AGENDA D-1(d)
DECEMBER 2006

MEMORANDUM

TO: Council, SSC and AP Members

FROM: Chris Oliver
Executive Director

DATE: November 27, 2006

SUBJECT: Adak EFP

ESTIMATED TIME
8 HOURS
(all D-1 items)

ACTION REQUIRED

Request for Exempted Fishing Permit for Pollock Study in Adak Area

BACKGROUND

In February 2006, the Council recommended to NMFS that a request be approved for an Exempted Fishing Permit (EFP) to the Aleut Enterprise Corporation to allow trawling for pollock in certain areas of Steller sea lion critical habitat in the Aleutian Islands. The objective of that project, which was conducted in cooperation with the Alaska Fisheries Science Center (AFSC), was to test the feasibility of using commercial fishing vessels for acoustic surveys of pollock; those survey data would then be used to develop estimates of biomass in the areas surveyed. The project was completed last spring, and the AFSC has completed data analysis. Attached as Item D-1(d)(1) is a report on the 2006 project for the Council and public to review. Dr. Steve Barbeaux with the AFSC will present the study design and results and can answer questions about this project.

The Aleut Enterprise Corporation has applied for another EFP to continue testing this methodology in 2007 and the proposed project has received scientific review by the NMFS AFSC and an Environmental Assessment has been prepared (Item D-1(d)(2)). The application has been reviewed by the Alaska Region, Office of Protected Resources (PR). The consultation between Sustainable Fisheries (SF) and PR has been completed and a Biological Opinion has been issued (Item D-1(d)(3)). Dr. Barbeaux and representatives of the Aleut Enterprise Corporation will be here to review the 2006 study and to present to the Council the experimental design for the 2007 study and to answer questions. NMFS staff from SF and PR also will be available to answer questions.

Based on an inquiry from the Council about the use of hydroacoustics from private fishing vessels to survey fish populations in other areas, Dr. Bill Karp with the AFSC will provide the Council with a brief report. In 2004, the International Council for Exploration of the Sea (ICES) established a Study Group on the Collection of Acoustic Data from Fishing Vessels (SGAFV), chaired by Dr. Bill Karp; active membership of the group consisted of approximately 15 scientists from 10 nations. Over a three-year period, the group was directed to:

a) Review and evaluate recent and current research which involves collection of scientific acoustic data from commercial vessels.
b) Develop standardized methods and protocols for collection of acoustic data to address specific

ecosystem monitoring, stock assessment and management objectives including: acoustic system calibration and performance monitoring, characterization of radiated vessel noise, comparability of results, survey design, biological sampling, data interpretation and analysis, and data storage and management.

c) Prepare background material, guidelines, methods and protocols for publication in the Cooperative Research Report series.

The work of the study group is almost complete and a draft of the publication will be finished before the end of 2006. Dr. Karp will provide a brief summary of the scientific acoustic studies that have been carried out aboard commercial fishing vessels throughout the world, and of the recommendations that will be included in the final report.

# 2006 Aleutian Islands Cooperative Acoustic Survey Study

Steve Barbeaux
AFSC NMFS/NOAA
Seattle WA 98115

In March-April 2006 the Aleutian Islands Cooperative Acoustic Survey Study (AICASS) was conducted to assess the feasibility of using a small (< 35 m) commercial fishing vessel to estimate the abundance of walleye pollock (*Theragra chalcogramma*) in waters off the central Aleutian Islands. NMFS currently has limited resources to conduct acoustic surveys of pollock in the Aleutian Islands subarea. The acoustic and biological information from the study is being used to assess: 1) if it is feasible to conduct acoustic surveys in the Aleutian Islands using commercial fishing vessels, 2) if the data collected are of sufficient quality for management purposes, and 3) the extent that fine scale spatial and temporal management measures may be biologically reasonable. The project was envisioned as a first step in the development of a co-management/co-monitoring system that would involve the Aleut Corporation (the local Alaskan native corporation that has been allocated the pollock quota for this area), local fishermen, and NMFS. This could potentially lead to limited pollock harvests that explicitly accounts for the needs of Steller sea lion (*Eumetopias jubatus*) within critical habitat.

The project was conducted aboard the F/V Muir Milach, a 32 m stern trawler (Fig. 1), in three activity phases: (1) evaluating the commercial fishing vessel's appropriateness as an acoustic sampling platform; (2) opportunistically collecting acoustic data of pollock distribution around two sites, Kanaga Sound and Atka Island (Fig. 2) and (3) direct acoustic and biological data sampling at one of the study sites. To verify the acoustic data and to support the study, 1000 mt of walleye pollock was allocated to be harvested within an area that included waters within 20 nautical miles (nm) to 3 nm of Steller sea lion haulouts.

A SONAR-self noise test was conducted on 15 February 2006 to assess the noise characteristics of the vessel and determine the optimum vessel speed for conducting the survey. An engine speed of 1200 rpm was determined to be optimal for acoustic surveying resulting in a survey speed between 6 and 8 knots and a signal to noise ratio of at least 10:1 (Fig. 3). The acoustic system calibration followed standard sphere calibration protocols (Foote et al. 1987) and were conducted prior to and post study to ensure system reliability. Sphere calibration showed that the system was stable during the duration of the survey. These tests therefore allowed us to conclude that the acoustic data from the F/V Muir Milach were of sufficient quality for abundance estimation.

Opportunistic acoustic data were collected by the F/V Muir Milach within two proposed study sites during the Pacific cod (*Gadus macrocephalus*) fishing season in February 2006. In consultation with the fishing vessel captain and upon review of the opportunistic acoustic data, a survey area inside the Atka Island study site, east of North Cape, Atka Island and west of Kasatochi Island, was selected because the area had the highest observed densities of pollock and had less area closed to fishing due to proximity to Steller sea lion haulouts.

The primary factor thought to affect the ability to survey from small vessels in the Aleutian Islands in the winter months is the weather. Between 13 March and 6 April 2006 the winds were primarily

southerly, between 90° and 270°, and hourly average wind speed ranged from 0.5 kts to 20.9 kts with a median and mean of 5.9 kts and 6.9 kts respectively (Fig. 4). Between 13 March and 6 April the maximum daily wind gusts exceeded 30 kts for 19 of the 25 days and exceeded 50 kts for 9 of the 25 days. Surveying and commercial fishing were suspended from 16 March through 17 March due to high southeasterly winds with gusts exceeding 50 kts. Although other strong wind events occurred during the survey period, they did not affect the ability of the vessel to fish or conduct surveys.

Six acoustic surveys were successfully conducted between 14 March and 4 April 2006. The area from North Cape of Atka Island to Koniuji Island (~ 1 degree longitude) was surveyed three times while a smaller subset of this area was surveyed on three other occasions. The three larger surveys (180 $nm^2$ with transect spacing at 1.5 nm) were conducted in the beginning (Survey 2), middle (Survey 4), and end (Survey 8) of the study period. Survey 5 was conducted parallel to the shelf break and covered only 9 $nm^2$ (with transects spaced at 0.5 nm). This survey provided data useful for geostatistical analyses. Surveys 6 and 7 covered 72 $nm^2$ with 1.5 nm transect and occurred in the middle of the large survey area coincident with the highest density of pollock. All survey transects were designed to sample 5 nm offshore after the shelf break (181 m isobath) and 1 nm inshore from the shelf break. To reduce survey time, an adaptive strategy was implemented and transects were ended when it was determined that pollock sign was no longer encountered along a transect. Small trawl tows (< 10 mt) were conducted during the surveys to identify acoustic sign. Between survey periods the vessel was allowed to commercial fish until it reached capacity (~165 t). The catch was then delivered to the Adak Fisheries fish processing plant on Adak Island. Biological samples including length, weight, maturity, otoliths, and fin clips were collected from both the verification and commercial tows. Physical oceanographic data were also collected throughout the survey using a Sea-bird conductivity-temperature-depth (CTD ) system.

Between 14 March and 4 April 2006 six successful surveys were completed resulting in relatively precise estimates of biomass for the survey area over time. Survey 2, conducted 14-15 March, provided a biomass estimate for pollock of 8,910 t. The biomass estimate for subsequent surveys were lower (although not statistically significantly lower for Survey 4) and dropped significantly after Survey 4 to a low of 2,845 t for the final survey (Table 2, Fig. 5, Fig. 6, and Fig. 7)

The size of pollock captured in the verification and commercial trawls varied between 35 cm and 75 cm (Fig. 8) with a mean length of males at 56.9 cm and females at 58.5 cm. For all of the verification and commercial trawl hauls 55% of the pollock were female. Male pollock averaged 1.58 kg while females were somewhat larger, averaging 1.80 kg. The age data revealed that the age 6 and age 5 pollock (2000 and 1999 year classes) were the most abundant (Fig. 9).

In total, 965 t of fish were harvested during this study the majority of which (97% or 935 t) were harvested from the smaller area covered in Survey 6 and 7 (Fig. 10). Most (77%) of the harvest (745 t) occurred after Survey 4 (Day 9). The pollock biomass apparently declined by 68% in the large survey area during the three weeks of the study. In the smaller "fished" area, the decline was estimated at 90% (Fig 3). The "unfished" region showed no significant difference in biomass estimates between Surveys 2 and 8. Further analyses are needed to evaluate the cause the decline in the fished area. A conservative estimate on the change in biomass over the study period is about 4,000 t—much greater than the amount of pollock caught. A trend in the maturity data (Fig. 11) shows that the pollock began to show signs of active spawning only at the end of the study period. This could

indicate that fish were moving out of the area to spawn. This may account for some of the observed declines.

In short the 2006 AICASS was successful. In addition to achieving its scientific objectives, this project fostered an excellent working relationship between NMFS, the Aleut Enterprise Corporation, and the fishing industry. Local participation and stakeholder involvement enhances NMFS ability to provide responsible stewardship of this important marine resource. Future work should consider the expansion of this technique to survey more areas within the Aleutian Islands to determine the health and behavioral dynamics of this stock within Steller sea lion critical habitat.

## References

Foote, K.G., Knudsen, H.P., Vestnes, G. , MacLennan, D.N., and Simmonds, E.J. 1987. Calibration of acoustic instruments for fish density estimation: a practical guide. ICES Cooperative Research Reports, Int. Counc. Explor. Sea Coop. Res. Rep. No. 144, 69p.

Table 1: Summary of 2006 AICASS surveys.

| Survey | Dates | Survey Day | Spacing (nm) | Number of Transects | Survey Area ($nm^2$) |
|---|---|---|---|---|---|
| 2 | 14-15 Mar. | 1 | 1.5 | 18 | 180 |
| 4 | 23-24 Mar. | 9 | 1.5 | 18 | 180 |
| 5 | 24 Mar. | 10 | 0.5 | 7 | 9 |
| 6 | 28-29 Mar. | 14 | 1.0 | 12 | 72 |
| 7 | 1 Apr. | 19 | 1.0 | 12 | 72 |
| 8 | 3-4 Apr. | 21 | 1.5 | 18 | 180 |

Table 2: Abundance estimation for 2006 AICASS surveys.

| Survey | Area ($nm^2$) | Deadzone (Y/N) | Biomass (t) | Relative Precision ($E_i$) | High Biom. (t) | Low Biom. (t) | Density (t / $nm^2$) |
|---|---|---|---|---|---|---|---|
| 2 | 180 | N | 8233.8 | 8.67% | 9632.5 | 6835.1 | 45.7 |
| 2 | 180 | Y | 8809.9 | 8.04% | 10198.4 | 7421.4 | 48.9 |
| 2 | 72 | N | 6484.5 | 12.29% | 8046.1 | 4922.9 | 90.1 |
| 2 | 72 | Y | 6706.6 | 14.32% | 8589.2 | 4824.0 | 93.1 |
| 4 | 180 | N | 6600.4 | 7.96% | 7630.1 | 5570.7 | 36.7 |
| 4 | 180 | Y | 7980.2 | 7.87% | 9210.6 | 6749.8 | 44.3 |
| 4 | 72 | N | 5246.4 | 12.31% | 6512.6 | 3980.2 | 72.9 |
| 4 | 72 | Y | 6149.8 | 11.89% | 7582.5 | 4717.1 | 85.4 |
| 5 | 9 | N | 890.8 | 5.29% | 983.2 | 798.4 | 99.0 |
| 5 | 9 | Y | 1036.6 | 4.75% | 1133.1 | 940.1 | 115.2 |
| 6 | 72 | N | 3015.0 | 6.64% | 3407.4 | 2622.6 | 41.9 |
| 6 | 72 | Y | 3458.5 | 6.44% | 3894.9 | 3022.1 | 48.0 |
| 7 | 72 | N | 1159.0 | 6.83% | 1314.2 | 1003.8 | 16.1 |
| 7 | 72 | Y | 2179.7 | 5.05% | 2395.4 | 1964.0 | 30.3 |
| 8 | 180 | N | 2313.6 | 14.51% | 2971.6 | 1655.6 | 12.9 |
| 8 | 180 | Y | 2845.2 | 14.24% | 3639.0 | 2051.4 | 15.8 |
| 8 | 72 | N | 559.2 | 14.32% | 716.1 | 402.3 | 7.8 |
| 8 | 72 | Y | 677.0 | 12.96% | 848.9 | 505.1 | 9.4 |

# Figures

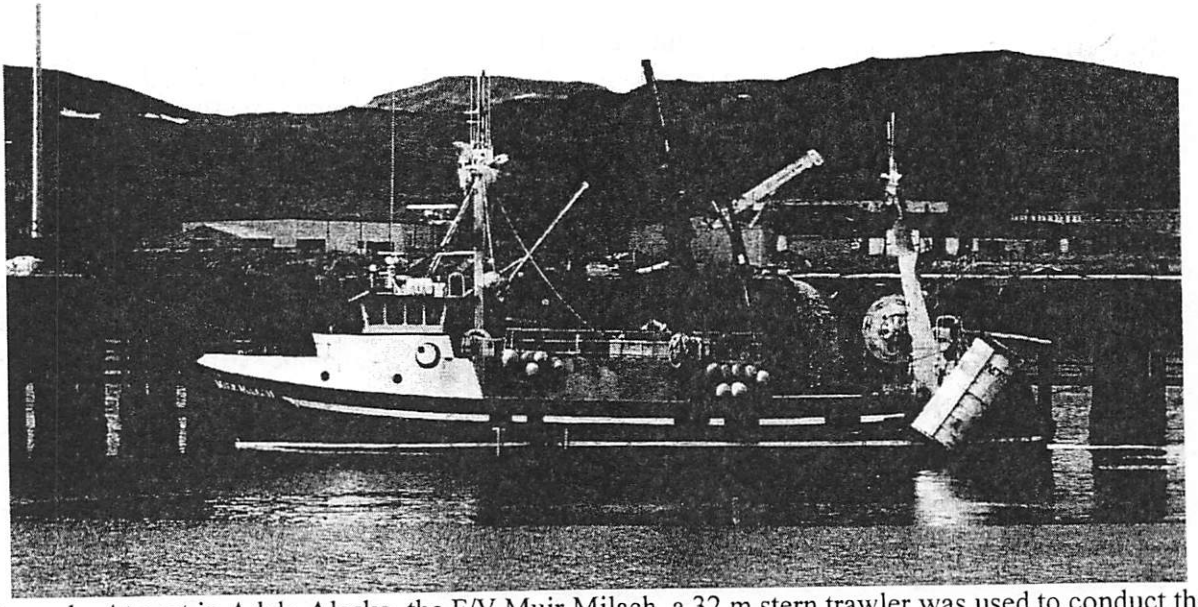


Figure 1: At port in Adak, Alaska, the F/V Muir Milach, a 32 m stern trawler was used to conduct the 2006 Aleutian Islands cooperative acoustic survey study.

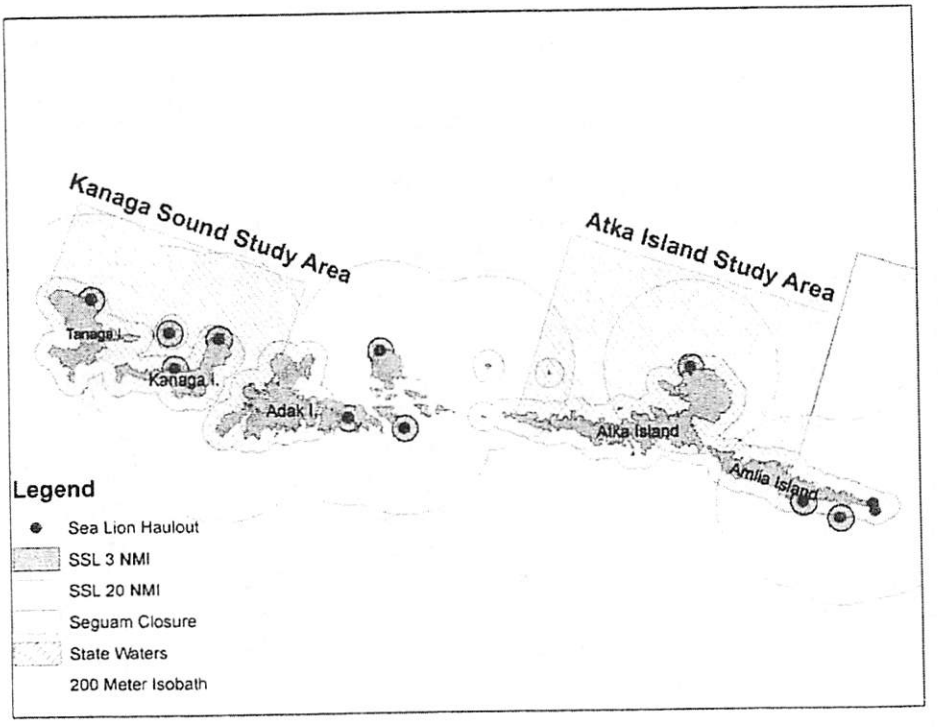



Figure 2: Proposed 2006 AICASS sites within the Central Aleutian Islands

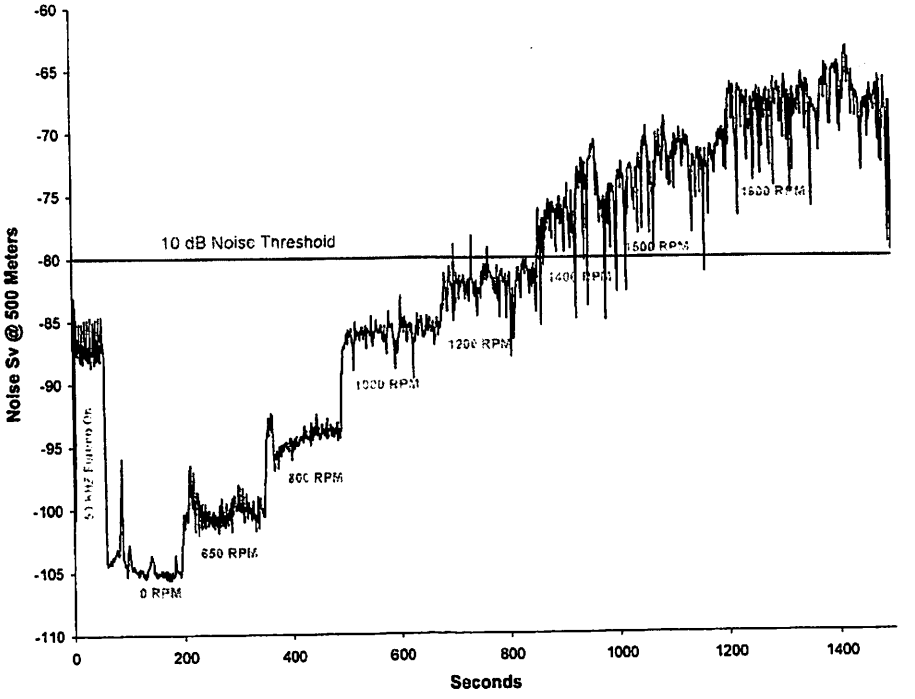



Figure 3: F/V Muir Milach 15 February 2006 Sonar-self noise test with -80dB threshold at different levels of engine RPM.

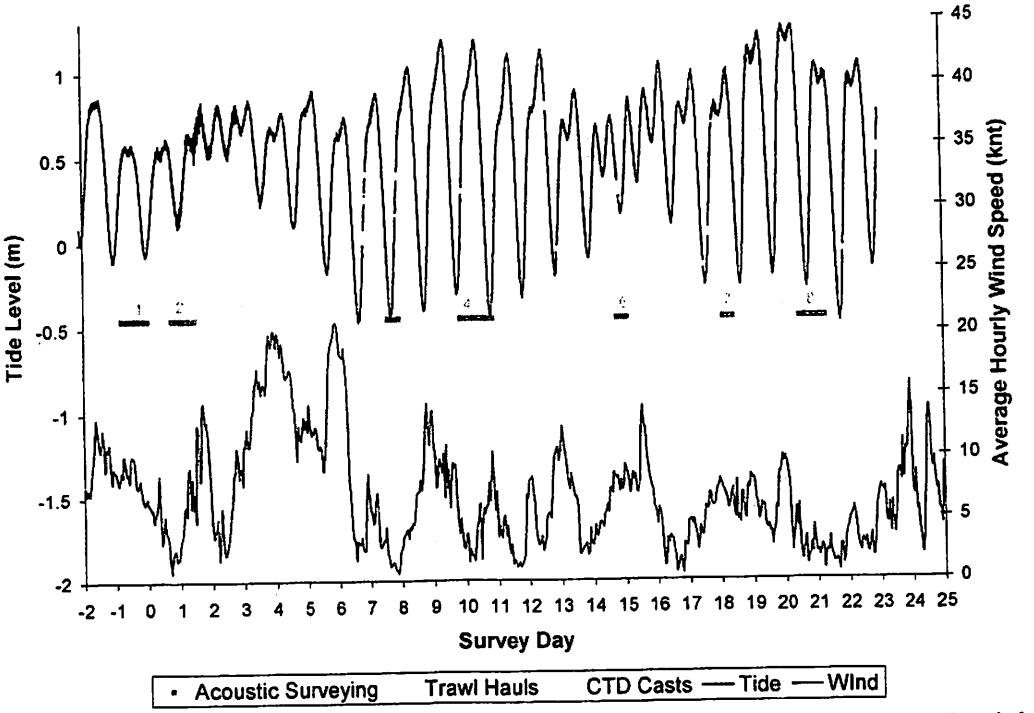
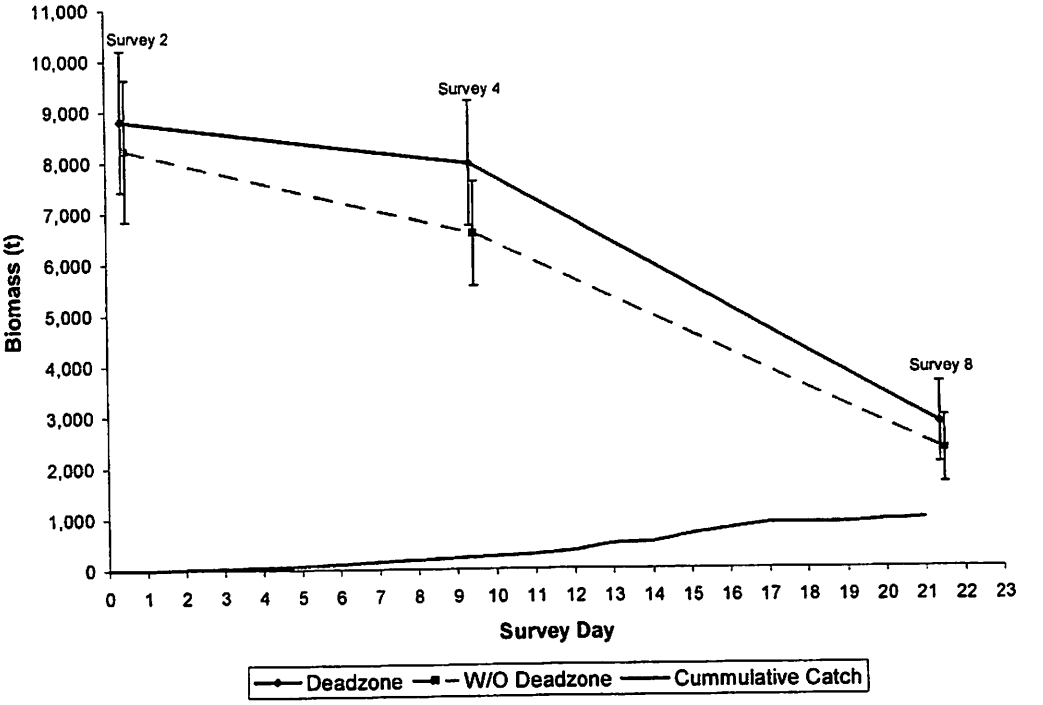



Figure 4: Weather and tide fluctuations relative to survey activities. Survey number is in pink. Wind speed and tide data from Adak, Alaska station ADKA2 – 9461380 (NOAA 2006).



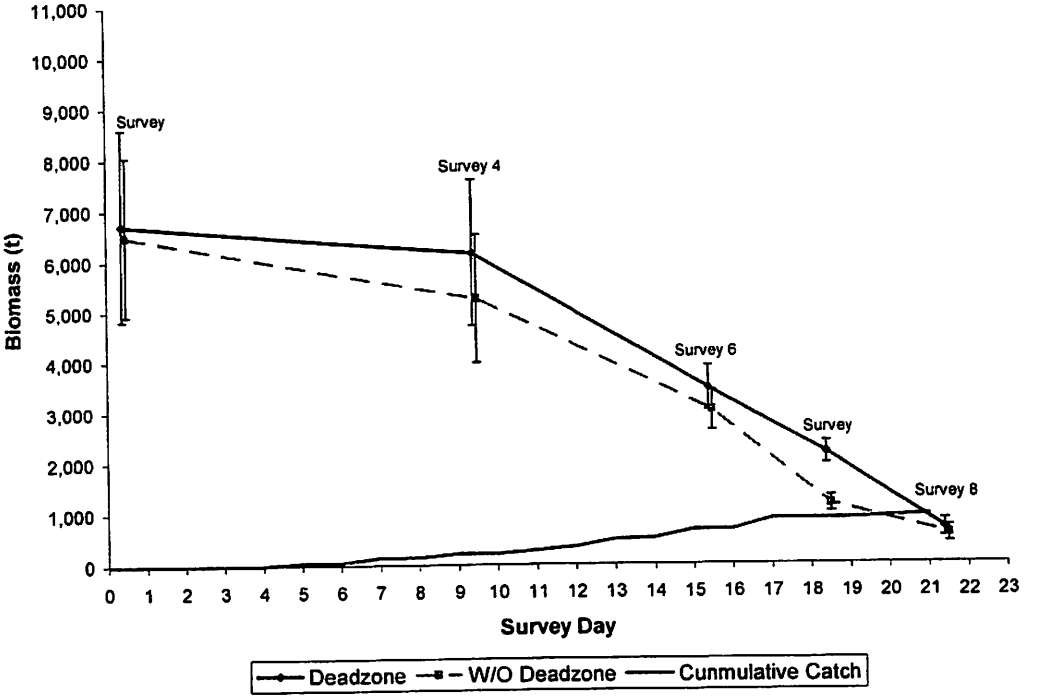




Figure 5: Pollock abundance estimation and cumulative catch for large (top) and small (bottom) survey areas. Note error bars are $\pm 1.96 \times E_i \times B_i$.

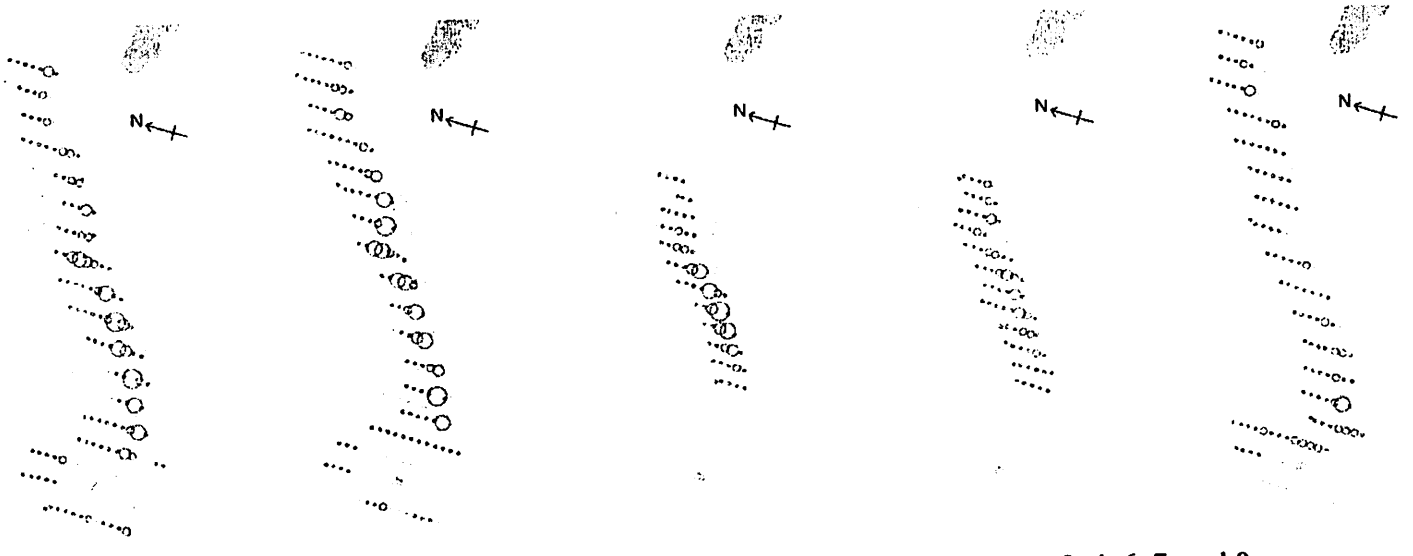



Figure 6: 2006 AICASS distributions of pollock. Figures from left to right correspond to Surveys 2, 4, 6, 7, and 8.

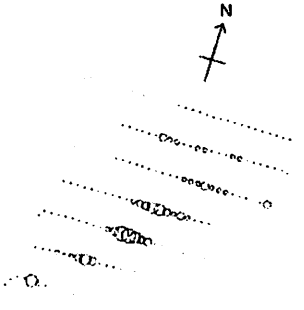



Figure 7: 2006 AICASS Survey 5 distribution of pollock. Please note that the axes of the map are different from Figure 6.

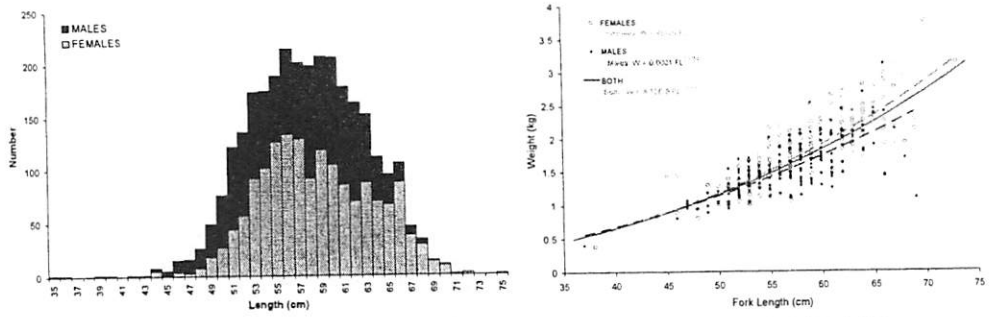



Figure 8: Pollock length frequency and weight at length from the 2006 AICASS.

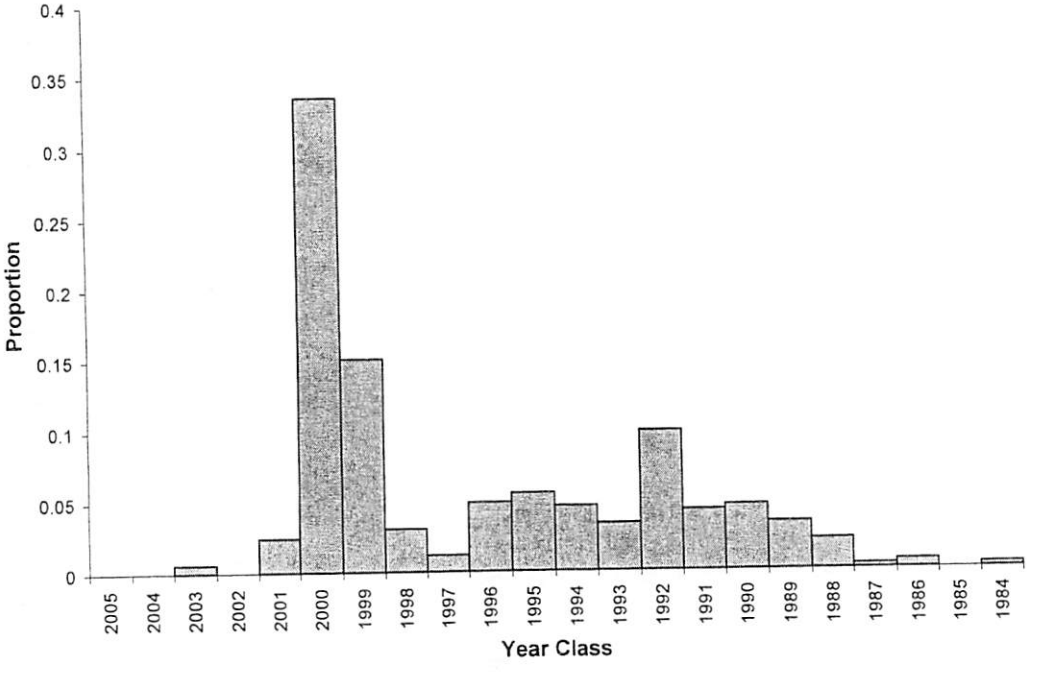



Figure 9: Age composition from the otolith data collected during the 2006 AICASS.

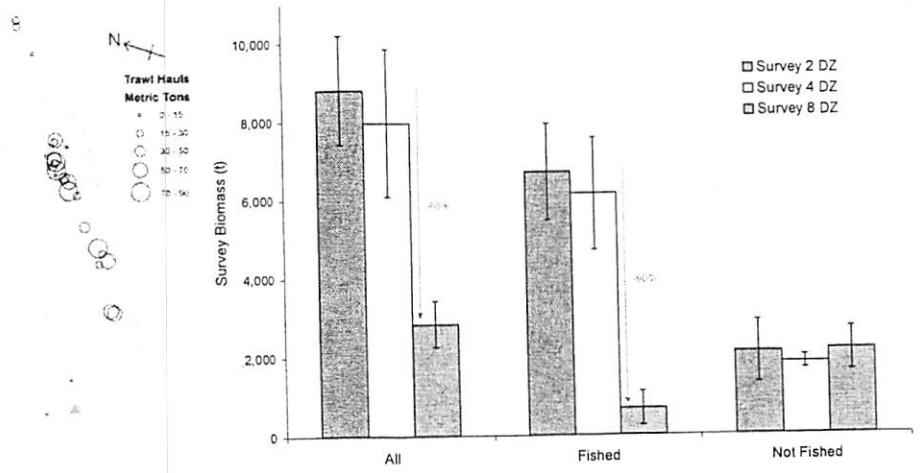
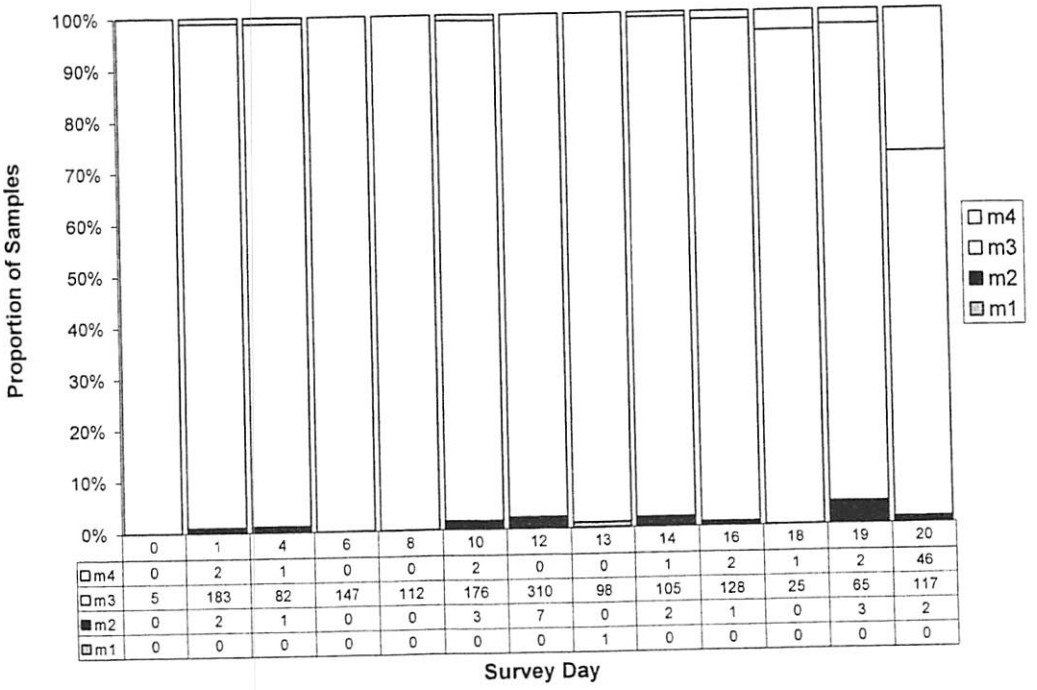



Figure 10: Trawl haul start locations (left) and pollock biomass estimates (right). The area encircled is the large survey area ("All") and the red lines are the small survey area ("Fished") and the orange lines are the "Not Fished region". The blue shaded regions are Steller sea lion critical habitat.




| | 0 | 1 | 4 | 6 | 8 | 10 | 12 | 13 | 14 | 16 | 18 | 19 | 20 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| m4 | 0 | 2 | 1 | 0 | 0 | 2 | 0 | 0 | 1 | 2 | 1 | 2 | 46 |
| m3 | 5 | 183 | 82 | 147 | 112 | 176 | 310 | 98 | 105 | 128 | 25 | 65 | 117 |
| m2 | 0 | 2 | 1 | 0 | 0 | 3 | 7 | 0 | 2 | 1 | 0 | 3 | 2 |
| m1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |

Figure 11: Female pollock maturity over the duration of the 2006 AICASS. Gonad stages are: M4-actively spawning, M3-prespawning, M2-developing, M1-immature. Note: no M5-spent fish were observed.

**UNITED STATES DEPARTMENT OF COMMERCE**
**National Oceanic and Atmospheric Administration**
*National Marine Fisheries Service*
*P.O. Box 21668*
*Juneau, Alaska 99802-1668*

AGENDA D-1(d)(2)
DECEMBER 2006

November 13, 2006



Stephanie Madsen, Chair
North Pacific Fishery Management Council
605 West 4th Avenue, Suite 306
Anchorage, Alaska 99501

Dear Ms. Madsen:

We have received an application from the Aleut Enterprise Corporation for an exempted fishing permit (EFP) to assess pollock abundance in a portion of the Aleutian Islands subarea and to test the feasibility of managing pollock harvest at a finer temporal and spatial resolution using near real-time acoustic surveying. The goal of the experiment is to improve utilization of the Aleutian Islands pollock resources. Issuance of EFPs is authorized by the Fishery Management Plan for Groundfish of the Bering Sea and Aleutian Islands Management Area and its implementing regulations at 50 CFR 679.6, Exempted Fisheries.

Under regulations at § 679.6, we have consulted with the Alaska Fisheries Science Center (AFSC), and have determined that the application contains all the information necessary to judge whether the proposal constitutes a valid fishing experiment appropriate for further consideration. We are initiating consultation with the North Pacific Fishery Management Council (Council) by forwarding the application, as required by 50 CFR 600.745(b)(3)(i). We are also providing the draft environmental assessment (EA) for the Council's consideration. The description of the project in the EA is revised from the application description based on consultation with the AFSC. This project would be conducted in cooperation with the AFSC. We understand that you have tentatively scheduled Council review of the proposed project at the Council's December 2006 meeting in anticipation of our review and determination that the application warrants further consideration and consultation with the Council.

Please notify Ms. Sandra Moller of the Aleut Enterprise Corporation of your receipt of the application and invite her to appear before the Council in December in support of the application, if she desires. An AFSC stock assessment scientist also will be available at the December Council meeting to present the EA. We will publish a notice of receipt of the application in the Federal Register with a brief description of the proposal. Enclosed are copies of the application, EA, and the AFSC's memorandum of approval of the experimental design.

Sincerely,

Robert D. Mecum
Acting Administrator, Alaska Region

Enclosures

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE

Alaska Fisheries Science Center
7600 Sand Point Way N.E.
Bldg. 4, F/AKC
Seattle, Washington 98115-0070

NOV 7 2006

MEMORANDUM FOR: Robert D. Mecum
Acting Regional Administrator, Alaska Region

FROM: Douglas P. DeMaster
Science and Research Director, Alaska Region

SUBJECT: Application for an Exempted Fishing Permit from the Aleut Enterprise Corporation

AFSC staff has reviewed the attached Exempted Fishing Permit (EFP) application from the Aleut Enterprise Corporation (AEC). This EFP request represents an extension of the work begun in February 2006 under EFP. We recommend approval of this application. This recommendation is made with the understanding that this proposal is for winter 2007. If the project becomes a multi-year effort, we would expect to be given the opportunity to review a report of the 2007 findings along with a revised survey plan for the future years.

cc: F/AKC1 – S. Barbeaux
F/AKR - J. Anderson

# Experimental Fishing Permit Application
# 2007 Aleutian Islands Cooperative Acoustic Survey Study

**1. Application Date**

August 30th 2006

**2. Applicant**

Aleut Enterprise Corporation
Attention: Sandra Moller
840 K Street Suite 202
Anchorage Alaska 99501
907-526-5444

**3. Purpose and Goal**

***Background***

Prior to passage of the Magnuson Fishery Conservation and Management Act of 1976 (MFCMA), the Bering Sea/Aleutian Island (BSAI) Pollock (*Theragra chalcogramma*) fishery was prosecuted primarily by foreign fleets (Japan, USSR, and Korea). The MFCMA established the 200-mile Exclusive Economic Zone and gave management control of the BSAI Pollock fishery to the newly created the North Pacific Fishery Management Council (NPFMC). A BSAI Groundfish Fishery Management Plan (FMP) was developed by the NPFMC to provide a framework for developing specific regulations for the AI Pollock fishery (NPFMC 2005). Joint ventures (American catcher vessels delivering fish to foreign at-sea processors) operated during the 1980s, but were phased out by the domestic fleet by 1991. During the 1990's Aleutian Island Pollock harvests ranged from 23,822 mt in 1998 to 99,604 mt in 1991.

In 1990 Stellar sea lions (*Eumetopias jubatus*) were listed as "threatened" under the Endangered Species Act (ESA). Directed Pollock fishing in the Aleutian Islands was closed beginning in 1999, in part due to concerns about Steller sea lions. In 2001 the NMFS Office of Protected Resources and the Alaska Regional Office of NMFS worked through the Reasonable and Prudent Alternative (RPA) committee and the NPFMC to develop conservation measures which focused on the removal of spatial overlap between Stellar sea lions and the fisheries in order to relax some of the more financially disruptive aspects of the RPA from the BSAI FMP biological opinion (such as critical habitat catch limits). However, no allowance was made for pollock fishing inside critical habitat in the Aleutian Islands.

Under Steller sea lion mitigation measure adopted by the NPFMC in 2001, NMFS reopened pollock fishing restricted to those areas outside critical habitat (generally as 20 miles from rookeries and haulouts listed in table 4 of CFR 679.50) beginning in 2003. The June 2003 supplement to the 2001 biological opinion describes experiments on fisheries effects on prey availability for Steller sea lions (pg. 30 & 31) and the need for further studies to determine whether commercial fishing activities impact the prey availability of pollock to Steller sea lions (NMFS 2003).

Section 803(a-d) of PL 108-199 allocated the directed pollock fishery in the Aleutian Islands to the Aleut Corporation. The allocation was implemented under Amendment 82 to the BSAI FMP by the

NPFMC, and became effective in 2005. Until the regulations implementing the Aleut Corporation allocation were in effect in 2005, NPFMC recommended pollock Total Allowable Catches (TACs) that were insufficient to support a directed fishery. Beginning in 2005 the Aleutian Island pollock TAC was set at 19,400 metric tons, however directed pollock harvests in 2005 were less than 200 metric tons.

In February-April 2006 the Aleutian Islands Cooperative Acoustic Survey Study (AICASS) was conducted to assess the feasibility of using a small (< 35 m) commercial fishing vessel to estimate the abundance of pollock in waters off the central Aleutian Islands. The acoustic and biological information from the study were used to assess: 1) if it is feasible to conduct acoustic surveys in the Aleutian Islands using commercial fishing vessels, 2) if the data collected are of sufficient quality for management purposes, and 3) the extent that fine scale spatial and temporal management measures may be biologically reasonable. The project was envisioned as a first step in the development of a co-management/co-monitoring system that would involve the Aleut Corporation, local fishermen, and NMFS. The 2006 AICASS was highly successful. In addition to achieving its scientific objectives, this project fostered an excellent working relationship between NMFS, the Aleut Enterprise Corporation, and the fishing industry. Local participation and stakeholder involvement enhances NMFS ability to provide responsible stewardship of this important marine resource. Future work should consider the expansion of this technique to survey more areas within the Aleutian Islands to determine the health and behavioral dynamics of this stock within Steller sea lion critical habitat.

***Goals***

The primary objectives of this Exempted Fishing Permit (EFP) is to assess pollock abundance and temporal stability in the Central Aleutian Islands and secondarily to evaluate the feasibility of managing an Aleutian Islands pollock fishery at a finer temporal and spatial resolution using near real-time acoustic surveying. To accomplish these objectives two acoustic surveys with 2.5 nm spacing will be conducted, surveying the area between 173°W longitude to 179°W longitude on the north side of the Aleutian Island archipelago. Verification tows will be conducted during the surveys to determine the species composition and biological attributes of the observed acoustic sign. Verification tows will be limited to less than 10t and to no more than 30 tows per survey. All verification catch will be accounted for by either weighing at sea or volumetric assessment and discarded at sea. The study area will be divided into five one-degree pollock fishing areas. Between the two surveys commercial fishing vessels will be allowed to remove (AR) up to a maximum of $AR = \left[\sum (N_A W_{A+1})\right]\left(\frac{A_{07}}{A_{06}}\right)(1-M)(0.75M)$ of groundfish from the survey area, removals are not to exceed 1000t from any two adjacent 1 degree longitude blocks. $N_A$ is the numbers at age from the final 2006 survey, $W_{A+1}$ is the calculated weight-at-age from the 2006 survey, M is the natural mortality, A is the survey area. All commercial hauls will be sampled by NMFS certified observers on board the vessels and all catch will be delivered to Adak Fisheries LLC. in Adak, Alaska.

Using fishing vessels to collect scientific data for management purposes is a growing trend worldwide (Dorn et al. 2002, O'Driscoll and Macaulay 2005, Stanley et al. 2000). For the foreseeable future NMFS does not have sufficient resources to survey Aleutian Island Pollock stocks, and using fishing vessels to conduct surveys may be a viable alternative. Hence, this EFP is the next step in a more far-reaching goal of creating a cooperative system for managing fisheries within Steller sea lion critical habitat at finer temporal and spatial scales. Our long-term vision is that one or more commercial fishing vessels conducts hydroacoustic surveys in specific areas of Steller sea lion critical habitat prior to commercial fishing beginning in these areas. Data from the surveys will be relayed to NMFS personnel at the Alaska Fishery Science Center (or an agreed upon third party contractor), and NMFS

personnel (or an agreed upon third party contractor) will estimate a biomass for the specific area. These biomass estimates will then be used by the NMFS Regional Office to set a quota for the area surveyed.

Implied within our primary objective are the following sub-objectives:

- Collect calibrated hydroacoustic data to determine pollock stock distribution and movement within the study area before and after the commercial fishery.
- Collect calibrated hydroacoustic data to estimate pollock biomass.
- Collect fin clips to complement and enhance ongoing genetic analyses of pollock stock structure (i.e., for comparison with other stocks).

Note that this EFP is designed to be a cooperative study with fishing vessels collecting the data and all data analysis being performed by NMFS or other researchers.

**4. Technical Details**

***Harvest Amounts***

A maximum $AR = \left[\sum (N_A W_{A+1})\right]\left(\frac{A_{07}}{A_{06}}\right)(1-M)(0.75M)$ of groundfish will be harvested under this EFP, removals are not to exceed 1000t from any two adjacent 1 degree longitude blocks. $N_A$ is the numbers at age from the final 2006 survey, $W_{A+1}$ is the calculated weight-at-age from the 2006 survey, M is the natural mortality, A is the survey area.

Commercial and survey trawl tows under the EFP may be conducted inside Steller Sea Lion Critical Habitat, however commercial trawl tows will not be conducted within 3NM of designated Sea Lion haulout or rookery protected areas.

Beyond incidental catch normally associated with the pelagic pollock fishery in the Aleutian Islands, no other species will be harvested besides pollock. Any salmon bycatch will be accounted against the Prohibited Species Catch cap for the Aleutian Island Pollock fishery. Any incidental catch of non-pollock species will be accounted against the Optimum Yield. All commercial catch will be retained for secondary sampling at the processing plant.

***Timing***

Phase one of the experiment will be conducted during the month of February during the Pacific cod (*Gadus macrocephalus*) fishery, and will consist of the Sonar self-noise tests and opportunistic collection of hydroacoustic data. The first survey will commence upon the closure of the catcher vessel cod trawl fishery (expected to occur in late February) and will take 5-9 days. The commercial fishery will open at the completion of the first survey and inter-ship comparison. The duration of the fishery will depend on the number of participants, but is not expected to take more than two weeks. Following the fishery a second acoustic survey will be conducted taking an additional 5-9 days. The study should be concluded by 7 April 2007.

***Study Site***

The study area is the region between 173°W longitude to 178°W longitude on the north side of the Aleutian Island archipelago and will be divided into five one-degree pollock fishing areas (PFA). The area lies between Seguam Island in the east and the Delaroff Islands in the west and is considered to encompass the possible fishing range of catcher vessels delivering pollock to Adak Island.

*Vessel and Gear*

The vessels will be selected from trawl catcher vessels that participate in the AI cod fishery delivering to Adak during the 2007 cod season. The vessels will be equipped with Simrad ES60 echosounders with 38kHz split beam transducers, be equipped for pelagic pollock fishing, and be on the NMFS approved list of vessels eligible to fish the Aleut Corporation pollock allocation. The vessel will have accommodations for a NMFS scientist or survey technician, and provide a sheltered work area for sampling.

The echosounders will be sphere calibrated by NMFS staff prior to and after the formal surveys in Scabbard Bay of Adak Island.

Fishing gear will be pelagic Pollock trawls, appropriate to the vessel's horsepower equipped with 3/8" knotless net liners.

***Experimental Design***

See attached Cruise Plan.

***Public Information***

All data from this experimental fishery will be made available to the public, including the catch and position data.

**5. Observers**

A NMFS staff scientist will be onboard one of the survey vessels during the survey periods. All commercial fishing operations will be observed by a NMFS certified observer with prior experience onboard catcher vessel trawlers. An acoustic technician and NMFS certified observer will direct survey and sampling onboard the second survey vessel. The acoustics technician will be approved by the NMFS lead scientist, the technician will have experience conducting and processing echo-integration trawl surveys using Simrad EX echosounders.

**6. Principal and coordinating parties**

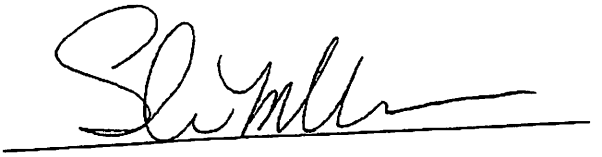
The principal and coordinating parties are the following:

- Aleut Enterprise Corporation – Sandra Moller
- Catcher vessel - managers and captains (to be determined)
- NMFS AFSC Scientific Staff – Steve Barbeaux

**7. Vessel Information**

The following vessel information will be determined once the vessels are selected.
*Vessel Name.*
*Vessel Owner.*
*Vessel Skipper.*
*USCG Documentation Number.*
*Home Port.*
*Vessel Length.*
*Net Tonnage.*
*Gross Tonnage.*

**8. Applicant Signature**



Sandra Moller, AEC

**9. Additional Information**

See the EA and Biological Opinion for 2006 AICASS EFP, see also the report on the 2006 EFP.

**10. References**

Coombs, R.F. and P.L. Cordue. 1995. Evolution of a stock assessment tool: acoustic surveys of spawning hoki (*Macruronus novaezelandiae*) off the west coast of South Island, New Zealand, 1985-91. New Zealand Journal of Marine and Freshwater Research, 1995: Vol. 29: 175-194.

Dorn, M.W., W.A. Karp, V.G. Wespestad, J. Ianelli, and T.J. Quinn II. 2002. Using fishing vessels to collect acoustic data for scientific purposes: preliminary results from midwater trawlers in the eastern Bering Sea walleye Pollock fishery.

Foote, K.G., H.P. Knudsen, G. Vestness, D.N. MacLennan, and E.J. Simmonds. 1987. Calibration of acoustic instruments for fish-density estimation: a practical guide. ICES Cooperative Research Report No. 144, 57 pp.

Jolly, G.M. and I Hampton. 1990. A stratified, random-transect design for acoustic surveys of fish stocks. Canadian Journal of Fisheries and Aquatic Sciences, 47: 1282-1291.

Milton, R.V. 1995. Underwater noise of research vessels: review and recommendations. ICES Cooperative Research Report No. 209. 61 pp.

NPFMC. 2005. Fishery Management Plan for groundfish of the Bering Sea/Aleutian Island management area.

NMFS. 2003. Supplement to the Endangered Species Act – Section 7 Consultation Biological Opinion and Incidental Take Statement of October 2001.

Nishimura, A., T. Yanagimoto, and Y. Takao. 2002. Cruise results of the winter 2002 Bering Sea Pollock survey (Kaiyo Maru). Document for the 2002 STC meeting, Central Bering Sea Pollock Convention, September 2002.

O'Driscoll, R.L. and G.J. Macaulay. 2005. Using fish-processing time to carry out acoustic surveys from commercial vessels. ICES Journal of Marine Sciences, 62: 295-305.

Stanley, R.D., R. Kieser, K. Cooke, A.M. Surry, and B. Mose. 2000. Estimation of a widow rockfish (*Sebastes entomelas*) shoal off British Columbia, Canada as a joint exercise between stock-assessment staff and the fishing industry. ICES Journal of Marine Science, 57: 1035-1049.

Stanton, T.K. 1982. Effects of transducer motion on echo-integration techniques. Journal of the Acoustical Society of America, 72: 947-949.

# DRAFT ENVIRONMENTAL ASSESSMENT
## for the Issuance of an Exempted Fishing Permit for Using Commercial Pollock Fishing Vessels for Acoustic Surveys within Portions of Steller Sea Lion Protection Areas in the Aleutian Islands Subarea

November 2006


**Lead Agency**: National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Alaska Regional Office
Juneau, Alaska

**Responsible Official**: Robert D. Mecum
Acting Administrator
Alaska Regional Office

**For Further Information**: Melanie Brown
National Marine Fisheries Service
P.O. Box 21668
Juneau, AK 99802
(907) 586-7228



**Abstract**: This document is an Environmental Assessment (EA) of the potential impacts of issuing an exempted fishing permit (EFP) to allow pollock fishing vessels to conduct acoustic surveys and limited pollock harvest within selected areas of Steller sea lion protection areas in the Aleutian Islands subarea. The purpose of the EFP is to assess pollock abundance in a portion of the Aleutian Islands and to test the technical feasibility of setting quotas for pollock at a finer temporal and spatial resolution using near real-time acoustic surveying. Exemption from certain pollock fishing closure areas within Steller sea lion protection areas in the Aleutian Islands subarea would be necessary to ensure sufficient quantities of pollock are encountered to conduct the test and to compensate the study participant. The project is intended to improve the Aleutian Islands pollock stock assessment, conservation, and management. The analysis found no significant impacts on the human environment for this action.


**Public Comments Due: December 12, 2006**

(This page is blank)

## Table of Contents

## List of Figures and Tables

## Executive Summary

The exempted fishing permit (EFP) would support a project to assess the abundance and distribution of Alaska pollock (*Theragra chalcogramma*) in portions of the Aleutian Islands (Areas 541 and 542) susceptible to an Adak-based small boat fishery and to test the technical feasibility of setting pollock quotas at a finer temporal and spatial resolution using near real-time acoustic surveying. The data collected may improve the information available for stock assessments and thereby improve pollock harvest management.

The project would be conducted between 173° W and 179° W longitude. The selected study area would be used for acoustic surveys, fishing to verify survey data, and commercial fishing to compensate for survey expenses and collect additional biological data. The areas identified include waters within Steller sea lion protection areas. The EFP would permit vessels to harvest the verification and compensation fish (mostly pollock) over approximately six weeks in February through April. All pollock harvested will be counted against the Aleut Corporation's allocation for the directed pollock fishery in the Aleutian Islands. The allowable harvest level will be determined by the final size of the survey area (see attachment), but would not exceed 3,000 metric tons (mt) minus any fish taken in a state-managed Aleutian Islands pollock fishery prior to or during the study. Harvests also would not exceed 1,000 mt in any one degree longitude block, and commercial fishing would be limited to one vessel greater than 60 feet length overall (LOA) within a one degree block at any given time.

The EFP is necessary to allow the applicant to harvest pollock in Steller sea lion protection areas that are currently closed to pollock fishing. Two alternatives were analyzed in this EA. Alternative 1 is status quo with no permit issued. Alternative 2 would issue the permit. The environmental effects of Alternative 2 are limited to marine mammals and prohibited species components. No significant effects were identified. Even though no significant effects under this EA were identified for Steller sea lions, adverse effects are likely, and therefore, an Endangered Species Act Section 7 consultation must be completed before the EFP may be issued. The primary socioeconomic effects of Alternative 2 would be potential future improved pollock harvests through more accurate information on the status of pollock stocks. The State of Alaska has authorized a pollock fishery in nearly the same areas as described in the EFP, contingent on the EFP not being issued for 3,000 mt of harvest. The Sate action may cause cumulative effects beyond those already considered in previous National Environmental Policy Act analyses for the groundfish fisheries, but these effects are not expected to be cumulatively significant.

### Comparison of Alternatives and Selection of a Preferred Alternative

Alternative 2 had no significant impacts identified. Alternative 1 had no additional environmental impacts beyond those already identified in previous analyses, except for the potential impact of the State waters pollock fishery on Steller sea lions. Additionally, Alternative 1 would not provide improved information for pollock stock assessments and potential improvement of pollock harvest management. Alternative 1 also would likely result in a State 3,000 mt pollock fishery prosecuted during the A season in the Aleutian Islands and inside Steller sea lion protection areas. Alternative 2 is the preferred alternative, because it has

no significant adverse impacts identified, would likely result in fewer impacts on Steller sea lions, and may improve future management of pollock resources in the Aleutian Islands.

# 1.0 Introduction

## 1.1 Background

The U.S. Congress, in Section 803 of the Consolidated Appropriations Act of 2004 (CAA, HR 2673), Public Law 108-199, required that future directed fishing allowances of pollock in the Aleutian Islands subarea be allocated to the Aleut Corporation. Only fishing vessels approved by the Aleut Corporation or its agents are allowed to harvest this allowance. To harvest the fish, the Aleut Corporation is only allowed to contract with vessels under 60 feet length overall (LOA), or vessels listed under the American Fisheries Act (AFA). The allocation was made to the Aleut Corporation to further the economic development of Adak, Alaska. The CAA requires half the Aleutian Islands pollock allocation be harvested by small boats (less than 60 feet LOA) in 2013 and beyond.

The Aleut Corporation harvested only 1.2 percent of its initial 2005 pollock allocation in part due to difficulty in finding pollock. In 2006, no additional pollock was harvested by the Aleut Corporation, beyond the amount taken under the 2006 EFP (897 mt, 16 percent of the annual allocation). The majority of pollock harvests in the Aleutian Islands subarea had historically been in Steller sea lion critical habitat until the entire subarea was closed to pollock fishing in 1999 (NMFS 2004 and 64 FR 3437, January 22, 1999). The Aleutian Islands subarea was reopened to pollock fishing outside of critical habitat with the 2003 Steller sea lion protection measures (68 FR 204, January 2, 2003).

NMFS has limited resources for pollock surveys in the Aleutian Islands subarea. Surveys have generally been bottom trawl surveys conducted every second or third summer. The 2005 Stock Assessment and Fishery Evaluation (SAFE) report for Aleutian Islands pollock used bottom trawl surveys and catch data to develop the stock assessment for this pollock stock (NPFMC 2005b). Because of the limited data available, the stock is currently managed at tier 5, as required by the Fishery Management Plan (FMP) for Groundfish of the Bering Sea and Aleutian Islands Management Area (BSAI). The study under the 2006 EFP demonstrated that a commercial vessel could be successfully used to conduct acoustic surveys of pollock in the Aleutian Islands (Barbeaux 2006). The proposed EFP would continue the work from 2006 to obtain baseline data on pollock abundance and distribution within the area susceptible to an Adak-based small boat fishery and to better assess the technical feasibility of setting fine temporal and spatial scale pollock quotas. The results may lead to new methods for managing pollock harvests in the Aleutian Islands subarea.

## 1.2 Purpose and Need

The purpose of the EA is to predict whether the impacts to the human environment resulting from this action will be significant. If the predicted impacts from issuing the EFP are not significant, no further analysis is necessary to comply with the requirements of the National Environmental Policy Act.

The purpose of the EFP is to use commercial fishing vessels to assess Alaska pollock abundance and distribution in the portions of the eastern and central Aleutian Islands (Areas 541 and 542) susceptible to an Adak-based small boat fishery and to test the technical feasibility of setting pollock quotas at a finer temporal and spatial resolution using near real-time acoustic surveying. NMFS currently does not have resources to conduct acoustic surveys of pollock in the Aleutian Islands subarea. The acoustic and biological information from the project will provide a baseline assessment of pollock biomass and distribution in the area susceptible to an Adak-based small boat fishery and help to determine if the local aggregations of pollock are stable enough during the spawning season to allow for fine-scale spatial and temporal quotas. Additionally, genetic samples will be collected during this study that will be used for stock structure analysis. Better information may lead to improved conservation and harvest management at finer spatial and temporal scales for the Aleutian Islands subarea pollock.

Improved harvest management of the Aleutian Islands pollock stock is needed based on the high uncertainty in the stock structure and the potential effects of the fishery on Steller sea lion populations. This project is consistent with Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) national standard 1 which requires that conservation and management measures achieve optimal yield from a fishery. This project also enhances implementation of national standard 2 by providing improved data for the best scientific information available to use in pollock stock conservation and management.

Appendix A is the cruise plan, a detailed description of the work to be performed under the EFP. To verify the acoustic data and to compensate the participating vessel, a maximum of 3,000 mt of walleye pollock would be harvested within an area that includes waters within 0 nautical miles (nm) to 20 nm of Steller sea lion haulouts and rookeries. Conducting the project within Steller sea lion protection areas is necessary because pollock aggregations must be encountered, and historical information about pollock aggregations indicates that pollock are likely to occur inside protection areas. As seen in the 2005 and 2006 pollock fisheries, it may be difficult to conduct the project outside of the Steller sea lion protection areas because of the difficulty in finding sufficient quantities of pollock. The time period of the project is late February through April 30, 2007, with the possibility of renewing or modifying the permit for an extension up to 12 months to replicate the survey in 2008. Several years of surveying may be needed to provide enough information to determine the feasibility of setting quotas based on survey data (S. Barbeaux, personal communication. October 13, 2006).

The EFP is needed to allow the applicant to fish for pollock in the study area, inside Steller sea lion protection areas normally closed to pollock fishing and to conduct the survey work as designed by the Alaska Fisheries Science Center (AFSC). Exemptions from portions of the closure areas between 173 to 179 degrees west longitude are necessary to ensure enough pollock are encountered to verify acoustic signals and compensate the participants. As explained further in Section 4.1, historical information indicates that this area should have enough pollock to complete the project.

## 1.3 Project Area

The acoustic survey and supporting fishing will take place in the Aleutian Islands subarea in up to six one degree blocks between 173 and 179 degrees west longitude on the north side of the Aleutian Island chain,. Fishing activities would include State waters which require permission from the Alaska Department of Fish and Game (ADF&G).

The study area is delimited by a northern boundary of 52° 35' N latitude, a southern boundary of 51° 35' N latitude, an eastern boundary of 173° 00' W longitude, and a western boundary of 179° 00' W longitude (Figure 1). This area is located within statistical areas 541 and 542 of the BSAI.

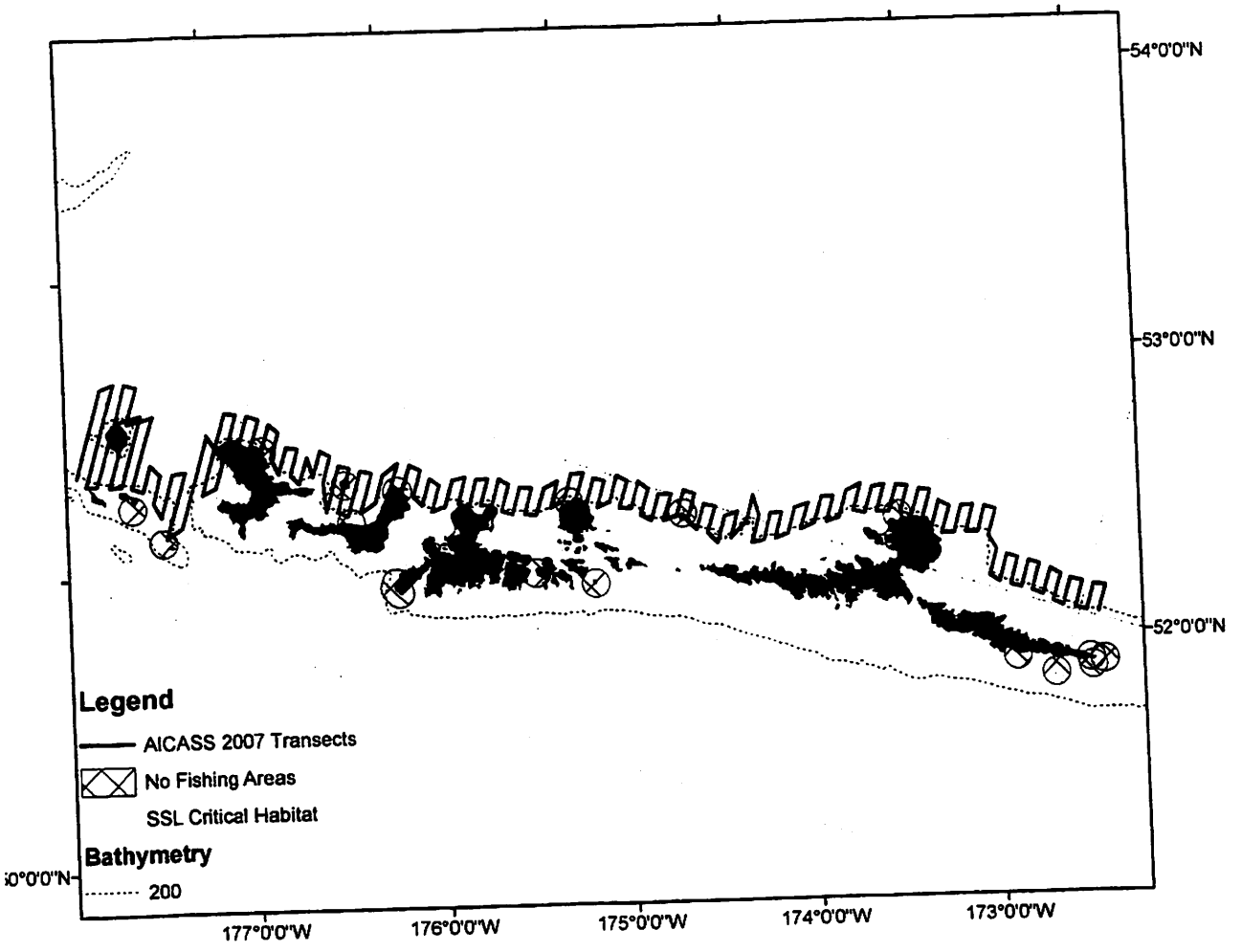



**Figure 1 Study Area Including Acoustic Survey Transects for the Aleutian Islands Pollock EFP**

# 2.0 Descriptions of Alternatives

The applicant has worked with NMFS AFSC to develop the project, which has been approved by the AFSC (Demaster 2006). Completion of the project would require the applicant's exemption from several regulations under 50 CFR part 679, including portions of the Steller sea lion protection area closures as identified in Figure 1 and listed in Table 4 to 50 CFR part 679. Because meeting the purpose and need of this project is only possible within the context of the experimental design, the alternatives are limited to the following:

**Alternative 1: No action alternative.** The applicant's request for the EFP is not approved.

**Alternative 2**: Issue the EFP including the following exemptions and conditions. The EFP would allow the applicant to use one to four vessels to conduct the survey portion of the experiment as designed in cooperation with the AFSC and up to four vessels to conduct the compensatory fishing portion of the project. Details of the experiment are contained in Appendix A. The exemptions only apply to Federal waters. Any fishing activities in State waters (within 0 nm to 3 nm) would require an ADF&G Commissioner's permit. The EFP may be modified to include an additional year of fishing under the EFP under the same conditions. The following lists the regulations that are considered for exemption under Alternative 2 and those regulations that need consideration during implementation of the project.

1. **§ 679.7(a)(2)**: This regulation states that persons are prohibited from conducting any fishing contrary to notification of inseason actions, closures, or adjustments under §§ 679.20, 679.21, 679.22, and 679.25. Nearly all the groundfish harvested will be pollock, with small amounts of Pacific ocean perch also expected to be taken. A small potential exists that the pollock fishery in the Aleutian Islands subarea may be restricted due to northern, shortraker or rougheye rockfish bycatch. As long as the bycatch of these rockfish species remain below the overfishing level, the applicant would be exempt from these potential pollock fishery closures.

2. The amount of groundfish taken and retained during work performed under the EFP shall not exceed the allowable harvest calculated as described in Appendix A and shall not exceed 3,000 mt. This limit includes fish harvested under the EFP and any harvest in the State waters pollock fishery in the Aleutian Islands during the year. The combined harvest under the EFP and the State of Alaska pollock fishery in the Aleutian Islands cannot exceed 3,000 mt. The majority of this harvest is expected to be pollock. If either limit is reached, fishing activities under the EFP must stop. No more than 1,000 mt of groundfish shall be harvested from a single one degree block of longitude in the study area. In addition, no more than one fishing vessel greater than 60 feet LOA can fish in a single, one degree block concurrently. If the 1,000 mt limit is reached in a block, fishing activities under the EFP must stop in the block. The Regional Administrator must be notified before the limit is reached, if modification of the EFP is to be considered. Considerations may include, but are not limited to (1) the present amount of harvest of groundfish species by the groundfish fisheries compared to the annual total allowable catch amounts (TACs), (2) the progress of the project to date, and (3) the potential impacts of any modification of the EFP.

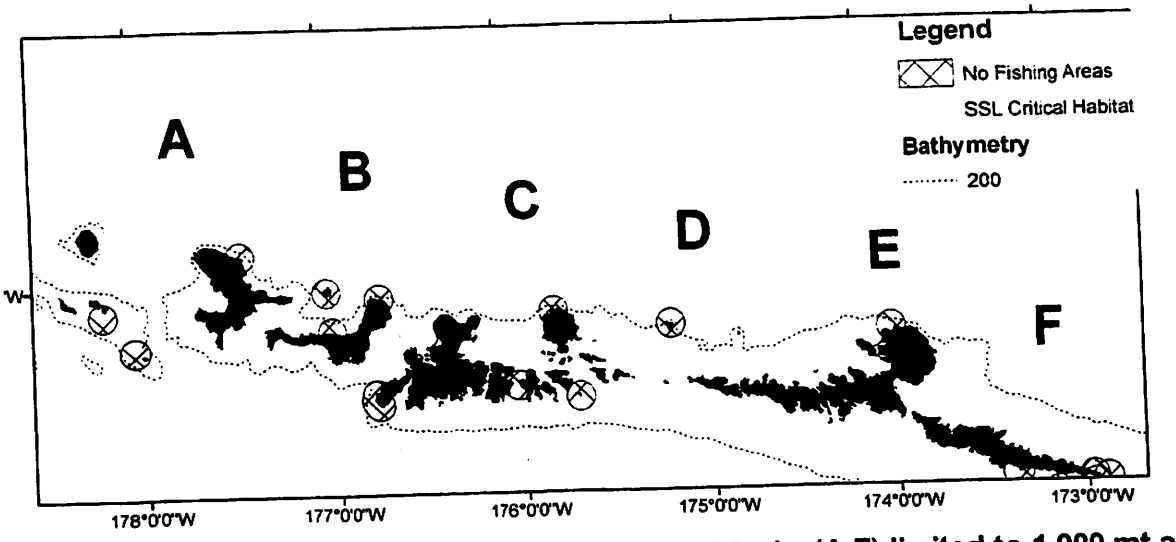



**Figure 2** **Study Area showing 1 degree longitude blocks (A-F) limited to 1,000 mt and one fishing vessel greater than 60' LOA at a time.**

3. **§ 679.20(e)**: Maximum retainable amounts of incidentally taken species are specified in 50 CFR part 679 Table 11 for the BSAI. The applicant will be exempt from these amounts for groundfish to allow the retention of all groundfish. By retaining the incidentally caught groundfish, the applicant will be able to accurately document the species weight and composition and compare this information to the acoustic data.

All retained groundfish species will be counted against the annual TAC amounts (50 CFR 679.20).

4. All prohibited species taken will be handled as required by regulation and counted against any prohibited species limits that apply to the Aleutian Islands directed pollock fishery (50 CFR 679.21). All Chinook salmon taken will count against the Chinook salmon prohibited species limit of 647 fish, as established for the Aleutian Islands directed pollock fishery (50 CFR 679.21(e)(1)(ix)).

5. **§ 679.22(a)(8)(i)(B) and (ii):** These regulations establish 20 nm closures around Steller sea lion haulouts and rookeries in the Aleutian Islands subarea and close the Sequam Foraging Area to pollock fishing. The permit would exempt the applicant from pollock fishery closures in Table 4 of 50 CFR part 679 only in the waters of the study area, as described above in Section 1.3 and that portion of the Seguam Foraging Area located in the EFP study areas. Fishing may occur within 0-3 nm of haulouts in the study area to verify acoustic survey data. No more than 10 mt of groundfish may be harvested in an acoustic survey data verification tow. The applicant must work with the NMFS scientist to ensure that the amount of groundfish harvested within 0 nm to 3 nm of a haulout is the minimum amount necessary to verify the acoustic survey data.

6. The effective date of the permit would be February 15 through April 30, 2007. The permit may be modified to extend the valid dates up to 12 additional months in the case of

unforeseen circumstances that prevent completion of the project within the effective dates of the permit or if the applicant and NMFS determines that the study should continue for an additional year.

7. **§ 679.28 (c)(3)(ii)(D) and (g)(7)(iv)** The shoreside plant accepting deliveries of harvest under this EFP must operate under the Catch Monitoring and Control Plan regulations, as described under 679.28(g).

8. **§ 679.50(c):** A NMFS-certified observer must be available at the Adak plant to observe 100 percent of the shoreside deliveries of fish taken under the EFP. 50 CFR 679.50(d)(1) requires shoreside plants to have an observer present at the facility each day it receives or processes groundfish, if more than 1,000 mt of groundfish are processed in a month. Considering the fish harvested under this EFP and other potential shoreside deliveries, it is possible that more than 1,000 mt of groundfish will be delivered to the Adak plant in a month, and therefore, the daily observer coverage would apply.

The participating vessel owner or operator will be exempt from catcher vessel observer requirements at § 679.50(c) during the survey portion of the experiment only, because a NMFS scientist or contracted acoustic and biological technicians must be on board the vessel at all times during that phase of the project. These personnel are responsible for ensuring the activities are conducted as described in the project plan and that attempts are made to resolve any problems in a manner that will not invalidate the work. The NMFS scientist will ensure the data required to track compliance, normally provided by a vessel observer, are provided to NMFS inseason management.

9. **§ 679.23(i)** Catcher vessels harvesting pollock are excluded from harvesting pollock in two management areas in one season. If the determination to issue this permit is not made by middle of January 2007 the vessels participating in this project may choose to fish the Gulf of Alaska in the A season. In such case, the vessel owners or operators would be exempt from this exclusive fishing season only for 2007. This exclusion is reasonable because of the investment in equipment to participate in the project and because the owner or operator cannot anticipate whether the EFP will be issued and may experience economic loss if not exempted from the restriction. In addition, the project manager may not be able to acquire another vessel with the necessary sonar equipment to do the work in a timely manner. If an EFP determination is made by the middle of January, this exemption would not be necessary.

# 3.0 Affected Environment

The NEPA documents listed below contain extensive information on the fishery management areas, marine resources, ecosystem, social and economic parameters of these fisheries, and the harvest specifications. Rather than duplicate an affected environment description here, readers are referred to these documents. All are public documents and are available in printed form or over the Internet at the links given in the references. Because this action is limited in area and scope, the description of the affected environment is incorporated by reference from the following documents available at: http://www.fakr.noaa.gov/index/analyses/analyses.asp.

Amendment 84a to Modify Existing Chinook and Chum Salmon Savings Areas Environmental Assessment/Regulatory Impact Review /Initial Regulatory Flexibility Analysis (EA/RIR/IRFA) (NPFMC 2005c): The North Pacific Fishery Management Council has recommended analysis of potential changes to the management of salmon bycatch in the BSAI. Salmon is primarily taken in the pollock trawl fisheries and current management measures have not prevented the BSAI groundfish fisheries from exceeding the incidental take statement for Chinook salmon under the last biological opinion on Endangered Species Act (ESA)-listed Chinook salmon. Closures of the Chinook Salmon Savings Areas have been triggered by the pollock fishery exceeding the Chinook salmon limit of 29,000 fish in the Bering Sea in 2004, 2005, and 2006. These closures appear to increase rates of salmon bycatch by shifting the pollock fleet out of areas that currently have lower bycatch rates. Increased salmon bycatch outside the closure areas may be due to shifts in salmon distribution. Section 3 contains the latest information regarding the pollock fisheries in the BSAI and salmon bycatch, including harvest and bycatch rates, locations, and potential effects on salmon species by the groundfish fisheries. This document provides information to support the analysis of the proposed EFP's effects on PSC species.

Amendment 82 for the Aleutian Islands Directed Pollock Fishery EA/RIR (NMFS 2005). Amendment 82 to the BSAI groundfish FMP established the direct pollock fishery in the Aleutian Islands as required by the CAA. Section 3.0 contains a detailed description of the Aleutian Islands pollock fishery history and catch data and Steller sea lion issues, including population trends and historical protection measures for the groundfish fisheries. This document provides the background and effects information regarding the pollock fishery in the Aleutian Islands subarea.

Harvest Specification EA. The 2006 and 2007 harvest specifications were analyzed in an EA and a finding of no significant impact (FONSI) determination was made prior to publication of the final harvest specification (NMFS 2006a). This document contains the information on the status of target species (Stock Assessment and Fishery Evaluation (SAFE) Reports in Appendix A) and contains the latest significance analysis of the effects on the groundfish species and on all other components of the human environment. Additionally, the ecosystem considerations section of the SAFE reports is included as Appendix C to the 2006 and 2007 harvest specifications EA. The stock assessment for Aleutian Islands pollock (Appendix C) shows that the stock is not considered overfished nor approaching an overfished condition. The SAFE report also contains summaries and references to recent studies and information applicable to understanding and interpreting the criteria used to evaluate significance of impacts that will result from alternative harvest quotas. This document provides the most recent examples of significance criteria for determining impacts on the human environment which is appropriate for this EA.

Alaska Groundfish Programmatic Supplemental Environmental Impact Statement (PSEIS) (NMFS 2004). This programmatic SEIS was completed August 2004. This document evaluated the fishery management policies of the BSAI and GOA groundfish FMPs against policy level alternatives and the setting of TACs and acceptable biological catch amounts (ABCs) at various levels. This document provides a comprehensive review of the groundfish fisheries, the affected environment and potential impacts.

Steller Sea Lion Protection Measures SEIS (NMFS 2001). This document includes a detailed description of the Steller sea lion protection measures and the biological opinion for these measures (Appendix A to NMFS 2001). Extensive descriptions and analysis of the effects of the groundfish fisheries on Steller sea lions and other components of the human environment are included. This document is important for the description of the impacts of groundfish fisheries on Steller sea lions and their critical habitat.

Alaska Groundfish Harvest Specifications DRAFT Environmental Impact Statement (NMFS 2006b) This document provides an evaluation of the environmental, social, and economic effects of alternative harvest strategies for the federally managed groundfish fisheries in the GOA and the BSAI. The EIS examines alternative harvest strategies that comply with Federal regulations, the FMPs for the GOA and BSAI groundfish fisheries, and the Magnuson-Stevens Act. The harvest strategies are applied to the best available scientific information to derive the total allowable catch for the groundfish fisheries. This document has the most recent analysis of potential impacts of the groundfish fisheries on the human environment and is based on the latest information available. Much of the information from this document will be adopted by reference for purposes of this EA.

# 4.0 Environmental and Economic Consequences

*Environmental Components Potentially Affected*

The issuance of the EFP is limited in scope and will not likely affect all environmental components of the BSAI. This project involves the taking of groundfish species, primarily pollock, in a portion of the Aleutian Island between 173 and 179 degrees west longitude using pelagic trawl gear. The applicant requested that the groundfish taken be counted against the TACs. In 2005 and 2006, most of the Aleutian Islands pollock TAC was unharvested (about 1.2 percent and 16 percent respectively, of initial annual TAC harvested based on NMFS inseason data). In 2006, the only directed harvests were those associated with the 2006 EFP, totaling less than 1,000 mt. If harvests are similar to the past two years, the TAC and ABC for pollock are not likely to be approached in 2007 or in 2008, even with the harvest anticipated under the EFP. An exemption from the TAC limits is therefore not necessary to facilitate the project.

No effects beyond those already identified (NMFS 2006b) are expected on the physical environment, benthic communities, non-specified and forage species, target species, and seabird components of the environment for the following reasons:

- The amounts of groundfish taken will be applied against the TACs.
- The anticipated duration of the project is approximately 6 weeks, inclusive of the before and after surveys and commercial fishing.
- The anticipated duration of commercial fishing between surveys is approximately three weeks.
- The area of harvest is limited.
- The gear type and method of harvest would not change from current practices.

Ecosystem effects also are not expected due to the short duration of the activity, the limited amount of harvest, the gear type, and the relatively small area identified for the activity.

Ecosystem effects are usually evaluated based on large scale activities (with respect to time, place or amount of harvest).

Table 4.0-1 shows the potentially affected environmental components. The 2005 Aleutian Islands groundfish fishery will be the baseline for purposes of this analysis. Because the location of fishing and the amount of pollock harvest would change from the 2005 fishery, three potential environmental sectors may be impacted: marine mammals, PSC, and socioeconomic. Fishing activities under the EFP may impact Steller sea lions in the closure areas. Under PSC, the effects are limited to Pacific halibut and Pacific salmon, which may be taken during the project. Socioeconomic effects may occur by allowing fishing under the EFP in areas that historically have yielded pollock. More potential exists for the Aleut Corporation to harvest an additional portion of their pollock allocation compared to pollock harvests in 2005 and 2006. This additional harvest would not be available to be reallocated to the Bering Sea pollock fishery. However, if the Bering Sea TAC is set equal to ABC for 2007 and 2008, it would not be possible to reallocate unharvested Aleutian Island pollock to the Bering Sea pollock fishery.

**Table 4.0-1 Resources potentially affected by the alternatives**

| | Potentially Affected Component | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Alternatives | Physical | Benthic Comm. | Groundfish | Marine Mammals | Seabirds | Non - specified and forage species | Prohibited Species | Ecosystem | Socio-economic |
| 1 | N | N | N | N | N | N | N | N | N |
| 2 | N | N | N | Y | N | N | Y | N | Y |

N = no impact beyond status quo anticipated by the option on the component.
Y = an impact beyond status quo is possible if the option is implemented.

This section forms the scientific and analytical basis for the issue comparisons across alternatives. As a starting point, Alternative 2 is perceived as having the potential to affect one or more components of the human environment. The significance of the potential effect is determined by considering the context in which the action will occur and the intensity of the action. The context in which the action will occur includes the specific resources, ecosystem, and human environment affected. The intensity of the action includes the type (beneficial versus adverse), duration (short versus long term), and magnitude (minor versus major), and degree of risk (probability of an impact occurring). Further tests of intensity include (1) the potential for compromising the sustainability of any target or nontarget species; (2) substantial damage to marine habitats and/or essential fish habitat; (3) impacts on public health or safety; (4) impacts on endangered or threatened species, or critical habitat of listed species; (5) cumulative adverse effects; (6) impacts on biodiversity and ecosystem function; (7) significant social or economic impacts; and (8) degree of controversy (NOAA Administrative Order 216-6, Section 6.02).

Differences between direct and indirect effects are primarily linked to the time and place of impact. Direct effects are caused by the action and occur at the same time and place. Indirect effects occur later in time and/or are further removed in distance from the direct effects (40 CFR 1508.27). For example, the direct effects of an alternative which lowers the harvest level of a target fish could include a beneficial impact to the targeted stock of fish, a neutral impact on the ecosystem, and an adverse impact on net revenues to fishermen, while the indirect effects of that same alternative could include beneficial impacts on the ability of Steller sea lions to forage for

prey, neutral impacts on incidental levels of prohibited species catch, and adverse impacts in the form of economic distribution effects, for example, reducing employment and tax revenues to coastal fishing communities.

The section below contains an explanation of the significance criteria. The following ratings are used for significance: beneficial, adverse, insignificant, and unknown. When sufficient information on direct and indirect effects is available, rating criteria are quantitative. In other instances, when less information is available, the discussions and rating criteria used are qualitative. In instances where criteria to determine an aspect of significance (adverse, insignificant, or beneficial) do not logically exist, no criteria are noted. These situations are termed "not applicable" in the criteria tables. An example of an instance where criteria do not logically exist, is the evaluation of the impact vector of incidental take on a declining stock of marine mammals. In that situation, an increase in take that caused a downward change in the population trajectory by more than 10 percent is considered significantly adverse. Any level below that which would have an effect on population trajectories is insignificant because the stock is continuing to decline regardless of fishery effects. There is no logical significantly beneficial alternative (a reduction in take resulting in a beneficial effect on the population trajectory). Therefore, a criterion for significantly beneficial is not applicable (NMFS 2004). Significance is not determined for socioeconomic effects because the significance of these effects alone do not trigger the need for an EIS.

The rating terminology used to determine significance is the same for each resource, species, or issue being evaluated. However, the basic "perspective" or "reference point" differs depending on the resource, species, or issue being evaluated. The reference point relates to the biological environment. For each resource or issue evaluated, specific questions were considered in the analysis. In each case, the questions are fundamentally tied to the respective reference point. The generic definitions for the assigned ratings are as follows:

S+ Significant beneficial effect in relation to the reference point; this determination is based on interpretations of available data and the judgment of the analysts who addressed the topic.

I Insignificant effect in relation to the reference point; this determination is based upon interpretations of data, along with the judgment of analysts, which suggests that the effects are small and within the "normal variability" surrounding the reference point.

S- Significant adverse effect in relation to the reference point and based on interpretations of data and the judgment of the analysts who addressed the topic.

U Unknown effect in relation to the reference point; this determination is made in the absence of information or data suitable for interpretation with respect to the question of the impacts on the resource, species, or issue.

NE No effect is anticipated from implementation of the action.

## 4.1 Significance Criteria for Prohibited Species

As defined in the BSAI groundfish FMP, the prohibited species resource component includes,

> "...those species and species groups the catch of which must be avoided while fishing for groundfish, and which must be returned to sea with a minimum of injury except when their retention is authorized by other applicable law . . ." (NPFMC 2005a, page 10).

The BSAI groundfish FMP specifically lists Pacific halibut, Pacific herring, Pacific salmon, steelhead, king crab, and Tanner crab as prohibited species.

Fishermen are not permitted to retain prohibited species (unless specifically provided for in regulation). Fisheries are often subject to PSC harvest thresholds, and to restrictions on fishing activity when these thresholds are triggered. These thresholds and restrictions are provided for in the BSAI FMP in Section 3.6.2 (NPFMC 2005a) and in regulations at 50 CFR 679.21.

These PSC limits and their associated measures were implemented under amendments to the groundfish FMPs and through regulatory amendments. EAs were prepared for these actions. These EAs determined that these groundfish fisheries restrictions would have insignificant impacts on the human environment, including PSC species. These conclusions were located in the EAs and accompanying FONSIs. These analyses are available from the NMFS Alaska Region website at www.fakr.noaa.gov. Table 4.0-2 describes the significance criteria for evaluating effects on prohibited species.

**Table 4.0-2 Criteria used to estimate the significance of impacts on incidental catch of prohibited species**

| Type of Impact | Criteria |
|---|---|
| No impact | No incidental take of the prohibited species in question. |
| Adverse impact | There are incidental takes of the prohibited species in question. |
| Beneficial impact | Natural at-sea mortality of the prohibited species in question would be reduced – perhaps by the harvest of a predator or by the harvest of a species that competes for prey. |
| Significantly adverse impact | Fisheries are subject to operational constraints under PSC management measures. Groundfish fisheries without the PSC management measures would be a significantly adverse effect. |
| Significantly beneficial impact | No benchmarks are available for significantly beneficial impact of the groundfish fishery on the prohibited species, and significantly beneficial impacts are not defined for these species. |
| Unknown impact | Not enough information is available to determine nature of impacts. |

## 4.2 Significance Criteria for Marine Mammals and ESA-Listed Marine Mammals

Direct and indirect interactions between marine mammals and groundfish harvest may occur due to overlap in the size and species of groundfish harvested in the fisheries that are also important marine mammal prey, and due to temporal and spatial overlap in marine mammal occurrence and commercial fishing activities.

Impacts of the alternative are analyzed by addressing three questions: (1) Do the proposed harvest levels result in increases in direct interactions with marine mammals (incidental take and entanglement in marine debris)? (2) Do the proposed harvest levels remove prey species at levels or in areas that could compromise foraging success of marine mammals (harvest of prey species)? and (3) Do the proposed harvest levels modify marine mammal behavior (disturbance)?

Significant incidental take of marine mammals is determined by predicting whether the proposed harvest levels will result in a take that exceeds the potential biological removal (PBR). The PBR is the maximum number of animals that may be removed from a marine mammal stock while allowing that stock to reach or maintain its optimum sustainable population. The PBR is used for marine mammals because it is the value determined through the marine mammal stock assessments (Angliss and Outlaw 2005) to identify the level at which animals may be removed from the stocks while maintaining sustainable populations. As long as take is maintained within the PBR, the take is considered not significant. Significance ratings for each question are summarized in Table 4.0-3.

**Table 4.0-3 Criteria for determining significance of impacts to marine mammals.**

| | **Incidental take and entanglement in marine debris** | **Harvest of prey species** | **Disturbance** |
|---|---|---|---|
| No impact | No incidental take by fishing operations and no entanglement in marine debris | No competition for key marine mammal prey species by the fishery | No disturbance of mammals or their prey |
| Adverse impact | Mammals are taken incidentally during fishing operations, or become entangled in marine debris | Fisheries reduce the availability of marine mammal prey | Fishing operations disturb marine mammals |
| Beneficial impact | No beneficial impacts | No beneficial impacts | No beneficial impacts |
| Significantly adverse impact | Incidental take is more than PBR or is a substantial amount in | Competition for key prey species likely to constrain foraging success of | Disturbance of mammal such that population is likely to decrease |

| | Incidental take and entanglement in marine debris | Harvest of prey species | Disturbance |
|---|---|---|---|
| | comparison to estimated population for species with no PBR | marine mammal species causing population decline | |
| Significantly beneficial impact | Not applicable | Not applicable | Not applicable |
| Unknown impact | Insufficient information available on take rates | Insufficient information as to what constitutes a key area, important time of year, or prey species | Insufficient information as to what constitutes disturbance |

## 4.3 Alternative 1 Impacts

Alternative 1 is the status quo and is thoroughly analyzed in the Groundfish Harvest Specifications draft EIS (DEIS; NMFS 2006b). The DEIS analysis for prohibited species, marine mammals and socioeconomic effects is incorporated in this analysis by reference. The reader may refer to Section 7 for prohibited species, Section 8 for marine mammals, and Section 12 of the DEIS for the socioeconomic analyses for the status quo. In the 2006-07 harvest specifications EA, the significance analysis determined that the status quo would not have a significant impact on the human environment (NMFS 2006a). No new information is known that would result in a different determination for the direct and indirect effects of status quo.

The conclusions of the DEIS (NMFS 2006b) for status quo for prohibited species is that management measures are in place to limit the impacts of incidental catches on salmon and halibut species. Not enough information is available to understand the potential impacts of the status quo on salmon biomass, but the Council is taking further actions to reduce salmon incidental catch through Amendment 84 (NPFMC 2005c). Very few halibut and salmon are expected to be taken under the status quo in the action area, and therefore the impacts of status quo are much less than those described in the DEIS.

The impacts of status quo on marine mammals is only a concern for Steller sea lions based on the analysis in the DEIS. In general, the status quo is not expected to cause incidental takes of marine mammal above the PBRs for each species; and for nearly all mammals, competition for prey is not a concern. Harvest under status quo may lead to competition with Steller sea lions for prey species; but the area considered for this action is limited, and existing Steller sea lion protection measures would limit the potential impact of the status quo so that population level effects would be unlikely.

The cumulative effect of the status quo is a potential concern for Steller sea lions and is further addressed in Section 5.0 of this EA. If the EFP is not issued, the State of Alaska has authorized a

fishery in an area inside the EFP study area for 3,000 mt. If the EFP is not issued based on a determination that the harvest under the EFP may cause adverse modification of critical habitat, the implementation of the State fishery would need to be offset by mitigation measures for the Federal fisheries to ensure critical habitat is not modified. The determination that an action may adversely modify critical habitat is an indication that population level effects may be possible if mitigation is not implemented. Therefore, the cumulative effects of the status quo may be significant if the EFP is found to adversely modify critical habitat and mitigation measures in the Federal fisheries to offset the State fishery impacts are not implemented. The effects of the potential State pollock fishery on Steller sea lions and their critical habitat are further explained in Section 5.0 of this EA.

The socioeconomic impacts of Alternative 1 would be less beneficial than Alternative 2. Under Alternative 1, less of the Aleutian Islands pollock TAC is likely to be taken and therefore less revenue would be available for economic development. The effects would be limited to those participating in the pollock fishery in the Aleutian Islands. If a portion of the Aleutian Islands pollock could be rolled over to the eastern Bering Sea pollock fishery, Alternative 1 would be more beneficial to the participants in the eastern Bering Sea pollock fishery than Alternative 2. This is unlikely to occur in 2007 or 2008 since the proposed TAC for the eastern Bering Sea pollock fishery is the same as the proposed ABC (NMFS 2006b).

## 4.4 Alternative 2 Impacts

### 4.4.1 Marine Mammals and ESA-listed Marine Mammals

Because the study will be conducted in the limited area identified in section 1.3 of the Aleutian Islands, pelagic trawl gear is used, and the harvest targets pollock, the number of species of marine mammals that may be impacted is limited. According to the List of Fisheries for 2006 (71 FR 48802, August 22, 2006), marine mammal species that have been killed or injured by the BSAI pollock trawl fisheries and range into the Aleutian Islands are Dall's porpoise, harbor seals, minke whale, ribbon seal, western stock of Steller sea lions, killer whales, and humpback whales (Angliss and Outlaw 2005). Steller sea lions, sperm whales, fin whales, and humpback whales are listed as endangered species and occur in the action area. Pollock has been identified as a principal prey species for Steller sea lions, and fishing activities under the proposed action would occur in Steller sea lion protection areas, including critical habitat.

Several cetacean species were observed in the Aleutian Islands area during NMFS Steller sea lion research cruise in June 2001, and May and June 2002 (Hunt and Stabeno 2005). Areas surveyed in 2001 were from Seguam Pass to Seward, Alaska. Surveys in 2002 were from Unimak Pass to Tanaga Pass. Surveys were conducted in a series of 10 nm-wide cells centered on the island chain. Of the 259 individual humpback whales observed, nearly all occurred in the area between Samalga and Unimak Island with 3 individuals seen west of Samalga (Sinclair et al. 2005). All sperm whales were west of Samalga, and only one of 118 fin whales observed was west of Unimak Pass (Sinclair et al. 2005). Other marine mammals sighted during this research include harbor and Dall's porpoise, Pacific white-sided dolphin, Baird's beaked whale, killer whales (resident and transient), and minke whales. Because the sightings of harbor porpoise, Pacific white-sided dolphin and Baird's beaked whales were rare, distribution of these species

could not be inferred (Sinclair et al. 2005). Killer and minke whales were seen primarily west of Unimak Pass (Sinclair et al. 2005).

A recent, detailed analysis on the effects of the groundfish fisheries on marine mammals is in Section 8 of the Groundfish Harvest Specifications DEIS (NMFS 2006b). This DEIS details the potential incidental takes, competition for prey species, and disturbance that may occur for marine mammals throughout the BSAI and GOA. Much of that analysis is incorporated here by reference.

Table 4.4-1 lists the marine mammals that may range into the action area (from Table 8-3 in NMFS 2006b). For each species, the total groundfish incidental take is shown in relation to the PBR. Except for transient killer whales and humpback whales, the incidental take in the groundfish fisheries is well below the PBR or undetermined. In all cases the entire incidental take in the groundfish fisheries is below the PBR or is a very small amount (less than one animal per year) and is therefore insignificant. For this proposed action, the potential incidental take would be a minor portion of the annual take in the groundfish fisheries. The harvest under Alternative 2 is a very small portion of the entire groundfish fisheries harvests, in a discrete location for a short duration. The potential for incidental takes under Alternative 2 is much less than the potential for incidental takes for the entire groundfish fisheries. Because the effects of Alternative 2 on the incidental takes of marine mammals is much smaller than the groundfish fisheries as a whole, the overall incidental take of marine mammals under Alternative 2 is insignificant. In many cases the incidental take of marine mammals under Alternative 2 is likely to occur due to no history of takes in the pollock fishery or the unlikely occurrence of the marine mammal in the action area during the study. These marine mammals are identified in Table 4.4-7 with "no impact" in the incidental take column.

**Table 4.4-1 Estimated mean annual mortality of marine mammals from observed BSAI and GOA groundfish fisheries compared to the total mean annual human-caused mortality and potential biological removal for each stock.** Mean annual mortality, expressed in number of animals, includes both incidental takes and entanglements, as data are available, and averaged over several years of data. Years chosen vary by species. Groundfish fisheries mortality calculated based on Angliss and Outlaw (2005).

| Marine Mammal | Mean annual mortality, from BSAI and GOA groundfish fisheries | Total mean annual human-caused mortality * | PBR |
|---|---|---|---|
| **Steller sea lions (western) | 10.8 | 217.9 | 231 |
| Harbor seal (GOA) | 0.6 | 827 | 868 |
| Ribbon seal | 0.8 | 194 | Undetermined |
| Killer whale Eastern North Pacific AK resident | 2.3 | 2.3 | 11.2 |
| Killer whale Eastern North Pacific Northern resident | 0 | 0 | 2.16 |
| Killer whale GOA, BSAI transient | 2.4 | 2.3 | 3.1 |
| Pacific white-sided dolphin | 0.8 | 4 | Undetermined |
| Harbor porpoise BSAI | 1.1 | 4 | 393 |
| Dall's porpoise | 5.9 | 38 | 1,537 |
| **Humpback whale Western North Pacific | 0.5 | 0.7 | 1.3 |
| Beaked whale | 0 | 0 | undetermined |
| Minke whale Alaska | 0.3 | 0.3 | Undetermined |
| **Sperm whale North Pacific | 0.5 | 0.5 | Undetermined |
| **Fin whale Northeast Pacific | 0.6 | 0.8 | 11.4 |
| **Sea otter Southwest Alaska | 0 | 97 | 830 |

* Does not include research mortality. Other human-caused mortality is predominantly subsistence harvests for seals, sea lions, otters, bowhead whales, and walrus.
** ESA-listed stock.

*Humpback Whales, Fin Whales, Sperm Whales and Killer Whales*

The potential effects on humpback and killer whales are limited to incidental take and disturbance. No record of sperm whale injury or mortality from trawl gear exists for the years 1989-2003 (Perez 2003). Pollock is not likely a major prey species for any of these whale species (NMFS 2000), and therefore, pollock harvested during the project would be unlikely to have significant impacts on prey availability.

Humpback whales that may occur in the study sites are likely from the Western North Pacific stock (Angliss and Outlaw 2005). This stock generally migrates to Japan during winter and spring, and therefore is unlikely to be in the study area during March or April. Also, the 2001 and 2002 surveys conducted by Sinclair rarely observed humpback whales west of Akutan Pass, and no fin whales were observed in the proposed action area (Sinclair et al. 2005). Because of the migration of the humpbacks and lack of fin whales, any potential for incidental take and disturbance are minimal; and therefore, no effects are likely for humpback or fin whales. Sperm whales are not known to be injured or killed by trawl fisheries. No ESA consultation for these species will be necessary for this proposed action, because the trawl harvest of pollock in this action is not likely to impact humpback, fin, or sperm whales.

Killer whales from the Gulf of Alaska, Bering Sea and Aleutian Islands transient stock and from the Alaska resident stock may be present in the project areas in March. Dall's porpoises also may be present based on the 2001 and 2002 surveys (Sinclair et al. 2005). Killer whales have been incidentally taken in the pollock fisheries in the BSAI. Only one Dall's porpoise was recorded taken in the area 541 trawl fishery between 1989 and 2001 (Perez 2003). Dall's porpoises eat a variety of fish and cephalopods (NMFS website http://nmml.afsc.noaa.gov/education/cetaceans/dalls2.htm#) and are not likely to experience competition for prey from the proposed action. Killer whales observed in the areas were primarily residents feeding on fish (Sinclair et al. 2005). Under the proposed action, up to four vessels operating for three weeks during two years is unlikely to deplete prey, disturb, or incidentally take killer whales or Dall's porpoise in amounts that would have population-level effects. Therefore, any effects on killer whales or Dall's porpoise are likely not significant.

*Sea Otters and Harbor Seals*

The ESA-listed southwest Alaska distinct population segment of northern sea otters and the Gulf of Alaska stock of harbor seals also may occur in the EFP study area (Angliss and Outlaw, 2005). Disturbance is possible for both species, but would not likely cause population level effects based on a small number of vessels fishing for two to three weeks up to two years in a limited area. Sea otter diet primarily consists of invertebrates, and therefore, does not overlap with groundfish fisheries harvest. No record of incidental take by trawl gear of sea otters exists (NMFS, North Pacific Groundfish Observer Program, and vessel operator reports under the Marine Mammal Protection Act, December 2005 and List of Fisheries 2006). The incidental take of the GOA stock of harbor seals in the groundfish trawl fishery has been estimated at 0.4 animals per year but the portion of that take attributed to the pollock fishery is unknown (Angliss and Outlaw 2005). There is some diet overlap between the pollock fishery and harbor seals (based on ADF&G wildlife notebook, http://www.adfg.state.ak.us/pubs/notebook/marine/harseal.php), but the removal of pollock by a small number of vessels in a limited area in a two to three week time period in two years is not expected to compete with harbor seals at a level that might cause a population decline. Harbor seals eat a variety of fish, and therefore, may not experience as much competition as other marine mammals that are more dependent on pollock. Based on these considerations, the potential impact of the EFP is likely to be insignificant for sea otters and harbor seals. As found for the entire groundfish fisheries (Mecum 2006), any potential disturbance effect on sea otters is likely to be discountable, and therefore, no ESA consultation under section 7 would be needed for this proposed action for sea otters.

*Steller sea lions*

Further analysis of the effects of the proposed action on the western distinct population segment (DPS) of Steller sea lions is required because they are listed as endangered under the ESA, the animals and their critical habitat occurs in the action area, and they are likely to compete with the pollock fishery for prey resources. All or a portion of critical habitat or 20 nm protection areas associated with 7 rookeries and 18 haulouts occur in the proposed action area. Seven of the haulouts do not meet the criteria of more than 100 non-pups to be considered a winter haulout and therefore, 9 of the 18 haulouts are considered year round or winter haulouts. Table 4.4-2

shows the sites that may have protection areas or critical habitat occurring in the EFP study area (NMFS 2006c). Animals also may be present in lower numbers at the other haulouts.

**Table 4.4-2. Haulouts and Rookeries with Critical Habitat or Protected Areas Designations that Occur in the EFP Study Area** (From Table 3.32 of the draft 2006 FMP biological opinion for the Alaska groundfish fisheries and NMFS 2006c)

| Name of Site | Description | Season |
|---|---|---|
| Amilia E. Cape | Haulout | All |
| Amilia Sviech Harbor | Haulout | Summer |
| Atka N. Cape | Haulout | All |
| Little Tanaga Strait | Haulout | All |
| Kanage N. Cape | Haulout | Winter |
| Boborof | Haulout | Winter |
| Tagalak | New haulout | Winter |
| Kasatochi N. point. | Rookery | All |
| Great Sitkin I. | Haulout | Neither |
| Anagaksik I. | haulout | Neither |
| Adak Lake Point | Rookery | All |
| Gramp Rock | Rookery | All |
| Kanaga Ship Rock | Rookery/Haulout | All |
| Tanaga Bumpy Point | Haulout | Neither |
| Seguam/Saddleridge | Rookery | All |
| Tag | Rookery | All |
| Ulak Hasgox Point | Rookery | All |
| Unalga+Dinkum Rocks | Haulout | Winter |
| SEmisopochnoi/Petrel | Haulout/rookery | Winter |
| Amatignak/Nitrof Point | Haulout | Winter |
| Sagigik | Haulout | Neither |
| Tanadak (Amilia) | Haulout | Neither |
| Agligadak | Hauolout/rookery | Summer |
| Ugidak | haulout | Neither |
| Kavalga | haulout | Neither |

Rookery/haulout is a functional rookery currently listed as a haulout. Haulout/rookery is a functional haulout listed as a rookery.

Based on previous pollock fishing in the Aleutian Islands, the majority of the harvest under this EFP likely would occur in two sub-areas, Kanaga Sound and the west side of Atka Island. Non-pup Steller sea lion surveys at the proposed Kanaga Sound portion of the study area between 173 and 179 degrees west longitude have been conducted at haulouts on Bobrof Island, Kanaga Island North Cape, Kanaga Island Ship Rock, and Kanaga Island Cape Miga. Very little harvest of pollock occurred in the Seguam Foraging Area between 1995 and 1998 (NMFS 2005) and very little harvest in the foraging areas is likely under the EFP. The Cape Miga site is not listed as Steller sea lion critical habitat nor identified as an important site in the draft biological opinion on the groundfish fisheries scheduled to be released for public review in 2007. The other three sites are listed as critical habitat (NMFS 2001). Pups have not been counted at most of these sites, although aerial survey pup counts were made at the Kanaga Island Ship Rock haulout in

[12] Fritz, L.W. and C. Stinchcomb. Undated manuscript. Aerial, ship, and land-based surveys of Steller sea lions (*Eumetopias jubatus*) in the western stock in Alaska, June and July 2003 and 2004. National Marine Mammal Laboratory, Seattle.

2001 and 2002 (92 and 113 pups, respectively)[2] and in 2005 (221 pups).[3] The number of pups at Kanaga Island Ship Rock qualifies the site as a rookery even though it is currently listed as a haulout. The Ship Rock rookery (non-listed rookery) is now larger than any of the listed rookeries in the western Aleutian Islands area and may be especially important to the recovery of the western population, especially the Central Aleutian Islands given an overall decline in pup numbers (NMFS 2006c).

Roughly 10 percent of Steller sea lions in the Central Aleutian Islands (Yunaska to Gramp Rock), a very large area which stretches 500+ miles, are found in Kanaga Sound in March at four haulouts. Kanaga Sound is much more important to non-pup sea lions in the winter based on counts; however, the Ship Rock rookery is very important in the summer (NMFS 2006c). Pup counts in the Central Aleutian Islands continues to decline but at a slower rate (2 percent decline from 2001-02 to 2005, compared to 72 percent decline comparing 2001-02 data to earlier counts)[4].

Most surveys have been conducted during summer months, although some winter data are available for some sites for the years 1962 and 1965 (April surveys – winter/spring) and 1993, 1998, and 1999 (March surveys). Non-pup counts for Bobrof Island and Kanaga sites are provided below in Table 4.4-3.[5]

**Table 4.4-3 Steller sea lion non-pup counts at Kanaga Sound study area**

| Survey Site | Month | Day | Year | Count |
|---|---|---|---|---|
| Bobrof Island | 6 | 20 | 1992 | 150 |
| | 3 | 15 | 1993 | 190 |
| | 6 | 15 | 1998 | 13 |
| | 3 | 2 | 1999 | 76 |
| | 6 | 15 | 2000 | 0 |
| | 6 | 19 | 2002 | 28 |
| | 6 | 23 | 2004 | 49 |
| | | | | |
| Kanaga I. No. Cape | 5 | 25 | 1959 | 0 |
| | 4 | 5 | 1962 | 0 |
| | 4 | 5 | 1965 | 0 |
| | 6 | 28 | 1979 | 309 |
| | 6 | 13 | 1985 | 155 |
| | 5 | 4 | 1987 | 300 |
| | 6 | 20 | 1989 | 0 |
| | 6 | 22 | 1991 | 75 |
| | 6 | 20 | 1992 | 24 |
| | 3 | 15 | 1993 | 210 |
| | 6 | 29 | 1994 | 30 |
| | 6 | 22 | 1994 | 10 |
| | 6 | 18 | 1996 | 34 |

[3] Memorandum for the record, October 20, 2005, Lowell Fritz, Charles Stinchcomb, and Wayne Perryman, National Marine Mammal Laboratory, Seattle.

[4] From the draft 2006 biological opinion, table 3.2, which is scheduled for release for public review in 2007. Available from www.fakr.noaa.gov.

[5] Steller sea lion pup and nonpup count data base, National Marine Mammal Laboratory, Seattle. http://nmml.afsc.noaa.gov/AlaskaEcosystems/sslhome/Databases/Adult%20count%20database.htm http://nmml.afsc.noaa.gov/AlaskaEcosystems/sslhome/Databases/Pup%20count%20database.htm

| Survey Site | Month | Day | Year | Count |
|---|---|---|---|---|
| | 3 | 4 | 1998 | 0 |
| | 3 | 2 | 1999 | 118 |
| | 6 | 15 | 2000 | 25 |
| | 6 | 19 | 2002 | 12 |
| | 6 | 15 | 2004 | 7 |
| | | | | |
| Kanaga I. Ship Rock | 5 | 25 | 1959 | 0 |
| | 4 | 5 | 1962 | 0 |
| | 4 | 26 | 1965 | 150 |
| | 7 | 99 | 1977 | 24 |
| | 6 | 28 | 1979 | 168 |
| | 6 | 13 | 1985 | 314 |
| | 5 | 4 | 1987 | 40 |
| | 6 | 20 | 1989 | 0 |
| | 6 | 22 | 1991 | 92 |
| | 6 | 20 | 1992 | 93 |
| | 3 | 15 | 1993 | 98 |
| | 6 | 20 | 1994 | 172 |
| | 6 | 28 | 1994 | 177 |
| | 6 | 18 | 1996 | 146 |
| | 3 | 4 | 1998 | 0 |
| | 6 | 15 | 1998 | 164 |
| | 3 | 3 | 1999 | 196 |
| | 3 | 6 | 1999 | 232 |
| | 6 | 15 | 2000 | 156 |
| | 6 | 19 | 2002 | 242 |
| | 6 | 15 | 2004 | 229 |
| | | | | |
| Kanaga I. Cape Miga | 4 | 5 | 1962 | 0 |
| | 4 | 26 | 1965 | 25 |
| | 7 | 99 | 1977 | 135 |
| | 6 | 28 | 1977 | 135 |
| | 6 | 13 | 1985 | 0 |
| | 5 | 4 | 1987 | 0 |
| | 6 | 20 | 1989 | 0 |
| | 6 | 18 | 1996 | 34 |
| | 3 | 2 | 1999 | 0 |
| | 6 | 15 | 2000 | 1 |
| | 6 | 15 | 2004 | 0 |

Non-pup Steller sea lion surveys near Atka Island in the study area have been conducted at a haulout on Atka Island at North Cape. No pup counts have been made at this site. As noted above for the Kanaga Sound area, most Steller sea lion surveys have been conducted during summer months, although some winter data are available for some sites; on the Atka Island site there are winter counts for the years 1962 (winter/spring), 1993 and 1999. One survey conducted during April 1962 resulted in a count of 4,300 non-pups. Surveys during March 1993 and 1999 counted 138 and 230 non-pups, respectively. Non-pup counts for this site are provided below in Table 4.4-4.

**Table 4.4-4 Steller sea lion non-pup counts at Atka Island North Cape study area**

| Month | Day | Year | Count |
|---|---|---|---|
| 5 | 26 | 1959 | 550 |
| 4 | 6 | 1962 | 4300 |
| 6 | 25 | 1979 | 1192 |
| 6 | 12 | 1985 | 653 |
| 5 | 3 | 1987 | 855 |
| 6 | 17 | 1989 | 333 |
| 6 | 20 | 1990 | 153 |
| 6 | 21 | 1991 | 180 |
| 6 | 12 | 1992 | 80 |
| 6 | 19 | 1992 | 156 |
| 3 | 15 | 1993 | 148 |
| 6 | 17 | 1994 | 68 |
| 6 | 27 | 1994 | 38 |
| 6 | 18 | 1996 | 59 |
| 6 | 14 | 1998 | 156 |
| 3 | 2 | 1999 | 230 |
| 8 | 6 | 1999 | 203 |
| 8 | 6 | 1999 | 60 |
| 6 | 18 | 2000 | 76 |
| 6 | 19 | 2002 | 224 |
| 6 | 15 | 2004 | 383 |

Adult counts shown in Table 4.4-5 are from the adults count file NMML.SSL.ADULT.ZIP at: http://nmml.afsc.noaa.gov/AlaskaEcosystems/sslhome/Databases/Adult%20count%20database.htm. The table is based on sites listed for the Central AI and includes sites that are listed and not listed as important Steller sea lion locations. Winter season counts for 1993 and 1999 were used because they were the only years of comprehensive winter surveying. In 1999 replicate counts occurred on March 2 and 6, and the table values represent the maximum value of the two counts. Summer 2004 counts are the most recent complete counts.

**Table 4.4-5 Adult Steller sea lion counts in the Central Aleutian Islands**

| Site Name | Longitude | Site Type | Mar-93 Adult Count | Mar-99 Adult Count (max) | Summer 2004 Adult Count |
|---|---|---|---|---|---|
| AGLIGADAK | 172.54 | Rookery | 74 | 84 | 61 |
| KASATOCHI/NORTH POINT | 175.31 | Rookery | 126 | 116 | 667 |
| ADAK/CAPE YAKAK | 176.59 | Rookery | 0 | 114 | 209 |
| ADAK/LAKE POINT | 176.59 | Rookery | 346 | 359 | 799 |
| GRAMP ROCK | 178.20 | Rookery | 220 | 142 | 679 |
| TAG | 178.34 | Rookery | 129 | 108 | 242 |
| ULAK/HASGOX POINT | 178.57 | Rookery | 276 | 190 | 531 |
| TANADAK (AMLIA) | 172.57 | Haulout - listed | 50 | 20 | 1 |
| AMLIA/EAST CAPE | 172.58 | Haulout - listed | 0 | 210 | 34 |
| SAGIGIK | 173.08 | Haulout - listed | 19 | 12 | 30 |
| AMLIA/SVIECH. HARBOR | 173.23 | Haulout - listed | 30 | 75 | 144 |
| ATKA/NORTH CAPE | 174.17 | Haulout - listed | 148 | 230 | 383 |
| ANAGAKSIK | 175.53 | Haulout - listed | 40 | 84 | 2 |
| GREAT SITKIN | 176.10 | Haulout - listed | 0 | 0 | 0 |
| LITTLE TANAGA STRAIT | 176.13 | Haulout - listed | 26 | 292 | 49 |
| KANAGA/N CAPE | 177.09 | Haulout - listed | 210 | 118 | 7 |

| Site Name | Longitude | Site Type | Mar-93 Adult Count | Mar-99 Adult Count (max) | Summer 2004 Adult Count |
|---|---|---|---|---|---|
| KANAGA/SHIP ROCK | 177.22 | Haulout - listed | 98 | 232 | 229 |
| BOBROF | 177.27 | Haulout - listed | 190 | 76 | 49 |
| TANAGA/BUMPY POINT | 177.58 | Haulout - listed | 98 | 0 | 33 |
| UGIDAK | 178.30 | Haulout - listed | 37 | 8 | 25 |
| KAVALGA | 178.51 | Haulout - listed | 0 | 62 | 56 |
| UNALGA+DINKUM ROCKS | 179.04 | Haulout - listed | 167 | 84 | 19 |
| AMLIA/CAPE MISTY | 172.58 | other | - | - | 21 |
| ATKA/CAPE KOROVIN | 174.17 | other | 0 | 0 | 4 |
| SALT | 174.39 | other | 0 | 0 | 0 |
| KONIUJI/NORTH POINT | 175.08 | other | 0 | 0 | 0 |
| OGLODAK | 175.27 | other | 64 | 77 | 86 |
| IKIGINAK | 175.29 | other | - | 0 | 0 |
| FENIMORE | 175.32 | other | - | 98 | 30 |
| TAGALAK | 175.40 | other | 30 | 150 | 91 |
| CHUGUL | 175.46 | other | - | 0 | 39 |
| IGITKIN/SW POINT | 175.57 | other | - | 0 | 0 |
| KAGALASKA | 176.23 | other | 43 | 119 | 48 |
| ADAK/CRONE ISLAND | 176.38 | other | 0 | 35 | 0 |
| ADAK/CAPE MOFFET | 176.48 | other | - | 8 | 0 |
| ADAK/ARGONNE POINT | 176.55 | other | - | 52 | 35 |
| KANAGA/CAPE MIGA | 177.11 | other | - | 0 | 0 |
| KANAGA/CAPE CHUNU | 177.39 | other | - | 5 | 9 |
| TANAGA/CAPE SASMIK | 177.54 | other | 0 | 0 | 122 |
| ILAK | 178.18 | other | 37 | 44 | 45 |
| SKAGUL/S. POINT | 178.35 | other | - | 0 | 1 |
| OGLIUGA | 178.40 | other | - | 11 | 49 |
| GARELOI | 178.48 | other | - | 98 | - |
| SILAK | ? | other | - | - | 38 |

Incidental take and entanglement: By fishing inside protection areas, the proposed action may increase the likelihood of encountering Steller sea lions and the potential for incidental take. It is assumed that the number of Steller sea lions encountered inside protection areas will be greater than the number of animals encountered by fishing vessels outside of protection areas. Table 4.4-5 shows that more than 100 animals may be present at 13 Steller sea lions sites within the study areas during the time of the study. The potential for encountering sea lions is lessened by limiting the amount of fishing that may take place inside the 3 nm closure around the haulouts, excluding fishing within 3 nm of rookeries, limiting participation to no more than three vessels, and limiting the duration of the study.

The current annual PBR for the western distinct population segment of Steller sea lions is 231 animals (Angliss and Outlaw 2005). Approximately 2.72 animals are taken in the entire BSAI pollock fishery each year. It is unlikely that take of Steller sea lions during the study combined with take in the groundfish fisheries would exceed the PBR, therefore, the potential effects on incidental take of Steller sea lions by the EFP activities are insignificant.

Harvest of Prey Species:

The Steller sea lion protection measures for pollock harvest include the overall harvest control and temporal and spatial dispersion of harvest. The harvest of pollock under the EFP will be within the TAC and therefore within the harvest control established under 50 CFR 670.20(d)(4). Temporal dispersion will be met by applying the EFP harvest to the TAC which is temporally dispersed and by restricting harvest to no more than one vessel over 60 feet LOA per 1 degree block. Spatial dispersion of harvest may be a concern because of the exemption to the fishing closures near the Steller sea lion haulouts and rookeries in the study areas. However, spatial dispersion will be achieved by limiting the amount harvested in one degree blocks of longitude to no more than 1,000 mt, as described in section 2.0.

In both the Kanaga Sound and Atka Island portions of the study area, past pollock fishing efforts have been concentrated in the 100 to 500 fathom isobaths. The proportion of the area harvest of pollock taken in these sites during the 1990s varied. For Kanaga Sound, the harvest of pollock in the 1990s made up at least 81 percent of area 541 harvests (Table 4.4-6). Catch data include directed fishery harvest and incidental take in the Pacific cod fishery.

In the Atka Island site, the harvest of pollock in the 1990s varied from 7 percent to 78 percent of Area 541 harvests (Table 4.4-7). The majority of the Aleutian Islands pollock harvests shifted after 1995 from Area 541 to Area 542. Much of the harvest in this time period was part of a large 1978 year class (Steve Barbeaux, personal communication,December 29, 2005). In 1998, only 1,837 mt of pollock was harvested in Area 541 with 78 percent of this harvest coming from the Atka Island area. Catch data include directed fishery harvest and incidental take in the Pacific cod fishery.

**Table 4.4-6 Recent catch data for the Kanaga Sound area.**

| Year | Observed Catch (mt)* | % Pollock ** | 541 + 542 A-season Sub-Total Catch (mt) *** | 541 District Annual catch (mt) | 542 District Annual Catch (mt) | 543 District Annual Catch (mt) | Aleutian Island Annual Catch (mt) | (541 + 542) A-season % of AI Total | Area % of AI Total | Area % of District Annual |
|---|---|---|---|---|---|---|---|---|---|---|
| 1993 | 2,493 | 99.49% | 23,001 | 54,512 | 2,536 | 83 | 57,131 | 40% | 4% | 98% |
| 1995 | 35,935 | 99.58% | 63,988 | 28,109 | 36,714 | 102 | 64,925 | 99% | 55% | 98% |
| 1996 | 20,884 | 99.52% | 27,760 | 9,226 | 19,574 | 216 | 29,016 | 96% | 72% | 107% |
| 1997 | 14,868 | 99.58% | 23,001 | 8,110 | 16,799 | 1,031 | 25,940 | 89% | 57% | 89% |
| 1998 | 3,114 | 99.28% | 5,120 | 1,837 | 3,858 | 18,127 | 23,822 | 21% | 13% | 81% |

* Observed official total catch for Jan-Apr (includes bycatch)

** Percent pollock in the observed species composition samples for the area

*** Total catch in NMFS Areas 541 and 542 for Jan-Apr

Source: Steve Barbeaux, NMFS, AFSC, 12/05

**Table 4.4-7 Recent catch data for the Atka Island area.**

| Year | Observed Catch (mt)* | % Pollock ** | 541 + 542 A-season Sub-Total Catch (mt) *** | 541 District Annual catch (mt) | 542 District Annual Catch (mt) | 543 District Annual Catch (mt) | Aleutian Island Annual Catch (mt) | (541 + 542) A-season % of AI Total | Area % of AI Total | Area % of District Annual |
|---|---|---|---|---|---|---|---|---|---|---|
| 1992 | 6,247 | 98.50% | 38,315 | 52,140 | 206 | 6 | 52,352 | 73% | 12% | 12% |
| 1993 | 14,011 | 99.29% | 23,001 | 54,512 | 2,536 | 83 | 57,131 | 40% | 25% | 26% |
| 1994 | 4,219 | 99.64% | 47,045 | 58,091 | 554 | 15 | 58,660 | 80% | 7% | 7% |
| 1995 | 16,869 | 98.96% | 63,988 | 28,109 | 36,714 | 102 | 64,925 | 99% | 26% | 60% |
| 1996 | 1,894 | 99.83% | 27,760 | 9,226 | 19,574 | 216 | 29,016 | 96% | 7% | 21% |
| 1997 | 3,822 | 98.56% | 23,001 | 8,110 | 16,799 | 1,031 | 25,940 | 89% | 15% | 47% |
| 1998 | 1,428 | 98.76% | 5,120 | 1,837 | 3,858 | 18,127 | 23,822 | 21% | 6% | 78% |

* Observed official total catch for Jan-Apr (includes bycatch)

** Percent pollock in the observed species composition samples for the area

*** Total catch in NMFS Areas 541 and 542 for Jan-Apr

Source: Steve Barbeaux, NMFS, AFSC, 12/05

Pollock is an important prey species for Steller sea lions in the Aleutian Islands. The frequency of occurrence of pollock in winter scat samples collected in the Central and Western Aleutian Islands between 1999 and 2005 is 12 percent (NMFS 2006c). Pollock may be important in specific local areas (e.g., Kanaga Sound, Atka Island, eastern Aleutian Islands). Scat collected at nearby Silak Island had a pollock frequency of occurrence of 46 percent in April of 2002 (NMFS 2006c). In Table 4.4-8, pollock appears to have more importance in the diet of the western and central Aleutian Islands Steller sea lions than in the summer.

**Table 4.4-8 Ranking of prey items in scat collected from 1999 to 2005. Data based on Table 3.21 in the draft FMP biological opinion. For the western DPS overall, both Federal and non-Federal directed fisheries are shaded.**

| | Central & Western Aleutians | | Eastern Aleutians | | Western Gulf | | Central Gulf | | Eastern Gulf | Western DPS | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Rank | Summer | Winter | Summer | Winter | Summer | Winter | Summer | Winter | Summer | Summer | Winter | ALL |
| 1 | A. mackerel | A. mackerel | Pollock | Pollock | Sand lance | Pollock | Salmon | Pollock | Salmon | A. mackerel | Pollock | A. mackerel |
| 2 | Salmon | Pacific cod | Salmon | A. mackerel | Salmon | Pacific cod | Pollock | Pacific cod | Sand lance | Salmon | A. mackerel | Pollock |
| 3 | Ceph. | Irish Lord | Herring | Pacific cod | Pollock | Salmon | Arrowtooth | Sand lance | Herring | Pollock | Pacific cod | Salmon |
| 4 | | Ceph. | Sand lance | Irish Lord | Pacific cod | Sand lance | Sand lance | Arrowtooth | Capelin | Sand lance | Irish Lord | Pacific cod |
| 5 | | Snailfish | A. mackerel | Sand lance | A. mackerel | | Capelin | Salmon | | Pacific cod | Sand lance | Sand lance |
| 6 | | Pollock | Rock sole | Salmon | Arrowtooth | | Herring | Irish Lord | | Herring | Salmon | Irish Lord |
| 7 | | | Pacific cod | Arrowtooth | Irish Lord | | | Sand fish | | | Arrowtooth | Arrowtooth |
| 8 | | | Sand fish | Snailfish | | | | Halibut | | | Snailfish | |
| 9 | | | Poacher | Rock sole | | | | Herring | | | Rock sole | |
| 10 | | | Irish Lord | Sand fish | | | | | | | Sand fish | |
| 11 | | | | Halibut | | | | | | | | |

The EFP is designed to develop a method of basing the verification and compensatory fishery on the in-season survey estimates, but that capability is not possible until enough data are gathered through several years of study (S. Barbeaux, personal communication November 7, 2006). It is not possible at this time to determine an acceptable level of harvest in critical habitat. The AFSC has reserved time on the R/V Oscar Dyson in 2008 in the Central Aleutians to conduct a localized depletion study. The 2007 and 2008 EFP study is intended to develop a baseline for abundance and possible movement inside the area, i.e. whether NMFS is surveying the applicable population, and to determine possible boundaries for the 2008 localized depletion study. Information obtained from the EFP studies in 2007 and 2008 would support setting quotas based on inseason abundance estimates.

Up to 3,000 mt groundfish could be taken from between 173-179 degrees west longitude where fishing is most likely to occur under the EFP. The amount of groundfish harvest within 3 nm of a haulout will be limited to 10 mt per tow and tows limited to only as many needed to verify the acoustic data. It is likely that the majority of the groundfish caught during the EFP fishing will be pollock (Steve Barbeaux, personal communication, December 30, 2005). Based on a 2002 winter pollock survey in the study area, the amount of harvest under this EFP is expected to be less than 9.4 percent of the biomass expected to occur in the study area (Nishimura et al. 2002). This amount of overall harvest in relation to biomass is well within the harvest control rule for pollock under the Steller sea lion protection measures (50 CFR 679.20(d)(4)). From February 21 through March 1, 2002, the R/V Kaiyo Maru conducted an echo integration-trawl survey (EIT) in the Aleutian Islands area that partially covered the proposed study area (Appendix A). The estimates produced by this survey are considered conservative because the survey was limited to

waters deeper than 100 m and did not go inland of Bobrof Island or west of 178° E longitude. The 2002 EIT survey estimated 32,000 mt in the portion of the study area between 173° W and 178° W longitdute. For the entire survey region from 170° W to 178° W longitude, the 2002 EIT survey estimated the pollock biomass at 123,000 mt. Given the conservative estimates provided by the 2002 EIT survey, this study would be expected to take less than 9.4 percent of the pollock biomass in the study area surveyed in 2002, and less than 2.5 percent of the pollock biomass for the region between 170° W to 178° W longitude.

In 2006, the AFSC completed a bottom trawl survey in the Aleutian Islands. Data from the survey are used for the Aleutian Islands pollock stock assessment for 2007 pollock acceptable biological catch (ABC) development. If the North Pacific Fishery Management Council's Scientific and Statistical Committee determines that the stock remain at Tier 5, the 2007 ABC for pollock will be 21,370 mt, compared to 29,400 mt ABC for 2006.

Localized depletion of pollock may be a concern for foraging Steller sea lions. Removing 1,000 mt in a 3-week period from Atka Island/North Cape would be similar to the overall amount of pollock harvested in the 2006 study and the 1998 fishery when 78% of area 541 pollock harvest was taken from the Atka Island area (Table 4.4-7). We do not know the pollock biomass in this area in 1998. It is possible that this method of harvest may result in localized depletion of pollock prey. Any impacts on prey would be limited to the animals using the haulouts in the study area or animals foraging as they pass through the area. Kanaga Sound fishing is also a possible concern because a large portion of the historical catch for the districts has come from this area (Table 4.4-6) and recent use by Steller sea lions has increased. Of particular concern is the Kanaga Island Ship Rock rookery which may be an important site for reproduction in the Central Aleutian Islands.

The results of the 2006 EFP for this study showed that a small commercial fishing vessel could be used for acoustic survey of pollock in the Aleutian Islands. Post fishing surveys of the fished and unfished areas showed different biomass declines (Figure 4.4-1). Compared to the biomass determined in the early part of the study, the biomass of the unfished area declined 68 percent, and the biomass of the fished area declined 90 percent. The biomass decline in the fished area was 4,000 mt compared to the 935 mt removed by the fishery during the EFP. Possible reasons for the biomass decline beyond the direct harvests may include avoidance, pollock may move out of the fished area due to disturbance caused by fishing, and pre-spawning migration, pollock may use the surveyed area as a staging location and moved to another location to spawn. Given the observed changes in maturity at the end of the survey and behavior observed in pre-spawning pollock in the Bering Sea the second scenario may be more likely.

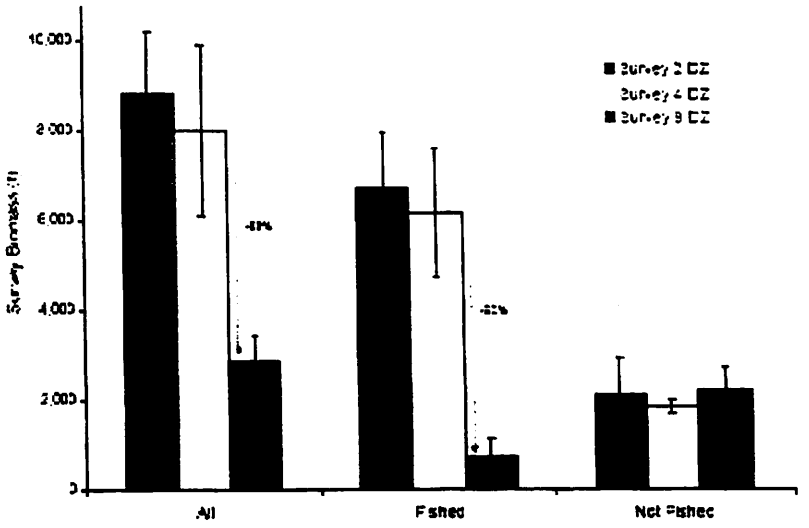



**Figure 4.4-1 Fished and unfished biomass before and after fishing under the 2006 EFP (AI pollock; from Barbeaux survey results June 27, 2006, presentation to the Steller Sea Lion Mitigation Committee).**

The EFP formula for allowable harvest in 2007 uses the lowest large survey density estimate from the 2006 Aleutian Islands Cooperative Acoustic Survey Study (15.8 mt/nm$^2$) and extrapolates this out over the proposed 2007 survey area (Appendix A). The density estimate for the low 2006 survey is actually lower than the densities observed in the low density areas or "non-fished areas" of the 2006 surveys (19.5, 16.9, and 20.1 mt/nm$^2$ for surveys 2, 4, and 8 respectively). The tonnage allowed under the proposed formula, with an mortality (M) of 0.3, would be 4,382 mt for the surveyed area between 173 and 179 degrees W longitude (1,695 nm$^2$). Areas of higher density likely exist throughout the survey area, in particular the area inside Bobrof Island, north of Atka Island (at times), and near Seguam Pass. Using an average density of the three large area surveys from 2006 (38.4 mt/nm$^2$) in the formula the allowable removals (AR) would be 10,362 mt and using the density from Survey 2(48.9 mt/nm$^2$)would have resulted in an AR of 13,569 mt. Based on the AR formula and the 3,000 mt limit in the EFP, the overall harvest under the EFP is very conservative.

Impacts on prey species are not likely to cause a population level effect on western distinct population segment of Steller sea lions because

- fishing activity is limited to 3,000 mt. Harvest is also limited to 1,000 mt for any one degree block of longitude and is conservative,
- fishing is limited to one vessel less than60 feet LOA at a time within the one degree blocks,
- fishing is limited within the selected area,
- each tow inside 3 nm is limited to 10 mt,
- removals are expected to be less than 2.5 percent of the total biomass for the central Aleutian Region surveyed in 2002 (between 170° W and 178° W longitude) and less than 9.4 percent of the biomass for the region between 173° W and 178° W longitude,
- one to four vessels are used, and
- the project is of a short duration (two to three weeks of fishing in one or two years).

The impact of the action on prey resources for Steller sea lions is therefore insignificant. Even though the effects on prey resources are not likely to result in population level effects for the western DPS of Steller sea lions, the proposed action may adversely affect the portion of

designated critical habitat in the action area by reducing available prey resources. Because of the potential for adverse impacts on Steller sea lions in the study areas, an ESA section 7 formal consultation is necessary.

*Disturbance*

Issuing the EFP would result in one to four vessels harvesting pollock inside the study area for approximately three weeks between February and April for up to two years if the EFP is modified for an extension. Fishing inside critical habitat would increase the possibility of encountering Steller sea lions during fishing operations. The potential for encounters within 3 nm of haulouts is reduced by the limitations on fishing in this area. A NMFS scientist will specify the amount of fishing necessary only to verify the acoustic data within the 0 to 3 nm waters of haulouts. Considering the size of the study area (Figure 1) and the relatively small number of animals likely to be using the haulouts (fewer than 250 animals), disturbance by the one to four vessels used in this project is possible, but of minor intensity and short duration (at the most three weeks in up to two consecutive years). Any disturbance that may occur is unlikely to cause population effects, and is therefore insignificant.

Even though the impacts of this action are deemed insignificant for the western DPS of Steller sea lions, this proposed project may adversely affect some Steller sea lions by increasing the potential for incidental take, disrupting pollock aggregations or reducing available pollock for foraging Steller sea lions, and by disturbing animals in waters where more Steller sea lions may occur (0 to 3 nm). For these reasons, an Endangered Species Act Section 7 consultation should be completed before issuing the EFP. The Assistant Regional Administrator for Sustainable Fisheries will request initiation of formal consultation from the Protected Resources Division to determine if the proposed action is likely to result in jeopardy of extinction or adverse modification or destruction of designated critical habitat for the western DPS of Steller sea lions.

*Conclusions*

The proposed action is not likely to compete for prey with any of the marine mammals occurring in the action area, except Steller sea lions. Any prey competition that might occur between marine mammals and the groundfish fisheries is not known to result in population effects (NMFS 2006b). Disturbance of marine mammals that may occur in the action area during the study is possible. Because the action area is limited, the study is expected to last for only 2-3 weeks in up to two years, and only up to four vessels would be involved harvesting a limited amount of pollock, it is unlikely that any disturbance would result in population level effects for any marine mammals. Therefore, disturbance of marine mammals under Alternative 2 is likely insignificant. Even if the EFP is modified for an additional year of activity, the level of impact would be similar and insignificant.

For the proposed action, in many cases the marine mammals are not likely to occur in the action area at the time of the study, are not taken in the pollock fishery, or are known not to compete with the pollock fishery and therefore, no impacts are expected. Table 4.4-9 summarizes the effects of the proposed action on marine mammals that may occur in the action area.

**Table 4.4-9 Summary of Impacts on Marine Mammals**

| Marine Mammal | Incidental Takes | Competition | Disturbance |
|---|---|---|---|
| Steller Sea Lions | insignificant | insignificant | insignificant |
| Harbor seal (GOA) | insignificant | insignificant | Insignificant |
| Ribbon seal | insignificant | No impact | Insignificant |
| Killer whale Eastern North Pacific AK resident | insignificant | Insignificant | Insignificant |
| Killer whale Eastern North Pacific Northern resident | insignificant | insignificant | Insignificant |
| Killer whale GOA, BSAI transient | insignificant | No impact | Insignificant |
| Pacific white-sided dolphin | No impacts | No impacts | No impacts |
| Harbor porpoise BSAI | No impacts | No impact | Insignificant |
| Dall's porpoise | insignificant | No impact | Insignificant |
| **Humpback whale Western North Pacific | No impact | No impact | No impact |
| Beaked whale | No impact | No impact | No impact |
| Minke whale Alaska | insignificant | No impact | insignificant |
| **Sperm whale North Pacific | No impact | No impact | Insignificant |
| **Fin whale Northeast Pacific | No impact | No impact | No impact |
| **Sea otter Southwest Alaska | No impact | No impact | insignificant |

* Does not include research mortality. Other human-caused mortality is predominantly subsistence harvests for seals, sea lions, otters, bowhead whales, and walrus.
** ESA-listed stock.

## 4.4.2 Effects on Prohibited Species

The only prohibited species likely to be taken during the EFP activities are Pacific halibut and Pacific salmon. Under Alternative 2, the EFP would require salmon and halibut to be treated in the same manner as Alternative 1, as required by the PSC regulations at 50 CFR 679.21. With the increased take of pollock in the Aleutian Islands under the EFP, the amounts of halibut and salmon incidental take in the Aleutian Islands are also expected to increase compared to the status quo.

Table 3.7-1 of the Amendment 82 EA shows rates of bycatch in the pollock fishery of the AI (NMFS 2005). Between 1993 and 1998, the average annual bycatch rates in Areas 541 and 542 were 0.0222 kg/mt for halibut, 0.019 fish/mt for Chinook salmon, and 0.037 fish/mt for other salmon species. Using these average bycatch rates, approximately 22.2 kg halibut, 19 individual Chinook salmon, and 37 other salmon would be incidentally caught for each 1,000 mt of pollock harvested during EFP activities. This is consistent with the results of the 2006 EFP fishery during which 44 salmon were taken (table 6 of Barbeaux 2006) It is unlikely that any of the salmon taken would be from ESA-listed stocks. Coded-wire tag recoveries of salmon incidentally taken in the groundfish fisheries have shown that ESA-listed salmon are more likely to occur in the Bering Sea and in the Gulf of Alaska than the proposed study areas (Myers et al. 2005). The harvest under the EFP is not expected to result in significant impacts on PSC species because of the relatively small amount of potential bycatch and because no exemptions will be given for the PSC measures in the regulations.

### 4.4.3 Social and Economic Effects

Economic and social impacts differ in important ways from the impacts on other resource components examined in this EA. Significance findings for social and economic impacts would not affect a FONSI; see 40 CFR 1508.14. In light of 40 CFR 1508.14, significance determinations are not made for these impacts.

*Increased Aleut Corporation pollock revenues in 2006*

The Aleut Corporation's AI pollock harvest is limited to 19,000 mt by regulation. The social and economic impacts of harvests up to this level were fully analyzed in the EA/RIR/IRFA for BSAI FMP Amendment 82, which allocates the directed pollock fishery in the Aleutian Islands to the Aleut Corporation (NMFS 2005). However, Alternative 2 may increase the likelihood that an additional 3,000 mt of the Aleut Corporation's pollock allocation will be harvested by the Corporation's affiliates (within the 19,000 mt limitation) compared to harvests in 2005.

Pollock harvested under the EFP would be processed shoreside at Adak. If the 3,000 mt of pollock were not harvested under the EFP, or by other Aleut Corporation affiliates, it would roll over to the eastern Bering Sea pollock fishery (subject to pollock ABC exceeding TAC in the BS) where it would be split between catcher processors, and catcher vessels and shoreside processors (Table 3, 2006 harvest specifications 71 FR 10894, March 3, 2006). This is unlikely to happen based on the proposed pollock TACs for the eastern Bering Sea being set at the proposed ABCs for 2007 and 2008 (NMFS 2006b).

For each 1,000 mt of pollock harvested in the Aleutian Islands, the Aleut Corporation and its affiliates would receive approximately $849,000 in first wholesale gross revenues[6]. If the 1,000 mt of pollock were rolled over to the eastern Bering Sea, the participants in the Bering Sea fishery would receive approximately $966,000 in first wholesale gross revenues[7][8]. Fishing, processing, and transportation costs in the two sectors are unknown, but are believed to be higher in the relatively remote Aleutian Islands, than in the eastern Bering Sea.

*New Information and improved utilization of the Aleutian Island Pollock Resource*

The results of the study under the EFP may provide a better understanding of pollock aggregations, biomass, and distribution in the Aleutian Islands. The results also may provide another method for the AFSC to gather additional stock assessment information for Aleutian Islands pollock. Additional information about the stock may result in increased confidence in the data and the ability to manage the stock at a higher tier level than is currently used.

---

[6] Based on 2004 "A" season BSAI first wholesale value per metric ton, round weight, for shoreside deliveries ($849/metric tone).

[7] Based on a weighted average of the catcher-processor and shoreside processing "A" season prices per metric ton for pollock in the "A" season BSAI fishery in 2004 ($1,082 and $849 per metric ton respectively).

[8] Values per metric ton round weight were based on weekly production reports and Commercial Operators Annual Reports (COAR), and provided by Terry Hiatt, National Marine Fisheries Service, P.O. Box 15700, Seattle, WA 98115-0070, on January 9, 2006. BSAI prices represent eastern Bering Sea prices. Not enough AI information is available for a specialized AI first wholesale price.

Under the current level of knowledge and the current fishery restrictions, the pollock resource may not be fully harvested. The lack of information regarding the stock leads to more cautious setting of harvest levels. The type of information collected during the EFP study may result in more confidence is setting harvest levels providing for higher harvest amounts based on the additional information. Harvesting pollock under the current Steller sea lion protection measures has been difficult, as seen in the 2005 and 2006 fisheries in which only 1.2 percent and 16 percent, respectively, of the initial annual TAC were harvested.

If the study shows that the amount of pollock biomass in a discrete area can be predicted and a harvest quota may be set based on this biomass, then future management of the AI pollock TAC harvest may improve over the current pollock harvest management. Note that improved long-term utilization of the AI pollock TAC implies a commensurate reduction in pollock harvests by the AFA fleets in the eastern Bering Sea in those years when the BS pollock ABC exceeds the TAC.

*Economic Development*

The intent of establishing the Aleut Corporation pollock allocation was to encourage economic development in Adak. Additional revenue in 2007 (and 2008 if the EFP is modified for a year extension) should contribute to this objective. Moreover, economic development depends on the ability to harvest the pollock allocation. The results of the study may improve the ability to more fully harvest Aleutian Islands pollock, which may result in more economic activity in Adak with the processing of pollock shoreside. At sea processing of pollock would likewise result in more revenues for the Aleut Corporation to reinvest in the Adak community.

*State Pollock Harvest Effects on Revenues for EFP Participants*

Because the State has authorized a pollock fishery in the Aleutian Islands and the limit in the EFP is no more than 3,000 mt of the combined EFP and State of Alaska pollock harvest, the revenues to the EFP participants may be decreased by any amount of fishing that may occur in the State fishery. If the participants in the EFP also are the participants in the State fishery, no effect on income is expected. If participants in the State fishery are not participants in the EFP, the EFP participants would experience a reduction in potential harvest by the amount of the harvest in the State fishery. It is likely that the participants in the EFP will be the same participants in the State fishery because of the limited interest in the pollock fishery in the Aleutian Islands and the limited participation in the Aleut Corporation's directed pollock fishery.

# 5.0 Cumulative Effects

Analysis of the potential cumulative effects of a proposed action and its alternatives is a requirement of the NEPA. An EA or EIS must consider cumulative effects when determining whether an action significantly affects environmental quality. The Council on Environmental Quality (CEQ) regulations for implementing NEPA define cumulative effects as:

> "the impact on the environment, which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or nonfederal) or person undertakes such other actions. Cumulative effects can result from individually minor but collectively significant actions taking place over a period of time" (40 CFR 1508.7).

The cumulative effects of the current harvest specifications are discussed in detail in the Groundfish Harvest Specifications DEIS (NMFS 2006b) and are adopted here by reference. The Harvest Specifications EIS is a very recent and broad examination of potential cumulative effects for fisheries throughout Alaskan waters. The findings can therefore be applied to this small portion of the Aleutian Islands pollock fishery. That EIS concludes that the foreseeable future actions (ecosystem approaches to management, rationalization, traditional management tools, other government actions, and private actions) will all lead to a reduction in the adverse effects of fishing on target species. The DEIS states that continued fishing and subsistence harvest are potentially the most important sources of additional adverse impacts on marine mammals, but concludes that a number of factors will tend to reduce impacts in the future (such as a trend toward ecosystem-based management and fisheries rationalization).

One foreseeable future action not previously analyzed is the new State of Alaska pollock fishery in the Aleutian Islands. This fishery was established by unanimous vote at the October 2006 Board of Fisheries meeting and is not included in the cumulative effects of the DEIS. This fishery has the following features:

- Located in state waters (0-3 nm) in the Adak area between 174° and 178°W longitude.
- The areas 20 miles around Steller sea lion rookeries and 3 miles around SSL haulouts will remain closed, with the exception of the Adak rookery closure area that extends into the bay on the northwest side of Kanaga Island.
- The pollock fishery is open to trawl vessels 58 feet LOA or less.
- The season will open January 20 and run through June 10 or until the guideline harvest level (GHL) is taken.
- No cod-end transfers will be allowed; vessels must deliver catch to a plant with observer coverage.
- The harvest limit will be 3,000 mt, which may be a combination of the state waters fishery and any federally-authorized pollock fishing inside AI critical habitat.
- Vessels must register and report daily catch to the department.
- The state waters fishery will sunset on December 31, 2008.

The intent is no more than 3,000 mt of pollock would be taken from the Federal and State waters in the area, regardless of whether it was harvested under an EFP or state waters fishing. The State fishery would open January 20, concurrent with the Federal pollock fisheries unless emergency action is taken to close it. A news release would announce the GHL. Unfortunately, the GHL set in this manner does not take into account the potential that the available pollock biomass may not support a harvest amount of 3,000 mt of pollock. Potential Federal harvest and survey information would not be available until late February or early March after the initial surveys under the EFP. The amount of Federal harvest would not be known until after fishing is completed under the EFP, in the first part of April.

Figure 5.0-1 shows the state waters that are likely to provide habitat suitable for pollock harvests in the State waters pollock fishery areas. Based on the 2006 pollock survey under the EFP, pollock are expected to be most highly aggregated deeper than150 m during spawning.

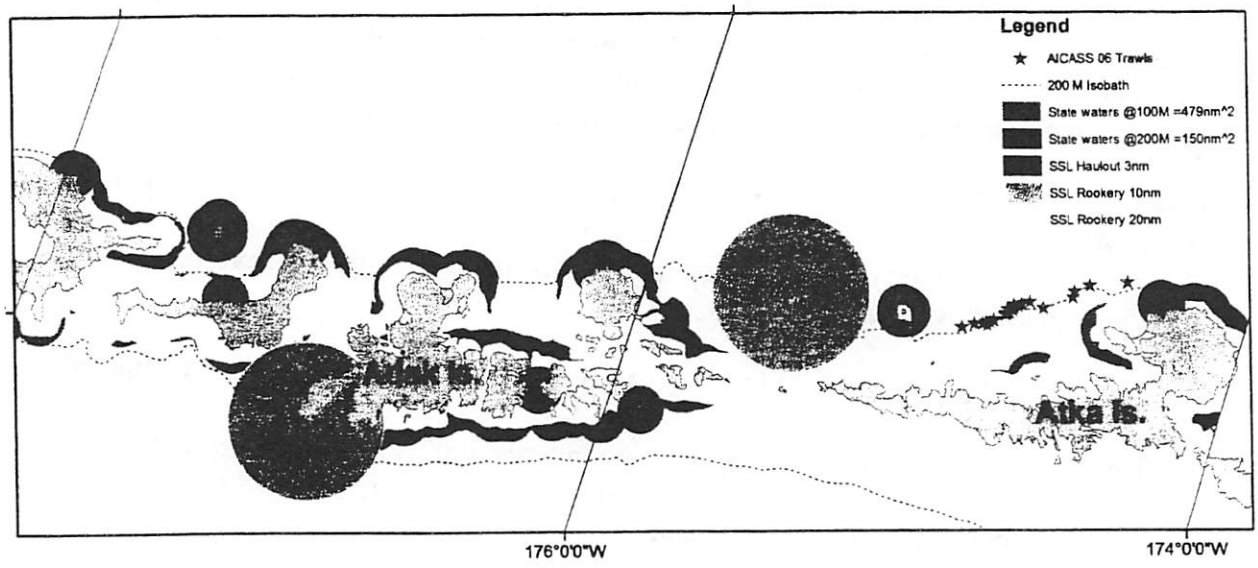



**Figure 5.0-1 Pollock habitat within State waters, and outside closed Steller sea lion areas, as described by depth.** Red areas are waters deeper than 200 m, gold areas are deeper than 100 m (Steve Lewis, October 27, 2006, NMFS Alaska Region Analytical Team).

Historical harvests of pollock in State waters have shown concentrations of harvest primarily in the Kanaga Island/Bobrof Island areas and Atka Island (Figures 5.0-2 through 5.0-4).

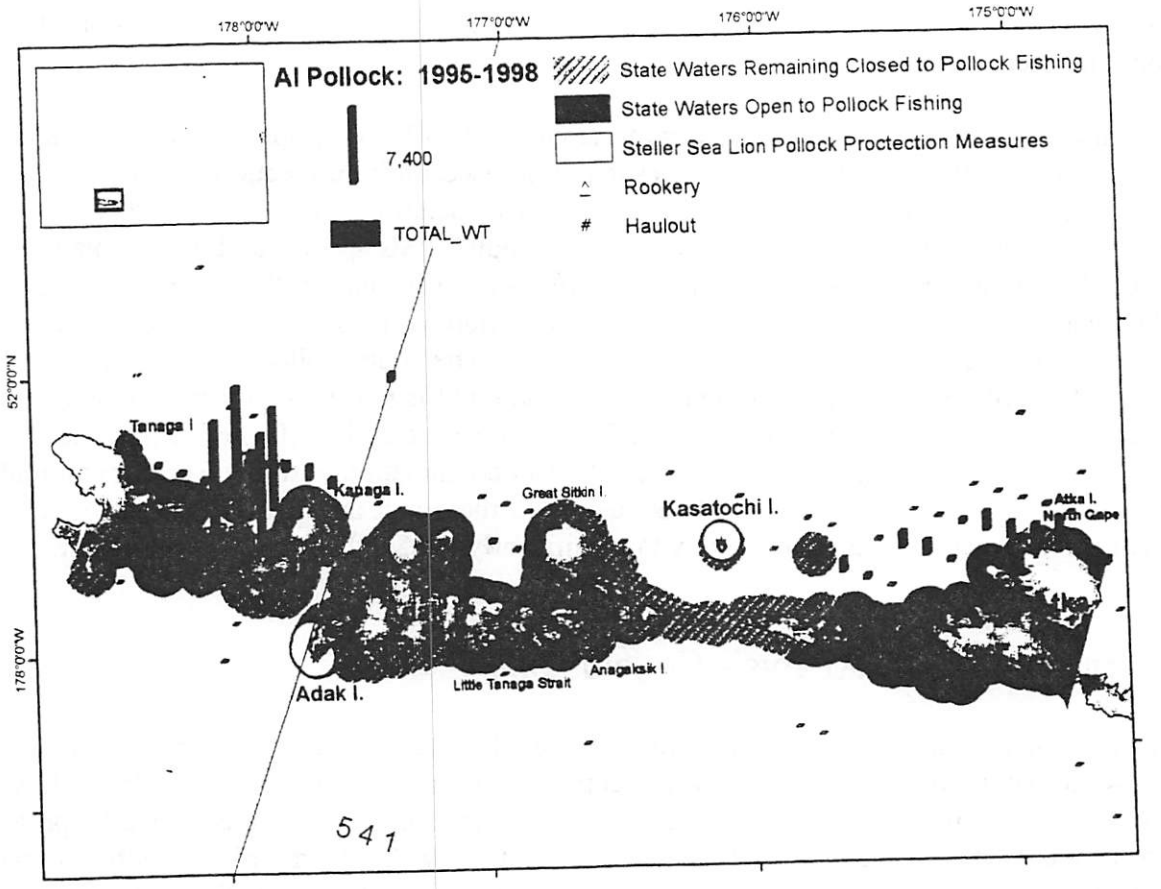



**Figure 5.0-2 Pollock harvests in the Aleutian Islands between 1995 and 1998 and the State waters pollock fishery.** (Steve Lewis, October 27, 2006, NMFS Alaska Region Analytical Team).

The State Aleutian Islands pollock fishery is a concern because it is located within 0-3 nm, the area where Steller sea lions are most likely to be encountered, increasing the potential for disturbance and incidental take. The larger concern is the harvest amount of 3,000 mt is not limited by any biomass information and is concentrated in very limited areas. Localized depletion is more likely to occur with this State managed fishery compared to the EFP because the number of vessels is not limited, the harvest amount is not based on biomass information for discrete location, and harvest is concentrated in the 0-3 nm waters between closer longitudes than under the EFP. Because of the limited number of Steller sea lions impacted, the effect of this action in combination with the EFP is not likely to result in population level effects for the western DPS of Steller sea lions, and is therefore insignificant. Regardless, the potential cumulative effect on Steller sea lions is likely adverse and may need to be addressed in an ESA section 7 consultation for this action and for the BSAI groundfish fisheries.

Because of the nature of the State fishery, the potential effects under Alternative 1 may be more adverse for Steller sea lions than under Alternative 2. If the EFP allows for 3,000 mt of harvest, the State pollock fishery would not open. If the EFP harvest amount is reduced due to required mitigation from a biological opinion, the State is authorized to harvest the difference up to 3,000

mt which would likely need to be offset in some manner in the Federal groundfish fisheries. In any case, less fishing under the State pollock fishery, means less potential for impacts on Steller sea lions and their critical habitat.

In summary, the cumulative effects analysis of the Groundfish Harvest Specifications EIS and in this EA shows that the past, present, and reasonably foreseeable future actions do not appear to require a change in the direct-indirect significance determinations with regard to the environmental components considered in this EA, including PSC species and marine mammals. Based on the harvest specifications' cumulative effects analysis and on the analysis in this EA, no additional past, present, or reasonably foreseeable future actions were identified, except for the State of Alaska Aleutian Islands pollock fishery. The State pollock fishery is likely to adversely affect Steller sea lions and their critical habitat but is not likely to result in population level effects for the western DPS of Steller sea lions. The State pollock fishery is likely to occur under Alternative 1 and may harvest up to 3,000 mt in combination with the EFP harvest under Alternative 2. Thus, the cumulative effects added to the direct and indirect effects of either Alternative 1 or Alternative 2 are not likely to significantly impact the human environment.

# 6.0 Environmental Analysis Conclusions

Alternative 1 maintains the status quo. No EFP would be issued, and therefore, no additional effects would occur beyond those already identified and analyzed in the Groundfish Harvest Specifications EA and EIS (NMFS 2006a and 2006b), except for the State of Alaska pollock fishery in the Aleutian Islands. Alternative 2 would allow 3,000 mt of groundfish harvest (mostly pollock) under an EFP that would provide survey information on pollock abundance and distribution in a portion of the Aleutian Islands. In addition to the significance analysis in the 2006 and 2007 harvest specifications EA (NMFS 2006a), the significance of impacts of the actions analyzed in this EA were determined through consideration of the following information as required by NEPA and 40 CFR 1508.27:

Context: For the issuance of the EFP, the setting of the proposed action is the pollock fishery of the Aleutian Islands. The effects of the issuance of an EFP on society, within this area, are on individuals directly and indirectly participating in the Aleutian Island pollock fishery and on those who use the ocean resources. Because this action may improve the use of the Aleutian Islands directed pollock fishery allocation, this action may have regional impacts on society.

Intensity: Listings of considerations to determine intensity of the impacts are in 40 CFR 1508.28(b) and in the NOAA Administrative Order 216-6, Section 6. Each consideration is addressed below in order as it appears in the NMFS Instruction 30-124-1 dated July 22, 2005, Guidelines for Preparation of a FONSI. The preferred alternative is Alternative 2 and the focus of the responses to the questions.

1. Can the proposed action be reasonably expected to jeopardize the sustainability of any target species that may be affected by the action? *No. No significant adverse impacts were identified for Alternative 2. All catches of pollock and other groundfish will be accounted for and will be*

*applied against the 2007 or 2008 TACs (EA Section 4.0). The effects are not expected to cause population level effects for the western DPS of Steller sea lions.*

2. Can the proposed action be reasonably expected to jeopardize the sustainability of any non-target species or prohibited species? *No. Potential effects of Alternative 2 on non-target/ prohibited species were limited to Pacific halibut and salmon, and those effects were determined to be not significant (EA Section 4.4.2).*

3. Can the proposed action be reasonably expected to cause substantial damage to the ocean and coastal habitats and/or essential fish habitat as defined under the Magnuson-Stevens Act and identified in FMPs? *No. No significant adverse impacts were identified for Alternative 2. No effects were expected on ocean or coastal habitat or EFH. All fishing will be by pelagic trawl gear and will not occur within designated Habitat Areas of Particular Concern (EA Section 4.0).*

4. Can the proposed action be reasonably expected to have a substantial adverse impact on public health or safety? *No. Public health and safety will not be affected in any way not evaluated under previous actions or disproportionately as a result of the EFP study. The EFP will not change fishing methods (including gear types), timing of fishing or quota assignments to gear groups, which are based on previously established seasons and allocation formulas in regulations.*

5. Can the proposed action be reasonably expected to adversely affect endangered or threatened species, marine mammals, or critical habitat of these species? *The only ESA-listed animal that may be impacted by the action is the western DPS of Steller sea lions. The study would allow for limited fishing within critical habitat. The potential impacts are incidental take, competition for prey species, and disturbance. Because the amount of harvest is limited, activities are for a short time period, and only up to four vessels will be used, it is not likely that these effects would cause a population level effect for Steller sea lions. Therefore, for this NEPA analysis, the impacts on Steller sea lions are likely not significant. For purposes of ESA, an adverse effect on one or more Steller sea lions is likely and requires a formal consultation under section 7 of the ESA. Formal consultation will be completed before issuance of the EFP (EA Section 4.4.1 and 4.4.2).*

6. Can the proposed action be expected to have a substantial impact on biodiversity and ecosystem function within the affected area (e.g., benthic productivity, predator-prey relationships, etc.)? *No significant adverse impacts were identified for Alternative 2. No effects were expected on biodiversity, the ecosystem or seabirds (EA Section 4.0).*

7. Are social or economic impacts interrelated with natural or physical environmental effects? *Risks to the human environment by the Aleutian Islands pollock fishery are described in detail in the 2006 and 2007 harvest specifications EA and the draft Groundfish Harvest Specifications EIS (NMFS 2006a and 2006b). This action is limited in scope to a study that would last up to two years and with limited amounts of pollock harvest within a limited portion of the Steller sea lion protection areas. The effect on the human environment from this activity in critical habitat is insignificant in term of this analysis. Socioeconomic effects are possible in the future depending on the success of the project and the development of management measures. It is not possible to predict the outcome of the project or future levels of pollock harvest in relation to the Aleutian*

*Islands directed pollock fishery allocation. If the study results in improved utilization of pollock resources in the Aleutian Islands and for Adak, the socioeconomic impacts would likely be beneficial for those participants in the fishery and for residents in Adak (EA Section 4.5).*

8. Are the effects on the quality of the human environment likely to be highly controversial? *This action involves the permitting of a project to improve use of an underharvested fishery. The Aleut Corporation, Alaska Fisheries Science Center, and the Council support this action. Fishing inside critical habitat may be controversial but the limited vessel use, timing, discrete areas, and harvest amounts reduce the potential for this action being controversial. In addition, the potential for improved management of harvest inside Steller sea lion protection areas may outweigh concerns of potential impacts of the study. The experimental design of the project is supported by the Alaska Fisheries Science Center and by the Science and Statistical Committee of the North Pacific Fishery Management Council (EA Section 1.0).*

9. Can the proposed action be reasonably expected to result in substantial impacts to unique areas, such as historic or cultural resources, park land, prime farmlands, wetlands, wild and scenic rivers, essential fish habitat, or ecologically critical areas? *No. This action takes place in the geographic area of the Aleutian Islands, generally from 0 nautical miles (nm) to 20 nm offshore and between 173° and 179° W longitude. The land adjacent to this marine area may contain archeological sites of Aleut villages. This action would occur in adjacent marine waters and processing is limited to one location in Adak, Alaska so no impacts on these cultural sites are expected. The marine waters where the fisheries occur contain ecologically critical areas. Effects on the unique characteristics of these areas are not anticipated to occur with this action because of the small amount of fish removed by fewer than four vessels using pelagic trawl gear that is not as likely to impact ecologically critical areas.*

10. Are the effects on the human environment likely to be highly uncertain or involve unique or unknown risks? *The potential effects of the action are well understood because of the fish species and harvest method involved and the limited duration, harvest amounts, and area of the activity. For the Steller sea lions, enough research has been conducted to known about the animals' abundance, distribution, and feeding behavior to determine that this action is not likely to result in population effects (EA Section 4.4.1). The potential impacts of pollock harvest on other components of the environment also are well understood as described in a previous NEPA analysis (EA Section 3.0).*

11. Is the proposed action related to other actions with individually insignificant, but cumulatively significant impacts? *Beyond the cumulative impact analyses in the 2006 and 2007 harvest specifications EA and the Groundfish Harvest Specifications EIS (NMFS 2006a and 2006b), the only additional past, present or future cumulative impact issues identified was on the State of Alaska Aleutian Islands pollock fishery. The combination of effects from the State of Alaska pollock fishery and this proposed action are not likely to result in population level effects for Steller sea lions and are therefore not significant. Foreseeable future impacts include socio-economic beneficial effects for this action, as described above and in Section 5.0 of the EA.*

12. Is the proposed action likely to adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places or may cause

loss or destruction of significant scientific, cultural or historical resources? *This action will have no effect on districts, sites, highways, structures, or objects listed or eligible for listing in the National Register of Historic Places, nor cause loss or destruction of significant scientific, cultural, or historical resources. Because this action is in nearshore waters to 20 nm at sea, this consideration is not applicable to this action (EA Section 1.0).*

13. Can the proposed action be reasonably expected to result in the introduction or spread of a nonindigenous species? *This action poses no effect on the introduction or spread of nonindigenous species into the Aleutian Islands beyond those previously identified because it does not change fishing, processing, or shipping practices that may lead to the introduction of nonindigenous species.*

14. Will the proposed action likely establish a precedent for future actions with significant effects or represents a decision in principle about a future consideration? *Future actions related to this action may result in impacts. As described in Section 5.0, future actions depend on the results of the study. Pursuant to NEPA for all future action, appropriate environmental analysis documents (EA or EIS) will be prepared to inform the decision makers of potential impacts to the human environment and to implement mitigation measures to avoid significant adverse impacts. Socioeconomic impacts of improved management of pollock harvest in the Aleutian Islands would likely be beneficial.*

15. Can the proposed action be reasonably expected to threaten a violation of Federal, State, or local law or requirements imposed for the protection of the environment? *This action poses no known violation of Federal, State, or local laws or requirements for the protection of the environment. Issuance of the EFP would be conducted in a manner consistent, to the maximum extent practicable, with the enforceable provisions of the Alaska Coastal Management Program within the meaning of Section 30(c)(1) of the Coastal Zone Management Act of 1972, and its implementing regulations. ESA section 7 consultation would be completed before issuance of the EFP (EA section 4.4.1 and 5.0 ).*

16. Can the proposed action be reasonably expected to result in adverse impacts, not otherwise identified and described above? *Beyond the analysis in the 2006 and 2007 harvest specifications EA and the draft Groundfish Harvest Specifications EIS (NMFS 2006a and 2006b), no additional direct, indirect, past or present impacts have been identified that would accrue from this action. Foreseeable future impacts are likely socioeconomic depending on the results of the experimental study. These potential benefits are described above and in Section 5.0 of the EA.*

**Comparison of Alternatives and Selection of a Preferred Alternative**

Alternative 1 is the status quo and does not provide for the issuance of an EFP for the assessment of pollock abundance in the Central Aleutian Islands and to test the technical feasibility of setting quotas for Aleutian Islands pollock at a finer temporal and spatial resolution using near real-time acoustic surveying. In addition, Alternative 1 would result in the opening of the State of Alaska Aleutian Islands pollock fishery which is likely to have more impacts on Steller sea lions than Alternative 2. Alterative 2 would provide for an EFP that would allow the potential gathering of additional information regarding pollock biomass and distribution and

determining if finer defined quotas may be developed. The ultimate goal is to develop management measures that may improve the use of pollock resources in the Aleutian Islands. Alternative 2 had no significant impacts identified and potential beneficial socioeconomic effects for Adak. Alternative 1 had no additional environmental impacts beyond those already identified in previous analyses, but Alternative 1 would not provide for the additional information and potential for improved management and use of pollock resources in the Aleutian Islands and would allow for the State of Alaska Aleutian Islands pollock fishery. Because Alternative 2 has no significant adverse impacts identified and provides the potential for improved use of pollock in the Aleutian Islands and is likely less adverse to Steller sea lions, Alternative 2 is the preferred alternative.

# 7.0 List of Preparers and Contributors

Barbeaux, Steven. Research Fisheries Biologist, Status of Stocks and Multispecies Assessment, Resouces Ecology and Fisheries Management, AFSC, NMFS 7600 Sand Point Way NE, 98115.

Brown, Melanie. Fisheries Regulations Specialist, Sustainable Fisheries Division, NMFS Alaska Region, P.O. Box 21668, Juneau, Alaska 99802-1668.

Campbell, Rebecca. Sustainable Fisheries Division, NMFS Alaska Region, P.O. Box 21668, Juneau, Alaska 99802-1668 (document preparation).

Fraser, Dave. Manager, F/V Muir Milach, Telephone: (206) 399-0742, E-mail: dfraser@olympus.net. (EFP application preparation, EA preparation and review.)

Hiatt, Terry. Economist, Alaska Fisheries Science Center, NMFS P.O. Box 15700, Seattle, WA 98115-0070.

Muse, Ben. Economist, Sustainable Fisheries Division, NMFS Alaska Region, P.O. Box 21668, Juneau, Alaska 99802-1668.

# 8.0 References

Angliss, R. P., and R. B. Outlaw. 2005. Alaska marine mammal stock assessments, 2005. U.S. Dep. Commer., NOAA Tech. Memo. NMFSAFSC-161, 250 p.

Barbeaux, S. 2006. 2006 Aleutian Islands Cooperative Acoustic Survey Study, AFSC NMFS/NOAA, Seattle WA 98115. October 2006. URL: http://www.afsc.noaa.gov/Quarterly/amj2006/divrptsREFM7.htm

Demaster, D. P. 2006. Memorandum to James W. Balsiger regarding Review of Exempted Fishing Permit entitled "Application for an Exempted Fishing Permit from the Aleut

Enterprise Corporation." November 7, 2006. Alaska Fisheries Science Center, 7600 Sand Point Way NE, Bldg. 4, Seattle, WA 98115.

Hunt, G. L. Jr., and P. J. Stabeno. 2005. Oceanography and ecology of the Aleutian Archipelago: spatial and temporal variation. November 2005. Fish Oceanogra. 14(s1). p. 292.

Mecum, R. D. 2006. Letter to E. LaVerne Smith regarding Further consideration of Endangered Species Act Section 7 Consultation for the Alaska Fisheries and Its Effect on the Threatened Southwest Alaska Distinct Population Segment of Northern Sea Otters. (consultation number 2006-117). May 25, 2006. NMFS Alaska Region P. O. Box 21668, Juneau, AK 99802.

Myers, K. W., N. D. Davis, A. G. Celewycz, E. V. Farley, Jr., J. Morris, M. Trudel, M. Fukuwaka, S. Kovalenko, and A. Shubin. 2005. High seas salmonid coded-wire tag recovery data, 2005. (NPAFC Doc. 905) SAF-UW-0505. School of Aquat. Fish. Sci., Univ. Washington, Seattle 42 p.

NMFS. 2006a. Environmental Assessment/Final Regulatory Impact Analysis for the Total Allowable Catch Specifications for the Years 2006 and 2007 Alaska Groundfish Fisheries. National Marine Fisheries Service, Alaska Region, P.O. Box 21668, Juneau, Alaska 99802-1668. January 2006. Available at http://www.fakr.noaa.gov/index/analyses/analyses.asp .

NMFS. 2006b. Draft Environmental Impact Statement for the Alaska Groundfish Harvest Specifications. September 2006. National Marine Fisheries Service, Alaska Region, P.O. Box 21668, Juneau, Alaska 99802-1668. Available at http://www.fakr.noaa.gov/index/analyses/analyses.asp .

NMFS. 2006c. NMFS response to questions posed in a March 13, 2006 letter to Doug DeMaster, Sue Salveson, and Steve Davis from Robert D. Mecum, NMFS Office of Protected Resources, Juneau, AK.

NMFS. 2005. Environmental Assessment/Regulatory Impact Review for Amendment 82 to the BSAI FMP and regulatory amendments to allow the allocation of future Aleutian Islands pollock harvest to the Aleut Corporation as required by Public Law 108-199. January 2005. DOC, NOAA, NMFS P.O. Box 21668, Juneau, AK 99802. Available at http://www.fakr.noaa.gov/analyses/amd82/bsai82finalea0205.pdf.

NMFS. 2004. Programmatic Supplemental Environmental Impact Statement for the Alaska Groundfish Fisheries Implemented Under the Authority of the Fishery Management Plans for the Groundfish Fishery of the Gulf of Alaska and the Groundfish of the Bering Sea and Aleutian Islands Area. June 2004. DOC, NOAA, NMFS P.O. Box 21668, Juneau, AK 99802. Available at http://www.fakr.noaa.gov/sustainablefisheries/seis/intro.htm.

NMFS. 2001. Steller Sea Lion Protection Measures Final Supplemental Environmental Impact Statement. Implemented under the Fishery Management Plans for the Groundfish of the

GOA and the Groundfish of the BSAI. 2001. NMFS, Alaska Region P.O. Box 21668, Juneau, AK 99801. November 2001. Available at http://www.fakr.noaa.gov/sustainablefisheries/seis/sslpm/default.htm.

National Marine Fisheries Service (NMFS). 2000. Section 7 consultation of the authorization of the Bering Sea and Aleutian Islands groundfish fishery under the BSAI FMP and the authorization of the Gulf of Alaska groundfish fishery under the GOA FMP. Office of Protected Resources, NMFS. November 30, 2000. p. 352.

Nishimura, A., T. Yanagimoto, and Y. Takao. 2002. Cruise results of the winter 2002 Bering Sea pollock survey (Kaiyo Maru). Document for the 2002 STC meeting. Central BS pollock Convention, September 2002. Hokkaido National Fisheries Research Institute.

North Pacific Fishery Management Council (NPFMC). 2005a. Fishery Management Plan for Groundfish of the Bering Sea and Aleutian Islands Management Area. Anchorage: January, 2005. Available at http://www.fakr.noaa.gov/npfmc/fmp/bsai/BSAI.pdf..

NPFMC. 2005b. Stock assessment and fishery evaluation report for the groundfish resources of the Bering Sea/Aleutian Islands regions (SAFE document). BSAI Plan Team, Anchorage, AK. November 2005. URL: http://www.afsc.noaa.gov/refm/docs/2005/BSAI_Intro.pdf.

NPFMC. 2005c. Environmental Assessment / Regulatory Impact Review /Initial Regulatory Flexibility Analysis For Modifying Existing Chinook And Chum Salmon Savings Areas Proposed Amendment 84 To The Fishery Management Plan For Groundfish Of The Bering Sea And Aleutian Islands Management Area. August 31, 2005. North Pacific Fishery Management Council 605 W. 4th Avenue, Suite 306, Anchorage, AK 99501.

Perez, M. A. 2003. Compilation of marine mammal incidental take data from the domestic and joint venture groundfish fisheries in the U. S. EEZ of the North Pacific, 1989-2001. U. S. Department of Commer., NOAA Tech Memo. NMFS-AFSC-138, 145 p.

Sinclair, E. H., S. E. Moore, N. A. Friday, T. K. Zeppelin, and J. A. Waite. 2005. Do patterns of Steller sea lions (Eumetopias jubatus) diet, population trend and cetacean occurrence reflect oceanographic domains from the Alaska Peninsula to the central Aleutian Islands? Fish. Oceanogr. 14(s1). pp. 223-242.

Appendix A

# FINAL CRUISE INSTRUCTIONS

**F/V Muir Milach and F/V TBD**
**Late February 2007 – April 1, 2007**
**Chief Scientist: Steven J. Barbeaux**

## 1.0 FINAL CRUISE INSTRUCTIONS

### 1.1 Cruise Title – Aleutian Islands Pollock Acoustic Survey Study

### 1.2 Cruise Dates:

1.2.1 **Departure** – Depart Adak, Alaska, after the close of the federal trawl CV cod season in late February 2007.

1.2.2 **Arrival** – Arrive Adak, Alaska, at 1200 on April 1, 2007.

## 2.0 CRUISE OVERVIEW

**Cruise Objectives** – The purpose of this study is to assess Alaska pollock abundance in a portion of the Aleutian Islands and to test the feasibility of managing an Aleutian Islands pollock fishery at a finer temporal and spatial resolution using near real-time acoustic surveying. To accomplish these objectives two acoustic surveys will be conducted, surveying the area between 173°W longitude to 179°W longitude on the north side of the Aleutian Island archipelago. Verification tows will be conducted during the surveys to determine the species composition and biological attributes of the observed acoustic sign. Verification tows will be limited to less than 10t and to no more than 30 tows per survey. All verification catch will be accounted for either by direct weighing or by volumetric assessment and discarded at sea. Between the two surveys commercial fishing vessels will be allowed to remove (AR) up to a maximum of

$$AR = \left[\sum (N_A W_{A+1})\right]\left(\frac{A_{07}}{A_{06}}\right)(1-M)(0.75M)$$ of groundfish from the survey area, removals are not to exceed 3,000 t and not to exceed 1000t from any 1 degree longitude blocks. $N_A$ is the numbers at age from the final 2006 survey, $W_{A+1}$ is the calculated weight-at-age from the 2006 survey, M is the natural mortality, A is the survey area. In addition only one vessel greater than 60' LOA will be allowed to fish in a 1 degree longitude block at a given time. All commercial hauls will be sampled by observers on board the vessels and all catch will be delivered to Adak Fisheries LLC. in Adak, Alaska.

2.1 **Applicability** – These instructions present complete information for this cruise.

2.2 **Operating Area** – Aleutian Islands

2.3 **Participating Organizations**
NOAA – Alaska Fisheries Science Center (AFSC)
7600 Sand Point Way N.E., Seattle, Washington 98115-0070

2.4 **Personnel**

2.4.1 **Chief Scientist**

| Name | Gender | Affiliation | E-mail Address |
|---|---|---|---|
| Steven J. Barbeaux | Male | AFSC | Steve.Barbeaux@noaa.gov |
| (206) 526-4211 | | | |

2.4.2 **Participating Scientists**

| Name | Gender | Affiliation | E-mail Address |
|---|---|---|---|
| To be determined | | | |
| Libby Logerwell | Female | AFSC | Libby.Logerwell@noaa.gov |
| Martin Dorn | Male | AFSC | Martin.Dorn@noaa.gov |

2.5 **Administrative**

2.5.1 **Ship Operations**

Dave Fraser
Manager, F/V Muir Milach
Telephone: (206) 399-0742
E-mail: dfraser@olympus.net

Dave Wilmore
Captain F/V Muir Milach
Telephone: (360) 380-2082, Cellular: (360) 319-8267
E-mail: peanutsplace@nas.com

2.5.2 **Scientific Operations**

Steven J. Barbeaux, AFSC
Telephone: (206) 526-4211
E-mail: Steve.Barbeaux@noaa.gov

Dr. Libby Logerwell, AFSC
Telephone: (206) 526-4231
E-mail: Libby.Logerwell@noaa.gov

## 3.0 OPERATIONS

3.1.1 **Data To Be Collected** – The purpose of this study is to assess Alaska pollock abundance in the Central Aleutian Islands and to evaluate the feasibility of managing

an Aleutian Islands pollock fishery at a finer temporal and spatial resolution using near real-time acoustic surveying. In the course of this study data on the reliability and stability of the echosounder will be collected as well as the specific noise characteristics of the small commercial fishing vessel/s. This will be done through SONAR self-noise testing and sphere calibrations. Two acoustic surveys of pollock aggregations will be conducted that will entail the collection of both acoustic data from ES-60 echosounders as well as biological data collected from verification trawl tows. CTD casts will be made to support both the calibration exercises and the survey effort. Commercial fishing will be conducted to support the study. Sampling of the catch will occur at sea by NMFS certified Observers for species composition, pollock length, weight, and age structures. In addition species composition and total delivery data of the commercial catch will be collected at the processing plant in Adak.

3.2 **Staging Plan** – The majority of the equipment necessary for the cruise will be shipped to Adak prior to January, 2007. The laptop computers, CTD, and personal gear of the scientists will be carried as luggage and delivered to the boats in Adak at the time of embarkation.

3.3 **De-staging Plan** – The data, computer hardware, and personal gear will be returned with the chief scientist at the end of the study. All other gear will remain on board the F/V Muir Milach until the ship returns to Bellingham, WA (June 2007).

3.4 **Cruise Plan** – The study area is the region between 173°W longitude to 179°W longitude on the north side of the Aleutian Island archipelago and will be divided into six one-degree pollock fishing areas (PFA). In February the acoustic survey vessel/s will conduct SONAR self-noise tests while steaming to fishing grounds (See Below). On the first and last trip an ES-60 system calibration will be conducted on board each of the vessel/s (See Below). If more than one vessel is to be used for the acoustic surveys, an in-formation inter-ship comparison exercise will be conducted in a location and at a time deemed appropriate by the NOAA lead scientist. In the second phase of the study, NOAA scientists (or contracted acoustic technician) will board the vessel/s and depart from Adak, Alaska, after the closing of the federal catcher vessel trawl cod A season in 2007. A 2.5 nm spacing parallel transect acoustic survey will be conducted of the study area. If a single acoustic survey vessel is to be used, then the survey will commence at 173°W longitude and work towards 179°W longitude. At the direction of the NMFS scientist a second vessel will conduct verification tows to collect biological data. If two acoustic vessels are used for the survey the vessels will start at the eastern most edge of the survey area and conduct the survey in parallel with each survey vessel surveying every other transect such that each vessel will survey transects 5 nm apart.. At least one CTD drop per PFA will be made for each acoustic survey to obtain conductivity and temperature at depth. At the direction of the NOAA scientists (or contracted acoustic technician) trawl hauls of no more then 10t will be conducted during the acoustic surveys to verify acoustic backscatter and obtain biological samples. The validation tows will be randomly sampled for species composition, the samples will not exceed 1 t. A random subsample of 150 pollock and/or other dominant species will be measured and weighed. All measured pollock will be scanned for maturity. Otolith and fin clip samples will be collected from a subsample of the measured fish. Following the acoustic survey the NMFS scientists (or contracted acoustic technician) will disembark from the survey vessels. NMFS certified observers will embark the commercial fishing vessels that are to conduct fishing operations. The observed vessels will be allowed to harvest pollock in the PFAs up to the limits identified in section 2.0 above. All commercial tows will be monitored by biological technicians and all

catch will be delivered to Adak, Alaska. All commercial tows will be sampled for species composition. A random subsample of pollock will be measured, weighed, and scanned for maturity. Otolith samples will be collected from a subsample of the measured fish. Following commercial fishing the NMFS scientists will again board the survey vessel/s and another 2.5 nm spaced parallel transect survey will be conducted following the same procedures as the first survey.

3.5 **Study Locations** – See Figs. 9.2

- **Study Operations** – The following are operations to be conducted on this cruise.

3.5.1 **Phase 1: SONAR Self-noise testing** – SONAR Self-noise tests will be conducted in January 2007 while the vessel/s steam to the Pacific cod fishing grounds. For this part of the study the ES-60 echosounder will record data in "passive" mode as the vessel systematically increases speed from 0 knots to maximum in 2 knot increments every three minutes. This exercise will take no more than 45 minutes. The recorded data will then be sent to the Chief Scientist for analysis to determine signal to noise ratios and speed for the optimum survey operations.

3.5.2 **Phase 1: ES-60 System Calibration** – Two ES-60 System calibrations will be conducted per survey vessel, one prior to the first parallel transect acoustic survey and one following the final acoustic survey. The calibrations will be conducted by the NOAA Scientist (or contracted acoustic technician) as per protocols described in Foote et al. (1987) for sphere calibration of a scientific echosounder.

3.5.3 **Phase 2: CTD measurement** – During each of the calibration exercise and once during each parallel transect survey in each PFA, CTD casts will be made to assess speed of sound at depth. The CTD will be allowed to acclimate 1m below the surface for one minute and then lowered via the vessel winch or crane to the bottom and retrieved. CTD cast data will be downloaded to a NOAA laptop and backed up on DVD after each cast.

3.5.4 **Phase 2: Parallel Transect Acoustic Survey** – Two 2.5 nm spaced acoustic surveys will be conducted of the area between 173°W and 179°W longitude (See figure below). The waypoints for these surveys will be determined by the Chief Scientist by February 15th, 2007. The survey will consist of parallel transects with a random start location for the beginning transect. The transects will be adaptive in that they are designed to survey 1nm inshore of the 200m isobath and 5nm offshore of the 200m isobath, but can be cut short if, in the opinion of the NMFS scientist or contracted acoustic technician, pollock acoustic sign is no longer observed. Ping rate during the survey will be one ping per two seconds and vessel speed for the survey will be determined by the Chief Scientist after analysis of the SONAR self-noise test. All acoustic data will be recorded on external 120GB IOMEGA drives and backed-up nightly onto DVDs. If a single acoustic survey vessel is to be used, then the survey will commence at 173°W longitude and work towards 179°W longitude. A second vessel will conduct verification tows to collect biological data at the direction of the NMFS scientist. If two vessels are used for the survey the vessels will start at the

eastern most edge of the survey area and conduct the survey in parallel with each survey vessel surveying every other transect such that each vessel will survey transects 5 nm apart..

3.5.5 **Phase 2: In-formation Inter-ship Comparison** – If two vessels are to be used for the survey an in-formation inter-ship comparison will be conducted. Once a suitable location is identified near the center of the study area where there are substantial quantities of fish in layers or dispersed aggregations of varying density the vessels will collect data in formation. One vessel will lead and the other will follow about 400m astern, far enough to the side to avoid the leaders wake. The two vessels will take the lead in turns and exchange position at the end of two transects. A total of eight 3 mile transects spaced 0.5 nm apart will be run over the area.

3.5.6 **Phase 3: Verification Trawling** – At the direction of the NOAA scientist or contracted acoustic technician, trawls hauls of no more then 10t will be conducted during the acoustic surveys to verify acoustic backscatter and obtain biological samples. If a single acoustic survey vessel is used then verification trawls will be conducted by accompanying fishing vessels and the survey vessel will not fish. If two acoustic survey vessels are employed then verification trawling will be conducted by the acoustic survey vessels. The choice of net will be up to the vessel captain/s, and will be fitted with a 3/8" knotless codend liner. Time, date, and location of each trawl will be recorded using standard observer program trawl haul forms. All validation tows will be measured for total catch and randomly sampled for species composition, the samples will not exceed 1t. A random subsample of 150 pollock and/or other dominant species will be measured and weighed. All measured pollock will be scanned for maturity. Otolith and fin clip samples will be collected from a subsample of the measured fish. Deck hands on the survey vessels will conduct the species composition samples and length measurements under the supervision of a contracted biological technician. Maturity scans, otoliths, and fin clips will be collected by the contracted biological technician/s. All data will be recorded on deck sheets and later transferred to an access database designed by the Chief Scientist. The Access database will be backed up on DVD nightly.

3.5.7 **Phase 3: Commercial Trawling** – Following the first survey commercial fishing vessels will conduct commercial fishing in the survey area. All fishing vessels must have a NMFS approved biological technician on board. All commercial trawl locations must be outside of 3 nm from designated Steller Sea Lion (SSL) haulout and rookery sites, but otherwise will be at the discretion of the vessel captain. Time, date, and location of each trawl will be recorded using standard observer program trawl haul forms. All commercial tows will be measured for total catch and sampled for species composition. A random subsample of pollock will be measured, weighed, and scanned for maturity. Otolith samples will be collected from a subsample of the measured fish. Observers will collect species composition, length measurements, maturity scans, otoliths, and fin clips from pollock. All data will be recorded on standard observer deck sheets. All catch will be delivered to the Adak processing plant where it will be sorted and weighed. Data on total catch composition and weight will be reported to the NOAA scientist prior to embarkation on a following trip.

3.5.8 **Phase 3: Opportunistic Acoustic Data Collection** – During all fishing operations, including searching for fishable aggregations of pollock, and when traveling to and

from port, the survey vessels will continue to collect ES-60 acoustic data. These data will be used to qualitatively assess the relative densities and assess the spatial dynamisms of fish within the study areas in between acoustic surveys. In addition these data, in conjunction with catch per unit effort data from the commercial trawl hauls, will be used to assess possible impacts of fishing activities on the pollock aggregations due to the study.

3.6 **Underway Operations** – The following are underway operations to be conducted on this cruise.

- Opportunistic Acoustic data collection

3.7 **Applicable Restrictions** – Commercial trawl tows will not be conducted within 3NM of designated Sea Lion haulout or rookery protected areas.

3.8 **Small Boat Operations** – None

## 4.0 FACILITIES

### 4.1 Equipment and Capabilities Provided by Ships

- Stern trawl system (winches, wire, electronics, etc.)
- 38kHz SIMRAD ES-60 echosounder with GPS feed
- Sea-water hoses and nozzles to wash nets and gear ,
- Adequate deck lighting for night-time operations,
- Navigational equipment including GPS and radar,
- Ship's crane(s) used for loading and/or deploying,
- Commercial pelagic trawl gear, appropriate to the vessel
- 3/8" cod end liner for trawls

### 4.2 Equipment and Capabilities Provided by Scientists for Each Survey Vessel

- Sea-Bird Electronics' SBE-19 SEACAT system
- AFSC Laptop with SEASOFT software for CTD data collection and processing,
- Electronic 50kg basket scale, 2kg scale for individual fish weights,
- 120GB IOMEGA External Drives, DVD read write drive, and Backup DVDs
- Miscellaneous scientific sampling and processing equipment,
- Data forms,
- Data storage Access database

## 5.0 DISPOSITION OF DATA AND REPORTS

5.1 The following data products will be included in the cruise data package:

- Calibration Sheets for all ship's and scientific instruments used
- CTD Cast Information
- 120GB Iomega external drive logs of ES-60 Acoustic Data
- Nightly DVD Backup logs of ES-60 Acoustic Data
- Access database log of all fishing activity
- Trawl haul information sheets, trawl haul deck forms
- All data and preliminary analyses will be submitted as an AFSC Processed report

5.2 **Pre- and Post-cruise Meetings** – A pre-cruise meeting will be scheduled with the chief scientist, the contracted acoustic technician, contracted observers, and the vessel captains (via telephone) in February, 2007 prior to the closure of the federal catcher vessel cod trawl A season in Seattle to discuss sampling strategy and coordinate vessels. A meeting of the NOAA scientist, the vessel captain, and the vessel crew will be conducted on board the survey vessels prior to departure for the first survey to discuss operations on board the vessel and assigned duties. In April 2007, a post-cruise meeting will be held in Seattle, Washington with the chief scientist, the vessel owner, and a representative from the Aleut Enterprise Corporation to discuss preliminary results of the survey.

## 6.0 ADDITIONAL PROJECTS

6.1 **Definition** – Ancillary and piggyback projects are secondary to the objectives of the cruise and should be treated as additional investigations. The difference between the two types of secondary projects is that an ancillary project does not have representation aboard and is accomplished by the ship's force.

6.2 **Ancillary Projects** – None

6.3 **Piggyback Projects** – During biological data collection fin clips will also be taken from pollock. In at least two separate hauls, fin clips will be collected from at least 50 randomly selected pollock. Length, weight, sex, and maturity of females will be recorded for each fish. Otolith samples will be collected from each fish and placed in a vial with a unique specimen number. The clips will be placed in separate micro-ampoules containing 95% alcohol and the specimen number recorded on the micro-ampoule. The data will be recorded in an Access database developed by the Chief Scientist. The fin clip samples and associated data will be provided to Dr. Mike Cannino of the AFSC for processing. Otoliths samples will be included in the total otolith samples from the study and processed by the Age and Growth Laboratory at the AFSC.

## 7.0 HAZARDOUS MATERIALS

7.1 **Inventory**

| Chemical | Amount | Neutralizer | Contact |
|---|---|---|---|
| Alcohol, Reagent, 95% | 2 x 1-Liter | 3-M Sorbent Pads | Barbeaux |

7.2 **Material Safety Data Sheet (MSDS)** – Submitted separately

## 8.0 MISCELLANEOUS

**Communications** – Specific information on how to contact the F/V Muir Milach

8.1 **Important Telephone and Facsimile Numbers and E-mail Addresses**

### 8.1.1 Alaska Fisheries Science Center (AFSC):

Resource Ecology and Fisheries Management (REFM):

- (206) 526-4211 (voice)
- (206) 526-4066 (fax)

E-Mail: Steve.Barbeaux@noaa.gov

### 8.1.2 Commercial Fishing Vessels to be determined by AEC and NMFS – Telephone and E-mail contacts

Homeport :
Cellular:
INMARSAT Mini-M:
INMARSAT B:
E-Mail:
Other:

## 9.0 APPENDICES

### 9.1 Equipment Inventory

| Equipment | Quantity | Source |
|---|---|---|
| **Acoustic Gear** | | |
| Laptop Computer | 2 | Chief Scientist, FIT program |
| IOMEGA 120GB external drive | 4 | FIT Program |
| Calibration Downrigger | 4 | Chief Scientist |
| Tungsten-Carbide Calibration Sphere | 2 | Chief Scientist |
| Lead Cannonball | 2 | Chief Scientist |
| Spiderwire 100 lbs test | 300 M | Chief Scientist |
| Calibration Tools and Parts | 1 | Chief Scientist |
| CTD and Cage | 1 | FIT Program |
| DVD Read/Write Drive | 2 | FIT Program |
| DVD backup discs | 10 | FIT Program |
| | | |
| **Biological Sampling** | | |
| Flatbed Scale 50 kg, 0.002 kg precision | 2 | RACE Division |
| Length-Frequency Board | 2 | Observer Program |
| Sampling Baskets | 10 | RACE Division |
| Otolith Vials | 500 | RACE Division |
| Species Id Manual | 2 | RACE Division |
| Handheld Deck Computer | 2 | FIT Program |
| Otolith Knife | 2 | FIT Program |

| | | |
|---|---|---|
| Forceps | 2 | FIT Program |
| Scalpel | 4 | FIT Program |
| Scissors | 2 | FIT program |
| Various Zip-lock bags | 30 | FIT Program |
| Fin Clip micro-ampoules | 100 | Dr. Mike Canino |
| 1 Liter 95% Alcohol | 1 | Dr. Mike Canino |
| Small Scale 1kg | 1 | FIT Program |
| Deck Sheets | 100 | Observer Program |
| | | |
| **Safety** | | |
| Immersion Suit | 2 | RACE Division |
| Life Jacket | 2 | RACE Division |
| Boots | 2 pair | RACE Division |
| Wet Weather Gear | 2 sets | RACE Division |
| Personal EPIRB | 2 | RACE Division |
| Hardhat | 2 | RACE Division |
| Work Gloves | 6 pair | FIT Program |
| | | |
| **Other** | | |
| Digital Camera | 1 | FIT Program |
| Sleeping Bag | 2 | FIT Program |
| | | |

## 9.2 Figures

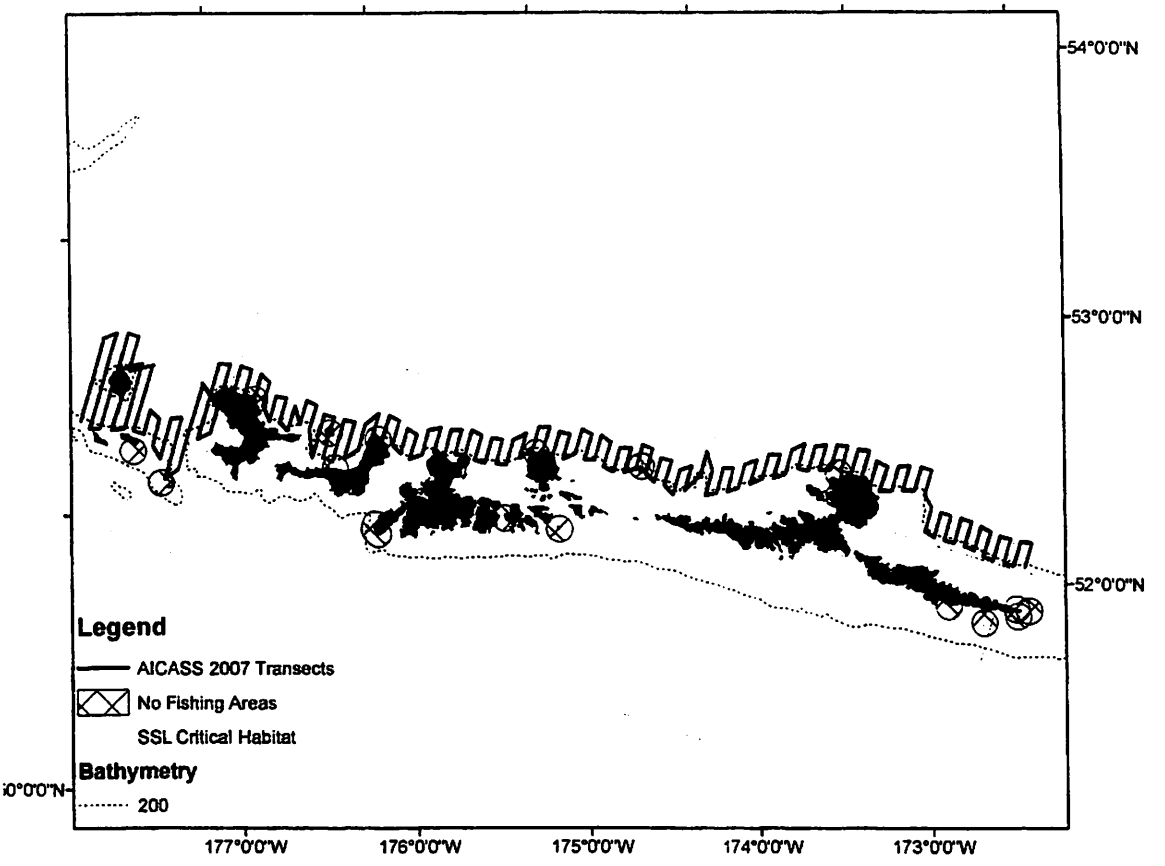



**Figure 9.2 Aleutian Islands Study Area**

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
*National Marine Fisheries Service*
*P.O. Box 21668*
*Juneau, Alaska 99802-1668*

November 27, 2006

MEMORANDUM FOR: Sue Salveson
Assistant Regional Administrator
Sustainable Fisheries Division

FROM: Kaja Brix
Assistant Regional Administrator
Protected Resources Division

SUBJECT: Endangered Species Act Section 7 Consultation on the Aleut Enterprise Corporation Exempted Fishing Permit

The Sustainable Fisheries Division (SFD) initiated formal consultation with the Protected Resources Division (PRD) pursuant to section 7 of the Endangered Species Act for an exempted fishing permit (EFP) to use commercial fishing vessels for acoustic surveys of pollock in the Aleutian Islands subarea on November 8, 2006. PRD reviewed the environmental assessment provided with the consultation request and determined that it provided the necessary information to initiate consultation. PRD has completed formal consultation on this EFP and is providing to SFD the final Biological Opinion for this consultation.

Attachment

# Endangered Species Act — Section 7 Consultation
# Biological Opinion

Bering Sea and Aleutian Islands Management Area (BSAI)
Groundfish Fishery
Exempted Fishing Permit
Authority: 50 CFR 600.745(b) and 50 CFR 679.6
PERMIT #07-01

Lead Action Agency: National Marine Fisheries Service

Consultation Conducted by: National Marine Fisheries Service
Alaska Region

Date Issued: November 27, 2006

Issued by: Robert D. Mecum
Robert D. Mecum
Acting Administrator, Alaska Region

TABLE OF CONTENTS

## INTRODUCTION

The biological opinion (Opinion) and incidental take statement of this consultation were prepared by the National Marine Fisheries Service in accordance with section 7(b) of the Endangered Species Act (ESA) of 1973, as amended (16 USC 1531, et seq.), and implementing regulations at 50 CFR 402. With respect to critical habitat, the following analysis relies only on the statutory provisions of the ESA, and not on the regulatory definition of "destruction or adverse modification" at 50 CFR 402.02.

### Background and Consultation History

On November 8, 2006, the National Marine Fisheries Service (NMFS) Protected Resources Division (PRD) received a written request for ESA section 7 formal consultation from the NMFS Sustainable Fisheries Division (SFD). The SFD proposes to issue an exempted fishing permit (EFP) to support using commercial fishing vessels for acoustic surveys of pollock in the Aleutian Islands subarea. SFD is proposing this action according to its authority under 50 CFR 600.745 and 679.6. Formal consultation was initiated on November 8, 2006.

The project involves the harvest of pollock inside Steller sea lion designated critical habitat. This harvest is necessary to verify acoustic data collected during acoustic surveys using a fishing vessel under an experimental fishing permit and to fund the EFP research. The SFD has determined that the project "may affect, and is likely to adversely affect" the western distinct population segment (population) of Steller sea lion (*Eumetopias jubatus*) and its designated critical habitat. The November 2006 environmental assessment (NMFS 2006) for the proposed action is hereby incorporated by reference into this Opinion as it provides a substantial review of the proposed action.

On April 19, 2006, PRD received a written request from SFD for re-initiation of formal section 7 consultation on the BSAI and GOA groundfish fisheries, as implemented under the respective Fishery Management Plans and State management of parallel fisheries. Re-initiation on the 2000 Biological Opinion was requested by SFD to address potential impacts to listed marine species related to actions associated with the groundfish fisheries in Alaska. PRD concurred with this request and formally re-initiated consultation on June 21, 2006. NMFS expects to complete a draft opinion on the FMPs in 2007. During this FMP-level consultation, NMFS continues to consult on other proposed actions, such as issuance of this EFP, that may affect listed species and critical habitat in the FMP action area. However, the conclusions reached in these biological opinions should not necessarily be viewed as an indication of the conclusions that may be reached in the ongoing FMP-level consultation.

### Proposed Action

The purpose of the one-year EFP is to use commercial fishing vessels to assess pollock abundance and distribution in the portions of the eastern and central Aleutian Islands (Areas 541 and 542) susceptible to an Adak based small boat fishery and to test the technical feasibility of setting pollock quotas at a finer temporal and spatial resolution using near real-time acoustic surveying. Two acoustic surveys will be conducted, surveying the area between 173°W longitude to 179°W longitude on the north side of the Aleutian Island archipelago and compensatory fishing will be allowed between the two surveys. NMFS currently does not have resources to conduct winter acoustic surveys of pollock in the Aleutian Islands subarea. The acoustic and biological information from the project will provide a baseline assessment of pollock biomass and

distribution in the area susceptible to an Adak-based small boat fishery and help to determine if the local aggregations of pollock are stable enough during the spawning season to allow for fine-scale spatial and temporal quotas. Additionally, genetic samples will be collected during this study that will be used for stock structure analysis. Better information may lead to improved conservation and harvest management at finer spatial and temporal scales for the Aleutian Islands subarea pollock.

The EFP is necessary to allow the applicant to fish for pollock in the study area, inside Steller sea lion protection areas, including critical habitat, which is currently closed to commercial pollock fishing. Pollock fishing is necessary to verify acoustic sign and financially support the survey effort. Exemption from portions of the Steller sea lion pollock fishery closures are necessary to ensure the participants encounter enough pollock to complete acoustic survey work with commercial vessels in the Aleutian Islands subarea and to fund the EFP research. The time period of the project is late February 2007, through April 30, 2007, with the possibility of modifying the permit for an extension up to 12 months to complete the work. This BO, however, will examine only one year of fishing.

The acoustic and biological information from the project will be used to determine; 1) if the data collected in such a manner is of sufficient quality for management purposes, and 2) if the local aggregations of pollock are stable enough during spawning season to allow for fine scale spatial and temporal management. Additionally, genetic samples will be collected during this study that will be used for stock structure analysis. Improved information may lead to improved conservation and potentially finer spatial and temporal harvest management of the Aleutian Islands subarea pollock. Improved harvest management of the Aleutian Islands pollock stock is needed based on the high uncertainty in the stock structure and the potential effects of the fishery on Steller sea lion populations.

Appendix A of NMFS (2006), contains the cruise plan for the project which is a detailed description of the work to be performed under the EFP. The project has three phases: 1) sonar calibration and self noise testing, 2) parallel transect acoustic surveying and 3) verification and compensatory fishing. Phase 3 includes acoustic and biological data sampling. To verify the acoustic data and to support the study, 3000 mt of walleye pollock would be harvested within the project area that includes waters within 20 nautical miles (nm) to 0 nm of Steller sea lion haulouts and within 3 to 20 nm of rookeries. Harvests in waters 0 nm to 3 nm of haulouts is limited to only enough fish to verify acoustic sign and no more than 10 mt per tow. All compensatory fishing is limited to outside of 3 nm of rookeries and haulouts. Conducting the project within Steller sea lion critical habitat (Figure 2) is necessary because pollock aggregations must be encountered to support the work, and historical information about the occurrence of pollock indicates that pollock aggregations are likely to occur inside critical habitat. As seen in the 2005 pollock fishery, it may be difficult to conduct the project outside of critical habitat because of the difficulty in finding sufficient quantities of pollock.

**Action Area**

"Action area" means all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action (50 CFR 402.02(d)). The acoustic survey and compensation fishing will take place in the Aleutian Islands subarea in up to six one degree blocks of longitude on the north side of the Aleutian Island chain, between 173 and 179 degrees west longitude. Fishing activities would include State waters which requires permission from the Alaska Department of Fish and Game (ADF&G).

The site is the area delimited by the northern boundary of 52° 35' latitude and a southern boundary of 51° 35' latitude. The eastern boundary is 173° 00' longitude W, and the western boundary is 179° 00' (Figure 1). This area is located within statistical areas 541 and 542 of the BSAI.

Most activities associated with the action occur within the project area between 173° and 179° W longitude. NMFS has determined that the entire area between these longitudes as described above is likely to be directly or indirectly affected by the proposed action. The project area includes Steller sea lion rookeries, haulouts and a portion of the Seguam Foraging Area. NMFS recognizes that listed species and their prey move in and out of these areas. In particular, Steller sea lions likely travel into this area from other nearby haulouts and foraging areas. Thus direct and indirect impacts to individuals as a result of the action may be carried with them when they are not in the action area. Further, prey resources (e.g. pollock) move throughout the project area, especially during the winter during spawning season. For the purpose of this consultation the action area includes all waters within the exclusive economic zone (EEZ) within the Central Aleutian Islands area (CAI) as defined by Steller sea lion survey areas (from Samalga Pass to Kiska Island; see Figure 4).

The action area is used by the western population of Steller sea lions for foraging, migration, hauling out, and reproduction. The action area includes Steller sea lion critical habitat as defined at 50 CFR 226.202 (Figure 3).

## BIOLOGICAL OPINION

The ESA establishes a national program to conserve threatened and endangered species of fish, wildlife, plants, and the habitat on which they depend. Section 7(a)(2) of the ESA requires Federal agencies to consult with U.S. Fish and Wildlife Service, NMFS, or both, to ensure that their actions are not likely to jeopardize the continued existence of endangered or threatened species or adversely modify or destroy their critical habitats. Section 7(b)(4) requires the provision of an incidental take statement that specifies the impact of any incidental taking and includes reasonable and prudent measures to minimize such impacts.

This Opinion presents NMFS' review of the status of the western population of Steller sea lion, the condition of designated critical habitat, the environmental baseline for the action area, all the effects of the action as proposed, and cumulative effects (50 CFR 402.14(g)). For the jeopardy analysis, NMFS analyzes those combined factors to conclude whether the proposed action is likely to appreciably reduce the likelihood of both the survival and recovery of the affected listed species.

The critical habitat analysis determines whether the proposed action will destroy or adversely modify designated critical habitat for listed species by examining any change in the conservation value of the essential features of that critical habitat. This analysis relies on statutory provisions of the ESA, including those in section 3 that define "critical habitat" and "conservation," in section 4 that describe the designation process, and in section 7 that sets forth the substantive protections and procedural aspects of consultation. The regulatory definition of "destruction or adverse modification" at 50 CFR 402.02 is not used in this Opinion.

### Status of Listed Resources

NMFS has determined that the action being considered in the Opinion may adversely affect the western population of Steller sea lion and its designated critical habitat.

**Steller sea lion – western population**

***Species description:*** The Steller sea lion (*Eumetopias jubatus*) is the only species of the genus *Eumetopias*, and is a member of the family Otariidae, order Pinnipedia. The closest relatives of the Steller sea lion appear to be the other sea lion genera, including *Zalophus*, *Otaria*, *Neophoca*, and *Phocarctos*, and fur seals of the genera *Callorhinus* (Northern fur seals) and *Arctocephalus*. Loughlin et al. (1987) provide a brief but informative summary of the fossil record for *Eumetopias*. Repenning (1976) suggests that a femur dated three to four million years old may have been from an ancient member of the *Eumetopias* genus, thereby indicating that the genus is at least that old. *Eumetopias jubatus* likely evolved in the North Pacific (Repenning 1976).

***Reason for Listing:*** Due to a significant decline in total numbers of 64% over a 30-year period, on November 26, 1990, NMFS issued an emergency rule listing the Steller sea lion as threatened under the ESA (55 FR 40204). On August 27, 1993 (58 FR 45269) critical habitat was designated based on observed movement patterns. In 1997 the Steller sea lion population was split into two distinct population segments (western and eastern populations) based on demographic and genetic dissimilarities (Bickham et al. 1996, Loughlin 1997) (62 FR 30772). Population Viability Analysis (PVA) models indicated a continued decline at the 1985-1994 rate would result in extinction of the western population in 100 years or a 65% chance of extinction if the 1989-1994 trend continued (62 FR 24354), therefore the status of the western population was changed to endangered. Although increasing in numbers, the eastern population remained listed as threatened because NMFS believed that the large decline in the overall U.S. population threatened the continued existence of the entire species (62 FR 24354).

***Status and trend:***

Overview: The western population of Steller sea lions decreased from an estimated 245,000-290,000 animals in the late 1970s to less than 50,000 in 2000 (Table 1). The decline began in the 1970s in the eastern Aleutian Islands (Braham et al. 1980), western Bering Sea/Kamchatka and the Kuril Islands (Table 3). In Alaska, the decline spread and intensified east and west of the eastern Aleutians in the 1980s, and persisted at a slower rate through 2000 (Sease et al. 2001). The 12% increase in numbers of non-pups counted in the Alaskan range of the western population between 2000 and 2004 was the first region-wide increase observed during more than two decades of systematic surveys. The observed increase, however, has not been spread evenly among all regions of Alaska. Increases were noted in the eastern and western Gulf of Alaska, and in the eastern and central Aleutian Islands, while the decline persisted through 2004 in the central Gulf of Alaska and the western Aleutian Islands. Non-pup counts at all western-stock trend sites in Alaska in 2004 were similar to the 1998 total, but were still 33% lower than the number counted in 1990 (Table 1). In Russia, both pup and non-pup data indicate that sea lion numbers are increasing at Sakhalin Island and in the Sea of Okhotsk and likely at the Commander Islands (Table 3). However, non-pup numbers in Kamchatka and the Kuril Islands, the former core of the Russian range, declined substantially through the late 1980s, but have increased slightly through 2005. The number of western Steller sea lions throughout its range in Alaska and Russia in 2005 is estimated at approximately 60,000 (44,800 in Alaska, and 16,000 in Russia).

Steller sea lions use 38 rookeries and hundreds of haul-out sites within the range of the western population in Alaska (Figures 3 and 4). The first reported counts of Steller sea lions in Alaska were made in 1956-1960 (Kenyon and Rice 1961, Mathisen and Lopp 1963), and these totaled

approximately 140,000 for the Gulf of Alaska (GOA) and Aleutian Islands (AI) regions (Merrick et al. 1987). Subsequent surveys showed a major decline in numbers first detected in the eastern AI in the mid-1970s (Braham et al. 1980). The decline spread eastward to the central GOA during the late 1970s and early 1980s and westward to the central and western AI during the early and mid 1980s (Merrick et al. 1987, Byrd 1989). Approximately 110,000 adult and juvenile sea lions were counted in the Kenai-Kiska region in 1976-1979, and by 1985 and 1989, counts had dropped to about 68,000 (Merrick et al. 1987) and 25,000 (Loughlin et al. 1990), respectively. Since 1990 when Steller sea lions were listed under the ESA, complete surveys have been conducted throughout their range in Alaska every 1 or 2 years (Merrick et al. 1991, 1992, Sease et al. 1993, 1999, 2001, Strick et al. 1997, Sease and Loughlin 1999, Sease and Gudmundson 2002, Fritz and Stinchcomb 2005).

Between the late 1950s and the mid 1970s, sea lion populations in parts of the Alaskan range of the western stock may have begun to drop (Table 1). From the mid-1970s to 1990 the overall western population in Alaska declined by over 70%, with the largest declines in the AI (76% to 84%) and smaller declines in the GOA (23% to 71%; Table 1). Between 1990 and 2000, trend site counts continued to decline, though more slowly than in the 1980s, resulting in total reduction of almost 90% since the 1950s and 83% since the 1970. Sub-area declines from 1990 to 2000 had a different pattern than in the 1970s-1990 period, with smaller changes in the center of the Alaskan range (western GOA and eastern and central Aleutians: -32% to +1%) and larger declines at the edges (eastern and central GOA and western Aleutians: -54% to –64%). The average rate of decline between 1990 and 2000 for all trend sites in the western population was 5.1% per year (Sease et al. 2001).

Between 2000 and 2004, Kenai-Kiska and western Alaska population trend site counts of non-pup Steller sea lions increased by 12% (Table 1; Figure 6; Fritz and Stinchcomb 2005). Increases were not spread evenly across the range in Alaska, however. Non-pup counts increased by over 20% in the eastern Aleutian Islands and in the eastern and western GOA, and by 10% in the central Aleutian Islands (Table 5), but were lower by as much as 16% in the central GOA and western Aleutians (Table 1; Figure 7). While overall non-pup counts from 2000 to 2004 increased, counts in the western GOA and eastern AI had essentially no detectable trend between 1990 and 2004, suggesting that western Steller sea lions in the core of their Alaskan range may currently be oscillating around a new lower mean level.

A non-pup survey was conducted in 2006 (Fritz and Gelatt 2006). However it did not result in a complete assessment of the population. Weather problems and a court-ordered injunction on research activities delayed the survey and truncated the completion date. In 2006, NMFS was able to survey 53 of the 87 trend sites, and thus we cannot update the range-wide trend for the western DPS. However, we did survey all of the 1990s trends sites in the EGOA and EAI, and all but one site in the WGOA and WAI; this allows for some comparisons of sub-areas. Counts of 1990s trends sites for the EGOA, EAI, and WGOA were essentially unchanged from 2004 to 2006. For each of these 3 sub-areas, counts had increased considerably (20-43%) between 2000 and 2004. Thus, the 2006 count indicates that the population of adult and juvenile Steller sea lions in these areas may have stabilized. In the WAI, non-pup counts on the 9 trend sites surveyed in 2006 declined 19% from 2004, suggesting that the decline observed in the WAI may be continuing.

Using the methods described in Loughlin et al. (1992), Loughlin (1997) estimated that the non-pup U.S. western population totaled approximately 177,000 in the 1960s; 149,000 in the 1970s; 102,000 in 1985; 51,500 in 1989; and only 33,600 in 1994. Using similar methods, Loughlin and York (2000) estimated the number of non-pups in the U.S. western population in 2000 at

about 33,000 animals. Using a different method, Ferrero et al. (2000) and Angliss and Lodge (2004) estimated the minimum abundance of the western U.S. population in 1998 at 39,031 and in 2001-2004 at 38,206, respectively, a decline of over 80% since the late 1970s.

Pups have been counted less frequently than non-pups, but the overall trends since the late 1970s have been similar to counts of non-pups (Table 2). The number of pups counted in the Kenai-Kiska region declined by 70% from the mid-1980s to 1994, with large declines (63% to 81%) in each of the four sub-areas. From 1994 to 2001-02, Kenai-Kiska pup counts decreased another 19%, with the largest change (-39%) observed in the central GOA. The overall decline in the number of pups in the Kenai-Kiska region from the mid-1980s through 2002 was 76%. Pup counts in the eastern GOA (not included in the Kenai-Kiska region) declined by 35% from 1994 to 2002, while in the western Aleutian Islands, pup counts declined by 50% between 1997 and 2002 (Table 2). Between 2001-02 and 2005, increases in pup counts were noted in the eastern and western GOA and eastern AI, while pup counts declined in the central GOA and central and western AI. In June-July 2005, a medium format aerial survey for pups was conducted from Prince William Sound to Attu Island, which provided the first complete pup count for all western stock rookeries in Alaska (n = 9,951 pups; NMML, unpublished). Using the 'pup' estimator (4.5) yields an estimate of approximately 44,800 Steller sea lions in the range of the western stock in Alaska (Calkins and Pitcher 1982).

Steller sea lions use 10 rookeries and approximately 77 haul-out sites within the range of the western population in Russia (Figure 4). Of these 77 haul-outs, three had been rookeries but presently no breeding occurs there, 49 are active haul-out sites, 20 have been abandoned (no sea lions seen there for the past 5-10 years), and five have inadequate information to assess their status. Analysis of available data collected in the former Soviet Union indicates that in the 1960s, the Steller sea lion population totaled about 27,000 (including pups), most of which were in the Kuril Islands (Tables 3 and 4). Between 1969 and 1989, numbers of adult and juvenile sea lions at major rookeries and haul-outs in the Kuril Islands alone declined 74% (Merrick et al. 1990). By the late 1980s and early 1990s, the total Russian population had declined by approximately 50% to about 13,000 (including pups) (Burkanov and Loughlin 2006). Since the early 1990s, the population has increased in most areas, and in 2005, is estimated to number approximately 16,000 (including pups) (Burkanov and Loughlin 2006).

Modeling studies based primarily on data collected in the central GOA indicate that the decline experienced by the western sea lion population in Alaska in the 1980s was largely caused by a steep drop in the survival rate of juveniles, perhaps by as much as 20-30% (York 1994, Pascual and Adkison 1994, Holmes and York 2003). However, the decline at this time was also associated with smaller decreases in adult survival and female fecundity (Holmes and York 2003). The drop in fecundity would not have been predicted based on density-dependence alone. Subsequent to the 1980s, demographic models indicate that juvenile and adult survival rates rebounded to levels similar to those of the 1970s stable equilibrium population, but that fecundity continued to decline (Holmes and York 2003).

***Survival and reproduction:*** Changes in the size of a population are ultimately due to changes in one or more of its vital demographic rates. Inputs to the population are provided by reproduction of adults (e.g., birth rates, natality, fecundity; probability that a female of a given age will give birth to a pup each year) and immigration. Outputs from the population include those that leave the population through emigration or death, which can also be inversely described by rates of adult and juvenile survivorship. Estimates of vital rates are best determined in longitudinal studies of marked animals, but can also be estimated through population models fit to time series of counts of sea lions at different ages or stages (e.g., pups, non-pups).

Causes of pup mortality are numerous and include drowning, starvation caused by separation from the mother, disease, parasitism, predation, crushing by larger animals, biting by other sea lions, and complications during parturition (Orr and Poulter 1967; Edie 1977, Maniscalco and Atkinson 2004, ADF&G and NMFS unpublished data). Older animals may die from starvation, injuries, disease, predation, subsistence harvests, intentional shooting by humans, entanglement in marine debris, and fishery interactions (Merrick et al. 1987).

Calkins and Pitcher (1982) estimated mortality rates using life tables constructed from samples collected in the Gulf of Alaska in 1975-1978. The estimated overall mortality from birth to age 3 was 0.53 for females and 0.74 for males; i.e., 47% of females and 26% of males survived the first 3 years of life. Annual mortality rate decreased from 0.132 for females 3-4 years of age, to 0.121 for females 4-5 years old, to 0.112 for females 5-6 years old, and to 0.11 by the seventh year; it remained at about that level in older age classes. Male mortality rates decreased from 0.14 in the third year to 0.12 in the fifth year. Females may live to 30 years-old and males to about 20 (Calkins and Pitcher 1982).

York (1994) produced a revised life table for female Steller sea lions using the same data as Calkins and Pitcher (1982) but a different model. The estimated annual mortality from York's life table was 0.22 for ages 0-2, dropping to 0.07 at age 3, then increasing gradually to 0.15 by age 10 and 0.20 by age 20. Population modeling suggested that decreased juvenile survival likely played a major role in the decline of sea lions in the central Gulf of Alaska during 1975-1985 (Pascual and Adkison 1994; York 1994; Holmes and York 2003). This is supported by field observations on two major rookeries in the western population. The proportion of juvenile sea lions counted at Ugamak Island was much lower in 1985 and 1986 than during the 1970s, suggesting that the mortality of pups/juveniles increased between the two periods (Merrick et al. 1988). A decline in the proportion of juvenile animals also occurred at Marmot Island during the period 1979-1994. A very low resighting rate for pups marked at Marmot Island in 1987 and 1988 suggested that the change in proportions of age classes was due to a high rate of juvenile mortality (Chumbley et al. 1997).

Detailed information on Steller sea lion reproduction has been obtained from examinations of reproductive tracts of dead animals. These studies have shown that female Steller sea lions reach sexual maturity at 3-6 years of age and may produce young into their early 20s (Mathisen et al. 1962; Pitcher and Calkins 1981). Adult females normally ovulate once each year, and most breed annually (Pitcher and Calkins 1981). Males reach sexual maturity between 3 and 7 years of age and physical maturity by age 10 (Perlov 1971; Pitcher and Calkins 1981). Males are territorial during the breeding season, and one male may breed with several females. Thorsteinson and Lensink (1962) found that 90% of males holding territories on rookeries in the western Gulf of Alaska were between 9 and 13 years of age while Raum-Suryan et al.(2002) found that males marked on Marmot Island as pups first became territorial at 10 and 11 years of age.

In samples collected in the Gulf of Alaska in the mid-1980s, Calkins and Goodwin (1988) found that 97% of females aged 6 years and older had ovulated. Ninety-two percent of females 7-20 years old were pregnant when they were collected in October during early implantation. The pregnancy rate of sexually mature females collected during April-May (late gestation) was only 60%, indicating that a considerable amount of intrauterine mortality and/or premature births occurred after implantation. Estimates of near-term pregnancy rates were 67% from a collection of females taken from 1975-1978 and 55% from a similar collection during the mid-1980s (Pitcher et al., 1998), but the difference was not statistically significant between periods (P =

0.34). Examination of reproductive tracts from female Steller sea lions killed near Hokkaido, Japan in 1995-96 showed that the pregnancy rate for females that had ovulated was 88% (23/26) (Ishinazaka and Endo 1999). These samples were collected in January and February so this estimated pregnancy rate was much higher compared to the late-term rates of 55-67% estimated for sea lions from Alaska.

***Habitat use:*** Steller sea lions use a variety of marine and terrestrial habitats. Haulouts and rookeries tend to be preferentially located on exposed rocky shoreline and wave-cut platforms. Some rookeries and haulouts are also located on gravel beaches. Rookeries are nearly exclusively located on offshore islands and reefs. Terrestrial sites used by Steller sea lions tend to be associated with waters that are relatively shallow and well-mixed, with average tidal speeds and less-steep bottom slopes. When not on land, Steller sea lions are seen near shore and out to the edge of the continental shelf and beyond.

Limited data are available concerning the foraging behavior of adult Steller sea lions. Adult females alternate trips to sea to feed with periods on shore when they haul out to rest, care for pups, breed, and avoid aquatic predators. Conversely, territorial males may fast for extended periods during the breeding season when they mostly remain on land (Spalding 1964; Gentry 1970; Withrow 1982; Gisiner 1985). Females with dependent young are constrained to feeding relatively close to rookeries and haulouts because they must return at regular intervals to feed their offspring.

Telemetry studies show that in winter adult females may travel far out to sea into water greater than 1,000 m deep (Merrick and Loughlin 1997) and juveniles less than 3 years of age travel nearly as far (Loughlin et al. 2003). The Platforms of Opportunity data base maintained by NMFS shows that they commonly occur near and beyond the 200 m depth contour (Kajimura and Loughlin 1988; NMFS POP data). Some individuals may enter rivers in pursuit of prey (Jameson and Kenyon 1977). In summer while on breeding rookeries, adult females attending pups tend to stay within 20 nm of the rookery (Calkins 1996; Merrick and Loughlin 1997).

Studies using satellite-linked telemetry have provided detailed information on movements of adult females and juveniles. Merrick and Loughlin (1997) found that adult females tagged at rookeries in the central Gulf of Alaska and Aleutian Islands in summer made short trips to sea (mean distance 17 km, maximum 49 km) and generally stayed on the continental shelf. In winter, adult females ranged more widely (mean distance 133 km, maximum 543 km) with some moving to seamounts far offshore. Most pups, which were tracked during the winter, made relatively short trips to sea (mean distance 30 km), but one moved 320 km from the eastern Aleutians to the Pribilof Islands. Adult females with satellite transmitters in the Kuril Islands in summer made short at-sea movements similar to those seen in Alaska (Loughlin et al. 1998).

Behavioral observations indicate that lactating females spend more time at sea during winter than in the summer. Attendance cycles (consisting of one trip to sea and one visit on land) averaged about 3 days in winter and 2 days in summer (Trites and Porter 2002, Milette and Trites 2003). Time spent on shore between trips to sea averaged about 24 hours in both seasons. The winter attendance cycle of dependent pups and yearlings averaged just over 2 days, suggesting that sea lions do not accompany their mothers on foraging trips (Trites and Porter 2002). Foraging trips by mothers of yearlings were longer on average than those by mothers of pups (Trites and Porter 2002).

Additional studies on immature Steller sea lions indicate three types of movements: long-range trips (greater than 15 km and greater than 20 h), short-range trips (less than 15 km and less than 20 h), and transits to other sites (Raum-Suryan et al. 2004). Long-range trips started around 9 months of age and likely occurred most frequently around the time of weaning while short-range trips happened almost daily (0.9 trips/day, n = 426 trips). Transits began as early as 2.5-3 months of age, occurred more often after 9 months of age, and ranged between 6.5 - 454 km (Raum-Suryan et al. 2004, Loughlin et al. 2003). Some of the transit and short-range trips occur along shore, while long-range trips are often offshore, particularly as ontogenetic changes occur.

Overall, the available data suggest two types of distribution at sea by Steller sea lions: 1) less than 20 km from rookeries and haulout sites for adult females with pups, pups, and juveniles, and 2) much larger areas (greater than 20 km) where these and other animals may range to find optimal foraging conditions once they are no longer tied to rookeries and haulout sites for nursing and reproduction. Loughlin (1993) observed large seasonal differences in foraging ranges that may have been associated with seasonal movements of prey, and Merrick (1995) concluded on the basis of available telemetry data that seasonal changes in home range were related to prey availability.

***Diet:*** Steller sea lions are generalists, feeding on seasonally abundant prey throughout the year. They feed predominately on species that aggregate in schools or for spawning. Prey varies seasonally and geographically. Principal prey species identified from scats include walleye pollock (*Theragra chalcogramma*), Atka mackerel (*Pleurogrammus monopterygius*), Pacific salmon (*Onchorhynchus* sp.) and Pacific cod (*Gadus macrocephalus*) in the western part of the range (Sinclair and Zeppelin 2002). In southeast Alaska, the diet includes walleye pollock, Pacific cod, flatfishes, rockfishes, Pacific herring (*Clupea harengus*), salmon, sand lance, skates, squid, and octopus (Calkins and Goodwin 1988, Trites et al. 2003). Principal prey in British Columbia has included hake, herring, octopus, Pacific cod, rockfish, and salmon (Spalding 1964, Olesiuk et al. 1990). In California and Oregon, rockfish, hake, flatfish, cusk eel, lamprey, other fishes, squid, and octopus have been identified as important prey items (Fiscus and Baines 1966, Jameson and Kenyon 1977, Jones 1981, Treacy 1985). Ephemeral, seasonal prey are also important in local areas, such as the seasonal occurrence of spawning eulachon and Pacific herring in Berners Bay in southeast Alaska that supports up to 7-10% of the southeast Steller sea lion population for about three weeks in April (Sigler et al. 2004, Womble 2005).

Considerable effort has been devoted to describing the diet of Steller sea lions in the Gulf of Alaska, Aleutian Islands, and Bering Sea (Table 6). In the mid 1970s and mid 1980s, Pitcher (1981; n = 250) and Calkins and Goodwin (1988; n = 178) described Steller sea lion diet in the Gulf of Alaska by examining stomach contents of animals collected for scientific studies. Walleye pollock was the principal prey in both studies; octopus, squid, herring, Pacific cod, flatfishes, capelin, and sand lance were also consumed frequently. Stomachs of Steller sea lions collected in the central and western Bering Sea in March-April 1981 contained mostly pollock, and also Pacific cod, herring, sculpins, octopus, and squid (Calkins 1998).

Merrick and Calkins (1996) analyzed Kodiak Island region sea lion stomach contents (n = 263) data from the 1970s and 1980s for seasonal patterns of prey use. They found a significant seasonal difference in diet for the 1970s. Walleye pollock was the most important prey in all seasons except summer in the 1970s, when the most frequently eaten prey type was small forage fishes (capelin, herring, and sand lance). No significant seasonal differences were found in the 1980s. Researchers noted that, overall, small forage fishes and salmon were eaten almost

exclusively during summer, while other fishes and cephalopods were eaten more frequently in spring and fall.

Since 1990, additional information on Steller sea lion diet in Alaska has been obtained by analyzing scats collected on rookeries and haulouts (Merrick et al. 1997; NMFS 2000; Sinclair and Zeppelin 2002). Scat data, like stomach contents, may be biased (e.g., prey species may have hard parts that are more or less likely to make it though the digestive tract; see Cottrell and Trites 2002, Tollit et al. 2003, 2004, Zeppelin et al. 2004), but they allow a description of prey used over a wide geographic range from Kodiak Island through the western Aleutian Islands, and for both summer and winter (Table 6). Results confirmed previous studies that showed pollock to be the dominant prey in the Gulf of Alaska and also indicated that Atka mackerel is the most important prey in the central and western Aleutian Islands. Pacific cod has also been an important food, especially in winter in the Gulf of Alaska, while salmon was eaten most frequently during summer months. Results also indicated a wide variation as certain species that appear to be minor dietary items when data are tabulated for large regions may actually be highly ranked prey for specific rookeries and seasons.

At the far western end of the Steller sea lion range, Atka mackerel, sand lance, rockfish, and octopus were identified as important foods at the Kuril Islands in collections made in 1962 (Panina 1966), and pollock, Pacific cod, saffron cod, cephalopods, and flatfish were the main prey of 62 animals collected near Hokkaido, Japan in 1994 - 1996 (Goto and Shimazaki 1998). NMFS (2000) compiled all the available data on prey occurrence in stomach contents samples for the eastern and western Steller sea lion populations for the 1950s-1970s and the 1980s. For both populations the occurrences of pollock, Pacific cod, and herring were higher in the 1980s than in the 1950s-1970s. These results suggest that the dominance of pollock in the Steller sea lion diet over much of its range may have changed over time. However, studies completed prior to the mid-1970s had small sample sizes and more limited geographic scope. As such, caution should be exercised when extrapolating from these limited samples to a description of the diet composition of Steller sea lions in the 1950s -1970s.

Stomach contents analysis indicate that Steller sea lions have a mixed diet. Although it is not uncommon to find stomachs that contain only one prey species, most collected stomachs contained more than one type of prey (Merrick and Calkins 1996; Calkins 1998). Merrick and Calkins (1996) found that the probability of stomachs containing only pollock was higher for juveniles than for adults, and small forage fish were eaten more frequently by juveniles while flatfish and cephalopods were more frequently eaten by adults.

***Diving behavior:*** Steller sea lions generally feed at shallow depths. The average dive depth for adult females is 21 m but females can dive in excess of 250 m. Average dive depths for pups in Alaska were 7.7 m with a maximum depth up to 252 m and for yearlings, an average depth of 16.6 m and maximum of 288 m (Loughlin et al. 2003). There is often a diel component (vertical migration in the water column between day and night) to their diving that is consistent with foraging on vertically migrating prey such that diving is shallow at night when prey moves to the surface, and deeper during the day when prey is located deeper in the water column (Merrick and Loughlin 1997, Loughlin et al. 2003).

***Resource requirements especially during the winter season:*** Changes in behavior, foraging patterns, distribution, and metabolic or physiological requirements during the Steller sea lion annual cycle are all pertinent to consideration of the potential impact of prey removal by commercial fisheries. Steller sea lions, at least adult females and juveniles, are unlike most marine mammals that store large amounts of fat to allow periods of fasting. Sea lions need

more or less continuous access to food resources throughout the year. Nevertheless, the sensitivity of sea lions to competition from fisheries may be higher during certain times of the year. Reproduction likely places a considerable physiological or metabolic burden on adult females throughout their annual cycle. Following birth of a pup, the female must acquire sufficient nutrients and energy to support both herself and her pup. The added demand may persist until the next reproductive season, or longer, and is exaggerated by the rigors and requirements of winter conditions. The metabolic requirements of a female that has given birth and then become pregnant again are increased further to the extent that lactation and pregnancy overlap and the female must support her young-of-the-year, the developing fetus, and herself. And again, she must do so through the winter season when metabolic requirements are likely to be increased by harsh environmental conditions.

Weaned pups may be independent of their mothers, but may not have developed adequate foraging skills. They must learn those skills, and their ability to do so determines, at least in part, whether they will survive to reproductive maturity. This transition to nutritional independence is likely confounded by a number of seasonal factors. Seasonal changes may severely confound foraging conditions and requirements; winter months bring harsher environmental conditions (lower temperatures, rougher sea surface states) and may be accompanied by changing prey concentrations and distributions (Merrick and Loughlin, 1997). Weaned pups' lack of experience may result in greater energetic costs associated with searching for prey. Their smaller size and undeveloped foraging skills may limit the prey available to them, while at the same time, their small size results in relatively greater metabolic and growth requirements.

Other times of the year are also important for Steller sea lions. Preparation for winter may make foraging during the fall more important. Spring is also important as pregnant females will be attempting to maximize their physical condition to increase the likelihood of a large, healthy pup (which may be an important determinant of the subsequent growth and survival of that pup). Similarly, those females that have been nursing a pup for the previous year and are about to give birth may wean the first pup completely, leaving that pup to survive solely on the basis of its own foraging skills. Thus, food availability is surely important year-round, although it may be particularly important for juvenile animals and pregnant-lactating females during the winter.

***Summary of Steller sea lion status:*** As noted, Steller sea lions were first listed as threatened under the ESA in 1990 due to a significant unexplained population decline of 64% over a 30-year period. This listing conveyed that the species was likely to become endangered within the foreseeable future throughout all or a portion of its range. In 1997, the species was separated into western and eastern populations, and the western population was listed as endangered. At the time of this listing, the population was considered to be in danger of extinction in all or a portion of its range. PVA models indicated that the western population would be extinct in 100 years if the population trends at that time remained unchanged.

The U.S. portion of the western population continued to decline through the 1990s at about 5% annually. Between 2000 and 2004, the population increased at about 3% per year, with most portions of the range showing signs of recovery. The increase appears to be driven by increases in juvenile survival while pup production may still be in decline or possibly beginning to stabilize. The increasing trend in the population was observed in two surveys and thus must be observed for at least two more surveys before we can affirm that the population is indeed recovering. Unfortunately, the 2006 survey was incomplete and limited information can be gained from it on the overall status of the population. Although, results

indicated continued declines in the WAI and general stability across other areas. Because this population still faces substantial threats, the observed increases are very short compared to the long time period of decline, and although the increase may have abated by 2006, the population is still considered to be at risk of extinction within the next 100 years.

The western population of Steller sea lion sustains some direct mortalities from bycatch in commercial fisheries, subsistence harvest, illegal shootings, and entanglements in fishing gear. These human activities clearly have an adverse effect on individuals in the western population; however, the population-level consequences of these anthropogenic stressors are potentially low compared to competition for prey with commercial fisheries or natural changes in the availability or abundance of prey. Because of the relatively low number of animals (compared to historic observations), the population is considered vulnerable to catastrophic and stochastic events that could result in significant declines, threaten viability, and increase the species' risk of extinction. It is important to note that abundance estimates alone cannot be relied upon as accurate measures of population recovery without a long-term understanding of demographic parameters of the population, variability in the population trends and the effects of natural and anthropogenic stressors on the status of the population.

**Designated critical habitat for Steller sea lions**

On August 27, 1993 NMFS published a final rule to designate critical habitat for the threatened and endangered populations of Steller sea lions (August 27, 1993; 58 FR 45269). The areas designated as critical habitat for the Steller sea lion were determined using the best information available at the time (see regulations at 50 CFR 226.202). This included information on land use patterns, the extent of foraging trips, and the availability of prey items. Particular attention was paid to life history patterns and the areas where animals haul out to rest, pup, nurse their pups, mate, and molt. Critical habitat areas were finally determined based upon input from NMFS scientists and managers, the Steller Sea Lion Recovery Team, independent marine mammal scientists invited to participate in the discussion, and the public (Figure 3)).

***Physical and biological features of Steller sea lion critical habitat:*** Two kinds of marine habitat were designated as critical. First, areas around rookeries and haulout sites were chosen based on evidence that many foraging trips by lactating adult females in summer may be relatively short (20 km or less; Merrick and Loughlin 1997). Also, mean distances for young-of-the-year in winter may be relatively short (about 30 km; Merrick and Loughlin 1997; Loughlin et al. 2003). These young animals are just learning to feed on their own, and the availability of prey in the vicinity of rookeries and haulout sites must be crucial to their transition to independent feeding after weaning. Similarly, haulouts around rookeries are important for juveniles, because most juveniles are found at haulouts not rookeries. Evidence indicates that decreased juvenile survival may be an important proximate cause of the sea lion decline (York 1994, Chumbley et al. 1997), and that the growth rate of individual young sea lions was depressed in the 1980s. These findings are consistent with the hypothesis that young animals were nutritionally stressed. Furthermore, young animals are almost certainly less efficient foragers and may have relatively greater food requirements, which, again, suggests that they may be more easily limited or affected by reduced prey resources or greater energetic requirements associated with foraging at distant locations. Therefore, the areas around rookeries and haulout sites must contain essential prey resources for at least lactating adult females, young-of-the-year, and juveniles, and those areas were deemed essential to protect.

Second, three aquatic areas were chosen based on 1) at-sea observations indicating that sea lions commonly used these areas for foraging, 2) records of animals killed incidentally in fisheries in the 1980s, 3) knowledge of sea lion prey and their life histories and distributions, and 4) foraging studies. In 1980, Shelikof Strait was identified as a site of extensive spawning aggregations of pollock in winter months. Records of incidental take of sea lions in the pollock fishery in this region provide evidence that Shelikof Strait is an important foraging site (Loughlin and Nelson 1986, Perez and Loughlin 1991). The southeastern Bering Sea north of the Aleutian Islands from Unimak Island past Bogoslof Island to the Islands of Four Mountains is also considered a site that has historically supported a large aggregation of spawning pollock, and is also an area where sighting information and incidental take records support the notion that this is an important foraging area for sea lions (Fiscus and Baines 1966, Kajimura and Loughlin 1988). Finally, large aggregations of Atka mackerel are found in the area around Seguam Pass. These aggregations have supported a fishery since the 1970s and are in close proximity to a major sea lion rookery on Seguam Island and a smaller rookery on Agligadak Island. Atka mackerel are an important prey of sea lions in the central and western Aleutian Islands. Records of incidental take in fisheries also indicate that the Seguam area is important for sea lion foraging (Perez and Loughlin 1991).

The status of critical habitat is best described as the status of the important prey resources contained within those areas. These fishery resources are evaluated annually and that description is contained in the stock assessment and fishery evaluation (SAFE) reports. Barbeaux et al. (2005) is incorporated here by reference and provides the background for discussions in the baseline and effects of the action sections of this document pertaining to the removal of pollock resources from the Aleutian Islands subarea.

**Environmental Baseline**

The environmental baseline is an analysis of the effects of past and ongoing human-caused and natural factors leading to the current status of the species or its habitat and ecosystem within the action area. Environmental baselines for biological opinions include past and present impacts of all state, federal or private actions and other human activities in the action area, the anticipated impacts of all proposed federal projects in the action area that have already undergone formal or early section 7 consultation, and the impact of state or private actions that are contemporaneous with the consultation in process (50 CFR 402.02). Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act.

NMFS describes the environmental baseline in terms of the biological requirements for habitat features and processes necessary to support all life stages of the species within the action area. When the environmental baseline departs from those biological requirements, the adverse effects of a proposed action on the species or its habitat are more likely to jeopardize the listed species or result in destruction or adverse modification of a critical habitat. Western population Steller sea lions reside in or migrate through the action area. Thus, for this action area, the biological requirements for Steller sea lions are the habitat characteristics that support survival, reproduction, and migration.

**Steller sea lion prey in the Action Area**

The latest information on Aleutian Islands pollock stock status can be found in the 2005 stock assessment (Barbeaux et al. 2005) and in NMFS (2006). From Barbeaux et al. 2005:

*Walleye pollock (Theragra chalcogramma) are distributed throughout the Aleutian Islands with concentrations in areas and depths dependent on season. Generally, larger pollock occur in spawning aggregations during February – April. Three stocks of pollock inhabiting three regions in the Bering Sea – Aleutian Islands (BSAI) are identified in the U.S. portion of the BSAI for management purposes. These stocks are: the eastern Bering Sea pollock occupying the eastern Bering Sea shelf from Unimak Pass to the U.S.-Russia Convention line; the Aleutian Islands Region pollock encompassing the Aleutian Islands shelf region from 170°W to the U.S.-Russia Convention line; and the Central Bering Sea—Bogoslof Island pollock. These three management stocks probably have some degree of exchange. The Central Bering Sea—Bogoslof stock is a group that forms a distinct spawning aggregation that has some connection with the deep water region of the Aleutian Basin. In the Russian Exclusive Economic Zone (EEZ), pollock are thought to form two stocks, a western Bering Sea stock centered in the Gulf of Olyutorski, and a northern stock located along the Navarin shelf from 171°E to the U.S.-Russia Convention line. The northern stock is believed to be a mixture of eastern and western Bering Sea pollock with the former predominant. Bailey et al. (1999) present a thorough review of population structure of pollock throughout the north Pacific region. Recent genetic studies using mitochondrial DNA methods have found the largest differences to be between pollock from the eastern and western sides of the north Pacific.*

*Previously, Ianelli et al. (1997) developed a model for Aleutian Islands pollock and concluded that the spatial overlap and the nature of the fisheries precluded a clearly defined "stock" since much of the catch was removed very close to the eastern edge of the region and appeared continuous with catch further to the east. In some years a large portion of the pollock removed in the Aleutian Islands Region was from deep-water regions and appeared to be most aptly assigned as "Basin" pollock. This problem was confirmed in the 2003 Aleutian Islands pollock stock assessment (Barbeaux et al. 2003).*

The time series of pollock biomass in the Aleutian Islands (for two models) is provided in Figure 13. In the late 1990's the biomass was in decline, then after 1999 it began increasing due to better recruitment (Barbeaux et al. 2005). Issues of stock structure are thoroughly described in the assessment, with two major points: (1) generally, the near shore biomass of pollock (critical habitat) is a different stock than the offshore biomass of pollock found off the continental shelf break, and (2) the stock assessment authors did not consider biomass east of 174° W because it is likely that biomass is part of the Bogoslof population or is linked to it in some way that is not well understood.

**Steller sea lion prey use in the Action Area**

Our knowledge of Steller sea lion prey use is largely through the collection and analysis of scat samples (Sinclair and Zeppelin 2002; NMFS unpublished data). Sinclair and Zeppelin (2002) found that the average frequency of occurrence (FO) of pollock in the diet of central Aleutian Islands area Steller sea lions from 1990-1998 was low, and that Atka mackerel appears to have been the primary food source for sea lions (i.e., found in 64.9% of scats; Table 8). Sinclair and Zeppelin (2002) point out that although some of the food items had a low FO when averaged across all samples, some had higher occurrences when looked at during specific seasons or at specific sites (see Sinclair and Zeppelin 2002, their Appendix 1). Specifically, areas within the eastern Aleutian Islands area seem to be more dependent upon pollock with a FO of 59.1% from December – April (Table 8; Region 3). In Table 9, the FO is provided for various cites near Adak in the central Aleutian Islands (Sinclair and Zeppelin 2002; their Appendix 1). Pollock ranked among the top three prey species at both Kasatochi

Island (summer) and at Ulak Island (summer), both of which are rookeries in the Central Aleutian Islands.

Beyond the published literature, NMFS unpublished data are available on scats collected since 1998 in the central Aleutian Islands area near Adak. Table 10 describes the prey items found in scats at Adak, Amlia, and Kasatochi in 1999 and 2000, and Table 11 describes scats at a variety of sites in the central Aleutian Islands since 2001. In general, Atka mackerel was the dominant prey item found, especially during the summer. Pollock was more important in the diet during the winter but was also found at some sites during the summer (Tables 10 and 11; Figure 9). In the most recent samples collected during the winter in 2002, pollock was between 8% and 46% FO at Seguam and Silak (Table 11). In these samples pollock was much more important in the diet than the average values reported above and likely represent the local availability of prey as well as the variability in sampling times. Season appears to be an important consideration as pollock was most often in the diet of Steller sea lions during the winter.

From February 21 through March 1, 2002 the R/V Kaiyo Maru conducted an echo integration-trawl survey (EIT) in the Aleutian Islands area that partially covered the proposed study site (Nishimura et al. 2002). The biomass estimates produced by this survey are considered conservative because the survey was limited to waters deeper than 100m, and a portion of pollock biomass would be expected to be inshore of 100m at this time of year. The 2002 EIT survey estimated pollock abundance within the surveyed areas at approximately 20,000 mt near Atka Island (Leg 2-2) and 18,000 mt near Kanaga Island (Leg 2-4). For the entire survey region from 170° W longitude to 178° W longitude the 2002 EIT survey estimated the pollock biomass to be 123,000 mt.

In summary, pollock is an important prey item for Steller sea lions in the Aleutian Islands, especially in the eastern portion of the area and in other locations where pollock may be available in relatively small aggregations, especially in winter. Based on the differences in the occurrence of pollock in scat samples, pollock may be more important to Steller sea lions using the Atka Island/North Cape haulout than for animals using haulouts near Kanaga Sound. The variability of pollock in the diet of sea lions is likely to be linked to the availability of the prey and is likely to reflect similar patterns as the fishery. Harvest of pollock in the Aleutian Islands has been patchily distributed with some locally high harvest amounts due to dense aggregations of pollock nearshore during spawning. Due to the remoteness of the Aleutian Islands, scat is not frequently collected at many sites which further confounds our ability to draw a clear picture of prey utilization in these areas. From the best information available, pollock is likely to be an important component of Steller sea lion diet in the winter but not during the summer (Tables 10 and 11; Sinclair and Zeppelin 2002). Also from the 2001 Opinion, we know that the ratio of prey biomass available to the biomass consumed by sea lions is the lowest in the Aleutian Islands, and may be lower than what is optimal for their survival (NMFS 2003, their Table III-8). This indicates that sea lions in the Aleutian Islands may be more susceptible to perturbations in the prey field than other areas such as the eastern Bering Sea.

**Fisheries harvest of Steller sea lion prey within the Action Area**

The majority of pollock harvest in the Aleutian Islands subarea has historically taken place inside Steller sea lion critical habitat (Table 13). However, the Aleutian Islands subarea was closed to directed pollock fishing in 1999 (64 FR 3437, January 22, 1999; Table 14) as part of the Steller sea lion conservation measures. The Aleutian Islands subarea was re-opened to

pollock fishing outside of critical habitat in January 2003 (68 FR 204, January 2, 2003; Figure 10). Since 1999, no directed fishing for pollock has occurred inside critical habitat.

The nature of the pollock fishery in the Aleutian Islands region has varied considerably since 1977 due to changes in the fleet makeup and in regulations. During the late 1970s through the 1980s the fishing fleet was primarily foreign (Table 16). In 1989, the domestic fleet began operating in earnest and continued in the Aleutian Islands subarea until 1999.

From 1987 through 1994 between 80% and 100% of the annual catch was taken from the area east of 174° W (Figure 11; Table 17). From 1995-1998, catch in critical habitat ranged from 74% to 97% of the TAC (Figure 11; Table 14). The highest annual catch in the Aleutian Islands area was in 1991 with 98,000 tons, 99% of which was removed from the area east of 174° W, mostly from Amukta Pass (Barbeaux et al., 2005; Table 15). Catch at age data reveal that for 1983 through 1994 the Aleutian Islands catch was largely composed of the 1978 year class (Barbeaux et al., 2005). In 1995 the fishery shifted west and from 1995-1997 the majority (80%-100%) of the annual catch was removed from the area west of 174° W. Most of the annual catch from 1995-1997 was removed from the shelf area north of Adak, Kanaga, and Tanaga Islands in area 542 (Figures 11 and 12). In 1998 the fishery shifted farther west and the majority (66%) of catch was removed from around Buldir Pass in area 543. Since 1998 all pollock catch in the Aleutian Islands area has occurred as incidental catch (about 1,000 tons annually), primarily in the Pacific cod and Atka mackerel fisheries (Table 15).

In the 1990s, within the area west of 174° W, the fishery was concentrated largely in two areas; northwest of Adak Island and northwest of Atka Island (Figures 11 and 12). In both the Kanaga Sound and Atka Island areas, past pollock fishing efforts have been concentrated in the 100 fathom to 500 fathom isobaths. The portion of the area harvest of pollock taken in these sites during the 1990s varied. For Kanaga Sound, the harvest of pollock in the 1990s made up at least 81 % of area 541 harvests (NMFS 2006 their Table 4.1-3). Catch data include directed fishery harvest and incidental take in the Pacific cod fishery.

In the Atka Island site, the harvest of pollock in the 1990s varied from 7 % to 78% of area 541 harvests (NMFS 2006 their Table 4.1-4). It appears that the majority of the Aleutian Islands pollock harvests shifted after 1995 from area 541 to area 542. Much of the harvest in this time period was part of a large 1978 year class (NMFS 2006). In 1998, only 1,837 mt of pollock was harvested in Area 541 with 78 percent of this harvest coming from the Atka Island area. Catch data include directed fishery harvest and incidental take in the Pacific cod fishery.

**Effects of the Action**

"Effects of the action" means the direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that are interrelated or interdependent with that action, that will be added to the environmental baseline (50 CFR 402.02).

Direct effects of the proposed action are primarily related to the removal of pollock from critical habitat. Steller sea lions are likely to be in the action area during the time the project is implemented. The proposed action will reduce the amount of biomass of pollock available to foraging Steller sea lions within critical habitat, potentially modify the prey field through disturbance, and potentially directly interact with Steller sea lions resulting in the death of animals through drowning in the trawl net. Long term effects of the project are unlikely.

**Effects on Steller sea lions**

*Competition for prey resources:* Concentrated harvest of important prey during particular seasons may adversely affect sea lions. For example, during the winter months, sea lions may have relatively infrequent foraging opportunities and may be less able to travel large distances in search of food. Similarly, juvenile sea lions may rely on easy feeding opportunities during periods when they are learning to forage independently. Substantial harvests of sea lion prey during these times may lead to nutritional stress, even if ample food is available at other times of the year.

Competition between pollock fishing vessels in the AI and sea lions can occur at a variety of spatial scales. At the macro-scale, potential impacts of fishing include competition for a common resource and/or shifts in predator-prey relationships that may change the carrying capacity of the ecosystem. Observation of these effects is complicated by natural variability of the ecosystem. At the meso-scale, fisheries can affect the distribution and abundance of groundfish in a region such as Shelikof Strait or Bristol Bay that is important to local groups of sea lions. Finally, at a micro-scale fishing vessels can affect the distribution and abundance of groundfish in specific locations, making it harder for sea lions to prey upon groundfish in those areas. The effects of fisheries on the distribution and abundance of fish species have shorter duration as the spatial scale of impact decreases. Nevertheless, localized depletions of fish that are prey for sea lions can be important for the affected individuals, especially during vulnerable life stages (e.g., juveniles or nursing mothers) and near important habitat areas (e.g., haulouts).

If these reductions in pollock schools occur within the foraging areas of Steller sea lions, the reduced availability of prey may reduce their foraging effectiveness. The effects of these reductions become more significant the longer they last and the reductions are likely to be most significant for juvenile and adult female Steller sea lions during the winter months when these animals have their highest energetic demands.

Information about the potential impacts of trawl fisheries on sea lion prey is mixed (Logerwell 2005). NMFS has conducted a number of experiments to determine whether trawl fisheries alter the prey field for Steller sea lions. For pollock fisheries, of the two years that the experiment was completed, one year of the study observed a change to the prey field and one year did not. Mixed results were also found for the Atka mackerel fishery in the Aleutian Islands (testing of closure areas), while no indication of localized depletion was found for the Pacific cod fishery in the EBS experiment. Conclusions based on the Pacific cod study conflict with an analysis of the Pacific cod fishery using winter survey data from 2001 (Fritz and Brown 2005).

The 2001 Biological Opinion (NMFS 2001) explicitly states that trawl fishing is the most likely fishing activity to negatively impact Steller sea lions both indirectly by removing large quantities of pollock from foraging areas and directly by entanglement in fishing gear. A trawl fishery for pollock within critical habitat has a potential to negatively impact juveniles and adult females. In the winter, satellite telemetry data indicates that adults spent about 20.9% (n=96 locations) of the time at-sea beyond 10 nm from land (NMFS 2003, their Table II-5). Juveniles older than 10 months, spent 32.1% (n=586 locations) of the time at-sea beyond 10 nm from land (NMFS 2003, their Table II-6). Previous analyses from the 1990s indicated that adult females spend 66.7% of their time greater than 20 nm from shore (NMFS

2003, their Table II-1). In general, Steller sea lions are likely to be foraging within the project areas (Table 7).

Juveniles and adult females have been identified as the most likely groups to be negatively impacted by competition with fisheries (Loughlin and York 2000). A decline in juvenile survival and lower reproductive success for adult females, due to reduced prey availability, have been identified as possible causes for the decline in the 1990s (York 1994, Holmes and York 2003). There appears to be a positive correlation between the implementation of conservation measures in the late 1990s and early 2000s and stabilization and recovery in the western population. However, it is too early to conclude whether the recent apparent leveling off is real or necessarily due to the conservation measures implemented. Based on available survey data, the current rate of increase would have to continue for four more years (and be surveyed at two-year intervals during that period) for the increase in numbers to be statistically significant (NMFS 2000).

***Effects of the removal of prey resources:*** The 2006 Aleutian Islands summer bottom trawl survey (AIBTS) area stratification does not line up exactly with the study area and abundance estimates include biomass for areas outside of the proposed study area. In addition it should be noted that the AIBTS survey only accounts for pollock near bottom between the 50m and 500m isobaths and therefore may be a conservative estimate of total pollock abundance. The total AIBTS pollock biomass estimate between 170° W to 170° E longitude was 94,992 mt. The 2006 Aleutian Islands pollock Tier 3a stock assessment estimated the total pollock biomass in the Aleutian Islands between 170° W to 170° E longitude to be approximately 224,750 mt. Using the two sub-area wide estimates this project would remove between 1.3% to 3.2% of the total estimated Aleutian Islands pollock biomass.
From February 21 through March 1, 2002, the R/V Kaiyo Maru conducted an echo integration-trawl survey (EIT) in the Aleutian Islands area that partially covered the proposed study area (Nishimura et al. 2002, Barbeaux et al. 2005). The estimates produced by this survey are considered conservative because the survey was limited to waters deeper than 100 m and did not go inland of Bobrof Island or west of 178° W longitude. The 2002 EIT survey estimated 32,000 mt in the portion of the study area between 173° W and 178° W longitude. For the entire survey region from 170° W to 178° W longitude, the 2002 EIT survey estimated the pollock biomass at 123,000 mt. Given the conservative estimates provided by the 2002 EIT survey, this study would be expected to take less than 9.4 % of the pollock biomass in the study area surveyed in 2002, and less than 2.5% of the pollock biomass for the region between 170° W to 178° W longitude.
The abundance estimates for the 2006 Aleutian Islands Cooperative Acoustic Survey conducted between mid-February and early April 2006 varied from the first to last survey with a density of between 48.9 mt/nm$^2$ and 15.8 mt/nm$^2$ for the 180 nm$^2$ study area. The proposed study area for 2007 will encompass 1,695 nm$^2$ of similar habitat. If the 2006 pollock density levels were consistent for the 2007 study area, pollock biomass in the area would range between 82,960 mt and 26,790 mt. With a 3,000 mt harvest the proposed action would result in a study area wide exploitation of between 3.6% and 11.2% of the pollock biomass.

Pollock is an important prey species for Steller sea lions in the Aleutian Islands especially in the winter. In 2002, pollock was found in 8, 27, and 46% of scat samples collected at three sites sampled in the winter in the central Aleutian Islands (Table 11). In winter, pollock was found in most scats in the eastern Aleutian Islands (59.1%) and much less overall in the central Aleutian Islands (2.7%) as reported in Sinclair and Zeppelin (2002). Based on the differences in the occurrence of pollock in scat samples, pollock may be more important to

Steller sea lions using the Atka Island/North Cape haulout than for animals using haulouts near Kanaga Sound.

Up to 3,000 mt of pollock could be taken from within the action area. The amount of groundfish harvest within 3 nm of a haulout will be limited to 10 mt per tow and tows will be limited to only as many as needed to verify the acoustic data. It is very likely that the majority of the groundfish caught during the EFP fishing will be pollock (NMFS 2006).

The proposed action incorporates a number of measures that will mitigate potential effects on Steller sea lions and their critical habitat, including,

- the overall area of fishing is limited to an area between 173 and 179 degrees longtitude,
- catches will be dispersed across the action area,
- each tow inside 3 nm is limited to 10 mt near haulouts only, for acoustic sign verification and all fishing is prohibited 0-3 nm of rookeries,
- removals are expected to be a very low percentage of available biomass,
- no more than four vessels are used,
- harvest is limited to no more than 1,000 mt in a one degree block,
- no more than one vessel over 60 feet length overall may harvest in a one degree block,
- and the project is of a short duration.

***Synthesis of effects on Steller sea lions:*** Localized removals of pollock may affect foraging Steller sea lions. Animals using critical habitat may be potentially impacted due to their dependence on pollock as a prey species compared to animals further west in the central Aleutian Islands (e.g., NMFS statistical area 542). It is possible that this proposed action may result in localized depletion of pollock prey within the action area. This may affect Steller sea lions relying on pollock in the eastern portion of the central Aleutian Islands. Any impacts on prey would be limited to the animals using the haulouts in the study areas or animals foraging as they pass through the area.

Issuing the EFP would result in up to four vessels harvesting pollock in the project area for approximately three weeks between February 15 and April 30, with a possibility of modifying the permit for an additional year. An extension for another year would result in reinitiation of this consultation. Fishing inside critical habitat would increase the possibility of encountering Steller sea lions during fishing operations. The potential for encounters within 3 nm of haulouts is reduced by the limitations on fishing in this area, as determined by the NMFS scientist to verify the acoustic data. No fishing would occur from 0-3 nm of rookeries. Considering the size of the area (Figure 1) and the relatively small harvest amount, disturbance by a few vessels used in this project is possible but of minor intensity and short duration.

The proposed action may adversely affect some Steller sea lions by increasing the potential for incidental take, disrupting pollock aggregations or reducing available pollock for foraging Steller sea lions, and by disturbance of animals as activities occur in waters where more Steller sea lions may occur (0-10 nm). Because of the small portion of the western population of Steller sea lions that is likely to be present in the project areas and the short duration of the project, any disturbance that may occur, is unlikely to cause population level effects.

**Effects on critical habitat**

There is little information available on the foraging requirements of Steller sea lions at the local or global scale. However, the best available information on prey availability at a relatively broad scale is the analysis that was presented in the 2001 BiOp in Section 5.3.3. In that analysis, NMFS investigated the amount of biomass available by area in the eastern Bering Sea (EBS), AI, and GOA and the amount of prey the local populations of Steller sea lions may require. A number of assumptions were made in the analysis, and the reader should review Section 5.3.3. of the 2001 Biological Opinion (NMFS 2001) for the details of that exercise.

The forage ratio for the EBS (see Table III-8 in NMFS 2003) is much higher than the ratio for a "healthy" stock of Steller sea lions foraging on a theoretical, unfished groundfish population (446 compared to 46 for the "healthy" case)(NMFS 2000, 2001). The forage ratios for the GOA and AI are substantially lower than the EBS and are also below the healthy range. However, the ratio in the Aleutian Islands was only 11 times the amount consumed annually by Steller sea lions which is relatively low and represents a similar fraction to the amount taken by fisheries (e.g., Atka mackerel). Interpretation of these ratios is not straightforward, as Steller sea lions forage on species other than pollock, Pacific cod, and Atka mackerel. This information indicates that fisheries effects are more likely in the AI and the GOA than in the EBS. Therefore, depletion of prey in critical habitat in the Aleutian Islands may be more likely than similar fisheries in other areas.

Due to a lack of data on the distribution of pollock biomass, movements, and spawning aggregations in the Aleutian Islands, it is difficult to predict local effects of the pollock fishery on the prey field. The data on Aleutian Islands pollock is much less than that for EBS pollock. It appears that sea lions consume pollock in the affected area as a portion of a diverse diet often dominated by Atka mackerel (Table 8). Based on forage ratios, removal of 3,000 mt, in this area is likely more of a concern than a similar fishery in either the EBS or perhaps the Gulf of Alaska. We expect that the local harvest rates on the pollock biomass in these two areas would be relatively low (compared to the annual expected harvest rate as determined in the stock assessment). Calculations of local harvest rates for pollock fisheries was made in NMFS (2003 their Table III-7), but not for pollock in the AI in part because that fishery was closed inside critical habitat. Based on the relatively low harvest rate expected in these localized areas, the fact that only four vessels will be used in the EFP, and the conservation measures incorporated into the project, the impact of the action on prey resources for Steller sea lions is unlikely to appreciably reduce the conservation value of that habitat for Steller sea lions.

**Cumulative Effects**

"Cumulative effects" include the effects of future State, tribal, local or private actions, not involving Federal activities, that are reasonably certain to occur in the action area considered in this biological opinion (50 CFR 402.02). Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act. Past and present impacts of non-federal actions are part of the environmental baseline of this biological opinion. Cumulative effects that reduce the capacity of listed species in the action area to meet their biological requirements increase the risk to the viability of the species, and consequently increase the risk that the proposed action on the species or its habitat will result in jeopardy (NMFS 1999). The action area for this proposed action is subject to a

variety of activities which potentially affect the prey field for Steller sea lions as well as result in incidental take.

**Subsistence harvest**

The subsistence harvest of Steller sea lions by Alaska natives results in direct mortalities that are expected to continue into the foreseeable future. These takes represent the highest level of known direct mortality from an anthropogenic source. The primary areas of subsistence harvest of western population Steller sea lions is in the Aleutian Islands (96 animals in 2004; Wolfe et al. 2004). Subsistence harvest may be a substantial source of mortality in the action area within the western population of Steller sea lion.

**State of Alaska managed fisheries**

The State of Alaska (State) manages commercial fisheries, subsistence fisheries, and sport fisheries which occur within the action area. Subsistence and sport fisheries occur for species other than pollock (e.g., halibut, crab, and salmon). However, State managed commercial fisheries do occur within the action area within critical habitat and may take Steller sea lions and reduce the availability of prey. Future State managed fisheries include a new Pacific cod fishery in the Aleutian Islands within State waters (starting in 2006), and a new Aleutian Islands pollock fishery between 174° and 187° W longitude. The Alaska Board of Fisheries has authorized a 3,000 mt State pollock fishery within State managed waters in 2007 and 2008 if this EFP is not authorized, or if only a portion of 3,000 mt harvest under the EFP is authorized. NMFS' assumption here is that the EFP will be authorized and there will be no additional harvest of pollock pursuant to the Board's action. Details of the Board's action are further explained in section 5.0 of NMFS 2006. The Aleutian Islands State Pacific cod and pollock fisheries (pollock fishery contingent on the EFP) could have a substantial impact on the prey availability for Steller sea lions and may result in incidental take. The Aleutian Islands pollock fishery includes conservation provisions, such as 20 nm closures around rookeries and 3 nm closures around haulouts, mitigating potential impacts for Steller sea lions using these waters.

**Alaska State population growth**

Alaska has the lowest population density of all of the states in the United States. Although Alaska's population has increased by almost 50 percent in the past 20 years, most of that increase has occurred in the Cities of Anchorage and Fairbanks. Outside of Anchorage, the largest populations occur on the Kenai Peninsula, the Island of Kodiak, Bethel, and in the Valdez - Cordova region. Outside of the City of Anchorage, few of the cities, towns, and villages would be considered urbanized. Within the action area, Adak represents the largest community and is trying to establish itself as a larger, and growing community in the Aleutian Islands. Their intent is to establish fisheries and a community built on resource development.

**Conclusions**

After reviewing the status of the western population of Steller sea lion and its critical habitat, the environmental baseline for the action area, the effects of the proposed action, and cumulative effects, NMFS concludes that the action, as proposed, is not likely to jeopardize the continued existence of these species and is not likely to destroy or adversely modify designated critical habitat. These conclusions are based on the following considerations.

The action area (CAI; Figure 4) is used extensively by the western population of Steller sea lions. From the 1970s to 2000, the CAI non-pup Steller sea lion population declined by 85%, but from 2000 to 2004 the CAI increase by 10% (roughly 450 animals; Table 1). Pup counts declined by 72% from the mid-1980s to 2001-2002 and continued to decline by 2% to 2005. Diet in the CAI is dominated by Atka mackerel and to a lesser extent pollock, especially during the winter. Pollock spawning aggregations are patchily distributed in the CAI and are likely to be targeted by Steller sea lions in relationship to their availability to them. This appears to be reflective of the food habits data which show patchy reliance on pollock as a prey resource. This has two implications: first, pollock may be locally important to sea lions feeding on those dense aggregations of spawning prey; and second, sea lions in general rely to a greater extent on a variety of prey in the CAI, dominated by Atka mackerel. The proposed action will remove prey from Steller sea lion critical habitat which will likely alter the prey field in which sea lions are likely to forage. However, due to the limited reliance on this prey due to its patchy distribution and the relatively small harvest amounts and intensity of fishing it is unlikely that individual sea lions will be exposed to a stressor that would result in a measurable response. It is also likely that the proposed fishing activity will result in no discernible change to the prey field and the conservation value of critical habitat. Since this project is for only one application, long term effects on prey are very unlikely. At this reduced harvest rate, impacts to the prey field (albeit small) could only be expected to last from hours to potentially a few days at most (Logerwell 2005). Incidental take in the trawl net are unlikely given that only four vessels will be fishing and the take rate in the Alaska groundfish fisheries is relatively low compared to the total of number of vessels fishing and the amount of groundfish harvested compared to the proposed action considered here (Angliss and Lodge 2004).

**Incidental Take Statement**

Section 9 of the ESA and Federal regulations pursuant to section 4(d) of the ESA prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the ESA; provided that such taking is in compliance with the terms and conditions of an incidental take statement. Regulations at 50 CFR 402.14 (i)(1) state that where the Service concludes that an action (or the implementations of any reasonable and prudent alternatives) and the resultant incidental take of listed species will not violate section 7(a)(2), and, in the case of marine mammals, where the unintentional and incidental taking is authorized pursuant to section 101(a)(5) of the Marine Mammal Protection Act of 1972 (MMPA), the Service will provide with the biological opinion a statement concerning incidental take.

However, because no MMPA section 101(a)(5) authorization has been applied for and issued for the proposed action, this opinion does not include an incidental take statement at this time. Once the action agencies or applicant apply for and are issued regulations or authorizations under section 101(a)(5), NMFS will amend this opinion to include an incidental take statement. Any take related to the proposed action occurring without an incidental take statement may result in a violation of the ESA.

**Conservation Recommendations**

Section 7(a)(1) of the ESA directs Federal agencies to use their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of the threatened and endangered species. NMFS has considered conservation recommendations within the design of the EFP; thus, no further recommendations are made for this proposed action.

**Reinitiation of Consultation – Closing Statement**

This concludes formal consultation on activities associated with this one year EFP (permit #07-01) described in the EA for the proposed action (NMFS 2006). As provided in 50 CFR 402.16, reinitiation of formal consultation is required where discretionary federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or designated critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or designated critical habitat not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, the action agency must immediately reinitiate formal consultation on the action.

Should NMFS decide to authorize an extension on the fishing season for this EFP beyond the existing one year authorization for 2007, reinitiation of consultation will be necessary.

## LITERATURE CITED


Angliss, R.P. and K.L. Lodge. 2004. Alaska Marine Mammal Assessments, 2003. U.S. Department of Commerce, NOAA Technical Memorandum NMFS-AFSC-144. 230 p.

Burkanov, V. N., and T. R. Loughlin. In press. Historical distribution and abundance of Steller sea lions on the Asian coast. Marine Fisheries Review.

Barbeaux, S., J. Ianelli, and E. Brown. 2005. "Aleutian Islands Walleye pollock." Stock Assessment and Fishery Evaluation Report for the Groundfish Resources of the Bering Sea and Aleutian Islands, North Pacific Fishery Management Council, 605 W. 4th Avenue, Suite 306, Anchorage, Alaska 99501-2252.

Bickham, J. W., J. C. Patton, and T. R. Loughlin. 1996. High variability for control-region sequences in a marine mammal: implications for conservation and biogeography of Steller sea lions (*Eumetopias jubatus*). J. Mammal. 77:95-108.

Braham, H. W., R. D. Everitt, and D. J. Rugh. 1980. Northern sea lion decline in the eastern Aleutian Islands. J. Wildl. Mgmt. 44:25-33.

Byrd, G. V. 1989. Observations of northern sea lions at Ugamak Island, Buldir, and Agattu Islands, Alaska in 1989. Unpubl. rep., U.S. Fish and Wildlife Service. Alaska Maritime National Wildlife Refuge.

Calkins, D.G. 1996. Movements and habitat use of female Steller sea lions in Southeastern Alaska. Pages 110-134, 166 in: Steller sea lion recovery investigations in Alaska, 1992-1994. Rep from AK. Dep. Fish and Game, Juneau, AK to NOAA, Wildlife Technical Bulletin 13, May 1996.

Calkins, D.G. 1998. Prey of Steller sea lions in the Bering Sea. Biosphere Conservation 1:33-44.

Calkins, D.G., and K.W. Pitcher. 1982. Population assessment, ecology and trophic relationships of Steller sea lions in the Gulf of Alaska. Pages 447-546, *in*: Environmental assessment of the Alaskan continental shelf. U.S. Dept. Comm. and U.S. Dept. Int., Final Rep. Principal Investigators, 19:1-565.

Calkins, D.G., and E. Goodwin. 1988. Investigation of the declining sea lion population in the Gulf of Alaska. Unpubl. Rep., Alaska Dep. Fish and Game, 333 Raspberry Road, Anchorage, AK 99518. 76 pp.

Chumbley, K., J. Sease, M. Strick, and R. Towell. 1997. Field studies of Steller sea lions (*Eumetopias jubatus*) at Marmot Island, Alaska 1979 through 1994. NOAA Tech. Memo. NMFS-AFSC-77. 99 pp.

Cottrell, P.E. and A.W. Trites. 2002. Classifying prey hard part structures recovered from fecal remains of captive Steller sea lions (*Eumetopias jubatus*). Marine Mammal Science 18:525-539.

Edie, A. G. 1977. Distribution and movements of Steller sea lion cows (*Eumetopias jubata*) on a pupping colony. Unpubl. M.S. thesis, Univ. British Columbia, Vancouver. 81 pp.

Ferrero, R. C., D. P. DeMaster, P. S. Hill, M. M. Muto, and A. L. Lopez. 2000. Alaska marine mammal stock assessments. NOAA Tech. Memo. NMFS-AFSC-119. 191 pp.

Fritz, L. W., and C. Stinchcomb. 2005. Aerial, ship, and land-based surveys of Steller sea lions (*Eumetopias jubatus*) in the western stock in Alaska, June and July 2003 and 2004. U.S. Dep. Commer., NOAA Tech. Memo. NMFS-AFSC-153, 56 p.

Fritz, L. W., and T. Gelatt. 2006. Survey of adult and juvenile Steller sea lions, June 2006. Memorandum to the record. U.S. Department of Commerce, National Marine Mammal Laboratory, 7600 Sand Point Way NE, Seattle, WA, 98115.

Fiscus, C.H., and G.A. Baines. 1966. Food and feeding behavior of Steller and California sea lions. J. Mamm. 47:218-223.

Gentry, R. L. 1970. Social behavior of the Steller sea lion. Unpubl. Ph.D. thesis, Univ. California, Santa Cruz. 113 pp.

Gisiner, R. C. 1985. Male territorial and reproductive behavior in the Steller sea lion, *Eumetopias jubatus*. Ph.D. Thesis, Univ. California, Santa Cruz. 145 pp.

Goto, Y., and K. Shimazaki. 1998. Diet of Steller sea lions off the coast of Rausu, Hokkaido, Japan. Biosphere Conservation (1)2:141-148.

Holmes, E.E., and AE. York. 2003. Using ages structure to detect impacts on threatened populations: a case study with Steller sea lions. Conservation Biology 17(6):1794-1806.

Ishinazaka, T., and T. Endo. 1999. The reproductive status of Steller sea lions in the Nemuro Strait, Hokkaido, Japan. Biosphere Conservation 2(1):11-19.

Jameson, R.J., and K.W. Kenyon. 1977. Prey of sea lions in the Rogue River, Oregon. J. Mamm. 58:672

Jones, R.E. 1981. Food habits of smaller marine mammals from northern California. Proc. Calif. Acad. Sci. 42:409-433.

Kajimura, H., and T.R. Loughlin. 1988. Marine mammals in the oceanic food web of the eastern subarctic Pacific. Bull. Ocean Res. Inst. 26:187-223.

Kenyon, K. W., and D. W. Rice. 1961. Abundance and distribution of the Steller sea lion. J. Mamm. 42:223-234.

Logerwell, L. 2005. Presentation and document presented to the North Pacific Fisheries Management Council in June 2005 on the results of fisheries experiments by the Alaska Fisheries Science Center. Document dated June 6, 2005; 18 pages.

Loughlin, T.R. 1993. Status and pelagic distribution of otariid pinnipeds in the Bering Sea during winter. OCS study, MMS 93-0026. 58 pp.

Loughlin, T.R. 1997. Using the phylogeographic method to identify Steller sea lion stocks. Pages 159-171, *in*: A. E. Dizon, S. J. Chivers, and W. F. Perrin (eds.), Molecular Genetics of Marine Mammals. Society for Marine Mammalogy Spec. Publ. 3.

Loughlin, T.R., and R. Nelson, Jr. 1986. Incidental mortality of northern sea lions in Shelikof Strait, Alaska. Mar. Mamm. Sci. 2:14-33.

Loughlin, T.R., M.A. Perez, and R.L. Merrick. 1987. *Eumetopias jubatus*. Mammalian Species Account No. 283. Publ. by Amer. Soc. Mamm. 7 pp.

Loughlin, T.R., A.S. Perlov, and V.A. Vladimirov. 1990. Survey of northern sea lions (*Eumetopias jubatus*) in the Gulf of Alaska and Aleutian Islands during June 1989. U.S. Dep. Comm., NOAA Tech. Memo. NMFS F/NWC-176. 26 pp.

Loughlin, T.R., A.S. Perlov, and V.A. Vladimirov. 1992. Range-wide survey and estimation of total number of Steller sea lions in 1989. Mar. Mamm. Sci. 8:220-239.

Loughlin, T.R., A.S. Perlov, J.D. Baker, S.A Blokhin, and A.G. Makhnyr. 1998. Diving behavior of adult female Steller sea lions in the Kuril Islands, Russia. Biosphere Conservation 1:21-31.

Loughlin, T. R., and A. E. York. 2000. An accounting of the sources of Steller sea lion, *Eumetopias jubatus*, mortality. Mar. Fish. Rev. 62(4):40-45.

Loughlin, T. R., J. T. Sterling, R. L. Merrick, J. L. Sease, and A. E. York. 2003. Diving behavior of immature Steller sea lions (*Eumetopias jubatus*). Fish. Bull. Vol. 101, no. 3, pp. 566-582.

Maniscalco and Atkinson 2004

Mathisen, O. A., R. T. Baade, and R. J. Lopp. 1962. Breeding habits, growth and stomach contents of the Steller sea lion in Alaska. J. Mamm. 43:469-477.

Mathisen, O. A., and R. J. Lopp. 1963. Photographic census of the Steller sea lion herds in Alaska, 1956-58. U.S. Fish and Wildl. Serv. Spec. Sci. Rep. Fish. No. 424. 20 pp.

Merrick, R.L. 1995. The relationship of the foraging ecology of Steller sea lions (*Eumetopias jubatus*) to their population decline in Alaska. Ph.D. dissert., Univ. Washington, Seattle. 171 p.

Merrick, R.L., M.K. Chumbley, and G.V. Byrd. 1987. Diet diversity of Steller sea lions (*Eumetopias jubatus*) and their population decline in Alaska; a potential relationship. Ca. J. Fish. and Aquatic Sci 54:1342-1348.

Merrick, R., P. Gearin, S. Osmek, and D. Withrow. 1988. Field studies of northern sea lions at Ugamak Island, Alaska during the 1985 and 1986 breeding seasons. NOAA Tech. Memo. NMFS F/NWC-143.

Merrick, R. L., L. M. Ferm, R. D. Everitt, R. R. Ream, and L. A. Lessard. 1991. Aerial and ship-based surveys of Steller sea lions (*Eumetopias jubatus*)in the Gulf of Alaska and Aleutian Islands during June and July 1990. NOAA Tech. Memo. NMFS F/NWC-196. 34 pp.

Merrick, R. L., D. G. Calkins, and D. C. McAllister. 1992. Aerial and ship-based surveys of Steller sea lions (*Eumetopias jubatus*)in Southeast Alaska, the Gulf of Alaska, and Aleutian Islands during June and July 1991. NOAA Tech. Memo. NMFS-AFSC-1. 41 pp.

Merrick, R.L., and D.G. Calkins. 1996. Importance of juvenile walleye pollock, *Theragra chalcogramma*, in the diet of Gulf of Alaska Steller sea lions, *Eumetopias jubatus*. Pages 153-166 *in*: U.S. Dep. Commer. NOAA Tech. Rep. NMFS 126.

Merrick, R. L., and T. R. Loughlin. 1997. Foraging behavior of adult female and young-of-the-year Steller sea lions in Alaskan waters. Can. J. Zool. 75:776-786.

Merrick, R. L., M. K. Chumbley, and G. V. Byrd. 1997. Diet diversity of Steller sea lions (*Eumetopias jubatus*) and their population decline in Alaska: a potential relationship. Can J. Fish Aquat. Sci. 54:1342-1348.

Milette, L.L. and A.W. Trites. 2003. Maternal attendance patterns of lactating Steller sea lions (*Eumetopias jubatus*) from a stable and a declining population in Alaska. Canadian Journal of Zoology 81:340-348.

Nishimura, A., T. Yanagimoto, and Y. Takao. 2002. Cruise results of the winter 2002 Bering Sea pollock survey (Kaiyo Maru). Document for the 2002 STC meeting. Central BS pollock Convention, September 2002.Hokkaido National Fisheries Research Institute.

NMFS. 1992. Recovery plan for the Steller sea lion (*Eumetopias jubatus*). Prepared by the Steller Sea Lion Recovery Team for the National Marine Fisheries Service, Silver Spring, Maryland, 92 pp.

NMFS. 1999. The Habitat Approach. Implementation of Section 7 of the Endangered Species Act for Actions Affecting the Habitat of Pacific Anadromous Salmonids. Northwest Region, Habitat Conservation and Protected Resources Divisions, Portland, Oregon (August 26).

NMFS. 2000. Endangered Species Act, Section 7 Consultation Biological Opinion and Incidental Take Statement on the authorization of the Bering Sea/Aleutian Islands and Gulf of Alaska Groundfish Fishery Management Plans. NMFS Alaska Region, Protected Resources Division, Juneau, AK

NMFS. 2001. Endangered Species Act, Section 7 Consultation Biological Opinion and Incidental Take Statement on the authorization of the Bering Sea/Aleutian Islands and Gulf of Alaska Groundfish Fishery Management Plan Amendments 61 and 70. NMFS Alaska Region, Protected Resources Division, Juneau, AK.

NMFS. 2003. Supplement to the 2001 Endangered Species Act, Section 7 Consultation, Biological Opinion and Incidental Take Statement on the authorization of the Bering Sea/Aleutian Islands and Gulf of Alaska Groundfish Fishery Management Plan Amendments 61 and 70. NMFS Alaska Region, Protected Resources Division, Juneau, AK.

NMFS. 2006. Environmental assessment for the issuance of an exempted fishing permit for using commercial pollock fishing vessels for acoustic surveys within portions of Steller sea lion protection areas in the Aleutian Islands subarea. NMFS Alaska Region, Sustainable Fisheries Division, Juneau, AK. November 2006. Available from http://www.fakr.noaa.gov/analyses/efp/AECpollockEA06.pdf

Olesiuk, P.F., M.A. Bigg, G.M. Ellis, S.J. Crockford, and R.J. Wigen. 1990. An assessment of the feeding habits of harbour seals (*Phoca vitulina*) in the Strait of Georgia, British Columbia, based on scat analysis. Can. Tech. Rep. Fish. and Aquat. Sci. No. 1730.

Orr, R.T., and T.C. Poulter. 1967. Some observations on reproduction, growth, and social behavior in the Steller sea lion. Proc. California Acad. Sci. 35:193-226.

Panina, G. K. 1966. On the feeding of the sea lion and seals on the Kuril Islands. Izv. TINRO 58:235-236. In Russian. (Transl. by Bur. Commer. Fish., Off. Foreign Fish., U. S. Dep. Interior, Washington, D.C.)

Pascual, M.A., and M.D. Adkison. 1994. The decline of the Steller sea lion in the northeast Pacific: demography, harvest or environment. Ecol. Applications 4:393-403.

Perez, M. A., and T. R. Loughlin. 1991. Incidental catch of marine mammals by foreign-directed and joint-venture trawl vessels in the U.S. EEZ of the North Pacific, 1973-88. NOAA Technical Report 104. 57 p

Perlov, A.S. 1971. The onset of sexual maturity in sea lions. Proc. All Union Inst. Marine Fish. Ocean. 80:174-187.

Pitcher, K.W., and D.G. Calkins. 1981. Reproductive biology of Steller sea lions in the Gulf of Alaska. J. Mamm. 62:599-605.

Pitcher, K.W., D.G. Calkins, and G.W. Pendleton. 1998. Reproductive performance of female Steller sea lions: an energetics-based reproductive strategy? Canadian Journal of Zoology 76:2075-2083.

Raum-Suryan, K L., K.W. Pitcher, D.G. Calkins, J.L. Sease, and T.R. Loughlin. 2002. Dispersal, rookery fidelity and metapopulation structure of Steller sea lions (*Eumetopias jubatus*) in an increasing and a decreasing population in Alaska. Marine Mammal Science 18:746-764.

Raum-Suryan, K.L., M.J. Rehberg, G.W. Pendleton, K.W. Pitcher, and T.S. Gelatt. 2004. Development of dispersal, movement patterns, and haul-out use by pup and juvenile Steller sea lions (*Eumetopias jubatus*) in Alaska. Marine Mammal Science 20:823-850.

Repenning, C.A. 1976. Adaptive evolution of sea lions and walruses. Syst. Zool. 25:375-390.

Sease, J.L., J.P. Lewis, D.C. McAllister, R.L. Merrick, and S.M. Mello. 1993. Aerial and shipbased surveys of Steller sea lions (*Eumetopias jubatus*) in Southeast Alaska, the Gulf of Alaska, and Aleutian Islands during June and July 1992. U.S. Dep. Commer., NOAA Tech. Memo. NMFS F/NWC-17, 57 pp.

Sease, J.L., and T.R. Loughlin. 1999. Aerial and land-based surveys of Steller sea lions (*Eumetopias jubatus*) in Alaska, June and July 1997 and 1998. NOAA Tech. Memo. NMFS-AFSC-100. 61 pp.

Sease, J. L., J. M. Strick, R. L. Merrick, and J. P. Lewis. 1999. Aerial and land-based surveys of Steller sea lions (*Eumetopias jubatus*) in Alaska, June and July 1996. U.S. Dep. Commer., NOAA Tech. Memo. NMFS F/NWC-99, 43 pp.

Sease, J. L., W. P. Taylor, T .R. Loughlin, and K. W. Pitcher. 2001. Aerial and land-based surveys of Steller sea lions (*Eumetopias jubatus*)in Alaska, June and July 1999 and 2000. noaa Tech. Memo. NMFS-AFSC-122. 52 pp.

Sease, J. L., and C. J. Gudmundson. 2002. Aerial and land-based surveys of Steller sea lions (*Eumetopias jubatus*) from the western stock in Alaska, June and July 2001 and 2002. NOAA Tech. Memo. NMFS-AFSC-131. 45 pp.

Sigler, M.F., J.N. Womble, and J.J. Vollenweider. 2004. Availability to Steller sea lions (*Eumetopias jubatus*) of a seasonal prey resource: a prespawning aggregation of eulachon (*Thaleichthys pacificus*). Canadian Journal of Fisheries and Aquatic Sciences, Vol. 61, no. 8, pp. 1475-1484

Sinclair, E., and T. Zeppelin. 2002. Seasonal and spatial differences in diet in the western stock of Steller sea lions (*Eumetopias jubatus*). J. Mammal. 83(4):973-990.

Strick, J.M., L.W. Fritz, and J.P. Lewis. 1997. Aerial and ship-based surveys of Steller sea lions (*Eumetopias jubatus*) in Southeast Alaska, the Gulf of Alaska, and Aleutian Islands during June and July 1994. U.S. Dep. Commer., NOAA Tech. Memo. NMFS F/NWC-71, 55 pp.

Spalding, D.J. 1964. Comparative feeding habits of the fur seal, sea lion and harbour seal on the British Columbia coast. Bull. Fish. Res. Board Canada 146:1-52.

Thorsteinson, F.V., and C.J. Lensink. 1962. Biological observations of Steller sea lions taken during an experimental harvest. J. Wildl. Mgmt. 26:353-359.

Tollit, D.J., M. Wong, A.J. Winship, D.A.S. Rosen, and A.W. Trites. 2003. Quantifying errors associated with using prey skeletal structures from fecal samples to determine the diet of the Steller sea lion (*Eumetopias jubatus*). Marine Mammal Science, Vol. 19, no. 4, pp. 724-744.

Tollit, D.J., S.G. Heaslip, T.K. Zeppelin, R. Joy, K.A. Call, A.W. Trites. 2004. A method to improve size estimates of walleye pollock (*Theragra chalcogramma*) and Atka mackerel (*Pleurogrammus monopterygius*) consumed by pinnipeds: digestion correction factors applied to bones and otoliths recovered in scats. Fishery Bulletin, Vol. 102, no. 3, pp. 498-508

Treacy, S.D. 1985. Feeding habits of marine mammals from Grays Harbor, Washington to Netarts Bay, Oregon. Pages 149-198 *in*: R. J. Beach, A. C. Geiger, S. J. Jeffries, and B. L. Troutman (eds.). Marine mammals and their interactions with fisheries of the Columbia River and adjacent waters. NWAFC Proc. Rep. 85-04.

Trites, A.W. and B.T. Porter. 2002. Attendance patterns of Steller sea lions (*Eumetopias jubatus*) and their young during winter. Journal of Zoology, London 256:547-556.

Trites, A.W., D.G. Calkins, and A.J. Winship. 2003. Diet and the decline of Steller sea lions in Alaska. Proceedings of the 15th Biennial Conference on the Biology of Marine Mammals, Greensboro, NC.

Withrow, D.E. 1982. Using aerial surveys, ground truth methodology, and haul out behavior to census Steller sea lions, *Eumetopias jubatus*. M.S. Thesis, Univ. Washington, Seattle. 102 pp.

Wolfe, R.J., J.A. Fall, and R.R. Stanek. 2004. The subsistence harvest of harbor seal and sea lion by Alaska natives in 2003. Final report for year eleven, the subsistence harvest of sea lions and harbor seals by Alaska natives (award number NA17FX2835). Prepared for NMFS by Alaska Dept. Fish and Game, Juneau, Alaska, 253 pp.

Womble, J.N., M.F. Willson, M.F. Sigler, B.P Kelly, and G.R. VanBlaricom. 2005. Distribution of Steller sea lions Eumetopias jubatus in relation to spring-spawning fish in SE Alaska. Marine Ecology Progress Series, Vol. 294, pp. 271-282

York, A. 1994. The population dynamics of the northern sea lions, 1975-85. Mar. Mamm. Sci. 10:38-51.

Zeppelin, T.K., D.J. Tollit, K.A. Call, T.J. Orchard, and C.J. Gudmundson. 2004. Sizes of walleye pollock (*Theragra chalcogramma*) and Atka mackerel (*Pleurogrammus monopterygius*) consumed by the western stock of Steller sea lions (*Eumetopias jubatus*) in Alaska from 1998 to 2000. Fishery Bulletin, Vol. 102, no. 3, pp. 509-521.

TABLES

Table 1. Counts of adult and juvenile (non-pup) Steller sea lions at western stock rookery and haul-out trend sites in Alaska during June-July surveys from 1976 to 2004 (NMFS 2000, Sease et al. 2001, Sease and Gudmundson 2002, and Fritz and Stinchcomb 2005). Numbers in parentheses are the number of trend sites counted in each sub-area. Percentage changes between years are shown in bold.

| Year(s) | Gulf of Alaska | | | Aleutian Islands | | | Kenai-Kiska (69) | Western Stock in Alaska (82) |
|---|---|---|---|---|---|---|---|---|
| | Eastern (9) | Central (15) | Western (9) | Eastern (11) | Central (34) | Western (4) | | |
| 1956-60[1] | | 34,792 | 15,772 | 44,020 | 17,120 | | 111,704 | |
| 1962 | | | | | 23,175 | | | |
| 1976-79[2] | 7,053 | 24,678 | 8,311 | 19,743 | 36,632 | 14,011 | 89,364 | 110,428 |
| 1985 | | 19,002 | 6,275 | 7,505 | 23,042 | | 55,824 | |
| 1989 | 7,241 | 8,552 | 3,908 | 3,032 | 7,572 | | 23,064 | |
| 1990 | 5,444 | 7,050 | 3,915 | 3,801 | 7,988 | 2,327[3] | 22,754 | 30,525 |
| 1991 | 4,596 | 6,270 | 3,732 | 4,228 | 7,496 | 3,083 | 21,726 | 29,405 |
| 1992 | 3,738 | 5,739 | 3,716 | 4,839 | 6,398 | 2,869 | 20,692 | 27,299 |
| 1994 | 3,365 | 4,516 | 3,981 | 4,419 | 5,820 | 2,035 | 18,736 | 24,136 |
| 1996 | 2,132 | 3,913 | 3,739 | 4,715 | 5,524 | 2,187 | 17,891 | 22,210 |
| 1998 | 2,110[4] | 3,467 | 3,360 | 3,841 | 5,749 | 1,911 | 16,417 | 20,438 |
| 2000 | 1,975 | 3,180 | 2,840 | 3,840 | 5,419 | 1,071 | 15,279 | 18,325 |
| 2002 | 2,500 | 3,366 | 3,221 | 3,956 | 5,480 | 817 | 16,023 | 19,340 |
| 2004[5] | 2,536 | 2,944 | 3,512 | 4,707 | 5,936 | 898 | 17,099 | 20,533 |
| **1950s to 2000** | | **-91%** | **-82%** | **-91%** | **-68%** | | **-86%** | |
| **1970s to 2000** | **-72%** | **-87%** | **-66%** | **-81%** | **-85%** | **-92%** | **-83%** | **-83%** |
| **1970s to 1990** | **-23%** | **-71%** | **-53%** | **-81%** | **-78%** | **-83%** | **-75%** | **-72%** |
| **1990 to 2000** | **-64%** | **-55%** | **-27%** | **+1%** | **-32%** | **-54%** | **-33%** | **-40%** |
| **2000 to 2004** | **+28%** | **-7%** | **+24%** | **+23%** | **+10%** | **-16%** | **+12%** | **+12%** |

[1] 1956 counts for the western GOA, 1957 counts for the central GOA, 1959 counts for the central Aleutians and 1960 counts for the eastern Aleutians.

[2] 1976 counts for the eastern, central, and western GOA and the eastern Aleutians, and 1979 counts for the central and western Aleutians.

[3] Gillon Point rookery, Agattu Island not surveyed in 1990.

[4] 1999 counts substituted for sites in the eastern Gulf of Alaska not surveyed in 1998.

[5] 2004 counts were from medium format photographs, while all others were from 35 mm photographs, aerial counts or beach counts. 2004 data reflect a –3.64% adjustment to account for film format resolution and count differences (Fritz and Stinchcomb 2005).

TABLES

Table 2. Counts of Steller sea lion pups at western stock rookeries in Alaska during 1979 to 2004 (NMFS 1992, Sease and Loughlin 1999; Fritz and Stinchcomb 2005; NMML, unpublished). Percentage changes between years are shown in bold.

| | Gulf of Alaska | | | Aleutian Islands | | | Eastern Bering Sea | Kenai-Kiska[7] | Western Stock in Alaska |
|---|---|---|---|---|---|---|---|---|---|
| Year(s) | Eastern[1] | Central[2] | Western[3] | Eastern[4] | Central[5] | Western[6] | Walrus Island | | |
| 1979 | | | 8,616 | | | | | | |
| 1982 | | | | | | | 334 | | |
| 1984 | | | 6,435 | | | | | | |
| 1985-89 | | 10,254 | | 4,778 | 9,428 | | 250 | 30,895[7] | |
| 1990-92 | | 4,904 | 1,923 | 2,115 | 3,568 | | 63 | 12,510 | |
| 1994 | 903 | 2,831 | 1,662 | 1,756 | 3,109 | | 61 | 9,358 | |
| 1996 | 584 | | | | | | | | |
| 1997 | 611 | | | | | 979 | 35 | | |
| 1998 | 689 | 1,876 | 1,493 | 1,474 | 2,834 | 803 | | 7,677 | 9,169 |
| 2001-02 | 586 | 1,721 | 1,671 | 1,561 | 2,612 | 488 | 39 | 7,565 | 8,678 |
| 2003-04 | 716 | 1,609 | 1,577 | 1,731 | | | | | |
| 2005 | 715 | 1,651 | 1,707 | 1,921 | 2,551 | 343 | 29 | 7,830 | 8,917 |
| **Earliest count to 1994** | | **-72%** | **-81%** | **-63%** | **-67%** | | | **-70%** | |
| **Earliest count to 2001-02** | **-35%** | **-83%** | **-81%** | **-67%** | **-72%** | **-50%** | **-88%** | **-76%** | **-5%** |
| **1994 to 2001-02** | **-35%** | **-39%** | **+1%** | **-11%** | **-16%** | | **-36%** | **-19%** | |
| **2001-02 to 2005** | **+22%** | **-4%** | **+2%** | **+23%** | **-2%** | **-30%** | **-25%** | **+4%** | **+3%** |

[1] Seal Rocks and Fish (Wooded) Island
[2] Outer, Sugarloaf, Marmot, Chowiet and Chirikof Islands
[3] Atkins and Chernabura Islands, and Pinnacle Rock and Clubbing Rocks
[4] Ugamak, Akun, Akutan, Bogoslof and Adugak Islands
[5] Yunaska, Seguam, Kasatochi, Adak, Tag, Ulak, Ayugadak and Kiska (2) Islands, and Gramp and Column Rocks.
[6] Buldir, Agattu (2), and Attu Islands
[7] Rookeries in the Central and Western Gulf of Alaska, and Eastern and Central Aleutian Islands

Table 3. Counts of adult and juvenile (non-pup) Steller sea lions on terrestrial trend sites in Russia.

| Year | W. Bering Sea | Commander Islands | E. Kamchatka | Kuril Islands | Tuleny Island | Sea of Okhotsk |
|---|---|---|---|---|---|---|
| 1963 | | 2,920[1] | | 14,660 | 60[2] | |
| 1969 | | | | 14,184 | | |
| 1971 | | 2,920 | | | | |
| 1973 | | 3,503 | | | | |
| 1974 | | | | | 49 | 1,208 |
| 1975 | | | | 8,397 | | |
| 1977 | | 4,480 | | | | |
| 1978 | | 2,807 | | | 26 | |
| 1981 | | 2,101 | | 5,921 | | |
| 1982 | 4,910 | 1,577 | | | | |
| 1983 | 3,230 | 1,761 | 2,073 | | 65 | |
| 1984 | | 1,930 | | | | |
| 1985 | 3,370 | 1,700 | | | 137 | |
| 1986 | | 2,633 | | | 450 | |
| 1987 | 1,231 | 2,267 | 1,690 | | | |
| 1988 | | 1,221 | | | 171 | 1,691[3] |
| 1989 | 1,199 | 896 | 1,519 | 4,488 | 190 | |
| 1990 | | 865 | | | 410 | |
| 1991 | 427 | 752 | 794 | | 350 | |
| 1992 | | 843 | | | 463 | |
| 1993 | | 569 | | | 549 | |
| 1994 | 200 | 543 | 642 | | 557 | |
| 1995 | | 653 | | | | |
| 1996 | | 804 | | | 615 | 2,429[4] |
| 1997 | | 812 | | | 679 | |
| 1998 | | 900 | | | 836 | |
| 1999 | 180 | 860 | 720 | | 770 | |
| 2000 | | 741 | | | 1,155 | |
| 2001 | | 718 | 669 | 5,129 | 857 | 2,324 |
| 2002 | 16 | 581 | 491 | | 1,041 | 2,072 |
| 2003 | | 530 | | 5,178 | 1,119 | |
| 2004 | 91 | 674 | 548 | | 1,084 | 2,357 |
| 2005 | | | | 5,544 | 1,218 | |

[1]1962 data. [2]1964 data. [3]1989 data for Iony Island. [4]1995 data for Yamsky Islands and 1997 data for Iony Island.

Table 4. Counts of Steller sea lion pups on rookery trend sites in Russia.

| Year | Commander Islands | E. Kamchatka | Kuril Islands | Tuleny Island | Sea of Okhotsk |
|---|---|---|---|---|---|
| 1962 | 1 | | | | |
| 1963 | | | 3,673 | | |
| 1969 | 0 | | 3,250 | | |
| 1970 | 3 | | | | |
| 1971 | 4 | | | | |
| 1972 | 9 | | | | |
| 1973 | 26 | | | | |
| 1974 | | | | 1 | 607 |
| 1977 | 19 | | | | |
| 1978 | 26 | | | 0 | |
| 1980 | | | | 6 | |
| 1981 | 48 | | | | |
| 1982 | 83 | | | 0 | |
| 1983 | 104 | | 1,992 | 5 | |
| 1984 | 141 | | | 0 | |
| 1986 | 151 | | 1,560 | 25 | |
| 1987 | 197 | 211 | | | |
| 1988 | 141 | | | 38 | 712[1] |
| 1989 | 195 | | 1,442 | 45 | |
| 1990 | | | | 59 | |
| 1991 | 229 | | | 63 | |
| 1992 | 222 | 108 | 1,623 | 90 | |
| 1993 | 224 | 115 | | 120 | |
| 1994 | 226 | 93 | | 146 | |
| 1995 | 248 | 84 | 1,972 | | |
| 1996 | 261 | 87 | | 219 | 1,250[2] |
| 1997 | 244 | 96 | | 256 | |
| 1998 | 280 | 91 | | 303 | |
| 1999 | 271 | 87 | | 291 | |
| 2000 | 180 | 76 | 1,824 | 340 | |
| 2001 | 228 | 61 | 1,807 | 303 | 1,231 |
| 2002 | 210 | 84 | 1,973 | 410 | 980 |
| 2003 | 216 | | 2,086 | 480 | |
| 2004 | 221 | 107 | | 508 | 1,868 |
| 2005 | 236 | | 2,306 | 407 | |

[1]1989 data for Iony Island. [2]1995 data for Yamsky Islands and 1997 data for Iony Island.

Table 5. Counts of adult and juvenile (non-pup) Steller sea lions at selected sites in the Aleutian Islands area.

| | | SUMMER NON-PUP COUNTS | | | | | | | | | | | | | | | | Average | Rate |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SITENAME | Rook | 1959 | 1977 | 1979 | 1985 | 1989 | 1990 | 1991 | 1992 | 1994 | 1996 | 1998 | 2000 | 2002 | 2004 | Max | Min | (90-04) | (90-04) |
| ADAK/ARGONNE POINT | 0 | | | | | | | | | | 141 | 43 | 8 | 99 | 35 | 141 | 8 | 65 | |
| ADAK/CAPE MOFFET | 0 | | | | | | | | | | | | | | 0 | 0 | 0 | 0 | |
| ADAK/CAPE YAKAK | 1 | | | | 325 | | | | 93 | 183 | | 101 | 174 | 68 | 209 | 325 | 68 | 138 | |
| ADAK/LAKE POINT | 1 | | | | 964 | | | | 522 | 582 | | 582 | 700 | 753 | 799 | 964 | 522 | 656 | |
| AGLIGADAK | 1 | | | 993 | 514 | 132 | 274 | 231 | 125 | 8 | 73 | 40 | 48 | 82 | 61 | 993 | 8 | 105 | -78% |
| AMATIGNAK/NITROF POINT | 0 | | | | | | | 104 | 147 | 92 | 72 | 106 | 96 | 40 | 76 | 147 | 40 | 92 | |
| AMLIA/EAST CAPE | 0 | 700 | | 2,463 | 484 | 50 | 40 | 38 | | 87 | 6 | 220 | 86 | 82 | 34 | 2463 | 6 | 74 | -15% |
| ANAGAKSIK | 0 | 700 | | 124 | 307 | | 33 | 65 | 38 | 28 | 32 | 34 | 46 | 40 | 2 | 700 | 2 | 35 | -94% |
| ATKA/CAPE KOROVIN | 0 | 100 | | 14 | | | | | 1 | | | | 12 | 1 | 4 | 100 | 1 | 5 | |
| ATKA/NORTH CAPE | 0 | 550 | | 1,192 | 653 | 333 | 153 | 180 | 118 | 53 | 59 | 156 | 76 | 224 | 383 | 1192 | 53 | 156 | 150% |
| GRAMP ROCK | 1 | 700 | 2,235 | 1,705 | 1,290 | 747 | 712 | 773 | 691 | 537 | 582 | 570 | 580 | 600 | 679 | 2235 | 537 | 636 | -5% |
| KASATOCHI/NORTH POINT | 1 | | | 2,166 | 1,170 | 659 | 641 | 466 | 376 | 288 | 330 | 350 | 390 | 529 | 667 | 2166 | 288 | 449 | 4% |
| KAVALGA | 0 | | 1 | 233 | 1 | - | 8 | 25 | 34 | 21 | 12 | 52 | 50 | 18 | 56 | 233 | 0 | 31 | 600% |
| LITTLE TANAGA STRAIT | 0 | 450 | | 196 | 411 | 150 | 55 | 64 | 51 | 79 | 76 | 234 | 234 | 82 | 49 | 450 | 49 | 103 | -11% |
| SAGIGIK | 0 | | | 262 | 482 | 116 | 66 | 102 | 58 | 13 | 10 | 5 | 22 | 40 | 30 | 482 | 5 | 38 | -55% |
| SEGUAM/FINCH POINT | 0 | | | | | | | | 1 | 27 | 1 | 56 | 14 | 27 | 2 | 56 | 1 | 18 | |
| SEGUAM/LAVA COVE | 0 | | | | | | | | | | | 40 | | | 0 | 40 | 0 | 20 | |
| SEGUAM/LAVA POINT | 0 | | | | | | | | 22 | 42 | | 128 | | 10 | 5 | 128 | 5 | 41 | |
| SEGUAM/SADDLERIDGE | 1 | 25 | | 4,018 | 2,942 | 602 | 833 | 684 | 696 | 658 | 553 | 586 | 570 | 666 | 923 | 4018 | 25 | 685 | 11% |
| SEGUAM/SW RIP | 0 | | | | | | | | | 50 | | | 23 | 50 | 40 | 50 | 23 | 41 | |
| SEGUAM/TURF POINT | 0 | | | | | | | | 101 | 146 | | | 82 | 84 | 58 | 146 | 58 | 94 | |
| SEGUAM/WHARF POINT | 0 | | | | | | | | 1 | 21 | | 64 | 55 | 50 | 90 | 90 | 1 | 47 | |
| TAG | 1 | 400 | 1,613 | 1,740 | 944 | 590 | 478 | 440 | 370 | 309 | 320 | 370 | 301 | 279 | 242 | 1740 | 242 | 345 | -49% |
| TANADAK (AMLIA) | 0 | 50 | | 264 | 974 | 136 | 60 | 9 | 10 | - | 13 | 10 | 74 | 32 | 1 | 974 | 0 | 23 | -98% |
| UGIDAK | 0 | 400 | | 254 | | 25 | 110 | 26 | 48 | 14 | 12 | 42 | 6 | 23 | 25 | 400 | 6 | 34 | -77% |
| ULAK/HASGOX POINT | 1 | 1,500 | 3,088 | 2,170 | 2,729 | 1,123 | 1,324 | 1,046 | 1,059 | 866 | 844 | 698 | 663 | 481 | 531 | 3068 | 481 | 835 | -60% |
| UNALGA+DINKUM ROCKS | 0 | 350 | 4 | 419 | 544 | 182 | 91 | 101 | 95 | 142 | 80 | 120 | 50 | 46 | 19 | 544 | 4 | 83 | -79% |

## TABLES

Table 6. Food habits information for Steller sea lions collected in the range of the western stock, 1945-1998. (Reprinted from Fritz and Hinckley 2005).

| A. Sample Sizes and Characteristics | | Months | | | | Region | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Reference | Years | Jan-Mar | Apr-Jun | Jul-Sep | Oct-Dec | CGOA | WGOA | EBS | EAI | CAI | WAI | Russia |
| Imler and Sarber (1947) | 1945 | | | 7 | | 7 | | | | | | |
| Wilke and Kenyon (1952) | 1949, 51 | | | 3 | | | | 3 | | | | |
| Mathisen et al (1962) | 1958 | | 94 | | | | 94 | | | | | |
| Thorsteinson and Lensink (1962) | 1959 | | 56 | | | 9 | 27 | | 20 | | | |
| Tikhomirov (1964) | 1962 | X | X | | | | | X | | | | |
| Fiscus and Baines (1966) | 1960, 62 | | 16 | | | 4 | 2 | 1 | 9 | | | |
| Perlov (1975) | 1966-69 | | | ? | | | | | | | | X |
| Lowry et al (1982) | 1976 | 4 | | | | | | 4 | | | | |
| Pitcher (1981) | 1975-78 | 43 | 54 | 9 | 47 | 136 | 17 | | | | | |
| Calkins (1998) a | 1981 | 60 | | | | | | | | | | 60 |
| Calkins (1998) b | 1981 | 32 | | | | | | 32 | | | | |
| Frost and Lowry (1986) | 1985 | 13 | | | | | | 13 | | | | |
| Gearin (unpub) | 1985, 86 | | | 3 | 8 | | | 11 | | | | |
| Calkins and Goodwin (1988) | 1985, 86 | | X | | X | 74 | | | | | | |
| Merrick et al (1997) a | 1990-93 | | | 76 | | 76 | | | | | | |
| Merrick et al (1997) b | 1990-93 | | | 67 | | | | | 67 | | | |
| Merrick et al (1997) c | 1990-93 | | | 167 | | | | | | 167 | | |
| Merrick et al (1997) d | 1990-93 | | | 28 | | | | | | | 28 | |
| Goto and Shimazaki (1997) | 1994-96 | 62 | | | | | | | | | | 62 |
| Sinclair and Zeppelin (2002) a | 1990-98 | X | X | X | X | 574 | | | | | | |
| Sinclair and Zeppelin (2002) b | 1990-98 | X | X | X | X | | 929 | | | | | |
| Sinclair and Zeppelin (2002) c | 1990-98 | X | X | X | X | | | | 889 | | | |
| Sinclair and Zeppelin (2002) d | 1990-98 | X | X | X | X | | | | | 1370 | | |

Table 6. Food habits information of Steller sea lions collected in the range of the western stock, 1945-1998 (continued).

| B. Food habits data | Sample | Sample | Data | Percent of Sample with Prey Item (x=present) | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Reference | Type | Location | Type | Pollock | Cod | Flatfish | Greenling | Rockfish | Smelts | Sandlance | Herring | Salmon | Sculpin | Shrimp/Crab | Squid | Octopus |
| Imler and Sarber (1947) | Stomach | Land | FO | 57 | | 71 | | | | | | 28 | | | | 43 |
| Wilke and Kenyon (1952) | Stomach | Land | PW | 7 | 10 | 49 | | | | 32 | | | <1 | | | 2 |
| Mathisen et al (1962) | Stomach | Land | FO | | | | 13 | 9 | 14 | 1 | | 1 | 6 | 10 | | 44 |
| Thorsteinson and Lensink (1962) | Stomach | Land | FO | | | 6 | 4 | 11 | | 25 | | | 4 | 2 | | 20 |
| Tikhomirov (1968) | Visual | At-sea | | | | | | | | | D | | | | | |
| Fiscus and Baines (1966) | Stomach | At-sea | FO | 6 | | 12 | 6 | 6 | 56 | 25 | | | 19 | | | |
| Perlov (1975) | Stomach | At-sea | FO | 63 | | | 10 | | | | | | 1 | | >30 | 25 |
| Lowry et al (1982) | Stomach | At-sea | PV | 97 | | 1 | | | | | | | | | 1 | 1 |
| Pitcher (1981) | Stomach | Land | FO | 67 | 12 | 5 | | 3 | 11 | | 11 | 4 | 4 | 7 | 23 | 13 |
| Calkins (1998) a | Stomach | At-sea | FO | 83 | 43 | 3 | | | | | 17 | | >12 | 2 | 2 | 18 |
| Calkins (1998) b | Stomach | At-sea | FO | 100 | 28 | >19 | | 3 | | | 6 | | 6 | >10 | 19 | 19 |
| Frost and Lowry (1987) | Stomach | At-sea | PV | 48 | | | | | | | 48 | | | | | |
| Gearin (unpub) | Stomach | Land | FO | >36 | >45 | 54 | | | | | | | | 18 | | 45 |
| Calkins and Goodwin (1988) | Stomach | Land | FO | 58 | 7 | 14 | | | | 7 | 3 | 3 | 1 | >1 | 4 | 32 |
| Merrick et al (1997) a | Scat | Land | FOSS | 66 | | 4 | <1 | | 6 | | | 20 | 0 | | 3 | |
| Merrick et al (1997) b | Scat | Land | FOSS | 33 | | 2 | 31 | | 8 | | | 17 | 7 | | 2 | |
| Merrick et al (1997) c | Scat | Land | FOSS | 13 | | 0 | 69 | | 1 | | | 6 | 4 | | 8 | |
| Merrick et al (1997) d | Scat | Land | FOSS | 7 | | 0 | 77 | | | | | 5 | 5 | | 7 | |
| Goto and Shimazaki (1997) | Stomach | At-sea | FO | 89 | 76 | 24 | | | | | | | | | 69 | 11 |
| Sinclair and Zeppelin (2002) a | Scat | Land | FO | >50 | >5 | >20 | <5 | x | x | >10 | >10 | >10 | <10 | | <10 | <10 |
| Sinclair and Zeppelin (2002) b | Scat | Land | FO | >70 | >10 | >10 | <5 | x | x | >10 | <10 | >10 | >10 | | <5 | <5 |
| Sinclair and Zeppelin (2002) c | Scat | Land | FO | >50 | >10 | <5 | >20 | x | x | <5 | >5 | >20 | >10 | | <10 | <10 |
| Sinclair and Zeppelin (2002) d | Scat | Land | FO | <10 | >10 | <5 | >60 | x | | <5 | <5 | >20 | >10 | | <20 | <20 |

Abbreviations: CGOA – central Gulf of Alaska; WGOA – western Gulf of Alaska; EBS – eastern Bering Sea; EAI – eastern Aleutian Islands; CAI – central Aleutian Islands; WAI – western Aleutian Islands; X – number for cell is unknown; ? – season of sample collection is unknown but likely to be as indicated; FO=frequency of occurrence; PW=percent by weight; PV=percent by volume; FOSS=Split sample FO.

TABLES

Table 7. Source of literature, age class/group, sample size (n), capture location, season captured, instrument deployed, and mean trip duration, distance, and time at sea for Steller sea lions tagged with radio (VHF) and satellite (e.g. SLTDR) transmitters. Error is standard deviation unless otherwise indicated.

| Source | Age Class/Group | n | Capture Location | Season | Instrument | Mean Trip Duration (h) | Mean Trip Distance (km) | Mean % Time @ Sea |
|---|---|---|---|---|---|---|---|---|
| Merrick and Loughlin (1997) | Adult Female | 7 | Marmot (CGOA) | Summer | VHF | 21.0 ± 3.7 (SE) | | 53 |
| | Adult Female | 3 | Ugamak (EAI) | Summer | VHF | 25.0 ± 3.9 | | 58 |
| | Adult Female | 4 | EAI to CGOA | Summer | SLTDR | 18.0 ± 3.1 | | 50 |
| | Adult Female | 5 | EAI to CGOA | Winter | SLTDR | 204.0 ± 104.6 | | 90 |
| | YOY | 5 | EAI to CGOA | Winter | SLTDR | 15.0 ± 2.2 | | 38 |
| | | | | | | | | |
| Loughlin et al. (1998) | Adult F | 8 | Kuril Islands, Russia | Summer | SLTDR | short; max = 94 h | 94% trips ≤ 10 km (max=263 km) | |
| Loughlin et al. (2003)[1] | YOY | 12 | CAI, EAI, EGOA, CGOA, and WA | All | SLTDR/SDR | 7.5 ± 7.5 | 7.0 ± 19.0 | |
| | Juv (>10 mo.) | 13 | CAI, EAI, EGOA, CGOA, and WA | All | SLTDR/SDR | 18.1 ± 34.2 | 24.6 ± 57.2 | |
| | Combined | 25 | CAI, EAI, EGOA, CGOA, and WA | All | SLTDR/SDR | 12.1 ± 23.8 | | |
| | | | | | | | | |
| Raum-Suryan et al.( 2004)[2] | YOY (75), Juv (28) | 103 | see below | Spr/Sum/Win | SDR | 84% trips ≤ 20 h | 90% trips ≤ 15 km | |
| | | | | | | | | |
| | Western Stock | 29 | EAI, CGOA, EGOA | Spr/Sum/Win | SDR | | 6.5 (5.08-8.26) CI | |
| | Eastern Stock | 74 | North, South, and Central SE | Spr/Sum/Win | SDR | | 4.7 (3.92-5.53) | |
| | | | | | | | | |
| Fadely et al. (2005)[3] | YOY/Juv | 30 | CAI, EAI, and CGOA | Feb-April | SDR | 8.9 (8.4-9.4) CI | 0.56 (0.56-0.74) CI | |
| | | | | May-July | SDR | 12.5 (11.3-13.9) | 1.30 (0.93-1.49) | |
| | | | | Nov-Jan | SDR | 10.1 (8.2-12.5) | 1.11 (0.74-1.67) | |
| | | | | | | | | |
| Rehberg (2005) | YOY | 11 | CAI and GOA | Spring/Winter | SRDL | | | 42 (38-45) CI |
| | Juv | 12 | CAI and GOA | Spring/Winter | SRDL | | | 51 (49-54) CI |

[1]Trip duration ranged from 1.0 h to 81.3 h (YOY) and 344.0 h (Juv) and trip distance ranged from 1.0 km to 260.7 km (YOY) and 447.3 km (Juv).
[2]Inter-haulout distance averaged 79.3 ± 7.7 km (max = 127 km) and dispersal distances (2 YOY, 2 Juv) included 76, 120, 500, and 1300 km, respectively. Sea lions in the western and eastern stocks used an average of 1.6 and 2.1 haulouts, respectively.
[3]Most locations associated with diving were within 9 to 19 km (5-10 nm) of shore and in waters < 100 m. Trip duration and use of offshore waters increased with age and coincided with spring.
YOY: young-of-the-year; Juv: juvenile (> 1 year unless otherwise specified); VHF: very high frequency radio transmitter; SLTDR: satellite-linked time-depth recorder; SDR: satellite depth recorder; SRDL: satellite relayed dive logger; CAI: central Aleutian Islands; EAI: eastern Aleutian Islands; EGOA: eastern Gulf of Alaska; CGOA: central Gulf of Alaska; SE: Southeast Alaska; WA: Washington State; CI: 95% confidence interval

TABLES

Table 8. Percent frequency of occurrence of prey items in scat recovered from Steller sea lion scat collected in winter (December - April, 1990-1998; Sinclair and Zeppelin 2002).

| Prey Species | Range (n=3762) | Region 3 | Region 4 |
|---|---|---|---|
| Pollock | 63.2 | 59.1 | 2.7 |
| Atka mackerel | 16.1 | 24.7 | 64.9 |
| Pacific cod | 27.7 | 19.6 | 16.9 |

Table 9. Percent frequency of occurrence of prey items in scat recovered from Steller sea lion scat at various sites near Adak Island (Sinclair and Zeppelin 2002). Samples were collected during the summer except for one set of samples collected at Ulak during the winter (as marked).

| Site | No. of scats | First | Second | Third |
|---|---|---|---|---|
| Kasatochi | 153 | Atka 76 | Sal 48 | Pol 38 |
| Adak - Lake Pt. | 86 | Atka 98 | Sal 23 | Ceph 19 |
| Gramp Rock | 59 | Atka 98 | Ceph 32 | Sal 24 |
| Tag | 99 | Atka 99 | Ceph 20 | P. cod 5 |
| Ulak | 105 | Atka 100 | Ceph 41 | Pol 10 |
| Ulak (winter) | 31 | Atka 71 | Greenling 29 | Ceph 23 |

Table 10. Recent scat samples collected in the Adak/Atka region of the Aleutian Islands subarea (NMML unpublished data). Results are reported as the percent frequency of occurrence and all prey items found in over 5% of the samples are shown.

| Site | Adak - Lake Point |
|---|---|
| Collection Date | 06/27/99 |
| Number of Scats | 39 |
| **ATKA MACKEREL** | **81** |
| **SALMON** | **65** |
| **POLLOCK** | **24** |
| CEPHALOPOD | 16 |
| ROCKFISH SP | 11 |

| Site | Amlia - Sviech. Harbor |
|---|---|
| Collection Date | 09/06/00 |
| Number of Scats | 30 |
| **ATKA MACKEREL** | **93** |
| **SAND LANCE** | **52** |
| **POLLOCK** | **34** |
| **PACIFIC COD** | **34** |
| IRISH LORD SP | 21 |
| GADID(NH) | 17 |
| SALMON | 17 |
| DOGTH.LAMPFISH | 14 |
| SAND FISH | 14 |
| POLYCAETE UNID | 10 |
| CEPHALOPOD | 7 |

| Site | Kasatochi - N. Point |
|---|---|
| Collection Date | 03/12/99 |
| Number of Scats | 20 |
| **PACIFIC COD** | **40** |
| **SALMON** | **25** |
| **ATKA MACKEREL** | **20** |
| **CEPHALOPOD** | **20** |
| SNAILFISH SP | 20 |
| UNIDENT FISH | 20 |
| IRISH LORD SP | 15 |
| SKATE | 15 |
| ROCK GREENLING | 10 |
| SMOOTHTONGUE | 10 |
| *POLLOCK* | *5* |
| ROCKFISH SP | 5 |

Table 11. Percent frequency of occurrence of prey items contained in scat samples. NMML unpublished data for samples collected in the Central Aleutian Islands area.

| Site | Seguam Saddleridge | Adak Lake Point | Ayugadak | Gramp Rock | Kiska Cape St. Stephen | Kiska Lief Cove | Seguam Saddleridge | Tag | Ulak Hasgox Point | Yunaska | Amlia Svlech Harbor | Seguam Turf Point | Silak |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Scats with prey remains | 33 | 30 | 28 | 45 | 21 | 25 | 7 | 28 | 22 | 27 | 37 | 49 | 35 |
| Collection Date | 6/23/2001 | 6/29/2002 | 7/1/2002 | 6/30/2002 | 7/2/2002 | 7/2/2002 | 6/26/2002 | 6/30/2002 | 6/30/2002 | 6/25/2002 | 3/31/2002 | 3/29/2002 | 4/2/2002 |
| ATKA MACKEREL | 100 | 90 | 82 | 100 | 95 | 80 | 86 | 93 | 100 | 100 | 43 | 71 | 26 |
| POLLOCK | 6 | | | | | | | | | 19 | 27 | 8 | 46 |
| PACIFIC COD | 9 | | 4 | 2 | | 4 | | 4 | | 4 | 14 | 6 | 37 |
| SALMON | 3 | 3 | 4 | 27 | 10 | | | 11 | | 11 | | 8 | 3 |
| CEPHALOPODS | 6 | 17 | 7 | 56 | 14 | 4 | | 7 | 14 | 37 | 30 | 41 | 29 |
| GREENLING SPP | | | 11 | | 5 | 4 | | | | | 27 | 2 | 9 |
| IRISH LORD SP | | | 7 | 2 | | | | | | | 24 | 16 | 43 |
| POLYCAETE UNID | 6 | 7 | 21 | | 10 | 4 | | 7 | | | 19 | 2 | 11 |
| ARROWTOOTH FL | 3 | | | | | | | | | | | | |
| CAT SHARK UNIDENT. | | | | | | | | | | | | | 3 |
| CHUM SALMON | | | | 2 | | | | | | | | 2 | 3 |
| CODLING | | | | | | | | | | | | | 3 |
| DUSKY SNAILFISH | | | | | 5 | | | | | | 3 | 2 | 6 |
| FLATFISH SP. | | | | | | | | | | | 11 | | 9 |
| GREAT-TYPE SCULPIN | | | | | | | | | | | | | 3 |
| GREENLING UNIDENT. | | | | 2 | | | | | | | | 2 | |
| GUNNELS | | | | | | | | | | | | | 3 |
| GYMNOCANTHUS SP | | | | | | | | | | | 3 | | |
| HAKE | | | | | | | | | | | | 2 | 3 |
| HALIBUT | | | | | | | | | | | | | 3 |
| HIGH COCKSCOMB | | | | | | | | | | | | 4 | |
| LAMPREY SPP. | | | | | | | | | | | 3 | | |
| LUMPSUCKER SP | | | | | | | | | | | | 12 | |
| NORTH. LAMPFISH | 6 | | | | | | | | | | | 2 | |
| RIGHTEYE FLOUNDER UN. | | | | | | | | | | | 8 | | 9 |
| ROCK GREENLING | | | | | | | | | | | 3 | | 29 |
| ROCK SOLE | | | | | | | | | | | 3 | | |
| ROCKFISH/SCORPIONFISH UN. | | | | | | 4 | | | | 4 | | 4 | 6 |
| ROCKFISH SP. | | | 4 | | | | | | | | | | 6 |
| RONQUIL SP. | | | | | | | | | | | 14 | 8 | 3 |
| SAND FISH | | | | | | | | | | | 3 | | 6 |
| SAND LANCE | 3 | | 4 | 2 | | | | | | | | 4 | |
| SCULPIN | | | | | | | | | | | 8 | 12 | 6 |
| SKATE | | | | | | | | | | | 3 | 2 | 3 |
| SMOOTH LUMPSUCKER | | | | | | | | | | | 22 | 10 | 26 |
| SNAILFISH SP. | | | | | | | | | | | | | 6 |
| STICHAEIDAE SP. | | | | | | | | | | | 19 | 16 | 14 |
| UNID | | 10 | 4 | | 5 | 16 | 14 | 7 | | | 5 | | 6 |
| UNID GADID | 3 | | | | | | | | | | 3 | | |
| WOLF EEL | | | | | | | | | | | | | |

Table 13. Harvest of pollock in the Aleutian Islands area within areas of critical habitat.

| | Catch Amounts | | | | Proportion in Critical Habitat | | |
|---|---|---|---|---|---|---|---|
| Year | CH 20 nm | Total CH | Outside CH | Total | CH 20 R&H | Total CH | Outside CH |
| 1995 | 60,867 | 60,868 | 4,029 | 64,897 | 94% | 94% | 6% |
| 1996 | 27,725 | 27,726 | 1,326 | 29,052 | 95% | 95% | 5% |
| 1997 | 25,135 | 25,135 | 763 | 25,898 | 97% | 97% | 3% |
| 1998 | 17,612 | 17,612 | 6,174 | 23,786 | 74% | 74% | 26% |
| 1999 | 749 | 749 | 247 | 996 | 75% | 75% | 25% |

Table 14. The percent of critical habitat areas closed in the BSAI and GOA under the Steller sea lion conservation measures.

| | | | % Area Closed | | | | | |
|---|---|---|---|---|---|---|---|---|
| Region | Fishery | Gear | 0-3 | 3-10 | [0-10] | 10-20 | Foraging Area | Total CH |
| AI | Pollock | Trawl | 100% | 100% | 100% | 100% | 100% | 100% |
| | Pacific Cod | Trawl | 100% | 51% | 57% | 4% | 100% | 25% |
| | | Pot | 100% | 58% | 63% | 18% | 100% | 36% |
| | | Longline | 100% | 58% | 63% | 18% | 100% | 36% |
| | Atka Mackerel | Trawl | 100% | 75% | 76% | 45% | 100% | 58% |
| EBS | Pollock | Trawl | 100% | 92% | 93% | 60% | 45% | 58% |
| | Pacific Cod | Trawl | 100% | 92% | 93% | 60% | 45% | 58% |
| | | Pot | 100% | 63% | 67% | 60% | 45% | 54% |
| | | Longline | 100% | 61% | 65% | 57% | 44% | 52% |
| | Atka Mackerel | Trawl | 100% | 100% | 100% | 100% | 45% | 73% |
| GOA | Pollock | Trawl | 100% | 83% | 85% | 48% | 0% | 57% |
| | Pacific Cod | Trawl | 100% | 83% | 85% | 48% | 0% | 57% |
| | | Pot | 58% | 29% | 32% | 27% | 0% | 27% |
| | | Longline | 58% | 29% | 32% | 16% | 0% | 20% |
| BSAI/GOA | Pollock | Trawl | 100% | 90% | 91% | 69% | 39% | 70% |
| | Pacific Cod | Trawl | 100% | 73% | 76% | 36% | 39% | 48% |
| | | Pot | 78% | 44% | 48% | 31% | 39% | 38% |
| | | Longline | 78% | 44% | 48% | 25% | 38% | 34% |
| | Atka Mackerel (BSAI) | Trawl | 100% | 83% | 85% | 66% | 48% | 66% |

Table 15. Time series of ABC, TAC, and total catch for Aleutian Islands Region walleye pollock fisheries 1991-2005. Units are in metric tons. Note: There was no OFL level set in 1991 and the 1993 harvest specifications were not available

| YEAR | ABC | TAC | OFL | CATCH | CATCH/TAC |
|---|---|---|---|---|---|
| 1991 | 101,460 | 72,250 | NA | 98,604 | 136% |
| 1992 | 51,600 | 47,730 | 62,400 | 52,352 | 110% |
| 1993 | | | | 57,132 | |
| 1994 | 56,600 | 56,600 | 60,400 | 58,659 | 104% |
| 1995 | 56,600 | 56,600 | 60,400 | 64,925 | 115% |
| 1996 | 35,600 | 35,600 | 47,000 | 29,062 | 82% |
| 1997 | 28,000 | 28,000 | 38,000 | 25,940 | 93% |
| 1998 | 23,800 | 23,800 | 31,700 | 23,822 | 100% |
| 1999 | 23,800 | 2,000 | 31,700 | 1,010 | 51% |
| 2000 | 23,800 | 2,000 | 31,700 | 1,244 | 62% |
| 2001 | 23,800 | 2,000 | 31,700 | 824 | 41% |
| 2002 | 23,800 | 1,000 | 31,700 | 1,156 | 116% |
| 2003 | 39,400 | 1,000 | 52,600 | 1,653 | 165% |
| 2004 | 39,400 | 1,000 | 52,600 | 1,150 | 115% |
| 2005 | 29,400 | 19,000 | 39,100 | 1,556 | 8% |

Table 16. Estimates of walleye pollock catches from the entire Aleutian Islands Region by source, 1977-2003. Units are in metric tons.

| Year | Official Foreign & JV Blend | Domestic Blend | Foreign Reported | NMFS Observer Data | Current estimates |
|---|---|---|---|---|---|
| 1977 | 7,367 | | 7,827 | 5 | 7,367 |
| 1978 | 6,283 | | 6,283 | 234 | 6,283 |
| 1979 | 9,446 | | 9,505 | 58 | 9,446 |
| 1980 | 58,157 | | 58,477 | 883 | 58,157 |
| 1981 | 55,517 | | 57,056 | 2,679 | 55,517 |
| 1982 | 57,753 | | 62,624 | 11,847 | 57,753 |
| 1983 | 59,021 | | 44,544 | 12,429 | 59,021 |
| 1984 | 77,595 | | 67,103 | 48,538 | 77,595 |
| 1985 | 58,147 | | 48,733 | 43,844 | 58,147 |
| 1986 | 45,439 | | 14,392 | 29,464 | 45,439 |
| 1987 | 28,471 | | | 17,944 | 28,471 |
| 1988 | 41,203 | | | 21,987 | 41,203 |
| 1989 | 10,569 | | | 5,316 | 10,569 |
| 1990 | | 79,025 | | 51,137 | 79,025 |
| 1991 | | 98,604 | | 20,493 | 98,604 |
| 1992 | | 52,352 | | 20,853 | 52,352 |
| 1993 | | 57,132 | | 22,804 | 57,132 |
| 1994 | | 58,659 | | 37,707 | 58,659 |
| 1995 | | 64,925 | | 18,023 | 64,925 |
| 1996 | | 29,062 | | 5,982 | 29,062 |
| 1997 | | 25,940 | | 5,580 | 25,940 |
| 1998 | | 23,822 | | 1,882 | 23,822 |
| 1999 | | 1,010 | | 24 | 1,010 |
| 2000 | | 1,244 | | 75 | 1,244 |
| 2001 | | 824 | | 88 | 824 |
| 2002 | | 1,156 | | 144 | 1,156 |
| 2003 | | 1,653 | | | 1,653 |
| 2004 | | 1,150 | | | 1,150 |
| 2005 | | 1,610 | | | 1,610 |

Table 17. Estimates of Aleutian Islands Region walleye pollock catch by the three management sub-areas. Foreign reported data were used from 1977-1984, from 1985-2003 observer data were used to partition catches among the areas. Units are in metric tons.

| Year | East (541) | Central (542) | West (543) | Total |
|---|---|---|---|---|
| 1977 | 4,402 | 0 | 2,965 | 7,367 |
| 1978 | 5,267 | 712 | 305 | 6,283 |
| 1979 | 1,488 | 1,756 | 6,203 | 9,446 |
| 1980 | 28,284 | 7,097 | 22,775 | 58,157 |
| 1981 | 43,461 | 10,074 | 1,982 | 55,517 |
| 1982 | 54,173 | 1,205 | 2,376 | 57,753 |
| 1983 | 56,577 | 1,250 | 1,194 | 59,021 |
| 1984 | 64,172 | 5,760 | 7,663 | 77,595 |
| 1985 | 19,885 | 38,163 | 100 | 58,147 |
| 1986 | 38,361 | 7,078 | 0 | 45,439 |
| 1987 | 28,086 | 386 | 0 | 28,471 |
| 1988 | 40,685 | 517 | 0 | 41,203 |
| 1989 | 10,569 | 0 | 0 | 10,569 |
| 1990 | 69,170 | 9,425 | 430 | 79,025 |
| 1991 | 98,032 | 561 | 11 | 98,604 |
| 1992 | 52,140 | 206 | 6 | 52,352 |
| 1993 | 54,512 | 2,536 | 83 | 57,132 |
| 1994 | 58,091 | 554 | 15 | 58,659 |
| 1995 | 28,109 | 36,714 | 102 | 64,925 |
| 1996 | 9,226 | 19,574 | 261 | 29,062 |
| 1997 | 8,110 | 16,799 | 1,031 | 25,940 |
| 1998 | 1,837 | 3,858 | 18,127 | 23,822 |
| 1999 | 484 | 420 | 105 | 1,010 |
| 2000 | 615 | 461 | 169 | 1,244 |
| 2001 | 332 | 386 | 105 | 824 |
| 2002 | 842 | 180 | 133 | 1,156 |
| 2003 | 569 | 758 | 326 | 1,653 |

FIGURES

Figure 1. The site is the area delimited by the northern boundary of 52° 35' latitude and a southern boundary of 51° 35' latitude. The eastern boundary is 173° 00' longitude W, and the western boundary is 179° 00' (Figure 1). This area is located within statistical areas 541 and 542 of the BSAI.

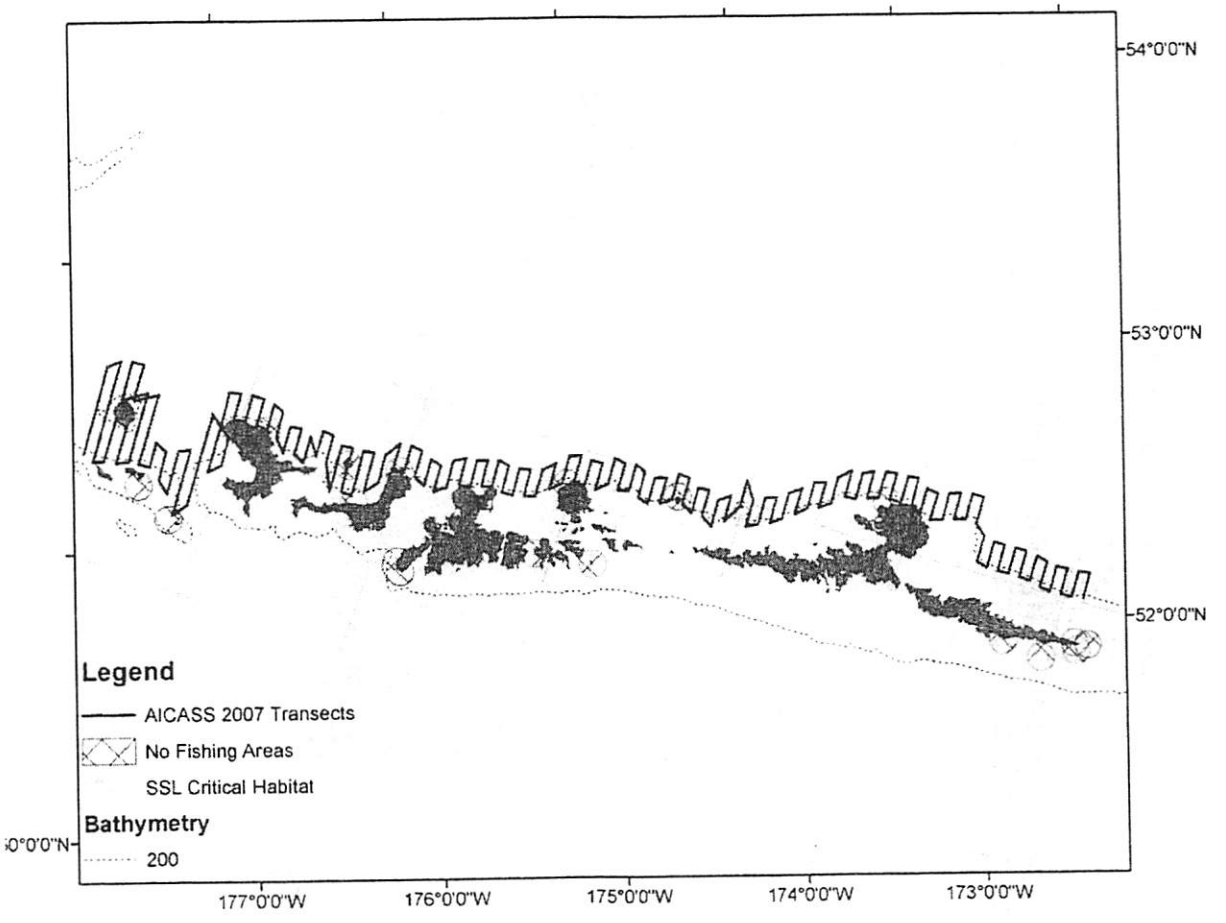


Figure 2. Designated critical habitat for the western population of Steller sea lion in Alaska. 50 CFR 226.202

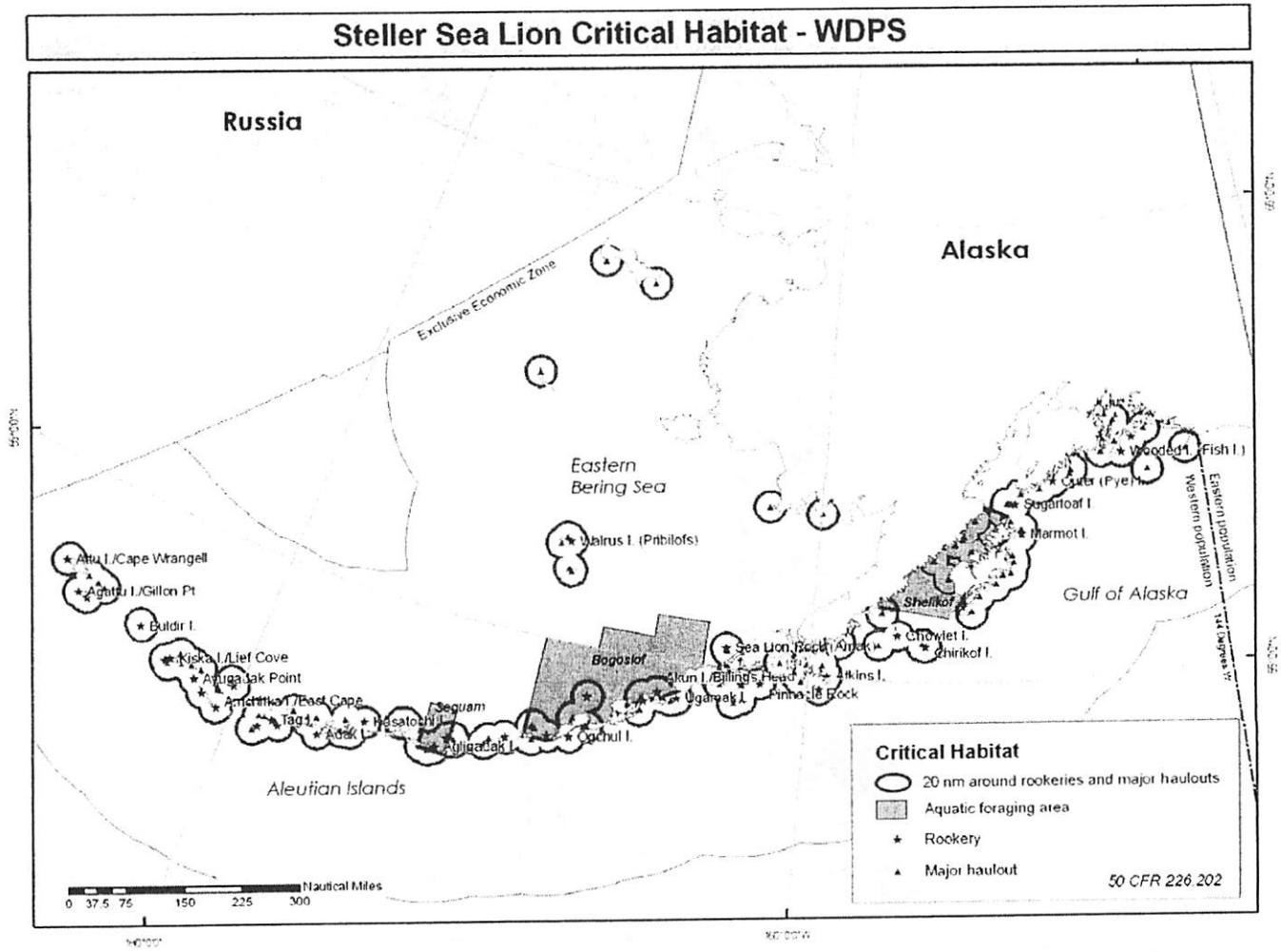


Figure 4. Steller sea lion survey regions from Dixon Entrance to Attu Island and the location of the principal rookeries in Alaska. Kiska Island, the Kenai Peninisula, and Walrus Island in the eastern Bering Sea are also noted, along with the boundary between the breeding ranges of the eastern and western sea lion stocks. The Central Aleutian Islands is defined as the area between Samalga Pass and Kiska Island.

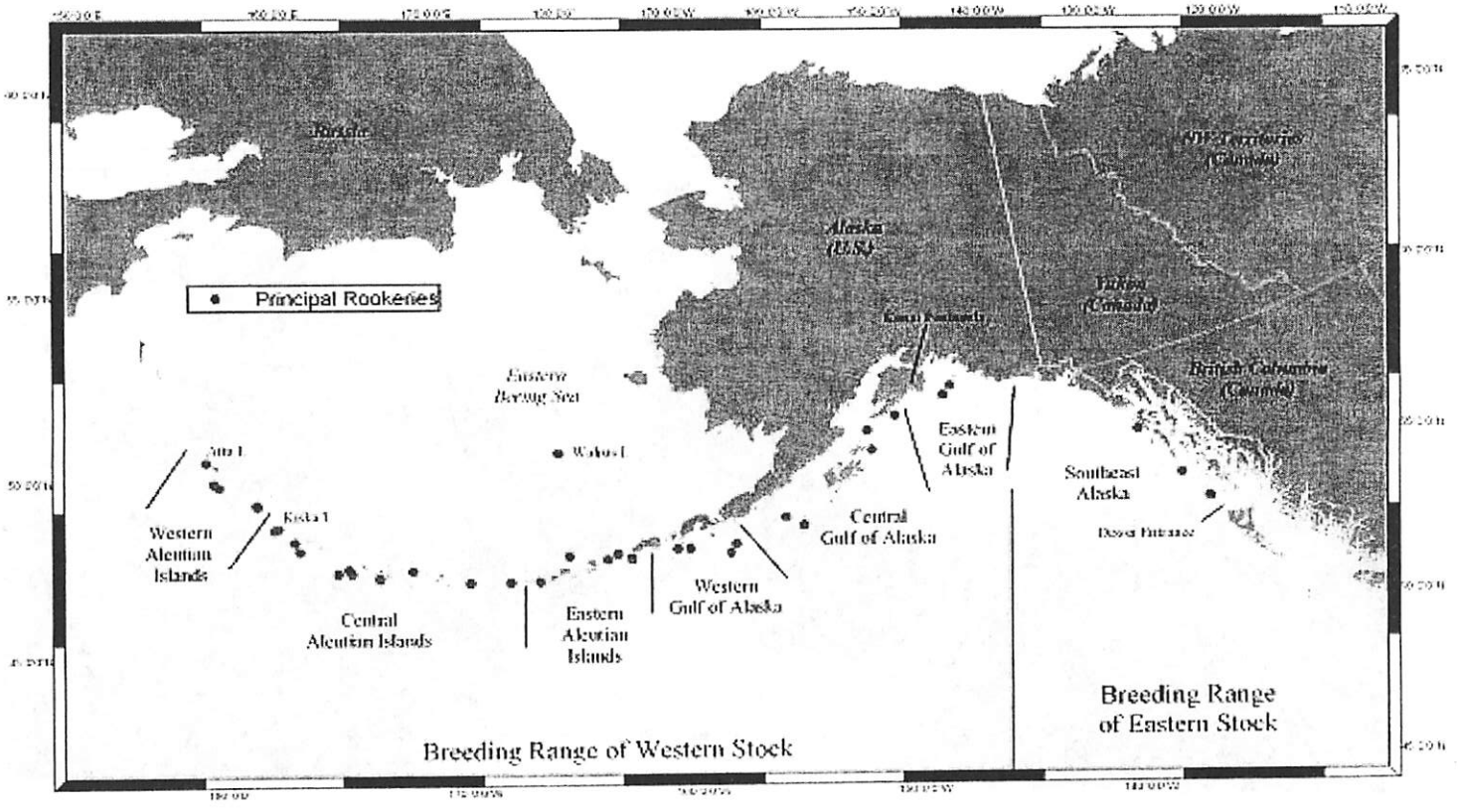


Figure 5. Breeding ranges of the western and eastern stocks of Steller sea lions (triangles = terrestrial locations of major rookeries) in the North Pacific.

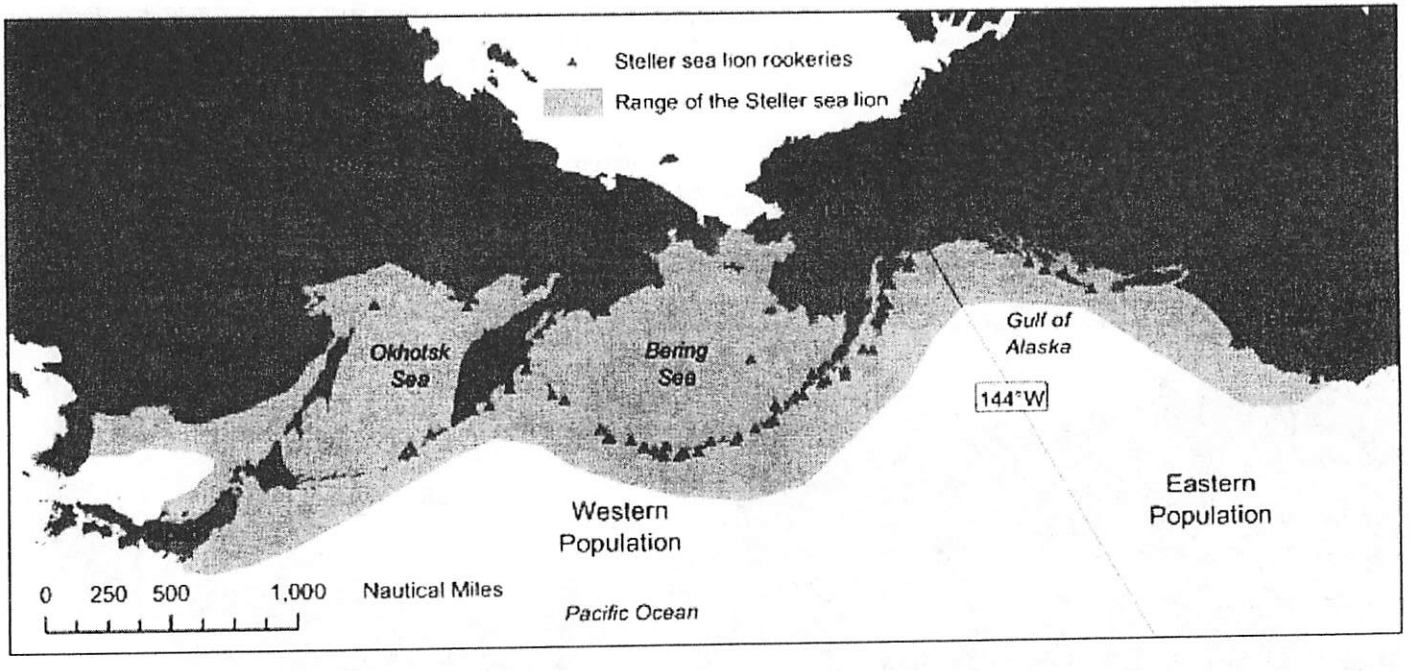
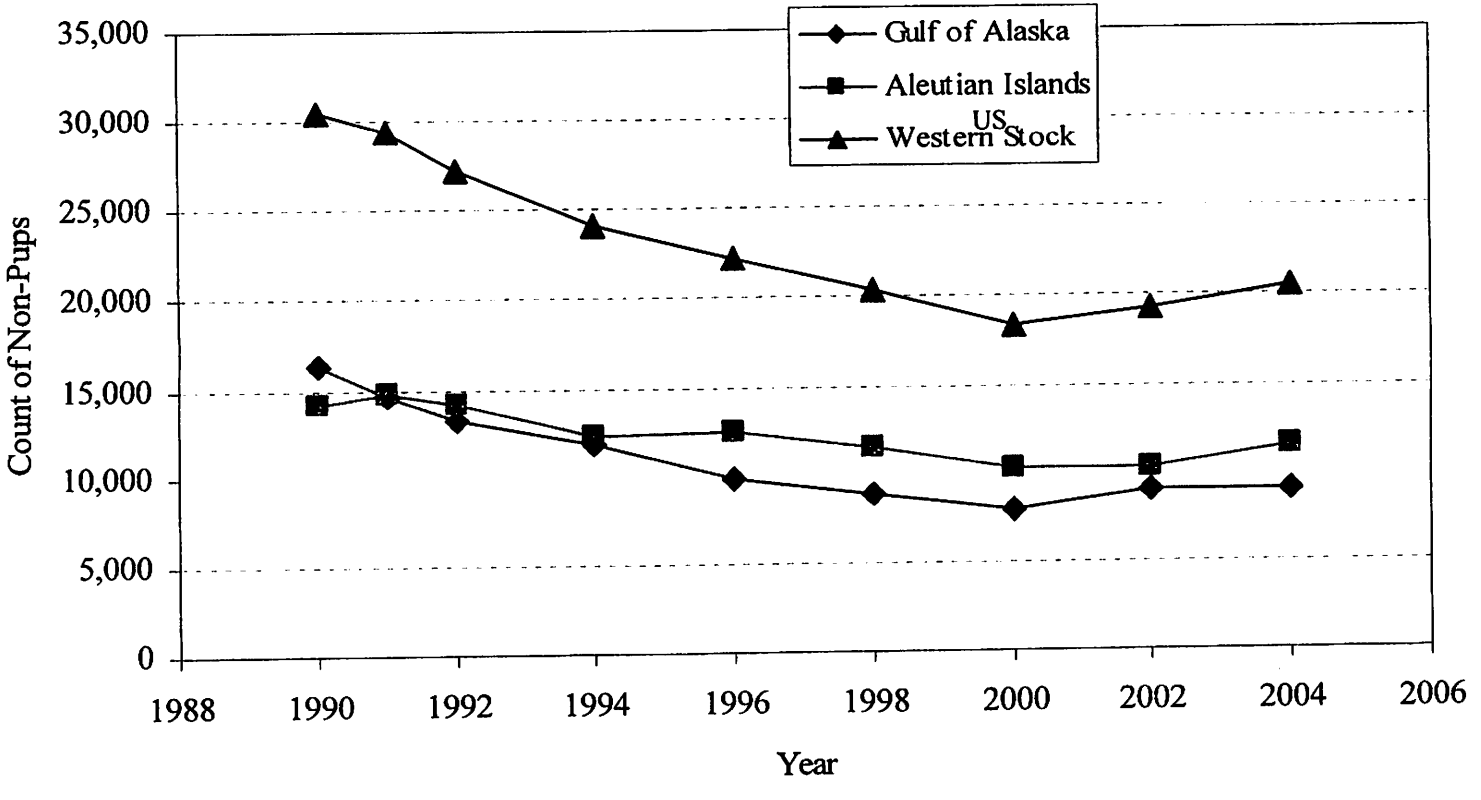


Figure 6. Counts of non-pups in the western population.



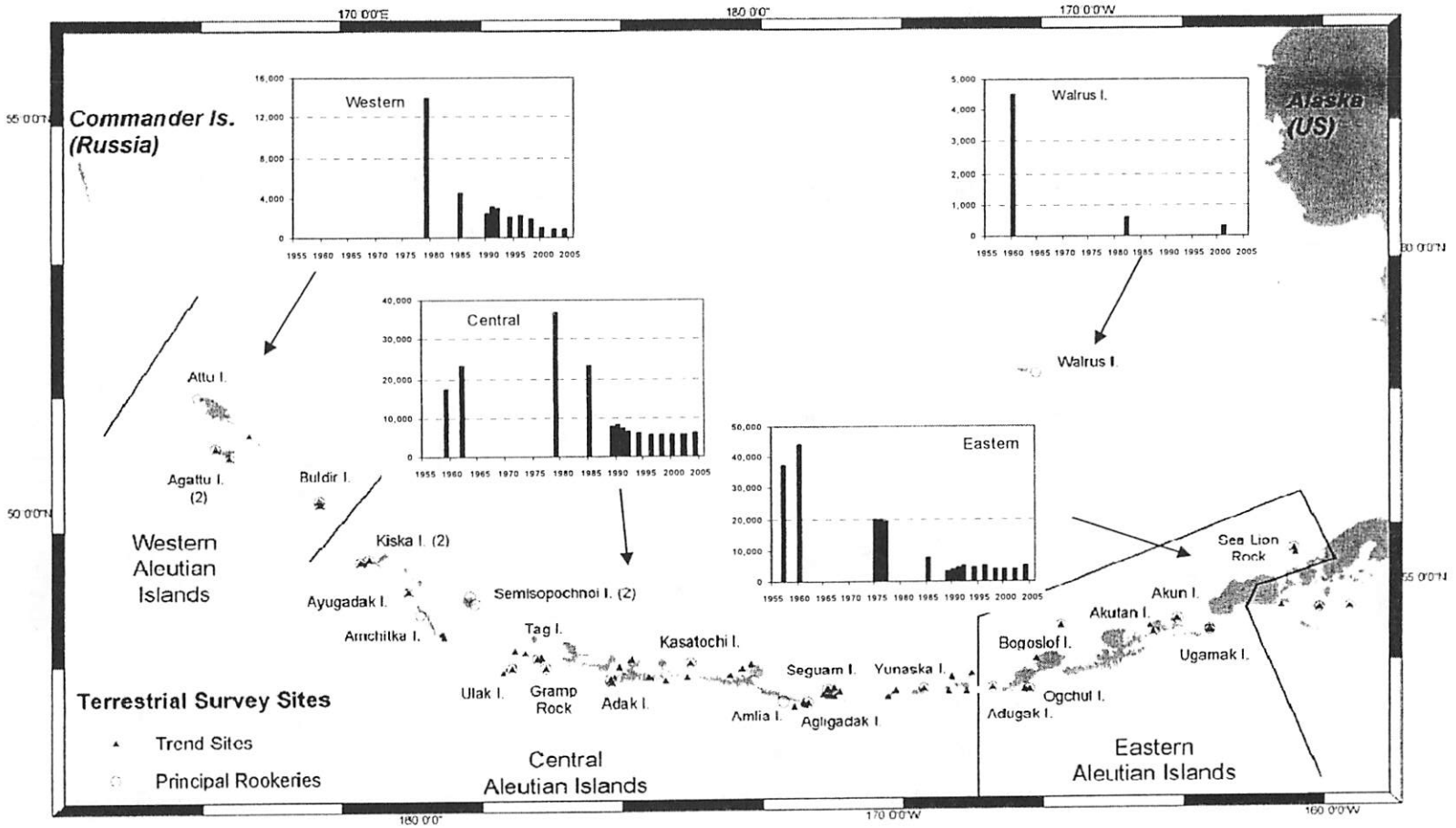



Figure 7. Counts of adult and juvenile Steller sea lions on western population trend sites in three sub-areas of the Aleutian Islands, 1950s through 2004. Counts on Walrus Island in the eastern Bering Sea are also shown, as are the location of principal rookeries (named) and major terrestrial haulout trend sites (NMFS 1992; Fritz and Stinchcomb 2005).

Figure 8. Steller sea lion pup counts at trend rookeries in the range of the western stock in Alaska by region from the late 1980s to 2005 in the Gulf of Alaska (A) and Aleutian Islands (B). Percent change in counts between 1990/92 and 2001/02 (C) and 2001/02 and 2005 (D) are also shown (data from Table 2).

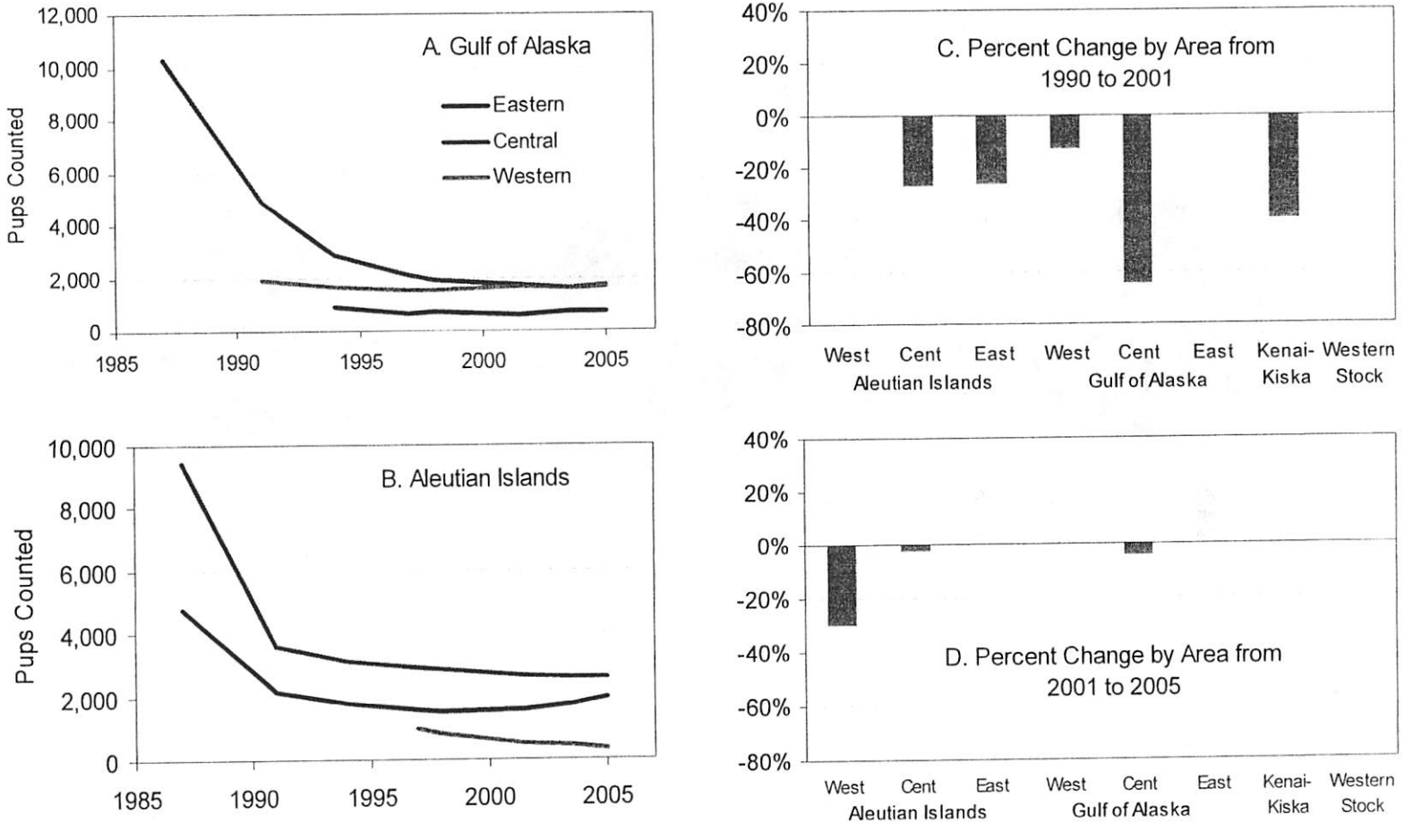
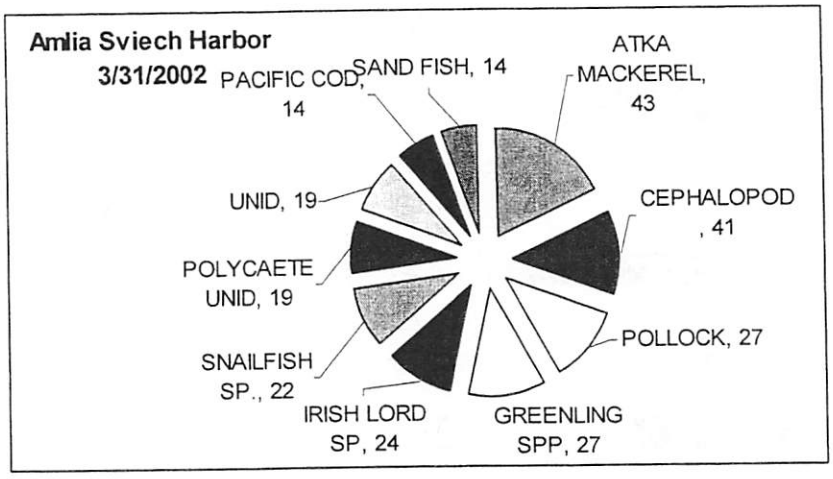
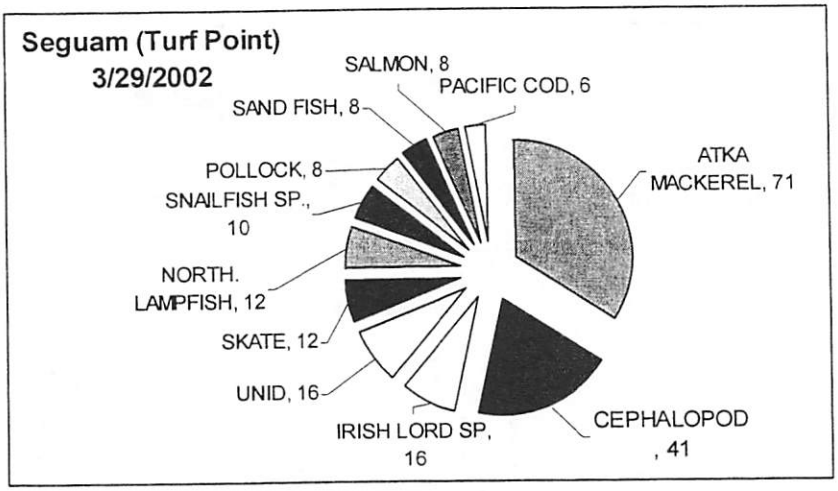


Figure 9. Frequency of occurrence of various prey items in scat as described in Table 6.



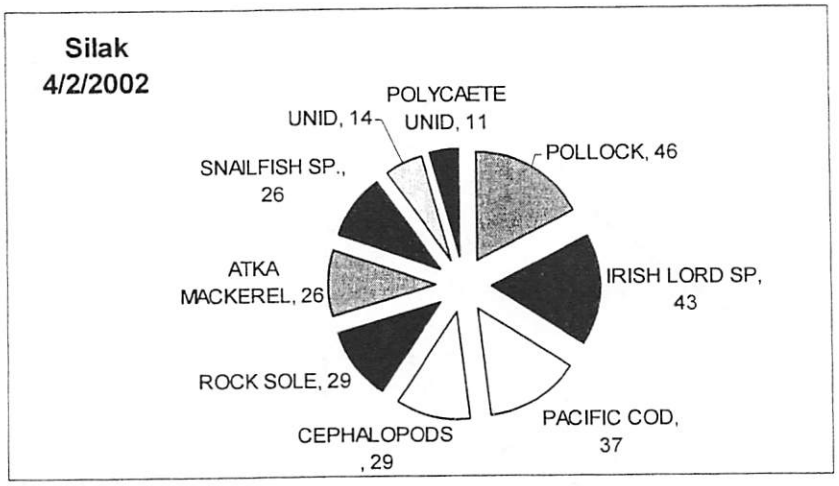
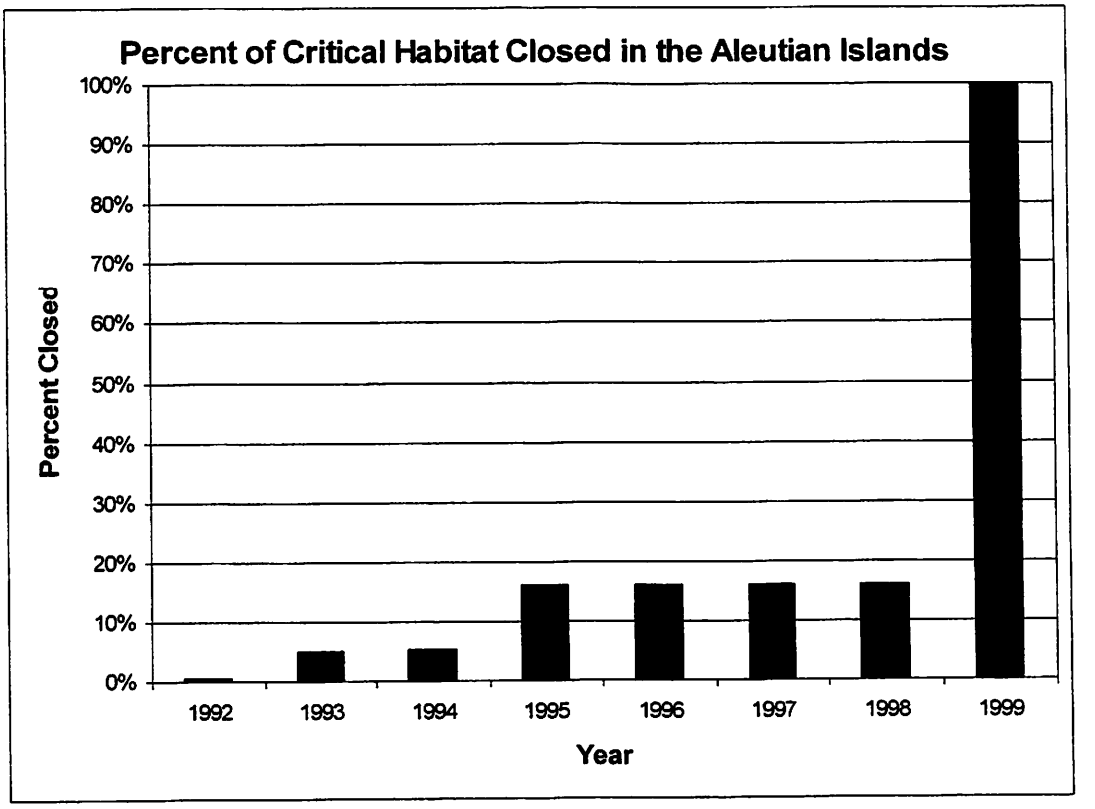



Figure 10. Fraction of critical habitat in the Aleutian Islands area closed to pollock fishing.



FIGURES

Figure 11. Observed foreign and J.V. (1978-1989), and domestic (1989-2002) pollock catch in the Aleutian Islands Area summed over all years and 10 minute latitude and longitude blocks. Both maps use the same scale (maximum observed catch per 10 minute block: foreign and J.V. 8,000 t and Domestic 19,000 t). Catches of less than 1 t were excluded from cumulative totals. (from Barbeaux et al. 2005.

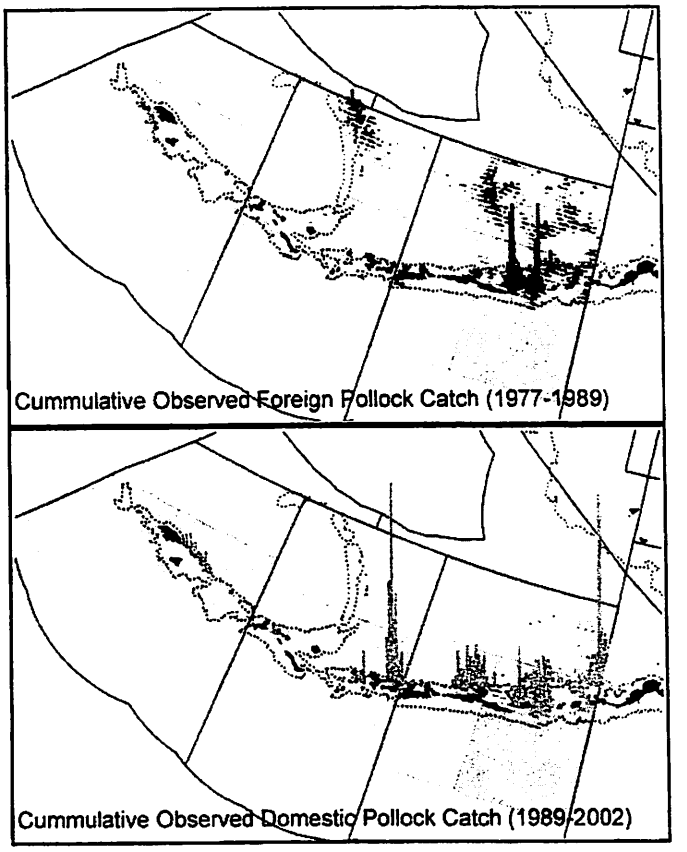


Figure 12. Harvest of pollock in the Aleutian Islands area from 1989-2003 (NMFS unpublished data).

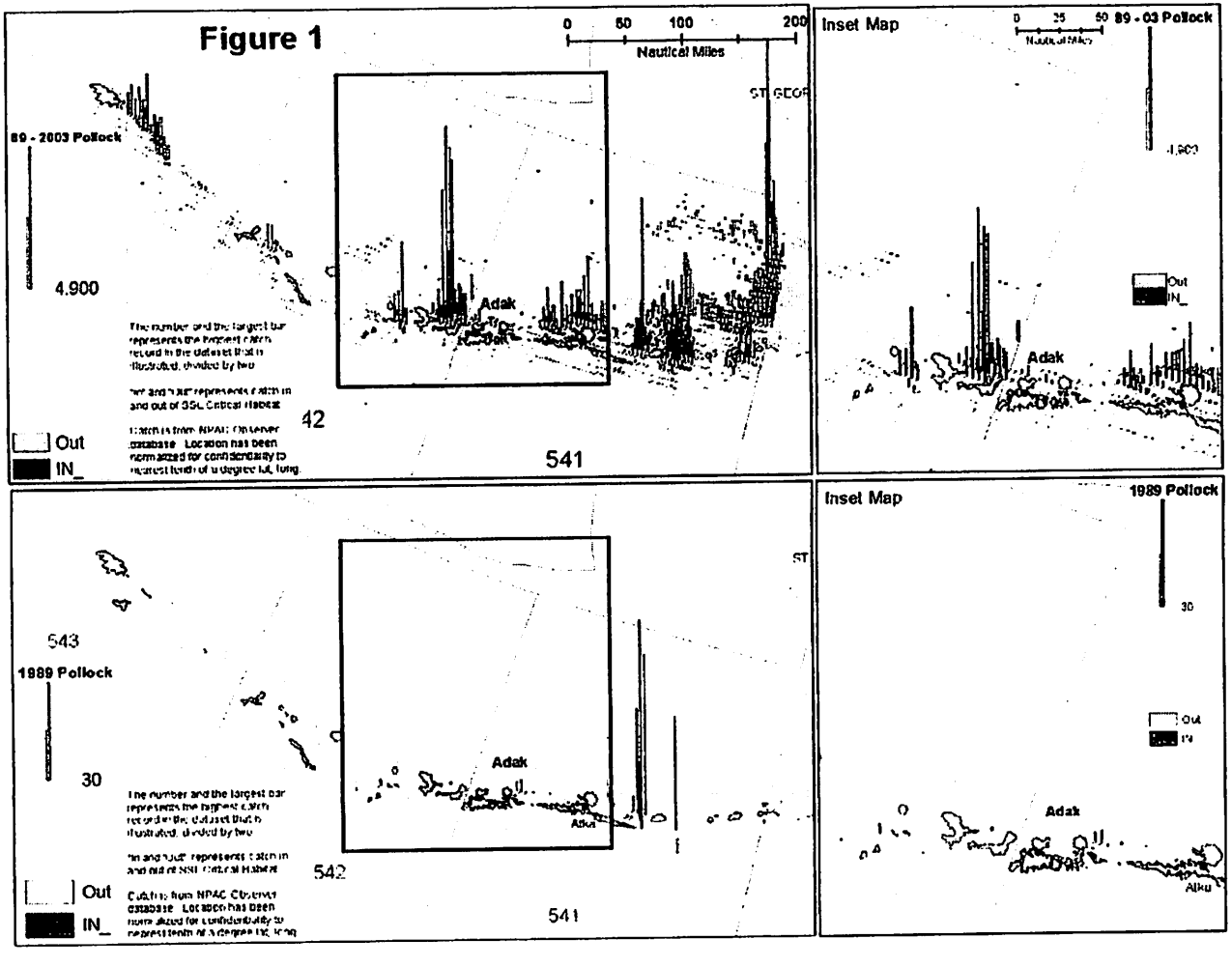
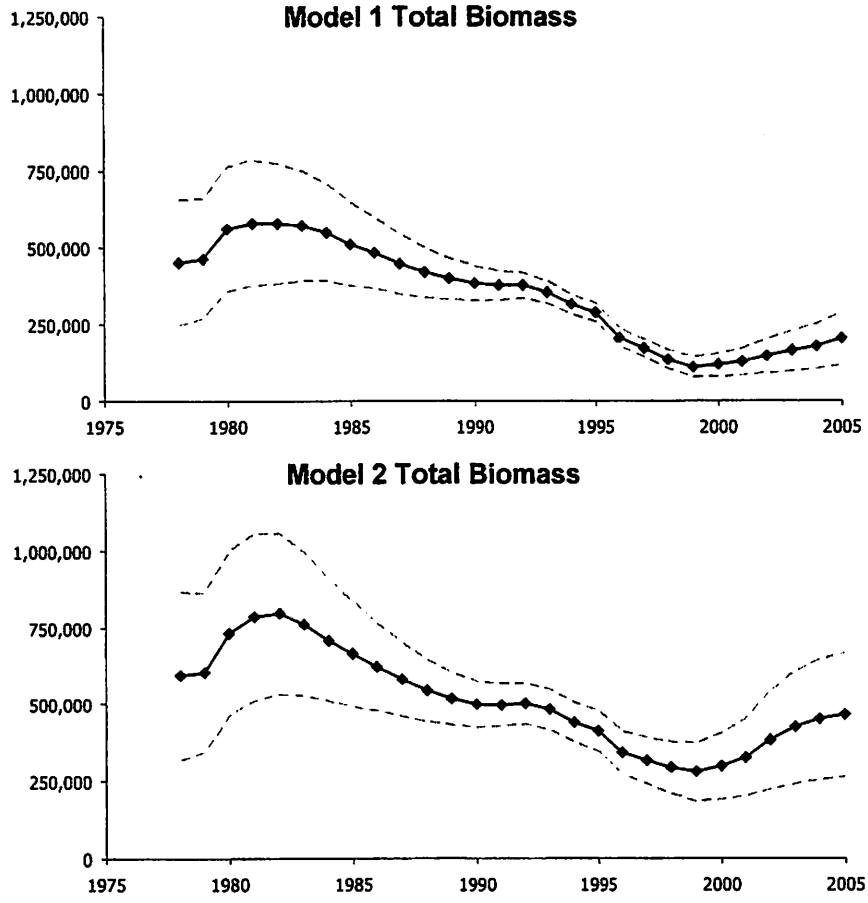


Figure 13. Model1(top) and Model 2 (bottom) estimates of Aleutian Islands pollock age 2+ total biomass (in tons); dashed lines represent approximate upper and lower confidence bounds (from Barbeaux et al 2005).



**Title 5. Fish and Game.**

**Chapter 28. Groundfish Fishery.**

**Article 10. Bering Sea – Aleutian Islands Area (Registration Area O).**

5 AAC 28.645 is repealed and readopted to read:

**5 AAC 28.645. Aleutian Islands District Walleye Pollock Management Plan.** (a) This management plan governs the directed harvest of walleye pollock in that portion of the Aleutian Islands District between 174° W. long. and 178° W. long.

(b) The commissioner will establish the guideline harvest level for the directed harvest of walleye pollock under this section at 3,000 metric tons, reduced by the amount of walleye Pollock **authorized to be taken by federal Exempted Fisheries Permit** [THAT THE COMMISSIONER PROJECTS WILL BE TAKEN BY FEDERALLY PERMITTED FISHERIES] inside critical habitat areas in the Aleutian Islands District between 174° W. long. and 178° W. long., described in C.F.R. 226.202, revised as of October 1, 2005. [THE COMMISSIONER MAY ADJUST THE GUIDELINE HARVEST LEVEL IN SEASON IF THERE IS A SIGNIFICANT CHANGE IN THE AMOUNT OF WALLEYE POLLOCK THAT THE COMMISSIONER PROJECTS WILL BE TAKEN BY THE FEDERALLY PERMITTED FISHERIES.]

(c) **Seven days after the beginning of the federal EFP fishery** [ON OR AFTER ~~JANUARY 20~~ March 1], the commissioner may open, by emergency order, the walleye pollock fishery under this section if the commissioner determines that the available guideline harvest level is sufficient to allow a manageable fishery. The commissioner shall close, by emergency order, the

walleye pollock fishery under this section when the guideline harvest level is projected to be taken or on June 10 if the commissioner determines that the guideline harvest level will not be taken by June 10.

(d) Walleye pollock may be taken under this section only with pelagic trawl gear and on a vessel that is no more than 58 feet in overall length.

(e) Before a person uses a vessel to operate gear to take walleye pollock under this section, the vessel owner, the owner's authorized agent, or the vessel operator shall validly register the vessel with the department office in Dutch Harbor.

(f) A vessel operator must notify a local representative of the department daily between the business hours of 8:00 a.m. through 5:00 p.m. to report the amount, by weight, of unprocessed walleye pollock on board the vessel. Cod end transfers are prohibited. The vessel operator must land the walleye pollock on board the vessel at a processing plant that has observer coverage where the unsorted catch may be observed by the observer.

(g) The following waters are closed to the direct harvest of walleye pollock under this section:

(1) all state waters within 20 miles around a Steller sea lion rookery, excluding the waters of the bay on the northwest side of Kanaga Island;

(2) all waters within three miles around a Steller sea lion haulout.

(h) In this section,

(1) "overall length" means the straight line length between the extremities of the vessel, excluding the anchor rollers;

(2) "Steller sea lion haulout" means a site listed as a Steller sea lion protection area in Table 4 of 50 C.F.R. 679, revised as of October 1, 2005, adopted by reference, but not listed in Table 12 of 50 C.F.R. 679, revised as of October 1, 2005, adopted by reference;

(3) "Steller sea lion rookery" means a site listed as a Steller sea lion protection area in Table 12 of 50 C.F.R. 679, revised as of October 1, 2005, adopted by reference.

(i) The provisions of this section do not apply after December 31, 2008. (Eff. ____/____/2007, Register _____)

**Authority:** AS 16.05.060 AS 16.05.251

**Editor's note:** The department office in Dutch Harbor may be contacted at the Department of Fish and Game, P.O. Box 920587, Dutch Harbor, AK 99692-0587; Phone: (907) 581-1219; Fax: (907) 581-1572.

# Public Testimony Sign-Up Sheet

## Agenda Item ~~C-5 Sweeps~~ D-1(d) ADAK EFP

| | NAME (PLEASE PRINT) | AFFILIATION |
|---|---|---|
| 1 | Stephen Taufen | ~~Groundfish~~ Adak Power & Electric |
| 2 | Sandra Moller / dave Fraser | AEC + Adak Fisheries |
| 3 | | |
| 4 | | |
| 5 | | |
| 6 | | |
| 7 | | |
| 8 | | |
| 9 | | |
| 10 | | |
| 11 | | |
| 12 | | |
| 13 | | |
| 14 | | |
| 15 | | |
| 16 | | |
| 17 | | |
| 18 | | |
| 19 | | |
| 20 | | |
| 21 | | |
| 22 | | |
| 23 | | |
| 24 | | |
| 25 | | |

NOTE to persons providing oral or written testimony to the Council: Section 307(1)(I) of the Magnuson-Stevens Fishery Conservation and Management Act prohibits any person " to knowingly and willfully submit to a Council, the Secretary, or the Governor of a State false information (including, but not limited to, false information regarding the capacity and extent to which a United State fish processor, on an annual basis, will process a portion of the optimum yield of a fishery that will be harvested by fishing vessels of the United States) regarding any matter that the Council, Secretary, or Governor is considering in the course of carrying out this Act.