**Annual Report for Fisheries and Ecosystem Research Activities**
**Conducted by Alaska Fisheries Science Center**
**January 1 – December 31, 2022**

On October 7th, 2019, the Alaska Fisheries Science Center (AFSC) received a Letter of Authorization (LOA) under section 101(a)(5)(A) of the Marine Mammal Protection Act (MMPA; 16 U.S.C 1371(a)(5)) to take marine mammals incidental to fishery and ecosystem research activities in Alaska. Take of marine mammals incidental to AFSC fishery and ecosystem research activities is subject to the provisions of the MMPA and the regulations governing this take as described in 50 CFR Part 219, Subpart F (Regulations). The LOA is valid through October 7, 2024.

Additionally, on March 29, 2018, the AFSC received a Biological Opinion and Incidental Take Statement [50 CFR §402.14] from the U.S. Fish and Wildlife Service (USFWS) under Section 7(b)(4) of the Endangered Species Act. In the Biological Opinion, USFWS considered the effects to short-tailed albatross within federal waters of Alaska, resulting from the proposed fishery and ecosystem research activities (including research by the International Pacific Halibut Commission (IPHC) working in partnership with AFSC). Prior to the 2019 Biological Opinion, in 2017 USFWS issued a Letter of Concurrence (LOC) to AFSC for research activities not likely to adversely affect sea otters, polar bears, spectacled eiders and Steller's eiders. This BiOp was revised in 2022. ESA Section 7 consultation was informally re-initiated in fall 2022 due to separate interactions with a sperm whale and humpback whale. Consultation is currently ongoing.

On April 5, 2019, AFSC received a programmatic Biological Opinion and Incidental Take Statement from the National Marine Fisheries Service (NMFS) evaluating the potential effects of AFSC and IPHC fishery and ecosystem research on ESA-listed cetaceans, pinnipeds, sea turtles and fish species within the action area.

In accordance with the MMPA and ESA, the AFSC is required to provide annual reports. This annual report covers the period from January 1 – December 31, 2022.

The report is organized by the following sections:



In each section, a summary for each research area is described in relation to the reporting period. A summary of calendar year 2022 AFSC fishery research surveys can be found in Table 1.

Table 1. Summary of Calendar year 2021 AFSC fishery research surveys

| Survey name | Region | Start date | End date |
|---|---|---|---|
| Winter Acoustic-Trawl | Shumagin/ Shelikof/Chirikof/Sanak | 3/08/2022 | 3/17/2022 |
| Bering Sea Moorings and Zooplankton Survey_Spring | Eastern Bering Sea | 5/10/2022 | 5/19/2022 |
| Alaska Longline Survey | Gulf of Alaska, Bering Sea, Aleutian Islands | 5/30/2022 | 8/29/2022 |
| IPHC Setline Survey | Gulf of Alaska, Bering Sea, Aleutian Islands | 5/28/2022 | 9/15/2022 |
| EBS Bottom Trawl Survey | Eastern Bering Sea | 5/25/2022 | 8/5/2022 |
| AI Bottom Trawl Survey | Gulf of Alaska | 6/6/2022 | 8/17/2022 |
| Bering Sea Acoustic Trawl Survey Summer | Bering Sea | 6/2/2022 | 8/6/2022 |
| NBS Bottom Trawl Survey | Northern Bering Sea | 8/03/2022 | 8/28/2022 |
| NBS Surface Trawl Survey (BASIS) | Northern Bering Sea | 8/28/2022 | 9/11/2022 |
| EBS EMA-FOCI Juvenile Fish Survey Fall | Eastern Bering Sea | 8/12/2022 | 9/11/2022 |
| Gulf of Alaska Juvenile Sablefish Tagging | Gulf of Alaska | 8/28/2022 | 9/01/2022 |
| Gulf of Alaska Larg-Scale Age-0/1 Pacific Cod Nursery Habitat | Gulf of Alaska | 7/1/2022 | 8/5/2022 |
| Kodiak Age-0/1 Pacific Cod Nursery Habitat | Gulf of Alaska | 6/30/2022 | 8/30/2022 |

1. Overview of AFSC's mitigation measures

AFSC has developed and implemented a set of prescribed mitigation measures on all surveys in order to minimize the likelihood or severity of incidental gear interactions with marine mammals and other protected species. These measures vary slightly depending on the gear type and survey but are mainly comprised of dedicated marine mammal / protected species monitoring, move-on rule if protected species are seen during monitoring, and standard operating procedures by gear type. Below are gear specific descriptions of these conservation measures.

Trawl

15 minute pre-station monitoring

Most research vessels engaged in trawling will have their station in view for 15 minutes or 2 nm prior to reaching the station, depending upon the sea state and weather. For these surveys the tow path is inspected before deploying the trawl gear, adding another 15 minutes of observation time and gear preparation prior to deployment. If marine mammals are observed at or near the station, the Chief Scientist and the vessel operator will determine the best strategy to avoid potential takes based on the species encountered, their numbers and behavior, their position and vector relative to the vessel, and other factors.

Move-on rule

If a marine mammal or other protected species is at risk from a research activity before setting gear or when occupying the site, then the research activity will stop until the animal moves away and is no longer at risk. If the animal does not move from the research site, then the research activity will be moved to an alternate location or canceled so there is no longer a risk to the animal or other protected species. If a protected species is encountered during a research activity during gear deployment, then the vessel maintains course, slows down, or takes other actions to avoid direct contact of the animal with the vessel or gear.

Active gear monitoring

Active gear monitoring during research activities, gear deployment, fishing, and retrieval, is conducted by a dedicated observer. If a marine mammal is seen during research activities, the most appropriate action to avoid an interaction will be determined using professional judgment and recorded. Professional judgment is only used in circumstances when the gear is already deployed - that is, if a marine mammal is seen during the pre-set watch, the move-on rule must be implemented, but if it is seen when the net is fishing, then professional judgment is used to determine the best course of action to avoid an interaction.

Longline

15 minute pre-station monitoring and Move-on rule

The AFSC Longline Survey uses bottom longline gear with two 8 kilometer (km) long sets per day. The IPHC survey uses shorter longlines up to 3 nm (6.1 km) and usually deploys three longlines per day. Longline gear is set at predetermined stations if no listed species are present, and the gear is allowed to soak for a minimum of three hours for the AFSC survey and for a minimum of five hours for the IPHC survey before haul-back begins.

Gear Deployment and Haul-back

Some species of whales (including sperm whales) have learned the sounds associated with longline operations and sometimes appear as the gear is being retrieved, two primary strategies are used to minimize exposure time of the gear to whale depredation. If whales are present at haul-back, the AFSC sablefish survey vessel retrieves the gear as quickly as possible in order to minimize interactions. Due to the length of the mainline and numbers of hooks involved, it takes up to three to eight hours to complete

the haul-back. If whales are present during IPHC haul-back, the gear is dropped or left and another line retrieved to give the chance for the whales to leave the area near the first line. For both surveys, if whales follow the vessels between survey stations, the survey pattern may be altered to increase the distance between stations as a means to dissuade the animals from depredation and to avoid continued interactions.

Chumming

AFSC and IPHC longline protocols specifically prohibit chumming (i.e., releasing additional bait to attract target species to the gear) before or during the longline setting operations. However, longline surveys are conducted on contracted commercial fishing catcher/processor vessels and fish are processed as the longline is retrieved. On the AFSC survey vessel, catch is processed aboard the vessel, and offal is macerated and discharged off the side opposite of gear retrieval. This minimizes the attraction to marine mammals and keeps seabirds away from the gear being retrieved. On IPHC survey vessels, bait and undesirable fish are immediately returned to the sea. Due to the small vessels and amount of catch, it is impossible to retain the catch and discard it at another time.

Gillnet

If no marine mammals are present, the gear is set and monitored continuously during the soak. If a marine mammal is sighted during the soak and appears to be at risk of interaction with the gear, then the gear is pulled immediately in order to minimize the time the net is in the water and exposed to nearby marine mammals. Acoustic pingers may be used to reduce the chance of encounters. Small mesh gillnets are used in AFSC surveys, which may further reduce interactions with marine mammals.

Biological Oceanography

The AFSC deploys a wide variety of gear to sample the marine environment during all of their research cruises, including but not limited to plankton nets, oceanographic sampling devices, video cameras, high-frequency active acoustics, AUVs, ROVs, and a variety of less commonly used small nets. It is not anticipated that these types of gear or equipment would interact with protected species, or are used rarely, and are therefore not subject to specific mitigation measures. However, vessel operator and Chief Scientist and designated crew monitor for any unusual circumstances that may arise at a sampling site and use their professional judgment and discretion to avoid any potential risks to protected species during deployment of all research equipment.

Specific Mitigation Measures for Seabirds

The AFSC Longline Survey uses bottom longline gear with two 8 kilometer (km) long sets per day. The IPHC survey uses shorter longlines up to 3 nm (6.1 km) and usually deploys three longlines per day. Tori lines must be used to avoid interactions with the endangered short-tailed albatross and other seabirds. All vessels in or near Spectacled or Steller's Eider critical habitat must avoid disturbing their feeding habitat. At night all vessels must keep all lights of all colors to a minimum and direct any necessary lights inboard and downward to the extent possible. Cover all portholes. All vessels must be vigilant for flotillas of birds, if seen, slow down and give wide berth to avoid spooking birds.

2. Line-kilometers surveyed during which the EK60/EK80, ES60, ME70, and SX90 were predominant during the reporting period and pro-rated estimates of actual take (Table 2).

Table 2. Total line-kilometers (kms) surveyed during the reporting period, 2022, for which the EK60/EK80, ES60, ME70, or SX90 echosounder was the predominant acoustic source in Alaska compared to the totals estimated in the AFSC's MMPA LOA application (Table 69 of AFSC Research BiOp, ECO AKRO-2017-00028).

| Survey/Project | Acoustic System | Platform | Dominant Operating Frequency (others concurrent sources in parentheses) | Total Distance (km) over 5 years* | Annual or Survey Permit Distance (km) | Actual Distance (km) |
|---|---|---|---|---|---|---|
| **GOA** | | | | **5 years** | | **2022** |
| Pollock Summer Acoustic Trawl Survey - Gulf of Alaska (Biennial) | EK60/ME70 | NOAA Ship Oscar Dyson | 18 kHz (38, 70, 120, 200 kHz/70 kHz) | 17558 | 5833 | 0 |
| Pollock Winter Acoustic Trawl Survey - Shelikof Strait | EK60/ME70 | NOAA Ship Oscar Dyson | 18 kHz (38, 70, 120, 200 kHz/70 kHz) | 9540 | 1908 | 1509 |
| Pollock Winter Acoustic Trawl Survey – Shumagin/Sanak Islands | EK60/ME70 | NOAA Ship Oscar Dyson | 18 kHz (38, 70, 120, 200 kHz/70 kHz) | 4520 | 904 | 0 |
| Pollock Winter A-T Survey – Kenai/PWS | EK60/ME70 | NOAA Ship Oscar Dyson | 18 kHz (38, 70, 120, 200 kHz/70 kHz) | 4520 | 904 | 0 |
| Gulf of Alaska Shelf and Slope Bottom Trawl Groundfish Survey (Biennial) | ES60 | Charter Vessel (3) | 38 kHz (120 kHz) | 9189 | 3063 | 0 |
| **BSAI** | | | | | | |
| Pollock Summer Acoustic Trawl Survey – Bering Sea (Biennial) | EK60/ME70 | NOAA Ship Oscar Dyson | 18 kHz (38, 70, 120, 200 kHz/70 kHz) | 17558 | 5853 | 8149 |
| Aleutian Islands Shelf and Slope Bottom Trawl Groundfish Survey (Biennial) | ES60 | Charter Vessel (2) | 38 kHz (120 kHz) | 3190 | 1595 | 680 |
| Bering Sea Shelf Bottom Trawl Survey | ES60 | Charter Vessel (2) | 38 kHz (120 kHz) | 11200 | 2240 | 1128 |
| Eastern Bering Sea Upper Continental Slope Trawl Survey Summer (Biennial) | ES60 | Charter Vessel | 38 kHz (120 kHz) | 1125 | 563 | 0 |
| NBS Surface Trawl Survey (BASIS) | ES60 | Charter Vessel | 38 kHz (120 kHz) | 12288 | 2458 | 152 |
| Northern Bering Sea Bottom Trawl Survey | ES60 | Charter Vessel | 38 kHz (120 kHz) | 1440 | 480 | 432 |

| | | | | | | |
|---|---|---|---|---|---|---|
| **Chukchi and Beaufort Seas** | | | | | | |
| Arctic Ecosystem Integrated Survey | ES60 | Charter Vessel | 38 kHz | 5915 | NA | 0 |
| *Estimated Annual Active Lineal Distance (km) - This considers ONLY effective line effort of active acoustic operations directed at mobile survey efforts (not active transmission during transit or other non-directed times) for each research area. | | | | | | |
| NOAA vessel Oscar Dyson deploys the SIMRAD EK60 at 18-, 38-, 70-, 120-, and 200-kHz and the ME 70 multi-beam operating at 70 kHz. In recent years, and foreseeable future operations, the ME 70 will only be run ad hoc, with no real plans, as there was significant cross-talk issues that emerged with concurrent operation with EK60. | | | | | | |
| NOTE: All charter vessels used for fishery acoustics include the requirement for a SIMRAD ES60 (or its successor) echo sounder system with either a 38-kHz single or split beam transducer (preferred). All units are calibrated to manufacturer specifications. Arctic EIS survey is sporadic and funding dependent, that is why annual is NA. | | | | | | |

Table 3.
AFSC's annual Level B harassment by acoustic sources for each marine mammal species in Alaska in 2022. For each species and predominant source, the cross sectional area for the relevant depth strata (Table 1) and the volumetric density (shown here, source Table 71 -73 of AFSC Research BiOp. ECO AKRO-2017-00028) to assess Level B harassment for the reporting period (source 50 CFR Part 219 Vol 84, No. 172).

| | | Volumetric Density (#/km$^3$) | Typical vertical habitat | | **Reporting Period Total Acoustic Takes** | Federal Register Final Rule Annual Takes |
|---|---|---|---|---|---|---|
| Species | Stock | | 0-200 m | >200 m | EK60/EK80 | |
| North Pacific Right Whale | ENP | 0.0265 | X | | **1** | 2 |
| Bowhead Whale | Western Arctic | 0.0850 | X | | **12** | 42 |
| Gray Whale | ENP | 8.5000 | X | | **490** | 5,579 |
| Humpback Whale | CNP | 0.0500 | X | | **14** | 161 |
| | WNP | 0.0035 | X | | **1** | 6 |
| Minke whale | Alaska | 0.0060 | X | | **3** | 8 |
| Sei whale | ENP | 0.0009 | X | | **2** | 2 |
| Fin whale | Northeast Pacific | 0.1000 | X | | **2** | 40 |
| Blue whale | ENP | 0.0005 | X | | **1** | 1 |
| Sperm whale | North Pacific | 0.0020 | | X | **5** | 22 |
| Cuvier's beaked whale | Alaska | 0.0002 | | X | **2** | 2 |
| Baird's beaked whale | Alaska | 0.0034 | | X | **2** | 8 |
| Stejneger's beaked whale | Alaska | 0.0102 | | X | **2** | 15 |
| Beluga* | Beaufort Sea | 0.0400 | X | | **0** | 3 |
| | Eastern Chukchi Sea | 0.0400 | X | | **0** | 3 |
| | Eastern Bering Sea | 1.2100 | X | | **184** | 939 |
| | Cook Inlet | 1.0000 | X | | **0** | 3 |
| Pacific white-sided dolphin | NP | 0.0750 | X | | **6** | 54 |
| Killer whale | ENP Offshore | 0.0550 | X | | **10** | 67 |
| | West Coast Transient | 0.0280 | X | | **1** | 13 |
| | AT 1 Transient | 0.0035 | X | | **1** | 2 |
| | ENP GOA, AI and BS transient | 0.0035 | X | | **3** | 14 |
| | ENP Northern Resident | 0.0125 | X | | **1** | 6 |
| | ENP Alaska Resident | 0.0060 | X | | **2** | 24 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Harbor porpoise | Southeast Alaska | 0.5500 | X | | **15** | 358 |
| | Gulf of Alaska | 1.0000 | X | | **27** | 650 |
| | Bering Sea | 2.2500 | X | | **343** | 1,746 |
| Dall's porpoise | Alaska | 3.2000 | X | | **90** | 5,343 |
| Northern fur seal | Pribilof Islands/Eastern Pacific | 1.0753 | X | | **181** | 1,576 |
| Steller sea lion | Western DPS | 0.1750 | X | | **15** | 3,526 |
| | Eastern DPS | 0.2900 | X | | **9** | 914 |
| Bearded seal | Alaska (Beringia DPS) | 1.9675 | X | | **331** | 1,727 |
| Harbor seal | Aleutian Islands | 0.0144 | X | | **3** | 301 |
| | Pribilof Islands | 0.0005 | X | | **1** | 29 |
| | Bristol Bay | 0.0724 | X | | **12** | 187 |
| Spotted seal | Alaska | 3.0060 | X | | **387** | 2,106 |
| Ringed seal | Alaska | 1.7460 | X | | **293** | 2,066 |
| Ribbon seal | Alaska | 1.2035 | X | | **155** | 1,404 |

*Acoustics are not used in areas of Bristol Bay where Belugas occur, thus level B take not included.

3. Summary of AFSC and IPHC gear used during all Fisheries and Ecosystem Research

Table 4. AFSC trawl survey metadata for the reporting period by trawl net and research area.

| Research Area | Trawl Net | Total # tows | Fishing Depth Range (m) | Average Tow Duration of active fishing (minutes) |
|---|---|---|---|---|
| *Eastern Bering Sea Shelf* | Bottom Trawl | 331 | 20-200 m | 15-20 |
| | Plankton Net | 126 | 0-200 m | 10-30 |
| | Surface Trawl | 0 | 0-25 m | 30 |
| | Midwater | 0 | 50-300 m | variable |
| *Northern Bering Sea* | Surface Trawl | 40 | 0-25 m | 30 |
| | Bottom Trawl | 80 | 15-80 m | 15-20 |
| | Plankton Net | 0 | 0-200 m | 10-30 |
| *Aleutian Islands* | Bottom Trawl | 320 | 20-500 m | 15-20 |
| *Gulf of Alaska* | Mid-water | 55 | 50-300 m | variable |
| | Bottom Trawl w/ auxiliary underbag net | 0 | 20-700 m | 15-20 |
| *Bogoslof Island* | Mid-water | 0 | 50-300 m | variable |
| *Southeast Alaska Inshore Waters* | Surface trawl | 0 | 0-25 m | 20 |
| | Seine | 0 | Nearshore | N/A |

Table 5. ASFC and IPHC reporting period longline and hook & line metadata.

| Gear Type | Survey | Total # sets | # Hooks | Fishing depth range (m) |
|---|---|---|---|---|
| *Longline* | Alaska Sablefish | 152 | 615,600 | 100-1000 |
| *Hook & Line* | IPHC | 659 | 421,694 | 30-119 |

4. Protected Species Encounters

Table 6. AFSC entries into protected species interaction database

| Survey | Date | Protected species | Number killed | Notes |
|---|---|---|---|---|
| GOA/EBS/AI Longline Stock Assessment Survey | 6/18/2022 | Black-footed Albatross | 1 | The AFSC longline survey caught a black-footed albatross on June 18 in the western Gulf of Alaska. The bird was caught while gear was deployed and subsequently drowned. I was told that while setting the longline gear, the vessel and scientific crew determined the bird deterrent tori lines were functioning properly and were adjusted (pulled in tighter to the gear) to compensate for waves, wind, and current to discourage bird interactions. 20-25 knot winds and 6-8' seas were present during setting. The vessel and science crew have inspected the seabird mitigation tori lines to verify their configuration is appropriate. Heightened vigilance and extra caution will be used during subsequent setting operations to try to avoid the aggressive seabirds. Relevant information for the black footed albatross: 1) 1 black-footed albatross caught on AFSC longline survey 2) 1 dead 3) June 18, 2022 at ~11:00 4) N 53 11.50', W -166 52.82' (coordinates of start of set) 5) Bird deterrents (tori lines) were in place and observed fully operational by chief scientist during setting operations 6) Bird drowned after being hooked during setting operations; observed on hook during gear retrieval 7) Specimen was retrieved and put in the freezer for later transfer to the AFSC seabird coordinator 8) Tori lines were inspected after the recovery and deemed fully functional |
| GOA/EBS/AI Longline Stock Assessment Survey | 6/18/2022 | Laysan Albatross | 1 | The AFSC longline survey caught a Laysan albatross (banded with ID# EY24) on June 18 in the western Gulf of Alaska. The bird was caught while gear was deployed and subsequently drowned. I was told that while setting the longline gear, the vessel and scientific crew determined the bird deterrent tori lines were functioning properly and were adjusted (pulled in tighter to the gear) to compensate for waves, wind, and current to discourage bird interactions. 20-25 knot winds and 6-8' seas were present during setting. The vessel and science crew have inspected the seabird mitigation tori lines to verify their configuration is appropriate. Heightened vigilance and extra caution will be used during subsequent setting operations to try to avoid the aggressive seabirds. Relevant information for the black footed albatross: 1) 1 Laysan albatross caught on AFSC longline survey 2) 1 dead 3) June 18, 2022 at 12:00 4) N 53 11.50', W -166 52.82' (coordinates |

| | | | | |
|---|---|---|---|---|
| | | | | of start of set) 5) Bird deterrents (tori lines) were in place and observed fully operational by chief scientist during setting operations 6) Bird drowned after being hooked during setting operations; observed on hook during gear retrieval 7) Specimen was retrieved and put in the freezer for later transfer to the AFSC seabird coordinator 8) Tori lines were inspected after the recovery and deemed fully functional |
| GOA/EBS/AI Longline Stock Assessment Survey | 6/26/2022 | Black-footed Albatross | 1 | The AFSC longline survey caught a black-footed albatross on June 27 in the western Gulf of Alaska. The bird was caught while gear was deployed and subsequently drowned. I was told that while setting the longline gear, the vessel and scientific crew determined the bird deterrent tori lines were functioning properly and were adjusted (pulled in tighter to the gear) to compensate for waves, wind, and current to discourage bird interactions. 20-25 knot winds and 6-8' seas were present during setting. The vessel and science crew have inspected the seabird mitigation tori lines to verify their configuration is appropriate. Heightened vigilance and extra caution will be used during subsequent setting operations to try to avoid the aggressive seabirds. Relevant information for the black footed albatross: 1) 1 black-footed albatross caught on AFSC longline survey 2) 1 dead 3) June 26, 2022 at ~17:00 4) N 54.3717', W -159.4317' (coordinates of end of set) 5) Bird deterrents (tori lines) were in place and observed fully operational by chief scientist during setting operations 6) Bird drowned after being hooked during setting operations; observed on hook during gear retrieval 7) Specimen fell off hook and could not be retrieved 8) Tori lines were inspected after the recovery and deemed fully functional |
| GOA/EBS/AI Longline Stock Assessment Survey | 8/19/2022 | Black-footed Albatross | 1 | The AFSC longline survey caught a black-footed albatross August 19, 2022 in the central Gulf of Alaska. The bird was caught while gear was deployed and subsequently drowned. I was told that while setting the longline gear, the vessel and scientific crew determined the bird deterrent tori lines were functioning properly. There were approximately 400 seabirds observed during setting. Wind and sea state may have been a contributing factor, as 20-25 knot winds and 7' seas were present. The vessel and science crew have inspected the seabird mitigation tori lines to verify their configuration is appropriate. I have entered the PSIT information into the PSIT database as of 08:00 today. Below is relevant information: 1) 1 black- |

| | | | | |
|---|---|---|---|---|
| | | | | footed albatross caught on AFSC longline survey 2) 1 dead 3) August 19, 2022 at 14:30 4) N 57.04, W -151.30 5) Bird deterrents (tori lines) were in place and observed fully operational by chief scientist during setting operations 6) Bird drowned after being hooked during setting operations; was observed on hook during gear retrieval 7) Specimen was retrieved and put in the freezer for later transfer to the AFSC seabird coordinator 8) Tori lines were inspected after the recovery and deemed fully functional |

a. Protected Species Summary for 2022 AFSC Longline Survey

The operations of the 2022 AFSC Longline Survey were completed in a manner that adhered to the guidelines set forth for avoiding and mitigating interactions with protected species. Throughout the survey, the vessel's captain made daily log entries when protected species were observed and discussed the observations and/or any mitigation measures with the Chief Scientist. The Chief Scientist also made daily notes about protected species observations following the Alaska Fisheries Science Center's protected species reporting protocols. Below is a summary of protected species interactions for the entirety of the AFSC longline survey which sampled the eastern Aleutian Islands and the Gulf of Alaska from June 3-August 26, 2022.

In 2022, the AFSC Longline Survey occasionally interacted with or observed protected species. Killer whales depredated on the longline at 5 stations; one in the eastern Aleutian Islands and four in the western Gulf of Alaska. Sperm whales were observed depredating on the longline at 8 stations in the Gulf of Alaska. In general, depredating whales stayed at least 0.25 nmi away from the survey vessel and depredation occurred deep within the water column out of sight. Mitigation procedures were followed when depredation was suspected and the longline was hauled back as quickly as possible when whales were observed.

Table 7. Protected Species Observations during 202 Winter Acoustic Trawl Surveys, 2022 Summer Acoustic Survey, 2022 EBS bottom trawl survey. No encounters were had in other surveys.

| Survey | Species | Number | Distance from Vessel (m) | Encounter |
|---|---|---|---|---|
| | | | | |
| Winter Acoustic Trawl | Killer Whale | 3 | 20 | While on transect officer on duty called lab - orcas close approach. Vessel altered course slightly to avoid interactions. |
| | Killer Whale | 2 | 100 | Observer spotted orca off of Starboard bow swimming away from vessel while on acoustic transect. No action taken. |
| | Minke Whale | 1 | 100 | Passed on port side. No action taken. |
| | Dalls Porpoise | 8-10 | 100 | No action taken |
| Summer Acoustic Survey | Dall's Porpoise | 4 | 30 | Bow riding. |
| | Fin Whale | 1 | 100 | Blows and back observed from the vessel. No action taken. |
| | Humpback Whale | 5 | 2000 | Several blows and flukes of group of humpbacks. |
| | Killer Whale | Several | 800 | Pod of orcas crossed in front of the ship. |
| | Short-tailed Albatross | 1 | 100 | Bird seen flying around codend upon retrieval. No interaction. |
| | Short-tailed Albatross | 1 | 20 | During haulback for LFS 13 we observed a ST Albatross land on the water near the floating codend. ID was clear due to its large size and pink bill. It flew back and forth between ~20m off the stern of the ship and the area around the codend while hauling back. |
| EBS Bottom Trawl Survey | Humpback whale | 3-5 | 500 | Observed whales near tow path, waited 30 minutes to clear but did not move. Vessel operator determined it would be fine to set gear and tow. No interaction. |

a. International Pacific Halibut Commission – Setline Survey

Table 8. Protected Species Observations during 2022 IPHC Survey

| Species | Number | Distance from Vessel (m) | Encounter |
|---|---|---|---|
| Northern Fur Seal | 1 | 3 | 1 Northern fur seal approached the side of the boat. |
| | 1 | 10 | Small northern fur seal seen following the boat starting on the third skate at hook 90 until the 5th skate midway through, seen going after the sub-legal halibut that was discarded. |
| California Sea Lion | 1 | 30 | Small Sea Lion spotted nearby yellow eye - Possibly eating discard |
| | 1 | 10 | Small California sea lion spotted eating halibut discards. Rollerman felt the line tugged a few times. Some halibut also came up with bite marks. |
| Steller Sea Lion | 1 | 5 | Near boat, feeding on discards. Fresh scars on the face. |
| Fin Whale | 1 | 10 | Fin whale passed vessel while retrieving gear. No interaction with gear. |
| Humpback Whale | 2 | 800 | Whales were spyhopping, no interaction. |
| | 1 | 250 | Whales seen breaching and fin slaps |
| | 5 | 600 | Pod of humpbacks transited while gear in water. No interaction. |
| | 1 | 75 | Humpback nearby during haulback. No interaction. |
| Killer Whale | | | |
| | 3 | 75 | Family of orcas seen diving on the line including one very young one. No lips only, or BBMs, or noticible drop in catch, but catch was low to begin with. |
| | 1 | 150 | At least one or a seen diving on the line. Hard to tell if there was a drop in catch. Not many fish to begin with. |
| | 1 | 1500 | Single male orca seen diving on the line. One half eaten black cod, one set of halibut lips and a BMM observed. |
| | 3 | 1000 | Male orca and at least two others seen diving on the line. Previous set had BBMs, lips and a black cod bit in half. When half a black cod appeared, I started looking for whale sign and saw the orca. It may have been present earlier and gone undetected, no halibut caught so no drop in catch noticed. |
| | 5 | 50 | Possible orca depredation. Saw a distinct drop in Black cod after orcas showed up. No halibut before or after. |
| | 2 | 200 | Likely depredation. Distinct drop in catch and plenty of halibut lips observed. |
| | 3 | 500 | 3 Killer whales spotted after hook count on the skate 2 (hook 30). Ground line was attached to buoy line after hook 50 (second tub) and dropped with the anchor. The vessel shut down the engine and waited for 1 hour and resume hauling from the other end when Killer whales were no longer present. |
| | 4 | 10 | one male, one female, and 2 babies. appeared to be teaching the young ones to pick longline gear. whales were not present nor were there damaged catch till skate 4 |
| | 4 | 5 | We were already hauling when orcas appeared. The same pod from the last station. They left the area in the first 20 hook of the 3rd skate. |

| | | | |
|---|---|---|---|
| | 8 | 2 | Many orcas present (7-10) throughout the haul. No direct evidence of predation was observed, but seem likely. |
| | 5 | 50 | no direct evidence of depredation observed but they stayed with us for the rest of the haul. |
| | 1 | 30 | Ineffective due to orcas. Only sighted one and only briefly. No evidence of depredation observed on line. |
| | 4 | 50 | Ineffective due to orcas present. No real evidence of predation observed on the gear, but approximately 4 of them followed the boat for the entire haul. |
| | 3 | 50 | multiple halibut lips came up over the course of the set |
| | 1 | 30 | Orcas observed just as we were finishing the haul. |
| | 2 | 10 | 2 orcs approached to 10 meters of boat. More than usual bent hooks. Likely depredation. |
| | 2 | 50 | 1 orca observed in mid 4th skate around 60th hook. Another one showed up around 10minutes later. Only 2 halibuts were seen partially eaten of which one was LAR. |
| | 3 | 150 | Significant drop in halibut catch. 3 orca seemed to just be passing through. |
| Short-tailed Albatross | 1 | 25 | Juvenile STA sighted. |
| | 1 | 100 | Sub adult. Described as a mostly brown albatross with bright pink bill. |
| | 1 | 100 | 1 STA sighted toward end of haul. |
| | 1 | 10 | 1 STA observed at 10 meters from vessel |
| | 1 | 100 | 1 STA observed in the distance. |
| | 1 | 100 | 1 STA observed in the distance. |
| | 1 | 50 | Sub-adult STAL |
| | 1 | 100 | 1 STA observed in the distance. |
| | 1 | 50 | Sub Adult Short-tailed Albatross seen following boat. |
| | 1 | 80 | Sub adult Short-tailed Albatross seen following boat. |
| | 1 | 50 | Sub adult with a silver metal band on the left foot. |
| | 1 | 100 | Juvenile |
| | 1 | 15 | Late sub adult Short-tailed Albatross appeared at the start of hauling. |
| | 1 | 150 | 1 STA observed in the distance. |
| | 2 | 150 | Two adult Short-tailed Albatross seen following the vessel. |
| | 1 | 50 | Sub-Adult |
| | 1 | 25 | Adult Short-tailed Albatross |
| | 5 | 50 | Adult Short-tailed Albatross |
| | 1 | 100 | 1 immature, 1 sub adult. |
| | 1 | 100 | 1 sub adult |
| | 13 | 20 | 13 Short-tailed Albatross seen. 2 sub adult, 11 adults. |
| | 3 | 15 | 3 sub adults |
| | 4 | 10 | 3 adults and 1 sub adult. |
| | 2 | 150 | 1 adult, 1 sub adult |
| | 2 | 10 | 1 adult, 1 immature |
| | 1 | 25 | 1 sub adult |
| | 2 | 50 | One immature and one sub adult Short-tailed Albatross |
| | 5 | 25 | 5 adults |
| | 2 | 15 | 2 Adults |
| | 11 | 10 | Adult=11, Sub Adult=2 |
| | 2 | 50 | Adult=0, Sub Adult=1, Immature=1 |
| | 1 | 20 | 1 adult |
| | 1 | 100 | Adult=1 |

| | | | |
|---|---|---|---|
| | 2 | 20 | Adult=1, SubAdult=1 |
| | 3 | 10 | Adult=2, Sub Adult =1 |
| | 2 | 10 | 1 adult, 1 immature |
| | 4 | 20 | 3 adults, 1 sub adult |
| | 4 | 20 | 2 sub adults, 2 adults |
| | 3 | 20 | 2 adults, 1 sub adult |
| | 5 | 30 | Adult=3, Immature=2 |
| | 4 | 50 | 2 sub adults, 1 adult, 1 immature |
| | 1 | 50 | 2 immatures |
| | 2 | 50 | 2 immatures |
| | 4 | 50 | Adult=1, Immature=3 |
| | 1 | 100 | 1 adult |
| | 2 | 100 | Adult=0, Sub Adult=1, Immature=1 |
| | 2 | 80 | Immature=2 |
| | 2 | 50 | 1 sub adult, 1 immature |
| | 1 | 10 | Adult=1 |
| | 1 | 8 | Juvenile STA |
| | 1 | 10 | A single juvenile STA was sighted near the boat, feeding off of discards/offal on set 06 |
| | 2 | 5 | 2 STA observed. |
| | 1 | 15 | 1 STA observed |
| | 1 | 20 | STA touched on the water after the haul and then flew away. |
| | 1 | 20 | One STA observed at 20 meters from boat after the haul was finished. |
| | 2 | 30 | Observed 2 STA, one adult and one immature. |
| | 4 | 10 | 4 STA observed feeding on discards. |
| | 4 | 30 | Multiple STA observed during both hauls. Likely the same ones (3 immature/subadults, and 1 adult) |
| | 2 | 20 | Multiple STA observed during both hauls. Likely the same ones (3 immature/subadults, and 1 adult) |
| | 1 | 40 | STA sighted on first skate. |
| | 1 | 20 | STA adult sighted briefly as we started to steam to the next station. |
| | 1 | 20 | 1 STA spotted toward the end of hauling. 20 meters from boat. |
| | 1 | 25 | 1 STA spotted toward the end of hauling. |
| | 1 | 40 | STA sighted at start of set 139 and stayed with us the entire haul. Juvenile plumage. Came within 20 meters or so a couple of times. |
| Sperm Whale | 1 | 50 | Sperm whale sighted at very end of set, I feel confident that skate 1-6 had no sperm whale interaction as it was sighted a distance off approaching the vessel before diving off the bow presumably to feast on our catch. However, we didn't see any evidence of depredated catch or a drop in catch. |
| | 2 | 50 | Sablefish, which we had been seeing regularly, stopped coming up on the line after 2 sperm whales made an appearance at the start of skate 8. The showed up about 150 m off the stbd bow and approached as close as 50m before they dove and were gone towards the end of skate 8. One sablefish head came up on a hook. No broken or bent gear was seen. Labeled as ineffective per protocol, but set is likely effective skates 1-7. |

| | | | |
|---|---|---|---|
| | 2 | 50 | Sperm whales, potentially the same two from set 16 appeared at skate 6 and before diving, arrival was marked from a distance. A bent hook and drop in catch were noted during skates 7-8. Skates 1-6 were fished effectively before the whales arrived. |
| | 1 | 150 | Seen in distance. Returning gear and catch show no evidence of depredation. |
| | 1 | 75 | Sperm Whale seen during last skate being hauled, when the buoy line was coming in the whale came up near the boat for 3 minutes |
| | 1 | 50 | sperm whale surfaced inside 50m on skate 2, briefly visible. no observable drop in catch. |
| | 2 | 10 | Sperm whale destroyed catch weight between skates 4 & 5 |
| | 2 | 40 | Sperm Whale present at end of haul at 40m |
| | 1 | 15 | 1 Sperm whale observed close to vessel. |
| | 5 | 50 | At least 5 sperm whales were observed at the surface. The rollerman could feel the tugging on the line. Halibut lips on hooks and Black cod heads coming up. Plenty of bent hooks. |
| | 1 | 450 | sperm whale seen in the distance, diving. no drop in catch or damage to fish. it continued diving in the same place as we continued fishing. by the end it was 800-900m away still diving. with as much fish as we had, its unlikely to have depredated the line. |
| | 1 | 500 | sperm whale sighted right from the start. one halibut had a bite mark, but it could have been something else like dogfish. no more bbm than normal. pod of humpbacks traveling nearby as we fished. |
| | 1 | 300 | Several Sperm whales were spotted away from the vessel. No drop in catch or lips on the hooks. |
| | 1 | 50 | Sperm whale was sighted very near the vessel. Gear parted, but all gear was retrieved. There was still a lot of Pacific halibut. |
| | 1 | 50 | Significant drop in halibut catch. |

5. Seabird Incidental Takes During AFSC and IPHC Research

<u>Albatross during AFSC longline and IPHC setline surveys</u>

1) Multiple sightings – see tables 6 and 8, for more info.
2) Short-tailed albatross were observed but did not directly interact with gear and were unharmed.
3) Three black-footed and 1 Laysan albatross were taken dead on AFSC longline survey.
4) Location: multiple – see table 6.0 for more information.
5) Conditions: Direct interactions were typically when wind and sea state were high.
6) No pictures

Short-tailed albatross were observed at many stations but there were no direct interactions with those birds. Three black-footed albatross were taken on the gear. Two were taken in the western GOA and 1 in the central GOA. Additionally, a single Laysan albatross was taken in the western GOA. The takes occurred during gear deployment, often when wind and sea state were high, allowing the baited hooks to be present in surface waters for a period longer than usual. On each day before gear deployment, the Chief Scientist verified that bird deterrent (tori) lines were in place. After all albatross takes occurred, tori

lines were inspected to ensure they provided the required deterrence and repairs were performed if necessary. The albatross takes were recorded in the PSIT database and reported to AFSC leadership and the Protected Species Coordinator.

6. Historical Artifacts

No artifacts were collected in 2022.

7. Evaluation of AFSC Mitigation Strategies

To evaluate the effectiveness of the AFSC mitigation measures a post-survey debrief google form survey was sent to all Chief Scientists at the end of survey season in October 2022. We received responses from all of our surveys and used them as discussion topics at a debrief discussion in December 2022.

During 2022, the AFSC was in section 7 consultation with USFWS and NMFS. The AFSC received an updated BiOp from USFWS for Seabirds and sea otters. Although the UWFWS BiOp was not finalized until September, many of the requested mitigation measures to avoid encounters with Eiders, such as using less lights at night, were included in 2022 training.

## 8. Protected Species Training for AFSC Staff

The AFSC is required to conduct annual training for all chief scientists and other personnel who may be responsible for implementing mitigation measures, data collection, and reporting requirements. Mitigation trainings have occurred since 2017 prior to final authorizations, using available information on best practices. Since 2018, a portion of the training was dedicated to discussion on the use of best professional judgment to avoid marine mammal interactions to gain an understanding of successful versus unsuccessful decisions.

The training was developed and conducted by the AFSC compliance coordinator, AFSC seabird specialist, and AFSC marine mammal identification training was done by staff from the AFSC Fishery Monitoring and Analysis division. Trainings in 2022 were conducted virtually via Google Meet. The virtual trainings included three presenters and successfully delivered the required content regarding mitigation, monitoring and reporting under the MMPA and ESA. The Google platform was easy to use and promoted discussion either via the chatbox or using voice and video after each presentation.

The training was designed to introduce seagoing staff who had not played a major role in acquiring environmental compliance and incidental take authorizations (EC/ ITA) to the process and new regulatory requirements that would have to be implemented on their surveys.

Throughout the training two-way communication was promoted between staff and presenters to ensure an understanding on all new requirements. First, an overview and background were provided to give a general understanding of statutory requirements, AFSC's incidental take history, and development of the Center's mitigation measures. After that, the main objective of the training was to introduce 1) the scope (research areas, gear types, authorized take species, etc.) of what the Center's authorizations would cover, and 2) the implementation of the authorization conditions (mitigation measures, reporting requirements, data collection, etc.). The next portion of the training was focused on the circumstances in which professional judgment decisions can be used (detailed below) and what decisions are frequently made when dealing with specific gear types and interactions / avoidance practices with protected species. Training for taking biological samples was not done.

The training also consists of marine mammal identification, handling, and biological sampling instruction, as well as seabird identification and handling instructions.

These pre-field season training sessions and the post-season forums to discuss how everything went seem to be a good complement and approach to disseminating and collecting information from seagoing fisheries and ecosystem research staff. AFSC expects that this investment in communication with its staff will ensure AFSC research meets its requirements and also yield important data and observations that will inform development of future mitigation strategies.