

Project Title: Using low-cost stereo GoPro cameras to describe nearshore Steller sea lion prey fields in untrawlable habitats near rookeries and haulouts	FY16 \$150.0K FY17 \$155.9K
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Industry Partners: Charter vessel company (to be determined); Linker Technologies LLC (contract Fisheries Biologist Mike Levine)

Overview: Recent satellite tag-based tracking of endangered Steller sea lion adult females has found that they frequently forage in shallow nearshore and other untrawlable habitats in the western/central Aleutian Islands. This area has experienced steep population declines and is where controversial fisheries management measures were enacted. Understanding how these animals forage is necessary to evaluate the potential for prey competition with other predators and commercial fisheries, but there are no data on fish assemblages in these nearshore habitats because they are largely untrawlable. To assess the fish abundance and distribution in these untrawlable grounds we propose to use a Stereo GoPro camera developed at the AFSC to assess species composition and abundance. Traditional bottom trawl surveys cannot sample much of the rough seafloor habitat utilized by commercially important fish species in nearshore rocky habitat. Stereo camera systems are increasingly being used as a complimentary sampling tool in these difficult habitats.

Preliminary work using GoPro cameras in a stereo configuration demonstrated that they can capture quality images and video and can be quantitatively analyzed to determine fish abundance, length frequency distribution, and species composition. We propose to deploy our camera system on National Marine Mammal Laboratory (NMML) Alaska Ecosystem Program ship-based Steller sea lion projects. We will place camera transects in locations near Steller sea lion rookeries and haulouts in part guided by foraging behaviors of previously-tracked sea lions, and use the data collected to inform nearshore fish distribution estimates in areas inaccessible to bottom trawl surveys. This study is a cooperative effort within the AFSC among the NMML and the Resource Ecology and Fisheries Management (REFM) Divisions, and between the AFSC, U.S. Fish and Wildlife Service Alaska Maritime Wildlife Refuge, a private charter vessel company, and Linker Technologies LLC providing the contract biologist who has experience using underwater GoPro Stereo camera systems.

Research Description: Traditional bottom trawl surveys are unable to access much of the rough seafloor habitat that is utilized by a variety of fish species including Pacific ocean perch, Atka mackerel, and northern rockfish (Williams et al. 2010, Rooper et al. 2007, Lauth et al. 2007). These difficult-to-sample grounds are especially prevalent in the Aleutian Islands especially in rocky nearshore habitats, which are utilized as foraging grounds by adult female Steller sea lions. Stereo camera systems, dropped onto the seafloor or towed from a moving vessel, are increasingly being adopted to access these habitats (Jones et al. 2012, Rooper et. al. 2010, Rooper et al. 2011, Williams et al. 2010). Some important measures that traditional trawl surveys capture, including fish species composition, size distribution, and relative abundance, can be estimated using current stereo camera systems developed at the AFSC. During a preliminary phase of our study, we tested a low-cost system using GoPro video cameras towed from a vessel-mounted winch as part of an ongoing Atka mackerel mark-recapture study. The live feed from the GoPro composite video signal is transmitted up the winch cable, allowing an operator on deck to keep the system near the seafloor. Analysis of video data has shown that it is possible to estimate abundance and species composition with this sampling tool using AFSC developed software (SEBASTES).

The platform for this study will be the NMML Steller sea lion ship-based studies in the Aleutian Islands. Transects will be conducted from the chartered vessel using a camera and winch system developed at the AFSC. In each study site, transects will be placed from shore towards deeper water in a stratified random

design based on depth and substrate strata whenever this information is available. Camera tows will be conducted opportunistically whenever vessel time is available. We will attempt to place at least three 20-minute camera transects at each study site with depth ranging from 30-100 meters, but will adjust the survey design as necessary to accommodate variable habitat. Video data will then be analyzed using the AFSC developed software SEBASTES. Fish will be counted, measured and identified to species or species groups, and associated habitat will be defined. Using stereo techniques, area swept can be estimated and abundance and fish density determined by species or species group. Species composition, length frequencies, and relative abundance can be compared among study sites.

Performance Indicators:

Successful deployment of underwater camera aboard the chartered vessel. Ability to determine species composition and index of abundance for nearshore fish assemblages in Steller sea lion foraging areas.

Deliverables:

Species composition, length frequencies, relative abundance, and habitat association of fish species in nearshore areas around sea lion rookeries. Presentation of results at the Alaska Marine Science Symposium.

Budget: FY 2016	Cost per item	Number	Total cost
Contract Fisheries Biologist			
Salary per month	\$7,500	7	\$52,500
Travel to Adak	\$2,500	1	\$2,500
Sea-time on marine mammal survey/day	\$450	18	\$8,100
Travel to Alaska Marine Science Symposium	\$2,500	1	\$2,500
Parts and supplies			
Two complete camera kits plus winch cable	\$5,400	1	\$5,400
Travel to Adak (NMFS Scientists)	\$2,500	2	\$5,000
Shipping	\$4,000	1	\$4,000
Vessel charter support	\$10,000	7	\$70,000
<i>Total FY2016</i>			<i>\$150,000</i>
FY 2017	Cost per item	Number	Total cost
Contract Fisheries Biologist			
Salary per month	\$7,500	7	\$52,500
Travel to Adak	\$2,500	2	\$5,000
Sea-time on marine mammal survey/day	\$450	21	\$9,450
Travel Alaska Marine Science Symposium (AMSS)	\$2,500	1	\$2,500
Travel to Adak NMFS scientist	\$2,500	4	\$10,000
Travel to AMSS (NMFS scientist)	\$2,500	1	\$2,500
Parts and supplies (one camera kit and misc. equipment)	\$6,000	1	\$6,000
Shipping	\$8,000	1	\$8,000
Vessel charter support	\$10,000	6	\$60,000
<i>Total FY2017</i>			<i>\$155,950</i>

References:

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