



# THE SMAST HIGH RESOLUTION TRAWL SURVEY: A CASE STUDY IN THE DESIGN AND DEVELOPMENT OF COOPERATIVE TRAWL SURVEY PROGRAMS BETWEEN COMMERCIAL FISHING FLEETS, ACADEMIC INSTITUTIONS, AND GOVERNMENT

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## Abstract:

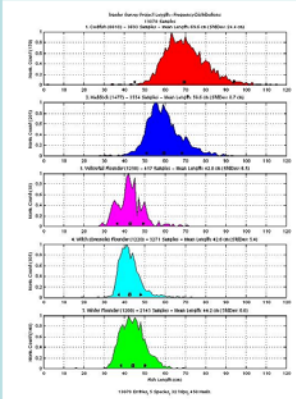
The High resolution Trawl Project at the School for Marine Science and Technology (SMAST) is a collaborative exercise between the commercial bottom trawl fishing fleet, researchers at SMAST, and the Massachusetts Department of Environmental Protection Division of Marine Fisheries. The primary focus of the project has been the development of methods of gathering fishery, oceanographic, and meteorological data through commercial fishing operations. One important component of the program is developing methods for training commercial fishermen to record scientifically acceptable data during normal fishing operations. Another component is the development of technologies to enhance data transfer from the fishermen to researchers and managers. To date, the project has primarily utilized New Bedford Harbor based bottom trawlers that fish on the North Flank of Georges Banks. In the first year, SMAST technicians trained the crews of twenty vessels that logged 4508 hauls over 721 fishing days. In year two the project has trained eight vessels and logged 1813 hauls in 45 trips over 302 fishing days. The design and implementation of the project relied on the ability of technicians to design a data collection system that made sense to fishermen and was useful for analysis and processing by SMAST scientists. The technicians worked closely with fishermen on George Bank during normal fishing operations and at SMAST in order to develop the data collections methods currently used.

## Contracting and Training Fishermen-

The process of gathering data involves many steps. The first is locating a vessel that fishes in our target area (the north flank to the northeast part of Georges Bank), is willing to be contracted, is willing to accept a trainer on board, and finally is willing to do the required work when fishing. When these criteria have been met an SMAST technician goes out to sea on a fishing trip with that vessel. During the next five to twelve days the processes of assessing catch, measuring fish, and properly coding all paperwork are taught to the fishermen so that they will be able to replicate the processes on subsequent trips.

The paperwork and Tidbit temperature monitors are then brought back to SMAST and the information is digitized into useful templates that can be used in a relational way by biologists, oceanographers and others.

## Length Frequency of selected species



The length frequency distributions on the left were collected during the current phase of the SMAST Trawl Project, known as Trawl II. Fishermen and SMAST technicians have combined in measuring over 13,000 fish in hopes of better understanding the fishes we study.

The more fisheries data like this SMAST is able to accumulate from fishermen the better we will be able to approach an understanding of what the state of the fishery is.

In the meantime data like this is a promising sign that fishermen and science can work hand in hand.

## Data Collection

Data collection includes five major information components-vessel information, gear information, haul information, environmental information, and length frequency data.

**Vessel Information** includes information including length and horsepower.

**Gear information** characterizes the nets, otter trawl doors, ground cable and other properties of each individual fishing configuration.

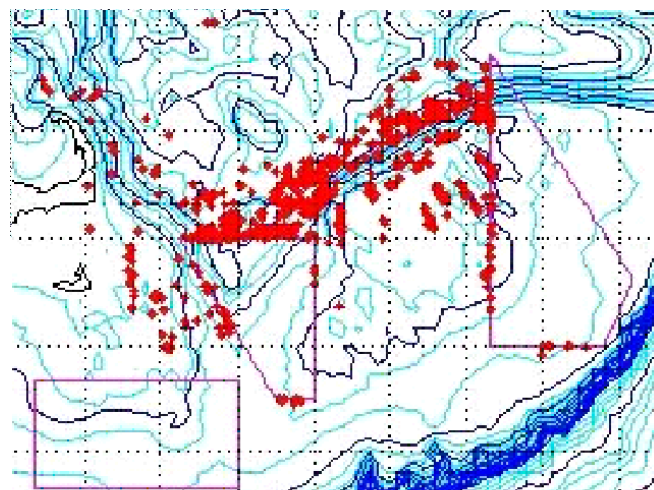
**Haul Information** comprises all fishes and some commercially valuable invertebrates that are captured on a haul by haul basis.

**Environmental Information** is made up of location, bottom temperature, time, bottom type and other components.



SMAST Technician training crewmember to measure codfish

**Length Frequency logs** include the lengths of various fishes from various depths and locations.



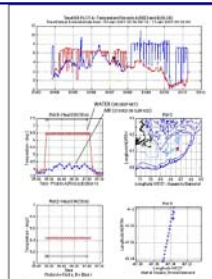
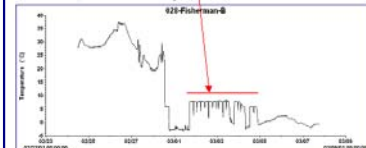
Locations of all hauls through 34 trips during Trawl II



A modern sea captain surrounded by modern electronics contemplating commercial fishing in a modern world.

## Tidbit temperature monitors record bottom temperature and aid in the understanding of biology and oceanography

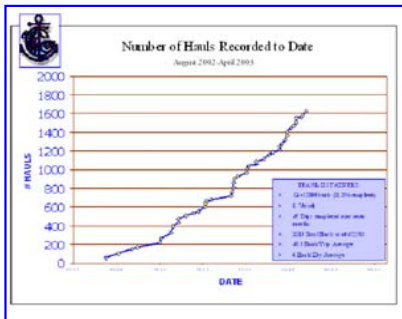
A Temperature Profile derived from a Tidbit temperature monitor that was placed on the otter trawl doors during a normal fishing trip where scientific data was gathered-notice the spikes and flat line representing bottom temperature on a fishing trip.



A final product - merging position (in latitude and longitude), depth, date, time and temperature.

## Cod CPUE by location

The graphic to the left demonstrates catch per unit effort of codfish on Georges Bank by participants in the 2002-2003 phase of the SMAST Trawl Project. Each circle color in the histogram below the graphic demonstrates a bin value representing pounds of codfish caught/minute on a given tow. Only hauls where codfish were captured are represented on this graphic.



Tidbit Temperature Monitors and optical reader (left) - The temperature monitors are sealed and read with optics thereby allowing the sensitive equipment to withstand the rigors of repeated exposure to salt water and the massive pressures associated with depths greater than 200 meters