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Keeping Remedial Action Plans On Target: Lessons Learned from Collingwood Harbour

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ABSTRACT. *Remedial Action Plans (RAPs) are being developed and implemented at Areas of Concern (43, now 41). The Areas of Concern are locations throughout the Great Lakes basin ecosystem where environmental quality is particularly compromised. According to the United States and Canada Great Lakes Water Quality Agreement of 1987, RAPs are to embody a systematic and comprehensive ecosystem approach to restoring and protecting beneficial uses (the ability of fish, wildlife, and humans to thrive) in the Areas of Concern. The Agreement calls for the federal governments, in cooperation with state and provincial governments, to ensure the public is consulted throughout the development and implementation of the RAPs. Downsizing at all levels of government in the mid-1990s has created significant problems in sustaining the momentum for clean up. Community-based actions may be proceeding, but costly clean up efforts remain. Despite these organizational and fiscal resource hurdles, several RAPs are being applied and, as a result, there are notable advances in remediation and prevention programs. Essential elements that characterize successful initiatives include true participatory decision making, a clearly articulated and shared vision, and focused and deliberate leadership.*

INDEX WORDS: *Remedial Action Plans, decision making, environmental quality.*

INTRODUCTION

In 1909, there was an event that demonstrated respectful wisdom, that water does not abide by political boundaries. The signing of the Boundary Waters Treaty by Canada and United States and the creation of the International Joint Commisssion (IJC) was a landmark event to protect the shared waters of the two nations. It has provided the framework for cooperation on questions relating to air and water pollution and the regulation of water levels and flows. The Commission also undertakes investigations of specific issues, or monitors situations, when requested to do so by governments. IJC recommendations concerning pollution in the Great Lakes served as the basis for the governments to create the Great Lakes Water Quality Agreement, which was signed by the Prime Minister of Canada and the President of the United States on 15 April 1972 (United States and Canada 1972).

On 22 November 1978, a revision to the 1972 Agreement was signed. It provided new programs and more stringent goals to eliminate pollution, particularly persistent toxic substances from the lakes. The concept of a Great Lakes basin ecosystem was adopted, which recognizes that water quality depends on the interplay of air, land, water and living organisms, including humans, within the system. This action led to more comprehensive assessments of the Great Lakes cleanup effort.

In November 1987, the Governments signed a protocol which aimed to strengthen the programs, practices, and technology prescribed in the 1978 Agreement and to increase accountability for their implementation. The governments made the commitment to restore and maintain the chemical, physical, and biological integrity of the waters of the Great Lakes basin ecosystem (United States and Canada 1972). Remedial Action Plans (RAPs) were described in the 1987 amendment of the Agreement under Annex 2. The United States and Canada revision in 1987 of the Great Lakes Water Quality Agreement specifically calls for the development of RAPs at Areas of Concern (42 in total at that time) where ecosystem deterioration is particularly pronounced (United States and Canada 1987). A RAP is a tool through which governments and concerned citizens can restore and protect “beneficial uses”

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(14 of which are specified in the Agreement). The two federal governments directed their national environmental agencies to work in cooperation with state and provincial governments and with local communities to jointly develop and cooperatively implement the RAPs.

The restoration experiments, as suggested by Sproule-Jones (2002), promise a way in which resource users, regulators, and those interested in restoring the local ecosystem can collaborate towards a common purpose. They promise to empower local stakeholders to determine their own solutions to ecological degradation, and open new venues for collaboration.

With the assistance of governments, residents in most AOCs formed an advisory council/committee to work with federal/state/provincial technical and scientific experts. These committees typically have or had representatives from diverse community sectors, including agriculture, business, and industry, citizens-at-large, community groups, conservation and environment, education, fisheries, health, labor, municipal governments, native peoples, shipping, tourism, and recreation. Engaging stakeholder groups in the plan design minimizes the risk of future polarization (Samya *et al.* 2003). Advisory Committee participants possess unique knowledge and represent the interests of their particular stakeholder groups. A key premise is that community residents posess important knowledge, and can provide an informed perspective of the social impacts of the decisions (Harris *et al.* 2003). The importance of involving communities in the management of water resources was one of the strongest and most consistent messages coming forward from a recent conference (Managing Shared Waters 2002). It is a matter of recognizing the value of traditional knowledge and the public's anecdotal and experiential expertise. Good public processes use plan language to communicate clearly, are supported by commitments in institutional workplans, demonstrate clearly how public input will be used, include mechanisms to resolve disputes, provide the community with access to technical experts, celebrate successes, and train community leaders.

Stakeholders have been instrumental in helping governments be more responsive to and responsible for restoring uses in AOCs. Further, stakeholders have been the primary catalyst for implementing actions which have resulted in ecosystem improvements. Such broad-based partnerships among diverse stakeholders can best be described as a step toward grassroots ecological democracy in the Great Lakes basin (Hartig and Zarull 1992). The collective objective is to work with governments and develop a plan to revitalize ecosystem health and implement the plan to achieve agreed-upon targets that indicate when beneficial uses are restored.

A key concept in the RAP process is accountability for action. This is established through open sharing of information, clear definition of problems (including identification of indicators to be used in measuring when the desired state is reached), identification of causes, agreement on actions needed, and identification of who is responsible for taking action. From this foundation, the responsible institutions and individuals can be held accountable for progress (Hartig and Zarull 1992).

Since 1987, incremental progress has been made to restore beneficial uses in the Areas of Concern. Approximately 15 years since the inception of the RAP program, hundreds of kilometers of riparian vegetation and thousands of hectares of wetlands have been rehabilitated (Canada-Ontario 1999). Sediment quality is improving in some locations because of pollution control and some sediment clean-up (IJC 1997). More fish are edible in more places and swimming is again possible in parts of our urban centers for the first time in decades (Krantzberg *et al.* 1999). Tens of thousands of volunteers are giving their energy to revitalize their homes. Scores of funding partners have collaborated (Environment Canada 1997). Research is being advanced basin-wide on the insidious nature of toxic chemicals. Technologies are emerging to better manage stormwater and wastewater, and contaminated sediment. There have been declines in chemical concentrations in Great Lakes fish (Ontario Ministry of Environment 2001).

Notwithstanding these strides forward, human health is still being compromised by toxic chemicals, particularly for those consuming fish that are contaminated at unsafe levels, and particularly for children exposed to contaminants in utero (Schwartz *et al.* 1983, Davidson *et al.* 1995, Jacobson and Jacobson 1996, Lonky *et al.* 1996). More aggressive action to revitalize the Lakes is essential to protect the health of all their residents (IJC 2003).

More than 33 million people inhabit the Great Lakes basin, including about a third of Canada's population and 15% of United States' population. The Great Lakes and other lakes and rivers in the basin provide drinking water to millions. On both sides of the border, the basin supports multibillion dollar manufacturing, service, tourism, and outdoor

recreation industries as well as strong maritime transportation systems and diversified agricultural sectors. It provides the foundation for trade between Canada and the United States, equaling 50% of Canada's annual trade with the United States. Degradation of environmental quality directly impairs the viability and vitality of the region. The reliance of the economy on a healthy Great Lakes basin ecosystem is unequivocal and the imperative to restore ecosystem health is clear. To achieve sustainability, ecology and economics must be integrated. Sustainability can be defined as a balanced relationship between the dynamic human economic systems and the dynamic, but generally slower-changing ecological systems in which: 1) human life can continue indefinitely; 2) people can flourish, 3) cultures can develop, but within bounds such that human activities do not destroy the diversity, complexity, and function of the ecological life-support system (Costanza 1992).

EVIDENCE OF PROGRESS

Stakeholders in various AOCs in the United States and Canada have made considerable investments of time and money, and several well-documented successes are highly visible (IJC 2003). Gurtner-Zimmermann (1995) notes that the commitment of individuals who participate in the RAP process, local support for the RAP goals, and the scientific basis and sound analysis of environmental issues contribute to the positive outcomes.

Major successes include Collingwood Harbour and Severn Sound in Ontario, where conditions have improved to the point that these locations are no longer considered to be Areas of Concern. Spanish Harbour in Ontario and Presque Isle Bay in Pennsylvania are now recognized as in a stage of recovery due to completion of all selected remedial actions, while monitoring continues to measure recovery of beneficial uses.

Other examples of successes include the removal of over 1.3 million cubic yards (1 million cubic meters) of sediment contaminated with polychlorinated biphenyls (PCBs) from the Kalamazoo River, Manistique River, Maumee River, Rouge River, Saginaw River, Saginaw Bay, and St. Lawrence River. Approximately $270 million (Can) and at least $3 billion (U.S.) has been invested over the last 10 years to improve the condition of wastewater infrastructure in various AOCs (IJC 2003).

But even with these successes, the chemical, physical, and biological integrity of the Great Lakes basin ecosystem remains threatened. Lack of resources and lack of inter-program coordination and cooperation impede progress (Gurtner-Zimmermann 1995). In some AOCs, environmental problems remain ill-defined both in terms of the magnitude of degradation and the societal costs to either maintain the status quo or undertake adequate remedial actions (IJC 2003).

Differences in the local context of the plans have resulted in a diversity of individual planning and implementation experiences. Notwithstanding this diversity, the motivation and political clout of RAP participants are strongly intervening factors. Resource input from upper levels of government, in particular financial commitment for plan implementation, is also a necessary ingredient for progress due to the RAPs' weak regulatory and institutional framework (Gurtner-Zimmermann 1996).

This paper explores the elements that foster successful cooperative and collaborative initiatives and sustain the objectives of a community engaged in cleaning up its harbor. The discussion is meant to illuminate strategies for revitalizing place-based efforts to restore ecosystem quality in the Areas of Concern. The RAP process clearly embraces the ecosystem approach. Here, the ecosystem approach is based on the man-in-system concept rather than a system-external-to-man concept (IJC 1978), where the ecosystem is composed of the interacting elements of water, air, land, and living organisms including man. While Lee *et al.* (1982) discuss several variants of the ecosystem approach, most share a focus on the responsiveness of ecological systems to natural and human activities, and a readiness to strike a programmatic compromise between detailed understanding and more comprehensive holistic meaning. This flexible pragmatism is perhaps the most productive feature for addressing Great Lakes environmental problems, and was reflected in the manner in which the Collingwood Harbour RAP was developed and implemented.

CASE STUDY: COLLINGWOOD HARBOUR

The analysis of local capacity to achieve consensus and sustain momentum to complete the cleanup are based predominantly on a case study, the cleanup that led to Collingwood Harbour being delisted in 1994, the first location to achieve this milestone (Krantzberg and Houghton 1996). Illustrations of RAP ingenuity from other AOCs are also presented.

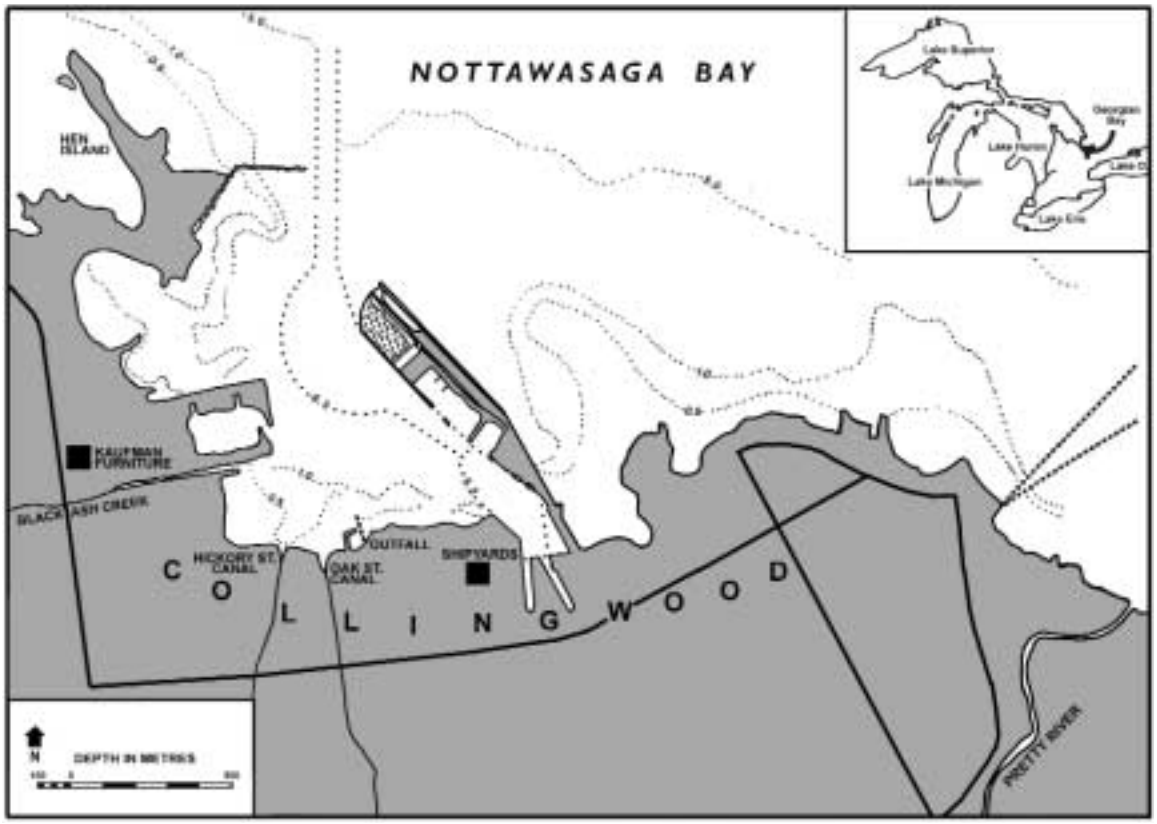

FIG. 1. Location of Collingwood Harbour, Ontario.

Contextual Setting

Collingwood Harbour is situated on the south shore of Nottawasaga Bay, the southern extension of Lake Huron's Georgian Bay (Fig. 1). The Town of Collingwood surrounds the harbor with a population of approximately 21,500. During the mid to late 1800s, Collingwood was the railhead of Ontario and its harbor was the trans-shipment point for goods destined to Western Canada. Shipping produced a need for ship repairs, and in 1883, the Collingwood Shipyards, then known as Collingwood Dry Dock Shipbuilding and Foundry Company Limited, opened. The shipyards became one of the principal industries in the town, employing at some periods until its closure in 1986 as much as 10% of the total labor force. Eight additional manufacturing companies had located in the town by 1983, making Collingwood the largest industrial employer in the region (Town of Collingwood 2001).

Nuisance algal growth plagued the harbor waters up until the mid 1980s as a result of excessive phosphorus inputs to the harbor from the Collingwood sewage treatment plant (STP), which at the time was a primary treatment facility (Collingwood Harbour RAP 1992). The harbor, as an industrial port for over a century, suffered from habitat and wetland loss, shoreline hardening, and contamination of sediment.

In 1987 the Ontario Ministry of Environment (MOE) assigned the author to coordinate the Collingwood Harbour RAP. The coordinator's duties involved representing the governments of Ontario and Canada, working with other local, provincial, and federal experts to provide the community with the technical information they would need to develop the RAP. The role also involved networking among the community and governments to secure funding commitments for the implementation of the plan, to ensure monitoring tracked the response of the environment to actions, and that progress in restoration of beneficial uses was publicly reported.

What follows is a description of some lessons

learned in the Collingwood experiment, followed by the local expression of the lesson.

- Lesson one—Leadership:
  Engage local leaders who are committed to their community and can affect change.

In establishing the means for community collaboration, senior leaders with local influence, possessing unique points of interest, were contacted and interviewed. The selection of candidates for the Public Advisory Committee (PAC) was based predominantly (but not exclusively) on identifying decision makers who could affect change within the sector or stakeholder group they represented. This is in keeping with the observation that plan effectiveness will be, in part, a function of the inclusiveness of stakeholder and user representation and goal setting. Inclusivity lends legitimacy, stimulates funding, and can galvanize potentially marginalized but important stakeholders through peer pressure. It has been observed that the wider the scope of stakeholder representation, the stronger the performance of the RAP (Sproule-Jones 2002)

- Lesson two—Consensus on Goals:
  Articulate clear and meaningful goals early in the process to unite the team. This gives the group the means to overcome conflicts and obstacles during the development and implementation of the plan.

The leaders constituted the PAC (Fig. 2) which, in consultation with the community at large, reached consensus on the vision for the future of their harbor. To gain support for a restoration and rehabilitation strategy, the common vision for the future of the harbor and its watershed was of paramount importance. The PAC recognized that Collingwood Harbour was and could continue to be a site for a blend of industrial and recreational uses. In keeping with that recognition, the PAC decided upon balanced goals and uses, which met with inclusive public favor early in the RAP process (Collingwood Harbour RAP 1992). When there were conflicting opinions on aspects of the restoration plan that threatened further development and implementation of the plan, returning to the shared vision as the fundamental purpose of the RAP enabled the group to reestablish consensus-based decision making.

- Lesson three—Quantifiable Endpoints:
  Specifying, to the extent possible, quantifiable endpoints or delisting targets that signify success and the achievement of the goals allows the group to recognize progress, prioritize actions, and reach consensus on delisting.

To evaluate when or whether the harbor could support the goals and uses formulated by the community, the RAP Team and PAC jointly delineated rehabilitation targets (or delisting criteria) that were, to the extent possible, quantitative and science based. These targets enabled the team to prioritize clean up efforts, and to measure progress toward the restoration of beneficial uses (Colling-

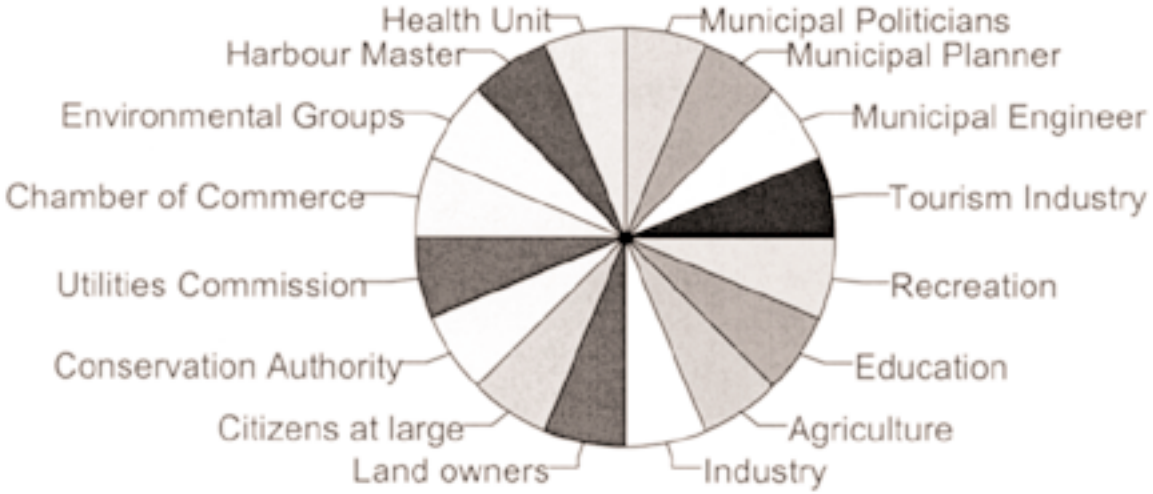

FIG. 2. Composition of the Collingwood Harbour Public Advisory Committee. The equal slices are intended to represent equal parts of "one view, one voice."

wood Harbour RAP 1992). This was remarkably helpful for setting priorities for RAP implementation and designing environmental monitoring programs.

The identification of such targets is not deliberately called for in Annex 2 of the GLWQA. Fortunately it is implied (United States and Canada 1987). Under sub-paragraphs 4 (vii) and (viii) Annex 2 calls for:

> "(vii) a process for evaluating remedial measure implementation **and effectiveness**; and
> (viii) a description of surveillance and monitoring process to **track the effectiveness** of remedial measures and the eventual **confirmation of the restoration of uses**." (author's emphasis).

The ultimate goal of RAPs as described in Annex 2 of the Agreement is to confirm that the beneficial uses have been restored. Since implementation efforts can be prolonged, environmental conditions will presumably change. Further, since our knowledge regarding the threats posed by degraded environmental conditions is evolving, descriptions of the status of beneficial uses and their restoration targets need to be reviewed and updated systematically. For example, human health effects that can be caused by exposure to PCBs or methyl mercury are reflected by fish consumption advisories. These advisories are more restrictive presently than when AOCs were identified. Accordingly, delisting targets must be modified using current data.

Measuring progress toward the delisting targets improves the likelihood that investments in actions result in optimal environmental returns. Many AOC practitioners across the basin presently cannot estimate the degree to which beneficial uses are improving, in part, because the RAPs do not contain targets that help identify when beneficial uses would be considered restored (IJC 2003). The absence of suitable restoration targets and lack of understanding of the current status of beneficial uses represent a real challenge to progress. In times of scarce resources, it is imperative that RAP practitioners affirm that investments in particular active interventions are appropriate and productive (IJC 1988).

Defining delisting targets has proven problematic for many. For example, both the GLWQA and the Ontario provincial water quality guidelines discuss water quality problems in terms of persistence, a term which is not delimited. Using a pragmatic approach to problem solving, the Collingwood Harbour RAP examined persistence in the context of impairing the goals and uses described by PAC. If a particular water quality objective was not met for a specific location or during a given length of time, the RAP Team and PAC examined the implications for achieving the community-based endpoints (such as the absence of nuisance levels of algae, sufficient oxygen to support aquatic life, aesthetics and enjoyable recreational experiences, fish community health). Persistence, then, was linked to the ability of the harbor to support the goals and uses embodied in the vision statement of the PAC.

Tracking the resultant incremental improvement in the restoration of the ecosystem helps identify shortfalls, guide future actions and work plan development, and allows for the prioritization of the most effective activities (Sustainability Network and Ontario Ministry of the Environment 2000, IJC 1998).

- Lesson four—Ownership:
  The formulators of the plan are the owners of the plan. Ownership means that when agreeing to the plan, each member overtly recognizes and takes responsibility for the resource implications for its stakeholder group. Ownership results in pride in delivery, which sustains the process.

The PAC sought advice from the government team regarding technical and nontechnical options that could help restore beneficial uses. In the Collingwood Harbour RAP model, however, the RAP Team was not the decision making body, but was a resource offered to the community. The provincial and federal government representatives did not have a formal voice in selecting the preferred plan. The agencies acted as advisors, informing the PAC of the technical feasibility, scientific certainty, and policy implications of their recommended plans. The PAC was advised, as well, that the governments might reject any plans that were inconsistent with government policy and the goals of the GLWQA. At such junctures the PAC often reconsidered their recommendations in light of new information and adjusted their approach.

- Lesson five—Respect:
  Trust and respect, derived from a common purpose and reliability, strengthened the group's credibility and ability to solve challenges as a team.

The assignment of a RAP Coordinator by governments to assist the community in restoring their

harbor brings with it complications as well as benefits. First, local leaders are correct to be skeptical that a government representative has arrived from outside the community with the good intent of helping them correct historic and ongoing problems. Trust is earned not granted. If the process is to work, confidence in one another needs to be fostered. Honest effort is more important than bureaucratic rhetoric. Within months, all members of the PAC and RAP team recognized that they truly did share the common goal of restoring the harbor ecosystem. This was unifying, and trust, respect, and honesty evolved among the participants.

Further, credibility was gained by making realistic and achievable commitments to the community at large, particularly at the level of local governments. Municipalities are extremely important partners in helping to implement a RAP. They make decisions that can protect environmental quality and preserve sensitive and valuable natural features. Land use planning, investments in infrastructure, water and energy conservation, sewer use bylaws and other tools and practices proffer appreciable opportunities to advance the mission of the RAP. The agency staff and PAC forged a solid relationship with councillors and senior staff, and linked the RAP's planning needs with those of the municipality, sharing data and information (see Sustainability Network and Ministry of the Environment 2000).

Similar relationships have been observed, for example, in Southeast Michigan, which includes four AOCs, and has done an excellent job of showing leadership regarding wastewater infrastructure needs. In Wayne County, Michigan, the infrastructure cost (excluding inflation and interest) of combined sewer overflow control from 2001 until 2030 was estimated from a low value of $1.8 billion to a high value of $2.7 billion U.S. Sanitary sewer overflow remediation from the same time period was estimated with a low value of $40 million, and a high value of $431 million. In addressing these infrastructure needs, Wayne County is faced with estimated upgrade costs ranging from a low value of $1.8 billion, a mid-range value of $2.4 billion, and a high-end value of $3.2 billion. The entire Southeast Michigan needs study is an admirable representation of multijurisdictional coordination of multi-billion dollar efforts to mitigate impacts of aging and outdated infrastructure. It demonstrates the necessity of municipal participation in the RAP clean up efforts. http://www.semcog.org/products/pdfs/sewerneeds2.pdf

- Lesson Six—Incentives:
  The incentives for achieving the shared goal can differ among the participants and must be respected. It is not important that different stakeholders extracted different benefits by meeting the shared goals.

As the RAP process advanced, it was clear that participants wanted the harbor ecosystem restored for different reasons. Some wanted recreational boating or fishing opportunities, others were concerned over the ability to eat the fish or swim in the water. Some wanted better birding or passive recreation, others looked at improved property values or growth of the tourism industry.

The important point was to be able to return to the crux of agreement, that the ecosystem needed to be restored, and that there was a shared vision regardless of individual motives. This allowed the participants to appeal directly to the interests of a diverse cross section of citizens and opinion leaders in ways that compelled others to take action (see Bonk *et al.* 1998).

Some aspects of the success of the Collingwood Harbour story tend to go untold. They can serve as guidance in stimulating place-based action to achieve the mission of restoring the Great Lakes basin ecosystem.

- Lesson Seven—Quality of Life:
  Recognition that the local economy and quality of life is inextricably bound to environmental excellence provides an impenetrable shield to the current economic-environment dialectic.

From personal observation, it is certain that the people of Collingwood pride themselves on excellence. Driving north on Hurontario to the harbor, one notices that Collingwood shines, from the architecture, to the landscaping, to the impeccable appearance of its core and its neighborhoods. The web site is perhaps the best evidence: "Welcome to the Town of Collingwood. Collingwood's location is in the heart of a four season natural playground, on the southern shore of Georgian Bay . . . The Town of Collingwood offers many economic opportunities; a utopian lifestyle and our natural surroundings make Collingwood an ideal location to live, work and play."

This town of 21,500 hosts international fairs, festivals, and competitions drawing on thousands of local volunteers to show their guests the finest. Nestled on the shores of Georgian Bay and located

in close proximity to the Blue Mountains, the town has become the major recreation area for the southern part of the province. Businesses in Collingwood benefit from the large influx of sunseekers, fishermen, cottagers, and skiers (Town of Collingwood 2001). It is no wonder that citizens and local politicians were particularly determined to remove the stigma of a toxic hot spot from its image. It made economic and business development sense. While it is undeniable that the relatively small size of the AOC presented an advantage over cleaning up larger AOCs, one must note AOCs of comparable size where there is little or limited progress, or very complex locations where progress is substantive (IJC 2003).

Consider the much larger and more complex Hamilton Harbour, Ontario. The Bay Area Restoration Council (Council), formed in 1991 as a not-for-profit-community group, monitors, assesses, and promotes the Hamilton Harbour RAP. The multi-stakeholder Council facilitates involvement and participation in the RAP. Since 1994, the Council has published an annual report, entitled *Toward Safe Harbours*, that highlights restoration activities and comments on progress. The International Joint Commission has previously noted the extraordinary level of input that the Council has provided in support of the RAP implementation. The common purpose of restoring the harbor ecosystem has served as a unifying maxim to resolve conflicts in this large and complex RAP. The Council's reports grade progress toward the achievement of various desired outcomes, notably, the restoration targets for the beneficial uses. (http://www.hamiltonharbour.ca/barc/barc_b2.html)

Another example is the Severn Sound Environmental Association (Association), a partnership founded in 1997 with representation from 2 towns, 6 townships, Environment Canada, and the Friends of Wye Marsh, Inc. Its goals include restoring water quality in Severn Sound so that it can be removed from the list of AOCs and to assist in the transition of the local remedial action plan effort to a locally sustained environmental office. The Association seeks to become a model "Sustainable Community." The Association brings together the community and the resources of the federal, provincial, and municipal governments and has implemented hundreds of water quality improvement projects. The Association has proven to be a very effective organization that has built the local community capacity to sustain restoration and economic vitality, in partnership with governments. (http://www.severnsound.ca)

To cite Dwight D. Eisenhower: "What matters is not necessarily the size of the dog in the fight—it's the size of the fight in the dog."

- Lesson Eight—Measure Success
  As partners from numerous sectors see the RAP participants are making incremental progress in restoring beneficial uses, more volunteers ask to participate and join in the successes.

In fact, the economic benefits of environmental health enabled the PAC to forge numerous partnerships with the business community in implementing a myriad of projects and programs (Collingwood Harbour RAP 1994). The PAC organized annual campaigns around habitat rehabilitation and public outreach with the support of service clubs, schools, the municipality, and donations from business of food, equipment, and advertising. The signature outreach project, ENVIRONPARK, was possible through a consortium of over 30 different local partners, with additional funding from the provincial and federal governments. Even the sediment clean up project brought forward volunteers and local businesses to launch the initial cleanup of the shipyard boat slips, so that dredging could commence (see Krantzberg and Houghton 1996).

An excellent example of documenting and demonstrating focus can be illustrated by the Maumee River RAP, which has benefited from active support of personnel of the U.S. Environmental Protection Agency, the Ohio Environmental Protection Agency, the Toledo Metropolitan Council of Governments, as well as an active community committee. A feature of the Maumee River RAP is to document success and broaden partnerships. Recently the RAP produced a 263 page summary of activities and accomplishments that covers the period of 1991 to 2001. Measuring and celebrating progress, as the Maumee RAP participants do, is fundamental to sustaining momentum for RAP implementation and attracting new volunteers. (http://www.maumeerap.org)

- Lesson Nine—Leadership and Focus:
  Find a strong leader and stay focused on the task at hand. This allows for steady progress in the selection of remedial measures, their implementation, and the recovery of the ecosystem.

A fundamental ingredient in the Collingwood mix was the strong and directed leadership of the Chairman. Voted in by the PAC members at their first meeting, Mr. Houghton, the Manager of the

Collingwood Public Utilities Commission, remained the Chairman for the duration of the RAP. Under his direction, and the PAC's concurrence, the mission of the RAP did not deviate from the need to restore the harbor ecosystem. The PAC did not become the town's environment committee, but explored those activities, programs, or policies that directly affected the harbor ecosystem. Other matters of peripheral interest were reserved for venues outside of the PAC/RAP discussions.

The delisting document ("Stage 3") was endorsed by governments and transmitted to the IJC in 1994, when the monitoring program substantiated that the restoration targets had been met and sustained (Collingwood Harbour RAP 1994). Members of the community, government, and the IJC celebrated that by 1994, Collingwood Harbour no longer had the attributes of an Area of Concern.

CONCLUDING REMARKS

The international Joint Commission's Water Quality Board, in 1996, concluded that RAPs are on the cutting edge of community-based and ecosystem-based management processes (IJC 1996). RAP implementation and progress toward watershed management can continue to thrive with strong local leadership, despite reductions in some state, provincial, and federal programs. Governments should be viewed as facilitators of RAPs and partnership builders, and must continue to provide resources and technical assistance to leverage local and private sector resources. Participation of the appropriate actors, development of a mutally agreed upon decision making process, development of common objectives, dispute resolution, political support, public participation, and funding are all central prerequisites to achieving the ecosystem approach (Mackenzie 1996), an approach inherent in successful RAPs

RAPs can continue to be a source of pride and optimism, but this requires that the process be improved to make it more visible, inclusive, and institutionally integrated (Grima 1997). It also would benefit from a greater emphasis on measuring, celebrating, and marketing successes, and building the local capacity to sustain progress.

The 1992 United Nations Conference on Environment and Development identified capacity-building in Agenda 21 as one of the essential means to implement sustainable development. Capacity-building means enhancing the ability of a community, region, or country to identify and reach agreement on problems, develop policies and programmes to address them, and mobilize appropriate resources to fulfil the policies and programs (Hartig *et al.* 1995). The Collingwood Harbour RAP employed a combination of human, scientific, technological, organizational, institutional, and resource capabilities to generate and sustain the capacity for the changes required to solve the harbor's environmental problems. The Collingwood Harbour RAP has also been cited as one of the best examples of success in the RAP experiment, in part, because no stakeholder monopy or opportunism jeopardized the implementation of remedial interventions (Sproule-Jones 2002).

As observed by Hartig and Law (1994), RAPs require cooperative learning that involves stakeholders working in teams to accomplish a common goal under conditions that involve positive interdependence (all stakeholders cooperate to complete a task) and individual and group accountability (each stakeholder is accountable for the final outcome). For RAPs to be successful, they must:

- be cleanup- and prevention-driven, and not document-driven;
- make existing programs and statutes work;
- cut through bureaucracy;
- elevate the priority of local issues;
- ensure strong community-based planning processes;
- streamline the critical path to use restoration; and
- be an affirming process.

RAPs are an unprecedented collaboration of international significant worth continuing by the parties, the jurisdictions and the public (Krantzberg 1997). The passion and dedication of communities involved in implementing RAPs need ongoing nurturing. Solidarity does emerge, and potential adversaries become allies united by a vision of a shared inspiration to enhance and protect the magnificence that is the Great Lakes.

Community groups that have enlisted local champions can marshal incentives for others to join the mission. Creative, innovative partnerships and institutional arrangements are needed to stimulate and sustain advances in the clean up of the AOCs, to control contaminant inputs, restore riparian vegetation, rehabilitate coastal wetlands, remediate contaminated sediment, raise public awareness of individuals' responsibilities, unite government with nongovernment leaders, and make the lakes great.

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REFERENCES

Bonk, K, Griggs, H., and Tynes, E. 1998. *Strategic Communications for Nonprofits*. San Francisco: Jossey Bass Publ.

Canada-Ontario. 1999. *Third Report of Progress Under the Canada-Ontario Agreement Respecting the Great Lakes Basin Ecosystem 1997–1999*. Environment Canada and Ontario Ministry of Environment, Toronto, Ontario. http://www.on.ec.gc.ca/coa/third-progress-report

Collingwood Harbour RAP. 1992. *Stage 2 Document*. Prepared by the Ontario Ministry of Environment and Energy, Toronto, Ontario; Environment Canada, Ministry of Natural Resources, and the Collingwood Harbour Public Advisory Committee. ISBN # 0-7778-0162-0.

_____. 1994. *Stage 3 Document. Right On Target*. Prepared by the Ontario Ministry of Environment and Energy, Toronto, Ontario; Environment Canada, Ministry of Natural Resources, and the Collingwood Harbour Public Advisory Committee.

Costanza, G. 1992. Ecological economics of sustainability: investing in natural capital. In *Population, Technology and Lifestyle*, pp. 106–118, ed. R. Goodland, H.E. Daly, and S.E. Serafy. Washington, D.C.: Island Press.

Davidson, P.W., Myers, G.J., Cox, C., Shamlaye, C.F., Marsh, D.O., Tanners, M.A., Berlin, M., Sloane-Reeves, J., Cernichiari, E., and Chloisy, O. 1995. Longitudinal neurodevelopmental study of Seychellois children following in utero exposure to methymercury from maternal fish ingestion: outcomes at 19 and 29 months. *Neurotoxicology* 16:677–688

Environment Canada. 1997. *Great Lakes 2000 Cleanup Fund Project Summaries Report*. http://www.on.ec.gc.ca/glimr/data/cleanup-project-summaries/intro.html ISBN 0B662-26232-8.

Grima, A.P.L. 1997. Ten years of RAPs: reflections and suggestions. *J. Great Lakes Res.* 23:232–233.

Gurtner-Zimmermann, A. 1995. A mid-term review of Remedial Action Plans: difficulties with translating comprehensive planning into comprehensive actions. *J. Great Lakes Res.* 21:234–247.

_____. 1996. Analysis of Lower Green Bay and Fox River, Collingwood Harbour, Spanish Harbour, and the Metro Toronto and Region Remedial Action Plan (RAP) Processes. *Environmental Management* 20:449–459.

Harris, C.C., Nielsen, E.A., McLaughlin, W.J., and Becker, D.R. 2003. Community-based social impact assessment: the case of salmon-recovery on the lower Snake River. *Impact Assessment and Project Appraisal* 21:109–118.

Hartig, J.H., and Law, N.L. 1994. Institutional frameworks to direct the development and implementation of Great Lakes remedial action plans. *Environmental Management* 18:855–864.

_____, and Zarull, M.A. (eds.) 1992. *Under RAPs. Toward Grassroots Ecological Democracty in the Great Lakes Basin.* Ann Arbor, Michigan: University of Michigan Press.

_____, Law, N.L., Epstein, D., Fuller, K., Letterhous, J., and Krantzberg, G. 1995. Capacity-building for restoring degraded areas in the Great Lakes. *Int. J. Sustain. Dev. World Ecol.* 2:1–10

International Joint Commission (IJC). 1978. *The Ecosystem approach.* Great Lakes Research Advisory Board. Special Report to the International Joint Commission. Windsor, Ontario.

_____. 1996. *Position statement on the future of Great Lake Remedial Action Plans*. Report of the Water Quality Board. Windsor, Ontario, Canada.

_____. 1997. *Overcoming Obstacles to Sediment Remediation*. Report of the Sediment Priority Advisory Committee (SedPAC) to Water Quality Board.

_____. 1998. *If You Don't Measure It, You Won't Manage It! Measuring and Celebrating Incremental Progress in Restoring and Maintaining the Great Lakes.* Report of the Water Quality Board.

_____. 2003. *The Great Lakes Areas of Concern Report.* Ottawa, Washington, Windsor.

Jacobson, J.L., and Jacobson, S.W. 1996. Intellectual impairment in children exposed to polychlorinated biphenyls in utero. *New England Journal of Medicine* 335:783–789.

Krantzberg, G. 1997. International Association for Great Lakes Research Position Statement on Remedial Action Plans. *J. Great Lakes Res.* 23:221–224.

_____, and Houghton, E. 1996. The Remedial Action Plan that led to the cleanup and delisting of Collingwood Harbour as an Area of Concern. *J. Great Lakes Res.* 22:469–483.

_____, Ali, H., and Barnes, J. 1999. What progress has been made in the RAP program after ten years of effort? In *Aquatic Restoration in Canada,* ed. T. Murphy and M. Munawar, pp. 1–13. Ecovision World Monograph Series, Backhuys Publ., The Netherlands.

Lee, B.J., Regier, H.A., and Rapport, D.J. 1982. Ten ecosystem approaches to the planning and management of the Great Lakes. *J. Great Lakes Res.* 8:505–519.

Lonky, E., Reihman, J., Darvill, T., Mather, Sr., J., and Daly, H. 1996. Neonatal behavioral assessment scale performance in humans influenced by maternal consumption of environmentally contaminated Lake Ontario fish. *J. Great Lakes Res.* 22:198–212.

Mackenzie, S.H. 1996. *Integrated resource planning and management: the ecosystem approach in the Great Lakes basin.* Washington: Island Press.

Managing Shared Waters. 2002. http://www.pollutionprobe.org/managing.shared.waters.

Ontario Ministry of Environment. 2001. *Guide to Eating Sport Fish 2001–2002.* Queen's Printer. ISSN 0826-9653.

Samya, M., Snow, H., and Bryan, H. 2003. Integrating social impact assessment with research: the case of methylmercury in fish in the Moblie-Alabama River Basin. *Impact Assessment and Project Appraisal* 21:133–140.

Schwartz, P.M., Jacobson, S.W., Fein, G., Jacobson, J.L., and Price, H.A. 1983. Lake Michigan fish consumption as a source of polychlorinated biphenyls in human cord serum, maternal serum, and milk. *Amer. J. Public Health* 73:293–296.

Sproule-Jones, M. 2002. *The Restoration of the Great Lakes.* University of British Columbia Press.

Sustainability Network and Ministry of the Environment 2000. The Road to Delisting: Addressing RAP Challenges. http://www.sustain.web.net/resource/pdf/rapreportPDF

Town of Collingwood. 2001. http://www.town.collingwood.on.ca/ProfileTOC.cfm

United States and Canada. 1972. *Great Lakes Water Quality Agreement.*

_____. 1987. Revised Great Lakes Water Quality Agreement of 1978 As Amended by Protocol Signed November 18, 1987. Consolidated by the International Joint Commission.

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