

CRUISE RESULTS

Cruise 2001-01 Ocean Explorer 2001 Trawlex study in the eastern Bering Sea

June-July 2001

The Resource Assessment and Conservation Engineering (RACE) Division of the Alaska Fisheries Science Center (AFSC) conducted a survey in the eastern Bering Sea to evaluate short-term impacts of bottom trawls on soft-bottom benthic habitats and to describe the recovery process. This is a multi-year project which follows earlier studies of long-term bottom trawling impacts in the same general region.

The field work was a cooperative effort with the Naval Undersea Warfare Center (Keyport, Washington). Other collaborators include the University of New Hampshire - NOAA Center for Coastal Ocean Mapping / Joint Hydrographic Center (Durham, New Hampshire), the University of Alaska Fairbanks, Institute of Marine Science (Fairbanks, Alaska), Klein Associates, Inc. (Salem, New Hampshire), B&N Fisheries (Seattle, Washington), the Groundfish Forum (Seattle, Washington), and Triton-Elics International (Watsonville, California and Portland, Oregon).

OBJECTIVES

The research objectives address Congressional mandates (Magnuson-Stevens Fishery Conservation and Management Act of 1996) to investigate potential adverse impacts of fishing gear on essential fish habitats. The primary objectives of this study were to determine if bottom trawls have measurable and significant effects on soft-bottom habitat in the eastern Bering Sea and if so, are there fundamental changes that define a new recovery state.

Secondary objectives were to:

1. evaluate advanced remote-sensing technology for future broad scale seafloor mapping expeditions;
2. incorporate an ultra-short baseline (USBL) positioning system to monitor range and bearing of sampling gear and the commercial trawl in real time;
3. conduct side scan sonar assessments of the seafloor;
4. collect epifauna and infauna samples;
5. collect underwater video to groundtruth side scan imagery and to assess the benthos and sampling gear efficiency; and
6. determine the feasibility of using ships of opportunity for this purpose.

VESSEL AND GEAR

Survey activities were conducted aboard the 47.2 meter (155 ft) chartered vessel *Ocean Explorer*. This was a commercial fishing vessel modified to support the research activities.

The commercial gear used during the impact phase of the study was a Nor'eastern Trawl System (NETS) Inc. 91/140 two-seam Aleutian combination otter trawl with a 14" diameter footrope. It was rigged and deployed in a manner that is consistent with standard practices of the fleet.

The standard NMFS 83/112 bottom trawl, modified to improve capture and retention of small macroinvertebrates, was used to sample the area before and after deployment of the commercial trawl. Modifications to the 83-112 consisted of a tickler chain, 1.5" liner in the bossom of the net, and hula skirt covering the footrope set back.

A 0.1m² van Veen grab was used to collect quantitative samples of infaunal invertebrates. A secondary grab sample at each station was obtained to characterize physical and chemical properties of

the surficial sediments.

ITINERARY

The survey began in Dutch Harbor, Alaska on 15 June and ended in Dutch Harbor on 15 July. Prior to the beginning of the study, successful gear trials were conducted in Puget Sound and scientific systems were installed and appropriately calibrated (30 May - 1 June).

SURVEY DESIGN AND METHODS

The study area is within the Crab and Halibut Protection Zone 1 in Bristol Bay (management area 512: approximately lat 58° N and long. 160° W, Fig. 1).

In general, at-sea work was divided into three phases: (1) integrated biological and geological sampling before experimental trawling, (2) experimental trawling and (3) integrated biological and geological sampling after experimental trawling. Activity during phase 1 consisted of side scan assessments of seafloor morphology during night wheel watches, with epifauna trawls and collection of infauna and sediment grabs during daylight hours. All samples from a particular gear were collected in succession, so as to minimize the time spent installing and configuring gear during phases (1) and (3).

The "impact" phase of the experiment consisted of repetitive (n=4) trawling of predetermined swaths of the seafloor using the commercial bottom trawl. The scientific crew processed infauna grabs and addressed other logistical matters during this period.

Assessment activities after the impact phase were a repeat of activities prior to experimental trawling. Sampling occurred after the natural process of scavenging in the trawl swaths had commenced. Side scan assessments of seafloor morphology were initiated during night wheel watches. Epifauna trawls and infauna/sediment grabs during daylight hours were processed as collected.

A color video system attached to the trawls provided a qualitative assessment of the benthos and performance of the trawl gear.

RESULTS

Over 950 line-km of high resolution backscatter and swath bathymetry data were collected with the interferometric side scan sonar system. A total of 144 van Veen grab samples were collected for characterization of the seafloor and for groundtruthing side scan sonar images. An additional 144 van Veen grab samples were collected and retained for subsequent infaunal species identification. The catches from 72 83-112 bottom trawls were processed and all invertebrates were completely sorted to species, weighed, and enumerated while at-sea.

SCIENTIFIC PERSONNEL

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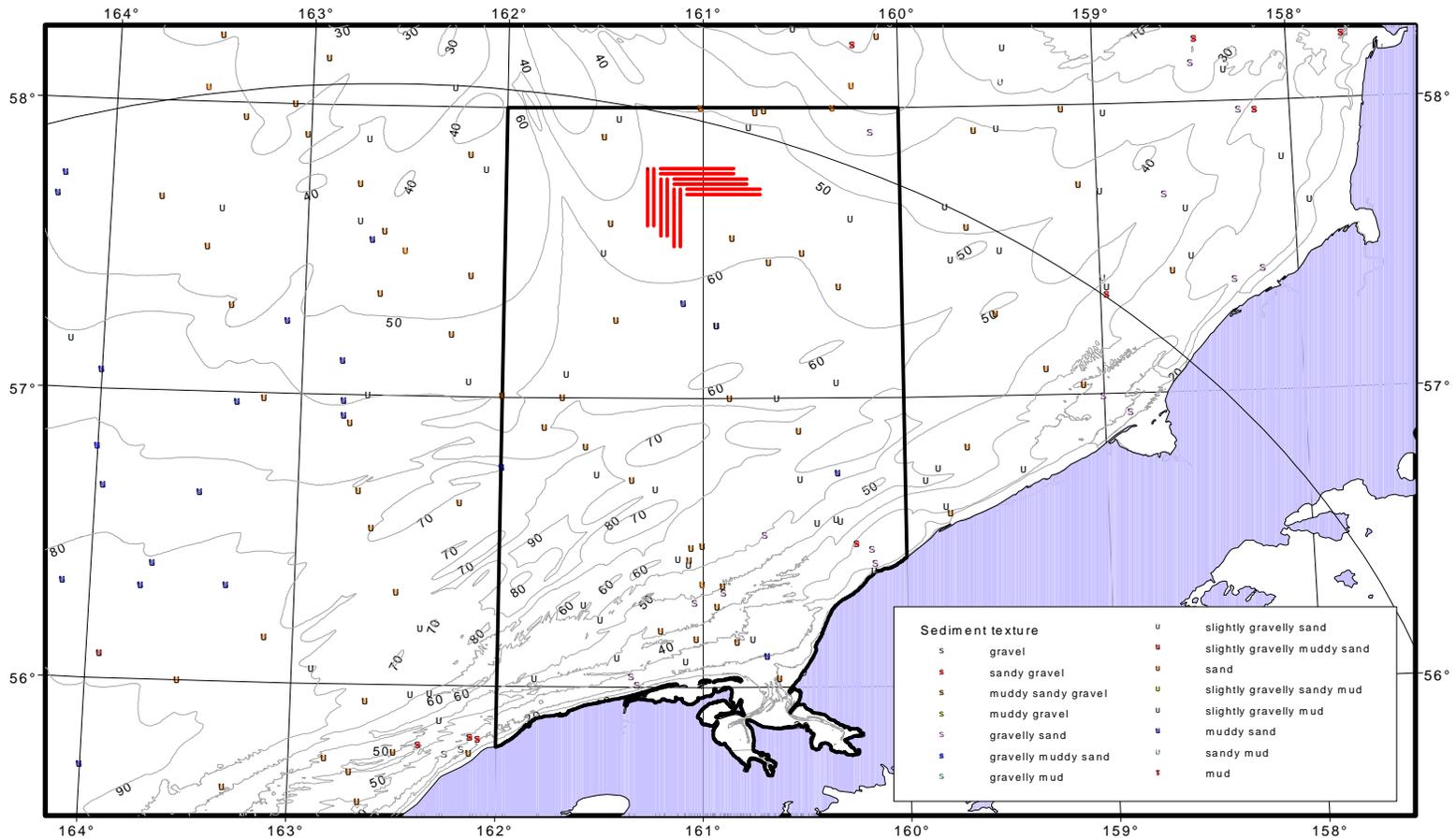


Figure 1. Location of Trawlex research corridors in the Bristol Bay area of the eastern Bering Sea. Six experimental-control corridor pairs were sampled during the summer 2001 cruise. Depths in meters and sediment textures are indicated, as well as an arc indicating the advertised 180 nm broadcast radius for the U.S. Coast Guard differential GPS beacon located at Cold Bay, Alaska.

