

Appendix D: CASE STUDIES

This appendix includes three case studies – one for each of the three pilot communities that used this Indicator Toolkit: Gogebic County (Michigan), Wallowa County (Oregon), and Baltimore County (Maryland). The case studies provide information on the community, how the project started and how the Montreal Process Criteria and Indicators were used to advance forest sustainability efforts. Included is also information on the selected indicators, next steps in the projects, and the key lessons learned from each community.

Case Study 1: Gogebic County, Michigan

1-1. The Community

Gogebic County is a rural community of 1,112 square miles or 712,032 acres located in the Upper Peninsula of Michigan. It is the westernmost county in Michigan, bounded on the west and south by the state of Wisconsin and on the northwest by Lake Superior. Eighty percent of the County is forested. The forests are largely comprised of aspen, birch, maple, and softwoods. The Ottawa National Forest occupies 311,493 acres in the County or 43.7% of the land area. Of the remaining forest, 47.5% is private and the remaining 8.8% is under state and county control. Mining and timber production have traditionally been the main industrial sectors but they have been in decline, since the mid-1960's. Roughly 30 miles of Lake Superior shoreline is a prime recreational attraction. The combination of climate, forests, and terrain produces ideal natural conditions for nature or sport activities such as downhill or cross-country skiing, snowmobiling, ATV trails and mountain biking.

Gogebic County's population is currently 17,370 people. The County is struggling with high unemployment, low wages, aging population and a growth in second home ownership. The County has been very active in trying to address these issues and attract new industries. Some of the recently established businesses include the Watersmeet mill, Wakefield mill, FiberSpec mill, Bessemer Plywood, and Burton industries. The calculated tax benefits of these industries to the municipalities and the school system is estimated at about \$245,000 annually.

1-2. How the project started

In the course of developing a multi-year strategic plan in 1998, the Gogebic County Economic Development Commission brought together a group of 29 county residents representing a broad cross section of the community to define a vision for the county. The group was challenged to identify strategic goals and related specific projects to move the community closer to realizing these goals. One goal identified was *to coordinate uses and users of the county's natural resources*. A project adopted to move toward that goal was *to define sustainable forestry for Gogebic County*. The initiative was driven by a desire

on the side of community planners to own the process and to enfranchise local voices regarding local forestland issues.

As a first step a steering committee on Natural Resources was established in February 1999 to serve primarily as the data gathering and coordinating group. The Committee agreed that economic, ecological and social aspects of sustainable forestry were to be considered within the scope of sustainability. The need for assembling economic data was paramount. It was acknowledged that some data on forest resources are readily available, but others such as social and cultural data, are not. The Group agreed that the economic aspect of forestry was the priority area but at the same time it was important to harmonize it with the ecological and social aspects to promote sustainable resource use over the long term.

The steering committee agreed that there was a need for a “large, diverse community based organization.” As a result, a community group was formed to provide continuous input and feedback from the larger community. The group was called the Forest Advisory Coordinating Team (FACT) and was charged with helping to identify and address forest-related issues in Gogebic County.

FACT was made up of approximately twenty-five people from diverse segments of the County, including:

- foresters
- land owners
- forest products firms
- public officials
- educators
- retailers
- tribal authorities
- service companies
- health care providers
- public safety providers
- conservation groups
- representatives of the faith community
- the soil conservation district board
- community development organizations
- regional media, and
- resource educators from Michigan State University Extension.

FACT’s mission was to agree upon a vision for sustainable forestry in Gogebic County in the long run, based on data for past and present trends. The group was also charged with mediating and advocating for the County in forest issues using recognized factual basis for its positions. A key responsibility of FACT was to educate the public about the role of forestry and inform the community about the need to sustain the value of forests for the future of the County.

The Forest Advisory Coordinating Team first met in June 1999. As a first step, the group developed a draft definition for sustainable forestry in the County. This was not a simple task given the diversity of views represented by FACT members. The definition that they reached consensus on was:

Sustainable forestry in Gogebic County is [*forest management*] that contributes to the [*economic health*] of Gogebic County while maintaining the [*ecological and social/cultural values*] for the benefit of present and future generations in Gogebic County.

To reach this consensus, they made the strategic decision to put several phrases in brackets. These were phrases that would need further refining but that they could all agree on initially without spending too much time debating their actual definition.

In order to get even wider community involvement in the process, FACT members took the draft definition to a large number of organizations to get buy-in to the idea. As a result, the definition was supported via formal resolution by every municipality in the county, the Tribal government of the Lac Vieux Desert Band of the Lake Superior Chippewa, the Gogebic County Board of Commissioners, and a number of development and civic organizations in the county such as the County Economic Development Commission, the County Forestry Commission and several civic organizations.

Even with this success, the members of FACT realized that their job had just begun. The next step was to continue to refine the definition and develop a consensus on the parenthetical elements:

- forest management
- economic health
- ecological and
- social/cultural values

In order to further refine these four terms, FACT decided to use the Montreal Process Criteria and Indicators (MP C&I). Initially the group focused on developing socio-economic indicators assisted by the Michigan State University Extension Program. The next step was to expand the focus and include some ecological indicators to evaluate the health and productive capacity of local forests. This led to the idea of being a pilot in the “Linking Communities to the Montreal Process” project.

1-3. Using the Montreal Process Criteria and Indicators (MP C&I)

Gogebic County was particularly interested in using the MP C&I for two main reasons:

- a) to refine their definition and the four bracketed terms by selecting criteria and indicators;
- b) to use these indicators to measure their progress toward the vision of sustainable forestry in the County.

The intent was to either adopt existing criteria and indicators or develop local criteria and indicators that would help accomplish the above two tasks.

In a series of two workshops in November 2001, organized by FACT, participants from Gogebic County developed a draft list of principles and sustainability indicators for measuring economic, environmental and social conditions, pressures and activities as they relate to sustainable forestry efforts.

This draft list of indicators was a result of two approaches. First, workshop participants brainstormed sustainability indicators within each of the three key areas (forest management, economic health, and ecological and social/cultural values). The next step was to select indicators from a long list of sustainable community/sustainable forestry indicators that was organized within the MP C&I framework. A round robin exercise was used to help select draft indicators for the County. The workshop concluded with a brief discussion of possible data sources for the indicators and how to move the project ahead.

1-4. Next steps

In early 2002 two key FACT members left the community and although this slowed down the process, the project did not stop because the remaining FACT members, including Dick Bolen, Director of Forestry and Parks for Gogebic County, were firmly committed to the project. The steering committee met twice in January and April 2002 and finalized the list of indicators for Gogebic County. It also developed recommendations on how to proceed with the work. The definition of sustainable forestry in Gogebic County was finally agreed upon by selecting a small set of indicators for each of the four bracketed terms (economic health – 4 indicators, ecological health – 4 indicators, ecological values – 5 indicators, and social/cultural values – 6 indicators) (see Table D-1).

The County's main challenge was to obtain funding for the data crunching. The FACT submitted a grant proposal to the USDA Forest Service but due to budget cuts to pay for the forest fires in the West, there was no available funding. The FACT will submit another proposal for the next fiscal year. Meanwhile, the group focused on doing more education and outreach to different sectors to get final support from the community. In addition, FACT was involved in some outreach beyond the local community. This effort began in 2002 with a presentation of the Gogebic model to a multi-state group called ANSWERS (Alliance of Northern States Working to Ensure Regional Stability). This group was interested in exploring how the model used in Gogebic County could be applied in surrounding counties and/or at the region-multi state level such as the border counties of Michigan and Wisconsin.

1-5. Lessons learned

The Gogebic County initiative for sustainable forestry provided some key lessons that other communities may find valuable:

- It is over-ambitious to try to do both sustainable community and sustainable forestry indicators at the same time under the MP C&I. The latter is specifically designed to address forest issues and leaves very little space for other social and economic issues, such as education, civic engagement, public health, etc. While these are important aspects of any community, trying to develop indicators to cover each of them leads to a long list that is extremely difficult to manage. Moreover, because it is focused primarily on forest resources, the MP C&I is not the most suitable approach to use for general community development. Other approaches such as the community capital or pressure-state-response may be more useful in developing indicators for these areas. The MP C&I is most suited for communities with a strong interest in or concern for forest-related issues.
- Some of the indicators in the Montreal Process C&I set are not meaningful at the local level. There is clearly a need for upscaling and downscaling the indicators, or identifying which indicators at the national level can be used locally and which ones at the local level can be integrated up to the national scale. Creating a tiered system of indicators at different scales (local, regional, multi-state, and national) is particularly important both for improving data collection and decision-making at all these levels in order to promote sustainable forestry.
- Although the MP C&I framework is useful as an organizational tool during a community's indicator development process, a community may find other frameworks more useful for final presentation of an indicator set. In the case of Gogebic County, the categories “Forest Management,” “Economic Health,” “Ecological Values,” and “Social and Cultural Values” were used.
- There is no one set of indicators that will apply to every community (one-size-fits-all). Depending on their resources and key issues, communities need to select the most relevant indicators to measure their sustainable forestry efforts.
- The workshops in Gogebic County demonstrated that community indicator projects are processes and not endpoints. A community cannot expect that in one meeting it will get all the answers and develop the perfect set of sustainable forestry indicators. First, involving a diverse community representation often involves a series of discussions to reach a consensus. Second, public education and raising awareness about the importance of preserving forest resources is more important than simply coming up with a sophisticated set of indicators. Third, as a community changes over time, its key issues may also change. This requires continuous revisiting of the goals and indicators for sustainable forest management.
- Indicator projects should include a wide group of people representing diverse interests in the community. This helps build ownership within the community and helps to overcome the institutional and policy fragmentation that results from multiple land ownership, mandates, legislation, and policies. Moreover, diverse community support for the project helps to ensure that the initiative will continue even in the case of a loss of critical members.

- There is a clear need to identify data and information sources that communities can use in measuring and tracking the indicators. Data collection can be time-consuming and expensive as some of the information is place specific. For example, to measure some of the social and cultural values in the community, Gogebic County initiated a comprehensive residents survey designed and conducted by the Department of Forestry and MSU Extension, Michigan State University. However this was an expensive one-time effort that cannot be replicated without continuing funding.

Gogebic County was clearly an example of a community that did not have outside resources but managed to engage the entire community and come up with a common vision for a sustainable forestry. It demonstrates that even small communities with limited resources can do a lot by taking charge in defining a common vision and goals, initiating action and measuring progress.

Table D-1: List of indicators selected by Gogebic County FACT

Category	Indicator	Data
Forest Management	1. Number of acres of forest in Gogebic County in each category.	FIA (Forest Inventory Assessment data)
	2. Number of forest acres in Gogebic County with written forest management plan.	
	3. Percent of forested land in Gogebic County that is certified by a third party.	
	4. Percent of volume of forest harvested relative to volume growth in Gogebic County.	FIA
Economic Health	1. Acres of forest that allow timber harvest (a.k.a., working forest) in Gogebic County.	Measurements are not known but FIA data can be used for trends.
	2. State Equalized Value of land in Gogebic County.	SEV is readily available at the County offices.
	3. Changes in labor statistics and employment patterns in Gogebic County.	Readily available from labor market analyst of State of Michigan.
	4. Value and volume of value-added products of forest industries in Gogebic County.	
Ecological Value	1. Change in water quality in Gogebic County.	
	2. Changes in forest structure and composition in Gogebic County.	FIA and MSU Extension
	3. Proportion of forests in Gogebic County that are affected by disturbance and damaging agents.	FIA
	4. Number of forest species in Gogebic County that are classified as threatened, rare, vulnerable, endangered, or extinct.	
	5. Average parcel size in Gogebic County.	FIA and plat book.
Social and	1. Change in ownership of land in Gogebic County.	

Cultural Value	2. Changes in quality of life in Gogebic County.	Primary data collected through interviews of county residents.
	3. Changes in population in Gogebic County.	
	4. Percent of Gogebic County population under the poverty level.	Census data available.
	5. Changes of infrastructure of Gogebic County.	
	6. Changes in acreage of forest land converted to development in Gogebic County.	

Case Study 2: Wallowa County, Oregon

2-1. The Community

Wallowa County consists of 3,153 square miles located in Northeastern Oregon in the beautiful Wallowa-Whitman National Forest area. The county is about 52 % forestland and 56% of the forests are owned by the federal government. Wallowa County has a population of about 7,200 people. Forest and watershed management activities in the county suffer from declining financial and human resources. This decline can be seen in the high unemployment rate (10.7% in the County compared to 6.3% in Oregon and 4.8% in U.S. in year 2001); the declining school enrollment; and the emigration of working families. The average annual pay per job in the year 2000 in the county was \$22,546 compared to \$35,296 in the U.S. In a recent statewide assessment the Oregon Progress Board ranked Wallowa County’s economy as the 35th out of 36 counties in the state. Over the past several years, 14.3% of the county residents have had income below the federal poverty level. In addition, there is a clear trend toward increasing retiree and second homeownership.

The traditional forest-related industry sector in Wallowa has experienced significant decline over the past decade as a result of increased tree mortality, severe fire and pest impacts, a downturn in the market price for lumber, and increasing federal-level restrictions on wood and other natural resources such as anadromous salmonids (under the Endangered Species Act of 1992). All three of the remaining timber mills closed by 1995 – including the large Boise Cascade mill in Joseph, which had the highest (union) wage jobs. While the two smaller mills in Joseph and Wallowa reopened in 1996, supplies to these mills remains tenuous. As a result, the 123 jobs provided by these mills – and the over 100 other jobs linked to the lumber and wood products industry (contractors and workers, truckers, etc.) – are at risk. Over the past 10 years, the forest-related sector of the local economy lost over 220 jobs, which is greater than the jobs gained over the same period by all other sectors combined.

Despite the losses, the lumber and wood products sector remains the second largest employer in the County in terms of both job count and total payroll. Local government is the leading sector in both of these categories due in large part to the county hospital, while federal government places third in both categories.

2-2. How the project started

Several representatives from local, county, state, and federal agencies met in November 2000 in La Grande, Oregon to discuss current and ongoing assessments primarily related to social and economic conditions. The group was brought together by LUCID (Local Unit Criteria and Indicator Development Project) and shared a wide range of goals and objectives related to monitoring and reporting needs based on county, state and federal laws and policy initiatives. As a first step the group developed a list of current initiatives working in the field of sustainable forestry at different levels – local, regional, multi-state and national.

Following the meeting, the Northeast Oregon Community Assessment Workgroup (NEOCAW) was formed to design and implement a social and economic assessment framework and process for Union and Wallowa Counties. The Core Group of NEOCAW included:

- ◆ Regional Services Institute, Eastern Oregon University
- ◆ Grande Ronde Model Watershed (an intergovernmental agency covering Wallowa and Union counties)
- ◆ Wallowa Resources, a small local NGO
- ◆ USFS Wallowa-Whitman National Forest

Other parties who participated in this work included representatives of:

- ◆ Wallowa and Union Counties' Board of Commissioners
- ◆ Wallowa and Union Counties' School Districts
- ◆ Oregon Department of Forestry
- ◆ Oregon Economic and Community Development Department
- ◆ Oregon Progress Board
- ◆ Northeast Oregon Economic Development District
- ◆ Oregon Department of Employment
- ◆ USFS Pacific Northwest Research Station (INLAS)
- ◆ USFS Malheur, Umatilla and Wallowa-Whitman National Forests
- ◆ Blue Mountains Demonstration Area
- ◆ Ecosystem Workforce Program

The group recognized the need to do additional outreach to assess interest in participation amongst the tribes with ceded lands and treaty rights within the analysis area including the Nez Perce Tribe, the Confederated Tribes of the Umatilla Indian Reservation, and the Confederated Tribes of the Warm Springs Reservation of Oregon. Participation from each County's Workforce Investment Boards and/or Economic Development Committees, and other parties was also considered important.

The key objectives for NEOCAW were:

- to provide an overall framework for assessing social and economic baseline conditions with common indicators, protocols and standards and to monitor meaningful and measurable changes over time.
- to facilitate and focus the project partners' limited resources on collaborative data collection and combined assessment efforts.
- to provide an effective feedback from the public of how the groups are progressing toward achieving the various goals and objectives.

The participants agreed that they needed to focus on key questions to guide the development of a *Collaborative Assessment Framework*. As a result, the following six key questions were developed to guide NEOCAW's work in the first year (2001):

1. What is the baseline condition of the economy, social well-being, and the quality of life in Union and Wallowa Counties, and what factors and trends (natural resource management, economic development, agricultural production, etc.) are affecting these conditions?
2. What key assets and business and workforce capacity are available for ecologically sustainable natural resource management, economic development, agriculture production, etc.?
3. What opportunities exist or are forthcoming to utilize local skills, businesses, and resources to address ecosystem restoration needs and create by-products or value-added opportunities?
4. How can investments in community-based watershed restoration lead to improvement in the natural resource management of landscapes, generate economically viable local employment and income, or improve the socio-economic conditions?
5. Where and how can investments in high priority watersheds for conservation and restoration be most effective in providing a high probability of benefits to local communities?
6. What are the tradeoffs between alternative choices for ecosystem restoration management activities and what is the distribution of impacts to local communities, other individuals and future users of the area?

Although most of these questions focus on the socio-economic aspects of natural resource management, the Group acknowledged that the framework developed should be based on the concept that social, ecological and economic systems interact with each other as elements of the ecosystem. Moreover, multiple temporal and spatial scales are important to linking changes in the system, therefore identifying indicators that assess such changes at different scales would be critical.

The first draft of the *Collaborative Assessment Framework* focused on the relationships between the forested landscapes and the resulting community conditions. The Montreal Process Criteria and Indicators and the Oregon Department of Forestry's Core Indicator Data Matrix were used as the initial basis for developing the local draft framework. The

main objective of the Core Group was to focus on indicators that were already being assessed at the state and national levels to maximize efficiency in data collection and assessment efforts.

The Core Group screened a partial list of useful resources and frameworks identified at the November 28, 2000. Criteria and indicators were modified to provide a meaningful and measurable set of local criteria and indicators.

The first fundamental change was to expand the framework to capture information and provide for the analysis of community conditions with the entire landscape of both counties, including forested, agricultural and urban lands. The Group agreed to retain the criteria and indicators from the Montreal set at this time, and noted that the State of Oregon set is based on a narrower range of Montreal Criteria and Indicators that help to focus the discussion.

NEOCAW agreed that incorporating standards for assessing progress of the indicators was necessary, but deferred the discussion and development of standards until the core criteria and indicators framework was finalized.

Due to funding limitations, the participants agreed that each entity conducting an assessment would be responsible for archiving the information gathered and sharing it with the others whenever it becomes available. Several different groups have been collecting various elements of the data but no collaborative data gathering and analysis had been undertaken. The short-term objective of the group was to establish a collaborative effort for identifying multiple plans and policies, criteria and indicators, collect multiple data sets among the various entities and produce analysis of results in comprehensive format using the framework for communicating to the public.

2-3. Using the Montreal Process Criteria and Indicators (MP C&I)

NEOCAW was particularly interested in using the MP C&I to help expand their indicator set beyond the socio-economic indicators to include some ecological indicators for assessing baseline conditions and trends in local natural resources.

In a workshop held in May 2002 NEOCAW brought together representatives from Wallowa, Union and Grant Counties to introduce them to the concept of sustainability, Montreal Process C&I, and the work done so far. The main objective of the workshop was to refine and expand Wallowa County's indicators for sustainable forest management and sustainable community, and develop a common vision of what natural resource management can or should mean in the context of community-based needs, desires, and economic well-being.

During the first day of the workshop Wallowa County participants were first introduced to the work done by NEOCAW. Then, using Round Robin exercise the group selected indicators from a long list of sustainable community/sustainable forestry indicators organized within the MP C&I framework.

The second day of the workshop brought together NEOCAW, Blue Mountains group and the Tech Team to address specific challenges to indicator development, such as data availability, issues of scale, data interpretation, etc. Participants further discussed the six key Wallowa County questions.

2-4. Next steps

The workshop faced some skepticism toward the process and a real fear of loss of local control over the natural resources. However, this problem was resolved in the following months. The Natural Resource Advisory Committee (NRAC) was charged with the task of moving the process ahead. People wanted to meet and brainstorm indicators. Over 70 people were involved in setting the community values. NEOCAW members presented their work and the larger group liked it. This work naturally built on a previous effort in the County called “Future Search” – a process that involved a wide group of people from Wallowa County who got together and developed a common vision and agreed on key initiatives to move toward this vision.

As a next step the larger community group charged NEOCAW and NRAC to develop some county specific criteria and indicators that focus on the unique attributes of the County. The goal was to come up with indicators which are highly valued by the residents. A final list of indicators has been developed but due to the pressures of other projects, the final report is not expected to become available until 2004.

2-5. Lessons learned

NEOCAW project provided the following key lessons that other communities may find valuable:

- The MP C&I approach focuses primarily on forest sustainability and leaves out other important natural resources such as agricultural and range land. Other important community issues such as education, public health, safety, etc. are also left out of the framework. Therefore, the MP C&I is best suited as a framework for communities particularly interested in forest-related issues.
- Having long lists of indicators to choose from can be overwhelming and frustrating for the participants. It might be better to take a few key issues and have participants develop their own indicators.
- It is overly ambitious to try to develop a final list of indicators in one day-long meeting. It takes a long time to review and discuss each indicator; therefore a better approach would be to have a series of one-day meetings to finalize the indicators.
- Before beginning a process to develop sustainability indicators it is very important that there be clarity about a) the purpose that the indicators will serve; and b) the common vision and set of goals that will guide indicator development and related

action. The indicators are only a tool and they cannot help promote sustainable forest management unless they are part of a process of goal-setting, decision-making and acting upon results.

- There is no one set of indicators that will apply to every community (one-size-fits-all). Depending on their resources and key issues, communities should be able to select the most relevant indicators to measure their sustainable forestry efforts.
- There is a strong interest in developing sustainable resource management indicators because indicators are information and information is power. In a community like Wallowa County, the greatest fear is the loss of local control over the local resources. Having comprehensive information on the baseline of natural resources and trends would allow the community to participate in national-level discussions and help change national policies. An example of such participation is the NEOCAW's recent involvement in revising the National Fire Plan.
- Related to the fear of loss of control mentioned above, the MP C&I framework can initially be seen in a negative light by community members because it was developed by an international group to address national level forest management. This can cause misunderstanding that using the MP C&I will result in decisions that reflect national or international concerns rather than local concerns. This is not the case, since the MP C&I is only a framework for organizing information and addressing issues. Therefore, if the process is locally driven, the results will reflect local concerns and solutions. However, organizers of a community process should be aware of this potential concern and be careful how the MP C&I is introduced to the community.
- Involving a wide group of community members is critical for gaining credibility, building consensus and creating ownership of the indicators, which paves the way for moving ahead. It further helps raise awareness and educate the public about key community issues related to natural resource management. The Wallowa case demonstrated the importance of preparing the larger group before the actual launching of the indicators project in order to avoid some difficulties related to local cultural and political issues.
- The Wallowa County pilot demonstrated that the process of developing indicators is not an easy one. Frustration at some points is natural; it should not discourage the participants. Developing goals and indicators for sustainable resource management is a cyclical, evolving process. Even if a community decides to go back and start from a blank sheet, it has benefited from the cumulative learning. The process of indicator development is as important as the actual indicators because it promotes understanding of and buy-in to the overall objectives.
- Involving more than one community can be challenging when developing vision, goals and indicators for sustainable resource management. Even though Wallowa and

Union Counties are very similar they have enough differences to approach the process and the indicators differently.

- Some of the Montreal Process C&I are not meaningful at local level. There is clearly a need for upscaling and downscaling the indicators, or identifying which indicators at national level can be used locally and which ones at local level can be integrated up to the national scale (this was a common finding from all three pilots). Creating a tiered system of indicators at different scales (local, regional, multi-state, and national) is particularly important both for improving data collection and decision-making at all these levels in order to promote sustainable forestry.
- In some cases using the Montreal Process Criteria appears to be more useful than the Montreal Process Indicators themselves because the Criteria ensure a comprehensive coverage of forest issues but leave more freedom to communities in selecting the most appropriate measures for their circumstances. Other frameworks for developing the actual indicators may turn out to be more useful (e.g., Community Capital Framework, Input-Output-Outcome, Pressure-State-Response).
- It is very difficult for a community with limited resources to attempt to use all 67 indicators laid out in the MP C&I. A better approach might be to select and use a small number of core indicators covering key issues of concern (e.g., 10-20).

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 on ecosystems • Forest fragmentation 	<ul style="list-style-type: none"> • Maintain or increase biological diversity of native forest- “dependent” species in Baltimore County to improve the quality of life. 	<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 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 	<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

		productive capacity of forest ecosystems	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"> List of exotic/invasive species Area and percent of forest impacted beyond a [threshold] of damage 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"> Percent (or acres) of forests with a sustainable forest management plan 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"> Area of forest in County Size of forested patches
4. Soil and water resources	<ul style="list-style-type: none"> Loss of forest land affecting water quality, quantity, and stream function Maintaining and increasing forest in key sensitive areas (buffer, recharge, reservoirs) 	<ul style="list-style-type: none"> Manage Baltimore County Forest for protection and improvement of soil and water resources 	<ol style="list-style-type: none"> Percent of forest land under permanent protection (through easements, etc.) 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 Protection for upland forest Capacity for planning, regulating and assessing forest Paradigm shift 	<ul style="list-style-type: none"> Establish laws, regulations, policies and incentives to value, protect and increase sustainable forest. 	<ol style="list-style-type: none"> Percent of forest that is protected and sustainable compared to Y2K Number of sustainable new builds and retrofits Number of schools that include sustainable forest in their curriculum Amount of funding sustainable forest compared to Y2K Number of Baltimore county and state agencies which include sustainable forest objective Number of acres covered by a new tax code Number of developers and architects building sustainable buildings Number of economic and social incentives focus on sustainable forest

