Integrating Watershed and Land Use Planning in Maryland

Workshop Summary and Meeting Notes

March 7, 2005
Blue Heron Center
Annapolis, Maryland

Sponsored by the Chesapeake Bay Program's Scientific and Technical Advisory Committee and the Land, Growth, and Stewardship Subcommittee

STAC Publication 05-007

About the Scientific and Technical Advisory Committee

The Scientific and Technical Advisory Committee (STAC) provides scientific and technical guidance to the Chesapeake Bay Program on measures to restore and protect the Chesapeake Bay. As an advisory committee, STAC reports periodically to the Implementation Committee and annually to the Executive Council. Since it's creation in December 1984, STAC has worked to enhance scientific communication and outreach throughout the Chesapeake Bay watershed and beyond. STAC provides scientific and technical advice in various ways, including (1) technical reports and papers, (2) discussion groups, (3) assistance in organizing merit reviews of CBP programs and projects, (4) technical conferences and workshops, and (5) service by STAC members on CBP subcommittees and workgroups. In addition, STAC has the mechanisms in place that will allow STAC to hold meetings, workshops, and reviews in rapid response to CBP subcommittee and workgroup requests for scientific and technical input. This will allow STAC to provide the CBP subcommittees and workgroups with information and support needed as specific issues arise while working towards meeting the goals outlined in the *Chesapeake 2000* agreement. STAC also acts proactively to bring the most recent scientific information to the Bay Program and its partners. For additional information about STAC, please visit the STAC website at www.chesapeake.org/stac.

About the Land, Growth, and Stewardship Subcommittee

The mission of the Land, Growth and Stewardship Subcommittee is to develop and promote sound land use practices which protect and restore watershed resources and water quality, maintain reduced pollutant loadings for the Bay and its tributaries, and restore and preserve aquatic living resources. Accomplishment of the LGSS mission will result in the following: preservation of most valued resource lands by conservation of open space; reduction in the rate of harmful sprawl development of forests and farms; promotion of environmentally sensitive development, including; low impact development and similar techniques that minimize water quality impacts of new development redevelopment of underutilized urban, suburban and rural communities, including the redevelopment of brownfields; reduction of impervious cover associated with development; concentration of new development in areas supported by adequate water resources and infrastructure; coordination of transportation and land use planning; and increase in public access to the Bay and its rivers and streams, including through the development of water trails.

Publication Date:
January 2006

Publication Number:
05-007

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Workshop Summary and Meeting Notes: *Integrating Watershed and Land Use Planning in Maryland*

March 7, 2005, at the Blue Heron Center in Annapolis, Maryland

Acknowledgements

The Chesapeake Bay Program Office greatly appreciates the contributions of the following people to the organization and development of this workshop:

Ted Graham of the Metropolitan Washington Council of Governments; Jim George, Janice Outen, and Danielle Lucid of the Maryland Department of the Environment; Don Outen of Baltimore County's Department of Environmental Protection; Mary Dolan of the Montgomery County Dept. of Park and Planning, Maryland-National Capital Park and Planning Commission; Mary Searing of Anne Arundel County; Tay Harris of the Maryland Department of Planning; Sandi Olek of the Maryland Department of Natural Resources; Shannon Moore, Frederick County Department of Public Works; David Umling of the Charles County Department of Planning; and Menchu Martinez and Emily Clifton of the Chesapeake Bay Program Office.

In addition, the Bay Program Office would like to thank the generous contribution of time to the day's presenters:

Secretary Audrey Scott, Secretary, Maryland Department of Planning; Hilary Spence, Talbot County Council; Tom Schueler, Center for Watershed Protection; Sandi Olek and Jamie Baxter, Maryland Department of Natural Resources; Jim Noonan, Maryland Department of Planning; Janice Outen, Maryland Department of the Environment; Lynn Richards, Environmental Protection Agency; Shannon Moore, Frederick County Department of Public Works; Mary Dolan, Montgomery County Dept. of Park and Planning, Maryland-National Capital Park and Planning Commission; and Don Outen, Baltimore County Dept. of Environmental Protection & Resource Management

Table of Contents

Introduction

Over time, our understanding of the relationship between land use and downstream impacts to water quality and natural resources continues to improve. The number and sophistication of urban best management practices (BMPs) to minimize the impact of development has grown accordingly. As a result, BMPs in wastewater treatment, stormwater management, and better site design are widely used.

While these site-specific controls are critical, they can only mitigate the impacts of planned land uses. Land use planners today deal with far more than the classic trilogy of land use, transportation and public facilities. Localities are increasingly required to consider issues such as long-range sustainability, brownfields, assurance of clean air and water, the protection of sensitive areas, provisions for waste disposal and recycling, and affordable housing. An understanding of the watershed impact of land use choices, locations and density is often missing, especially in planning areas that address parts of watersheds. This information is often prepared in the form of a watershed plan, separate from the land use planning and zoning process.

On March 7, 2005, the Chesapeake Bay Program co-sponsored a workshop to bring together planning, natural resource, and regulatory professionals in Maryland to collaborate on how to incorporate water quality planning and regulatory requirements into comprehensive planning. The objectives of this workshop were to:*

- Discuss the role of watershed planning and how it can be coordinated with other land use planning activities;
- Identify existing watershed based regulations or requirements facing local jurisdictions and the implications for county planning;
- Provide examples of how and to what extent land use and watershed planning have been integrated in Montgomery and Baltimore counties; and
- Provide time for practitioners from different communities to share opportunities, challenges, and needs, so you can take away specific ideas for your county.

Local practitioners interacted with State representatives from MDE, MDP, and MDNR to address State expectations or current regulations affecting natural resources and their implications for land use planning. Selected counties with advanced programs presented case studies demonstrating successful strategies, potential opportunities and challenges/impediments to incorporating watershed management into daily land use planning decisions. The following is a summary of the day's proceedings.

*See Appendix A for Agenda

Workshop Summary
Opening Remarks – Hilary Spence, Talbot County Council*

Talbot County has developed an effective, data based tool and Green Infrastructure (GI) Plan to assist its planners and elected officials in making critical land use and preservation decisions. This plan targets preserving open space for the purpose of maintaining an agriculture industry, protecting the County's watersheds, and preserving rural character.

The tool itself is a scientifically-based model used to identify, prioritize, evaluate, and preserve environmentally sensitive land areas. It includes aquatic resources (wetlands, floodplains and riparian zones that typically contribute to water quality); ecological resources (sensitive species and their habitats and valuable ecosystems); and agricultural and rural landscapes (economically productive working ands and open space).

The plan was developed during the time that the State government was implementing its "Green Print" program which essentially mapped environmentally sensitive lands. Being a State plan, however, Green Print did not provide the level of detail needed by the County, nor did it include waterfront acreage in the mapping of sensitive areas, which was important for Talbot.

Talbot County's Green Infrastructure plan was developed in 2002 under the expertise of The Conservation Fund, which allowed the County to customize its mapping to include resource areas that are plentiful in and most meaningful to the County. This customized approach was beneficial because not all counties are the same – they do not have the same types of land uses, they do not place the same values on different types of lands, they do not have access to the same amount or type of data about the parcels in their jurisdiction.

There were three driving forces which made this plan happen for the county. First, the County had a very supportive constituency that was urging the County Council to take a more proactive approach toward land preservation, with at least three groups pushing the effort. Second was the five-year update of the County's comprehensive land use plan. The County was just beginning the process and saw the development of a GI plan as a way to address preservation issues within the comprehensive plan. Third, and probably most important, was the Conservation Fund's ability to develop the plan and its desire to work with the County.

Now that the plan is developed, the County will use it to prioritize lands for preservation. The GI Plan is now included as an implementation strategy in the updated Comprehensive Land Use Plan that the County Council approved in February (2005). In addition, when zoning ordinances are revised as a result of the update, the GI plan will be required to be incorporated in the decision-making process for all land preservation decisions.

On an ongoing basis, the Planning Commission will use the Plan to review potential development projects. For example, when a developer comes in with a parcel he wants to develop, the Commission will evaluate the parcel for its resource value and decide whether development is compatible. If the parcel has a high resource value, the Commission can work with the developer to modify the project to preserve as much of the property as possible by clustering development and preserving more open space. The Planning staff, Commission, and County Council will also use the Plan to make decisions about supplemental growth allocations in critical areas.

Finally, this is a tool the County would like to share with its towns so that, as they look to annex land.

Recommendations for other counties: Land use decisions are often loaded with political and personal interest overtones. Decision makers are accused of advancing an "agenda", either pro-growth or anti-growth depending on which side you are on. Using a data-based tool such as a GI plan can disarm the nay-sayers and provide credibility. Elected officials and other decision makers will be viewed as fair and objective when they use such tools. And that is what property owners, developers, and interest groups want: fairness and objectivity.

*See Appendix B for presentation handout from Hilary Spence

Incorporating Watershed Management into the Local Planning Context
Tom Schueler, Center for Watershed Protection (CWP)*

The Impervious Cover Model: impervious cover provides a general indicator of water quality or stream sensitivity. Overall, there have been more than 200 studies on 26 aquatic indicators, and the Impervious Cover Model has been studied more in Maryland than anywhere else. What it tells you:

Between 2 and 10% impervious cover (IC):

- Most indicators are in the good to excellent range, though subject to land management practices. Some individual indicators are more sensitive and may start to decline at 5-10% IC. Brook trout, e.g., is an indicator of a highest quality stream, and shows a decline over 5% IC. Other subwatershed metrics such as forest cover may have more predictive ability.
- *Key planning issues*: even low intensity residential development with proper treatment will degrade such streams. Protection of streams requires aggressive down-zoning, land conservation, and riparian buffers. No sewers should be allowed.

Between 10 and 25% impervious cover:

- Researchers have documented that at about 10% IC, the aquatic insect community in urban streams begin to decline sharply. There's a shift to more pollution tolerant organisms. Waterfowl, macroinvertebrates, amphibians and fish are adversely effected by land development. In this range, streams show clear signs of declining stream health. Stream indicators are in the fair to good range and have the highest restoration potential.
- *Key planning issues*: Apply CWP's 8 tools of watershed protection; set goals for retaining forest cover, riparian continuity and overall watershed treatment; continue to monitor.

Between 25 and 60% impervious cover:

- Non-supporting streams that do not support a full range of designated uses; streams in the fair to poor range. Streams in the 25-40% IC range show promise for stream restoration. The primary goals are to reduce pollutant loads, improve stream corridors, or enhance appearance. Water contact recreation may be allowed during dry weather.
- *Key planning issue*: Evaluate streams in 25-40% IC range for restoration potential; support active redevelopment/infill to increase IC; create an urban drainage classification for extremely high IC streams; commit to smart watersheds program.

Why has success in integrating land use and local watershed plans been limited?
Reasons for limited success in integrating land use into local watershed plans: 1) overzoning; 2) segregation of planning entities (3) bmp effect; (4) confusion on scope; (5) lack of watershed zoning unit.

(1) *Overzoning* – Most watersheds are already zoned for development, and nearly all residential zoning categories produce more than 10% IC. For an area zoned for agriculture (considered a transitory zoning category), you can expect an IC percentage around 1.9%. A subdivision with one dwelling unit per two acres is about 10.6% impervious, so it doesn't take a whole lot of development to go over 10%. For an area zoned one dwelling unit per ½ acre, IC percentage is around 21.2%. Reducing impacts would require downzoning, which is very difficult.

(2) *Segregation of planning entities* – comprehensive planning focuses on the whole package and tends to be growth-oriented, while watershed planning occurs outside of the comprehensive planning process. Also psychological differences: for comprehensive planners, density is good. It reduces costs for municipal services, supports vibrant communities, and provides jobs. For land use planners, low density zoning is the most inefficient land use.

(3) *Uncertainty regarding the BMP effect* – Current BMP's cannot fully mitigate land use impacts and as such, the implementation of BMP's should not be the sole focus for reducing pollutants, etc. Communities have found that no matter what watershed they are working in, the same eight basic management tools apply: watershed planning, land conservation, aquatic buffers, better site design, erosion and sediment control, stormwater management, non-stormwater discharges, and watershed stewardship programs. A holistic approach is best.

*See Appendix C for presentation handout from Tom Schueler

(4) *Confusion on the scope of watershed plans* – The goals and management focus of local watershed plans are different, depending on what unit of local, state, or federal government you talk to. There is no standardization among agencies, and no standard approach or scale for watershed planning. There are multiple and ambiguous goals in Maryland, and more watershed planning directors in this state than anywhere else.
(5) *Lack of a true watershed zoning unit*. Traditional zoning doesn't regulate land cover – such as imperviousness, forest, and turf – but density. A watershed protective zone would modify master plans/zones to correspond to subwatershed targets and closer linked to impervious cover goals (*Note: see slides for all information presented on what a true watershed protection zone would look like – 4 slides total*).

To increase success in integrating land use and local watershed plans, more time must also be spent educating elected officials and comprehensive planners on the benefits of local watershed planning. A more *unified approach* to watershed planning is also necessary – one that uses common resource inventory elements and pollutant load calculations; common reporting elements; portable nutrient reduction targets and habitat restoration across watershed management units.

One final point is the need to provide real incentives. Incentives can take many forms but are necessary if the concept of watershed management planning is to more forward. These may include:

- Cost-sharing of local planning efforts
- Extended TMDL implementation schedules (ex: in Los Angeles, there are 27 sub-watersheds. Areas have eighteen years to comply with the TMDL with a watershed plan, and only six years if no plan exists)
- Automatic eligibility for 319 funds
- Trading between watershed scales (TMDL offsets)
- Safe harbor from addl. regulations in highly urban watersheds
- Free technical assistance (w/o strings)
- Access to special watershed implementation funds from SRF
- Presumed compliance with nutrient reduction for next ten years
- Five year grace from any more watershed guidance/requirements
- Real credits for implementing watershed-based zoning

For county participants, there are some new products available. Be sure to check out the *Small Watershed Restoration Manual Series* (available at www.cwp.org) for new updates. In addition, community testing will begin on the Smart Watersheds Benchmarking Tool later this spring. The Smart Watersheds project evaluates municipal programs on how well they implement and integrate fourteen key municipal program areas, such as Stream and Subwatershed Field Assessment, Management of Natural Area Remnants, Illicit Discharges Detection and Elimination, and Public Involvement and Neighborhood Consultation, into a coherent strategy to treat stormwater runoff and restore urban watersheds. Testing will occur in four to six communities throughout the summer, with full application and potential certification of Smart Watershed programs in two communities. The final tool, program profile sheets, and a Guidebook will be completed this winter.

Remarks to Local Planners
Audrey Scott, Secretary, Maryland Department of Planning

The Maryland Department of Planning provides a vision, recommendations, and technical assistance, but each of these depend on local governments. Success is determined by relationships with local officials.

In Governor Elrich's commitment to balanced growth, the Chesapeake Bay is a priority. The connection between land use and water quality have not always been made when addressing daily development decisions. We have to change this thinking. When a development proposal comes before an elected county official, we need watershed and water quality to become as automatic in the decision-making process as issues such as overcrowded schools. We need to begin to ask the question: "How will development impact the watershed?"

What's happening on the State level: Maryland is currently refocusing its smart growth initiatives, and the two first Priority Places have just been announced – Leonardtown in southern Maryland and the Poppleton neighborhood in Baltimore City. The goal of the Priority Places initiative is to target state resources to redevelop older, more established areas to capitalize on existing infrastructure and on private–public partnerships. Though not the only tool, TMDL's will also become an increasing factor in development and land use decisions, just as capacity issues and upgrades of wastewater treatment plants and overcrowded schools are.

Beginning in the fall of 2005, the Maryland Department of Planning and Maryland Department of the Environment will host a series of workshops for state and local officials to discuss land use planning and watershed management– covering Central, Southern, and Western Maryland and the Eastern Shore.

For more information on the upcoming workshop dates and locations, visit www.mdp.state.md.us.

Discussion session: Existing federal / state environmental requirements and their impact on county planning and development.

Moderator: Sandi Olek, Maryland Department of Natural Resources

Panelists: Jamie Baxter, Maryland Department of Natural Resources
Jim Noonan, Maryland Department of Planning
Janice Outen, Maryland Department of the Environment
Lynn Richards, Environmental Protection Agency

Remarks from Panelists:

Jamie Baxter, Tributary Strategies Program Director, Maryland DNR

- How do we incorporate the impact of future growth with the Bay Cleanup? The tributary strategies reflect the state's plan to meet proposed water quality standards. To do so, we need to have technical assistance to provide tools and resources without strings attached. The strategy does attempt to accommodate growth in two areas: 1) upgrading treatment plants; and 2) building bmp's on predicted future land use baseline through 2010.

Jim Noonan, Director of Infrastructure Planning, MDP

- There's a push/pull between different state requirements. The sensitive area element requirement for comprehensive plans is not specific, and we may not have the infrastructure in place that we think we do to tie into opportunities to focus growth, and for now, it is still easier to grow on the fringes due to public opposition to infill and the difficulty of getting innovative development through the permitting process. We need to translate competing policies to impact how and where growth occurs and do a better job at capacity building at the local level (i.e., staffing). In terms of scale, planning and zoning comes down to the parcel level, so we need tools not just for policy level but for better managing individual parcels.

Janice Outen, Water Resources Engineer, MDE

- Maryland's population will increase by 1.1 million by 2030. That's 550,000 new households (Anne Arundel: 48,000 households; Prince George's 87,000; Frederick County – 52,500. For additional figures, see *Appendix H, Handout: Maryland Department of the Environment*). If each new household is developed on one acre lots, the total footprint would be 850 miles squared, or the size of Charles and St. Mary's Counties. At 3.5 lots per acres, this number would be 250 miles squared – the size of Howard County. We must think more about how to best design and plan for population increase, water quality and supply, and point and non-point pollution. What requirements can you use in your favor? Communities should explore source water protection. MS4 permits, which apply to larger metropolitan counties, permit for stormwater systems and provide money for activities such as education, planning, and capital facilities improvement. Outside sewage systems, there's money available to upgrade septic systems in certain priority areas. And finally, additional comprehensive plan preparation guidance is being developed jointly by MDE and MDP so that comprehensive planning is not as developer-driven.

Lynn Richards, Senior Policy Analyst, US Environmental Protection Agency Smart Growth Program

- Total US population will increase by 50 million by 2020 – we need to think more about where and how new growth will be accommodated. The planning process should be kept in perspective – we need to look at what drives development: local codes and regulations – developers responds to these – minimum densities, mixed use prohibitions (mixed use illegal to build in many areas). We need to incentivize redevelopment. Baltimore City, for example, can accommodate 50% of the expected growth with existing structures. We need to take a look at rehab standards – New Jersey, for example, focuses on places already degraded. Greensboro, NC is a good example of brownfield redevelopment. For other ideas or reading materials, visit www.epa.gov/smartgrowth/ and click on publications.

Spotlight: Frederick County
Shannon Moore, Frederick County Department of Public Works*

The issue: watershed health is deteriorating and water resources diminishing. *The solution*: water quality, quantity and habitat issues must be addressed on a watershed basis.

In general, watershed management is seen to detract from other issues and is not a high priority. As a result, we lack the mechanisms to implement the necessary planning elements. What do our decision-makers value?

(1) decreased cost and increased benefit of program
(2) defensibility of decisions
(3) avoidance of conflict
(4) meets definition of "important," including what is important to key stakeholders
(5) other personal value.

In Frederick County, the initiation of watershed management planning was a reaction to the threat of regulatory requirements. A fear of fines or consent order for not meeting NPDES Phase I MS4 permit requirements initially drove watershed management planning. NPDES Phase II MS4 permit requirements can provide some of the same impetus.

In addition, public conflict over Lake Linganore reservoir's volume and water quality and a TMDL was a hot topic, causing the Commissioners to act. As a result, the Commission requested an Action Plan for reducing nutrients and sediments. The antidegradation rules specified under Maryland's antidegradation policy (COMAR §26.08.02.04) also have the ability to address the maintenance of water quality in more pristine areas.

One priority for Frederick County in developing its watershed management plans has been the inclusion of "key stakeholders", or those people commissioners feel especially responsible to – such as farmers, developers, large landowners – and could directly communicate their support to decision-makers. Stakeholders were identified and kept part of the process. Honestly seeking opinions and involvement in identifying problems and solutions was key.

Another priority was cost and importance. No one wants to pay to dredge Lake Linganore, but ICPRB estimates that the County may not be able to meet future water supply needs during drought conditions. The Director of Utilities is concerned about future impacts to water supply from water quality issues. The goal is starting to look more important to the Commission, and in December of 2004, the County Commission voted to establish an Integrated Water Resources Management Task Force to address water quality and quantity issues.

The County's NPDES program lacks tools to adequately identify problems. To address this, the County leveraged funds through the DNR (now MDE) Watershed Restoration Action Strategy program for watershed and field assessments. The Stream Corridor Assessment allowed the County to cover more area with less money, and identified sites for further upland and upstream investigations. The County followed up with Stream Restoration and Stormwater Management Facility Retrofit Assessment.

The Conclusion: there are a number of points that will help the County move forward to better integrate land use and watershed planning. This includes the organization of a well-armed Integrated Water Resources Management Task Force to address water quality and quantity issues; coordination with MDP on the integration of water resources issues into Priority Funding Area approvals; better coordination between planning staff and NPDES compliance staff; the development of an Action Plan for the Commission; better interaction with the public and key stakeholders; and continued briefings to Commissioners on topics they value.

*See Appendix D for presentation handout from Shannon Moore

The Montgomery County Experience
Mary Dolan, Montgomery County Dept. of Park and Planning, MNCPPC*

Montgomery County fully integrates water quality and environmental concerns in its master planning process. Park and Planning staff prepare an inventory of environmental resources on a predetermined schedule to correspond with the County's 27 master planning areas. These Environmental Resource Inventories review all sub-watersheds contained either partially or fully within the master planning area. This document is used to determine the range of development scenarios that would be considered given the condition of resources. The environmental resource inventory for a particular master planning area is timed to occur before the master plan for that area is reviewed and updated. Thus, the environmental criteria are considered upfront and have a greater influence on zoning decisions.

No matter what approach your county chooses to take, the following is some general advice for ensuring effectiveness in implementing environmental criteria:

- Cultivate respect even with competing interests
  - Environmental staff must recognize land use goals & influences
  - Environmental and land use planning staff must get together and exchange information about resources and goals
- Prepare yourself
  - Environmental staff must stay ahead of the crowd and know sources of information
  - Environmental staff must identify which environmental facts & direction relate to land use planning
  - Land use planners must understand that environmental concerns can support desirable land use objectives
  - All staff must take the time to make the connections
- Become part of the process
  - Environmental staff can't save resources by monitoring their change
  - Land use planners must understand that master plans can forever compromise environmental options
  - All staff must realize that no one wins in a turf battle
  - All staff must realize that analysis must be timely to be useful
- Convey your passion
  - Land use planners must invite environmental staff to community outreach meetings
  - Environmental staff must provide analysis and insight
  - All staff must recognize the realities and tailor options
- Support the results
  - Environmental staff must be there to explain and answer questions
  - Environmental staff must simplify the results
  - Environmental staff must suggest further options
  - Environmental staff must be creative and responsive
  - Environmental staff must give limitations of the analysis along with their professional judgment

The Montgomery County process can be best understood by looking at an example of a previously completed environmental review and master plan revision, which occurred for Upper Rock Creek Park (for this example, the watershed boundary happily corresponded exactly with the master plan area boundary). In general, for the Montgomery County process, we begin by staying ahead of the crowd and knowing our sources of information. We also focus our efforts on areas where the environment is a critical factor. The environmental review takes the following form:

- Prepare documentation – in Montgomery County, it is called an *environmental resource inventory* – to establish the existing condition of environmental resources, explain previously adopted environmental policies and recommendations, inform the public, and establish credibility

*See Appendix E for presentation handout from Mary Dolan

- Determine appropriate range of alternatives by establishing objectives for things such as imperviousness, forests, and resource protection based on inventory findings; by testing development scenarios; and by involving stakeholders in the process
- Review results and prepare recommendations, with the planning team, to present to the planning board. It's important to include tests using various zoning alternatives as well as the recommended zoning and density for a particular area. In the case of Upper Rock Creek (used as an example during the presentation), the team settled on appropriate zoning and density that would result in about 7-8% impervious.

In making recommendations, it is just as important to understand or deal with the politics involved. In Upper Rock Creek, the County Council included a special protection area in order to ensure more stormwater management and reforestation. An 8% impervious cover cap on new development was also put in place. These were a result of pressures from the community for more protection. Modifications for the Upper Rock Creek area also included a slight increase in the total number of units allowed, decreasing imperviousness, and adding 400 acres of parkland.

In conclusion, results come from respect, preparation, and participation. Convey your passion, support your results, be content but not contented, and improve the process the next time.

Note: For those county participants that attended the meeting, Mary Dolan provided CD's which included Montgomery County's environmental planning documents. We do have some cd's that are still available and can make a few additional copies upon request. Please contact Emily Clifton (eclifton@chesapeakebay.net) or Menchu Martinez (martinez.menchu-c@epa.gov) if you would like a copy and we will try to accommodate your request.

The Baltimore County Experience
Don Outen, Baltimore County Dept. of Environmental Protection & Resource Management*

Baltimore County has the third largest land area and the third largest population (780,654), and the second highest number of jobs (364,837) in Maryland. It is slow growing, at about 1% a year, and has no incorporated municipalities.

Environmental degradation is not just problem spurred by new development; it's an inherited legacy of land abuse before the pre-industrial era. Land use patterns are determined by historic and local regional development, the decentralization of metropolitan areas, timing of regulatory controls, low interest mortgage rates, the Baltimore Beltway, the 'white flight' following the desegregation of schools, the pursuit of the American Dream, and the declining role and presence of agriculture.

In terms of the 'land use planning versus environmental' dilemma, *land use planning, not environmental restoration, should drive and provide a framework for integration*. Integration needs to be reflected in continuing, comprehensive and coordinated County programs. Program elements should include Growth Management and Integrated Watershed Management. And environmental outcomes of land use decisions need to be purposeful and address past and future commitments.

We also need science-based indicators of sustainability. Environmental assessments for land use plans should assess the relationship of existing and proposed urban land uses to: green infrastructure (ecologically important forests and habitat), watershed hydrology (headwater streams), stream biological quality, stream channel stability, and impervious cover and water quality.

Within Baltimore County, growth management has been aided by the delineation of urban and rural areas (growth boundary) in the late 1960's, and that growth boundary is still in force today. Baltimore County has used zoning tools and basic services (water and sewer) to concentrate development and reduce sprawl. Through our new 'Renaissance Process', we are encouraging infill and re-development within older communities, and future growth is accommodated in planned growth areas.

Some ways that environmental management is incorporated in Baltimore County:

- Zoning tools and land preservation are used to reduce rural development, protect reservoir watersheds and agriculture;
- Development regulations protect resource function in both urban and rural areas;
- Implement aggressive restoration programs in older urban areas; and
- Integrate resource management strategies ("Green Renaissance").

There are both benefits and liabilities to concentrated growth. While concentrated growth helps reduce sprawl, improve efficiencies, and protect working lands and reservoirs, its liabilities include concentrated pollution and the high cost of retrofit.

When planning communities, we need to think further out into the future – we need cities that are done well ("new urbanism") and must measure our success based on the health of our waters. Currently in Baltimore County, 90 percent of the total population lives in our urban growth boundary, which makes up one third of the County's total land. Most rural streams are fairly functional, and we have downsized more than 60 percent of the County (outside the urban growth boundary) to maintain rural lands. We have spent about $90 million so far towards our preservation goal and are developing a strategy for protecting the remaining acres, and have spent $5 million a year on restoration.

*See Appendix F for presentation handout from Don Outen

Appendix A. Workshop Agenda

9:00AM **Sign in and refreshments**

9:30AM **Welcome and Overview**
Ted Graham, Chair, Chesapeake Bay Program Land Growth and Stewardship Subcommittee

9:35AM **Plenary speaker**
Hilary Spence, Talbot County Council

9:50AM **Incorporating Watershed Management into the Planning Context**
Tom Schueler, Center for Watershed Protection

10:25AM **Break**

10:40AM **Remarks to Local Planners**
Audrey Scott, Secretary, Maryland Department of Planning

10:45AM **Discussion session**: Existing federal / state environmental requirements and their impact on county planning and development.

Moderator: Sandi Olek, Maryland DNR

Panelists: Jamie Baxter, MDNR
Jim Noonan, MDP
Janice Outen, MDE
Lynn Richards, EPA

Description: One challenge affecting local governments in incorporating watershed protection goals into the comprehensive planning process is finding the right resources and agencies to provide guidance. Often times, different agencies have conflicting goals. This session provides an opportunity for local practitioners to engage a panel of representatives from MDE, MDP, MDNR, and EPA on current state and federal regulations, addressing such questions as:

- What are the federal and state requirements that impact planning and development?
- What are counties going to have to respond to?
- What guidance is there for counties to follow?

11:30AM **Spotlight: Frederick County**
Shannon Moore, Frederick County DPW

Description: Frederick County has been taking steps to better align watershed protection goals with its land use planning responsibilities. Ms. Moore will set the stage for the afternoon discussion by posing some issues her county is facing and the possible solutions to those problems.

12:00PM **Lunch**

1:00PM **Spotlight on Montgomery and Baltimore Counties:**

Description: In Maryland, Montgomery and Baltimore counties are considered successful for linking land use and watershed protection goals, yet the ways in which they do so differs. Mary Dolan and Don Outen will explain their own county processes and highlight some of the tools and techniques they have used to impact daily development decisions through the planning process.

The Montgomery County Experience: Setting Environmental Parameters at the Beginning of the Planning Process

Mary Dolan, Montgomery County Dept. of Park and Planning, Maryland-National Capital Park and Planning Commission

The Baltimore County Experience: Progress and Challenges for Land Use-Watershed Planning Integration

Don Outen, Baltimore County Dept. of Environmental Protection & Resource Management

2:00PM **Problem solving session**: Identifying and overcoming obstacles in your county.

3:30PM **Adjourn**

This workshop was organized in partnership with:

Process – Resource Evaluation

Ecological Resources including sensitive species and their habitats and valuable ecosystems.

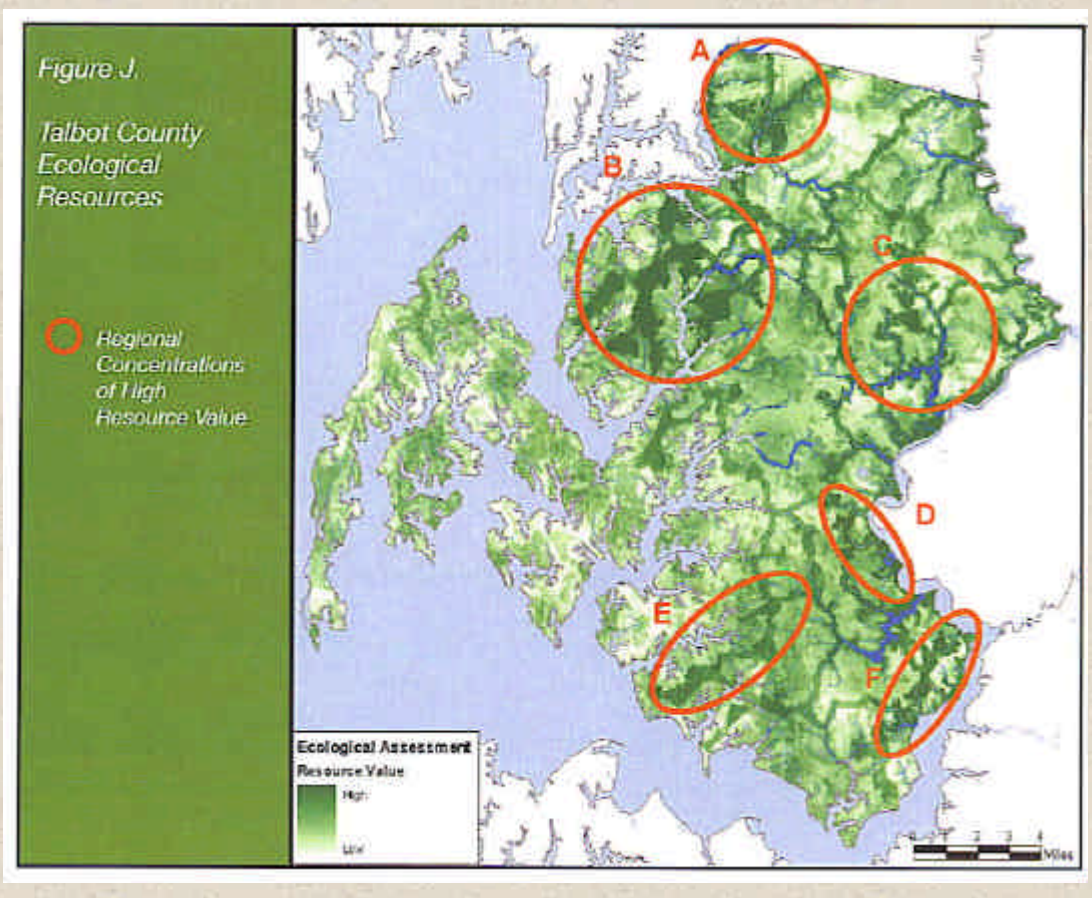
Agricultural and Rural Landscape including economically productive working lands and open spaces.

Aquatic Resources including wetlands, floodplains and riparian zones that contribute to water quality.

Quantitative geographic evaluation of these three resource targets were performed in order to rank the relative suitability and conservation importance of all lands within Talbot County

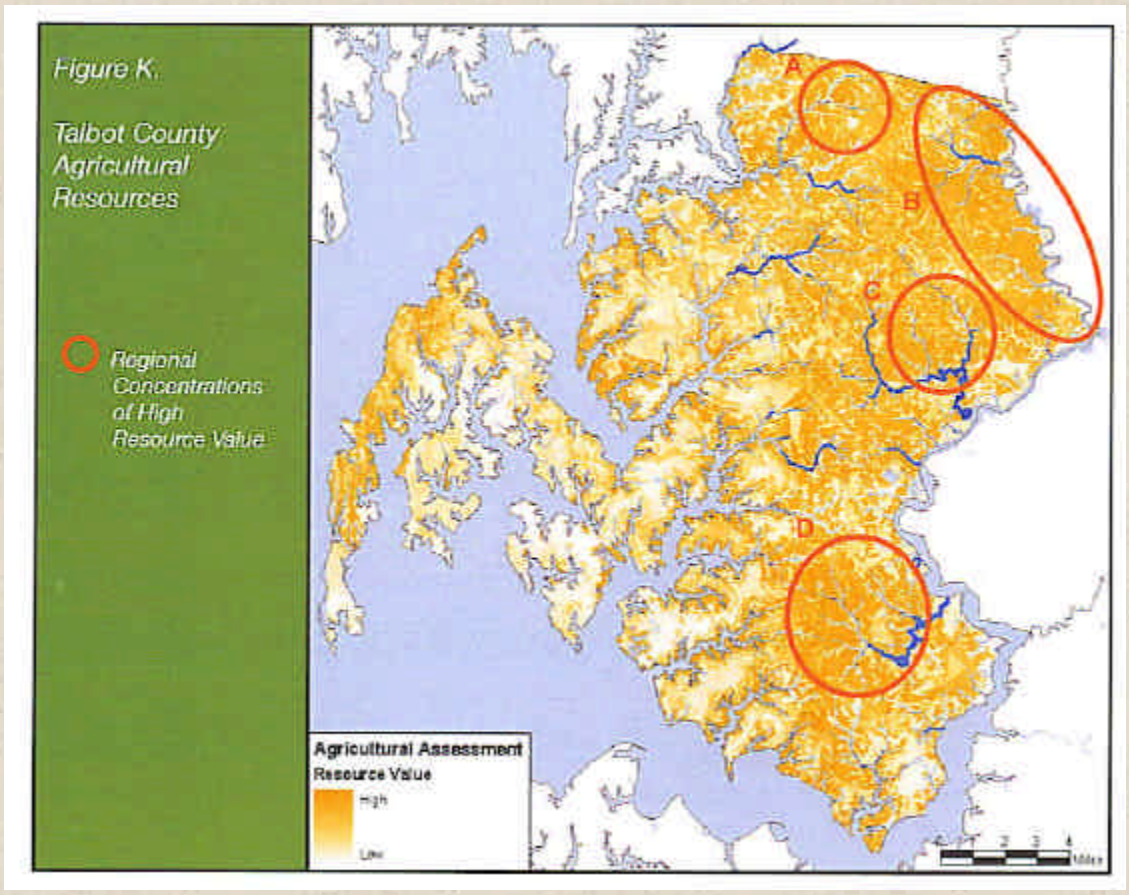
Regional Concentration of High Resource Value

Ecological Component



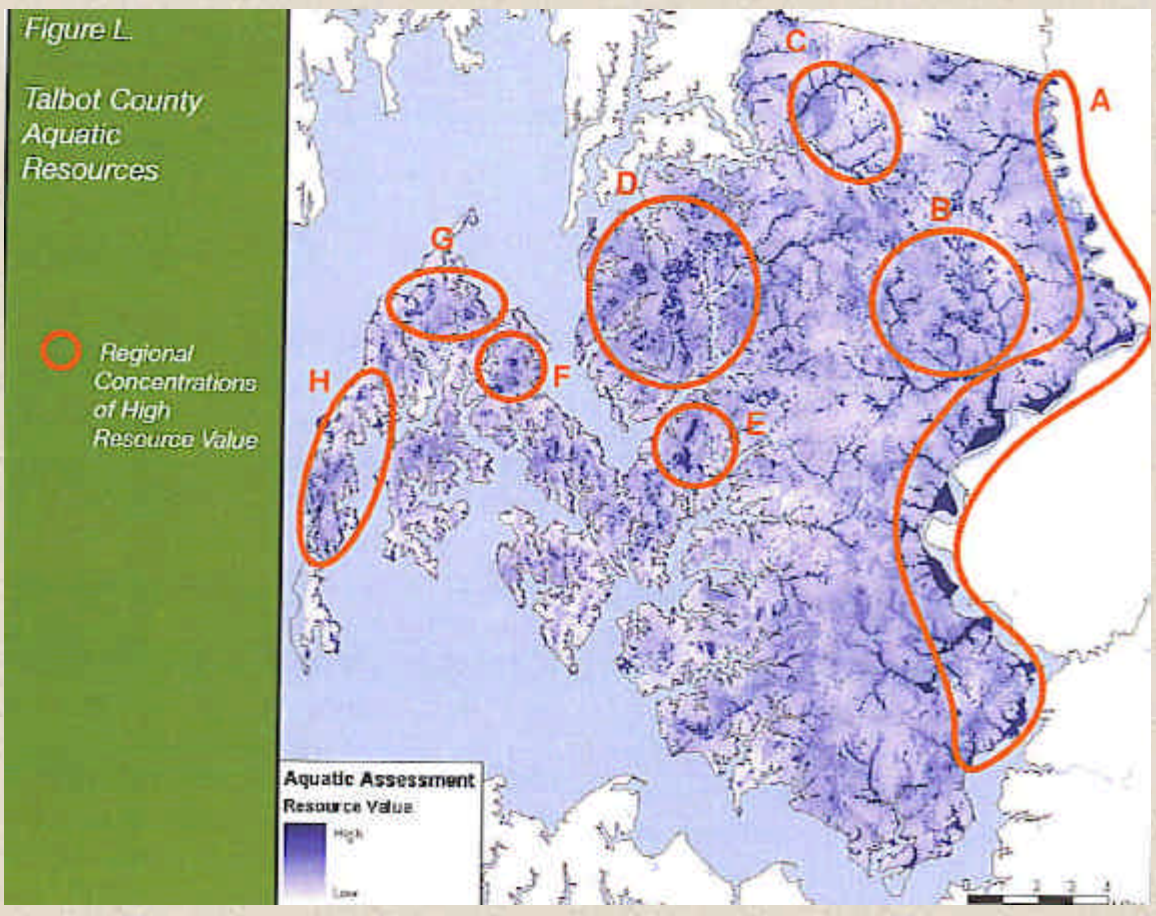
Regional Concentration of High Resource Value

Agricultural Component



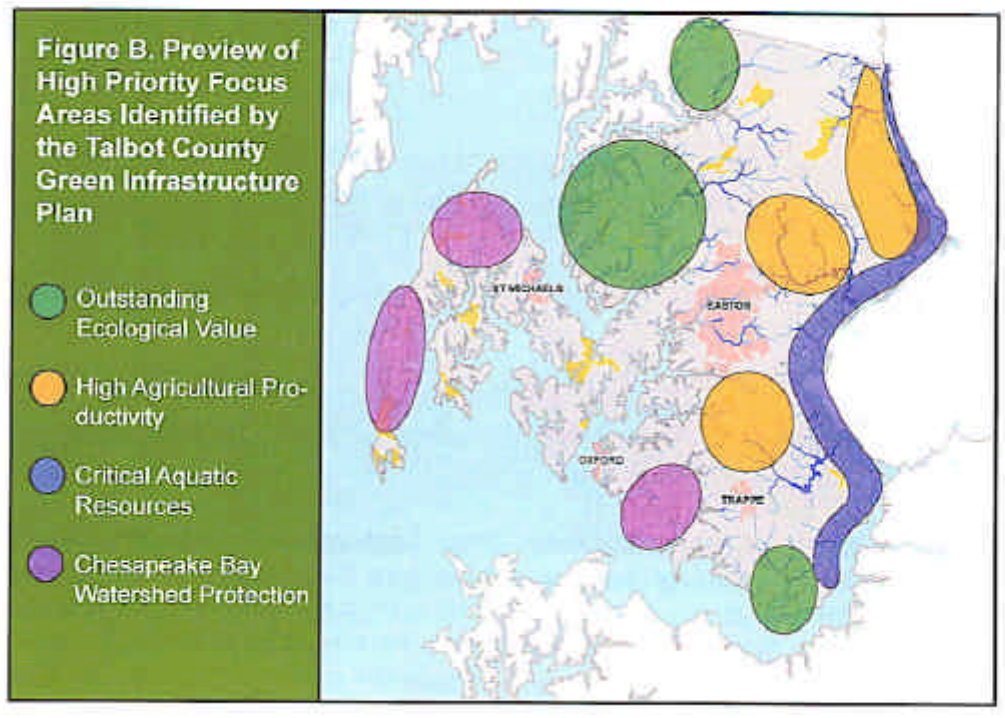
Regional Concentration of High Resource Value

Aquatic Component



Identifying Hubs

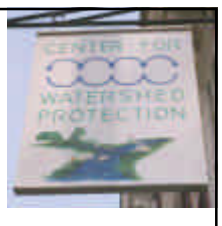
(High Priority Focus Areas)



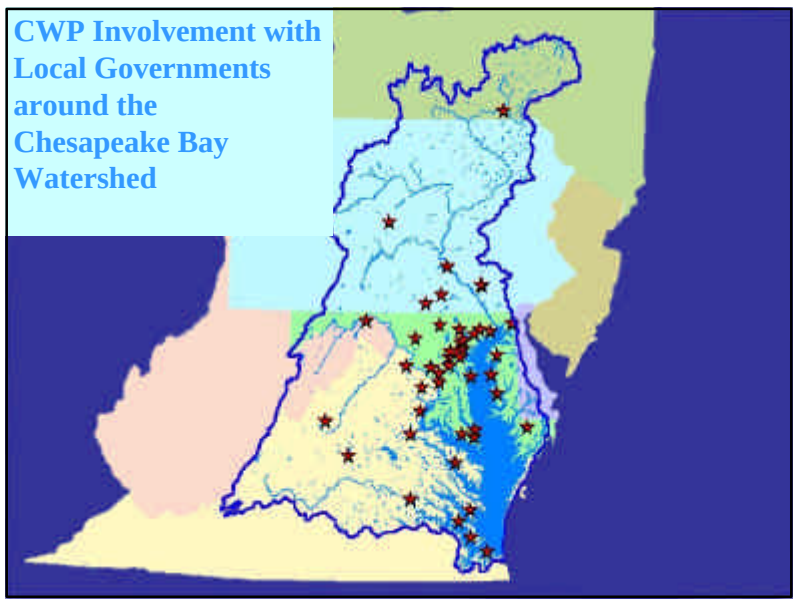
Incorporating watershed management into the local planning context

Tom Schueler
Center for Watershed Protection
LGSS Workshop 3/7/05

About the Center for Watershed Protection



- Non-profit 501(c)3, non-advocacy organization
- Work with watershed groups, local, state, and federal governments
- Provide tools communities need to protect streams, lakes, and rivers
- 20 staff in Ellicott City, MD
- www.cwp.org
- www.stormwatercenter.net

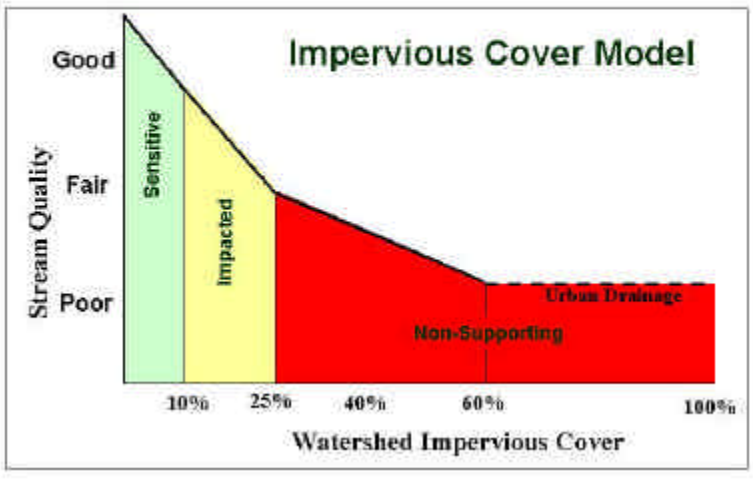


The Bay, by the numbers

1	Chesapeake Bay Basin
36	Bay Tributary Strategies
~ 125	River Basins (TMDLs)
~ 600	Watersheds (100 + mi2)
~ 7500	Subwatersheds (>10 sq miles)
~ 50,000	Catchments

Key Topics

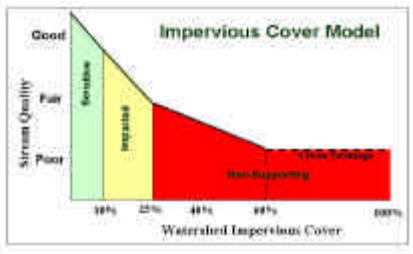
- The Impervious Cover Model
- Why it is so hard to integrate land use/zoning into local watershed plans
- Some ideas on watershed-based zoning
- New CWP tools



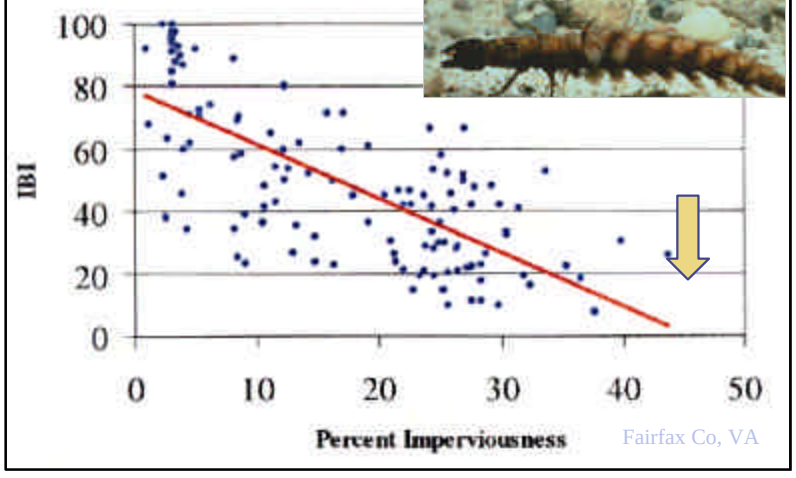
ICM Disclaimer

"ICM predictions are general, and may not fully apply to every stream. Factors such as stream gradient, stream order, stream type, age of subwatershed development, prior land use, past management practices can and will make some streams depart from these predictions"

Must be 18 or older to enter. Not valid in TX, UT and AK. APR of 6.15%. Not everyone qualifies for special financing. Offer may restricted due to Acts of God. You can never win. Center not liable for any damages, we don't have any $ even if we are



ICM supported by over 200 Studies on 26 aquatic indicators (CWP,2003)



Fairfax Co, VA

Sensitive Streams

[2 to 10% IC]

Most indicators in the good to excellent range.

Not automatic, indicators will decline if poor land management practices exist in the subwatershed

Some individual indicators are more sensitive and start to decline at 5 to 10% IC

Other subwatershed metrics may have more predictive ability (forest cover, RFC, Turf cover)

Sensitive Streams

Key Planning Issue:

Predicts that even low intensity residential development will degrade streams even with watershed treatment

Response:

Aggressive down-zoning, land conservation, and buffers. No sewers. ICM is defensible, but only apply to most critical resources.

Impacted Streams

10 to 25% IC

Show clear signs of declining stream health

Stream indicators in the fair to good range

Stream corridor may still be intact

Available land in subwatershed to install practices

Streams have highest restoration potential

Impacted Streams

Key Issue:

What practices can minimize the expected decline in stream indicators, and by how much?

1. Apply all 8 Tools of Watershed Protection
2. Set goals for retaining forest cover, riparian continuity and overall watershed treatment
3. Keep on Testing

Non-Supporting Streams 25 to 60% IC

- Do not support a full range of designated uses
- Stream indicators in the fair to poor range
- Streams in 25 to 40% IC show promise for stream restoration
- Primary goals are to reduce pollutant loads, improve stream corridor or enhance appearance
- Allow water contact recreation during dry weather

Non-Supporting Streams

Not likely to ever support a full range of designated uses

Responses:

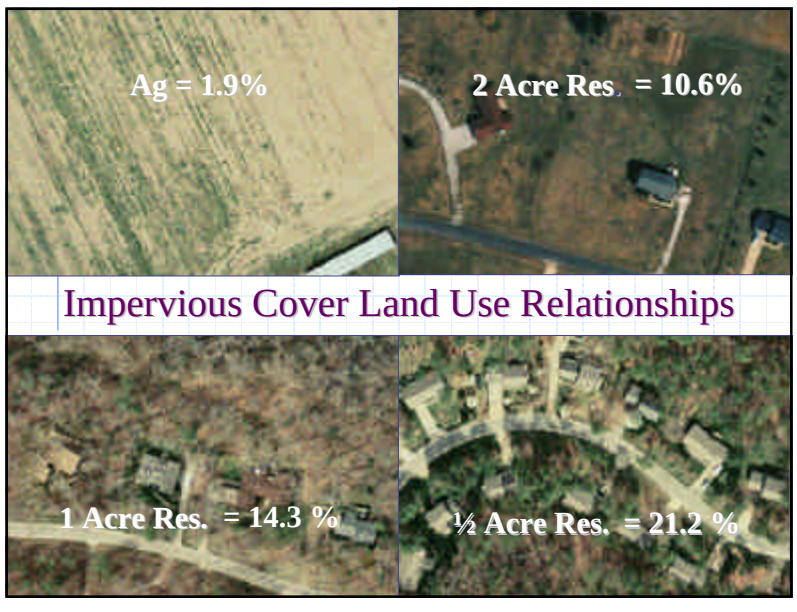
1. Evaluate streams in 25 to 40% IC for potential restoration
2. Support active redevelopment/infill to increase IC
3. Create an "urban drainage" classification for extremely high IC streams
4. Commit to Smart Watersheds Program

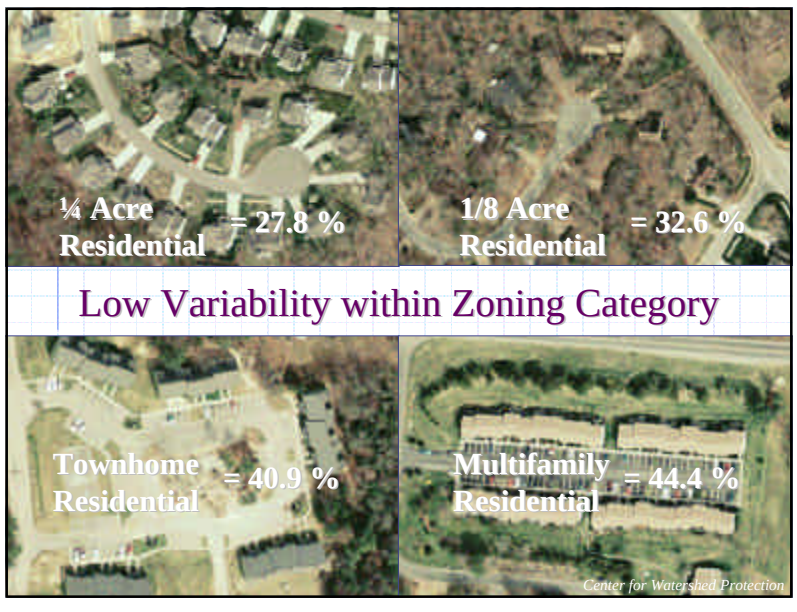
Why it is so hard to integrate land use into local watershed plans?

1. Over-Zoning
2. Segregation between comprehensive and environmental planning
3. Uncertainty about the BMP effect
4. Confusion about scope of watershed plans
5. Lack of a watershed zoning unit

1. Over- zoning

- Most watersheds have existing zoning
- Nearly all residential zoning categories produce more than 10% IC
- Agricultural zoning is often a temporary condition
- As a result, full protection can only be achieved through aggressive down-zoning





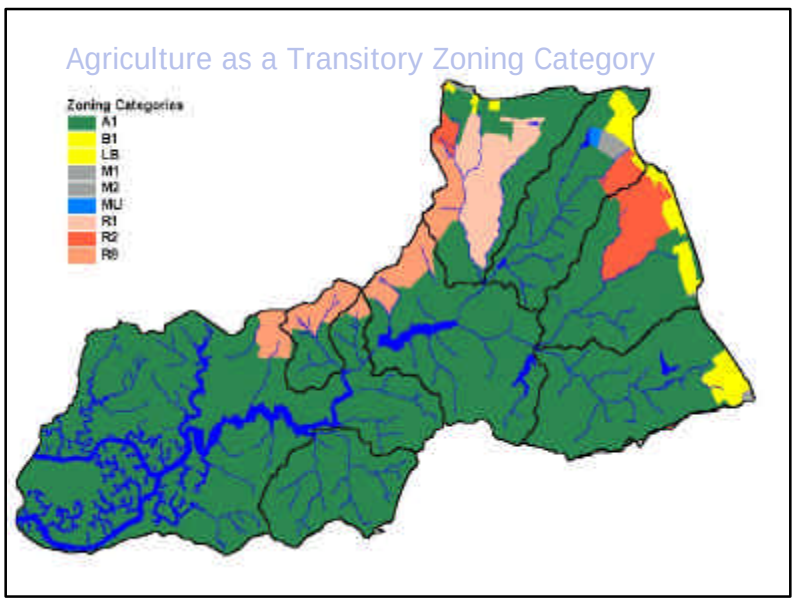
Data from 4 Suburban Counties (CWP, 2001)

Light Industrial **= 53.4 %**

Commercial **= 72.2 %**

Center for Watershed Protection

Agriculture as a Transitory Zoning Category



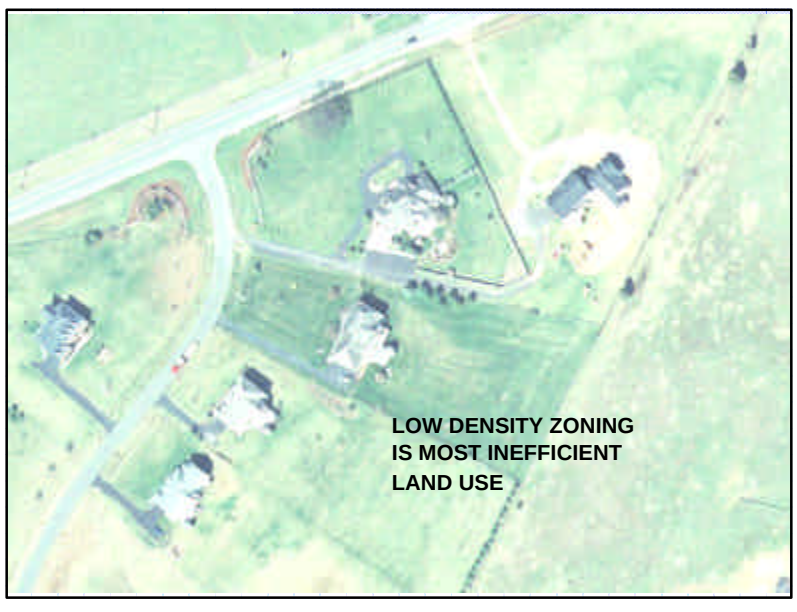
2. Planning Segregation

- Comprehensive planning focuses on the whole package, tends to be growth-oriented, and occurs over regular cycles.
- Watershed planning is conducted outside of this process, using different planning boundaries, and occurs episodically
- Different local folks perform each function

More on comprehensive planning

Density is desirable from the standpoint of comprehensive planning:

- it is smart growth
- reduced cost for municipal services
- supports vibrant communities
- jobs from commercial/industrial



3. The BMP Effect

- Can watershed BMPs mitigate the ICM?
- Debate has raged for three decades.
- Research indicates current generation of BMPs cannot fully mitigate…but someone is always proposing new and improved ones
- Until we admit that **some** land use thresholds cannot be mitigated – plans will always be more about BMPs than land use

4. Confusion on the Scope of Watershed Plans

The goals and management focus of local watershed planning are different, depending on what unit of local, state and federal government you talk to.

No standards on mapping, modeling, bean-counting
Process, contents, goals, outputs and tracking of plans

Multiple and ambiguous goals in MD

CB tributary strategies…Watershed TMDL implementation plans…MS4 watershed restoration permit requirements…CWA Section 319 a- i requirements….SDWA Source Water Assessments…Corps wetland RGL 02-02…water and sewer planning… FEMA floodplain …growth management …natural area planning.. Watershed restoration action plans… and C2K agreement.

MD Watershed Users guide

- Present a unified approach for local watershed plans in the state of Maryland
- Integrate local, state, and federal planning guidance and requirements
- Provide access to technical resources
- Oriented to small and medium communities

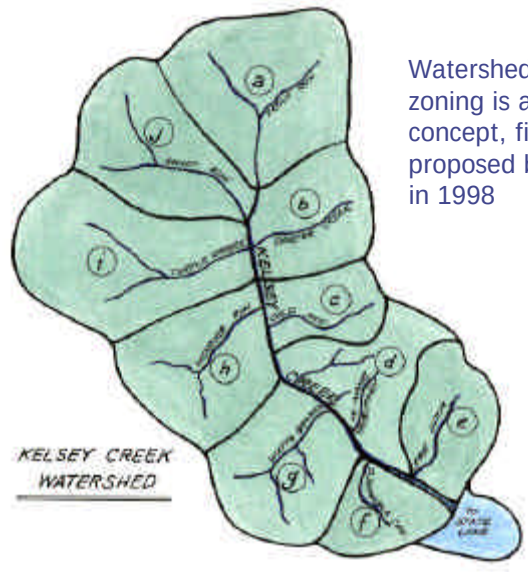
Project scheduled to be completed by end of 2005

5. Lack of a True Watershed Zoning Unit

- Zoning is a clumsy tool for watershed protection
- Zoning regulates density, but not land cover

(Forest cover, impervious cover, turf cover)

- Need for a zoning unit specifically designed for watershed protection that has an economic use

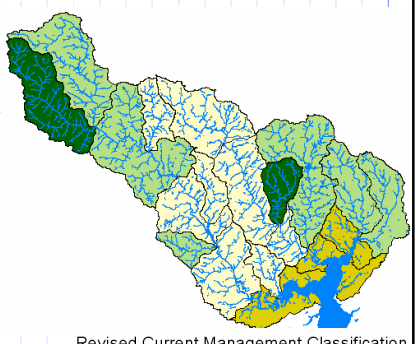


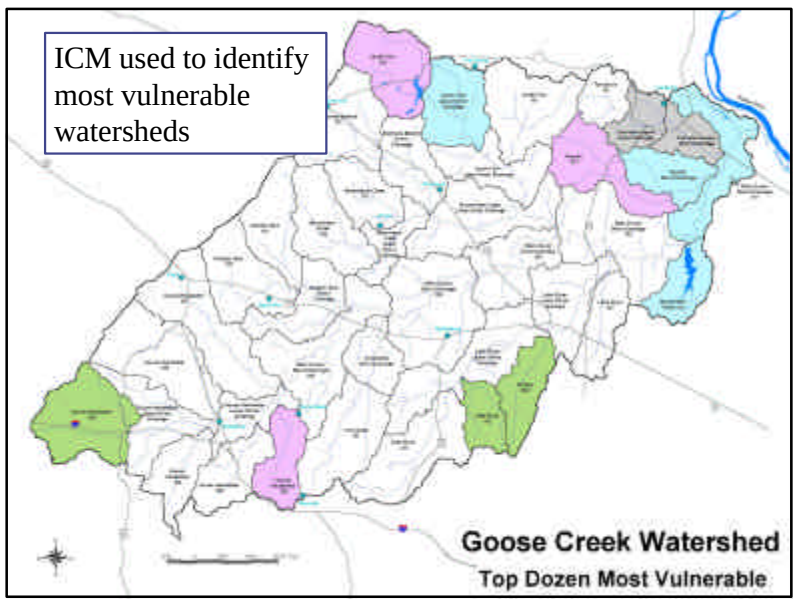
Watershed-based zoning is a recent concept, first proposed by CWP in 1998

Watershed Based Zoning

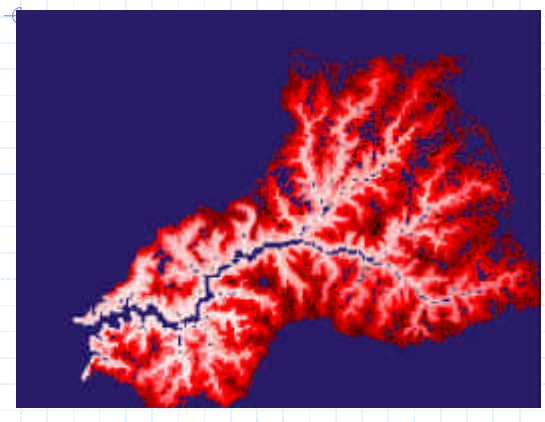
Subwatershed Name	Current Imp. Cover	Zoned Imp. Cover	Target Imp. cover	Subwatershed Cassification
A. Trout Run	4%	5%	5%	Sensitive
B. Darter Creek	9%	15%	10%	Sensitive
C. Cold Mountain	9%	18%	18%	Impacted
D. No-Name Trib.	45%	65%	None	Non-Supporting
E. East Ditch	28%	55%	None	Non-Supporting
F. Flammable Ck	65%	70%	None	Non-Supporting
G. Watts Ck	30%	35%	30%	Restorable
H. Widener Run	15%	18%	24%	Impacted
I. Turtle Ck	20%	28%	25%	Impacted
J. Swift Run	6%	8%	8%	Sensitive

ICM used to classify and manage streams





So, how can we integrate land use planning intro local watershed plans?



What Might a True Watershed Protection Zone look Like (WD-40)

- Not linked to density or dwelling units
- Defined by area and location
- Maximum cap on impervious cover (5%)
- Minimum level of natural or farm cover (95%)
- Non-divisible but connectable
- Minimum area (40 acres)
- Long term restoration plan

WD-40, continued

- Primary Use: Conservation/Restoration
- Protected by conservation easements
- Permanent -- no re-zoning
- Private ownership/controlled public access
- No water, no sewer, no roads
- Minimum performance standards for stream buffer and land management practices

WD-40 continued

- Supplemental uses: forestry, pasture, vineyards, boutique agriculture, restoration, wetlands, passive recreation
- Non-allowable uses: resource extraction, confined animal production:
- Dwelling units: 1 per 40 acres
- Defined caretaker or steward

WD-40: Making it an economic use

- Must have annual return equivalent to farming
- No property tax
- Sustainable economic activity to generate income (including farming)
- IC transfer fees to support ongoing restoration and land conservation

Incentives for better local watershed planning

Educating elected officials and comprehensive planners

Why should I spend a considerable amount of scarce money now on a politically dangerous process that will ultimately expose my community to even greater financial and regulatory burdens in the future – to achieve uncertain benefits that are primarily realized outside of my community?

Potential elements of a unified approach

Portable nutrient reduction targets and habitat restoration goals across watershed management units

Scaleable approach to land use/cover forecasting

Common resource inventory elements and pollutant load calculations

Common reporting of implementation outputs

Unified nutrient currency among wmus

Real incentives to promote local watershed planning

1. Cost-sharing of local planning efforts
2. Extended TMDL implementation schedules
3. Automatic eligibility for 319 funds
4. Trading between watershed scales (TMDL offsets)
5. Safe harbor from addl. regulations in highly urban watersheds

More incentives to promote local watershed planning

6. Free technical assistance (w/o strings)
7. Access to special watershed implementation funds from SRF
8. Presumed compliance with nutrient reduction for next ten years
9. Five year grace from any more watershed guidance/requirements
10. Real credits for implementing WD-40

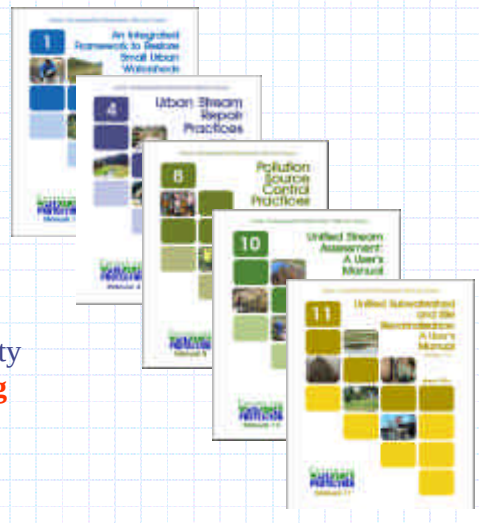
New Local Planning Tools

Urban restoration manual series

Maryland watershed users guide

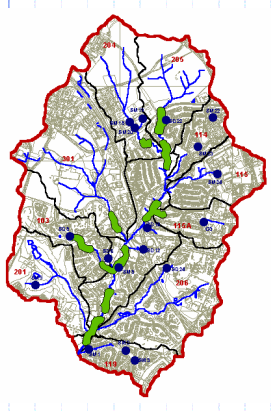
Smart watershed benchmarking tool

The Small Watershed Restoration Manual Series



Check availability at **www.cwp.org**

Applying Practices Together in Urban Subwaterheds to Achieve Goals



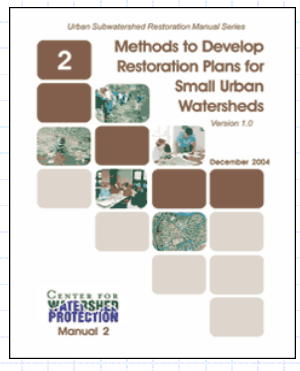
- **Articulate clear and measurable restoration goals**
- **Implement best combination of restoration practices within a fixed time.**
- **Subwatersheds: less than ten square miles in area**

Manual 2. Methods to Develop Restoration Plans for Small Urban Watersheds

Step-by-step guidance to develop, adopt and implement restoration plans

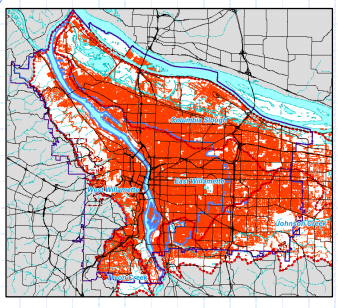
Features 32 different desktop analysis, field assessment, stakeholder involvement and restoration management methods

Detailed info on plan scoping and budgeting



Available in Spring 2005

Smart Watershed Benchmarking Tool



Municipal self-assessment

56 benchmark questions assess scope and activity for 14 municipal restoration programs

Can be applied community-wide or to a specific watershed

Review, testing, and pilot Communities in 2005.

Integrating Watershed Management and Land Use Planning in Frederick County

March 7, 2005

Problem and Solution, As We Know All Too Well

- Problem: Watershed health is deteriorating. Water resources are diminishing. The Chesapeake Bay is dying.
- Solution: Water Quality, Quantity and Habitat issues must be addressed on a watershed scale when decisions are to be made that would affect these resources.

What Obstacles Keep Us From Integrating Watershed Management and Land Use Planning in Frederick County?

- Priorities: Watershed management is seen to detract from other goals of decision-makers. Value of watershed function is unrecognized. Watershed management is not seen as high priority and is not incorporated into rightful place in hierarchy of decision-making. Number one obstacle!
- Abilities and Resources: County lacks tools to comprehensively identify threats to watersheds and lacks mechanisms to implement planning elements that would protect against threats. County lacks funds and people to adequately address watershed management issues.

Priorities: What Do Our Decision-Makers Value?

- Understand what the priorities are and show the value of our goal in terms of values of decision-makers.
- Remove our preconceived ideas about why decision-makers should have our same values. Their values:
  - Reduction of costs and maximization of benefits for necessary programs;
  - Defensibility of decisions to their key stakeholders;
  - Avoidance of conflict with voting public, news agencies, other government agencies;
  - Meeting “important” needs;
  - Other personal values.

Priorities: Regulatory Compliance

- Fear of not meeting regulatory requirements instigated the beginnings of integrated watershed management and land use planning.
  - The fear of fines or consent orders from not meeting NPDES Phase I MS4 permit requirements was the genesis for watershed management in Frederick County Government.
  - NPDES Phase I MS4 permit is essentially reactive but opens the door to integrated planning.
  - Phase II NPDES MS4 permits can provide some of the same impetus.

Priorities: Regulatory Compliance and Conflict Avoidance

- Public conflict over Lake Linganore reservoir volume and water quality became a big news-getter. Bad news caused the Commissioners to act.
  - Commissioners approved County staff to participate in Source Water Protection Task Force.
- Total Maximum Daily Load (TMDL) on Linganore caused fear and uncertainty.
  - Commissioners requested preparation of an Action Plan for Lake Linganore to reduce nutrients and sediment.
- Impacts of Antidegradation Rule in COMAR are yet to be seen but could provide opportunity to address issues for more pristine areas.

Priorities: Key Stakeholder Support

- "key stakeholders" – people who have clout with our decision-makers– that could directly communicate their support of integrating watershed management and land use planning to decision-makers.
- Staff focused on large landowners, farmers, and non-traditional supporters of watershed management, including developers.
- Staff invited key stakeholders to steering committees, workgroups, workshops, public meetings, individual meetings, etc., presented findings from watershed assessments, and asked them for their honest opinions about problems and solutions.

Priorities: Cost and Importance

- Lake Linganore is filling up with sediment. Nobody wants to pay to dredge it, but it is a public water supply. The County is looking to get water from the Potomac River but that is also expensive.
- ICPRB estimates that Frederick County may not be able to meet future water supply needs during drought conditions.
- Director of Utilities expressed concern to the Commissioners about future impacts to the water supply from water quality, particularly from chemicals we are not yet testing for, like hormones.
- Our goal is starting to look more "important." Commissioners voted on 12/4/04 to establish an Integrated Water Resources Management Task Force to address water quality and quantity issues in Frederick County.

Abilities and Resources: Develop Tools

- County's NPDES program lacks tools to adequately identify problems
  - County leveraged funds with grants for additional support with watershed assessment and field assessment through DNR Watershed Restoration Action Strategy (WRAS) program.
  - DNR Stream Corridor Assessment (SCA) allows us to cover more area for less money
  - SCA identifies sites for further upland and upstream investigation.
  - County follows up with Stream Restoration/Stormwater Management Facility Retrofit Assessment.

Abilities: Identify Mechanisms

- State Advisory Committee on Integrated Water Resource Management Planning
- Organization of Integrated Water Resources Management Task Force to address water quality and quantity issues in Frederick County.
- Coordination with Maryland Department of Planning on integration of water resource issues into Priority Funding Area approvals, other MDP initiatives
- Better coordination between Planning Staff and NPDES compliance staff. Development of Action Plan for Commissioners.
- Better interaction with public, key stakeholders through WRAS planning process, leads to identification of program changes and support of efforts.
- Briefings to Commissioners on topics they value.

Integrating Watershed Management

Cultivate Respect

- Recognize land use goals and influences
  - Historical land use patterns
  - Needs for growth
- Recognize environmental goals and requirements
  - Need to reduce imperviousness
  - Need to maintain forest and wetland areas
- Get together and exchange information

Prepare Yourself

- Determine which facts and directions relate to land use planning
  - Are key resources at stake?
  - Is the watershed limited for non-point sources?
- Understand that environmental concerns can support desirable land use objectives
  - Smart growth and walkable communities with open space
  - Stream valley parks and trails
- Take time to make the connections

Become a Part of the Process

- You cannot save the resource by monitoring its decline
- Master plans can forever compromise environmental options
- No one wins in a turf battle
  - Programs can offer mutual support
  - Complimentary efforts garner more funding
  - Be aware of schedules

Convey Your Passion

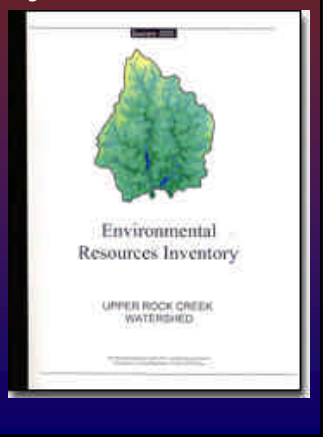
- Invite environmental staff to outreach meetings
  - Field walks with citizens, stakeholders
  - Educate and listen
- Provide analysis and insight as needed
  - Heed critical deadlines
  - Work cooperatively on “what ifs”
- Recognize the realities and tailor options

Support the Results

- Be there to explain and answer questions
- Simplify the results of the analysis
- Suggest further options as necessary
- Be creative and responsive
- Give limitations with caveats

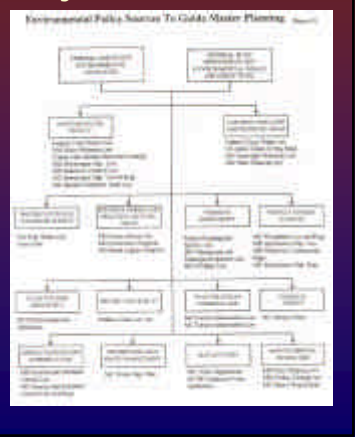
Montgomery County Process

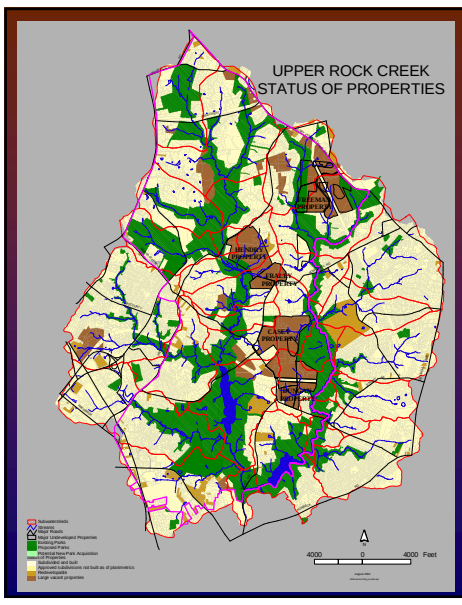
- Stay ahead of the crowd
- Know sources of information
- Focus on where environment is a critical element
  - Use III or IV stream systems
  - Areas of biodiversity
- Prepare documentation
  - Environmental Resources Inventory



Montgomery County Process

- Environmental Resources Inventory
  - Establishes environmental conditions
  - Explains policies and regulations
  - Does not make recommendations
  - Informs the public
  - Establishes credibility
  - Sets the stage for the master plan process





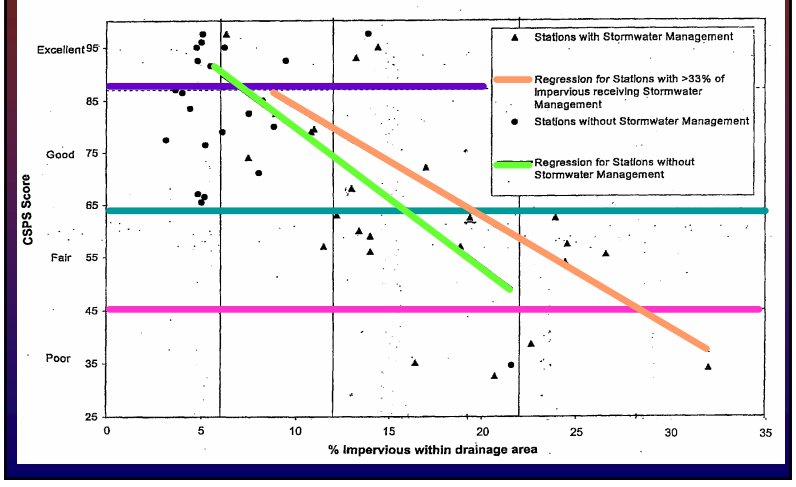
Upper Rock Creek

- Most of the watershed is developed
- The headwaters of the mainstem have very low imperviousness
- Most of the developable property is low in the watershed
- Intense development outside the planning area

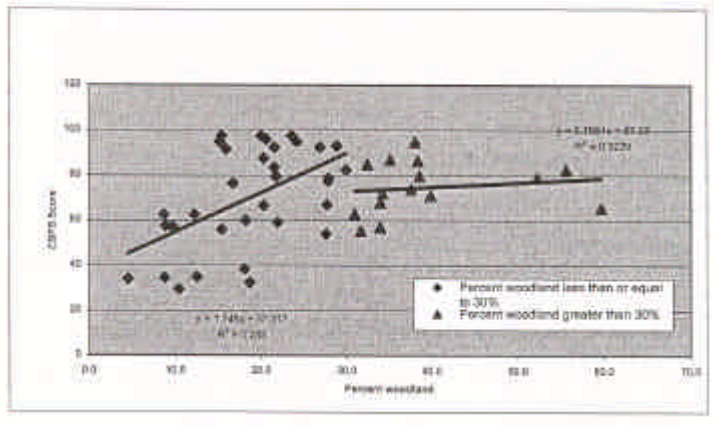
Montgomery County Process

- Determined the Appropriate Range of Alternatives
  - Established objectives for imperviousness and resource protection based on findings of inventory
  - Worked as part of team to establish development scenarios to test
  - Worked with stakeholders to understand the range of alternatives

Imperviousness is the Biggest Factor



Forest Also Makes a Difference



Montgomery County Process

- Preparing the Analysis of Alternatives

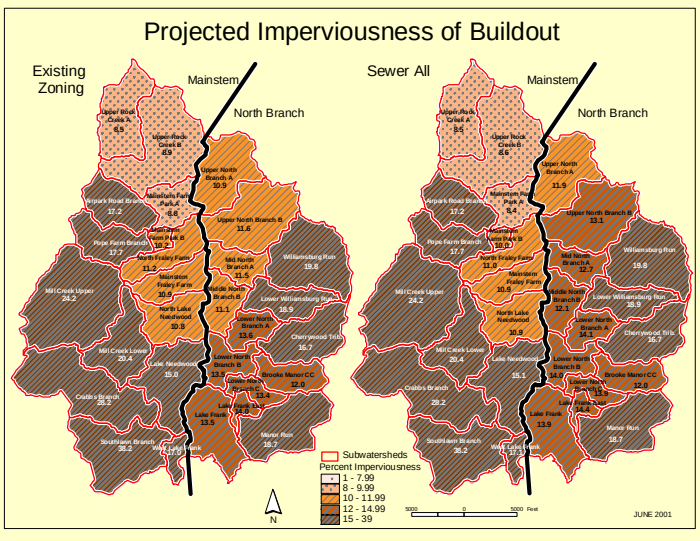
Determine Existing Imperviousness from GIS

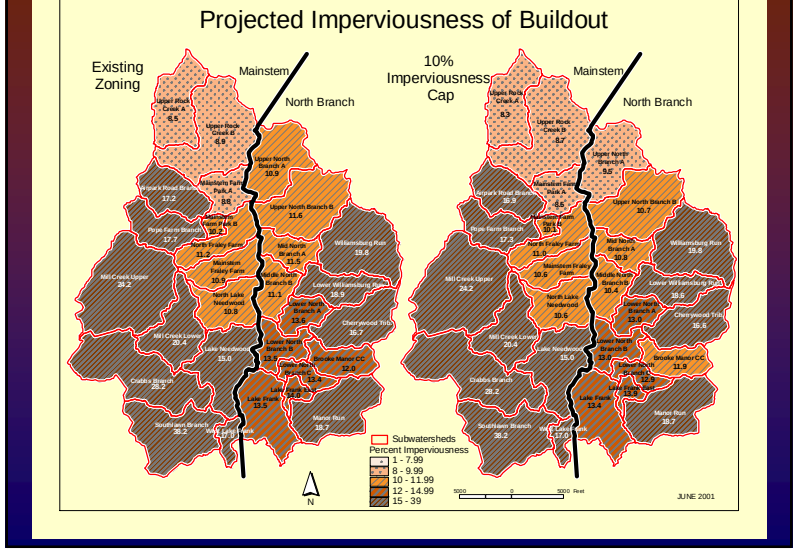
Determine Typical Imperviousness by Zone

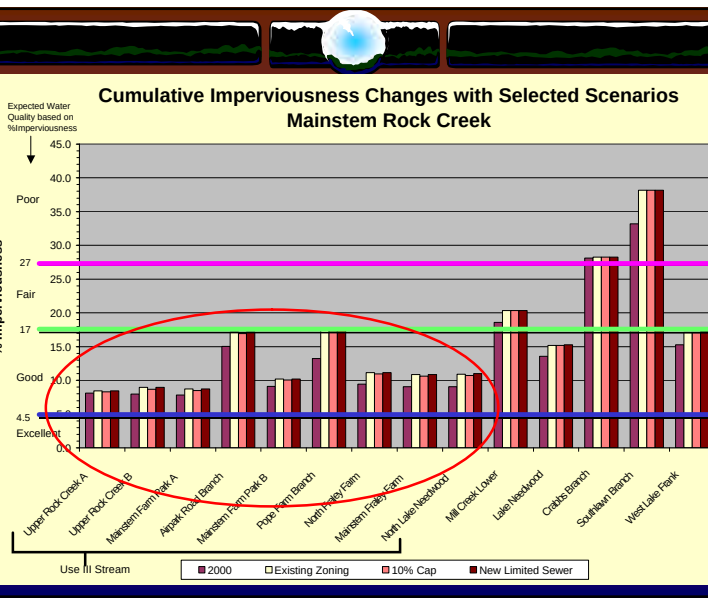
For Each Scenario, Substitute Zoning Imp for Existing Imp as Appropriate

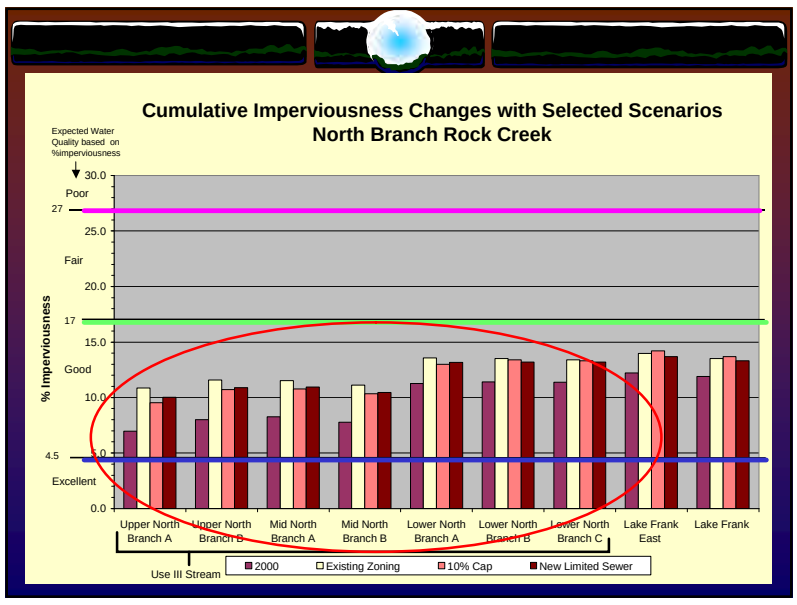
Average Imperviousness by Zoning Category for Selected Zones

Zoning Category		Sample Data			Imperviousness Percentages	
Zone	Water/Sewer Type	# Of Sites	Total Lots	Total Acreage	Weighted Average*	Range of Samples
RE-2	Well/septic	3	61	186.1	10.6	9.4 -- 11.9
RE-2	Community water & septic	2	77	205.08	12.9	10.6 -- 15.8
RE-2C	Community water & sewer	4	395	966.9	11.1	6.6 B 11.7
RE-1	Community water & septic	4	188	430.1	12.4	7.7 -- 14.9
RE-1/C	Community water & sewer	4	505	483.5	22.8	16.8 B 28.0
RNC	Community water & sewer	2	89	218.14	8.9	8.1 -- 9.8







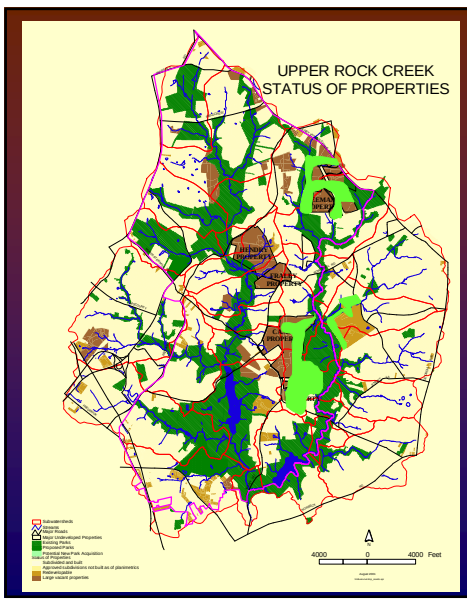


Montgomery County Process

- Reviewed the Results
  - With a Technical Committee
  - With the Stakeholders
- Prepared Recommendations with Planning Team
- Presented to the Planning Board
- Tested various Zoning Tools
- Settled on appropriate Zoning and Density

Montgomery County Process

- Dealing with the Politics
  - Special Protection Area and Imperviousness Caps
  - Earlier direction from the County Council
  - Pressure from the Community for more protection
  - The Council takes a stronger approach
  - Funding for more staff to implement



Land Use Plan Results

- Total number of units increased
- Potential imper-viousness decreased significantly
- Almost 400 acres of Parkland protected
- Additional Stormwater requirements implemented through SPA

Conclusions

- Cultivate Respect
- Be Prepared
- Participate in the Process, Stay Involved
- Convey Your Passion
- Support Your Results
- Be Content, but not Contented, with the Outcome
- Improve It the Next Time

Appendix F. Presentation - Don Outen, Baltimore County Department of Environmental Protection & Resource Management

WORKSHOP ON INTEGRATION OF LAND USE AND WATERSHED PLANNING
March 7, 2005

The Baltimore County Experience

PROGRESS AND CHALLENGES FOR INTEGRATION OF LAND USE AND WATERSHED PLANNING

BALTIMORE COUNTY MARYLAND

Donald C. Outen, AICP
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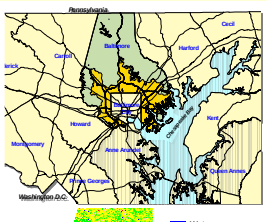
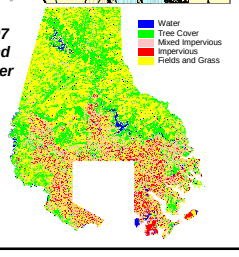
BALTIMORE COUNTY, MARYLAND — An Introduction





- Maryland's 3rd largest County:
  610 square miles
  770,000 population
- Density: 1,260/sq.mi. (v. 542 for MD)
- Growth rate: 1% per year 1970-2000
- No incorporated municipalities (Baltimore City independent in 1851)
- Charter County - County Executive and 7 County Council districts
- Water and sewer services purchased from the City; Metropolitan District funding
- 4th best-managed of 40 largest urban counties in the US (*Governing*, 2002)

The Problem is Not Just New Development

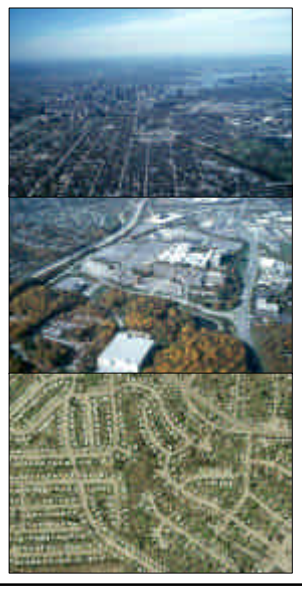
MYTH?: **Local governments have failed miserably to control development that is causing environmental degradation.**

REALITY?: **Environmental degradation occurred long before local governments were accorded any control over land use. We have inherited a legacy of land abuse from a pre-industrial era.**

EXAMPLES:

- **The Ridgely estate in colonial Baltimore County cleared 25 acres of forest per day to fuel iron smelting furnaces (> 9,000 ac/yr).**
- **The port of Joppa on the Gunpowder River was abandoned due to > 8 million cyd of sediment deposited from 1846-1897.**
- **1929 MD Geological Survey report showed that County forest cover was an "optimal" 25%, due to clearing for farming.**

BUT*, environmental problems have intensified since WWII, and *our federal and State governments were direct partners in fueling metropolitan decentralization (i.e., sprawl).



Growth Shapers

Locational Factors:

- historical development surrounding Baltimore City
- proximity to port (State's economy)
- regional context – *"Megalopolis"*

Metropolitan Decentralization:

- mortgage insurance programs
- Baltimore Beltway
- water and sewer availability - shared with Baltimore City
- school desegregation -"white flight"
- pursuit of the "American Dream" and open space
- decline of agriculture

A Typology of Recent and Future Growth for MD Counties

	Population Rank			1970-2030 Rank	% of 2000 Population	% Population Increase	Recent Growth	Future Growth
County	1970	2000	2030	Change	in 1970	2000-2030	%'00 in '70	%'00-'30
Howard	11	6	7	4	25.0%	20.2%		
Calvert	20	16	15	5	27.7%	40.0%		
Charles	14	11	9	5	39.6%	70.1%		
Frederick	8	8	6	2	43.5%	66.7%	<50%	>30%
Queen Anne's	23	18	17	6	45.4%	47.4%		
Carroll	10	9	10	0	45.7%	35.3%		
Worcester	17	17	18	-1	52.5%	23.6%		
Harford	6	7	8	-2	52.8%	15.7%		
St. Mary's	15	12	12	3	55.0%	48.0%		
Montgomery	4	1	1	3	59.8%	23.7%	50-65%	20-30%
Anne Arundel	5	5	5	0	60.8%	16.7%		
Cecil	13	13	13	0	62.0%	26.6%		
Wicomico	12	14	14	-1	64.1%	27.9%		
Caroline	21	22	20	1	66.4%	18.2%		
Talbot	18	19	19	-1	70.0%	15.2%		
Garrett	19	21	21	-2	72.0%	13.6%	65-80%	10-20%
Somerset	22	23	23	1	76.5%	9.9%		
Washington	7	10	11	-4	78.7%	13.0%		
Baltimore	3	3	3	0	82.3%	7.6%		
Prince George's	2	2	2	0	82.4%	21.9%		
Kent	24	24	24	0	84.1%	9.1%	>80%	<10%
Dorchester	16	20	22	-6	95.9%	13.6%		
Allegany	9	15	16	-7	112.2%	-4.4%		
Baltimore City	1	4	4	-3	139.1%	1.7%		
Maryland					74.0%	20.1%		

The Integration Test

PLANNING	ENVIRONMENT
MPO, New Urbanism, TDM, APFO, PDR/TDR, SIC, PFA, TOD, LEVEL-OF-SERVICE, ADT, FAR, PUD, CBD, Special Exception, LESA, UGA/UGB, lulu, Form-based codes, Zip lots, IRB, taking	IBI, 6217, GAP Analysis, BMP, LID, NPDES, D_{50}, FONSI, EMC, Use Attainability Analysis, TR-55, TMDL, CWA, FSD, Use III-P, HSPF, Fac-wet, cfs, CAFO, BEHI, OSDS

Speaking a different language?

Who's in Control?

Government:

- Power to Tax
- Power to Spend
- Eminent Domain
- Police Power

Citizens:

- Private Property Rights
- Right to Vote

Land Use - Watershed Planning Integration
PLANS, PERMITS, AND PROGRAMS

- Land use planning, not environmental restoration, should drive and provide the framework for integration (i.e., focus on the source)
- No single plan or environmental permit will contain all necessary components for integration
- Integration needs to be reflected in continuing, comprehensive, and coordinated County programs (a "*new 3 C's of planning*")
- Program elements should include Growth Management and Integrated Watershed Management
- Environmental outcomes of land use decisions need to be purposeful and address past and future commitments

Environmental Assessments for Land Use Plans

Assess the relationship of existing and proposed urban land uses to:

- green infrastructure – ecologically important forests and habitat
- watershed hydrology (headwater streams)
- stream biological quality
- stream channel stability
- impervious cover and water quality

Use science-based indicators of sustainability

Determinants of the Land Use Pattern

- historical (pre-planning) local & regional development
- timing of regulatory controls (initial zoning)
- "growth shapers" – cost efficiencies of infrastructure

3 Transitions to the Integration of Land Use and Watershed Planning

1. un-regulated development ➡ growth management
2. growth management ➡ environmental protection
3. environmental protection ➡ watershed function (env. management)

Core County Strategy

Growth Management:

- Delineate urban and rural areas (growth boundary - URDL)
- Use zoning tools and basic services (water and sewer) to concentrate development and reduce sprawl
- Encourage infill and re-development ("*Renaissance*") within older communities
- Accommodate future population in planned growth areas (Owings Mills, White Marsh)

Environmental Management:

- Use zoning tools and land preservation to reduce rural development, protect reservoir watersheds and agriculture
- Enact development regulations to protect resource functions in urban and rural areas
- Implement aggressive restoration programs in older urban areas (stream restoration, stormwater practices, reforestation)
- Integrate resource management strategies ("*Green Renaissance*")

Environmental Implications of Historical Development Patterns

Benefits:

- protected rural "working" lands and reservoirs
- reduced sprawl
- more efficient provision of infrastructure and services

Liabilities:

- concentration of air and water pollution in denser communities
- high cost to retrofit and restore older development

Metrotowns for the Baltimore Region - 1962

1960 – regional population: 1.8 million
2000 – projected population: 3.5 million
2000 – actual population: 2.5 million

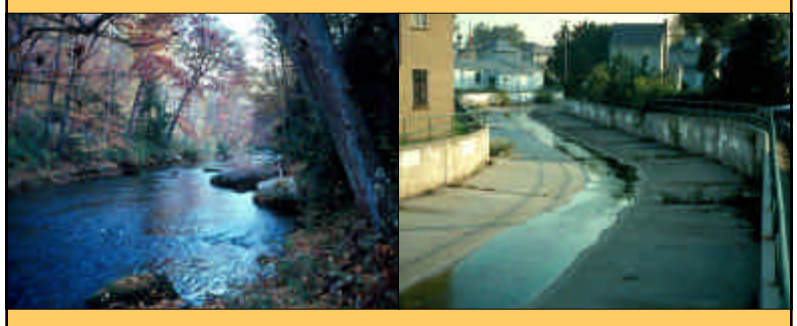
"The rapid spread of population and industry into the counties surrounding Baltimore City since the end of World War II has created a number of problems with respect to planning, control of land use and the provision of public facilities calling for a regional approach to their solution."

on the creation of the Regional Planning Council – April, 1957

" … the suburb is getting to be more like a city, and a primary goal should be to reinforce this trend…. We need cities more than ever for qualitative reasons: efficient government and good services; convenience for selective contacts and activities; stimulation and variety; and above all perhaps, for learning to live in an increasingly small and complex world full of different kinds of people."

Goals for Americans,
The President's Commission on National Goals

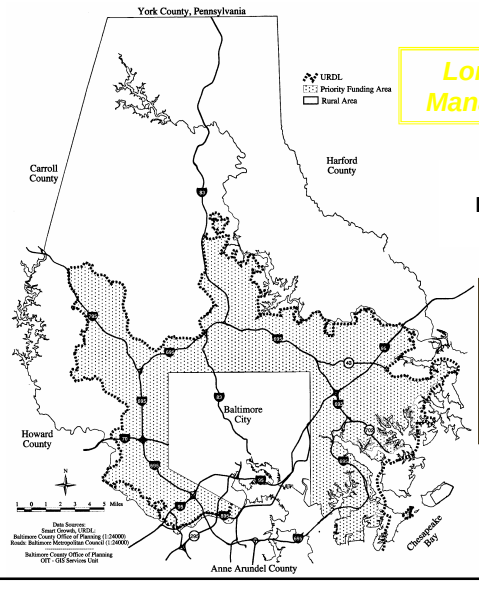
How Do We Measure Success?



"The health of our waters is the principal measure of how we live on the land"

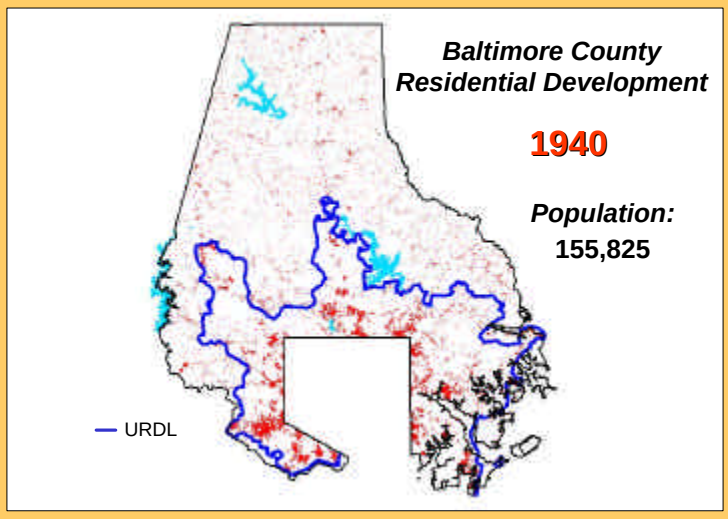
Luna B. Leopold

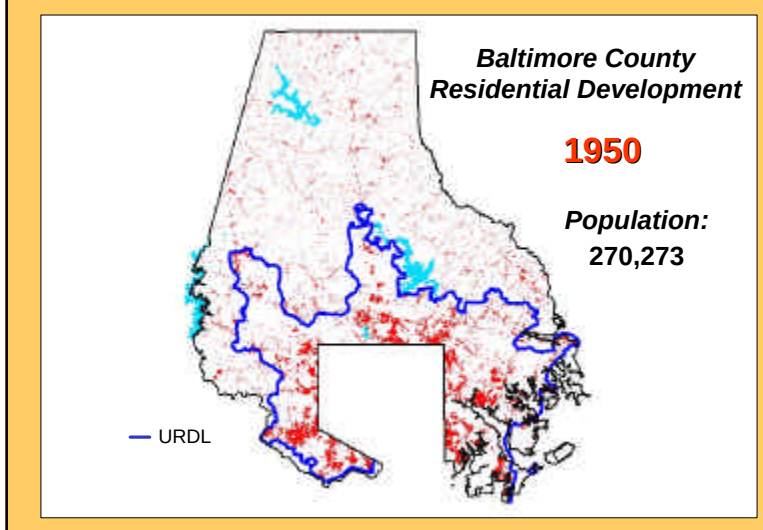
Long-term Growth Management Results

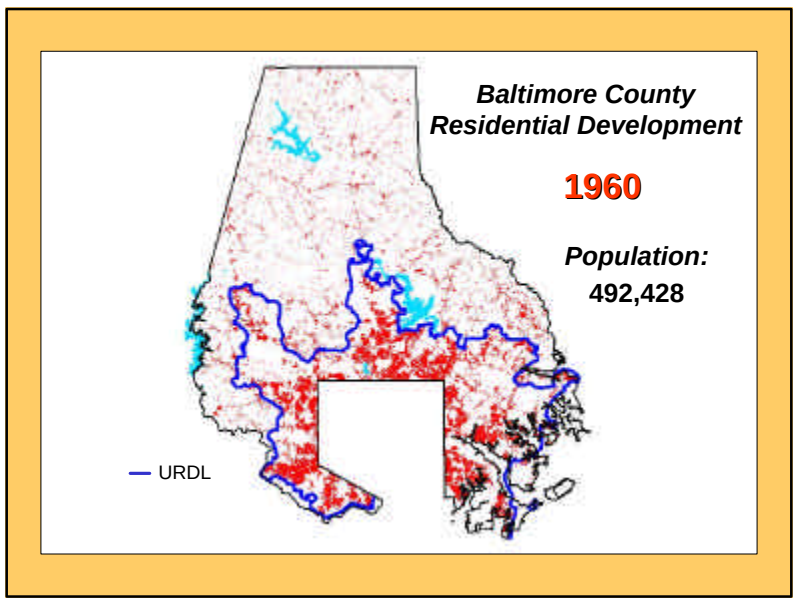


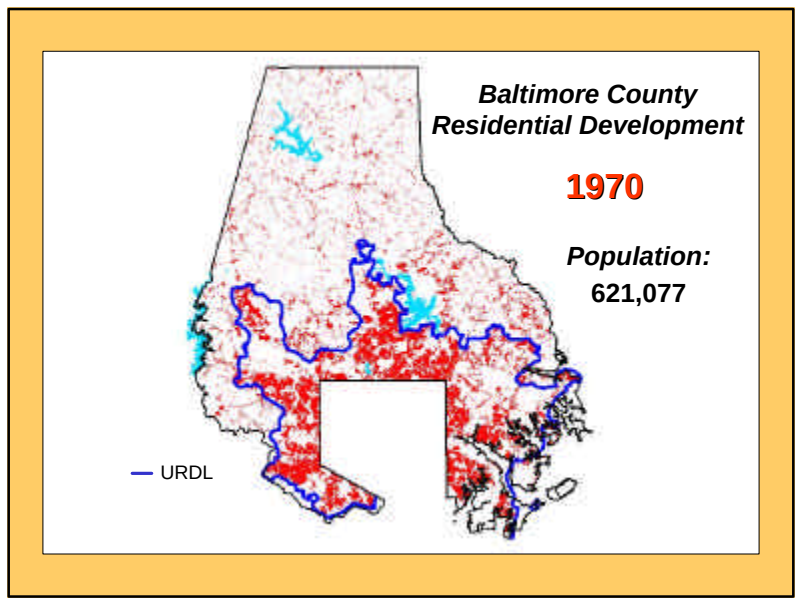
Urban-Rural Demarcation Line (URDL)

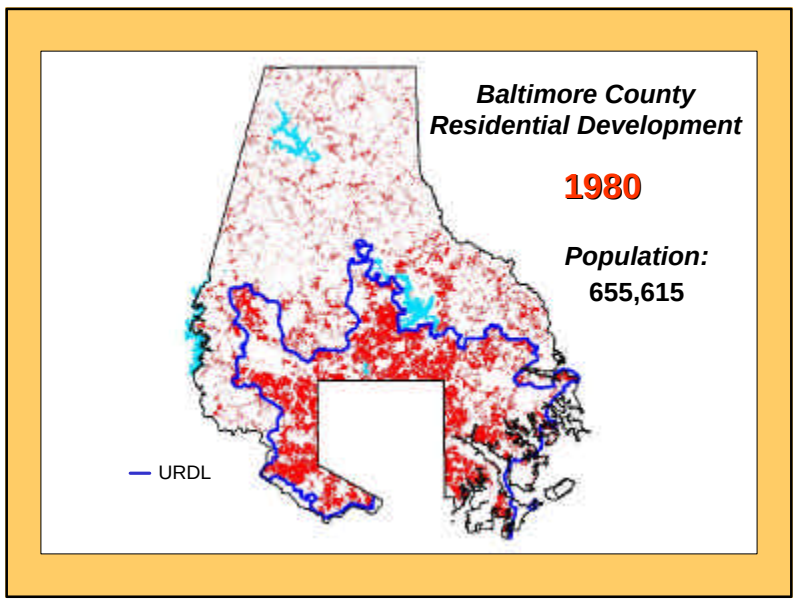
90% of Year 2000 Population lives inside the URDL on 1/3 of the County's land

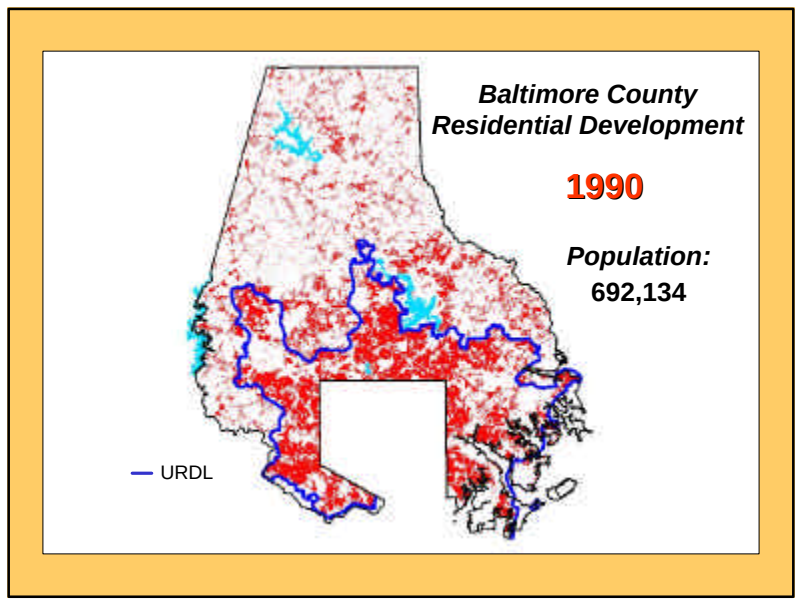


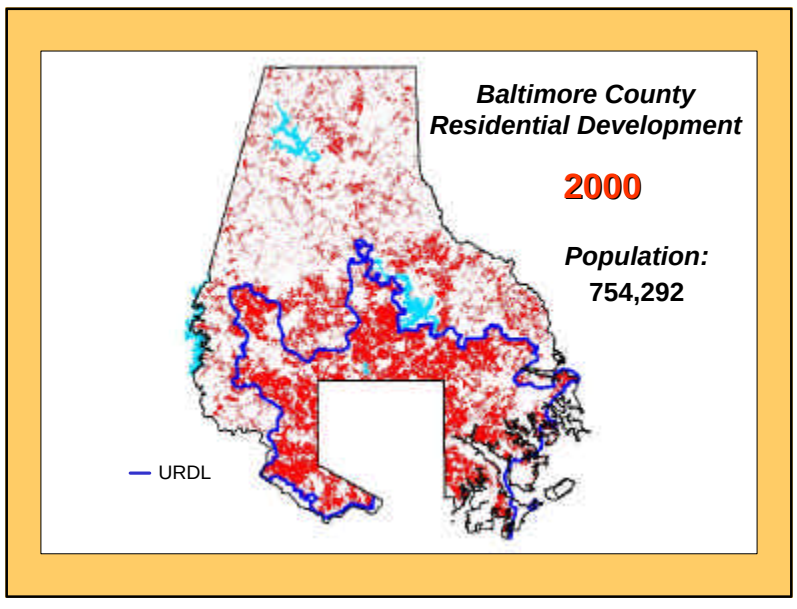


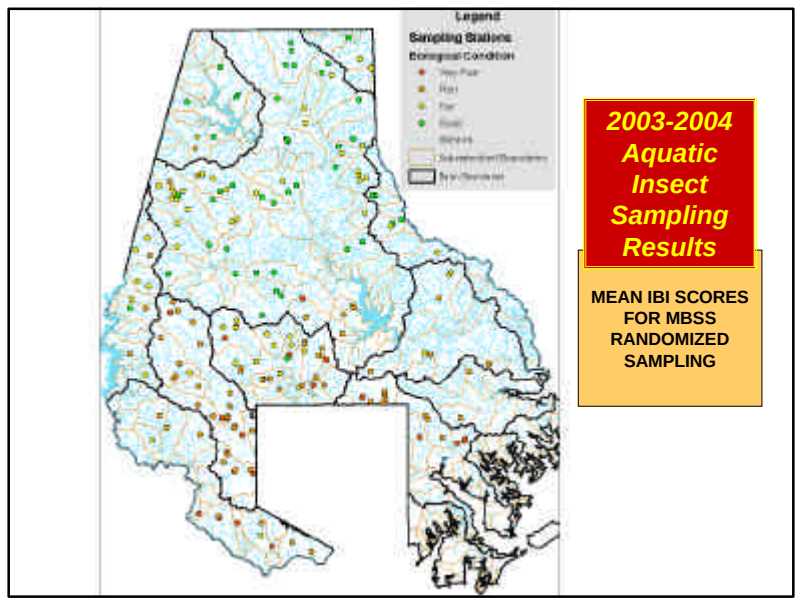

Baltimore County
Residential Development
1960
Population:
492,428
URDL

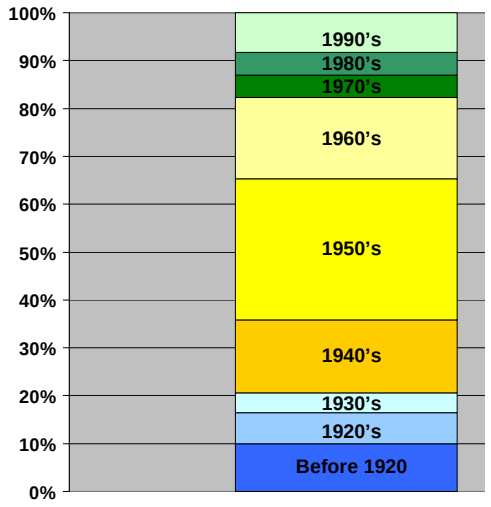

Baltimore County
Residential Development
1970
Population:
621,077
URDL


Baltimore County
Residential Development
1980
Population:
655,615
URDL


Baltimore County
Residential Development
1990
Population:
692,134
URDL


Baltimore County
Residential Development
2000
Population:
754,292
URDL


Legend
Sampling Stations
Biological Condition
2003-2004
Aquatic
Insect
Sampling
Results
MEAN IBI SCORES
FOR MBSS
RANDOMIZED
SAMPLING



Baltimore County's Middle-Age Bulge

62% of population growth in just 30 years: 1940-1970

36% - post-1950's
29% - 1950's
35% - pre-1950

Growth and Management

Year	Population	Increase	Cum. %
1920	74,817		9.9%
1930	124,565	66.5%	16.5%
1940	155,825	25.1%	20.7%
1950	270,273	73.4%	35.8%
1960	492,428	82.2%	65.3%
1970	621,077	26.1%	82.3%
1980	655,615	5.6%	86.9%
1990	692,134	5.6%	91.8%
2000	754,292	9.0%	100.0%

No Land Use Planning

Planning & Growth Management

Environmental Management

a significant amount of growth pre-dated environmental awareness, science, and management

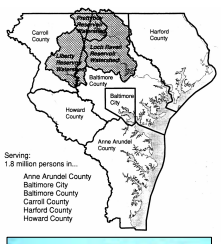
Planning Milestones: 1940-1980

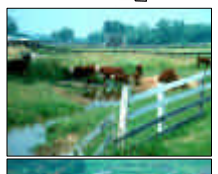
POPULATION	
1940 - 155,800	• 1940 - zoning authorized; court challenge • 1945 - zoning legally adopted (5 classes) • 1947 - Planning Commission established
1950 - 270,273	• 1949 - Commission's plan for "trunkline motorways" (Beltway) • 1952 - land use studies for comprehensive zoning maps • 1955 - Office of Planning, Zoning Commissioner, Planning Board created
1960 - 492,428	• 1960 - creation of People's Counsel • 1962 - Baltimore Beltway completed - completion of 11 area master plans and zoning maps • 1963 - Plan for the Valleys • 1967 - Urban-Rural Demarcation Line adopted
1970 - 621,077	• 1970 - Bill 100 adopted - 2 rural zones • 1971 - density zoning adopted (control # units/acre v. lot sizes) – based on new towns (Columbia, Reston) • 1972 - 1980 Guideplan (first master plan) • 1975 - Resource Conservation Zones adopted
1980 - 655,615	• 1979 - New town centers designated in Master Plan

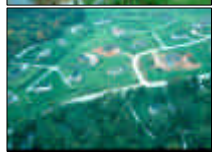
Early Environmental Management Milestones

- 1972 federal Clean Water Act
- mid 1970's - State basin plans
- 1975-1985 Clean Water Act, Section 208 non-point source pollution control program for the Baltimore region
- 1978 Coastal Zone Plan
- 1978 Water Quality Management Plan for the Baltimore Region
- 1979 Reservoir Watershed Management Agreement; 1984 Action Strategy

Focus on Reservoir Watersheds







- 60% of watersheds are in the County
- 50% of County's streams drain to reservoirs
- 90% of County citizens drink the water
- others rely on groundwater
- 1970's saw high nutrient runoff and algae with taste and odor effects in treated City water (33% increase in water treatment costs)
- 1960's surveys showed loss of storage capacity due to sediment from watersheds
- 30,000 acres of undeveloped land in URDL
- research indicated that impervious surfaces lead to degraded waters (Klein, 1979)
- research recommended 300' setbacks from streams to protect quality (Leopold, 1968)
- significant public support for protection

Components of Growth Management Program

Comprehensive/Master Plan - vision & goals, policies and action recommendations for implementation

Implementation tools:

- **urban growth boundary**
- **designated land management areas**
- **planned growth centers**
- **larger scale community plans**
- **water and sewer plan consistency**
- **flexible zoning (e.g., density zoning, PUD's, etc.)**
- **conservation zoning, clustering, net density**
- **development guidelines and regulations**
- **impervious surface & forest clearing limits**
- **comprehensive zoning review process**
- **citizens' ombudsman for Master Plan & zoning map (People's Counsel)**

Integrating Environmental Management into the Master Plan

1980 Guideplan

The first official Master Plan for Baltimore County

Preparation began in 1968

Adopted by the Planning Board June, 1972

- **29 Policies for 10 Urban and Rural topic areas**
- **Plan urged that interim rural zone lot sizes be increased from 1.0 acre to 3.0 acres minimum**

Conservation of Rural Areas **– "…there is certainly not any current need for urban development in the County's rural areas. These lands are a legacy for the future…."**

Policy No. 21 – Preservation of Character and Condition of Rural Land. "The present character and condition of most of the land outside the 1972 urban-rural demarcation line must be preserved until its future use may be rightly determined by an adopted land-use plan."

Water Quality **– "The three water reservoirs and the 173 miles of bayfont are threatened by the prospect of development as they have never been before…..It is imperative that the reservoirs' watersheds be preserved."**

Policy No. 23 – Development in Reservoir Watersheds. "Only development of very low intensity should be permitted in the reservoir watersheds."

Integrating Environmental Management into the Master Plan

Baltimore County Comprehensive Plan 1975

Adopted by the Planning Board October, 1975

- ***Purpose of the Plan:***

  " …the general purpose of guiding and accomplishing a coordinated, adjusted and harmonious development of the County…."

  "The plan reflects the values of clean air and water, of conserving wildlife and vegetation … and of preventing the abuse of land, water, and other natural assets…."

- ***Policies for Conservation & Protection of Natural Resources:***
  - **Agriculture**
  - **Water Sources (watersheds and ground water)**
  - **Wetlands**
  - **Chesapeake Bay, Estuaries, and Stream Valleys**
  - **Air Quality**
  - **Scenic and Recreational Resources**
  - **Critical Areas (Critical Areas of State Concern)**
- **Plan maps depicted concept of Resource Conservation zones for agriculture, reservoir protection, and rural residential development.**

Integrating Environmental Management into the Master Plan

Baltimore County Master Plan

Adopted by the County Council November, 1979

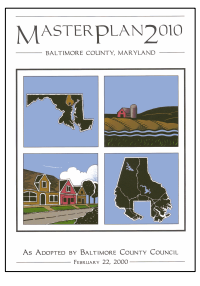
WATER SOURCES

Policies

"Baltimore County should maintain the presently high quality of the public supply by limiting land use in those areas which are critical to the protection of the water quality of the three major impoundments….The County should maintain at least a minimum level of vegetative cover and limit the amount of impervious cover allowed in the watersheds."

Integrating Environmental Management into the Master Plan

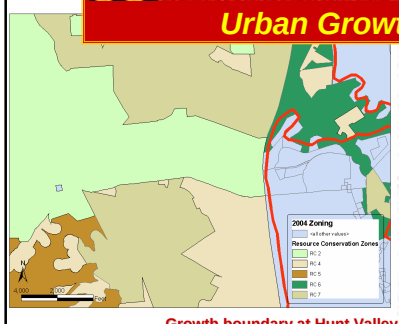
Master Plan 2010



Adopted February 2000

1. Continue to protect streams, wetlands, floodplains, and woodlands from impacts of new development and redevelopment as required by development regulations.
2. Identify and protect the remaining high value natural resources in watersheds in order to preserve their beneficial functions for clean water, clean air, and habitat.
3. Continue projects to restore wetlands, reestablish forests, and stabilize stream channels in impacted watersheds.
4. Reduce pollution through a reduction in impervious surface area, improved management of urban runoff, and implementation of source-based controls.
5. Coordinate the management of inter-jurisdictional watersheds with surrounding jurisdictions.
6. Include environmental policies and goals in community plans for the preservation and enhancement of functional open spaces such as greenways and wildlife habitat; the reduction of water, air, and toxic pollution and solid wastes; and the promotion of neighborhood environmental stewardship.
7. Encourage and actively participate in partnerships among agencies, organizations, and communities to address environmental issues.

BALTIMORE COUNTY, MARYLAND
Urban Growth Boundary



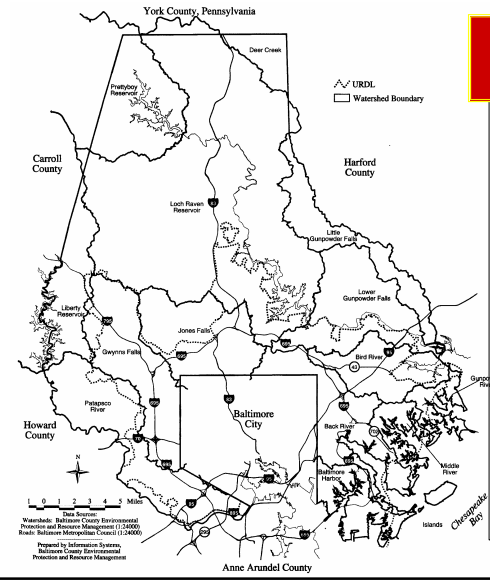
Growth boundary at Hunt Valley Industrial Park at Shawan Road

The Urban-Rural Demarcation Line (URDL) was first established in 1967 by the Planning Board to delineate urban and rural development areas

WEST OF I-83

EAST OF I-83

The URDL and Watersheds



Rural Watersheds:
- **Deer Creek**
- **Prettyboy Reservoir**
- **Little Gunpowder Falls**
- **Lower Gunpowder Falls**
- **Gunpowder River**
- **Liberty Reservoir**
- **Loch Raven Reservoir (except Towson-Hunt Valley Corridor)**

Urban Watersheds:
- **Gwynns Falls**
- **Back River**
- **Baltimore Harbor**
- **Bird River**
- **Middle River**

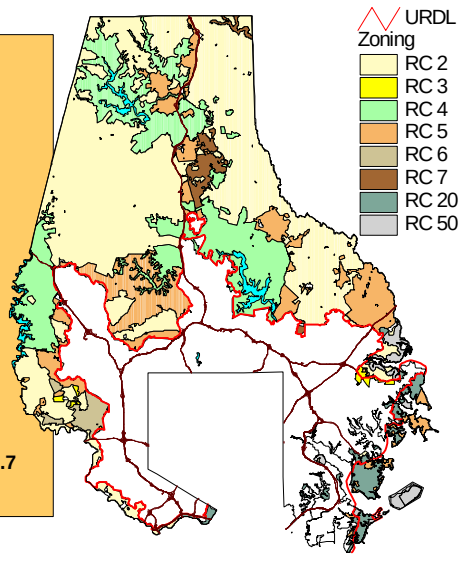
Mixed Watersheds:
- **Patapsco River**
- **Jones Falls**

Resource Conservation Zoning (2000)

R.C. Zones first established in 1975

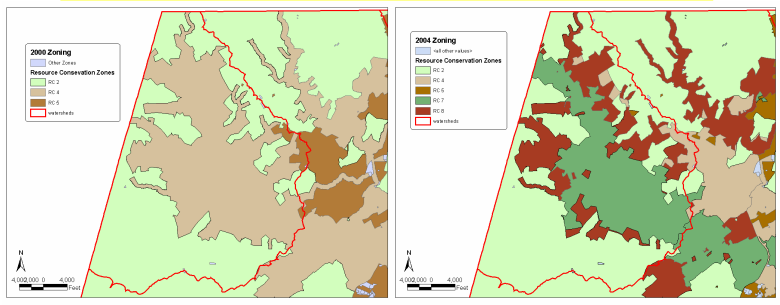
Quadrennial Comprehensive Zoning Map Process (CZMP)

New Zones:
2001 - R.C.6, R.C.7
2004 - R.C.8



Comprehensive Zoning Map Process (CZMP)

CHANGES IN THE PRETTYBOY RESERVOIR WATERSHED 2000 - 2004

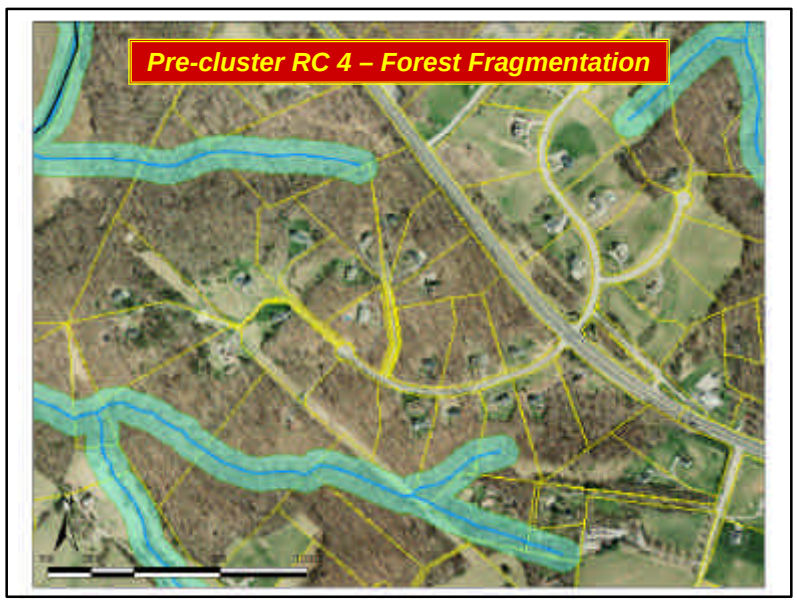


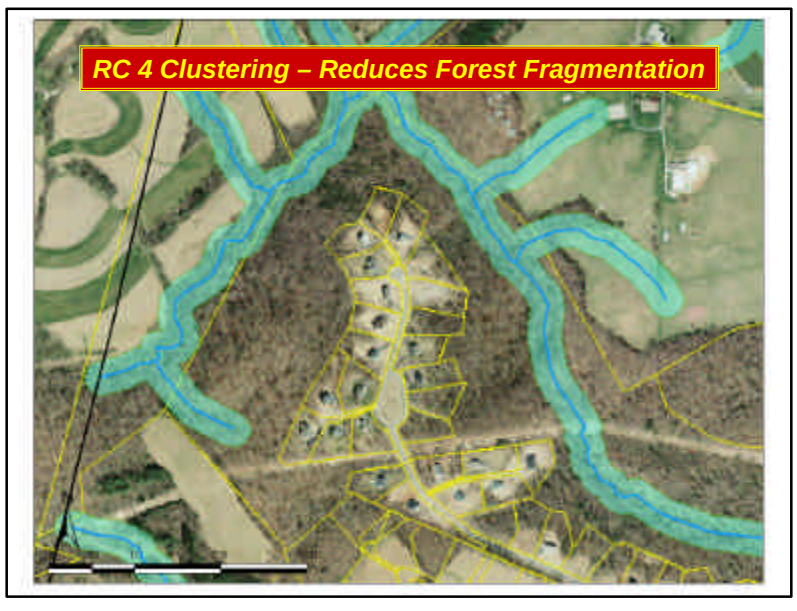
Approximate Acres of Resource Conservation Lands Downzoned in the Loch Raven, Liberty, and Prettyboy Reservoir Watersheds

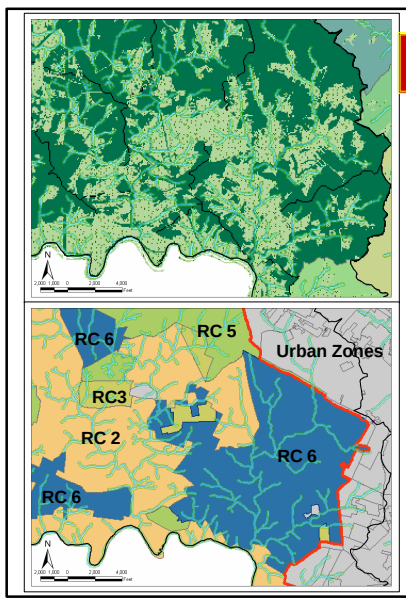
- **1996 – 9,000 acres**
- **2000 – 12,000 acres**
- **2004 – 48,000 acres**

Rural Development

Issues for Rural Design Standards and Resource Protection







RC 6 - Rural Conservation & Residential

- **created in 2000 for Patapsco-Granite area (3,871 acres)**
- **focus: reduce forest fragmentation and assure rural character**
- **replaced RC 3 Deferred Planning zoning (.3 d.u./acre)**
- ***net density approach*: no density inside the Primary Conservancy Area (regulated forest buffer and any part of a contiguous 200+ ac. forest patch)**
- **base density = .2 d.u./acre**
- **maximum lot size = 1.5 acre**
- **Minimum Development Allowance = 1 d.u./parcel of record**
- **Secondary Conservancy Area = minimum of 50% of open space outside of lots**
- **rural character performance standards**
- **2004 CZMP – applied to an additional 8,948 acres outside this area**

Rural Design Standards Can Conflict with Protection of Forests and Water Quality

Improving rural clustering and alternative designs to the suburban cul-de-sac:

- allow for expansion of forest patches
- reduce length of single-loaded roads
- reduce landowner conflicts with forest patch edges
  - physical encroachment
  - invasive plants
  - fertilizer and septic runoff
  - pets

RC 6 Development Design Guidelines in Conflict with Forest Resource Protection

Single-loaded roads cut deeply into forest patches

Separated lots create excessive roads (impervious surfaces).

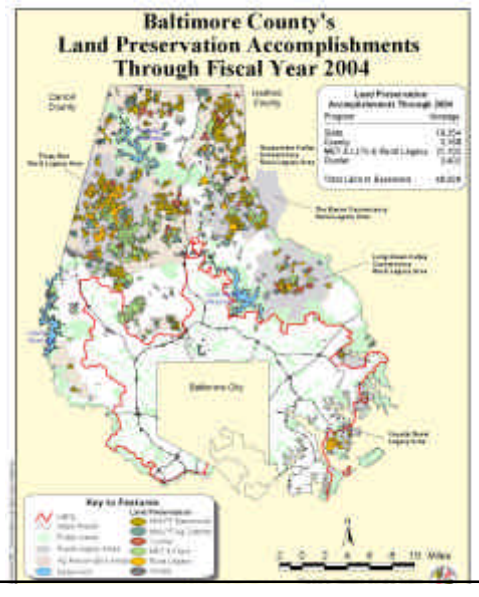
Integrated Environmental Management Program Components

In order to address impacts of existing and future development on the environment, local programs should include:

- land preservation
- regulatory programs
- restoration
- facility maintenance
- assessments, monitoring, and research
- planning and program coordination
- education and citizen participation

Necessary to offset concentrated development

Our TMDL, NPDES, C2K, Trib Strategies, 6217, etc. Response



Baltimore County Land Preservation Easements

ACRES as of NOV. 2003 in RESERVOIR WATERSHEDS	
Liberty	988
Prettyboy	2,419
Loch Raven	26,961
Total Reservoir	30,368

$ 90+ million invested

Resource Protection
DEVELOPMENT REGULATIONS

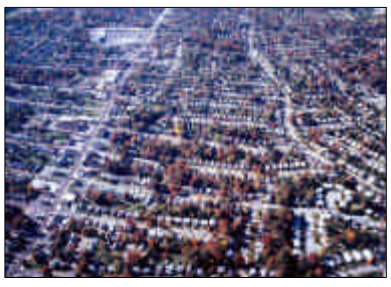
- Sediment/Erosion Control - 1968
- Stormwater Management - 1974
- Stream Buffers - 1983
- Chesapeake Bay Critical Area - 1988
- Forest Conservation - 1993

Progress:

1994-1999, > 3,600 acres of forest buffer and forest conservation easements applied to 256 development projects, totaling 9,050 acres and containing 50 miles of streams

The Tyranny of Time:

In 1970, Baltimore County's population was > 621,000 or 82.3% of the year 2000 population.



Changing Character of Land Development

Pre-Regulatory

- lot size approach
- use of engineering to address site constraints
- no environmental protection

Post-Regulatory

- density approach
- site-based environmental assessment
- protect streams, wetlands, forests

Environmental Restoration

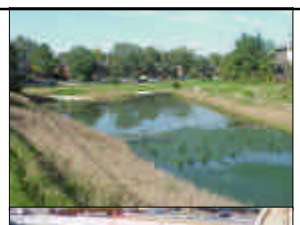
Project Types:

- **Shore Erosion Control**
- **Stormwater Retrofits**
- **Waterway Dredging**
- **Stream Restoration**
- **Wetland Creation**
- **Reforestation**

Funding:

- **County GO Bonds**
- **State Cost-Share Programs**

Stormwater Conversions and Retrofits



- Provide water quality retrofit facilities in areas developed prior to County SWM regulations
- Install water quality inlets to trap sediment and nutrients
- Modify existing stormwater outfall structures to provide water quality and habitat benefits
- Plant native vegetation for nutrient uptake and habit enhancement

Stream Restoration Progress - 1997-2001

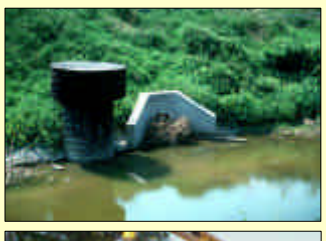
- 700 miles assessed (1/3 of streams)
- 26 projects completed
- 53,100 feet restored
- $12.4 million invested

Channel reconstruction:

- reduce bank & bed erosion and sediment transport
- remove concrete channels
- restore velocity control
- convey multiple flows
- improve aquatic and riparian habitat; aesthetics
- protect infrastructure and property

Urban Maintenance Practices

MAINTAINING THE EFFICIENCY OF BMP'S



Practices:

- stormwater management facility maintenance
- storm drain inlet and pipe vacuuming
- street sweeping

Purpose:

- to remove pollutants before they enter streams

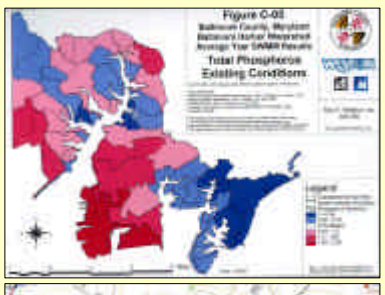
Tracking:

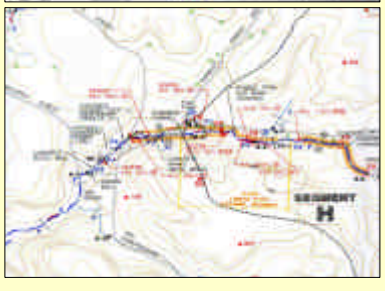
- practices tracked for storm water permit programs by watershed

Watershed Water Quality Management Planning

- **1995-2004, ten plans completed as part of NPDES Stormwater permit**
- **local investment of $ 2.0+ million**

Watershed Water Quality Management Planning

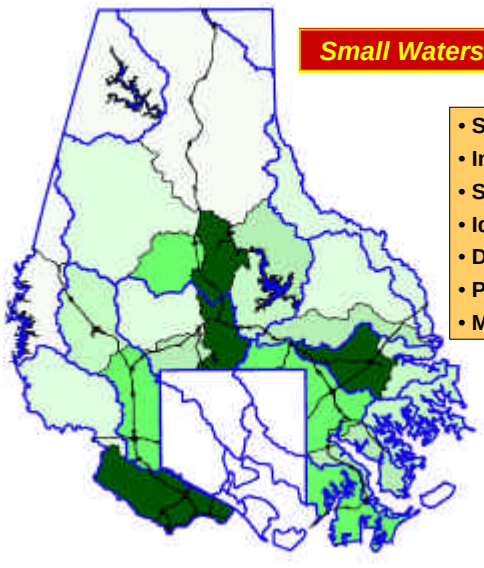




- Watershed Characterization
- Hydrologic & Water Quality Modeling (SWMM)
- Stream Stability Assessment

- Summarize problems
- Identify effective solutions
- Prioritize restoration projects

Small Watershed Action Plans



- Sub-watershed areas
- Involve stakeholders
- Set measurable goals
- Identify projects
- Determine cost/benefit
- Prioritize activities
- Monitor success

Monitoring

Chemical, geomorphological, and biological monitoring provides support for:

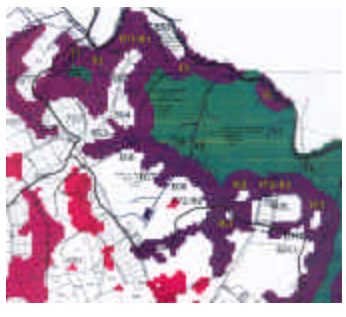
- NPDES Stormwater Discharge Permit
- TMDL Program
- Stream Restoration Permits

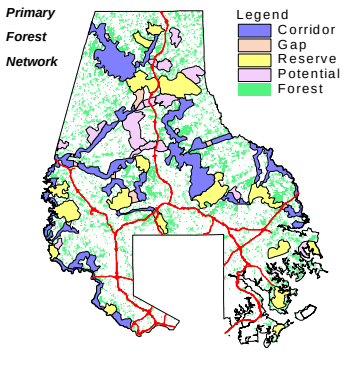
Parameters monitored:

- Chemical water quality
- Temperature and pH
- Bacteria
- Benthic macroinvertebrates, fish, SAV's
- Stream discharge
- Channel stability

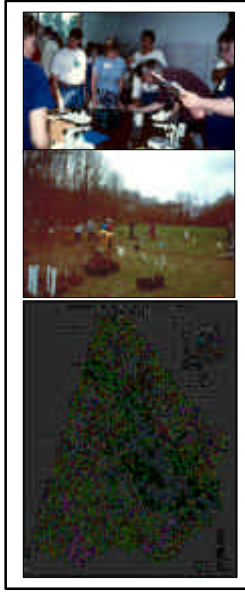
Green Infrastructure Assessment

A GIS-based Methodology for Establishing a Greenway Corridor System in a Fragmented Forest Landscape (1996)





Encouraging and Supporting Citizen Participation



- Baltimore County Forestry Board (annual operating support grant)
- Baltimore County Citizens for Stream Restoration Campaign (Save Our Streams biological stream monitoring)
- Baltimore Watershed Agreement (2002) and annual State of the Watersheds Conference
- Watershed Grants program ($30,000) for watershed associations
- Support to communities for Tree-Mendous Maryland, Pitch-in for Progress, and other tree planting projects
- Mapping assistance to watershed associations for stewardship outreach and restoration projects
- Builders for the Bay roundtable

Baltimore County Green Schools

THE STATE LEADER IN ENVIRONMENTAL SCHOOL CERTIFICATION

14 public and private schools in Baltimore County were recognized as *Green Schools* from 1999-2002

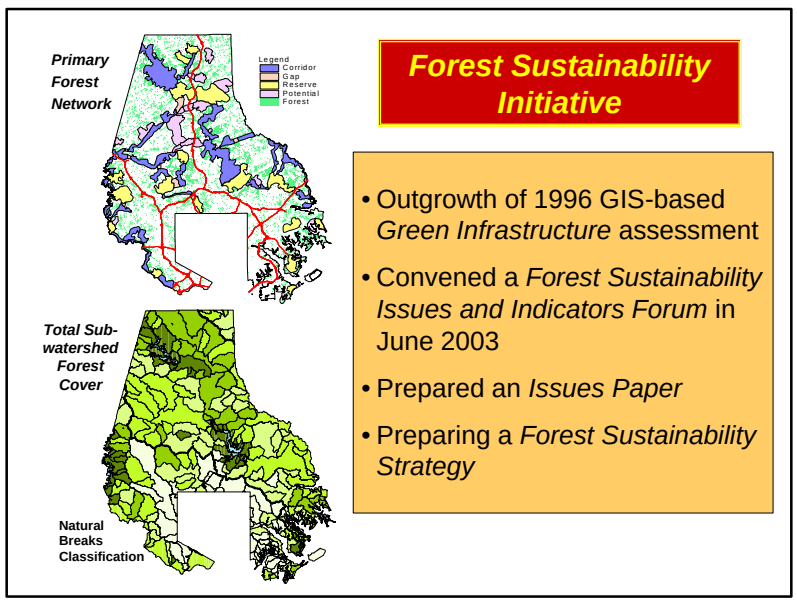
Green Schools use school curricula, school buildings and schoolyards, and community partnerships to integrate environmental learning

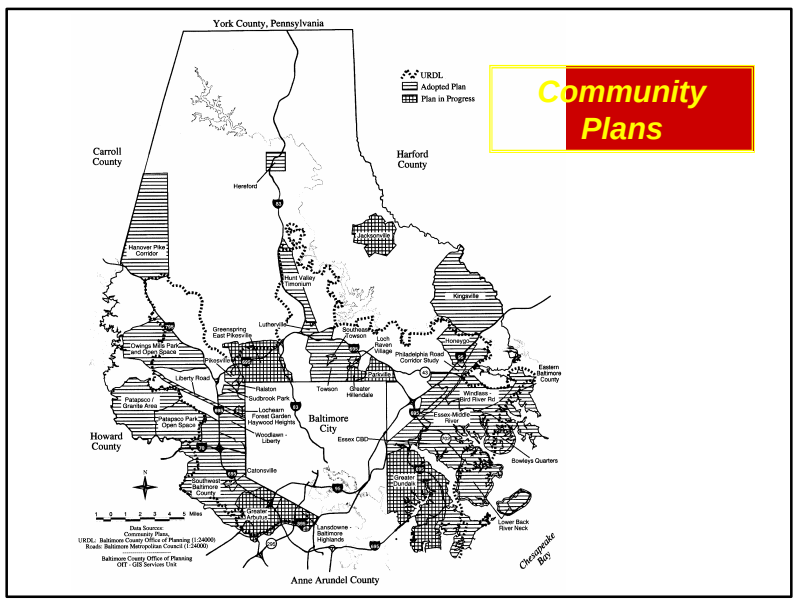
Recent Initiatives

GREEN RENAISSANCE BALTIMORE COUNTY

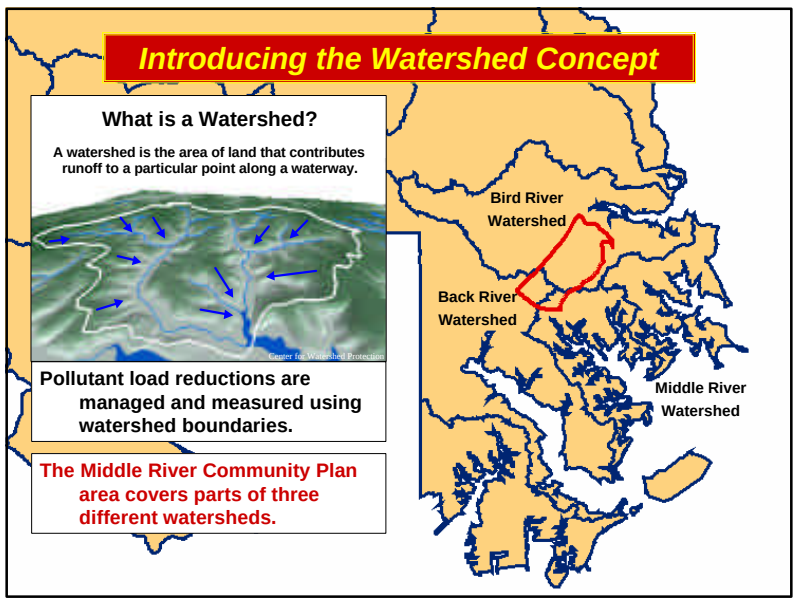
- Forest Sustainability Strategy
- Land Preservation Strategy
- Water Quality & Watershed Restoration Program

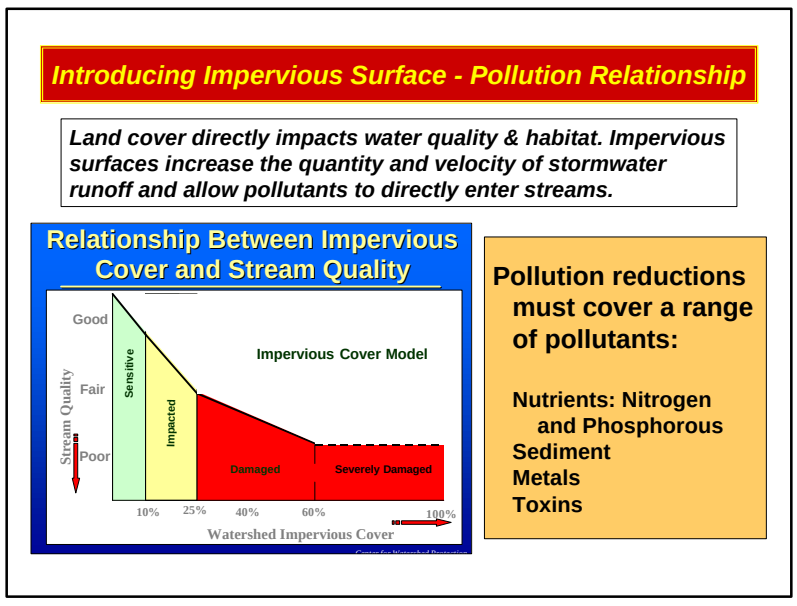

Forest Sustainability Initiative
Linking Communities to the Montreal Process Criteria & Indicators Project
ECOLOGICAL AND ECONOMIC SUSTAINABILITY


Primary Forest Network
Legend
Corridor
Gap
Reserve
Potential Forest
Total Sub-watershed Forest Cover
Natural Breaks Classification
Forest Sustainability Initiative
• Outgrowth of 1996 GIS-based Green Infrastructure assessment
• Convened a Forest Sustainability Issues and Indicators Forum in June 2003
• Prepared an Issues Paper
• Preparing a Forest Sustainability Strategy


York County, Pennsylvania
URDL
Adopted Plan
Plan in Progress
Community Plans
Carroll County
Harford County
Howard County
Baltimore City
Anne Arundel County
Hereford
Hanover Pike Corridor
Hunt Valley Timonium
Kingsville
Greenspring East Pikesville
Lutherville
Southeast
Towson
Loch Raven Village
Cockeysville
Philadelphia Road Corridor Study
Eastern Baltimore County
Owings Mills Park and Open Space
Liberty Road
Ralston
Sudbrook Park
Towson
Chester Hillendale
Patapsco Granite Area
Patapsco Park Open Space
Lochearn Forest Garden Haywood Heights
Woodlawn - Liberty
Essex CBD
Windlass - Bird River Rd
Essex-Middle River
Bowleys Quarters
Catonsville
Southwest Baltimore County
Greater Dundalk
Lower Back River Neck
Landsowne - Baltimore Highlands
Chesapeake Bay
Data Sources:
Community Plans
URDL: Baltimore County Office of Planning (1:24000)
Roads: Baltimore Metropolitan Council (1:24000)
Baltimore County Office of Planning
OIT - GIS Services Unit


Middle River Community Plan


Introducing the Watershed Concept
What is a Watershed?
A watershed is the area of land that contributes runoff to a particular point along a waterway.
Pollutant load reductions are managed and measured using watershed boundaries.
The Middle River Community Plan area covers parts of three different watersheds.
Bird River Watershed
Back River Watershed
Middle River Watershed


Introducing Impervious Surface - Pollution Relationship
Land cover directly impacts water quality & habitat. Impervious surfaces increase the quantity and velocity of stormwater runoff and allow pollutants to directly enter streams.
Relationship Between Impervious Cover and Stream Quality
Impervious Cover Model
Stream Quality
Good
Fair
Poor
Sensitive
Impacted
Damaged
Severely Damaged
10%
25%
40%
60%
100%
Watershed Impervious Cover
Pollution reductions must cover a range of pollutants:
Nutrients: Nitrogen and Phosphorous
Sediment
Metals
Toxins

Middle River Plan Study Area
Watershed and Impervious Acreage (1996)

Watershed	Total Acres	Impervious Ac.	% Impervious	Condition
Back River	561	118	21.0%	
Bird River	2,273	209	9.2%	
Middle River	281	89	31.7%	
Total	3,115	416	13.4%	

Subwatershed	Total Acres	Impervious Ac.	% Impervious	Condition
Cowpens Run	155	36	23.1%	
Darkhead Creek	13	2	14.3%	
Honeygo Run	3	1	29.6%	
Middle River	113	51	45.5%	
O'Briens Run	562	118	21.0%	
Whitemarsh Run	1,209	165	13.6%	
Windlass Run	1,061	44	4.1%	

Stream Condition	Impervious Threshold	
Sensitive	0 - 10%	
Impacted	10 - 25%	
Damaged	25 - 60%	
Severly Damaged	> 60%	

Introducing Potential Middle River Plan Environmental Goals

- Support County commitments and requirements for reducing pollution and protecting resources
- Accommodate reasonable future growth while assuring that new planned development performs better with regard to the environment
- Consider ways to reduce impervious surface impacts:
  - set maximum as well as minimum parking standards
  - encourage mixed-use, higher density, pedestrian-oriented development with structured parking
  - remove unneeded existing impervious areas
  - retrofit existing development with stormwater management
  - offset new imperviousness through mitigation fees

Lessons from Our Experience?

- we're not starting at square one
- integration is a long-term effort, an evolution
- need to use multiple tools, based in land use planning and implementation
- we won't be successful using only site-based environmentally-sensitive development; we need area-wide growth management strategies
- state and federal agencies need to help build local capacity to manage growth and protect resources
- we need effective organizational structures
- local capacity includes consistent leadership and sustained citizen support

MARYLAND DEPARTMENT OF THE ENVIRONMENT
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410-537-3000 • 1-800-633-6101

Integrating Watershed and Land Use Planning in Maryland
March 7, 2005

ADDITIONAL MATERIALS

MDE Current Publications

Population Data from the *Final Report of the Advisory Committee on the Management and Protection of the State's Water Resources*

Overview of the *Final Report of the Advisory Committee on the Management and Protection of the State's Water Resources*

Maryland's NPDES Municipal Stormwater Permits

NPDES Municipal Separate Storm Sewer System Permits - Watershed Assessment Progress

NPDES Permitting for Stormwater Discharges

Wetland Restoration, Enhancement and Preservation Programs from the *Maryland State Wetland Conservation Plan*

Overview of the Bay Restoration Fund - Onsite Sewage Disposal Systems

Summary of MDE's FY 2005 Capital Program for Water Quality and Drinking Water

www.mde.state.md.us

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MDE Current Publications and Video

Final Report of the Advisory Committee on the Management and Protection of the State's Water Resources, 2004.

Final Report of the Water Security and Sewerage Systems Advisory Council and Preliminary Report of the Interagency Technical Assistance Committee, 2004.

Maryland State Wetland Conservation Plan, 2003.

Priority Areas for Wetland Restoration, Preservation and Mitigation in Maryland's Coastal Bays, 2004.

Maryland's Stormwater Program: Managing for Results, 2005 (DVD).
(Please call 410-537-3543 to request a copy)

Future Publications

Clean Water Needs Survey 2004, EPA.

Guidance for Capacity Management: Water Supply and Wastewater.

MDE's publications are available at: www.mde.state.md.us

Please go to the bottom of MDE's home page and click on "more publications".

NOTE: The Population Tables and Figures presented on the following six pages are from Appendix B of the *Final Report of the Advisory Committee on the Management and Protection of the State's Water Resources*, May 2004.

APPENDIX B – POPULATION DATA

Data Sources:

Maryland Department of Planning, 2001, Maryland's Changing Land: Past, Present and Future, 83 pp.

Maryland Department of Planning, 2004, Socio-Economic Projections.

Table B-1: Total Population by County - 1970, 2000, 2030.

County	Total Population			% Increase
	1970	2000	2030	2000-2030
Allegany	84,044	74,930	71,650	-4.4%
Anne Arundel	297,539	489,656	571,500	16.7%
Baltimore City	905,759	651,154	661,900	1.7%
Baltimore County	621,077	754,292	811,500	7.6%
Calvert	20,682	74,563	104,390	40.0%
Caroline	19,781	29,772	35,200	18.2%
Carroll	69,006	150,897	204,100	35.3%
Cecil	53,291	85,951	108,800	26.6%
Charles	47,678	120,546	205,000	70.1%
Dorchester	29,405	30,674	31,650	3.2%
Frederick	84,927	195,277	325,600	66.7%
Garrett	21,476	29,846	33,900	13.6%
Harford	115,378	218,590	252,800	15.7%
Howard	61,911	247,842	297,900	20.2%
Kent	16,146	19,197	20,950	9.1%
Montgomery	522,809	873,341	1,080,000	23.7%
Prince George's	660,567	801,515	976,800	21.9%
Queen Anne's	18,422	40,563	59,800	47.4%
St. Mary's	47,388	86,211	127,600	48.0%
Somerset	18,924	24,747	27,200	9.9%
Talbot	23,682	33,812	38,950	15.2%
Washington	103,829	131,923	149,100	13.0%
Wicomico	54,236	84,644	108,250	27.9%
Worcester	24,442	46,543	57,550	23.6%
State of Maryland	**3,922,399**	**5,296,486**	**6,362,090**	**20.1%**

Table B-2: Total Number of Households by County - 1970, 2000, 2030.

County	Total Number of Households			% Increase
	1970	2000	2030	2000-2030
Allegany	27,857	29,322	29,725	1.4%
Anne Arundel	81,100	178,670	226,525	26.8%
Baltimore City	289,349	257,996	279,675	8.4%
Baltimore County	184,890	299,877	330,725	10.3%
Calvert	5,540	25,447	38,025	49.4%
Caroline	6,360	11,097	14,225	28.2%
Carroll	19,623	52,503	77,550	47.7%
Cecil	14,242	31,223	42,650	36.6%
Charles	12,098	41,668	77,100	85.0%
Dorchester	9,725	12,706	14,025	10.4%
Frederick	24,926	70,060	122,425	74.7%
Garrett	6,315	11,476	14,225	24.0%
Harford	32,026	79,667	103,475	29.9%
Howard	16,880	90,043	121,750	35.2%
Kent	5,109	7,666	9,100	18.7%
Montgomery	156,674	324,565	421,225	29.8%
Prince George's	192,963	286,610	373,825	30.4%
Queen Anne's	5,795	15,315	23,825	55.6%
St. Mary's	12,100	30,642	49,625	62.0%
Somerset	5,945	8,361	9,300	11.2%
Talbot	7,914	14,307	17,450	22.0%
Washington	32,463	49,726	59,325	19.3%
Wicomico	17,170	32,218	43,725	35.7%
Worcester	7,869	19,694	26,125	32.7%
State of Maryland	1,174,933	1,980,859	2,525,625	27.5%

Table B-3: Household Size by County - 1970, 2000, 2030.

County	Total Household Size			% Increase
	1970	2000	2030	2000-2030
Allegany	2.95	2.35	2.16	-8.1%
Anne Arundel	3.45	2.65	2.42	-8.7%
Baltimore City	3.07	2.42	2.25	-7.0%
Baltimore County	3.28	2.46	2.38	-3.3%
Calvert	3.70	2.91	2.71	-6.9%
Caroline	3.06	2.64	2.42	-8.3%
Carroll	3.26	2.81	2.56	-8.9%
Cecil	3.45	2.71	2.50	-7.7%
Charles	3.90	2.86	2.62	-8.4%
Dorchester	2.95	2.36	2.19	-7.2%
Frederick	3.27	2.72	2.59	-4.8%
Garrett	3.35	2.55	2.31	-9.4%
Harford	3.45	2.72	2.41	-11.4%
Howard	3.59	2.71	2.39	-11.8%
Kent	3.02	2.33	2.12	-9.0%
Montgomery	3.30	2.66	2.52	-5.3%
Prince George's	3.34	2.74	2.54	-7.3%
Queen Anne's	3.13	2.62	2.48	-5.3%
St. Mary's	3.68	2.72	2.47	-9.2%
Somerset	3.10	2.37	2.20	-7.2%
Talbot	2.94	2.32	2.18	-6.0%
Washington	3.08	2.46	2.31	-6.1%
Wicomico	3.08	2.53	2.39	-5.5%
Worcester	3.09	2.33	2.15	-7.7%
State of Maryland	**3.25**	**2.61**	**2.44**	**-6.5%**

Table B-4: Population, Number of Households, and Household Size, by Region - 1970, 2000, 2030.

Region	Total Population			% Increase
	1970	2000	2030	2000-2030
Baltimore Metropolitan	2,071,016	2,512,431	2,799,700	11.4%
Washington Suburban	1,269,455	1,870,133	2,382,400	27.4%
Southern Maryland	115,748	281,320	437,000	55.3%
Western Maryland	209,349	236,699	254,650	7.6%
Upper Eastern Shore	131,322	209,295	263,700	26.0%
Lower Eastern Shore	127,007	186,608	224,650	20.4%

Region	Total Number of Households			% Increase
	1970	2000	2030	2000-2030
Baltimore Metropolitan	623,868	958,756	1,139,700	18.9%
Washington Suburban	374,563	681,235	917,475	34.7%
Southern Maryland	29,738	97,757	164,750	68.5%
Western Maryland	66,635	90,524	103,275	14.1%
Upper Eastern Shore	39,420	79,608	107,250	34.7%
Lower Eastern Shore	40,709	72,979	93,175	27.7%

Region	Total Household Size			% Increase
	1970	2000	2030	2000-2030
Baltimore Metropolitan	3.22	2.55	2.37	-7.1%
Washington Suburban	3.32	2.70	2.54	-5.9%
Southern Maryland	3.77	2.83	2.60	-8.1%
Western Maryland	3.05	2.44	2.27	-7.0%
Upper Eastern Shore	3.18	2.58	2.40	-7.0%
Lower Eastern Shore	3.05	2.43	2.27	-6.6%

The Baltimore Metropolitan Area consists of Baltimore City and Anne Arundel, Baltimore Carroll, Harford, and Howard Counties.

The Washington Suburban Area consists of Frederick. Montgomery. and Prince George's Counties.

The Southern Maryland Area consists of Calvert, Charles, and St. Mary's Counties.

The Upper Eastern Shore Area consists of Caroline, Cecil, Kent, Queen Anne's, and Talbot Counties.

The Lower Eastern Shore consists of Dorchester, Somerset, Wicomico, and Worcester Counties.

The Western Maryland Area consists of Allegany, Garrett, and Washington Counties.

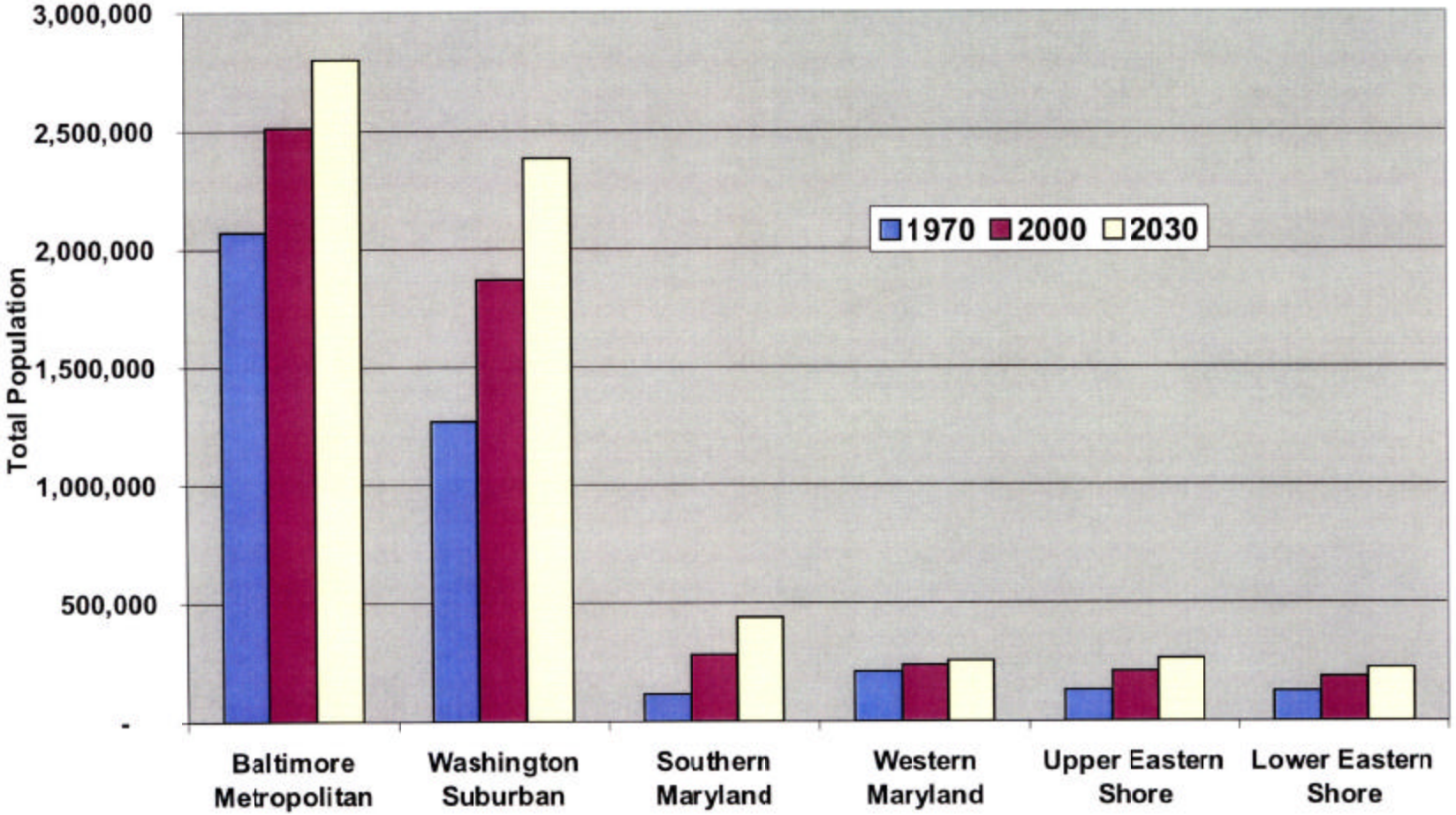


Fig. B-1: Total Population, 1970-2030, by Region

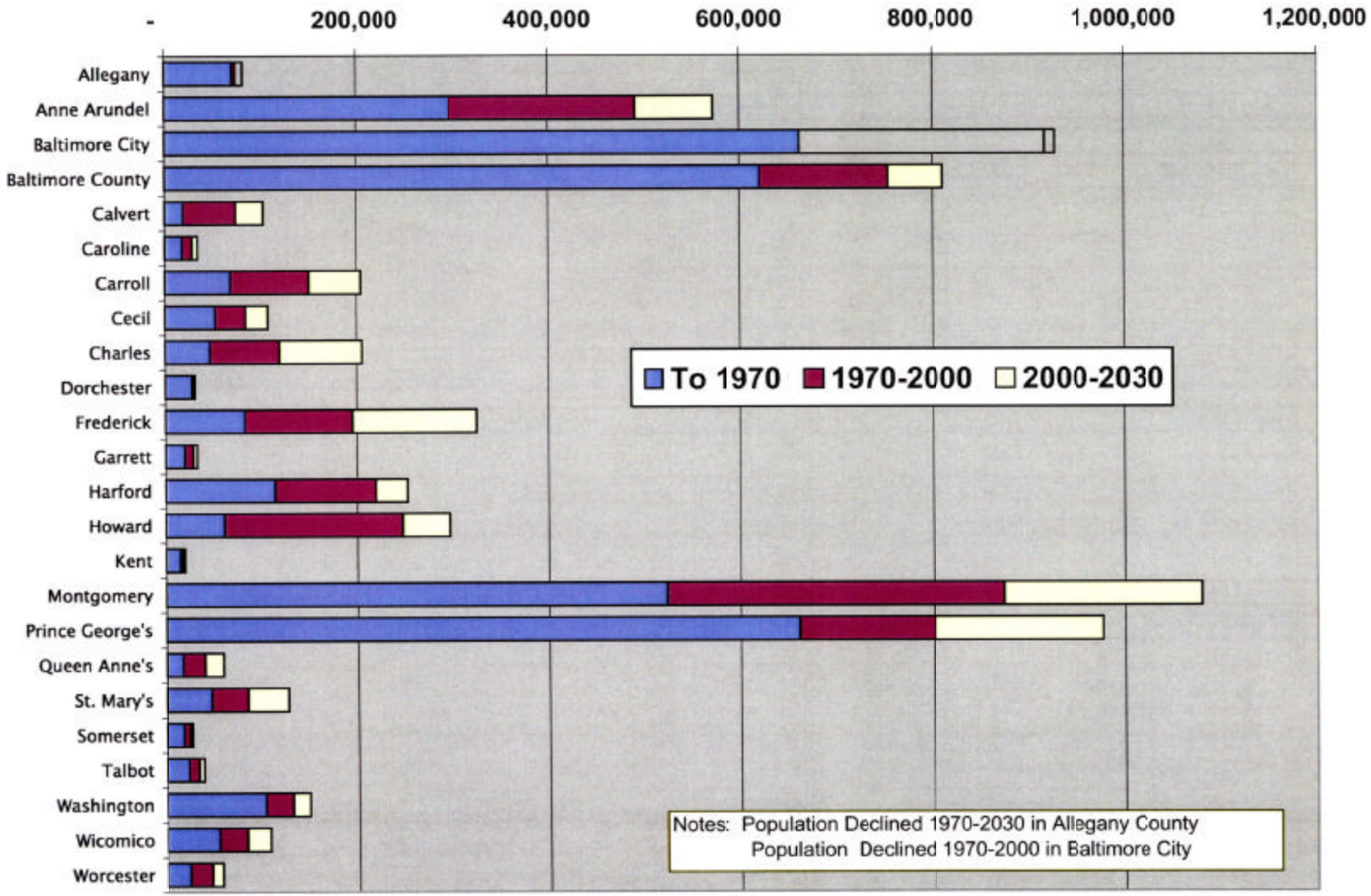


Fig. B-2: Population Growth by County, 1970-2030

ADVISORY COMMITTEE
ON THE MANAGEMENT AND PROTECTION OF
MARYLAND'S WATER RESOURCES

In response to the drought of 2002, Governor Robert L. Ehrlich, Jr. issued Executive Order 01.01.2003.08, which created the ***Advisory Committee on the Management and Protection of the State's Water Resources*** and charged the Committee with several responsibilities, principally to evaluate the sustained ability of Maryland to meet its projected water needs.

The Advisory Committee, chaired by Dr. Gordon Wolman of Johns Hopkins University, analyzed the population growth in Maryland and the future demand for water for several categories of use. The Committee found that Maryland's population is projected to increase to 6.4 million people between 2000 and 2030, an increase of 1.1 million people. The water demand for public water supply is expected to increase from 824 mgd to 882 mgd by 2030, an increase of 58 mgd. Likewise, other categories of water use in Maryland are also expected to increase. The total water demand in 2000 was 1,447 mgd and is projected to increase by 223 mgd in 2030.

The Advisory Committee published its Final Report in May 2004 and identified seven key recommendations to meet the future water needs of Maryland:

1. ***Continue the comprehensive evaluation of watersheds and aquifers that are significant sources of water supply. Continue an Advisory Committee to provide guidance in implementing the recommendations.***
2. ***Restore funding for existing observation wells and stream gages deleted from the FY 2005 budget. Expand monitoring networks as funding becomes available.***
3. ***Improve coordination between Maryland and Virginia regarding water allocations from the Potomac River.***
4. ***Support water and sewer planning at the State and local government levels.***
5. ***Implement a comprehensive outreach program to educate Maryland citizens and create partnerships for stewardship of the State's water resources.***
6. ***Exempt withdrawals below a minimum threshold in the Appropriation Permit Law.***
7. ***Review laws, regulations, funding resources, and State laboratory capacity relative to comprehensive management of the State's water resources.***

The full Report of the Advisory Committee may be found under the heading "More Publications" at:

www.mde.state.md.us

Robert L. Ehrlich, Jr.
Governor

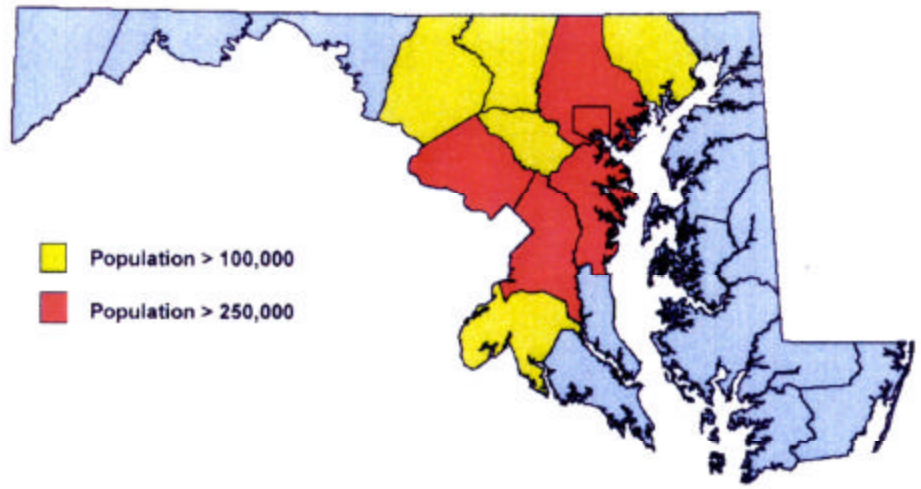
Michael S. Steele
Lieutenant Governor

MDE

Kendl P. Philbrick
Secretary

Jonas A. Jacobson
Deputy Secretary

Maryland's NPDES Municipal Stormwater Permits



National Pollutant Discharge Elimination System (NPDES)
Phase I Large & Medium Jurisdictions

Jurisdiction	Issue Date	State#	NPDES#
State Highway Administration	01/08/1999	99-DP-3313	MD0068276
Prince George's	01/12/1999	99-DP-3314	MD0068284
Baltimore City	02/08/1999	99-DP-3315	MD0068292
Anne Arundel	03/01/1999	99-DP-3316	MD0068306
Harford	08/13/1999	99-DP-3310	MD0068268
Baltimore	06/15/2000	00-DP-3317	MD0068314
Howard	06/15/2000	00-DP-3318	MD0068322
Carroll	07/14/2000	00-DP-3319	MD0068331
Montgomery	07/05/2001	01-DP-3320	MD0068349
Frederick	03/11/2002	02-DP-3321	MD0068357
Charles	07/31/2002	02-DP-3322	MD0068365

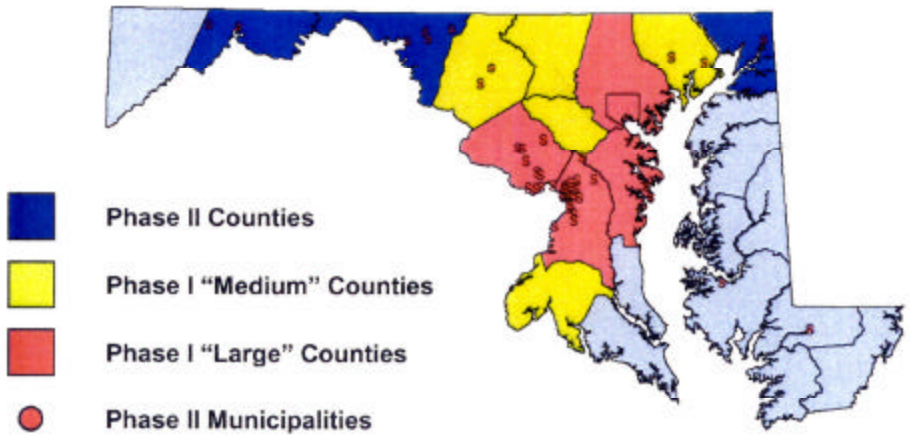
Standard Permit Conditions Are:

NOTE: Conditions reflect information submitted to MDE by all municipalities during the initial NPDES municipal stormwater application process and progress made during the initial permit implementation of management programs.

- **Permit Administration** (names, titles, addresses, phone numbers, and functions of all primary administrative and technical personnel responsible for permit compliance, etc.)
- **Legal Authority** (certification from counsel that adequate authority exists)
- **Source Identification** (Mapping using GIS, geologic features, land use, resources, infrastructure, significant discharges, etc.)
- **Discharge Characterization** (contribute to Maryland's understanding of stormwater runoff and its effect on water resources; chemical, biological, and physical monitoring; monitor effectiveness of "2000 Maryland Stormwater Design Manual", etc.)

- **Management Programs** (maintain acceptable stormwater management, illicit connection detection and elimination, erosion and sediment control, and public education and outreach programs, etc.)
- **Watershed Restoration** (a systematic assessment of water quality within all watersheds, target restoration in those areas where opportunities to improve water quality are significant and prior restoration efforts have been insufficient to meet established goals, etc.)
- **Program Funding** (an annual fiscal analysis of the capital, operation, and maintenance expenditures necessary to comply with the permit)
- **Assessment of Control** (estimates of expected pollutant load reductions as a result of proposed management programs)
- **Special Conditions** (cooperative participation in activities related to the Chesapeake Bay Program and Agreement)

Phases I & II NPDES Jurisdictions



NPDES Phase II

EPA issued Phase II regulations in December 1999. Phase II of the NPDES stormwater program increases significantly the number of places and activities that will be required to be permitted. Permits required under the Phase include "construction activities" greater than one acre, "small" municipalities, and State and federal facilities.

Phase I Lessons for Phase II Use

- Existing Programs – much of the minimum control measures are already implemented
- Emphasize local/State programs – Maryland's stormwater management program
- One size does not fit all – (Urban counties vs. rural towns; State & federal facilities, etc.)

NPDES PERMITTING FOR STORMWATER DISCHARGES
October 2002

The U.S. EPA issued final regulations in November 1990 that require National Pollutant Discharge Elimination System (NPDES) Phase I permits for stormwater discharges associated with eleven categories of industrial activities and municipal separate storm sewer systems. Within the Maryland Department of the Environment (MDE), the Water Management Administration (WMA) administers this permit program. Ten of the industrial categories are permitted through WMA's Wastewater Discharge Permit Program. Examples of these activities are hazardous waste treatment facilities; landfills; open dumps receiving industrial waste; steam electric power generating facilities; mass transit, school bus, and trucking facilities; hazardous waste storage facilities; land application sites; recycling facilities (junk yards, etc); vehicle maintenance facilities; and treatment works for domestic sewage. These are activities that are similar to those traditionally permitted by MDE for wastewater through industrial discharge permits. The eleventh industrial activity subject to the stormwater permit requirements is construction activity that disturbs more than 5 acres. WMA's Compliance Program permits this activity and WMA's Nonpoint Source Program permits municipal separate storm sewer systems.

INDUSTRIAL ACTIVITY

EPA's original regulations provided three types of applications for industrial stormwater discharge permits. These were individual applications, group applications, and notices of intent (NOI) to comply with a general permit. The deadlines for these applications were October 1992 for an individual application or an NOI and September 1991 for group applications. An individual permit application required information describing the industry and its stormwater management provisions. It also required the submission of monitoring data. An alternative to an individual application was a group application. Industries making a group application were required to submit information describing the industries included in the group to EPA. EPA then determined whether the industries were sufficiently similar to warrant being covered by a general permit. If the group was valid, then only representative monitoring data need be reported. This resulted in substantial cost savings to all the industries in the group. The third industrial application alternative was an NOI. This method required Maryland to issue a general permit with conditions the permitted activity must meet. For example, MDE issued a general permit for construction activity. Owners of affected construction sites currently submit an NOI to be covered by MDE's General Permit for Construction Activity.

Maryland is in a good position with respect to permitting construction activity. There are comprehensive, statewide sediment control and stormwater management programs in place currently that satisfy NPDES mandates. In other words, the permitting of construction sites is transparent due to the requirements that exist under State laws. Questions regarding the General Permit for Construction Activity should be directed to MDE's Compliance Program at (410) 537-3510.

MDE uses a second general permit to provide coverage to the remaining ten categories of industrial activity. Questions regarding this general permit should be directed to the Wastewater Discharge Permit Program at (410) 537-3323.

MUNICIPAL SEPARATE STORM SEWER PERMITS

Federal stormwater regulations require separate storm sewer systems serving "large" and "medium" municipalities to be permitted under NPDES. A "large" system is one that serves a municipal population of 250,000 or more. A "medium" system serves a population between 100,000 and 250,000. The following jurisdictions in Maryland are "large" municipalities: Anne Arundel, Baltimore, Montgomery, and Prince George's Counties; and Baltimore City. Carroll, Charles, Frederick, Harford and Howard Counties are considered "medium" municipalities. Maryland's State Highway Administration (SHA) is also permitted under Phase I NPDES. The municipal permit application requirements were substantially the same for both "large" and "medium" municipalities.

Municipal NPDES stormwater applications were exhaustive and submitted to MDE in two parts over two years. Part I can best be described as an inventory process. Municipalities submitted descriptions of existing legal authority to control storm drain system discharges, eliminate sources of pollution, and implement various management programs. Where authority was wanting, schedules were provided to address the deficiencies found. One of the more onerous Part I tasks was field screening of upwards of 500 major storm drain outfalls for dry weather flow. This activity required significant storm drain system mapping and field chemical testing all in an effort to investigate non-stormwater related pollutant sources.

Part II of the application process built on information and those data submitted in the first year. Mechanisms needed to be established for addressing inadequate legal authority; the location of outfalls not discovered previously needed to be submitted; and descriptions needed to be provided for programs to be implemented for things like erosion and sediment control and stormwater management. Additionally, extending the monitoring and field screening work performed in Part I, localities were required to analyze samples from their respective storm drain systems under storm conditions. Storm flow samples were required to be collected and tested for 138 constituents in an effort to characterize the pollutants generated from specific land uses.

The federal regulations specify only the information that municipalities must submit in their applications. The regulations do not describe permit requirements or conditions. To cover Phase I municipal dischargers, MDE issued 10 individual permits to localities, one individual permit to the SHA, and 2 general permits for industrial activity.

NPDES – Phase II

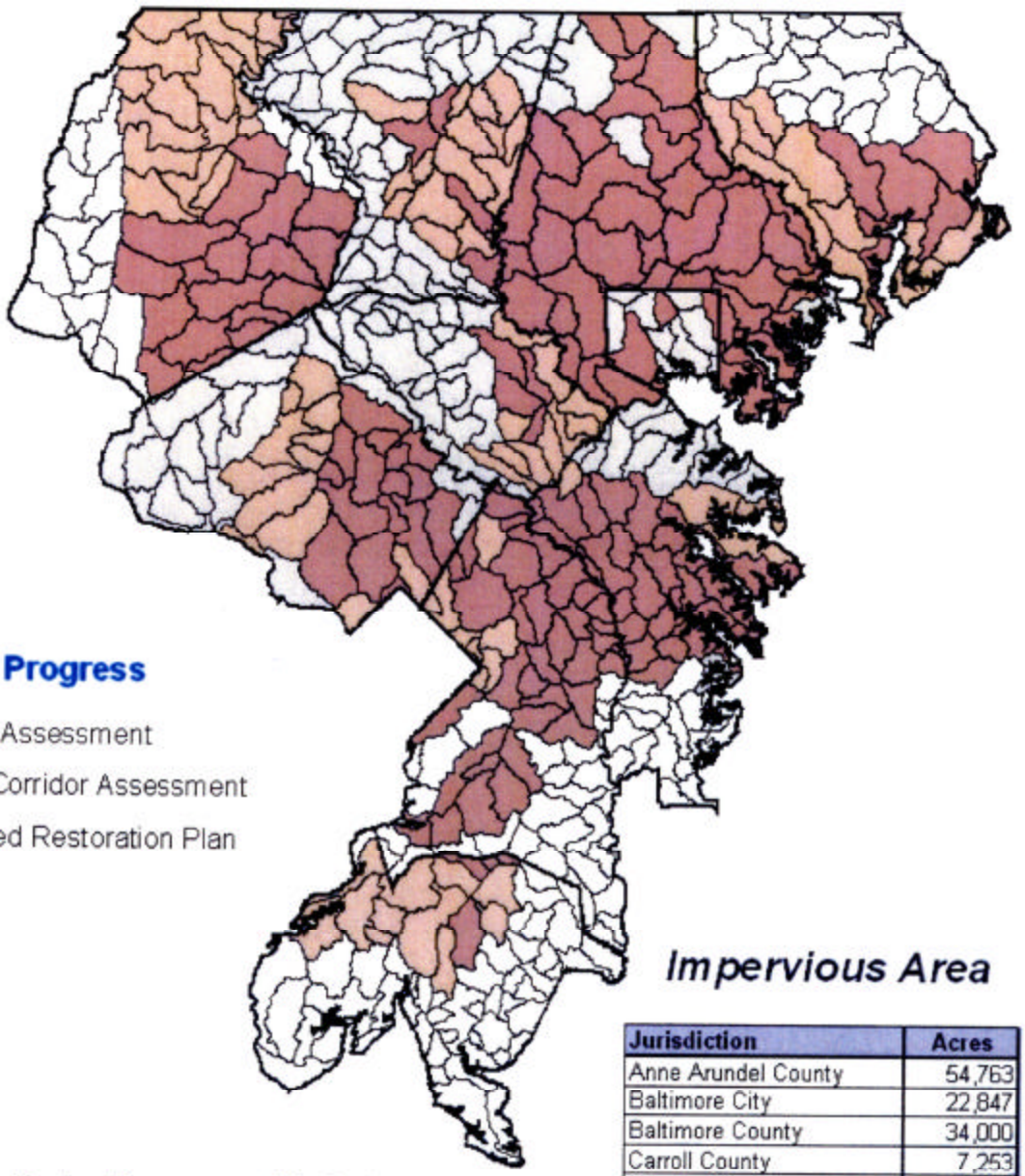
Because of federal Clean Water Act changes and a lawsuit filed by the Natural Resources Defense Council (NRDC), EPA issued Phase II regulations in December 1999. Phase II of the NPDES stormwater program increases significantly the number of places and activities that will need to be permitted. For example, the construction activity permitting threshold was lowered from 5 acres to one. This affects hundreds of construction projects but, again, the affect on the regulated community will be minimal because of existing programs.

On the municipal side, Phase II requires permit coverage for "small" municipal separate storm sewer systems. Those affected are typically municipalities under 100,000 in population located in a census-designated "urbanized area." In simpler terms, this includes small places in the more populated areas of Maryland. MDE has developed two general permits to provide coverage for the 60 localities and hundreds of State and federal facilities affected by Phase II.

National Pollutant Discharge Elimination System (NPDES)
Municipal Separate Storm Sewer System Permits

Watershed Assessment Progress

February 2005



Level of Progress

- Informal Assessment
- Stream Corridor Assessment
- Watershed Restoration Plan

Impervious Area

Jurisdiction	Acres
Anne Arundel County	54,763
Baltimore City	22,847
Baltimore County	34,000
Carroll County	7,253
Charles County	5,706
Frederick County	9,980
Harford County	22,050
Howard County	12,554
Prince George's County	35,712
Montgomery County	30,805

MDE

Maryland Department of the Environment
Water Management Administration
Sediment, Stormwater, and Dam Safety Program
1800 Washington Boulevard Baltimore, MD 21230

Restoration, Enhancement, and Preservation

Wetland Restoration Initiative

In 1997, Maryland established a voluntary goal of restoring 60,000 acres of wetlands. The figure was based on estimated losses of wetlands since the 1940's, a time when many wetlands were lost due to channelization and suburban growth. A steering committee was appointed by the Governor in 1998 to provide recommendations on how to achieve the goal. Committee members include representatives from State, federal, and local government, agriculture, mining, consulting, citizenry, and environmental groups. The Committee evaluated various restoration programs and conducted outreach to major stakeholders in developing recommendations to increase participation in voluntary restoration efforts. The Committee also released the first consolidated figures for wetland restoration accomplished through various programs.

By 2010, Maryland has agreed to restore 15,000 acres as its share of the 25,000 acre Bay-wide restoration commitment in the Chesapeake 2000 agreement. As of 2002, Maryland has made excellent progress toward the goal with approximately 12,000 acres of additional wetlands created, restored, or enhanced Statewide. Wetland Habitat Goals, a new addition to Maryland's Tributary Strategies Program, takes the 15,000 acre goal and distributes the acreage to tributary basins based on the relative amount of wetland restoration potential. Wetland restoration potential was determined through GIS by combining hydric soil and land use maps. Hydric soils not developed, forested or currently defined as a wetland were considered potential restoration opportunity. This approach will improve the targeting of resources, funds and restoration efforts. Tributary Team support of basin-specific goals will promote the identification of restoration opportunities and encourage partnership development to meet restoration objectives. The following table presents the proposed goal allocation to each Tributary Basin.

Basin	Goal Allocation (Acreage)
Choptank	2818
Lower Eastern Shore	6155
Lower Potomac	1490
Lower Western Shore	113
Middle Potomac	363
Patapsco/Back	279
Patuxent	532
Upper Eastern Shore	2186
Upper Potomac	470
Upper Western Shore	594

Maryland has also completed its Clean Water Action Plan and unified watershed assessment. Priority watersheds for restoration have been identified. The next step is to develop restoration strategies for the watersheds. The initial restoration plans are being developed for the Isle of Wight watershed (Worcester County); Manokin watershed (Somerset County); Georges Creek

watershed (Allegany County); Middle Chester watershed (Kent County); and Little Patuxent watershed (Howard County). Restoration of wetlands is expected to be included in the strategies.

MDE has a grant to identify priority wetland restoration and preservation areas. As a result of the project, sites which have the best potential for performing desired wetland functions will be identified. It is anticipated that watershed stakeholder partnerships such as local teams for Watershed Restoration Action Strategies or Tributary Teams will help in identification of key wetlands to be preserved and desired wetland functions to be established or increased in future created, restored or enhanced wetlands.

State and federal Programs which have funded the majority of restoration projects include: Conservation Reserve Program, Conservation Reserve Enhancement Program, Partners for Fish and Wildlife, Wetlands Reserve Program, Phragmites Eradication Program, Water Quality Infrastructure Program, and Stewardship Incentive Program. Programs are administered by soil conservation districts, U.S. Fish and Wildlife Service, and the Departments of Natural Resources and Environment, often in partnership. Federal highway funds under the Transportation Enhancement Program (TEA-21), administered by the Department of Natural Resources and State Highway Administration, is expected to be important over the next few years. The Chesapeake Bay Foundation and Ducks Unlimited are the major private organizations with active restoration programs and also often form restoration partnerships with government agencies to support restoration efforts. Since 1998, voluntary restoration has averaged over 1000 acres per year.

The Departments of Environment, Natural Resources, Agriculture, Natural Resources Conservation Service, Ducks Unlimited, and the Chesapeake Bay Foundation are partners in a Landowner Referral Service. The Service matches landowners interested in undertaking conservation practices, including wetland restoration, with partners who are able to provide financial and/or technical assistance. DNR has produced a guide for funding assistance describing various programs. The Service is currently administered by MDE.

In 2000, The Governor issued an executive order directing State agencies to incorporate wetland restoration into existing programs and evaluate opportunities to restore wetlands on State lands. Federal agencies have a goal of restoring 100 acres of wetland per year on federal lands.

Chesapeake Bay Program

The 2000 Chesapeake Bay Agreement included goals for voluntary wetland restoration, based in part on Maryland's goal. An interim goal of 25,000 acres of wetland restoration for the Chesapeake Bay watershed by 2010 has been set. Maryland's share is 15,000 acres. The Comprehensive Coastal Bays Management Plan has a goal of 10,000 acres for the Coastal Bays watershed. Maryland is on schedule to meet its goals, with over 5000 acres of wetlands restored through 2000.

The 2000 Chesapeake Bay Agreement also contains a provision for developing and implementing watershed management plans with a wetland preservation component in 25% of the Chesapeake Bay watershed by 2010. The plans would preserve key wetlands while addressing surrounding land use so as to preserve wetland functions. Land use practices may also

indirectly help preserve wetlands. Local requirements and plans for clustering, open space, stormwater management, infrastructure, and zoning may also restrict activities that degrade wetlands.

The Chesapeake Bay Program offers several grants. Habitat restoration grants are awarded for projects that restore important habitat such as streams, wetlands, and riparian buffers. The Chesapeake Bay Small Watershed Grants Program offers funding for watershed planning and locally based protection and restoration projects. The National Fish and Wildlife Foundation (see below under Private Efforts) administers the Small Watershed Grant Program in cooperation with various federal sponsors.

Corps of Engineers

Beneficial Use

The Corps also funds projects which make use of dredge spoil material. Projects under development include wetland restoration in Ocean Pines and Poplar Island in Chesapeake Bay.

Conservation Reserve Enhancement Program (CREP)

The CREP in Maryland is an enhancement of the Federal Conservation Reserve Program that has been tailored for Maryland. . The CREP offers payments above normal rental rates for establishing riparian buffers, retiring highly erodible lands, and restoring wetlands and shallow water habitats. The goal is to enroll 100,000 acres of environmentally sensitive land statewide (70,000 acres of riparian forest buffers and herbaceous buffers, 20,000 acres of highly erodible land within 1,000 feet of a stream, 5,000 acres of wetlands, and 5,000 acres of shallow water habitat). CREP practices receive a one-time incentive payment of $100/acre from the State of Maryland. Additional incentives are also available for some practices. Rental payments will be made yearly for the life of the contract; usually 10-15 years. . Landowners also have the option to sell permanent easements to the State of Maryland for land enrolled in CREP. Easement payments are based upon local land values. Current benefits include the one-time sign-up bonus, yearly land rental payments, maintenance payments, and 75-100% cost share. Enrollment is non-competitive and open. The program is administered by the Farm Services Agency with several other federal and State partners.

Conservation Reserve Program

The Conservation Reserve Program (CRP) was established by the 1985 Farm Bill, and expanded in later amendments of that bill. The CRP provides cost sharing and land rental payments to farmers for a variety of conservation practices, including establishing permanent cover on highly erodible lands, planting filter strips and riparian forest buffers adjacent to streams and other waterbodies, and restoring wetlands and shallow water areas for wildlife. Landowners enter into contracts for 10 to 15 years, during which they receive annual rental payments. The program is administered by the Farm Services Agency.

Wetlands Reserve Program (WRP)

WRP is a voluntary, competitive program offering agricultural landowners the opportunity to restore and enhance wetlands on their property. The program is offered competitively nationwide and offers payment, based on the agricultural value of the land, for restoration of wetlands that have previously been drained and converted to agricultural uses or timber production. WRP

offers three options to protect, restore, and enhance wetlands and associated uplands: permanent easements, 30-year easements, or 10-year restoration cost-share agreements. WRP is unique among agricultural cost share programs in that land to be restored does not have to have been recently used for crop production. The program is administered by the Natural Resources Conservation Service and funds are limited.

Maryland Agricultural Water Quality Cost-Share Program

The Maryland Agricultural Water Quality Cost-Share (MACS) Program pays up to 87.5 percent of the cost to install eligible BMP's to protect water quality. In recent years several new BMP's have been added to the list of eligible practices. These include stream protection practices, conservation cover, and nutrient management services. Some of the 29 eligible BMPS designed to reduce soil, nutrients and animal wastes entering state waterways include: filter strips, stream fencing, Critical Area plantings riparian buffers, and sediment basins. The program is administered by the Maryland Department of Agriculture.

Maryland Agricultural Land Preservation Foundation

The Maryland Agricultural Land Foundation was created by the General Assembly in 1977. The Foundation cooperates with local jurisdictions to establish agricultural preservation districts. Landowners within an approved district mat sell and easement to the State to preserve the land in perpetuity for agricultural use. The program also may fund acquisition of woodland, which may include wetland areas.

Rural Legacy Program

The Rural Legacy Program encourages local governments and private land trusts to competitively apply for funds to complement existing land conservation efforts or to develop new ones. Easements or fee estate purchases are sought from willing landowners in order to protect areas vulnerable to sprawl development that can weaken an area's natural resources, jeopardizing the economic value of farming, forestry, recreation and tourism. The Rural Legacy Advisory Committee, appointed by the Governor and confirmed by the Senate, reviews applications and makes recommendations to the Rural Legacy Board. The Rural Legacy Board makes final recommendations to the Governor and the Board of Public Works. The Board designates the Rural Legacy Areas and approves the grants for Rural Legacy funding.

Program Open Space

Program Open Space (POS) is the primary funding source for State recreational and resource lands, funded in part by real estate transfer taxes.. This effort has resulted in the acquisition of more than 150,000 acres of open space for state parks and natural resource areas and more than 25,000 acres of local park land. Other funds from the transfer tax help support Rural Legacy, and agricultural preservation. POS funds are evenly divided between State and local recreation acquisition and park development. In addition to acquisition, POS money may also buy easements and buffers for projects under the Conservation Reserve Enhancement Program.

DNR Fish, Wildlife, and Heritage Program staff provide Program Open Space with a listing of priority sites. The ranking is based on rarity of a species or community, threats, current and

potential long-term health of the population or community; and whether or not acquisition is an appropriate management strategy. Many sites acquired through POS have been wetlands.

Maryland's GreenPrint Program
This program funds protection of Maryland's most ecologically valuable remaining lands, identified as the Green Infrastructure Land Network. For fiscal year 2002, $35 million was made available for the purchase of easements or fee simple acquisition.
See previous section (Planning) for more details on the Greenways and GreenPrint Program.

Maryland Environmental Trust
The Maryland Environmental Trust (MET) is a statewide local land trust governed by a citizen Board of Trustees. Their goal is the preservation of open land, such as farmland, forestland, and significant natural resources. The primary tool for doing this is the conservation easement, a voluntary agreement between a landowner and MET. Since its creation by the General Assembly in 1967, MET has helped landowners protect over 65,000 acres of open land through more than 500 conservation easements (http://www.dnr.state.md.us/met/aboutmet.html). MET also endeavors to promote the protection of open land through the Local Land Trust Assistance Program. In addition, MET gives grants to environmental education projects through the Keep Maryland Beautiful Program.

Coastal and Estuarine Land Conservation Program
This program, administered by the Department of Commerce, was authorized in 2002. The purpose is to protect "important coastal and estuarine areas that have significant conservation, recreation, ecological, historical, or aesthetic values, or that are threatened by conversion from their natural or recreational state to other uses." (Public Law 107-77, Dept. of Commerce, Justice, and State appropriations Act of 2002). States with approved coastal zone management plans or National Estuarine Research Reserves are eligible to participate and seek funding for program development and administration and acquisition of properties for conservation. A match is required. A State must first receive approval of a Coastal and Estuarine Land Conservation Plan that identifies the scope of the plan, and identifies priority areas for protection and process for ranking proposals.

Chesapeake Bay Trust
The Chesapeake Bay Trust was created by as a nonprofit organization by the Maryland General Assembly in 1985. The Trust receives funding from a portion of the proceeds from sale of Chesapeake Bay license plates and a tax check off on Maryland income tax returns. The Trust also seeks contributions from the business community. Grants are awarded for projects that focus on preserving and improving water quality and wildlife habitat, and involve students and communities in conservation projects. Environmental education projects and watershed planning projects may also be funded.

U.S. Fish and Wildlife Service
Partners for Fish and Wildlife
This program concentrates on restoring cleared, drained or otherwise degraded fresh or saltwater wetlands, restoring streamside areas, and the habitats of fish, neotropical migratory songbirds,

and threatened species. Most projects involve wetland restoration. Private lands of any size are eligible.

Landowner Incentive Program
The Landowner Incentive Program provides competitive grants for States, territorial fish and wildlife agencies, and tribes to enter into collaborative efforts with private landowners interested in conserving natural habitat while continuing traditional land use practices. The Program provides technical or financial assistance for protection, restoration, and management of habitat to benefit species at risk, including federally listed endangered or threatened species as well as proposed or candidate species on private land.

Private Stewardship Grants Program
This Program provides grants and assistance on a competitive basis to individuals and groups engaged in voluntary conservation efforts on private lands that benefit at risk species on private lands.

Private Efforts
Private entities such as The Nature Conservancy, Eastern Shore Land Conservancy, and Conservation Fund all contribute to land preservation efforts. Efforts include acquisition of land, easements, holding easements, or facilitating acquisition. Private entities are often aided by DNR Natural Heritage staff and tools such as the Green Infrastructure to target preservation efforts.

National Fish and Wildlife Foundation
The National Fish and Wildlife Foundation is a private organization established by Congress in 1984 to conserve fish, wildlife, and plants, and their habitats. Funds are received from Congress and private sources. Goals include conservation of species of special concern, protection and restoration of streams, wetlands, forests, grasslands, and oceans, and promotion of conservation education.

Table App. II-2. Listing of voluntary programs affecting wetlands and waterways. The complete database of these programs including descriptions, can be referenced from the MDE Wetlands and Waterways website at http://www.mde.state.md.us/wetlands/1programs.htm

Scope	Name of Program/Law	Government Level
Technical and/or financial assistance, various land uses		
	Chesapeake Bay Agreement	Federal
	Chesapeake Bay Commission	Federal
	Chesapeake Bay Program	Federal
	Chesapeake Executive Council	Federal
	Coastal Wetlands Planning, Protection, and Restoration Act	Federal
	EPA State Wetlands Programs Development Grants	Federal
	Federal Aid in Sport Fish Restoration Act	Federal
	Forest Stewardship Program	Federal
	Forestry Incentives Program	Federal
	Ramsar Convention Treaty	Federal
	Land and Water Conservation Fund	Federal
	Maryland Coastal Bays Program	Federal
	Migratory Bird Conservation Act	Federal
	Migratory Bird Conservation Commission	Federal
	Migratory Bird Conservation Fund	Federal
	National Estuary Program	Federal
	Near Coastal Waters Program	Federal
	North American Waterfowl Management Plan	Federal
	North American Wetlands Conservation Act	Federal
	Partners for Fish and Wildlife	Federal
	Stewardship Incentive Program	Federal
	Landowner Incentive Program	Federal
	Private Stewardship Grants Program	Federal
	Surplus Federal Property Transfer	Federal
	Watershed Protection and Flood Prevention Act	Federal
	Wildlife Habitat Incentives Program	Federal
	Chesapeake Bay Trust	State
	Maryland Agricultural Tax Incentives	State
	Maryland's Local Tax Credit Program	State
	Non-Structural Shore Erosion Control	State
	Program Open Space	State
	Rural Legacy Program	State
	Small Creeks and Estuaries Reserve Program	State
	Stream ReLeaf/ Buffer Initiative	State
	Wetland Restoration Initiative	State
	Woodland Incentive Program	State

(*Table App. II-2* continued)

Scope	Name of Program/Law	Government Level
Technical and financial assistance, agricultural only		
	Conservation Reserve Enhancement Program	Federal
	Conservation Reserve Program	Federal
	Emergency Watershed Protection Program	Federal
	Environmental Quality Incentives Program	Federal
	Swampbuster	Federal
	Wetlands Reserve Program	Federal
	Farm Credit Program	State
	Flood Risk Reduction	State
	Maryland Agricultural Water Quality Cost-Share Program	State
Technical assistance only		
	BayScapes	Federal/Private
	Youth Corps in the Chesapeake Bay	Federal
	Backyard Wildlife Habitat Program	Private
Technical and financial assistance, private		
	Chesapeake Bay Initiative	Private
	Chesapeake Wildlife Heritage	Private
	MARSH Program (Ducks Unlimited)	Private
	Private Lands Program (Ducks Unlimited)	Private
	National Fish and Wildlife Foundation	Private
	Wildlife Habitat Improvement Program	Private
Planning Strategies		
	Clean Water Act Sec. 404 Advanced Identification	Federal
	Emergency Wetlands Resources Act	Federal
	Partners in Flight	Federal
	Statewide Comprehensive Outdoor Recreation Plans	Federal
	Greenways Commission	State
	Special Area Management Plans	Federal
	Tributary Strategies	State
	Wild and Scenic River Designation	State
	Green Infrastructure Assessment	State
	Watershed Restoration Action Strategies	State
Preservation		
	Program Open Space	State
	GreenPrint	State
	Maryland Agricultural Land Preservation Fund	State
	MD Environmental Trust	State

The Conservation Fund	Private
Coastal and Estuarine Land Conservation Program	Private
Land Trusts	Private
The Nature Conservancy of MD	Private

MDE
MARYLAND DEPARTMENT OF THE ENVIRONMENT
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Robert L. Ehrlich, Jr.
Governor

Michael S. Steele
Lt. Governor

Kendl P. Philbrick
Secretary

Jonas A. Jacobson
Deputy Secretary

BEST AVAILABLE TECHNOLOGY (BAT)WORKGROUP

Maryland Department of the Environment Water Management Administration
Bay Restoration Fund (BRF) – Onsite Sewage Disposal Systems (OSDS)
February 16, 2005

Collection of the BRF - OSDS

- Beginning January 1, 2005 all onsite sewage disposal system (OSDS) users with water bills pay a fee of $1.50/month (collected by the water billing authority).
- Beginning October 1, 2005 all OSDS users not receiving a water bill will pay $30/yr to the BRF (collected by the County).

Use of the BRF - OSDS

- Up to 5% of the fees collected by the County from users of OSDS may be used by the County for documented administrative costs. Cost beyond 5% may be carried over into subsequent years.
- Up to 0.5% of the fees collected by the Comptroller may be used for administrative costs.
- 40% of the remaining fees collected from OSDS users go to the Maryland Department of Agriculture to fund cover crop activities.
- 60% of the remaining fees collected from OSDS will be used for the following:
    - Grants or loans for the costs "attributable" to upgrading an OSDS to best available technology (BAT) for nitrogen removal.
    - Grants or loans for the cost difference between a conventional OSDS and a BAT nitrogen removal OSDS.
    - 8% of OSDS funds may be used by MDE for:
        - Implementing outreach, education, and upgrade programs.
        - Issuing grants and loans.
        - Providing technical support.

Impact of BRF – OSDS on Counties

- Counties are required to collect fees from OSDS users.
- The Department is exploring means of 'out sourcing' elements of the program to local jurisdictions.
- Health Department activities may include the following:
    - Public outreach and education.
    - Identifying grant eligible properties.
    - Plan review.
    - Inspecting system installations.
    - Implementing appropriate levels of management.
    - Follow-up inspections or monitoring of systems.

MDE

MARYLAND DEPARTMENT OF THE ENVIRONMENT
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Summary of MDE's FY 2005 Capital Program for Water Quality and Drinking Water

LOANS	AMOUNT
Water Quality Revolving Loan	70,000,000
Drinking Water Revolving Loan	11,000,000
GRANTS	
Nutrient Removal	17,500,000
Supplemental Assistance	5,000,000
Small Creeks and Estuaries Restoration	500,000
Stormwater Pollution Control	500,000
Water Supply	2,500,000
TOTAL	$106,500,000

Integrating Watershed and Land Use Planning in Maryland
List of Confirmed Participants (as of 3/03/2005)

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