



Characterization of Fisheries Violations From the Türkiye's Mediterranean Coasts Within the Scope of Fisheries Law No. 1380

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A B S T R A C T

In this study, fisheries violations within the scope of the Turkish Fisheries Law No. 1380 were characterized for the Mediterranean Coasts of Türkiye. For this purpose, by taking into account the frequency and amount of the fines, the patterns of violations in terms of fishing gear, region, season, region-season and fishing gear-season by regions interactions were determined. Data were derived from the Turkish Coast Guard Command' fisheries surveillance activities during 2014 for areas between coordinates of (36°00'00" N-29°00'00" E) and (36°00'00" N-35°45'00" E). A total of 491 violations against the Fisheries Law No. 1380 were considered. It was determined that the most violations were made by angling (23.22%) and the least by drift nets (0.4%). According to penalties amounts for the 2014, a total of \$298,817 administrative fines were imposed. Trawl violations accounted for the highest total administrative fines (48.38%), while the lowest total administrative fines (0.17%) were for violations with drift nets. While the most violations were detected in Antalya region, the highest administrative fine was applied in Adana-Mersin region. According to seasons, there was a decrease in fisheries violations due to closed season measurement for fishing during summer. In terms of administrative fines, the season-region interaction was experienced the most in Adana-Mersin region during winter, and the least in Hatay-Adana region during summer. In season-region interaction, the most violations were observed in Antalya region in spring, while the least in summer in Hatay-Adana region. In interaction related to fishing gear-season by regions, it was determined that the highest number of violations and administrative fines occurred in winter during angling in Adana-Mersin region and in autumn during purse seine fishing in Hatay-Adana region. As a result, in short term, these findings could assist decision-making mechanisms for the effectiveness and efficiency of MCS (Monitoring, Control and Surveillance) system, which is an important part of fisheries management regime. In long term, these findings could also be used in a regional Decision Support System for fishery management with integrating with other elements of fisheries management regime.

INTRODUCTION

Fishing activities around the globe increase the welfare of humanity, meet the basic food needs of hundreds of millions of people, provide job opportunities, create recreation opportunities and provide foreign exchange resources. Considering today's increasing world population and the negative effects of global climate change, if MCS does not work effectively, besides the disappearance of the benefits it provides to society, it will cause more damage to the ecosystem with illegal fishing. (Flewweling, 2001; Boubekri et al., 2021). Extending usage of implementation of responsible fishing principles in all countries of the world will help for a sustainable fishing industry with all its components. In the context of responsible fishing principles, the MCS (monitoring, control and surveillance) is a term developed by the FAO MCS Conference of Experts in 1981 which is now widely accepted as a key principle in sustainable fisheries management and identified as the best hope in preventing, deterring and eliminating IUU (illegal, unregistered and unregulated) fishing (FAO, 2018).

All fishing activities, whether managed or not, take place within a general framework of social institutions. This institutional framework is called the fisheries management regime. Essentially, the fisheries management regime is a set of social guidelines and procedures that control fishing activities. All fisheries management regimes should logically include the following three key components; (i) Fisheries management system, (ii) the monitoring, control and surveillance system; and (iii) Fisheries jurisdiction (Fisheries Legislation). The fisheries management system (FMS) contains all the rules that the fishing activity must comply with. It specifies the regulatory framework for fishing activity such as fishing gear and area restrictions, fishing licenses, harvest quotas, etc. The primary task of the monitoring, control and surveillance (MCS) system is to monitor the activities of the fishing industry and ensure that the fisheries management system complies with its rules. Its secondary but still crucial task is to collect data on fisheries that can be used to improve fisheries management and judicial systems, as well as the monitoring, control and surveillance system itself. The

fisheries justice system processes allegations of violations of fisheries management rules and imposes sanctions on those deemed to have violated the rules. The fisheries jurisdiction thus complements the monitoring, control and surveillance activities in the implementation of fisheries management rules. To take full advantage of fisheries management, all three components of the fisheries management regime must be properly designed, fully functional and well-coordinated. These three components of fisheries management regimes are like links in the same chain. If any of these fails, there will be little benefit, no matter how well-designed and implemented the other components are (Arnason, 2009).

MCS systems have the greatest long-term potential in reducing illegal fisheries, with implementation objectives such as spatial, temporal, managerial and practical solutions (Miller et al., 2013). Flewweling (1994) defines the MCS as follows: Monitoring covers measurement and analysis of all fishing activity such as catch, species composition, fishing effort, by-catch, discards, area of operations, and related issues. This information is used as base data for fisheries managers to arrive at management decisions. In case of unavailable, inaccurate or incomplete of this information, will lead the managers to be handicapped in developing and implementing management measures. Specification of the terms and conditions under which resources can be harvested is termed as control activity. These specifications are normally contained in national fisheries legislation and other arrangements that might be nationally, sub-regionally, or regionally agreed. The legislation provides the basis for which fisheries management arrangements, via MCS, are implemented. To get maximum efficiency from control activity, the framework legislation should clearly state the management measures being implemented and define the requirements and prohibitions that will be enforced. Surveillance involves the regulation and supervision of fishing activity to ensure that national legislation and terms, conditions of access, and management measures are observed. Surveillance is critical for ensuring that resources are not subject to over-exploited, poaching is minimized and management arrangements are implemented (FAO, 2002).

Ünal et al. (2016) stated that to prevent illegal fishing activities on the Mediterranean coast of Antalya and to strengthen weak MCS components, fishermen must periodically submit catch data (catch composition, target catch, bycatch, fishing duration, etc.) to the Ministry of Agriculture and Forestry, associations related to “marine and coastal protected areas” and to the Coast Guard Command (Within the scope of MCS activities in Türkiye, the most active official institution in terms of especially surveillance in Türkiye). Workshops, seminars and symposiums should be organized with riparian countries to prevent illegal fishing. The gains to be obtained as a result of these meetings; Ensuring coordination between audit institutions is an indication that MCS components will have a dynamic structure (Tanrıverdi, 2021a).

It is well recognized that to reduce fishing violation, the control system should be strengthened and sanctions for violations should be increased (Falautano et al., 2017). However, performing the MCS component is a costly process in terms of both human resources and equipment. Optimizing this process in terms of resource use is required a good characterization of the MCS based on past audit activities. Studies on this subject in Türkiye, especially in the Mediterranean region, are limited in terms of both materials and methods (Ünal et al., 2016; Tolon, 2017; Karabacak, 2019; Tanrıverdi, 2021b).

In the present study, it has been tried to reveal the characterization of all violations made under the Fisheries Law No. 1380 along the Mediterranean coast of Türkiye, taking into account the frequency and penalty amounts according to the interaction of fishing gear, region, season, region-season and fishing gear-season by regions. With this study aimed to create a basis for the decision-making authorities (relevant

ministries, institutions and organizations) for the regulation and management of fisheries on a scientific base.

MATERIAL AND METHODS

Data were derived from the Turkish Coast Guard Command surveillance activities during the year 2014. A total of 491 violations against the Fisheries Law No. 1380 were considered. The violations examined were located between coordinates of (36°00'00" N - 29°00'00" E: Firnaz Bay-Kas, Antalya) and (36°00'00" N - 35°45'00" E: Yayladagi, Hatay). That geographic range has a coastline of 1577 km on the Mediterranean Sea (Öztürk & Başeren, 2008). In order to better evaluate the change along the coastline, the Mediterranean Sea coast of Türkiye was divided into three regions and called as following; from Kas to Gazipasa is “Antalya region”, from Anamur to the west of Karatas Cape is “Adana-Mersin region” and, from the east of Karatas Cape to Denizgören is “Adana-Hatay region” (Figure 1).

The analysis was aimed, by taking into account the frequency and amount of the fines, to extract the patterns of the violations for the fishing gear, region, season, region-season and region-fishing gear-season by region interactions. Although the fines were in Turkish Lira, they have been converted to US dollars at the 2014 exchange rate in order to compare with other studies. Microsoft Excel and Past 4.0.9 software were used for the calculations, statistical analyses (Chi-square goodness of fit test and Chi-square test of independence), and summarization (as tables and graphs). Chi-square tests were performed with 5 % significant level (McHugh, 2013; Connelly, 2019). In case of rejecting the null hypothesis of chi-square test,

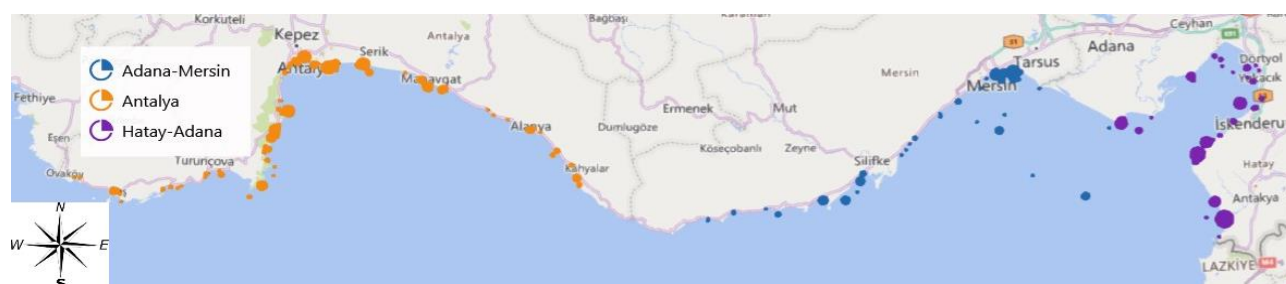


Figure 1. Study area. Circle points show logged penalties with their frequencies (The larger circle, the more penalty records)

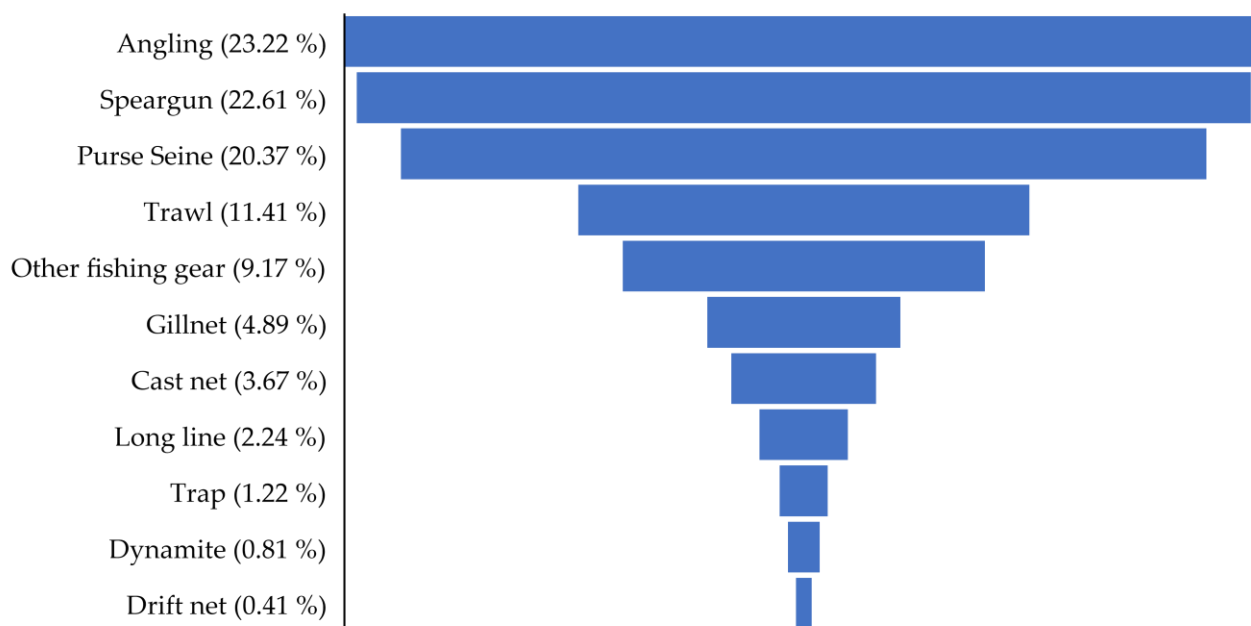


Figure 2. Distribution of fisheries violations in the Mediterranean by fishing gear

contingency coefficient (C) is used to measure the degree of relationship (dependency degree) between two categorical variables. (Munro, 2005). If C is near zero (or equal to zero) the variables are independent of each other; there is no association between them. The larger the table chi-squared coefficient is calculated from, the closer to 1.0 (or 100%) a perfect association will approach (Khan & Farooqi, 2022).

RESULTS

Taking into account the penalty frequency and penalty amounts, the characterizations were made according to the gear, region, season, region-season interaction and, gear-season by regions interaction.

Characterization of Fishing Gear

The most violations were fishing with angling (n=114, 23.22%), followed by speargun (n=111, 22.61%), purse seine (n=100, 20.37%), trawl (n=56, 11.41%), other fishing gear (n=45, 9.17%), gillnet (n=24, 4.89%), cast net (n=18, 3.67%), longline (n=11, 2.24%), trap (n=6, 1.22%), dynamite (n= 4, 0.81%) and drift net (n=2, 0.4%) (Figure 2).

Characterization of Season

According to Figure 3, it is seen that 146 (29.74%) violations were committed in winter months, 143

(29.12%) violations in autumn, 124 (25.25%) violations in spring and 78 (15.89%) violations in summer. It was determined that the difference in terms of the number of penalties according to the seasons was statistically significant (p<0.05).

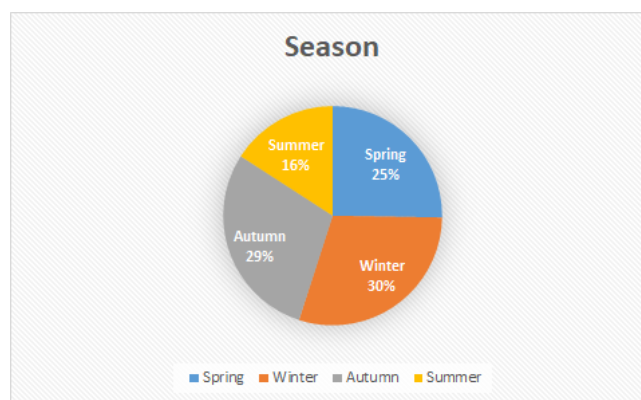


Figure 3. Distribution of seasons fisheries violations in the Mediterranean

Characterization of Region

There were 119 (24.23%) violations in the Adana-Mersin region, 231 (47.05%) in the Antalya region and 141 (28.72%) in the Hatay-Adana region. The total distribution of the fines according to the regions is given in Figure 4. It was determined that the difference in terms of the number of penalties according to the regions was statistically significant (p<0.05).

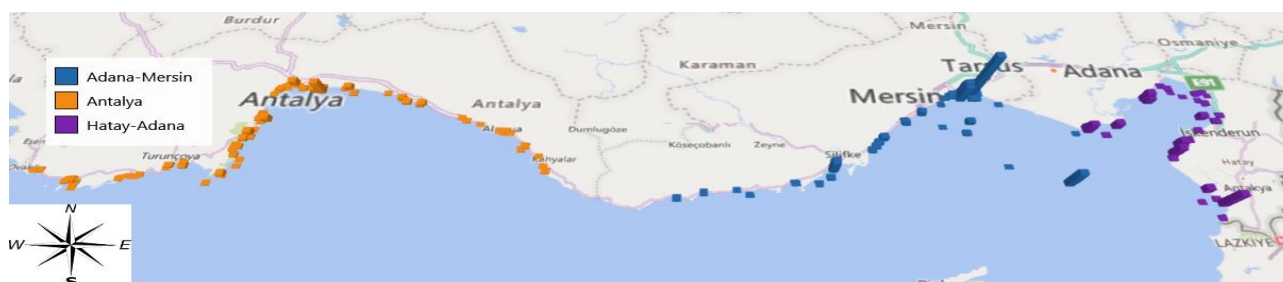


Figure 4. Distribution of penalties totals by region

When the data is examined, it was seen that the highest total penalty amount according to the regions, as a result of illegal fishing activities carried out in the MCS activities, was experienced in the Adana-Mersin region with 49.31%. This is followed by Hatay-Adana region (27.19%) and Antalya region (23.49%).

Characterization of Region-Season Interaction

Considering all regions, the total amount of penalties for violations on a seasonal basis was the highest with \$131,445 (43.99%) in winter, and the least with \$19,975 (6.68%) in summer. When the distribution of the total fines for violations, both regionally and seasonally was analyzed, the highest amount was from Adana-Mersin region in winter with \$89,077 (29.81%), and the least was from Hatay-Adana region in the summer season with \$3,030 (1.01%).

The highest number of violation cases occurred in the Antalya region with 231 cases (47.05%). This was followed by Hatay-Adana region with 141 cases (28.72%) and, Adana-Mersin regions with 119 cases (24.23%). Region-season interaction in terms of violation numbers was significant with 22.33% dependency (Contingency coefficient=0.2233,

$p=0.0002$). Considering the frequency distribution of violations on a seasonal basis, it was seen that 143 violation cases (29.12%) were reported in autumn and 146 (29.74%) of them were reported in winter. In terms of region-season interaction for violation cases, the highest was occurred with 64 cases (13.03%) from Antalya region in the spring season, and the least with 9 cases (1.83%) from Hatay-Adana region in the summer (Table 1).

Characterization of Gear-Seasonal Interaction by Regions

Adana-Mersin region

In the Adana-Mersin region, 119 fisheries violations, located at northern latitudes between 36.08°-36.80° and eastern longitudes between 32.99°-35.30°, were investigated. In the region, gear-region-seasonal interaction for fines amount produced (in total) the following outcomes; “other fishing gear” in spring was \$5,066 (43.67%), trawling in winter was 79 \$707 (89.48%), in autumn was \$32,222 (74.88%), and “other fishing gear” in summer was \$1,267 (34.76%) (Table 2).

Table 1. Violations by regions and seasons

| Season | Region | | | | | |
|--------------|--------------|--------------|------------|--------------|-------------|--------------|
| | Adana-Mersin | | Antalya | | Hatay-Adana | |
| | n | % | n | % | n | % |
| Spring | 23 | 4.68 | 64 | 13.03 | 37 | 7.54 |
| Winter | 46 | 9.37 | 54 | 11.00 | 46 | 9.37 |
| Autumn | 33 | 6.72 | 61 | 12.42 | 49 | 9.98 |
| Summer | 17 | 3.46 | 52 | 10.59 | 9 | 1.83 |
| Total | 119 | 24.24 | 231 | 47.05 | 141 | 28.72 |

Table 2. Penalties (\$) for fisheries violations in Adana-Mersin region according to seasons and fishing gear

| Fishing Gear | Season | | | | | | | |
|--------------|---------------|---------------|---------------|---------------|---------------|---------------|--------------|---------------|
| | Spring | | Winter | | Autumn | | Summer | |
| | Total | % | Total | % | Total | % | Total | % |
| Angling | 1,506 | 12.98 | 629 | 0.71 | 1,677 | 3.90 | 1,211 | 33.23 |
| Purse seine | 1,264 | 10.90 | 3,811 | 4.28 | 5,506 | 12.80 | | |
| Trap | | | | | | | 124 | 3.41 |
| Drift net | 124 | 1.07 | | | | | | |
| Cast net | | | 794 | 0.89 | 421 | 0.98 | | |
| Other | 5,066 | 43.67 | 1,905 | 2.14 | 2,538 | 5.90 | 1,267 | 34.76 |
| Speargun | 124 | 1.07 | 421 | 0.47 | 248 | 0.58 | 794 | 21.79 |
| Trawl | 3,392 | 29.24 | 79,707 | 89.48 | 32,222 | 74.88 | | |
| Gillnet | | | 967 | 1.09 | 421 | 0.98 | | |
| Longline | 124 | 1.07 | 843 | 0.95 | | | 248 | 6.82 |
| Total | 11,600 | 100.00 | 89,077 | 100.00 | 43,034 | 100.00 | 3,644 | 100.00 |

Table 3. Penalties of fisheries violations in Adana-Mersin region according to seasons and fishing gear

| Fishing Gear | Season | | | | | | | |
|--------------|-----------|---------------|-----------|---------------|-----------|---------------|-----------|---------------|
| | Spring | | Winter | | Autumn | | Summer | |
| | n | % | n | % | n | % | n | % |
| Angling | 8 | 34.78 | 3 | 6.52 | 8 | 24.24 | 7 | 41.18 |
| Purse seine | 3 | 13.04 | 3 | 6.52 | 4 | 12.12 | | |
| Trap | | | | | | | 1 | 5.88 |
| Drift net | 1 | 4.35 | | | | | | |
| Cast net | | | 4 | 8.70 | 1 | 3.03 | | |
| Other | 8 | 34.78 | 3 | 6.52 | 3 | 9.09 | 3 | 17.65 |
| Speargun | 1 | 4.35 | 1 | 2.17 | 2 | 6.06 | 4 | 23.53 |
| Trawl | 1 | 4.35 | 27 | 58.70 | 14 | 42.42 | | |
| Gillnet | | | 3 | 6.52 | 1 | 3.03 | | |
| Longline | 1 | 4.35 | 2 | 4.35 | | | 2 | 11.76 |
| Total | 23 | 100.00 | 46 | 100.00 | 33 | 100.00 | 17 | 100.00 |

Table 4. Penalties amounts (\$) for fisheries violations in Hatay-Adana region according to seasons and fishing gear.

| Fishing Gear | Season | | | | | | | |
|--------------|---------------|---------------|---------------|---------------|---------------|---------------|--------------|---------------|
| | Spring | | Winter | | Autumn | | Summer | |
| | Total | % | Total | % | Total | % | Total | % |
| Angling | 838 | 4.73 | 2,013 | 7.30 | 838 | 2.69 | | |
| Purse seine | 10,546 | 59.47 | 13,514 | 49.00 | 14,339 | 45.92 | 843 | 27.82 |
| Cast net | 421 | 2.38 | 843 | 3.06 | 124 | 0.40 | | |
| Other | 2,011 | 11.34 | 1,057 | 3.83 | 1,393 | 4.46 | | |
| Speargun | 967 | 5.45 | 2,107 | 7.64 | 1,810 | 5.80 | 497 | 16.40 |
| Trawl | | | 6,784 | 24.59 | 10,175 | 32.59 | | |
| Gillnet | 1,686 | 9.51 | 1,264 | 4.58 | | | 843 | 27.82 |
| Dynamite | | | | | 2,542 | 8.14 | 847 | 27.97 |
| Longline | 1,264 | 7.13 | | | | | | |
| Total | 17,734 | 100.00 | 27,582 | 100.00 | 31,222 | 100.00 | 3,030 | 100.00 |

The frequency of violations in the Adana-Mersin region according to fishing gear and seasons are as given in Table 3. The fishing gears with the highest number of violations in the region by the seasons were “angling” and “other fishing gear” with 8 cases (34.78%) in spring (for each of the two gear groups), trawling with 27 cases (58.70%) in winter, trawl with 14 (42.42%) cases in autumn and, angling with 7 (41.18%) cases in summer. In terms of violation numbers, region-season interaction was significant with 61.86% dependency (Contingency coefficient=0.6186, $p<0.05$) in the region. The number of the penalties in the region was identified mostly in winter (46 cases) in terms of season, in terms of fishing gear, 42 of them were trawls.

Hatay-Adana region

In the Hatay-Adana region, 141 fisheries violations, located between 35.95°-36.86° northern latitudes and 35.37°-36.21° east longitudes, were observed. The data of the penalty amounts and frequencies for the season and fishing gear were as given in Table 4 and Table 5, respectively.

In terms of the sum of the fines for violations in the Hatay-Adana region, purse seine fishing produced the highest amounts in all seasons as \$10,546 (59.47%) in spring, \$13,514 (49%) in winter, \$14,339 (45.92%) in autumn, and \$843 (27.82%) in summer. It was observed that the penalties for dynamite (27.97%) and gill net (27.82%) fishing gained importance in the region during the summer months. While the total amount of

fines in the region in terms of season was maximum in autumn with \$31,222 (39.24%), in terms of gear, fishing with purse seine produced the most with \$39,242 (49.32%) (Table 4).

In Hatay-Adana region, among 141 violations, the most occurred violations according to the season and fishing gear were purse seine in spring, in winter and, in autumn with 17 cases (45.95%), 23 cases (50.00%), and 26 cases (57.78%), speargun in summer with 4 cases (44.44%), respectively (Table 5). In terms of violation numbers, region-season interaction was significant with 57.85% dependency (Contingency coefficient=0.5785, $p<0.05$) in the region

Antalya region

In the Antalya region, 231 fisheries violations, located between 36.14°-36.88° northern latitudes and 29.37°-32.27° east longitudes, were investigated. The data of the penalty amounts and frequencies for the season and fishing gear were given in Table 6 and Table 7, respectively.

In Antalya region, the highest fine amounts were from trawling with \$10,175 (36.24%) in spring, from angling with \$3,478 (23.52%) in winter, from speargun with \$6,450 (45.93%) in autumn and \$5,558 (41.79%) in summer. While the highest total amount of fines in the region was \$28,077 (40%) in the spring in terms of season, the highest amount was from speargun with 20 \$194 (27.76%) in terms of fishing gear (Table 6).

Table 5. Penalties of fisheries violations in Hatay-Adana region according to seasons and fishing gear

| Fishing Gear | Season | | | | | | | |
|--------------|-----------|---------------|-----------|---------------|-----------|---------------|----------|---------------|
| | Spring | | Winter | | Autumn | | Summer | |
| | n | % | n | % | n | % | n | % |
| Angling | 4 | 10.81 | 9 | 19.57 | 4 | 8.89 | | |
| Purse seine | 17 | 45.95 | 23 | 50.00 | 26 | 57.78 | 2 | 22.22 |
| Cast net | 1 | 2.70 | 2 | 4.35 | 1 | 2.22 | | |
| Other | 5 | 13.51 | 2 | 4.35 | 3 | 6.67 | | |
| Speargun | 3 | 8.11 | 5 | 10.87 | 5 | 11.11 | 4 | 44.44 |
| Trawl | | | 3 | 6.52 | 3 | 6.67 | | |
| Gillnet | 4 | 10.81 | 2 | 4.35 | | | 2 | 22.22 |
| Dynamite | | | | | 3 | 6.67 | 1 | 11.11 |
| Longline | 3 | 8.11 | | | | | | |
| Total | 37 | 100.00 | 46 | 100.00 | 49 | 100.00 | 9 | 100.00 |

Table 6. Penalties (\$) for fisheries violations in Antalya region according to seasons and fishing gear.

| Fishing Gear | Season | | | | | | | |
|--------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| | Spring | | Winter | | Autumn | | Summer | |
| | Total | % | Total | % | Total | % | Total | % |
| Angling | 3 772 | 13.43 | 3 478 | 23.52 | 6 083 | 43.31 | 2 222 | 16.71 |
| Cast net | 1 264 | 4.50 | 1 340 | 9.06 | | | | |
| Drift net | 421 | 1.50 | | | | | | |
| Gillnet | 1 686 | 6.00 | 1 340 | 9.06 | 124 | 0.88 | 124 | 0.93 |
| Longline | 843 | 3.00 | 124 | 0.84 | | | | |
| Other | 2 103 | 7.49 | 2 232 | 15.09 | 419 | 2.98 | 1 057 | 7.95 |
| Purse seine | 2 950 | 10.51 | 2 950 | 19.95 | | | 3 372 | 25.35 |
| Speargun | 4 862 | 17.32 | 3 323 | 22.47 | 6 450 | 45.93 | 5 558 | 41.79 |
| Trap | | | | | 546 | 3.89 | 967 | 7.27 |
| Trawl | 10 175 | 36.24 | | | 421 | 3.00 | | |
| Total | 28 077 | 100.00 | 14 786 | 100.00 | 14 043 | 100.00 | 13 301 | 100.00 |

Table 7. Penalties of fisheries violations in Antalya region according to seasons and fishing gear

| Fishing Gear | Season | | | | | | | |
|--------------------|-----------|---------------|-----------|---------------|-----------|---------------|-----------|---------------|
| | Spring | | Winter | | Autumn | | Summer | |
| | n | % | n | % | n | % | n | % |
| Angling | 17 | 26.56 | 17 | 31.48 | 27 | 44.26 | 10 | 19.23 |
| Cast net | 3 | 4.69 | 6 | 11.11 | | | | |
| Drift net | 1 | 1.56 | | | | | | |
| Gillnet | 4 | 6.25 | 6 | 11.11 | 1 | 1.64 | 1 | 1.92 |
| Longline | 2 | 3.13 | 1 | 1.85 | | | | |
| Other | 7 | 10.94 | 7 | 12.96 | 2 | 3.28 | 2 | 3.85 |
| Purse seine | 7 | 10.94 | 7 | 12.96 | | | 8 | 15.38 |
| Speargun | 20 | 31.25 | 10 | 18.52 | 28 | 45.9 | 28 | 53.85 |
| Trap | | | | | 2 | 3.28 | 3 | 5.77 |
| Trawl | 3 | 4.69 | | | 1 | 1.64 | | |
| Total | 64 | 100.00 | 54 | 100,00 | 61 | 100.00 | 52 | 100.00 |

From a total of 231 violations in the Antalya region; In terms of season, speargun was the most prominent in spring with 20 cases (31.25%), in autumn with 28 cases (45.9%) and in summer with 28 cases (53.85%). Violations due to angling using with 17 cases (31.48%) in winter were the most. While the violation frequencies the region were mostly in the spring (64 cases) in terms of season, the most cases were from the speargun (86 cases) in terms of fishing gear. In terms of violation numbers, region-season interaction was significant with 50.05% dependency (Contingency coefficient=0.5005, $p < 0.05$) in the region.

DISCUSSION

Totally, 491 violations from the Turkish Mediterranean coast in 2014 were detected by the Coast Guard Command. Yağcılar (2009) examined the violations of the fisheries law along the site of Turkish Mediterranean coast. The number of violations researcher examined between 2004 and 2008 was 586 in total. It is noteworthy that the number of violations examined in our study that only covering one year of period was 491.

The size and equipment of the patrol ships used in inspection activities, the size of the working area and the number of inspection personnel have also important in MCS (Fujii et. al., 2021). There are seven Coast Guard Command stations in the Antalya region, three in the Adana-Mersin region and 4 in the Hatay-Adana region. When the regions are compared, in terms of the frequency of violations; Antalya>Hatay-Adana>Adana-Mersin pattern was observed. In this sense, it could be said that the number of stations belonging to the coast guard command is compatible with the frequency of violations. Because logically, as the number of stations increases, the chances of detecting violations are expected to increase. In addition, when the coordinates of the fisheries violations were examined, it was an average of 21.87 nautical miles to the nearest Coast Guard Command stations. In our study, as a result of the examination of fishing violations in the Antalya region, it was observed that there was a decrease in violation cases as you move away from the central station of the Coast Guard. Öztürk (2009) emphasized that the control in international waters in the Mediterranean remained weak and stated that biodiversity should be protected except for marine or coastal protected areas.

It was determined that the frequency of violation pattern according to the fishing gears made throughout the entire study area was angling>speargun>purse seine>trawl, and seasonally, the pattern was winter>autumn>spring>summer. Considering that the fishery structure in the region is small-scale fisheries and angling is used more widely in this type of recreational fishing, it was seen that the findings of the study were compatible. Moreover, it was seen that the seasonal pattern showed an expected structure, considering that there is more fishing gear in the sea and inspection activities are carried out more frequently during the open season.

In terms of administrative fines, the order of fine amount according to the regions (from the most to the least) were "Adana-Mersin", "Hatay-Adana" and "Antalya" regions. In studied area, 48.38% of the administrative fines due to violations against the law were accounted for trawls, 19.78% for purse seine, and 8.12% for angling. When the penalty amount patterns of the regions and fishing gears were considered

together, this situation could be seen as a function of the intense use of the relevant fishing gears in the regions. It was seen that the pattern of administrative fine amount according to the seasons (winter>autumn>spring>summer) was also compatible with the fishing season. The reason for the decrease in administrative fines in summer season is the ban on trawl and purse seine.

In terms of administrative fines amount in Antalya region, the pattern of fishing gear was; speargun>angling>trawl>purse seine, and the pattern of seasons was; spring>winter>autumn>summer. In terms of violation frequency, the pattern of fishing gear was; speargun>angling>purse seine, and the pattern of season was; spring>autumn>winter>summer. Considering these patterns, speargun and angling stand out as fishing gear in the first two rows, and spring and winter as the seasons. Despite the high number of violations in the Antalya region, it is noteworthy that it ranks third in terms of administrative fines. While fisheries violations with angling and speargun are observed in all four seasons in the region, it is striking that fisheries violations with trawlers occur frequently in the spring. The high total administrative fine in the spring is probably due to trawler fishing gear.

In Adana-Mersin region, in terms of administrative fines amount, the pattern of fishing gear was; trawl>purse seine, and the pattern of seasons was; winter>autumn>spring>summer. In terms of violation frequency, the pattern of fishing gear was; trawl>angling, and the pattern of season was; winter>autumn>spring>summer. Although it ranks third in the Adana-Mersin region in terms of the number of violations, it ranks first in terms of administrative fines, especially due to trawl. Considering these patterns, trawl and purse seine stand out as fishing gear in the first two rows, and winter and autumn as the seasons. It was observed that fisheries violations made with angling in the region decrease in winter months and increase in other seasons compared to winter months.

In Hatay-Adana region, in terms of administrative fines amount, the pattern of fishing gear was; purse seine>trawl, and the pattern of season was; autumn>winter>spring>summer in Hatay-Adana

region. In terms of violation frequency, the pattern of fishing gear was; purse seine>angling=spargun, and the pattern of season was; autumn>winter>spring>summer. According to the patterns mentioned, purse seine as a fishing gear in the region, winter and spring as the seasons come to the fore. In addition, violations of fishery products with purse seine and spargun were observed in the region in all four seasons. In addition, it was observed that violations with purse seine fishery was mostly experienced in autumn with the start of the fishing season, and then decreased towards spring. Fisheries violations made by trawling in the region are similar to the times of purse seine violations in the region and there are no trawl violations in the spring. Dynamite is not a fishing gear. This forbidden method, which takes place in the Hatay-Adana region, is difficult to detect by law enforcement since it is carried out from the coast. Additional measures are needed in the region regarding dynamite, which is easily made with substances such as dry ice and agricultural fertilizers. Arslantaş (2017) determined that 52% of the fishing activities in the Hatay-Adana region are illegal. He also pointed out that when the sample carrying out illegal fishing activities with angling was examined, illegal fishing activities increased as the income level decreased.

Yağcılar (2009) stated that trawl violations increase significantly with the opening of the fishing season in autumn, and decreases occur in the spring. A similar situation was seen in the current study, which was similar to Adana-Mersin and Hatay-Adana regions, but was not compatible with Antalya region. Karabacak (2019) studied trawler and purse-seine violations between years 2014-2018 in Turkish seas. Researcher found that the most trawling violations were experienced in Mersin. This result was similar to current study. Also, researcher calculated the administrative fine per violation was two times higher for trawl violations than purse purse-seine violations. However, in this study, administrative fine per violation ratio was calculated as 3.53. Öztürk (2015) stated that illegal fishing activities in the Mediterranean are mostly made with trawl, purse seine, and towed fishing gear.

CONCLUSION

The activities that were detected and penalized during the surveillance activities carried out by the Coast Guard Command on the coastline of the Mediterranean coast of Türkiye in 2014 were considered. Considering the population density on the Mediterranean coastline, as well as industrialization and global warming, fishing pressure has increased in fishing areas. This fishing pressure has caused an increase in IUU activities day by day. In these circumstances, the importance of ecosystem-based sustainable fisheries management has increased in the 21st century. Therefore, the findings obtained as a result of the research could assist decision-making mechanisms for the effectiveness and efficiency of the MCS system, which is an important part of the fisheries management regime in the short term. In the long term, these outputs may also be used in a regional fishery management Decision Support System, integrating with other elements of the fisheries management regime (VMS, BAGIS, AIS, SUBIS). However, most importantly, the government should develop and finance policies that will increase the efficiency of this system, which requires investment and is therefore expensive, like MCS.

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Compliance with Ethical Standards

Authors' Contributions

HBK: Drafting, Performed and managed statistical analyses.

MFC: Manuscript design, Performed and managed statistical analyses.

Both authors read and approved the final manuscript.

Conflict of Interest

The authors declare that there is no conflict of interest.

Ethical Approval

For this type of study, formal consent is not required.

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