Essential Fish Habitat project status report

Reporting date: 10/26/12

Project number: 4

Title: Quantifying flatfish habitat quality in the eastern Bering Sea by infauna prey density

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Funding year: 2011

Funding amount: $124,000

Status: ☐ Complete ☒ Incomplete, on schedule ☐ Incomplete, behind schedule

Planned completion date if incomplete:

Field sampling was completed at fifteen stations in July-August on the 2011 eastern Bering Sea (EBS) bottom-trawl survey. Benthic samples and underwater videocamera footage of the habitat were collected aboard the FV Alaska Knight. At station G15 (Fig. 1), the benthic grab sampler was damaged when it caught a rock in its jaws. Thus, no benthic samples were collected at that station. The strobe light failed in the videocamera system towards the end of the survey, leaving five stations without good-quality footage (Fig. 1). The three species of small-mouthed flatfish were sampled concurrently aboard the FV Alaska Knight and the FV Aldebaran. The quantities of stomachs collected of each species-length class are given in Table 1 and the spatial distribution of the collection is shown in Figure 1.

Analysis of sediment grain-size and biochemistry (total organic carbon, total nitrogen, carbon-nitrogen stable isotopes), and flatfish and prey tissue stable-isotopes have all been completed. Fish stomach contents analysis has also been completed and the data has been entered into the Food Habits database. Taxonomic identification of infauna was completed in September 2012 and the data are being checked and entered into the infauna database. Analysis will begin after data entry and quality assurance are completed. Results will be reported in FY 2013.

Reporting: Have the project results been reported? If yes, state where the results were reported and attach an electronic copy of the report.

No.

Results: What is the most important result of the study?

The main objectives of this project are to build a database of the eastern Bering Sea infauna community and sediment properties for habitat research, investigate prey availability to and demand by flatfish in different habitats, and compare the diets between small (≤20 cm total

length) and large (≥30 cm) length-classes in different sediment types. The intermediate lengths (>20 and <30 cm) were excluded to buffer the distinction. Stomachs were collected from 69 small and 213 large yellowfin sole, 165 small and 192 large northern rock sole, 1 small and 130 large Alaska plaice (Table 1). The minimum length sampled of yellowfin sole was 13 cm, northern rock sole was 11 cm, and Alaska plaice was 18 cm. Alaska plaice were not abundant in the study area of coastal Alaska peninsula. They were concentrated in the mid-section along the cross-shelf line of stations, and small fish were practically absent. Yellowfin sole were distributed from Bristol Bay to the mid-section, and almost all small fish were caught in Bristol Bay. Northern rock sole, both large and small, had the widest distribution, extending from Bristol Bay to the shelf edge. The different spatial distributions of these three generally co-occurring benthivores may be manifestations of intraspecific (ontogenetic) and interspecific habitat and prey preferences.

Table 1. Number of stomachs collected in 2011 (Length class (cm): 1 = ≤20, 2 = >20 - <30, 3 = ≥ 30).

	northern rock sole			yellowfin sole			Alaska plaice		
Length class	1	2	3	1	2	3	1	2	3
Station									
J15	15	0	15	9	7	14	0	0	0
I14	15	0	15	14	1	15	0	0	0
H16	16	14	0	15	0	15	0	4	0
H13	15	0	15	10	5	15	0	2	1
G15	22	8	0	15	0	15	1	0	0
G12	15	0	15	1	14	15	0	1	2
F11	0	15	15	0	9	21	0	0	31
E10	1	14	15	0	15	15	0	0	30
D09	5	10	15	0	15	15	0	0	30
C09	20	12	8	0	20	20	0	0	1
C08	5	16	11	0	20	20	0	0	15
B08	7	8	15	5	10	15	0	10	20
B07	14	1	15	0	11	16	0	0	0
A06	9	11	20	0	0	0	0	0	0
Z05	6	16	18	0	0	2	0	0	0
Total	165	125	192	69	127	213	1	17	130

The surficial sediment of this inshore area was predominantly sandy (where sand is defined as particles 0.0625-2 mm dia., mud <0.0625 mm dia., and gravel >2 mm dia.). Only two stations had <90% sand. These were A06 and H16, where the sediment had 82% and 42% gravel, respectively. The fraction of mud in any sample was <10%. This offers a contrast with our previous EFH studies where the habitat types tend to be softer sediments with higher mud content.

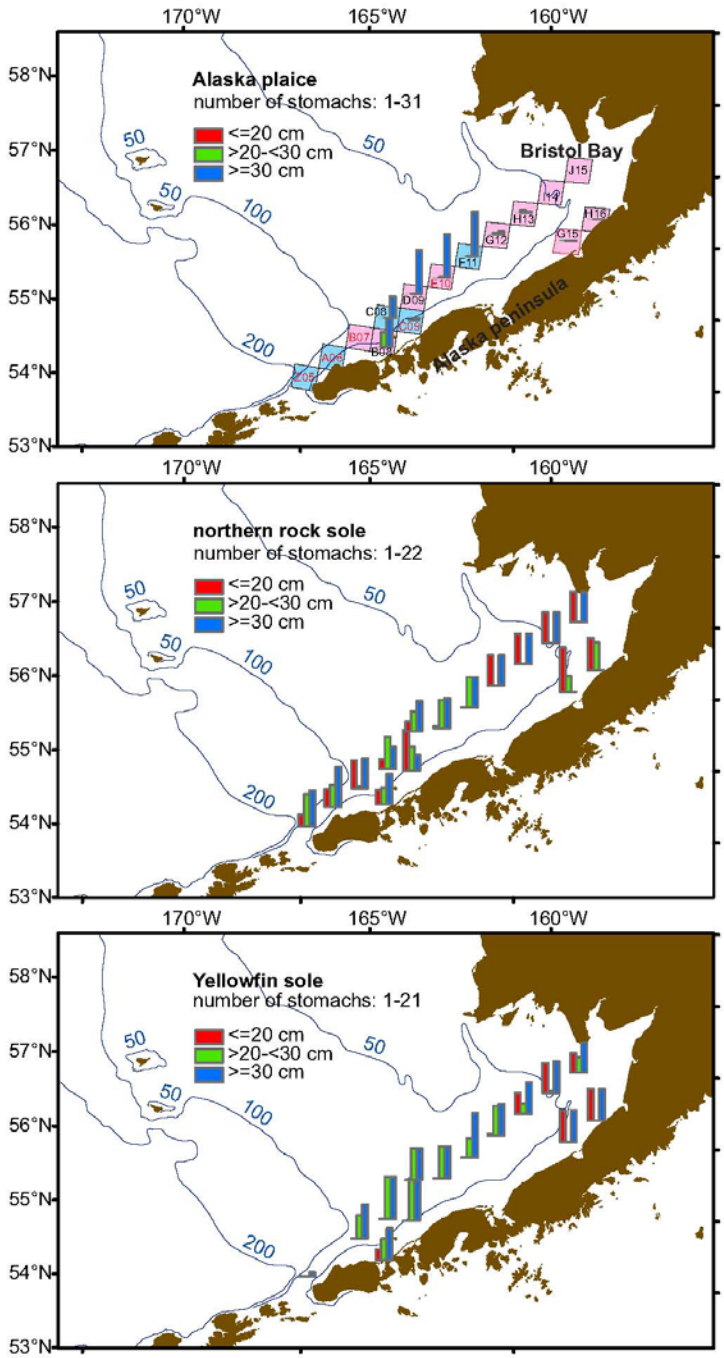

Figure 1. Number of stomachs of each flatfish species-length group collected at each station in this project (bar lengths are scaled to the range of number of stomachs). Top panel shows the bottom-trawl survey cells containing the stations. Blue cells were trawled by the FV Aldebaran, pink cells by the FV Alaska Knight, who also collected benthic samples at all the stations except G15 (red cell outline), where the benthic grab was damaged, and video footage at all stations except those with red station label.