

# Building a future for sustainable small-scale fisheries in the Mediterranean and the Black Sea

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## An important small-scale fishery targeting rapa whelk along the Southern Black Sea Coast (Samsun province, Turkey); The social, economic and ecological effects

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# Background

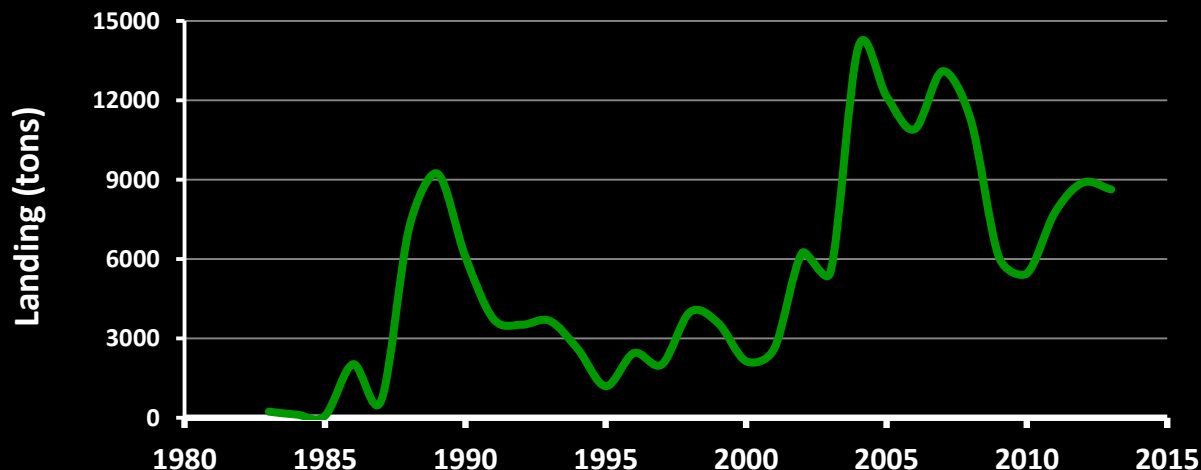
The Rapa whelk (*Rapana venosa*) is an invasive species that was first recorded in the Black Sea during the 1940s (<http://www.issg.org/database>). They are top predators with a ferocious, and bivalve diversity in the Black Sea declined two-fold since their introduction.



Sea snail is associated with a decline in range and density of native mussel settlements, near both the Anatolian, Caucasus coasts and Western-Danube Shelf Region on the Black Sea, originally biologically rich areas. Thus, the sea snail has caused important changes in the interaction between fishing and habitat in the coastal waters of the southeastern Black Sea. While being an introduced species that has attained an important role in the demersal ecosystem of the Black Sea, rapa whelk has also become one of the most important commercial species trade ([Black Sea TDA, 2008](#)).

# Fishing capacity and landing

Rapa whelk landing has fluctuations since first starting time in Turkey. Its landings in the Southern Black Sea was 10000 t in 1989, changed around 3000 t in average (1000- 6000 t) between 1990 and 2000 according to national fishery statistics. In the following decade landing of rapa whelk increased and reached its maximum as 14000 t in 2004. This trend continued more or less stable (11000-14000 t) until 2009. A sudden decrease was recorded in landing as 6199 t in 2014. The increase in 2000-2014 may be explained with the tending of fishermen on rapa whelk fishery for better economic advantages because of the depletion in the major demersal stocks throughout the area.





Rapana fisheries is highly important as a social-economic driver for coastal fishermen and their families since 1980 in Black Sea Region.

40% of rapa whelk fishermen are from Samsun province which is the most productive and the largest continental shelf in the Turkish Black Sea coasts flooded by the riverine outputs of Kızılırmak and Yeşilirmak (Zengin et al, 2014a).





# Fisheries

Rapa whelk has been fished mostly by beam trawls (local name is algarna) (82%) and by diving (%18). Beam trawl most likely damages benthic habitats. From the early 1980s, sea snail fishery started to gain economic importance and has expanded considerably in Samsun since 2000 (Knudsen et al, 2010).

There are 169 fishing vessels in SSA (Samsun Shelf Area), 182 in western Black Sea and 105 in eastern Black Sea currently operating with or without a license. There is significant difference in the number of day-at-sea between SSA and the two other regions. The reason may be the more available bottom type of SSA for rapa fishery and the higher catch per unit effort (CPUE). (Kkaykaçet al, 2014).





The number of active fishing day per year is 115 in SSA and averagely 45 days per year for eastern and western Black Sea in Turkey. The fishing time is daily (Zengin et al, 2014a).

Compared to many other kinds of fishing, this fishery does not require much skill or investment in technology. The threshold for entering this sector is therefore relatively low (Knudsen et al, 2010).

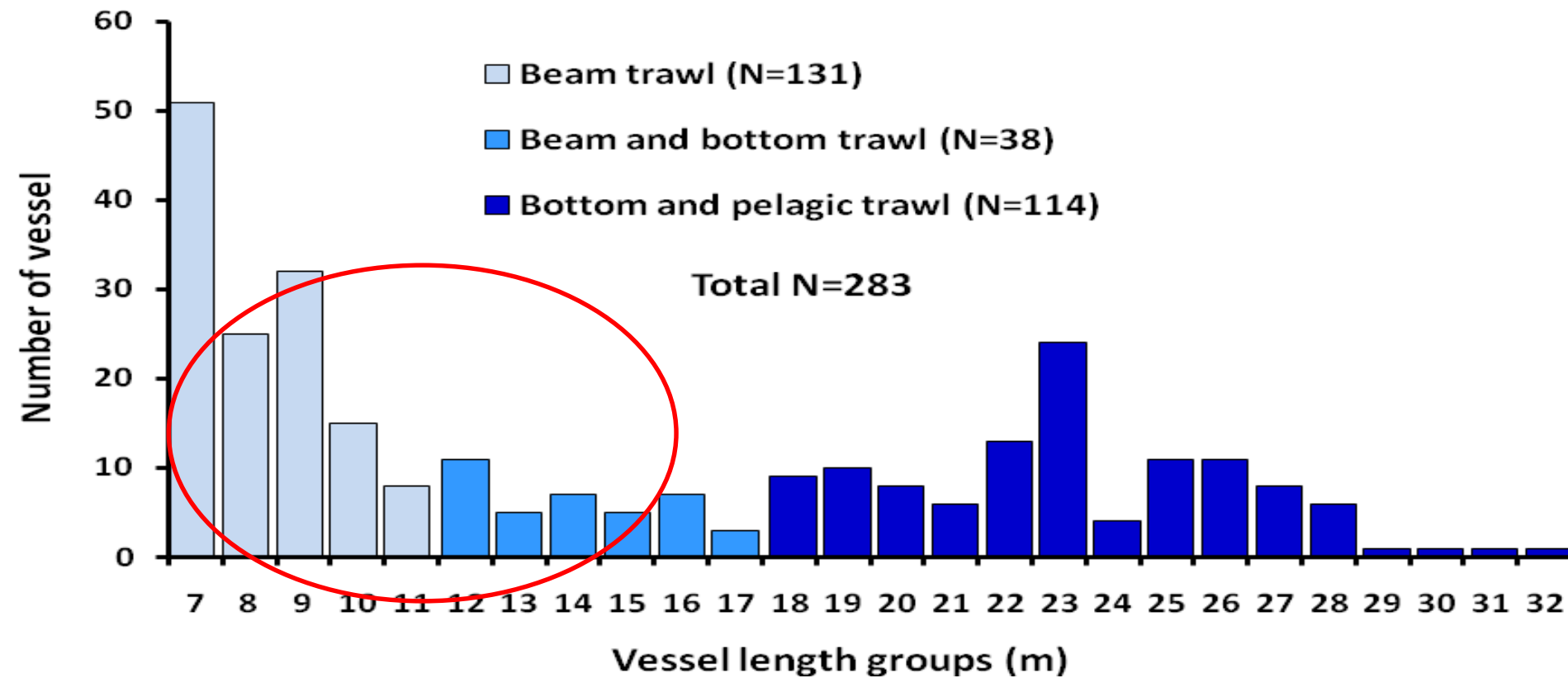


The closed season for beam trawl is between 1 May and 30 August since 2000...



There is usually need for two or three men on the boat when operating for sea snails. Boats generally sails with low speed and parallel to the coast in relatively shallow waters (Kaykaç et al, 2014).

Boats of less than 7-8 m in length are landed routinely on beaches of small villages along the delta seaside. Boats of up to approximately 16 m can find shelter in the river mouths of two major rivers, where there are higher numbers of small trawlers (typically 12-16 m). Almost the total of fish caught by trawlers in this region are landed at the fishing ports of Samsun.



The size-frequency distribution of trawl fishing fleet in SSA for 2012/13 fishing season (Zengin et al, 2014a).

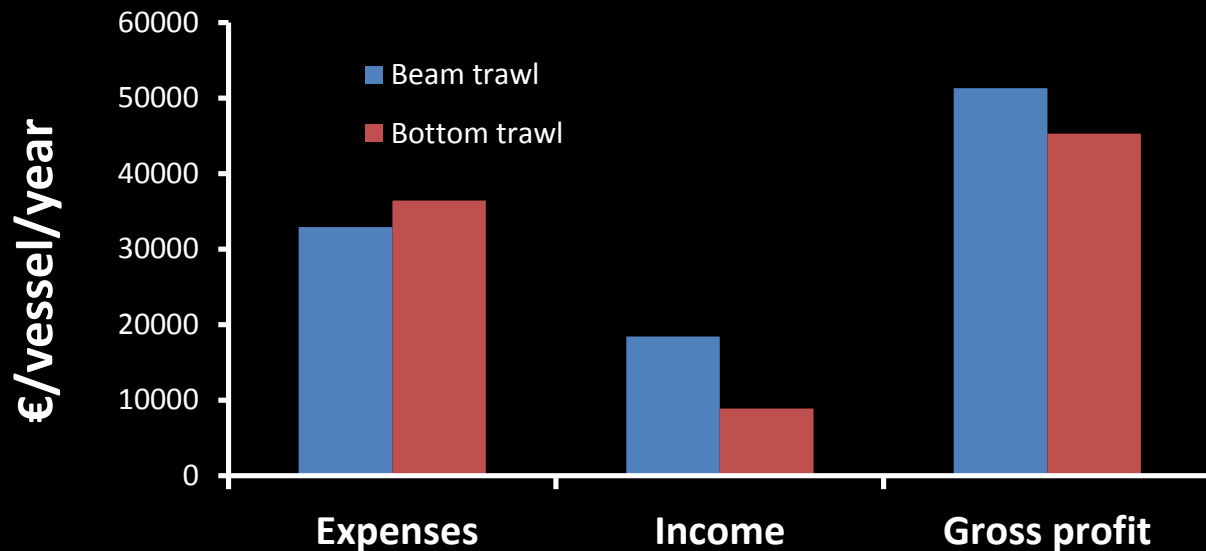


# Marketing and economical important

As the fish resources decline, rapa fisheries is getting much more importance due to its economic value. After the decline in turbot fisheries in the Turkish Black Sea coast, artisanal fishermen have preferred to harvest rapa whelk as a source of new income since 2000s (Knudsen et al, 2010). Average export revenue in 2014 is about €4 million. According to the Turkish statistical data, revenues per vessel are still important for the rapa whelk fishermen even though there is regular decrease since 2004.

The sea snail season usually brings higher than average income. Sea snail fishing has actually become so attractive in Samsun during the last ten years that there has been substantial investment in this sector and increased catch capacity.

According to the preliminary data, the cost-benefit analysis of the fishing vessels were compared for two common fishing method in the same region; bottom and beam trawl in 2014. It is determined that the beam trawl fisheries are more advantageous than bottom trawl because of the depleting demersal fish stocks in the last two decades. According to some estimations; the expense, income and gross profit for beam trawl is calculated as 32899.9, 18408.9 and 51308.8 €/vessel/year, and for bottom trawl as 36428.8, 8879 and 45307.7 €/vessel/year respectively (Zengin et al, 2014a).





- This fishery product is not consumed in Turkey, but instead, is exported to Asian markets. Demand for its meat on the international market has enhanced its commercial fisheries in Turkey.
- Today, there are 6 factories in the Black Sea Region processing sea snail. The catch is sold by middlemen at an auction organized by the municipality.







The rapa landing is directly transported from boat to processing plants by means of middlemen in the local fishing harbour. Market price is controlled by factory owners.



## Social effects on the coastal communities



Almost all fishing boats -larges as well as smalls- activating around Samsun, are owned and operated by families resident in the province. Family economy and the economy of the fishing business are often inseparable. When catches are poor fishing can be subsidized by other activities or by reducing household expenses.



It is fairly common among owners of small boats (up to 10 m) to combine work on one's own boat, typically during sea snail and bonito seasons, with work as crew on trawlers or purse seiners during winter.



According to the fishers interviewed; 10.4% are working both on their own boat and also as a crew during the previous fishing season. 28.6% of the fishers had extra income from activities other than fishing, especially of farming (17.2%), but some were also seasonal workers (5.2%) or civil servants/tradesmen (3.8%) (Knudsen and Zengin, 2006).

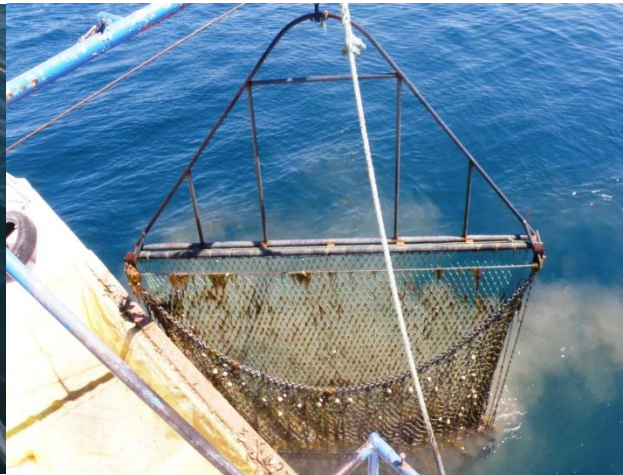


For unskilled young men it is not uncommon to combine or switch between fishing and construction work which are both hard, migratory, and poorly paid seasonal works.

Poverty thus seems a major problem in the Turkish small-scale fishery economy and society with a very skewed income distribution.

In Samsun the situation has been particularly difficult; industry has moved out of the province resulting in many unemployed people migrating to western Turkey or exploring other new opportunities. Locally, fishing is one of very few options (Knudsen and Koçak, 2011).





Despite difficult work conditions and low income people are not only willing but even eager to participate in sea snail fishing. Lack of alternative income opportunities and social security drives people to engage in this fishery, and thereby contribute to increased pressure on the stock and ecosystem.

Poverty, lack of social welfare systems and skewed income distribution are drivers that result in higher fishing pressure.



## Some fisheries indicators



- Engine power is lower HP higher than trawl fisheries
- Fishing are is locally and regionally
- Single species
- Higher fuel use than artisanal/gill-net fisheries
- Adverse ecological impact (benthic ecology)
- Low number of crew
- Capital intensity is low/medium
- Ownership regime is individual/family
- Labor intensity is medium/high
- Control is difficult
- Human food, long distance from market
- Profitability on export income

# Social and economic characteristics

- Based on family labor force
- Fishermen from suburb and rural area
- Fishing fleet is individually
- Labor is high
- An informal organization structure
- Transition is very easily by fishermen from small vessel to big one in a short period
- Alternatives are inadequately in terms of struggle of poverty
- Institutionalization is weakly (including fisheries)
- Fishing is simply prefer and practicable a work

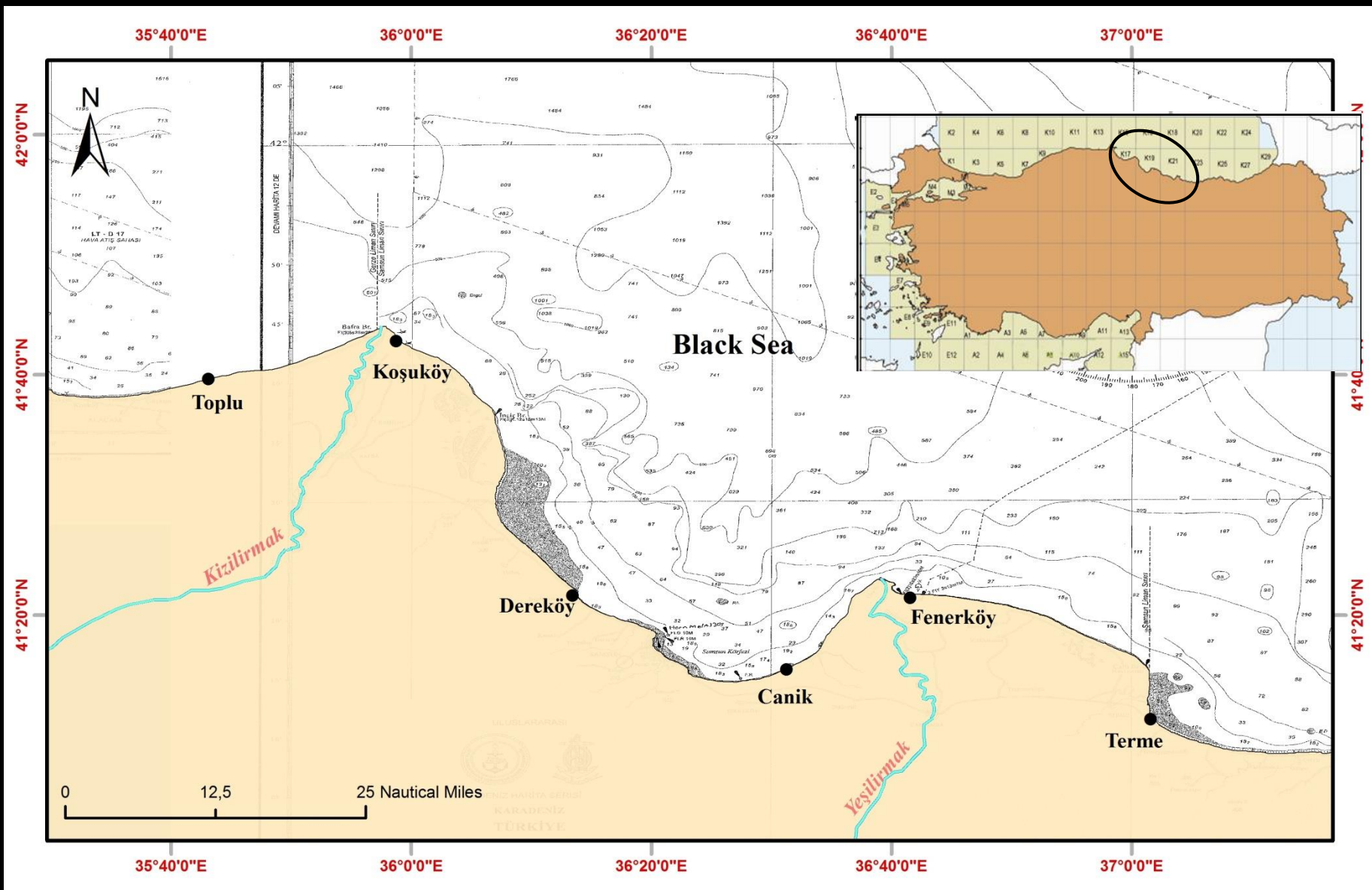




# Ecological effects on the coastal habitat

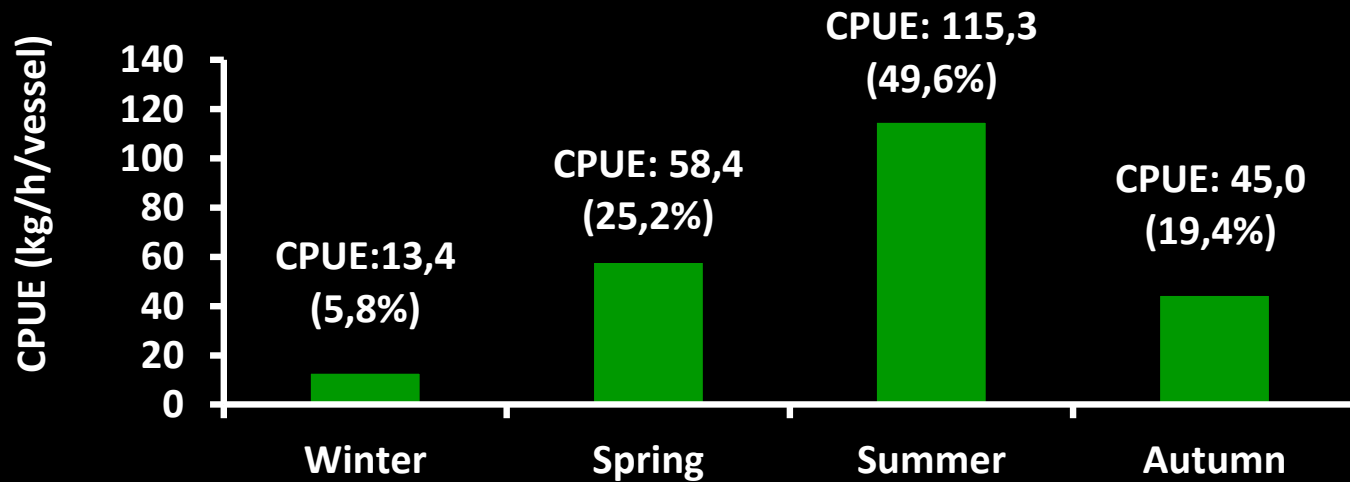
There are some problems in management of ongoing rapa whelk fishery along SSA between depths of 5 and 30 m and becoming intense in summer months. The fishermen always tend to break the fishing rules in terms of area, timing and the type of gear or its application. Though it is illegal, the most of the boats use two beam trawls simultaneously and often operate at night (also illegal). Formal state regulations to a large extent are surrounded with regards to the sea snail fishery of the Black Sea ([Zengin, 2006](#)).





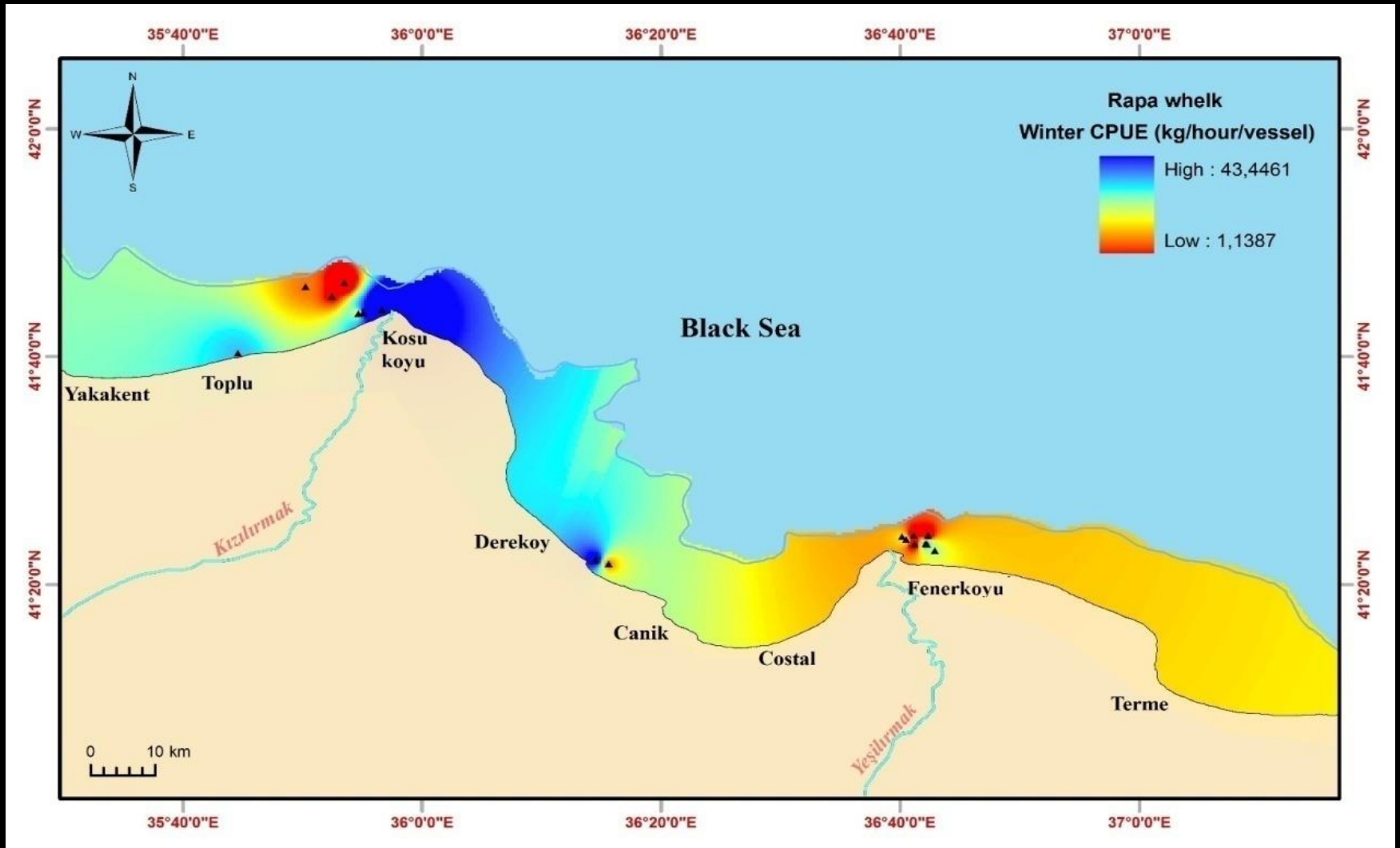


- The CPUE seems to be higher in summer (115.3 kg/h/vessel) when compared to fall (45 kg/h/vessel), winter (13.4 kg/h/vessel) and spring (25.2 kg/h/vessel) seasons. The summer period is also the banned season (May 1- August 30) for beam trawl fishery targeting rapa whelk.
- The fishing mortality caused by intense algarna fishery is relatively high in summer months. This fishing effort has a significant effect on juvenile fish populations which use the nearshore benthic as nursery areas.



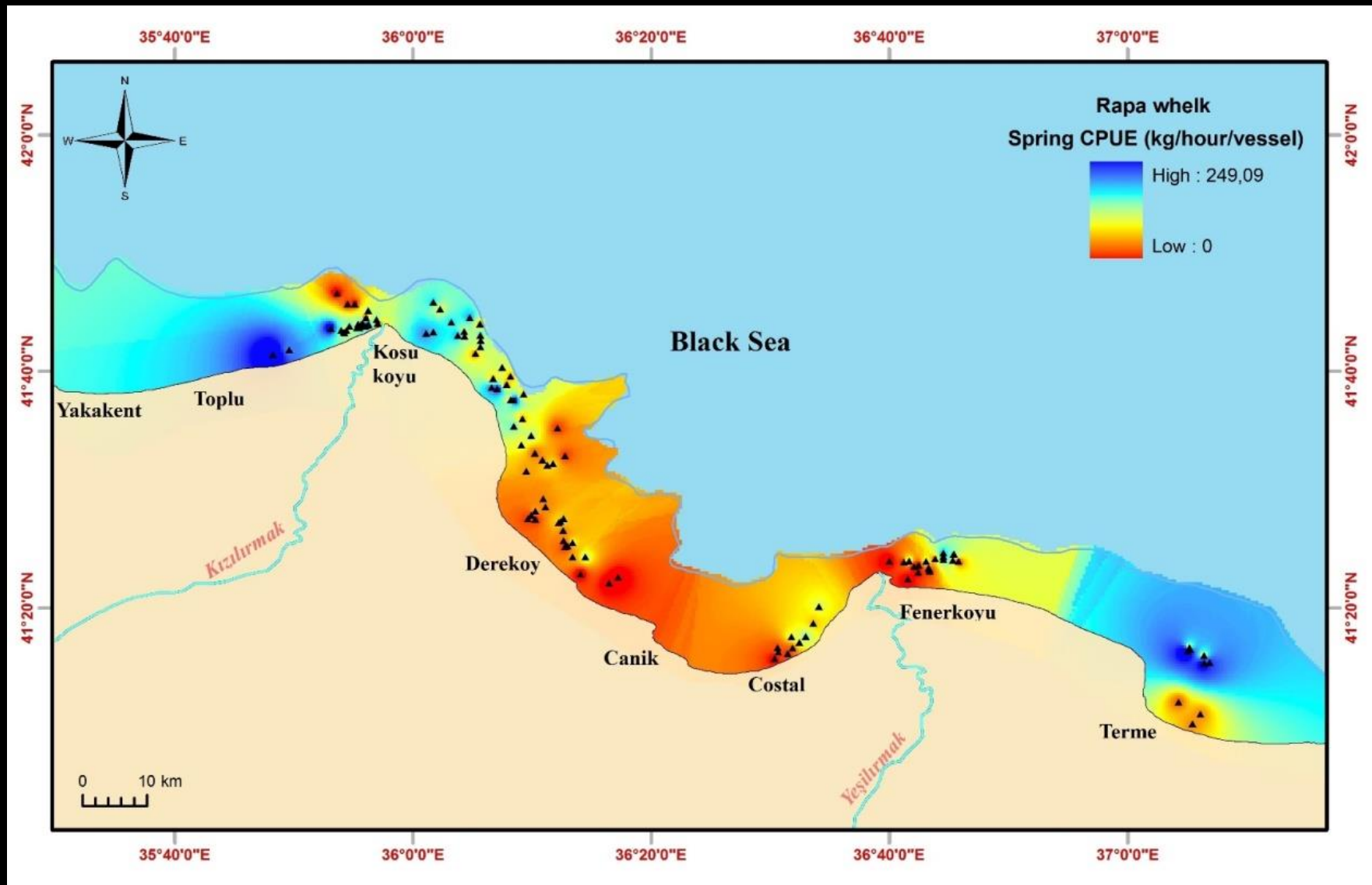
The seasonal variation of CPUE values of rapa whelk fishery in SSA, in 2013

# Winter period CPUE mapping in SSA

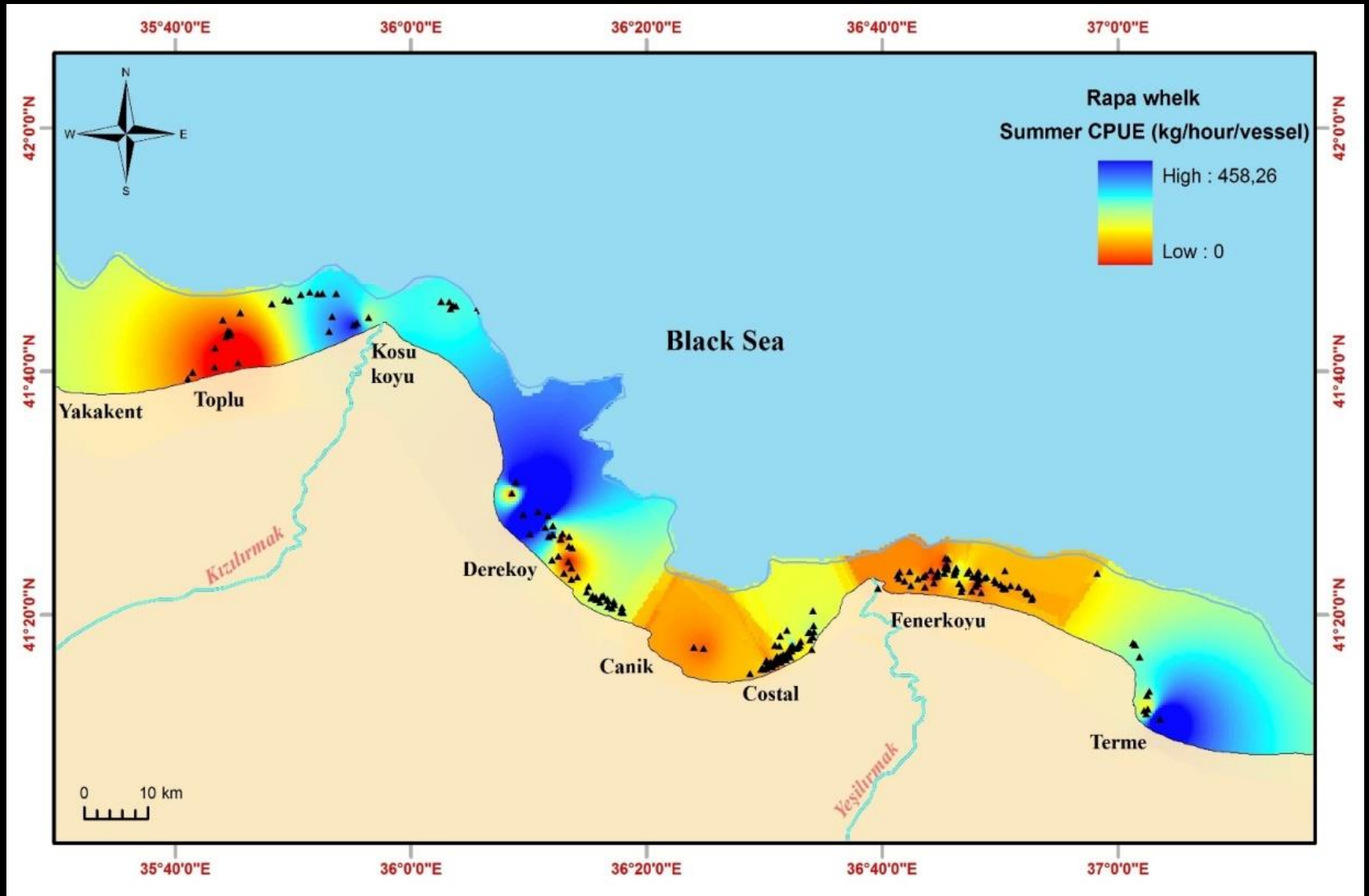




## Spring period CPUE mapping in SSA

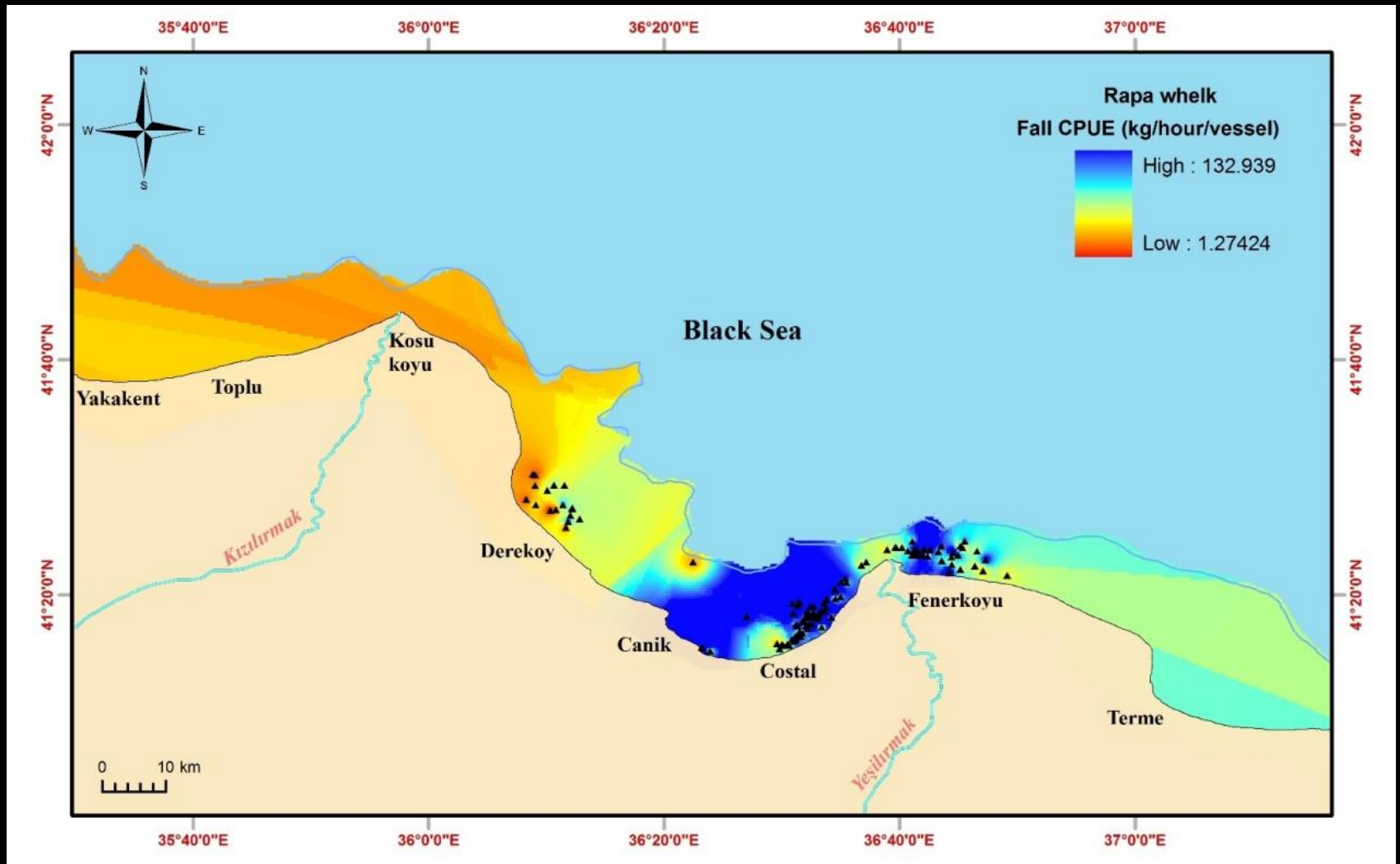


## Summer period CPUE mapping in SSA





## Autumn period CPUE mapping in SSA



- The total catch of algarna fishery is composed of target species; rapa whelk (70.3%) and other by catch species (29.7%) in summer period.



- In this period totally 33 species identified belonging to four different taxonomic group. Their abundance is estimated as 25.7% Mollusk, 3.5% Crustaceans, 0.2% fishes (mostly juveniles) and 0.3% Tunicates. The species number in these groups is as 9, 7, 16 and 1, respectively. The data about species diversity and abundance is an important matter in terms of a rational fishery management (Zengin et al, 2014b).



The bycatch species from different taxa caught in beam trawl fishery in SSA.



*Bothryllus schlosseri*, a colonial tunicate on inside of an empty *Anadara cornea* shell. The species firstly identified in this area by this study.



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# Sustainability

- The sea snail is determined as the most dominant species having a large biomass in this nearshore coastal habitat causing a high fishing pressure with beam trawls resulting in significant physical disturbance on sea bottom.
- The maximum landing of sea snail was obtained in summer months. Actually, fishing with beam trawls is banned in this period in order to protect the nearshore benthic and demersal makrofauna (Knudsen and Koçak, 2011).



- This is one of the main contradictions in the fishery of this region.



- Rapa whelk stocks should be monitored continuously for the sustainable use of the Black sea ecosystem and stock assessments should be done regularly by the swept area and other virtual methods.
- According to the multicriteria analysis, the protection of natural habitats was found to be the best management alternative and the second best was the enforcement of beam trawl modification to reduce bycatch rate especially in summer time (Zengin et al, 2014b).
- If the responsible authorities wish to achieve good environmental and socio-economic results in rapa whelk fisheries then investments are needed for improved management including funding for research, for strict control and inspection, and subsidizing non-native species control and habitat friendly methods of harvest.





"BENİM NAÇİZ VÜCUDUM  
ELBET BİR GÜN TOPRAK  
OLACAKTIR ; FAKAT TÜRKİYE  
CUMHURİYETİ İLELEBET  
PAYIDAR KALACAKTIR."

MUSTAFA KEMAL  
ATATÜRK

Forewer with my son Engin Can