Annual Report for Fisheries and Ecosystem Research Activities
Conducted by Alaska Fisheries Science Center
January 1 – December 31, 2021

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.

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, 2021.

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 2021 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	2/18/2021	3/17/2021
EBS Ichthyoplankton Survey Spring	Eastern Bering Sea	5/15/2021	6/05/2021
Alaska Longline Survey	Gulf of Alaska, Bering Sea, Aleutian Islands	5/25/2021	9/01/2021
IPHC Setline Survey	Gulf of Alaska, Bering Sea, Aleutian Islands	5/28/2021	9/15/2021
EBS Bottom Trawl Survey	Eastern Bering Sea	5/22/2021	9/01/2021
GOA Bottom Trawl Survey	Gulf of Alaska	5/17/2021	8/16/2021
GOA Acoustic Trawl Survey Summer	Gulf of Alaska	6/1/2021	7/11/2021
NBS Bottom Trawl Survey	Northern Bering Sea	8/02/2021	8/25/2021
NBS Surface Trawl Survey	Northern Bering Sea	8/29/2021	9/30/2021
EBS EMA-FOCI Juvenile Fish Survey Fall	Eastern Bering Sea	8/27/2021	9/21/2021

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.

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. Total line-kilometers (kms) surveyed during the reporting period, 2021, 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**		**2021**
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	5853	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	2378
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	843
BSAI						
Aleutian Islands Shelf and Slope Bottom Trawl Groundfish Survey (Biennial)	ES60	Charter Vessel (2)	38 kHz (120 kHz)	3190	1595	0
Arctic Ecosystem Integrated Survey	ES60	Charter Vessel	38 kHz (120 kHz)	2599	NA	0
Bering Sea Shelf Bottom Trawl Survey	ES60	Charter Vessel (2)	38 kHz (120 kHz)	11200	2240	0

Eastern Bering Sea Upper Continental Slope Trawl Survey Summer (Biennial)	ES60	Charter Vessel	38 kHz (120 kHz)	1125	563	225
Pollock Summer Acoustic Trawl Survey - Bering Sea	EK60/ME70	NOAA Ship Oscar Dyson	18 kHz (38, 70, 120, 200 kHz/70 kHz)	25460	12730	4371
Pollock Winter Acoustic Trawl Survey - Bogoslof Island (Biennial)	EK60/ME70	NOAA Ship Oscar Dyson	18 kHz (38, 70, 120, 200 kHz/70 kHz)	2788	1394	0
Bering Aleutian Salmon International Survey (BASIS)	ES60	Charter Vessel	38 kHz (120 kHz)	12288	2458	2556
Acoustic Research and Mapping to Characterize EFH (FISHPAC)	Reson 7111 (Reson 8160; Klein 7180)	NOAA Ship Fairweather	100 kHz (50, 38 kHz)	145	29	0
Response of Fish to Drop Camera Systems	ES60	Charter Vessel	38 kHz (120 kHz)	259	52	0
Northern Bering Sea Bottom Trawl Survey	ES60	Charter Vessel	38 kHz (120 kHz)	1440	480	72
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 2021. 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		**0**	2
Bowhead Whale	Western Arctic	0.0850	X		**7**	42
Gray Whale	ENP	8.5000	X		**494**	5,579
Humpback Whale	CNP	0.0500	X		**8**	161
	WNP	0.0035	X		**1**	6
Minke whale	Alaska	0.0060	X		**2**	8
Sei whale	ENP	0.0009	X		**2**	2
Fin whale	Northeast Pacific	0.1000	X		**3**	40
Blue whale	ENP	0.0005	X		**1**	1
Sperm whale	North Pacific	0.0020		X	**1**	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		**118**	939
	Cook Inlet	1.0000	X		**0**	3
Pacific white-sided dolphin	NP	0.0750	X		**0**	54
Killer whale	ENP Offshore	0.0550	X		**1**	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		**1**	14
	ENP Northern Resident	0.0125	X		**1**	6
	ENP Alaska Resident	0.0060	X		**1**	24

Harbor porpoise	Southeast Alaska	0.5500	X		**23**	358
	Gulf of Alaska	1.0000	X		**42**	650
	Bering Sea	2.2500	X		**218**	1,746
Dall's porpoise	Alaska	3.2000	X		**119**	5,343
Northern fur seal	Pribilof Islands/Eastern Pacific	1.0753	X		**113**	1,576
Steller sea lion	Western DPS	0.1750	X		**8**	3,526
	Eastern DPS	0.2900	X		**13**	914
Bearded seal	Alaska (Beringia DPS)	1.9675	X		**207**	1,727
Harbor seal	Aleutian Islands	0.0144	X		**2**	301
	Pribilof Islands	0.0005	X		**1**	29
	Bristol Bay	0.0724	X		**8**	187
Spotted seal	Alaska	3.0060	X		**242**	2,106
Ringed seal	Alaska	1.7460	X		**184**	2,066
Ribbon seal	Alaska	1.2035	X		**97**	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	0	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	0	0-25 m	30
	Bottom Trawl	0	15-80 m	15-20
	Plankton Net	0	0-200 m	10-30
Aleutian Islands	Bottom Trawl	0	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	1,890	511,846	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	6/29/2021	Black-footed Albatross	1	The AFSC longline survey caught a black-footed albatross today in the western Gulf of Alaska. I was told that while setting the gear, the vessel and scientific crew determined the bird deterrent tori lines were functioning properly. Weather was not a contributing factor as wind and seas were mostly calm. The bird was caught while gear was deployed and subsequently drowned. The vessel and science crew are being extra vigilant with seabird mitigation procedures and have inspected the bird deterrent tori lines.
GOA/EBS/AI Longline Stock Assessment Survey	7/26/2021	Black-footed Albatross	1	The AFSC longline survey caught a black-footed albatross yesterday, July 26 in the eastern 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. However, a crewman mistakenly thought that setting was complete and retrieved the tori lines when there were still four skates (180 hooks) of gear to deploy. This mistake was the likely cause of the black-footed albatross take, as the bird was caught during this lapse of coverage from the tori lines. The crewman was quickly corrected and the fishing crew have been reminded of proper bird deterrent techniques. There were approximately 500-1000 seabirds observed during both sets, and they were noticeably more aggressive than previous days. Wind and sea state were mostly calm. The vessel and science crew have inspected the seabird mitigation tori lines to verify their configuration is appropriate.
GOA/EBS/AI Longline Stock Assessment Survey	8/11/2021	Black-footed Albatross	2	The AFSC longline survey caught two black-footed albatross today, August 11 in the central Gulf of Alaska. The birds were 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, and they were noticeably more aggressive than previous days. Wind and sea state were not likely a contributing factor, as 10-15 knot winds and 5' seas are not unusual. The vessel and science crew have inspected the seabird mitigation tori lines to verify their configuration is appropriate. Bird deterrents (tori lines) were in place and observed fully operational by chief scientist during setting operations 6) Birds drowned after being hooked during setting operations; were observed on hooks during gear retrieval 7) Specimens were 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	8/12/2021	Black-footed Albatross	1	Circumstance similar to above. There were approximately 100 seabirds observed during setting, and there was no noticeably different behavior than previous days. Wind and sea state were not likely a contributing factor, as 15-20 knot winds and 7'-10' seas are not unusual. The vessel and science crew have inspected the seabird mitigation tori lines to verify their configuration is appropriate.
GOA/EBS/AI Longline Stock Assessment Survey	8/17/2021	Black-footed Albatross	3	Circumstance similar to above. One bird was killed during three sets on this day.
GOA/EBS/AI Longline Stock Assessment Survey	8/24/2021	Black-footed Albatross	1	Caught in central GOA. Circumstance similar to above.
GOA/EBS/AI Longline Stock Assessment Survey	5/30/2021	Laysan Albatross	1	The AFSC longline survey caught a Laysan albatross today in the eastern Bering Sea. I was told that while setting the gear, the vessel and scientific crew determined the bird deterrent tori lines were functioning properly. Weather may have been a contributing factor as wind (20-25 knots) and seas were high (6-10 feet). The bird was caught while gear was deployed and subsequently drowned. The vessel and science crew are being extra vigilant with seabird mitigation procedures but bird activity and aggressiveness in the area seemed particularly high.
GOA/EBS/AI Longline Stock Assessment Survey	7/22/2021	Pinniped, Uni	1	See below for description of incident
GOA/EBS/AI Longline Stock Assessment Survey	7/28/2021	Sperm Whale	0	See below for description of incident
Southeast Alaska Coastal Monitoring	9/12/2021	Steller's Eider	0	See below for description of incident
International Pacific Halibut Commission Setline Survey	8/4/2021	Humpback Whale	0	See below for description of incident

a. Protected Species Summary for 2021 AFSC Longline Survey

The operations of the 2021 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 Bering Sea and the Gulf of Alaska from May 30-August 26, 2021.

In 2021, the AFSC Longline Survey occasionally interacted with or observed protected species. Killer whales depredated on the longline at 11 stations; ten in the eastern Bering Sea and one 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. However, there were two adverse marine mammal interactions during the survey in the eastern GOA; a sperm whale was briefly entangled in the longline gear and a deceased unidentified pinniped was entangled in the groundline and brought to the surface during retrieval. The sperm whale was able to part the groundline and all gear was subsequently recovered. After the line was broken, the whale freely swam away from the vessel without any gear attached to it and appeared unharmed. The pinniped was apparently entangled in the line and drowned at depth. As the animal came to the surface during retrieval, it slipped off the line and sank from view. It did not appear to be attached to a hook. The sperm whale and pinniped takes were recorded in the PSIT database and reported to AFSC leadership and the Protected Species Coordinator. A more detailed report for both incidents is below. The sperm whale take was also reported to the Alaska Marine Mammal Stranding Network and to the Office of Protected Resources at the Alaska Regional Office.

Sperm Whale Entanglement during AFSC Longline Survey

1) July 28, 2021 at 11:04
2) One sperm whale entanglement on the AFSC longline. The animal freed itself by breaking the groundline and it appeared to be in stable condition when last observed. All of the gear was recovered and accounted for.
3) The sperm whale is assumed to be alive and in stable condition.
4) Location: N 59.534', W 143.030'
5) Weather when setting: seas <1 ft and winds. Weather when hauling: seas 3 ft, E 10-15 kt.
6) No photographs were taken during the encounter; however, one crew member (Whitten O'Brick) took a short video of the whale. The video file will be available when the Chief Scientist returns to Juneau.

Setting: On July 28, 2021 the F/V Alaskan Leader set two experimental sets, one with typical survey hook-and-line gear (90 skates, each consisting of forty-five 13/0 circle hooks), and the other with 90 collapsible slinky pots. Setting began at 05:00 with the slinky pot set, and the longline gear was set directly afterward just after 06:00. Chief Scientist, Jane Sullivan, was on the bridge with the Captain, Dennis Black, serving as the Protected Species Observer (PSO) throughout both sets. No protected species were observed while setting the pots. Shortly after we began deploying the hook-and-line set, one sperm whale was spotted off the stern at least 2 nm away. The sperm whale observation was communicated to Mr. Black and recorded in the log. The distance between the vessel and the whale was great enough that no threat of interaction was perceived and the gear was set without any mitigation measures, such as the move-on rule.

Haulback: Mr. Black served as PSO from the bridge before and during haulback of both sets. No whale observations were made while hauling the pot gear. No whale observations were made prior to starting the haulback of the hook and line gear or during the first few skates. During the first half of the hook set, Jason Wright was acting as catch recorder, and Ms. Sullivan was assisting Greg Jay in the factory collecting lengths. Mr. Wright reported the first evidence of depredation on skate #3 (hooks with fish lips on them). However, it was not possible to determine what had depredated the gear. On skate #13 of the hook set, the line began slipping on the block. On skate #24 hauling was ceased to replace all block parts; the groundline remained attached to the vessel. The line slipping in the block was not likely related to any

whale depredation but may have allowed a greater opportunity for depredation since the line was not in motion. On skate #26 a partially eaten sablefish was observed and was visually inspected by Mr. Wright.

Encounter: On skate 34 of the hook set, the line pulled tight under the boat and then went slack, angled parallel to the water surface towards the starboard bow of the vessel. A large adult sperm whale was observed from the bridge by Mr. Black and from the hauling station by Mr. Wright and the other crew members (Junior Mainifo, Brandon Sanders, and Victor Marquez). The whale was positioned approximately 30 ft from the hauling area toward the starboard bow of the vessel. The whale was seen in close proximity to the drifting line, indicating that the whale was entangled in the gear. Those who observed from the tally station and the landing pit had clear vision of its back and blowhole and did not see line or other fishing gear attached to the animal. Mr. Black turned the vessel towards portside away from the whale and instructed crew to go to the bow to serve as spotters. Mr. Marquez ran up to the bow and saw the whale take a shallow dive; he had visibility of its tail at this time and reported that no line was visible. All who observed the whale reported that it swam towards the starboard stern in front of the hauling station. At this time Mr. Wright instructed the crew to cut the line, but shortly after the line went tight, it broke with force as it passed the hauling station. Mr. Sanders speculated that because no line was visible on its back or tail, the line was potentially tangled near the head of the whale. This is consistent with the movement of the whale and line in the water; the animal was clearly entangled but no one had visibility of where the line was attached to the animal.

After the line parted, Mr. Wright continued the hook census of the gear that remained attached to the vessel and determined that the gear was parted at skate 36. Meanwhile Mr. Marquez ran from the bow to the stern of the vessel. Mr. Marquez and Mr. Black observed the whale at the surface of the water off the starboard stern. Mr. Marquez saw the animal roll, show its belly, and then dive; he reported no visible line on its tail or belly. At this point the vessel turned starboard and idled to obtain a better view of the encounter and determine if the animal was in distress. The whale rested and breathed at the surface for a brief time then finally dove and was not seen again. The entire encounter lasted approximately 10 minutes.

Immediately after the incident Mr. Wright informed Ms. Sullivan, who contacted the longline survey lead, Pat Malecha. Ms. Sullivan and Mr. Wright advised crew to keep a lookout for the whale. Ms. Sullivan interviewed Mr. Black and the members of the crew who observed the encounter. Mr. Wright took detailed notes throughout the encounter, and his notes were consistent with other versions of events. Mr. Malecha reported the entanglement to the NMFS 24-hr Alaska Marine Mammal Stranding Network Hotline and AKRO OPR Staff (Kate Savage). After a period of observation and after consultation between Ms. Savage and Mr. Malecha, the Captain was advised by to haul the remainder of the gear from the opposite end of the groundline, which was attached to a surface line and buoy. Hauling at the opposite end began at 12:08. There were no signs of depredation on the remaining hooks and all of the gear (hooks and groundline) was accounted for by Mr. Wright. Mr. Black continued to serve as PSO throughout the remainder of the hook-and-line haulback, as well as before and during the second haul of pot gear. He did not observe any sperm whales or other marine mammals for the remainder of the day. Because all gear was accounted for and the animal was observed breathing normally at the surface prior to diving, the animal is assumed to be in stable condition.

Unidentified Pinniped Incidental Take during AFSC Longline Survey

1) July 21, 2021 at 11:00
2) One unidentified pinniped incidental take (mortality) during AFSC longline.
3) The unidentified pinniped appeared lifeless and is presumed dead.
4) Location: southeast of Yakutat Bay at approximately 58.683 N, 140.713 W

5) Conditions: Weather throughout the day was overcast, with a relatively high ceiling. Visibility was approximately 5 miles. Sea state was 5-10' swell with a SE wind 15 knots.
6) No photos or video possible.

Setting: On July 21, 2021 the Alaska Fisheries Science Center's Longline Survey caught an unidentified pinniped (likely a sea lion). The incident occurred at Station 96 in the eastern Gulf of Alaska, southeast of Yakutat Bay at approximately 58.683 N, 140.713 W. Weather throughout the day was overcast, with a relatively high ceiling. Visibility was approximately 5 miles. Sea state was 5-10' swell with a SE wind 15 knots.

Prior to setting the longline, Jane Sullivan (Chief Scientist, AFSC/MESA) and Jason Wright (NOAA Affiliate, Saltwater) were on the bridge fulfilling the duties of Protected Species Observers (PSO). Ms. Sullivan and Mr. Wright began observing for protected species around the vessel at 06:10. The first set was made at 06:30. While setting was performed and until the second set was completed at 08:40, Ms. Sullivan, Mr. Wright, and the vessel's skipper (Dennis Black) continued to keep a lookout for protected species. None were sighted. Mr. Black has been trained to be the designated PSO when the chief scientist is not in the wheelhouse. Following setting operations, Mr. Black served as PSO during transiting and hauling operations from 08:40 until hauling operations were complete at 17:30. No protected species were observed during the retrieval of the first set. There were at least two grenadier heads hauled during the first set with evidence of depredation, which prompted Ms. Sullivan and Mr. Wright to go to the second level deck to provide additional assistance for looking for marine mammals. None were observed. During transit to the second set and while the second set was hauled (13:05 – 17:30), no protected species were observed until the final buoys were retrieved (17:30), at which point one small pinniped (1-1.5 m in length) was seen swimming freely astern of the vessel. The pinniped was initially reported by Mr. Black and first mate Andy Billings as a small Steller sea lion; however, during later discussion Mr. Black speculated that it was likely a seal (unidentified species).

Encounter: The unidentified pinniped (likely a Steller sea lion) came up on the 46th (out of 180) skate of longline gear on the first set of the day (haul 93) at approximately 11:00 at a depth of 421 m. The 1.5-2 m animal surfaced with its belly facing up and appeared lifeless. It was observed by contract biologist Sarah Atkins as she was recording the status of each hook as they came up on the line. She described that as the animal surfaced it was freed from the gear unassisted and then quickly sank. The encounter was brief, and a lack of visibility prevented a definitive determination of how the animal was attached to the gear. Ms. Atkins reported that the animal did not appear to be hooked or noticeably entangled in the line, but that it may have had a fish in its mouth. She was unable to recall the taxa of the fish or other relevant details. She reported that the animal had a tan, beige, or light brown belly, potentially with spots, however no head was visible. Additionally, it was described as being quite large, both in length and width. There was no time to get photos of the animal and definitive identification of the pinniped species could not be determined. The animal was glimpsed briefly by the fishermen at the hauling station (Junior Mainifo and Brandon Sanders), who corroborated Ms. Atkin's description of the animal and the incident. The animal was not observed by Mr. Black, Ms. Sullivan, Mr. Wright, or other members of the crew.

The condition of the animal could not be ascertained in the brief moments that it was observed, other than it was large and did not appear to be bloated or decomposing. The incident coincided with slipping of the longline gear at the sheaves of the hauling block, and the shims (i.e. spacers) of the sheaves were subsequently replaced by crew between skate 55 and 56, delaying retrieval of the gear by about 5 minutes. The slippage of the line may have provided an opportunity for the animal to depredate, although this is speculation. There were no significant snarls associated with the capture. The situation seems unusual in that it would be expected that a strong animal, such as a sea lion, would struggle significantly against the gear, either breaking the gangion attached to the mainline or causing considerable damage or

fouling of the gear. The lack of an apparent struggle or entanglement may suggest an unhealthy animal but without closer observations, that supposition is purely conjecture.

After the incident, in addition to the PSO (or designee) on the bridge, all personnel on the vessel were instructed to keep a concerted lookout for protected species to prevent additional incidents. This is the second pinniped/sea lion take in the 43 year history of the Longline Survey (the first occurred in August 2019 off Kodiak). Mr. Black has been a commercial longline fisher for over 24 years and has never seen or heard of a large pinniped or sea lion getting hooked on longline gear. Likewise, the other six fishermen onboard the vessel, with a minimum of 50 years of experience combined, also stated that this is the first large pinniped they have ever seen caught on a longline.

To date, the operations of the 2021 AFSC Longline Survey have been completed in a manner that adhered to the guidelines set forth for avoiding interactions with protected species. Throughout the survey, Mr. Black and alternate Captain Dean Paine have made daily log entries when protected species were observed and discussed the observations and/or any mitigation measures with the various rotating Chief Scientists. Chief Scientists also have made daily notes about protected species observations following Alaska Fisheries Science Center's protected species reporting protocols. Prior to this incident, no sea lions had been observed at Gulf of Alaska survey stations during the 33 previous days of sampling in 2021. This unfortunate incident was highly unusual and is presumably not likely to happen again. Nevertheless, future operations of the AFSC Longline Survey shall be completed under extra vigilant conditions to avoid additional interactions.

b. Protected Species Summary for 2021 AFSC Northern Bering Sea Surface Trawl

Steller's Eider Incidental Take during Northern Bering Sea Surface Trawl

1) September 12, 2021 at 04:55
2) Two Steller's eiders appeared on deck.
3) The two eiders are presumed alive and uninjured.
4) Location: Northern Bering Sea, 64.503, -167.0381
5) Conditions: No weather or sea state was recorded.
6) Photo of birds on deck was taken.

Setting: At 04:45 on September 12, 2021, the Mate notified the USFWS seabird observer of two ducks on the trawl deck. The Observer went outside and saw two female eiders. Both were in good health with no apparent injuries and walking about the deck with no lameness or wing droop. It was decided to leave them on the deck and evacuate them at sunrise (~08:25). The rationale was that daylight would allow them to navigate about the ship with reduced risk of fouling in the rigging or colliding with the ship. At 07:45 the Observer went out again and found only one eider on deck. The ambient daylight (civil twilight) seemed adequate to release the bird. The deck crew lowered the trawl/stern gate and walked slowly toward the bird to flush her towards the ramp. As soon as she saw her opportunity she took flight and fled the ship. The ship was searched forward, aft, and topside but the second bird was not to be found-the conclusion being that she found her way off on her own. Photos were taken and the identification of Steller's eiders was confirmed by a second party. All mitigation measures (reduce/safe lighting, slow speeds at night, and coordination amongst crew and science) had been established pre-cruise.

c. International Pacific Halibut Commission – Setline Survey

Humpback Whale Entanglement during IPHC Setline Survey

1) August 4, 2021, 1800
2) One humpback whale was entangled in gear.
3) Whale struggled to come up to surface to breathe until line was cut, whale swam away with some gear still wrapped around it.
4) Location: Near Ketchikan, 55’ 49.05’, 132” 15.90’
5) Conditions: Cloudy, visibility 2 miles, wind speed 20 mph
6) Photos taken

Setting: August 4, 2021 around 1800, while hauling back the setline at station 3039 at 55 49 05 N 132 15 90 W, within Ernest Sound in southeast Alaska, at approximately 1800, the FV Bold Pursuit entangled a humpback whale. Seafloor depth was approximately 100 fathoms. Visibility was less than 2 miles. Weather was dry with 100% cloud cover; wind speed was 20 mph. Sea state was approximately a four on the Beaufort scale with a wave height of around 2 m. There was no sign of whale activity in the morning while setting, but visibility was poor.

Encounter: The encounter occurred at the sixth skate of gear, about 53 hooks into the haul back, when an animal crested the surface about 70 meters in front of the bow. Cautiously, crew members hauled the gear until it was about 25 meters from the boat and identified it as a humpback whale. They saw the mainline was wrapped twice around the dorsal fin area and once around the head/mouth area. The IPHC Secretariat aboard the vessel called Kayla Ualesi, the Setline Survey Coordinator, who immediately instructed the crew to try and ensure the whale’s wellbeing without endangering the crew. Coordinates of the entanglement were reported to the Coast Guard. Attempts were made to reach the Alaska Marine Mammal Stranding Network, but they only received busy signals. They then called the Alaska Sealife Center in Seward who directed them to contact NOAA.

During this time, the weight of the gear pulled the whale down and away from the boat, and they could not get close enough to untangle or cut the wrapped gear off. The whale struggled to stay up and breathe. The decision was made to cut the gear loose and head to the other end of the setline to carefully haul back the gear with the hope that they could free the whale or allow it to free itself from all the gear anchoring it down. As the vessel pulled closer the whale dove and snapped the gear. The crew waited for the whale to come back up to the surface in order to assess its condition as well as report direction of travel. The whale was seen alive and breathing with at least 2 wraps of gear. Once around the head and one near the dorsal fin. The whale seemed tired after the encounter and hung around the area, but was able to breathe freely. There were halibut on the line as they approached the whale from either side, so it seems that that section of gear made it to the bottom and was fishing. It was a deep station, approximately 100 fathoms, so it is possible that the whale entangled the gear as they were hauling back and it was off the ground.

While on the phone with NOAA staff, they were instructed to not make any further attempt to free it themselves and that the whale would either free itself or they would send out an entanglement team later if it is seen again with gear on it. They were later contacted by Sadie Wright, and gave a report as well as a drawing of the entanglement.

IPHC provided several photos showing the whale post entanglement. In Image 1, the black line can be seen around the whale.

IPHC informed AFSC compliance coordinator and it was suggested they use the WhaleAlert app to help keep up to date with the most recent sightings of whales in the area. Many cruise ships were in the area and they too use WhaleAlert to document sightings and to see where other sightings have occurred. The vessel left the area and continued to adhere to standard IPHC mitigation measures. They completed three stations on 5 August (3035, 3036, 3209) and the final three stations of their survey work on 6 August (3028, 3032, 3206).

Table 7. Protected Species Observations during 2021 Winter Acoustic Trawl Surveys, 2021 Summer Acoustic Survey, 2021 GOA Bottom Trawl Surveys. No encounters were observed during 2021 EBS bottom trawl survey.

Survey	Species	Number	Distance from Vessel (m)	Encounter
Winter Acoustic Trawl	Killer Whale	8	30	While on transect officer on duty called lab - orcas on starboard side heading towards vessel crossing bow. Vessel maneuvered to starboard to avoid interactions.
	Killer Whale	5	500	Whales were spotted near trawl path when setting gear. Moved trawl path .5 mi to SE to avoid interaction
	Fin Whale	2	200	Whale surfaced ~200 m to Starboard while on transect, another seen ~1nmi to Port. No action taken
	Fin Whale	1	200	Officer on duty saw whale surface while on transect. Diverted ship slightly to starboard to avoid interaction. Whale not seen again.
Summer Acoustic Survey	Dall's Porpoise	8	10	While on transect Dall`s porpoise appeared several hundred m off bowand approached within 10 m of the starboard (stbd) bow then swam away
	Dall's Porpoise	5	100	Porpoise spotted as we were setting net. Stopped setting and let them decide what they were going to do. After Porpoise swam away we continued setting
	Dall's Porpoise	3	100	Bridge radioed down that Dall`s porpoises were swimming off the port side
	Dall's Porpoise	5	100	Bridge reported that 5 Dall's porpoise were swimming alongside the vessel
	Dall's Porpoise	10	100	Bridge called down to say that porpoise were moving across our bow at a distance of 300 m
	Fin Whale	1	25	Vessel crew noted fin whale popping up at close range. Diverted transect to increase distance from whale
	Fin Whale	8	300	Officer on duty called scientist to alert that whales were straight ahead of vessel on transect. Scientist went to bridge, to verify and identify. Reduced speed and altered course slightly to starboard
	Fin Whale	1	25	transiting between transects officer spotted whale surface near starboard side of ship too close to maneuver from
	Fin Whale	1	100	Whale surfaced, seen moving away from vessel

	Fin Whale	3	50	Officer called scientist and said a whale just surfaced off the starboard side of the ship. Scientist went to starboard deck and saw whale approximately 50 yards off starboard blowing. Lots of euphausiids noted under the vessel just as the officer saw the whale
	Fin Whale	12	200	Bridge called down to say that whale were crossing our bow. Vessel slowed down to allow animals to cross bow.
	Gray Whale	50	100	Transiting between transects officer on duty called scientist to inform them many whales were seen ahead. Scientist went to bridge and saw many grey whale blows spread across the area and animals appeared to be surfacing and diving to feed. Vessel moved slowly through them. Added extra personnel to be on lookout.
	Gray Whale	5	150	5 whales seen at end of haulback when net was on deck. Vessel maneuvered around them.
	Humpback Whale	1	200	As we were approaching transect bridge called scientists to report whale siting and scientists went to back deck and witnessed whale slapping fins, diving and breaching twice. Appeared to be a juvenile at play
	Humpback Whale	10	500	Multiple whales on setup for planned midwater trawl. Looked to be feeding on krill. Aborted trawl, went to next station.
	Humpback Whale	5	100	Whales initially 3/4 nmi away, moved toward ship and got within 100 m
	Killer Whale	15	300	While on transect CO saw orcas ahead of vessel. Scientist went to bridge and saw 2 pods one slightly to starboard and one slightly to port, both moving in same direction. Vessel slowed to allow animals to cross bow
	Pacific white-sided Dolphin	5	3	Vessel crew saw 5 pop up right in front of bow and then swim off
	Pinniped Unid	1	10	Officer on watch briefly saw seal on port side as we passed by
	Seal Unid	1	100	Seal surfaced near vessel and dove
	Sei whale	5	100	Saw whales scattered about as we were approaching set up location for trawl. Watched whales for a while and saw they were moving astern of vessel so vessel continued to trawl location.
	Short-tailed Albatross	1	100	Scientist spotted bird sitting on water near codend as net was being set. Saw again when retrieving net. Bird did not interact with net.
	Short-tailed Albatross	1	100	Spotted bird sitting on water near where CTD was deployed.
	Whale Unid	1	100	Bridge lookout reported seeing a whale (unidentified) ~100 m from the port side. It submerged and disappeared. Was not spotted again by ChiefSci or OOD
GOA Bottom Trawl Survey	Gray whale	1	500	Whale at station, observed, didn't move, so moved station.

	Fin Whale	2	250	Observed during haul back, vessel slowly moved away from animal.
	Humpback whale	5	925 m	Feeding behavior .5 nm from station. Set and retrieved net without interaction.
	Whale unide	1	300	Whale seen briefly, then swam away as gear was set. Not seen again.
	Humpback whale	1	925	Whale seen to the west of station. Continued work.
	Humpback whale	1	450	Whale seen to the west of station and swimming away. Continued work.
	Dall's Porpoise	5	within 100 m	Animals appeared during haul back of gear. Briefly rode the bow wake and moved away without any interaction.
	Steller Sea Lions	10	3700	The station was in an RPA, but we were searching >2 nm from charted RPA line near the western edge of the cell. There was an aggregation of Steller Sea Lions on and along the shore as observed through 10x42 binoculars. The bottom was also hard so we chose to not conduct the station and moved on to an alternate. There was not any startle or stampeding response that was obvious, but they were rather far away to observe detailed behavior.
	Short-tailed Albatross	1	300	Flying around vicinity of station. No feeding behavior or direct interaction.
	Short-tailed Albatross	1	100	Feeding on previously discarded catch at end of tow.
	Northern fur seal	1	100	Seen checking out the codend at the end of a tow. Only seen for a few seconds then disappeared.
	Northern fur seal	1	100	Seen checking out the codend at the end of a tow. Only seen for a few seconds then disappeared.
Kodiak Cod Survey	Sea otter	3	60	While deploying VR2W-69 kHz receivers (INNOVASEA) several otters swam by the boat. They did not appear to care about our presences and continued swimming. We waited till they cleared the space and continued our work.
	Sea otter	1	50	While jigging for fish with 3 hand held fishing rods and an otter swam by. It did not appear to be interested in our activity. We recovered our lines, waited till it passed and resumed fishing.
	Sea otter	5	50	While jigging for fish with 3 hand held fishing rods we encountered a group of sea otters. They did not appear to be interested in our activity. We recovered our lines, waited till it passed and resumed fishing.
	Sea otter	2	70	While jigging for fish with 3 hand held fishing rods we encountered a group of sea otters. They swam past the boat and did not appear to be interested in our activity. We recovered our lines, waited till it passed and resumed fishing.

	Sea otter	1	40	While jigging for fish with 3 hand held fishing rods we a sea otter swam past the boat and did not appear to be interested in our activity. We recovered our lines, waited till it passed and resumed fishing.
	Sea otter	1	40	While jigging for fish with 3 hand held fishing rods we a sea otter swam past the boat and did not appear to be interested in our activity. We recovered our lines, waited till it passed and resumed fishing.
	Sea otter	2	70	While jigging for fish with 2 hand held fishing rods we a mother sea otter and pup swim past the boat. We recovered our lines, waited till they passed and resumed fishing.
	Sea otter	1	40	While jigging for fish with 2 hand held fishing rods we a sea otter swam past the boat and did not appear to be interested in our activity. We recovered our lines, waited till it passed and resumed fishing.

Table 8. Protected Species Observations during 2021 IPHC Survey

Species	Number	Distance from Vessel (m)	Encounter
Dall's Porpoise	2	20	Close
	4	200	Close
	12	5	Close
Fin Whale	1	600	Close
Harbor Seal	1	15	Close
Humpback Whale	1	1	Take / Direct Interaction
	1	Unk	Close
Killer Whale			
	4	Unk	Significant Observation
	3	40	Significant Observation
	1	50	Close
Short-tailed Albatross	2	Unk	Significant Observation
	1	15	Significant Observation
	1	10	Significant Observation
	1	10	Significant Observation
	1	10	Significant Observation
	1	10	Significant Observation
	1	20	Significant Observation
	2	50	Significant Observation
	1	20	Significant Observation
	3	15	Significant Observation
	1	20	Significant Observation
	1	25	Significant Observation
	1	10	Significant Observation
	1	20	Significant Observation
	1	20	Significant Observation

	1	5	Significant Observation
	1	Unk	Significant Observation
	4	Unk	Significant Observation
	4	Unk	Significant Observation
	1	Unk	Significant Observation
	8	Unk	Significant Observation
	4	Unk	Significant Observation
	3	Unk	Significant Observation
	1	Unk	Significant Observation
	2	Unk	Significant Observation
	1	Unk	Significant Observation
	1	Unk	Significant Observation
	1	Unk	Significant Observation
	1	20	Significant Observation
	1	50	Significant Observation
	1	50	Significant Observation
	1	10	Significant Observation
Sperm Whale	2	40	Significant Observation
	1	20	Significant Observation
	1	50	Significant Observation
	1	100	Significant Observation
	5	50	Significant Observation
	5	20	Significant Observation
	1	100	Significant Observation
	1	100	Significant Observation
	1	80	Significant Observation
Steller Sea Lion	1	5	Close

Image 1.Photo from IPHC of entangled humpback whale.

5. Seabird Incidental Takes During AFSC and IPHC Research

Albatross during AFSC longline and IPHC setline surveys

1) Multiple – see tables 6 and 8, for more info.
2) Short-tailed albatross were observed but did not directly interact with gear.
3) Nine 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. Nine black-footed albatross were taken on the gear. One was taken in the western GOA, seven in the central GOA, and 1 in the eastern GOA. Additionally, a single Laysan albatross was taken in the eastern Bering Sea. 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.

Steller's Eider Incidental Take during Northern Bering Sea Surface Trawl

1) September 12, 2021 at 04:55
2) Two Steller's eiders appeared on deck.
3) The two eiders are presumed alive and uninjured.
4) Location: Northern Bering Sea, 64.503, -167.0381
5) Conditions: No weather or sea state was recorded.
6) Photo of birds on deck was taken.

At 04:45 the Mate notified the USFWS seabird Observer of two ducks on the trawl deck. The Observer went outside and saw two female eiders. Both were in good health with no apparent injuries and walking about the deck with no lameness or wing droop. It was decided to leave them on the deck and evacuate them at sunrise (~08:25). The rationale was that daylight would allow them to navigate about the ship with reduced risk of fouling in the rigging or colliding with the ship. At 07:45 the Observer went out again and found only one eider on deck. The ambient daylight (civil twilight) seemed adequate to release the bird. The deck crew lowered the trawl/stern gate and walked slowly toward the bird to flush her towards the ramp. As soon as she saw her opportunity she took flight and fled the ship. The ship was searched forward, aft, and topside but the second bird was not to be found-the conclusion being that she found her way off on her own. Photos were taken and the identification of Steller's eiders was confirmed by a second party. All mitigation measures (reduce/safe lighting, slow speeds at night, and coordination amongst crew and science) had been established pre-cruise.

6. Historical Artifacts

No artifacts were collected in 2021.

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 2021. We received responses from all of our surveys and used them as discussion topics at a debrief discussion in December 2021.

Due to the take of the sperm whale during the AFSC longline survey and the unauthorized take of the humpback whale during the IPHC setline survey and the take of the eiders during the Northern Bering Sea Surface Trawl survey, AFSC is now coordinating with NMFS and USFWS to reinitiate Section 7 Consultation based on interactions with protected species described herein. For the humpback whale take, it was determined by AFSC marine mammal experts that the mitigation measures used were adequate, and the interaction was a rare, random event. It was suggested that the WhaleAlert app be used consistently by all research occurring in the Southeast Alaska region to learn of previous sightings of whales. It was determined that all possible mitigation measures were taken to avoid Sperm whale encounter, as they are consistently predating on the longline gear. New mitigation measures are being recommended by USFWS for minimizing interactions with Eiders, such as decreasing nighttime lights on the vessel and a move-on rule if other vessels are around when Eiders are spotted. If any further mitigation measures are needed, this will be determined during the reinitiation of section 7 consultation with NMFS and USFWS.

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. In 2018 and 2019, 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 2021 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.