Initiatives about fisheries-cetaceans interactions in Spanish Mediterranean waters

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Cetacean – fishery interactions in Spain : obtaining baseline information to put by-catch into context

Diverse research programmes have been carried out in recent years to asses the impact of by-catch on the populations. The first step in this direction is to obtain baseline information on abundance to put the by-catch into context. Several studies have yielded abundance estimates for bottlenose dolphins along the whole Spanish Mediterranean waters (Forcada *et al*., 2004; Cañadas and Hammond, in press; Gómez de Segura *et al*., in press), for common dolphins along the south and south-eastern waters of Spain (Cañadas, 2006), and striped and Risso's dolphins along the eastern Spanish waters (Gómez de Segura *et al*., in press):

- Studies carried out by Alnitak off south-eastern Spain between 1992 and 2006,
- The "Proyecto Mediterraneo" programme for the identification of areas of special interest for the conservation of cetaceans in Spanish Mediterranean waters between 2000 and 2002, carried out by Alnitak, the University of Valencia and the University of Barcelona, and funded by the Spanish Ministry for the Environment,
- The European Union LIFE-Nature project "Conservation of cetaceans and turtles in Murcia an Andalucía" (LIFE02NAT/E/8610) between 2002 and 2006, carried out by the Spanish Cetacean Society and funded by the European Commission, the Spanish Ministry for the Environment, the Spanish Ministry of Fisheries and the regional governments of Murcia and Andalucía.

Establishing the degree of interactions in Atlantic waters has also been a priority in recent years, and Spain has participated in the European Union LIFE-Nature project SCANS II through the Spanish Cetacean Society with funds from the Spanish Ministry of Fisheries, and has participated in the preparation phase of the CODA project. Some projects, both using mark-recapture and line transect visual surveys have been also initiated recently along the Atlantic coasts of Spain.

The European Union countries are bound by the Regulation (CE) nº 812/2004 of the Council, which establish the measures regarding accidental capture of cetaceans by fishing gear. This regulation establishes a control regime of cetaceans accidental catches and deaths, and adopts research and conservation measures that guarantee that the accidental catches or deaths do not have a significant impact on the species. Specifically, the regulation foresee the progressive suppression of drift nets in the Baltic Sea, the use of pingers in certain gears and fishing areas, and the establishment of observers programmes on board fishing vessels. In addition, it establishes the obligatoriness for the Member States to send an annual report on its implementation to the Commission.

Pingers as scarecrows

A matter of growing concern is the reaction of fishermen with regards to interactions with cetaceans, and especially the use of acoustic devices of different types. The use of these acoustic deterrent or acoustic harassment devices (ADD, AHD) is rapidly spreading, as a consequence of the coming into effect of the EU Regulation mentioned above.

Publicity of acoustic deterrent and harassment devices to fishermen and aquaculture companies has led to an increasing demand for these in most regions of Spain. Fish farms and traditional gillnet and trammel net fisheries mainly, are interested in using these devices to drive away dolphins, and particularly the bottlenose dolphin and common dolphin.

Reports of the use of "dolphin scarecrows" as they are popularly called by fishermen have seen an important increase over the last few years.

Experiments carried out

Effectiveness of pingers in the Balearic Islands:

The University of Barcelona conducted, between September and October 2001 and 2002, a project funded by the Spanish Ministry of Environment (Directorate of Nature Conservation) and the DGP (Govern Balear), to test the use of pingers (Aquamark 100) in deterring bottlenose dolphins from predating fish in trammel nets. This study indicated that pingers have no significant effect on the catch of targeted species and can therefore be considered as a passive element in the fishing gear. The effect of the pingers on the frequency of depredation on nets was not clear.

With the projects IFOP ES.R.BAL.5.1.21 and IFOP ES.R.BAL.5.1.22 conducted between June and December 2005, the DGP tested the efficacy of three brands of commercially available pingers using both inactive (placebo condition) and active (treatment condition) pingers and nets with no pingers (control condition). Each vessel was equipped for the study with 15 identical bottom-set gill nets, 60m long, 1.25m high and with 50mm mesh. Nets were equipped with either one of three brands of pinger (Savewave™, Aquamark™ and Netmark™) or with no pingers. Pinger activation was carried out such that those reporting on the fishing were unaware of the condition. Catch data were recorded for each operation on board the vessel. Fifty-nine participating vessels reported on 1149 fishing operations. Of these, 743 had active pingers, 262 had inactive pingers and 144 had no pingers. Depredation was evidenced either by direct observation of dolphins taking from nets or by the presence of characteristically damaged fish in the hauled net. The frequency of depredation on nets with no pingers was 0.08 (95% CI 0.04-0.13). Significant overall reduction in rates of dolphin/net interactions in active pinger condition was detected -*but not equal among brands*- but no significant changes in net damage rates and CPUE were observed.

Effectiveness of noise playback on bowriding dolphins:

Between mid-June and mid-August 2005, DIFRES (Danish Institute for Fisheries Research) in cooperation with the University of Southern Denmark and the Spanish ngo Alnitak conducted a series of experiments to compare the effectiveness of different acoustic signals as a means of deterring common dolphins, *Delphinus delphis*, away from a sound source. This experiment was carried out within the framework of the European Project NECESSITY focussing on interactions between common dolphins and pelagic trawls. The experiments were conducted in Spanish waters of the Mediterranean Sea (Alborán Sea & Gulf of Vera) on board the research vessel RS Toftevaag. This area has an estimated population of short-beaked common dolphins, *Delphinus delphis*, of around 15.000-23.000 (Cañadas, 2006). The experiments took advantage of the bow-riding behaviour of the dolphins to secure semi-controlled conditions for the experiments. The bow-riding dolphins were exposed to a number of acoustic signals (tonal, frequency sweep, noise and a control) and their reactions monitored using both acoustic and video recordings.

This experiment has shown that it is possible to conduct playback experiments on bow-riding dolphins using the setup and experimental protocol used in 2005. Furthermore, repeated testing on even relatively small groups (5 individuals) is possible. In signals with RSL up to 150 dB re 1 µPa RMS [130 msec duration] there seems to be no visually significant deterrent difference between signal types. In signals with excess of this RSL the deterrent effect of the noise signal appears though to be more effective. This method is well suited for testing other signal parameters e.g. the signal length and the S+N:N parameter.

Regulating the use of pingers

As a result of research conducted in the Balearic Islands on the utility of pingers as a mitigation measure for interactions between coastal fisheries and bottlenose dolphins, a regional decree was passed to limit and regulate the use of ADD and AHD. The effect of pingers in the management of the interactions between bottlenose dolphins and local fisheries in Balearic Island is not clear. To avoid the indiscriminate sale and use of pingers, and their possible negative effects, the DGP, by means of the law nº 22751 of BOIB (Official Bulletin of the Government of Balearic Islands) Nº 194 (29-12-2005), has forbidden the use and possession of pingers in inshore waters. This prohibition will continue till new studies of the DGP confirm the effectiveness of pingers in the management of interactions between dolphins and fishermen. This is very much in line with the recent resolutions and guidelines of the Bonn Convention Agreement for the conservation of cetaceans in the Black Sea, Mediterranean Sea and contiguous Atlantic waters (ACCOBAMS).

However, at a national level there is presently no regulation and fishermen have easy access to these devices, with no requirement from the fisheries administrations or nature conservation agencies.

Further initiatives

Effectiveness of noise playback on bowriding dolphins:

Further experiments will be carried out in 2006, from June to August, by the same team of researchers (sea above), within the framework of the project NECESSITY. One aspect will be the testing of an inter active pinger prototype produced by Aquatec.

Regulating the use of pingers:

In response to the rapid increase in the commercialisation of pingers, basically due to the EU Regulation mentioned above coming into effect, and based on results of studies carried out in the Balearic Islands and in the Alborán sea (see above), the Spanish Ministry of Fisheries is considering a legislative action to regulate the acquisition and use of ADDs and AHDs.

Developing a control system:

The Spanish Ministry of Fisheries is also considering establishing a control system to at sea by patrol boats to: a) detect pingers in nets and fish farms and b) control if these are legal and within the range of technical specifications established under the developing legislation (see above).

Conservation Plan for bottlenose dolphins:

A Conservation Plan for bottlenose dolphins is being finalised within the framework of the LIFE-Nature project "Conservation of cetaceans and turtles in Murcia an Andalucía" (LIFE02NAT/E/8610). This Conservation Plan, developed with the support of the Spanish Ministries of Environment and of Fisheries, and many other stakeholders, includes several actions to address the problem of interactions between dolphins and fisheries, and the use of pingers.

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