INTERACTIONS BETWEEN BOTTLE-NOSED DOLPHINS, *Tursiops truncatus* , AND FISHERIES ALONG NORTH-EASTERN COASTS OF SARDINIA, ITALY

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The presence of populations of marine mammals in coastal waters where fishing activities of a traditional kind take place often causes certain conflicts which are hard to solve. Conflicts from the damage caused to fishing equipment and the local fishing communities by cetaceans and pinnipeds have arisen in many regions of the world.

Although these species are now protected by international legislation, the number of animals killed by exasperated fisherman remains quite high.The exploitation of the monk seal, *Monachus monachus*, in a large portion of the Mediterranean basin may surely be attributed to this factor. Not even the widespread legends and traditions concerning the supernatural and benevolent nature of dolphins has succeeded in avoiding the killing of these animals. The situation is surely not new for Italy, but it appears to be increasing with particular frequency along the coasts of Sardinia.

About one year ago, we started to study a population of bottle-nosed dolphins, *Tursiops truncatus*, living in the waters of north-eastern Sardinia, where the problem seems to be particularly serious. Sightings are carried out from the land and from inflatable and fishing boats. All those observations which allow us to evaluate the dimensions of the case in an objective way are recorded. Here, we intend only to report some preliminary findings, deferring to the near future a more detailed analysis of data which are still being collected.

The study area covers the archipelago of small islands facing the coast of north-east Sardinia, the Gulf of Olbia, the island of Tavolara, and the zone south of it reaching to the fishing harbour of La Caletta.

The monk seal was present in this area until about 40 years ago, and it probably became extinct here as a result of direct hunting by fishermen. Fishing activities in this area are carried out essentially with set nets, trawl nets and long lines; the sizes of the fishing fleets are quite small, especially for trawlers. Local fishermen do not use drift nets or surrounding nets.

LONG LINES Interactions between dolphins and long lines have never been reported.

SET NETS Trammel set nets and bottom gillnets are employed: as a rule, they are set at dusk and remain in place for periods ranging from a few hours to an entire day, according to the season. The trammels chiefly capture bottom living fish and are employed in spring and summer, whereas gillnets are used in winter to catch small pelagic fish. The set nets are made of nylon and are employed in a traditional way. They are used by fishermen for individual incomes and family subsistence.

Schools of bottle-nosed dolphins appear to systematically cause damage to the nets which are placed in shallow waters, close to the coast. About one hour after the nets were put in place, we observed schools of four or five animals coming close to them and tearing out fish that were caught in them, making large rips in the net. The activity continued until the nets were almost empty.

The damage caused through loss of catch and loss due to time needed to repair the nets is considered to be very high, and often the nets need to be completely replaced. Similar damage is caused by seals, as older fishermen have confirmed.

TRAWLERS The interactions between the dolphins and trawlers have been different. Trawl nets are pulled along the muddy and sandy bottoms at depths of 50 to 100 metres. The harvest is largely heterogeneous and the impact of this kind of fishing on the benthic environment is surely very high.

While fishing is in progress, schools of between four and ten dolphins come within about 200 metres astern of the boat and dive repeatedly for periods of about two minutes. Although the fishermen complain about low catches in these circumstances, particularly with repect to mullet (*Mugil* sp.) and benthic cephalopods, the way in which the animals interact with the fishery is still unclear. It may be that the prey are easier for the dolphins to catch, having risen to the surface after being frightened by the net, steel cable or kites dragging on the bottom. Quantification of the damage to the potential catch is at present difficult to evaluate, and damage to the nets has been reported only rarely.

The entangling of dolphins in nets, either gillnets or trawl nets, is a very rare event and it is considered to bring bad luck. We have no data about deliberate, illegal killing of dolphins, but we have no reason to believe this was frequent until now.

Some benign acoustical systems of an artisanal and empirical kind have been tested by the fishermen to scare bottle-nosed dolphins away from the nets. The use of explosive petards and the production of metalic noises were unsuccessful except for a very short time.

It should be noted that small schools of dolphins come near the beaches and enter the small harbour of the town of Golfo Aranci when the fishing activity has been forbidden by law to allow the recovery of fish popultions.

The aim of our research is to understand the size of the bottle-nosed dolphin population and its home range, and to define the behaviour of the dolphins with respect to fishing gear. The quantification of the damage could be useful in anticipation of an alternative legislative scenario to protect marine mammals, allowing some indemnities to fishermen, in the same way as is done today for protected terrestrial fauna.

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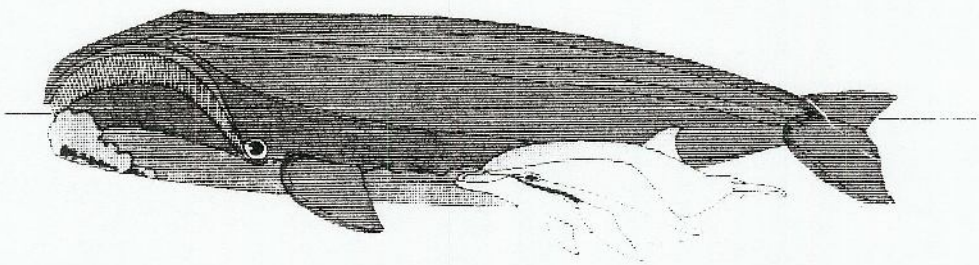

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