REPORT ON
THE OUTCOMES OF
The UNB-FIG Meeting on Marine Cadastre Issues

Held at
The Wu Centre, University of New Brunswick
Fredericton, New Brunswick, Canada
September 15th and 16th, 2003

Prepared from papers, presentations and discussions
by
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TABLE OF CONTENTS

LIST OF FIGURES

ATTENDEES

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AGENDA

Saturday and Sunday, September 13 and 14, 2003	
	Pre-meeting event: NB Harvest Jazz and Blues Festival
Monday, September 15, 2003	
09:00- 09:30 **09:30-10:30**	**Registration** **Welcome address and guest speakers** **John McLaughlin**, President, University of New Brunswick **Mark Doucette**, Chair, Canadian Institute of Geomatics, NB Branch **Peter Dare**, Chairman, Dept. of Geodesy and Geomatics Engineering (for the Royal Institution of Chartered Surveyors) **Ian Methven**, Terradigm and Centre for Property Studies **Michael Sutherland**, Vice-Chair, FIG Commission 4 **Sue Nichols**, "Towards a Rights-Based Approach for Ocean Governance"
10:30-10:45	**Coffee break**
10:45-12:00	**Country/Regional presentations (status/initiative)** **Michael Sutherland**, Canada **Leland Thormahlen**, United States of America **Discussions**
12:00-13:00	**Lunch**
13:00-15:00	**Country/Regional presentations (status/initiative)** **Abbas Rajabifard**, Australia **Mike Barry**, The Netherlands **Discussions**
15:00-15:15	**Break**
15:15-16:30	**Wrap-up discussions**
18:00	**Special Dinner at the Lord Beaverbrook Hotel**
Tuesday, September 16, 2003	
08:30-09:00 **09:00-10:30**	**Registration** **Presentations and discussions on conceptual issues** **Abbas Rajabifard**, "Issues in Defining the Concept of a Marine Cadastre for Australia" **Sam Ng'ang'a**, "Developing the Concept of a Marine Cadastre - Lessons from the Proposed Musquash MPA Case Study" **Dave Monahan**, "UNCLOS and the Marine Cadastre " **Discussions**
10:30-10:45	**Coffee break**
10:45-12:15	**Presentations and discussions on institutional and technical issues** **Stephen Hartley and Richard Stewart**, "Marine Cadastre Issues: The role of the New Brunswick Land Surveyor" **Sam Ng'ang'a**, "Some Technical Issues in a Marine Cadastre: Lessons from the Proposed Musquash MPA Case Study" **Discussions**
12:15-13:30	**Lunch**
13:30-16:30	**Wrap-up discussions**

Introduction

Between September 15th and 16th, 2003 The Land and Coastal Studies Group, Department of Geodesy and Geomatics Engineering, University of New Brunswick, Canada in conjunction with Working Group 4.3 of the International Federation of Surveyors (FIG) hosted a "Meeting on Marine Cadastre Issues". The meeting was held at the Wu Centre, University of New Brunswick, in the city of Fredericton, Canada. The meeting provided an excellent opportunity for international stakeholders and experts to share their perspectives, and to learn about international initiatives relating to this the marine cadastre.

The event was sponsored by the University of New Brunswick (Canada), Terradigm (Canada), The Royal Institution of Chartered Surveyors, Geomatics Faculty (United Kingdom), The Canadian Institute of Geomatics, the FIG, The Association of New Brunswick Land Surveyors, and the Canadian Hydrographic Association. There were delegates in attendance from Australia, Canada, the United States of America, the Netherlands, Malaysia, and Trinidad and Tobago.

Papers and presentations covered country status and initiative with regard to the implementation of marine cadastres, as well as related technical, institutional, and conceptual issues. Links to these papers and presentations may be assessed at http://gge.unb.ca/Research/LandStudies/MarineCadastre/marine_cadastre_2003.htm. This report focuses on deliberations framed within certain questions posed to the attendees.

Outcomes of Deliberations

On the final day of the meeting, and in the final session a number of questions were posed to consolidate the many thoughts that arose from previous presentations and deliberations. These questions were:

- What is the scope of a Marine Cadastre?
- How does it relate to a Spatial Data Infrastructure?
- What are the priority issues that need to be addressed?
- What organizational arrangements (internationally, regionally, and nationally) that might be developed to push the concept forward?
- How can other disciplines and stakeholders be engaged?

The following sections constitute a summary of the responses to the questions. The author has taken the liberty to rephrase certain views expressed, and to add his own comments.

What is the scope of a Marine Cadastre?

The term "marine cadastre" is fairly new. This question was meant to address the meaning of the term "marine cadastre" and what that system entails, bearing in mind that different jurisdictions have different requirements and needs in relation to an information system of this kind, and in relation to marine spaces. The delegate from Australia offered two definitions of a marine cadastre in one of his presentations[1]:

1. Marine cadastre is a system to enable the boundaries of maritime rights and interests to be recorded, spatially managed and physically defined in relationship to the boundaries of other neighbouring or underlying rights and interests[2];
2. It is a marine information system, encompassing both the nature and spatial extent of the interests and property rights, with respect to ownership, various rights and responsibilities in the marine jurisdiction[3].

The two definitions are stated from different perspectives (i.e. one from a boundary perspective, and the other from a broader perspective). Regardless, they converge on the point that a marine cadastre is basically a marine information system in which the *primary* information held relates to rights and interests (along with related restrictions and responsibilities) to marine spatial extents.

The use of "primary" in the previous paragraph to describe the type of information stored in a marine cadastre is not insignificant. During discussions at the meeting there were some deliberations on whether the term "cadastre" limits the scope of what many envision the marine cadastre to be, in light of *a* meaning of the term cadastre. In some jurisdictions a "cadastre" is a map, while in others it is a register of rights and interests in land. It was however pointed out that in some jurisdictions distinction is made among various types of cadastres such as a "juridical cadastre", a "fiscal cadastre" and a

[1] Andrew Binns, Abbas Rajabifard, Phil A. Collier and Ian Williamson (2003). "Issues in Defining the Concept of a Marine Cadastre for Australia." Presented at the UNB-FIG Meeting on Marine Cadastre Issues, Canada, September.

[2] Robertson, B., Benwell, G. and Hoogsteden, C. (1999), 'The Marine Resource: Administration Infrastructure Requirements', UN-FIG Conference on Land Tenure and Cadastral Infrastructures for Sustainable Development, Melbourne, Australia.

[3] Nichols, S., Monahan, D. and Sutherland, M. (2000), Good Governance of Canada's Offshore and Coastal zone: Towards an Understanding of the Marine Boundary Issues, Geomatica, 54 (4) 415-424.

"multipurpose cadastre" (all related to the terrestrial environment). These terms represent evolutions in thought about what a cadastre is and can be. Advances in information technology have made the concept of a multipurpose cadastre much easier to realise, facilitating the sharing and combination of many types of information related to any defined marine spatial extent (including information related to rights, interests, restrictions and responsibilities) to support the allocation and administration of rights. Most (if not all) participants agreed that although the marine cadastre's primary focus is on rights, interests, restrictions, and responsibilities to marine spatial extents, they also desire access to more types of information related to those spatial extents.

The author adds to the foregoing by stating that since the term "marine cadastre" is fairly new there is relative freedom to refine the definition to include the term "multipurpose". This is said in consideration of the fact that there is the availability of enabling technology, and with regard to the fact that most stakeholders appear to desire the marine cadastre to have that quality. This is supported also by the fact that at the meeting responses to the question about the scope of the marine cadastre included (among other things):

- Delineation
- The identity of entities with statutory consent (i.e. those assigning rights and interests)
- Scientific information (e.g. geology, hydrology, biology etc.)
- Other marine-related information that has boundary implications

Additionally, some meeting attendees felt that the use of the term "register" is important when defining a marine cadastre.

According to attendees at the meeting, the geographic scope of the marine cadastre is either:

- From the private/public interface to the outer limits of the juridical continental shelf or
- From established baselines to the outer limits of the juridical continental shelf or
- From a State/federal boundary to the outer limits of the juridical continental shelf

It is prudent to point out at this time that those descriptions appear to describe maximum scopes. However, as pointed out by one presenter[4] there may be various levels of a marine cadastre. In other words, depending upon the types of jurisdictional arrangements for the management and administration of rights to marine spaces, there

[4] Dr. Abbas Rajabifard, while presenting Australia's concept of a marine cadastre

may be systems that can be described as a municipal marine cadastre, a state/provincial marine cadastre, or a national marine cadastre.

As with any other information system (and apart from data content) the scope of the marine cadastre also impacts upon issues of data quality (i.e. accuracy, completeness, timeliness, currency etc.). This issue was brought up on many occasions during the meeting, along with the need for good quality metadata that among other things determine a dataset's fitness for use.

Meeting attendees also pointed out that there is also the scope of a marine cadastre in terms of the use of the information stored in the system. The information stored may be accessed to give support to decision-making or to administration regarding the use of marine spaces.

How does it relate to a Spatial Data Infrastructure?

Meeting attendees agreed that the multipurpose nature of the marine cadastre is supported by the development of spatial data infrastructures (SDI). In other words, every organization has a mandate and each organization collects data to fulfill its mandate. The SDI facilitates the sharing of various types of spatial data (including marine-related spatial data) that are hosted by various stakeholders. A vision of the components of a spatial data infrastructure is shown in Figure 1.

In Canada the Canadian Geospatial Data Infrastructure (CGDI) initiative aims to provide the spatial data infrastructure, using for example the NAD83 Canadian Spatial Reference System (CSRS) and a common vertical datum to enable the sharing of spatial data among stakeholders as described in the previous paragraph. The Marine Geospatial data infrastructure (MGDI) is a subcomponent of the CGDI and will form the underpinnings of a Canadian marine cadastre that would be developed. Australia's vision of the relationship between a SDI (i.e. the Australian Spatial Data Infrastructure) and the marine cadastre is shown in Figure 2. Other initiatives to commence and accommodate the sharing of data among shareholders is, for example, the Marine Boundary working Group (MBWG) that through their web page provide links to data custodians. The idea is that one can go to the source of the information to determine who has responsibility for specific lines and who has authority to define the line. There is still the problem of negotiating turf protection attitudes, a problem that has to be overcome in order to effectively implement a SDI.

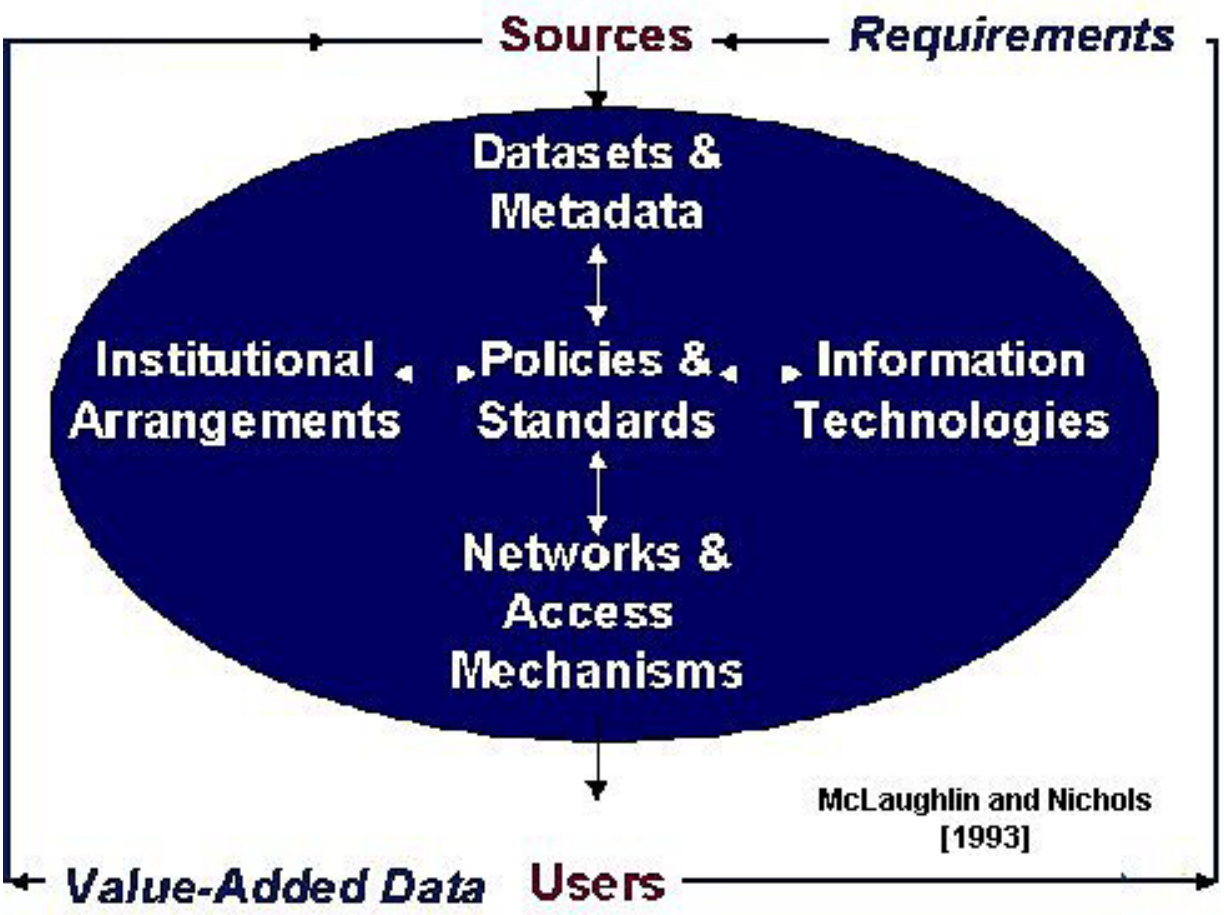

Figure 1: The components of a spatial data infrastructure

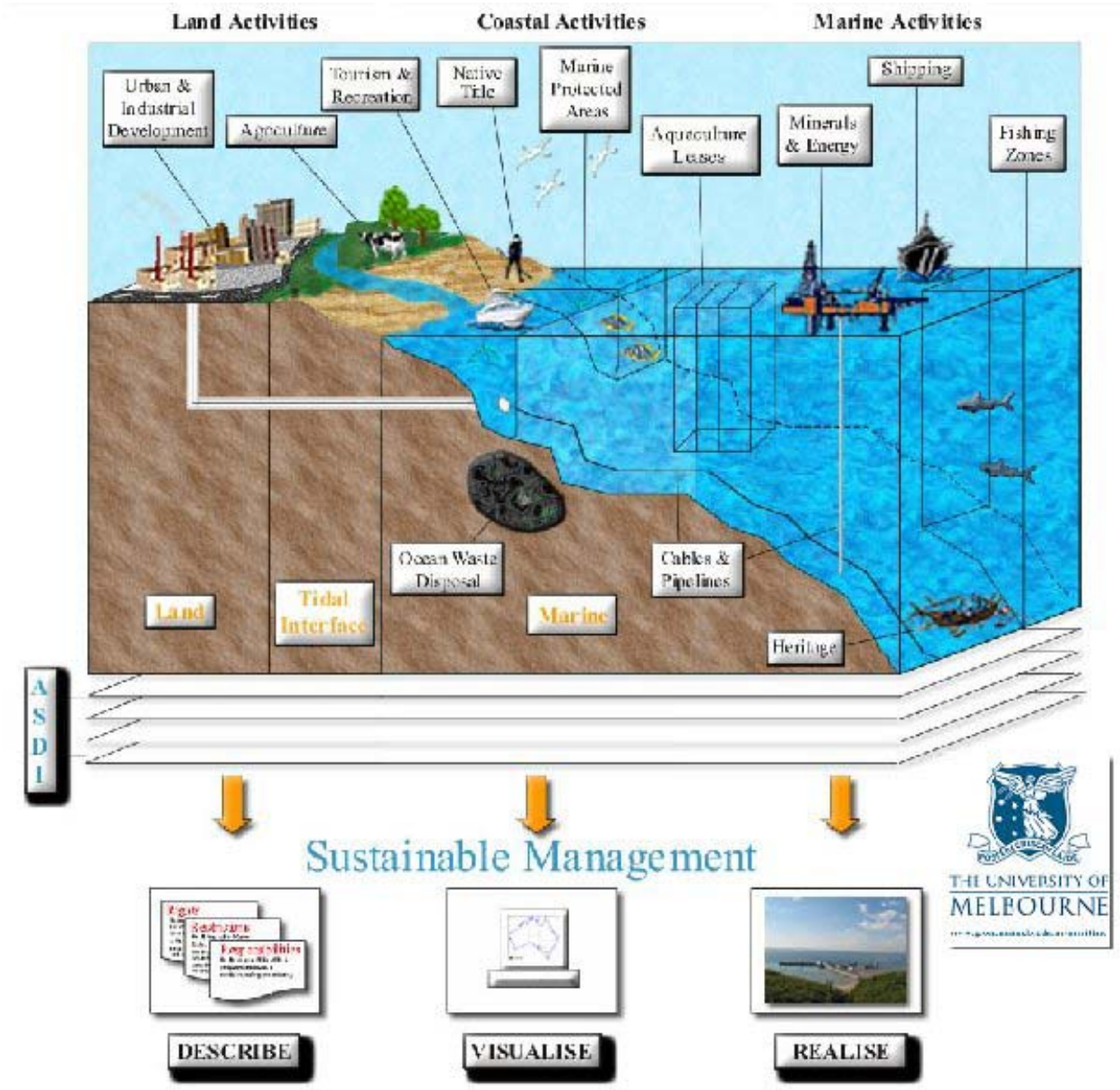

Figure 2: Australia's concept of the relationship between SDI and the marine cadastre

What are the priority issues that need to be addressed?

In order to realize a marine cadastre that is multipurpose and supports multi-stakeholder and multi-custodian participation, a number of priority issues have to be addressed. The issues identified are as a result of deliberations at the meeting, in addition to the experience of international participants. Issues fall under the broader headings of institutional issues, technical issues, or legal issues. Below is a summary list of *some* of the issues identified by the meeting attendees. General responses included:

- Developing appropriate data models to support the marine cadastre (Sam Ng'ang'a at UNB, Canada is working on refining a model)
- Identifying organizations that have a mandate to manage needed datasets
- Obtaining the cooperation of stakeholders and creating partnerships to facilitate the sharing of data, including clarifying issues related to custodianship, licensing, liability, duplication of effort etc. (mindsets need to be changed)
- Obtaining high quality metadata, including having access to a metadata repository
- Overcoming issues of overlapping jurisdiction, administration, rights and interests
- Identifying champions with clout to push the implementation of the marine cadastre.
- Overcoming laws and regulations that promote conflicts in marine spaces
- Defining unambiguous terminology to promote a greater understanding of the issues and to promote easier communication and the enactment of effective legislation among other things (some participants thought that terminology should not be a focus, but clarified terminology makes for ease of communication, and minimizes miscommunication)
- Obtaining the input of all stakeholders who are affected by rights and interests allocated in marine spaces (e.g. all levels of government, native groups, academe, and communities etc.)
- Producing discussion papers to keep the issue of the marine cadastre in the forethought of all stakeholders
- Obtaining adequate financial support for academic research into issues related to the marine cadastre (e.g. Australia has provided funding for academic research on the marine cadastre, but the Canadian participants felt that adequate funding is hard to obtain)
- Obtaining funding for the implementation of a marine cadastre. Again the Australian government has supplied funding for the implementation of a marine cadastre. In the United States there is no funding for a marine cadastre; it is the by-product of other processes related to maritime boundaries.

Responses relevant to Canada included:

- Obtaining direct funding for a marine cadastre. However, the CGDI-MGDI initiative might be leveraged to obtain support.

What organizational arrangements that might be developed to push the concept forward (internationally, regionally, and nationally)?

From many perspectives (nationally, regionally, and nationally) the question of the creation/maintenance of organizational arrangements to push the idea of a marine cadastre was considered. Below are some of the responses from meeting participants:

- It was suggested that there is the need for a champion for the marine cadastre initiative in each jurisdiction. There is also the need for a person or organization to coordinate the effort.
- There was agreement that venues such as the UNB-FIG Meeting on Marine Cadastre Issues, which was a multi-jurisdictional event can be used to communicate ideas about the marine cadastre to international stakeholders
- There was the suggestion that reports resulting from the UNB-FIG Meeting on Marine Cadastre Issues could be used to foster relationships between the Permanent Committee on GIS Infrastructure for Asia and the Pacific (PCGIAP) and the International Federation of Surveyors (FIG), thereby increasing opportunity to keep marine cadastre issues in the forefront of the minds of all potential stakeholders
- The Malaysian delegate informed the group that there is a planned workshop on marine cadastre, and that one aim is to activate more cooperation among countries in that part of the Asiatic region
- The Netherlands does not directly have a marine cadastre initiative. The National Oceanographic Data Committee (NODC), under the direction of the Ministry of Transport, North Sea Direct, is a coordinated effort among departments that host/use marine-related spatial data. GIS is used to exchange scientific data. The Dutch lesson is that data sharing is demand driven, and the NODC is one viable model to emulate
- The delegate from Trinidad and Tobago suggested that there can be role for academe on a national inter-ministerial committee-role to define a list of what tangible benefits can be obtained from the establishment of a marine cadastre. The clarification and identification of benefits can positively impact upon financial support for both academic research on marine cadastres, and on the establishment of a marine cadastre

- It was suggested that in Canada the federal government, provincial governments, First Nations, the private sector, and communities find a forum for discussions on how to proceed with a marine cadastre, as well as to secure funding for the endeavour

How can other disciplines and stakeholders be engaged?

An important question posed to the participants was "How can other disciplines and stakeholders be engaged?" General answers included:

- Using the PCGIAP and FIG to increase rate of participants
- Identifying champions with clout to push the implementation of the marine cadastre.
- Performing studies on social systems in order to increase community engagement
- Creating websites to inform the public and other stakeholders and provide a platform for discussion. This can also facilitate linkages to relevant information
- Informing influential people about the importance of this issue. The issues have to be refined before these persons are approached
- Directing focus on how the system can be used. In other words, benefits need to be clearly identified. There is also the need to look at the technical issues surrounding this
- Using scientific information to review how a marine cadastre impacts on policies, program requests etc. This is considered crucial to the whole process.
- Organizing and promoting national, regional and international workshops.

Answers relevant to Canada included:

- Identifying champions with clout to push the implementation of the marine cadastre. The Canadian delegation in particular found this to be an issue, but it was suggested that the Canadian Council on Geomatics (CCOG) could be the champion (involved but not lead).
- Utilizing networks and projects such as the Ocean Management Research Network (OMRN), the Geomatics for Informed Decisions (GEOIDE) centre of excellence, and the Eastern Scotian Shelf Integrated Management (ESSIM) project etc.
- Leveraging initiatives such as that engaged by the Association of Canada Lands Surveyors (ACLS) to facilitate discussions on the marine cadastre
- Engaging the oil and gas industry to be an important ally / supporter
- Engaging First Nations who have access to funds. They can also be among the champions for a marine cadastre. It is first, however, important to make the marine cadastre a First Nations interest.
- Engaging Atlantic (and other) premiers as a political support

Answers relevant to Asia and Australia included:

- Using the PCGIAP as a means of increasing the rate of participants

Answers relevant to the United States of America included:

- Clarifying how a marine cadastre can have more utility than just using a GIS.
- Continuing to develop a business case for the US marine cadastre