

GIS BASED INVENTORY OF MARINAS ON THE COASTAL REGION OF TURKEY

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ABSTRACT:

GIS is widely used in marine sciences since last decade. Through the Geographical Information systems, it is possible to synthesize all data about marinas for comprehensive interpretation and forecasting of marine environmental systems. In marine sciences, the simultaneous analysis of data sets can be combined within a GIS. In this study, it has been aimed to constitute inventory of marinas on the coastal regions of Turkey by means of GIS. The graphic data which includes borders of counties on the coastal regions of Turkey have been obtained from standard topographic maps. Data design has been established for attribute data includes general information about marinas as coordinates, location, the name of marina, etc. and service opportunities given to yachtmen as forecast, rent a car, laundry, etc. Attributes data of marinas have been obtained from different sources such as internet, information forms, advertisement brochures, publications of government associations, etc. Various analysis have been carried out about marinas of Gocek Bay. In this temporal analysis it is indicated a significant parallelism between the augmentation of yacht number and total coliform values.

1. INTRODUCTION

Tourism has very important positive effects on developed and under developing countries in view of economical, political, cultural and social lives. Marine tourism takes a great share in the general tourism activities. Turkey has an enormous Marine Tourism potential depending on its climate, coasts and historical places. Although the absence of infrastructure and the delayed legislation, marine tourism has to be continue to developed itself in Turkey. Yatching tourism is being a part of marine tourism.

Developed countries in tourism such as Spain, Italy, covered their coasts with massive concrete structures like hotels. Since communication and travel possibilities is getting better day by day The World is getting smaller. And depend on this situation, tourists began to tend to go farer countries. Therefore, Turkey should be extremely careful not to repeat the same mistakes other countries have inevitably done before (Dogan, 1990).

Yacht Tourism in Turkey began to develop at the beginning of 1980's years. One of the important reason of this movement is unspoilt Turkish nature. Fishermen had been began yacht tourism with spongers boats without any comfort later it is symbolized as Blue Voyage. At the beginnig these journeys was done with small fishing boats. The encouragement of yacht construction and management are accelarated the development of yacht tourism. The numbers of mooring capacity on land and sea for marinas have the certificates of tourism investment and tourism administration was about 10.600 in 2001 (DTO, 2002).

2. YACHT TOURISM

In the recent years not only tourism in the world has been growing rapidly but it has also getting assorted. Yacht tourism

is the one of these types of tourism. The demand for yaching is increasing because of its features : it satisfies the feelings of freedom, being close to nature and history, sports and adventure, exploration. Yacht Tourism means the type of tourism which consist of 'yacht management', 'Yachter', 'yacht manufacture' and 'Yacht harbour'.

Yacht tourism is composed of private yaching and resting of yachts by groups. Private yachts' owners are both local owners and cruiser owners. Local owners moor their own yachts in nearest marina and sail at weekends. Cruiser owners have more convenient time to sail and cruise. Generally they give months to cruise in foreign seas and leave yachts in a marina so as to park for winter. Other groups of yacht tourists are charterers. They rent a yacht or a cabin for certain time from Yacht Charter Agencies.

2.1 World Yacht Tourism

There are two important cruising areas in the world : The Caribbean Sea and The Mediterranean Sea. They both of them have convenient winds to sail, climate, rich natural and cultural beauties, etc. But they are not competitor to each other because of distance between them and season order.

The Mediterranean Sea is very much suitable for yaching, both because of climate and winds convenient to sail, its natural small bays and different cultures and history of surrounding countries.

Coast of Spain, France, Italy in the west Mediterranean and marinas on these coast, are just about to lose their quality. The increasing amount of pollution at coasts this side of the Mediterranean, the price of marinas which have risen astronomically, have dissuaded yachtmen from western Mediterranean. As a result of this situation, in recent years,

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yachtmen have finally managed to find themselves new coasts in the Eastern Mediterranean which are both economic and lovely (Dogan, 1990).

2.2 Mediterranean Yacht Tourism

Most popular cruising areas in the Mediterranean are as follows:

- Sardinia and Corsica Island (Bonifacio Straits)
- Dalmatian Coasts in Yugoslavia
- Greek Islands: The Saronic Gulf, The Sporades, The Ionian Islands
- Turkish coast (Lycian and Karian coasts)

According to obtained data, there are 311.000 mooring capacity at the 711 marinas on the Mediterranean countries also include Turkey. Most popular cruising areas in the World can be seen in Figure 1 (DTO, 2003).

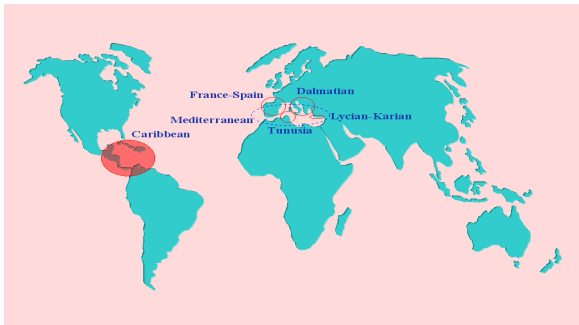


Figure 1. The Essential Yacht Tourism Areas of The World.

2.3 Turkish Yacht Tourism

Yacht tourism in Turkey began with France and Greek charter operations. At the same time, our intellectuals made journeys by local boats and called journeys as ‘Blue Voyage’. The concept started back in 1980’s and really took off in 1983 after the acceptance of new law with the specific objectives of regulating and promoting yacht tourism: construction new marinas, renovating and improving existing ones and encouraging yacht charter services in Turkey.

According to Table 1, The number of foreign tourist rised to 13,2 million in 2002. But the number of tourist visits to the Turkey by using air and sea transportation moved backward 34,7% (www.turizm.gov.tr).

YEARS	Tourist Number using Maritime	TOTAL TOURIST	% RATE
2001	1.137.865	11.618.969	9,8
2002	742.507	13.246.875	5,6
2003	-	14.029.558	-
2004 (first 3 month)	-	1.924.877	-

Table 1. The Number of Tourists Visit to Turkey

2.4 Yacht Harbour

Marinas are most important substructure for Yacht Tourism. Marinas are divided safety sea areas in which yachtmen can moor, maintain their own yacht, go on shopping, take a bath, wash clothes, pump in oil, eat, drink, communicate, etc. A well-

equipped marina should give these services to yachtmen and other customer.

2.4.1 Yacht Harbour in the World: At the coastal region of France, there are 261 marinas which has 145.000 mooring capacity. Also, there are 9000 mooring capacity at the 35 marinas on the rivers. Germany has a 750 km coastline, although the short summer season, there are 100.000 mooring hulls at the marinas. The number of hull about 280.000 is available on the 800 marinas in Holland. The coastal region of Belgium has 4000 mooring capacity on the 8 marinas. The number of hulls in the U.K. is 220.000. 14.000 marinas of the World through about 20.000 marinas and 4 millions hulls of 6,5 millions hulls are in U.S.A. (Dagci, 2002).

2.4.2 Marinas of The Turkey: The Mediterranean, Aegean and the Black Seas, as well as the Sea of Marmara, surround Turkey to the north, west and south. With over 8333 kilometers of coastline, Turkey has beautiful gulfs, bays (www.akdeniz.edu.tr).

Turkey’s most established marinas lie on southern Aegean and Mediterranean coasts at, Cesme, Kusadasi, Bodrum, Datca, Bozburun, Marmaris, Gocek, Fethiye, Kalkan, Kas, Finike, Kemer and Antalya. In these well equipped harbours, yachters can find the services.

In Turkey, there are 15 marinas, are shown in Table 2, have the certificate of Tourism Administration and 10 marinas, are shown in Table 3, have the certificate of Tourism Investment (DTO, 2003).

Name of Marina	Kind of Marina	City	Capacity	
			sea	land
Setur Kusadasi Marina	Main Marina	Kusadasi/Aydin	310	-
Atakoy Marina	Subordinate M.	Atakoy/Istanbul	700	40
Akdeniz Kemer Marina	Subordinate M.	Kemer/Antalya	150	150
Kale ici Marina	Berthing Places	Kale ici/Antalya	90	-
Altin yunus Marina	Subordinate M.	Cesme/Izmir	90	60
Ata bay Tur.	Parking Ashore	Gebze/Kocaeli	-	60
Amiral Fahri Koruturk Marina	Subordinate M.	Fenerbahce/Istanbul	558	-
Marmaris Marina	Main Marina	Marmaris/Mugla	676	122
Club Marina	Berthing Places	Gocek/Mugla	121	-
Setur Antalya Marina	Subordinate M.	Antalya	169	290
Ayvalik Marina	Parking Ashore	Ayvalik/Balikesir	-	140
Sun Marina	Parking Ashore	Marmaris/Mugla	-	100
Ayvalik Marina	Subordinate M.	Ayvalik/Balikesir	100	-
Kumlu buku Yacht Club	Berthing Places	Marmaris/Mugla	10	-
Albatros	Parking Ashore	Marmaris/Mugla	40	48
SUBTOTAL	-	-	3014	1010
TOTAL	-	-	4024	

Table 2. Marinas have the Certificate of Tourism Administration in Turkey.

Name of Marina	Kind of Marina	City	Capacity	
			sea	land
Alaca tur Tur.Tesis	Subordinate M.	Turgutreis/Mugla	40	12
Meersa Kormen Marina	Subordinate M.	Datca/Mugla	246	56
Marmarin	Parking Ashore	Marmaris/Mugla	-	200
Martı Mar.ve Y. Is.A.S.	Subordinate M.	Marmaris/Mugla	301	70
Il-Tur Ileri Tur ve Y. Is.	Berthing Places	Gocek/Mugla	80	-
Yacht Marin	Parking Ashore	Marmaris/Mugla	-	100
Karada Marina	Subordinate M.	Bodrum/Mugla	144	50
Kalkedon Marina	Subordinate M.	Bodrum/Mugla	200	200
Bodrum Yalikavak Marina	Main Marina	Bodrum/Mugla	336	100
Turgut reis Marina	Main Marina	Turgut reis/Mugla	455	100
Toplam	-	-	1802	888
GENEL TOPLAM	-	-	2690	

Table 3. Marinas have the Certificate of Tourism Investment in Turkey.

2.5 Blue Flag

Europe Community has determined the microbiologic parameters for sea and lake waters have been used for swimming. This work put together Blue Flag Campaign include 11 European country by Foundation For Environmental Education (FEEE) in 1987. Blue Flag has focused on four fundamental subjects:

1. Water Quality have been used for swimming
2. Environmental Education
3. Security and order of beaches
4. Environment Management

This subjects have been divided into 27 criterias by FEEE. Foundation For Environmental Education of Turkey (TURCEV) is carrying on with control the Blue Flag in Turkey.

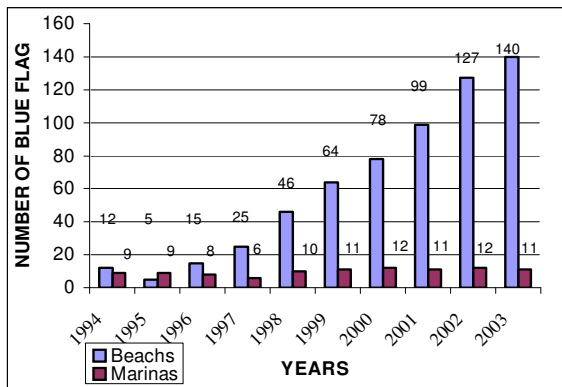


Figure 2. The Numbers of Blue Flag According to Years in Turkey.

The Blue Flag is the international environment reward have given to marinas and beaches which have essential standard. Blue Flag is available for 25 countries in Europe and Republic of South Africa. Marinas has the Blue Flag Reward in Turkey in 2003 are shown in Table 4 and also a graph about the number of blue flag according to years in Turkey are given in Figure 2 (www.denizmagazin.com).

1	Atakoy Marina
2	Setur Cesme Marina
3	Setur Ayvalik Marina
4	Setur Kusadasi Marina
5	Bodrum Karada Marina
6	Marmaris Marti Marina
7	Kemer Park Marina
8	Setur Antalya Marina
9	Setur Finike Marina
10	Setur Amiral Fahri Koruturk Kalamis, Fenerbahce Marinas
11	Dogus-Turgut reis Marina

Table 4. 2003 Marinas have the Blue Flag Reward in Turkey

3. YACHT HARBOUR MANAGEMENT AND THE POSSIBILITIES OF USING GIS AND INVENTORY STUDIES IN MANAGEMENT

There are different kind of marina management all over the World.

- In American marina management, technology is essential and available. The number of personnel is extreme.
- England management system aims to give customers maximum service with minimum personnel as Sweden, Norway.
- France management system has appropriated leasing for mooring.
- Mediterranean management system was careful about customer's poverties.

When these marina management styles have been consider for Turkey, it can be seen that Turkey has a mixture of marina management. For instance: in Setur Marinas have the England marina management style (Ecemen, 2004).

By using GIS and inventory studies in marinas, control of Yacht Harbours will get easier by means of innumerable analysis. The decision-making mechanisms of directors related to future plans will acquire advantages with using temporal analysis about yachts, personnel and yachter.

4. OPERATIONS

4.1 Inventory of Marinas on the Coastal Regions of Turkey

4.1.1 Data Design: The inventory is consist of graphical data and attributes data of graphic data. The graphic data which

includes borders of counties on the coastal regions of Turkey (Figure 3) have been obtained from standard topographic maps. Data design has been established for attribute data includes general information about marinas as coordinates, location, the name of marina etc. and service opportunities given to yachtmen as forecast, rent a car, laundry, etc. Attributes data of marinas have been obtained from some sources as internet, information form, advertisement brochures, publications of government association, university libraries, etc.

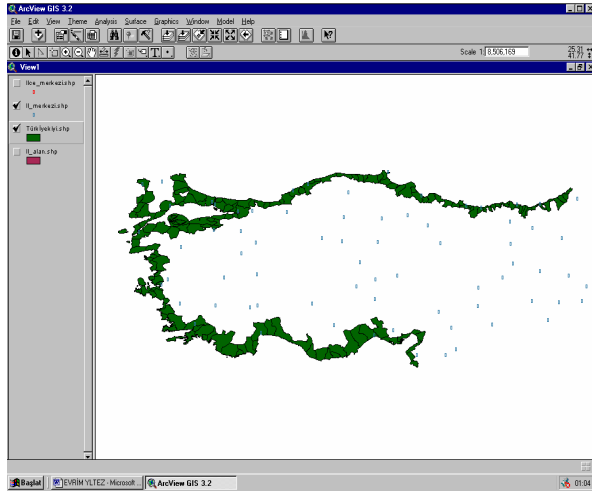


Figure 3. The Counties in The Coastal Regions of Turkey.

Some attributes data have been used in inventory about the marinas are as follows:

- The name of Marina
- Geographical Coordinates of Marina
- Capacity
- County
- Direct Electricity Connection to Yacht
- Direct Fresh Water Connection to Yacht
- Fuel Station
- Sewage Removal
- Direct Phone Line to Yacht
- Parking
- Security 24H
- Repair Facilities
- Supermarket
- Laundry
- Restaurant / Bar / Cafe
- Doctor
- Rent a Car
- The Certificate of Tourism Administration
- The Certificate of Tourism Investment

In inventory, '1' have been used for the meaning of existent, '0' have been used for the meaning of absent attribute data.

4.1.2 Query and Analysis: With using GIS software, it is possible to arrival to attribute data from graphic data and vice versa.

Several queries can be taken form about marinas. For instance: demonstrate the marinas have 100 yacht mooring capacity, which marinas have the certificate of Tourism Administration in Figure 4.

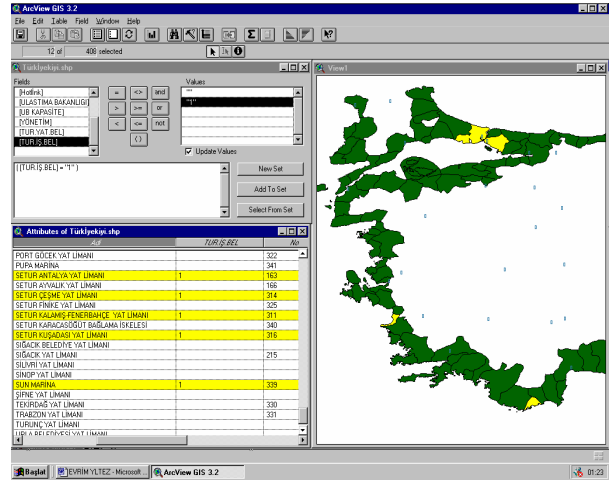


Figure 4. Querying The Marinas Have The Certificate of Tourism Administration in Turkey.

4.1.3 Analysis of Gocek Bay: Gocek Bay which was become an important part of mediterranean yacht tourism. This region especially is illustrated in Figure 5 attracts attention with natural beauties.



Figure 5. The Location of Gocek Bay.

Through the GIS and inventory have been established, in Gocek Bay, some analisis have been done such as follows:

It can be seen the management situations of Turkish Marinas from the Table 5 (www.ubak.gov.tr).

Situation	The Name of The Marina
Private	Gocek Berthing Place
Private	Iltur Marina
Private	Gocek Iltur Club Marina
Private	Gocek Marina
Private	Port Gocek Marina
Private	Gocek Skopea Marina
Private	Gocek Marina
Municipality	Gocek Belediye Marina

Table 5. In Gocek Bay, Private Marinas and Municipality Marinas

It can be said that the most mooring capacity in Gocek Bay is nearly 400 through the analysis in Figure 6.

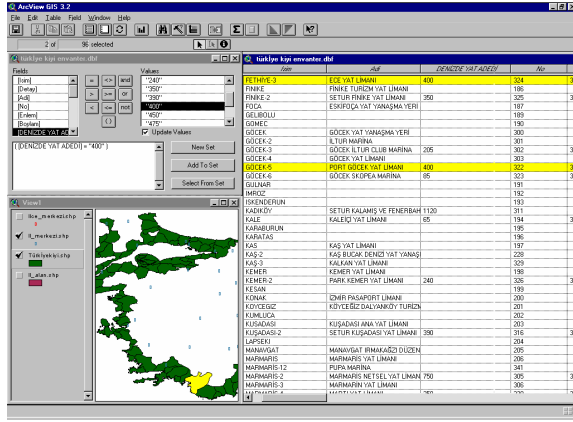


Figure 6. Analysis of the marinas have most mooring capacity in Gocek Bay.

4.2. Water Quality Analysis In Gocek Bay

Dates are shown in Table 6, in 1996, water quality measurement included coliform values have been done in Gocek Bay so as to understand how change the water quality.

Months	Number of Measurements	Measurements Dates
January	1	29
February	1	27
March	1	27
April	2	6, 10
May	2	7, 31
June	1	18
July	2	15, 24
August	3	6, 19, 27
September	2	16, 30

Table 6. Measurements Dates of Coliform Values in Gocek Bay.

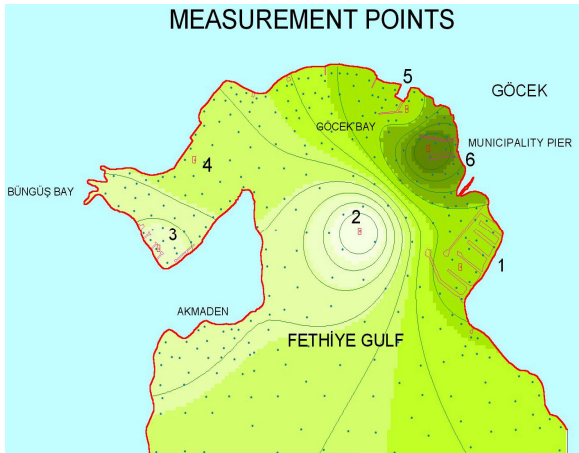


Figure 7. Measurement Points of Gocek Bay.

It have been accepted max. coliform value 1000 for 100 ml. at the measurement points of Gocek Bay in Figure 7. (Kabdasli, 1996).

1. Enternasyonel Marina Region
2. Middle of the Gocek Bay
3. Bungus Bay
4. Seka Pier
5. Iltur Pier
6. Municipality Pier

Another obtained data for temporal analysis is the yacht numbers have come in Gocek Bay at the season of tourism between April and October in 1996. The numbers of yacht are presented in Table 7, have been considered for Municipality Pier and Club Marina (Kabdasli, 1996).

MONTHS	MUNICIPALITY MARINA (6)	CLUB MARINA(3)	TOTAL
APRIL	210	27	237
MAY	1698	56	1754
JUNE	1986	70	2056
JULY	2132	77	2209
AUGUST	2106	127	2233
SEPTEMBER	1893	128	2021
NOVEMBER	1701	41	1742
TOTAL	11725	527	12252

Table 7. Yacht Numbers of Gocek Bay in 1996.

To use in temporal analysis, surfaces have been taken form for each month through the coliform values.

Temporal analysis can be achieved to compare the yacht number and coliform values.

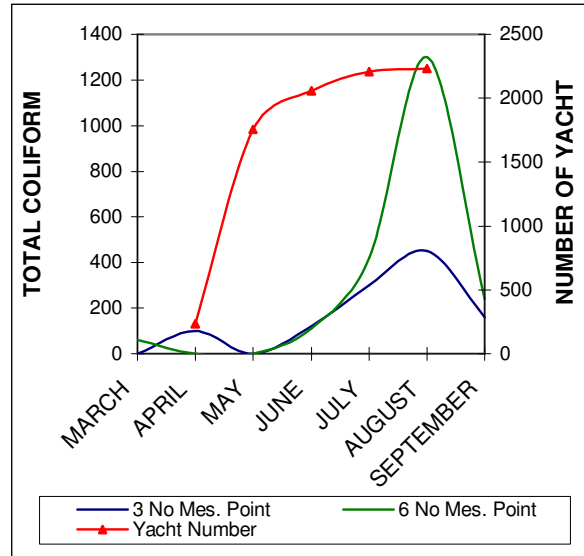


Figure 8. Along the Tourism Season in Gocek Bay, 1996, Yacht Numbers

Figure 8 has indicated that the water quality have reduced according to yacht numbers in Gocek Bay. In Figure 9, coliform changing between 6 April and 19 August can be seen.

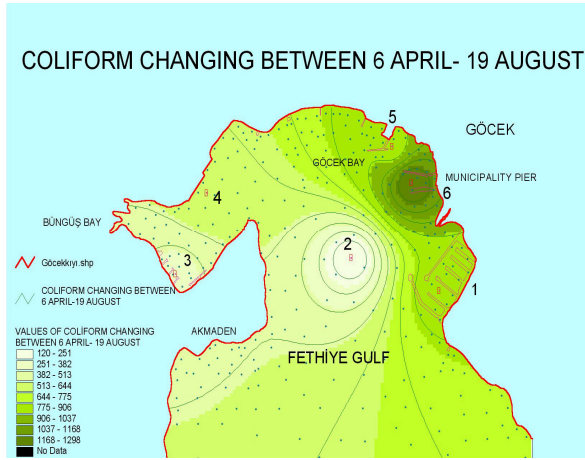


Figure 9. The Variation of Total Coliform Values Between 6 April and 19 August 1996 in Gocek Bay.

5. CONCLUSIONS AND SUGGESTIONS

Turkey has a great potential for World and Mediterranean Yacht Tourism. To improve the yacht tourism and marine tourism, Turkey's available opportunities and infrastructure must be determined and then must be compared with another World countries. This kind of inventory studies may be used for decision-making mechanisms and future plans can be established related to this studies. When directors are carrying on with plans, natural beauties have to be considered. After the plans have been applied, for control mechanism, autonomous establishments must be organized. This kind of inventory studies can be put forward to yachtmen on the internet and tourism incomes can be increased.

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