

3. By-catch management

Management of the cetacean by-catch problem is not simply a matter of designing effective by-catch reduction devices and enforcing their use in fisheries. It is also important to establish a good flow of communication between all the parties involved and to earn the trust of the ‘opposing’ parties (Northridge 1996; Driscoll 1999). It seems that concern amongst fishermen about which by-catch management strategy will be implemented must be one of the most important factors constraining the efforts of scientists to determine the extent of the by-catch problem and, subsequently, manager’s efforts to remedy the problem.

For by-catch reduction to be sustainable, as well as a design being successful in operation, the implications for the fishery must be considered, and communication about management objectives is paramount. Numerous ways of reducing by-catch have been suggested but the most effective methods are usually detrimental to the fisheries and this not only affects the fishermen’s livelihoods, it also exacerbates the divide, between scientists and managers on one hand and fishermen and local communities on the other, by decreasing trust (Lowry & Teilmann 1994). The pros and cons of various possible approaches are briefly reviewed below.

Methods of by-catch reduction tried so far include: closure of fisheries, seasonal or area closures, setting of by-catch quotas (with fishery closure once the quota is reached), removal of mammals from problem areas by culling or translocation, release of entangled cetaceans, and modification of fishing gear and/or fishing practices (Notarbartolo di Sciara 1990; Perrin 1992; Silvani *et al.* 1992; Cockcroft 1994a; Hatakeyama *et al.* 1994; Lowry & Teilmann 1994; Read 1994; Sequeira & Ferreira 1994; Tregenza *et al.* 1997a,b; Morizur *et al.* 1999).

It has been speculated that the enforcement of cetacean by-catch quotas would simply lower the frequency with which by-catch was reported and that fishermen would attempt to catch as much fish as possible at the beginning of the season, before the quota was met (the race to fish, “derby” fishing) (Gill 1999; Janisse 1999). However, the use of quotas in the Eastern Tropical Pacific tuna fisheries appears to have had the desirable effect of making fishermen more cautious about catching cetaceans so that they could continue to fish throughout the season (Hall 1994). However, the use of purse seine nets in the ETP tuna fishery and the process of dolphin entrapment mean that the tuna fishermen have opportunities to release

animals alive that may not exist in other fisheries. Dolphins may have the opportunity to learn to avoid entrapment (Hall & Boyer 1986).

Possible modifications of fishing gear and strategies in gillnet fisheries include lowering the net height, changing the mesh size, changing the hanging ratio of the net and increasing the gap between the bridle. However, there is no evidence to suggest that these modifications would decrease the cetacean by-catch and all would be likely to reduce the selectivity and productivity of the fishery involved (Lowry & Teilmann 1994). Similarly, Morizur *et al.* (1999) suggested that gear modifications in trawls such as escape routes in the cod-ends and large meshes over the trawl mouth would negatively affect the catch efficiency of gears.

Whilst closure of fisheries in areas where cetacean by-catch is high should obviously be an effective measure to reduce the problem (Bisack 1997), this is not conducive to co-operation from fishermen in subsequent observer studies, since they are likely to fear that prime fishing grounds will be closed. In any case, regulations that are perceived as unworkable or economically catastrophic (such as current regulations on discarding over-quota fish) are unlikely to be restricted. Continued illegal fishing is a real possibility.

Blanket closures may of course not be necessary to achieve by-catch reduction and area or seasonal closures are possible (Trippel *et al.* 1996). However, deciding which months fisheries should be closed is often difficult since monthly peaks in by-catch rates change annually (Bisack 1997). This problem was highlighted by a trial closure of two specific areas to gillnet fishing, in the Gulf of Maine in 1995. Closure in November and December, based on previous years' data, significantly reduced the harbour porpoise by-catch. However, in 1995, by-catch rates peaked in October raising the question of whether the November and December closure was the best choice (Bisack 1997). Another problem is that gillnet fishing activity peaks at the same time as porpoise abundance - not surprising given that prey abundance and porpoise abundance are often directly correlated (Trippel *et al.* 1999). In the lower Bay of Fundy, the peak of porpoise abundance occurs in August, a time when fishermen usually caught 40% of their annual landings. Trial closures of fisheries this area in August were not welcomed (Trippel *et al.* 1999).

It is of course easy to identify problems resulting from measures such as seasonal and area closures, such as the shifting of by-catch to other areas and seasons, but the fact is that such

closures can be effective. Adaptive management strategies should allow the time or area of closure to be modified if new data suggest it would be worthwhile. Indeed it may be desirable to deliberately vary the closure from year to year to help identify the most effective choice. Provided that fishermen understand the rationale for the closure, that their welfare as well as that of cetaceans is on the agenda, and that complete closure is not among the options considered, co-operation should be achievable.

The methods used to reduce by-catch depend not only on the fishing area and gear used but also on the attitudes of the people in authority who implement the management strategies (Perrin 1992). While the measures listed by Perrin (1992) have had varying success in the short term, the important aspect is long-term success and the sustainability of the strategy in terms of by-catch reduction as well as the health of the fishing industry (Young 1999).

Perhaps the biggest obstruction to by-catch management is the conflict between the goals of the ‘opposing’ parties. If conservationists want to reduce by-catch irrespective of all other considerations, and the fishermen want to maintain their livelihoods with the same vehemence, then a political stalemate can be the only result. There can be no denying that the issue of cetacean by-catch is controversial. However, given all the efforts that are made to understand the behaviour of cetaceans, it would be surely beneficial to take a step back and to try to understand that of the fishermen, as occurs in the Take Reduction Teams (TRTs) set up under the provisions of the US MMPA of 1972.

Aiming their advice at the secretariat of ASCOBANS at the May 2000 meeting, the Whale and Dolphin Conservation Society stated that “Governments and the EU should act now to properly investigate pelagic trawls and end this appalling death toll – or close the fisheries”¹⁴. Hostile and antagonistic statements such as this – whilst arguably made with the best of intentions - are ultimately counterproductive. Asking fishermen to extend their sympathies and finance to the plight of cetacean populations is somewhat analogous to asking repeated victims of theft and vandalism to volunteer their time and money to make prison a better place for criminals! While this analogy is not intended to imply that fishermen are victims of conservation efforts, we would stress that aggressive approaches to the by-catch problem

¹⁴ See Appendix III: Website reference No. 4

such as complete closures of fisheries (or the threat thereof) will lead only to a complete cessation of co-operation from fishermen.

Such a problem occurred when the NMFS called for an immediate closure of the Atlantic swordfish driftnet fishery (Janisse 1999). Lines of communication had been established between fishermen and managers through the Atlantic TRT. This team included representatives from fishermen's associations, fishery management councils, scientific organisations, environmental groups and State officials, to name but a few (NMFS 1999b). Following the success of the Pacific TRT in reducing by-catch in swordfish fisheries to levels compatible with the recovery of strategic cetacean populations, the Atlantic TRT convened to discuss the most effective approach to mitigating by-catch in their swordfish fishery (Janisse 1999). Based on the short fishery season and the existence of quotas, it was agreed between all TRT representatives that fishermen would be allocated a standard number of net sets so that there would be no need to clamour to catch as many fish as possible, allowing them time to try out by-catch reduction devices and gear modifications. The agreed plan was presented to the NMFS who made a "micro-management... administrative decision" and closed the fishery down, ignoring the TRT's proposal. Marks (1999) comments that the NMFS made a management decision based on "data-poor, risk-averse, vacuum-packed models and predetermined emotions suggesting that marine mammals are of higher value than harvesting food or the fishermen that do so for a living". The closure was, to say the least, not welcomed.

Suggestions that gear bans and fishing ground closures should be implemented until effective by-catch reduction devices are designed are not conducive to the development of trust between fishermen and the authority. With this in mind, it should not be forgotten that the expertise and experience of fishermen was instrumental in the design of effective measures to mitigate by-catch in the eastern tropical Pacific driftnet tuna fishery (Jefferson & Curry 1994). This success may not have occurred without co-operation from the fishermen and a respect for their knowledge. While many papers refer to the lack of co-operation from fishermen, fishermen have on occasion requested help from scientifics (Chiofalo *et al.* 2000) and it could be argued that the scientists are also unwilling to co-operate. The NMFS response to proposals from the Atlantic TRT is a prime example of an aggressive approach which served only to discourage future co-operation from fishermen. As asked by an ex-fishermen turned fisheries lawyer (Janisse 1999), "who on the Atlantic team will again make

such a commitment?" Without co-operation and commitment from all parties, observer programs will cease, by-catch estimates cannot be made and the suspected need for action in given areas cannot be substantiated. It seems entirely counterproductive to take a blinkered approach to the by-catch issue with 'us' on one side and 'them' on the other.

Lack of communication between the scientists and the fishermen has the potential to undermine the whole process of impact assessment and by-catch mitigation. Concern arises over the by-catch rates in a given area which generates observer programs to determine the extent of the problem and the fishery involved, as was the case after mass strandings of common dolphins on the SW coast of England (Kuiken *et al.* 1994; Tregenza & Collet 1998). These programs lead to concern among fishermen that fisheries or fishing grounds will be closed, as could be expected following closure of the Norwegian salmon driftnet fishery as a direct result of an observer program (Northridge 1998). Consequently some fishermen may refuse to co-operate with the program, as occurred in studies of by-catch in the mid-water pelagic trawl fisheries in the Celtic Sea and by gill-netters off the NW Spanish coast (Tregenza & Collet 1998; Pierce & Santos 2000). Inevitably this leads to extrapolation of by-catch rates from fewer data and/or data from fishermen who complied only at times when by-catch was low (Trippel *et al.* 1996). In turn, this results in continuing uncertainty about the extent of the problem which leads to scientists "erring on the side of conservation" (Benke 1994; Tregenza & Collet 1998; Marks 1999). This leads to recommendations that further work is required, which further raises the suspicions of fishermen and the cycle begins again.

Legislation that penalises uncooperative parties is one possible approach. In the NW Atlantic, the MMPA stipulates that 20 – 35% of all category I¹⁵ fishing vessels take observers onboard (Read & Gaskin 1990) and mandates that logbooks should be maintained, recording all marine mammal by-catch (Northridge 1996). Category I fishermen must adhere to these rules in order to obtain permits to allow fishing. However, compliance is difficult to police and, in 1990, fishermen's logbooks declared only 5.9% of the 1250 harbour porpoises estimated to have been by-caught by observers studies in the area (Northridge 1996). Several studies have concluded that by-catch rates derived from logbook entries are probably under-estimates (Polacheck 1989; Read & Gaskin 1990; Read 1994). Such is the concern amongst fishermen, that reports of high by-catch will result in drastic by-catch reduction measures, even the offer

¹⁵ See Appendix IX for details of MMPA fisheries categories

of financial rewards for the completion and submission of logbooks resulted in a return of only 49% of books (Lien *et al.* 1994). The occurrence of high porpoise abundance and by-catch in certain months during an observer study, in the Bay of Fundy in 1993, led to the cessation of co-operation from gill-netters, (Trippel *et al.* 1996) who felt that co-operation would not be in their own best interests (Polacheck 1989). More recently in UK waters, observer studies have been put at risk following unauthorised press statements by observers leading to withdrawal of industry co-operation (Northridge, pers. comm.)

Whilst the enforcement of co-operation may become accepted by future generations of fishermen, it should be recognised that in the immediate future – the time that matters, given the urgency of the by-catch problem – introduction of legal sanctions may serve only to increase the tension in already volatile situations and to reduce the willingness of fishermen to accurately report anything, as was observed in Portugal (Sequeira & Ferreira 1994).

A positive "spin" can be put on the resolution of the problem, one which emphasises consideration of all marine mammal-fishery interactions, including damage to fishing gear caused by marine mammals and, ultimately, competition between marine mammals and fishermen. Thus we favour an integrated approach, in which fishermen's objectives, as well as marine mammal conservation, are also explicitly considered, and all parties are working towards the common goal of achieving sustainable exploitation of living marine resources. During interviews in NW Spain, 70% of gill-netters and 50% of trawlermen stated that gear damage by cetaceans was a problem for them (Pierce & Santos 2000). Thus reduction of entanglements can be seen as beneficial to both fishermen and marine mammals.

Assurances are needed that closures of fisheries will be considered only as a last resort after the failure of all other efforts, emphasising that the scientists are "on the same side" as the fishermen. If closures are unavoidable, they should be accompanied by compensation to fishermen who suffer financial losses (Jefferson & Curry 1994). Ideally, there should be economic incentives for both managers and fishermen to achieve by-catch reduction without resorting to fishery closure. Co-operative studies are needed to develop and test by-catch reduction devices that serve the needs of both fishermen and the cetacean populations by helping to prevent by-catch, damage to fishing gear, and financial losses to fishermen.

It may thus be beneficial to view the problem as a management issue, which can be resolved with communication, mutual trust, and involvement of all interest groups in the decision-making process. The process itself needs to be perceived as transparent and fair to all parties. Under the provisions of the MMPA, TRTs are set up, to open lines of communication, albeit with varying success (NMFS 1999a,b,c). Some kind of arbitration process may of course be needed to bring groups with extreme viewpoints together at the same table in the first place.

Conservation and animal welfare/rights groups on the one hand and fishermen on the other may well have diametrically opposed views about how to deal with marine mammal fisheries interactions. However, all parties should recognise the power of public opinion. In Canada, questionnaire surveys demonstrated that the general public “consistently disputed the notion of sacrificing the needs of marine mammals for the benefit of commercial fishing...[and]...indicated a willingness to favour the interests of marine mammals over commercial fisheries in marine mammal entanglement situations” (Kellert *et al.* 1995). It is possible, certainly in countries like the UK in which fishing is a small sector of the national economy, that public opinion could favour avoiding consumption of fish rather than accepting significant mortality to dolphins. Conversely, promotion of by-catch reduction measures and "dolphin-friendly" fish products could help to boost the economy of the fisheries sector.