

Case Study 3: Baltimore County - A Case of Urban Forest Sustainability

3.1 The Community

Baltimore County is Maryland's third largest county in both area and population, consisting of 610 sq. miles (about 389,000 acres) surrounding, but not including, the independent City of Baltimore. The City and County were legally separated in 1851. In 2000 the County had a population of 754,300 people. This was an increase of 21% since 1970 and an increase of 9% since 1990. By comparison, the 2000 population of the City of Baltimore was about 650,000, representing a decline of 11.5% since 1990. Despite its sizeable population, 33.9% (or 130,258 acres) of Baltimore County's land area is in forest and tree cover. Of the total 130,258 acres of forests, 75% are in private ownership and 25% in public ownership. Nearly 14,000 acres (10.7% of total forest acres) are in protective conservation easements. Large amounts of the Baltimore County forests are concentrated around three City-owned reservoirs, which serve 1.8 million people in the region, including the City of Baltimore.

Unique for Baltimore County is its strong emphasis on concentrating development in the current urban centers in order to preserve the rural agricultural economy, to protect the region's drinking water reservoirs, and to conserve forests and open space. Eighty-five percent of Baltimore County's residents live within the urban growth boundary, established in 1967, on 1/3 of the land. Overall, land cover is approximately one third each urban, agriculture and forests. Due to suitability of soils for farming, the County's forests are highly fragmented, with only about a dozen patches greater than 1,000 acres. About 62% (or 80,300 acres) of the County's total forest is in 100-acre or larger forest patches. About 44% of the County's forest cover is in patches greater than 200 acres.

Unlike the other two case studies where a coalition representing private and public interests was involved in developing indicators for sustainable forests, in Baltimore County, a county agency, the Department of Environmental Protection and Resource Management (DEPRM) took the lead on the project. DEPRM's mission is to:

“administer and enforce environmental laws, regulations, programs, and activities for the purpose of conserving, enhancing, and perpetuating the natural resources of the county and to preserve and protect the environmental health of its citizens”.

DEPRM performs a diverse set of resource protection and management functions including land preservation, resource protection (regulatory programs such as stormwater management, forest buffers, forest conservation, and groundwater protection), environmental restoration (stream restoration, stormwater best management practices, shoreline erosion control), watershed planning and water quality monitoring, urban stormwater facility maintenance, watershed-based ecosystem research, education and citizen participation, and protection of environmental health.

Some of the key issues that the County has been facing in relation to forests include:

- Loss of forest cover due to development

- Conflict between farming and forestry
- Forest fragmentation
- Increasing deer population affecting significantly forest health
- Drought (water shortage) and the impacts on forest health
- Air pollutants and the impacts on forest health
- Managing Baltimore County’s watersheds (protecting the reservoirs)
- Lack of knowledge regarding the health of large forest holdings
- Lack of knowledge about the needs of, and communication with, the forest products industry

There have been numerous initiatives and organizations working on forestry issues in the County and the region. One example of a regional effort is *Revitalizing Baltimore* – a national model community forestry and watershed restoration project funded by the USDA Forest Service, which involved partnership between the Maryland Department of Natural Resources Forest Service, Baltimore County and Baltimore City, non-profit organizations, three community-based watershed associations, businesses and academic institutions. In addition, one of the first of two US “urban” Long-Term Ecological Research (LTER) projects funded by the National Science Foundation is focused on rural-to-urban watersheds in Baltimore County and City.

Baltimore County has also established itself for aggressive and innovative resource management programs. Stream and forest resources have particularly been the focus of the County’s efforts. For example, in order to better address protection of forest and stream system resources during land development, DEPRM enacted comprehensive *Regulations for the Protection of Water Quality, Streams, Wetlands, and Floodplains* in 1990, which expanded County policies first developed in 1986 to require retention of forested stream buffers. This regulatory effort pre-dated the Chesapeake Bay Program’s Riparian Buffer initiatives. With the passage of the Maryland Forest Conservation Act in 1991, DEPRM’s field assessment procedures that implemented local forest conservation were subsequently adopted by the State for the Act’s Technical Manual.

DEPRM also became involved in Green Infrastructure network research in 1995, and in 1996 produced a methodology for the MD Department of Natural Resources under contract. The project’s report, *A GIS-based Methodology for Establishing A Greenway Corridor System in a Fragmented Forest Landscape*, established DEPRM’s interest in assessing forest resources on a landscape level and in identifying large-scale priority sites for protection and reforestation. Through this work, DEPRM’s programs became known to officials with the USDA Forest Service.

Finally, Baltimore County’s Master Plans have acknowledged the importance of protecting valuable natural resources, including forests, streams, and reservoirs, for more than 20 years.

DEPRM has extensive large-scale GIS (Geographic Information System) data on urban, herbaceous, and forest land cover; streams; conservation zoning; soils and geology; property parcels; etc. Although large amounts of data have been collected, these have not

been systematically organized and linked to overall forest resource management goals and vision, thus making it difficult to determine what is important and what is not, and how to use data to make better decisions.

3-2. How the project started

In August 2002 key DEPRM staff met with “this ToolKit” project team members to discuss the involvement in the project and Baltimore County’s needs. Two objectives were identified that the “Linking Communities to the MP C&I” Toolkit could help achieve:

- Incorporate sustainability indicators into DEPRM’s existing natural resource management efforts (e.g., development of a process for identifying critical issues and relevant goals, identification of indicators, data sources, thresholds, and targets, organizing existing data, and interpreting results); and
- Raise awareness among other Baltimore County agencies and organizations about the usefulness of sustainability indicators to the County’s mission, goals and initiatives including:
 - Understanding of the connection between existing initiatives and sustainable forests;
 - Building cross-agency/cross-organizational understanding, engagement and support for sustainable forests;
 - Identifying possible sustainability goals and indicators for Baltimore County to raise awareness and measure progress in key areas (e.g., forest cover, fragmentation, water availability, impacts of deer population)

The initial task involved identifying work already done to address key forest management issues in Baltimore County. Information about critical issues, goals/targets, indicators, and available data sources was compiled into a table organized within the Montreal Process Framework. Initially, DEPRM staff attempted to develop “the ultimate” list of indicators but soon it came to realize that such an effort requires an input from a larger and more diverse group. Also, while DEPRM has an understanding of some County-wide resource issues, those for management of privately-owned and managed forests are largely unknown.

Therefore as next step DEPRM sponsored a one-day forum in June 2003 to help identify system-level issues and indicators that would allow tracking progress and making better decisions for forest sustainability in the County.

3-3. Using the Montreal Process Criteria and Indicators (MP C&I)

Baltimore County was interested in using the MP C&I, since it saw its potential as a tool for making better decisions in managing forest resources and growth in the County. The scope of the C&I, including both technical and institutional aspects, and including ecosystem and human components, was particularly appealing. DEPRM also viewed that

the Montreal Process provided a framework for supporting a broader management role for sustainability of the County's forest resources.

Baltimore County Forest Sustainability Issues and Indicators Forum was held on June 10, 2003. Over 60 participants attended the forum, including local, state and federal government, NGOs, citizens groups, businesses, and academia. Private sector interests included forest products users, and consulting ecologists and foresters, in addition to a variety of agencies that provide technical and financial assistance to landowners. The groups and organizations represented included:

- Baltimore City Department of Planning
- Baltimore City Department of Public Works
- Baltimore County Department of Public Works
- Baltimore County DEPRM
- Baltimore County Forest Conservancy District Board
- Baltimore County Office of Planning
- Baltimore County Soil Conservation District
- Biohabitats, Inc.
- Charles A. Davis, Inc.
- Edrich Lumber Co.
- Friends of Patapsco Valley and Heritage Greenway
- Gaylord Brooks Realty Company
- Glatfelter Pulpwood Company
- Gunpowder Valley Conservancy
- KCI Technologies, Inc.
- MAR-LEN Forestry, Inc.
- MD Department of Agriculture
- MD Department of Natural Resources
- Parks and People Foundation, Inc.
- Parkton Woodland Service, Inc.
- The John Hopkins University
- U.S. Environmental Protection Agency
- U.S. Geological Survey
- USDA Forest Service
- USDA Natural Resources Conservation Service
- University of Maryland Cooperative Extension Service
- Watershed Protection Coalition, Inc.

The main objectives of the Forum were to:

- Review forest sustainability and the Montreal Process Criteria and Indicators as relevant to Baltimore County;
- Introduce participants to sustainability goals and indicators (system, program and action level);
- Identify and prioritize key issues related to forest sustainability in Baltimore County

- Select key indicators to measure forest sustainability in Baltimore County.

During the first part of the workshop participants were introduced to the DEPRM work to date and why DEPRM decided to get involved in the project. A brief introduction of the MP C&I was made, followed by a “round-robin” (carousel) exercise for identifying key issues and challenges for Baltimore County for each of the seven Montreal Process criteria. Participants were randomly assigned to groups in order to preclude people from the same organization working in the same group. After brainstorming numerous issues and challenges, participants prioritized them using their knowledge and best judgment. The result was a smaller list of most important (key) issues and challenges. Additional issues/challenges to the ones identified by the DEPRM staff in the preliminary phase included education, inventory of species, funding for acquisition and forest management, and public and private ability and willingness to manage forest lands, among others.

Some of the important issues identified by the participants did not fit into the seven Montreal Process Criteria. These included:

- “Financing” sustainable forests – who benefits, who pays and how to measure values in order to establish incentives
- Education and decision-making for “Stewardship”
- Regulatory authority and enforcement within an ecosystem management framework
- Linkage of process, information, measures and decisions across political boundaries and landscape scales

Once the key issues and challenges to sustainable forest management in Baltimore County were identified, participants defined some broad sustainability goals and selected indicators to measure progress. For this activity, small groups were formed based on participants’ interests. Each group worked on one of the seven Montreal Process Criteria by first reviewing the list of Montreal Process Indicators to select most relevant ones, then suggesting additional measures, and finally prioritizing the list of indicators. The result was a shorter list of four-to-five key indicators for each criterion. Participants were encouraged not to be limited by data availability while selecting the key indicators. During the report back session, each group briefly talked about data availability for the identified indicators, allowing the larger audience to provide additional ideas and suggestions.

A list of identified key issues/challenges, goals and indicators is included in Table D-3.

3-4. Next steps

Using the information from this first meeting, DEPRM intends to form a committee including all participants interested in helping to move the process ahead by finalizing the list of indicators and beginning data collection. It was acknowledged that this is expected to be a long process of continuous improvement, aiming to involve an even wider group

of organizations in order to share resources, define common goals and vision and measure progress toward sustainable forest resource management in Baltimore County.

As a first step DEPRM plans to call for volunteers to be on a Steering Committee, which would take a lead on drafting a strategy for moving the process ahead.

DEPRM is also finalizing a proposal and application to use indicators for other management programs, an effort that can potentially interface well with the Montreal Process project. DEPRM is working with the U.S. Environmental Protection Agency's National Exposure Research Laboratory to demonstrate the application, at a local scale, of analytic tools developed for the EPA's Regional Vulnerability Assessment (ReVA) program. The ReVA application will allow Baltimore County to evaluate resource stressors and effects for existing and future conditions.

3-5. Lessons learned

A key lesson from this pilot community was that the MP C&I is useful for initial review of forest-related issues to ensure that all key aspects of forests are considered. The seven criteria in particular provide a simple framework to identify key issues and challenges to sustainable forests in local communities. In its current state, however, the framework does not address the issues of farming, loss of forest cover to development, and air quality impacts, which are critical in Baltimore County.

Participants pointed out that the Montreal Process C&I are a better fit for large publicly-owned forests. In east coast areas such as Baltimore County, private land ownership has always been the predominant pattern. Forest management approaches used nationally for large publicly-owned areas do not necessarily work well for small, fragmented privately-owned forest lands. Forest resource management issues are exacerbated as a result of increasing fragmentation of ownership as well as fragmentation of actual forest blocks. Conflicts have also increased over the balance between protection of forests from harvesting and their management for sustainable production. There needs to be more work under the MP and particularly Criterion 7 to address funding and availability of incentives for private owners to adopt sustainable forest practices.

Some participants noted that, as it currently stands, the Montreal Process C&I does not adequately address engaging the users of forests. Education and public involvement with emphasis on ethnic and class representation is a key, if the goal is to advance forest sustainability. This is an important future issue as the population of Baltimore County becomes more diverse in its socioeconomic composition. The growing deer population in Baltimore County was another of the key identified challenges. The deer have significantly affected the forests serving as buffer around the regional drinking water reservoirs. Many deer are causing car accidents. Many people, however, are still opposed to deer hunting and this perception can only be changed if the public is better educated about the issue.

Educating the public on forest sustainability issues can further help change public perception by emphasizing that forest management is a positive and not a detrimental activity, when properly planned and conducted. Overall, the challenge is essentially whether Baltimore County can “have its cut and ecology too.”

The Forum participants had some specific comments on the Montreal Process criteria, including the following:

- Under Criterion 1 (Biological Diversity) some of the indicators seem to have too large a focus and thus are not relevant at the community level. Participants emphasized the importance of measuring all forest dependent species, not just the large patch species. There was also a concern that ‘the number of forest dependent species’ may be misleading, since it is not directly linked to biodiversity.
- The main issue with Criterion 2 (Productive capacity of forest ecosystems) was the lack of clarity on what is meant by ‘a forest product’. Does it mean trees, hydro geologic capacity or providing food for other species? This needs to be defined and followed by establishment of timeframe for forest management plans.
- The main problem with Criterion 6 (Long term multiple socio-economic benefits) was that most of the Montreal Process indicators measured forest production, therefore were not particularly relevant for Baltimore County. Participants pointed out the need to find a way to value the forests for other uses than timber production. For example, it is well known that housing prices go up as the number of trees in a neighborhood increase. In addition, forests are highly valued for recreation and they provide protection of water resources (both quality and quantity).

A key lesson from the workshop was that Montreal Process Criteria and Indicators work can only be useful when it is part of the community development process, i.e. when a wide range of groups and organizations are brought to work together on sustainable forest issues. MP C&I helps link organizations and people working on different aspects of sustainable forests, and thus ensures a better communication and collaboration between groups with conflicting interests, promotes data sharing and work towards a common vision and goals. For Baltimore County, MP C&I are also a demonstration of using indicators themselves as important tools to measure change and progress toward goals.

Table D-3: List of issues, goals and indicators selected by Baltimore County Forum participants

Criterion	Key Issues/Challenges	Goal(s)	Indicators
1. Biological Diversity	<ul style="list-style-type: none"> • Inventory of species • Impact of non-native, native, domestic species 	<ul style="list-style-type: none"> • Maintain or increase biological diversity of native forest- “dependent” species in Baltimore County 	<ol style="list-style-type: none"> 1. Extent of forest fragmentation 2. Number of rare elements in Baltimore County forests 3. Number of forest ‘dependent’ species

	<ul style="list-style-type: none"> on ecosystems • Forest fragmentation 	to improve the quality of life.	<ol style="list-style-type: none"> 4. Extent of area by forest type and by age class or succession state 5. Number and extent of non-native organisms in County's forests
2. Productive capacity of forest ecosystems	<ul style="list-style-type: none"> • Education • Conversion of land use and land cover to non-forest • <u>Sustainable</u> management plan 	<ul style="list-style-type: none"> • Enhancing and maintaining the capacity of existing forest ecosystems • Generating new and productive forested areas using sustainable management plans • Promoting education and awareness of the productive capacity of forest ecosystems 	<ol style="list-style-type: none"> 1. Area of forest land and net area of forest land available for timber production 2. Annual removal of wood products compared to the volume determined to be sustainable 3. Total growing stock of both merchantable and non-merchantable tree species on forest land available for timber production 4. Area of public forest land with a sustainable management plan and 5. Area of private forest land with a sustainable management plan 6. Annual removal of non-timber forest compared to the level determined to be sustainable 7. Number of acres of timber productive land harvested from natural forest ecosystems vs. tree plantations
3. Maintenance of forest ecosystem health and vitality	<ul style="list-style-type: none"> • Exotic invasive species 	<ul style="list-style-type: none"> • Invasive/exotic/native species will be managed to limit impacts on sustainability. 	<ol style="list-style-type: none"> 1. List of exotic/invasive species 2. Area and percent of forest impacted beyond a [threshold] of damage 3. Monitor spread of invasives/exotics
	<ul style="list-style-type: none"> • Management for ecosystem values 	<ul style="list-style-type: none"> • Increase implementation of management plans that maintain forest health. 	<ol style="list-style-type: none"> 1. Percent (or acres) of forests with a sustainable forest management plan 2. Percent (or acres) of <u>implemented</u> management plans
	<ul style="list-style-type: none"> • Expand forest cover 	<ul style="list-style-type: none"> • Develop and implement a plan for decreasing fragmentation and increasing forested area. 	<ol style="list-style-type: none"> 1. Area of forest in County 2. Size of forested patches
4. Soil and water resources	<ul style="list-style-type: none"> • Loss of forest land affecting water 	<ul style="list-style-type: none"> • Manage Baltimore County Forest for 	<ol style="list-style-type: none"> 1. Percent of forest land under permanent protection (through

	<p>quality, quantity, and stream function</p> <ul style="list-style-type: none"> Maintaining and increasing forest in key sensitive areas (buffer, recharge, reservoirs) 	<p>protection and improvement of soil and water resources</p>	<p>easements, etc.)</p> <ol style="list-style-type: none"> Percent of streams (miles) protected by forest buffers/miles restored Percent of forest land by watershed Percent of stream miles/waters meeting “good” IBI – Index of Biological Integrity Percent of streams supporting trout populations (or some measure of percent natural species) Acres of potential recharge areas in forest cover Percent/miles of unstable streams (deviate from historic or stable flow and timing)
5. Global carbon cycle	<ul style="list-style-type: none"> Lack of inventory/information on present condition \$\$ for acquisition and management Inability to respond to existing market demand due to lack of resources/infrastructure 	<ul style="list-style-type: none"> Increase opportunities for participation in carbon markets 	<ol style="list-style-type: none"> Quantity and quality of ecosystem and carbon pool, by forest type, age, class, successional stage, land use, region \$\$ expended buying credits (acquisition and maintenance) Number of acres afforested and reforested under program Number and geographic location of buyers and sellers of credits
6. Long term multiple socio-economic benefits	<ul style="list-style-type: none"> Timber harvest is not a major economic factor in Baltimore County but management, including cutting, may be important for forest health 	<ul style="list-style-type: none"> Expand forest land base and manage for: recreation, forest health, aesthetic, and water supply purposes, with minor income/revenue enhancement from selective cutting. 	<ol style="list-style-type: none"> \$ value of forest setting for residences Economic value of protected water supply \$ value of selective cuts on managed forests Area and percent of forest land managed for recreation, as percent of total forest Area (total acres) maintained for residential aesthetic values Local budget for forest assessment, inventory, research, planning, regulation and education.
7. Legal, institutional, economic framework	<ul style="list-style-type: none"> Public and private ability and willingness to manage forest lands 	<ul style="list-style-type: none"> Establish laws, regulations, policies and incentives to value, protect and increase sustainable 	<ol style="list-style-type: none"> Percent of forest that is protected and sustainable compared to Y2K Number of sustainable new builds and retrofits

	<ul style="list-style-type: none"> • Protection for upland forest • Capacity for planning, regulating and assessing forest • Paradigm shift 	forest.	<ol style="list-style-type: none"> 3. Number of schools that include sustainable forest in their curriculum 4. Amount of funding sustainable forest compared to Y2K 5. Number of Baltimore county and state agencies which include sustainable forest objective 6. Number of acres covered by a new tax code 7. Number of developers and architects building sustainable buildings 8. Number of economic and social incentives focus on sustainable forest
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