

Marine Cadastre Issue and Conceptual for Implementation in Malaysia

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Abstract

In Malaysia, there are various activities in marine environment such as fishing, heritage area, aquaculture, tourism attraction, oil and gas exploration and Marine Park itself, which requires proper administration and management. The United Nations Convention on the Law of the Sea (UNCLOS) institute a comprehensive jurisdictional regime where Malaysia can claim, manage and utilize its maritime territories (United Nations, 1983). The law and regulations for a marine area is indistinct till today despite the implementation of Marine Spatial Planning for administrating and managing. This is due to the issue on the boundary description which is vague, inaccurate, or incorrectly presented on a map. Therefore, effective regulations dealing with marine spatial issue are yet to fully implement in marine organizations and administration. Serious actions need to be taken in adopting a new mechanism for successful management. This paper aims to examine marine legal in Malaysia from the context of marine spatial, investigates its procedure and data besides providing some inputs for marine legal draft in Malaysian marine cadastre scope. The methodology used in this study includes direct interview and discussion on legal issues associated with marine rights. Conflict of area in marine institutional governance at Langkawi Island is used as the study case. Finally, this research is expected to develop a marine cadastre model and conceptual as proposed in the official guideline for particulars agency especially to marine institutions in Malaysia.

Key words: marine spatial, marine cadastre, institutional, legal issue

Introduction

In marine environments, there are various activities such as fishing, sea navigation, tourisms, oil and gas exploration, marine parks and marine conservation that need serious management and proper administration. Malaysia has a total land mass of approximately 330,000 square kilometers and 4320 kilometers of coastlines. These land masses support a population of 25 million. (Ahmad, 2006). It also lies close to the equator between latitudes 1-7⁰N and longitudes 100-119⁰ E.

Background

The United Nations Convention on the Law of the Sea (UNCLOS) institutes a comprehensive jurisdictional regime where Malaysia can claim, manage and utilize its maritime territories (United Nations, 1983). In line with provisions of UNCLOS:

- i. The Territorial Sea is measured 12 nautical miles (nm) seaward from the territorial sea baseline (straight base line approach is used by Malaysia). On 2 August 1969 an Ordinance under Article 150(2) of the Constitution known as the Emergency (Essential Powers) Ordinance, No.7, 1969 was promulgated. Under this Ordinance, the territorial waters of Malaysia (except the Straits of Malacca, the Sulu Sea and the Celebes Sea) were declared as 12 nautical miles from the base line in accordance with UNCLOS.
- ii. The contiguous zone is where the belt of sea, contiguous to the territorial sea, measured 24Nm seaward from the Territorial Sea Baseline.
- iii. The Exclusive Economic Zone, which is the area beyond and adjacent to the territorial sea, measured 200Nm seaward from the Territorial Sea Baseline.

In accordance to Exclusive Economic Zone 1984 Act under Section 3 (1) The exclusive economic zone of Malaysia as declared by the King of Malaysia vide P.U(A) 115/80 is an area beyond and adjacent to the territorial sea of Malaysia and subject to subsections (2) and (4) extends to a distance of two hundred nautical miles from the baseline from which the breadth of the territorial sea is measured (Figure 1).

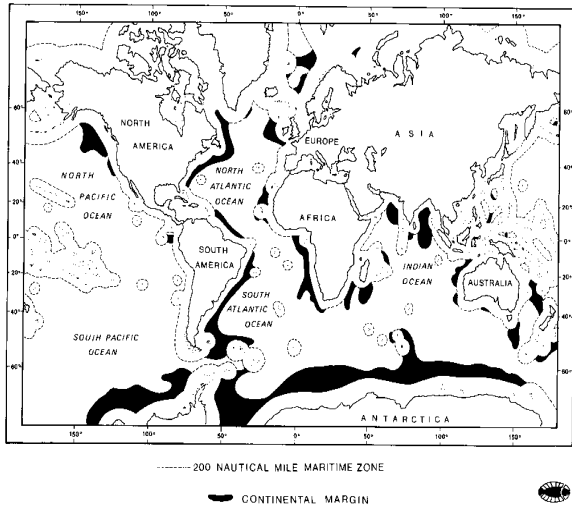


Figure 1: 200nm Maritime Zone and Continental Margin (University of Melbourne, 2002)

Subsection (2) mention that where there is an agreement in force on the matter between Malaysia and a State with an opposite or adjacent coast, questions relating to the delimitation of the exclusive economic zone shall be determined in accordance with the provisions of that agreement. Subsection (4) where having regard to international law, state practice or an agreement referred to in subsection (2) King of Malaysia can considers its necessary so to do , he may by order published in the Gazette alter the limits of the exclusive economic zone determined in accordance with subsection (1).

Malaysia is a federal state where its marine jurisdiction and management responsibility is splitted between the states and the central (federal) government. The amendments to the Emergency (Essential Powers) Ordinance, No7 1969 states that territorial water shall be constructed as a reference to such part of the sea adjacent to control the coast thereof not exceeding 3 nautical miles measured from low water mark. With this, the state government control up to 3 nautical miles from low water mark whilst the federal government has jurisdiction and management responsibility from the said 3 nautical miles limits to the outer edge of the EEZ and continental shelf. Later on 22 June 2012, The Emergency (Essential Powers) Ordinance, No. 7 1969

(P.U. (A) 307 A/1969) was withdrawn soon after the establishment of Territorial Water Act in the year of 2012.

Malaysia recognized the UNCLOS 1982 on 14 October 1996 and carry out several of its obligations. Among them is to highlight the baseline and maritime limitation showed by the big scale chart or present the list of base point geographical coordinate with the information of geodetic datum to United Nations Association (PBB). In the context of determination of base point and baseline, Malaysia is practicing the straight base line approach as baselines provide the starting line for the measurement of maritime zones offshore (N. F Ahmad, 2006). This approach is accepted internationally. There is an urge that baseline and base point should be deposited into United Nation Convention and approval should be given for a country to explore wider marine territorial. Baseline of Maritime Zone Act 2006 was established by Malaysian Government to determine the actual position of territorial water of the country in order to avoid conflict with international maritime boundary or the overlapping of reclamations of island in future (Figure 2).

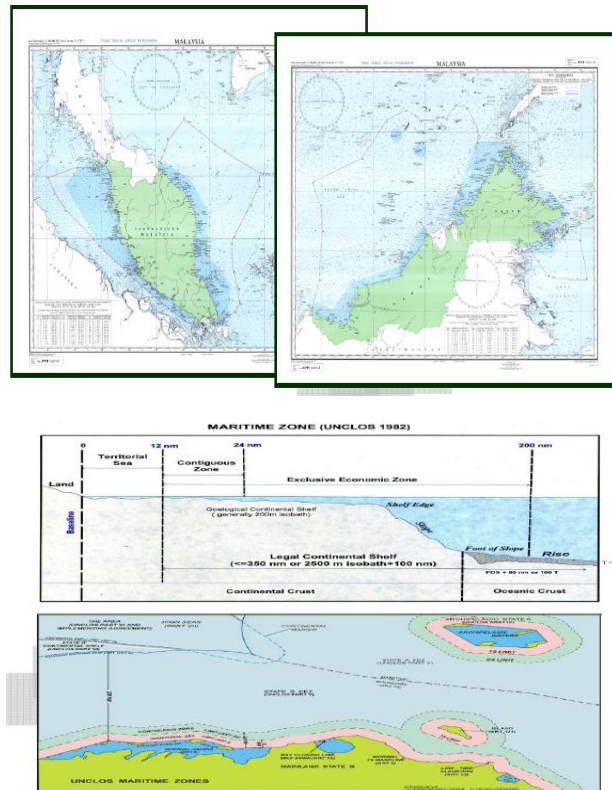


Figure 2 : New Malaysia Map 1979 and Malaysia Maritime Zone

Cadastre is defined as normally a parcel based and up-to-date land information system containing a record of interests in land (e.g. rights, restriction and responsibilities). It usually includes a geometric description of land parcels linked to other records describing the nature of the interests, and ownership or control of those interests, and often the value of the parcel and its improvements. It may be established for fiscal purposes (e.g. valuation and equitable taxation), legal purposes (convincing), to assist in the management of land and land use (e.g. for planning and other administrative purpose), and enables sustainable development and environmental protection. Comprehension cadastre concepts are used as a guide to build marine cadastre system.

Marine Cadastre, as defined by as an information system that facilitates the visualisation of the effect of a jurisdiction's private and public laws on the marine environment (e.g. spatial extents and their associated rights, responsibilities, restrictions, and administration). Other relevant information such as regarding the physical and biological natures of the environment may be connected to the cadastre using spatial referencing to give the cadastre a multipurpose function (Ng'ang'a et. al, 2003). However according to Robertson, et. al (1999), 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.

Marine Cadastral Concept In Malaysia

In Malaysia, the introduction of Marine Cadastre is still at the early stage in comparison to other countries like Australia, United State and Canada. The importance in governing the ocean territory is due to the realization that marine areas provide social, economic and natural functions which contribute to the quality of life. Tenancy that have been applied in land was legislate system in National Land Code, 1965 called Land Cadastre System. Unfortunately, the execution of this system is not relevant with occupancy in maritime environment or ocean. Marine cadastre can be defined as an information management system that facilitates on the marine environment particular in right, responsibilities, restriction and administration. Other relevant information such as that regarding the physical and biological natures of the environment may be connected to the cadastre using spatial referencing to give the cadastre a multipurpose function (Ng'ang'a et al, 2004). In additional, the Figure 3 shows the stratum

effect at the marine environment where the layers represented different kinds of function.

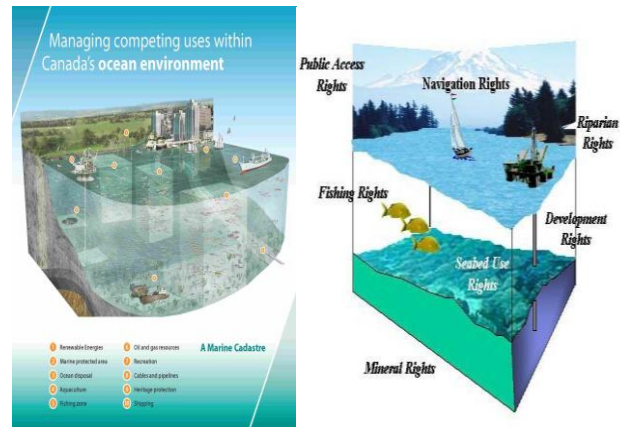


Figure 3: The Marine Cadastral Concept (Sue Nichols, 2004)

Moreover, marine cadastre sits in a completely different situation as that on the land. The most important problem is that there is no physical benchmark and boundary on the seabed. When marine boundaries are not demarcated, there is no physical evidence of the boundaries and this might cause disagreement, confusion and conflict between the state authorities. Definition of marine cadastre in Malaysia perspective is:

- The federal and state government is fully responsible for the marine boundary determination and the respective legal procedures.
- The documentations on marine parcel in spatially context gives marine the ownership.
- The marine spatial arrangements on rights, restrictions and responsibilities must be cooperated into administration and authorities procedures.

The conceptual model needs to be developed in order to implement the marine cadastre exclusively. This model consists of matters on how to commence the structure of marine cadastre system up to the execution phase. Therefore, the developmental concept as follows at least would give a clearer picture on contents within the marine cadastre development as shown below. Ashraf (2004) has initially defined the components and describe their functions (Figure 4). The main entity highlighted is about the component of coordinate system, marine cadastre database, the method measurement aspects, the marine cadastre infrastructure and the visualization of marine cadastre database. These have been focused in relation to the Malaysia context and current technological development.

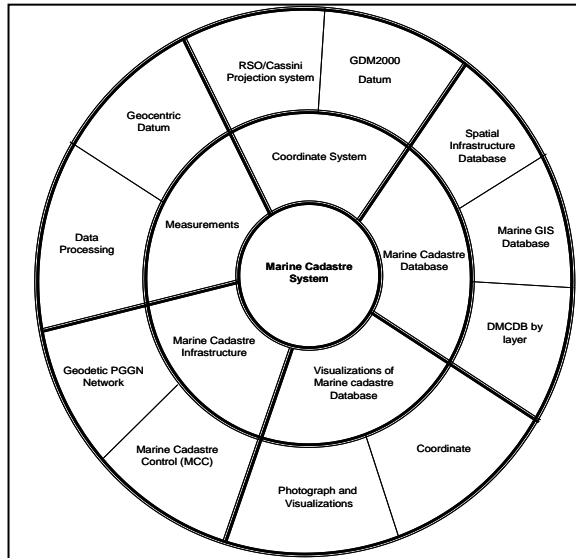


Figure 4: Marine Cadastre Conceptual Model In Peninsular Malaysia (Ashraf, 2004)

It was suggested the implementation of marine cadastre using the techniques of GDM 2000 as the main reference system. While development of marine data spatial infrastructure should comprehensively develop where rights, border limit and responsibility in marine environment can be accessed, administered and managed efficiently. The establishment of coastal control station is proposed to fully cover the coastal of Peninsular Malaysia together with GPS observations at 15km in grid. GIS based analysis is expected to be used widely in various marine visualizations.

Marine Cadastre Conceptual Implementation: a Case study of Langkawi, Kedah

The result is based on the case study of Langkawi marine cadastre conceptual implementation. Various discussions with the marine agencies and governances in Langkawi have contributed to lot of new suggestions thus some improvement has taken place (Figure 5).

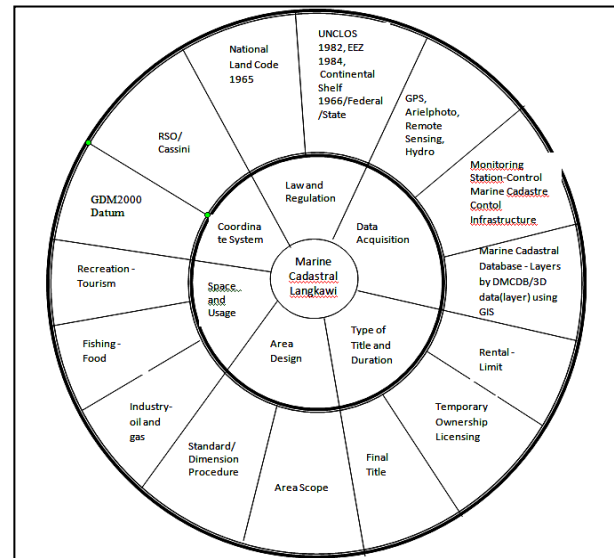


Figure 5: Marine Cadastre Conceptual Model – Langkawi Island Perspective

In this model, focusing on the implementation of marine cadastre is based on the six entities. There are several attributes to support this entity:

Coordinate system

The development of Malaysia Geocentric Datum 2000 (GDM2000) recently is seen as suitable datum for marine cadastre application. Geocentric system by definition have their centre at the centre of mass of the earth and the direction of their axes are defined arbitrarily (usually used averaged astronomical phenomena). Whilst such systems are easy to define, realization of coordinates within them requires very high accuracy space geodetic techniques. Their associated ellipsoids may not fit a particular region well and might lead to significant correction having to be made when processing surveying data. That datum was recommended to be implemented particularly using the GPS application since they can provide seamless positioning across the world and are directly related to the modern space-based positioning systems. The GDM2000 provides coordination that are appropriate for applications at all levels (local and international) and allow easy integration with other information technologies such as GIS. This situation will be beneficial in future on spatial data requirements. It can be shared and practiced in marine cadastre system making rooms for different perspective of various government department agencies, non-government organizations as well as the public.

Law and regulation

The marine cadastre concept will be successful if supported by the appropriate law and regulation on marine management and practice for marine parcel. However, there must be a review and thorough investigations on the existing law, rules or any regulation specifications. The law and regulation is dependent on two components such as local and international. The local aspect of the law are executed by federal and state government whereas UNCLOS, EEZ and Continental Shelf Regulations in charge of the international law. In Malaysia, National Land Code 1965 is mainly used as a reference for subject as land problem. There are several other references such as Land Acquisition Act 1960, State Land Rule and the other state regulation which can be taken into consideration.

Data Acquisition

In achieving practical realization of the reference frames, there is a need for a practical approach to their implementation and application, and recognition that processes need several applications for data collections as the basic requirement. This data will be an input in data management to process and analyses in becoming spatial data management which can be accessed and updated. The suggestion to use the variety of equipment and applications is to make sure the marine spatial data complete in ongoing term to realize that implementations. So the use of GPS, hydrographic, photogrammetric, remote sensing image were recommended considering the marine situation on that 4 dimensional in right, restriction, responsibilities and time.

The suggestions for implementation of marine cadastre control infrastructure is very crucial in particular making sure that positioning of marine data acquisition are always under tolerance and preferable for positioning. In this study, the proposal on the marine cadastre control by infrastructure along the coastal line and come from the existing GPS network established by Department Survey of Malaysia. GPS networks of 238 stations as in have been observed in Peninsular Malaysia using four Ashtech LX II dual frequency receivers (JUPEM,1999). The acquired data was processed and adjusted in 1993. The main objectives of the undertaking were to establish a new GPS network, analyze the existing geodetic network and obtain transformation parameters between WGS84 of GPS and MRT. In the network adjustment, a minimally constrained adjustment was made with Kertau, Pahang, held fixed. The coordinates of Kertau are in approximate WGS84 and derived from Doppler

coordinates of NSWC 9Z-2 reference frame. The Ashtech processing software with broadcast ephemeris was used for the determination of the baseline solutions. The relative accuracy of the network is 1-2 ppm for horizontal coordinates and 3-5 ppm for vertical. (Figure 6)

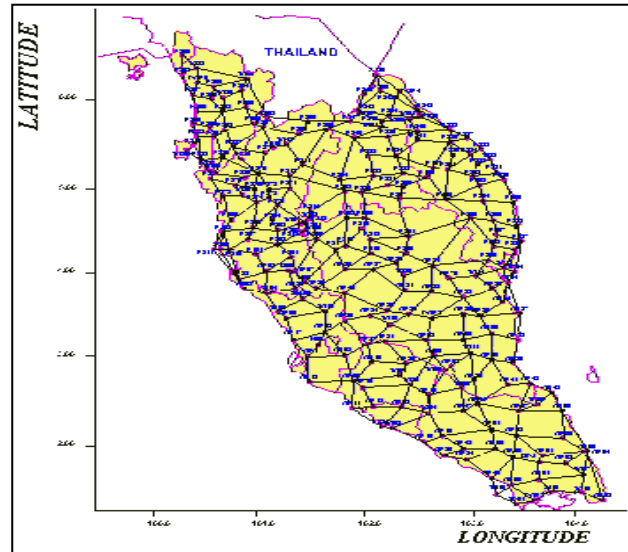


Figure 6: The Malaysia GPS Network (JUPEM)

Parallel to the data acquisition process is integrations of data and how to make the interactive data presentation. Digital Marine Cadastre Database using the GIS applications is suggested to fulfill several requirements. The DMCDDB is the new orientation on marine spatial data management and the content must be as following:

- A complete marine parcel in its cadastral fabric including the privately owned, State and federal limitation, the marine institutional authorities, the legal behind that implementations, clearly define on that marine activities.
- Number of layers that would facilitate the performing of its functions including the existing Temporary Ownership Licensing layer in order to ensure completeness of cadastral information.
- Components of the nation’s marine spatial data infrastructure provide one of the core spatial data sets which would be able to integrate with other spatial data sets.
- A complete legal aspect in term of definition of marine parcels and the boundary coordinates would serve as contributory evidence to that effect.
- A unique identifier that link the parcel on marine environment to the user and authorities apart from enabling cross referencing to other information needed by users such as the local

government and agencies, planners, navigator, utilities and evaluator.

Type of Title and Duration

Marine environment is very unique yet it is difficult to imagine its unique processes and natural phenomenon that occur in the ocean. This situation has some impact on title and duration. Compared to the land cadastre, the elements of the boundary mark was easier depending on the marine itself. The rental aspect is about dynamic environment of positioning activities such as fish cage, the aquaculture purposes, the marine animal feedings industry and recreation activities. In this case, the accuracy of positioning normally does not follow the surveying aspect rather new formulation considering on phenomena effect.

However, following the techniques in giving Temporary Ownership Licensing (TOL) which was approved by State Government, the implementations follows the National Land Code 1965 procedure. The TOL has period of ownership for only a year and need to reapply.

Area Design

In this study, the researcher focused on the area design as for the complexity of the marine environment. Marine parcel arrangements in layers were adopted. Those implementations must follow the history record of this area to ensure it is not overlapped with the other stakeholder. Two attributes i.e. area scope and standard procedure were recommended to fulfill the requirement of stakeholders. This standard was proposed by the authorities after considering the area is surrounded by too many related agencies and authorities. As for the area scope, it is proposed by the applicants together with concrete and relevant reason of the application.

Space and Usage

This entity is defined from three major aspects which carries the attributes in marine cadastre model.

- i. The recreation – tourism, marine park, mangrove,

Marine environment is the part of nature for the human being and fulfill the requirement of peaceful life for community. The recreation – tourism, marine park, mangrove have a good impact of country's economy as it can generate high revenue and an indirectly become main contributor for country income. Government has to look seriously into the issues in order to exploit the marine sources.

- ii. Fishing – Food

Malaysia aims to increase fisheries production by one third . Malaysia's fisheries industry has reached the half way stage in the government's programme that is to increase the nation's annual fisheries production by 600,000 metric tons (mt) or one third during the current Ninth Five Year Malaysia Plan (2006-2010). Fisheries has been identified as a strategic sector in the government's programme to increase domestic food production. In addition to increase domestic food supply, the government wants to develop the export potential of fisheries as part of wider efforts to increase rural employment and tackle poverty among coastal communities.

- iii. Industry – Oil and gas production

Malaysia's economy heavily depend on production and use of the range of goods and services based on the maritime sector. It would thus cover the activities that are resource based including fisheries, oil and gas, marine biotechnology and those that are service based such as shipping ports, shipbuilding and repair and the myriad range of ancillary maritime services.

As for the industry requirement, marine cadastre is one of the highest income target for government as in National Transformation Planning 2011 (NTP2011). Our Prime Minister started looking deeper into marine industry such as the oil and gas production as it is the biggest contribution for nation's income through Petroleum Malaysia (PETRONAS). As quoted from (Siew Nam Fai, 2010), the nation is facing three challenges which have implications in the management of the maritime sector:

- A global approach to industrialization allowing firms to venture into large-scale operations to gain scale economies by exporting to world markets.
- Maintaining and enhancing competitiveness in the face of changing market preferences which require reinforcing the nation's competitive foundation and strengthening infrastructure.
- Developing a modern, dynamic and outward-oriented services sector to become a major catalyst for growth and a potential for the export of services in international trade.

Conclusion

The marine cadastre is not only about maritime issue but as an alternative to optimize the marine sources in Malaysia to be profited by public, community and government. Under Ordinance No.7 1969 the jurisdiction for Malaysia territorial water is well defined in addition to The Water Territorial Act 2012. The research shows that , there is an improvement in

the conceptual design of marine cadastre model . The implementaion of marine cadastre in Malaysia requires some period of time specifically in establishing marine legal and some technical aspect. More effort needed to be put as marine environment has many dynamical factors and stratification issues involving national and state sovereignty and marine resource management itself. In the next study, marine legality towards realizing marine cadastre will be focused.

Acknowledgement

The author acknowledges financial assistance for this research from Ministry of Higher Education (*Skim Latihan Biassiswa Staf*) and Universiti Teknologi MARA, Department of Surveying and Mapping Malaysia, University of Technology Malaysia and Centre of Studies for Surveying Science and Geomatics, UiTM Perlis.

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