



## PLAN OF ACTION AND PRIORITIES FOR RESEARCH TO REDUCE DEPREDAATION ON LONGLINES BY CETACEANS

### 1. INTRODUCTION

Participants at the first technical workshop on “*Cetacean Interactions with Commercial Longline Fisheries in the South Pacific Region: Approaches to Mitigation*” met at the headquarters of the South Pacific Environment Programme (SPREP) in Apia, Samoa from 11-15 November, 2002 with the following objectives:

- To begin an assessment of depredation on longlines by cetaceans in the South Pacific and globally;
- To identify and provide best current information on possible mitigation measures; and
- To agree actions and research priorities to address this global problem.

The thirty-two participants from eleven countries included industry representatives, fishers, scientists, managers and representatives of regional inter-governmental and non-governmental organizations.

The Purpose of this **Plan of Action and Priorities for Research to Reduce Depredation on Longlines by Cetaceans** is to:

1. Provide an informed assessment of the depredation problem;
2. Identify the key issues, questions arising, priorities for research and recommended actions;
3. Provide the best present information on approaches to mitigation;
4. Raise awareness and understanding of depredation issues and the need for action amongst key fisheries and conservation management stakeholders.

Participants defined depredation in the present context as “*the removal of hooked fish or bait from longlines by cetaceans.*” This was distinguished from predation, which was defined as “*the taking of free-swimming fish (or other organisms) by cetaceans.*”

Participants gratefully acknowledged the financial support provided by the Oak Foundation, the US Marine Mammal Commission and the New England Aquarium. Participants further acknowledged and thanked SPREP for hosting the workshop.

### 2. BACKGROUND

Worldwide, many marine capture fisheries are in serious decline. Over the past decade, pelagic fisheries have increased their share of the global market, and longline fishing in particular has undergone a rapid expansion. Since the United Nations prohibition on large-scale high seas driftnet fishing in 1994, a number of Asian fleets have increased their longline effort. Additionally, with the general acceptance of Exclusive Economic Zones under the provisions of the United Nations Convention on the Law of the Sea, many countries have developed their own longline fisheries. This growth in domestic fishing effort is particularly apparent in many Pacific Island nations, where pelagic fishes such as tunas and billfishes are the target species. Furthermore, some demersal longline fisheries have expanded rapidly, particularly in the Southern Ocean (e.g. for Patagonian toothfish).



Concomitant with the expanding longline fishing effort, the scale of interactions between longline fisheries and cetaceans has increased. Reports about the removal by cetaceans of fish caught on commercial longlines (depredation) indicate increases both in the frequency of such events and in the number of cetacean species involved. The problem is now documented in all oceans and many fisheries. Cetaceans implicated in the depredation include the sperm whale and a variety of smaller toothed whale species.

Possible explanations for the recent increase in reports of depredation include:

1. increased fishing effort and/or increased rates of reporting;
2. increases in abundance or changes in distribution of some cetacean populations;
3. increased ecological competition and spatial overlap with fisheries;
4. incorrect attribution of shark damage to whale damage;
5. that as opportunistic predators, toothed cetaceans are quick to take advantage of 'new' food sources in their environment, or alternatively that depredation is a learned behaviour and has been rapidly transmitted; or
6. a combination of the above.

At the 2001 Regional Workshop to progress a South Pacific Whale Sanctuary, SPREP was requested to provide the best available scientific evidence on the interactions between whales and fisheries in the region. The Technical Workshop in Samoa was conceived, in part, as a response to that Request.

Although the depredation workshop was originally envisioned as a meeting specifically to address the issue of removal of hooked fish by cetaceans, it became clear as planning progressed that other issues are associated with this interaction. In particular, the incidental take of cetaceans in longline gear and the removal of bait from hooks by dolphins were identified as additional concerns.

### **3. SCOPE OF DEPREDATION ISSUES**

The problem of depredation by cetaceans occurs worldwide and has been recorded in longline fisheries dating at least to the early 1950s. In all the world's oceans, killer whales have been reported to interact with longline fisheries for a variety of fish species. In the South Pacific, there are numerous reports of fishery interactions with small and medium-sized toothed whales, although species identification is uncertain. Furthermore, at least eight species of dolphins have been observed in the vicinity of longlines and some may have been involved in bait removal. Additionally, sperm whales are known to remove Patagonian toothfish from demersal longlines in the Southern Ocean, as well as sablefish and other fish species in the eastern Gulf of Alaska.

In addition to the possible explanations outlined above under "Background," the reported increase in depredation may simply reflect the fact that local fishers in the South Pacific are now encountering a problem that had long been experienced at a similar scale by distant-water fishers from northern nations operating in the South Pacific since the 1950s. Nevertheless, from the perspective of the fishing industry, depredation causes loss of catch, gear and time, and it adds to vessel operating costs. The adverse economic impact is an obvious concern. Furthermore, the financial losses to individual fishers could lead them to take negative actions towards cetaceans, which are normally held in high regard throughout the South Pacific.

In addition to the economic losses, depredation has environmental consequences. For example, losses due to depredation are not usually accounted for in the fish stock assessment and quota allocation processes



(although in some instances depredation may overlap with natural predation and therefore not affect fish stock assessment). The loss of catch due to depredation may lead to increased fishing effort, with associated environmental effects. Depredation also may represent a modification of cetacean foraging behaviour and involve atypical prey for some cetaceans. It can at least occasionally lead directly to incidental catch (bycatch) of cetaceans.

The problem of longline depredation, especially in the South Pacific region, is surrounded by uncertainties – scientific, technical and economic. It was therefore agreed that identifying priorities for assessment and framing key questions that arose during the workshop would help stakeholders to better understand the extent of, and elements involved in, the depredation issue. Such an understanding is fundamental to reducing, and hopefully solving, this problem.

#### **4. PRIORITIES FOR ASSESSING THE DEPREDATION PROBLEM**

Priorities identified by the Workshop were:

- 4.1 Consolidation and analysis of existing scientific and industry data or reports on cetacean and shark depredation
- 4.2 Standardisation of methodology, and selection of a standard index of depredation
- 4.3 Priority data
- 4.4 Data limits
- 4.5 Predator identification workshop
- 4.6 Training
- 4.7 Opportunities to assess interactions in the initial phase of developing domestic longline fisheries

##### **4.1 Consolidation and analysis of existing scientific and industry data or reports on cetacean and shark depredation**

Depredation is not a new phenomenon and has been reported for both sharks and cetaceans since at least the early 1950s in many areas, including much of the Indo-Pacific. Existing data need to be consolidated to facilitate comparative analyses and investigate regional differences in depredation rates. Such analyses could incorporate and correlate fishing methods and cetacean ecology to assist with mitigation.

##### **4.2 Standardisation of methodology, and selection of a standard index of depredation**

A preliminary review of key papers during the workshop revealed differences in definition and also methodology. It was clear that there is currently no standard index of depredation.

Existing reports quantify depredation as:

- a) damaged fish as a percentage of the catch in affected sets exclusively,
- b) damaged fish as a percentage of the overall number of caught fish or weighed catch,
- c) revenue lost to industry, or
- d) others.



The workshop concluded that the standard index of depredation rate should be damaged fish (number or weight) as a percentage of the total catch in a given fishery. However, such an index may underestimate the true impact of depredation because, e.g. some fish that would have been caught are scared away from the longlines, some caught fish may be stripped away entirely leaving a bare hook and therefore no evidence of depredation. Alternatively, the index could be positively biased if damage by sharks and other organisms has been wrongly attributed to whales.

There is a need for standard methods to quantify longline losses due to depredation caused not only by cetaceans but also by other organisms such as sharks, bony fish and squid. To standardise data collection for a given fishery region, it may be necessary to convene a group of experts to develop appropriate methods and data sheets. The data should be archived in a central location and made available for independent analysis, subject to agreed terms of control and ownership.

### 4.3 Priority data

Data crucial to assessment as well as to the development of mitigation measures can come from the following sources (in order of reliability):

- a) Dedicated research cruises.
- b) Independent observers
- c) Fisheries logbooks
- d) Port sampling

Data required to assess the scope and nature of the depredation issue might include:

- Details on depredation, predators and their behaviour, e.g.:
  - Did depredation occur, and if so at which stage of operations?
  - Could depredation be attributed to a particular predator category, e.g. cetaceans/sharks/squid/bony fish/other? (see proposed predator identification workshop, below)
  - On what basis was the predator identified (head only, tooth marks, etc.)?
  - Were whales observed in the vicinity of fishing activity?
- Vessel, operational and environmental details, e.g.:
  - Vessel description and operating procedures
  - Total catch – number and weight
  - Time and latitude/longitude of set (beginning and end)
  - Number of hooks deployed
  - Other data relevant to CPUE (may be cross-correlated with ship's log)
  - Meteorological and oceanographic data
- Linking depredation and vessel characteristics (both design and operational) to examine the reasons why different vessels within a particular fishery often experience markedly different levels of depredation.



#### 4.4 Data limits

It is important to acknowledge that assessment of these fisheries interactions is challenging given the current lack of understanding of the problem and the limited knowledge of status, dynamics and behavioural ecology of cetacean populations in the South Pacific and elsewhere. Key uncertainties include:

1. Attribution of fish damage to predator categories (e.g. cetacean vs. shark)
2. Full extent of depredation, e.g.:
  - Should all empty hooks be attributed to depredation?
  - Depredation of the same fish by multiple predators
3. Indirect catch losses:
  - Interference with target species – predators scare fish away from lines
  - Removal of baits
4. Status and trends of cetacean populations
5. Acoustic behaviour of cetaceans involved in depredation
6. Migratory patterns and movements of cetaceans

#### 4.5 Predator identification workshop

A technical scientific workshop that focuses on predator identification is clearly needed. Such a workshop should involve fishing skippers, biologists with regional fisheries and/or cetacean expertise, and individuals from observer programmes. Ideally, some focused field and laboratory work would be completed prior to the workshop, to ensure informed discussions and a positive outcome.

The key question to be addressed is - how can confidence be increased in the way fishers, on-board observers and others distinguish between the various potential predators when assessing damage to longline-caught fish? Important elements might include:

- Additional training of observers and skippers/crew
- Consensus on clear cases – what types of damage can be attributed with 100% confidence to a specific category or species of predator?
- Accept that for some percentage of damaged catch, the true predator is unknowable.

Educational or training tools produced from such a workshop might include videos on predator species identification and laminated sheets illustrating the types of damage caused by different predators.

#### 4.6 Training

Training is essential to ensure quality-control of data that are collected and to increase regional coverage by observer and other data-collection programs.



#### *4.6.1 Establish new partnerships and programmes.*

Regional and national observer programmes to monitor longline fishing currently have limited opportunities to address the depredation problem. Thus, it is important to establish new partnerships and programmes with interested and/or affected nations and industries. Recent national and industry initiatives, such as those in Papua New Guinea and Samoa, may offer such opportunities.

#### *4.6.2 Core components of training programmes to assess cetacean depredation should include:*

- Standardised data collection and data quality
- Improved assurance that fish damage can be attributed to the correct predator category – shark/cetacean/squid/bony fish
- Cetacean species identification at sea (including acoustic techniques)
- Best practices for effective and long-term mitigation.

#### *4.6.3 Other training opportunities*

While it is not possible to use data from strandings or bycatch for quantitative assessments of whale depredation, such events represent rare and important opportunities to train fishers and observers about the biology, anatomy and identification features of predator species.

Established networks that investigate strandings (and bycatch) should collect data on:

- obvious evidence of longline interactions (such as stranded animals with hooks in mouth, longline scarring and/or entanglement, etc.);
- hook location;
- stomach contents.

### **4.7 Opportunities to assess interactions in the initial phase of developing domestic longline fisheries**

There is a lack of baseline data and statistics to corroborate alleged increases in depredation rates as a fishery develops. Therefore it is important to monitor meticulously the development of any new fishery for interactions with cetaceans.

The Cook Islands could be considered a particularly good area for monitoring the effects of longline fishing on cetacean behaviour, as it has a relatively new domestic fishery and is just opening its northern EEZ to longlining vessels from South Pacific-based operations.

## **5. PRIORITIES FOR MITIGATION AND CURRENT INFORMATION ON BEST PRACTICE**

For a number of reasons, including the legal protection that is afforded to cetaceans by various statutes and the desirability of finding solutions that will work in the long-term, participants recommended that only non-lethal methods be employed to discourage or avoid depredation.



In addition, participants acknowledged that while much work is needed to develop and field-test a mitigation strategy for any of the fisheries discussed, the following suggestions presently have merit in attempting to reduce depredation by cetaceans:

- Vessel and gear noise management, both in the design and operation of the vessel. To the extent that is practical, noise should be minimised while travelling to fishing grounds and during fishing operations (e.g. turn off echo sounder, reduce noise of winch, propeller)
- Consider changes in fishing season, gear, setting and hauling times, and fishing areas
- Avoid hotspots – areas where cetaceans congregate
- Check (visually and/or acoustically) for potential predators before setting or hauling and try to avoid doing either when cetaceans are in the vicinity
- Suspend or delay hauling if depredation is noticed (demersal longlining only)
- Improve the abilities of fishermen to identify cetacean species
- Avoid chumming or discarding offal and bait in the vicinity of fishing locations
- Encourage fishermen to communicate their experiences with mitigation, and their concerns about depredation, e.g. via the list-serve
- When feasible, use a decoy vessel to distract cetaceans away from the fishing area
- Try setting dummy/false gear to mislead the cetaceans and direct them away from the fishing area
- Encourage scientists or observers to travel aboard longline vessels to provide expert advice on species identification and behaviour.

The workshop strongly encouraged research and development of acoustic and other approaches to mitigation. It was noted that no acoustic deterrent is presently available to offer as a "quick fix" for this problem. In fact, the use of acoustic devices could just as easily have a "dinner-gong" effect. Participants emphasized the need for rigorous scientific trials to demonstrate effectiveness before broad-scale adoption of any particular mitigation device or procedure.

## **6. NETWORKING AND COMMUNICATION OF ACTION PLAN**

Participants agreed that the outcomes of the workshop should be communicated to the following target audiences:

- national regulatory agencies (fisheries, environment/conservation),
- regional/international agencies, and
- the longline fishing industry.

It was strongly recommended that emphasis should be given to providing a proactive message that would continue to foster a positive involvement by the fishing industry.

Participants also agreed on the need to establish an electronic list server to develop and maintain access to information and for networking.



## Recommended Actions:

1. Participants agreed to ensure that their own networks receive a copy of this Action Plan.
2. The following international/regional organizations and groups were identified as key target audiences that should be provided with this Action Plan and the report from the workshop:
  - For the Pacific Islands region SPREP to distribute to:
    - SPREP Focal Points
    - SPC Fisheries and FFA (including respective observer programmes and their national focal points)
    - PIF Marine Sector Working Group
    - SPREP's Second RMMCP Meeting (February 2003)
    - Pacific Islands Roundtable for Nature Conservation
    - Interim Secretariat for the WCPTC and SCTB
  - For elsewhere:
    - UNEP, FAO, UNDP
    - NMFS, WPRDMC, US MMC
    - IOTC, IATTC, ICCAT
    - DWFN fisheries agencies
    - CCAMLR, IWC, CMS
    - WDCS, IFAW, Ocean Alliance, TNC, WWF, APEX, GP, CI
3. SPC and SPREP (inter alia) should jointly produce a brochure that summarizes this Action Plan, and that includes information on how to identify cetacean species. This brochure could be used as a popular summary of the issues to generate public and media interest and as a template for use in other regions.
4. SPREP should establish the aforementioned list server.