

# Using Marine Protected Areas to Visualize the Property Rights Infrastructure of a Canadian Marine Cadastre

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**Key words:** Marine Property Rights infrastructure, Marine Protected Areas (MPAs), Marine Cadastre.

## ABSTRACT

The ability to establish Marine Protected Areas (MPAs) has provided additional management tools that can be used for better stewardship of marine resources and their habitats. MPAs are being identified, established and managed using existing environmental and ecological data that has often been collected for other purposes. Little attempt is being made to identify what the real information requirements are, due to cost of new data collection and the need to expedite MPA creation. It is acknowledged that accurate information on the marine environment, its resources and uses is critical in identifying, evaluating, and managing MPAs. Yet it is accepted practice that management decisions concerning MPAs are being made with limited information, especially with regard to marine property rights.

There are several marine property questions that also need to be answered in the planning stage of a Marine Protected Area (MPA): Who has the rights to issue private rights offshore? Where are the public rights in the near and offshore? How are these rights surveyed and what is their spatial extent? Who maintains this (and other) marine property information? How do you visualize various levels of jurisdiction and administration in the marine environment? etc.

This paper provides answers to some of these questions by outlining how these and other issues were addressed in the proposed Musquash Marine Protected Area in New Brunswick Canada. In this paper, we outline what an MPA is, outline the relationship between marine property rights and MPAs, outline our research on MPA governance, outline the components of a MPA property rights infrastructure, show how this fits into the broader picture of a Canadian marine cadastre, and conclude by outlining the problems encountered in defining this infrastructure.

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## 1. INTRODUCTION

The importance of the marine environment to human existence makes it imperative that information models represent the multidimensional nature of reality as closely as possible to facilitate good governance. Information for a jurisdiction, on the effects of its formal law and community interests on the marine environment (e.g. nature and spatial extents and the rights, responsibilities, and restrictions etc.) would be stored in a marine cadastre. Other information on the physical, biological, socio-cultural and economic nature of the environment may be linked to the cadastre to give it a multipurpose function.

Internationally, the United Nations Convention on Law of the Sea (UNCLOS) has provided a legal mechanism whereby a nation can extend its claims as far seaward as the continental shelf. As it explicitly deals with the rights, restrictions and responsibilities to the physical offshore, UNCLOS has created a complex multidimensional mosaic of potential private and public interests. When coastal zone management programs, and internal jurisdiction and administration issues are added on, a clear understanding of the nature and extent of offshore interests is crucial for decision making purposes.

The ability to establish Marine Protected Areas (MPAs) has provided additional management tools that can be used for better stewardship of marine resources and their habitats [Canada, 1997a, 1997b, 1999]. In Canada, MPAs supplement existing formal marine protected area programs administered by Canadian Heritage (Parks Canada) and Environment Canada [Canada, 1998].

### 1.1 What is an MPA?

Under Section 35 of the Canada *Oceans Act* (1996) an MPA is defined as “an area of the sea designated for special protection that forms part of the internal waters of Canada or the exclusive economic zone of Canada”. An area can be designated as an MPA to conserve and protect one or more of the following:

1. Commercial and non-commercial fisheries resources, including marine mammals and their habitats
2. Endangered and threatened marine species, and their habitats
3. Unique habitats
4. Marine areas of high biodiversity or biological productivity
5. Any other marine resource or habitat as is necessary to fulfill the mandate of the Minister of Fisheries and Oceans

Canada's National Framework for establishing and managing Marine Protected Areas (MPAs) advocates the identification of a system of ecologically sensitive marine and coastal areas, areas of high biodiversity, areas of ecological or scientific significance, or of community value, and to recommend appropriate management initiatives for these areas. Referred to as Pilot Project MPAs, they test critical elements of the designation process and provide Department of Fisheries and Oceans (DFO) with the ability to refine national and regional frameworks to reflect 'real world' experiences [Canada, 1997a, 1997b, 1999].

## **1.2 Governance of MPAs**

Governance is about decision-making and steering, and the distribution of knowledge and power within an organized entity (e.g. a jurisdiction, government department etc.) as that entity pursues its goals and objectives [Centre on Governance, 2000; Paquet, 1994; Paquet, 1997; Rosell, 1999]. Accurate, up-to-date, complete and useful information regarding the resources that currently exist, the nature of the environment within which those resources exist, as well as on users' relationships to those resources is therefore always a requirement for effective governance of marine areas.

A prerequisite for good governance of coastal and ocean resources is appropriate information about the ownership, stewardship, and use of these resources, i.e., a marine cadastre [Nichols et al., 2001]. Several authors [Dale and McLaughlin, 1988, National Research Council, 1980, 1983, Niemann and Moyer, 1988] have argued that the cadastre presents an efficient method of identifying, recording and protecting interests in land. If it is accepted that cadastres are able to efficiently fulfill this role, then the extension of cadastre to the marine environment is reasonable.

## **1.3 Marine Property Rights and MPAs**

MPAs are being identified, established and managed using existing environmental and ecological data that was collected for other purposes while little attempt is being made to identify what the information requirements are [Canada, 1997a, Fenton and Westhead, 2000]. We contend that plans are being designed, decisions are made, and activities taking place in the creation of Marine Protected Areas (under Canada's *Ocean Act*) without too much regard to the impact on any existing property rights. The objectives for establishing MPAs include environmental and socio-economic criteria but they can potentially impact on, for example: oil and gas development rights, including cables and pipelines, traditional fishing rights, aboriginal rights, coastal property rights (including riparian rights), as well as rights for public navigation, recreation, and access. Yet the MPA administrators, NGOs and community groups involved cannot go to a single source and discover what rights might exist in a specific area.

While it is acknowledged that accurate information on the marine environment, its

resources and uses is critical in identifying, evaluating, and managing MPAs, it is accepted practice that management decisions concerning MPAs are being made with limited knowledge [Canada, 1997b]. We contend that the rationale for creating a more complete marine property rights infrastructure (as part of a Canadian Marine Cadastre) is to facilitate the enactment of good governance.

## **2. OUR RESEARCH ON MPA GOVERNANCE ISSUES**

Since the winter of 2001, the Land Studies and Ocean Mapping Groups at the University of New Brunswick have been involved in a Geomatics for Informed Decisions (GEOIDE) project dealing with Good Governance of Canada's Oceans. This project focuses on providing information on what resources (living and non-living) there are to govern; who holds the rights and responsibilities for their safe and orderly conservation, distribution and exploitation; and the spatial limits (boundaries) of those rights and responsibilities [Nichols et al., 2000, Ocean Governance, 2000].

One of the case studies of the Good Governance project involves the proposed Musquash Marine Protected Area (MPA) in the Bay of Fundy in Atlantic Canada. Musquash Estuary is located approximately 20 kilometers west of the city of Saint John, New Brunswick. The estuary, which is approximately 1km wide at the mouth, empties into the Bay of Fundy, the site of one of the highest tides in the world. The site was originally proposed as a protected area by the Conservation Council of New Brunswick (CCNB), because it represented one of the last ecologically intact estuaries in the Bay of Fundy.

Designating the Musquash estuary as an MPA represented an attempt to regulate and take measures to protect this marine environment. By participating in this project, it became increasingly clear that it was first important to determine who has authority, jurisdiction, administration, or ownership of the offshore and who, as a consequence, can regulate and take measures to protect its environment. We determined this to be the role of a marine property rights infrastructure.

### **2.1 The Role of Property Rights Infrastructure in MPAs**

As is the case of information infrastructures, a property rights infrastructure consists of policies, processes, standards, and information necessary for the allocation, delimitation, registration, valuation and adjudication of marine property rights. This definition is derived from expectation that marine property infrastructure will serve the following functions [Nichols, et. al. 1998; and McLaughlin and Nichols, 1997]:

1. Unambiguously define and record the rights, responsibilities, and restrictions allocated for land and fixed improvements;
2. Unambiguously define, record, and provide notice of the physical extent of those interests on the land;
3. Clearly define and record who holds these interests;

4. Provide the information and means to determine the value of the interests, where the value may be economic, cultural, or physical;
5. Provide the means to adjudicate property-related disputes.

The growing awareness of the need for ocean management and co-management strategies is highlighted in the proceedings of the March 2001, Association of Canada Lands Surveyors (ACLS) national stakeholders workshop in Halifax. Although the proceedings discuss the issues and requirements related to property rights infrastructure for oil and gas development offshore they also highlight critical driving forces of change in Canadian ocean spaces (including MPAs) by the following statement [ACLS, 2001]:

*... Aboriginal rights, depletion of the cod fishery, the Atlantic Accords, and the recent Newfoundland-Nova Scotia boundary dispute in so-called "Canada Lands" all point to a slowly changing concept that any ocean management in Canada will be co-management. **Co-management means information sharing; to co-manage there is a need to involve the stakeholders.** The new federal Oceans Act provides one framework for action but there is much work to be done....*

## 2.2 Allocation of Legal Interests

In 1982, 119 nations (including Canada) signed the United Nations Convention on the Law of the Sea (UNCLOS). In 1996 the Convention came into force with the ratification of 60 nations. Most nations have ratified the treaty but Canada, has yet to do so. Canada's *Ocean Act* mirrors the considerations of UNCLOS in many respects. UNCLOS defined the zones over which a nation could claim sovereignty. Each was measured from the nation's coastal baselines, defined either as the low water line on the national hydrographic charts or as straight lines approximating the coast. Although Canada has not ratified the treaty, the country has or is in the process of claiming these zones. The major zones of interest include the *Internal Waters*, *Territorial Sea*, *Contiguous Zone*, *Exclusive Economic Zone* and the *Extended Continental Shelf*.

Several reports [Nichols et al., 1997, 1998, 2001] have concluded that the federal government owns Internal Waters and the Territorial Sea except where a province has made, or may make, a successful claim to these lands and waters. Therefore, Internal Waters and the Territorial Sea will be Canada Lands, provided that no provincial claim has or may take precedence. Musquash is an inshore "Area of Interest" in the Marine Protected Areas (MPA) Program under the *Oceans Act*. Any MPA that is located in either the internal waters or the Territorial Sea falls under Federal jurisdiction unless there is a claim (by the Province or First nations) that could take precedence.

From the foregoing, it would seem that to determine who allocates legal interests in MPAs one has to be able to distinguish whether an MPA lies within or outside

Canada lands. Nichols et al [2001] provide the following criteria for making this distinction:

1. *Distinguishing between Federal and Provincial Ownership of the Seabed:* As mentioned before, there are certain areas that are presumably under federal ownership except where provinces have made or may make claims. These areas include:
  - Public Harbours, including and the inner and outer limits of harbours whether under federal or provincial ownership and control;
  - Historical Bays (e.g., Bay of Fundy, Baie de Chaleur, Hudson's Bay) and their outer limits;
  - Territorial Seas around the Atlantic Provinces and Quebec that may have existed at Confederation (three nautical miles) ;
  - Areas such as the Bay of Fundy and Northumberland Strait where provincial boundaries were defined as midlines before Confederation;
  - Internal Waters enclosed by straight baselines that may be claimed by provinces as "part of the land".
  
2. *Vertical Boundaries between Federal and Provincial Jurisdiction in the Territorial Sea, the Contiguous Zone, and the Exclusive Economic Zone:* These zones which include waters, seabed, and in the case of Territorial Sea, the airspace may have many different jurisdictional (and administrative) boundaries depending upon the resource or matter at hand. For example, New Brunswick has administration over aquaculture through an MOU transferring whatever administration the federal government had to the province. Yet the federal government has jurisdiction through various statutes over navigation, customs, etc.
  
3. *The Territories and Powers of First Nations:* In some circumstances, land claims settlements with aboriginal peoples have included or may include offshore lands. The agreement in principle between the federal and Newfoundland governments and the Labrador Inuit proposes to transfer some 44,030 square kilometres offshore to the extent of twelve nautical miles to the Inuit people. In such circumstances, it will be necessary to address the status of the offshore lands granted, that is, whether or not they will retain status as Canada Lands. There may also be broader claims to offshore areas with respect to oil and gas resources, pipelines and corridors, fishing, environmental protection, and tourism that may arise from comprehensive claims or from interpretations of existing treaties as in the recent *Marshall* case.
  
4. *The Coastline Limit:* The precise coastline to be used to establish Canada lands may be at issue. In *Re: Offshore Mineral Rights in British Columbia* the Court defined "ordinary low water" as the seaward limit of provincial jurisdiction. Provinces have many statutes affecting the areas between high and low water and it can be assumed that jurisdiction and ownership extend at least to the ordinary

low water line. However, a case could be made that the chart datum used to define baselines and baseline points for the various offshore zones should be the "coastline" adopted.

### **3. DELIMITATION OF THE INTERESTS**

The legislative scheme set out in the *Canada Lands Surveys Act* indicates that if lands are designated as Canada Lands, the Act requires that all surveys on them be conducted in accordance with the instructions of the Surveyor General. In effect, this means that Canada Lands are subject to the Canada Lands Survey System as it has been developed by the Office of the Surveyor General over the years. The survey system represents one component of a property rights infrastructure. Its primary purpose is to address the question of the physical extent of property rights and to, so much as possible, unambiguously define, record and provide notice of the physical extent of different bundles of those rights.

Marine boundary delineation generally distinguishes between water lots (which have a land/water component) and offshore areas (which are deemed purely water based). An ocean mapping campaign was carried out for the Musquash MPA in the spring of 2001. It was carried out as part of Hydrographic Field Operations, a 5th year undergraduate course offered within the Department of Geodesy and Geomatics Engineering at the University of New Brunswick. It involved elements of water lot boundary delimitation and ocean mapping. The rationale behind this mapping campaign was that mapping activities were a necessary first step in determining the location of various (living and non-living) resources in order to proceed with the delimitation of interests. This stage of the research is almost complete. However, issues surrounding marine point boundary definition remain a pressing focus of this research.

#### **3.1 Marine Boundary Point definition**

Once the boundaries are delimited there is a need to consider marine boundary definition models. Table 1 provides a summary of options as outlined by Grant [1999]. We compared this model scheme against the Musquash MPA boundary description. Singh et al., [2000] describe the Musquash MPA as including "... all saltmarsh, estuary and mudflats below the high water mark from the head of the tide to a line between Gooseberry Island and Musquash Head including a special scallop zone." In addition to this description, there is a graphical description of the boundaries on a chart.



Table 1: Marine Boundary Point Definition (After Grant 1999)

<i>Survey definition</i>	<i>Seabed Cadastre</i>	<i>Land Cadastre</i>
Surveyed Natural Feature	Yes e.g. Land / sea boundary	Yes e.g. river banks and coastline
Surveyed man made feature	Could be required for wharves and other man made features	Yes – Flats and units
Survey marks	Yes e.g. marine reserves. Note that survey marks may be located on land in some cases	Yes – boundary pegs
Boundary dimensions	Yes- some existing boundaries including those with a defined offset from another boundary	Yes – unpegged boundaries such as inaccessible points, easements, etc.
Coordinates	Yes – Future continental shelf boundaries and probably most other seabed boundaries	Not authoritative definition but used for spatial management (e.g. in a GIS)
Graphical depiction on plan or chart	Yes e.g. marine boundaries on hydrographic charts	Indirect – as representation of survey data on plans
Textual description(metes and bounds)	Yes – some existing boundaries	Yes – some unsurveyed boundaries including unsurveyed Maori partitions

The Musquash MPA boundary point definition involves a reference to a surveyed natural feature (high water mark) and a textual description (head of the tide and line between Gooseberry Island and Musquash Head). Field visits to the MPA attempting to determine what natural or artificial features (if any) could be used to indicate the location of said boundaries resulted in uncertainty about the location of the described boundaries. It is the focus of current research being undertaken to investigate (among other things) whether a general boundary definition can be supported by scientific information (such as sediment boundaries).

#### 4. PROBLEMS IN THE EXISTING INFRASTRUCTURE

Nichols et al [2001] summarize the problems in the existing infrastructure quite succinctly. The existing marine property rights infrastructure in Canada has a number of serious problems, which can be classified as follows:

1. *Unclear Authorities* : The jurisdictional, ownership, and administration issues in Canada's offshore have led to, for example:
  - An unwillingness to address certain issues for fear of raising constitutional questions ;
  - Possibly some lack of economic development (e.g., industry reluctance to invest in some areas until the Newfoundland/Nova Scotia revenue-sharing boundary is resolved);

- No clear mandate for comprehensive coastal and marine policy development (in New Brunswick, for example, development of a marine policy and coastal lands policy by two different departments, leaving the critical inter-tidal strip largely unmanaged);
  - A lack of consistent standards and practices, even within the same federal departments, in different locations on the Canadian coasts (some differences are necessary due to varying conditions);
2. *No Overall Rights Structure:* There is no overarching way of understanding the administrative, jurisdictional, and property rights structure in Canada's marine areas. The *Constitution* and *Oceans Act* provide starting points but there is no comprehensive legislation addressing the federal and provincial divide as exists in Australia or the United States. This is complicated by the fact that Canada has not yet ratified the 1982 UNCLOS. Most rights and interests have been claimed or granted in an ad hoc fashion depending on the time the rights were acquired (e.g., customary fishing weirs), the province/territory in which they were located; and the object of the rights (e.g., fishing rights vs. oil development rights vs. piers and wharves). The ways in which First Nations are reacquiring control of some coastal and offshore resources are also dependent on specific treaties, court decisions, and land claims settlements leaving uncertainty in many areas.
3. *Multiple Administrative Arrangements:* This has led, for example, to a fractured set of data about property rights and interests in the coastal regions and offshore. Many federal and provincial/territorial government agencies are involved and each has a partial set of information. There are duplications and significant gaps. At the provincial and territorial level, three decades of information system improvement have meant that the information held at this level is beginning to be integrated and more easily accessible. However, in contrast to on-shore land, much of the required information for understanding the offshore property rights regime is also held by several federal agencies.

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