NPAFC
Doc. 676
Rev. 1

Rev. Date: 2003-Sep-18

Cruise Report of the 2002 *F/V Northwest Explorer* BASIS Survey in the Bering Sea, September-October.

by

James Murphy[1], Nancy Davis[2], Oleg Ivanov[3], Melanie Rohr[4],
Sonya Elmajatii[5], William Barber[6]

[1]Auke Bay Laboratory, Alaska Fisheries Science Center, NMFS, Juneau, AK
[2] School of Aquatic & Fishery Sciences, University of Washington
[3]Pacific Fisheries Research Centre (TINRO-Centre), Vladivostok, Russia
[4]Alaska Quaternary Center, University of Alaska Fairbanks
[5]Institute of Marine Science, University of Alaska Fairbanks
[6]1200 I St. #313 Anchorage, AK

Submitted to the

NORTH PACIFIC ANADROMOUS FISH COMMISSION

by

the United States of America

Revised May 2003

THIS REPORT MAY BE CITED TO IN THE FOLLOWING MANNER:
Murphy, J., N. Davis, O. Ivanov, M. Rohr, S. Elmajjati, and W. Barber. 2003. Cruise report of the 2002 *F/V Northwest Explorer* BASIS survey in the Bering Sea, September-October. (NPAFC Doc. 676 Rev. 1) 23 p. NMFS, Auke Bay Laboratory, Juneau, AK; School of Aquatic & Fishery Sciences, University of Washington; Pacific Fisheries Research Centre (TINRO-Centre), Vladivostok; Alaska Quaternary Center, University of Alaska Fairbanks; Institute of Marine Science, University of Alaska Fairbanks

ABSTRACT

The survey consisted of two cruise legs between September 5 and October 8 with a port call in Dutch Harbor. The first leg involved sampling 23 rope trawl stations along the Aleutian chain in the Bering Sea basin or within the proximity of the Aleutian Islands, resulting in the capture of 27,548 fish and squid (biomass of 2,868 kg) and included at least 17 species. The second leg involved sampling 21 rope trawl stations on or adjacent to the Eastern Bering Sea shelf, resulting in a catch of 269,127 fish and squid (biomass of 1,590 kg), and included at least 22 species. Immature chum salmon (*Oncorhynchus keta*) were present at the highest biomass levels in the catch during leg 1, followed by juvenile Atka mackerel (*Pleurogrammus monopterygius*). Catch of juvenile Atka mackerel was significantly higher along the western Aleutian chain (west of 180 degrees longitude) than the eastern Aleutian chain, whereas catches of immature sockeye salmon (*Oncorhynchus nerka*) were higher along the eastern Aleutian chain. Juvenile walleye pollock (*Theragra chalcogramma*) occurred at the highest biomass levels in the catch during leg 2 and were captured primarily in the middle shelf habitat of the Eastern Bering Sea shelf along with adult walleye pollock. Immature chum salmon had the second highest biomass levels and were caught primarily in the outer shelf and oceanic habitats, similar to the distribution of juvenile Atka mackerel. Juvenile chum and chinook salmon (*Oncorhynchus tshawytscha*) were captured primarily in the inner shelf habitat along with herring (*Clupea pallasi*) and capelin (*Mallotus villosus*). Juvenile Pacific ocean perch (*Sebastes alutus*) and juvenile sablefish (*Anoplopoma fimbria*) were caught exclusively in the outer shelf habitat. Juvenile salmon captured on the Eastern Bering Sea shelf were larger than those of juvenile salmon captured in Southeast Alaska during October 1997. In 1997, Southeast Alaska juvenile salmon had the highest rate of growth observed between 1997 and 2002. This limited information provides evidence indicating that the size of Eastern Bering Sea juvenile salmon as they enter their first marine winter was not an important limiting factor in 2002. The 1999 brood year of chum salmon (age 0.2) was the predominate brood year of chum salmon captured during the survey and made up 65% (n=1000) of the immature chum salmon captured. The low percentage of age 0.1 chum salmon captured during the survey (25%) indicates that the bulk of the 2000 chum salmon brood year was distributed outside of the survey area. Preliminary results of salmon stomach contents examined during leg 1 indicated that immature chum and sockeye diets contained a high proportion of euphausiids (*Thysaneossa* spp.) and hyperiid amphipods (*Themisto pacifica*). Average sea surface temperature and salinity were lowest on the Northern Bering Sea shelf due to the influence of the Yukon River on surface waters along the Eastern Bering Sea shelf.

INTRODUCTION

At the 2001 annual meeting of the North Pacific Anadromous Fish Commission (NPAFC), Canada, Japan, Russia, and the United States agreed to plan and coordinate a new international cooperative research initiative in the Bering Sea and Aleutian Islands, called BASIS (Bering-Aleutian Salmon International Survey) (North Pacific Anadromous Fish Commission, 2001). BASIS is intended to provide a scientific foundation by which we can determine causes of change in the productivity of Bering Sea salmon populations. The primary approach of BASIS involves international cooperative surveys of salmon and their ecosystem in the Bering Sea at key times and areas to provide seasonal information on the migration and ecology of salmon.

Although worldwide catches of Pacific salmon have reached record levels in recent years, salmon survival to rivers emptying into the Eastern Bering Sea have declined, reaching economically disastrous levels. Causes of the decline are not understood, although multiple factors affecting different life-history stages of these stocks are likely contributing to the decline in survival. A significant gap in our understanding of production and survival dynamics of these stocks stems from a lack of information on the marine life-history stages of salmon, and is the focus of BASIS research. Density dependent growth and feeding competition during critical ocean growth periods may limit salmon production. Poor feeding conditions or low nutritional status of salmon during their juvenile life-history period may limit production through increased overwintering mortality during their first winter at sea. Bycatch in non-targeted fisheries becomes increasingly important with the decline in these stocks. Bycatch estimates require direct harvest monitoring; however, scientifically based management measures to minimize bycatch for particular stocks of concern require more complete information on the migration and distribution of salmon.

The objectives of this survey were to collaborate with other BASIS programs to 1) define migratory routes and spatial overlap of significant stock groups of salmon in the Bering Sea and Aleutian Islands ecosystems, and 2) evaluate the nutritional status, forage availability, and growth of salmon in the Bering Sea.

METHODS

Two cruise legs between September 5 and October 8 were planned for the *Northwest Explorer* as part of the 2002 BASIS survey in the Bering Sea, with a port call in Dutch Harbor (Figure 1). The first cruise leg involved stations along the Aleutian chain in the Bering Sea basin or within the proximity of the Aleutian Islands. The second cruise leg involved stations on or adjacent to the Eastern Bering Sea shelf. Only 44 of the 64 planned rope trawl stations, 42 of the 64 planned oceanographic stations, and one (Captain's Bay on Unalaska Island) of the three sediment core stations were sampled due to adverse weather conditions, CTD failure at the beginning of the survey, and a change in the diel survey from six to four stations in a 24-hour period (Figure 2; Table 1). Coordinated trawling was completed with the *Kaiyo Maru* on September 13–14; and with the *TINRO* on September 15–17 (Murphy et al., 2003). A diel survey was completed with the *TINRO* on September 17. Two BASIS stations were sampled each day during daylight hours (with the exception of the diel survey conducted with the *TINRO*).

Additional daylight trawl sets were made adaptively depending on weather, catches, and time to increase sample sizes and resolution in the spatial distribution of salmon.

Temperature and salinity profiles were collected using a Seabird[1] SEACAT-19+ CTD from 0 to 200 meters, or within 10 m from the sea floor. Zooplankton were collected using a bongo net (mesh sizes: 333 and 505 microns) towed obliquely between the surface and 200 meters, or 20 meters from the sea floor. Zooplankton samples were split onboard the vessel with a Matoto splitter and sample halves were preserved in formalin and frozen. Formalin preserved specimens have been sent to the Polish sorting center for species identification; frozen specimens will be used for stable isotope analysis. Surface water samples were collected and filtered for stable isotopes, coccolithophores, and chlorophyll. Filters were frozen and 250 ml of the filtered water was retained for nutrient analysis (NO_2, NO_3, PO_4, and SiO_3).

Salmon and other pelagic nekton were sampled with a Cantrawl model 400/580 midwater rope trawl. The Cantrawl trawl had a typical mouth opening of 17 x 45 m with the bridle and door configuration used aboard the *Northwest Explorer*. All trawling was conducted during daylight (except for the diel stations with the *TINRO*), and the duration for all trawls was one hour. Lengths, weights, scales, maturity, gender (for adult salmon), and genetic samples (either electrophoresis tissues or whole body) were collected from all salmon. Adult salmon stomachs and muscle tissue samples were collected from a subsample of up to 10 individuals per species per station. Lengths and weights were taken from other nekton species (subsamples from large catches). Adult pollock stomachs were preserved in formalin for laboratory analysis, and whole fish samples of other nekton were frozen for further laboratory analysis. All salmon scales and chum salmon otoliths were sent to the Tag, Mark, and Age Laboratory, Alaska Department of Fish and Game (ADFG) for ageing and thermal mark identification.

Stomach samples from all species of immature or maturing salmon and steelhead trout were examined. A maximum of 10 stomachs per species from each trawl haul were collected and examined while on board the vessel. Stomachs were weighed to the nearest gram before and after removal of the contents, and content weight was obtained by subtraction. Contents were examined using a binocular microscope and identified to several general prey categories including euphausiids, copepods, amphipods, crabs, squid, pteropods, fish, polychaetes, chaetognaths, gelatinous zooplankton (ctenophores, medusae, and salps), other prey, and unidentified material. More detailed identification was noted when possible. The proportion by volume in each prey category was visually estimated.

RESULTS

Rope Trawl Catch

A total of 44 rope trawl stations were sampled during the 2002 BASIS survey by the *Northwest Explorer* (Table 1). Twenty-three rope trawl hauls were completed during leg 1, resulting in the catch of 27,548 fish and squid (biomass of 2,868 kg) and included at least 17 separate species (Table 2; Appendix 1). Twenty-two rope trawl hauls were

[1] Reference to trade names does not imply endorsement by the National Marine Fisheries Service, NOAA.

completed in leg 2, resulting in a catch of 269,127 fish and squid (biomass of 1,590 kg), and included at least 22 separate species (Table 3).

Immature chum salmon (*Oncorhynchus keta*) occurred at the highest biomass levels in the catch along the Aleutian Islands (leg 1), followed by juvenile Atka mackerel (*Pleurogrammus monopterygius*). Adult Atka mackerel were captured primarily on the Aleutian Island shelf, whereas juvenile Atka mackerel were captured on the shelf and in oceanic habitats, with largest biomass levels occurring offshore in the Bering Sea basin. Catch of juvenile Atka mackerel was significantly higher along the western Aleutian chain (west of 180 degrees longitude) than the eastern Aleutian chain. Catches of immature chum and chinook salmon (*Oncorhynchus tshawytscha*) were similar between the western and eastern regions of the Aleutian chain; however, catches of immature sockeye salmon (*Oncorhynchus nerka*) were higher along the eastern chain. Catches of myctophid fish species (*Leuroglossus schmidti, Stenobrachius leucopsarus*, and *Diaphus theta*) and the squid species (*Onychoteuthis borealijaponicus, Gonatopsis borealis*) occurred during night hauls made with the *TINRO* as part of the diel survey. The squid species, *Gonatus kamtchaticus,* although present in catches at higher levels during the night, was captured during daylight hours and did not appear to have as strong of a diel vertical migration as *O. borealijaponicus* and *Gonatopsis borealis*. The small squid species, *Berryteuthis anonychus*, was only present in the rope trawl catches along the eastern Aleutian chain and Bering Sea shelf. Sunrise sets along the western Aleutian chain (A16a, and A21a) resulted in significantly higher catches of juvenile Atka mackerel, suggesting the presence of diel migration by Atka mackerel during their juvenile life-history stage.

Four habitats were sampled during the second leg: 1) inner shelf (bottom depth < 50 m), 2) middle shelf (50 < bottom depth < 100 m), 3) outer shelf (100 < bottom depth < 200 m), and 4) oceanic (bottom depth > 200 m). Juvenile walleye pollock (*Theragra chalcogramma*) occurred at the highest biomass levels in the catch during leg 2 and were captured primarily in the middle shelf habitat along with adult walleye pollock. Immature chum salmon had the second highest biomass levels and were caught primarily in the outer shelf and oceanic habitats, similar to the distribution of juvenile Atka mackerel. Immature chinook salmon were captured in all four habitats, but were most abundant in the oceanic habitat. Juvenile chum and chinook salmon were captured primarily in the inner shelf habitat along with herring (*Clupea pallasi*) and capelin (*Mallotus villosus*). Juvenile Pacific ocean perch (*Sebastes alutus*) and juvenile sablefish (*Anoplopoma fimbria*) were caught exclusively in the outer shelf habitat and squid species (*G. kamtschaticus* and *B. anonychus*) were captured in the outer shelf and oceanic habitats. Significant numbers of two lamprey species (*Lethenteron camtschaticum*, and *Lampetra tridentata)* were captured on the northern Bering Sea shelf, with *Lethenteron camtschaticum* occurring primarily in the inner shelf habitat and *Lampetra tridentata* occurring further offshore.

Size Structure

Lengths and weights of all species sampled are listed in Table 4. Of particular interest is the juvenile salmon size data. Coho had the largest average fork length of 336 mm, followed by chinook (265 mm), sockeye (228 mm), chum (223 mm), and pink salmon (218 mm). Condition factor (weight/length^3·100,000) followed a similar species pattern: coho (1.35), chinook (1.29), sockeye (1.10), chum (1.07), pink (0.95). Juvenile

pink and chum salmon captured on the Eastern Bering Sea shelf were larger than juvenile salmon captured in Southeast Alaska during October (Murphy et al., 1999). In 1997, Southeast Alaska juvenile salmon had the highest rate of growth observed between 1997 and 1999 (Orsi et al., 2000), and has continued to be the highest growth rate observed through 2002 (J. Orsi, personal communication). This limited information provides evidence that the size of Eastern Bering Sea juvenile salmon was not an important limiting factor in 2002. Larger size does not necessarily equate to better growing conditions, and could simply indicate older ages. The progression of the spring bloom and timing of peak outmigration of juvenile salmon typically follows a south to north progression; therefore, the probability that Eastern Bering Sea juvenile salmon have migrated to sea prior to the southeast Alaska juveniles is unlikely. The influence of freshwater age and growth in sockeye, chinook, and coho salmon will prevent meaningful interpretations of size structure in terms of early marine growth.

Fork lengths of juvenile walleye pollock were smaller in the northern region of the shelf, and were typically smaller closer to shore (Table 5). Three spawning groups (Aleutian basin, southern shelf, and northern shelf) are thought to occur in the Bering Sea (Hinkley, 1987). Spawn dates progress from south to north and occur between January and March in the basin, between March and June on the southern shelf, and between June and August on the northern shelf. Using parameters from juvenile pollock growth models derived by Nishimura et al. (1996), we estimate the average parental spawning date of juvenile pollock from the southern shelf to be around the first week of May, juvenile pollock from the middle and outer shelf habitats of the northern Bering shelf to be mid-May, and juvenile pollock from the inner shelf habitat of the northern Bering shelf to be around the first week of June.

Fork lengths of juvenile Atka mackerel were smallest along the Western Aleutian chain, which may be the result of different spawning dates (different spawning stocks) or slower growth of juvenile Atka mackerel along this portion of the Aleutian Islands. Due to the large biomass of juvenile Atka mackerel along the Western Aleutian chain, density dependent growth may be present. Growth models may help in evaluating the relative importance of these two factors in the size structure of juvenile Atka mackerel.

Salmon Age Structure

Chum and sockeye salmon scales aged by the ADFG Mark, Tag, and Age Laboratory are summarized in Table 6. Availability of preferred scales was low for immature sockeye and juvenile chum salmon (approximately 20%). Availability of preferred scales was much higher for immature chum salmon (43%) and juvenile sockeye (approximately 90%). The 1999 brood year of chum salmon (age 0.2) was the predominate brood year captured during the survey and made up 65% (n=1000) of the immature chum salmon captured. Age 0.3 was the predominate brood year for mature chum salmon and made up 73% (n=11) of the mature chum salmon. The most probable explanation for the low percentage of age 0.1 immature chum salmon captured during the survey (25%) is that the majority of the 2000 brood year (age 0.1) chum salmon were distributed outside of the survey area. Differences in brood year strength may also be contributing to the low percentage of the 2000 brood year captured during the survey; however, it is unlikely that differences in brood year strength could explain the significantly lower number of age 0.1 chum salmon captured in the survey area.

Salmon Diets

Four hundred seventy-one salmonid stomach contents were examined. This included 354 stomachs collected during leg 1 (88 sockeye, 222 chum, 1 coho, and 42 chinook salmon, and 1 steelhead) and 117 samples collected during leg 2 (6 sockeye, 80 chum, and 31 chinook salmon). Preliminary results from examination of samples collected during leg 1 indicated that chum and sockeye stomach contents contained a high proportion of euphausiids (*Thysaneossa* spp.) and hyperiid amphipods (*Themisto pacifica*). Chum salmon consumed the most diverse prey including ctenophores, other amphipods (*Primno abyssalis, Lysanassidae*), shrimp, small squid (< 15 mm ML), pteropods (*Limacina helicina*), and fish including the common myctophid, *Stenobrachius leucopsarus* (70–120 mm SL), and juvenile Atka mackerel (100–135 mm SL). Sockeye stomach contents contained many of the same amphipods, pteropods, small squid, and fish (*S. leucopsarus* 80–100 mm SL) as chum salmon; however, sockeye salmon stomach contents did not contain Atka mackerel. Chinook salmon stomach contents contained predominately gonatid squids (35–90 mm ML), and less frequently fish, including juvenile Atka mackerel (105–130 mm SL).

Examination of salmon stomach contents collected during the second cruise leg indicated a shift in food habits from the earlier leg, probably reflecting a change in the suite of available prey. In addition to the amphipods and pteropods frequently consumed by chum salmon, crab zoea and magalopa, and fish were commonly found in chum salmon stomach contents collected during leg 2. Chum salmon stomach contents contained high proportions of juvenile pollock (56–95 mm SL), juvenile sablefish (100 mm SL), and juvenile rockfish (55 mm SL). Chinook salmon consumed squid (60–159 mm ML) and fish including juvenile pollock (60–190 mm SL), herring (190 mm SL), and capelin (90–115 mm SL). The small number of stomach samples collected from sockeye salmon showed they consumed many amphipods and pteropods; however, the sockeye salmon sampled for food habits analysis did not contain forage fish.

Oceanographic Data

Sea surface (2-meter depth) temperature and salinity data are summarized in Table 7. The 2-meter depth bin was used to summarize sea surface conditions due to increased error in salinity values at shallower depths. Average sea surface temperature (SST) and sea surface salinity (SSS) were lowest in the northern Bering Sea region (8.2°C and 31.86 PSU) due to the influence of the Yukon and other major drainage systems along the northern Bering Sea shelf. Observed SST and SSS were highest in the Western Aleutian chain region (9.7°C and 32.95 PSU). The station with the lowest SST (6°C) during the survey was on the Aleutian Islands shelf, where strong tidal currents vertically mix the water column preventing stratification at the surface.

REFERENCE

Hinckley, S. 1987. The reproductive biology of walleye pollock, *Theragra chalcogramma*, in the Bering Sea, with reference to spawning stock structure. Fish. Bull. 85(3):481-498.

Murphy, J.M., A.L.J. Brase, and J.A. Orsi. 1999. Survey of juvenile Pacific salmon in the northern region of southeastern Alaska, May-October 1997. U.S. Dep. Commer., NOAA Tech. Memo. NMFS-AFSC-105, 40 p.

Murphy, J. , O. Temnykh, and T. Azumaya. 2003. Trawl Comparisons by the *Northwest Explorer*, *TINRO*, and *Kaiyo Maru*, September, 2002. (NPAFC Doc. No. 677) 20 p. NMFS, Auke Bay Laboratory, Juneau, AK, USA; Pacific Fisheries Research Centre (TINRO-Centre), Vladivostok, Russia; and Hokkaido National Fisheries Research Institute, Fisheries Research Agency, Kushiro, Japan.

Nishimura A., M. Kei-ichi, T. Yanagimoto. 1996. Hatch date and growth estimation of juvenile walleye pollock, *Theragra chalcolgramma*, collected in the Bering Sea in 1989 and 1990. *In* R. Brodeur et al. (eds.) Ecology of juvenile Walleye pollock, *Theragra chalcogramma*. P. 81-87. U.S. Dept. Commer., NOAA Tech. Rep. 126.

North Pacific Anadromous Fish Commission. 2001. Draft plan for NPAFC Bering-Aleutian Salmon International Survey (BASIS). (NPAFC Doc. 579) 27 p.

Orsi, J.A., M.V. Sturdevant, J.M. Murphy, D.G. Mortensen, and B.L. Wing. 2000. Seasonal habitat use and early marine ecology of juvenile Pacific salmon in southeastern Alaska. N. Pac. Anadr. Fish Comm. Bull. No. 2:111-122.

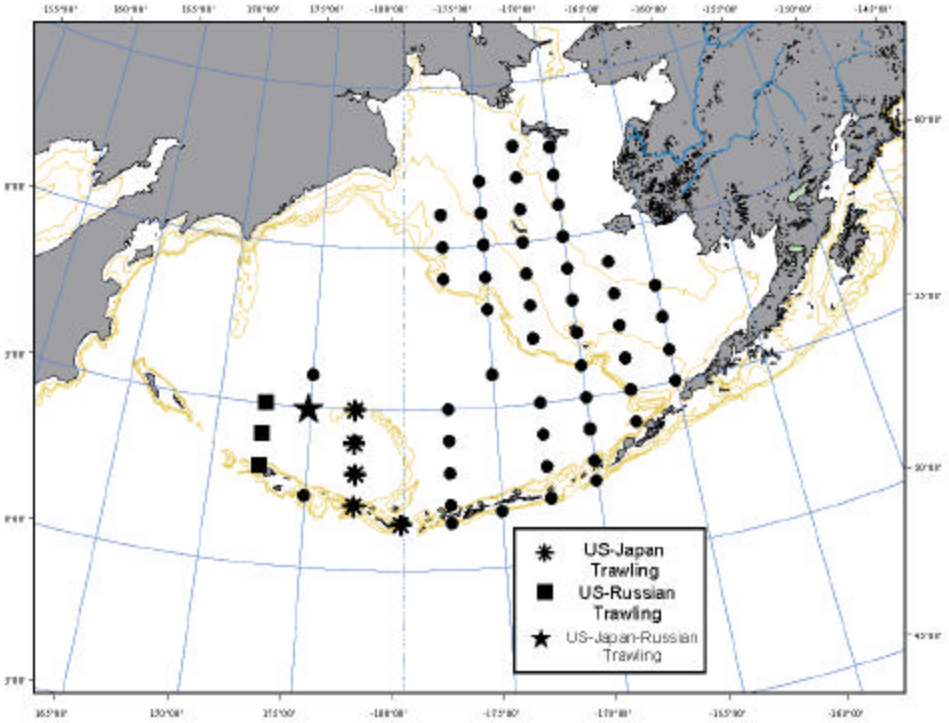

Figure 1. Planned sampling stations for the 2002 US BASIS survey using the *Northwest Explorer*, September-October, 2002.

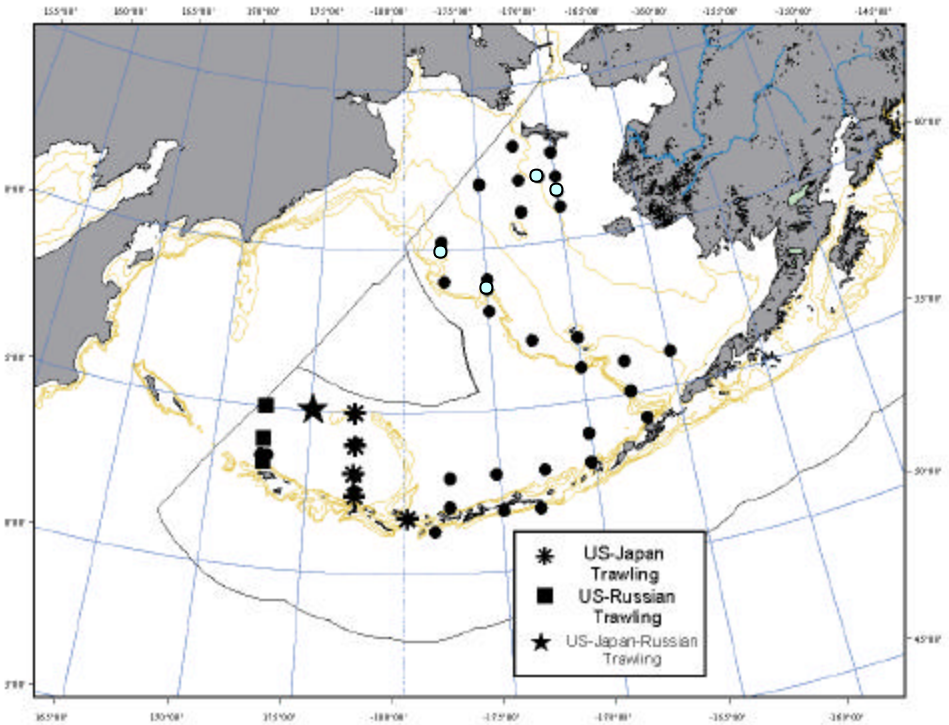

Figure 2. Stations sampled during the 2002 US BASIS survey using the *Northwest Explorer*, September-October, 2002. Unshaded circles indicate adaptively sampled stations.

Table 1. Rope trawl stations sampled during the 2002 US BASIS survey using the *Northwest Explorer*, September-October, 2002. All trawls were one hour in duration. Habitat codes refer to oceanic (O), shelf (SH), outer (OS), middle (MS), and inner (IS) Eastern Bering Sea shelf habitats.

Leg	Trawl No.	Station	Date	Trawl Start Time	Start Position	End Position	Trawl Vert. (m)	Trawl Hor. (m)	Trawl Warp (m)	Trawl Speed (kts)	Depth (m)	Course	Habitat
1	1	A3	9/8	615 (UTC11)	535947N 1700113W	535810N 1700780W	11	45	441	4.5	>1000	250	O
	2	A4	9/8	1545 (UTC11)	530028N 1695996W	530780N 1701801W	11	45	360	5.0	150	290	SH
	3	A5	9/9	815 (UTC11)	525947N 1723114W	530204N 1723922W	16	50	234	5.2	>1000	275	O
	4	A6	9/9	1545 (UTC12)	530010N 1750257W	525990N 1751090W	13	43	216	5	>1000	267	O
	5	A11	9/10	445 (UTC12)	525721N 1773240W	525390N 1772980W	13	50	360	4.2	>1000	180	O
	6	A12	9/12	455 (UTC12)	520112N 1772990W	520170N 1773560W	13	45	360	4.0	>1000	275	O
	7	A13	9/12	1608 (UTC12)	514010N 1794380W	514610N 1794310W	11	45	360	4.8	600	0	O
	8	A14	9/13	835 (UTC12)	523127N 1772815E	523450N 1773300E	16	47	333	4.3	>1000	70	O
	9	A15	9/13	1610 (UTC12)	530105N 1773006E	530140N 1773640E	14	45	387	3.8	>1000	85	O
	10	A16a	9/14	500 (UTC12)	535890N 1773050E	535900N 1772350E	18	43	378	3.9	>1000	270	O
	11	A16	9/14	830 (UTC12)	540150N 1772820E	540450N 1773380E	14	45	504	4.0		46	O
	12	A17	9/14	1600 (UTC12)	545530N 1771800E	545770N 1772480E	14	47	351	4.2	480	60	O
	13	A18	9/15	1600 (UTC12)	550010N 1750260E	550320N 1745830E	22	40	315	3.6	>1000	330	O
	14	A19	9/16	825 (UTC12)	550009N 1722978E	550070N 1723840E	18	45	432	3.9	>1000	80	O
	15	A20	9/16	1642 (UTC12)	540039N 1723050E	540000N 1723770E	18	47	432	4.0	>1000	95	O
	16	A21a	9/17	520 (UTC12)	533079N 1723003E	533010N 1723710E	22	43	324	4.2	>1000	100	O
	17	A21b	9/17	1110 (UTC12)	533022N 1723036E	533030N 1723740E	20	47	414	4.1	>1000	90	O
	18	A21c	9/17	1710 (UTC12)	532927N 1723150E	532951N 1722840E	18	47	360	4.3	>1000	100	O
	19	A21d	9/17	2312 (UTC12)	533095N 1722840E	532760N 1723290E	13	43	360	4.1	>1000	140	O
	20	A22	9/19	1630 (UTC12)	511919N 1782179W	511630N 1781950W	13	47	432	3.7	450	150	SH
	21	A23	9/20	525 (UTC12)	515226N 1745739W	515150N 1744880W	22	43	342	4.6	85	100	SH
	22	A24	9/20	1502 (UTC12)	515173N 1725910W	514880N 1730240W	14	47	468	3.7	>1000	215	O
	23	A25	9/22	605 (UTC11)	541040N 1664821W	540820N 1665280W	20	45	396	4.0	750	230	SH

Table 1. Rope trawl stations cont.

Leg	Trawl No.	Station	Date	Trawl Start Time	Start Position	End Position	Trawl Vert. (m)	Trawl Hor. (m)	Trawl Warp (m)	Trawl Speed (kts)	Depth (m)	Course	Habitat
2	24	B22	9/23	620 (UTC11)	550180N 1673120W	550580N 1673050W	20	47	378	4.3	158	6	OS
	25	B44	9/23	623 (UTC11)	560040N 1673010W	560030N 1673520W	18	47	441	4.1	128	270	OS
	26	B23	9/24	552 (UTC11)	560020N 1700060W	555990N 1695450W	16	47	450	3.8	157	89	OS
	27	B43	9/24	1645 (UTC11)	565880N 1695850W	565620N 1695380W	18	45	360	3.8	64	132	MS
	28	B24	9/28	700 (UTC11)	570101N 1723630W	570420N 1723180W	22	45	360	4.2	116	37	OS
	29	B25	9/29	610 (UTC11)	580031N 1745745W	580180N 1745070W	18	47	342	3.9	>1000	63	O
	30	B34a	9/29	1220 (UTC-11)	584113N 1745920W	584130N 1745070W	22	47	351	4.4	188	90	OS
	31	B34	9/29	1615 (UTC11)	590005N 1745803W	590130N 1745080W	20	47	405	4.0	125	72	OS
	32	B26	9/30	540 (UTC11)	585910N 1772940W	585930N 1772140W	20	47	378	3.9	128	86	OS
	33	B27	9/30	1400 (UTC11)	595897N 1773043W	595480N 1773050W	16	47	378	4.3	132	180	OS
	34	B28	9/30	1715 (UTC11)	601125N 1773050W	601470N 1773240W	18	45	504	3.9	134	340	OS
	35	B29	10/1	810 (UTC11)	615919N 1750180W	615740N 1745480W	18	47	414	3.9	75	117	MS
	36	B31	10/1	1725 (UTC11)	620035N 1722659W	620000N 1721750W	18	43	360	4.2	51	91	MS
	37	B51	10/2	620 (UTC11)	615970N 1695865W	615820N 1695050W	16	47	360	4.1	39	105	IS
	38	B39a	10/2	1440 (UTC11)	613055N 1700040W	612840N 1695370W	18	45	378	4.0	41	123	IS
	39	B39	10/2	1730 (UTC11)	610090N 1695867W	610150N 1695010W	22	45	270	4.3	41	86	IS
	40	B38	10/3	625 (UTC11)	610004N 1722807W	610180N 1722140W	18	43	396	3.9	59	38	MS
	41	B39a	10/3	1710 (UTC11)	620062N 1710068W	620430N 1710070W	22	43	378	4.0	45	348	IS
	42	B30	10/4	630 (UTC11)	630160N 1723100W	630520N 1723270W	20	45	324	4.0	56	359	MS
	43	B52	10/4	1555 (UTC11)	624310N 1700070W	624700N 1700090W	20	45	324	4.0	39	356	IS
	44	B50	10/6	1625 (UTC11)	560053N 1645932W	560410N 1645480W	20	45	342	4.3	90	34	MS

Table 2. Daylight catch in numbers and biomass of pelagic nekton during the first leg of the 2002 US BASIS survey using the *Northwest Explorer*, September-October.

		Eastern Aleutians				Western Aleutians			
		Oceanic Habitat (n=6)		Shelf Habitat (n=4)		Oceanic Habitat (n=10)*		Total (n=23)	
Scientific name	Life-History	Catch	Biomass (kg)	Catch	Biomass (kg)	Catch	Biomass (kg)	Catch	Biomass (kg)
Oncorhynchus keta	Immature	388	402	220	267	516	519	1124	1188
Pleurogrammus monopterygius	Juvenile	622	31	447	34	11373	380	12442	445
Pleurogrammus monopterygius	Adult	11	2	308	137	126	37	445	176
Oncorhynchus nerka	Immature	97	81	46	34	21	26	164	141
Oncorhynchus tshawytscha	Immature	21	34	0	0	18	34	39	68
Oncorhynchus keta	Mature	5	16	0	0	8	32	13	48
Gonatopsis borealis		7	1	0	0	0	0	7	1
Theragra chalcogramma	Adult	0	0	3	4	0	0	3	4
Oncorynchus mykiss	Juvenile	1	1	0	0	0	0	1	1
Gonatus kamtchaticus		6	<1	3	<1	34	<1	43	<1
Oncorhynchus kisutch	Juvenile	0	0	1	<1	0	0	1	<1
Berryteuthis anonychus		0	0	85	<1	0	0	85	<1
Eumicrotremus orbis		0	0	2	<1	0	0	2	<1
Zaprora silenus	Juvenile	0	0	0	0	1	<1	1	<1
Sebastes sp.	Juvenile	0	0	0	0	19	0	19	<1
Aptocyclus ventricosus		0	0	1	<1			1	<1
		1158	568	1116	477	12116	1028	14390	2074

*Does not include catches from the adaptive station A16a (trawl number 10).

Table 3. Night catch in numbers and biomass of pelagic nekton during the first leg of the 2002 US BASIS survey using the *Northwest Explorer*, September-October.

		Western Aleutians	
		Oceanic Habitat (n=2)	
Scientific name	Life-History	Catch	Biomass (kg)
Oncorhynchus keta	Immature	221	263
Pleurogrammus monopterygius	Juvenile	5230	254
Gonatopsis borealis		648	13
Pleurogrammus monopterygius	Adult	16	8
Oncorhynchus keta	Mature	2	6
Oncorhynchus nerka	Immature	2	3
Oncorhynchus tshawytscha	Immature	1	1
Onychoteuthis borealijaponicus		1	1
Stenobrachius leucopsarus		14	<1
Gonatus kamtchaticus		13	<1
Diaphus theta		4	<1
Leuroglossus schmidti		2	<1
Zaprora silenus	Juvenile	1	<1
		25274	1823

Table 4. Catch in numbers and biomass of pelagic nekton during the second leg of the 2002 US BASIS survey using the *Northwest Explorer*, September-October.

		Inner Shelf Habitat (n=5)		Middle Shelf Habitat (n=6)		Outer Shelf Habitat (n=9)		Oceanic Habitat (n=1)		Total (n=21)	
Species	Life-History	Catch	Biomass (kg)	Catch	Biomass (kg)	Catch	Biomass (kg)	Catch	Biomass (kg)	Catch	Biomass (kg)
Theragra chalcogramma	Juvenile	15335	25	213769	494	20041	86	1	<1	249146	605
Oncorhynchus keta	Immature	0	0	14	39	223	353	9	12	246	404
Theragra chalcogramma	Adult	64	58	565	210	0	0	0	0	629	269
Clupea pallasi		1367	54	234	18	5	1	0	0	1606	73
Oncorhynchus tshawytscha	Immature	4	7	11	15	8	35	8	13	31	65
Sebastes alutus	Juvenile	0	0	0	0	13018	29	0	0	13018	29
Oncorhynchus keta	Juvenile	200	25	14	2	1	<1	0	0	215	26
Mallotus villosus		2858	22	453	3	0	0	0	0	3311	25
Oncorhynchus keta	Mature	1	8	1	8	1	6	0	0	3	22
Oncorhynchus nerka	Juvenile	0	0	117	16	1	<1	0	0	118	16
Oncorhynchus tshawytscha	Juvenile	21	5	20	8	1	0	0	0	42	14
Pleurogrammus monopterygius	Juvenile	0	0	3	<1	138	10	9	<1	150	10
Oncorhynchus nerka	Immature	0	0	1	3	4	3	1	<1	6	6
Oncorhynchus gorbuscha	Juvenile	26	3	16	2	13	1	0	0	55	6
Lethenteron camtschaticum		39	4	2	<1	0	0	0	0	41	4
Anoplopoma fimbria	Juvenile	0	0	0	0	177	3	0	0	177	3
Lampetra tridentata		0	0	2	<1	5	2	1	<1	8	2
Zaprora silenus	Juvenile	0	0	31	1	27	1	2	<1	60	2
Theragra chalcogramma	Subadult	56	2	6	<1	1	<1	0	0	63	2
Gonatus kamtchaticus		0	0	0	0	7	<1	15	<1	22	<1
Anarhichas orientalis	Juvenile	1	<1	3	<1	0	0	0	0	4	<1
Berryteuthis anonychus		0	0	0	0	158	<1	0	0	158	<1
Trichodon trichodon		0	0	2	<1	0	0	0	0	2	<1

Table 4. Leg 2 catch cont.

Species	Life-History	Inner Shelf Habitat (n=5)		Middle Shelf Habitat (n=6)		Outer Shelf Habitat (n=9)		Oceanic Habitat (n=1)		Total (n=21)	
		Catch	Biomass (kg)	Catch	Biomass (kg)	Catch	Biomass (kg)	Catch	Biomass (kg)	Catch	Biomass (kg)
Blepsias bilobus		0	0	1	<1	2	<1	0	0	3	<1
Eumicrotremus orbis		0	0	2	<1	0	0	0	0	2	<1
Sebastes sp.	Juvenile	0	0	0	0	4	<1	1	<1	5	<1
Mallotus villosus	Juvenile	5	<1	0	0	0	0	0	0	5	<1
Pleuronectidae	Larval	0	0	0	0	1	<1	0	0	1	<1
		19977	213	215265	817	33836	530	47	26	269125	1585

Table 5. Fork lengths and weights of pelagic nekton captured during the 2002 US BASIS survey using the *Northwest Explorer*, September-October.

Leg	Scientific name	Life-History	Fork Length (mm)			Weight (g)		
			n	range	mean (sd)	n	range	mean (sd)
Leg 1	*Aptocyclus ventricosus*		1	201 - 201	201 (0)	0		
	Diaphus theta		2	85 - 90	88 (4)	0		
	Eumicrotremus orbis		2	66 - 85	76 (13)	0		
	Gonatopsis borealis		56	51 - 161	92 (27)	56	4 - 136	38 (36)
	Gonatus kamtchaticus		67	58 - 110	78 (14)	37	2 - 21	9 (5)
	Leuroglossus schmidti		2	85 - 170	128 (60)	2	3 - 20	12 (12)
	Oncorynchus mykiss	Juvenile	1	412 - 412	412 (0)	1	692 - 692	692 (--)
	Oncorhynchus keta	Immature	1357	302 - 618	441 (58)	1357	164 - 2958	1078 (419)
	Oncorhynchus keta	Mature	15	510 - 780	646 (88)	15	1532 - 6148	3667 (1498)
	Oncorhynchus kisutch	juvenile	1	298 - 298	298 (0)	1	292 - 292	292 (--)
	Oncorhynchus nerka	Immature	166	333 - 557	404 (59)	166	402 - 2479	873 (439)
	Oncorhynchus tshawytscha	Immature	42	355 - 755	481 (92)	42	560 - 5532	1684 (1173)
	Onychoteuthis borealijaponicus		1	287 - 287	287 (0)	1	558 - 558	558 (0)
	Pleurogrammus monopterygius	Adult	82	204 - 447	322 (54)	82	90 - 987	400 (181)
	Pleurogrammus monopterygius	Juvenile	603	120 - 205	159 (17)	603	11 - 104	40 (16)
	Sebastes sp.	Juvenile	19	25 - 50	40 (8)	0		
	Stenobrachius leucopsarus		12	40 - 79	54 (12)	0		
	Theragra chalcogramma	Adult	3	513 - 657	571 (76)	3	861 - 1342	1085 (242)
	Zaprora silenus	Juvenile	3	89 - 95	91 (3)	3	4 - 11	8 (4)

Table 5. Fork lengths and weights cont.

Leg	Scientific name	Life-History	Fork Length (mm)			Weight (g)		
			n	range	mean (sd)	n	range	mean (sd)
Leg 2	*Anarhichas orientalis*	Juvenile	4	230 - 250	240 (8)	4	78 - 98	91 (9)
	Anoplopoma fimbria	Juvenile	93	108 - 162	128 (12)	0		
	Blepsias bilobus		3	120 - 160	144 (21)	3	23 - 78	53 (28)
	Clupea pallasi		361	108 - 291	164 (42)	255	21 - 340	65 (58)
	Eumicrotremus orbis		2	82 - 109	96 (19)	2	31 - 84	58 (37)
	Gonatus kamtchaticus		22	75 - 152	112 (21)	22	6 - 56	22 (12)
	Lampetra tridentata		8	440 - 827	562 (121)	8	150 - 546	270 (132)
	Lethenteron camtschaticum		41	297 - 572	403 (48)	41	33 - 304	107 (47)
	Mallotus villosus		243	98 - 138	110 (7)	44	3 - 10	6 (2)
	Oncorhynchus gorbuscha	Juvenile	55	160 –307	218 (29)	55	29 - 336	107 (57)
	Oncorhynchus keta	Immature	246	328 - 673	494 (83)	246	404 - 4332	1644 (828)
	Oncorhynchus keta	Juvenile	162	191 - 250	223 (12)	161	63 - 178	121 (23)
	Oncorhynchus keta	Mature	3	760 - 817	783 (30)	3	6286 - 8380	7469 (1073)
	Oncorhynchus kisutch	Juvenile	10	263 - 372	336 (29)	10	473 - 744	573 (79)
	Oncorhynchus nerka	Immature	6	340 - 602	411 (108)	6	460 - 2862	1023 (963)
	Oncorhynchus nerka	Juvenile	101	187 - 270	228 (20)	101	70 - 222	133 (34)
	Oncorhynchus tshawytscha	Immature	31	330 - 990	508 (137)	31	370 - 13910	2213 (2514)
	Oncorhynchus tshawytscha	Juvenile	32	212 - 294	265 (16)	32	118 - 334	244 (49)
	Pleurogrammus monopterygius	Juvenile	132	141 - 227	181 (16)	132	28 - 136	64 (20)
	Pleuronectidae	Larval	1	47 - 47	47 (0)	1	1 - 1	1 (0)
	Sebastes alutus	Juvenile	214	52 - 78	65 (6)	0		
	Sebastes sp.	Juvenile	3	33 - 65	54 (18)	2	2 - 2	2 (0)
	Theragra chalcogramma	Adult	103	313 - 650	441 (82)	103	218 - 1652	608 (326)
	Theragra chalcogramma	Juvenile	972	48 - 125	71 (12)	26	1 - 14	5 (4)
	Theragra chalcogramma	Subadult	23	152 - 198	175 (14)	23	20 - 53	37 (9)
	Trichodon trichodon		2	215 - 229	222 (10)	2	130 - 156	143 (18)
	Zaprora silenus	Juvenile	60	65 - 172	128 (26)	60	2 - 80	33 (20)

Table 6. Length frequency distributions of juvenile walleye pollock fork lengths captured during the 2002 US BASIS survey using the *Northwest Explorer*, September-October. Length frequency distributions were not collected at trawl numbers 27 and 41.

Region:	Southern Bering Sea Shelf					Northern Bering Sea Shelf							
Habitat:	Middle	Outer				Inner		Middle				Outer	
Trawl:	27	24	25	28	44	38	39	35	36	40	42	29	34
45-50 (mm)	0	0	0	0	0	1	14	0	0	0	0	0	1
50-55 (mm)	0	0	0	0	0	19	46	0	0	8	0	0	1
55-60 (mm)	9	0	0	1	0	42	31	4	0	18	0	0	2
60-65 (mm)	17	0	0	8	0	36	10	23	23	21	0	0	3
65-70 (mm)	13	0	0	14	0	9	3	36	38	27	0	1	0
70-75 (mm)	27	0	0	45	0	3	0	21	27	24	11	0	2
75-80 (mm)	15	1	1	26	0	1	3	11	11	13	36	0	0
80-85 (mm)	16	2	14	12	0	0	0	1	3	2	48	0	4
85-90 (mm)	11	0	19	1	1	0	0	4	1	1	14	0	0
90-95 (mm)	13	0	10	0	1	0	0	3	0	0	3	0	0
95-100 (mm)	3	0	4	0	0	0	0	4	0	0	0	0	1
100-105 (mm)	1	0	0	0	2	0	0	0	0	0	0	0	0
105-110 (mm)	1	0	2	0	3	0	0	0	0	0	0	0	0
110-115 (mm)	0	0	0	0	3	0	0	0	0	0	0	0	0
115-120 (mm)	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	126	3	50	107	10	111	107	107	103	114	112	1	14

Table 7. Length frequency distributions of Atka mackerel fork lengths captured during the 2002 US BASIS survey using the *Northwest Explorer*, September-October.

Region:	Southern Bering Shelf		Northern Bering Shelf		Eastern Aleutian		Western Aleutian
Habitat:	Middle Shelf	Outer Shelf	Oceanic	Outer Shelf	Oceanic	Shelf	Oceanic
FL120-130 (mm)	0	0	0	0	0	0	11
FL130-140 (mm)	0	0	0	0	0	0	50
FL140-150 (mm)	0	0	0	3	3	0	118
FL150-160 (mm)	0	0	0	3	4	0	220
FL160-170 (mm)	0	1	4	16	27	2	79
FL170-180 (mm)	0	2	3	23	20	6	40
FL180-190 (mm)	1	1	2	28	20	11	16
FL190-200 (mm)	2	1	0	12	4	11	6
FL200-210 (mm)	0	0	0	13	1	9	3
FL210-220 (mm)	0	1	0	5	1	0	0
FL220-230 (mm)	0	0	0	2	0	0	0
Total:	3	6	9	105	80	39	543

Table 8. Age structure of immature chum and sockeye salmon captured during the 2002 US BASIS survey using the *Northwest Explorer*, September-October, 2002.

Species	Age	Leg 1	Leg 2	Total
Immature Chum	0.1	295 (25%)	65 (17%)	360 (23%)
	0.2	766 (66%)	234 (62%)	1000 (65%)
	0.3	91 (8%)	72 (19%)	163 (11%)
	0.4	5 (<1%)	8 (2%)	13 (1%)
		1157	379	1536
Immature Sockeye	1.1	71 (58%)	8 (62%)	79 (59%)
	1.2	33 (27%)	4 (31%)	37 (27%)
	2.1	13 (11%)	0	13 (10%)
	2.2	5 (4%)	1 (8%)	6 (4%)
		122	13	135

Table 9. Surface temperature and salinity during the 2002 US BASIS survey using the *Northwest Explorer*, September-October, 2002.

Region	Sea Surface Temperature		Sea Surface Salinity	
	Range (degrees C)	Mean (degrees C)	Range (PSU)	Mean (PSU)
Northern Bering	6.9 - 9.2	8.2	30.80 - 32.87	31.86
Southern Bering	8.4 - 9.6	9	32.16 - 33.04	32.59
Eastern Aleutian	6 - 9.9	8.6	31.65 - 33.28	32.84
Western Aleutian	6.9 - 10.1	9.7	32.22 - 33.37	32.95

Appendix—Rope trawl catches of pelagic nekton captured during the 2002 US BASIS survey using the *Northwest Explorer*, September-October, 2002.

Table 1. Salmon species captured during the 2002 BASIS survey by the *Northwest Explorer*, September-October, 2002.

Trawl Number	Juvenile						Immature			Mature
	Chum	Sockeye	Pink	Chinook	Coho	Steelhead	Chum	Sockeye	Chinook	Chum
1	0	0	0	0	0	0	51	10	2	0
2	0	0	0	0	0	0	46	8	0	0
3	0	0	0	0	0	0	201	75	0	1
4	0	0	0	0	0	0	28	3	1	1
5	0	0	0	0	0	0	27	1	3	2
6	0	0	0	0	0	0	65	4	15	1
7	0	0	0	0	0	0	3	1	1	0
8	0	0	0	0	0	0	26	0	0	0
9	0	0	0	0	0	0	47	0	2	2
10	0	0	0	0	0	0	12	0	2	0
11	0	0	0	0	0	0	41	0	4	0
12	0	0	0	0	0	0	10	0	0	0
13	0	0	0	0	0	0	62	5	1	0
14	0	0	0	0	0	0	30	11	1	1
15	0	0	0	0	0	0	140	1	2	3
16	0	0	0	0	0	0	167	2	1	2
17	0	0	0	0	0	0	144	3	3	1
18	0	0	0	0	0	0	13	0	4	1
19	0	0	0	0	0	0	54	0	0	0
20	0	0	0	0	0	0	18	26	0	0
21	0	0	0	0	1	0	7	4	0	0
22	0	0	0	0	0	1	16	4	0	0
23	0	0	0	0	0	0	149	8	0	0
24		1	9	0	0	0	49	1	3	0
25	0	0	0	0	0	0	40	0	0	0
26	0	0	0	0	0	0	6	1	3	0
27	0	0	0	0	0	0	0	0	0	0
28	0	0	0	0	0	0	5	0	1	0
29	0	0	0	0	0	0	9	1	8	0
30	0	0	0	0	0	0	1	0	0	0
31	0	0	3	0	0	0	1	0	0	0
32	0	0	0	0	0	0	85	1	0	1
33	0	0	0	1	0	0	5	0	1	0
34	1	0	1	0	0	0	31	1	0	0
35	2	0	2	2	0	0	1	0	2	0
36	0	0	0	6	0	0	0	0	4	0
37	154	0	10	12	0	0	0	0	0	0
38	43	0	15	2	0	0	0	0	1	1
39	0	0	0	2	0	0	0	0	0	0
40	12	0	8	2	0	0	0	1	2	1
41	3	0	1	5	0	0	0	0	1	0
42	0	0	1	0	0	0	0	0	1	0
43	0	0	0	0	0	0	0	0	2	0
44	0	117	5	0	10	0	13	0	2	0
Total	215	118	55	32	11	1	1,603	172	73	18

Table 2. Groundfish species captured during the 2002 US BASIS survey using the *Northwest Explorer*, September-October, 2002.

	Juvenile						Subadult	Adult	
Trawl Number	*Theragra chalco-gramma*	*Pleuro-grammus mono-pterygius*	*Sebastes alutus*	*Anoplo-poma fimbria*	*Zaprora silenus*	*Sebastes* sp.	*Theragra chalco-gramma*	*Theragra chalco-gramma*	*Pleuro-grammus mono-pterygius*
1	0	1	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	304
3	0	2	0	0	0	0	0	0	0
4	0	325	0	0	0	0	0	0	3
5	0	22	0	0	0	0	0	0	6
6	0	272	0	0	0	0	0	0	2
7	0	54	0	0	0	0	0	0	4
8	0	809	0	0	0	0	0	0	119
9	0	2,280	0	0	0	0	0	0	0
10	0	6,961	0	0	1	0	0	0	0
11	0	948	0	0	0	2	0	0	0
12	0	1,193	0	0	0	0	0	0	0
13	0	650	0	0	0	0	0	0	0
14	0	1,933	0	0	0	17	0	0	0
15	0	570	0	0	0	0	0	0	0
16	0	4,691	0	0	0	0	0	0	12
17	0	1,119	0	0	1	0	0	0	3
18	0	1,817	0	0	0	0	0	0	0
19	0	539	0	0	1	0	0	0	4
20	0	0	0	0	0	0	0	0	0
21	0	12	0	0	0	0	0	2	4
22	0	0	0	0	0	0	0	0	0
23	0	435	0	0	0	0	0	1	0
24	3	1	0	0	2	3	0	0	0
25	18,938	0	0	0	9	0	0	0	0
26	0	2	0	0	0	0	0	0	0
27	163,438	0	0	0	30	0	0	2	0
28	1,086	3	0	177	6	1	0	0	0
29	1	9	0	0	2	1	0	0	0
30	0	42	5,955	0	5	0	1	0	0
31	0	29	6,180	0	0	0	0	0	0
32	0	5	0	0	4	0	0	0	0
33	0	50	361	0	0	0	0	0	0
34	14	6	522	0	1	0	0	0	0
35	16,630	0	0	0	0	0	0	547	0
36	13,184	0	0	0	0	0	0	0	0
37	1,944	0	0	0	0	0	1	4	0
38	4,683	0	0	0	0	0	1	3	0
39	2,819	0	0	0	0	0	53	49	0
40	15,166	0	0	0	0	0	0	13	0
41	5,889	0	0	0	0	0	0	6	0
42	5,341	0	0	0	0	0	6	2	0
43	0	0	0	0	0	0	1	2	0
44	10	3	0	0	1	0	0	1	0
Total	249,146	24,783	13,018	177	63	24	63	632	461

Table 3. Forage fish species captured during the 2002 US BASIS survey using the *Northwest Explorer*, September-October, 2002.

	Forage Fish Species			Squid species				Mesopelagic Species		
Trawl Number	*Mallotus villosus (adult)*	*Clupea pallasi*	*Mallotus villosus (juvenile)*	*Gonatopsis borealis*	*Berryteuthis anonychus (juvenile)*	*Gonatus kamtchaticus*	*Onychoteuthis borealijaponicus*	*Stenobrachius leucopsarus*	*Diaphus theta*	*Leuroglossus schmidti*
1	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0
3	0	0	0	7	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	6	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0
10	0	0	0	2	0	24	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	24	0	0	0	0
16	0	0	0	6	0	13	1	12	4	0
17	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	11	0	0	0	0
19	0	0	0	642	0	0	0	2	0	2
20	0	0	0	0	67	3	0	0	0	0
21	0	0	0	0	0	0	0	0	0	0
22	0	0	0	0	0	0	0	0	0	0
23	0	0	0	0	18	0	0	0	0	0
24	0	0	0	0	132	3	0	0	0	0
25	0	0	0	0	0	1	0	0	0	0
26	0	0	0	0	26	2	0	0	0	0
27	5	0	0	0	0	0	0	0	0	0
28	0	0	0	0	0	0	0	0	0	0
29	0	0	0	0	0	15	0	0	0	0
30	0	4	0	0	0	0	0	0	0	0
31	0	0	0	0	0	0	0	0	0	0
32	0	0	0	0	0	1	0	0	0	0
33	0	1	0	0	0	0	0	0	0	0
34	0	0	0	0	0	0	0	0	0	0
35	99	20	0	0	0	0	0	0	0	0
36	229	81	0	0	0	0	0	0	0	0
37	60	46	0	0	0	0	0	0	0	0
38	53	74	0	0	0	0	0	0	0	0
39	10	281	0	0	0	0	0	0	0	0
40	9	129	0	0	0	0	0	0	0	0
41	232	965	0	0	0	0	0	0	0	0
42	111	0	0	0	0	0	0	0	0	0
43	2,503	1	5	0	0	0	0	0	0	0
44	0	4	0	0	0	0	0	0	0	0
Total	3,311	1,606	5	657	243	103	1	14	4	2

Table 4. Misc. pelagic fish species captured during the 2002 US BASIS survey using the *Northwest Explorer*, September-October, 2002.

Trawl Number	*Lethenteron camtschaticum*	*Lampetra tridentata*	*Anarhichas orientalis*	*Eumicro-tremus orbis*	*Blepsias bilobus*	*Trichodon trichodon*	*Aptocyclus ventricosus*	Pleuro-nectidae (larval)
1	0	0	0	0	0	0	0	0
2	0	0	0	2	0	0	1	0
3	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0
21	0	0	0	0	0	0	0	0
22	0	0	0	0	0	0	0	0
23	0	0	0	0	0	0	0	0
24	0	0	0	0	0	0	0	0
25	0	0	0	0	1	0	0	0
26	0	0	0	0	0	0	0	0
27	0	0	0	2	1	2	0	0
28	0	0	0	0	0	0	0	1
29	0	1	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0
31	0	2	0	0	1	0	0	0
32	0	0	0	0	0	0	0	0
33	0	3	0	0	0	0	0	0
34	0	0	0	0	0	0	0	0
35	0	2	0	0	0	0	0	0
36	1	0	0	0	0	0	0	0
37	6	0	0	0	0	0	0	0
38	11	0	0	0	0	0	0	0
39	1	0	0	0	0	0	0	0
40	0	0	3	0	0	0	0	0
41	3	0	0	0	0	0	0	0
42	1	0	0	0	0	0	0	0
43	18	0	1	0	0	0	0	0
44	0	0	0	0	0	0	0	0
Total	41	8	4	4	3	2	1	1