Baltimore County Forest Sustainability Project

Overview

The Baltimore County Forest Sustainability Project used the Montréal Process Criteria and Indicators (MPC&I) as a tool for engaging stakeholders and developing a Forest Sustainability Strategy for the County. The MPC&I allowed participants with divergent points of view to develop a common understanding of local forest issues, identify those issues requiring additional study, and agree on necessary actions to ensure the long-term health and vitality of Baltimore County's diverse forest resources. Four years after it began, the Forest Sustainability Project continues to engage the original participants as well as a widening circle of stakeholders working cooperatively to maintain, preserve, and enhance the forests of Baltimore County.

One of several large forested parks, Oregon Ridge adds to the quality of life in Baltimore County.

Highlights

- The initial meeting for the Forest Sustainability Project drew more than 65 people representing a wide array of organizations and interest areas. Many of these participants continue to be involved in the project four years later.
- The Montréal Process Criteria and Indicators (MPC&I) were used to introduce project participants to key concepts of sustainability relative to temperate forests in an urban county.
- The MPC&I were instrumental in allowing participants with diverse interests in the County's forest resources to develop a common understanding of the complex problems facing those resources.
- A Forest Sustainability Strategy for the County was created, outlining the key issues and providing a detailed action plan for what needs to be done to address these issues by different stakeholders in the County. The Strategy is being implemented through partnership projects, grants, and a capital improvement program.
- A strong, active stakeholder base was established to take action, develop, and support County policy regarding forest management.
- Key areas of improvement were identified to guide and strengthen the Baltimore County Forest Sustainability Project in the future.

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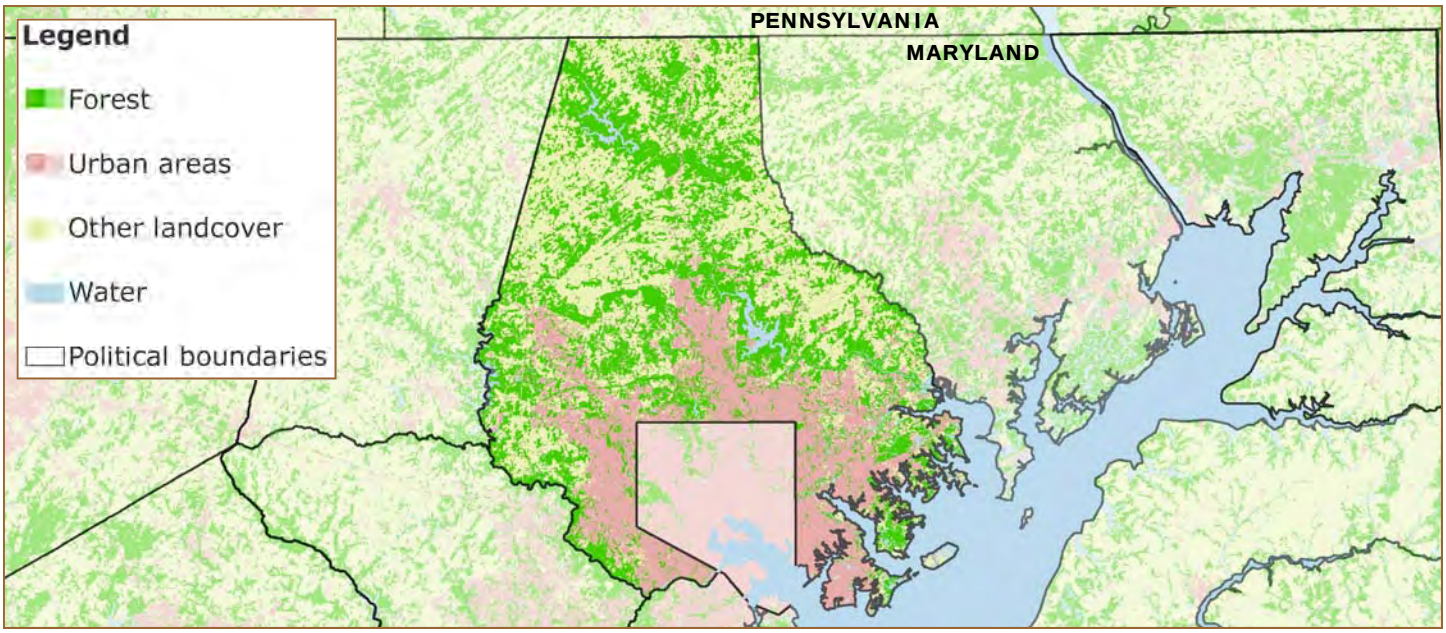

Background & Context

Forest Issues in Baltimore County

At the time Captain John Smith sailed up the Chesapeake Bay in 1607 the area that was later to become Baltimore County was estimated to have been 95% forested. Forests in the region benefit from generous annual rainfall averaging between 40-45 inches each year and generally good soils. The southeastern third of the County is in the Atlantic Coastal Plain with a climate best described as humid subtropical. The northern two-thirds of the County are in the Piedmont region with a climate more accurately described as humid continental. In both cases forests are the climax vegetation and would dominate the landscape without human intervention. Much of this forest was initially cleared more than 100 years ago for agricultural production, wood products, and fuel, including charcoal production.

Over the last 50 years, despite its location in the heavily populated eastern seaboard of the US, Baltimore County has been successful in minimizing conversion of its remaining forest resources to developed land. However, this success also contributed to the significant threats facing those resources as the twenty-first century began. The combination of population growth, an urban economy that supports a relatively affluent population, low-density zoning used to protect rural lands since 1975, and the lure of natural forest beauty has caused fragmentation and parcelization of the County's remaining forests.

Although 33% of Baltimore County is in forest and tree cover, the forest area is highly fragmented—physically and in terms of ownership (see Figure 1). The average forest patch size is 14 acres and only 14% of the County comprises forest patches greater than 200 acres. In general, privately owned forest land is more likely to be fragmented and parcelized than public land, and in Baltimore County private

Figure 1: Fragmentation of Baltimore County's Forest Resources

Baltimore County	Total acres	Percent of county	Percent of forest land
Total Land Area (610 sq mi)	389,000		
Forested area	130,258	33%	100%
Forest area – private ownership	97,693	25%	75%
Forest area – public ownership	32,564	8%	25%
Forest in 200+ acre patches	57,313	14%	44%
Forest in 100+ acre patches	80,300	20%	65%
Forest in protective easements	14,000	4%	11%

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Fragmentation: The physical splitting of contiguous blocks of forests into smaller patches. This is usually caused initially by clearing for agriculture or building roads and utility right-of-ways, although other types of development quickly follow. Fragmentation is a problem because of 'edge effects,' which are differences in the types of plants and animals that live on the edges of forest compared to interior forest areas. As the forest is broken into smaller physical pieces, there are more edge areas and fewer large interior areas. Animals and plants that require larger unbroken forest areas decrease and plants and animals that prefer edge areas begin to encroach. The result is degradation of the forest resources by invasive species, diseases, and insect pests.

Parcelization: The legal splitting of the ownership of large patches into smaller pieces, even if the forest isn't physically changed. This happens as large tracts of land are sold off for development or as owners divide up their holdings among their children. Although parcelization does not physically affect the forest, it makes future physical fragmentation much more likely. It also makes effective management of the forest more complicated and costly. Many owners of small parcels are ill-prepared for effective management of their forest land, both in terms of understanding the need for management and having the financial resources to do so. In addition, the loss of forest land under active management leads to a loss of forest-related industries and the forest experts with the skills and resources to do that management.

ownership accounts for 75% of the forest land. Between 1977 and 1989, the number of landowners who held fewer than 10 acres increased by 62%. Only 11% of the County's forests are protected from development by easements and land preservation programs. Other threats to the County's forest resources include: declining health of the forest lands due to the spread of invasive species, damage from disease, and damage from insect pests such as gypsy moths. In addition, the expanding deer population has over-browsed the forest understory, affecting the forest's ability to regenerate. These issues were of concern to the staff of the Baltimore County Department of Environmental Protection and Resource Management (DEPRM) and others, who realized that the successful preservation of forest lands was only a part of the task needed to ensure that the County would continue to enjoy the benefit of its forest resources in the twenty-first century.

The DEPRM staff also understood the significance of forest land in the context of protecting and restoring water quality—not just for the water bodies in the County, such as the three drinking water reservoirs for metropolitan Baltimore, but also for the Chesapeake Bay. This is particularly important because the federal Clean Water Act requires that states and local communities measure the extent to which land use is either degrading or helping to improve the water quality in lakes, rivers, and streams. Forest buffers around these water bodies reduce the amount of pollutants that run off into the water. However, the importance of forest resources to water quality was not well understood by the wide variety of decision-makers whose actions were affecting the health of the County's forest.

Montréal Process Criteria and Indicators (MPC&I)

In 2001, Baltimore County was approached by the US Forest Service to participate in a project called *Linking Communities to the Montréal Process Criteria and Indicators.* The Montréal Process (MP) is an international effort to develop measures of the sustainability of temporal and boreal forest resources. Experts from 12 countries that represent 90% of the world's temperate and boreal forests defined seven categories of critical ecological, economic, and social

"Most local government officials probably don't appreciate the extent to which having sustainably managed forest resources will help them achieve the TMDL [total maximum daily load] requirements intended to improve the water quality of their water resources."

—Don Outen, Natural Resource Manager, Baltimore County Department of Environmental Protection & Resource Management

issues that needed to be addressed. These categories, called 'criteria,' are listed in Figure 2, with a brief explanation of each category.

For each of the criteria, indicators had been developed to assess progress toward sustainable forest management. Because many of the decisions that affect forest management in the US are made at the local level, the US Forest Service wanted to determine if these criteria and indicators (C&I) could be used by local communities to foster more sustainable management of forest resources. Baltimore County was selected to test the indicators' usefulness in urban forest areas because of its location in the greater Baltimore-Washington DC metropolitan area.

Process

The broader process of developing a sustainability strategy began in June 2003 with a half-day Forest Sustainability Issues and Indicators Forum, which drew more than 65 people representing a wide array of organizations interested in forest resource management in Baltimore County. Attending organizations included government agencies, businesses, environmental groups, academic institutions, and private citizens. The government agencies represented all levels of government—from city and county to state and federal—and included planning departments, natural resource agencies, parks and recreation, public works, and agriculture. Local businesses represented included a local sawmill, a pulp and paper company, consulting foresters and ecologists, and a real estate company. Environmental groups included land conservancies and watershed protection groups. The interests of the participants were as varied as the organizations they represented.

The goals of the Forest Sustainability Issues and Indicators Forum were to: introduce the participants to the concepts of sustainability relative to forest management; identify and prioritize the key forest sustainability issues for Baltimore County; and identify key indicators for measuring forest sustainability in the County. In a brainstorming session, the participants voiced their concerns about forests in the County and used the MPC&I as a framework for organizing the issues raised. The participants then worked in small groups—again using the MPC&I framework—to prioritize the issues and identify possible indicators to use in evaluating issues and measuring progress.

After the Forum, the participants formed a Steering Committee to draft an overall strategy for sustainable forest management in the County, which was completed in November 2005. At the same time, in November 2005, a memorandum of understanding (MOU) was signed between Baltimore County, the Maryland Department of Natural Resources, the US Forest Service, and American Forests. The MOU provides for technical assistance to the County and helped to raise the visibility of the project with the County Executive. DEPRM staff created a web site for posting meeting notes, research papers, and committee work in progress. In addition, e-mail communication was used extensively to keep the original participants informed of the subcommittees' progress and the efforts to draft the overall strategy. With the completion of the Strategy, the Steering Committee continued working on the issues raised and identified five general themes of particular interest and priority for action. A "5E Forum" was held in June 2006 to explore these five priority areas: economic sustainability, ecological sustainability, easements, 'endicators' or environmental indicators, and education. The 5E Forum included more than 70 representatives of some 40 organizations, including adjacent counties. In addition to developing implementation actions, the Steering Committee became a valuable forum for sharing information among participants about a variety of topics and other programs such as gypsy moth suppression, deer management, forest habitat restoration, and biomass energy production.

Baltimore County's strong development regulations protect forested stream buffers.

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Figure 2: The Montréal Process Criteria and Indicators

Montréal Process Criteria	Sample Indicators
1. Conservation of biological diversity: the amount, range, diversity, and protected status of forest resources including the types of forests, types of species, and the genetic diversity of those resources.	a. Amount or area of forest by different type, age class, or successional class. b. Number of forest-dependent species and their status (threatened, endangered, etc.). c. Number of forest-dependent species that occupy a small portion of their former range.
2. Maintenance of productive capacity of the forest ecosystem: the extent to which the forest is able to produce timber and non-timber products.	a. Area of the forest land that is available for timber production. b. Annual removal of wood products compared to the amount determined to be sustainable. c. Annual removal of non-timber forest products compared to the amount determined to be sustainable.
3. Maintenance of forest ecosystem health: whether or to what extent the forest resources are healthy or threatened.	a. Percent of forest affected by insects, disease, or invasive species. b. Percent of the forest land subjected to air pollutants at a level causing negative impacts to the forest ecosystem. c. Percent of the forest with diminished biological capacity.
4. Conservation and maintenance of soil and water resources: the extent to which the soil and water resources in the forest land are healthy and will continue to contribute to the overall health of the forest.	a. Percent of the forest land with significant soil erosion. b. Percent of the forest land with significantly diminished soil organic matter or other changes to soil chemistry. c. Percent of streams in forest with stream flows, biological diversity, or chemical composition significantly deviated from historic range.
5. Maintenance of forest contribution to global carbon cycles: the extent to which the forest is absorbing or releasing carbon dioxide.	a. Total forest ecosystem biomass. b. Amount of carbon dioxide that the forest ecosystem is absorbing or releasing annually.
6. Maintenance and enhancement of multiple long-term socio-economic benefits to meet the needs of society: the extent to which the forest is contributing to the economic or social welfare of its community.	a. Volume and economic value of wood and non-wood forest products and the number of jobs in the forest industry sector. b. Percent of the forest managed for general recreation and tourism. c. Direct and indirect employment in the forest sector.
7. Legal, institutional, and economic framework for forest conservation and sustainable management: the extent to which the community's laws, organizations, and economy support conservation and sustainable management of its forest resources.	a. Inclusion of best practices, planning, and public participation in forest-related decision-making. b. Development and maintenance of human resource skills needed for sustainable forest management. c. Investment, taxation, and regulatory practices that support sustainable forest management.

"The [MPC&I] framework extracted the emotion from the effort and helped people see that the forest embodies all of these different issues."

—Steven Koehn, Maryland State Forester, Maryland Department of Natural Resources

Baltimore County is working with rural landowners to reforest large residential lots.

Results and Products

Reaching Consensus on the Issues and Challenges

Ecological Issues

The key ecological issues identified related to the extent of the forest land in the County and the quality or health of the existing forest. The problem of fragmentation and parcelization (see page 3) of the existing forest was the second most mentioned issue. Along with this was the concern that the amount of forest land and forested riparian buffers remaining in the County are not sufficient to provide required ecosystem services relative to water and air quality protection. Also mentioned was the amount of urban forest canopy and the benefits this tree cover provides. The key issues identified in terms of the health of the County's forest included edge effects associated with fragmentation, the lack of active management of the forest resources, and pests and diseases. The lack of regeneration from deer over-browsing was the most-mentioned forest issue.

Economic Issues

The key economic issues identified were related to development pressures, loss of forest industry infrastructure, and the lack of resources for forest management. These three issues create a vicious cycle: as more land is developed, there is less working forest land, making it harder for the forest industry to survive. That leads to a decline in the infrastructure necessary to support the industry, including a loss of people with the skills to manage the existing forest lands. The result is that there are fewer forest professionals to help and advise the increasing number of land owners with smaller parcels of land. This process also reduces the incentives available to forest landowners to keep their land in forest as compared to some other land use.

Development pressures were seen as a major driver of forest issues, causing a conflict between farm and forest land and increasing the value of land in general. Because of the importance of agriculture to the Maryland state economy, there is a strong focus on preserving farmland. Development is focused more on "putting houses in the trees instead of on the fields," as one participant said. Another participant suggested that farmers may be hesitant to convert working farmland to forest because of potential loss of farm revenue. One more participant pointed out that because of the high cost of land, people who purchase forest land are not willing to harvest the lumber unless they receive a higher return than the existing markets will pay.

The decline in working forest land has resulted in a loss of forest industry. For example, only one sawmill remains in the County. The cost of managing forest land is also an issue—more and more people own smaller and smaller parcels of forest land, but the cost of creating a management plan does not decrease proportionately with parcel size. The average size of a forest parcel in the County is 14 acres. Owners of parcels this size usually do not have the skills or knowledge to create their own management plan, or the money to hire someone to create or implement a plan.

There are also issues with resources available to manage public forest land, both for city- and County-owned tracts. Both Baltimore City and Baltimore County have large constituencies that do not place as much value on forest management as on issues such as education, housing, and economic development. This is partly an economic issue, since forest management requires funding, and partly a social issue, since the general public does not understand the value that forests provide in terms of drinking water protection and other ecosystem services.

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Social Issues

There were three key social issues identified: lack of understanding, lack of coordination, and legal barriers. The participants of the initial forum came to the meeting because they understood the importance of forests, but they acknowledged that other agencies, elected officials, and the general public lack an understanding of:

- The benefit of forests,
- The current state of the health of the forests in the County,
- The need to manage existing forests, and
- How the smaller pieces of forest fit into the larger picture of quality of life in the County.

Without a better understanding of the importance of forests, there is a lack of support for forest-related programs and projects—even though the forests provide many benefits, like improved water and air quality and a positive impact on housing values.

Lack of coordination between various agencies, organizations, businesses, and private individuals is related to this lack of understanding. As already mentioned, there is a conflict between farmland and forest preservation, since there is a fixed amount of land that can be preserved and both types of land are under pressure from development. There is also a lack of coordination of work on invasive species; for example, agricultural agencies are primarily concerned about invasive species that pose a risk to agriculture. Further, nurseries and garden centers are still selling plants for the home market that are considered to be invasive or potentially invasive.

The legal barriers identified relate to the ability to actively manage forest land that is under conservation easements. An initial concern was that existing easement programs prohibited active management. However, a study by the Easement Subcommittee showed that, rather than being actual legal barriers, they were perceptual and management related barriers. First, both for people putting land into easement

Restoration in the Patapsco River Watershed using a mechanical seedling planter.

and people who enjoyed public and private forest conservation land, the perception is that the forest land is saved from development so that it can remain 'wild.' Active management measures, such as cutting trees and culling deer populations, are contrary to most people's concept of preservation, even to improve the health of the forest. Second, the diversity of easement programs—each with its own programmatic goals, funding mechanisms, and management structure—makes a unified, county-wide approach to forest resource management difficult. Although most of the easement programs have requirements for forest management plans, in practice, the number of such plans in place and being followed is quite small. The result is that, although forest land has been preserved, in many cases the quality of that land is degrading because it is not being effectively managed to deal with diseases, pests, and invasive species.

Continuing Dialogue and Outreach

Continuing dialogue is taking place about forest sustainability through the efforts of the Steering Committee and the five subcommittees. A core group has been meeting for more than four years, and the group's size has been growing. The increase is due to new organizations and individuals being engaged and to the reengagement of people who attended the initial Forum but did not see how the work of the

"As a result of being part of this process I have learned a lot about how the health of the forest is affected by proper management and the importance to the county of having a Forest Sustainability Strategy."

— Bill Hughey, Planner, Baltimore County Office of Planning

Forests and farmlands comprise the working landscape of northern Baltimore County.

group fit with their overall interest. The use of email lists and the County's web site to provide frequent updates on activities were cited by a number of participants as the reason for their reengagement.

Tangible Outcomes: Projects, Programs, and Strategies

Effect on County Policies, Programs, and Practices

As a result of the forum and subsequent work of those who came together, a Forest Sustainability Strategy was created, outlining the key issues and providing a detailed action plan for what needs to be done to address these issues by the many different stakeholders in the County. The Strategy is being implemented via partnership projects, grants, and DEPRM's capital budget, all of which are approved by the County Council if they involve funding. Through new State requirements for local master plans that consider forests as sensitive areas and that require a holistic water resources element, it is anticipated that the forest strategy will be incorporated into the Master Plan for the County, which also is adopted by the County Council.

With the MPC&I and its Strategy as a guide, the County's Department of Environmental Protection and Resource Management (DEPRM) has moved aggressively to implement forest sustainability. One important set of projects includes assessing and monitoring forest health, including demonstrating leadership for its own forest holdings. DEPRM initiated a comprehensive assessment of Oregon Ridge Park, a County-owned parcel of more than 900 acres of contiguous forest land. The need for this assessment and the decision to fund it were a direct result of the County's involvement in the MPC&I project.

The results of the assessment were surprising to many people; for example, many did not know that more than half of the oak-dominated forest system has no regeneration due to excessive deer browse, or that the oak forest will evolve to a maple, beech, and black gum dominated forest if deer, invasive species, and pests/diseases are not controlled. The issue was heightened just as the study was completed when a 30 acre chestnut oak stand in the middle of the tract died after an initial defoliation by gypsy moths. The assessment outlined necessary action to maintain and enhance the health of this important segment of the County's forest resource. The assessment also provides a model for future assessments of publicly owned land in the County

Other forest-related assessment programs in the County have begun as a result of the Forest Sustainability Project. Under the *Urban Tree Canopy* program, Baltimore County is committing to specific goals for increasing the amount of tree cover in its urban areas. DEPRM also contracted with the US Forest Service to conduct a forest ecosystem values study of its urban forests using the Urban Forest Effects (UFORE) model.

The County is currently working with scientists at the University of Vermont to develop a forest fragmentation index for the County, and DEPRM has been

assisted by the US Forest Service in designing a rural forest health monitoring program.

Prior to the forest sustainability project, the County's suite of reforestation programs was limited. Since the late 1980's DEPRM has promoted the state's *Tree-Mendous Maryland* program that provides low-cost trees for planting on public lands and community open spaces. And since 1994 DEPRM's *Community Reforestation Program* has used fees from developers under the state's Forest Conservation Act to reforest open areas on public lands in the County. But with the large amount of private lands and forest ownership, the County needed to help with increasing tree cover on private lands. This led to the development of several innovative programs. The *Growing Home Campaign* provides homeowners with education about the benefits of planting trees and coupons for buying trees at a discount from local nurseries and garden centers. The *Rural Residential Stewardship Initiative* educates rural residential landowners on the importance of their 'management' of forest and streams. The *Community Reforestation Program* uses fees from developers to reforest open areas in the County, and provides for implementation of reforestation for landowners in return for their monitoring and maintenance of projects.

DEPRM has also developed a poster describing the work being done in the County on sustainable forest management and recently launched a web site to provide information to the general public and other forest stakeholders about the importance of fores land and what needs to be done to protect it.

Effect on Activities of Other Organizations

The diverse group of stakeholders convened at the beginning of the Forest Sustainability Project is still active in subcommittees, working on the key tasks outlined in the Forest Sustainability Strategy. Subcommittee members understand the benefits of better forest management to the County and their own organizations. They have become better advocates for forest issues, both at the county level and within their own constituency groups.

Buffer reforestation projects help to restore some of the County's transitional landscapes.

The adoption of the Forest Sustainability Strategy as County policy is moving forward, in part because of the diversity of the groups now strongly supporting it. In addition, these project members have become a conduit for information about forests. For example, one representative of a land conservancy group has shared information she learned about forest fragmentation, the need for migratory bird habitat, and other issues in newsletters and educational programs for her membership.

"The [MPC&I] was an approach that we didn't have to invent from the ground up. For a jurisdiction this is a major thing. Starting something new requires a lot of effort, so having a program/process that is already designed is very useful. It is also important that this was a comprehensive, resource-based approach that brought together industry people, the land preservation community, and the people who regulate the resources. The result gets you light years further than if each group is out there alone, spending time and energy on fragmented approaches."

—David Carroll, Director, Baltimore County Department of Environmental Protection & Resource Management

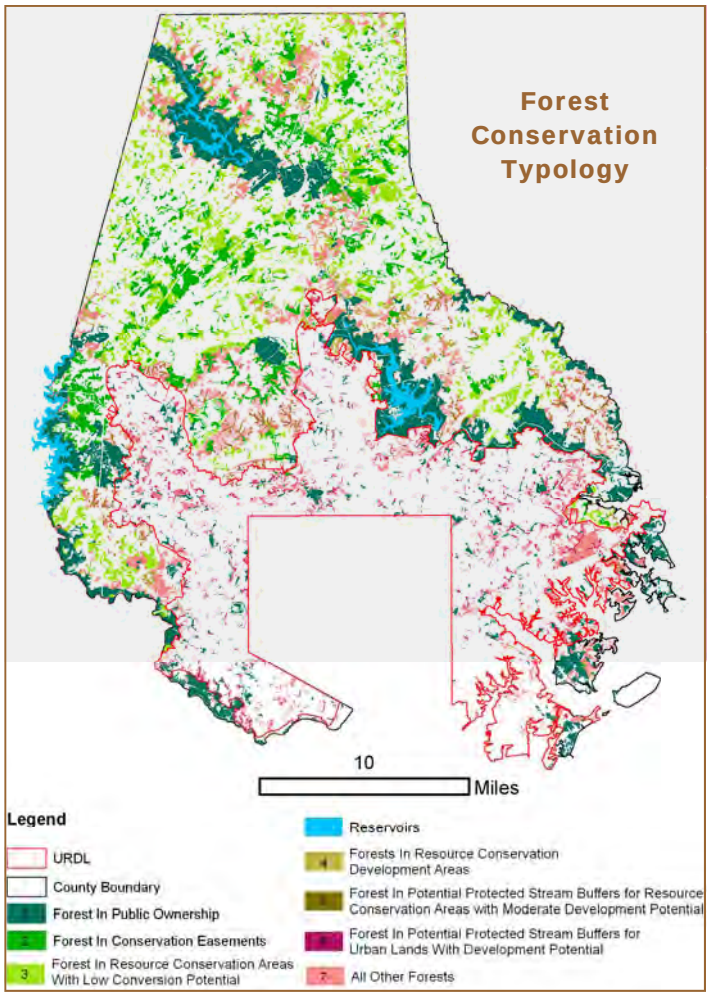
Evaluation

Montréal Process Criteria and Indicators

The use of the Montréal Process Criteria and Indicators (MPC&I) was a significant factor in the success to date of Baltimore County's Forest Sustainability Project. First, it provided a structure for organizing many different forest issues into a manageable big-picture view. Second, it served as a vehicle for bringing together people with diverse viewpoints and provided a platform for discussing those views. This made it easier for a large group of diverse stakeholders to understand and commit to the issues under discussion.

Because the framework includes social and economic aspects as well as the ecological aspects, all participants could see that their specific concerns would be addressed. Because the framework looked at all the ecosystem services that the forest provides, it enabled discussion of topics that could be emotionally charged for some groups, such as cutting trees and controlling deer populations. Several participants with an environmental viewpoint said they now understand the need for forest management, the benefit of having a viable forest industry, and the fact that, as one participant said, "cutting trees can be sustainable."

The flexibility of the MPC&I was cited as an important aspect of its usefulness. The framework provided structure and underlying scientific information, but within the structure, the group was able to examine Baltimore County-specific goals, criteria, and action strategies.



Total Acreage	Forest %	Cumulative Forest %
36,394	27	27
23,132	17	44
29,668	22	66
4,345	3	69
2,445	2	71
3,806	3	74
34,505	26	100

This map shows the status of forest patches by their degree of protection, or vulnerability to conversion to non-forest land uses (e.g., development).

Commitment to Conservation

Another factor in the success of the project is a long history of planning for and protecting open spaces in Baltimore County. In the early 1960s, the well-known landscape architect and planner, Ian McHarg was hired by a citizen conservation group to develop a plan for protecting open space in the County. In 1967, the Urban Rural Demarcation Line (URDL), Maryland's first urban growth boundary, was established to concentrate new development in areas with existing infrastructure. Beginning in 1975, the County enacted a series of protective rural Resource Conservation zones to protect farmlands, forest, and watersheds of the metropolitan drinking water supply. In 1987 the County's Department of Environmental Protection and Resource Management was created, with trained staff and a mission that

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includes resource planning in addition to regulatory aspects of resource management. One result of this history is a wealth of data necessary for effective forest management available in the County, including digitized property line information, stream boundaries, forest patches, and an inventory of forest easements. In 1995, DEPRM received a grant from the state Department of Natural Resources to develop the analysis methodology for the state's Green Infrastructure Assessment. The experience and data that resulted were also a boost to this project.

Keeping People Engaged Over a Multi-Year Project

Another factor of success mentioned frequently was the long-term involvement of a diverse group of public and private stakeholders, representing groups and individuals with a varied set of interests in forests: environmental groups, influential landowners, city and county agencies, foresters, businesses, and private citizens. There was also a diversity of geographic scale, with representatives from local, state, and national organizations. The diversity of the group gave political credibility to the process. Also, most of the initial members are still involved, which has provided stability and enabled varied tasks to move forward.

The project also benefited from effective use of e-mail and web-based communications. A project web site was used for sharing ideas and posting documents, and all participants were kept informed of upcoming meetings and the results of past meetings. This was useful in keeping people engaged and letting them see that the project continued to move forward even though the entire team might not be present at every meeting.

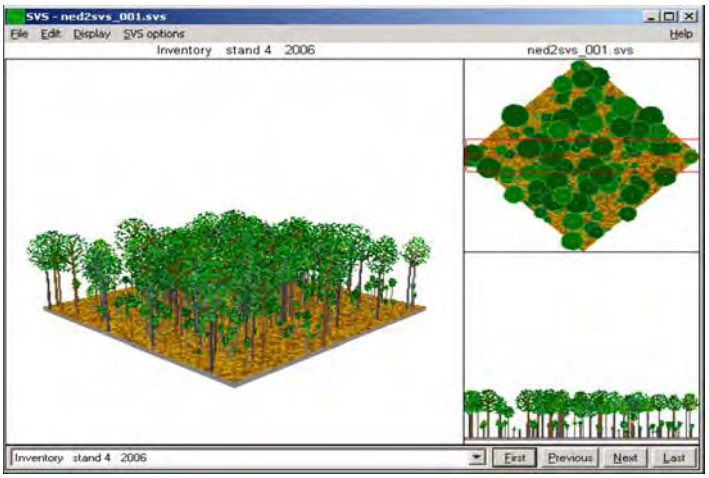
One less successful aspect of the project mentioned by some of those interviewed was the length of time the project has taken. Some of the participants expected to see results sooner and hoped to get the word out to the general public earlier.

Leadership

Strong leadership of the project was a success factor mentioned by most of those interviewed. This leadership included an effective point-person responsible for keeping the project moving and strong agency backing of the project.

The support of the Director of DEPRM was crucial in keeping the project going, particularly since it was a multi-year effort that would not produce immediate results. The County Executive's interest in natural resources and the fact the project tied into the County's Green Renaissance program were also key to its success. One participant said that few local governments were trying to elevate the importance of their remaining natural resources to be on par with built infrastructure and social capital, and that even in Maryland—which has counties with sophisticated planning and zoning capabilities—Baltimore County is unique in its integration of environmental and natural resources into the decision-making process.

Another aspect of the strong leadership was the effectiveness of the DEPRM staff working on the project. This included strong networking skills, credibility with the stakeholders, understanding of forest- and



Baltimore County uses state-of-the-science visualization tools such as NED-2, the Northeast Decision Model, to assess forest sustainability.

"Up until now, the committees have been like a jazz band playing for itself. Now we need a pop group that can play to the general audience—get this information out to homeowners and other people making daily decisions that affect the forest."

—Bud Chrismer, Baltimore County Department of Recreation & Parks

land-related data sets, the need for data, and the potential value of criteria and indicators in discussing forest issues in the context of County issues and policy. One participant mentioned DEPRM staff's ability to "translate data and measures into 'planner speak'" and ability to work with the data, science, planning, and political aspects of the project. Also mentioned by participants were DEPRM staff's hard work to make management comfortable with the whole process, their ability to use external connections with organizations like the US Forest Service and the Maryland Department of Natural Resources to bring additional resources to the table when appropriate, and the networking skills that were instrumental in bringing together 65 professionals and interest group representatives for the initial forum and then keeping those people actively engaged in the process.

Government Agencies Raised Visibility—and Added Credibility

The involvement of the Maryland Department of Natural Resources and the US Forest Service were mentioned as important success factors in two ways. First, having these organizations involved provided access to expertise, information sources, and funding opportunities that would have been difficult for the County to obtain otherwise. In addition, the involvement of these groups provided additional credibility to the process and helped raise the level of interest of other actors in the County, such as the County Executive. Because of this outside support, as well as the clarity of forest issues that resulted from the project, funding was made available for forest related projects, including the Oregon Ridge Assessment and the creation of a capital improvement program for forest resources.

Education and Outreach

The project has been successful to date in engaging individuals and organizations who understand the importance of forest resources to overall quality of life in Baltimore County. However, a critical next step for the project will be reaching out to other members of the community who do not yet understand that they are stakeholders in the process of ensuring the long-term health of Baltimore County's forests. This need is being addressed by the Education Subcommittee, which has prioritized forest education in schools, landowner education, and the role of demonstration forests.

Data and Indicators

Baltimore County is in the process of developing a specific set of indicators for the sustainable management of its forest resources. This relates to a key problem with local use of the MPC&I: a lack of data for actually measuring many of the MPC&I indicators at a local level. Indicators and actual measurement are important, but collecting the data for the full list of indicators in the Montréal Process would be an extremely expensive and time-consuming project. In Baltimore County, this actually caused a delay in the start of the project, since the DEPRM staff attempted to develop a list of indicators before convening the first meeting. Now, four years after the first meeting of the Forum, the project still lacks a set of indicators for measuring progress. However, there is a Forest Sustainability Strategy that outlines the critical issues as well as the data needed for moving forward on a set of indicators. The DEPRM staff understands there is a need to measure and report on progress in order to maintain the visibility of forest issues, but DEPRM does not see that the full suite of specific Montréal process indicators are necessarily most useful at a local level. DEPRM has begun several forest assessment and monitoring projects that will yield useful data for the County, and it has developed a conceptual framework for how the Montréal Process Criteria and Indicators might relate to local management questions and how the information can be used in county decision-making.

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Resources

Baltimore County Forest and Trees – web site maintained by the Department of Environmental Protection and Resource Management to provide information on the importance of forests and trees and County programs, such as the Growing Home Campaign, that allow residents and businesses in Baltimore County to make a difference. Also includes the Baltimore County Forest Sustainability Strategy and information about the 2003 and 2006 Forums and subsequent Forest Sustainability Project implementation activities.

http://www.baltimorecountymd.gov/Agencies/environment/forestsandtrees

Communities Committee of the Seventh American Forest Congress – a nonprofit organization that seeks to focus attention on the interdependence of America's forests and the vitality of rural and urban communities and the belief that local participation in stewardship of natural resources is critical to both forest ecosystem health and community well-being. Resources on the web site include publications, tools, guides, research, bibliographies, and information about funding for community forestry projects.

http://www.communitiescommittee.org

Forest Sustainability Indicators – Tools for Communities – a tool kit that uses the MPC&I as a framework for communities to assess their natural resources as a basis for long-term economic, social, and environmental health. The tool kit includes case studies of three communities that used the MPC&I and materials for organizing community workshops.

http://www.communitiescommittee.org/fsitool/index.html

Maryland Department of Natural Resources Forest Service – web site includes information about the state's *Strategic Forest Lands Assessment* and the various programs that support forest resources in Maryland, including riparian forest buffers, drinking water source protection, urban tree canopy goals, watershed-based forest management, and the Chesapeake Bay program. Includes a very useful section on 'Tools for Volunteers and Local Governments.'

http://www.dnr.state.md.us/forests

Roundtable on Sustainable Forests – a collaboration among public and private organizations and individuals, the Roundtable has produced an internationally recognized set of criteria and indicators of forest sustainability for public and private lands in the United States.

http://www.sustainableforests.net

Total Maximum Daily Loads (TMDLs) – web site providing basic information about TMDLs as well as examples of how they have been implemented in various states, tips and tools, regulations and policies, and links to other resources.

http://www.tmdls.net

US Forest Service Sustainable Resource Management – web site provides information about the use of the Montréal Process Criteria and Indicators in the US, including the 2003 *National Report on Sustainable Forests* with 67 indicators of sustainable forests in the United States.

http://www.fs.fed.us/sustained

For More Information

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About the Author and Designer

This green infrastructure case study was prepared by Maureen Hart and Dana Coelho.

Maureen Hart is the President of Sustainable Measures and author of the *Guide to Sustainable Community Indicators*. An internationally known expert on sustainability indicators, she consults on sustainability measurement issues with communities, non-profit organizations, and government agencies at all levels. She developed the indicators module of The Conservation Fund's weeklong *Strategic Conservation Planning Using a Green Infrastructure Approach* training program.

Dana Coelho is a Presidential Management Fellow with the US Forest Service. She works with both the Urban & Community Forestry and the Cooperative Forestry staffs in Washington DC.

About Green Infrastructure

Green infrastructure is a strategic approach to land and water conservation that links lands for the benefit of nature and people, helps identify conservation priorities, and provides a planning framework for conservation and development. Green infrastructure is different from conventional approaches to conservation because it looks at conservation values and actions in concert with land development and growth management. Green infrastructure projects bring public and private partners together to work collaboratively toward a common land conservation goal. They help move beyond jurisdictional and political boundaries by providing a process for identifying, protecting, and restoring interconnected green space networks that conserve natural ecosystem functions and provide associated benefits to human populations. The green infrastructure approach appeals to people concerned about biodiversity, habitat, and land conservation as well as people interested in open space and land use planning at the community, region, or statewide scale. It also appeals to smart growth advocates because of its potential to lessen impacts and reduce the costs of built infrastructure.

Green Infrastructure Case Study Series

This series of case studies highlights successful and innovative green infrastructure projects from around the country. The series was undertaken so that readers can learn from and improve upon approaches tried by others. We hope that thorough, well-documented examples will allow readers to see the many possibilities and to adapt successful practices to their unique situations and challenges. Each case study addresses the same basic pieces of the story: overview, highlights, background and context, process, public education and participation, results and products, management and stewardship, financing, application of green infrastructure principles, and evaluation. Eight principles of green infrastructure, which are elements of most successful efforts, form the core of the case studies. The series illustrates concrete, real-life examples of how to assess and protect green infrastructure, including details about how each step was implemented.

About The Conservation Fund

The Conservation Fund is a national, nonprofit land conservation organization that forges partnerships to protect America's legacy of land and water resources. Through land acquisition, community planning, and leadership training, the Fund and its partners demonstrate sustainable conservation solutions emphasizing the integration of economic and environmental goals. Since 1985, the Fund has protected more than 4 million acres of open space, wildlife habitat, and historic sites across America. The Conservation Fund's Green Infrastructure Program was created in 1999 to build the capacity of land conservation professionals and their partners to undertake strategic conservation activities that are proactive, systematic, well integrated, and applied at multiple scales. The program is a cooperative effort of the Fund and multiple public and private partners. Program products include a national course, workshops and conference sessions, publications, case studies, demonstration projects, a website, and related educational materials. The Conservation Fund would like to thank the Surdna Foundation and the USDA Forest Service for providing support for this and other Green Infrastructure Program products.

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