# Citizen involvement in sustainability-centred environmental assessment follow-up

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#### Abstract:

In Canada, many project proponents and planners in the public and private sectors are required to forecast and minimize the adverse environmental effects of their undertakings. However, environmental assessments have traditionally been weak in the areas of planning and conducting effective monitoring, encouraging public participation, integrating social and ecological considerations, encouraging environmental rehabilitation and enhancement, and examining cumulative effects of multiple projects. This paper attempts to address these deficiencies by drawing from theory and practice in the areas of citizen monitoring, sustainable livelihoods, and local knowledge. Based on case study research in several regions of Canada, this discussion compares the outcomes of particularly innovative initiatives with conventional arguments for increasing local involvement in environmental assessments. Opportunities and challenges are presented with respect to integrating local and conventional (or scientific) knowledge systems, addressing concerns about credibility and bias between citizens and project proponents, and contributing to broader sustainability goals such as increased stewardship and civility. Potential benefits of broadening the temporal, geographic, and topical scope of environmental assessment follow-up activities are also discussed. Finally, some ideas for coordinating and funding integrated and participatory monitoring programs are suggested. The resulting recommendations call for a dramatically different approach to follow-up activities on the part of private and public project proponents, as well as novel thinking for environmental assessment practitioners. This paper is a reduced version of a report prepared under a contribution agreement with the Canadian Environmental Assessment Agency Research and Development Program.

<u>Key words</u>: environmental assessment follow-up; citizen participation; cumulative effects monitoring; citizen monitoring; local knowledge; integrated approaches.

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# Introduction

Critics have identified several areas of weakness within environmental assessments in Canada. Three commonly recognized areas of deficiency are in encouraging public participation, planning and conducting monitoring, and integrating social and ecological considerations. In this paper we focus on monitoring, but also incorporate attention to the other two concerns. In particular, we consider how monitoring in environmental assessment follow-up might be facilitated and improved though greater use of citizen-based monitoring that integrates social and ecological considerations.

The discussion is relevant to environmental assessment processes generally. However, it is particularly timely for applications under the *Canadian Environmental Assessment Act*, which has recently been amended to require follow-up monitoring of projects in major assessment categories. We begin with a brief review of developments in the three areas of deficiency, and then explore these topics are explored in greater detail through the examination of three case studies of innovative citizen monitoring initiatives and their implications.<sup>1</sup>

#### Citizen participation in Canadian environmental assessment processes

In Canada, public participation is written into environmental assessment legislation in all provincial and federal jurisdictions (Sinclair and Diduck 2001: 126-7). However, project proponents have been left chiefly responsible for designing and carrying out public involvement schemes with no standards in place for doing so (Sinclair and Diduck 2001). Historically, involving the public in environmental assessments has most frequently meant providing public notification about proposed developments and providing an opportunity for citizens to submit written comments. In general, citizen involvement is legally required only at late (operational) stages of project planning and development (Sinclair and Diduck 2001). Other obstacles to citizen participation in environmental assessment include the following: citizens may receive less assistance from government agencies than project proponents do; plain-language information on environmental assessment is not available in all jurisdictions; feedback to participants is not always provided (Sinclair and Diduck 2001); and, as in Alberta, citizens may have to prove that they are "directly affected" by a proposed development before they are allowed to participate (Boyd 2003).

Amendments made to the *Canadian Environmental Assessment Act* in 2003 provide greater opportunities for public input in the screening and comprehensive study

<sup>&</sup>lt;sup>1</sup> Details on these matters are included in the research report upon which this paper is based, Hunsberger et al, (2004).

processes, and may encourage public participation earlier in the approval process (CEAA 2003). While these changes could lead to an enhanced public role in some aspects of environmental assessment, they do not ensure a direct citizen role in determining the purpose, scope or priorities of local undertakings, or in contributing knowledge to the follow-up stage of project development.

#### Monitoring and environmental assessment follow-up

Prior to the recent amendments, the *Canadian Environmental Assessment Act* did not require project proponents or regulators to conduct follow-up monitoring. However, the Act now calls for the development of follow-up plans for developments approved through comprehensive study, panel review or mediation processes (CEAA section 16). Community-based monitoring, also called citizen monitoring, provides one model for conducting monitoring and is examined here.

Community-based monitoring refers to a range of activities through which concerned citizens gather and record systematic observations about environmental or social conditions, often in collaboration with government, industry, academia or community institutions (Whitelaw et al. 2002). Monitoring creates opportunities to evaluate the accuracy of predictions, enforce regulations, and implement corrective actions where environmental effects are found to exceed acceptable levels. In order to be meaningful, monitoring should be connected to mechanisms for designing and adapting management procedures when negative effects are detected.

To date, the majority of citizen monitoring groups in Canada have focused their attention on elements of the natural environment, studying physical, chemical, or biological (also called ecological) indicators of environmental health. Recently, some groups have begun to monitor a broader set of concerns in order to gauge changes in sustainability practices (Bliss et al. 2001) or quality of life (e.g. in Muskoka, Ontario<sup>2</sup>).

The number of active citizen monitoring groups in Canada has grown dramatically since the early 1990's. Over the same time period, governments have generally reduced their own participation in environmental monitoring activities (Savan et al. 2003). Citizen monitoring groups often struggle to secure adequate funding for their activities.

Citizen monitoring represents a form of public participation in environmental affairs. While some citizen monitoring groups focus their efforts on educational goals or local problem identification, others seek to apply their monitoring results to conservation, regulatory, policy, or even legal initiatives (Savan et al. 2003).

<sup>&</sup>lt;sup>2</sup> Efforts are underway in Muskoka, Ontario to develop a community monitoring program that supports the protection of valued social and natural features as identified through a public consultation process. The resulting indicators of watershed health guiding this program include employment levels, rates of involvement in stewardship programs, and the prevalence of "green" school and business practices, in addition to many aspects of the biophysical environment (Muskoka Watershed Council 2003). For details, see the website of the Muskoka Watershed Council: http://www.muskokaheritage.org/watershed.

#### Sustainability-centred environmental assessment

Canada has committed to promoting sustainability through various policy mechanisms, including the *Canadian Environmental Assessment Act* (section 4). Numerous definitions of sustainability exist.<sup>3</sup> Generally, however, a sustainable society must address intertwined requirements for ecological integrity, democracy and civility, precaution, equity, efficiency, and human sufficiency and opportunity (Gibson 2002). The implications of moving from conventional to sustainability-centred environmental assessment centre on the need to integrate human and biophysical factors over the long and short term. A sustainable approach is also one that acknowledges the importance of locally relevant decision making, informed by public involvement (Robinson et al. 1990) as well as "expert" perspectives.

Processes as well as outcomes are important in considering how citizen involvement in environmental assessment follow-up can contribute to the achievement of a sustainable society (Bliss et al. 2001). A major goal of monitoring is to protect environmental integrity by gathering information that can be used to make informed decisions about managing or protecting land and resources. The means by which this information is gathered and shared should also be consistent with principles of democracy and public participation in governance, as well as social and political equity. Ultimately, the application of citizen-collected data by decision makers also depends on the adoption of a precautionary approach.<sup>4</sup>

## **Case studies**

Three case studies were chosen to provide lessons for citizen involvement in environmental assessment follow-up from the areas of citizen monitoring, traditional ecological knowledge, and community resource management. The information on Comox Valley was gathered through semi-structured interviews (n=10), while the Lutsel K'e and Eastport case reviews are based on secondary research. The main activities and themes from each case are summarized in Table 1.

#### Citizen monitoring in Comox Valley, BC

Citizen monitoring outcomes in Comox Valley, British Columbia, have informed environmental planning and management decisions in numerous ways. First, through a process of public engagement and partnership with four levels of government, in 2001 the

<sup>&</sup>lt;sup>3</sup> "Sustainable development" is defined by the 1987 report *Our Common Future* as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (United Nations World Commission on Environment and Development 1987). Various definitions and models have subsequently been developed to illustrate the relationships between social, economic, and environmental components of sustainability.

<sup>&</sup>lt;sup>4</sup> The 1990 Bergen Declaration explains the precautionary principle as follows: "Environmental measures must anticipate, prevent and attack the causes of environmental degradation. Where there are threats of serious or irreversible damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation" (United Nations Environmental Commission for Europe 1990). Applied to decision making, this principle means that where uncertainty exists, available information should be considered in order to devise a course of action that minimizes the possibility of environmental harm.

Millard/Piercy Watershed Stewards developed a watershed management plan that is based on information collected by volunteers. Second, water quality testing by volunteers identified a problem with sewage cross-connections that threatened shellfish production in Baynes Sound. Municipal governments conducted follow-up investigations and corrected these infrastructure problems. Finally, mapping work by Project Watershed, a non-profit organization that originally based its work on volunteer efforts and now employs professional technicians, has provided information used to address zoning and development permit issues at the Regional District level. These citizen monitoring and mapping efforts reflect a strong presence of citizen science in support of decision making in Comox Valley (Hunsberger 2004).

#### Traditional ecological knowledge in Lutsel K'e, NWT

Mineral development in Canada's north has raised many issues of concern to First Nations communities whose traditional territories are potentially affected by resulting ecological change. In the Slave Geological Province, the proposed opening of the first diamond mine in the traditional territory of the Lutsel K'e First Nation sparked a desire to address related environmental concerns. In 2002, the Nihat'ni monitoring program was launched in an attempt to collect information on indicators that "describe fundamental aspects of the community's way of life and how it is changing" (LKDFN 2002, i). The Nihat'ni program illustrates several themes of importance to environmental assessment. First, it relies on traditional ecological knowledge (TEK) as its principal form of information and evaluates the significance of monitoring results within the cultural context of TEK, rather than considering TEK as a form of public participation or a supplement to conventional scientific studies. Second, the program integrates social and biophysical factors, with its indicators contributing to an overall understanding of "quality of life." Finally, it addresses cumulative effects, with a scope that is landscape-level and long-term (Shaw 2004).

#### Lobster fisheries management in Eastport Peninsula, Newfoundland

Since 1992, the lobster fishery in Newfoundland has faced increased pressure due to fishers' loss of revenue from the closure of the cod fishery. In response to new concerns about over-harvesting of the lobster fishery, in 1996 a community program was launched in Eastport, Newfoundland to protect and enhance the local lobster fishery. Fishers initiated and accepted a system that restricted their harvesting to traditional fishing areas in exchange for an agreement that outside fishers would not have access to these areas. A program of releasing undersized and egg-bearing female lobsters was introduced to help restore the lobster population. As well, two areas (Round Island and Duck Island) have been declared marine protected areas and closed to all lobster fishing. Community involvement is a key feature of the Eastport lobster fishery's protection measures, with community members actively involved in education programs about the fishery, such as working with students from a local school to analyze and interpret monitoring data (Santisteban 2004).

	Comox Valley, BC	Lutsel K'e, NWT	Eastport, NF
Type of initiative	<ul><li>Citizen monitoring</li><li>Citizen science</li></ul>	<ul> <li>Community monitoring</li> <li>Traditional ecological knowledge (TEK)</li> </ul>	<ul> <li>Community resource management</li> <li>Sustainable livelihoods</li> </ul>
Valued features	<ul><li>Shellfish production</li><li>Salmon habitat</li><li>Watershed health</li></ul>	<ul> <li>Overall quality of life</li> <li>Traditional values, practices, knowledge</li> </ul>	• Lobster fishery
Threats to valued features	<ul><li>Water pollution</li><li>Increased urban development</li></ul>	<ul> <li>Mineral development</li> <li>Dominance of scientific worldview</li> </ul>	Over-harvesting
Tools for protection	<ul> <li>Monitoring, mapping</li> <li>Watershed planning</li> <li>Regulatory measures</li> <li>Infrastructure corrections</li> </ul>	<ul> <li>Monitoring, mapping</li> <li>Local interpretation, application of results</li> <li>EA agreements for industrial practices</li> </ul>	<ul> <li>Research, monitoring</li> <li>Marine protected areas</li> <li>Harvesting restrictions</li> <li>Peer enforcement</li> </ul>
Temporal scope	• Anticipatory, ongoing	• Ongoing, cumulative	Ongoing
Geographic scope	• Watershed	• Landscape (traditional territory)	Traditional harvesting     areas
Topical scope	• Biophysical, with some economic elements	• Holistic: overall quality of life	• Biophysical, livelihood changes inseparable
Credibility issues	<ul> <li>Credibility increases with protocols, partnerships, training</li> <li>Decreases with perceived agenda/bias</li> <li>Largely scientific approaches</li> </ul>	<ul> <li>TEK increasingly considered in EA</li> <li>Scepticism re. scientific "value" of TEK (different worldview)</li> <li>Data interpretation is culture-specific</li> </ul>	<ul> <li>Community involvement, knowledge previously excluded from fisheries management</li> <li>More inclusive approaches now sought</li> </ul>
Integration of local, conventional knowledge	<ul> <li>Citizens make quantitative, qualitative contributions</li> <li>Must choose purpose, protocols to meet goals, information needs</li> </ul>	<ul> <li>Barrier: TEK stigmatized as "opinion"</li> <li>Response: locals train interested non-locals in TEK methods, interpretation</li> </ul>	<ul> <li>Scientific methods introduced into local knowledge base</li> <li>Fishers contribute quantitative and qualitative information</li> </ul>
Power	<ul> <li>Citizens empowered to push local governments to enforce or modify existing bylaws</li> <li>No major power shifts</li> </ul>	<ul> <li>Historically, TEK marginalized by non- local program guidance</li> <li>Nihat'ni program based on local significance of TEK</li> </ul>	<ul> <li>Fishers empowered to manage resource</li> <li>Knowledge as power</li> <li>Decisions based on local determinations of success or failure</li> </ul>
Benefits to society	<ul> <li>Stewardship projects</li> <li>Relationship building</li> <li>Environmental ethic</li> <li>Fosters citizenship that includes environmental citizenship</li> </ul>	<ul> <li>Cultural interests, worldview, local land uses protected</li> <li>Informs non-aboriginal settings - local knowledge in EA</li> </ul>	<ul> <li>Stewardship ethic</li> <li>Cooperation between harvesters and scientists</li> <li>Local involvement increases acceptance of conservation strategies</li> </ul>

Table 1: Summary of case study activities and themes

# **Discussion of themes**

The case studies illustrate citizen involvement at various levels and stages of environmental monitoring, assessment and management undertakings. In all cases, citizens have transcended the traditional public role of responding to official notice and submitting written comments about a proposed development. Levels of citizen involvement demonstrated through the case studies include

- determining the agenda (purpose, scope, and priorities) for monitoring and management, usually through collaboration with governments;
- gathering, interpreting, and presenting data;
- developing policy, planning, regulatory recommendations;
- implementing management plans; and
- conducting peer enforcement of plans.

#### Scope

The three cases discussed here exhibit a scope of inquiry that is broader than that of conventional monitoring and assessment activities on three levels. These initiatives tend to be temporally long-term, spatially based on relatively large geographic units, and topically diverse, integrating social and biophysical parameters. It is argued here that the benefits of broadening the scope of follow-up activities would outweigh the logistical challenges associated with doing so. Locally directed environmental assessment follow-up activities where citizens have the latitude to set their own boundaries would be better able to examine the cumulative and interactive effects of many developments on ecosystem health and quality of life than follow-up programs limited to examining only one development at a time.

#### **Problems and strategies**

Several common problems (or challenges) emerge from the case studies. Three of these will be examined here, together with strategies for overcoming them: establishing credibility, applying local knowledge to decisions, and securing funding to sustain programs that promote citizen involvement in environmental decisions.

#### Establishing credibility

In order to contribute meaningfully to environmental assessments, citizen groups need to establish credibility with regard to the quality and legitimacy of their work. In Comox Valley, efforts to establish legitimacy through the use of scientific methods, volunteer training and quality assurance/quality control measures have been undermined to some extent by government suspicions that individual volunteers or citizen groups may bias their data in order to advance a particular agenda related to environmental conservation. However, citizens involved in this type of work often harbour their own suspicions that their governments favour agendas related to economic growth and urban expansion (Hunsberger 2004).

In Lutsel K'e, local assessments of ecosystem trends face a deeper stigma: that research conducted through a culturally based system of knowledge lacks rigour and replicability. Given that environmental assessments tend to be dominated by information collected using conventional scientific methods, gaining equal recognition for TEK has proven to

be an uphill struggle (Shaw 2004). In Eastport, efforts to protect and regenerate the lobster fishery through local knowledge, cooperation and peer enforcement represent a departure from conventional fisheries management, which relies heavily on expert-led assessment. Only recently has fishers' understanding of ecological relationships been recognized as an important element of stock assessment (Santisteban 2004).

Barriers to the acceptance of environmental knowledge gathered by citizens can thus include differences in worldviews, doubts about the scientific validity of local knowledge or monitoring results, and suspicion that those citizens who engage in environmental monitoring or assessment activities are pursuing a particular agenda related to ecological preservation that could influence their data. Strategies for overcoming these barriers are presented in the following section.

## Integrating local and conventional knowledge

The three case studies offer some encouraging signs that local knowledge can be meaningfully integrated with expert-led scientific research. In Comox Valley, despite some discomfort with perceived agendas on both sides, citizen monitoring coordinators and decision makers have been able to work together successfully. These concerns have been addressed by fostering working partnerships from the earliest stages of program design and implementation. In Comox Valley, such partnerships achieved success through round tables and advisory committees that included both citizen participants and technical advisors (Hunsberger 2004).

In Lutsel K'e, integrating local and conventional forms of knowledge has been a process of respecting and encouraging local definitions of value and significance. Participants in the Nihat'ni monitoring program gather information while they are engaged in traditional land use activities and interpret results within a traditional ecological knowledge framework before they are released for non-local use, though advanced GIS techniques are also involved. Non-local researchers are invited to learn about TEK from local researchers and to confer with them on matters of data interpretation (Shaw 2004).

In Eastport, scientific methods have been integrated into the local knowledge base rather than trying to fit local knowledge into an existing scientific framework. As a result, community members have provided both quantitative and qualitative information to a body of knowledge that is used to determine local fisheries management practices (Santisteban 2004). Here, as in Comox Valley and Lutsel K'e, early and ongoing dialogue between science-based research agencies, government bodies and local people has facilitated the application of local information.

## Funding

Long-term, stable funding is critical to the success of environmental assessment followup activities. However, available grants tend to be short-term, directed at projects that are small enough to complete within one or two years. The nature of monitoring programs – long-term, ongoing initiatives that produce the same kind of deliverable year after year – means they need a different kind of funding. Funding for community monitoring programs can also come with concerns that sponsoring organizations attach certain expectations to their support.

Late process continuation of environmental assessment intervenor funding could offer one possible avenue for strengthening community monitoring programs. Other funding sources for citizen monitoring and management activities that were suggested through the case studies include the local tax base, voluntary contributions, project proponents, and "user-pay." A particularly ambitious idea is to establish a system for funding communitybased monitoring and stewardship centres across the country, with financial support from multiple levels of government and coordination through partnerships between local organizations.

# **Recommendations for environmental assessment**

## Agenda

It is important for community members to play a role in determining the purpose, scope, and priorities of environmental assessment follow-up activities. As noted in the Comox Valley case, setting the agenda for environmental decisions can enhance government and citizen perceptions that they are working towards a common, mutually acceptable goal if the process involves collaboration among citizen groups, governments, academics and industrial representatives. What emerges from this research is a sense of the importance of the context and unique characteristics of each place where developments with potential effects on the environment are proposed. Because the community-defined priorities and strategies varied greatly from place to place, a "one size fits all" approach to citizen involvement clearly would not have led to acceptable results in Comox Valley, Lutsel K'e and the Eastport Peninsula. Broadening this insight gained from the case studies to a wider range of communities, it would be undesirable to apply a national or provincial strategy for meeting local needs through environmental assessment processes when the valued ecosystem and social features in each community are place-specific.

Keeping in mind the importance of unique community values and characteristics, it is possible to make some general recommendations based on this research:

- The agenda for environmental assessment generally should integrate monitoring into all stages of the process, from anticipating effects to post-project compliance and effects monitoring.
- Follow-up activities should include monitoring that can be connected to adaptive design and management (i.e. actions to ensure flexibility and to identify and correct unanticipated or excessive effects).
- The scope should be based on ongoing time frames, ecological units (e.g. watersheds), and an integrated view of human and ecological considerations.
- Priorities should be designated according to locally valued ecosystem features.

#### Tools

Several tools exist that can help to promote the success of public participation in environmental assessment follow-up activities, including monitoring. These can be applied to the stages of obtaining, sharing, comparing and keeping track of information. This section discusses tools that facilitate monitoring and interpretation of results at the community level.

As demonstrated through the work of the Millard/Piercy Watershed Stewards and Project Watershed Society in Comox Valley (Hunsberger 2004), volunteer efforts to collect reliable information are greatly aided by the use of protocols developed by recognized agencies or organizations. Standardization is important for increasing the respectability, applicability and comparability of protocols, but it is also important to realize that protocols may need to be adapted to suit local conditions and priorities. Several government agencies have taken up the challenge of preparing standardized and relatively simple protocols that cover a wide range of chemical and ecological monitoring parameters<sup>5</sup>. Governments have also provided valuable training and technical advice to citizen groups, particularly through round tables or advisory committees as seen in Comox Valley (Hunsberger 2004) and Eastport (Santisteban 2004). Thresholds and indices developed through academic or government research can assist with interpreting and determining the significance of monitoring results. Such guidance has been crucial to ongoing evaluation and modification of community lobster management initiatives in Eastport (Santisteban 2004).

For monitoring activities that follow a non-scientific approach (e.g. using traditional or local ecological knowledge), the participating community should develop criteria for determining significance that are consistent with cultural values and practices. Recognition for local and culturally appropriate definitions of significance is an important feature of the Nihat'ni community monitoring program in Lutsel K'e in that it leads to recommendations based on monitoring outcomes that are consistent with local values and a non-Western worldview (Shaw 2004).

Both science- and non-science-based information gathering can benefit from maps that have been ground tested for accuracy. In some instances, citizen mapping initiatives have proven to be equal or superior in quality to those performed by external experts. For example, on Galiano Island, British Columbia, local citizens found many inaccuracies within a land-use classification exercise that had been produced by scientists and air photo interpreters who did not conduct any field visits to any of the sites under study. (Holden 2000: 293). In this case, community knowledge served as an important check on government-collected and interpreted data.

Community monitoring activities conducted within a traditional ecological knowledge framework can be enriched through the inclusion of multimedia such as photographs, audio and video footage. In Lutsel K'e, these supplementary materials have helped to communicate to non-local stakeholders the context in which the information was

<sup>&</sup>lt;sup>5</sup> The Ecological Monitoring and Assessment Network, Department of Fisheries and Oceans, Ontario Benthos Biomonitoring Network, British Columbia Ministry of Water, Land and Air Protection, and Ontario Conservation Authorities are just some of the government agencies and quasi-governmental organizations working to develop standardized protocols for environmental monitoring programs suitable for citizen use.

collected (Shaw 2004). In a non-aboriginal setting where differences in worldviews between the citizen participants and other stakeholders are less significant, narrative information about local land use history can still be a valuable supplement to monitoring data, as shown through Project Watershed's mapping work in Comox Valley (Hunsberger 2004).

Finally, data storage and communication are made possible through searchable digital databases. User-friendly databases have revealed relationships between natural features and human activities and supported the development of community atlases in Comox Valley (Hunsberger 2004) and Lutsel K'e (Shaw 2004). Online information clearinghouses, if well coordinated and managed, can make monitoring information widely, though not universally, accessible.

Recommendations about tools derived from this research can be summarized as follows:

- Provincial and federal government agencies should continue to develop standardized protocols that include thresholds and indices for data interpretation on a range of parameters that are broadly relevant to assessing and monitoring community environmental health.
- In recognition of the unique nature of each community, increased provisions should be made for adapting protocols to meet local needs.
- Where standardized or adapted methods for interpreting monitoring results are considered by the community to be culturally inappropriate, communities should develop locally and culturally acceptable criteria for determining significance in monitoring. Resources and opportunities for this are needed.
- Maps on a scale that is useful for discussions about community-level land uses and effects should be generated by government agencies and ground tested for accuracy by citizens.
- Community monitoring data should be compiled into searchable digital databases. Where desired, these should include supporting multimedia and narrative information about the area.

# Resources

Long-term, stable funding is critical to the success of environmental assessment followup activities. NGO and government representatives in Comox Valley stressed the importance of having a paid coordinator to facilitate volunteer involvement in monitoring activities. Organizations that initiate community monitoring or research programs face the challenge of securing ongoing funding, often from government grants or foundation sources. These available funds tend to be short-term, directed at new projects that are small enough to complete within one or two years, as explained by program coordinators in Comox Valley. Unfortunately, the nature of monitoring programs – multi-year, ongoing initiatives that produce the same kind of deliverable year after year – speaks to the need for longer-term funding (Pollock and Whitelaw 2003).

While funding for community monitoring programs is often ephemeral, it can also come with concerns that funding organizations attach certain expectations to their support. This is of particular concern in First Nations communities such as Lutsel K'e, where the scientific methods and evaluation criteria of research programs led by non-locals have at times conflicted with aboriginal worldviews and undermined the value of locally meaningful ecological knowledge. If aboriginal organizations had adequate funding from sources without these expectations, it would be possible to run these programs without facing pressure to conform to non-local research agendas. Given that financial allocations are value-based, neutral funding may be as difficult to come by as neutral information. Intervenor funding offers one possible avenue for strengthening community monitoring programs that are culturally appropriate in First Nations communities.

For non-aboriginal settings, several funding models for citizen monitoring and management activities are suggested through the case studies. These include restructuring the local tax base, soliciting voluntary contributions, charging project proponents for a portion of community monitoring efforts, and (in the case of the lobster fishery) moving to a user-pay system.

This idea raises a fundamental question about the most appropriate funding model for environmental assessment follow-up: should follow-up activities be funded on a projectby-project basis, or should a system be developed that supports geographically and temporally broader monitoring initiatives? It is argued here that the benefits of broadening the scope of follow-up activities outweigh the logistical challenges associated with doing so. Our research suggests that locally directed environmental assessment follow-up activities with the latitude to set their own boundaries will be better able to examine the cumulative and interactive effects of many developments on ecosystem health and quality of life than follow-up programs limited to examining only one development at a time.

Recommendations about resources derived from this research are summarized as follows:

- Long-term, stable funding is important to the success of environmental research and monitoring initiatives involving citizens in order to support consistent activities and a paid program coordinator.
- Funding for such programs should come without expectations that citizen monitoring efforts will be consistent with a non-local agenda, particularly in First Nations communities.
- Intervenor funding should be examined as a potential source of funds for environmental assessment-related community monitoring programs that are consistent with local values and culture.
- Other funding models should be considered, including a combination of local tax reallocation and support from project proponents.

## Application of findings

This section considers tools that help decision makers and practitioners act on findings obtained through locally informed environmental assessment follow-up activities.

The programs detailed in the case studies demonstrate some measure of success at incorporating citizen-collected information into planning, management, regulatory, enforcement, and evaluation mechanisms at the local level. Planning applications include

preparation of watershed management planning documents and policies to protect sensitive areas. Resource management mechanisms include fisheries closures and changes to local harvesting strategies. Regulatory measures include use of development permit systems and restrictions on resource extraction activities. Enforcement applications include peer enforcement systems for local management schemes, as well as round tables where citizens report their findings to multi-stakeholder groups that include both polluters and regulators. Local information can also be used to evaluate the outcomes of changes in any of these areas.

In order for monitoring findings to be applied successfully, results must be reported in a timely fashion. Matching the time frames of locally conducted research with decision making schedules has proven to be a challenge to date. This has been the case in Comox Valley, where official plans have not yet been updated to include recommendations from the Millard/Piercy Watershed Management Plan (Hunsberger 2004).

A recommendation about applying findings derived from this research is:

• Environmental assessment practitioners, citizen groups and decision makers should be aware of and prepared to implement planning, resource management, regulatory, and enforcement mechanisms based on locally informed environmental assessment follow-up activities.

## Roles and tasks

The above recommendations can be presented as roles and tasks for non-government ("citizen") organizations, government agencies, and project proponents.

Non-government organizations and citizen participants are currently the driving force behind many community environmental monitoring and management activities. In all three case studies, citizen groups and community members have assumed responsibility for finding funds, training volunteers, gathering data, interpreting results, and producing management plans. Apparent successes at managing these activities can be observed through the Comox Valley, Lutsel K'e, and Eastport experiences (Hunsberger 2004, Shaw 2004, Santisteban 2004). If stable funding and productive, mutually trusting relationships between citizen groups, governments and project proponents can be established, then environmental assessment follow-up will be stronger for involving citizens in these roles.

Governments at multiple levels can help to strengthen citizen involvement in environmental assessment follow-up by developing protocols and analysis tools (including thresholds and indices) that are adaptable to meet local needs. Government coordination, housing and sharing of citizen-collected data would also be tremendously beneficial to community monitoring, assessment and management activities, at regional, provincial or federal levels. As well governments have important roles to play in facilitating broad and continuous citizen monitoring by facilitating applications in, for example, on-going regional land use decision making and environmental quality protection as well as specific project follow-up. Project proponents have a role in ensuring that environmental assessment follow-up is sufficient to detect adverse environmental effects stemming from their activities, and a responsibility to adapt their practices to mitigate these adverse effects (and enhance positive ones). Proponents will need to work to maintain open, honest and responsive relationships with citizens and governments so that follow-up activities can be connected to adaptive design and management.

# Conclusions

Conventional arguments for increasing citizen participation in environmental decision making activities hold that public involvement produces a locally relevant and relatively inexpensive body of information, heightened public awareness of and capacity to engage in issues of local concern, and decisions that are stronger and more acceptable. Similarly, conventional arguments for sustainability gains hold that significant decision making including environmental assessment processes should integrate short- and long-term perspectives, human and biophysical considerations, and local as well as broader knowledge, all within a framework of social equity, cultural integrity and empowered political participation. Taken together, these arguments suggest that increased citizen participation in follow-up activities such as monitoring could help to improve the quality and local relevance of environmental assessment, while at the same time advancing the process toward sustainability goals.

These arguments are well supported by the case experience with citizen environmental monitoring reviewed here: citizen environmental monitoring in Comox Valley, British Columbia; community-based monitoring based on traditional knowledge in Lutsel K'e, Northwest Territories; and community lobster fisheries management in Eastport Peninsula, Newfoundland.

The main findings are that community involvement in determining the purpose, scope and priorities of follow-up activities helps to produce results that are locally meaningful. Adopting a broad temporal, geographic and topical scope through ongoing monitoring and compliance assurance activities, watershed-based analysis, and integration of social and ecological variables leads to several benefits. Follow-up programs with these characteristics are able to track cumulative effects of multiple projects, assess changes in local quality of life, and respond to detected changes with adaptive design and management strategies. In particular, environmental assessment follow-up in many cases could benefit from adopting a focus that is broader than the effects of a single project.

There are implications here for environmental assessment practitioners and project proponents, community groups, and designers of environmental assessment legislation. Certainly, strong partnerships between citizen groups, government agencies and project proponents are vital to the development of follow-up strategies that meaningfully engage the public and promote the protection of valued natural and social features. Participation of all three groups will also be needed to address the key challenges, including finding ways to coordinate and fund community environmental assessment follow-up activities. There are, however, plenty of tools available and promises of important benefits for all.

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