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## EXECUTIVE SUMMARY

## How We Fish Matters

With global reports of declining fisheries catches, and with the disintegration of many local fishing communities here in the United States, there is much debate about how best to manage our fisheries. Traditionally, fisheries have been managed on a “numbers” basis, species-by-species. In what is referred to as “single-species management,” the focus is on how many fish can be removed before we cause deleterious effects to future stocks. What is all too often lost in this assessment is the impact of how we fish—what gear we use, how it is deployed, and its consequences for the health and sustainability of our marine species and ecosystems.

While specific problems, such as the collapse of New England groundfish fisheries, are widely covered by the media, the ongoing harm to non-target species and damage to marine ecosystems caused by fishing is largely overlooked. Currently, almost one-quarter of global fisheries catches are discarded at sea, dead or dying, each year. Scientists estimate that 2.3 billion pounds of sea life were discarded in 2000 in the United States alone. In addition, many uncommon, threatened, or endangered species, such as sharks, sea turtles, seabirds, and marine mammals, are killed in fishing operations. There is growing concern that fishing gears that contact the seafloor damage the very habitats that marine life depend on for their survival.

These collateral impacts of fishing gears—whether the incidental take of an endangered

seabird or the destruction of a deep-sea coral reef—alter marine food webs and damage habitats, reducing the ability of marine ecosystems to sustain fisheries.

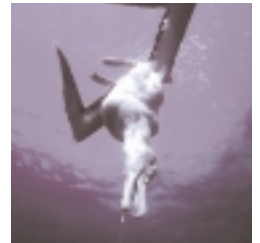
Fishers, scientists, and managers acknowledge that these problems exist, but the complexity of assessing ecological impacts associated with different gears—how we fish—has long been a stumbling block to the serious consideration of gear impacts in fisheries management decisions.

### Severity Ranking of Collateral Impacts

By synthesizing existing information and using expert knowledge, *Shifting Gears* documents and ranks the collateral impacts of various fishing gear classes. This ranking will help fishers, conservationists, scientists, managers, and policymakers in addressing the urgent need to reduce the impacts of fishing.

Although previous studies document the impacts associated with specific fishing gears, *Shifting Gears* is the first to integrate information on bycatch and habitat damage for all major commercial fishing gears, gauge the severity of these collateral impacts, and compare and rank the overall ecological damage of these gears.

While there has been clear documentation of collateral impacts in some fisheries, until now no scientific method has addressed what types of impacts are considered most harmful. It is difficult for any one sector of science or society to determine the answers to such questions as which is more ecologically damaging, a gear that kills endangered sea turtles or one that destroys a portion of a deep-sea coral forest. Social science methods can help us answer such questions by integrating the knowledge-



- *At least forty seabird species, including albatrosses and petrels in Alaska, are killed by pelagic longlines, with mortality rates high enough to cause population declines in at least half of these species. Streamer line usage is reducing this number.*



able viewpoints and values of fisheries and marine professionals to fill gaps in current ecological assessments. These answers, in turn, provide enhanced understanding of collateral impacts, which is needed for ecosystem-based management. Ecosystem-based management focuses on maintaining the health and viability of the ecosystems on which fish depend for their survival, rather than simply calculating, species-by-species, the number of fish that can be removed.

The innovative “damage schedule” approach used in this study combines existing information with the knowledgeable judgments of those involved in fisheries issues to produce a ranking of the impacts of commercial fishing gears. Using data compiled from over 170 sources, an expert panel of fishers, managers, and scientists reviewed impacts of ten commercial fishing gears widely used in the United States. The results of this workshop were summarized and incorporated into an anonymous survey that was distributed to fishery management council members (including fishers), scientists who served on the National Research Council’s Ocean Studies Board or its study panels, and fishery specialists of conservation organizations. These professionals were asked to consider the suite of collateral impacts of various gear classes in paired comparisons, each time choosing which set of impacts they considered to be ecologically most severe.

Contrary to general expectations, the results of this survey show remarkable consensus among the different groups: there was consistent agreement about which fishing gears are the most and least damaging to marine resources. The respondents rated the

ecological impacts from bottom trawls, bottom gillnets, dredges, and midwater (drift) gillnets relatively “high,” impacts from longlines, pots and traps relatively “moderate,” and the impacts from hook and line, purse seines, and midwater trawls relatively “low.” In addition, these marine professionals consistently judged habitat impacts to be of greater ecological importance than bycatch impacts.

### **Toward Ecosystem-based Management**

Taking gear impacts into account is an important first step in the move toward ecosystem-based management. Shifting effort from the gears deemed to have high impacts to those with low impacts is one way to improve fisheries management. Other methods for mitigating gear impacts include closing areas to certain types of fishing and developing new, less harmful fishing technologies or gear deployment practices. This report can serve as the basis for future policies to reduce the impact of fisheries on marine life and their habitats.

The time has come for fishery managers and conservation organizations to add fishing selectively, avoiding habitat damage, and protecting marine biodiversity as important components in maintaining ocean ecosystems and healthy fisheries. The results of this report demonstrate that people with diverse interests and experiences agree on the relative severity of ecological damage caused by different fishing gears. This consensus ranking demonstrates that common ground exists for better management of the collateral impacts of fishing gears.

