CALEDON INSTITUTE OF SOCIAL POLICY

community stories

June 2004 ISBN #1-55382-109-2

The Canadian Community Monitoring Network

Environment Canada and the Canadian Nature Federation have developed and are promoting an ecological monitoring process which taps into a powerful force in our society – people's desire to effect positive change in their natural environments. The process will harness the interest of environmentally-conscious citizens to gather local ecological information, coordinate these efforts and use the results to help direct public policy.

In our just-in-time information society, there is a pressing need for reliable scientific information to be supplied to civic leaders which will satisfy the requirements of both the scientific and legislative communities. Scientists, by definition, are driven to achieve a high level of statistical certainty, a requirement that can take more than 10 years in the case of environmental monitoring. Such results can be frustratingly slow and of questionable use to policy-makers who generally operate on a much shorter time frame.

To bridge the certainty and information needs of both communities, researchers around the world now are subscribing to the "precautionary principle" – a 'better safe than sorry' approach which recognizes "the need to act to reduce potential hazards *before* there is strong proof of harm, taking into account the likely costs and benefits of action and inaction" [P. Harremo, D. Gee et al 2002: 13].

In 2001, Environment Canada's Ecological Monitoring and Assessment Network Coordinating Office (EMAN CO)[1] and the Canadian Nature Federation (CNF) joined forces to better understand the issues involved in linking science to decision-making. They were interested in finding some way of harnessing the power of a community monitoring network in order to supply the kind of environmental information desired by policy-makers. With funding from the Canadian Voluntary Sector Initiative, 12 regional coordinators were hired to work with 31 communities across the country to test and refine different approaches to Community Based Monitoring and subsequent local decision-making.

The results derived from the 31 pilot communities were used to arrive at a four-phase Canadian Community Monitoring Network (CCMN) model. Originally, more than 80 project proposals were submitted to EMAN CO

and the CNF. The 12 projects chosen represented as wide a range of communities as possible – large to small, rural to urban. Aside from some preliminary training workshops, the participants operated in isolation from one another. Towards the end of the 18-month project, everyone was brought together to discuss the outcomes of their work, and to help develop a community monitoring model which could be used across the country. Dr. Hague Vaughan, Director of EMAN CO, remarked that within hours of meeting one another for the first time: "The model very quickly began to take shape. It was clear that people's experiences – while quite different – had been markedly complementary."

CCMN's pilot phase ended in March 2003, and several community volunteers are continuing to collect project data, despite the fact that no funds are immediately available to support the work. "Canadians in every community have a very strong tie with the land," says Hague. "Traditional structures – families, communities, religious organizations – have changed to such a degree that many people are searching for ways to re-connect with one another and their environment. Once renewed through involvement in a monitoring program that clearly makes a difference in local outcomes, concern for the land becomes a very powerful incentive to re-engage with the forces that shape society."

Watershed work in Alberta

The Town of Okotoks, located 30 kms south of Calgary, already had a sustainable community plan on its books when the EMAN CO request for proposals arrived in 2002. "Timing and readiness are very important to the success of this type of project," says Maureen Lynch, coordinator of the CCMN project in this region and now a community projects coordinator. "Laying the groundwork is often the most important step." Maureen was an independent consultant who relocated to the area from Red Deer when the proposal was approved by EMAN CO.

In response to EMAN CO's offer for communities to work together, representatives from Okotoks approached the nearby towns of Turner Valley and Black Diamond to partner on the program. The prospect of having a dedicated community coordinator work in their towns for one year was an attractive feature for all three communities. "In addition," says Maureen, "people liked the idea of working with an independent projects based on local needs. Because I wasn't associated with any particular group, they felt that I would bring an unbiased approach to the work."

The project used several innovative strategies to stimulate interest and awareness of local watershed issues. These included: coordinating three tri-community river cleanups, using a community-based marketing approach to go door-to-door to engage residents in a dialogue on water conservation issues, and providing high school students with opportunities to conduct water quality monitoring that link to their curriculum. So successful was the CCMN project that it paved the way for combined funding opportunities totalling more than $250,000 to date.

Says Maureen: "Thanks to the CCMN pilot, we had a one-year window to begin sharing information, building capacity and seeking new partners. The decision of all three town councils to include this work as line items in their budgets encouraged the participation of other stakeholders. Our involvement with partners such as the Bow River Basin Council has allowed us to share information with other interested communities and help them get started on their own initiatives. We kept the central message of CCMN front and centre – continuously link community activities to decision makers and be conscious of what information they need to make better decisions."

The opportunity for individual citizens to be involved in collecting information about their local environments gives them a stake in local decision-making. Supplied with specific data on water, soil and air quality, they may make informed decisions about how best to preserve and protect those elements of their surroundings that they have identified are central to their quality of life. CCMN offers the potential of a progressively richer dialogue between citizens and policy-makers. Organizers believe that as environmental data accumulates and participants become better informed of the issues, policy discussions and decisions will become more solidly based on environmental evidence.

Structuring the message

The precautionary principle suggests that we do not have to wait until we are certain to announce that a problem exists. Environmental monitoring can move the process back even further – to the point where reliable indicators show that a problem is beginning to emerge – though at an increased risk of being wrong. The goal of the CCMN project is to make sure that information is presented early enough into the process of issue development that it can result in a highly effective response. "We don't want to tell people that the canary is dead," says Hague. "We want them to understand that they need to listen when the canary coughs."

A lichen study conducted in the City of Hamilton is a good example of what can happen when community monitoring information is well presented. As in the Okotoks, Black Diamond and Turner Valley example, Hamilton's involvement in the CCMN project laid the groundwork for the development of a partnership among the city, EMAN CO and Environment Hamilton (a local nongovernmental organization) which would deliver community-generated data into local decision-making processes.

The City of Hamilton has included local government, citizens, businesses, and community groups and organizations in defining a long-term vision of a healthy, vibrant and sustainable future. Called "Vision 2020," the plan emphasized the importance of community empowerment and listed a commitment to ensuring that the City's air quality would be the highest of any urban area in Ontario (for more information on the report, visit *http://www.vision2020.hamilton.ca*).

Monitoring lichens on trees is one way for community groups to measure air quality. Areas with high air pollution levels will have little or no tree lichen. EMAN CO had worked with the best lichenologists in Canada to develop a simple, but scientifically sound, lichen monitoring protocol. After a half day of protocol training, seven university students and their professor took two days to visit 150 sites across Hamilton in order to identify and quantify lichens. Six weeks of data collection, collation and identification resulted in the creation of maps which established baseline information on Hamilton's lichen 'hot spots.' The maps and supporting information were presented at the City's Upwind Downwind Conference in March 2004 and EMAN CO now is using the maps to inform discussions with the Hamilton Industrial Environmental Alliance.

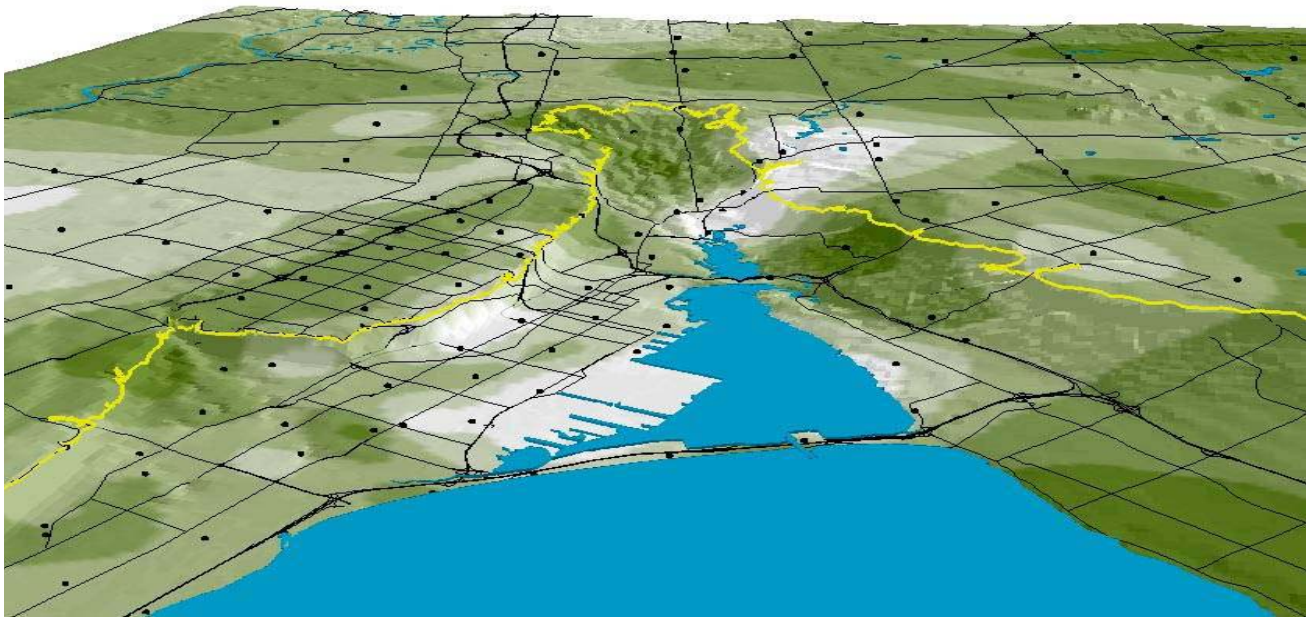
"The lichen maps were a visual way of summarizing the lichen data," says Hague. "People forge an immediate connection with information that is presented simply and clearly. This was only a first approximation of the air quality profile in Hamilton, using a newly-created protocol, but it provides a basis for responsive decisions such as whether to seek validation or investigate further. While at some increased risk of being incorrect, such timely information initiates a management approach which is stepped and adaptive. Further investigation and refinement of the initial findings will help inform future action, but already, the lichen work has borne fruit."

The City of Hamilton will channel results from community monitoring projects like the lichen study into its *Vision 2020 Annual Sustainability Indicators Report*, thus ensuring that the information is shared both by residents and decision-makers.

This example confirms our understanding of how a knowledge economy works – that information does not become knowledge until it is applied [Torjman et al. 2001: 8]. Not only do the maps provide a visual representation of the issue of air quality, they will have the effect of bringing science directly to the table and building trust between people who might never have had the chance to learn from one another. Says Hague: "Without winning over decision-makers, you can't deliver on targets. Timeliness, ownership and integration are all big ingredients in achieving outcomes."

Social capital refers to the features of social organization such as networks, norms and social trust that enable coordination and cooperation for mutual benefit [Putman 2000]. It is the glue that holds together the institutions that underpin our society. "A community's social capital is increased when people decide what they want, what they hold dear and they become more involved in increasingly complex issues. When local environmental groups get an opportunity to contribute meaningful and effective input into city council deliberations, it helps to change a previously adversarial relationship," says Hague. "That in itself is magic."

"There has been insufficient emphasis on the environment in the three pillars of sustainability [economic, social and environmental]. The environment doesn't get its due, at least in part, because science is not as effective as it might be in delivering needed information where, when and how it could do the most good. This work aims to strengthen scientific input by improving its linkages to social networks. Originally, the pilot project focused on the importance of capacity-building, but we soon realized that getting the information into places where it would be used was the ultimate goal of the exercise."



Lichen map of Hamilton – white sections indicate the presence of few arboreal lichens. Darker sections indicate areas of greater lichen diversity and abundance.

Shepherding, not driving

Now that the model is ready, EMAN CO and its partners are working to secure a long-term funding arrangement which will encourage local monitoring projects to develop and become self-perpetuating. Says Hague: "In the past, scientific researchers were interested in creating new knowledge and data and making it accessible. Now we see that to be truly useful, our work also must deliver that information to civic leaders and other decision makers. There is nothing wrong with

Social capital makes a strong program stronger

Ontario's Conservation Authorities, established in 1946 by an Act of the Provincial Legislature, are mandated to ensure the conservation, restoration and responsible management of Ontario's water, land and natural habitats through programs that balance human, environmental and economic needs. Ontario's 36 Conservation Authorities work with the support of their member municipalities, provincial and federal agencies, community organizations and landowners within their respective watersheds to: ensure that Ontario's rivers, lakes and streams are properly safeguarded, managed and restored; protect, manage and restore Ontario's woodlands, wetlands and natural habitat;develop and maintain programs that will protect life and property from natural hazards such as flooding and erosion; and provide opportunities for the public to enjoy, learn from and respect Ontario's natural environment.

The CCMN model complements the Conservation Authorities program, reinforcing the importance of credible, science-based information. Staff at the Peterborough-based Otonabee Region Conservation Authority (ORCA), engaged three of its eight member municipalities in its CCMN pilot project. Participants agreed that more work needed to be done to inform decision makers and residents of the health of watershed ecosystems in order to develop appropriate restoration plans. Says Meredith Carter, ORCA's Manager of Watershed Health: "The CCMN project gave us an opportunity to strengthen existing monitoring and education programs and our relationship with various institutions. The involvement of students, from Trent University, Sir Sandford Fleming College and local high schools, in sampling benthic invertebrates (bottom-dwelling creatures like insect larvae, clams and worms) to monitor water quality in the City of Peterborough, helped to raise the profile of our monitoring work, both among the decision-makers and the general population."

Meredith also points out that the financial and technical support of the CCMN has aided the Conservation Authority in positioning itself as an information clearinghouse. The Conservation Authority also had opportunities to test new monitoring protocols for water and air quality indicators. Conservation Ontario, which represents and supports the network of Conservation Authorities, is developing a watershed health reporting protocol that will be applied throughout watershed communities served by Conservation Authorities. ORCA staff believe that the information collected through CCMN will strengthen the science contained in its local watershed health report.

Says Meredith: "We provide information to the public, local municipalities and other agencies. Our work over the last year with students has helped to raise the profile of our monitoring work, both among the decision makers and the general population. We've also been successful in establishing some very interesting partnerships with other nature and youth-oriented organizations. This type of network building will ultimately result in more sharing of resources – both financial and human." (Social capital by any other name.)

the way ecosystem scientists conduct research and monitoring, but we need to enhance those monitoring programs so that they deliver effective feedback and facilitate responsive adaptive management."

To help this happen, EMAN is proposing that a rotating fund of $1 million per year be made available to communities to build local capacity. Projects would last for 20 months each and additional funding would be directed at providing tools and coordination. At the end of each project, the goal would be to have embedded the networks and communications links that would allow improved decisions in the future.

Says Hague: "We're trying to create a possibility-rich environment without anyone assuming control. Bureaucracies will need to be satisfied with informing a process instead of dictating an outcome. This means putting the tools in place that will allow good science to be picked up and finding people in each community who can bring civic and watershed organizations to the table."

In the meantime, EMAN CO continues with the preparation of protocols, supporting materials, training and answering questions. The organization currently is working to engage museums and other institutions as local centres for training and information, rather than trying to coordinate this type of work from a central office. EMAN CO also is sharing knowledge and best practices with emerging regional community-based monitoring networks.

By providing hard evidence of the impact of human activity on environmental systems, citizens can work with information in a unique way. Community-based monitoring networks are not about changing the nature of science; they offer the promise of establishing an enhanced delivery system for scientific information that allows society to be environmentally responsive and responsible.

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Endnote

1. The Ecological Monitoring and Assessment Network (EMAN) operates independently of Environment Canada. Established in 1994, it is made up of linked organizations and individuals involved in ecological monitoring in Canada to better detect, describe and report on ecosystem changes. The network is a cooperative partnership of federal, provincial and municipal governments, academic institutions, Aboriginal communities and organizations, industry, environmental nongovernment organizations, volunteer community groups, elementary and secondary schools, and other groups/individuals involved in ecological monitoring. Environment Canada's Ecological Monitoring and Assessment Network Coordinating Office (EMAN CO) is mandated to work collaboratively with the EMAN partners in improving the effectiveness of ecosystem monitoring to ensure informed decision-making and to create environmental awareness among Canadians [EMAN website].

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