

# **Design and test a monkfish grid to reduce juvenile monkfish in the Gulf of Maine multispecies trawls**

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**Summary.** This developmental project involves design and test of a monkfish grid to reduce juvenile monkfish catch in the trawls targeting monkfish and other groundfish species in the Gulf of Maine. Excessive undersize monkfish catch and subsequent discard in trawls is contrary to the sustainable exploitation of the resource. A Nordmøre grid-style device will be tested to exclude small monkfish passing through a 90 mm spacing grid. Successful result of use this or similar grid will lead to comprehensive test in trawls targeting for monkfish (the large mesh sector). The grid design utilizes information obtained from a previous research on grids for separating fish species and sizes. The preliminary grid will be 90 mm grid spacing and installed at 48 to 60 degrees. The alternating tow method will be used to evaluate the design in terms of juvenile monkfish reduction, retention of legal size monkfish and other commercial groundfish species, and operational aspects for handling the grid with existing deck equipment. However, sea trials have not yet carried out.

**Objectives and Statement of Research.** The objective of the proposed research is to test a rigging design for the Nordmøre grid to reduce fish bycatch. The proposed research will involve:

- Design and manufacture a grid suitable exclusion of undersized monkfish.
- Conducting full scale trials with the grid onboard a commercial trawler in Gulf of Maine;
- Conducting underwater video camera observation of the behavior of fish exiting the grid openings under fishing conditions;
- Evaluate the design or its modification for potential of more extensive sea and/or flume tank tests.

- Successful development of a monkfish grid will lead to research proposals in the next round of cooperative research funding competition of the Northeast Consortium and other funding agencies.

**Background.** Monkfish or goosefish, *Lophius americanus*, is a bottom-dwelling species inhabiting in the northwest Atlantic from Gulf of St. Lawrence and Grand Banks to Florida. In Gulf of Maine, monkfish are typically harvested by trawls and gillnets. In trawl fisheries, the species is caught in the multispecies fishery targeting various groundfish species, as well as in the “large mesh” trawls where the minimum codend mesh size is 10". Research has been conducted to determine various larger codend mesh sizes to reduce undersized monkfish in the fishery, but large loss of legal size fish often accompanied by a reduction in the amount of undersize fish released (Glass, 2005). Grids have been tested to reduce undersized monkfish in the west coast of Africa. Maartens of Namibia and his colleague in Norway (Maartens *et al.*, 2005) tested two grids designs made of rings and were able to reduce juvenile monkfish (*Lophius vomerinus*). He & McNeel (2005) noticed a substantial separation of monkfish sizes by various grid designs during a project to separate different groundfish species. One example of size separation by a 90 mm horizontal RoolerGrid is shown in Figure 1. The fish in the lower codend which contains mostly undersized fish can potentially be released in this example. The project was funded by the Northeast Consortium, and the final report on the project will be submitted soon.

We intend to design and preliminary test two grids and compare with a regular codend without a grid to evaluate potential of grid uses for releasing juvenile monkfish in multispecies trawls.

**Design Concept.** The grid was “Nordmøre-style” except that the top of the grid had an opening of 1' (30 cm) high and lead to the codend, and a small mesh panel behind the grid to guide small fish passing through the grid spacing to the exit on the bottom (Figure 2). We plan to test two grid designs. One is the 90 mm bar spacing horizontal RollerGrid and another is the 90 mm Diagonal grid as tested in the previous experiment. Overall size of the grid is 1 m x 1.4 m and the grid is installed at an initial angle of 50°.

### **Work Carried Out**

Gear design was completed and grids were fabricated. However, due to vessel availability and exempt fishing permit, sea trials were not carried out. It is suggested that the design concept and grids are incorporated into a new proposal which is being prepared for the NMFS Cooperative Research Program.

### **References**

Glass C (2005). Presented at the Maine Fisheries Forum. March 1, 2005.

He P and NcNeel B (2005). Design and test of grid devices to improve size and species selectivity in the Gulf of Maine multispecies trawl fishery. Interim report submitted to the Northeast Consortium. University of New Hampshire, Durham, NH. UNH-FISH-REP2005-022. 21 p.

Maartens L, Gamst KA and Schneider PM (2002). Size selection and release of juvenile monkfish *Lophius vomerinus* using rigid sorting grids. Fisheries Research, 57: 75-88.

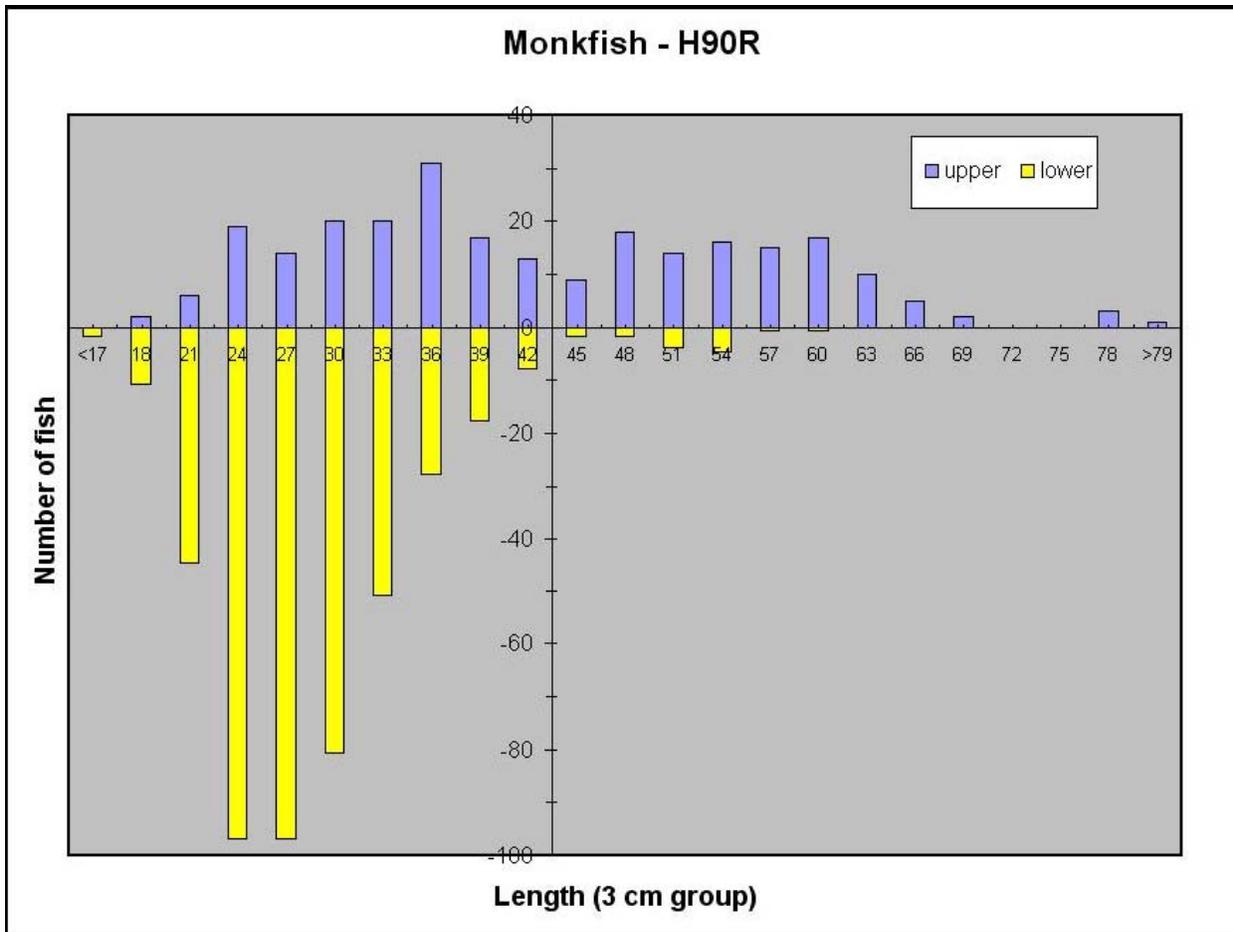


Figure 1. Size distribution of monkfish passing through of a 90 mm RollerGrid. (He & McNeel, unpublished).

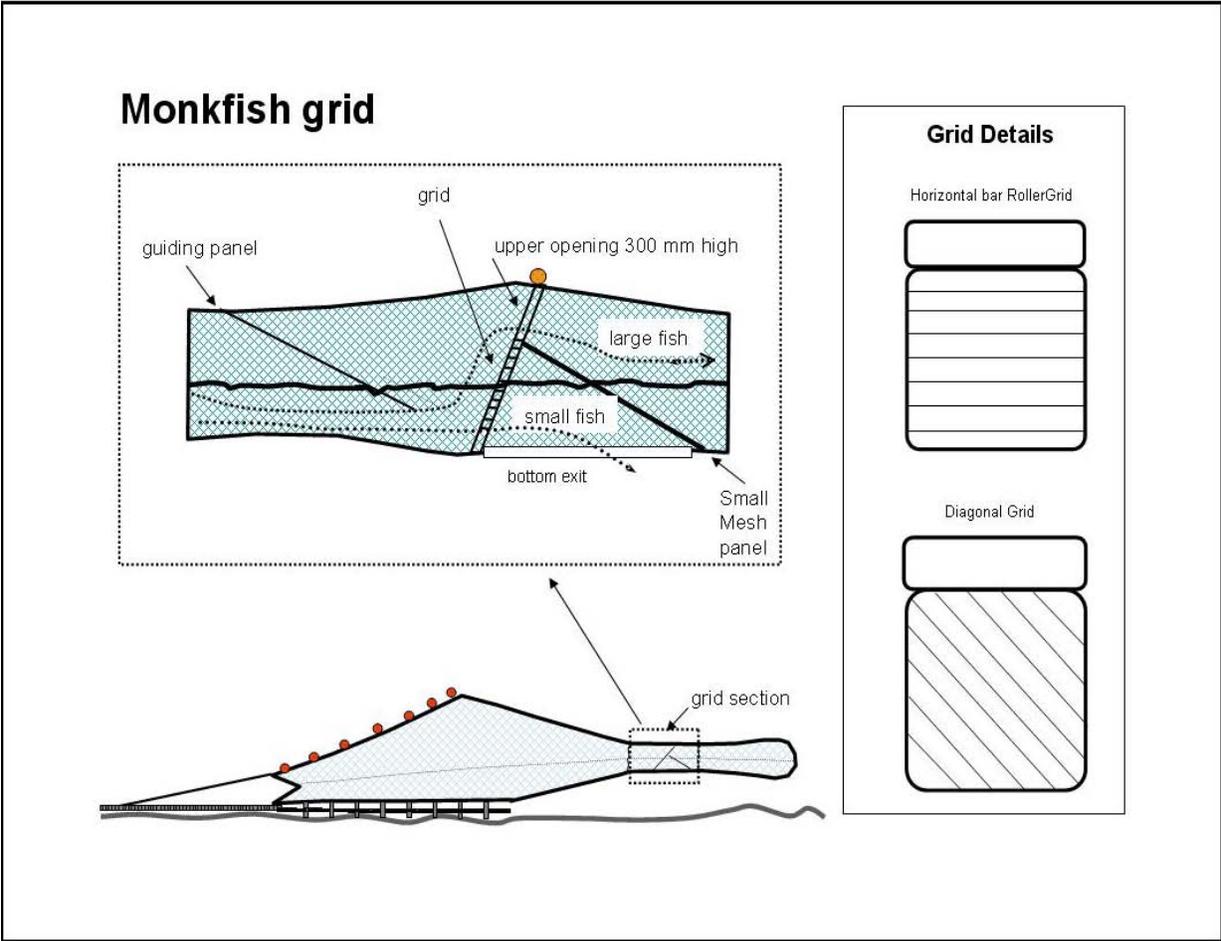


Figure 2. Conceptual design of a monkfish grid.