

biological oceanography, a range of trophic levels from the lowest (phytoplankton) to the highest (top predators), and as many species within each trophic level as possible.

*Stress and Other Indirect Fishery Effects.* Stress studies are also mandated by the MMPA amendments to address the concern that chase and encirclement during fishing operations might affect dolphins in ways that might not necessarily result in their immediate and observable death in the nets, but that could impede recovery. These are often called "cryptic" effects. Four related research projects generally termed "stress studies" were specifically required by U.S. law to study the effect of intentional encirclement on dolphins and dolphin stocks: a stress literature review, a necropsy study, a review of historical data, and a field study involving the repeated chasing and capturing of dolphins. The key lines of investigation included research on potential separation of dolphin cows and calves, measurement of acute and chronic physiological effects that could result in injury or death, observation of behavioral responses to fishing activities, and estimation of the average number of times a dolphin might be chased and encircled per-year per-stock.

*Stock Assessments.* The final component of the research, the stock assessment modeling, provides quantitative estimates of dolphin population growth rates and depletion levels, as well as a framework for testing hypotheses about the effects on dolphins of changes in carrying capacity and potential fishery effects. Of primary interest was an evaluation of the current population size relative to the population size that can be sustained by the ecosystem in the absence of human-induced mortality. This has a direct bearing on the potential rate of recovery for these depleted stocks and provides a means of evaluating the observed population growth rate in the context of the ecosystem and uncertainties associated with the estimates of abundance and mortality. Unfortunately, this question cannot be addressed for coastal spotted dolphins because historical estimates of mortality and abundance are not available for this stock.

#### *Information Obtained Under the IDCP and Other Relevant Information*

Pursuant to the MMPA, the Secretary is also required to consider "information obtained under the IDCP" and "other relevant information" when making the final finding. To this end, NOAA Fisheries worked with the

IATTC to obtain various types of information relevant to this decision. This information included data on the number of dolphin sets made by the fishery and dolphin mortality reported by the IATTC observer program, among other things.

NOAA Fisheries also invited interested members of the public to submit such information for consideration. In order to properly assess and evaluate this outside information with sufficient time for making the finding by the date required in the statute (December 31, 2002), the deadline for submission of information was May 1, 2002. For the purposes of weighing outside information, NOAA Fisheries determined that information submitted by the deadline was submitted in a timely manner and is given greater weight than information that was submitted after this deadline. There was only one submission of outside scientific information by May 1, 2002. This consisted of a review by the IATTC of three previously published NOAA Fisheries papers on the subject of dolphin stress and other indirect effects of the tuna purse seine fishery on dolphins. NOAA Fisheries considers the review relevant, since it was received in a timely manner and was able to be evaluated and verified. The document is currently under review with a scientific journal, but otherwise has not been independently peer reviewed.

NOAA Fisheries submitted its Final Science Report to the IATTC and the MMC for their review as a mechanism by which to provide the Secretary with the best information in making the final finding. NOAA Fisheries received general comments from the MMC. The IATTC submitted comments pertaining to the NOAA Fisheries Science Report, as well as additional information and analyses. NOAA Fisheries considers this information relevant, although it was not able to thoroughly evaluate and verify the information. NOAA Fisheries did, however, prepare a cursory assessment of the IATTC's comments for consideration. In summary, the IATTC's comments include in-depth analyses of relevant information and specific comments pertaining to the analysis and interpretation of information by NOAA Fisheries. The IATTC's response also concludes that the fishery is not having a significant adverse impact on depleted dolphin stocks in the ETP. The MMC's comments concluded that there is insufficient evidence to determine that the fishery is not having a significant impact on depleted stocks and that there is only inconclusive evidence that the intentional chase and encirclement of dolphins by the fishery is having

adverse impacts on the recovery of dolphin stocks. While this information is relevant and was considered in making the finding, it cannot be weighed as heavily as the information contained in NOAA Fisheries' Final Science Report.

#### *Expert Panels*

NOAA Fisheries appointed two panels of independent scientific experts to provide individual opinions regarding the answers to the Ecosystem and the Indirect Effects questions as a means of assisting in answering the two questions in the ODP for which there are the most complex and/or uncertain data (67 FR 31279). The panelists were nominated by the public, with the help of several scientific and professional societies, and were chosen by a committee of individuals which included representatives from NOAA Fisheries, the IATTC, the MMC, and an independent scientific body. The individual experts based their opinions on a review of the results from the required research program, information obtained under the IDCP, and other relevant information, along with the expert knowledge that these individuals possess as leaders in their respective fields.

#### *Analysis*

*The Ecosystem Question.* During the period of the fishery, has the carrying capacity of the ETP for dolphins declined substantially or has the ecological structure of the ETP changed substantially in any way that could impede depleted dolphin stocks from growing at rates expected in a static ecosystem? Or has the carrying capacity increased substantially or has the ecological structure changed in any way that could promote depleted dolphin stocks to grow at rates faster than expected in a static ecosystem?

Changes in an ecosystem can fundamentally affect the carrying capacity of a species that inhabits that ecosystem. Changes that adversely affect the habitat of a species, including its prey, likely will result in a decrease in the carrying capacity of that species. For depleted species, such adverse changes also will likely slow the rate at which these species recover.

Because substantial changes in an ecosystem can affect a depleted population or stock's recovery, the ODP considers scientific evidence of whether a significant ecosystem change has occurred in the ETP and if so, how that change may be impacting depleted dolphin stocks. In considering the possible effects of ecosystem changes, NOAA Fisheries collected or reviewed