2009 Environmental Studies Program in the Northeastern Chukchi Sea:

Fisheries Ecology of the Burger and Klondike Survey Areas

Final Report

Prepared for

ConocoPhillips Alaska, Inc.,

Shell Exploration & Production Company,

and Statoil USA E&P, Inc.

by

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EXECUTIVE SUMMARY

This report presents data from field and laboratory studies of fishes collected during the 2009 Chukchi Environmental Studies Program developed by ConocoPhillips Alaska, Inc. and Shell Exploration and Production Company. The overall goal of the program is to establish baseline environmental and biological conditions in the northeastern Chukchi Sea prior to oil and gas development. Assessments of physical, chemical, and biological (zooplankton, benthic infauna, marine mammals, and seabirds) oceanography were initiated in 2008 and continued in 2009. The Fisheries Ecology component of the program began in 2009 to document fish distribution, abundance, age, diet, and trophic level . The 2009 fisheries data are summarized briefly here, with a more rigorous analysis of data to be included in a synthesis report of fisheries ecology based on 2009 – 2010 collections by this program.

Stations near the Klondike and Burger prospects within Lease Sale 193 of the northeastern Chukchi Sea (**Figure 1**) were sampled during both summer and autumn 2009 with both a midwater and a bottom trawl. An Isaacs-Kidd midwater trawl of 3 mm mesh throughout (MW) fished in the water column and 3 m plumb staff beam trawl with 4 mm codend mesh (BT) fished on the bottom. Thirteen stations in each prospect were fished during each season by both gear types. A MW haul quantitative for volume fished was collected at each station in each season. At least one BT haul was collected at each station in each season; hauls quantitative for area fished were at each station except the summer collection at BF007; at this site presence of fish species was observed. Almost 8,000 fishes were collected during quantitative hauls, with 50% caught by the MW and 50% caught by the BT. Seven percent of the total biomass was caught by the MW and 93% was caught by the BT.

The midwater and bottom trawl sampled different life stages of fish. The MW effectively sampled early life history stages, i.e., pelagic larvae and early juvenile stages of fishes. The BT effectively sampled settled juvenile and adult demersal fishes. The length of fishes captured by midwater trawl overlapped that of those caught by the bottom trawl (**Figure 16**). The smallest fish caught was similar for both the MW and BT (15 and 27 mm, respectively), but the length range was much larger for the fish caught by BT. The maximum length of fish captured was 119 mm by MT and 215 mm by bottom trawl. The modal length of fishes in the MT was 27.5 mm while the modal length of fishes in the bottom trawl was 90 mm.

Five “key” species were selected for age, diet, and trophic analysis based on their prevalence on the sampling grounds and because they are representative of represent major fish taxonomic families present in the Chukchi Sea. Age, diet and trophic analyses were performed on Arctic cod *Boreogadus saida*, Arctic staghorn sculpin *Gymnocanthus tricuspis*, polar eelpout *Lycodes polaris*, stout eelblenny *Anisarchus medius*, and Bering flounder *Hippoglossoides robustus*.

Arctic cod lengths ranged from 15 to 215 mm; ages were 0 – 6. Arctic staghorn sculpin lengths ranged from 31 to 113 mm; ages were 0 – 4. Polar eelpout lengths ranged from 37 to 200 mm; ages were 0 – 7. Stout eelblenny lengths ranged from 42 to 139 mm; ages were 2 – 10. Bering flounder lengths ranged from 35 to 179 mm; ages were 1 – 6. Diets of each of the five key fish species were based primarily on small crustaceans. Arctic cod primarily consumed pelagic copepods, while the other fishes fed mainly on benthic epifauna.

INTRODUCTION

The northeast Chukchi Sea from Point Hope to Barrow is an area within which intensive exploration for oil and gas reserves is occurring. There is considerable interest from stakeholders in understanding the current biological communities of this area prior to development. Fishes are the least-studied biological group in the western Arctic, if one considers the number of gear deployments that have taken place. There are far more data about lower trophic levels such as zooplankton and benthos, and higher trophic levels such as seals and whales, than of fishes. The general consensus seems to be that little is known and much work needs to be done on Arctic marine fishes (e.g., Johnson 1997, Power 1997, Mecklenburg et al. 2002, 2008, MMS 2006). Documenting current distribution and abundance of fishes, together with information on their biology, is essential to document good stewardship by the oil and gas industry.

Very little is known about fishes that have no commercial or cultural significance (Power 1997). It is important to note that no fishes are taken commercially in the Chukchi Sea and that fishes utilized by subsistence users are mostly nearshore. Existing information published on fish distribution on the shelf of the northeastern Chukchi Sea, including online sources, peer-reviewed and gray literature, is based entirely on catches of demersal fish trawls and ichthyoplankton collected 1959 – 1992, and the 2004 – 2008 research in which we participated. The majority of these species are demersal (living on or near the bottom), many are benthopelagic (living or feeding near the bottom as well as in midwater or near the surface), and far fewer are pelagic (at surface or mid depths). The dominant Arctic fish families are cods, eelpouts, snailfishes, sculpins, and salmonids. Arctic cod was the dominant species captured in all earlier surveys of the Chukchi Sea (Alverson and Wilimovsky 1966; Frost and Lowry 1983; Fechhelm et al. 1985; Barber et al. 1997), and because it has the highest commercial importance, it is also the best studied species (Hop et al. 1997). Recent distributional, biological, and ecological knowledge about fishes in the northern Chukchi Sea comes from cruises in 1990 – 1991 (Barber et al. 1997), 1991 – 1992 (Hokkaido University 1992, 1993), the RUSALCA 2004 expedition (Mecklenburg and Sheiko 2006; Mecklenburg et al. 2007; Norcross et al. 2010) and our unpublished recent collections from four collections of demersal fishes in the northeastern Chukchi Sea during August 2007 (cruise OS180, T/S Oshoro-Maru), September 2007 (cruise OD0710, R/V Oscar Dyson), July 2008 (cruise OS190, T/S Oshoro-Maru), and July – August 2009 (cruise COMIDA-2009, R/V Alpha Helix). The only collections of pelagic fishes have been by surface trawl during September 2007 (cruise OD0710, unreported) and MT during July – August 2009 (cruise COMIDA-2009, our collections). Fish larvae and eggs have been collected in a number of zooplankton surveys, which we do not detail here. Fishes caught in the northeastern Chukchi Sea during those recent cruises were predominantly (>80% by number) sculpins, pricklebacks, cods, eelpouts, and flatfishes.

As with distribution, little is known about ecology and life history of the marine fishes of the Alaskan Arctic. Most available information comes from work associated with marine mammals food habits (Frost and Lowry 1981, 1983, 1984) and oil and gas exploration (Craig and McCart 1976; Craig et al. 1982, 1984). Food habits of four abundant species were examined from 1990 – 1991 collections in the northeastern Chukchi Sea (Coyle et al. 1997), and population biology of Bering flounder and Arctic staghorn sculpin were reported from those same collections (Smith et al. 1997a, 1997b).

Despite limitation in spatial and temporal extent of studies, diets of the most abundant species of marine fishes in the Arctic waters of Alaska reveal fish feeding on benthic and pelagic animals at all trophic levels. Arctic cod diet was examined from 1977 collections in the eastern Chukchi and western Beaufort Seas, where its predominant food was pelagic calanoid copepods (Lowry and Frost 1981.) In 1990 – 1991 collections in the northeastern Chukchi Sea, Arctic cod consumed pelagic and epibenthic prey, saffron cod *Eleginus gracilis* ate epibenthic and benthic prey, Arctic staghorn sculpin ate benthic polychaetes and mollusks, and Bering flounder ate fishes and epibenthic crustaceans (Coyle et al. 1997).

OBJECTIVES

The objectives of this data report are to document:

1. distribution and abundance of demersal and pelagic fish species in the Klondike and Burger study areas during summer and autumn 2009,
2. lengths and ages of fishes,
3. diets of fishes through examination of stomach contents, and
4. trophic level of fishes.

METHODS

Fieldwork

Descriptions of trawl collections

Midwater and bottom trawl nets were fished to collect pelagic and demersal fishes during two seasons near Klondike and Burger prospects in the northeastern Chukchi Sea. Thirteen sites in each prospect were fished during summer (cruise WWW0902, 13 – 29 August 2009) and autumn (cruise WWW0904, 25 September – 10 October 2009) (**Figure 1**).

Pelagic fishes were collected at night using an Isaacs-Kidd Midwater Trawl (MT) with 3 mm mesh throughout the body and codend. The MT mouth was 1.5 m wide by 1.8 m high, and the net had an effective fishing area of 2.137 m^2 when fished at 45° angle. A rigid diving vane kept the mouth of the net open during towing and exerted a depressing force to stabilize the net vertically. A Star-Oddi Centi DST time depth recorder (TDR) was attached to the MT frame and provided a post-haul record of fishing depth. A "lazy line" was fastened at the mouth of the codend to facilitate hooking up to the snatch block to lift the lower net and catch onboard. The MT was deployed using a starboard davit at midship and towed with the current at 4 kt over ground in a double oblique tow. During the haul, the towing cable was continuously released or

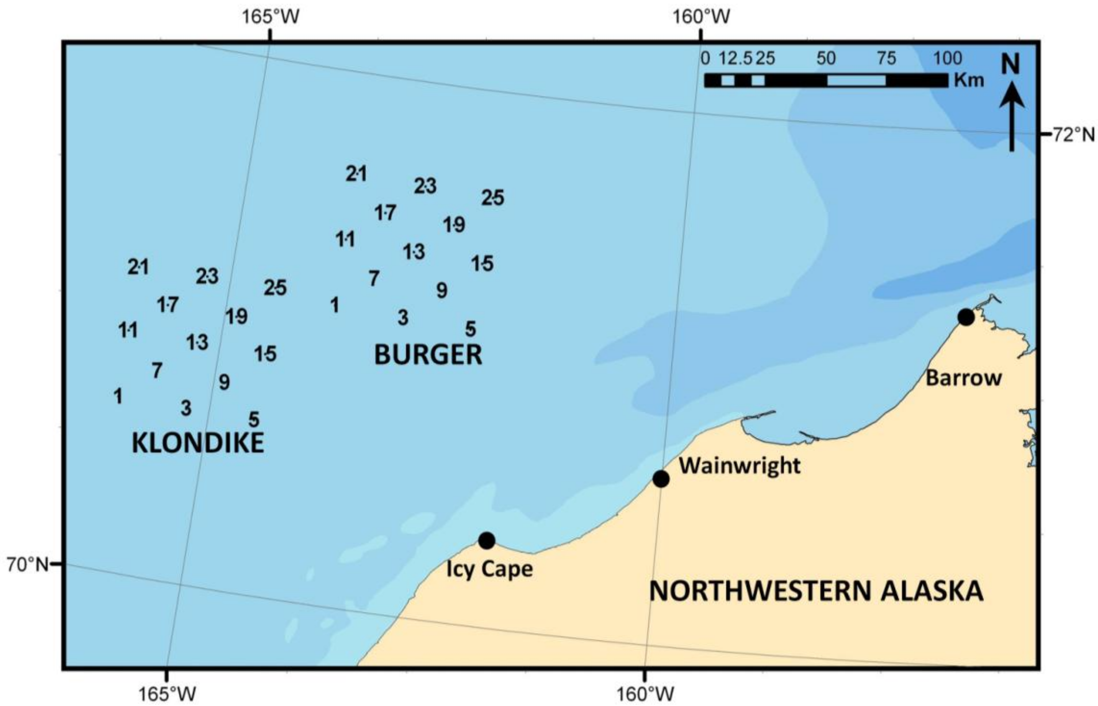

Figure 1. Stations where fishing nets were deployed during 2009. Stations are marked as 1 – 25 at each prospect. The full station names included prospect and type of station, e.g., KF001 = Klondike Fixed Station 001.

retrieved. The approximate rate was 30 m/min, but sometimes rate was modified to maintain the target 45° wire angle. The goal was to sample fishes in the water column from the surface to 10 m above the seafloor. This goal met with limited success. Usually MW hauls were within 20 m of the seafloor. Haul duration was from 6 to 20 minutes. The MT catch was photographed to document catch composition and processed in the wet lab. Jellyfish bell diameter was measured to the nearest mm and jellyfish were discarded. When available, a subset of pelagic invertebrates from each MT sample was kept for trophic analysis. A catch-per-unit-effort (CPUE) factor was calculated for each MT haul as (1000 / (haul distance in m x 2.137 m^2 net opening)). This CPUE factor was multiplied by the number or weight of fishes to calculate standardized catch, i.e., CPUE (number of fish per $1000m^3$) or biomass-per-unit-effort (grams of fish per $1000m^3$, BPUE).

Demersal fishes also were collected at night using a 10 ft (3.05 m) plumb staff beam trawl (BT) with 7 mm mesh and 4 mm codend liner. This same net has been used during five other recent fish surveys in the Chukchi Sea (Norcross and Holladay, unpublished data). The original net design (Gunderson and Ellis 1986) was modified for work in Alaska by shortening the beam from 3.66 m to 3.05 m, seizing a lead-filled line to the footrope and adding 6-inch (15 cm) lengths of chain at 15 cm intervals along the footrope, and lengthening the codend from 1 m to 4 m to avoid overfilling the codend. A rigid 3 m pipe forward of the net held the mouth open for an effective swath of 2.26 m, allowing for accurate quantifications of trawl effort by area swept or by duration of tow. The vertical opening of the net was approximately 1.2 m. A TDR was attached to the net headrope.

The BT was deployed from the deck using a starboard davit at midship. Latitude, longitude, and bottom depth were recorded throughout each haul. The towing cable was deployed at 30 m/min with a ratio of 3 – 5 m of towing cable to 1 m of water depth. Haul distance was calculated between the positions of the vessel when scope was fully deployed and when the haul back began. Haul duration was approximately 5 min in the Klondike prospect, and was reduced to 3 minutes in the Burger prospect, to avoid filling the net with benthic animals and mud. The BT was towed with the current while the vessel was moving at 1 – 1.5 kt over ground. After retrieval, the catch was classified as either qualitative or quantitative. A haul was considered qualitative where 1) the net was sufficiently damaged to allow loss of some of the catch or alter the net dimensions, 2) the catch overflowed the codend, 3) a high proportion of pelagic to demersal animals was collected, or 4) problems occurred with launching and retrieving the net. If a haul was classified as qualitative, a second BT haul was conducted for that station when sufficient time was available. Catch from qualitative hauls was discarded only after a quantitative haul was successfully brought onboard. Once a haul was aboard, it was dumped onto the deck sorting table. Muddy catches were washed through a 1 mm mesh sieve to remove mud prior to sorting. The catch was photographed to document sediment type and overall composition of the catch. The approximate volume and a description of substrate in the catch were recorded. The entire catch was sorted to remove fishes, and the catch was subsampled for invertebrate fauna. Fishes were taken into the wet lab for processing. A CPUE factor was calculated for each BT haul as (1000 / (haul distance in m X 2.26 m net swath)). This CPUE factor was multiplied by the number or weight of fishes to calculate standardized catch, i.e., CPUE (number of fish per $1000m^2$) or CPUE (grams of fish per $1000m^2$).

At-sea processing of fish

Fishes were euthanized according to approved UAF International Care and Use Committee protocol 07-047 by immersing the fishes in a solution of 2 alka-seltzer tablets per quart of seawater until gill movement ceased. In an effort to maintain sample quality for later analyses, euthanized fishes were placed on frozen ice packs during processing. Fishes were separated by species, grouped into similar length classes, and counted. Total length (to nearest 5 mm) and weight (nearest g) was measured for each group, e.g., N=3 Arctic cod at 80 mm weighing 18 g. When a species was represented by N>25 individuals of an obvious length class, a subsample of 25 individuals were counted, measured, and weighed while the rest of the individuals of that length class were counted but not measured. When time permitted, photographs of individual fish specimens were taken. Occasionally, larval fishes and specimens needing further identification were preserved in 10% buffered formalin. After processing, fishes were packaged by species into groups of five in a Ziploc bag with a label containing station and haul information. All species from a station, except for voucher specimens preserved in formalin, were placed in a larger Ziploc bag and frozen for transport to the laboratory.

Laboratory

Processing of fish

Fishes captured during the 2009 field season were transported to the Fisheries Oceanography Laboratory, Institute of Marine Science, University of Alaska Fairbanks (FOL/UAF), where field identifications of species were verified. In the laboratory, fishes were thawed and total length was measured to the nearest mm. Wet weight was measured to the nearest 0.1 g for larger fish, using a Mettler BB1200 scale, and 0.1 mg for smaller fish, using an A&D Company Ltd. HR-200 scale.

Laboratory analyses focused on five “key” fish species, which were selected based on their prevalence in the samples and because they were representative of major fish taxonomic families present in the Chukchi Sea. These species were Arctic cod (Family Gadidae, Cods), Arctic staghorn sculpin (Family Cottidae, Sculpins), polar eelpout (Family Zoarcidae, Eelpouts), stout eelblenny (Family Stichaeidae, Pricklebacks), and Bering flounder (Family Pleuronectidae, Flatfishes). A subset of specimens was selected for additional analyses. Initially this selection was based on the approximate age-class of each species as determined by length / frequency histograms of lengths measured in the field. In order to better compare across species, this approach was later discarded in favor of standard length ranges, i.e., ≤50 mm, 50 – 75 mm, 76 – 100 mm, and ≥100 mm.

Age determination

Ages were estimated for each of the five key fish species based on examination of fish ear bones (otoliths). Specimens were selected from both prospects, both gears and both seasons. The selection design was not intentionally balanced among these categories. Otoliths were dissected from fish and prepared for determination of age. Both saggital otoliths were removed, cleaned, and stored in centrifuge tubes. One was mounted using Crystalbond thermoplastic glue onto a 1" x 3" glass slide and thin sectioned using a Buehler isomet low speed saw. If juvenile and larval fish otoliths were not particularly concave, they were mounted and polished on the saggital plane. Otoliths were reheated to place the flat edge on the glass. Each was ground down to a thickness of 200 – 400 microns using a Buehler rotating wheel. The rotating wheel sprayed water over the surface of the lapping film (9 and 15 microns) to keep a clean grinding surface and prevent breakage of the otolith. During the grinding process, the otolith was periodically checked for clarity of the growth rings using a compound microscope (100x magnification). The second otolith was prepared if growth rings in the first otolith were illegible or the otolith broke during processing.

Otoliths were photographed using a Leica DM1000 compound microscope. Ages were assigned by comparing the photograph of transmitted light present on the computer image to the mounted otoliths viewed using a Leica M165C dissecting microscope and reflected light. Ages were estimated on the basis of paired summer and winter growth zones. Age-0 fish had daily rings (summer growth) without a winter growth annulus present on the margin. Age-1 fish had summer growth plus a winter growth annulus (post January 1st capture). The annuli (winter growth zones) marked the ages of the fish (**Figure 2**). Two FOL/UAF technicians estimated the age of each otolith. When their age estimations differed, the technicians examined the otolith together until they reached an agreement on age assignment.

We had difficulty preparing Arctic cod otoliths because of their thick calcification. We now know that Arctic cod otoliths require thin sectioning rather than being polished flat on a glass slide. Also, we found the ages of Arctic cod were more reliably legible if otoliths were

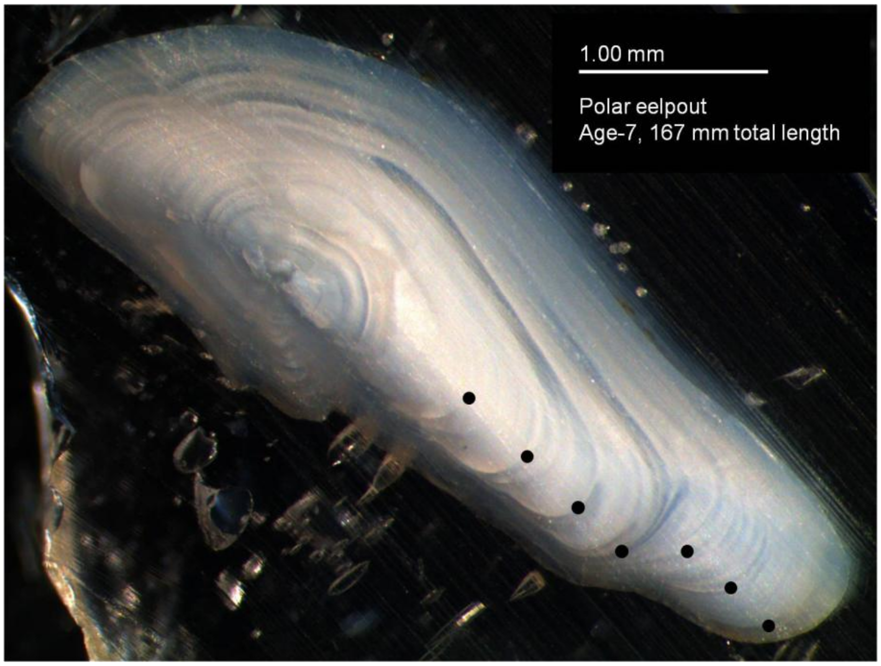

Figure 2. Photograph of polar eelpout otolith. The 7 winter growth zones are marked.

under-polished and thus less translucent. Preparing all Arctic cod otoliths in this manner will improve the quality of further age readings.

Histograms of length / frequency were prepared for each species, gear, prospect and season. and ages assigned based on otolith analyses were presented on the same length axes. Histograms are included in this report only for those categories that had more than one 5 mm bin of lengths.

Diet analysis

Stomach contents were examined from a total of 505 fishes. Where sufficient specimens were available from BT catches, stomach contents were examined from up to 23 stomachs per length class from each of the five key species, from each season and prospect. Only Arctic cod was examined from midwater catches. Because of insufficient sample availability, the diet sampling design was not evenly divided between prospects. Sample availability was limited by catches and by poor quality of frozen specimens. Frozen fishes were examined in 2009 because the same specimen could be examined for both stomach contents and trophic level. We improved quality of specimens for diet analysis from 2010 catches by preserving a subset of fishes in a solution of 10% buffered formalin. From the 2010 catches, if insufficient frozen specimens are available, stomach contents will be examined from the fishes preserved in formalin.

Stomachs were excised from the whole fish, covered in water, and frozen until processed. When thawed, wet weight of the stomach was measured to the nearest 0.1 mg. Prey were removed and the empty weight and approximate percent fullness of each stomach was recorded. Prey items were sorted in a water medium to family-level taxonomic groupings and divided into length classes (≤ 5 mm, 5 – 15 mm, and ≥ 15 mm). Each whole prey item, determined by the presence of a head, was counted. All prey items of the same length class and taxonomic grouping were blotted on lens paper and weighed to the nearest 0.0001 g. Fragments of organisms that were identified at least to the family level were included in this weight but did not count as whole organisms. This process was repeated for each fish length class and taxonomic grouping of prey in every stomach. Voucher specimens of prey taxa in good condition were archived in 50% isopropyl alcohol. Prey items in poor condition were retained for stable isotope analysis or discarded after counts and weights had been obtained. The sorted samples retained for stable isotope analysis were frozen in small vials. When possible, organisms were identified to species for enumeration and weighing, but were grouped together by family for stable isotope and diet analyses.

Data collected during laboratory analyses of fish diet will be examined together with fishes caught during 2010 collections in a future report. That report will examine frequency of occurrence (FO) and index of relative importance (IRI) of prey, as partitioned by fish species, length class, cruise, prospect and gear type. FO is the percentage of fish stomachs in each category containing a particular prey taxon, divided by the total number of stomachs in that category. IRI is calculated for each prey taxon in each category using IRI = (%N+%W)/%FO where N is the percentage of a certain prey taxon, W is the percentage of the weight of the prey taxon, and FO is the frequency of occurrence as described above (Pinkas et al. 1971). The results presented in this report are limited to a qualitative description of the stomach contents by predator species, length class, and gear.

Trophic analysis

Stable nitrogen and carbon isotope analyses of animal tissues are frequently used to examine the structure of food webs and to determine food sources. We examined the effects of lipid extraction on stable isotope values and refined our methods of laboratory stable isotope analysis. Two goals of trophic analysis were addressed with 2009 samples, i.e. refining the methods for stable isotope laboratory analysis, and examining specimens to achieve a reasonable quantity of specimens to lead to confidence in statistical analysis of results.

Preliminary analyses of whole fish versus muscle tissue, and lipid extraction versus no extraction, led us to determine that values of non-lipid extracted $\delta^{15}N$ and lipid-extracted values of $\delta^{13}C$ were most appropriate for this project (pers. comm., S. Carroll, UAF). This is the technique used to analyze stable isotopes for this project.

Approximately five specimens of each fish species, length class, prospect, and season were examined. Two subsamples of approximately 20 mg of muscle tissue were removed from the dorsal region of each fish, freeze-dried, and homogenized using mortar and pestle. Lipids were extracted from one subsample by the following process. Samples were washed in a 2:1 chloroform : methanol mixture, agitated for 5 minutes in a vortex genie and centrifuged for 5 minutes at 3000 rpm. The supernatant was discarded and the process was repeated twice. The lipid-extracted samples dried overnight in the fume hood and were then re-homogenized. Each of the two subsamples, one with lipids removed and one with lipids intact, was weighed using a micro-scale and carbon and nitrogen isotope ratios were analyzed at the Alaska Stable Isotope /Facility, UAF, using a Finnigan MAT DeltaPlusXL Isotope Ratio Mass Spectrometer (IRMS) directly coupled to a Costech Elemental Analyzer (ESC 4010).

Quality assurance procedures

The following quality control procedures were implemented. Fish identification was verified by C.W. Mecklenburg (Point Stephens Research, Juneau) or by comparison with voucher specimens in the collection held at the FOL/UAF. Voucher specimens of each fish species were archived in the University of Alaska Museum of the North (UAMN). Samples processed for stable isotopes are subject to standard QA/QC measures of the Alaska Stable Isotope Facility, UAF. As previously noted, two FOL/UAF technicians estimated the age of each otolith. When the two age estimations differed, the technicians examined the otolith together until they reached an agreement on age assignment. Additionally, a subset of otoliths examined at the FOL/UAF was separately assigned ages by the Aging Lab of the Alaska Department of Fish and Game. Fish muscle tissues were provided for genetic examination by the Fish Barcode of Life Initiative, a global effort to develop a standardized reference sequence library including all fish species, thereby further substantiating species identifications. Identification of prey was supervised by a senior taxonomist, and 5% of specimens were verified to ensure that counts are accurate and organisms are correctly identified. Voucher specimens of prey taxa are held at the FOL/UAF.

RESULTS

Twenty-six stations were sampled by both midwater and BTs during August 2009 (summer), and those same stations were sampled again approximately one month later (autumn) (**Figure 1**, **Tables 1 – 4**). Successful quantitative hauls were collected with both gears at all sites with one exception; only a qualitative bottom haul was collected at BF007 during summer. A qualitative bottom haul at KF001 during summer is reported because it caught species not present in the quantitative haul at that site.

A total of 7,999 fishes was collected during quantitative hauls, with 50% caught by MT (**Tables 5 – 6**) and 50% caught by BT (**Tables 7 – 8**). The total biomass of these fishes was 10.8 kg, of which 7% was caught by MW and 93% was caught by BT. Arctic cod was the most numerous fish caught by both gears, and accounted for 57% of overall quantity and 29% of overall biomass. The next most numerous species were stout eelblenny (10% of number, 21% of biomass) and shorthorn sculpin *Myoxocephalus scorpius* (8% of number, 7% of biomass). Other species each accounted for less than 5% of fish quantity.

Standardized catches (CPUE and BPUE) were averaged over MW hauls from each prospect and season (**Figure 3**). Relatively high midwater CPUE values were found during summer. Summer CPUE at Klondike was approximately three times (131 fish / $1000m^3$), and summer CPUE at Burger was approximately four times (207 fish / $1000m^3$) that observed during either prospect during autumn (56 – 65 fish / $1000m^3$). Midwater BPUE was highest at Klondike during autumn (32 g / $1000m^3$), and similar at both prospects during summer and Burger during autumn (19 – 21 g / $1000m^3$). Bottom CPUE values were lowest during autumn in Burger (118 fish / $1000m^2$), and similar at the other season/prospect combinations (172 – 206 fish / $1000m^2$). Likewise, bottom BPUE values were lowest during autumn in Burger (198 g / $1000m^2$) versus the other season/prospect combinations (473 – 597 fish / $1000m^2$)

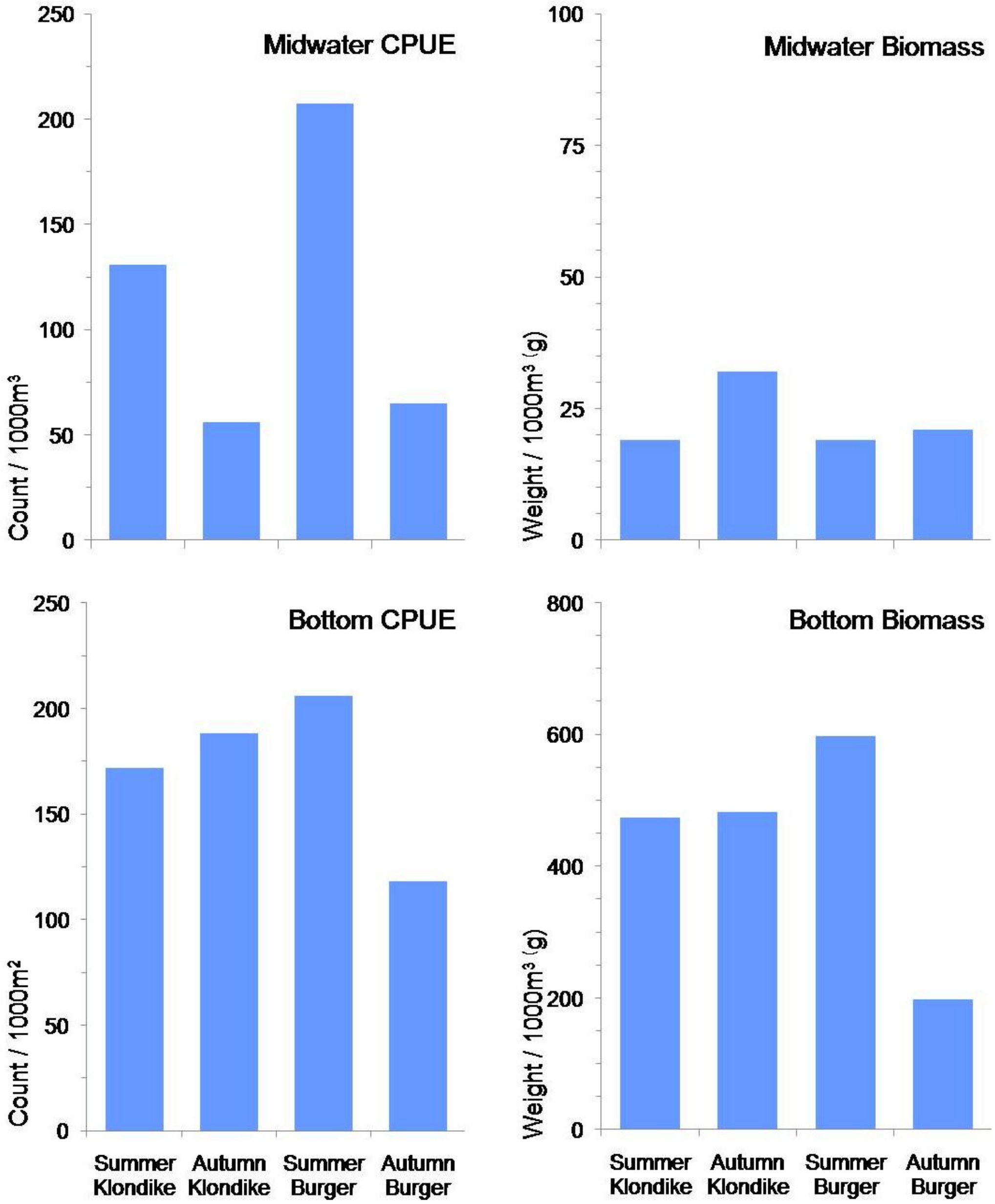

Figure 3. Standardized catches of fishes captured in 2009 averaged by gear type, prospect, and season. Midwater catch is standardized by volume, and bottom catch is standardized by area. Note the different scale of biomass axes.

Twelve species of fish from eight families were caught in MW hauls (**Tables 5 – 6**). The most numerous species was Arctic cod, which accounted for the largest count of any species in each prospect and each season (52 – 95% of number). Arctic cod accounted for 25 – 44% of total biomass in each prospect and season, and had the largest weight of any species at each prospect during autumn. During summer, the biomass of stout eelblenny (25 – 30% of total biomass) was similar to Arctic cod (25 – 26%).

Cods were of highest abundance in MW hauls of both prospects and seasons (52 – 95% of total CPUE) (**Figure 4)**. Pricklebacks were abundant in Klondike during both seasons (7 – 11% of total CPUE), and sand lances were abundant in both prospects during the later cruise (17% of total CPUE, both prospects). Catches with the midwater net were dominated by Arctic cod, which had an average abundance over both prospects and cruises of 97.2 fish/1000 m^3. Four other species had average abundances of >1 fish/1000 m^3, including Pacific sand lance *Ammodytes hexapterus* (7.0 fish/1000 m^3), shorthorn sculpin (4.6 fish/1000 m^3), Arctic shanny *Stichaeus punctatus* (3.4 fish/1000 m^3), and slender eelblenny *Lumpenus fabricii* (1.6 fish/1000 m^3).

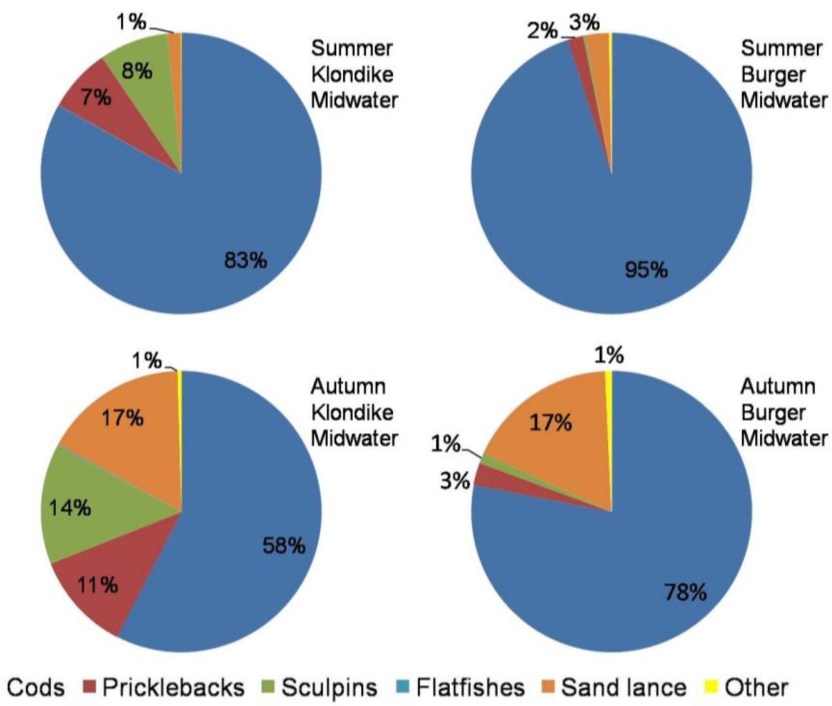

Figure 4. Proportional representation of the number of fishes captured by midwater trawl during summer and autumn 2009, by prospect. Catch was standardized to count per 1000 m^3.

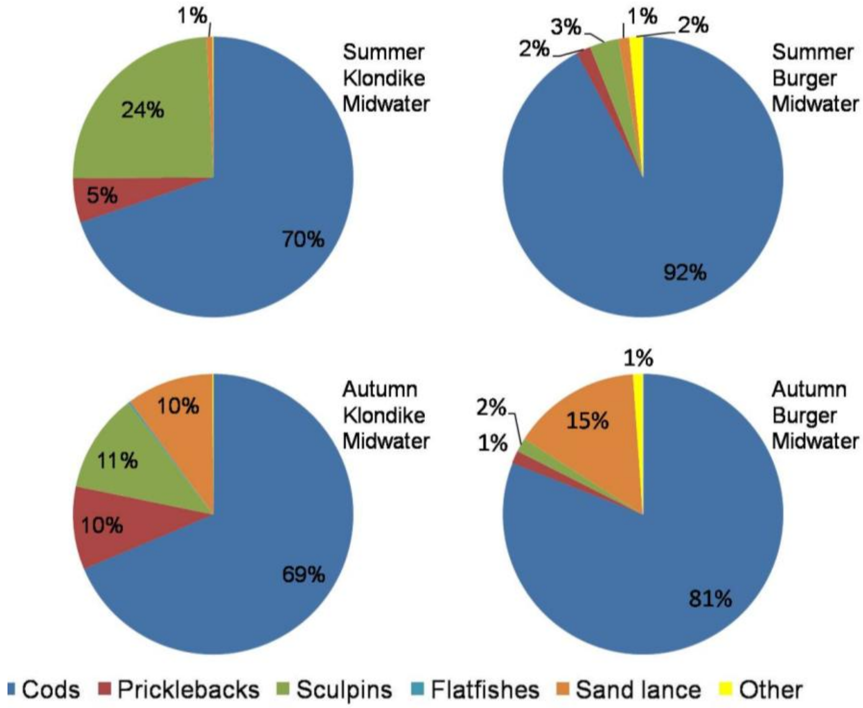

Figure 5. Proportional representation of the biomass of fishes captured by midwater trawl during summer and autumn 2009, by prospect. Catch was standardized to weight per 1000 m^3.

As with abundance, the relative proportion of MW cod biomass was the highest of any family in both prospects and seasons (69 – 92% of total CPUE) (**Figure 5**). Relatively high proportional biomasses of sculpins and pricklebacks were found in Klondike during both seasons (11 – 24% and 5 – 10% of total BPUE, respectively). The proportional biomass of Pacific sand lance was relatively high in both prospects during autumn (10 – 15% of total BPUE).

Demersal fish diversity and abundance

Standardized catches (CPUE and BPUE) were averaged over BT hauls from each prospect and season (**Figure 6**). CPUE of BT hauls was relatively low in Burger during autumn (118 fish / $1000m^2$), and was similar in the other season/prospect combinations (172 – 206 fish / $1000m^2$). Likewise, BPUE was lower in Burger during autumn (198 g / $1000m^2$) than in the other season/prospect combinations (473 – 597 g / $1000m^2$).

Twenty-nine species of fish from among nine families were caught in the BT (**Tables 7 – 8**). The most numerous fish was Arctic cod, which accounted for the largest count of any species in all season/prospect combinations (63 – 73% of number) except for autumn in Klondike (20% of number) where shorthorn sculpin was more numerous (25% of number). Arctic cod contributed a greater biomass than any other species during autumn in Burger (44% of biomass). The biomass caught of Arctic cod was similar to that of stout eelblenny at the other season/prospect combinations (25 – 29% and 21 – 30% respectively.

The same four families were abundant in BT hauls in each season and prospect, however the family of highest relative abundance was different (**Figure 6**). Cods and pricklebacks shared the highest abundance in Klondike during summer (each providing 34% of total CPUE), when pricklebacks were most abundant in Burger (48% of total CPUE). Sculpins were the most abundant family abundant in Klondike during autumn (50%), when cods were most abundant in Burger (53%). Pricklebacks had the highest biomass during summer in both prospects (34 – 38% of total BPUE) (**Figure 7**). Cods had the highest biomass during autumn in Burger (37% of total BPUE), and were of equally high biomass as sculpins during autumn in Klondike (each providing 29% of total BPUE).

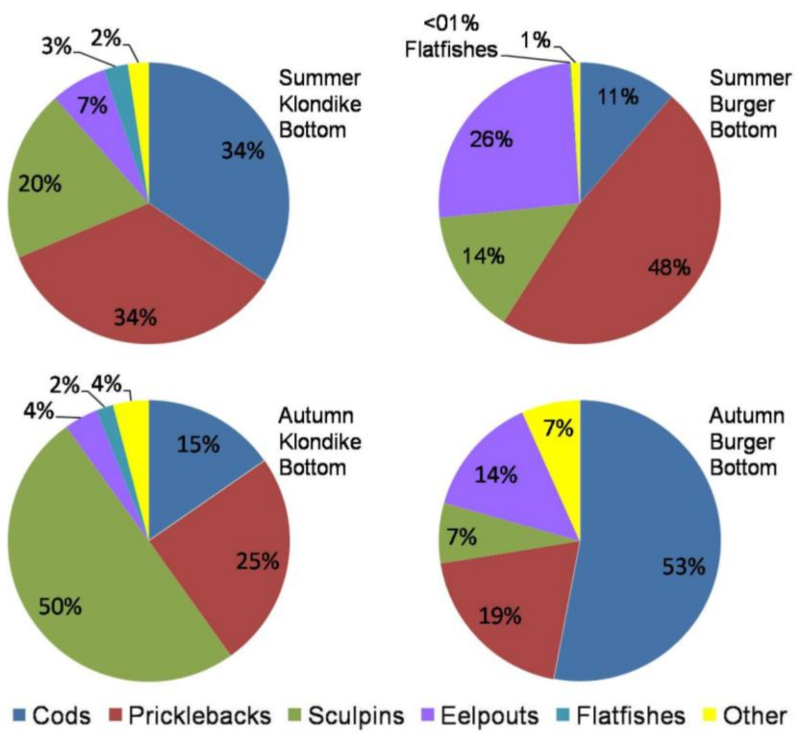

Figure 6. Proportional representation of the number of fishes captured by bottom trawl during summer and autumn 2009, by prospect. Catch was standardized to weight per 1000 m^2.

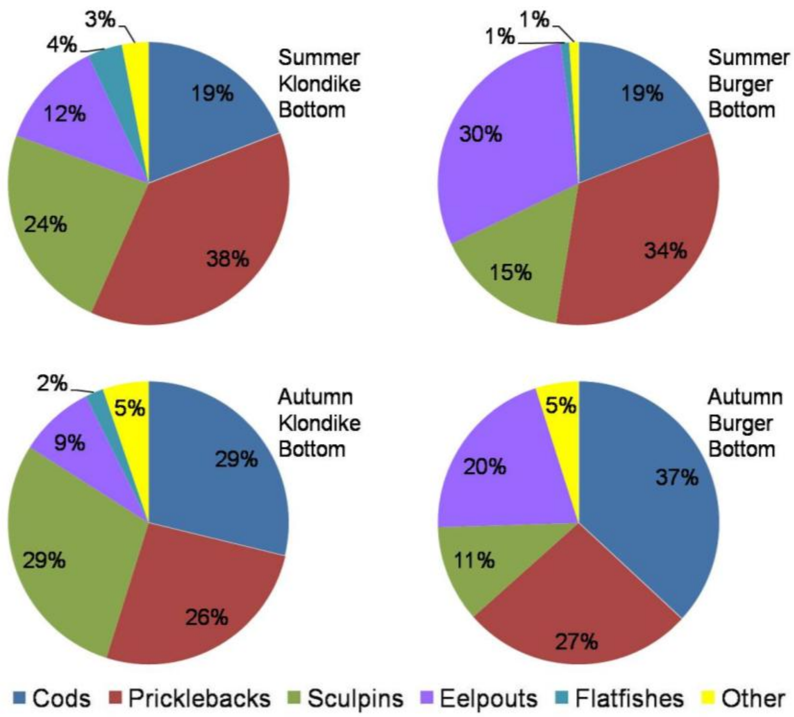

Figure 7. Proportional representation of the biomass of fishes captured by bottom trawl during summer and autumn 2009, by prospect. Catch was standardized to weight per 1000 m^2.

Fifteen species had abundances >1 fish / 1000 m^2 when averaged over BT hauls in both prospects and both cruises (**Table 9**). These same species, with the exception of Pacific sand lance and the addition of four species, had an average standardized biomass of >1 g / 1000m^2 (**Table 10**).

Fish length and age analysis

The MW and BT sampled different life stages of fish. The MT effectively sampled early life history stages, i.e., larvae and juvenile pelagic stages of fishes. The BT effectively sampled settled juvenile and adult demersal fishes. The lengths of fishes captured by MT overlapped those caught by BT (**Figure 8**). The smallest fishes caught were similar for both the MT and BT (15 and 27 mm, respectively), but the length range was much larger for the fish caught by BT. The maximum length of fish captured was 119 mm by MT and 215 mm by BT. The modal length of fishes in the MT was 27.5 mm while the modal length of fishes in the BT was 90 mm.

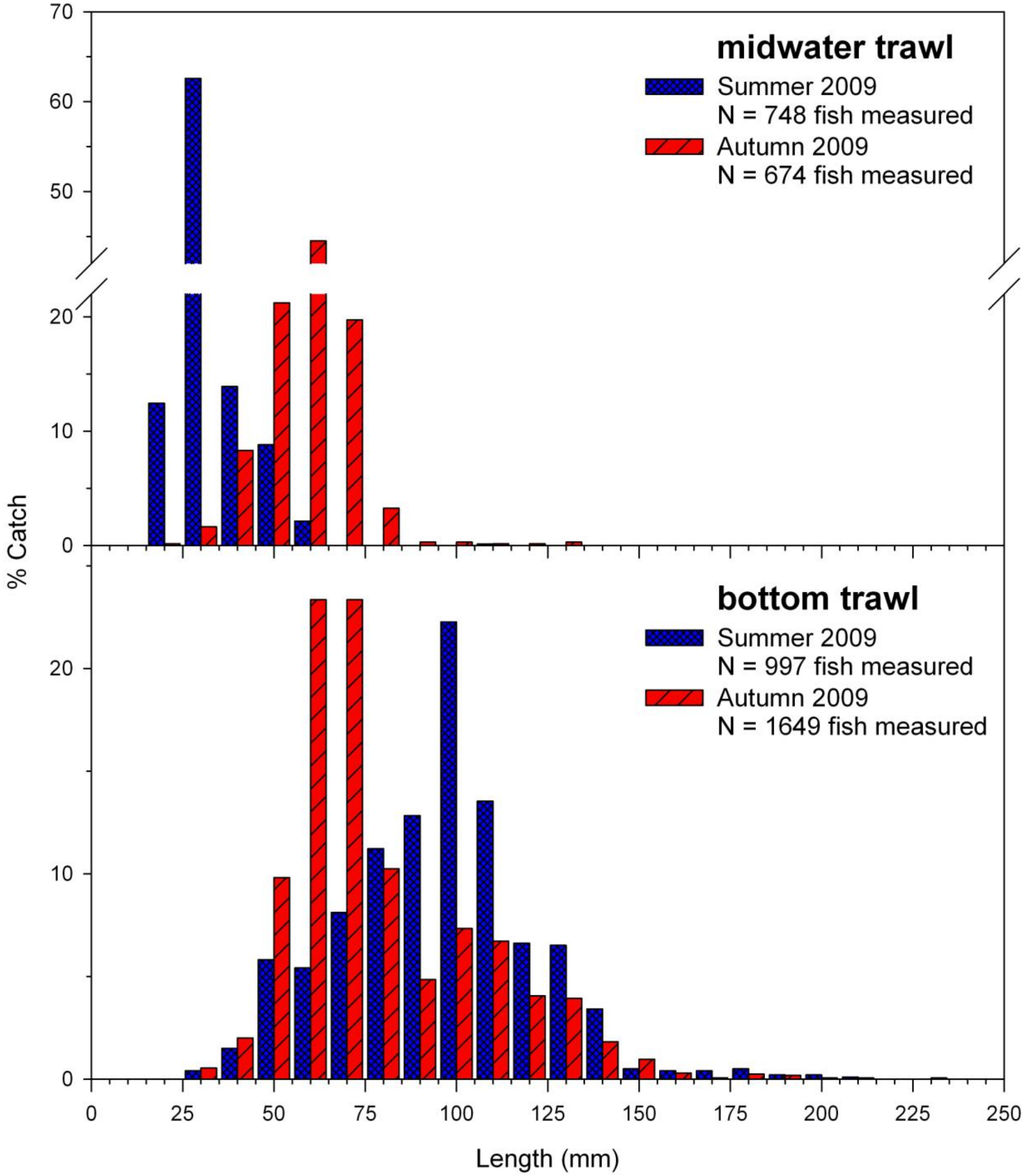

Figure 8. Histograms of length / frequency distributions of fishes, by gear type and season. Histograms are combined results for both prospects.

Estimates of fish ages are commonly generated in one of two ways. The quickest, less accurate and less precise method is to measure a large number of fishes and generate length/frequency plots. For a given population, in the analysis here, cruise, prospect and gear combination, and the total number of fish equals 100%. A percentage is calculated for each length bin, differentiated on the basis of 5 mm increments. The plot is examined for patterns and "break points" indicating a year class. This process is usually successful with age-0 fishes because they are usually abundant, at least in the gear we employed, and there is little overlap in length with older fish A poor example is Arctic cod captured during autumn at Burger with the MT (**Figure 9**). A good example of this is Arctic cod captured during summer at Klondike with a BT (**Figure 10**). The imprecision of this method is why the second method, determining ages of hard parts (otoliths) of fish, is necessary to reliably determine age. The following analysis compares results we obtained from these two methods. Though length/frequency analysis is not very reliable for determining ages, it produces good life history information about fishes and allows estimation of maximum length-at-age as well as comparison of fish lengths over time and area.

A total of 3439 Arctic cod were measured of lengths that ranged from 15 to 215 mm, and ages 0 – 6 were assigned based on otolith examination (**Figures 9 – 10)**. Age-0 cod were easier to identify from length/frequency analysis in summer than in autumn. It is likely that the modal peaks observed at 60 mm for autumn Klondike BT and at 55 mm for autumn Burger BT were age-1 Arctic cod because 55 mm fish caught in the summer Klondike MT were age-1. Because age-0 Arctic cod were 30 – 40 mm and age-1 fish were 70 mm during summer, it is also quite possible that age-0 cod grew quickly during the month between collections and reached 55 – 60 mm. Despite an order of magnitude more fish measured for this species than for some of the others, there was still a paucity of length data for the larger lengths. Otoliths were examined from a representative sample of lengths. The maximum age of 6 was not observed from the largest fish measured. According to otolith age determination, the largest (215 mm) Arctic cod was only age-4. There was considerable overlap in length-at-age, e.g., a 105 mm fish could be age-3, 4, or 5 and a 125 mm fish could be age-4, 5, or 6. Thus an Arctic cod of 118 mm could be age-3, 4, or 5, although the ones we examined appeared to be 4 or 5 years old. The Arctic cod captured in the MT were not as large as those captured in the BT, but the contrast in lengths and ages in the two gear types provides insight into potential growth over time.

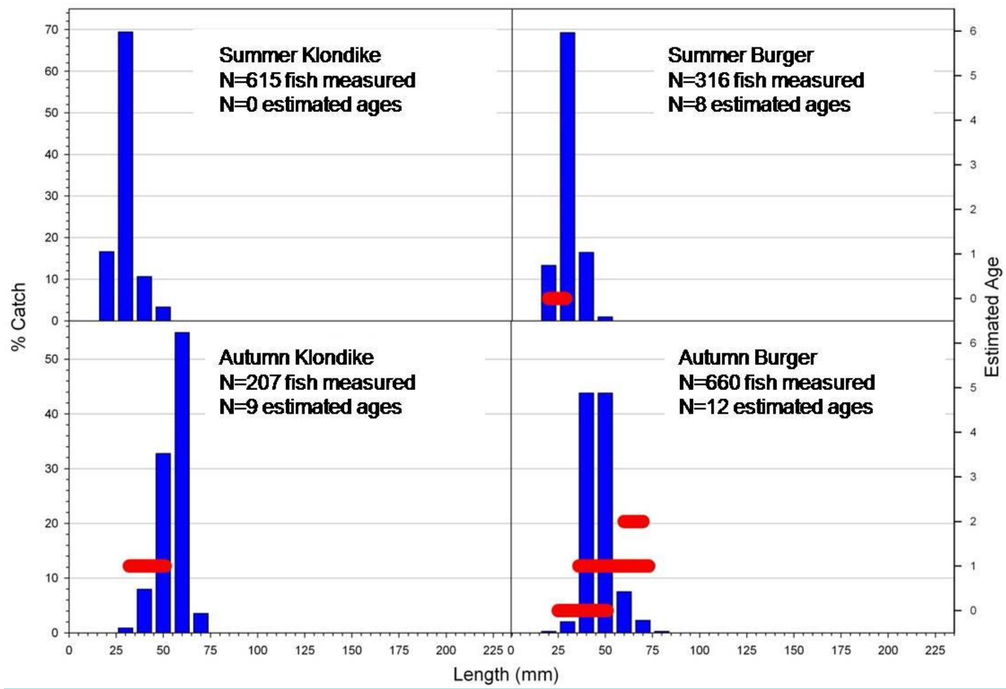

Figure 9. Length / frequency histograms of Arctic cod captured by midwater trawl during 2009, by season and prospect. Horizontal lines indicate ages estimated from otoliths.

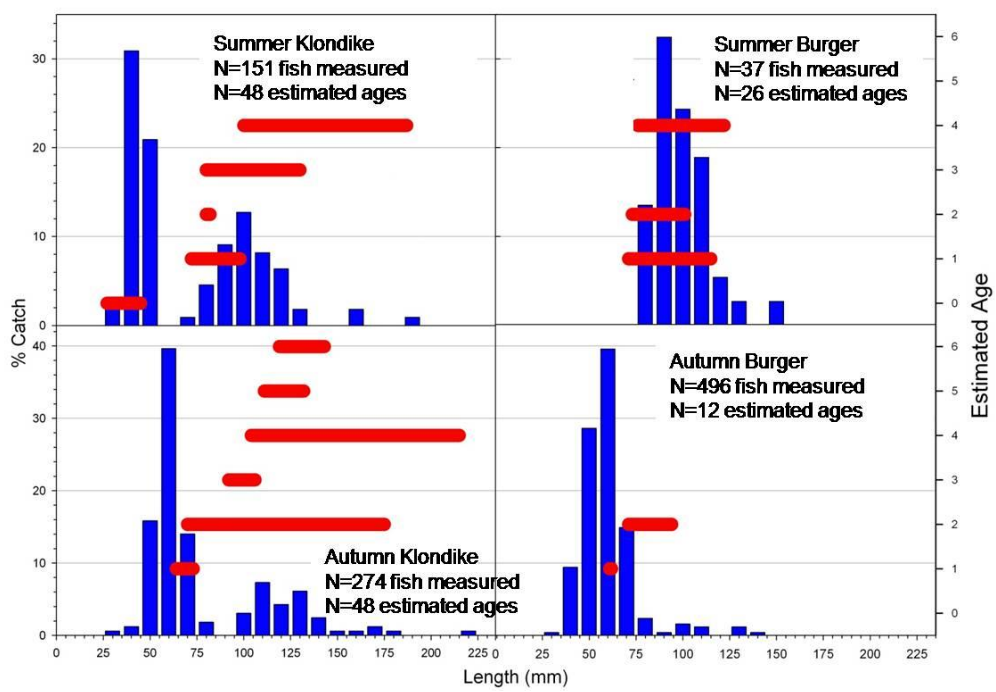

Figure 10. Length / frequency histograms of Arctic cod captured by bottom trawl during 2009, by season and prospect. Horizontal lines indicate ages estimated from otoliths.

A total of 218 Arctic staghorn sculpin were measured of lengths that ranged from 31 to 115 mm. Histograms were plotted only for the Klondike Prospect (**Figure 11**) because few fish were caught in other season/prospect combinations. Length/frequency analysis did not yield patterns that allowed easy interpretation of length at age because there were too few samples in most categories. Although the maximum age was age-4 at the largest length (90 mm), there was considerable overlap in length-at-age, e.g., age-2 fish ranged in length from 50 to 80 mm, overlapping the lengths of both age-1 and age-3 fish. A total of five Arctic staghorn sculpin were measured from MT hauls in Klondike; none were caught in Burger in either season. The length of these fish ranged from 31 to 38 mm, and ages were estimated at 0 and 1 years based on otolith examination. Two Arctic staghorn sculpin were captured with the BT during summer in Burger (32 –49 mm). The 32 mm specimen was estimated as age-1 based on examination of its otolith. One Arctic staghorn sculpin was captured using the BT during autumn in Burger; it was 76 mm in length and was estimated as age-3 based on otolith examination.

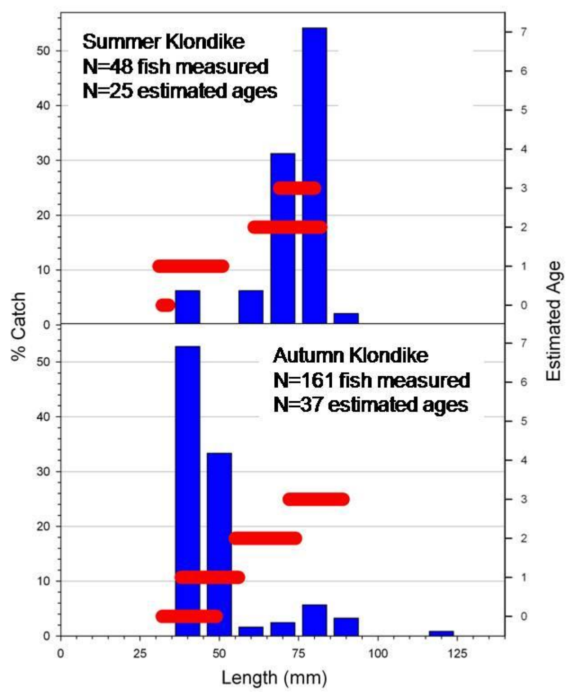

Figure 11. Length / frequency histograms of Arctic staghorn sculpin captured by bottom trawl during 2009 in Klondike, by season. Horizontal lines indicate ages estimated from otoliths.

A total of 184 polar eelpout were measured of lengths ranging from 37 to 200 mm, and ages were assigned as 0 – 7 based on otolith examination. Histograms were prepared only for BT catches, since no polar eelpout were caught by MT (**Figure 12**). Length/frequency analyses did not show bell-shaped patterns, but rather revealed overlapping lengths with very few fish definitively separated. Little overlap in age-at-length was observed, except for age-1 and -2, age-3 and -4, and age-6 and -7. The maximum age was 7, with lengths ranging 170 – 200 mm.

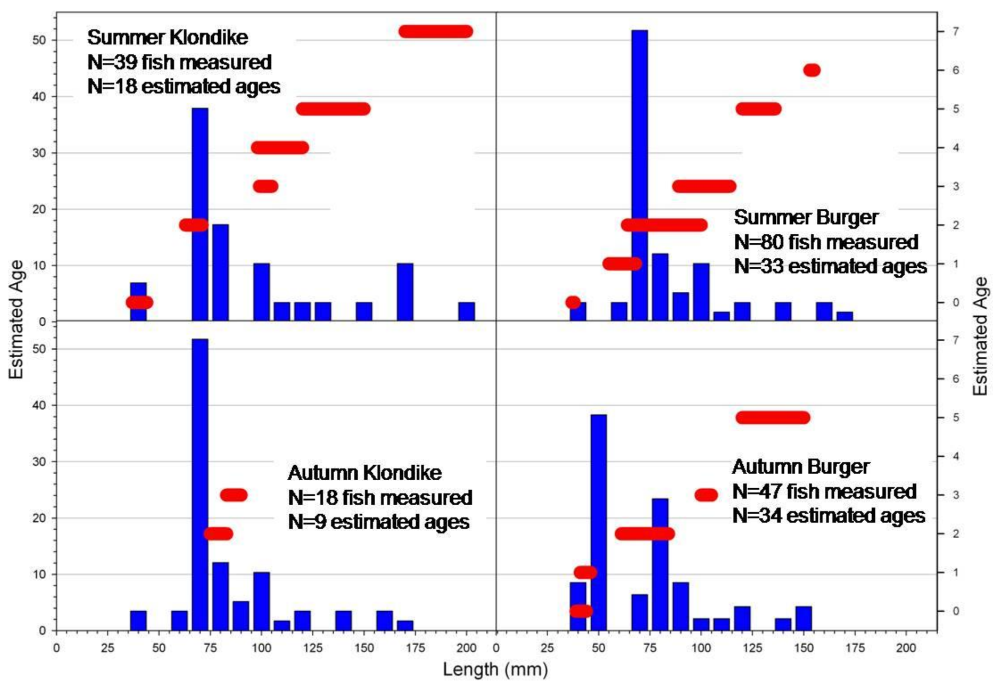

Figure 12. Length / frequency histograms of polar eelpout captured by bottom trawl, by season and prospect. Horizontal lines indicate ages estimated from otoliths.

A total of 728 stout eelblenny were measured of lengths that ranged from 42 to 139 mm, and ages were assigned as 2 – 10 based on otolith examination. Histograms were prepared only for BT catches and for MW catches during autumn in Burger (**Figures 13 – 14**). No other stout eelblenny were caught by MT. Only eight stout eelblenny were captured in the MT, but they had a wide length range, 45 – 120 mm (**Figure 13**).Unlike the other species that we examined, there were very stout eelblenny captured with lengths <70 mm. Results of otolith examination showed that a stout eelblenny could be 65 mm at age-1, 80 mm at age-3, and 135 mm at age-10 (**Figure 14**). This indicates an extremely slow growth rate for ages over 1. From our limited sample size, length-at-age overlap appeared to be limited to approximately 10 mm.

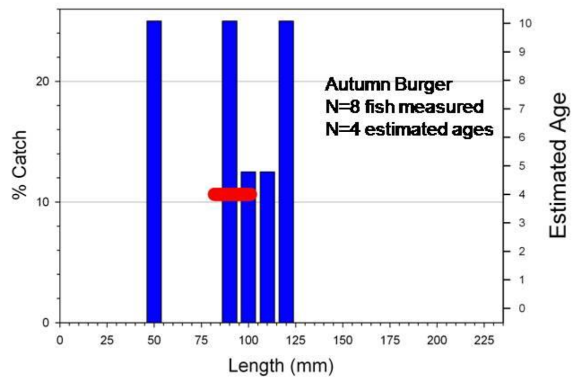

Figure 13. Length / frequency histogram of stout eelblenny captured by midwater trawl during autumn in Burger prospect. Horizontal lines indicate ages estimated from otoliths.

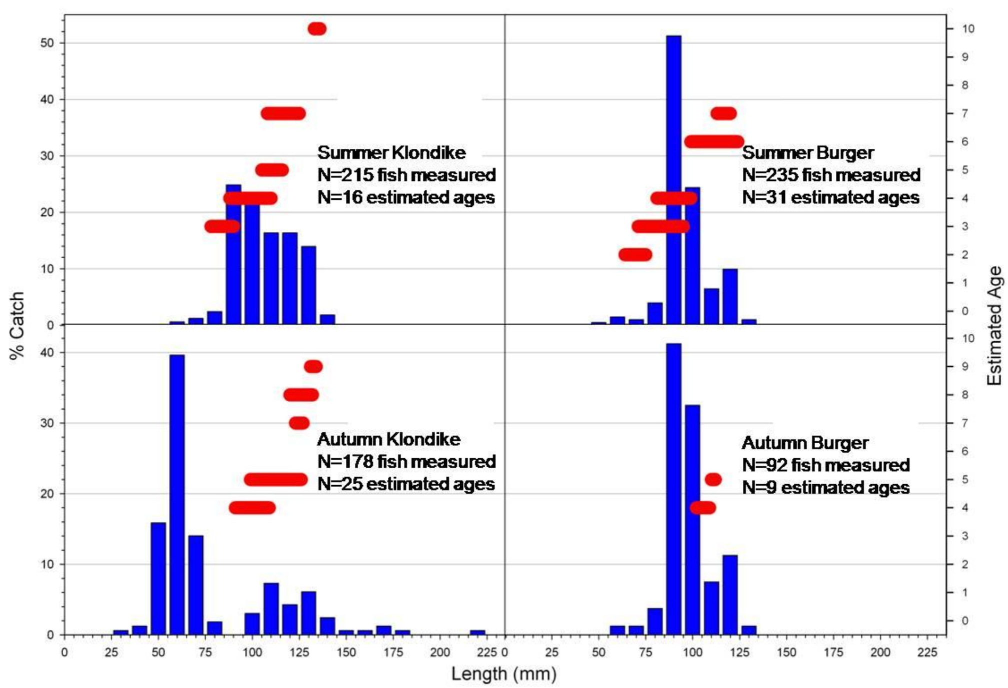

Figure 14. Length / frequency histograms of stout eelblenny captured by bottom trawl, by season and prospect. Horizontal lines indicate ages estimated from otoliths.

A total of 67 Bering flounder were measured of lengths ranging ranged from 35 to 179 mm, and ages were assigned as 1 – 6 based on otolith examination. Histograms were prepared only for BT catches in Klondike (**Figure 15)**, because no Bering flounder were caught by MT and only one was caught by BT in Burger. Length/frequency analysis yielded more information than one might expect from this small sample size. The modal length of age-1 Bering flounder was 40 mm in Klondike during summer and 50 mm a month later. Likewise, the modal length of age-2 Bering flounder increased from 55 to 65 mm over the same time period. No age-0 Bering flounder were captured. No age-4 fish were collected and only one each age-5 and age-6 fish were captured. The single Bering flounder captured by BT in Burger was 126 mm and age-5.

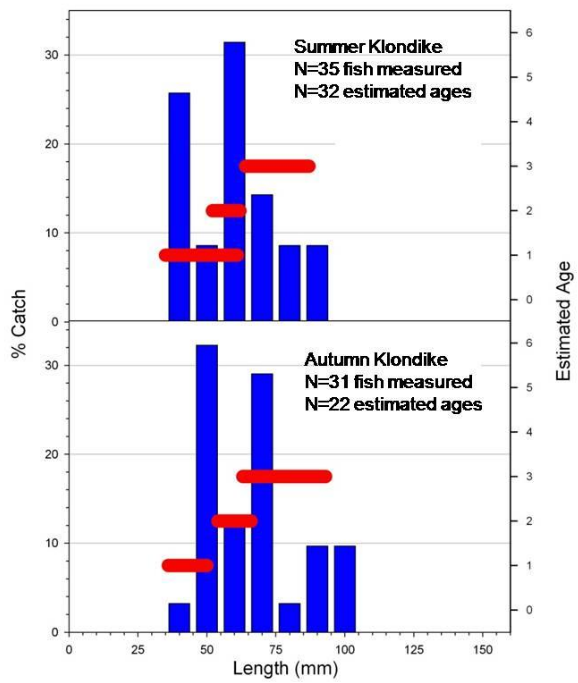

Figure 15. Length / frequency histograms of Bering flounder captured by bottom trawl in Klondike, by season. Horizontal lines indicate ages estimated from otoliths.

Diet analysis

Stomach contents were examined from a total of 505 fishes caught during 2009, including individuals from each of the five key species caught by BT and Arctic cod caught by MW (**Table 13**). The results presented in this report are limited to a qualitative description of the most prevalent prey consumed by each predator species, length class, and gear type.

The stomach contents of 244 Arctic cod were identified (**Table 13**). Twenty percent of those examined were caught by MT and 80% were caught by BT. Most of these prey were pelagic, although gammarid amphipods were likely benthic. Only fish <75 mm were examined from MW catches, and the main prey of both ≤50 mm and 51 – 75 mm pelagic Arctic cod was calanoid copepods. Every length class of this species caught by BT consumed calanoid copepods. In addition to copepods, Arctic cod larger than 75 mm ate gammarid and hyperiid amphipods, euphausiids and fish.

The stomach contents of 152 Arctic staghorn sculpin caught by BT were identified (**Table 13**). Prey were primarily benthic. Fish of each length class ate gammarid amphipods. Fish ≥51 mm ate mainly gammarid amphipods and demersal polychaete worms which were benthic, and euphausiids which likely were pelagic.

The stomach contents of 202 polar eelpout caught by BT were identified (**Table 13**). Fish of each length class ate gammarid amphipods, and fish ≥51 mm also ate fish.

Prey were identified from the stomach contents of 202 stout eelblenny caught by BT (**Table 13**). Prey were primarily benthic. Fish of each length class mainly fed on harpacticoid copepods. A larger proportion of gammarid amphipods was eaten by increasingly larger length classes of stout eelblenny. Nematodes were eaten by fish ≥50 mm in length.

Prey were identified from the stomach contents of 204 Bering flounder caught by BT (**Table 13**). Prey were primarily benthic. Fish of each length class mainly ate gammarid amphipods.

Trophic analysis

Stable isotope analysis did not exist for the five key species from the northeastern Chukchi Sea. As such, this analysis was a time-consuming process that required preliminary testing to determine the appropriate laboratory approach for these species.

For each of the five key species, data from all length classes, prospects, and seasons were combined. Lipid extracted muscle tissue values of $\delta^{13}C$ were used to assess where the fish had fed, e.g., benthic versus pelagic food source. Arctic staghorn sculpin, polar eelpout, stout eelblenny and Bering flounder all had an approximate $\delta^{13}C$ value of -18‰ (**Figure 16**), indicating that they fed in a similar place. The $\delta^{13}C$ of Arctic cod was lower, approximately -

19.5‰, indicating a different feeding place. These results verify that Arctic cod fed on pelagic prey as opposed to the benthic prey consumed by the other four species. Non-lipid extracted muscle tissue values of $\delta^{15}N$ indicated the trophic level at which the fish fed. Arctic staghorn sculpin, polar eelpout, and stout eelblenny had a higher $\delta^{15}N$ values of about 16‰ (**Figure 16**), indicating a similar trophic level of feeding. Bering flounder had a lower $\delta^{15}N$ value of 15‰ and fed at a lower trophic level. Arctic cod fed at the lowest trophic level of about $\delta^{15}N$ of 14‰.

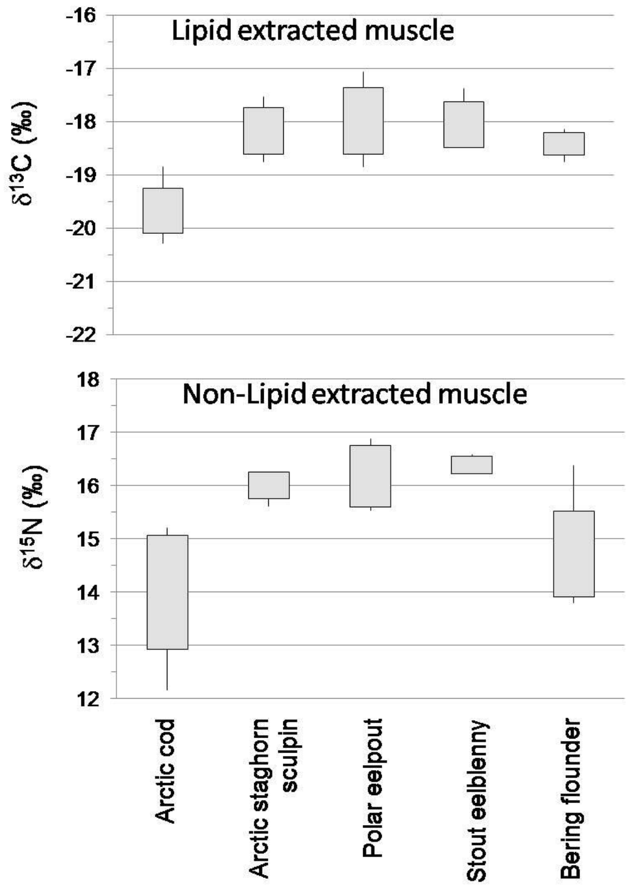

Figure 16. Stable isotope analysis of fish species, disregarding length class, season, and prospect. Minimum and maximum values of $\delta^{13}C$ and $\delta^{15}N$ (rectangles) and standard deviation (vertical lines), by species.

In addition to these overall findings, an analysis was designed to elicit similar comparisons not only among species, but also among size classes and between prospects and between seasons. Implementation of this design required choosing particular fishes from each species that met the required criteria. This design (**Table 14**) was a significant result of the 2009 analysis. The fishes collected during 2009 and 2010 that meet the criteria of the analytical design are currently being processed. Results will be presented in the 2009 – 2010 fisheries synthesis report.

ACKNOWLEDGMENTS

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Table 1 Data associated with midwater hauls during summer (13 – 29 August 2009), by prospect. Gear is Isaacs-Kidd midwater trawl and Haul is the consecutive deployment of this gear during a cruise. CPUE Factor is the quantity multiplied by number or weight of fish to calculate catch-per-unit-effort in units of number or weight of fish per $1000 m^3$. Temperature and salinity data were collected by vertical CTD cast and averaged over the top 25 m of the water column.

Station	Haul	Date and time (local)	Duration (min)	Start position	End position	Distance (m)	CPUE Factor	Haul depth Range (m)	Bottom depth (avg, m)	CTD: avg over 0-25 m Temp °C	Salinity
Summer Klondike											
KF001	1	13-Aug 23:51	19.5	70.6433 -166.0135	70.6430 -166.0017	434	1.079	0-14.5	40.0	6.914	30.693
KF003	6	17-Aug 04:05	6.2	70.6465 -165.2449	70.6474 -165.2368	315	1.484	0-16.4	40.4	6.537	31.131
KF005	7	19-Aug 20:31	7.1	70.6470 -164.4832	70.6502 -164.4866	378	1.239	0-35.9	44.9	5.745	31.064
KF007	4	16-Aug 10:36	7.8	70.7732 -165.6185	70.7744 -165.6077	417	1.122	0-14.6	39.3	6.480	31.188
KF009	8	19-Aug 23:16	7.5	70.7738 -164.8802	70.7735 -164.8755	173	2.698	0-19.4	38.2	5.195	30.550
KF011	2	16-Aug 01:26	17.2	70.8907 -166.0174	70.8884 -166.0157	262	1.785	0-30.2	39.4	6.181	31.284
KF013	5	17-Aug 01:04	10.5	70.8962 -165.2563	70.8978 -165.2534	200	2.335	0-17.0	39.4	5.961	31.388
KF015	24	28-Aug 22:11	12.8	70.8982 -164.4931	70.8979 -164.4868	232	2.019	0-21.7	35.7	5.544	30.829
KF017	3	16-Aug 04:32	12.4	71.0207 -165.6455	71.0212 -165.6293	590	0.793	0-18.6	40.9	5.968	31.504
KF019	9	20-Aug 03:08	11.8	71.0221 -164.8653	71.0206 -164.8743	362	1.291	0-19.3	34.3	3.994	30.343
KF021	10	20-Aug 08:46	8.5	71.1438 -166.0222	71.1477 -166.0235	433	1.080	0-18.4	41.1	5.568	31.269
KF023	11	20-Aug 11:19	9.1	71.1471 -165.2661	71.1493 -165.2696	276	1.697	0-24.4	42.3	4.428	30.323
KF025	25	29-Aug 01:52	12.8	71.1433 -164.4867	71.1488 -164.4688	889	0.526	0-21.7	40.3	4.819	30.802
Summer Burger											
BF001	22	27-Aug 23:07	11.6	71.1197 -163.8030	71.1176 -163.8113	383	1.221	0-21.7	40.5	5.120	30.314
BF003	14	21-Aug 06:31	6.5	71.1151 -163.0342	71.1176 -163.0397	343	1.362	0-20.0	43.3	2.655	30.062
BF005	20	23-Aug 06:41	7.8	71.1048 -162.2659	71.1043 -162.2746	317	1.475	0-17.5	45.2	3.403	29.882
BF007	12	20-Aug 22:46	7.9	71.2413 -163.4178	71.2465 -163.4118	618	0.758	0-16.9	42.5	4.572	29.878
BF009	18	22-Aug 22:33	8.2	71.2304 -162.6364	71.2328 -162.6373	273	1.714	0-35.9	43.6	4.245	29.837
BF011	23	28-Aug 04:51	12.6	71.3697 -163.7910	71.3730 -163.7842	433	1.080	0-21.7	42.9	4.909	30.878
BF013	13	21-Aug 02:57	8.1	71.3621 -163.0091	71.3626 -163.0139	182	2.578	0-23.9	43.4	5.224	30.116
BF015	19	23-Aug 02:20	10.5	71.3529 -162.2317	71.3481 -162.2242	598	0.782	0-19.8	43.0	4.280	30.262
BF017	16	22-Aug 00:46	6.9	71.4915 -163.3832	71.4926 -163.3843	130	3.604	0-26.1	40.5	4.447	30.324
BF019	17	22-Aug 05:01	7.3	71.4822 -162.6042	71.4817 -162.6113	258	1.814	0-17.5	41.7	4.701	29.837
BF021	26	29-Aug 08:43	10.4	71.6178 -163.7725	71.6144 -163.7536	765	0.612	0-21.7	38.8	5.262	30.933
BF023	15	21-Aug 20:59	9.3	71.6137 -162.9821	71.6159 -162.9841	246	1.906	0-20.9	39.2	4.180	29.872
BF025	21	23-Aug 21:09	10.2	71.6015 -162.1962	71.6023 -162.1968	86	5.415	0-22.3	41.3	4.272	29.120

Table 2. Data associated with midwater hauls during autumn (25 September – 10 October 2009), by prospect. Gear is Isaacs-Kidd midwater trawl and Haul is the consecutive deployment of this gear during a cruise. CPUE Factor is the quantity multiplied by number or weight of fish to calculate catch-per-unit-effort in units of number or weight of fish per $1000m^3$. Temperature and salinity data were assessed as previously noted.

Station	Haul	Date and time (local)	Duration (min)	Start position		End position		Distance (m)	CPUE Factor	Haul depth Range (m)	Bottom depth (avg, m)	CTD: avg over 0-25 m Temp °C	CTD: avg over 0-25 m Salinity
Autumn Klondike													
KF001	5	26-Sep 05:21	8.4	70.6461	-165.9993	70.6455	-165.9974	100	4.692	0-21.7	40.5	4.026	31.449
KF003	8	27-Sep 06:17	7.0	70.6482	-165.2459	70.6490	-165.2503	192	2.442	0-21.7	40.1	4.258	31.262
KF005	13	29-Sep 01:10	6.3	70.6497	-164.5000	70.6493	-164.5062	235	1.991	0-16.2	44.4	4.270	31.119
KF007	7	27-Sep 02:18	5.6	70.7720	-165.6277	70.7730	-165.6239	180	2.600	0-21.7	39.0	4.062	31.424
KF009	12	28-Sep 20:54	7.0	70.7752	-164.8751	70.7724	-164.8823	411	1.138	0-12.6	37.6	4.157	31.239
KF011	3	26-Sep 01:01	8.0	70.8961	-166.0176	70.8958	-166.0203	103	4.559	0-21.7	39.6	3.929	31.509
KF013	10	28-Sep 00:53	7.5	70.8963	-165.2521	70.8985	-165.2580	327	1.432	0-21.7	39.2	4.018	31.440
KF015	14	29-Sep 05:05	7.6	70.8979	-164.4975	70.8953	-164.4969	288	1.625	0-18.6	35.9	3.789	31.391
KF017	6	26-Sep 22:20	6.2	71.0209	-165.6340	71.0212	-165.6332	41	11.415	0-17.4	40.5	4.023	31.491
KF019	11	28-Sep 04:56	7.3	71.0234	-164.8786	71.0222	-164.8791	135	3.476	0- 8.3	33.0	4.096	31.382
KF021	1	25-Sep 20:29	11.6	71.1489	-166.0281	71.1437	-166.0333	609	0.769	0-21.7	40.6	4.017	31.474
KF023	9	27-Sep 20:36	7.2	71.1478	-165.2509	71.1447	-165.2598	471	0.993	0-15.0	41.7	4.038	31.421
KF025	15	29-Sep 21:00	9.6	71.1452	-164.4908	71.1473	-164.4903	232	2.015	0-21.7	40.3	3.800	31.356
Autumn Burger													
BF001	18	01-Oct 20:35	8.3	71.1182	-163.8144	71.1220	-163.8054	527	0.888	0-25.2	40.1	3.607	31.397
BF003	28	10-Oct 00:51	7.3	71.1123	-163.0369	71.1141	-163.0338	233	2.005	0-31.8	43.2	2.628	31.320
BF005	29	10-Oct 03:56	9.0	71.1049	-162.2653	71.1015	-162.2639	374	1.252	0-27.4	45.2	2.394	31.080
BF007	20	05-Oct 23:37	11.0	71.2420	-163.4070	71.2406	-163.4130	266	1.759	0-21.6	42.2	3.355	31.343
BF009	27	09-Oct 21:56	10.2	71.2354	-162.6389	71.2375	-162.6338	301	1.555	0-32.7	43.4	2.594	31.239
BF011	17	01-Oct 04:52	9.1	71.3666	-163.7848	71.3689	-163.7776	359	1.302	0-19.7	42.5	3.438	30.769
BF013	22	06-Oct 07:44	10.1	71.3653	-163.0048	71.3633	-163.0167	480	0.974	0-25.3	42.9	2.492	30.459
BF015	25	07-Oct 04:37	7.7	71.3535	-162.2337	71.3507	-162.2419	426	1.099	0-25.3	43.2	2.227	30.104
BF017	21	06-Oct 03:49	10.1	71.4895	-163.3928	71.4889	-163.3817	398	1.176	0-20.7	40.1	2.787	30.986
BF019	24	07-Oct 00:24	8.1	71.4830	-162.6045	71.4796	-162.6135	498	0.940	0-30.9	41.8	2.282	30.145
BF021	16	30-Sep 23:59	10.7	71.6183	-163.7761	71.6188	-163.7813	188	2.483	0-19.2	39.1	3.333	30.899
BF023	23	06-Oct 21:37	7.4	71.6099	-162.9782	71.6135	-162.9819	422	1.110	0-23.0	39.7	2.263	30.248
BF025	26	07-Oct 08:39	7.0	71.6005	-162.1873	71.5991	-162.2001	475	0.986	0-29.0	40.8	2.166	29.762

Table 3. Data associated with bottom hauls during summer (13 – 29 August 2009), by prospect. Gear is plumb staff beam trawl and Haul is the consecutive deployment of this gear during a cruise. CPUE Factor is the quantity multiplied by number or weight of fish to calculate catch-per-unit-effort in units of number or weight of fish per 1000m^2. Temperature and salinity data were collected with a CTD. Average percents gravel, sand and mud were assessed by grain size analysis of sediment collected with a VanVeen grab in the interim between summer and autumn collections of fishes. Distance is not reported from hauls that collected fishes but were not quantitative.

Station	Haul	Date and time (local)		Duration (min)	Start position		End position		Distance (m)	CPUE Factor	Haul depth (m)		Deepest CTD data			Avg% Gravel	Avg% Sand	Avg% Mud
											Range	Avg	Depth (m)	Temp °C	Salinity			
Summer Klondike																		
KF001	1X	14-Aug	04:33	4.6	70.6496	-165.9993	--	--	--	--	--	39.7	41.6	3.507	31.628	36.7	24.7	38.6
KF001	2	14-Aug	05:09	4.2	70.6472	-165.9920	70.6467	-165.9961	157	2.83	40.0-40.5	40.3	41.6	3.507	31.628	36.7	24.7	38.6
KF003	8	17-Aug	05:06	5.6	70.6460	-165.2436	70.6471	-165.2323	431	1.03	39.8-40.7	40.3	37.6	2.901	31.866	2.2	56.1	41.7
KF005	9	19-Aug	21:40	5.1	70.6493	-164.5084	70.6512	-164.5091	220	2.02	44.1-45.3	44.7	34.6	1.695	32.194	9.7	38.2	52.1
KF007	6	16-Aug	10:09	5.2	70.7737	-165.6138	70.7751	-165.6056	341	1.30	38.7-39.5	39.1	33.7	2.888	31.873	24.7	41.0	34.3
KF009	10	20-Aug	00:12	5.0	70.7704	-164.8863	70.7723	-164.8877	217	2.04	37.0-38.7	37.9	33.7	0.926	32.304	0.9	71.7	27.5
KF011	3	16-Aug	03:05	5.0	70.8943	-166.0152	70.8952	-166.0094	230	1.93	38.9-39.7	39.3	34.6	2.862	31.834	0.3	55.7	44.0
KF013	7	17-Aug	01:29	5.5	70.8991	-165.2715	70.9013	-165.2667	301	1.47	39.5-41.3	40.4	33.7	1.153	32.263	0.4	57.4	42.3
KF015	29	28-Aug	23:15	3.4	70.9012	-164.4954	70.9027	-164.4921	202	2.20	33.8-38.1	36.0	31.7	2.140	32.117	1.5	86.1	12.4
KF017	4	16-Aug	05:40	5.0	71.0214	-165.6281	71.0232	-165.6248	239	1.86	39.8-40.7	40.3	35.6	0.959	32.287	0.3	38.2	61.5
KF019	11	20-Aug	04:19	5.1	71.0222	-164.8774	71.0233	-164.8865	356	1.25	33.0-41.4	37.2	28.7	-0.380	32.477	51.0	37.1	11.9
KF021	12	20-Aug	09:16	5.0	71.1480	-166.0247	71.1491	-166.0329	320	1.39	40.9-42.8	41.9	32.7	3.426	31.846	0.3	22.5	77.2
KF023	13	20-Aug	12:22	5.2	71.1457	-165.2447	71.1450	-165.2405	174	2.54	42.3-42.5	42.4	39.6	-0.301	32.465	0.9	29.3	69.8
KF025	30	29-Aug	02:56	3.2	71.1480	-164.4759	71.1475	-164.4794	136	3.26	40.2-42.4	41.3	35.6	0.360	32.358	0.4	38.7	60.9
Summer Burger																		
BF001	27	28-Aug	00:16	2.5	71.1121	-163.7973	71.1111	-163.7970	112	3.97	40.6-42.3	41.5	30.7	1.707	32.280	6.1	43.8	50.1
BF003	17	21-Aug	07:37	3.1	71.1149	-163.0350	71.1162	-163.0382	187	2.37	40.7-43.5	42.1	33.7	-1.395	32.718	1.9	50.9	47.2
BF005	25	23-Aug	07:35	2.8	71.1009	-162.2588	71.1004	-162.2562	111	3.99	44.3-45.2	44.8	37.6	-1.513	32.799	0.5	63.0	36.5
BF007	15X	21-Aug	00:22	3.1	71.2529	-163.4280	--	--	--	--	--	43.2	41.6	-1.086	32.587	0.5	31.7	67.8
BF009	22	22-Aug	23:31	3.1	71.2330	-162.6393	71.2329	-162.6427	120	3.69	43.5-45.7	44.6	37.6	-1.065	32.593	0.3	26.4	73.3
BF011	28	28-Aug	05:58	3.4	71.3666	-163.7950	71.3660	-163.7984	139	3.19	41.1-42.9	42.0	35.6	-0.352	32.404	0.2	13.2	86.7
BF013	16	21-Aug	03:54	5.0	71.3621	-163.0052	71.3641	-163.0057	220	2.02	43.2-44.1	43.7	37.6	-0.799	32.526	23.1	9.2	67.7
BF015	24	23-Aug	03:59	3.1	71.3496	-162.2270	71.3486	-162.2258	114	3.88	42.7-43.5	43.1	31.7	-0.523	32.472	0.4	59.7	39.8
BF017	20	22-Aug	02:28	3.2	71.4902	-163.3751	71.4892	-163.3730	130	3.40	39.8-41.4	40.6	39.6	-0.137	32.408	11.5	42.0	46.5
BF019	21	22-Aug	05:57	3.2	71.4826	-162.5951	71.4836	-162.5971	132	3.35	41.4-41.8	41.6	34.6	-0.492	32.458	2.3	17.5	80.3
BF021	31	29-Aug	09:44	1.5	71.6175	-163.7604	71.6171	-163.7598	52	8.58	38.4-41.0	39.7	32.7	-0.535	32.434	3.0	37.0	59.9
BF023	18	21-Aug	21:56	3.1	71.6111	-162.9918	71.6125	-162.9942	180	2.47	38.0-39.9	39.0	37.6	-0.300	32.410	13.3	53.7	33.0
BF025	26	23-Aug	22:12	2.9	71.6017	-162.1959	71.6028	-162.1951	122	3.63	40.7-42.7	41.7	37.6	-0.132	32.432	6.7	37.3	56.1

Table 4. Data associated with bottom hauls during autumn (25 September – 10 October 2009), by prospect. Gear is plumb staff beam trawl, and Haul is the consecutive deployment of this gear during a cruise. CPUE Factor is the quantity multiplied by number or weight of fish to calculate catch-per-unit-effort in units of number or weight of fish per $1000m^2$. Temperature, salinity, and grain size were assessed as previously noted.

Station	Haul	Date and time (local)		Duration (min)	Start position		End position		Distance (m)	CPUE Factor	Haul depth (m)		Deepest CTD data			Avg% Gravel	Avg% Sand	Avg% Mud
											Range	Avg	Depth (m)	Temp °C	Salinity			
Autumn Klondike																		
KF001	4	26-Sep	06:19	5.3	70.6435	-165.9997	70.6417	-165.9942	293	1.51	39.1-40.6	39.9	39.6	2.339	32.032	36.7	24.7	38.6
KF003	10	27-Sep	07:11	5.0	70.6456	-165.2404	70.6437	-165.2442	252	1.76	39.9-40.2	40.1	39.6	2.385	32.056	2.2	56.1	41.7
KF005	20	29-Sep	02:01	5.2	70.6484	-164.4952	70.6462	-164.4974	258	1.72	43.9-44.5	44.2	41.6	2.356	32.087	9.7	38.2	52.1
KF007	8	27-Sep	03:12	5.9	70.7718	-165.6307	70.7721	-165.6215	342	1.30	38.9-39.6	39.3	39.6	2.257	32.113	24.7	41.0	34.3
KF009	18	28-Sep	22:04	5.8	70.7740	-164.8722	70.7715	-164.8751	295	1.50	37.3-37.8	37.6	37.6	3.690	31.618	0.9	71.7	27.5
KF011	2	26-Sep	02:02	11.4	70.8954	-166.0138	70.8934	-166.0048	394	1.13	39.2-39.5	39.4	39.6	2.166	32.125	0.3	55.7	44.0
KF013	14	28-Sep	01:45	4.6	70.8995	-165.2526	70.9002	-165.2466	233	1.90	39.0-39.4	39.2	40.6	2.541	32.053	0.4	57.4	42.3
KF015	22	29-Sep	05:57	5.0	70.8973	-164.4937	70.8951	-164.4924	254	1.74	33.9-36.8	35.4	35.6	3.742	31.605	1.5	86.1	12.4
KF017	6	26-Sep	23:16	5.3	71.0232	-165.6334	71.0233	-165.6261	265	1.67	40.4-40.8	40.6	40.6	1.745	32.158	0.3	38.2	61.5
KF019	16	28-Sep	05:48	5.4	71.0202	-164.8694	71.0205	-164.8773	285	1.55	32.5-34.6	33.6	32.7	2.964	31.904	51.0	37.1	11.9
KF021	1	25-Sep	21:58	5.1	71.1442	-166.0282	71.1431	-166.0223	241	1.84	40.5-41.0	40.8	39.6	1.628	32.202	0.3	22.5	77.2
KF023	12	27-Sep	21:51	5.2	71.1483	-165.2582	71.1501	-165.2522	291	1.52	41.7-41.9	41.8	40.6	2.334	32.039	0.9	29.3	69.8
KF025	24	29-Sep	22:03	5.4	71.1479	-164.4840	71.1475	-164.4772	251	1.77	40.2-41.0	40.6	40.6	2.677	31.935	0.4	38.7	60.9
Autumn Burger																		
BF001	31	01-Oct	21:29	3.4	71.1199	-163.7981	71.1188	-163.7970	135	3.27	40.1-41.0	40.6	40.6	2.278	32.012	6.1	43.8	50.1
BF003	51	10-Oct	01:42	3.3	71.1125	-163.0318	71.1110	-163.0310	171	2.58	42.6-43.3	43.0	41.6	1.395	32.174	1.9	50.9	47.2
BF005	53	10-Oct	04:51	3.0	71.1049	-162.2658	71.1049	-162.2618	144	3.08	44.4-46.1	45.3	41.6	1.134	32.266	0.5	63.0	36.5
BF007	34	06-Oct	00:22	3.1	71.2434	-163.4030	71.2429	-163.3995	140	3.16	42.0-42.7	42.4	40.6	2.251	32.052	0.5	31.7	67.8
BF009	49	09-Oct	22:52	3.2	71.2342	-162.6317	71.2328	-162.6295	171	2.60	43.3-44.1	43.7	42.6	0.893	32.357	0.3	26.4	73.3
BF011	29	01-Oct	06:03	3.1	71.3705	-163.7857	71.3714	-163.7826	153	2.89	42.4-43.2	42.8	41.6	1.302	32.199	0.2	13.2	86.7
BF013	39	06-Oct	08:55	3.0	71.3662	-163.0111	71.3665	-163.0074	138	3.21	42.8-43.2	43.0	34.15	2.054	31.630	23.1	9.2	67.7
BF015	45	07-Oct	05:36	3.3	71.3511	-162.2331	71.3501	-162.2313	132	3.35	41.8-42.9	42.4	42.6	0.721	32.403	0.4	59.7	39.8
BF017	37	06-Oct	04:44	3.0	71.4902	-163.3852	71.4895	-163.3816	147	3.02	40.0-40.2	40.1	40.6	1.119	32.238	11.5	42.0	46.5
BF019	43	07-Oct	01:20	1.7	71.4809	-162.6043	71.4803	-162.6056	75	5.94	41.4-41.8	41.6	39.6	0.959	32.282	2.3	17.5	80.3
BF021	27	01-Oct	01:12	5.0	71.6177	-163.7779	71.6157	-163.7815	255	1.74	39.0-39.6	39.3	37.6	1.601	32.169	3.0	37.0	59.9
BF023	41	06-Oct	22:32	3.0	71.6144	-162.9799	71.6151	-162.9762	150	2.95	39.5-40.9	40.2	40.6	1.216	32.232	13.3	53.7	33.0
BF025	47	07-Oct	09:31	3.2	71.6013	-162.1958	71.5999	-162.1955	149	2.98	40.8-42.0	41.4	37.6	1.075	32.231	6.7	37.3	56.1

Table 5. Count and weight of fishes captured by midwater hauls during summer 2009, by prospect. Dashes (--) indicate 0 fish caught. Weight is in parentheses and rounded to 0.1 g.

	Station	KF001	KF003	KF005	KF007	KF009	KF011	KF013	KF015	KF017	KF019	KF021	KF023	KF025	
Summer Klondike	Haul	1	6	7	4	8	2	5	24	3	9	10	11	25	Total
Cods (Gadidae)															
Arctic cod		18	3	40	9	133	6	8	9	16	535	1	67	203	1048
Boreogadus saida		(59.1)	(5)	(3)	(1.8)	(6.4)	(2)	(0.5)	(0.7)	(1.4)	(26.8)	(0.1)	(4.2)	(55.2)	(166.2)
Saffron cod		--	--	--	--	--	--	--	--	--	--	--	--	--	--
Eleginus gracilis															
Sculpins (Cottidae)															
Arctic staghorn sculpin		2	--	--	--	--	--	--	--	--	1	--	--	3	6
Gymnocanthus tricuspis		(0.8)									(0.3)			(0.9)	(2)
Shorthorn sculpin		41	4	3	7	--	17	2	7	5	5	2	--	12	105
Myoxocephalus scorpius		(15.6)	(2)	(1.2)	(2.5)		(5.9)	(1.4)	(4.9)	(2.3)	(2.8)	(0.8)		(8)	(47.4)
Eyeshade sculpins (Hemitripteridae)															
Eyeshade sculpin		--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nautichthys pribilovius															
Poachers (Agonidae)															
Arctic alligatorfish		--	--	--	--	--	--	--	--	--	1	--	--	--	1
Ulcina olrikii											(0.2)				(0.2)
Snailfishes (Liparidae)															
Gelatinous seasnail		--	--	--	--	--	--	--	--	--	--	--	--	--	--
Liparis fabricii															
Pricklebacks (Stichaeidae)															
Arctic shanny		9	5	1	6	2	36	1	7	4	3	--	1	3	78
Stichaeus punctatus		(1.1)	(0.6)	(<0.1)	(0.6)	(0.2)	(2.9)	(0.4)	(0.8)	(0.4)	(0.1)		(0.2)	(1)	(8.3)
Slender eelblenny		--	--	--	--	--	--	--	--	--	--	--	--	--	--
Lumpenus fabricii															
Stout eelblenny		--	--	--	--	--	--	--	--	--	3	--	--	--	3
Anisarchus medius											(0.2)				(0.2)
Sand lances (Ammodytidae)															
Pacific sand lance		1	1	4	--	1	--	3	2	1	--	--	2	2	17
Ammodytes hexapterus		(0.5)	(<0.1)	(<0.1)		(<0.1)		(0.2)	(0.1)	(<0.1)			(0.2)	(<0.1)	(1.2)
Flatfishes (Pleuronectidae)															
Longhead dab		--	--	--	--	--	--	--	--	--	--	--	--	--	--
Limanda proboscidea															
Count Total		71	13	48	22	136	59	14	25	26	548	3	70	223	1258
Weight Total		(77.1)	(7.6)	(4.2)	(4.9)	(6.7)	(10.8)	(2.5)	(6.5)	(4.1)	(30.4)	(0.9)	(4.6)	(65.2)	(225.6)

Table 5. Count and weight of fishes captured by midwater hauls during summer 2009 (continued, page 2 of 2).

	Station	BF001	BF003	BF005	BF007	BF009	BF011	BF013	BF015	BF017	BF019	BF021	BF023	BF025		Summer
Summer Burger	Haul	22	14	20	12	18	23	13	19	16	17	26	15	21	Total	Total
Cods (Gadidae)																
Arctic cod		61	243	255	114	50	207	69	576	30	82	18	56	70	1831	1048
Boreogadus saida		(5.9)	(14.8)	(29.3)	(8.7)	(5.9)	(10.1)	(5.3)	(78.4)	(1.7)	(5.7)	(4.8)	(3.6)	(5.1)	(179.3)	(345.5)
Saffron cod		1	--	--	--	--	--	--	--	--	--	--	--	--	1	--
Eleginus gracilis		(0.5)													(0.5)	(0.5)
Sculpins (Cottidae)																
Arctic staghorn sculpin		--	--	--	--	--	--	--	--	--	--	--	--	--	--	6
Gymnocanthus tricuspis																(2)
Shorthorn sculpin		2	--	--	--	--	3	1	--	--	--	--	--	--	6	105
Myoxocephalus scorpius		(1.5)					(1.1)	(2)							(4.6)	(52)
Eyeshade sculpins (Hemitripteridae)																
Eyeshade sculpin		--	1	--	--	--	--	--	--	--	2	--	--	--	3	--
Nautichthys pribilovius			(1)								(1.1)				(2.1)	(2.1)
Poachers (Agonidae)																
Arctic alligatorfish		--	--	1	--	--	--	--	--	--	--	--	--	--	1	1
Ulcina olrikii				(0.2)											(0.2)	(0.4)
Snailfishes (Liparidae)																
Gelatinous seasnail		--	--	--	--	--	--	--	1	--	--	--	--	--	1	--
Liparis fabricii									(0.2)						(0.2)	(0.2)
Pricklebacks (Stichaeidae)																
Arctic shanny		1	2	5	--	--	11	1	4	3	4	--	1	--	32	78
Stichaeus punctatus		(0.1)	(<0.1)	(0.6)			(1.1)	(0.1)	(<0.1)	(0.2)	(0.4)		(0.2)		(2.6)	(11)
Slender eelblenny		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Lumpenus fabricii																
Stout eelblenny		--	--	--	--	--	--	--	--	--	--	--	--	--	--	3
Anisarchus medius																(0.2)
Sand lances (Ammodytidae)																
Pacific sand lance		--	--	1	8	--	16	8	7	4	2	4	--	--	50	17
Ammodytes hexapterus				(<0.1)	(0.3)		(0.9)	(0.3)	(0.6)	(0.1)	(<0.1)	(0.2)			(2.4)	(3.6)
Flatfishes (Pleuronectidae)																
Longhead dab		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Limanda proboscidea																
Count Total		65	246	262	122	50	237	79	588	37	90	22	57	70	1925	3183
Weight Total		(8)	(15.8)	(30.1)	(9)	(5.9)	(13.2)	(7.7)	(79.3)	(2)	(7.2)	(5)	(3.8)	(5.1)	(191.9)	(417.5)

Table 6. Count and weight of fishes captured by midwater hauls during autumn 2009, by prospect. Dashes (--) indicate 0 fish caught. Weight is in parentheses and rounded to 0.1 g.

	Station	KF001	KF003	KF005	KF007	KF009	KF011	KF013	KF015	KF017	KF019	KF021	KF023	KF025	
Autumn Klondike	Haul	5	8	13	7	12	3	10	14	6	11	1	9	15	Total
Cods (Gadidae)															
Arctic cod		1	22	7	10	--	3	37	14	20	1	--	--	--	115
Boreogadus saida		(0.4)	(12.2)	(2.3)	(6)		(0.9)	(31.3)	(8.1)	(14.8)	(0.5)				(76.5)
Saffron cod		--	--	--	--	--	--	--	1	--	--	--	--	--	1
Eleginus gracilis									(0.2)						(0.2)
Sculpins (Cottidae)															
Arctic staghorn sculpin		1	--	2	--	--	--	--	--	--	--	--	--	--	3
Gymnocanthus tricuspis		(1)		(0.9)											(1.9)
Shorthorn sculpin		1	1	3	--	--	6	1	--	2	6	6	--	1	27
Myoxocephalus scorpius		(0.6)	(1.4)	(1.7)			(2.2)	(4.2)		(0.4)	(2.2)	(2.6)		(0.4)	(15.7)
Eyeshade sculpins (Hemitripteridae)															
Eyeshade sculpin		--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nautichthys pribilovius															
Poachers (Agonidae)															
Arctic alligatorfish		--	--	--	--	--	--	--	2	--	--	--	--	--	2
Ulcina olrikii									(0.3)						(0.3)
Snailfishes (Liparidae)															
Gelatinous seasnail		--	--	--	--	--	--	--	--	--	--	--	--	--	--
Liparis fabricii															
Pricklebacks (Stichaeidae)															
Arctic shanny		--	--	--	--	--	--	--	--	--	--	--	--	--	--
Stichaeus punctatus															
Slender eelblenny		--	1	5	1	--	4	--	2	2	6	--	--	--	21
Lumpenus fabricii			(0.5)	(2.2)	(0.3)		(1.1)		(0.9)	(0.7)	(1.5)				(7.2)
Stout eelblenny		--	--	--	--	--	--	--	--	--	--	4	--	--	4
Anisarchus medius												(17.7)			(17.7)
Sand lances (Ammodytidae)															
Pacific sand lance		1	1	11	5	2	--	1	5	1	15	5	--	--	47
Ammodytes hexapterus		(0.1)	(0.4)	(4.8)	(1.4)	(0.5)		(0.2)	(1.2)	(0.8)	(4)	(1.2)			(14.6)
Flatfishes (Pleuronectidae)															
Longhead dab		--	--	--	--	--	--	--	--	--	--	--	1	--	1
Limanda proboscidea													(1)		(1)
Count Total		4	25	28	16	2	13	39	24	25	28	15	1	1	221
Weight Total		(2.1)	(14.5)	(11.9)	(7.7)	(0.5)	(4.2)	(35.7)	(10.7)	(16.7)	(8.2)	(21.5)	(1)	(0.4)	(135.1)

Table 6. Count and weight of fishes captured by midwater hauls during autumn 2009 (continued, page 2 of 2).

	Station	BF001	BF003	BF005	BF007	BF009	BF011	BF013	BF015	BF017	BF019	BF021	BF023	BF025		Autumn
Autumn Burger	Haul	18	28	29	20	27	17	22	25	21	24	16	23	26	Total	Total
Cods (Gadidae)																
Arctic cod		19	19	37	42	53	15	15	49	11	62	80	28	12	442	557
Boreogadus saida		(11)	(6)	(14)	(20.5)	(25.5)	(5.4)	(6.2)	(14.5)	(6.2)	(20.2)	(16.7)	(8.3)	(4.5)	(159)	(235.5)
Saffron cod		--	--	--	--	--	--	--	--	--	--	--	--	--	--	1
Eleginus gracilis																(0.2)
Sculpins (Cottidae)																
Arctic staghorn sculpin		--	--	--	--	--	--	--	--	--	--	--	--	--	--	3
Gymnocanthus tricuspis																(1.9)
Shorthorn sculpin		--	--	1	--	--	--	--	--	--	--	3	1	--	5	32
Myoxocephalus scorpius				(0.3)								(1.4)	(0.5)		(2.2)	(17.9)
Eyeshade sculpins (Hemitripteridae)																
Eyeshade sculpin		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nautichthys pribilovius																
Poachers (Agonidae)																
Arctic alligatorfish		--	--	--	--	--	--	1	--	--	1	1	--	--	3	5
Ulcina olrikii								(0.2)			(0.4)	(0.4)			(1)	(1.3)
Snailfishes (Liparidae)																
Gelatinous seasnail		--	--	--	--	1	--	--	--	--	--	--	--	--	1	1
Liparis fabricii						(1)									(1)	(1)
Pricklebacks (Stichaeidae)																
Arctic shanny		--	--	--	--	--	4	--	--	--	--	4	--	--	8	8
Stichaeus punctatus							(0.5)					(1)			(1.5)	(1.5)
Slender eelblenny		--	--	1	--	--	--	--	--	--	2	--	--	--	3	24
Lumpenus fabricii				(0.2)							(0.5)				(0.6)	(7.8)
Stout eelblenny		--	--	--	--	--	--	--	--	--	--	1	--	1	2	6
Anisarchus medius												(0.1)		(<0.1)	(0.2)	(17.9)
Sand lances (Ammodytidae)																
Pacific sand lance		12	1	1	20	1	6	5	6	7	9	15	14	8	105	152
Ammodytes hexapterus		(2.7)	(0.3)	(0.3)	(5)	(0.5)	(1.1)	(2.3)	(2.6)	(2.1)	(2.6)	(3.7)	(5.2)	(2)	(30.3)	(44.9)
Flatfishes (Pleuronectidae)																
Longhead dab		--	--	--	--	--	--	--	--	--	--	--	--	--	--	1
Limanda proboscidea																(1)
Count Total		31	20	40	62	55	25	21	55	18	74	104	43	21	569	790
Weight Total		(13.7)	(6.3)	(14.8)	(25.5)	(27)	(7)	(8.7)	(17.1)	(8.3)	(23.7)	(23.3)	(14)	(6.5)	(195.8)	(330.9)

Table 7. Count and weight of fishes captured by bottom hauls during summer 2009, by prospect. Dashes (--) indicate 0 fish caught. Weight is in parentheses and rounded to 0.1 g. Species presence is noted from hauls that were not quantitative (X).

Station	KF001		KF003	KF005	KF007	KF009	KF011	KF013	KF015	KF017	KF019	KF021	KF023	KF025	
Summer Klondike — Haul	1X	2	8	9	6	10	3	7	29	4	11	12	13	30	Total
Cods (Gadidae)															
Arctic cod		3	1	1	5	--	6	9	1	24	15	454	7	4	530
Boreogadus saida		(22.4)	(20)	(7.8)	(35)		(26)	(51.6)	(1)	(81)	(28.5)	(362)	(47.4)	(30.5)	713.2
Walleye pollock		--	--	--	--	--	--	--	--	--	--	--	--	--	--
Theragra chalcogramma															
Sculpins (Cottidae)															
Arctic staghorn sculpin		4	--	--	6	16	3	2	6	9	--	1	1	--	48
Gymnocanthus tricuspis		(18)			(21.4)	(80.1)	(13)	(13.2)	(21.9)	(38)		(3)	(4.3)		(212.9)
Butterfly sculpin	X	--	--	--	--	1	--	--	--	--	--	--	--	--	1
Hemilepidotus papillio						(3.4)									(3.4)
Hairhead sculpin		--	--	--	--	--	--	--	--	--	--	--	--	--	--
Trichocottus brashnicovi															
Hamecon		38	--	5	29	4	14	1	4	1	34	--	--	4	134
Artediellus scaber		(110.6)		(23)	(118.5)	(18.1)	(37)	(3.5)	(6)	(2.5)	(99.5)			(20)	(438.7)
Ribbed sculpin	X	--	--	--	--	1	--	--	1	--	--	--	--	--	2
Triglops pingelii						(0.3)			(0.5)						(0.8)
Shorthorn sculpin		6	2	1	3	1	1	--	7	--	24	2	2	--	49
Myoxocephalus scorpius		(12.7)	(4)	(0.9)	(11.9)	(2.5)	(1.5)		(17.9)		(69.7)	(1.6)	(3.7)		(126.4)
Spatulate sculpin		--	--	--	--	--	--	--	--	--	--	--	--	--	--
Icelus spatula															
Spinyhook sculpin		--	--	--	--	--	--	--	--	--	--	--	--	--	--
Artediellus cf. gomojunovi															
Eyeshade sculpins (Hemitripteridae)															
Eyeshade sculpin		--	--	--	--	--	--	--	1	--	--	--	--	--	1
Nautichthys pribilovius									(0.2)						(0.2)
Poachers (Agonidae)															
Alligatorfish		--	--	1	2	--	--	--	--	1	--	--	--	--	4
Aspidophoroides monopterygius				(0.9)	(1.1)					(0.7)					(2.7)
Arctic alligatorfish		1	--	3	5	--	--	2	2	1	2	--	--	--	16
Ulcina olrikii		(1)		(3.7)	(6)			(2.7)	(1.2)	(1)	(3.4)				(19)
Snailfishes (Liparidae)															
Kelp snailfish		--	--	1	3	--	--	--	--	--	--	--	--	--	4
Liparis tunicatus				(6.5)	(23.5)										(30)
Variegated snailfish		--	--	--	--	--	--	2	--	--	3	--	2	--	7
Liparis gibbus								(16.5)			(15)		(26)		(57.5)

Table 7. Count and weight of fishes captured by bottom hauls during summer 2009 (continued, page 2 of 4).

	Station	KF001		KF003	KF005	KF007	KF009	KF011	KF013	KF015	KF017	KF019	KF021	KF023	KF025	
Summer Klondike	Haul	1X	2	8	9	6	10	3	7	29	4	11	12	13	30	Total
Eelpouts (Zoarcidae)																
Fish doctor			--	--	--	--	--	--	--	2	--	--	--	--	--	2
Gymnelus viridis										(12.9)						(12.9)
Halfbarred pout			--	--	4	1	--	2	1	--	1	--	--	4	1	14
Gymnelus hemifasciatus					(14.5)	(3.6)		(3.7)	(6.9)		(5.6)			(10.2)	(2.2)	(46.7)
Marbled eelpout			--	--	3	1	--	--	1	5	--	4	--	--	--	14
Lycodes raridens					(30)	(2)			(1.2)	(7.4)		(9.3)				(49.9)
Polar eelpout			--	--	--	1	--	7	3	2	15	--	1	3	6	38
Lycodes polaris						(40)		(52)	(27)	(1.9)	(141.6)		(1.5)	(3.5)	(13.2)	(280.7)
Saddled eelpout			1	--	--	--	--	--	--	--	--	--	--	--	--	1
Lycodes mucosus			(9)													(9)
Wattled eelpout			--	--	--	--	--	--	1	--	--	--	--	--	--	1
Lycodes palearis									(6.5)							(6.5)
Pricklebacks (Stichaeidae)																
Arctic shanny			--	--	--	--	1	--	--	--	--	--	--	--	--	1
Stichaeus punctatus							(1.7)									(1.7)
Daubed shanny			--	--	--	--	--	--	--	--	--	--	--	--	--	--
Leptoclinus maculatus																
Fourline snakeblenny			--	--	--	--	--	1	--	2	--	--	--	--	--	3
Eumesogrammus praecisus								(2.2)		(12.5)						(14.7)
Slender eelblenny			28	2	18	1	4	30	9	--	18	--	3	3	--	116
Lumpenus fabricii			(59.6)	(2.7)	(39.4)	(10.8)	(6.4)	(38)	(9.6)		(22.5)		(4)	(2.3)		(195.3)
Stout eelblenny			1	2	21	--	10	72	3	8	38	--	10	8	56	229
Anisarchus medius			(2.4)	(6.5)	(78.5)		(36.2)	(327.4)	(9)	(28)	(127.7)		(32.7)	(20)	(175.4)	(843.8)
Sand lances (Ammodytidae)																
Pacific sand lance			--	--	--	--	--	--	--	--	--	--	--	--	--	--
Ammodytes hexapterus																
Flatfishes (Pleuronectidae)																
Bering flounder			1	1	1	--	--	3	1	--	17	--	7	3	--	35
Hippoglossoides robustus			(0.3)	(0.5)	(4.9)			(3.3)	(1.4)		(22.6)		(5.9)	(69.4)		(109.7)
Longhead dab			--	--	--	--	--	--	--	--	--	--	--	--	--	--
Limanda proboscidea																
Total count		--	83	8	59	57	38	139	35	41	125	82	478	33	71	1249
Total weight		--	(236)	(33.7)	(210.1)	(273.8)	(148.7)	(504.1)	(149.1)	(111.4)	(443.2)	(225.4)	(410.7)	(186.8)	(241.3)	(3221.3)

Table 7. Count and weight of fishes captured by bottom hauls during summer 2009 (continued, page 3 of 4).

	Station	BF001	BF003	BF005	BF007	BF009	BF011	BF013	BF015	BF017	BF019	BF021	BF023	BF025		Summer
Summer Burger	Haul	27	17	25	15X	22	28	16	24	20	21	31	18	26	Total	Total
Cods (Gadidae)																
Arctic cod		3	3	4	X	1	5	2	17	30	1	5	3	--	74	604
Boreogadus saida		(24.5)	(40.8)	(31.8)		(4.6)	(18.5)	(8.5)	(107.1)	(110)	(4.2)	(11.4)	(23.8)		(385.2)	(1094.4)
Walleye pollock		--	--	--		--	--	--	--	--	--	--	--	--	--	--
Theragra chalcogramma																
Sculpins (Cottidae)																
Arctic staghorn sculpin		--	--	--		1	--	--	--	--	--	1	--	--	2	50
Gymnocanthus tricuspis						(1.3)						(0.3)			(1.6)	(214.5)
Butterfly sculpin		--	--	--		--	--	--	--	--	--	--	--	--	--	1
Hemilepidotus papillio																(3.4)
Hairhead sculpin		--	--	--		--	--	--	--	--	--	--	--	--	--	--
Trichocottus brashnicovi																
Hamecon		3	--	1		--	3	34	3	6	24	9	1	1	82	219
Artediellus scaber		(16.6)		(7.1)			(8.5)	(162.5)	(19)	(20.5)	(8)	(37.4)	(6)	(1)	(270)	(725.3)
Ribbed sculpin		--	--	--		--	--	--	--	--	--	--	--	--	--	2
Triglops pingelii																(0.8)
Shorthorn sculpin		1	--	--		--	--	--	1	--	--	--	1	1	3	53
Myoxocephalus scorpius		(2.3)							(3.3)				(1.1)	(2.3)	(6.7)	(135.4)
Spatulate sculpin		--	--	--		1	10	1	--	--	--	--	--	--	12	12
Icelus spatula						(0.2)	(31)	(2.5)							(33.7)	(33.7)
Spinyhook sculpin		--	--	--		--	--	--	--	--	--	--	--	--	--	--
Artediellus cf. gomojunovi																
Eyeshade sculpins (Hemitripteridae)																
Eyeshade sculpin		--	--	--		--	--	--	--	--	--	--	--	--	--	1
Nautichthys pribilovius																(0.2)
Poachers (Agonidae)																
Alligatorfish		--	--	--		--	--	--	--	--	--	--	--	--	--	4
Aspidophoroides monopterygius																(2.7)
Arctic alligatorfish		2	1	--	X	--	1	2	--	--	--	--	--	--	5	22
Ulcina olrikii		(2.6)	(0.7)				(2.1)	(1.5)							(6.7)	(25.9)
Snailfishes (Liparidae)																
Kelp snailfish		--	--	--		1	--	--	--	--	--	--	--	--	1	5
Liparis tunicatus						(12)									(12)	(42)
Variegated snailfish		--	--	1		--	--	--	--	--	--	--	--	--	1	8
Liparis gibbus				(2.5)											(2.5)	(60)

Table 7. Count and weight of fishes captured by bottom hauls during summer 2009 (continued, page 4 of 4).

	Station	BF001	BF003	BF005	BF007	BF009	BF011	BF013	BF015	BF017	BF019	BF021	BF023	BF025		Summer
Summer Burger	Haul	27	17	25	15X	22	28	16	24	20	21	31	18	26	Total	Total
Eelpouts (Zoarcidae)																
Fish doctor		7	1	--		2	1	--	3	1	--	--	--	--	15	17
Gymnelus viridis		(14.7)	(8.8)			(4.2)	(2.3)		(20)	(4.3)					(54.3)	(67.2)
Halfbarred pout		45	1	10	X	5	1	4	4	2	--	3	--	--	75	89
Gymnelus hemifasciatus		(62)	(1.7)	(19.3)		(9.4)	(2)	(6.5)	(12)	(4.1)		(8.9)			(125.9)	(172.6)
Marbled eelpout		10	--	--		--	--	2	--	1	--	--	--	--	13	27
Lycodes raridens		(148)						(7.1)		(1.8)					(156.9)	(206.8)
Polar eelpout		5	--	1	X	2	22	10	1	20	4	2	2	--	69	107
Lycodes polaris		(8)		(0.6)		(2)	(78)	(28)	(43)	(80.6)	(6)	(1.6)	(3.7)		(251.5)	(532.2)
Saddled eelpout		--	--	--		--	--	--	--	--	--	--	--	--	--	1
Lycodes mucosus																(9)
Wattled eelpout		--	--	--		--	--	--	--	--	--	--	--	--	--	1
Lycodes palearis																(6.5)
Pricklebacks (Stichaeidae)																
Arctic shanny		--	--	1	X	--	--	--	--	--	--	--	--	--	1	2
Stichaeus punctatus				(4.7)											(4.7)	(6.4)
Daubed shanny		--	--	--		--	1	--	--	--	--	--	--	--	1	1
Leptoclinus maculatus							(1.4)								(1.4)	(1.4)
Fourline snakeblenny		--	--	--		--	--	1	1	--	--	--	--	--	2	5
Eumesogrammus praecisus								(2.4)	(2.4)						(4.8)	(19.5)
Slender eelblenny		--	--	--		1	--	--	16	--	9	5	2	--	33	149
Lumpenus fabricii						(0.4)			(8)		(7.7)	(3.1)	(1.2)		(20.4)	(215.7)
Stout eelblenny		56	2	--	X	15	55	2	9	75	46	2	30	8	300	529
Anisarchus medius		(119.1)	(3.6)			(34.3)	(132.6)	(6.1)	(25.3)	(144.8)	(102)	(2.9)	(80)	(19.7)	(667.4)	(1514.2)
Sand lances (Ammodytidae)																
Pacific sand lance		--	--	--		--	--	--	--	--	--	--	--	--	--	--
Ammodytes hexapterus																
Flatfishes (Pleuronectidae)																
Bering flounder		--	--	1		--	--	--	--	--	--	--	--	--	1	36
Hippoglossoides robustus				(17.7)											(17.7)	(127.4)
Longhead dab		--	--	--		--	--	--	--	--	--	--	--	--	--	--
Limanda proboscidea																
Total count		132	8	19	--	29	99	58	55	135	84	27	39	10	695	1944
Total weight		(397.8)	(55.6)	(83.7)	--	(68.4)	(276.4)	(225.1)	(240.1)	(366.1)	(127.9)	(65.6)	(115.8)	(23)	(2043.5)	(5266.8)

Table 8. Count and weight of fishes captured by bottom hauls during autumn 2009, by prospect. Dashes (--) indicate 0 fish caught. Weight is in parentheses and rounded to 0.1 g.

	Station	KF001	KF003	KF005	KF007	KF009	KF011	KF013	KF015	KF017	KF019	KF021	KF023	KF025	
Autumn Klondike	Haul	4	10	20	8	18	2	14	22	6	16	1	12	24	Total
Cods (Gadidae)															
Arctic cod		26	42	14	16	23	24	12	19	11	29	4	9	9	238
Boreogadus saida		(76)	(67)	(17.7)	(124.2)	(114.1)	(135)	(120)	(39.2)	(146)	(128)	(42)	(68.3)	(77)	(1154.4)
Walleye pollock		--	--	--	--	--	--	--	--	--	--	--	--	--	--
Theragra chalcogramma															
Sculpins (Cottidae)															
Arctic staghorn sculpin		22	--	5	13	116	12	--	--	5	29	2	--	--	204
Gymnocanthus tricuspis		(13.7)		(2.5)	(22.5)	(165.3)	(11.2)			(4.6)	(12)	(0.8)			(232.6)
Butterfly sculpin		--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hemilepidotus papillio															
Hairhead sculpin		--	--	--	--	--	--	--	--	--	2	--	--	--	2
Trichocottus brashnicovi											(0.5)				(0.5)
Hamecon		9	4	12	34	18	10	5	1	1	47	2	7	--	150
Artediellus scaber		(28)	(19.2)	(76)	(90.2)	(43)	(21)	(15.5)	(2.5)	(0.4)	(117.8)	(0.7)	(25.8)		(440.1)
Ribbed sculpin		2	--	1	2	2	1	--	--	--	5	1	--	1	15
Triglops pingelii		(1)		(8.1)	(1.2)	(1.8)	(6.6)				(2.1)	(0.5)		(0.7)	(22)
Shorthorn sculpin		14	12	12	67	23	10	26	23	19	203	--	7	2	418
Myoxocephalus scorpius		(11.6)	(15)	(28.5)	(87.3)	(15)	(8)	(21)	(21.4)	(11.1)	(263.9)		(10)	(2.8)	(495.6)
Spatulate sculpin		--	--	--	--	5	--	--	3	--	5	--	--	--	13
Icelus spatula						(2)			(1.2)		(2)				(5.2)
Spinyhook sculpin		--	--	--	1	--	--	--	--	--	--	--	--	--	1
Artediellus cf. gomojunovi					(6)										(6)
Eyeshade sculpins (Hemitripteridae)															
Eyeshade sculpin		--	--	1	--	--	--	--	3	1	2	--	1	--	8
Nautichthys pribilovius				(9.4)					(4.1)	(0.1)	(0.5)		(0.3)		(14.4)
Poachers (Agonidae)															
Alligatorfish		1	--	--	3	3	--	--	--	--	1	--	--	--	8
Aspidophoroides monopter		(0.5)			(5.1)	(5.7)					(3)				(14.3)
Arctic alligatorfish		--	1	3	13	--	--	5	--	--	3	--	--	--	25
Ulcina olrikii			(2)	(4.3)	(15)			(6.4)			(5)				(32.7)
Snailfishes (Liparidae)															
Kelp snailfish		--	--	1	1	--	--	--	--	1	--	--	--	--	3
Liparis tunicatus				(0.2)	(15.8)					(0.3)					(16.3)
Variegated snailfish		1	--	1	1	1	1	--	5	--	1	1	--	--	12
Liparis gibbus		(17.4)		(5.7)	(23.8)	(10)	(0.4)		(56)		(9.2)	(8.6)			(131.1)

Table 8. Count and weight of fishes captured by bottom hauls during autumn 2009 (continued, page 2 of 4).

	Station	KF001	KF003	KF005	KF007	KF009	KF011	KF013	KF015	KF017	KF019	KF021	KF023	KF025	
Autumn Klondike	Haul	4	10	20	8	18	2	14	22	6	16	1	12	24	Total
Eelpouts (Zoarcidae)															
Fish doctor		--	1	--	--	--	--	--	6	--	--	--	--	2	9
Gymnelus viridis			(3.5)						(18.9)					(5.6)	(28)
Halfbarred pout		--	--	1	--	--	1	1	--	--	--	--	--	1	4
Gymnelus hemifasciatus				(1)			(1.2)	(3.4)						(0.5)	(6.1)
Marbled eelpout		--	--	5	4	1	3	7	--	--	2	--	--	--	22
Lycodes raridens				(28)	(18.5)	(21)	(19.6)	(105)			(4)				(196.1)
Polar eelpout		--	--	--	--	--	1	4	--	1	--	2	6	3	17
Lycodes polaris							(0.2)	(13.3)		(0.2)		(24.3)	(8)	(5.2)	(51.2)
Saddled eelpout		--	--	--	4	--	--	--	1	--	--	--	--	--	5
Lycodes mucosus					(21)				(0.3)						(21.3)
Wattled eelpout		--	--	--	--	--	2	--	--	--	--	--	--	--	2
Lycodes palearis							(27.5)								(27.5)
Pricklebacks (Stichaeidae)															
Arctic shanny		--	--	--	--	--	--	--	6	--	--	--	--	--	6
Stichaeus punctatus									(46)						(46)
Daubed shanny		--	--	--	--	--	--	--	--	--	--	--	--	--	--
Leptoclinus maculatus															
Fourline snakeblenny		2	--	--	--	--	--	--	21	--	--	--	--	--	23
Eumesogrammus praecisus		(1.2)							(202.3)						(203.5)
Slender eelblenny		8	--	8	14	52	11	21	20	10	19	18	8	--	189
Lumpenus fabricii		(14)		(18.2)	(21.7)	(41.2)	(15)	(17.2)	(25.9)	(7)	(10.7)	(45.1)	(5.5)		(221.5)
Stout eelblenny		--	8	2	1	4	24	5	1	15	4	--	42	55	161
Anisarchus medius			(27)	(4.5)	(3.3)	(13.2)	(89.4)	(15.5)	(2.5)	(61.6)	(7.9)		(143.2)	(167.7)	(535.8)
Sand lances (Ammodytidae)															
Pacific sand lance		--	1	1	--	1	--	--	3	1	--	--	--	1	8
Ammodytes hexapterus			(0.3)	(0.2)		(0.8)			(0.5)	(0.7)				(0.2)	(2.7)
Flatfishes (Pleuronectidae)															
Bering flounder		2	1	1	2	3	12	2	--	2	--	6	--	--	31
Hippoglossoides robustus		(1.6)	(2)	(9.4)	(9.1)	(14.3)	(19.4)	(12.6)		(7.3)		(8.9)			(84.6)
Longhead dab		--	1	--	--	--	--	--	--	--	1	--	--	--	2
Limanda proboscidea			(0.2)								(0.8)				(1)
Total count		87	71	68	176	252	112	88	112	67	353	36	80	74	1576
Total weight		(165)	(136.2)	(213.6)	(464.7)	(447.4)	(354.5)	(329.9)	(420.7)	(239.3)	(567.4)	(130.9)	(261.1)	(259.7)	(3990.4)

Table 8. Count and weight of fishes captured by bottom hauls during autumn 2009 (continued, page 3 of 4).

	Station	BF001	BF003	BF005	BF007	BF009	BF011	BF013	BF015	BF017	BF019	BF021	BF023	BF025		Autumn
Autumn Burger	Haul	31	51	53	34	49	29	39	45	37	43	27	41	47	Total	Total
Cods (Gadidae)																
Arctic cod		6	27	15	3	64	8	35	35	18	13	6	17	19	266	504
Boreogadus saida		(7)	(28.9)	(10)	(1.5)	(49)	(12)	(37.9)	(21.1)	(16.4)	(17.6)	(36.3)	(45.8)	(28.1)	(311.6)	(1466)
Walleye pollock		--	--	--	--	--	--	1	--	--	--	--	--	--	1	1
Theragra chalcogramma								(8.3)							(8.3)	(8.3)
Sculpins (Cottidae)																
Arctic staghorn sculpin		--	--	--	--	--	--	--	--	--	--	1	--	--	1	205
Gymnocanthus tricuspis												(0.6)			0.6	(233.2)
Butterfly sculpin		--	--	--	--	--	--	--	--	--	--	--	--	--	0	0
Hemilepidotus papillio																
Hairhead sculpin		--	--	--	--	--	--	--	--	--	--	--	--	--	0	2
Trichocottus brashnicovi																(0.5)
Hamecon		2	--	--	--	--	--	2	--	1	2	3	--	--	10	160
Artediellus scaber		(9.5)						(9.9)		(0.4)	(0.6)	(13.1)			(33.5)	(473.6)
Ribbed sculpin		--	--	--	1	--	--	--	--	--	--	--	1	--	2	17
Triglops pingelii					(0.7)								(0.5)		(1.2)	(23.2)
Shorthorn sculpin		--	2	2	4	1	5	--	2	--	1	--	2	1	20	438
Myoxocephalus scorpius			(1)	(1.5)	(9)	(2.5)	(11)		(15)		(3.2)		(6.2)	(0.9)	(50.3)	(545.9)
Spatulate sculpin		--	--	--	--	--	--	1	--	--	--	--	--	--	1	14
Icelus spatula								(8)							(8)	(13.2)
Spinyhook sculpin		--	--	--	--	--	--	--	--	--	--	--	--	--	0	1
Artediellus cf. gomojunovi																(6)
Eyeshade sculpins (Hemitripteridae)																
Eyeshade sculpin		--	--	--	--	--	--	--	--	--	--	--	--	--	0	8
Nautichthys pribilovius																(14.4)
Poachers (Agonidae)																
Alligatorfish		--	--	--	--	--	--	--	--	--	--	--	--	--	0	8
Aspidophoroides monopterygius																(14.3)
Arctic alligatorfish		--	3	--	--	--	--	--	--	--	--	--	1	--	4	29
Ulcina olrikii			(4.5)										(1)		(5.5)	(38.2)
Snailfishes (Liparidae)																
Kelp snailfish		--	--	--	--	2	--	--	--	--	--	--	2	--	4	7
Liparis tunicatus						(12.7)							(0.7)		(13.4)	(29.7)
Variegated snailfish		--	--	2	--	--	--	1	--	--	--	--	--	--	3	15
Liparis gibbus				(8)				(9.5)							(17.5)	(148.6)

Table 8. Count and weight of fishes captured by bottom hauls during autumn 2009 (continued, page 4 of 4).

	Station	BF001	BF003	BF005	BF007	BF009	BF011	BF013	BF015	BF017	BF019	BF021	BF023	BF025		Autumn
Autumn Burger	Haul	31	51	53	34	49	29	39	45	37	43	27	41	47	Total	Total
Eelpouts (Zoarcidae)																
Fish doctor		--	--	--	--	2	--	1	--	1	--	1	1	--	6	15
Gymnelus viridis						(6.5)		(2.9)		(8)		(2.4)	(2.8)		(22.6)	(50.6)
Halfbarred pout		1	1	3	1	2	1	--	--	--	--	1	--	--	10	14
Gymnelus hemifasciatus		(1.4)	(0.6)	(3.3)	(0.1)	(1.4)	(0.4)					(2.7)			(9.9)	(16)
Marbled eelpout		1	1	1	--	1	--	1	--	--	--	1	2	1	9	31
Lycodes raridens		(9)	(38.5)	(7)		(1.3)		(0.2)				(3)	(4)	(0.3)	(63.3)	(259.4)
Polar eelpout		--	3	2	6	--	8	--	1	3	4	5	9	6	47	64
Lycodes polaris			(19.2)	(0.9)	(23.4)		(11.8)		(2.6)	(0.6)	(2.3)	(36)	(2.2)	(5)	(104)	(155)
Saddled eelpout		--	--	--	--	--	--	--	--	--	--	--	--	--	0	5
Lycodes mucosus																(21.3)
Wattled eelpout		--	--	--	--	--	--	--	--	--	--	--	--	--	0	2
Lycodes palearis																(27.5)
Pricklebacks (Stichaeidae)																
Arctic shanny		--	--	--	--	--	--	--	--	--	--	--	--	--	0	6
Stichaeus punctatus																(46)
Daubed shanny		--	--	--	--	--	--	--	--	--	--	--	--	--	0	0
Leptoclinus maculatus																
Fourline snakeblenny		--	--	--	--	--	--	--	--	--	--	--	--	--	0	23
Eumesogrammus praecisus															(0)	(203.5)
Slender eelblenny		--	1	2	1	1	--	2	--	2	--	3	1	1	14	203
Lumpenus fabricii			(0.4)	(0.8)	(0.4)	(0.3)		(2.5)		(1.1)		(2.3)	(0.6)	(0.7)	(9.1)	(230.6)
Stout eelblenny		11	7	--	24	6	14	2	1	5	4	7	4	1	86	247
Anisarchus medius		(27.6)	(13.2)		(61.3)	(20.5)	(36.9)	(4.3)	(2.5)	(15.9)	(7.4)	(14.2)	(12.6)	(1.9)	(218.3)	(754.1)
Sand lances (Ammodytidae)																
Pacific sand lance		--	1	6	--	--	3	--	4	5	2	1	--	--	22	30
Ammodytes hexapterus			(0.4)	(1.8)			(0.7)		(1.5)	(1.2)	(0.8)	(0.5)			(6.9)	(9.6)
Flatfishes (Pleuronectidae)																
Bering flounder		--	--	--	--	--	--	--	--	--	--	--	--	--	0	31
Hippoglossoides robustus																(84.6)
Longhead dab		--	--	--	--	--	--	--	--	--	--	--	--	--	0	2
Limanda proboscidea																(1)
Total count		21	46	33	40	79	39	46	43	35	26	29	40	29	506	2082
Total weight		(54.5)	(106.7)	(33.3)	(96.4)	(94.2)	(72.8)	(83.5)	(42.7)	(43.5)	(31.9)	(111.1)	(76.3)	(36.9)	(883.8)	(4874.1)

Table 9. Mean standardized abundance of fishes caught by midwater hauls in each season and prospect, sorted by total. Catch was standardized to number of fish / 1000m^3.

	Summer		Autumn		
Species	Klondike	Burger	Klondike	Burger	Total
Arctic cod	108.8	196.9	32.3	50.6	97.2
Pacific sand lance	2.0	5.5	9.3	11.3	7.0
Shorthorn sculpin	10.0	0.6	7.1	0.8	4.6
Arctic shanny	9.3	3.8	--	1.2	3.6
Slender eelblenny	--	--	6.2	0.2	1.6
Arctic staghorn sculpin	0.4	--	0.7	--	0.3
Stout eelblenny	0.3	--	0.2	0.3	0.2
Arctic alligatorfish	0.1	0.1	0.3	0.3	0.2
Eyeshade sculpin	--	0.4	--	--	0.1
Saffron cod	--	0.1	0.1	--	0.1
Gelatinous seasnail	--	0.1	--	0.1	<0.1
Longhead dab	--	--	0.1	--	<0.1
	131.0	207.4	56.2	64.9	114.9

Table 10. Mean standardized biomass of fishes caught by midwater hauls in each season and prospect, sorted by total. Catch was standardized to g / 1000m^3.

	Summer		Autumn		
Species	Klondike	Burger	Klondike	Burger	Total
Arctic cod	13.3	17.5	21.9	17.3	17.5
Shorthorn sculpin	4.5	0.6	3.1	0.3	2.1
Pacific sand lance	0.1	0.2	3.2	3.2	1.7
Slender eelblenny	--	--	2.0	0.0	0.5
Arctic shanny	1.0	0.3	--	0.2	0.4
Stout eelblenny	<0.1	--	1.0	<0.1	0.3
Arctic staghorn sculpin	0.1	--	0.5	--	0.2
Eyeshade sculpin	--	0.3	--	--	0.1
Arctic alligatorfish	<0.1	<0.1	<0.1	0.1	<0.1
Gelatinous seasnail	--	<0.1	--	0.1	<0.1
Longhead dab	--	--	0.1	--	<0.1
Saffron cod	--	<0.1	<0.1	--	<0.1
Total	19.0	19.0	31.9	21.4	22.8

Table 11. Mean standardized abundance of fishes caught by bottom trawl in each season and prospect, sorted by total. Catch was standardized to number of fish / 1000 m^2.
.

	Summer		Autumn		
Species	Klondike	Burger	Klondike	Burger	Total
Arctic cod	59.1	23.3	28.9	62.5	43.9
Stout eelblenny	39.7	85.5	19.7	20.1	40.4
Shorthorn sculpin	6.3	1.2	49.7	4.8	15.8
Hamecon	19.8	24.1	17.2	2.5	15.8
Slender eelblenny	18.7	12.0	23.1	2.9	14.2
Polar eelpout	6.2	19.1	2.2	11.2	9.5
Arctic staghorn sculpin	7.3	1.0	23.3	0.1	8.1
Halfbarred pout	2.3	24.9	0.5	2.2	7.1
Marbled eelpout	1.9	3.9	2.7	2.0	2.6
Bering flounder	4.8	0.3	3.5	--	2.2
Arctic alligatorfish	2.1	1.5	2.9	0.8	1.8
Fish doctor	0.3	4.6	1.2	1.2	1.8
Pacific sand lance	--	--	1.0	5.5	1.7
Spatulate sculpin	--	3.1	1.6	0.2	1.2
Fourline snakeblenny	0.5	0.5	3.0	--	1.0
Variegated snailfish	0.9	0.3	1.5	0.7	0.9
Ribbed sculpin	0.3	--	1.8	0.5	0.7
Kelp snailfish	0.5	0.3	0.4	0.9	0.5
Alligatorfish	0.5	--	0.9	--	0.4
Arctic shanny	0.2	0.3	0.8	--	0.3
Eyeshade sculpin	0.2	--	1.0	--	0.3
Saddled eelpout	0.2	--	0.5	--	0.2
Wattled eelpout	0.1	--	0.2	--	0.1
Longhead dab	--	--	0.3	--	0.1
Walleye pollock	--	--	--	0.2	0.1
Daubed shanny	--	0.3	--	--	0.1
Hairhead sculpin	--	--	0.2	--	0.1
Butterfly sculpin	0.2	--	--	--	<0.1
Spinyhook sculpin	--	--	0.1	--	<0.1
Total	171.9	206.3	188.3	118.5	170.6

Table 12. Mean standardized biomass of fishes caught by bottom trawl in each season and prospect, sorted by total. Catch was standardized to g / 1000 m^2.

	Summer		Autumn		
Species	Klondike	Burger	Klondike	Burger	Total
Stout eelblenny	142.7	189.0	64.9	50.8	110.3
Arctic cod	90.8	114.4	138.8	71.0	103.6
Hamecon	64.1	79.9	51.5	7.0	50.0
Polar eelpout	39.5	69.2	7.1	20.6	33.4
Marbled eelpout	7.2	50.6	25.5	13.3	23.6
Shorthorn sculpin	15.6	2.7	58.7	12.6	22.8
Slender eelblenny	32.2	7.3	27.4	1.9	17.4
Arctic staghorn sculpin	32.3	0.6	26.4	0.1	15.1
Halfbarred pout	7.3	43.2	0.8	2.0	12.7
Bering flounder	18.9	5.9	10.0	--	8.8
Fourline snakeblenny	2.4	1.2	27.3	--	7.8
Variegated snailfish	8.4	0.8	16.2	4.2	7.5
Fish doctor	2.2	16.2	3.8	4.8	6.6
Kelp snailfish	3.4	3.7	1.6	2.7	2.8
Spatulate sculpin	--	8.7	0.6	2.0	2.7
Arctic alligatorfish	2.4	1.8	3.9	1.1	2.3
Arctic shanny	0.3	1.6	6.2	--	2.0
Saddled eelpout	2.0	--	2.1	--	1.0
Wattled eelpout	0.7	--	2.4	--	0.8
Ribbed sculpin	0.1	--	2.5	0.3	0.7
Pacific sand lance	--	--	0.3	1.7	0.5
Walleye pollock	--	--	--	2.1	0.5
Eyeshade sculpin	0.0	--	1.9	--	0.5
Alligatorfish	0.3	--	1.6	--	0.5
Spinyhook sculpin	--	--	0.6	--	0.2
Butterfly sculpin	0.5	--	--	--	0.1
Daubed shanny	--	0.4	--	--	0.1
Longhead dab	--	--	0.1	--	<0.1
Hairhead sculpin	--	--	0.1	--	<0.1
	473.4	597.3	482.2	198.2	434.6

Table 13. Count of fishes from which diet was examined.

Species	Length range (mm)				Total Size	Total Species
	≤50	51-75	76-100	≥101		
Bottom						
Arctic cod						**192**
Summer Klondike	5	1	23	16	45	
Summer Burger	--	3	3	1	7	
Summer COMIDA	1	3	8	2	14	
Autumn Klondike	--	6	--	17	23	
Autumn Burger	--	2	2	3	7	
Arctic staghorn sculpin						**152**
Summer Klondike	1	18	6	--	25	
Summer Burger	1	--	--	--	1	
Summer COMIDA	1	14	2	3	20	
Autumn Klondike	17	8	4	--	29	
Autumn Burger	--	--	1	--	1	
Polar eelpout						**202**
Summer Klondike	3	6	3	7	19	
Summer Burger	2	14	11	7	34	
Autumn Klondike	7	--	4	2	13	
Autumn Burger	13	12	5	5	35	
Stout eelblenny						**202**
Summer Burger	1	5	9	4	19	
Summer COMIDA	2	3	5	2	12	
Summer Klondike	--	1	9	15	25	
Autumn Klondike	--	--	13	23	36	
Autumn Burger	--	--	7	2	9	
Bering flounder						**204**
Summer Burger	--	--	--	1	1	
Summer COMIDA	12	17	12	4	45	
Summer Klondike	12	16	5	1	34	
Autumn Klondike	8	9	5	--	22	
Midwater						
Arctic cod						**54**
Autumn Klondike	7	2	--	--	9	
Autumn Burger	7	2	--	--	9	
Summer Klondike	1	--	--	--	1	
Summer COMIDA	8	--	--	--	8	
Total	110	143	137	115	505	505

Table 14. Count of fishes for stable isotope analysis.

Gear & Species	Length class (mm)	Summer Klondike	Summer Burger	Autumn Klondike	Autumn Burger	Total Size	Total Species
Bottom hauls							
Arctic cod	≤50	5	--	1	1	7	65
	51-75	5	5	5	5	20	
	76-100	5	5	5	5	20	
	≥100	5	5	5	3	18	
Arctic staghorn sculpin	≤50	5	5	5	--	15	48
	51-75	5	5	5	--	15	
	76-100	5	1	5	1	12	
	≥100	3	2	1	--	6	
Polar eelpout	≤50	5	2	5	5	17	70
	51-75	5	5	1	5	16	
	76-100	5	5	5	5	20	
	≥100	5	5	2	5	17	
Stout eelblenny	≤50	3	1	--	0	4	56
	51-75	5	5	--	2	12	
	76-100	5	5	5	5	20	
	≥100	5	5	5	5	20	
Bering flounder	≤50	5	--	5	--	10	36
	51-75	5	--	5	--	10	
	76-100	5	--	5	--	10	
	≥100	5	1	--	--	6	
Midwater hauls							
Arctic cod	≤50	5	5	5	5	20	30
	51-75	--	--	5	5	10	
	76-100	--	--	--	--	0	
	≥100	--	--	--	--	0	
Arctic staghorn sculpin	≤50	5	--	1	--	6	6
	51-75	--	--	--	--	0	
	76-100	--	--	--	--	0	
	≥100	--	--	--	--	0	
Stout eelblenny	≤50	--	--	--	2	2	8
	51-75	--	--	--	--	0	
	76-100	--	--	--	3	3	
	≥100	--	--	--	3	3	
Total		106	67	81	65	319	319