

Based upon the above information, remaining data gaps, and expert opinions, NOAA Fisheries cannot determine whether the carrying capacity of the ETP for dolphins has declined substantially or that the ecological structure of the ETP has changed substantially in a way that could impede depleted dolphin stocks from growing at rates expected in a static ecosystem.

*The Direct Mortality Question.* For any depleted stock, does the estimate of the total fishery-attributed dolphin mortality, obtained by adding together estimates of direct mortality and, where appropriate, quantifiable levels of indirect mortality, exceed the mortality standard considered appropriate by the Secretary?

Direct mortality as reported by observers is a known and easily quantifiable impact of the tuna purse seine fishery on depleted ETP dolphin stocks. To answer this question, NOAA Fisheries calculated the potential biological removal (PBR) levels for each depleted dolphin stock in the ETP. The PBR is the maximum number of animals, not including natural mortalities, that may be removed from a marine mammal stock while allowing that stock to reach or maintain its optimum sustainable population size. Direct mortality and estimates of indirect mortality (where appropriate) were compared to the PBR levels and other mortality standards for each stock. Additionally, possible changes in the carrying capacity and/or the ecosystem structure of the ETP were considered but deemed scientifically inconclusive.

The ODP calls for comparison between the level of direct mortality and a "mortality standard considered appropriate by the Secretary." The ODP therefore allows flexibility in determining what the threshold should be, specifically because the results of analyses on indirect mortality as well as ecosystem changes might have called for a threshold lower than PBR. For example, if there had been sufficient sample sizes to make population-level inferences of the impact of indirect effects, and/or if there had been strong evidence of a dramatic reduction in carrying capacity due to ecosystem changes, then a level of mortality close to PBR might have been considered too high.

The average of the abundance estimates for the most recent surveys are 641,153 northeastern offshore spotted dolphins, 448,608 eastern spinner dolphins, and 143,725 coastal spotted dolphins. The coefficients of variation (CV) for these estimates are approximately 17%, 23%, and 36%,

respectively. CV is a measure of the variability of the estimate. Much of the essential information regarding coastal spotted dolphins is lacking, especially from the early years of the fishery. This lack of information prevents NOAA Fisheries from further refining the precision of this stock's abundance estimation.

Reported levels of dolphin mortality for each stock have been very low in recent years (far less than PBR levels for approximately a decade) and have only rarely exceeded the strict stock-specific mortality limits set forth by the IDCP. These stock mortality limits (SMLs) are roughly 10% of the PBR standard. For this decision, the PBR standard, an established standard of mortality, provides the best insight into the significance of reported mortality to the dolphin stocks. By contrast, SMLs are not strictly science-based values, but rather reflect the lowest possible mortality achievable by the fishery and values that should be biologically insignificant to dolphin stocks. Comparing reported mortality to established standards of mortality, such as the PBR and the SML systems, can provide insight into the significance of reported mortality to the dolphin stocks. In 2001, the most recent year for which annual mortality estimates are available, the total reported mortality was 466 eastern spinner dolphins, 656 northeastern offshore spotted dolphins, and two spotted dolphins. PBR levels during this same time period were for 1298 eastern spinner dolphins, 2367 northeastern offshore spotted dolphins, and 1073 coastal spotted dolphins.

The only source of quantifiable information on levels of indirect mortality comes from investigations into the separation of cow-calf pairs during fishing operations. Analyses of purse seine sets from 1973 to 1990, in which all killed dolphins were examined, led to the conclusion that there is some separation of calves from their mothers. Based on reasonable assumptions about length of nursing dependency, NOAA Fisheries estimated that mortality was underestimated by 10–15% for spotted dolphins and 6–10% for spinner dolphins in this sample. Reported mortality for 2001, when combined with cow-calf separation estimates, is approximately: 31% of PBR for northeastern offshore spotted dolphin and 39% of PBR for eastern spinner dolphin. There is currently no way to quantify indirect mortality for coastal spotted dolphins. Therefore, direct mortality is based on that reported by the on-board observer programs and is only 0.2% of PBR for coastal spotted dolphin. When reported mortality for

2001 is combined with the estimate of cow-calf separation, quantifiable direct mortality is well below the PBR level for each stock.

NOAA Fisheries has a relatively high degree of confidence in both the dolphin abundance estimates and in a minimum estimate of mortality owed to cow-calf separation. Additionally, the IDCP utilizes 100% observer coverage to obtain dolphin mortality information, so unlike most other fisheries around the world, dolphin mortality is enumerated rather than estimated. Based on these data, information regarding dolphin mortality in the fishery obtained through the IDCP, and in consideration of the opinions of the Ecosystem Expert Panel, direct mortality does not exceed PBR, or any other appropriate mortality standard, for any of the depleted dolphin stocks.

*The Indirect Effects Question.* For each stock, is the estimated number of dolphins affected by the tuna fishery, considering data on sets per year, mortality attributable to the fishery, indicators of stress in blood, skin and other tissues, cow-calf separation, and other relevant indirect effects information, at a magnitude and degree that would risk recovery or appreciably delay recovery to its optimum sustainable population (OSP) level (how and to what degree)?

While direct mortality from sources in the tuna fishery causes a known impact on dolphin stocks, there are possible means by which the fishery could be indirectly impacting dolphins. Therefore, an assessment of indirect effects is relevant to making the final finding. Sources of indirect mortality include cow-calf separation and may include other types of effects resulting from chase and capture, which could compromise the health of at least some of the dolphins involved. The answer to this question was based on information collected and/or evaluated by NOAA Fisheries, as well as on opinions of individual members of a panel of independent scientific experts in veterinary science, physiology, and other stress-related fields (the Indirect Effects Panel).

In the aggregate, available data suggest the possibility that purse-seining activities result in indirect effects that negatively impact dolphins. However, available data are insufficient to determine whether the fishery is causing indirect effects of sufficient magnitude to either risk recovery or appreciably delay recovery. Completed research has included a combination of field experiments, retrospective analyses, direct observation, and mathematical modeling, to address a