

Enforcement of the European Union legislation about illegal fishing practices in the eastern Aegean Sea and its impact on *Posidonia oceanica* meadows

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KEYWORDS

Posidonia oceanica, EU legislation, fisheries, Aegean Sea, artisanal fishing communities

1. Introduction

Posidonia oceanica is a flowering seagrass species, endemic to the Mediterranean Sea. It grows in depths of up to 50m, usually within 1.5 nautical miles from the coastline, where light intensity is high (M&MS, 2004; Mann, 2000). These seagrass meadows are responsible for the development of multiple commercial fish stocks, such as *Serranus* spp., *Diplodus* spp. and *Spicara* spp., which are very important for the livelihoods of Hellenic artisanal fishing communities (UNEP-WCMC, 2006; Batjakas and Economakis, 1999). *P. oceanica* meadows are very common in the Hellenic seas, however, despite their importance as a productive and protected marine habitat, they have never been thoroughly mapped and so the exact extent of their location is unknown (Panayotidis & Drakopoulou, 2010).

The *P. oceanica* beds in the eastern Aegean Sea are highly threatened by illegal and destructive fishing practices; towed fishing gear and dynamite fishing uproots plants and destroys marine vegetation (Greenpeace Greece, 2008). *P. oceanica* is characterised by a slow growth rate, therefore recovery can take several decades, and confounding anthropogenic impacts or invasive species growth may inhibit the regrowth (Mann, 2000).

The European Union directly protects *P. oceanica* by naming it as a priority habitat under the Habitats Directive, and many known seagrass locations are also named as *Natura 2000* sites. In addition, fishing with towed gear (such as trawling) is prohibited within 1.5 nautical miles of the coastline, or in areas shallower than 50m depth.

In Greece, the status of fish stocks, which is directly related to the status of the seagrass beds, has changed radically since the entrance of the country in the EU. The annual commercial fisheries capture was increasing rapidly from 1981 until it reached a peak of 181125 tonnes in 1994 and has been declining since. In 2009, it fell at less than half the level of 1994, at 83334 tonnes (FAO, 2009).

2. Objectives and methodology

The research took place in the eastern Aegean Sea, Greece, with a focus on the islands of Samos and Fourni (Fig. 1). It was conducted for a Master of Science thesis (University of Edinburgh) (Vlachopoulou, 2011) and as part of the Fourni FPA project of Archipelagos, Institute of Marine Conservation. The study aimed at:

- a) examining the extent of Illegal, Unreported and Unregulated (IUU) fisheries as they are defined by the EU legislation, the level of enforcement of the EU and Greek legislation on the subject and their impact on the seagrass beds of the study areas;
- b) determining the perceptions of the local stakeholders about the issue;

- c) contributing to the knowledge about the ecosystems under examination and determining a possible route of action in order to tackle the issue of IUU in the Greek Seas and beyond.

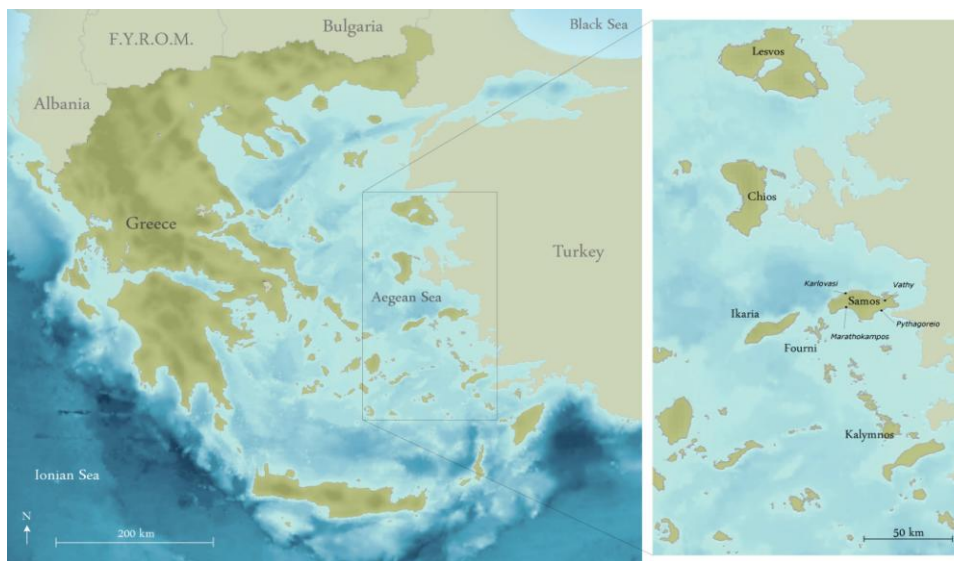


Figure 1: Study area map. Source: Ilpo Tammi/Archipelagos, 2011.

An extensive literature review of European and Greek legislation concerning fisheries and *P. oceanica* protection was conducted. This was combined with 24 semi-structured, open-ended interviews, with a range of stakeholders in the area under examination (Yin, 1994; Corbetta, 2003). The stakeholders were divided into four categories: fishermen, fishermen's families, local authorities responsible for fisheries control, and fisheries experts.

Furthermore, a Public Participation Geographical Information Systems (GIS) project was conducted in collaboration with the Archipelagos GIS team, in which informants were asked to draw the location of seagrass beds, trawling routes, fish stocks and other information on to maps of the area under examination. The project aimed at gaining access to the local knowledge of the ecosystems and the fishing activity.

In addition, the researcher participated in the daily fisheries catches surveys that Archipelagos has been conducting for the past 3 years. The results of the surveys were used in combination with the outcomes of the Public Participation GIS project and the interviews in order to determine the current condition of the local fish stocks.

Lastly, archival research on infringements of fisheries legislation was also conducted, at the Archipelagos archives and during the interviews with the local fisheries authorities.

3. Results and discussion

3.1 Differences between the European and Greek legislation

The most important differences between Greek and EU legislation are the minimum landing sizes of various commercial species and the rules governing the use of towed gear. In the table below (Tab. 1) are shown the differences in minimum tradable sizes. Some of these species, such as the *Diplodus* spp., are associated with the seagrass beds, which they use as nursery and/or feeding ground and shelter from predators (Waycott et al., 2009; Mann, 2000; Batjakas and Economakis, 1999).

SCIENTIFIC NAME	MINIMUM SIZE – GREEK LEGISLATION		MINIMUM SIZE – EU LEGISLATION	
1. FISH				
<i>Dicentrarchus labrax</i>	23		25	
<i>Diplodus sargus</i>	15		23	
<i>Pagellus erythrinus</i>	12		15	
<i>Scomber japonicus</i>	12		18	
<i>Trachurus</i> spp.	12		15	
2. CRUSTACEANS	TOTAL LENGTH	CARAPACE LENGTH	TOTAL LENGTH	CARAPACE LENGTH
<i>Hommarus gammarus</i>	24	8.5	30	10.5

Table 1: Comparison of minimum tradable sizes according to the EU and Greek legislation. Source: HCMR, 2007.

In 2011, in order for Greece to conform to European laws about trawling, a total exclusion zone of 1.5 nm from the coastline was introduced. The original decree (Decree number 9131.4/1/2011/11-FEK 776 B/6-5-2011) exempted approximately 45% of the Greek shoreline, which allowed for trawling up to 1 nm from the coast (Fig. 2). However, after national and EU intervention, a 1.5 nm total exclusion zone has now been established.

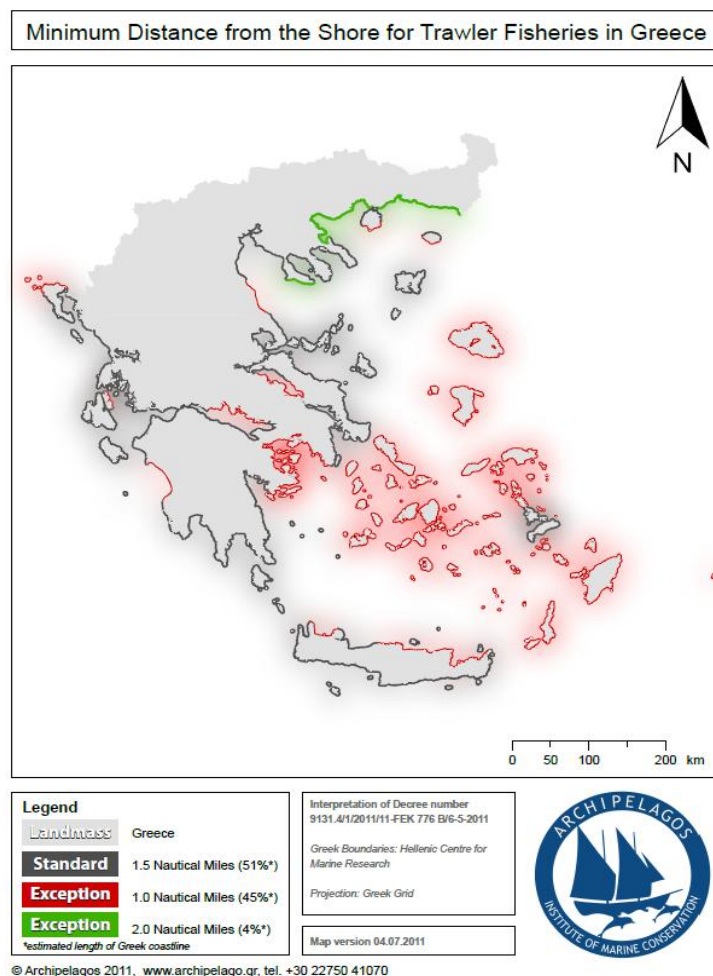


Figure 2: Areas exempted from the trawler ban at 1.5nm from the coast according to the Decree number 9131.4/1/2011/11-FEK 776 B/6-5-2011. Source: Archipelagos, 2011.

3.2 Condition of fish stocks in the study area

The Public Participation GIS project resulted in the production of two maps of the area under examination, in which the seagrass beds and fish stocks, along with major trawler routes according to the locals, are shown. The first depicts the area of Fourni Island (Fig. 3), while the second the area of Samos Island (Fig. 4).

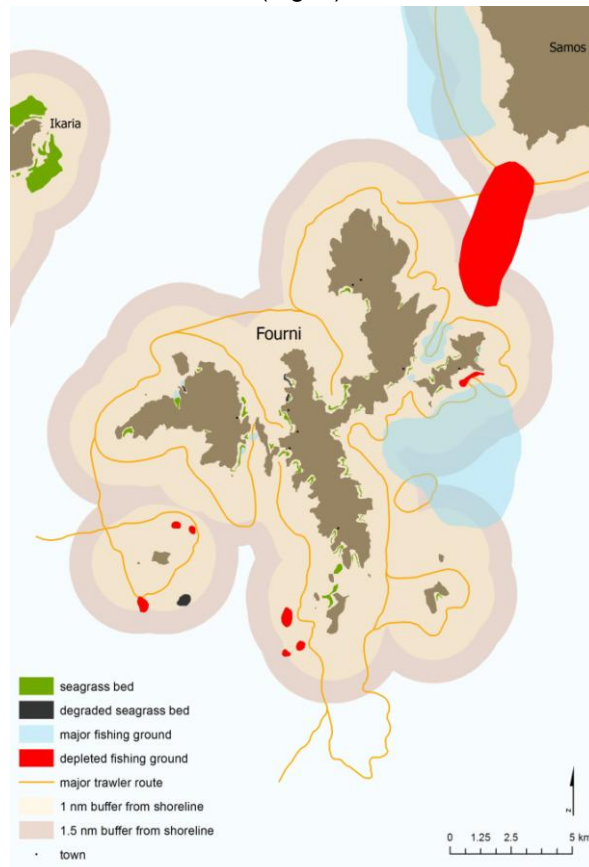


Figure 3: PPGIS map of Fourni depicting fish stocks, seagrass beds and trawler routes. Source: Ilpo Tammi/Archipelagos 2011.

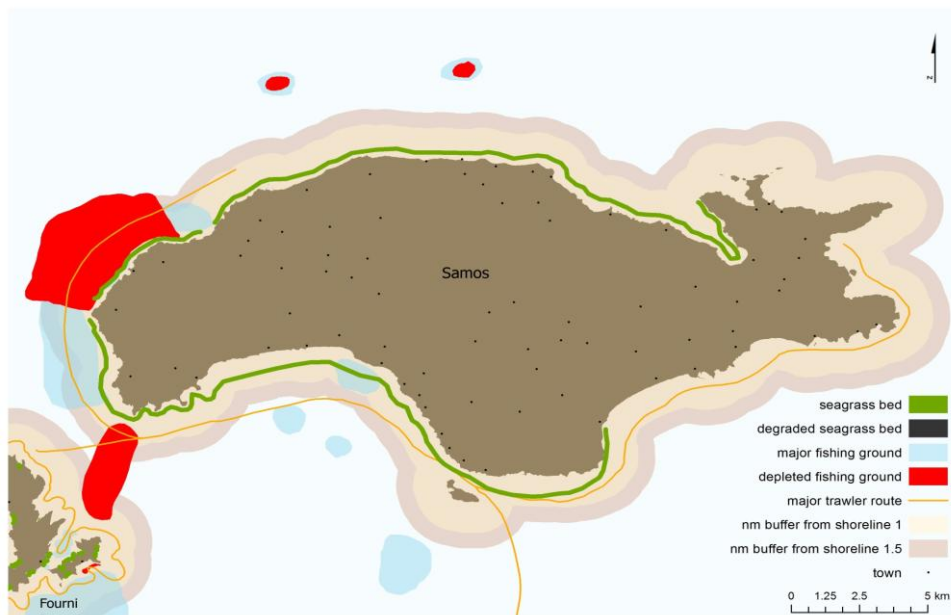


Figure 4: PPGIS map of Samos depicting fish stocks, seagrass beds and trawler routes. Source: Ilpo Tammi/Archipelagos 2011.

The surveys showed that catches of species associated with seagrass meadows, such as *Diplodus* spp., decreased by up to 88% between 2010 and 2011 in the area under examination. This fact strongly suggests a degradation of the local *Posidonia oceanica* beds.

3.3 Enforcement of EU legislation in the study area

According to the interviews and PPGIS mapping, trawlers have often been witnessed operating illegally within the 1nm zone from the coastline¹. Concrete evidence confirming that trawlers operate illegally in the area comes from monitoring of seagrass beds. It shows linear patterns of damage to seagrass beds, which indicates destruction caused by trawlers. The picture below was recorded at approximately 0.31 nm from the coast of Samos, at a depth of 27 metres and is the obvious result of illegal trawler activity over a protected habitat (Fig. 5).

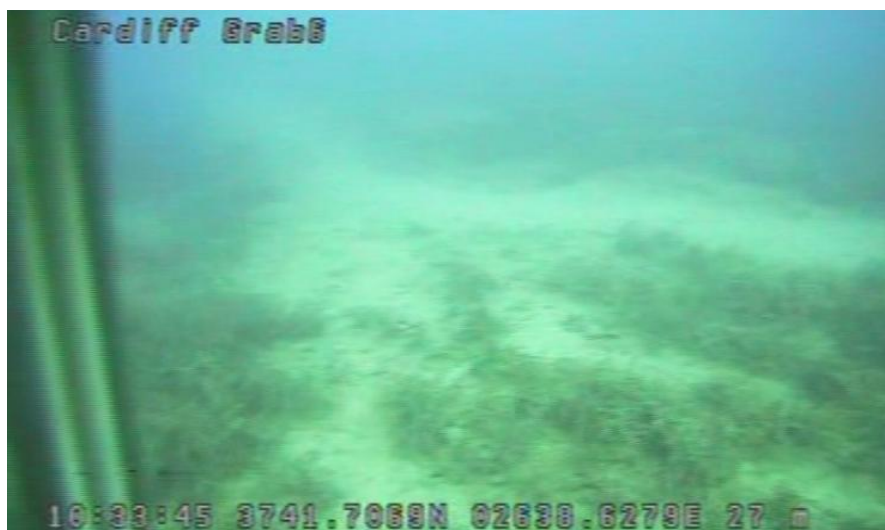


Figure 5: Snapshot from the underwater camera monitoring the seagrass beds around Samos. Indications of illegal trawling activity. Source: Archipelagos, 2009.

According to the interviews, even though there is adequate legislation in place, the local authorities lack equipment and trained staff in order to enforce it effectively. In the study area there is only one Coastguard speedboat, which shoulders multiple responsibilities apart from fisheries control. The lack of control and punishment enables a high level of illegal fishing activity to take place unchecked. In addition, a breakdown in the cooperation between artisanal fishermen and local authorities has prevented a successful functioning relationship. There is widespread distrust between the two parties and as a result the locals avoid reporting illegal activities for fear of being charged for infringement themselves, or because the illegal practitioners are a part of their tight-knit small community.

4. Suggestions

A working collaboration between artisanal fishermen and local authorities is essential for the effective enforcement of legislation. In order to tackle illegal and destructive fishing practices, a virtual monitoring grid should be established, made by both fishermen and members of the local authorities. As the authorities lack equipment and training, the fishermen can assist in both monitoring and training as they possess the local knowledge about the seagrass beds, the fish stocks and the fishing activity of the area. Importantly, the state should promote a training scheme for the members of the local authorities, in order to establish a viable enforcement scheme.

At Fourni Island, the municipality and local fishermen's association are piloting a project, in collaboration with Archipelagos, Institute of Marine Conservation, where they are

¹ The legal limit according to the Greek legislation was 1 nautical mile from the coast at the time of the study.

attempting to establish a co-managed Fisheries Protection Area (FPA). All members of the fishing community are taking responsibility for their resources; they will be monitoring their fishing area and prevent illegal fishing activity within its boundaries themselves. In addition, Archipelagos is surveying daily their catches in order to collect data about the current condition of the fish stocks and determine the effect of the FPA on the local ecosystems. This shared responsibility will help to control illegal and destructive fishing activities and as a result assist the regeneration of seagrass meadows and fish stocks. Nevertheless, there is an immediate need for detailed stock assessment and mapping of the seagrass beds, including an evaluation of their current condition.

5. Further research

Each stage of the Fourni FPA project must be monitored and evaluated, to determine its impacts on fish stocks, marine ecosystems, and fishermen's livelihoods, and to inform future FPA projects. This project could be used as a model for other sites with known significant biodiversity, where small fishing communities can take control of their own resources.

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