
3.4 Changes to fishing operations

Changes in the way fishing operations are conducted may reduce bycatch of marine mammals. However, many measures outlined in guidelines and codes of practice are difficult to enforce and often rely heavily on voluntary adoption by the fishing industry.

Backdown and other net deployment procedures – Purse seines

With the Agreement on the International Dolphin Conservation Programme (AIDCP), dolphin mortality in eastern tropical Pacific tuna purse seine fishery has been significantly reduced. While “set on dolphin” practice has not been banned in the AIDCP area, the practice has been drastically curtailed as a result of the implementation of dolphin mortality limits (DML) and a shift to sets around fish aggregation devices (FADs). Relevant management measures and agreements regarding the banning or prohibiting of setting on cetaceans while purse seining for tuna is described later on in this section. When marine mammals occur in a purse seine net, prior to completing the hauling procedure a fishing vessel should endeavour to release them with minimal harm.

One specific fishing method, the backdown procedure, has greatly contributed to the reduction of bycatch of small cetaceans in purse seine fisheries in the eastern tropical Pacific (Hall and Roman, 2013). This solution was developed as a mitigation measure for the well-documented tuna dolphin problem and is widely used (and required) in that region’s purse seine tuna fishery. The backdown procedure is effective when combined with the use of dolphin-safe techniques or rescue methods, in addition to the Medina Panel (dolphin safety panel). The backdown occurs after the majority of the net is on board. At this point net retrieval is stopped, the net is tied to the vessel and the engine is put into reverse. This creates a water current that causes the remaining net to form a long channel in the water. The water current pulls the end of the channel underwater, thereby providing an area for dolphins to escape (Bratten and Hall, 1996), which is facilitated by herding dolphins using rafts, swimmers and skiffs to maintain the shape of the seine net (NRC, 1992). Together with the use of the Medina Panel, a small-mesh net liner at the apex of the net, this technique has resulted in significant reductions in mortality for several species of dolphins in the eastern tropical Pacific (Hall and Roman, 2013).

Table 10. Pros and cons of using backdown/net deployment procedures in purse seine fishing		
Pros	Cons	Marine mammal species
Facilitates the escape of dolphins trapped in nets during hauling	Requires additional crew to assist in dolphin escape and the use of a Medina panel	Small cetaceans

Gear rigging

For pot, gillnet, longline, and other similar static gear types, in which multi-gear strings are used, reducing the ratio of vertical lines to units of gear would limit the number of vertical lines and probability of encounter with marine mammals (NMFS, 2015). However, in response to this measure some fishers have reported increasing the diameter of buoy lines to support heavier bottom-set gear, which likely decreases the probability that marine mammals can break free of it (Knowlton *et al.*, 2016). Increasing the number of pots per string will also increase groundline length, which in turns causes the entanglement of marine mammals. It is therefore important to note that any potentially beneficial change must also account for unintended consequences.

Gear switching

Where no strategies appear viable and solutions to marine mammal bycatch seem limited – or the challenges of implementing them look extremely daunting – fisheries managers should consider changing the type of gear used in a fishery to one that maintains commercial viability but poses a lower risk to marine mammals. Table 11 summarizes the results of studies that assessed the effectiveness of three alternatives to gillnets, pots, longlines or trawls. The table focuses primarily on the study results with respect to comparing target catch efficiency and size selectivity with assumptions about the reduction of marine mammal bycatch for the alternative gear or with recorded comparisons of both gillnet and the alternative gear.