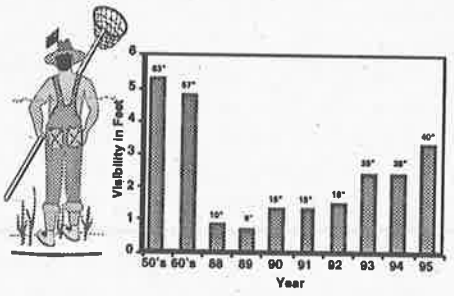
Support for Greater Effort

- 61% want more done to help restore the Bay.

Bernie Fowler's Sneaker Index

GOAL: Restore Bernie's sneaker visibility to chest depth (57 to 63 inches).

STATUS: Nutrient-caused plankton blooms, urban and rural sediment runoff block sunlight bay grasses need. White sneakers have similar visibilty to the Secchi disk scientists use to measure water clarity.



Source: Senator C. Bernard Fowler, 1992-1993 Chair of the Chesapeake Bay Commission; Kent Mountford, U.S. EPA Chesapeake Bay Program

Agriculture Stewardship Education Project

Easton, Maryland

Background

The Agriculture Stewardship Education Project is administered through Pickering Creek Environmental Center (PCEC), a conservation learning center of the Chesapeake Audubon Society. Agricultural subjects have been identified as an important focus for science and math curricula by the American Association for the Advancement of Science. Research suggests that hands-on activities result in higher rates of learning and more success in the classroom. Elements of this project will be piloted on the Eastern Shore and eventually made available to teachers and agriculture educators throughout the Chesapeake Bay region.

Project Description

The Agriculture Stewardship Education Project was developed by PCEC to address the need for a comprehensive approach to educating youth through the theme of agriculture. Pickering Creek has entered in partnership with a number of agriculture-related organizations to facilitate this effort, including the Maryland Education Center for Agriculture Science and Technology, Chesapeake Audubon Society, Maryland Agricultural Education Foundation, Maryland Farm Bureau, and Regional Cooperative Agriculture Educators' Consortium. These groups have been working together to support three major activities:

Curriculum Development

Pickering Creek and the Audubon Society have been developing sustainable agriculture curricula for elementary and secondary schools in a collaborative effort with the Sustainable Agriculture Educators' Consortium. The group is currently revising the existing curricula and is beginning to develop curricula for upper level students which deals specifically with concepts and practices of sustainable agriculture. Students will learn about the balance of ecosystems in the Chesapeake Bay region and how farming practices, among other factors, can contribute either to the health or decline of these ecosystems.

Pickering Creek is also working with the Maryland Education Center for Agriculture, Science and Technology (MECAST) to incorporate hands-on field activities related to environmental stewardship and resource conservation into the Center's "Ag in the Classroom" program — a hands-on activities-based curriculum that integrates agricultural curricula into mathematics, science and language arts.

Teacher Workshops

MECAST currently hosts summer inservice workshops for Maryland teachers to promote "Ag in the Classroom" curricula in public and private schools.

Four topic-specific regional workshops will be piloted at PCEC with the intent to fine-tune these for implementation at other sites. PCEC is also providing training opportunities for other players in the field of sustainable agriculture education. Participants in these workshops include educators from environmental education centers.

Field Sites

The success of any broad-scale agricultural education program may be enhanced by a diversity of field activities and outdoor learning opportunities. Through collaborative programs with Farm Bureau chapters and the Sustainable Agriculture Educators' Consortium, Pickering Creek is providing educators who attend the "Ag in the Classroom" regional workshops with lists of available resources to complement their classroom activities. These include both farms and outdoor/environmental education centers with available facilities and/or curriculum in sustainable agriculture. Field trips provide students and teachers with a broad overview of a diversity of farming practices and mitigation techniques.

Benefits/Results

PCEC will test the effectiveness of regional workshops, field programs and follow-up activities on the Eastern Shore. Pickering Creek has signed a Memoranda of Understanding with several education agencies on the mid-Shore, and annually serves over 12,000 students from public and private schools. Broad-scale evaluations will be undertaken through reviews by collaborating organizations, farmers, and regional experts.

Costs/Funding Source

The Agriculture Stewardship Education Project was made possible through financial support from the Northeast Region Sustainable Agriculture Research and Education Program, the Chesapeake Bay Trust and matching donations from other sources. The grant was matched with funds obtained from both federal and non-federal sources.

Contact

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Community Environmental Action Plan

Huntingdon, Pennsylvania

Background

The Pennsylvania Bay Education Office recognized a need to create more awareness and concern about the environment in the Huntingdon area. In the fall of 1994, it developed a program in cooperation with Huntingdon Middle School officials to expose all sixth graders to approximately fifty hours of environmental education. The goal of the program is to provide solid ecological knowledge and encourage involvement in helping to resolve community problems.

Project Description

While the major emphasis of this project was water quality, sixteen topics were addressed throughout the school year. The students were presented with local, meaningful issues, ranging from household pollutants and nutrient enrichment due to agriculture to acid rain and stormwater runoff which have regional, as well as global, implications. Much of this program involved hands-on field studies where the students could see first hand the need for making a difference in their environment.

Benefits/Results

The benefits of this project are far reaching. By educating these students at the sixth grade level, the belief behind the project is that the students will better examine their lifestyle choices in relation to watershed and other environmental concerns.

Costs/Funding Source

Funding for the Community Environmental Action Plan was provided by the Pennsylvania Bay Education Office, Center for Rural Pennsylvania, local businesses, and private contributors.

Contact

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Connection to the Bay

Prince George's County, Maryland

Background

The Prince George's County Chesapeake Bay Education Program focuses on local resources in the county that are vital to the Chesapeake Bay. The program is designed to introduce students and teachers to the importance of the Bay and its resources, and to show how each person's actions can either help protect or destroy these resources.

Prince George's County was the first county within the 64,000 mile Chesapeake Bay watershed to put together such a specific and comprehensive program to educate its citizens. The program introduces students to local aquatic systems, stressing the connection between land use and water quality. Emphasis is given to the importance of protecting sensitive coastal resources such as buffers, forests, and wetlands.

Project Description

A pilot program was implemented by staff of the Department of Environmental Resources at Baden Elementary School during the 1991-1992 school year. Students were given classroom lectures and were taken on field trips which provided them with hands-on experiences with aquatic resources and ecosystems. They were taken into a forested buffer and into a tidal and non-tidal wetland, and they collected aquatic life from the river. A 55-gallon aquarium was set up in the classroom and stocked with the collected fish. At the end of the program, the students were taken back to the Patuxent River to plant a forested buffer between an agricultural field and the river. Students planted over 500 seedlings to create a buffer that covered nearly a one acre strip of land.

Benefits/Results

To measure the effectiveness of the pilot program, identical pre-tests and post-tests were administered to the students to question their knowledge of the Chesapeake Bay and local resources. The test results demonstrated the success of the program. The average score on the pre-test was 44 percent and on the post-test 87 percent. On the pre-test not one student could name the three rivers in the county, but on the post-test 95 percent correctly identified the rivers.

The program was approved by the Board of Education in 1992 and since that time over 850 copies have been distributed within the county's school system. The program consists of seven units. Each unit includes a lecture sheet for teachers and a handout(s) for students. The lecture sheet lists the objective of the unit, concepts that should be conveyed to the students, the main concept that students should gain from their introduction to the unit, and suggested evaluation questions for the students.

The program is in its third printing which indicates that it is being well received by both teachers and students. It is an innovative, cost effective method to provide students with a baseline understanding of the importance of local natural systems as they relate to the Bay.

Costs/Funding Source

The program was developed under a one-time Coastal Zone Management grant of $5,000 from the State of Maryland through the National Oceanic and Atmospheric Administration (NOAA). The county matched this grant with $5,000 from its general fund and continues to contribute resources through staff time for teaching and costs associated with printing the program.

Contact

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Prince George's County Government
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Don't Dump - Storm Drain Stenciling

Fairfax County, Virginia

Background

The Northern Virginia Soil and Water Conservation District's (NVSWCD) *Don't Dump* storm drain stenciling project is designed to be an effective, low-cost method of educating large segments of the population about Chesapeake Bay water quality problems. The primary objective of the stenciling project is to educate the public about the dangers of dumping anything into a storm drain. Prior to stenciling, a mandatory educational component must be completed that can take the form of attending a homeowner association meeting and presenting a slide show or placing flyers/brochures/announcements on doors of homes affected by the painting.

Project Description

Storm drains are located throughout the Chesapeake Bay watershed. When it rains, the water that runs along the gutters on the street disappears down the storm drains, but does not go to a waste water treatment plant. Anything that goes into these drains goes directly into a local stream, which feeds into a river, and eventually empties into the Chesapeake Bay.

The project aims to discourage the dumping of items such as antifreeze, motor oil, paint, plastics, and yard waste into the drains. While storm drain stenciling is not necessarily a new idea, NVSWCD has made its program more effective by including the educational component. This educational addition to the program takes the stenciling idea one step further by not only telling people to stop dangerous actions, but also explaining *why* those actions are dangerous. People seem more willing to alter behavior when they understand the consequences of their actions.

Benefits/Results

At the end of the project, there is a permanent, public reminder about the dangers of dumping anything into a storm drain. This should be an immediate deterrent to throwing litter, yard debris, pet waste, etc. into a storm drain will have a direct impact on water quality in the Chesapeake Bay watershed.

In addition, several thousand people in the neighborhoods where the storm drains are painted are educated about conservation and preservation of the Chesapeake Bay. This leads to an increased awareness about non-point source pollution and its effect on the Chesapeake Bay. Additionally, this could lead to a change in behavior and a continuation of the education process, in that people may begin to educate their neighbors and friends about the preservation of the Chesapeake Bay.

Projects may be conducted by school groups, youth groups, and homeowner associations. The stenciling effort is one component of NVSWCD's *Backyard to Bay* program. *Backyard to Bay* is a non-point source pollution educational effort that is designed to cover citizens of all ages by combining various educational tools, including lawn care demonstration projects, workshops for teachers, presentations to homeowner/civic associations, classroom projects and technical assistance.

Costs/Funding Source

To date, NVSWCD has received no outside funding for the project. Citizens who wish to stencil storm drains supply all painting materials and cleaning supplies. However, the stencils are loaned free of charge. The Chesapeake Bay Program donated the stencils in exchange for NVSWCD's promotion of the program in Fairfax County.

A grant is pending from the Department of Conservation and Recreation to conduct five stenciling projects.

Contact

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(703) 324-1421 (fax)

Hard Bargain Farm

Accokeek, Maryland

Background

Hard Bargain Farm is the only curriculum based environmental education center on the banks of the Potomac River. An award-winning program more than 25 years old, the farm welcomes thousands of schoolchildren each year.

Project Description

Hard Bargain Farm began its Potomac River Education Program in 1987, offering classes such as "Rivers in Action" (erosion), "Watershed Walk" (aquatic organisms), "Corn: Indian Ways to Nowadays" (Potomac cultures and technology). Older students may use canoes to explore marshes and shallows of Piscataway Creek. A role-playing, interactive game entitled, "Who Pollutes the Potomac?" has been adapted for use in Japan and Australia.

Benefits/Results

To reach more Potomac region residents than the present site allows, the foundation trains teachers and links up with other environmental education programs throughout the region. The farm itself protects nearly two miles of the Potomac's shoreline in Prince George's County.

Costs/Funding Source

The Farm is sponsored and operated by the Alice Ferguson Foundation.

Contact

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Into the Susquehanna, Into the Chesapeake

La Plume, Pennsylvania

Background

While many residents of the Susquehanna watershed recognize the need to protect the Susquehanna River, many do not realize that any material that ends up in the Susquehanna River finds its way into the Chesapeake Bay. The Northeastern Pennsylvania Environmental Center recognized that there is a need to educate these residents of the potentially devastating impacts their pollution may have on the wildlife of the Bay. The goal of this program is to illustrate to Pennsylvania residents living in the Susquehanna watershed that much of their pollution ends up in the Susquehanna River and ultimately in the Chesapeake Bay.

Project Description

The program *Into the Susquehanna, Into the Chesapeake* which was first carried out in fall 1994, had three major objectives addressed in the four workshops. The first of these was to identify for the residents the variety of non-point sources of pollution in their environment. Next, the program's goal was to expose the pathways pollutants take from a typical home to the Susquehanna River, and ultimately into the Chesapeake Bay. Finally, the effects of pollution on the Chesapeake Bay and Susquehanna River were discussed with special attention being centered upon water quality and the wildlife inhabitants of the areas. A major activity of the workshops was a hands-on project of painting the sewers and drains with "Chesapeake Bay Drainage" stencils as a constant reminder to area residents of the final destination of their pollution.

Benefits/Results

Into the Susquehanna, Into the Chesapeake was one of the first projects of this sort available to residents in this area. The goal of the program to educate residents was successful. Many of the smaller towns in the watershed gave permission for the painting of stormdrains while attempts are still being made at gaining permission from the larger cities such as Scranton and Wilkes-Barre. Long range goals of continuing education on the issue are promising.

Costs/Funding Source

The project, which cost just under $500 was funded for by the Pennsylvania Chesapeake Bay Education Office.

Contact

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"Landscapes" Public Awareness Program

Chester County, Pennsylvania

Background

Chester County is located in southeastern Pennsylvania. Approximately 20 percent of the county falls in the Chesapeake Bay watershed.

Chester County's Comprehensive Planning program, entitled "Landscapes", represents a major initiative in the county to establish a new Comprehensive Policy Plan to guide actions related to management of the county's future growth and development. The program has been prompted by rapid population growth (100,000 new residents in the 20 year period 1970-1990) and consumption of some 50,000 acres of once open land for various forms of development during the same period. Though not yet complete, the plan will be designed to provide a comprehensive review of past and projected land use patterns to assist local and county leaders in decision-making for the future. Much of the county's early efforts in the planning process have been committed to both an extensive public awareness campaign and public opinion survey.

Project Description

This program balances both the needs to enhance public understanding of the range of issues facing the community regarding growth and development and to elicit community opinion concerning public expectations and interests regarding alternative county futures. Substantial time and effort have been devoted to preparation of tools designed to inform and enhance public understanding of the growth and development issues facing the County. These include a newspaper insert entitled, "Chester County is Disappearing — Tough Choices are Needed Now", which illustrates the effects of sprawl through a series of three maps which reflect land area committed to development in 1950, 1970 and 1990. The insert also offers three map illustrations of alternative future forms of more concentrated development including: "Local Development Centers", "Community Service Centers", and "Regional Centers and Corridors" development scenarios (see illustration). The insert contains a public opinion survey to solicit respondent views on sprawl, and to identify resident perceptions concerning both the positive and negative impacts of growth. Local newspapers received and distributed about 110,000 of the inserts which included the surveys. Additional inserts and surveys were available at all 17 public libraries in the county and at displays in the Government Services Center and County Courthouse. Additional tools used to support the county's public information program include a slide presentation and video used at public informational meetings designed to stimulate public awareness regarding growth and development issues facing the county.

Benefits/Results

Responses to the county survey reflect an overwhelming desire to change from the current land use pattern of sprawling development. In addition to newspaper distribution of the survey, a separate distribution to municipal officials and members of local Planning Commissions was made to determine how their responses might compare to responses from the general public. The response of municipal officials was consistent with that of the public. With 73 municipalities comprising Chester County, the informational insert

and survey have provided an opportunity to begin the process of establishing a framework that could be used as a guide for municipal cooperation and provide a broader context for local decision makers to consider.

Costs/Funding Source

The project was funded through the County Planning Commission budget as part of the "Landscapes" project to update the Comprehensive Plan. Costs for the preparation and distribution of the newspaper insert and survey components of this project are estimated to be $10,000 for design and $10,000 for printing and distribution.

Contact

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CHOICES: Three Examples of Concentrated Development

Local Development Centers

Development directed to local centers in each municipality.
45,000 additional acres developed by 2020.
Clustered communities within an open space network.

Community Service Centers

Development directed to community centers in each school district.
30,000 aditional acres developed by 2020.
Concentrated development in and around existing development.

Regional Centers and Corridors

Development directed toward regional centers and transportation corridors.
30,000 additional acres developed by 2020.
Focus is on existing towns.

Living Classrooms Foundation

Baltimore, Maryland

Background

Founded in 1985, the Living Classrooms Foundation is a non-profit organization that offers exciting educational programs on ships and on land out of Baltimore and other ports in the Chesapeake Bay. Programs emphasize teamwork and leadership development, elevating self esteem, career development, and fostering multi-cultural exchange.

Project Description

Students experience shipboard living classrooms aboard the Lady Maryland 104 foot tallship, the Mildred Belle buy boat, and the skipjack Sigsbee. The programs focus on the application of science and math skills, ecology, teamwork, and the region's maritime history and economy.

In 1989, the Foundation built the Maritime Institute. It leads the way in innovative breakthroughs in education, job-training, and historic preservation. Located on Center Dock on Baltimore's Inner Harbor, the Institute facility features a shipyard, a boatbuilding shop, a working marina, and an urban tidal wetland.

The Maritime Institute is committed to providing at-risk youth with the opportunity to acquire skills and experience in maritime trades. The program utilizes a 5:1 staff to student ration and hands-on, experience based educational methods to build individual student involvement and teamwork.

The Living Classrooms Outreach Program brings a variety of educational programs to the classroom. A Foundation educator visits a school to take students on an "in class" sailing trip on the Chesapeake Bay to learn about Bay ecology, Maryland history and marine lore, black maritime history, and Native American culture.

The land based Stream Ecology Trek at Emory Knoll Farm takes students through farm and forest along streams that flow into the Susquehanna River. Hands-on learning stations explore the water cycle and the underground beginnings of streams as well as demonstrating the watershed system. Students witness how land use affects streams, and thereby impacts their drinking water and the Chesapeake Bay estuary.

Benefits/Results

Annual numbers of students served have grown from 1,200 in 1986 to 25,000 in 1994. Resources and services include the three ships, a llama farm and nature center, a lighthouse, and a marina.

The Maritime Institute facility is already serving more than three times the number of students and staff for which it was designed. The Institute's Summer Program was selected as a National Model by the U.S. Department of Education and U.S. Department of Labor. The new Harry and Jeanette Weinberg Education Center will house programs and staff, a multicultural maritime library, a computer resource center, and science labs.

Costs/Funding Source

Funding for programs is provided by the Federal Department of Health and Human Services, Maryland Department of Juvenile Services, the Governor's Drug and Alcohol Abuse Commission, Baltimore City Government, the Baltimore Housing Authority, Maryland Department of Education, Baltimore City and County Schools, Baltimore Office of Employment Development and the Washington, D.C. Department of Employment Services. In addition, foundations, corporations, and individuals offer support.

Support and Revenue, 1994

Program Fees	$721,209
Contributions, Grants, and Special Events	$901,911
Sales, Interest, and Other	$35,930

Expenditures

Program Costs	$1,324,499
General and Administrative	$183,913
Development/Special Events	$101,687

Contact

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Octorara Creek Educational/Demonstration Site

Quarryville, Pennsylvania

Background

Maintaining fresh water on the West Branch of the Octorara for trout and other aquatic life is essential not only for the sportsman, but also for the educational aspects of the general public. The purpose of this project is to demonstrate to landowners and others interested in establishing erosion control measures along streams flowing into the Chesapeake Bay procedures which preserve and increase aquatic life through various streambank conservation control structures.

Project Description

The Solanco Future Farmers of America and the Octorara Watershed Association began a streambank stabilization project on a section of the West Branch of the Octorara. They constructed stream deflectors and mudsills along approximately 500 feet of the creek.

The project aimed to publicize and demonstrate the value of Best Management Practices through field trips; establish a baseline for chemical and physical parameters for the stream through data collection; and identify invertebrates.

Benefits/Results

Twenty-four students in a Natural Resource Management course at Solanco High School established water sampling teams. Every two weeks, the team took water samples and tested for nitrates, phosphates, pH, dissolved oxygen, water temperature, and air temperature and established a baseline for chemical and physical parameters for the site. An invertebrate study was conducted and invertebrates in all three biotic classes were found to exist. This indicates the stream is capable of supporting all forms of aquatic life as found in the three classes and essentially provides an ideal marine freshwater habitat.

Two field trips from local schools aided students in understanding the importance of stream monitoring and water sampling protocol.

A final product was the publication of a brochure detailing the various activities that took place at the demonstration site.

Costs/Funding Source

The project received a $750 mini-project grant from the Pennsylvania Chesapeake Bay Education Office.

Contact

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Patuxent Estuary Demonstration Programs

Bowie, Maryland

Background

The City of Bowie is located in the northeast portion of Prince George's County. The city is 12.1 square miles and has a population of 39,000 persons.

In spring 1993, the city was awarded the Patuxent Estuary Demonstration (PED) grant. The PED grant is designed to enhance state and local cooperation in refining and implementing a water quality and land use management strategy for the Patuxent River watershed. Bowie has used the grant to implement a city-wide public awareness campaign. The goal of the campaign is to make local residents aware of water pollution sources in the home, and ways in which changes to lifestyles can minimize pollutants reaching the Patuxent River and ultimately the Chesapeake Bay.

Project Description

The campaign's strategy for outreach is through a series of informational articles in the city newsletter. The articles explain proper disposal of household hazardous wastes, car washing tips and car care, chemical free lawn care, and where rain water goes after a storm.

The awareness campaign is supplemented by a variety of other informational aspects. One in particular is the use and demonstration of a three dimensional, educational tool, the EnviroScape Water Pollution Reduction model. The EnviroScape model shows a watershed and its many uses — urban, industrial/commercial, agricultural, highway, forest, streambank, and lake shore. Educational videos are broadcast over the city's government cable T.V. channel and bulletin boards are displayed at City Hall and the local library.

A third component of the public awareness campaign is the conversion of a 2.65 acre passive park land site to an environmental demonstration area. The Perrell Lane park site teaches residents which landscaping materials are best suited to minimize yard maintenance time and effort while reducing runoff of sediments. The concept includes a handicapped accessible trail, a 100 x 200-foot playing field, a compost demonstration area, a wildflower area, and a forested area. Signage provides orientation, identification of plant material, and explanations of how soils and plant material filter pollutants. Volunteers assist in the development and maintenance of the park, including tree planting, sign construction, wildlife monitoring, and program development.

Benefits/Results

Approximately 17,000 household in the city were mailed a survey in December 1993. The survey results were used to gauge residents' lifestyles and basic understanding of pollution sources. A second survey in late 1995 in the city newsletter will be used to determine the effectiveness of the campaign.

The campaign within the PED grant will draw to a close in December 1995. Early indications are that the efforts have been successful. Many residents are interested in learning more about ways to protect the environment and natural resources.

Costs/Funding Source

The PED grant from the U.S. Environmental Protection Agency and the Maryland Department of the Environment was $10,000. The in-kind match from the City of Bowie was $5,000.

Contact

James M. Cronk
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City of Bowie
2614 Kenhill Drive
Bowie, MD 20715
(301) 262-6200
(301) 262-1191 (fax)

Survey of Agriculture and Environmental Education

Somerset County, Maryland

Background

The Somerset Soil Conservation District in association with the Maryland Department of Agriculture and the U.S.D.A. Natural Resources Conservation Service (NRCS), sponsored and taught an in-service credit course for all interested school teachers in spring 1995. District personnel designed the course to increase the knowledge of area agricultural and environmental concerns for local teachers. The one credit hour course, which will be offered on an annual basis, consisted of three separate classes and one six hour field trip.

Project Description

The course was divided into three areas of concentration. In the first class, the history of the NRCS and the conservation districts was discussed. The roles and responsibilities of the field offices were discussed in order to lend a better understanding of the need for the service.

The second class consisted of an introduction and discussion of the concepts behind the Nutrient Management Program. Areas ranging from soil and manure testing to tests for corn were addressed. Integrated Pest Management was also discussed, explaining the principles and practices, pest management alternatives, safety and regulatory aspects, as well as pesticide stewardships.

In the third class one of the focuses was on controlling soil loss, nutrient movement and animal waste through conservation practices. The emphasis here was on the Maryland Agriculture Water Quality Cost-Share Program and the eligible practices for the lower Delmarva peninsula. Conservation programs and agencies which are of great service to the Delmarva area were discussed, including the Conservation Reserve Program, Wetland Reserve Program, and Combined Farm Services Agency.

The final meeting consisted of hands-on field visits to a variety of locations which were incorporating conservation practices into daily operations. Included in these visits were stops at poultry and cattle waste storage structures, waste storage lagoons, the Manokin Public Drainage Association, sediment and water quality ponds, filter strips, aquaculture projects and tidal and non-tidal wetlands.

Benefits/Results

The goal which the Somerset Soil Conservation District achieved through offering this course was to better educate the area teachers on the need for proper conservation techniques in their area. In turn, by properly educating the teachers they can present to their own students accurate information on how to conserve their environment.

Contact

Larry Fykes, District Manager
Somerset Soil Conservation District
30730 Park Drive
Princess Anne, MD 21853

Water Connections

Loysburg, Pennsylvania

Background

Bedford County is a rural, mountain and valley, agricultural community located off the Raystown Branch of the Juniata River. Recognizing the sciences as an area in need of improvement, the sixth grade teachers of Northern Bedford County School District launched a planning process during the 1993-94 school year to develop an eight-week unit of study emphasizing the environment. The teachers chose to focus on water and conduct an in-depth study of how local water systems impact the Chesapeake Bay. The intention was to make students more aware of how their actions can have local, regional and national consequences, thus stimulating them to become more globally aware and to modify their attitudes and behavior to meet future environmental goals.

Project Description

The 1994-95 school year was the first year the program was implemented. The school administration are committed to continued development during the 1995-96 school year.

The four goals of the study unit are: 1) Students will obtain a fundamental knowledge of water and its properties; 2)Students will develop an understanding of their relationship with and their effect on local water systems; 3) Students will analyze how cultural and economic behaviors impact water quality and the general well-being of the environment; and 4) Students will develop a global understanding of how human behavior impacts the environment.

Within the science curriculum, students study water cycles and conduct river, aquatic, and pollution studies. The math unit includes graphing, navigation techniques, and map study. Social studies emphasizes environmental issues, civics and biographical studies and language arts focuses on the related vocabulary and spelling. In addition, the program utilizes field trips and guest speakers to achieve its goals.

Benefits/Results

Students were observed to be highly motivated toward their studies and parental involvement increased. Through writing assignments, it was evident that students' understanding and attitude toward the environment were positively affected by the interdisciplinary approach.

Costs/Funding Source

Initial funding came from a several sources: ACT Center for Teacher Leadership; Northern Bedford County School Board; and Earthpreserv (a soap manufacturer). Currently, funds are being pursued from the Pennsylvania Environmental Education Grants Program.

Contact

Jerry W. Young, Northern Bedford Elementary School
HCR 1, Box 200A
Loysburg, PA 16659
(814) 766-2221
(814) 766-3772 (fax)

Watts Branch Educational Show

Prince George's County, Maryland

Background

The Watts Branch watershed is located in the northeastern part of the District of Columbia and the southern part of Prince George's County, Maryland. Watts Branch is the largest tributary to the Anacostia River located inside the District boundaries. The lower section of the stream is tidally influenced. The watershed is 3.53 square miles or 2,300 acres. Approximately one-half of the watershed is in the District. About 1,200 feet of the stream was diverted into underground conduits as part of stream bank restoration efforts in the 1950s.

Except for the small southeastern part of the city near Oxon Run, the entire eastern part of the District is drained by several tributaries such as Watts Branch. Super-urbanization of the city along these tributaries has choked their fragile habitat. Some streams have been paved over by human inhabitation; others have lost their natural mouths and are connected to the Anacostia via underground pipes and concrete conduits. The District of Columbia government wants to stop the destruction of these tributaries and restore their habitat as part of a larger effort to clean up the Anacostia River.

Project Description

As the first step toward the goal of educating the public about Watts Branch, the Water Quality Monitoring Branch has developed an interactive software package. It is designed to educate the public in a simple and colorful manner and has many illustrations and graphics to keep younger audiences interested. Environmental phrases and subjects are described in simple language and made available in a variety of categories.

The purpose of the show is to:

- Share environmental concerns with the public, at the school level;
- Extend an invitation to watershed residents to become part of the solution rather than the cause of Watts Branch water quality problems;
- Offer an educational tool to understand basic environmental terminologies and subjects;
- Raise the level of environmental consciousness among those who come to visit the Aquatic Education Center by making the software accessible at the center for their use; and
- Educate and raise interest among DC teachers by taking the software to their schools, so that they will be able to further educate students and children.

Several inter-office demonstrations have been arranged to test the software. Constructive ideas will make the next version an even more informative educational tool.

Benefits/Results

The most significant characteristic of this software is the fact that it can easily be adapted to other watersheds within the District of Columbia and elsewhere in the watershed. The future of this software lies in public schools, public libraries, and centers for educational programs. The most important targets of this program, however, will be the residents of the Watts Branch watershed.

Costs/Funding Source

The project is funded through a section 319(h) NPS Implementation grant from the U.S. Environmental Protection Agency.

Contact

Massoud Massoumi
Government of the District of Columbia
Department of Consumer and Regulatory Affairs
Environmental Regulation Administration
2100 Martin Luther King, Jr. Avenue, S.E.
Washington, D.C. 20020-5732
(202) 645-6601 ext. 3215

Youth Eco Patrol

Washington, D.C.

Background

As part of the Anacostia/Congress Heights Partnership, the Youth Eco Patrol is a project aimed at educating at-risk youths on the environment and its impact on their own neighborhoods. Children from the Stanton Dwellings public housing complex form the patrol that is based on the concept that improving the environment can be a learning adventure.

Project Description

Every Wednesday during the summer, twelve to thirty youths actively participate in their community by planting trees, tending gardens, taking nature hikes, or helping the Chesapeake Bay Foundation analyze the toxicity of fish from the Anacostia River. It is hoped that enough enthusiasm will be generated among the children to bring the message home to their parents.

The youths learn to identify environmental issues as they relate to their own lives. Prior to being a member of the patrol, most of the children had never planted a tree or set foot on a boat. Their experiences have prompted many of them to express an interest in environmental careers.

Benefits/Results

Projects include stenciling drains with the message, "Don't Dump -Anacostia River Drainage" and participating in clean-up days of plots of land or stretches of river. Last year the patrol received a $1,500 grant under the mayor's Youth Initiative. These funds will be used to tape six programs featuring the children talking about various issues concerning conservation and the environment.

Costs/Funding Source

The Youth Eco Patrol is administered by the Anacostia/Congress Heights Partnership, a non-profit group that coordinates services for public housing residents.

Contact

Brenda Lee Richardson, Executive Director
Anacostia/Congress Heights Partnership
2301 Martin Luther King, Jr. Avenue, S.E.
Washington, D.C. 20020
(202) 889-2102
(202) 678-3866 (fax)

Financial and Technical Assistance Resources

MARYLAND LOCAL ASSISTANCE

Maryland Office of Planning

Resource or Program Description

Maryland's Office of Planning is providing local governments with informational and technical assistance in an effort to support sound land use decisions at the local level. In 1992 the State of Maryland adopted the Economic Growth, Resource Protection and Planning Act. The Planning Act creates a statewide approach to land management and environmental protection. It provides the state, counties and towns with a framework for establishing their own planning approaches to meet future land, infrastructure, and service demands. In support of the Act, the Office of Planning created a publication series entitled Models and Guidelines which is aimed at assisting local decision-makers in implementing the Planning Act. The Office of Planning continues to provide practical solutions and innovative techniques to the challenges being faced by local governments.

Contact

Maryland Office of Planning
301 West Preston Street
Baltimore, MD 21201-2365
(410) 225-4550

Stream Protection for Private Landowners

Resource or Program Description

A guide for Soil Conservation Districts prepared by the Maryland Department of Agriculture. The guide catalogs financial and technical assistance programs from state and federal resources that provide assistance to restore and protect water quality and natural habitat. The guide catalogs twelve Financial Assistance Programs and offers alternative financial and technical assistance programs that can support specific Best Management Practices for stream protection.

Contact

Maryland Department of Agriculture
Office of Resource Conservation
50 Harry S. Truman Parkway
Annapolis, MD 21401
(410) 841-5700

PENNSYLVANIA LOCAL ASSISTANCE

Pennsylvania Rivers Conservation Program

Resource or Program Description

The Commonwealth of Pennsylvania, through the Department of Environmental Protection, has undertaken a new initiative to cooperate with local citizens, organizations and municipalities who are interested in river resource conservation activities. The program provides technical and financial assistance for local river conservation planning and implementation activities.

Contact

Pennsylvania Rivers Conservation Program
Program Planning and Development
P.O. Box 8475
Harrisburg, PA 17105-8475
(717) 787-2316

The Center for Rural Pennsylvania

Resource or Program Description

The Center for Rural Pennsylvania is a legislative agency of the Pennsylvania General Assembly. The Center was created to look at the long-term future for Pennsylvania's small towns and rural areas and to provide local officials and interested citizens with the information they need to make sound decisions. The mission of the Center is to ensure that rural communities have their needs addressed according to their own priorities. This is accomplished by acting as an advocate and source of information for state policy makers to encourage specific actions that benefit rural communities and to make sure other actions taken by the state do not inadvertently hurt rural interests. The Center provides grant awards annually.

Contact

Center for Rural Pennsylvania
212 Locust Street, Suite 604
Harrisburg, PA 17101-1510
(717) 787-9555

VIRGINIA LOCAL ASSISTANCE

Chesapeake Bay Local Assistance Department

Resource or Program Description

The Chesapeake Bay Local Assistance Department provides local governments in Tidewater Virginia with financial and technical assistance to implement the Chesapeake Bay Preservation Act. The Act requires the counties, cities, and towns of Tidewater Virginia incorporate general water quality protection measures into their comprehensive plans, zoning ordinances, and subdivision ordinances and that those localities protect certain lands called Chesapeake Bay Preservation Areas, which if improperly developed may result in substantial damage to the water quality of the Chesapeake Bay and its tributaries. The assistance allocations provided by the Chesapeake Bay Local Assistance Department have averaged just under $1.3 million annually in the past five fiscal years.

Contact

Chesapeake Bay Local Assistance Department
805 E. Broad Street, Suite 701
Richmond, VA 23219
Phone: (804) 225-3440

Virginia Coastal Resources Management Program

Resource of Program Description

The Virginia Coastal Resources Management Program is a network of state agencies and local governments which administer coastal laws and policies to manage subaqueous lands, tidal wetlands, primary sand dunes, fisheries, point and non-point air and water pollution, and shoreline sanitation, as well as numerous geographic areas of particular concern such as barrier Islands, significant wildlife habitat, and waterfront redevelopment areas. The Program is administered by the Virginia Department of Environmental Quality (DEQ) and receives about $2.7 million per year in federal funds from the National Oceanic and Atmospheric Administration's Office of Ocean and Coastal Resources Management under the Coastal Zone Act of 1972, as amended. DEQ makes these funds available to state agencies and local government through an annual Requests for Proposals.

Contact

Virginia Coastal Resources Management Program
Department of Environmental Quality
629 East Main Street, P.O. Box 10009
Richmond, VA 23240-0009
(804) 762-4323

REGIONAL ASSISTANCE PROGRAMS

Watershed Watch

Resource or Program Description

Watershed Watch is a comprehensive guide that provides community associations and local governments with informational tools to address environmental activities that support the restoration and protection of the Chesapeake Bay. The goal of Watershed Watch is to give communities the resources to initiate their own efforts to help the Bay watershed. The guide includes homeowner education materials, contacts from key state agencies, a river directory and much more.

Contact

The Alliance for the Chesapeake Bay
6600 York Road
Baltimore, MD 21212
(800) 662-CRIS

Environmental Finance Center

Resource or Program Description

The Environmental Finance Center is supported by the U.S. Environmental Protection Agency and was created to assist local communities in realizing the goal of full compliance with environmental and health regulations. The Center is part of the Coastal and Environmental Policy Program at the University of Maryland. The Center promotes alternative and innovative ways to manage the cost of environmental activities, provides training and development opportunities in environmental leadership and management, and works to increase the public and private sector's awareness of the benefits associated with sound environmental management policies.

Contact

Elizabeth Hickey, Coordinator
Environmental Finance Center at the University of Maryland
0112 Skinner Hall
College Park, MD 20742
(301) 405-6383

The Chesapeake Bay Program's Catalog of Assistance Programs

Resource or Program Description

The Catalog of Assistance Programs is a compilation of technical and financial assistance programs that support Bay Program goals and objectives. The catalog includes federal, non-profit/private and state assistance programs. The catalog's goal is to provide local governments, citizen organizations, and the private sector with a resource that enables these groups to leverage assistance to complete Bay restoration and protection projects. The catalog has over 80 programs listed.

Contact

Chesapeake Bay Program Office
410 Severn Avenue, Suite 109
Annapolis, MD 21403
(800) YOUR-BAY

Chesapeake Bay Watershed Development Policies and Guidelines

Resource or Program Description

In 1989, the Chesapeake Bay Program's Executive Council adopted the "Chesapeake Bay Watershed Development Policies and Guidelines: Agreement Commitment Report". The technical information report outlines a process for developing land in a manner that preserves the quality of the Chesapeake Bay and its tributaries. The Report provides information to assist local governments and community groups in their local efforts to protect and restore the Chesapeake Bay.

Contact

Chesapeake Bay Program Office
410 Severn Avenue, Suite 109
Annapolis, MD 21403
(800) YOUR-BAY

Interstate Commission on the Potomac River Basin (ICPRB)

Resource or Program Description

The ICPRB, in cooperation with many other local, state, and federal agencies and public and private organizations, undertook the Potomac Visions Project. The Project was created to help achieve a focus on ways to protect and enhance the water quality of the Potomac River. As a first step in citizen involvement, the Project team developed a directory of local projects, and technical and financial assistance programs available in the Potomac watershed. The directory also lists local and state agencies with natural resources responsibilities and public and private groups working on the watershed. Other products related to the Project are: 1) a booklet, *Potomac River Greenways: A Shared Agenda*, which highlights efforts at stream valley and watershed protection, heritage tourism, and economic development, environmental education, habitat enhancement, recreational trails and access, and water supply and quality; and 2) a video, *Potomac Visions*, which reports on efforts to preserve the water and cultural resources of the basin.

Contact

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Rockville, MD 20852-3903
(301) 984-1908

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