

3.2. *Current management of by-catch*

This section is arguably the most important section of this review for it aims to highlight what is currently being done on a long-term scale to monitor levels and trends in cetacean by-catch. Very few countries operate active, ongoing by-catch recording programs (Northridge 1996). Within Europe, Germany has legislated that no gillnetting must occur within 200 m of their shores (Kock & Benke 1995, 1996) and the Underwater Acoustics Group at the University of Loughborough (UK) designed the Pice pinger (De Haan *et al.* 1997).

Every paper described above is an example of efforts that have been made to monitor by-catch rates, and efforts that have been made to curtail them, however, most studies occurred over short periods of time, in accordance with funding. The longest projects in European waters tend to last for three years, e.g., those funded by the Ministry of Agriculture Fisheries and Food (MAFF) in the UK (SMRU 1999) and those funded by the EC.

In European waters, there are no standardised, ongoing, observation programs to monitor by-catch in different fisheries. Consequently, reliable data on by-catch rates in European waters are sparse and information on inter-annual variation in by-catch is practically non-existent. A good example of how cetacean by-catch can be effectively managed is seen in the USA, under provisions of the US MMPA of 1972.

3.2.1. By-catch management in the NW Atlantic: Case Study

3.2.1.1. The US MMPA: in theory

The MMPA was established in 1972 under Title 16 of the United States Code¹⁹, in response to public pressure on the federal government to reduce dolphin mortalities in the ETP (Driscoll 1999). The aim of the MMPA was to “maintain marine mammal stocks at, or recover the stocks to, their optimum sustainable population levels”. Responsibility for management of cetaceans, seals and sea lions is vested in the Department of Commerce,

¹⁹ See Appendix III: Website reference No. 6

which authorizes the NMFS – an arm of the National Oceanic and Atmospheric Administration (NOAA) (Polacheck 1989) - to implement the statutes.

In 1972, the MMPA imposed a moratorium on the taking and importation of marine mammals or any product thereof for any purpose, including the incidental mortality of cetaceans in fishing gear²⁰. The Act outlined procedures by which exemptions from this moratorium could be obtained and included the right to transfer management responsibility to individual states after approval from the Secretary of Commerce²¹. The Marine Mammal Commission (MMC) was established under Title II of the MMPA (NMFS 1998) and was accredited with the specific purposes of providing an independent advisory service and conducting research²⁰. Federal agencies are directed to co-operate with the MMC, by allowing them full use of their facilities and services²⁰. All these primary bodies are required to provide Annual Reports to Congress²⁰.

Since its enactment, various amendments have been made to the MMPA, a number of which pertain directly to the incidental entanglement of cetaceans in commercial fishing gear. In 1976, the Act was amended to extend its jurisdiction throughout the 200 mile EEZ. In 1981, an amendment specified a list of conditions to be satisfied before exemption permits could be issued to fishermen. This allowed them to take marine mammals incidentally in the course of commercial fishing and would remain valid until the next reauthorisation of the MMPA.

Numerous amendments were made in 1988. Firstly a process was established by which commercial fishermen could be completely exempt from the original moratorium on the taking of cetaceans, allowing them to avoid legal sanctions²⁰. The exemption certificate was valid for a period of five years and the MMC was directed to establish, by 1990, new guidelines governing by-catch, which were to be implemented at the end of the five year interim exemption period. The Department of Commerce was authorised to grant exemption permits²⁰ and permits were issued by the NMFS to persons or federal agencies, allowing them to legally take cetaceans²¹. As a condition of issue of the exemption permit, logbooks recording all by-catch were to be returned to the Secretary of Commerce (Northridge 1996). The Department of Commerce was also responsible for the provision of observers and data

²⁰ See Appendix III: Website reference No. 7

²¹ See Appendix III: Website reference No. 8

collection, conducted under the NEFSC Sea Sampling program - which is subsidiary to the NMFS (Bravington & Bisack 1996).

Further requirements of amendments to the MMPA in 1988 included²²:

- Reviews of the status of populations to determine whether they should be listed as 'depleted',
- Preparation of conservation action plans for the 'depleted' populations
- Rewards of \$2,500 be offered to any persons bringing attention to violation of the Act
- Categorisation of all fisheries in accordance with their level of interaction with, and mortality caused to, cetaceans.

The classification of fisheries is as follows²³:

- Category I²⁴: fisheries in which it is highly likely that one marine mammal will be taken by a randomly selected vessel during a 20-day period.
- Category II: fisheries in which there is some likelihood of taking one marine mammal during a 20-day period.
- Category III: fisheries in which it is highly unlikely that any marine mammal will be taken during a 20-day period.

Further substantial amendments were made as part of the re-authorisation of the MMPA in 1994, following contributions from many parties including commercial fisheries, the NMFS, the Fish and Wildlife Service (FWS), researchers and conservation groups²⁵:

- The Secretary of Commerce was given the authority to protect essential marine habitat,
- A prescription of emergency regulations to reduce by-catch should the take show significant impact on a stock,
- Fishermen are allowed to take small numbers of cetaceans listed as threatened under the Endangered Species Act, provided that they report all lethal by-catch to the Secretary of Commerce and take observers on-board as requested by the NMFS^{22,23}.

²² See Appendix III: Website reference No. 7

²³ See Appendix III: Website reference No. 9

²⁴ See Appendix IX for details of the MMPA fisheries categories

²⁵ See Appendix III: Website reference No. 10

The most significant of the 1994 amendments were made to address the problem of cetacean by-catch in fishing gear and a new system was put in place to govern and reduce the take of cetaceans. These changes pre-empted the expiry of the five-year exemption from the moratorium and were intended to replace the interim exemptions that had been in place since 1988 (NMFS 1999d)²⁶. These amendments mandated that:

- Comprehensive stock assessments of all marine mammal populations, in US waters under the MMPA jurisdiction, should be conducted to identify “strategic” stocks,
- TRPs should be designed and implemented in consultation with Regional Scientific Review Groups,
- Incidental takes of cetaceans should be monitored,
- Stock assessment reports for strategic populations were to be published annually and those for non-strategic stocks were expected every three years (Forney *et al.* 1999)

The MMPA defined ‘strategic’ stocks as those (a) in which anthropogenic mortality exceeds the PBR, and (b) which are declining and are likely to be listed, or are already listed, as threatened under the Endangered Species Act (ESA) or ‘depleted’ under the MMPA. For the purposes of this description, the word ‘Take’ is defined by the MMPA as the “harassment, hunt, capture or kill of any marine or the attempt to do so”. The PBR is a removal level above which the loss to the population is considered to be unsustainable (Caswell *et al.* 1996). In practice, PBR is estimated as the product of half the potential growth rate of a population, the population size and a ‘recovery factor’. The recovery factor is a somewhat arbitrary value between 0.1 and 1.0, which reflects the uncertainty of the population estimate used in the equation. The more uncertain the population estimate, the lower the recovery factor and the lower the PBR. Ultimately the recovery factor ensures that management decisions about stocks for which there are few data will always err on the side of caution (Caswell *et al.* 1996).

In compliance with the 1994 amendments, stock assessment reports include descriptions of the cetacean stock and its geographic range, the basic biological parameters of the stock, losses to by-catch, diagnosis of stock status, and how these figures relate to the predicted PBR²⁶. Recommendations made in these reports are used directly in the formation of the TRPs, which are implemented by the NMFS. The TRTs were given specific objectives,

²⁶ See Appendix III: Website reference No. 10

which had to be achieved in accordance with regimented deadlines (NMFS 1999d). The short-term goals of the TRTs were to assist in the recovery of, or to prevent the further depletion of, all strategic stocks that interacted with Category I and II commercial fisheries in accordance with the respective PBRs (NMFS 1999d). These teams had to convene within 30 days of the submission of the stock assessment reports to discuss and design their respective TRPs for presentation to Congress six months later (NMFS 1999d). In order to ensure fair, open and broadly representative discussion of the options available to TRTs, the teams comprised fishermen, managers, congress and environmentalists (NMFS 1999b). The TRTs were required to meet throughout the course of the implementation of their plans and to advise congress as to the need for further legislation should it arise. Ultimately the TRTs were expected to comply with the Zero Mortality Rate Goal (ZMRG) which aims to reduce mortality rates to levels near zero by 30th April 2001 (Dawson *et al.* 1998; NMFS 1999d).

In order to qualify for authorisation to take marine mammals, fishermen in all category I and II fisheries must register with the NMFS²⁷. The fishermen are no longer required to submit reports on their fishing effort or on trips where no by-catch occurred but the NMFS monitors the incidental take of cetaceans by placing trained observers onboard 20 – 35% of Category I and II fishing vessels. This is combined with a reporting scheme which requires that fishermen use supplied, postage-paid, ‘computer-readable’ forms to report all by-catch within 48 hours of its occurrence (NMFS 1999d). Fishermen are legally bound to adhere to the terms agreed by the relevant TRT and, if the situation arises, to adhere to emergency regulations as stipulated by the NMFS. Failure to comply with a TRP or the MMPAs requirements can lead to a fine and the Department of Commerce retains the right to revoke a fisherman’s authorisation to take marine mammals²⁷. Category III fisheries are not subject to the same stringent rules but fishermen must report all by-catch or serious injury to a marine mammal within 48 hours of their return to shore and can be requested to take observers onboard if the Secretary of Commerce deems it necessary.

²⁷ See Appendix III: Website reference No. 8

3.2.1.2. The US MMPA: in practice

In the course of describing the by-catch problem for small cetaceans in the NW Atlantic, most papers make reference to the MMPA and, although difficulties exist in enforcing the statutes, the legislation is by no means dormant. Further to the 1994 amendments to the Act, Congress stipulated deadlines by which all the action points had to be achieved and the NMFS has completed nearly all of these tasks. Three Regional Scientific Review Groups, representing the Pacific coast, the Atlantic coast and Alaska, were convened in 1994 and meet annually to discuss progress (NMFS 1999d). Final strategic population stock assessments were due in January 1995²⁸ to enable the direction of TRPs. This deadline was adhered to and, by the fourth quarter of 1999, the NMFS had completed comprehensive stock assessments on 147 marine mammal populations in US waters (NMFS 1999d). After presentation of their plans to mitigate and govern incidental takes of marine mammals, the first TRP was finalised in 1997. By 1999, the NMFS had implemented three TRPs and had partially implemented a fourth (NMFS 1999d). Stock assessments are continuing in order to advise on the need for TRPs for other marine mammal stocks. In 1997 the NMFS was instructed to review the progress TRPs towards the ZMRG²⁸ and to report to Congress (NMFS 1999d). At present, efforts to achieve the first deadline of reaching the ZMRG for each TRP have been delayed due to difficulties in achieving PBR levels within six months of TRP implementation. It is thought that reaching the ZMRG will require extensive research, gear technology development, and testing to identify ways to further reduce takes. Therefore, given that it has been difficult to meet PBR levels for most plans, it is unlikely that fisheries will be able to meet either old or new ZMRG deadlines.

Nonetheless, results on the implementation of the TRPs are currently becoming available and reports to congress were expected to be finalised in 2000 (NMFS 1999d). The NMFS has clearly accepted its responsibility to implement the MMPA in US waters and all the deadlines for action were met. The formation of TRTs and, subsequently, production of TRPs required a considerable amount of effort, such that the NMFS requested the formation of a task force to co-ordinate the process (NMFS 1999d).

²⁸ See Appendix III: Website reference No. 7

The success of the TRPs has varied. The reduction of by-catch in the Pacific swordfish fishery was hugely successful, with by-catch rates already reduced to below the required level (NMFS 1999c). Other TRPs have had less success in terms of the final outcome but all have demonstrated that communication between the relevant parties, all of whom may have different objectives and incentives, can be achieved and, moreover, can be effective (Janisse 1999). To ensure that time spent negotiating the TRPs was productive and effective, the NMFS enlisted the help of professional facilitators to mediate at the meetings (NMFS 1999b). The mediators conducted a questionnaire survey to assess perceptions of the meetings and subsequently advised the NMFS that TRTs should be more involved in the analysis of by-catch data, that the time allowed for negotiation should be extended and that the NMFS representatives should be better briefed (NMFS 1999b). Generally, they revealed that TRT meetings are considered by most fishermen to be a welcome opportunity to air their views and to have their voice heard, despite the time spent attending the meetings which could be spent earning money (Marks 1999).

Clearly, this whole process is costly. According to Andrew Rosenberg (Deputy Assistant Administrator for Fisheries, NMFS²⁹) "the take reduction process, while inherently sound, takes considerable time, staff resources, and expense. This multi-year process consists of approximately two to three years of observer coverage, abundance surveys, and research into stock structure and fishery characteristics, at an estimated annual cost of \$2 million. Convening teams for negotiations, including assembling the team and contracting a facilitator, can take approximately two years and cost approximately \$500 K per team. Additionally, time is required for NMFS to develop the regulations, followed by three to five years of monitoring and follow-up with the team, at an approximate cost of \$100 K per meeting and \$800 K per year of observer coverage".

Nonetheless, the consequences of the implementation of the US MMPA are clear when reviewing the literature. In the NW Atlantic, spatially and temporally stratified data exist on by-catch rates since 1990. Population estimates enable the estimation of the anthropogenic removal rates such that they can be compared to the relevant PBR levels (where they have been estimated), for each population.

²⁹ See Appendix III: Website reference No. 11

In summary, the US MMPA has set a precedent for the management of marine mammal populations, and for the monitoring and mitigation of anthropogenic losses to these populations. The lubricant required to turn the cogs of progress however is funding. The US MMPA is part of US federal law, implemented by the NMFS, which in turn is authorised and funded directly by the US Government. We can only conclude that the data speak for themselves.