

NCRP 2014 Proposal for AFSC funding

Acoustic assessment of the vertical distribution of Pacific cod and their diving behavior in response to bottom trawling

NOAA Partners: Elaina Jorgensen and David Somerton (Groundfish Assessment Program, RACE)

Industry Partners: Eastern Bering Sea Shelf Bottom Trawl Survey charter vessel & Freezer Longline Coalition

The management models for both the EBS and GOA stocks of Pacific cod utilize estimates (Bayesian priors) of the survey catchability parameter based on archival tagging data. These data showed that, undisturbed by trawling, 46% of the EBS cod stock and 78% of the GOA cod stock occurred below the headrope height of the trawls used to assess them. This assumption has a tremendous impact on the ACL for this species and is based on two tenuous notions: 1) the vertical distribution determined by the tags is correct and that cod do occur at distances from the bottom greater than the head rope height of the trawl and 2) cod do not dive toward the bottom when approached by the survey trawl. Obtaining knowledge about these issues was considered so important to the NPFMC that a project to “Study vertical distribution of Pacific cod to better understand catchability” was listed as one of the top recommended research areas in their most recently issued research directive.

We intend to take a two prong approach to studying these issues. First, the abundance of cod that were above the headrope height of EBS survey trawls will be estimated by analyzing the acoustic data collected during each haul of the EBS survey using standard acoustics software (ECHOVIEW). Second, the diving behavior of cod in response to a survey trawl will be studied by attaching the DIDSON ultrasonic imaging system (acoustic camera) to the headrope of the GOA/AI survey trawl. Data from this experiment would be analyzed using the MACE acoustic target tracking software (which was used to track Pollock escaping through trawl mesh) to determine the swimming speed and dive angle of cod and whether they dive into the trawl path. If cod do not occur at off-bottom distances greater than the head rope height or if they dive from such a distance into the trawl path, then the currently used catchability estimates are likely wrong and new research is needed to estimate cod catchability.

We are asking for funding to cover: 1) Purchase of an ECHOVIEW software license, 2) travel round trip to Dutch Harbor and overtime pay to participate on a MACE survey cruise to test the use of the DIDSON system on a trawl headrope, and 3) 2 days of additional vessel time, fuel, and overtime on the 2014 Bering Sea survey to conduct an experiment to determine the diving response of cod to the survey trawl. Work on cod diving was requested by the Freezer Longliner Coalition two years ago and a current letter of support from them is included.

Budget

Purchase ECHOVIEW software	\$24k
Travel and overtime (2014 MACE winter survey)	\$ 6k
Ship time; fuel (two days; 2014 BS summer survey)	\$28k
Overtime (two days; six people; 2014 BS summer survey)	\$ 6k
TOTAL	\$64k