

## Excess Harvesting Capacity in Federally Managed Commercial Fisheries: Results from Two U.S. Reports

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This extended abstract presents information from the following two reports on excess harvesting capacity that NOAA's National Marine Fisheries Service (NMFS) completed in 2008: 1) National Assessment of Excess Harvesting Capacity in Federally Managed Commercial Fisheries<sup>1</sup> and 2) Excess Harvesting Capacity in U.S. Fisheries: A Report to Congress<sup>2</sup>. Both reports are the products of a collaborative effort that included contributions by economists and others at all of the NMFS Fisheries Science Centers and Regional Offices, the NMFS Offices of Science and Technology, Sustainable Fisheries, and International Affairs, the eight Regional Fishery Management Councils, and three universities.

The National Assessment was conducted in part to meet a commitment in the United States National Plan of Action for the Management of Fishing Capacity<sup>3</sup>, which NMFS prepared in 2004 in response to 1) NMFS stewardship responsibilities; 2) the United

Nations Food and Agriculture Organization (FAO) International Plan of Action for the Management of Fishing Capacity<sup>4</sup>; and 3) the national and international concerns that overcapacity, overfishing, and other often co-occurring undesirable outcomes of a common underlying management problem prevent the attainment of the objectives for sustainable fisheries.

The Report to Congress was required by the Magnuson-Stevens Fishery Conservation and Management Act (MSA) as amended in January 2007. The National Assessment was used in preparing the Report to Congress. The Report to Congress includes harvesting capacity assessments for 25 fisheries, 60 fleets, and 127 species groups; identifies and described the fisheries with the most severe examples of excess harvesting capacity; and discusses measures to reduce excess harvesting capacity.

Presented here are the definitions of harvesting capacity, excess capacity, and overcapacity used in the two reports; a summary of the method used to estimate harvesting capacity; and some of the findings and policy recommendations in the two reports.

The reports define "excess harvesting capacity" to mean "too much" harvesting capacity and uses the following three measures or indicators of excess harvesting capacity:

- 1) Excess capacity: the difference between capacity and actual harvest,
- 2) Overcapacity: the difference between capacity and the harvest quota, and
- 3) Overharvest: the difference between

the actual harvest and the harvest quota.

Data envelopment analysis (DEA), trip-level catch data, and data on the physical characteristics of fishing vessels were used to estimate harvesting capacity by species groups, trip, and quarter (or other multi-month period). Those estimates were aggregated to provide estimates of harvesting capacity, excess capacity, overcapacity, and overharvest by fishery and species group, as well as estimates of harvesting capacity and excess capacity by fleet.

DEA is a mathematical programming approach that has been used to estimate capacity for a variety of industries and fisheries. Both reports include 11 basic terms of reference and constraints for the estimates that are intended to put the estimates in the appropriate context and to clarify the nature of the estimates, thereby increasing the probability that the estimates will be interpreted appropriately.

The two reports indicate that the excess capacity, overcapacity, and overharvest rates vary considerably among regions and fisheries, among fisheries themselves, and even among fleets and species groups within individual fisheries. High rates of excess capacity and overcapacity were accompanied by species groups that were subject to overfishing in 2004 in some federally managed commercial fisheries. In other fisheries with high rates of excess capacity and overcapacity, effective management of the use of harvesting capacity or other factors prevented overfishing, but they often did not prevent all the other co-occurring undesirable outcomes.

<sup>1</sup>Available online ([www.nmfs.noaa.gov/ocs/mfac/meetings/2008\\_11/docs/excess\\_harvesting\\_capacity\\_in\\_us\\_fisheries\\_appendix\\_c.pdf](http://www.nmfs.noaa.gov/ocs/mfac/meetings/2008_11/docs/excess_harvesting_capacity_in_us_fisheries_appendix_c.pdf)).

<sup>2</sup>Available online ([www.nmfs.noaa.gov/ocs/mfac/meetings/2008\\_11/docs/excess\\_harvesting\\_capacity\\_in\\_us\\_fisheries\\_report.pdf](http://www.nmfs.noaa.gov/ocs/mfac/meetings/2008_11/docs/excess_harvesting_capacity_in_us_fisheries_report.pdf)).

<sup>3</sup>Available online ([www.nmfs.noaa.gov/ia/resources/publications/ccrf/npoa\\_management-fishingcapacity2004.pdf](http://www.nmfs.noaa.gov/ia/resources/publications/ccrf/npoa_management-fishingcapacity2004.pdf)).

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<sup>4</sup>Available online (<http://www.fao.org/docrep/006/X3170E/x3170e04.htm>).

A high excess capacity rate indicates that the actual harvest in 2004 could have been taken by much smaller fleets and, therefore, at a lower cost, if the fleets had operated at capacity. A smaller fleet could have consisted of fewer vessels, fishing vessels that on average had less harvesting capacity, or both. The cost reductions could have included lower operating costs and annual fixed costs as well as reduced costs associated with, for example, bycatch, impacts on habitat, unsafe fishing practices, and fishery management.

The reports emphasize that, when they occur, overcapacity and overfishing are just two of the often co-occurring undesirable outcomes of a common management problem that prevents the attainment of the objectives for sustainable fisheries. The other undesirable outcomes include high levels of bycatch, adverse impacts on habitat, substandard vessel safety, lower product quality, poor economic performance, less viable fishing communities, noncompliance with regulations, and a fishery management regime that is unnecessarily complex, contentious, and costly.

The common underlying management problem is that, in the absence of well-defined and secure harvest privileges, the race for fish typically is used to allocate the allowable catch among competing fishermen, and the race for fish provides incentives for individual fishermen to increase harvesting ca-

capacity, to contribute to overfishing, and to take other actions that prevent the attainment of the objectives for sustainable fisheries. The severity of the undesirable results of this problem can be increased by inadequate information, monitoring, and enforcement, which, in part, can be due to the underlying problem. Basically, without well-defined and secure harvest privileges, the interests of individual fishermen are not aligned with the objectives for sustainable fisheries and fishermen do not have sufficient incentives to support investments in the conservation and management of fishery resources.

Based on the two reports, NMFS found that

- 1) It is possible, but typically not practical, to prevent overfishing by managing the level of harvesting capacity without also managing the use of harvesting capacity.
- 2) Efforts to address the often co-occurring undesirable outcomes individually without addressing the common underlying management problem often have increased the severity of those outcomes and are likely to fail.
- 3) Fishery management would be improved by initiating or accelerating efforts to identify and implement feasible catch share programs that reflect fishery-specific conditions, objectives, and fishery management capabilities and that will assist in ending/pre-

venting overfishing, recovering overfished species groups within mandated schedules, managing the level and use of harvesting capacity more effectively, and decreasing the severity of the other often co-occurring undesirable outcomes by addressing the common underlying management problem.

- 4) The cost of providing adequate monitoring of total catch by species group is a critical factor in determining if an effective catch-share program is feasible for a specific fishery or fleet.
- 5) The number, size, and horsepower of fishing vessels are some of the determinants of harvesting capacity, but they are not measures of harvesting capacity.

Portions of this abstract were earlier presented in Joseph Terry and Minling Pan. 2008. Findings of Two Recent U.S. Reports on Excess Harvesting Capacity in Federally Managed Commercial Fisheries. *In* Ann L. Shriver (Compiler), Proceedings of the Fourteenth Biennial Conference of the International Institute of Fisheries Economics & Trade, July 22-25, 2008, Nha Trang, Vietnam: Achieving a Sustainable Future: Managing Aquaculture, Fishing, Trade and Development, 12 p. International Institute of Fisheries Economics and Trade, Corvallis, Oregon, (online at <http://ir.library.oregonstate.edu/xmlui/bitstream/handle/1957/37737/360.pdf?sequence=1>).