"Six Years in the Mud. Restoring Maritime Salt Marshes: Lessons Learned and Moving Forward"

Bedford Institute of Oceanography, Dartmouth Nova Scotia

February 1st to 2nd, 2007.

Main Workshop Messages

This section summarizes successes and challenges facing salt marsh restoration in the Maritimes and the main messages emerging from the workshop. It also offers some recommendations for follow-up stemming from both the workshop and from analysis by the Workshop Advisory Team.

Successes and Challenges

Successes:

The workshop case studies, presentations and mapping activity highlighted many salt marsh restoration successes over the last six years.

- The entire Bay of Fundy, except Yarmouth County, has been inventoried for tidal barriers by the Conservation Council of New Brunswick, Ecology Action Centre and the Clean Annapolis River Project. Results are contained in an interactive GIS-based database available through Dr. Danika van Proosdij at Saint Mary's University. Contact Dr. van Proosdij for more information at dvanproo@smu.ca
- A mapping activity undertaken by participants at the workshop indicated that at least 260 hectares[1] (see note below) of salt marsh habitat has been restored in the Maritimes. Since this activity included only projects that workshop participants had direct knowledge of, or involvement with, there may be other completed restoration projects not identified on the maps. The mapping activity also showed an additional nine projects in the planning stages.
- The mapping activity also showed a renewed academic and scientific interest in coastal ecosystems and salt marshes. Over forty ongoing or completed research and monitoring projects were identified.
- In addition to ecological benefits, in many cases these restoration projects have generated great social and economic benefits to the community such as: eco-tourism, bird-watching, education, recreation, and eliminating insect infestations.
- Interest in salt marshes and salt marsh restoration has increased over the last several years, as indicated by an increase in the number of workshop participants, from thirty-five to eighty-five, since the "Getting Dirty" workshop organized by the Ecology Action Centre in 2000.
- There is a growing commitment by provincial governments to protect and conserve coastal wetlands as indicated by the development of new policies including: the New Brunswick Coastal Wetland Protection Policy, New Brunswick Wetlands Policy, and the Nova Scotia Wetland Designation Policy.
- At the federal level, this commitment is matched by increased compliance and enforcement of the Federal Wetlands Policy and the Fisheries Act.

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[1] This number incorporates 8 Ducks Unlimited Canada projects in the Maritimes for a total of 225ha [Allains Creek NS (14.2ha), Newfoundland Creek NB (78.5ha), Ten Mile House PEI (42.5ha), Musquash NB (15.4ha), Red Head NB (69ha), Walton NS (9.3ha), Ruisseau a Sivret NB (16ha), Comeau Hill NS (10.1ha)] as well as Cheverie Creek NS (30ha), Smith Brook (2.2ha), and two NS DoA sites [Green Creek (26ha) and Argyle (20ha)]

- A wide range and diversity of partners have been involved in salt marsh projects, including community groups, schools, federal government, provincial and municipal governments, land trusts, the scientific community, and universities.

Challenges:
The workshop sessions revealed challenges faced during salt marsh restoration projects and to the expansion of salt marsh restoration across the Maritimes.

- A lack of funding for salt marsh restoration work, especially for anything apart from the restoration itself, such as outreach, education, coordination, research, and monitoring.
- Many community groups have a low capacity to design and undertake restoration projects by themselves.
- Legislation and policies relating to the protection of salt marshes can be confusing and their implementation is not always well coordinated. Wetlands policies are not consistent between provinces.
- There are no federal or provincial policies related specifically to salt marsh restoration, instead salt marsh restoration happens as part of a process to compensate for unavoidable habitat damage.
- Public knowledge about the ecological and societal benefits provided by salt marshes is still limited.
- There is not enough baseline information and research about Maritime salt marshes. Monitoring is expensive. The cost of monitoring limits the quantity and quality of data being collected.
- There is no selection process to prioritize candidate restoration sites for funders and decision-makers.
- Salt marsh restoration is generally not considered part of long-term land use planning of municipalities. Some municipalities have been partners in salt marsh restoration projects, but most do not initiate restoration projects.

Main Themes
The main themes reflect issues that came out repeatedly during the workshop presentations and discussions as collated and synthesized by the Workshop Advisory Team. These themes reflect learning from past and ongoing salt marsh restoration projects, as well as emerging issues and questions. They also reflect the range and diversity of salt marsh projects happening in the Maritimes.

Information and Data Sharing
Despite increasing interest, the status, condition, and natural functions of many of the Maritimes salt marshes remain largely unknown. As well, we don't know how they will ultimately respond to salt marsh restoration efforts. In general, there needs to be more support for research on marshes throughout the Maritimes as there is still not sufficient baseline data and monitoring data being collected. There is also a need for targeted research into specific questions related to marshes and restoration. For example better techniques for assessing the diversity of fish in marshes with strong tidal variation are needed.

Data sharing amongst researchers needs improvement as there is currently no easily accessible means for sharing information. Nor is there one "lead" government, academic, or civil society institution that can take on this role. To support information sharing, the Gulf of Maine Council on the Marine Environment has recently developed an internet "portal" to regional information sources and Nova Scotia Transportation and Public Works has posted its summary reports on its website. This type of interaction and compilation of data is

necessary to keep track of progress, ensure monitoring is occurring properly, and transfer locally learned lessons to the global forum.

There is a sense of urgency in to salt marsh restoration efforts, as these important ecosystems are still being lost or damaged. Without more research and information sharing, practitioners still do no have an accurate sense of whether we are gaining or losing salt marsh habitat. Dealing with the information gaps will improve our ability to prevent habitat destruction, compensate for habitat we fail(ed) to protect, and more accurately predict the potential outcomes of restoration activities.

Diversity of Salt Marsh Projects

Musquash, NB and Cheverie Creek, NS, were two of the first salt marsh restoration projects in the Maritimes. These projects can be called “proactive” restoration projects because they were initiated by environmental organizations, required long term planning, and restoration was completed with active support from a wide range of partners. For these pilot projects, a lot of time was spent developing the process and the partnerships, including research, investing time and resources into education and outreach, and collecting baseline data. Both projects are examples of successful pro-active community-based salt marsh restoration.

There is currently an increasing diversity of salt marsh restoration projects happening in the Maritimes. There are now many types of salt marsh restoration projects. They vary with regards to:

- who initiated the project and why
- size and extent of restored area
- nature of ecological benefits from the project
- project cost
- type of restoration activity
- stakeholders involved
- extent of baseline research and monitoring
- duration of project from conception to completion
- time required to complete the project

The emerging diversity is a welcome sign that salt marsh restoration is becoming a more well-established activity carried out by a wide range of different partners; from community groups to regulatory agencies. Projects undertaken as part of compensation for habitat loss or alteration happen faster and generally do not support extensive community outreach and education. However, different project types have different needs and priorities that need further consideration. For example, as discussed in the monitoring section, the monitoring requirements for various projects might vary depending on the kind of project.

Community Participation

As guest speaker Harry Thurston reminded participants, stewardship is deeply connected to a sense of place. A connection to a particular marsh is very important to the success of a restoration project and explains why so many community groups initiate and volunteer on marsh restoration projects.

Not all salt marsh restoration projects are initiated by communities. Local communities can support and even take over restoration projects initiated by outside institutions. Communities can provide a different perspective, unique skills and a vast amount of information about local salt marshes. It is therefore important to involve communities before starting a restoration project in order to get their local and long-term ownership and support.

Climate Change Impacts

Sea level rise and other climate change impacts will have an enormous impact on salt marshes and restoration efforts. Marshes in different parts of the Maritimes may be affected differently by sea level rise. For example, there is some evidence that Bay of Fundy marshes are building up at rates that will keep pace with projected sea level rise, while marshes in the Northumberland Strait may disappear as sea levels are rising too fast for marshes to replace themselves.

The impacts of climate change on coastal areas and salt marshes will be aggravated by human activities such as coastal development and shoreline hardening. Salt marshes are naturally very dynamic systems, yet coastal development may constrain their natural ability to adapt to changes, and prevent the inland migration of marshes. Coastal habitats of all types (marshes, beaches, dunes, barrier islands) need to be allowed to migrate landward as sea levels rise. We need more information on the potential impacts of coastal development and to take them into account when considering how marshes will respond to restoration efforts. A strategic overview of sea level rise impacts and potential adaptation must be created, and should include the development of coastal policies and their enforcement.

Need for Coordination and Consistency

Although there has been progress in the development of policies and legislation to protect coastal wetlands, there remain gaps in existing policy and regulatory frameworks related to salt marshes. This is especially true with regards to understanding what triggers salt marsh restoration and identifying opportunities for pro-active (non-compensation) restoration projects. The present lack of clarity can lead to confusion and inconsistent implementation of projects. There is a need for consistent and appropriate legislation for the entire Maritime region and to make the existing regulatory system easier for stakeholders to understand.

Monitoring

Monitoring is important in ensuring restoration is moving in the right direction and achieving the expected results. There can be different levels of monitoring for different types of projects. Larger, legislatively required projects such as Federal Habitat Alteration Disruption and Destruction (HADD) compensation projects and provincial compensation projects require full scale monitoring programs based on the best available knowledge, tools and experience. Currently, modified GPAC Regional Monitoring Protocols are being applied to monitor restoration projects at Cheverie Creek, Walton River and other places in the Maritimes.

Not all projects require the same level of monitoring. The high degree of monitoring associated with compensation driven restoration projects is partially a deterrent so that proponents will avoid damaging salt marshes in the first place. However, these large monitoring programs are important research sites for future restoration projects. They are collecting essential information that can help improve the success of future salt marsh restoration efforts.

Larger monitoring programs can help in the development of the most appropriate and cost-effective monitoring programs, indicator sets and sampling methods for small community-driven projects for which few funds are available. These projects often rely on community or volunteer monitoring. However, communities need training and support for data collection, analysis, reporting and presentation. Very good monitoring protocols and handbooks for community volunteers have been developed in New England and the United Kingdom that could be adapted for use in Atlantic Canada.

Recommendations

We are at a crucial time in salt marsh restoration. Some gains have been made over the last 6 years, but they are localized. The mapping activity conducted during the workshop shows clusters of smaller projects scattered around the Maritimes. We have not yet evaluated the impact of these individual projects on the overall health of salt marshes in the Bay of Fundy, nor how our restoration efforts are improving the overall health of the coastal and marine environment. It is difficult to set priorities for restoration beyond specific local sites because we lack a clear overarching framework to guide salt marsh restoration. There is a need to determine the larger ecological goals on which to base our action plans, while at the same time continuing to carry out equally important local restoration projects.

The Advisory Team recommends that our future research and next steps be focused simultaneously on widening and deepening our knowledge of salt marsh restoration. With a wider focus, we will explore and prioritize restoration within a larger ecological context. What are we trying to achieve ecologically? Should our focus be on restoring systems and areas that have already been severely degraded or emphasize restoring small marsh areas within otherwise intact marsh systems? Are a number of smaller projects more ecologically significant than one larger project?

The Gulf of Maine Action Plan www.gulfofmaine.org provides a broad overview of the status of the entire Gulf of Maine and its ecosystems. These general goals now need to be translated into specific priorities to guide researchers, regulatory agencies and community groups in focusing their restoration efforts. The Advisory Team recommends a coordinated effort involving universities and other research bodies to prepare an ecological case for salt marsh restoration on a larger scale.

Other initiatives that will promote a wider perspective on salt marsh restoration include:

- Establishing a centralized and easily accessible database of restoration projects and existing restoration and monitoring data
- Incorporating salt marsh restoration planning into the development of adaptive strategies for sea level rise and climate change
- Increasing public outreach and education about salt marshes
- Identifying existing groups and institutions to take the lead on moving forward on these action statements and coordinating large scale research efforts

The Advisory Team also recognizes a need to deepen our understanding of certain aspects of salt marsh restoration through more focused exploration of complicated issues that cannot easily be resolved within a large workshop. We suggest holding a series of smaller forums to focus on specific emerging questions and topics related to salt marsh restoration. Based on what emerged during the workshop, some examples of topics needing further analysis include:

- Compensation banking and salt marsh credits
- Prioritizing restoration sites
- Comparative policy analysis across the Maritimes
- Ecosystem approach to planning and prioritizing restoration
- Monitoring techniques for small scale projects