

## Northern Bering Sea Surface Trawl and Oceanographic Survey Plan, 2019

by

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## Abstract

The 2019 northern Bering Sea pelagic trawl and oceanographic survey is a multi-disciplinary research project conducted aboard a chartered fishing vessel, the *F/V Northwest Explorer*. The survey is scheduled to begin and end in Dutch Harbor, AK from August 27 and September 20, 2019 with a port call in Nome, AK on Sep 8, 2019. The survey will principally be conducted in support of the Alaska Sustainable Salmon Fund (AKSSF) funded project entitled the ‘Northern Bering Sea Juvenile Chinook Salmon Survey Phase 2’ and the Alaska Fisheries Science Center’s Recruitment Process Alliance and Loss of Sea Ice research programs. Additional research objectives by AFSC, the Alaska Department of Fish and Game, U.S. Fish and Wildlife Service, University of Alaska, and the Alaska Pacific University will also be supported during the survey.

## Overview

The 2019 northern Bering Sea pelagic trawl and oceanographic survey will start and end in Dutch Harbor, AK on Aug. 27 and Sep. 20, respectively. The survey will support pelagic trawl research on Chinook salmon and other pelagic nekton species in the northern Bering Sea, and to collect oceanographic data in the northern Bering Sea. The survey is supported by the Alaska Sustainable Salmon Fund (AKSSF) through the project entitled Northern Bering Sea Juvenile Chinook Salmon Survey Phase 2, the Alaska Fisheries Science Center’s Recruitment Process Alliance, the Alaska Department of Fish and Game, U.S. Fish and Wildlife Service, and the Alaska Pacific University.

Survey objectives include: 1) Estimate abundance, distribution, size, and stock-structure of juvenile Chinook salmon in the coastal Northeast Bering Sea shelf, 2) Collect information on the pelagic fish ecosystem in the coastal Northeast Bering Sea shelf, 3) Collect electronic oceanographic data and water samples for temperature, salinity, chlorophyll a, nutrients, and particulate organic carbon with a SBE9-11 CTD and Niskin bottles, and 4) Collect zooplankton and ichthyoplankton samples with a 20 cm (150 µm mesh) and 60 cm (505 µm mesh) cm bongo array.

Personnel/Science Party: name, title, gender, and affiliation

Name (Last, First)	Title	Date Aboard	Date Disembark	Gender	Affiliation
Murphy, Jim	Fish Bio/Chief Scientist	8/27	9/20	M	AFSC
Gray, Andrew	Sup Fish Bio	8/27	9/8	M	AFSC
Waters, Charlie	Fish Bio	8/27	9/8	M	AFSC
Diamond, Andrew	Fish Bio	8/27	9/8	M	AFSC
Jalbert, Chase	Genetist	8/27	9/8	M	ADFG
TBD	Seabird Observer	8/27	9/8	M	USFWS
Sewall, Fletcher	Fish Bio	9/8	9/20	F	AFSC
Garcia, Sabrina	Fish Bio	8/8	9/20	M	ADFG
Nicols, Dave	Fish Bio	9/8	9/20	M	AFSC
TBD	Student	9/8	9/20	M	APU
Zeller, Tamara	Seabird Observer	9/8	9/20	F	USFWS

AFSC—Alaska Fisheries Science Center, Auke Bay Laboratories, Juneau, AK;

ADFG—Alaska Department of Fish and Game, Commercial Fisheries Division, Anchorage, AK

USFWS—US Fish and Wildlife Service, Office of Migratory Bird Management, Anchorage, AK

APU—Alaska Pacific University, Anchorage, AK

## Operations

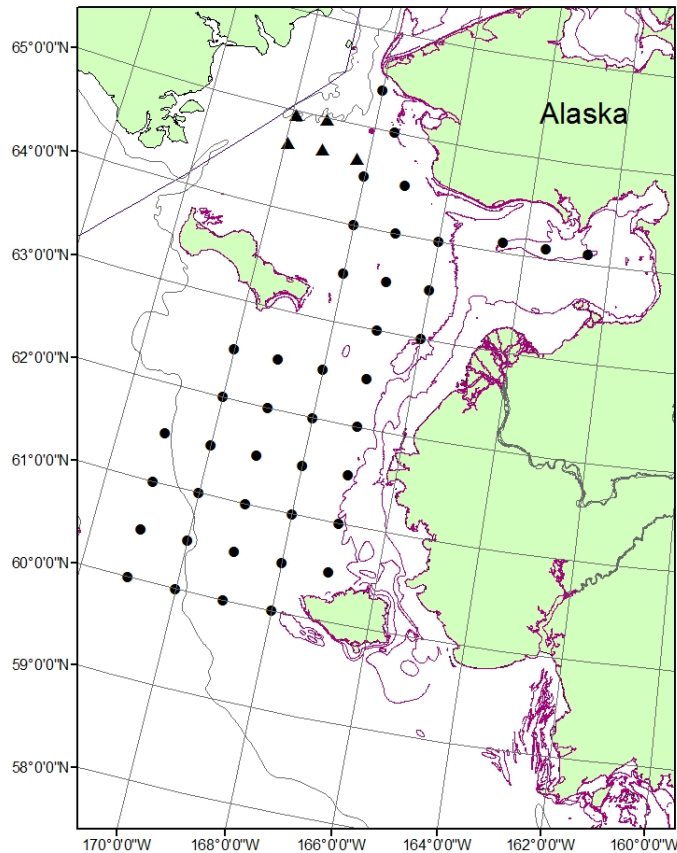
Survey operations will be conducted during daylight hours, generally 07:30 to 20:00. Stations will be sampled using a systematic grid design with a station grid of approximately 30 nm (every 0.5 degree of Latitude and 1.0 degree of Longitude). The survey will cover the area from 60°N to 65.5°N (Fig. 1).

Surface sampling will be completed with a Cantrawl 400/601 rope trawl with ¾” synthetic TS2 bridals and 5m NETS alloy doors. All surface trawls will be deployed for a duration of 30 minutes. A net sonar will be used during each surface trawl deployment to monitor and record net dimensions. Temperature and depth sensors (SBE39) will be secured to the headrope and footrope of the trawl to record vertical dimensions of the trawl. Polyform buoys will be added to each headrope wingtip and to the centre of the headrope to help maintain the trawl at the surface.

An electronic catch logging system developed by AFSC (CLAMS) will be used to record station and biological data collected from each trawl haul. Biological data will include species catch composition by weight and number. All other biological data will be defined by sample protocols defined for 1) juvenile salmon, 2) immature/mature salmon, and 3) all other fish species. All specimen collections will be tracked with barcoded specimen tags in CLAMS. Diets of Chinook salmon will be examined on-board the vessel.

Oceanographic measurements, zooplankton and ichthyoplankton data, fish diets, and jellyfish community composition will support scientific objectives on eastern Bering Sea ecosystem indicators by AFSC as part of its Loss of Sea Ice research plan. Zooplankton and ichthyoplankton data will be collected at each station with a 60 cm diameter bongo frame with 505 micron nets, a 20 cm diameter bongo frame with 150 micron nets and a Seabird SBE-49. This bongo array will be deployed obliquely through the water column from the surface to near-bottom (5m from bottom). One net from each bongo frame will be preserved in 5% buffered formalin, the second 60cm bongo net will be sorted for on-board Rapid Zooplankton Assessment (RZA). CTD casts will be conducted at station. Sensors that will be added to the SBE 911+ CTD include dual TC sensors, a PAR spherical sensor (Biospherical Instruments QSP 2300), chl-a fluorometer, beam transmissometer (Wet Labs C-star), and dissolved oxygen sensors (SBE 43). CTD casts will be to near-bottom (5 m from bottom). Water samples collected with Niskin bottles attached to the CTD will be sampled for chlorophyll a, nutrients, salinity, and particulate organic carbon.

Surface trawl catch, effort, and specimens collected during the survey support multiple research objectives on fish resources in the northern Bering Sea. Data collected on the distribution, abundance, diet, and condition of juvenile salmon support cooperative state and federal research on the abundance of juvenile salmon and pre-season run forecasts to assist with the international management of Yukon River subsistence fish resources. Data collected on the distribution, abundance, diet, and condition of age-0 pollock support research objectives on the recruitment of federally managed groundfish resources in the eastern Bering Sea by AFSC’s Recruitment Process Alliance.



**Figure 1.** Proposed survey stations for the Northern Bering Sea pelagic trawl survey, August 27 to September 20, 2019 aboard *F/V Northwest Explorer*.

### Supplementary Projects

Distribution and abundance of seabirds: A trained US Fish and Wildlife observer will be onboard the vessel to assess the distribution and abundance of seabirds and marine mammals. With limited vessel coverage of this area, a seabird observer will provide valuable information on the distribution of the upper trophic level species present in the coastal Northeast Bering Sea. Visual surveys for marine birds and mammals will be conducted while the vessel is in transit.

Distributed Biological Observatory (DBO): DBO sites are regional hotspot transect lines and stations located along a latitudinal gradient and are considered to exhibit high productivity, biodiversity, and overall rates of change in the Arctic marine ecosystem by NOAA Fisheries. Region 2 DBO stations will be sampled during the survey, weather permitting.