

NORTHEAST CONSORTIUM

Annual Report: 2008

2006 Cooperative Research Award (07-072):

Development of a Juvenile Shrimp Trap for use in Establishing a Juvenile Abundance Index for the Gulf of Maine Northern Shrimp, *Pandalus borealis*.

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Kelo Pinkham played a key role in project design and implementation.

Project objectives and scientific hypotheses:

Our objectives were to further examine a juvenile shrimp trap developed under a North East Consortium Project Development award in 2005 for use in obtaining a juvenile abundance index intended for management purposes. Managers of the fishery yield would benefit from a more reliable juvenile (1/2 – 1 1/2 year old) shrimp abundance index in order to set the season 2-3 years in advance. If the traps designed during the Project Development award sufficiently sample the juvenile population then they could be deployed in the early spring to acquire a juvenile abundance index useful for forecasting the 2-3 year class ahead.

Methods and work plan:

No changes have occurred to the overall experimental design that was planned in the original proposal. However, we did shorten the tow duration to 15 minutes and also reduced the subsample of juvenile shrimp to 0.5 kg instead of 1 kg. A half a kilogram yielded sufficient numbers of shrimp for adequate size frequency distributions. We also altered some of the traps by placing the vent on the side to try a second design. To continue acquiring data on the distribution of juvenile shrimp we explored the regions with the beam trawl while still setting traps of the two designs.

Our working hypothesis for the proposal was that juvenile shrimp abundance would be adequately represented in a lobster trap that had been modified with fine mesh liner and a predator/by-catch excluding vent placed in the top of the trap. To compare the efficiency of the traps in collecting the local population of juveniles we determined the presence of shrimp by using a beam trawl with a fine mesh liner. Once we located regions with juveniles, we set two designs of modified traps for a minimum of 24-hour soak time.

Work completed to date:

Work to date has been completed for the trips planned for Kelo Pinkham and Bradford Parady. The list of sample dates is as follows:

Kelo Pinkham:	Bradford Parady
5/10/2007	6/11/2007
5/23/2007	6/15/2007
6/6/2007	6/2/2008
6/7/2007	6/3/2008

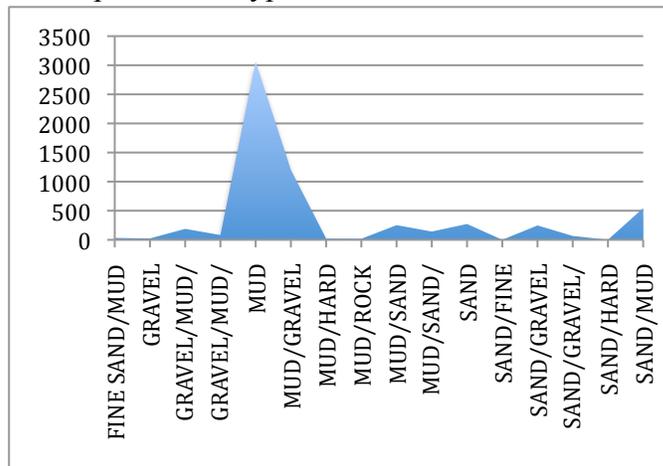
6/8/2007	6/12/2008
6/9/2007	6/22/2008
6/10/2007	7/11/2008
6/17/2007	7/18/2008
6/19/2007	7/31/2008
6/21/2007	8/4/2008
6/24/2007	8/15/2008
6/27/2007	8/20/2008
7/8/2007	8/21/2008
7/22/2007	8/25/2008
7/23/2007	8/26/2008
7/26/2007	8/28/2008
7/28/2007	8/29/2008
8/9/2007	8/30/2008
8/25/2007	8/31/2008
8/26/2007	
8/27/2007	
8/28/2007	
8/29/2007	

We intended work in both regions to be complete by the end of the 2007 season. However, the work in Boothbay was the only region that completed its work. After various issues and set backs in Kittery, the work was postponed until 2008. Kelo Pinkham was able to conduct 109 Beam trawl tows and 53 trap sets. Bradford Parady completed all of his samples in August 2008.

Results to date:

Data is still being analyzed so no full report is possible. However, the following are some of the results to date. Beam trawl data in the Pemaquid area revealed a distinct region of juvenile shrimp in the bathymetry of 30-40 fathom with mud as the substrate. Other bottom types, such as gravel and mud/sand, yielded no juvenile shrimp. In southern Maine, the same bathymetry and bottom type were found to have juvenile shrimp (Figure 1). One specific site that was abundant with juvenile shrimp corresponded with a location that we sampled for shrimp larvae on a Sea Grant project in 2006. That same region was found to be abundant with pelagic larval shrimp during March-May. It would be interesting to determine if that region is also a settlement area for larvae or if those juveniles emigrated in. An interesting aside was the abundant monkfish juveniles caught in the beam trawl from that same region

Figure 1: Sum of shrimp individuals sampled with the beam trawl whose carapace is less than 18mm per bottom type.



The beam trawl proved to be a very valuable tool for sampling the juvenile shrimp population and enabling us to learn more about their distributions. The traps on the other hand consistently failed to attract the juvenile shrimp. Traps of side or top vent style did not yield any *Pandalus borealis* juveniles. The catch in the traps consistently were *Dichelopandalus* and not *Pandalus*. Since the region was too deep for using the video camera, it is unclear as to why other species entered the trap but not *Pandalus borealis*. It is possible that the shrimp are primarily feeding on benthic detritus and are not attracted to the bait used as the other species were. Since we adjusted the vents to a side location on some of the trawls we eliminated the possibility that they would not crawl to the top of a trap. However, maybe a vent on all four sides is necessary. Data analysis will follow in the final report.

Future work:

Analysis and publication attempt is the next step.

Impacts and applications:

The original audience for this project was the ASMFC Technical Committee. The committee was interested in acquiring a tool to help in the juvenile assessment for the purpose of improving the committee's forecasting power of the fishery. However, the traps did not function as planned. Further improvements of the design could be tested but it is unknown if that would help their performance. The beam trawl on the other hand worked exceptionally well in sampling the population. It is not known if the Technical Committee would find the beam trawl a useful tool to employ for juvenile assessments since there is potential gear conflict with the lobster and fishermen. Traps were more lucrative because they would not create any conflicts and local fishermen trained in the sampling could tend them. Further trap designs could have been attempted but it was beyond the monetary scope of this project.

Partnerships:

Kelo Pinkham was extremely valuable to the success of this project. He designed and built the

beam trawls that were used by both regions. His knowledge of the beam trawl use and refinement helped Brad Parady become efficient in the use of the trawl. Kelo's knowledge of the shrimp population in the Boothbay/Pemaquid region also enabled the discovery of the juvenile shrimp distribution. Brad's knowledge of the bottom in the Kittery area allowed us to explore all the suitable and unsuitable habitats for the juvenile shrimp without losing the trawl. Brad's expertise is in lobster but his working knowledge of the area and his keen interest to learn made him valuable as well.

Data:

Data has not been submitted yet to the database but will be by the end of October 2009.