

Full Length Research Paper

The importance of marine cadastre for Turkey

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Human's have used the sea for nourishing, getting raw material, advancing technology and providing transportation throughout history. The society have been destroying the eco balance as a result of the manufacturing technologies they use and demolishing many facilities of the future in the long run in an anxiety to earn their keep in the short run. The marine environment, which is the most convenient environment for pollution, has been rapidly losing the feature of being the food store of the people in the future. The pollution of the seas is not only dangerous for the future, but also for today biologically. The pollution goes through food chain and destroys all creatures, including the human beings. The fact that rapid population increase, pollution and annual precipitation average is lower than the average of the world, it requires the usage of the current resources more carefully and taking all necessary precautions against pollution immediately. Since a variety of the activities included in these zones are not renewable and reproducible, it has emerged the necessity to take these zones, that change constantly under control. The limitation and inspection of these various activities and demands have revealed the obligation of a registration. All these reasons explained above have brought the concept of marine cadastre forward in many developed countries, particularly the United States of America, Canada and Australia. In Turkey, on the other hand, examining the regulation about coastal and marine zones, it is indicated that the seas and the coasts are under the command and austerity of the government and that there would be no personal property in question in these zones. In this study, the concept of marine cadastre in the developed countries has been explained in general terms and examining the activities in the coastal and marine zones in Turkey, a platform related to the condition whether this concept is necessary for Turkey or not has been tried to be built.

Key words: Coast, sea, land property, cadastre, marine cadastre.

INTRODUCTION

Coastal and marine zones have a great importance for countries, regions and the lives and peace of the societies living in these areas. These zones provide social, economic and natural functions that highly contribute to increasing the life standart. Additionally, they are also effective zones for climate movements all over the world (Lau, 2005). Coastal and marine zones are not only natural environments for species that are on the verge of extinction, but they are also the zones in which these species are raised and kept. Water treatment plants are only a few socio-economic usage areas that are served by tourism, commerce, marine aquaculture, communication and mining, coastal and marine zones. The rapidly increasing world population and various demands emerging from this population increase are rapidly

destroying the coastal and marine zones, together with the immediate surrounding that are filled with natural wealth. As a result of this, coasts and seas can not be used healthily and in a way to increase the life quality of the society as it should be (Anker et al., 2004). The countries, that are aware of this condition are developing fullscale coast policies in order to present the coasts in the best way for thier people and to protect this zone without destroying the natural habitat. Especially exhibiting the sensitive zones and researching the connection and various statis-tics between these zones are important from the point of protecting bio-variety. The administration and management of such kind of politics and studies can onle be possible through right decision supporting programs. In this context, while spatial data increases the capacity of making the right decision, it also contributes to the sustainable environment. In this context, studies on the International platform that aim various activities and regulations, together with Integrated and

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Sustainable Coastal Zone Management are tried to be performed, the Coastal Zone Management being in the first place. Besides all of these, especially in the recent epoch, the concept of Marine Cadastre has been brought to the agenda in coastal and marine zones of many world countries, particularly the United States of America, Canada and Australia. However the concept of the cadastre around the sea is still uncertain because of institutional issues, various technical and legal problems on coastal and marine zones (Mitchell et al., 2001). Examining the legis-lation about seas and coasts in Turkey, it is indicated that there are a number of legal regulations like Constitution, Civil Law, Coast Law, Cadastre Law, etc., that seas and coasts are under the command and austerity of the government, there would be no personal property in question in these zones, in other words, these zones can not be suspended. However, since these zones have a variety of activities, an increasing importance and the quality of being non-renewable and non-reproducible, these zones which change constantly in time have to be brought under control. One has to get the answers to the questions, what is, where, what kind, how much is there? Additionally, the priority among the available rights here and the necessities of according to which legal regulation it would be processed and of defining the positional relationships of all of these according to each other emerge the obligation for a registration for limiting and examining these various demands and activities.

There are legal regulations available for different institutions in the context of governance directed at marine zones. A good governance requires the best analysis of a dense information set. Marine zones have a dense positional data set consisting of sea bottom, sea surface and the coast. Several positional data like a deep discharge system passing through the sea bottom or oil or natural gas pipelines, mining sand zones left for sand ships, secure passage routes and holding zones for oil tankers, fishing zones, protection zones for the sea eco-system are the data which are necessary for a sustainable sea method. Particularly in recent years, special studies have been started aimed at marine cadastre by the International Federation of Surveyors (FIG) (Yomralioglu et al., 2003). In this context, it is obvious that as well as the continental measurements that have been done up today, the marine measurements and records shall be done in the future, too. The cadastre, which constitutes the substructure of social, economic and environmental applications is a necessity today for marine zones as well. Chaining the marine zones as well as the continental zones, defining their rights of usage are not only legal, social and economic necessity, but also necessary for a sustainable environment administration. Since the resources that are greatly demanded for the production and usage of food, commerce, transportation, raw material delivery, etc. and the increase of population are inversely proportional in Turkey, as well as in other

countries on earth, the significance of the seas shall be greater in the future. In this study, by examining the activities on the coastal and marine zones in terms of the Marine Cadastre, that creates some serious platforms in developed countries, the concept of Marine Cadastre in developed countries shall be explained in general terms and the platform, concerning whether this concept is necessary for Turkey or not shall be built.

THE LEGISLATION CONCERNING COASTS AND SEAS IN TURKEY

According to the article 43 of the Constitution Law of Turkish Republic, the coasts are at the disposal of the government. In utilizing from the sea, lake and river coastlines one must take care of first of all the Public Benefit. According to the 2001 date Turkish Civil Law, the places with no property and the goods in the benefit of the public are in no ones landownership and can never be a subject of a private landownership. According to the Coastal Law numbered 3621/3830, the detection of the shore border line is obligatory to be able to make plans and plan's implementation on the coast and shore buffer zone. But unfortunately, the usage out of public benefit is being seen because of the agitated in planning and the detection of shore border line not in the way or at the time it must be done (Sonmez, 2002).

According to the valid legislation in Turkey now, some determinations about the zones covered with the general water in the Cadastre studies are also mentioned. The places, convenient for the procurement of the aquaculture in the seas, lakes, dam lakes, rivers and mouths of rivers that are under the command and austerity of the government could be given up on the benefits of the special and corporate people by the ways of allocation or renting. In accordance with the related legislation, after measuring these and determining the numbers of section, square and block, it is registered on the "Fishery and Fishing Net Register". The determination of the cadastral measurements of these zones and sharing owners shall be made in order to develop and support particularly the marine aquaculture in the seas and inland waters (Biyik, 1998). Although the borders of such places are not so sensitively determined, they still have to be reflected on the cadastre. It is estimated that especially the studies of marine aquaculture of today shall be more widespread in the future. That's why the coasts, surrounding the general waters shall be included in the cadastre from place to place (Biyik and Karatas, 2002).

FUNDAMENTAL PROBLEMS IN THE USAGE OF THE SEAS AND THE COASTS IN TURKEY

Coasts and seas enable various usages for all creatures as a natural resource. The leading of these are;










Activity	Latitude	Activity	Latitude
 Tourism and Recreation	Diving	 Aquaculture Leases	Mussle Farms Oyster Farms
	Boating		Abalone Farms Spat Gathering Areas
	Fishing	 Energy and Minerals	Mineral Exploration
Swimming	Oil and Gas Exploration		
 Marine Protected Areas	Marine National Parks	 Nature Owner	Resource Extraction
	Marine Sanctuaries		Non-exclusive access to the sea and sea-bed
 Shipping	Commercial Shipping	 Heritage	Shipwrecks
	Freight Haulage		 Indigenous Artifacts
	Passenger Ferries		
 Cables and Pipeline	Oil and Gas Pipelines		
	Telecommunications		
	Electricity Cables		

Figure 1. Range of activities and latitudes in Turkey's marine environment.

transportation, commerce, industry, evacuation of waste material, supply of raw material, defence, recreation and tourism, health, energy, settlement, the resource of food product and sports activities (Oztan, 1976). These usages carry the principle of economic benefit more. On the other hand, the marine zones is not a system covered only with water. The marine zone has a complicated structure consisting of under sea bottom, sea bottom, underwater and water surface. Each section is used for different pur-poses, the sections are being used by different users and they have different legal regulations. While mining the under sea bottom, sand is drawn off from the sea bottom or while natural gas line is passed, different activities like fishing and tourism could be made on it. The admini-stration of such a complicated structure requires the gathering of the features related to marine zone in the same system.

The usages like water transportation, the production of vessels, floating facilities, the resources of energy and raw material, acquiring, proceeding and transmitting aquaculture have added new dimensions to the usages like conventional rest, health, entertainment, recreation and defence of coasts and seas (Korca, 1986). In Turkey, which has a long coastal strip, the reason that the coasts are preferred by various sectors because of natural beauty and cultural and historical values and that these sectors are in a competition environment with each other brings lots of problems herewith. Since sea is a place where waste materials and industrial waste could be drained easily and cheaply as a result of urban consumption and there is the possibility of cheap and easy transportation in marketing the raw materials and it includes

the most productive working conditions in terms of climate and other data, it encourages the development of industry in these areas. Industrial wastes pollute the coastal waters in a way to affect the public health, fishery and biological variety (Gulez, 1997).

ACTIVITIES ON MARINE ZONES IN TURKEY

In Turkey, the activities on the marine zones are generally; transportation, commerce, industry, agriculture, evacuation of waste material, supply of raw material, defence, recreation and tourism, health, Aquaculture, Undersea cables, Oil and Pipelines, Harbours, Navigation, Water Sports, Marinas, etc. (Figure 1). Within the context of this study, especially Aquaculture is mentioned. Aquaculture is a rapidly developing sector in inland waters and seas in Turkey. For example, embracing the Aquaculture, it is seen that Aquaculture carries the purposes of meeting the rapidly increasing demand of aquaculture, preventing the starvation, balanced and healthy diet, decreasing the fishing pressure on natural fish stocks, contribution to the rural improvement, providing employment and foreign currency inflow and supplying the water source with fish. Aquaculture sector is described as the most rapidly growing food sector in the world. By means of aquaculture, a production of approximately 48 million tons is made around the world. The first salmon farm in Turkey was founded during 1970s; sea bass and sea bream enterprise was founded in 1985. According to the values of the year 2004, there are totally 1659 enterprises (1301 in inland waters; 358 in the seas). According

to the data of the year 2003, the aquaculture production in farming is 40217 tons in inland waters and 39726 tons in the seas. The contribution of this value to the national economy is approximately 350 million dollars (Kinacigil and Akyol, 2002). The total annual production has reached to 94.010 tons with the numbers of the year 2004 (Bass: 26297 tons, Bream: 20435 tons). According to the data of the Turkish Statistical Institute (TSI) in 2005, 67% of the farming production of Turkey has been provided from the Aegean region. Black Sea region follows the Aegean region with a share of approximately 10% (12.112 tons).

According to the data of the Ministry of Agriculture and Rural Affairs, there are totally 1413 fish farms in Turkey, including the land and the sea. In the period between 1996 - 2005 that includes 10 years, marine aquaculture reached to 129 thousand tons in 2006 by increasing approximately 250% (TKB, 2007). By 2006, 19.5% of the total aquaculture production of Turkey, which is 662 thousand tons, is produced by farming. With the help of support politics applied on the sector in recent years, the capacity was significantly increased especially in 2006 and 2007 and new businesses started investment (Cavdar, 2007).

Aquaculture production decreased at the rate of 16,32% in 2008 compared to previous years; 646 thousand tons of aquaculture productions were produced (494 thousand tons for fishery and 152 thousand tons for farming). The amount of aquaculture productions, which had fishing in 2008 was 453 thousand tons by decreasing at the rate of 23,09% compared to the previous year. In 2008, the aquaculture production in the seas and inland waters was approximately 152 thousand tons by increasing at the rate of 8,8% compared to the previous year. In 2008, 43,73% of the aquaculture production was performed in inland waters and 56,27% of it was performed in the seas. Compared to the previous year, the aquaculture production in the seas increased at the rate of 5,92 and 12,75% in the inland waters in 2008 (TUIK, 2009). According to the Five-Year Development Plan prepared by State Planning Organization (SPO), if habits continue in 2023, 1,2 million tons of fish will have to be produced. It is emphasized that 600.000 tons of this production shall be provided by fishing and the rest shall be provided by production. In Turkey, in order to catch the World average, 2 fold fish shall be consumed; in order to catch the EU average, 3 fold fish shall be consumed and for this, at least 1,5 million tons fish shall be produced. It is not possible to get this amount only by fishing in the seas (Ozden, 2006). In this context, the spread and demand of Marine Aquaculture is inevitable. The first institution to be applied in order to found Aquaculture facilities is the Provincial Directorate of Agriculture of the Ministry of Agriculture and Rural Affairs and one has to apply to the Ministry of Environment and Forestry in order to evaluate the environmental effects of the Project. Environmental Effect Evaluation (EEE) includes the studies to be

processed in determining the possible positive or negative effects of the planned projects on the environment, determining and evaluating the chosen place and the technological alternatives of the precautions to be taken to prevent or minimize the negative effects in a way not to destroy the environment and following and controlling the practices of the projects. The followings in the stage after the foundation of Aquaculture facilities are being carried out by the Control Management of the Ministry of Agriculture and Rural Affairs. However, it takes a long time for enterprisers to start aquaculture in a certain zone because of legal procedures. According to the final declaration of "Aquaculture and Environmental Conscious Workshop", held in İzmir on 7th December 2006; Marine aquaculture producers have to take 53 separate actions in 14 separate institutions in order to get permission. In order to get only EEE positive report, one has to make averagely two EEE meetings with 18 separate institutions. As a result of these proceedings, the permission period for a fish farm averagely takes three years (Ozden, 2006). In this context, especially governorships demand the determination of convenient locations for fish farms. For the choice of location, spatial (settlement areas, tourism areas, natural and archeological protected areas) and oceanographic (depth of sea, speed and direction of flow, quality of water and structure of sediment) data are required from different institutions. Therefore, spatial data infrastructure is required for gaining and analysing the necessary data from the related institutions in a rapid, accurate and current way.

THE CONCEPT OF CADASTRE

The proceeding of indicating the limits of immovable goods on the land and the map and determining their legal status and rights is called cadastre. Cadastre is the basis of the land management system which includes a record of the investments on the land. Cadastre generally includes a geometrical definition of the immovable which defines the nature or the control of the investments and property, the development or the value of the parcel and which combines it with other records (Figure 2).

Cadastre parcel is the volumetrically limited status of the land which is accepted to have homogeneous relationships or property rights within. In the three dimensional structure of the earth, the parcel includes the up and down usage rights as well as above-ground rights, as it is seen in (Figure 3) (Yomralioglu, 2000). A person, who has a cadastre parcel has the right of property. The usage of this property right is limited with legal legislations. He is the owner of the cadastre parcel, he has responsibilities against the cadastre parcel and he can use his parcel within the limits determined by the laws. For example, the right of a cadastre parcel to use the Sky is limited with construction plans. It has the right of using the Sky as much as it is indicated in the construction

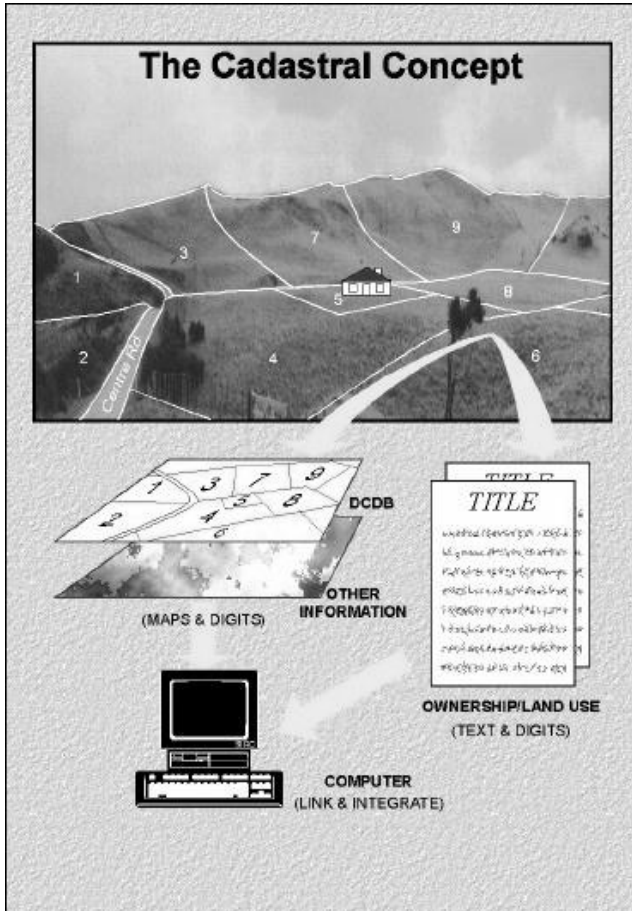


Figure 2. The concept of cadastre (Widodo, 2003).

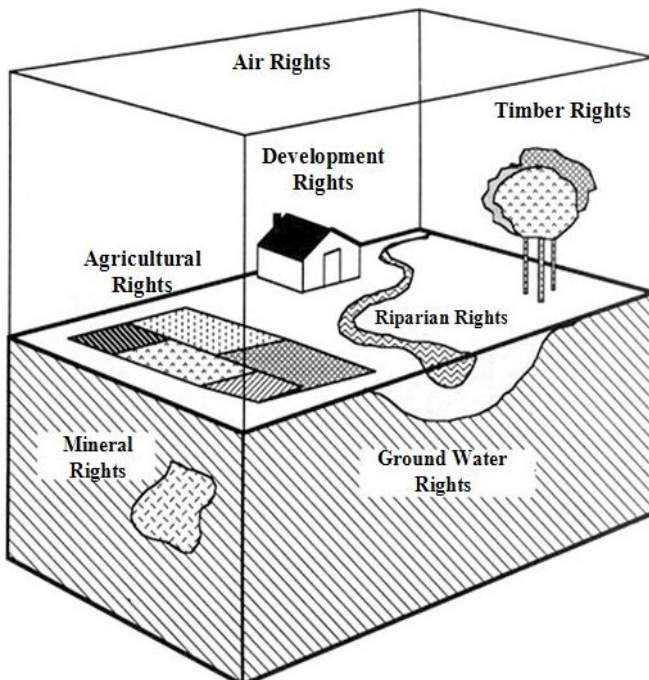


Figure 3. A cadastre parcel (Dale and McLaughlin, 1988).

plan. In short, it could be said that the land itself is not actually owned, and yet there is a right of using the land in accordance with the societal laws, enforcements and expectations.

GENERAL CONCEPTS ABOUT MARINE CADASTRE

Examining the legislation related to coastal zones and the seas in Turkey, it is specified that there are a number of legal regulations like Constitution, Civil Law, Coast Law, Cadastre Law, etc., that seas and coasts are under the command and austerity of the government, that there would be no personal property in question in these zones and in other words, these zones can not be suspended. However it is anticipated that since these zones have a variety of activities, an increasing importance and since they are not renewable and reproducible zones, it would be inevitable to move to cadastral proceedings – maybe not today but in the near future. In this context, general information concerning this issue is given above.

Definition of the Marine Cadastre

Due to the complicated and constantly changing nature of the marine zones, there is no definite description of the marine cadastre and its content (Binns et al., 2004). There are different descriptions (Strain et al., 2006; Ng’ang’a et al., 2002; Binns et al., 2004; Fulmer, 2007; Sesli and Colkesen, 2007). According to Robertson et al. (1999), the concept of marine cadastre is defined as “a system that enables the rights and benefits related to the usage of marine zones to be recorded within the boundaries of other neighboring basic rights and benefits, to be managed spatially and described physically”. Marine cadastre is received as one of the basic layers of the spatial data infrastructure, related to the marital zones (Rajabifard et al., 2003). However it is emphasized in projects and scientific studies that many administrative, legal and technical problems be overcome in the application of the marine cadastre (Ng’ang’a et al., 2001; Fraser et al., 2003; Binns et al., 2004; Ng’ang’a et al., 2004). Marine cadastre is actually a tool to define, manage and administrate the limits which would legally be described on the marine zones (Rajabifard et al., 2003).

It is a system used in defining, recording, spatially managing the rights and benefits on the sea and physically defining their relationships with the neighboring boundaries (OSG Technical Report 9, 1999), according to a different definition; it is a system of recording to determine the limits of the marine rights and investments, of managing spatially and of determining physically (Robertson et al., 1999) and according to some other definition, it is a Marine Information System that includes the spatial and natural dimension of property rights and investments related to property, together with various

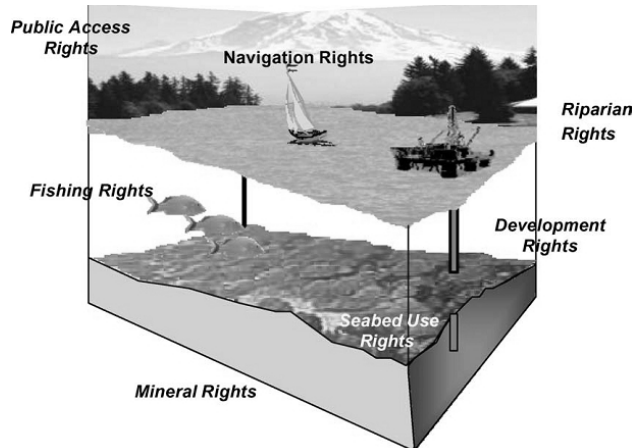


Figure 4. The sequence of the sea and the surrounding (Nichols et al., 2000).

rights and responsibilities in the marine administration (Nichols et al., 2000). The cadastre parcel on earth is considered to be 3 dimensional and marine surrounding in the marine cadastre could be considered to be 3 dimensional, as well (Figure 4).

The Development of the marine Cadastre and its administration enterprises

In 1958, United Nations arranged the first conference (United Nations Convention on the Law of the Sea = UNCLOS I) about marine law in Geneva and 86 participant countries came to an agreement. Accordingly, there is no limitation to coastal waters in the Agreement of Coastal Waters and Adjacent Zone; conversely, defining the basic principles, it was indicated that coastal countries could apply some certain rules on customs, health and financial issues in the 12 miles section adjacent to coastal waters. Additionally innocents passage was protected. According to the article 14/5, in case of the passage of the foreign fisherboats, the coastal governments here would introduce laws to be published in order to prevent these boats from fishing in the coastal waters and in case these boats did not obey the rules, they would be punished. In the Agreement of the Open Sea, the rights of journey, fishing, flight and laying cable or pipe were entitled, provided that the rights of other countries would be respected accordingly. The Agreement of Protecting Fishing and Sea Creature Sources authorized the coastal countries to protect the fishery in the zones adjacent to coastal waters. The fishers of other countries, fishing in these zones had to obey the protection precautions imposed by the coastal country. In case these precautions were not obeyed, the coastal countries had the right to impose scientific sanctions. The fourth article gave the coastal country the right for research and business (200 m depth in the

continental shelf and operable depth outside the continental shelf). Since the definition of operable depth depended on the technology of countries to operate the deep seas, it was drawing highly flexible lines. A second agreement (UNCLOS II), in which there never was a continuous consensus on the right of fishing and the limitations of the areal zones, was signed in 1960 (UN, 1982). UNCLOS III was open to signature in Montego Bay of Jamaica on 10th December 1982. More than 150 countries, representing various regions of the world this time, signed this agreement which is the result of the 14-year study (UN, 1982). The acceptance of UNCLOS III and the declaration of 200 miles EEZ (Economic special district) for the countries with coasts enabled the constitution of a new draft for the better management of the sea sources. The 5th section, 61st Article of the latest law was about the protection of the living sources and the 62nd Article was about operating these sources; additionally it was emphasized that the coastal countries had to define the fishable amount of the living sources within EEZ and for that, the most convenient scientific methods had to be considered (Collier et al., 2001). In Figure 5, the temporal development related to marine management is shown.

The purpose of marine cadastre

A natural resource is to provide the management perspective and spread the versatility and benefits of marine cadastre, which would become more definite with other co-partners (for example Coastal Countries Governments, Private Industry and Academical Communities). Additionally, it is to provide an extensive spatial data infrastructure that includes rights, limitations and responsibilities to be evaluated and managed around the sea. By this way the managers shall reach to the best knowledge that exist for the missions or the purposes of management, application and research.

The benefits of the marine cadastre

The application of marine cadastre enables the managers and technical staff to define, analyse and calculate each square meters of undersea zones. Marine cadastre aims to determine the rights, benefits and responsibilities which come successively and coincide around the sea (Figure 6). This enables the managers, technical staff, as well as other companies, coastal governments, local and regional administrations, private industry and academical communities to reach to the knowledge and the necessary resources directly.

Requirements for marine cadastre

Marine cadastre should provide an extensive Spatial

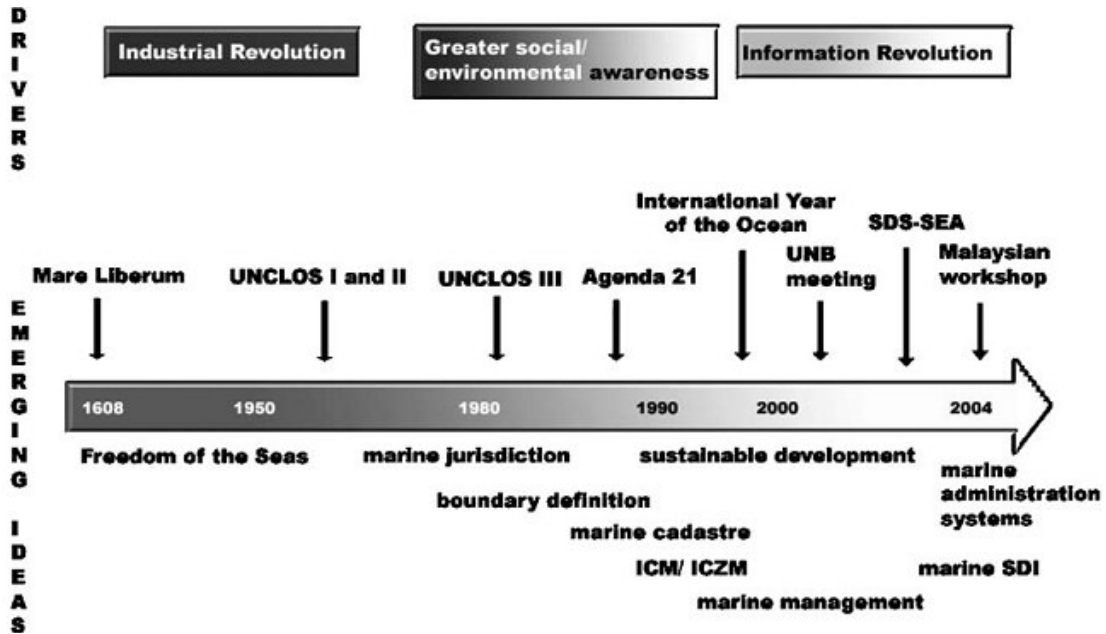


Figure 5. The development of marine management (Strain et al. 2006).

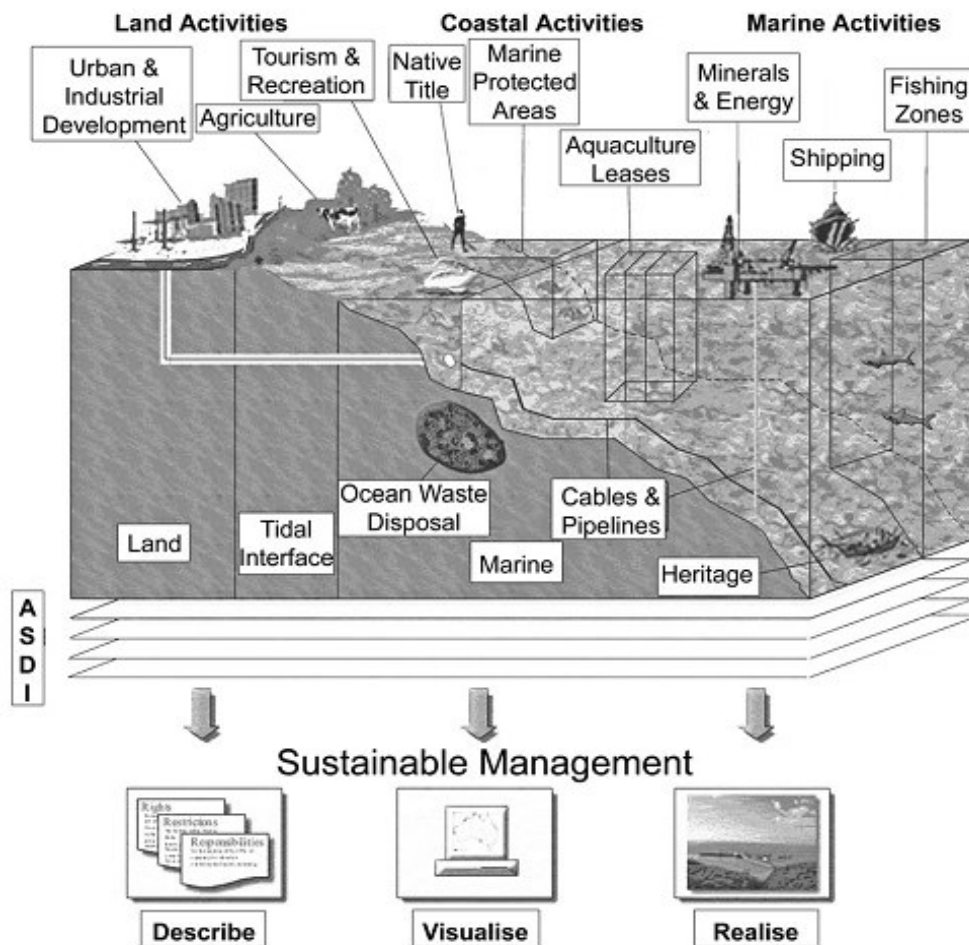


Figure 6. The diagram of the concept of marine cadastre (Sutherland, 2001).

Data Infra-structure which is necessary for ascertaining and administrating the rights, limitations and responsibilities. Cadastre should actually be extensive and it should include the necessary data in order to determine and evaluate how the values and interactions of these rights, limitations, and responsibilities get with with others around the sea. Considering the legislative framework for the marine cadastre, four basic questions shall be taken into consideration. These are;

- What kind of rights are there about the sea?
- Which laws do define these rights?
- What is the order of priority among these rights?
- How is the relationship of these various rights with one another?

In fact, every convenient law, available limits around the sea (for example pipelines, undersea cables, artificial limits etc.), limitations, permission or obstacles of military organization may be in interaction with each other and they effect the managers to fulfill their responsibilities. Marine cadastre should be dynamic and it should include the following data without any limitations;

UTM Grid System (The system in which the cadastre is defined)

1. National baselines
2. Coastal line
3. The limits of the sea bottom
4. Government limits
5. Region limits
6. Administrative limits
7. Coastal waters limits
8. Continental shelf
9. Financial Maps

As supportive data layers;

- Transmission sand areas
- Pipelines
- Undersea cables
- Artificial limits
- Ship routes, anchoring locations, route distribution plans
- Depth measurement
- Military protection zones and military waste fields
- Dock locations and dock structures
- Alternative energy areas (for example wind, wave, tide, solar etc.)
- Archeological areas
- Aquaculture areas
- Oil and gas businesses
- Alternative energy businesses
- Liquid natural gas facilities
- Natural life areas of the fishers
- Fish farms
- Information of the species to be protected/Critical natural

environments

- Dynamic field management regions
- Areas with no discharge fields
- Mouths of rivers
- Harbours (Transportation-Yacht-Touristic Harbours) shall be used (Binns et al., 2006).

DISCUSSION

The necessity of marine cadastre in Turkey

Turkey, surrounded by water on its three sides, has a coast with a measurement more than 8.333 km. Turkey, which has a geo-political and geo-strategic significance expands to the countries with coasts to the Black Sea, Middle Asia and Far East by the Turkish Bosphoruses; to Middle East and Northern Africa due to its position in the Eastern Mediterranean, to the Atlantic by Gibraltar and to the far east by Suez Canal. In Turkey, the local and foreign tourists mostly lean to the coastal sections. The tourism in Turkey is mainly focused on the archeological and historical areas on the Aegean and Mediterranean coasts. In this tourism type, which generally includes the summer season and is therefore called as sea tourism, different usage types have developed as well. Beach regions are important tourism areas for people living in various cities of Turkey and for tourists coming from the western Europe. The most important beaches start from the Aegean coasts and end around Antalya in the Mediterranean. Bodrum, Fethiye, Marmaris, Kuşadası and Alanya are among important holiday locations. The number of foreign tourists reached from 12.8 million to 21.2 million between 2002 and 2005, which has caused Turkey to be among "The Best 10 countries for Foreign Visitors". Another tourism type in Turkey that draws attention is the yacht tourism. The marinas, which are the frequent places for the yachtes in this type of tourism, that is made with yachtes under the name Blue Cruise on the coasts of Aegean and Mediterranean lie along İzmir, Altinyunus, Kuşadası, Bodrum, Marmaris, Kemer, etc.

For Turkey to come into its own in marine sector on international platform, it has to have harbours suitable for world standarts and technological developments, accommodate itself to the developing transportation and harbour technologies, constitute national and international marine politics, arise its share on external trade transportations, attach importance to the marine tourism, yachting and fishing, provide and develop Harbour and Flag State control mechanism in order to increase its prestige on the international platform. Turkey, where marine activities intensely take place, is on a significant position with its marine geographical position which is effective on international relations. The intensity and variety of the activities on coastal and marine zones in Turkey can clearly be seen with features like the existence of important gas and oil fields on the marine zones,

its bosphoruses and harbours, fishing facilities, naval shipyards and the facts that settlement is mainly on the coasts, domestic wastes are directly evacuated into the sea, it has many rivers evacuating into the sea, etc. As a result of the intensity and pollution of the aquaculture activities, which are increasing in Turkey and the world - especially on coastal zones- the necessity of management plans which are to be applied orderly and controlled in the near future emerges (Bahar and Comert, 2007). These areas, which constantly go under a change in time have to be taken under control and the questions like what is, where, how much is there? have to be answered. The obligation of a registration to control these various activities and demands seems to be inevitable.

CONCLUSION AND RESULTS

Since the marine resources that are mostly demanded and used for providing, producing and using the food, commerce, transportation, raw material etc. on earth and the increase of population are inversely proportional, the significance of the seas shall increase much more in the future. On the other hand, the information produced by the establishments that are responsible for the management and the administration of the marine zones are generally not current or in the accuracy desired. In this context, the necessity of the Marine Cadastre, which is tried to be explained above, for Turkey should be discussed by the highly-disciplined occupational groups, it should be researched whether regulations shall be made for these areas, which are not subjected to registry according to the current legislation or not with the participation of the scientists and necessary structures and regulations should be checked for the activities on the sea and in order to manage them. Additionally necessary studies should be started to constitute the spatial database, which would contribute to the constitution of cadastre for sustainable management of marine zones and which are directed at the plannings of the basic map underlays and marine zones with the support of information technology. With this purpose, a spatial information system to be used in the management of marine zones and the cadastral applications shall be established by using Geographical Information Systems (GIS). The spatial data to be used in the management and administration of the marine zones in Turkey is essentially inadequate. The marine cadastre to be constituted in this context shall actually enable the description of spatial information system directed at the sea and the user rights and also enable them to be chained systematically. For this, a substructure of "intero-perability", that would enable the data sharing between the related institutions is required. The structure of "interoperability" in question is named as "Spatial Data Infrastructure (SDI)" from the spatial point. The foundation studies of a structure that would provide interoperability between all sections that do business with marine SDI and all public institutions,

local managements, private sector and spatial data throughout the country and that would enable immediate access and usage of the necessary data and services for the concerned shall be started.

REFERENCES

- Anker HT, Nellemann V, Sverdrup-Jensen S (2004). Coastal zone management in Denmark: Ways and means for further integration. *Ocean Coastal Manage.*, 47: 495-513.
- Bahar O, Comert C (2007). Türkiye İçin Bütünleşik Kıyı Alanları Yönetimi Gereksinimlerinin Belirlenmesi, Türk Mühendis ve Mimar Odaları Birliği Harita ve Kadastro Mühendisleri Odası 11. Türkiye Harita Bilimsel ve Teknik Kurultayı, Bildiriler Kitabı, 02 Nisan – 06 Nisan 2007, Ankara (in Turkish).
- Binns A, Rajabifard A, Collier PA, Williamson I (2004). Developing the Concept of a Marine Cadastre: An Australian Case Study, [http://www.sli.unimelb.edu.au/maritime/publications/Binns%20et%20al%20\(2004\).pdf](http://www.sli.unimelb.edu.au/maritime/publications/Binns%20et%20al%20(2004).pdf), 20.01.2009.
- Binns A, Rajabifard A, Collier PA, Williamson I (2006). Issues in *Defining the Concept of a Marine Cadastre for Australia*, [www.sli.unimelb.edu.au/research/publications/IPW/Paper on Marine Cadastre Issues.pdf](http://www.sli.unimelb.edu.au/research/publications/IPW/Paper%20on%20Marine%20Cadastre%20Issues.pdf), 26.07.2006.
- Biyik C (1998). Dalyan ve Voli Yerlerinin Tespit ve Tescili, *Mülkiyet Dergisi*, Sayı 26, 16-23, Tapu ve Kadastro Müfettişleri Derneği, Ankara. (in Turkish)
- Biyik C, Karatas K (2002). Yüzyılımızda Kadastroda İçerik ve Kapsam, Selçuk Üniversitesi Jeodezi ve Fotogrametri Mühendisliği Öğretiminde 30. Yıl Sempozyumu, 16-18 Ekim 2002, Konya (in Turkish).
- Cavdar Y (2007). SUMAE, Karadeniz Bölgesi'nde Akuakültür ve Turizm Entegrasyonu, (Available at <http://www.yunus.sumae.gov.tr/2007/01/02.pdf>, accessed 8 January 2009).
- Collier PA, Leahy FJ, Williamson IP (2001). Defining a Marine Cadastre for Australia, Proceedings of the 42nd Australian Surveyors Congress, Brisbane, Australia, 25-28 September, CD-ROM.
- Dale P, McLaughlin JD (1988). *Land Information Management*, Clarendon Press, Oxford.
- Fraser R, Todd P, Collier P (2003). Issues in the Development of a Marine Cadastre, (Available at <http://www.gmat.unsw.edu.au/ablos/ABLOS03Folder/PAPER1-2.PDF>, accessed 20 January 2009).
- Fulmer J (2007). The Multipurpose Marine Cadastre Web Map, 2007 ESRI Survey and Engineering GIS Summit, June 16-19, 2007, San Diego, California.
- Gulez S (1997). Kıyısız Alanların Koruma-Kullanma Yönünden Bütüncül Planlaması, Türkiye'nin Kıyı ve Deniz Alanları 1.Ulusal Konferansı, Ankara, Bildiriler, (in Turkish). pp. 85-92.
- Kinacigil HT, Akyol O (2002). Uluslararası Deniz Anlaşmaları ve Balıkçılığa Etkileri, E.Ü. *Su Ürünleri Dergisi*, (in Turkish), 19(3-4): 529-537.
- Korca P (1986). Planlamada Kıyı Kullanımı ve Düzenlemeleri, Yeni İmar Mevzuatı Planlama ve Uygulama Semineri, İstanbul, Bildiriler Kitabı, (in Turkish). pp. 137-150.
- Lau M (2005). Integrated coastal zone management in the People's Republic of China—An assessment of structural impacts on decision-making processes, *Ocean Coastal Manage.*, 48: 115-159.
- Mitchell DJ, Collier PA (2001). The United Nations convention on the law of the sea and the delimitation of Australia's maritime boundaries. *Trans. Tasmanian Surveyor*, 4: 507.
- Ng'ang'a S, Nichols S, Sutherland M, Cockburn S (2001). Toward a Multidimensional Marine Cadastre in Support of Good Ocean Governance, International Conference on Spatial Information for Sustainable Development, 2-5 October 2001, Nairobi, Kenya.
- Ng'ang'a S, Sutherland M, Nichols S (2002). Data Integration and Visualisation Requirements for a Canadian Marine Cadastre: Lessons from the Proposed Musquash Marine Protected Area, Symposium on Geospatial Theory, Processing and Applications, Ottawa, Canada, (Available at

- <http://www.isprs.org/commission4/proceedings02/pdfpapers/506.pdf>, accessed 20 January 2009.)
- Ng'ang'a S, Sutherland M, Cockburn S, Nichols S (2004). Toward a 3D marine cadastre in support of good ocean governance: a review of the technical framework requirements, *Computers, Environ. Urban Syst.*, 28: 443-470.
- Nichols S, Monahan D, 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.
- OSG Technical Report 9 (1999). Office of the Surveyor-General-New Zealand.
- Ozden O (2006). *Akuakültür ve Çevre Birinci Çalıřtayı Sonuç Bildirgesi*, 07 Aralık, 2006, APIKEMA Arařtırma Salonu, Çankaya, İzmir (in Turkish).
- Oztan Y (1976). Kıyılarımız ve Korunması, *Peyzaj Mimarlıđı Dergisi*, 2 (in Turkish).
- Rajabifard A, Collier PA, Williamson I (2003). Report on Australian Marine Cadastre Research and Activities, FIG and University of New Brunswick Meeting on Marine Cadastre Issues September 15-16, 2003, University of New Brunswick, Canada.
- Robertson B, Benwell G, Hoogsteden C (1999). The Marine Resource: Administration Infrastructure Requirements, UN-FIG Conference on Land Tenure and Cadastral Infrastructures for Sustainable Development, 24-27 October 1999, Melbourne, Australia.
- Seřli FA, Colkesen I (2007). Türkiye'de Deniz Kadastro Gereksinimi Üzerine Bir Deđerlendirme, TMMOB Harita ve Kadastro Mühendisleri Odası 11. Türkiye Harita Bilimsel ve Teknik Kurultayı, 2-6 Nisan 2007, Ankara (in Turkish).
- Sonmez R (2002). Coastal Area Planning: Basic Issues and Policies, Unpublished report submitted to Turkish Scientific and Technical Research Council for the Report on Integrated Coastal Management in Turkey (in Turkish).
- Strain L, Rajabifard A, Williamson I (2006). Marine administration and spatial data infrastructure *Marine Policy* 30: 431-441.
- Sutherland MD (2001). Marine Boundaries in Support of Good Ocean Governance. PhD Thesis in progress, Department of Geodesy and Geomatics Engineering, University of New Brunswick, Fredericton, Canada.
- TKB (2007). Türkiye'de Su Ürünleri Yetiřtiriciliđi, (Available at <http://www.tugem.gov.tr/db/sud/sudweb/dis.pdf>, accessed 20 January 2009). (in Turkish)
- TUIK (2009). T.C. Bařbakanlık Türkiye İstatistik Kurumu Haber Bülteni (Available at <http://www.tuik.gov.tr/PreHaberBultenleri.do?id=4088>, accessed 16 July 2009). (in Turkish)
- United Nations (1982). United Nations Law of the Sea Convention, New York: UN.
- Yomralioglu T (2000). Cođrafi Bilgi Sistemleri Temel Kavramlar ve Uygulamalar, 1.Baskı, Seçil Ofset (in Turkish).
- Yomralioglu T, Uzun B, Demir O (2003). Kadastro 2014 Gelecekteki Kadastral Sistemler İin Bir Vizyon, TMMOB HKMO, Ankara, (Translation) (in Turkish).
- Widodo S (2003). The Needs for Marine Cadastre and Supports of Spatial Data Infrastructures in Marine Environment-A Case Study, FIG Working Week, Paris, France.