

MARINE CADASTRE – OPPORTUNITIES & IMPLICATIONS FOR QUEENSLAND

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ABSTRACT

Queensland adjoins an extensive maritime neighbourhood, over some of which Queensland has sovereign and jurisdictional rights & responsibilities. The breadth of Commonwealth and State involvement in the exploration, exploitation, conservation and management of Australia's maritime resource highlights the collaborative and conflicting roles for both parties. The importance of fundamental spatial infrastructure will be introduced with particular reference to providing clear and unambiguous legal *descriptions* for each maritime area, *visualization* of those areas on maps and within computer information systems and the *realization* of those areas in the physical maritime environment.

Recognition and adoption of an appropriate Legal & Technical Toolbox will be highlighted with particular reference to the inter-tidal zone.

INTRODUCTION

Within the Australian context, a number of legal regimes have immediate application when considering the maritime neighbourhood adjacent to Queensland.

The sovereign extent of Queensland was described under Imperial Law through Letters Patent. It is generally accepted that Queensland, including islands, extends to "low water mark", with the implicit inclusion of internal waters and explicit exclusion of a territorial sea.

The Offshore Constitutional Settlement has resulted in joint State and Commonwealth administration within the Australian maritime region. Typically roles and jurisdictional extent have statutory definitions, at times reciprocal. In addition, the Commonwealth fulfil national and international obligations under UNCLOS.

A marine cadastre requires an appreciation of these legal regimes as well as business practices associated with the exploration, exploitation, conservation and management of the maritime environment. Within this jurisdictional and administrative framework the analysis and design of fundamental spatial infrastructure requirements is seen as a priority.

ANALYSIS & DESIGN REQUIREMENTS

Initial assessment of the spatial infrastructure requirements for a marine cadastre has evolved with consideration to the Australian Spatial Data Infrastructure (ASDI), in particular the four key areas of Institutional Framework; Technical Standards; Fundamental Datasets and a Clearinghouse Network.

In this paper I would like to address two requirements:

- a) Technical Standard: Provision of a “*Clear and Unambiguous Definition*” and
- b) Clearinghouse Network: Access to information to support such clear and unambiguous definitions.

CLEAR & UNAMBIGUOUS DEFINITION

The “*point of truth*” for the definition of maritime boundaries lies in statutory descriptions, and to a lesser extent, conventional survey plans. Typically plans are associated with the administration of ports and harbours as well as leasehold land below high water mark.

Such definitions may be described by reference to geographical positions, meridians and parallels of longitude and latitude, geodesics, place names, as well as natural and artificial features. In addition to these geo-references, the use of constructors completes a definition, eg inclusions, exclusions, offsets, joining etc. Visualisation of definitions, on plans, maps and in computer systems, involves interpretation of descriptive keywords (within a legal regime), integrated with spatial information. Such information varies in its origin from highly accurate field surveys to satellite images, each requiring mature metadata, lineage and spatial relationships. Realisation of a definition, in the physical marine environment, adds a real-time “*Where am I?*” dimension to the application of a definition.

As such, the clarity and ambiguity of any definition lies in the manner in which a description links with a visualisation and allows the location of the boundary to be realised.

Definition: means ***Describe, Visualise and Realise.***

CLARITY AND AMBIGUITY

The characteristics of the existing marine environment are not simple. Each element has an underpinning knowledge system providing the legal and spatial integrity to specific business practices. A by-product is a range of associated information products and services. The design features built into a marine cadastre are a major limiting factors its application to real world life events. A revision of current marine spatial infrastructure would be necessary to support the knowledge and information systems needed to implement business initiatives. Such a revision would need to address the complexity resulting from the merge of disparate cultures dealing with the many parts of a physical marine environment.

Design requirements impacting the value of such infrastructure should address technical opportunities as well as the human interaction within the legal, technical and physical environments.

- a) At the fundamental level, all spatial definitions need to be related to a *homogeneous geodetic datum*. Additionally, the algorithms used to transform coordinates between datum would need to be recognised, unless differences were left to propagate into spatial accuracy.
- b) Each *legal regime* introduces a vocabulary specific to that regime, with conflicting meanings and interpretations for words, phrases and concepts. For a specific audience each variation provides clarity, whereas for a general audience the reverse may be the case.

The word “State” in UNCLOS refers to Australia as a maritime State, where as “State” in the Coastal Waters (State Powers) Act 1980 (Cwlth), refers to the States and Territories of Australia.

Also, “low-water” within the Seas and Submerged Lands Act (1973) is defined as “lowest astronomical tide”, (Ref: Commonwealth Special Gazette S29). Within the Letters Patent defining the extent of Queensland, the coastline is by common law, deemed to be low water. The earliest description of low water is in the Harbours Board Act 1892, where it means *ordinary low water mark at spring tides*.

- c) Words within a particular legal regime also have descriptions that vary in either meaning or wording. It could be argued that standardisation for the meaning of say *foreshore* would provide clarity to a general audience.

Administrative Boundaries Terminology Act 1985 - Sect 5	"foreshore" , "shore" , "coastline" , or other similar term, means the high-water mark along the foreshore, shore, coastline or similar feature;
Coastal Protection And Management Act 1995 - Schedule 2	"foreshore" means the land lying between high water mark and low water mark as is ordinarily covered and uncovered by the flow and ebb of the tide at spring tides.
Fisheries Act 1994 - Sect 4	"foreshore" means parts of the banks, bed, reefs, shoals, shore and other land between high water and low water.
Queensland Consolidated Acts - Volume 1 - Sect 3	"foreshore" means the land lying between high-water mark and low-water mark at ordinary spring tides.
State Development And Public Works Organization Act 1971 - Sect 5	"foreshore" means the part of the bed, shore or banks of the sea or of any harbour, including any tidal navigable river, that is ordinarily covered and uncovered by the flow and ebb of the tide at spring tides.
Harbours Act 1955-1980 - SECT 8 Meaning Of Terms	"Foreshores" or "Tidal lands" - Such parts of the bed, shore, or banks, of the sea or of any harbour (including any tidal navigable river) as are ordinarily covered and uncovered by the flow and ebb of the tide at spring tides;

Table 1. Definition of “foreshore” within Queensland Statutes.

- d) *Temporal issues* present a number of issues. Firstly there are the ambulatory boundaries and the thorny issues of slow and imperceptible erosion and accretion. In

addition, there are the issue of definitions, actual positions and or an interpretation being fixed in time.

Definition Fixed In Time	The sovereign extent of Queensland is fixed as at Federation.
Position Fixed In Time	a) Definitions fixed by position within the definition eg Adjacent Area of Queensland, described by geographic positions. b) Land Parcels within the terrestrial cadastre where due to erosion the parcel (or part of it) is now within the marine environment.
Interpretation Fixed In Time	In accordance with the Coastal Waters (State Powers) Act 1980 (Cwlth), Queensland's coastal waters are fixed relative to the rules for interpreting the extent of Australia's Territorial Sea but at a width of 3 nautical miles.

Table 2. Temporal Issues Within Definitions.

Of course, spatial infrastructure needs to address available technology and provide access to the necessary information so that potential benefits can be realised. Future technology will increasingly incorporate position and communication functionality into multi-function devices. The required spatial information infrastructure required to exploit such technology, will challenge existing technical standards and institutional arrangements.

- e) Spatial accuracy will always compromise the integration of data from disparate custodians, particularly as the current economic rationalism dictates that data is captured to extreme specifications. Spatial accuracy should not be the only tool used to achieve integration. However redesigned infrastructure should ensure that a *culture of synchronisation* is the driving business requirement rather than being limited to mere integration.

For example: the Cairns City Council may value add to the spatial accuracy of the Lowest Astronomic Tide (LAT) from which the territorial sea baseline was computed. Synchronisation with AUSLIG would ensure a single representation of LAT within the marine spatial infrastructure, but also all derived point, line and polygon features.

- f) Many official and non-official placenames have been incorporated into definitions. The use of such placenames requires the spatial extent of such locations to be readily obvious, as well as the name being recognised both locally and within the maritime community. When used as building blocks within a definition the spatial integrity of placenames must satisfy the requirements for clarity and ambiguity.

For example: The Innisfail Magistrates Court deemed that the use of a place name (Eddy Bay) lacked clarity as it was not identified on available topographic maps, despite the fact that it was a well recognised local name. The case, which sought to prosecute for illegal fishing, was dismissed merely because Eddy Bay formed part of the definition of the prohibited area. ASDI needs to address the

legal requirements of definitions within the maritime environment in collaboration with say topographic and hydrographic requirements.

- g) The integrity of any definition requires recognition of and continual reference to the “*point of truth*”. Only through such recognition can a marine cadastre support both business initiatives at the macro level (eg regional planning) and at the micro level (eg litigation within the inter-tidal zone).
- h) The need for a common language in a marine spatial infrastructure certainly raises the need for widely distributed training and tutorial material. “A Manual of Technical Aspects of the United Nations Convention on the Law of the Sea”, published by the International Hydrographic Organization, certainly addresses this issue for the international maritime regimes.

LEGAL & TECHNICAL TOOLBOX

I would argue that a single toolbox is needed to theme-bridge between legislative and technical requirements defining the spatial extent applicable to multidiscipline business initiatives.

Existing spatial infrastructure impacting the maritime environment is as diverse as the organisational business initiatives. The cultural and institutional diversity is clearly evident and aligned to individual business objectives. However addressing the design requirements for a marine cadastre needs to focus on this organisational diversity and target the necessary infrastructure to support their knowledge systems. Of course this then recognises such knowledge systems as fundamental spatial *information* infrastructure for a marine cadastre.

The maturity of a legal and technical toolbox will dictate the possible range of information products, based on achievable synchronisation within the four key areas of Institutional Framework; Technical Standards; Fundamental Datasets and a Clearinghouse Network.

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