Tracking Fish in Coastal Alaska with Autonomous Underwater Vehicles

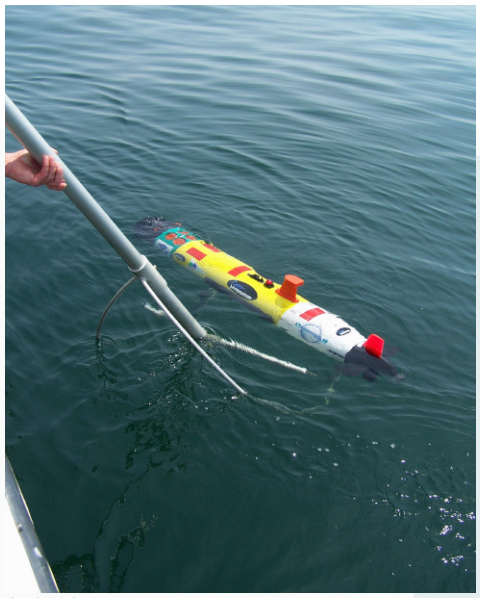


photo by J. Dobarro

J. H. Eiler, M. M. Masuda and J. J. Vollenweider • *Alaska Fisheries Science Center, NMFS, NOAA* • D. W. Carlile • *Alaska Department of Fish and Game*
N. Hillgruber and J. K. Nielsen • *University of Alaska Fairbanks* • T. M. Grothues, J Dobarro and R. F. Petrecca • *Rutgers State University of New Jersey*

Overview

Autonomous underwater vehicles (AUV) can potentially address a wide range of research and management issues in the north Pacific. We will evaluate the use of AUV technology to locate acoustic tags in the marine environment of coastal Alaska. The efficiency and accuracy of this method will be compared with traditional tracking methods. Information will also be collected on ocean conditions within the study area.

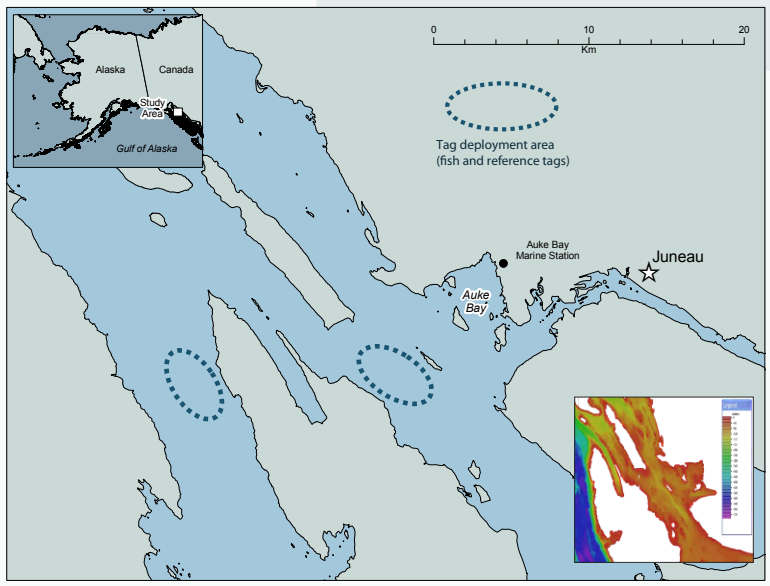
Problem

Information on the distribution, seasonal movements and habitat characteristics is needed for many marine species to improve stock assessment and implement ecosystem management, but is often difficult to obtain.

Acoustic telemetry can be used to collect this type of information, but data resolution and accuracy can vary depending on the methods used. Vessel-based tracking can be labor-intensive, logistically challenging, and weather dependent. Stationary tracking arrays can be difficult to install and maintain, and may not provide the information needed.

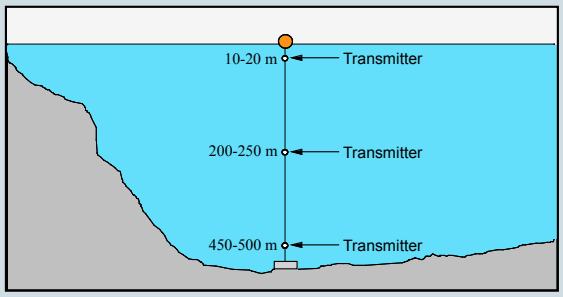
Objectives

1. Document ability of AUV to detect and record acoustic transmitters
2. Determine the accuracy and precision of AUV locations
3. Compare AUV and vessel-based tracking results



Study Area

Study will be conducted near Juneau, Alaska. The varied topography, diverse ocean conditions, and extreme depths (shallow near-shore to over 500 m) will provide a robust test of the AUV's capabilities and performance.



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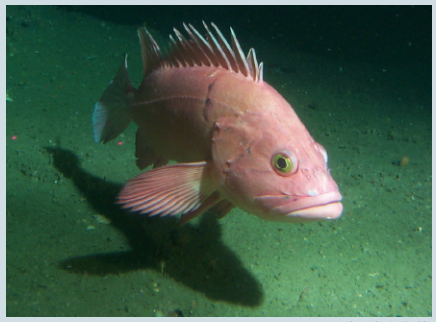


photo by D. Carlile

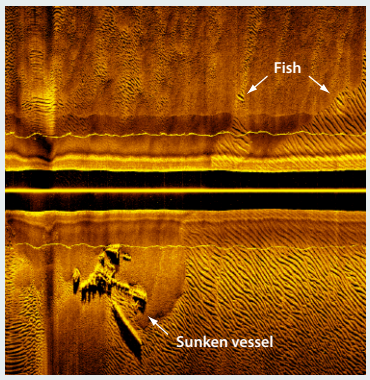
Acoustic transmitter

Tag Deployment

Reference transmitters (76 kHz, 155 dB) equipped with temperature and depth sensors will be deployed on a series of moorings to provide stationary targets at known locations and depths.

Fish (including rockfish, sablefish, and halibut) and crabs will be captured and tagged with acoustic transmitters to provide 'moving targets' within the study area.

photo by J. Eiler



Side-scan sonar image

Acoustic receiver

Tracking Surveys

Tracking surveys will be conducted with a REMUS 100 AUV equipped with a hydrophone and acoustic receiver to locate the tags and determine the accuracy of the locations. The tags will also be located from boats to compare the AUV results with traditional tracking methods.

AUV sensors will collect information on ocean conditions, including temperature, depth, salinity, current speeds, O_2 levels, and chlorophyll levels while AUV side-scan sonar records images of the ocean floor.

Summary

This study will provide a rigorous test of the AUV's capabilities and performance, and compare this technology with traditional methods of collecting acoustic telemetry data. If effective, AUV technology could be used to document the distribution, movements, and habitat use of important commercial and forage fish species.

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The recommendations and general content presented in this poster do not necessarily represent the views or official position of the Department of Commerce, the National Oceanic and Atmospheric Administration, or the National Marine Fisheries Service.