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Final Report

Design and Test of an Innovative Large Mesh Whiting Trawl to Reduce Spiny Dogfish Bycatch in the Southern New England Whiting Fishery

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Part I

Final Report Summary

Report title:	Design and Test of an Innovative Large Mesh Whiting Trawl to Reduce Spiny Dogfish Bycatch in the Southern New England Whiting Fishery
NOAA Award No.:	NA09NMF4720414
CFDA #:	11.472
Project leader:	Pingguo He University of Massachusetts Dartmouth School for Marine Science and Technology 706 South Rodney French Boulevard, New Bedford, MA 02744 Tel. (508) 910-6323, Email: phe@umassd.edu
Key collaborators:	Elias Olafsson, Dantrawl Inc., Seattle, WA Patrick McGlade, F/V "Enterprise", Wakefield, RI Donald Follett, F/V "Cody", Charlestown, RI
Funding agency:	Commercial Fisheries Research Foundation South New England Collaborative Fisheries Research Initiative P.O. Box 278, Saunderstown, RI 02874
Project Period:	June 1, 2010 – October 31, 2012
Funding Amount:	$204,301
List of Equipment:	None

Summary of Tasks Scheduled:

- Design a large mesh semi-pelagic trawl suitable for the southern New England whiting fishery;
- Construct a full-scale trawl system by a gear manufacturer and rent it to the project;
- Conduct sea trials in Southern New England waters to evaluate its effectiveness, operation and handling in the fishery;
- Sample catch and bycatch, and record fishing conditions
- Provide statistical analysis
- Prepare progress reports and the final report
- Conduct outreach and technology transfer upon successful sea trial results

Summary of Tasks Accomplished:

- Project partner Dantrawl Inc. of Seattle designed a Conquest 144 – 6.40 m mesh semi-pelagic whiting trawl
- Dantrawl constructed the trawl and rented it to the project
- The project also rented a pair of Thyboron Type 15VF 4.5 m^2 door from Trawlworks of RI
- A total of twenty-three fishing days were completed in fall 2010 and spring 2011 onboard two fishing vessels F/V "Enterprise" and F/V "Cody"
- Elias Olafsson, Stig-Rune Yngvesson and Pete Pedersen of Dantrawl, Pingguo He, Chris Rillahan, Sally Roman, and Shannon Bayse of SMAST, David Chosid of MA DMF, and Nathan Keith of NOAA Fisheries participated sea trials along with Caption Donald Follett and Patrick McGlade and their crew
- Three progress reports were submitted
- Two presentations were made at the foundation-sponsored meetings
- Outreach is continuing

Explanation of any problems encountered or differences between the scheduled and accomplished tasks:

- No difference between the scheduled and accomplished tasks
- It took longer than that was originally planned to tune the new trawl and to make adjustment/modification to the new trawl.

Summary of Project Results:

This project was to test a new large mesh whiting trawl, designed by Dantrawl Inc. of Seattle, for the Southern New England whiting (silver hake, *Merluccius bilinearis*) fishery to reduce bycatch of spiny dogfish (*Squalus acanthias*). Started in June 2010, this project has been a true collaboration among a scientist, a gear manufacturer, and the fishing industry. The purpose of the project was to demonstrate if the large mesh trawl, which has been proven in Alaskan pollock fishery, could maintain or increase whiting catch while reducing bycatch of spiny dogfish.

A full-scale large mesh whiting trawl was designed and fabricated, and necessary modifications were made after initial sea trials. A pair of semi-pelagic trawl doors (Thyboron Type 15VF, 4.5 m^2) that can operate both on and off bottom was rented for use with the project. Sea trials started in September 2010 with F/V "Cody" and F/V "Enterprise" using parallel tow method with a commercial whiting trawl as the control. At the end of that segment, gear rigging was finalized. Sea trials continued in April and May 2011 during which 37 paired-tows were completed. Thirty-six paired-tows were valid pairs, with one pair being excluded because the codend was not brought on board the vessel due to excessive dogfish in the control gear.

From the analysis of the valid 36 pairs, it was found that the new large mesh trawl increased catch of targeted whiting by 34% (mean 35.9 kg/h control vs. 48.3 kg/h experimental), but the increase is not statistically significant (non-parametric paired randomization test, N=36, p=0.0874). Catch rates of red hake (*Urophycis chuss*), longfin squid (*Doryteuthis pealeii,* formally *Loligo pealeii*), and scup (*Stenotomus chrysops*) were similar between the control and the experimental trawls (N=36, p>0.05). The new trawl significantly reduced the catch of spiny dogfish (by 58%, p=0.0391), butterfish (*Peprilus triacanthus*) (by 46%, p=0.0080), flounders (yellowtail, *Limanda ferruginea*; windowpane, *Scophthalmus aquosus*; winter, *Pseudopleuronectes americanus*; and four-spot, *Paralichthys oblongus*) (by 72%, p=0.001), and skates (little skate, *Leucoraja erinacea* and winter skate, *Leucoraja ocellata*) (by 71%, p=0.001), when compared with the commercial trawl.

While the new trawl achieved the project's goal of maintaining targeted whiting catch and reducing bycatch of dogfish, the results need to be viewed with caution, as the overall and individual catch rates of whiting were relatively low (0 to 215 kg/h). Therefore more comparative experimental tows are required in the range of commercial catch rates before the new trawl can be recommended for commercial use in the Southern New England whiting fishery.