

**Economic Value of Recreational Fishing in İzmir Inner Bay : (Aegean Sea), Turkey**

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### Introduction

- One of the most popular activity along the coasts
- Leisure time activity
- Poor studied social and economic activity




Photo: Ünal, V

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Research Article

**Characteristics of Marine Recreational Fishing in the Çanakkale Strait (Turkey)**

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**Abstract**

The economic and harvest impact of Marine Recreational Fishing (MRF) in the Çanakkale Strait were analysed along with fishing policy, sociology and habits of fishers. Data sources included field survey data carried out along the entire length of the Çanakkale Strait and policy information gathered from published sources. MRF policy is commendable, even in the fishing tourism sector, and is better developed than that in many other European countries. In Çanakkale, recreational fishers make up 9.9% of the population. Recreational fishers are typically men (90%), primarily those between the ages of 25 and 40 yrs. The occupation of the recreational fishers ranged from self-employed (28%), students (28%), retired persons (22%) and public employees (15%), to currently-unemployed persons (7%). An analysis of diel behaviour showed that most recreational fishers preferred fishing during the day (56.1%), while the evening was the next most preferred time for fishing (18%), followed by the night-time (9.8%), while a substantial number of recreational fishers (16.1%) reported that they fished at any time of day. The most popular type of fishing was shore-based (68%), followed by boat-based (21%), and underwater fishing (11%). The mean daily fishing times were 6.07 h d<sup>-1</sup>, 6.18 h d<sup>-1</sup> 4.75 d<sup>-1</sup> for boat-based, underwater and shore-based fishing, respectively. Summer and autumn were the preferred seasons for shore-based and underwater fishing, while autumn and winter were preferred for boat-based fishing. The highest Catch per Unit Effort (CPUE) was observed for boat-based fishing (2.77 kg h<sup>-1</sup>), followed by underwater (0.97 kg h<sup>-1</sup>) and shore-based fishing (0.61 kg h<sup>-1</sup>). The catch composition included 51 species, though the catch composition of each fishing type was mostly comprised of only 3 or 4 species. The impact of the MRF harvest was high (30% of commercial fishing), particularly for bluefish (*Pomatomus saltatrix*) and picarel (*Spicara ornata*) species. The economic impact of MRF was highly negative. Several indicators, including the following, revealed a high percentage of catch trading (47%) being conducted under the guise of a recreational label; annual fishing intensity, total costs, target species, and sales. At present, it is evident that the highly developed recreational fishing policy in Turkey is not sufficient to ensure that recreational fishing is sustainable or to prevent fishing conflicts in Turkey. This study revealed the need for establishing monitoring, control and surveillance programs to ensure the sustainability of fish resources and fisheries including MRF.

**Keywords:** Recreational fishing; Fisheries management; Economic impact; CPUE; Çanakkale Strait; Dardanelles.

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## Methodology

Wide range of economic valuation techniques are used for RF:

- Contingent Valuation Method,
- Travel Cost Method
- Hedonic Methods
- Production approaches
- Cost based approaches etc.

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#### In this study,

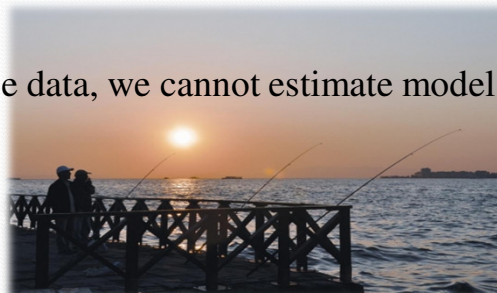
- Travel Cost Method (TCM) was used to measure Non-Market Economic Value of RF.
- The economic values of RF in terms of consumer surplus (CS) are derived from negative binomial regression model.
- Negative binomial count regression model was also used to estimate recreational fishing trip demand as well as relationship between variables.

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#### Necessary data :

- RF involves many expenditures in addition to travel costs such as the cost of gear (including rods, lures, tackle box, cooler, waders, etc.), the cost of obtaining a license-permit, the cost of owning and operating a boat, and accommodation.

- Without these data, we cannot estimate model by TCM.



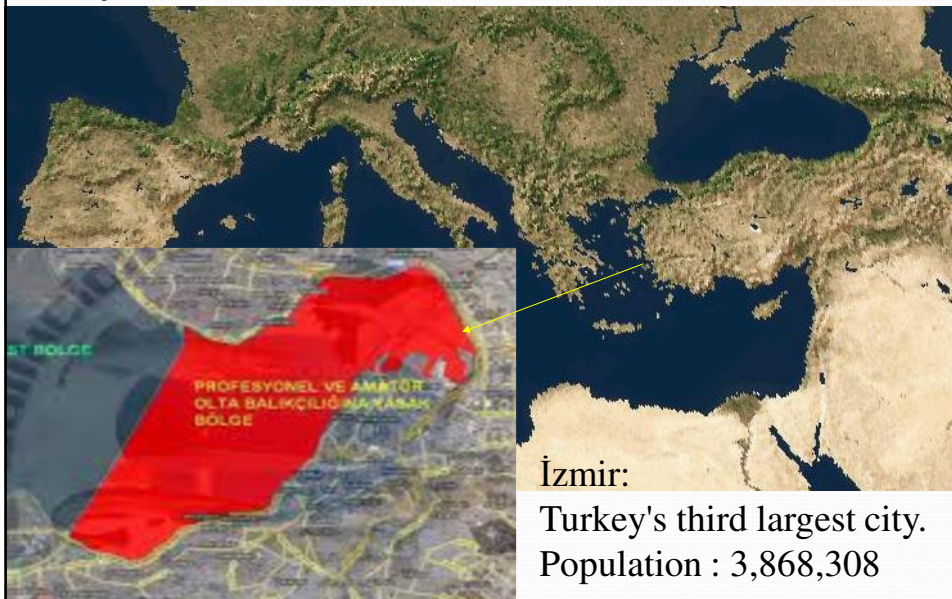


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- **Demographic features of anglers** (age, sex, marital status, monthly income, education degree, occupation etc.),
- **RF characteristics** (fishing days per year, fishing hours per day, species caught, annual catch in weight).
- After the data collection, demand function for RF was estimated using econometric methods.

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#### Study sites



## Economic Value of Recreational Fishing in İzmir Inner Bay (Aegean Sea), Turkey

### Most popular fishing points in the inner bay;

- Bostanlı,
- Karşıyaka,
- Bayraklı,
- Alsancak,
- Konak,
- Mithatpaşa,
- Göztepe,
- Üçkuyular.



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### Results

**Fishing experience:** 18.8±15.1 years.

**Hours spent on fishing per angler:** 2-10 (min.-max) hours/day.

**Average fishing hours per angler:** 4.7±1.9 hours/day.

**Average catch per angler:** 1.8 kg/day.

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**Catch per fishing hours: 0.42 kg**

**Consumer surplus per angler per trip: 16.2 €**  
(Opportunity cost of time was excluded).

**Cost of fishing trip per hour: 1.25 €**

**The mean arrival time to the fishing site: 15.3 minutes.**

**High months for RF, June, July, August, September and October.**

**1 Euro = 2.4 TL**

### Economic Value of Recreational Fishing in İzmir Inner Bay (Aegean Sea), Turkey

Family	Species	Share in total catch (%)	Share in total catch (kg)	Unit price (€ / per kg)	Market Value €
Sparidae	<i>Sparus aurata</i>	16.36	1,992	15.28	30431.95
Moronidae	<i>Dicentrarchus labrax</i>	10.46	1,252.8	11.73	14696.91
Mugilidae	<i>Mugil cephalus</i>	7.86	942	3.08	2904.5
Sparidae	<i>Diplodus sargus</i>	20.96	2,511	8.62	21631.22
Sciaenidae	<i>Sciaena umbra</i>	0.08	9	3.33	30
Sparidae	<i>Diplodus vulgaris</i>	3.76	450	3.26	1466.25
Scombridae	<i>Boops boops</i>	0.87	104	1.23	128.05
Sepiidae	<i>Sepia officinalis</i>	16.13	1,932	2.47	4773.65
Loliginidae	<i>Loligo vulgaris</i>	20.22	2,423	8.60	20832.75
Carangidae	<i>Trachurus trachurus</i>	2.96	355	1.93	682.64
Scombridae	<i>Scomber japonicus</i>	0.05	5.5	1.79	9.84
Sciaenidae	<i>Umbrina cirrosa</i>	0.04	4.5	7.38	33.19
<b>Total</b>		<b>100</b>	<b>11,980.8</b>		<b>97620.96</b>

### Economic Value of Recreational Fishing in İzmir Inner Bay (Aegean Sea), Turkey

#### Descriptions of the variables used in the Model

<b>TRIPS</b>	Dependent variable; number of RF visits to İzmir Inner Bay in 2010.
<b>TCOST</b>	Total round trip travel costs (€)
<b>FHOURS</b>	Average daily hours spent on RF
<b>GEARVALUE</b>	Total value of present fishing equipment (€)
<b>AGE</b>	Age of anglers
<b>INCOME</b>	Anglers' monthly income (€) (1: Under 208 €, 2: 208-416 €, 3: 416-625 €, 4: 625-833 €, 5: 833 – 1041 € - 6: 1041-1250 € 7: Over 1250 €)
<b>EXPERIENCE</b>	Anglers' RF experience in years
<b>TOTCATCH</b>	Total amount of fish caught during last year in kg

### Economic Value of Recreational Fishing in İzmir Inner Bay : (Aegean Sea), Turkey

#### Descriptives of the variables used in the Model

Variables	Mean	Std. Dev.	Min.	Max.
<b>TRIPS</b>	142	113.33	10	340
<b>TCOST (€)</b>	5.89	18.1	0.88	62.4
<b>FHOURS</b>	4.74	1.9	2	10
<b>GEARVALUE (€)</b>	367.88	480.9	4.2	2,083.3
<b>AGE</b>	45.04	12.81	17	71
<b>INC Intervals (€)</b>	416-625	-	≤208	1250≤
<b>EXPERIENCE</b>	18.75	15.08	1	60
<b>TOTCATCH</b>	125.75	165.11	3	992



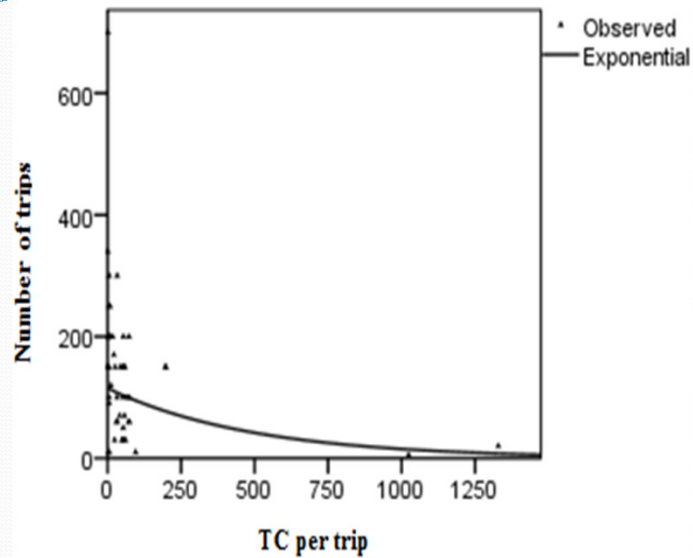
Economic Value of Recreational Fishing in İzmir Inner Bay (Aegean Sea), Turkey		
Negative Binomial Regression Model		
Dependent variable: TRIPS		
Independent Variables	Coefficient	Std. Errors
TCOST	-0.02572***	0.00624
FHOURS	0.09835**	0.04597
GEARVALUE	0.00036***	0.00011
AGE	0.00554	0.00896
INCOME	-0.08155	0.08574
EXPERIENCE	0.00202	0.00819
TOTCATCH	0.00121*	0.00067
Constant	4.25977	0.52333
A	0.33214	0.06619
Log L	-280.0589	

\*\*\*  $P \leq 0.01$   
 \*\*  $P \leq 0.05$   
 \*  $P \leq 0.10$

Economic Value of Recreational Fishing in İzmir Inner Bay (Aegean Sea), Turkey	
$Y = 4.25977 - 0.02572X_1 + 0.09835X_2 + 0.00036X_3 + 0.00554X_4 - 0.08155X_5 + 0.00202X_6 + 0.00121X_7 + \epsilon$	
Y :	Number of trips
X <sub>1</sub> :	Total round trip travel costs (€)
X <sub>2</sub> :	Average daily hours spent on RF
X <sub>3</sub> :	Total present fishing equipment value (€)
X <sub>4</sub> :	Age of anglers
X <sub>5</sub> :	Anglers' monthly income (€)
X <sub>6</sub> :	Anglers' RF experience in years
X <sub>7</sub> :	Total amount of fish caught during last year (kg)



### Economic Value of Recreational Fishing in İzmir Inner Bay (Aegean Sea), Turkey



Negative relationship was found between number of trips and TC per trip.

### Economic Value of Recreational Fishing in İzmir Inner Bay (Aegean Sea), Turkey

There are currently **7,669 recreational fishing licenses** in İzmir according to official records (Turkish Ministry of Food, Agriculture and Animal Husbandry, 2011)

By considering annual average number of trips per angler (**142**), total number of fishing trips was estimated as **1,088,998**.

Total attributed consumer surplus is **17,641,768 €**

License (certificate) fee of 7,669 anglers is **9,586 €**  
(Symbolic fee exists: 1.25 € per angler)

Market value of annual catch was estimated for **7,669 anglers** as **14,972,955 €**.

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#### **In conclusion:**

RF has not only social (leisure activity) but also economic value.

High demand for recreational fishing in the bay creates huge economy which should not be ignored by the management authority.

Any Management Plan for RF should take into account economic potential of the activity.

**This study should be a beginning point for economic valuation studies of RF in Turkey.**

