OSP Journal of Environmental Studies

Review Article

Towards a Better Understanding of the Great Lakes Regime and How it Pertains to Marine Spatial Planning

Krantzberg G

McMaster University, 1280 Main St. W., Hamilton, ON, Canada L8s 4k1

Corresponding Author: Gail Krantzberg, McMaster University, 1280 Main St. W., Hamilton, ON, Canada L8s 4k1, E-mail: krantz@mcmaster.ca.

Received: May 12, 2024; **Accepted:** May 23, 2024; **Published:** May 31, 2024

Abstract

The Great Lakes Water Quality Agreement (GLWQA) is a binational agreement, first signed in 1972 by Prime Minister Pierre Trudeau and President Richard Nixon, wherein the two countries (the Parties) commit to "restore and maintain the chemical, physical and biological integrity of the waters of the Great Lakes Basin Ecosystem". This paper explores the governance regime of this transnational ecosystem, including the role of the International Joint Commission (IJC) to provide guidance to the international efforts that are advancing Marine Spatial Planning and implementation. It explores differences in regulatory approaches and collaborative governance frameworks. It concludes that creative, distributed governance mechanisms ad new institutional arrangements [14] stimulate and sustain advances in the clean up local waterways, raise public awareness of individuals' responsibilities, provide for accountability and transparency, build capacity to address unexpected stressors, unite a community around a shared vision, purpose, and goals, and improve the likelihood of successful implementation.

Keywords: *Great Lakes; Collaborative Decision Making; Marine Spatial Planning; Good Governance*

Abbreviations:

AOC: Area of Concern

GLWQA: Great Lakes Water Quality Agreement

IJC: International Joint Commission

MSP: Marine Spatial Planning

RAP: Remedial Action Plan

Introduction

Understanding the Institutions

The Great Lakes community is a highly developed one with firm institutional roots in Canada and the United States. Managing the environment has traditionally been viewed as a responsibility and public trust of governments. While this view still prevails, there is growing recognition of environmental and societal responsibilities as a shared mission among Indigenous peoples, industry, business and by civil society and their governments.

The Boundary Waters Treaty of 1909 established the International Joint Commission (IJC) as an organization designed to resolve disputes and to avoid conflicts between Canada and the United States from coast to coast. Article 4 of the Treaty provides the provision that neither party shall cause pollution that would injure the health or property of the other side (United States and Great Britain 1909). The IJC was given authority to resolve disputes over the use of water resources that cross the international boundary. The IJC has six members, three appointed from each country by the heads of the federal governments. All members vow an oath to act independently of national concerns. The conviction of those who negotiated the Boundary Waters Treaty was that solutions to the boundary problems should be based on deliberations of a permanent binational and equal institution, rather than through bilateral negotiations of diplomacy. More recently, in light of the formation of the Truth and Reconciliation Commission there is a push for transnational engagement with a fo-

cus on Indigenous peoples, or rights holders:

(t) he Government of Canada continues to be committed to a renewed nation-to-nation relationship with Indigenous Peoples based on recognition of rights, respect, co-operation, and partnership. The Government of Canada will work closely with provinces, territories, First Nations, the Métis Nation, Inuit groups and church entities to implement recommendations of the TRC and further reconciliation to the benefit of all Canadians. This will include the implementation of the United Nations Declaration on the Rights of Indigenous Peoples." (Truth and Reconciliation Commission of Canada n.d.)

The International Joint Commission (IJC) is arguably the most well-known binational institution with a strong presence in Great Lakes program and policy development. In addition to specific powers under the 1909 Treaty, the IJC receives references from government. matters that are referred to the IJC jointly by the governments of Canada and the U.S. for problem resolution, and impartial fact-finding are termed "references". The IJC studies and recommends solutions to transboundary issues when asked to do so by the national governments. When the IJC receives a government request, called a reference, it appoints a board with equal numbers of experts from each country. Board members are chosen for their professional abilities, not as representatives of a particular organization or region (IJC n.d.).

References to the IJC have focused mostly on water and air quality and on the development and use of shared water resources. Although IJC reference recommendations are not binding, they are often accepted by the Canadian and United States governments.

Historically, the governments of Canada and the United States together with the International Joint Commission and in consultation with state and provincial governments provided leadership in Great Lakes matters. Their cooperative leadership is manifested in the various treaties, agreements, and arrangements, which continue to support Great Lakes activities.

Great Lakes are Unique

By surface area, Lake Superior is the largest freshwater lake in the world. Some 1370 kilometres to the east, Lake Ontario's average annual flow rate of 6,800 cubic meters per second gives birth to the St. Lawrence River—the connection to the Atlantic Ocean. In between, more than 8 million Canadian and 35 million U.S. residents live, work, and recreate in, on or by the waters of the Great Lakes basin. The amount of water in the Great Lakes is estimated to be 22.8 quadrillion litters, a glacial relic, of which only 1% is renewable each year through precipitation. These waters are also the foundation of a diverse and unique basin-wide ecosystem (Great Lakes Commission n.d.), and industries in the Great Lakes region account for more than a third of the combined Canadian and U.S. gross national product [21].

In 1964 Canada and the US issued a highly influential lower Great Lakes reference to the IJC to help understand the cause of deterioration of environmental quality in Lakes Erie and Ontario. Scientists associated with the IJC found that excessive phosphorus loads from anthropogenic sources were resulting in severe eutrophication of Lake Erie and Lake Ontario. The 1964 reference induced the creation of the Great Lakes Water Quality Agreement (GLWQA).

First signed in 1972 by Prime Minister Pierre Trudeau and President Richard Nixon, the Great Lakes Water Quality Agreement (GLWQA), the Parties to the GLWQA are the federal governments of Canada and the United States and hold responsibility for seeing that the objectives of the Agreement are achieved. By signing the agreement, the governments accepted the primary responsibility for achieving the objectives of the Agreement, a point that is self evident but has been subject to confusion by the members of the public who think that the International Joint Commission has the primary authority for implementation. The IJC does not have authority for implementation of the GLWQA, they are tasked with reviewing the progress of the Parties to the Agreement and tendering advice, which may or may not be adopted by the Parties.

Legal Matters

Treaties are considered the supreme law of the land in the United States and Canada. In international law, treaties are like contracts where if one

side does not live up to its commitments, the other side can take action to enforce the contract. The GLWQA is soft law, it is not a treaty, but like a contract it can be easily amended, if both sides agree. The GLWQA, a bilateral "executive agreement," has a very ambiguous status [26]. Due to the GLWQA's ambiguity, some, including the U.S. Environmental Protection Agency ("EPA"), argue that the GLWQA must be integrated with the domestic law of each respective nation, because it is not enforceable by itself [3].

The Constitution of the United States creates the authority for the federal government to enter into treaties with foreign countries. Article VI, paragraph 2, provides, "all treaties made… under the authority of the United States shall be the supreme law of land; and the judges in every state shall be bound thereby…" [2].

From a U.S. Constitutional perspective, a treaty is an international agreement (regardless of title, designation, or form) whose entry into force with respect to the United States takes place only after the Senate has given its advice and consent. The GLWQA is an executive agreement that is a follow-on agreement to the Boundary Waters Treaty and is not a Treaty.

In Canada, international treaties are not automatically part of the law of the land but are usually given effect through the adoption of legislation by the appropriate legislative body. This requires the adoption of new statutes, or amendments of existing statutes, at the federal and/or provincial levels depending on the subject matter.

Many contest that the difference between the Boundary Waters Treaty, ratified through the Boundary Waters Treaty Act, and the Great Lakes Water Quality Agreement, is that the former is enforceable "hard" law, while the Agreement is only "soft" law [19]. Even if Agreement did have the force of a treaty, the language in the Agreement is that of "seeking to achieve" and "making best efforts". The lack of enforceability and consequence for inaction is seen as a threat to the binational governance of the shared resource. The establishment of the GLWQA coordinating body, currently named the Great Lakes Executive Committee (GLEC) after the 2012 protocol of the GLWQA, has proven effective and coordinating national, state, and provincial programs and policies to support the implementation of the GLWQA. The GLEC is not mandated by law. It was established under the soft law of the GLWQA.

Some argue that our collective vision for the future of the Great Lakes is embodied in the GLWQA. It states that the purpose is to "restore and maintain the chemical, physical and biological integrity of the waters of the Great Lakes Basin Ecosystem". The GLWQA is ostensibly a water quality/chemical pollution agreement, with a single reference to the ecosystem approach. Both the 1972 and 1978 Agreements were focused on pollutant reductions: phosphorus in the 1972 agreement and toxic persistent substances in the 1978 Agreement. Contemporary environmental thinking regarding complex stressors and drivers of ecosystem quality has moved beyond pollutant reduction to include protection, revitalization, and rehabilitation of all components of the ecosystem, and are better reflected in the 2012 protocol of the GLWQA. The amendments are encouraged by the GLWQA itself which under Article 5 Section 5 states:

"Following every third triennial Assessment of Progress Report of the (International Joint) Commission, the Parties shall review the operation and effectiveness of this Agreement. The Parties shall determine the scope and nature of the review considering the views of State and Provincial Governments, Tribal Governments, First Nations, Métis, Municipal Governments, watershed management agencies, other local public agencies, downstream jurisdictions, and the Public."

Who Governs the Great Lakes?

And by corollary, who governs Marine Protected Areas?

It is important to understand where regional, national, binational, and transnational efforts are housed to improve coordination and determine appropriate leadership nodes for various initiatives.

The International Joint Commission (IJC) has the function of assisting the Parties in resolving disputes over the use of water resources that cross the international boundary. Historically, the governments of Canada and the United States together with the IJC in consultation with state and

provincial governments provided leadership in Great Lakes matters. Their cooperative leadership was manifested in the various agreements, and arrangements, which continue to support Great Lakes activities [15].

Two standing advisory boards are called for in the GLWQA. The Water Quality Board is the principal policy advisor to the IJC and consists mainly of program managers from indigenous, federal, state, and provincial agencies, as well as non-government institutions, selected equally from both countries. Its responsibilities include evaluating progress being made in implementation of the Agreement and promoting coordination of Great Lakes programs among the different orders of government. In 2012, revisions to the GLWQA created the Great Lakes Executive Committee, whose purpose is coordination of Great Lakes programs among the different orders of government.

The IJC's Science Advisory Board consists of government, academic, and industrial experts who advise the Water Quality Board and the IJC about scientific findings and research needs. The Boards can have substructures involving special committees, task forces and work groups to address specific issues.

Because of their obligations under the GLWQA, both governments have established special programs for the Great Lakes. In Canada, the authority for navigable waters and international waters is assigned to the federal government, while pollution control and the management of natural resources are primarily provincial responsibilities. The federal Canada Water Act provides for federal/provincial agreements setting out responsibilities for both levels of government. The Canada/Ontario Agreement Respecting the Great Lakes Basin Ecosystem and Human Health (COA) provides for joint work on activities related to the purpose of the GLWQA. Canada also holds a Canada/Quebec Agreement to manage its St. Lawrence Action Plan, analogous to the Great Lakes Action Plan. The lead agency at the federal level is Environment and Climate Change Canada. The major responsibility for water quality at the provincial level rests with the Ontario Ministry of Environment Parks and Conservation (MECP) [23]. In the U.S., many federal environmental laws affect the lakes, but it is federal policy to delegate regulatory authority to the state governments wherever possible. The states have their own laws and operate using both state and federal funding.

The U.S. Environmental Protection Agency (EPA) [4] has the lead responsibility for U.S. obligations under the GLWQA. Other agencies with important roles include the U.S. Fish and Wildlife Service, the U.S. National Biological Service, and the U.S. Coast Guard. The Great Lakes National Program Office in the EPA Region 5 offices at Chicago provides funding for research and implementation of the GLWQA. EPA regions 2 and 3 are also involved in Great Lakes programs and implementation of the GLWQA. To help coordinate the work of the Great Lakes states and the federal agencies, the Great Lakes Policy Committee, consisting of US federal and state agencies has been in operation and published the Great Lakes 2002 Strategy.

At a state level, the Great Lakes Commission coordinates the work of the Council of Great Lakes Governors. Their strategic priorities are reflected in the work of the Great Lakes Regional Task Force, and the resulting Great Lakes Regional Collaboration (GLRC) formed under the President's Executive Order in 2004 (see below). Canadians participate as observers only, in the GLRC.

At the municipal level is the Great Lakes St. Lawrence Cities Initiative. The Great Lakes and St. Lawrence Cities Initiative (GLSLCI) is a binational coalition of mayors and other local officials that works actively with federal, state, and provincial governments to advance the protection and restoration of the Great Lakes. The GLSLCI enables mayors and other local officials to be active participants in Great Lakes issues relating to governance, economics, and science.

During the 1950s and 1960s the parasitic sea lamprey had decimated fisheries as it invaded further into the waterway. In 1955 the binational Great Lakes Fishery Commission was established to find a means of control for the lamprey. Since then, the Fishery Commission has expanded its activities to include work to rehabilitate the fisheries of the lakes, to coordinate government efforts to stock and restore fish populations, and to participate in the Great Lakes regime as a binational contributor in part, to the purpose of the GLWQA.

Indigenous peoples, local communities, and individuals play a key role in the management of the Great Lakes. Non-government organizations are taking responsibility for public education, citizen-directed projects, and for providing direction to government. Businesses and industries seek to manage their own operations in a sustainable, ecological fashion, being partners with community and governments.

The Great Lakes regime has a complex governance structure, with many questioning its cohesion, accountability, and leadership dimensions. Under current governance regime, the Great Lakes and St. Lawrence region is one where people, the environment and the economy are considered collectively, when the institutions cooperate, and at risk when not.

In implementing the 2012 GLWQA Canada and the United States work in cooperation and consultation with a variety of partners, rights holders, and stakeholders. Engagement of partners and stakeholders occurs through a variety of means, including the following:

- The Great Lakes Executive Committee (GLEC) serves as a forum to advise and assist the Parties in coordinating, implementing, reviewing, and reporting on programs, practices and measures undertaken under the Agreement. The GLEC, co-chaired by ECCC and the US Environmental Protection Agency (EPA), includes senior-level representatives of federal governments, state and provincial governments, Tribal governments, First Nations, Métis, municipal governments, watershed management agencies, and other local public agencies.
- A formal structure of subcommittees, each with Co-Leads, has also been put in place to engage GLEC member organizations in working together to develop and implement actions to achieve commitments for each of the 10 issue annexes identified in the 2012 GLWQA, one of which, Annex 1 calls for the development and implementation of Remedial Action Plan. This committees involves others, beyond the GLEC membership, to undertake specific tasks and activities in support of achieving the commitments in Annex 1.

Remedial Action Plans for Great Lakes Areas of Concern

Under the 1987 GLWQA and then reaffirmed in the 2012 renegotiated protocol to the Agreement, the governments of Canada and the United States commit to develop Remedial Action Plans (RAPs) at geographic Areas of Concern where ecosystem deterioration is particularly pronounced. RAPs are intended to embody an innovative and comprehensive ecosystem approach to restoring and protecting ecological and human well-being and their evolution since inception in 1987 provides guidance regarding methods for MSP.

Annex 1 in the 2012 Protocol identifies 14 beneficial use impairments and initiated programs to restore these uses to the Great Lakes. These are impairments for fish and wildlife regarding degraded ecosystem function, or impairments to human uses and enjoyment of the Great Lakes due to pollution and other stressors. These help the RAP practitioners focus on their planned interventions. The beneficial use impairments are:

(i)restrictions on fish and wildlife consumption;

(ii)tainting of fish and wildlife flavour;

(iii)degradation of fish wildlife populations;

(iv)fish tumors or other deformities;

(v)bird or animal deformities or reproduction problems;

(vi)degradation of benthos;

(vii)restrictions on dredging activities;

(viii)eutrophication or undesirable algae;

(ix)restrictions on drinking water consumption, or taste and odour problems

(x)beach closings;

(xi)degradation of aesthetics;

(xii)added costs to agriculture or industry;

(xiii)degradation of phytoplankton and zooplankton populations; and

(xiv)loss of fish and wildlife habitat.

According to the Agreement:

"For each AOC, the Parties, in cooperation and consultation with State and Provincial Governments, Tribal Governments, First Nations, Métis, Municipal Governments, watershed management

Citation: Krantzberg G (2024) Towards a Better Understanding of the Great Lakes Regime and How it Pertains to Marine Spatial Planning. *OSP Journal of Environmental Studies* 1: JES-1-104.

agencies, other local public agencies, and the Public, shall develop and implement a systematic and comprehensive ecosystem approach to restoring beneficial use." (GLWQA 2012).

Annex 1 under the 2012 Protocol is perhaps the most public of the GLWQA's Annexes, because the activities required therein involved interest groups and Great Lakes stakeholders extensively. Newig and Fritsch [22] make the point that multi-level governance has components that include

'political structures and processes that go beyond the bounds of administrative jurisdictions, with the purpose of accounting for the interdependencies in societal development and political decision making which exist among geopolitical units. Systems of governance at different levels are ideally not hierarchical in a command-and-control sense, but rather are a blend of formally independent, yet mutually interacting governance levels.'

Beierle and Konisky [1] emphasize that participation should have two principal influences on the substance of decisions.

"First, it should bring public values into decision making. Second, it should increase substantive quality according to some common measure".

Ensuring that decisions reflect public values is one of the principal justifications for opening decision-making to the public. Values-oriented decisions are those that may in part be informed by scientific understanding, and also require judgments and influence by the assumptions, opinions, and preferences of the stakeholders and rights holders. In the RAP process participants start by reaching consensus on a shared vision or set of goals for environmental and socio-economic improvement based on diverse but shared priorities. The consensus-based approach generally does not include formal agreements. However, if there are formal agreements or contracts in place, these documents typically specify the roles, responsibilities, and accountabilities of each partner. Further, a documented decision-making process can hold stakeholder, institutions, or agencies accountable for following that process.

Where successful, RAPs clearly embrace the ecosystem approach. Here, the ecosystem approach is based on the human-in-system concept rather than a system-external-to –human concept, where the ecosystem is composed of the interacting elements of water, air, land and living organisms including humans. While Lee discusses 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. Hartig and Law [9] concluded that RAPs (and here one could substitute any place-based approach to Marine Protected Areas, such as MSP) 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).

As illuminated by Hartig et al [8] RAP communities overcame challenges in defining the scope, size, and nature of the problem; and how to even begin the work of unburdening the waters from years of abuse and neglect. They faced costly and confounding choices in tackling the legacy of toxic substances buried in sediment, whether and how to proceed, at what cost, and where to find the resources. In different ways and through varied approaches, they came to appreciate the importance of engaging and empowering the community in driving the cleanup. In so doing, they animated impactful processes that empowered residents as partners.

The communities came to incorporate in their work the restoration of habitat for fish and wildlife, resulting in a powerful and satisfying restoration of the life in and around the lakes that was such an integral part of their historic beauty and gift to human denizens. By cleaning, reclaiming, and reconnecting local communities to the waters, these communities have also catalyzed local economic development and community rebirth to the tune of hundreds of millions, even billions of dollars of economic benefits and countless new jobs for local residents. Finally, they have rebuilt the emotional connection—the "love of the lakes"—that is such a defining attribute for those lucky

enough to live in their vicinity.

Remedial Action Plans, built through a collaborative governance model, have paid off creating vibrant waterfronts that connect people to the water. Just as important for long-term success, a spirit and practice of collaboration has emerged in these communities and built capacity to address unpredictable pressures. This approach required networks of multiple groups and interests that coordinated their efforts to best support the common good.

The collaborative decision-making model results in comprehensive programs that go far beyond project-by-project interventions. The process does require investment in time and personnel, and sometimes the decision-making process takes longer than a government order. However, the return on investment is quite astonishing. By sharing knowledge and a variety of skill sets, the resulting interventions tend to be more holistic and generate collateral benefits. In one case, for example, a $10 million US federal grant to restore Muskegon Lake would create $60 million dollars in value through a restored environment, improved home values and increased recreation. This is a 6:1 return on investment. In Toronto, a revitalized waterfront through the collaborative governance model has generated millions of dollars in tax revenue and more than 14,000 years of employment. The Detroit RiverWalk was built with an $80 million investment in 10 years and has driven another $1 billion in public and private investment, more than a 10:1 return on investment. The largest contaminated sediment remediation project in the Canadian side of the Great Lakes is in Hamilton Harbour, Ontario.

The clean-up of Randle Reef comes at a cost of $139 million, the dominant portion from the federal government. Local businesses are projected to realize by 2032 about $600 million in gross accumulated benefits with recreational users and the federal government realizing $496 million and $338 million respectively. Total monetary value of RAP restoration projects implemented between 1991 and 2002 in Severn Sound, Georgian Bay was estimated at $35.3 million. Total implementation costs of restoration projects during the same time period were estimated at $2.16 million. Every dollar spent on restoration would generate $16.34 (>16:1 return on investment) in benefits, reflecting cost effectiveness of the RAP process. These benefits were based on a 10-year life span, meaning they were only estimated for 10 years. Place-based types of restoration initiatives like RAPs are an unprecedented collaboration of international significant [13].

The Role of the IJC in the Remedial Action Plan process

Annex 1 (AOCs) of the 2012 Agreement refers to the IJC three times. The Agreement requires that the governments of the U.S. and Canada:

1. Consult with IJC to designate additional Areas of Concerns based on an evaluation of beneficial use impairments
2. Make RAP reports available to the IJC
3. Solicit a review and comments from the IJC prior to the removal of a designation as an AOC[13].

The IJC is expected to providing time-sensitive comments on RAP Reports, particularly as they relate to delisting and/or designation of AOCs in recovery. The IJC is also expected to ensure that their feedback reflects state-of-the-art science as well as public input. They do this impartially regardless of the country with which they are communicating.

The IJC's reputation for impartiality can be attributed to the tradition of the six commissioners seeking consensus and very rarely split along national lines. The commissioners do not act under instruction of or as representatives of their governments, but on behalf of the shared resource, for which they pledge an oath.

Lemarquand [18] emphasizes they are free from government control and meet as one body, which encourages a collegial approach to problem solving, as opposed to the negotiation approach characteristic of commissioners acting as agents of their governments. Success, asserts Lemaquand, depends on appointment of qualified, capable, and politically perceptive commissioners.

13 The removal of a location from being designated an Area of Concern is called "delisting". The formal movement from an AOC to and Area of Concern in Recovery happens when all planned interventions have been implemented and time is required for the ecosystem to recover. This too is done in consultation with the IJC.

A major challenge for the IJC and the GLWQA is the process of bringing together a diverse cross section of society in a neutral setting to address environmental, political, and/or societal issues in a manner that is very difficult to achieve within jurisdictional limitations, policy, or geopolitics.

The committee structure under the Water Quality Board and the Science Advisory Board enables this to happen. Complex issues are addressed with members acting in their personal and professional capacity, not at the instruction of their agency. The IJC structure successfully can circumvent necessary but often cumbersome government bureaucracy, and advisors gain direct access to, and involvement with those holding the knowledge and expertise necessary to analyze objectively and make feasible recommendation for action. The lesson here for MSP is to seek a neutral, independent forum for information exchange, where government and nongovernment participants act in their personal and professional capacity, and not on behalf of their institution or agency.

An Ecosystem Approach for RAP Development and Implementation

Thought leaders of their time, Vallentyne and Beeton [27] instruct that an 'Ecosystem approach 'means an integrated set of policies and managerial practices that relate people to 'ecosystems' of which they are part-rather than to external resources or environments with which they interact. The identifying characteristics include synthesis (integrated knowledge); a holistic perspective interrelating system at different levels of integration; and actions that are ecological, anticipatory, and ethical in respect of other systems of Nature.

Adopting an ecosystem approach would require three changes:

- reframing the planning problem to account for air, land, water, and people,
- creating an integrative knowledge base, and
- institutionalizing multi-stakeholder participation in decision making [12].

RAPs were a departure from water quality remediation plans to a watershed-based management context that would consider a broad array of human actions that affect water, ecosystem quality, economic health, and social well-being. Ecosystem-based action plans address remedial actions to restore degraded conditions and inquire into the human dimensions that consider changing human behaviours that enable long term functionality and sustainability of the ecosystem. Discovering such methods necessitated an integrative understanding of the watershed's bio-chemical-physical functions and their susceptibility to anthropogenic stresses. Kellog [12] asserts that to be successful would necessitate collaboration of all representative jurisdictions, regulatory and resources agencies, and other stakeholders and citizens in the watershed. This ring familiar when it comes to MSP.

Hartig [7] points out that there is no single best way to implement an ecosystem approach, since each defined AOCs involves a distinct physico-chemical and biological factor, stakeholders, institutional frameworks, regulatory complexity and more. Nevertheless, an implementation framework that is guided by eight criteria should include:

- stakeholder involvement;
- leadership;
- information and interpretation;
- action planning within a strategic framework;
- human resource development;
- results and indicators;
- review and feedback; and
- stakeholder satisfaction

As such, Remedial Action Plans (RAPs) for Great Lakes Areas of Concern (AOCs) are perhaps the best example of community-based environmental protection in existence (EPA n.d.) Through the collaboration between public and private institutions, the RAPs apply a watershed approach to ecosystem regeneration and protection, as they progress towards the recovery of human and non-human “beneficial” uses.

Collaborative Decision Making/Governance

The experiment in collaboration aimed at aquatic ecosystem health, as Sproule-Jones [25] concludes, provides an innovative approach in which resource users, regulators, and those in an interest in regenerating resilience for the local ecosys-

tem 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[14] council/committee to work with federal/state/provincial technical and scientific experts. Citizen advisory committees were used as the focal point of public involvement for RAPs in 75% of the Areas of Concern. Known in various jurisdictions as public advisory committees (PACs), basin committees, or stakeholder groups, the IJC contends that such mechanisms are the key to implementing the ecosystem approach in remedial action planning. In citizen advisory committees, diverse interests come to the same table to participate in the planning process in an interactive manner, advising the planning agency throughout the preparation of the RAP, and in more recent times, becoming the decision-making party in consultation with government agencies. 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, labour, industry, business, municipal governments, indigenous peoples, shipping, tourism, and recreation [17].

Engaging stakeholder groups in the plan design minimizes the risk of future polarization [24]. Advisory Committee participants possess unique knowledge and represent the interests of their particular stakeholder groups. A key premise is that community participants possess important knowledge and can provide an informed perspective of the social impacts of the decisions [6].

Stakeholder involvement goes well beyond democratically making public decisions. It can result in arriving at decisions that better reflect public values and incorporate public knowledge. At the same time, it can improve relationships by resolving conflicts and building trust in government agencies and among participants. In also builds capacity among stakeholders and government to understand unanticipated challenges, so as to coordinate action and intervene accordingly.

Important is recognizing the value of Traditional Knowledge and the local public's anecdotal and experiential intellect. Best practices in public engagement processes use plain language to communicate clearly, are supported by commitments in institutional programs and policies, demonstrate early and often how the public input will be used, include mechanisms to resolve disputes, provide the community with access to technical experts, celebrate successes to nurture momentum and train community leaders thereby building capacity to sustain progress.

Jetoo et al [11] note that governance can be difficult to define as it is used in a multitude of different ways. While different interpretations abound, most agree that the basic characteristic of governance is the migration of power from the central state, horizontally to non-state actors.

Stakeholders have been instrumental in helping governments be more responsive to and responsible for restoring ecological and socio-economic well-being in AOCs. Further, stakeholders have been the primary catalyst for implementing actions which have resulted in ecosystem and socio-economic improvements. Such broad-based partnerships among diverse stakeholders can best be described as a step towards grassroots ecological democracy in the Great Lakes Basin [10]. The collective objective is to work with governments and develop a plan to revitalize ecosystem and socio-economic health and implement the plan to achieve agreed-upon targets that indicate when "beneficial uses" are restored [16].

Central to the successful deployment of the RAP process is clear accountability for active interventions. This is best accomplished through the open sharing of information, clear and unambiguous definition of stressors and problems (including the identification of indicators to be used in measuring when the desired state for a beneficial use is reached), agreement on the priority actions required, and the identification of who is responsible for taking what action. From this foundation, Hartig and Zarull (1992) clearly state that the responsible institutions and individuals can be held

14 Note that in many locations and at many times, these committees went far beyond advising governments, but became a collective decision-making body. The language of advisors is derived from the GLWQA and has evolved to be much more powerful, in practice.

accountable for progress.

The first stage for each Remedial Action Plan is to identify environmental problems, impaired beneficial uses, and their probable causes. The second stage is to develop a recommended set of remedial actions and preventative initiatives to improve environmental quality in support of the beneficial uses. Targets are set by which RAP practitioners can recognize that they have met their goals surrounding beneficial uses. In some AOCs, the targets are science-based and quantitative, wherever possible. In other cases, general statements guide the practitioners, making it difficult to recognize when success has been achieved.

Margerum and Robinson [20] advise that partnerships operating at the organizational level require networks that support the flow of information and decisions across agencies. While such efforts predict improved better decision making, long-term efficiencies and better outcomes, there are inevitable transaction costs. They point out that this necessitates that leaders be willing to make long-term investments and that organizations understand the need to change their culture and reward structures to support partnerships. For RAPs this is a critical investment if collective management is to attain shared goals.

Hall et al [5] provide an evaluation of the strengths the RAP processes. To achieve the goal of restoring environmental health requires

"a dynamic process that relies heavily on research and monitoring to direct remediation efforts. Three principle means of coordinating this research and monitoring include: research and monitoring workshops; a monitoring catalogue outlining both government and nongovernment initiatives; and an annual report written by a local community group. These tools increase the effectiveness of remedial actions by: (i) improving stakeholders' ability to track trends; (ii) allowing program decision-makers to utilize adaptive management techniques to continuously modify programs based on new results; (iii) integrating interdisciplinary fields, and (iv) increasing accountability."

Conclusion

Both RAPs and MSP involve collaboration among stakeholders and rights holders. Both recognize the importance of engaging a diversity of institutions and organizations in the decision-making process. Ideally, both initiatives should foster the common goal of promoting deep sustainability and address human pressures on aquatic ecosystems. While Great Lakes RAPs are specific plans to address existing environmental problems in a particular region, Marine Spatial Planning is a broader, forward-looking strategy to manage and sustainably use marine resources across larger areas. Nevertheless, both address the same goal of environmental protection and socio-economic stability and while they differ in scope, they are best served by going beyond traditional regulatory tools to more flexible and adaptable frameworks.

Further, RAPs often use adaptive management approaches, where active interventions are continually assessed and adjusted based on new information derived from monitoring results. This adaptive approach is important for the dynamic nature of marine environments which would benefit from the development of flexible and responsive management strategies in MSP. Table 1 provides a comparison of RAPS and MSP.

Table 1: A comparison of attributes of Remedial Action Plans and Marine Spatial Planning

Attribute	Great Lakes Remedial Action Plans (RAPs)	Marine Spatial Planning (MSP)
Scope	Focused on restoring and protecting specific geographic Areas of Concern (AOCs) within the Great Lakes.	Broad spatial planning for large marine or coastal areas, considering multiple uses and needs.
Objective	Environmental remediation and restoration to address historical and ongoing pollution and habitat degradation, with a consideration of socio-economic conditions.	Sustainable management of marine resources, optimizing economic, social, and environmental outcomes.
Scale	Local or regional, addressing issues within the Great Lakes basin, sometimes across jurisdictions, within a state/province or between a state/province.	Larger scale, covering marine or coastal areas, often involving multiple jurisdictions. Could benefit from breaking down into different zones based on use, condition, and other variables.
Stakeholder Involvement	Involves local communities, different orders of government, rights holders, business educators, industries, conservation groups and the public.	Potentially inclusive process involving government departments, rights holders, and stakeholders, including industries, conservation groups, and the public.
Cultural Heritage Preservation	In some locations, includes efforts to protect culturally significant places and practices.	Integrates cultural perspectives and considerations into planning, to preserve traditional customs and values.
Adaptive Management	Adapts remedial and protective measures based on monitoring and evaluation of results.	Adjusts plans based on changing marine conditions.
Legal Framework	Primarily nonregulatory, but in compliance with national and regional environmental regulations.	May incorporate a legal framework, with a complimentary cooperative process that that can involve national, regional, and international laws and agreements.
Economic Considerations	Considers economic consequences of cleanup and restoration efforts.	Balances or optimizes economic activities with conservation priorities.
Economic ROI	ROI is primarily seen in the restoration of ecosystem services, fisheries, and improved water quality, leading to increased property values and business and tourism revenues.	Economic benefits arise from sustainable use of marine resources, supporting fisheries, tourism, and other industries.
Temporal Focus	Generally, addresses historical pollution and habitat degradation issues. Includes long term monitoring to ensure sustainable outcomes persist.	Considers both current and future uses and threats, with a long-term perspective on sustainable development.

The most novel and significant success of what some consider to be the RAP experiment in collaborative management, was the building of community capacity to help push for implementation and sustain momentum for the gains made in ecological and socio-economic revitalization. Elements that sustain progress include: a strong and organized public, ownership by local government, trust and cooperation through frank dialogue and agreement on vision and goals, commitment to integrate water quality with land use, economic development, and other matters of local importance, quantitative restoration targets that indicated ecological response to active interventions, specific reporting requirements, opportunities to celebrate achievements, a strong commitment to adapting to new knowledge and adjust accordingly, and communicating the plan to potential partners to leverage gains for the local economy through establishment of collaborative coalitions.

By leveraging the knowledge, experiences, and tactics advanced through Great Lakes RAPs, governments, stakeholders, and rights holders involved in marine spatial planning can benefit from knowledge and a richer understanding of ecosystem management challenges, collaborative governance frameworks, and adaptive approaches, ultimately resulting in more effective, efficient, and sustainable MSP outcomes.

References

1. Beierle, TC., D. M Konisky (2001) What are we gaining from stakeholder involvement? Observations from environmental planning in the Great Lakes. *Environment and Planning C: Government and Policy* 19: 515 -527.

2. Dalton., Robert (1999) National Treaty Law and Practice: United States, In: National Treaty Law and Practice, eds. Monroe Leigh, Merritt R. Blakeslee, and L. Benjamin Ederington, American Society of International Law.

3. Donahue., Michael J (1999) The Case for Good Government: Why a Comprehensive Review of the Great Lakes Water Quality Agreement is Needed. *TOL. J. GREAT LAKEs' L. SCI. & POL'Y* 1: 10-11.

4. EPA. Nd (2012) Great Lakes Areas of Concern. Great Lakes Commission (nd).

5. Great Lakes Water Quality Agreement Protocol of 2012. Hall, J.D., K. O'connor., J. Ranieri (2006) Progress Toward Delisting a Great Lakes Area of Concern: The Role of Integrated Research and Monitoring in The Hamilton Harbour Remedial Action Plan. *Environmental Monitoring and Assessment* 113: 227-243.

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

7. Hartig, J.H (1997) Great Lakes Remedial Action Plans: Fostering Adaptive Ecosystem-Based Management Processes. *The American Review of Canadian Studies* 437-458.

8. Hartig., John H., Gail Krantzberg., John C. Austin., Paula McIntyre (2019) GREAT LAKES REVIVAL. How Restoring Polluted Waters Leads to Rebirth of Great Lakes Communities. *International Association for Great Lakes Research.*

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

10. Hartig, J.H., M.A. Zarull (1992) Under RAPs. Toward Grassroots Ecological Democracy in the Great Lakes Basin. *Ann Arbor, Michigan: University of Michigan Press*.

11. Jetoo, S., A.Thorn., K.Friedman., S. Gosman., G. Krantzberg (2015) Governance and geopolitics as drivers of change in the Great Lakes – St. Lawrence basin. *J. Great Lakes Res* 41: 108-118.

12. Kellog, W.A (1998) Adopting an Ecosystem Approach: Local Variability in Remedial. *Action Planning Society & Natural Resources* 11: 465-483.

13. Krantzberg, G (1997) International Association for Gret Lakes Research Position Statement on Remedial Action Plans. *J. Great Lakes Research* 23: 221-224.

14. Krantzberg, G (2003) Keeping Remedial Action Plans on target: lessons learned from Collingwood Harbour. *J. Great Lakes Research* 29: 641-651.

15. Krantzberg, G (2006) Sustaining the Gains Made in Ecological Restoration: Case Study Collingwood Harbour, Ontario. *Environment, Development and Sustainability* 8: 413-424.

16. Krantzberg, G., M. Bratzel., J. MacDonald (2006) Contribution of the International Joint Commission to Great Lakes Renewal. *Great Lakes Geographer* 13: 25-37.

17. Landre B.K., B.A. Knuth (1993) The Role of Agency Goals and Local Context in Great Lakes Water Resources Public Involvement Programs. Environmental Management 17: 153-165.

18. Lemarquand, D (1993) The International Joint Commission and Changing Canada-United States Boundary Relations. *Natural Resources Journal* 33: 59-91.

19. Lyster, S (1985) International Wildlife Law. *Grotius Publications Ltd., Cambridge, UK.*

20. Margerum, R.C., C.J Robinson (2015) Collaborative partnerships and the challenges for sustainable water management. *Current Opinion in Environmental Sustainability12*: 53-58.

21. Martin Associates (2001) Economic Impact Study of the St. Lawrence Seaway System. Prepared for The U.S. *Saint Lawrence Seaway Development Corporation*.

22. Newig J., O. Fritsch (2009) Environmental Governance: Participatory, Multi-Level – and Effective? *Environmental Policy and Governance* 19: 197-214.

23. Ontario Ministry of Environment (2001) Guide to Eating Sport Fish 2001-2002. *Queen Printer*.

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

25. Sproule-Jones (2002) The Restoration of the Great Lakes. *University of British Columbia Press*.

26. Tschorke Alisa (2008) Great Lakes Water Quality Agreement: Is Honesty Without Accountability or Enforcement Still Enough? *Mo. Envtl. L. & Pol'y Rev* 273.

27. Vallentine, JR., AM Beeton (1988) The 'Ecosystem' Approach to Managing Human Uses and Abuses of Natural Resources in the Great Lakes Basin. *Envron. Conservation* 1: 58-62.