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Final Report

Preliminary Test of a Cod Pot off the Coast of Maine



Submitted to:



The Northeast Consortium
142 Morse Hall
University of New Hampshire
Durham, NH 03824

July 2006

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Final Report

Preliminary Test of a Cod Pot off the Coast of Maine

by

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in association with

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Submitted to

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Preliminary Test of a Cod Pot off the Coast of Maine

Summary. Ten fish pots were manufactured and tested for ten fishing days at sea in Casco Bay in the spring of 2004. These pots were also used by the industry partner for another related project funded by other agencies in spring and summer of 2003 and 2004. The pots were 4' and 5' square, 2' or 2.5' high, and could be handled by the 46' F/V "Tenacious" without any problem. No substantial amount of fish was caught during two years' trials. Underwater observations on two of the pots did not see any fish near the pot. We consider that the reason for pots not to catch cod is unsuitable time of the year the pots were fished.

1. INTRODUCTION

Groundfish species such as cod and haddock in inshore waters of the Gulf of Maine was first harvested by hook and lines, and then mainly by trawls and gillnets from the early to middle of last century. Each gear type has positive and negative aspects regarding conservation and sustainable use of the groundfish resource, including species and size selectivity, post-selection survivability of escapees and discards, environmental impacts of fishing operations, energy conservation and product quality.

Faced with ever-increasing rules and regulations, and pressures from environmental and other interest groups, the fishing industry has been working diligently with researchers through various cooperative research projects to gather fish and fisheries data and to carry out conservation engineering projects aimed at reducing bycatch and discard during fishing operations, and to improve survival of those discards due to gear selectivity and management limitations. While improving traditional fishing gears should continue, developing new fishing gears may contribute to the sustainable use of the resource.

While there is no commercial fish potting fishery in New England at present, fish pots of various designs are being used all over the world. Examples of such baited pots include pacific cod pots in Alaska, sea bream pots in New Zealand, snapper pots in Australia (see Furevik, 1994). Cod pots are being tested in Newfoundland with promising results. Fishing cod and other groundfish with

baited pots can be a viable alternative to traditional fishing gears if reasonable catch rates can be achieved:

- ◆ Environmentally friendliness. Pots do not damage or alter the seabed. Potential for ghost fishing by lost pots can be controlled by escape panels and release devices.
- ◆ Good species and size selectivity. The size and species of fish to be entrapped can be controlled by varying certain design features such as entrance size, mesh size, escape vents, and type of bait.
- ◆ High quality catch. The fish is alive when brought on board.
- ◆ A good source of live fish. In conjunction with on board holding facilities, this fishing method will be ideal for providing live cod for farming, tagging and other uses.
- ◆ Energy efficient. As a type of stationary gear, potting requires very little energy during operations.

For many inshore fishermen using small vessels, baited fish pots may be a profitable and conservation oriented method for harvesting their share of the daily possession limit of cod, and other groundfish species. While the fish pot is not expected to replace the existing gears, it may create an alternative method during certain time of year. Depending on the location of the fishing grounds, the pot may be used as a supplemental fishing gear. Pots may also be used in deeper waters or irregular grounds.

2. OBJECTIVES

The objective of the development project was to test a baited groundfish pot for inshore vessels in Gulf of Maine so as to improve species and size selectivity, increase survivability of discards, provide quality catch, reduce seabed disturbance during fishing, and reduce energy cost of fishing.

The project involved in:

- ◆ Designing and fabrication of prototype pots involving a commercial gear manufacturer;
- ◆ Conducting sea trial involving a commercial fisherman as partner;
- ◆ Conducting underwater video camera observation of the behavior of fish near the pot;
- ◆ Evaluate handling of the pot on board an inshore vessel.

3. METHODOLOGY

3.1 Newfoundland Visit

While in Newfoundland in December 2003 for another project, the research team joined researchers of the Memorial University of Newfoundland on a cod pot experimental fishing trip. The principal investigator and the industry partner witnessed various pot designs and their operations.



Exhibit 1. The industry partner (second on the left) and the principal investigator (not in the photo) onboard F/V “Miss Cherise” on an experimental pot fishing trip in Newfoundland on December 6, 2003.

3.2 Pot Design

The pots were constructed using wire mesh materials. Two sizes of pots were constructed and tested. They all had square bottom. The 5' pots were 5' x 5' x 2.5' made of 2" square wire meshes and 4' pots were 4 x 4x 2' made with 1.5 x 2" wire meshes (Exhibit 2). Ten pots were constructed for this portion of the project, while some more pots were made for another related project sponsored by the Maine Technology Institute and Maine Department of Marine Resources. Some

pots were made with twine roof tops similar to those tested by He & Walsh (2000). Roof top twines, if installed, were made of 6" PE netting. Most of roof top netting was supported by a PVC collar of 3' x 3' square to increase the volume of the roof top area. All pots had two entrances, and most of them were offset in their relative positions. Designs of the ten pots are listed in Exhibit 3.



Exhibit 2. One of the 5' x 5' cod pot used for sea trials. Netting was added to the top of the pot to increase volume.

| Pot # | Size | twine top | Entrance offset | Entrance size | Trigger |
|-------|------|----------------|-----------------|-----------------------------|-----------------|
| 1 | 4' | No | Yes | 24"x10" | No |
| 2 | 5' | Yes, w/collar | Yes | 18"x24" | lobster trigger |
| 3 | 5' | Yes, w/collar | Yes | 18"x24" - 6"x8" | lexan trigger |
| 4 | 4' | No | No | 24"x10" | Neptune finger |
| 5 | 5' | Yes, w/collar | Yes | 18"X24" - 6"x8", 22"(L) | lexan trigger |
| 6 | 5' | Yes, w/collar | Yes | 18"X24" - ϕ 8" | lexan trigger |
| 7 | 5' | Yes, w/collar | No | 18"X24" - ϕ 8", 10"(L) | lobster trigger |
| 8 | 5' | Yes, w/collar | No | 18"X24" - ϕ 8", 10"(L) | lobster trigger |
| 9 | 5' | Yes, no collar | Yes | 18"X24" - ϕ 8", 24"(L) | No |
| 10 | 5' | Yes, w/collar | Yes | 18"X24" - ϕ 8", 24"(L) | No |

Exhibit 3. Sizes and designs of the ten pots tested at sea.

3.3 Sea Trials

Operation. Preliminary sea trials were conducted in Casco Bay in southern Maine during the spring of 2003. The experiment was carried out on board “F/V Tenacious”, a 46' fishing vessel owned and operated by Capt. Proctor Wells, the industry partner (Exhibit 4). The vessel was equipped with necessary fishing equipment and a pot hauler suitable for the operation (Exhibit 5).

The pot was set individually, similar to inshore lobster pot, with one pot attached to each line and marked with a buoy. Herring, mackerel, alewife and porgy were used as bait. The amount of bait was between 5 to 10 lbs per pot, in one or two bait bags. The pots were set for at least 24 hours before being hauled. A total of ten pots was fished, each deployed and retrieved ten times.



Exhibit 4. F/V “Tenacious”.



Exhibit 5. Cod pot being hauled over the rail of F/V “Tenacious”.

Underwater monitoring of fish and the fishing gear. An underwater video camera with a time-controlled digital video recording unit was used to record fish behavior and functioning of the pot during sea trials. The camera was attached to the roof top netting above the pot, overlooking the pot (Exhibit 6). Each session of recording lasted for 2 hours and 8 minutes, as limited by the length of the video cassette.



Exhibit 6. Underwater camera installed above the pot with the recording unit inside the pot.

4. RESULTS

Ten fishing days were completed during the spring of 2003. In addition, the industry partners fished the same pots, together with other pots for another 16 days during the summer of 2003 and spring of 2004 for a related project funded by the Maine Technology Institute and Maine Department of Marine Resources. Unfortunately, very few fish were caught during the entire 26 fishing days spanning two years. The total fish caught included one cod (31 cm), three wolffish (68, 86, and 63 cm), two dogfishes (71, 77 and 78 cm), two redfishes (21 and 17 cm), one cusk (68

cm), one red hake (24 cm), a few longhorn sculpins, rock crabs, and lobsters.

The 46' F/V "Tenacious" was able to handle the pot with two crew members without problems. If the pots are able to catch a reasonable amount of target species, the same size vessel class, or even smaller sizes, can readily adopt the pot design for commercial use with minimal deck machinery.

Two pots were observed on 03/19/2003. The video camera was able to cover the whole pot and surrounding areas (Exhibit 7). Unfortunately, no fish were seen on the video recording. Apparently, there were no fish in the area at the time of observation.

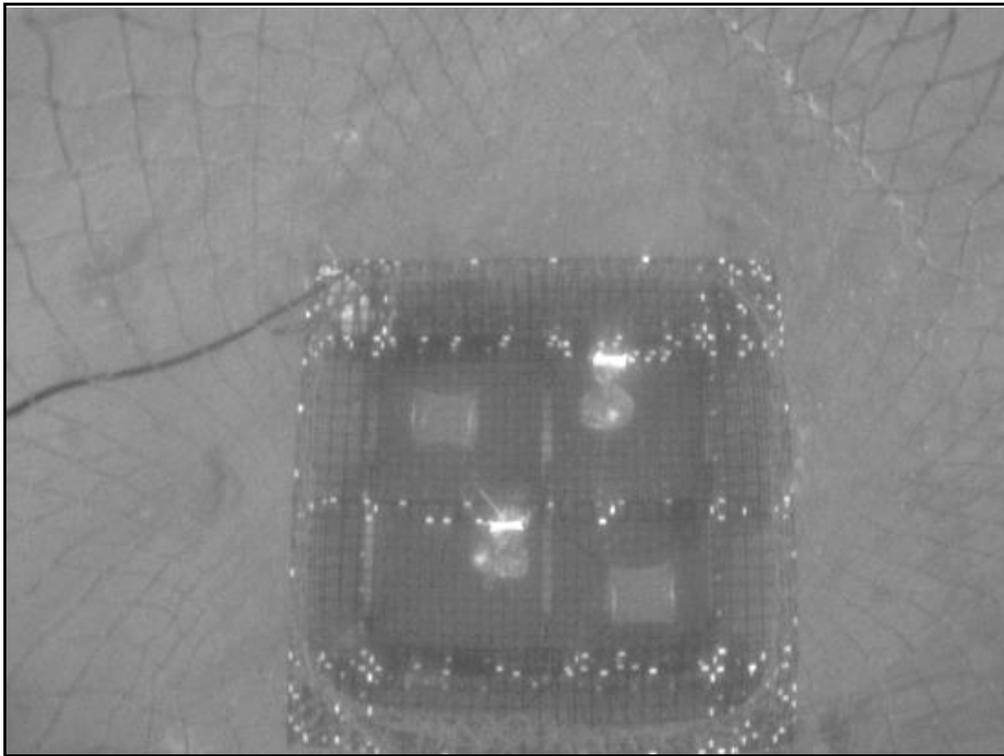


Exhibit 7. The pot as seen by the underwater video camera at the depth of 26 fathoms on March 19, 2003. The pot was 5' x 5' x 2.5'. The white dot seen are clips joining the wire meshes.

5. DISCUSSIONS

5.1 Fish Capture by Baited Gears

Sea trials did not result in substantial catch of the target species, the Atlantic cod. The reason for not catching the fish may be a result of seasonality in baited pot fishing. Other cod pot experiments were more successful, but also showed strong seasonal differences in catch rates (M. Pol, personal communication). Fish capture by baited fishing gears needs to be carried out when fish are actively feeding and when natural food is not plentiful on the fishing grounds. In absence of a baited gear fishery (eg. baited longlines) in the coast of Maine, no comparison can be made. It is advisable that longlines and gillnets are fished along with experiment fish pots when future similar experiments are carried out.

5.2 Partnership between Fishermen and Researchers

This project is a joint effort of a commercial fisherman, the University of New Hampshire researcher and a gear manufacturer (Riverdale Mills). This project also forms a part of a larger project funded by the Maine Technology Institute and Marine Department of Marine Resources. The industry partner, another fisherman, and Maine Sea Grant are involved in the larger project.

5.3 Impacts and Applications

Suitable pot designs for different species will provide fishermen and fisheries managers options for accessing certain species available for harvesting. Successful pots may be suitable for “B” Days-At-Sea use if they target species of relatively high abundance. Pot-caught fish could be marketed at high prices at certain niche market. Pot-caught fish are also most suitable for tagging and brood stocks. However, the pot tested during this project did not land reasonable amount of cod. It is thus not recommended for use in the commercial fishery without more extensive testing of the gear and determination of the time of the year when the gear is suitable.

5.4 Future Works

We understand that a cod pot project has been funded to test the bait pot around Cape Cod area (Pol and Walsh, 2005). The existence of a commercial longline fishery near Cape Cod would provide good guidance in terms of location and time (season) for the baited pot experiment. We

will propose further works on baited pots along the coast of Maine and New Hampshire upon successful completion of the cod pot project by Massachusetts colleagues.

In future fish pot experiments, gillnets or longlines should be fished near test pots to verify abundance and feeding condition of the target species in any future pot testing. Extensive use of underwater video or time-lapse camera systems are advised in developing fish pots for groundfish species.

6. ACKNOWLEDGMENT

The project was supported by the Northeast Consortium, a joint initiative of the University of New Hampshire, University of Maine, Massachusetts Institute of Technology and Woods Hole Oceanographic Institution. Riverdale Mills contributed wire mesh materials for the project.

7. REFERENCES

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8. ADDITIONAL IMAGES

Large format is available upon request.







