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A new approach to setting catch limits may help end overfishing in the United States.

SETTING ANNUAL CATCH LIMITS FOR U.S. FISHERIES

SUMMARY OF AN EXPERT WORKING GROUP REPORT:

Rosenberg, A., Agnew, D., Babcock, E., Cooper, A., Mogensen, C., O'Boyle, R., Powers, J., Stefánsson, G., and Swasey, J. 2007. Setting annual catch limits for U.S. fisheries.

WHEN THE U.S. CONGRESS reauthorized the Magnuson-Stevens Fishery Conservation and Management Act in 2006, it included requirements to specify annual catch limits and accountability measures for all fisheries that would prevent overfishing. In July and August 2007, the Lenfest Ocean Program convened a working group of experts in fisheries science and management to discuss applying these requirements to all species caught in U.S. waters.

The Expert Working Group developed a straightforward process for establishing sustainable catch limits for all species, including those that lack sufficient scientific data. The Group recommended a process for determining the appropriate level of precaution to ensure that overfishing does not occur, and outlined procedures for estimating catch levels in data poor situations. The Group produced a report titled "Setting Annual Catch Limits for U.S. Fisheries: An Expert Working Group Report." This *Lenfest Ocean Program Research Series* report is a summary of the Expert Working Group's findings.

ESTABLISHING A PRECAUTIONARY BUFFER

The Expert Working Group recognized that the most significant component in preventing overfishing is establishing a precautionary buffer between the scientific overfishing limit and the annual catch limit set by fishery managers. This buffer would address uncertainties in both science and management.

To set effective catch limits, the Group recommended that managers evaluate: (1) the vulnerability of the fish population to fishing pressure; (2) the uncertainties in scientific information about the status of the fish population; and (3) the uncertainties in the effectiveness of management tactics. From this information, scientists can determine a sufficiently precautionary buffer to help ensure that overfishing does not occur.

The buffer would determine how much lower to set the annual catch limit below the established overfishing level (OFL) or the acceptable biological catch (ABC) (see Box 1). In practice, greater precaution should be employed when: (1) the resource is more vulnerable; (2) there is high scientific uncertainty about the status of the population; and/or (3) there is high uncertainty about the effectiveness of management measures. For example, a fishery for a species that reproduces at an early age and for which there is good information and effective management might only need a small buffer. However, the buffer should increase if there is limited information about the fish population, the target fish is slow to reproduce, and/or fishery performance indicate that the overall catch from the fishery has not been well controlled. Focusing on the size of the buffer provides consistency in the process of dealing with various sources of risk.

BOX 1: OFL, ABC AND ACL: THE ALPHABET SOUP OF CATCH LIMITS

All regional Fisheries Management Councils establish an overfishing level (OFL), which is an estimate of the annual catch that can be taken without overfishing the resource. Some Councils also establish an acceptable biological catch (ABC) which is lower than the overfishing level and takes into account various sources of uncertainty. The Expert Working Group agreed that the acceptable biological catch (ABC) should be the upper limit for managers when setting the annual catch limit (ACL).

Uncertainty is inevitable and should be accounted for in setting annual catch limits.

One of the greatest challenges to implementing annual catch limits is the lack of sufficient scientific information for all species. The Expert Working Group stressed that catch limits need to be applied to all fish populations, not just those that constitute the majority of the catch or where extensive data are available. The Group recommended procedures for estimating catch levels in data poor situations, and cautioned against grouping fish populations of differing vulnerabilities into assemblages.

To implement these concepts, the Expert Working Group recommended that the process for setting annual catch limits follow five steps:

1. Scientists evaluate the vulnerability of the fish population based on an analysis of its productivity and susceptibility to fishing (see Box 2 and Figure 1).
2. Scientists estimate a sensible overfishing level for each population based on the concept of maximum sustainable yield, and estimate uncertainty in the knowledge of stock status and trends.
3. Managers decide on an acceptable level of risk of exceeding the overfishing level, considering the vulnerability of each resource and the consequences of overfishing.
4. Scientists recommend an appropriate buffer size between the established overfishing level/acceptable biological catch and the annual catch limit to provide reasonable assurance that overfishing does not occur.
5. To ensure accountability in the process, managers and scientists may then adjust the size of the buffer between the established overfishing level/acceptable biological catch and the annual catch limit depending on whether the fishery adheres to the catch limit and achieves the management goals.

BOX 2: CHARACTERIZING UNCERTAINTY

Vulnerability Analysis:
An evaluation of the ability of a fish stock to produce Maximum Sustained Yield on a continuing basis under a given level of fishing pressure. Stocks are more vulnerable if their *productivity* is low because of slow reproduction rates or other factors in the life history of the species, and/or they have high *susceptibility* to impacts from fishing effort due to factors such as: (1) direct capture by the fishing gear, (2) impacts from the fishing gear on their essential fish habitat, and/or (3) an already reduced population size.

Productivity and Susceptibility Analysis (PSA):
A ranking of the relative vulnerability of differing fish populations by mapping the populations in a chart that reflects both susceptibility and productivity scores. These rankings are based on information from knowledgeable experts (see Figure 1).

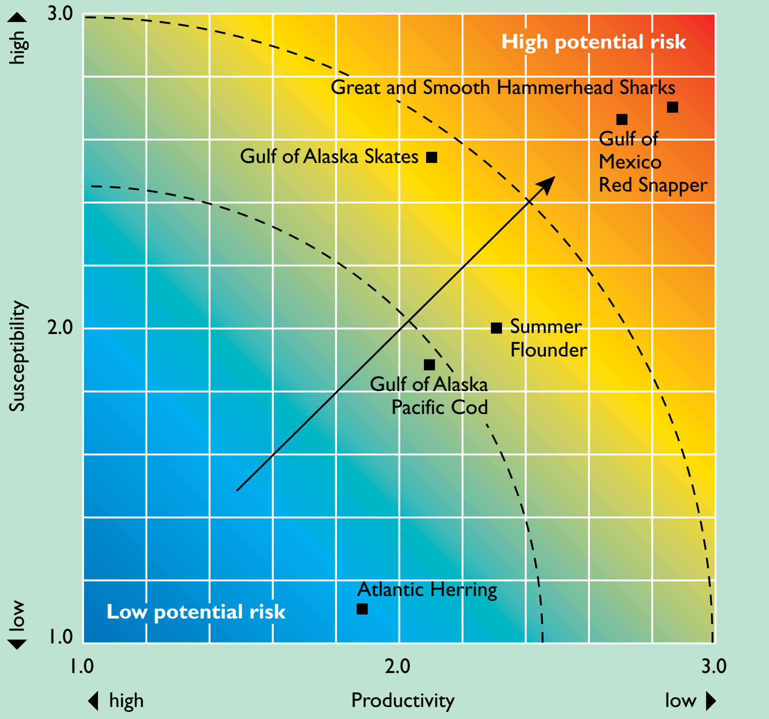
PRINCIPLES FOR GUIDANCE

Although the Expert Working Group focused on U.S. fisheries under federal authority, the recommended process is applicable to international, state and intrastate managed fisheries and builds on efforts underway around the world. While this is a conceptual framework, it can be implemented relatively quickly and is easily adapted as new information becomes available.

Additionally, the Expert Working Group identified a set of principles to guide the process and ensure consistency across fisheries:

- Annual catch limits and accountability measures should apply to all stocks, including data poor and minor components of the catch.
- Uncertainty about stock status and the efficacy of management measures is inevitable and alters the probability of overfishing. These factor should be accounted for in setting acceptable biological catch levels and annual catch limits.
- Consideration of risk must include some evaluation of resource vulnerability, including stock productivity and the susceptibility of a stock to fishing pressure.
- Grouping of stocks into assemblages for management should be avoided where possible because vulnerability and the consequences of overfishing primarily relate to individual stocks of fish.
- Setting and maintaining annual catch limits for each fishery in the United States should be considered a performance measure for that fishery and a basis for assigning accountability to managers and to the fishery.

FIGURE 1
Productivity and Susceptibility Analysis scores can reveal differences among species and different fisheries in risks of overexploitation.



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BOX 3: U.S. FISHERIES MANAGEMENT

- Federal fisheries are managed by eight regional Fishery Management Councils and the Secretary of Commerce.
- 46 Fishery Management Plans are presently established.
- These Plans include over 1,000 species organized into 530 stocks or stock assemblages.
- About 230 of these 530 stocks or assemblages are classified as major (i.e., considered target or important stocks).

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This Lenfest Ocean Program Research Series *report is a summary of a detailed report drafted by the Expert Working Group at and following two workshops in July and August 2007. MRAG Americas, Inc. convened the Expert Working Group and prepared the detailed report. The report is published at www.lenfestocean.org/publications/EWG_catch_limits.html.*

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