JOB 6: STUDIES IN CONSERVATION ENGINEERING

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GOAL

Evaluate new technologies and methodologies for potential inclusion in the Long Island Sound Trawl Survey or other Surveys of this Project.

OBJECTIVES

1) *Characterize catch composition and selectivity patterns using different gear combinations for Connecticut's marine fishery-independent monitoring surveys. Particular emphasis will be placed on evaluating modern trawl net design/materials and door combinations for potential use on the Long Island Sound Trawl Survey.*

2) *Evaluate impacts of gear changes on associated thirty–year time series data which are used in numerous coastal stock assessments, management decisions, essential fish habitat analysis and climate change studies.*

3) *Assess electronic data acquisition systems for fisheries research for potential benefits of modernizing the Long Island Sound Trawl Survey or other Surveys of this Project.*

4) *Assess new software applications to integrate the components of an onboard electronic data acquisition system with a computerized database for data collection and QA/QC for the Long Island Sound Trawl Survey or other Surveys of this Project.*

INTRODUCTION

Work during this segment focused solely on Objectives 2, however future segments may focus on other Objectives.

Progress has been made in acquiring more information on net mensuration equipment appropriate for the gear type currently being used on this survey. One of the greatest concerns with the use of net mensuration equipment on the LISTS is the size and subsequent effect this gear will have on our gear type. Compared to the commercial sector and other federal bottom trawl surveys, our gear is relatively small leading to possible performance changes with the use of net mensuration equipment. The goal of project staff is to identify equipment appropriate for our gear size and type that will provide baseline net geometry and performance so that we can test newer more readily available replacement gear like net building material, net floats, and combinations thereof. For example, the survey utilizes floats on the headrope of the net that are no longer available. While the project has a small inventory of these irreplaceable floats, net mensuration equipment would allow staff to test net geometry and performance using more modern products.

METHODS

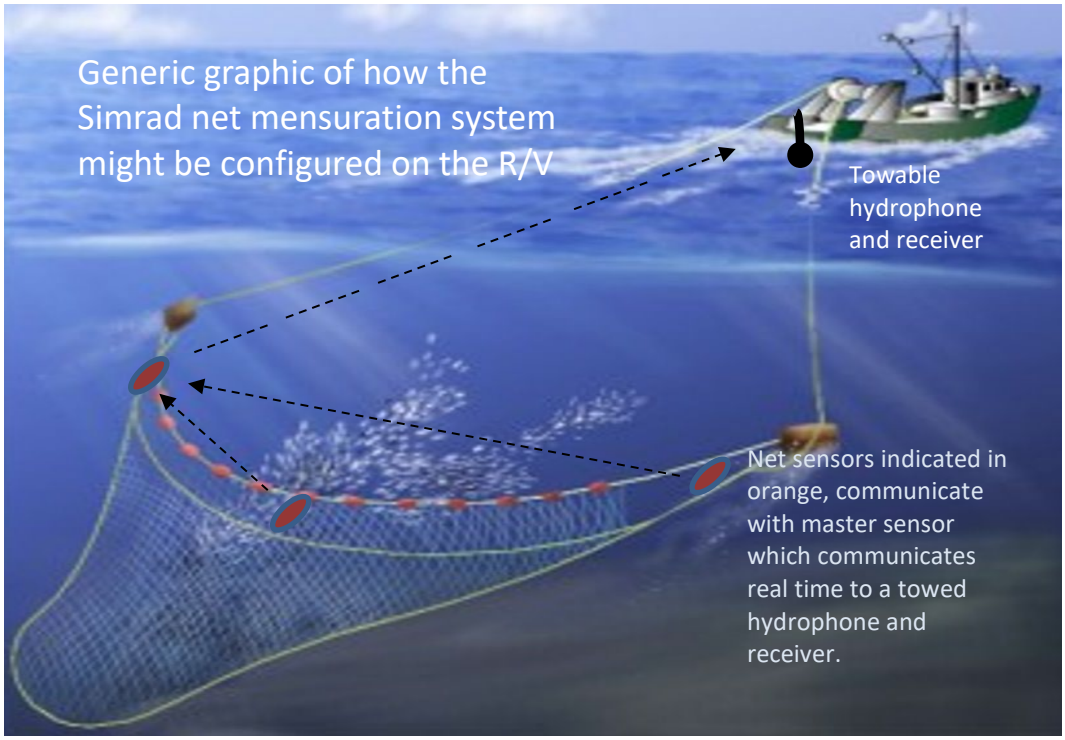
One of the main concerns in maintaining the integrity of the LISTS 39 year time series is conducting it in a consistent manner year after year. To date there have been very few

modifications to the gear used to complete the Survey. The biggest change being a vessel swap years ago. During that process, side-by-side comparison tows were conducted to explore differences between vessels. Catch was used to help verify consistency between vessels. Small adjustments to vessel operation were made and the conclusion was that the new vessel towed the net the same as the old vessel. Moving forward, net mensuration equipment will allow a much finer scale investigation of such changes.

In the past, staff investigated this equipment and found that the components used (actual net and door sensors) were bulky and cumbersome, far too robust for use on LISTS nets and doors. Staff spent considerable time in 2020 researching literature available on the internet as well as consulting with technical staff at VIMS (Virginia Institute of Marine Sciences) to identify if contemporary equipment has been scaled down to sizes more appropriate for our gear type.
It has been identified that there are multiple companies offering different configurations of this equipment both in size and functionality. Many of the manufacturers are now producing smaller scale components capable of generating different data aspects.

With the help of technical experts from VIMS, staff have identified Kongsburg Maritime the owner of Simrad as the company offering net mensuration equipment fit for LISTS gear type. The Simrad system offers relatively small net sensors with configurations that do not require door sensors. Historically, one of the more significant concerns with this type of equipment was the need for door sensors which would have required major modifications to our relatively small trawl doors. Staff have been very reluctant to make modifications such as these with the assumption that this would greatly alter the performance of our trawl doors.

The Simrad net mensuration system as selected for LISTS would consist of three removable sensors attached to the net. A headrope sensor capable of reading the distance from the headrope to the sea floor and two wing sensors capable of reading the distance from each other. One of the wing sensors while communicating with the other sensors is also relaying real time data to a towable hydrophone. This type of system is perfect for generating baseline net geometry while being towed. As an added benefit, measurements such as temperature can be recorded.



Schematic of how the components of the Simrad net mensuration system might be situated on the R/V John Dempsey and net.

RESULTS

Staff have recently worked with the sales team at Simrad to modify the original quote which included two door sensors and associated mounting equipment as well as a depth sensor that was included in headrope sensor pod. The two door sensors will be attached to the head of the net wings, removing the need for door mounting hardware. The depth sensor in the headrope pod will be replaced with a sensor capable of monitoring headrope height from the sea floor. Staff will be initiating the purchase of this system as soon as the new quote is received from Simrad.

Once the equipment is purchased, installation for testing outside the parameters of LISTS trawl season will commence. Staff will work with technical advisors to devise a sensor attachment method as well as optimal net placement to understand equipment dynamics and effects on our net. Once baseline net geometry is well understood, efforts will be made to test new equipment like headrope floats to determine consistency of new configurations.

MODIFICATIONS

Due to the nature of evaluating new technologies, it is not known ahead of time which ideas will be implemented. Therefore, the specific Objectives of this Job are likely to change over time. In the next segment of the Project, we expect to have the manufacturer identified and the equipment purchased.