

## SPOTLIGHT ON SCIENCE

### Increasing Profit and Reducing Environmental impact in Port Clyde's Trawler Fleet

Experimental fishing gear with the potential to cut fuel consumption, catch better quality fish, and reduce environmental impact is the coffee-talk among Port Clyde's groundfish fleet. Members of the Mid-coast Fishermen's Association (MFA) huddled into the office at Port Clyde Fresh Catch early this summer to discuss the results of a test run on a new trawl design. The MFA, along with Steve Eayrs, Gear Technologist at the Gulf of Maine Research Institute (GMRI), recently traveled to Newfoundland, Canada, home of a flume tank used to test trawl gear.

This tank—the only one of its kind in North America—consists of a large pool of re-circulating water that is forced through a scale model stationary trawl, with a conveyor belt on bottom simulating the seafloor. At one side is a viewing area where researchers can watch the effect of rigging adjustments on trawl behavior and geometry.

They compared the behavior of two trawls: the "Standard Cushman Trawl" built by Randy Cushman of Port Clyde, and an experimental trawl, similar to the Cushman, only with modifications made by Eayrs and the fleet in an effort to save on fuel and reduce bycatch. The body section in the experimental trawl is constructed with larger mesh and smaller diameter twine, to reduce resistance through the water and associated drag.

After a series of tests and tweaks in the tank, the experimental trawl showed about a 16% improvement on drag, which directly translates to fuel savings. "We gained 16% without even touching the otter boards," said Eayrs. Otter boards are devices that keep the mouth of the trawl open. With larger-mesh netting and less trawl drag, there's a good chance that the otter boards could go smaller as well, saving even more fuel. "There is a potential to cut fuel costs by up to a fifth using this trawl and smaller otter boards," he added. Of course, less fuel consumption means lower greenhouse gas emissions as well.

The team was also able to remove some of the floats on top of the trawl mouth, making the trawl open wider, which is better for catching flatfish, according to Cushman. "We're not worried about height with this [trawl]," said Cushman, "so it's good to see that mouth a little wider."



A team of fishermen and scientists make changes to an experimental trawl in a flume tank at the School of Fisheries and Marine Institute of Memorial University of Newfoundland.

New England fisheries have changed a lot over the past few years. Regulations have tightened while operating costs continue to rise and fish prices remain stagnant. "We need to start thinking about the fishing business more holistically," said Eayrs. It's not just about fish poundage anymore, he described, but rather a situation where fishermen need to maximize fishing profits from smaller catches while simultaneously reducing environmental impact.

Most recently the groundfishery has moved away from the old days-at-sea regime of catch limitation. Under a new system known as harvesting sectors, groups of fishermen like the MFA will be allocated what can be described as a bank account of fish they can catch over the course of the season.

One of the challenges of this new system is the use of an "assumed discard rate" of undersized commercially important fish that counts against their allocation each time a

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## PORT CLYDE CONTINUED

groundfish fisherman goes out fishing. If there isn't enough observer data to know how many pounds of different species are thrown back at sea, then the rate will be assigned based on an industry average. So in some cases, fishermen may have an assumed discard rate for species that they never typically see, or have a rate applied that is higher than their true discard rate. A concern of the Port Clyde fleet and another goal of this project is to arrive at more accurate discard rates for their sector with use of better data and better observer coverage.

The team has built this year's project objectives on previous work in an effort to create an Environmental Management System (EMS). An EMS has a two-part mission: (1) to identify, manage, and reduce impact on the environment; (2) to improve safety, operating efficiency, and seafood quality and value. It is a continuous process that allows fishermen to stay on top of pressing challenges. This is the first time an EMS has been attempted in a U.S. fishery.



The team sits in the viewing area of the facility, Cushman (left) grins as he sees his trawl in action.

Over the past two years, the team experimented with four different cod-ends (the rear section of the trawl where fish collect), testing different mesh sizes and shapes. They found that 6 ½-inch and 7-inch square meshes allowed for better escape of non-commercial and undersized commercial fish, in comparison to the diamond meshes of the same size.

"These guys are actually going beyond what is required by regulation in order to be more environmentally friendly."

—Steve Eayrs, GMRI

This summer, fisherman Gary Libby outfitted his gear with the seven-inch mesh cod-end for its first commercial use and saw a reduced discard rate of non-commercial fish from about 30 lbs/hour to about 5 lbs/hour. All harvestable fish retained from the trawl were in very good condition, according to Libby. "I lost a few fish, but they gave me a better price at the dock for the quality and it more than compensated," he said.

But the work isn't over yet. A full-scale trawl based on the model tested in Newfoundland this spring still needs to be constructed and fitted to boats to see how they perform in the ocean. Two boats will be outfitted with fuel consumption meters, to track how fuel is being used throughout fishing operations. Obviously, this will vary from boat to boat, but it will give them an idea of how different factors effect fuel use—things like cruising speed, towing speed, tide, wind, catch, and trawl design.

An energy audit is also in store for the Port Clyde fleet. The audit will tell them what changes could be made to their vessels in order to improve efficiency—and provide them with a payback period so they can decide if the change will be worth it. An auditor will look at things like propeller condition, engine age and wear, etc.

"Their new business model will help them make better informed decisions," said Eayrs, "and they're well on their way to becoming a highly productive, fuel efficient, and environmentally responsible fishing fleet."

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