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V.5. FISHERIES INTERACTIONS WITH CETACEAN SPECIES IN HELLAS

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INTRODUCTION

The Hellenic Seas host a diversity of protected animal species, some of them recognized as threatened globally by international bodies and conventions. Protected marine vertebrate species involve several classes (fish, reptiles, birds, mammals). Three major taxons of the marine mega-fauna of the Hellenic Seas, namely reptiles (sea turtles), pinnipeds (seals) and cetaceans (whales and dolphins) are



Figure 1: Common bottlenose dolphin found stranded with trammel nets around its caudal fin (Photo: A. FRANTZIS/Pelagos Cetacean Research Institute).

known to interact with fisheries. We review, here-with the available knowledge regarding six (out of twelve) cetacean species that inhabit the Hellenic Seas (Table 1) and are known to interact with fishing activities. The interaction of fisheries with these species has often a negative impact on either the threaten populations of the protected species, or the fishing activities, or both (Figure 1).

BIOLOGICAL NOTES ON THE CETACEAN SPECIES INVOLVED

(Abundance, distribution, habitat and feeding habits)

There are 12 cetacean species that have been recorded in the Hellenic Seas or in offshore waters surrounding Hellas. Eight of them have resident populations and four have been recorded only occasionally. Six species among those who have resident populations have been found to interact with fisheries (Table 1). The striped dolphin is by far the most abundant species followed by the bottlenose dolphin, the common dolphin, the sperm whale, the Risso's dolphin and the harbour porpoise. These species belong to two ecologically distinct groups, inhabiting the pelagic and the coastal waters respectively.

Table 1. Cetacean species that interact with fisheries in Hellas.

Species	Common name	IUCN status (Mediterranean population)	Fishing gear(s) involved	Interaction involved
<i>Physeter macrocephalus</i>	Sperm whale	Endangered	Pelagic driftnets	Entrapment
<i>Grampus griseus</i>	Risso's dolphin	Data deficient	Pelagic driftnets Longlines	Entrapment
<i>Tursiops truncatus</i>	Common bottlenose dolphin	Vulnerable	Traditional gillnets Trawl nets Aquacultures	Prey depletion Entrapment Gear damage Deliberate killing
<i>Delphinus delphis</i>	Short-beaked common dolphin	Endangered	Purse seiners, Trawler nets, Beach seiners, Trammel and gill nets	Prey depletion Entrapment ? Gear damage? Deliberate killing
<i>Stenella coeruleoalba</i>	Striped dolphin	Vulnerable	Pelagic driftnets Longlines	Deliberate killing
<i>Phocoena phocoena</i>	Harbour porpoise	Endangered	replace with trammel & gill nets	Prey depletion Entrapment ?

The sperm whales and the Risso's dolphins mainly inhabit the waters above the steep "slope", i.e. the end of the continental shelf where depth increases rapidly, but can also be found in further offshore waters. The striped dolphins inhabit the "slope" and pelagic offshore waters as well. Sperm whales are mainly found at depths of 500-1500 m and at distances of 2.5-10 km offshore. The Risso's dolphin are usually found at depths 200-1700 m and distances of 1-32 km offshore. Striped dolphins are found at all depths above 200 m and at all distances beyond the 1st km offshore. On the other hand the common bottlenose dolphin is the most abundant coastal species. It is mainly found over bottoms that do not exceed 250 m depth and usually limited at the first 6 km from the shore. It is common in gulfs and bays of the entire Aegean plateau, where it can be found further offshore in shallow waters in between islands. It is well present in the north Ionian Sea, even in the shallow and closed Amvrakikos Gulf. It is also present in the south Ionian and south Cretan Seas, although only locally along the coasts that run parallel to the Hellenic Trench. The short-beaked common dolphin also inhabits coastal and shallow waters below 200 m deep. It can be found further offshore only in the plateau of the Thracian Sea. A second, distinct ecotype of short-beaked common dolphins inhabits the Korinthiakos Gulf, where this species lives only in mixed pods with striped dolphins, only in deep waters of 500-900 m depth. The short-beaked common dolphins are disappearing very fast, and less than 20 individuals are now left in the entire Ionian Sea. No habitat data are available for the harbour porpoise, which is limited in the north Aegean Sea and mainly in the shallow plateau of the Thracian Sea, although it is believed to inhabit only coastal and shallow waters.

The three pelagic species feed almost exclusively with mesopelagic squids, and therefore, do not come close to fishing nets to feed. The coastal

species are feeding mainly or exclusively on fish. When feeding close to the surface, common dolphins prey upon epipelagic schooling fish (sardines and anchovies; *Sardinella aurita*, *Sardina pilhardus*; *Engraulis encrasicolus*). The common bottlenose dolphins have much more opportunistic feeding habits (demersal fish and schooling epipelagic fish), and finally the feeding habits of the harbour porpoise are not well known (sardines have been found in one stomach content).

INTERACTION WITH FISHERIES

Interactions between cetaceans and fisheries include an important number of relationships, and have an impact in both the cetacean populations and the fishing activities. These are summarized in the Table 2 according to Bearzi (2002) slightly modified.

Among the six cetacean species of the Hellenic Seas that are known to interact with fisheries, there is only one species known to have a measurable impact on fishing activity. This is the common bottlenose dolphin (*Tursiops truncatus*), which is known to interact with trammel and gill nets, fish farms (aquacultures) and trawl nets. Fishermen complains concerning gillnet damage probably regard only this species (in theory the short-beaked common dolphin and the harbour porpoise could also feed upon caught fish in trammel and gill nets; however there are no documented cases and anyway, the short-beaked common dolphin faced a dramatic decline in numbers over the past few decades and is now rare in most Hellenic Seas, and the harbour porpoise is an even rarer species). Several common bottlenose dolphins get entrapped in trammel and gill nets in Hellas every year (Figure 2), although there is no estimate of their number. By-catch does not seem to be high enough to threaten local population units, however, if the dolphin numbers continue to decline with the actual rates, even the by-catch numbers may be unsustainable.

Table 2. Main known interactions between cetaceans and fisheries (from BEARZI 2002, modified).

Impact of cetaceans on fisheries	Impact of fisheries on cetaceans
Damage to fishing gear in the form of holes torn in the nets as the dolphins attempt to remove fish	Injury or mortality from retaliatory measures by fishermen who perceive dolphins as a pest
Reduction in the amount or value of the catch as the dolphins mutilate or remove caught fish	Bycatch in fishing gear and direct injury or killing from illegal dynamite fishing
Reduction in the size or quality of the catch as the dolphins' presence may cause fish to flee from the vicinity of the nets	Reduction of food prey availability or changes in food prey composition/distribution caused by overfishing
A real or perceived ecological competition with cetaceans, based on the conviction that dolphins reduce the amount of fish available to fisheries	Modifications in cetacean behaviour leading to emigration, or reduced reproductive rates as a consequence of interactions with fisheries



Figure 2: Common bottlenose dolphin carcass entangled in trammel nets (Photo: N.TSOUKALA/Pelagos Cetacean Research Institute).

The damage of the fishing gear and secondarily the reduction of the amount of the catch by common bottlenose dolphins interacting with the gillnet fisheries is by far the most important problem, that makes fishermen perceive dolphins (without discriminating among species) as a pest. A direct consequence of this problem is the retaliatory measures by some fishermen. While evaluating the extent of the problems created by this dolphin species to the fisheries, it must be considered that Mediterranean common bottlenose populations have now declined considerably and their numbers are certainly much lower than they used to be a few decades ago. Recent efforts to use acoustic devices that could keep the dolphins away from the nets have not shown to provide a solution, either because they are ineffective, or because they may extirpate dolphin populations from their feeding grounds. Such devices have often been proposed to Hellenic fishermen as “their salvation” for commercial reasons, however, they turned to be inefficient and most importantly, they have not been passed by any control, and no regulations have been established regarding their use. The interaction of common bottlenose dolphins with trawler nets and fish farms is perceived as a much less important problem to fisheries, since in these cases no damage is inflicted to the fishing gear, and only in the trawler nets case, a limited quantity of fish is “stolen” from the fishermen. The dolphins either follow the trawl net and catch injured fish from the bottom or attempt to remove fish through the net mesh, or in some cases may enter rapidly the net pocket to directly collect fish. So far, there is no published evidence that cetaceans may cause direct damage to Mediterranean aquaculture facilities, however, there are cases of complains reporting stress in farmed fish induced by the dolphin presence and feeding activity in the



Figure 3: Striped dolphin still alive without caudal fin that was amputated by fishermen (provided by port-police authorities/ archive Pelagos Cetacean Research Institute).

vicinity of the cages. The dolphins are attracted primarily by the large shoals of fish, mainly boque (*Boops boops*), that have appeared in the vicinity of fish farms due to good feeding conditions.

The striped dolphin, which is by far the most abundant cetacean in the Hellenic Seas, has a pelagic distribution and largely feeds on non-commercial prey species. Therefore, it does not represent a problem to coastal fisheries. However, it is not rare to find stranded specimens of this species either shot or mutilated (Figure 3). The same is valid for the rare and endangered short-beaked common dolphin. These two dolphin species are occasionally killed deliberately by fishermen although they provoke no harm to their fishing activity. Unfortunately, almost no fishermen in Hellas can distinguish between the common bottlenose dolphin and the other two above mentioned species. They called them all “dolphins”, they may believe that the two smaller species (striped and short-beaked common dolphins) are calves or juveniles of the larger common bottlenose dolphins, and eventually, they consider them as harmful competitors or as a pest as well. The same problem is probably valid for the Risso’s dolphin and the harbour porpoise, however, their scarcity and their escaping behaviour significantly reduces the encounters with fishermen.

Reports of cetaceans caught by longlines are rare, although they do occur (a documented case exists for a couple of Risso’s dolphins, caught by surface drifting longline for swordfish and released by the fishermen off Evvoia Island). In other Mediterranean areas dolphins (striped dolphins, Risso’s dolphins and common bottlenose dolphins) have been found stranded with hooks in their mouth, or with fishing lines in their larynx, suggesting that in some cases these animals may try to feed on bait or hooked fish. Comprehensive studies on the

potential impact of longlines on cetaceans in the Mediterranean have never been conducted. However, this seems likely to represent a minor threat in the basin.

Another fishing activity, which unfortunately remains a common practice in the Hellenic Seas, is the illegal dynamite fishing. The serious negative impact of this fishing method on the fish stocks and the coastal ecosystem in general is certainly significant, although difficult to evaluate. Apart the role it plays in depleting fish stocks upon which coastal dolphin species prey, it may provoke direct physiological damage to cetaceans found in vicinity, or behavioural changes including emigration because of habitat degradation. Apart the coastal species, in some areas along the Hellenic Trench, where big depths are found close to the coasts, pelagic cetacean species including the sperm whale are also suffering from the frequent and unexpected explosions. The level of damage to their hearing or to other vital systems is unknown.

Finally, one of the most important threats for all the pelagic cetacean species, and especially for the endangered Mediterranean sperm whale population, is the deployment of pelagic driftnets. Historically, driftnets were the most significant source of entrapments for cetaceans. Driftnets are large, floating nets made of a mesh of monofilament or multifilament line, deployed in the open sea. In the Mediterranean, driftnets have been used to capture several species of tuna and, currently, mostly swordfish. They can be up 50 kilometers (30 miles) long and hang vertically 20-30 meters from the surface. Left to drift freely, the design of the nets means they are not selective in what they catch, resulting in a high level of bycatch - the catch of non-target species. Because driftnets are generally deployed in the open sea, they are likely to entangle large pelagic species, including whales, dolphins, sharks, turtles, rays and seabirds. The propensity for driftnets to kill so many large animals earned them the nickname "walls of death".

In 1992 the European Community prohibited driftnet fishing in the Mediterranean with nets more than 2.5 km in length, as did the General Fisheries Commission for the Mediterranean (GFCM) in 1997 under a binding Resolution. A total ban on driftnet fishing on large pelagic species by the EU fleet in the Mediterranean entered into force from 1st January 2002; the same decision was adopted by ICCAT by means of a binding recommendation in November 2003.

Although this fishing activity is illegal in the European Union, it still goes on in the international Mediterranean waters, but occasionally in the na-

tional Hellenic waters as well. Because driftnets are illegal, states will not admit formally to their use, or are unable to monitor the practice within their waters, and therefore no data on the targeted catch rates or the associated bycatch rates are available for driftnet fisheries. At the peak of driftnetting, an annual bycatch of over 8,000 cetaceans was estimated for Italian Seas alone. These catch rates were undoubtedly unsustainable for the species most affected, including striped and common dolphins, and sperm whales. Between 1986 and 2000, 64 sperm whales in Italy were killed as a result of entrapment in fishing gear, and probably most if not all of these were from driftnets.

In Hellas very few vessels had applied this fishing practice in the past, and it does not seem likely that they continue nowadays. However, foreigner fleets (particularly Italian boats) are still deploying driftnets at least in the Ionian Sea, and seriously threaten the sperm whales (Figure 4), for which the Ionian Sea is an important habitat.

Recently, on May 2005, fishermen off Hellas's Aegean island of Samothrace have found 13 dead striped dolphins, one Risso's dolphin, one shark and some tuna in an illegal abandoned driftnet. The



Figure 4: This sperm whale photographed along the Hellenic Trench has a driftnet around its tail flukes. According to a summary of records from the waters of Spain, France and Italy between 1971-2003, 229 sperm whales were reported as stranded, entangled in fishing gear or carrying entanglement scars.

(Photo: A. FRANTZIS / Pelagos Cetacean Research Institute).

floaters of the driftnet contained Turkish batteries that cannot be found in the Hellenic market and indicated a Turkish origin.

REFERENCES

- BEARZI, G. 2002. Interactions between cetaceans and fisheries in the Mediterranean Sea. In *Cetaceans of the Mediterranean and Black Seas: State of Knowledge and Conservation Strategies*. Ed. by Nortarbartolo di Sciara, A report to the ACCOBAMS Secretariat, Monaco, February 2002. Section 9. 20 pp.
- FRANTZIS, A., ALEXIADOU, P., PAXIMADIS, G., POLITI, E., GANNIER, A. & CORSINI-FOKA, M., 2003. Current knowledge of the cetacean fauna of the Hellenic Seas. *The Journal of Cetacean Research Management*. 5(3): 219-232.
- FRANTZIS, A. & ALEXIADOU, P., 2003. Cetaceans of the Hellenic Seas. Monographs on Marine Sciences (*Hellenic Centre for Marine Research, in Hellenic*), 6, 156 pp. (in Hellenic, with extensive English abstract, tables and figure legends)
- TUDELA, S., KAI KAI, A., EL ANDALOSSI M., MAYNOU, F. & GUGLIELMI, P. 2005. Driftnet fishing and biodiversity conservation: the case study of the large-scale Moroccan driftnet fleet operating in the Alboran Sea (SW Mediterranean). *Biological Conservation* 121: 65–78.