

Technical Summary BOEMRE Publication 2011-021

STUDY TITLE: Beaufort Sea Fish and their Trophic Linkages: Literature Search and Synthesis

CONTRACT NUMBER: M10PX00304

SPONSORING OCS REGION: Alaska

APPLICABLE PLANNING AREA: Beaufort Sea

FISCAL YEAR OF PROJECT FUNDING: 2010, 2011

COMPLETION DATE OF REPORT: July 31, 2011

COST: \$12,528.00

PROJECT MANAGER: Dr. Jodi L. Pirtle

AFFILIATION: School of Fisheries and Ocean Sciences, University of Alaska Fairbanks

ADDRESS: 17101 Point Lena Loop Road, Juneau, AK 99801

PRINCIPAL INVESTIGATOR: Dr. Franz J. Mueter, School of Fisheries and Ocean Sciences, University of Alaska Fairbanks

KEY WORDS: Beaufort Sea; trophic relationships; food webs; predators; fish; marine birds; marine mammals; diet.

BACKGROUND: Past studies of fish in the US Beaufort Sea include the Outer Continental Shelf Environmental Assessment Program (OCSEAP) during the 1970s, a joint effort between the US Bureau of Ocean Energy Management, Regulation and Enforcement (BOEMRE) formerly Minerals Management Service (MMS) and the National Oceanic and Atmospheric Administration (NOAA). Regular fishery resource surveys have not been conducted in the Beaufort Sea. However, recent surveys of the nearshore and the offshore regions by NOAA Fisheries and BOEMRE provide an updated perspective on fish and their abundance and distribution. A synthesis of studies can present an overarching view of trophic relationships among individual species. A synthesis of trophic linkages for marine and anadromous fishes will provide necessary information to assess and manage the potential environmental effects of offshore developments to the Beaufort Sea ecosystem.

OBJECTIVE: The objective of this review was to perform a literature search and synthesis of Beaufort Sea higher trophic linkages, focusing on fish as prey, the diet of these fishes, and potential trophic competitors, to demonstrate where fish fit into the Beaufort Sea ecosystem.

DESCRIPTION: This review has the following tasks: 1) synthesize existing literature linking fish as prey to a variety of predators in the USBS; 2) develop and present an overarching view of the many higher trophic linkages involving fish and their prey; 3) show the relative importance of a particular prey species among the diverse groups of predators and competitors, including marine mammals, birds, and fish; 4) construct and illustrate the trophic food web for the USBS, including specific fish species preyed upon by higher trophic level predators, the prey of the fish, and their potential competitors. Focal fish species for this review were chosen due to high local abundance, importance as prey to higher trophic level predators, and role as predators and trophic competitors with other key species in Beaufort Sea ecosystem, and include Arctic cod, saffron cod, capelin, Pacific sand lance, Pacific herring, Arctic cisco, and least cisco.

SIGNIFICANT CONCLUSIONS: The food webs presented are based on existing literature to convey the status of knowledge for these species in the Beaufort Sea ecosystem. Of the seven focal species investigated, the most complete understanding of food web structure and trophic pathways exists for Arctic cod. The food webs presented for other species are probably far more complex than indicated in this summary because these species are not well-studied in Beaufort Sea and the Alaskan Arctic.

STUDY PRODUCT(S): Pirtle, J.L., Mueter, F.J. 2011. Beaufort Sea Fish and their Trophic Linkages: Literature Search and Synthesis. BOEMRE 2011-021. US Department of the Interior, Bureau of Ocean Energy Management, Regulation and Enforcement, Alaska Environmental Studies Program, Anchorage, AK. 47pp.