

2016 Copper River Delta Carcass Surveys

NMFS PROTECTED RESOURCES DIVISION

Annual Report

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Survey Flights Flown by: Alaska Wilderness Air

Helicopter and Sampling Support: USCG, Jayhawk 60, Kodiak Air Station



Executive Summary

NMFS Protected Resources Division conducted six survey flights of the shifting sand shoals of the Copper River Delta (Delta) from May 10 to August 9, 2016. The purpose of the flights was to search for marine mammal carcasses, and, if carcasses were observed, coordinate with the USCG to fly to the carcasses via helicopter to determine cause of death and conduct necropsies. PRD biologists flew with the USCG following four of the six surveys to collect samples and conduct necropsies from observed marine mammals. At least three Steller sea lion (*Eumetopias jubatus*), one whale, and five harbor seal (*Phoca vitulina*) carcasses were observed on the survey flights. Six of the eight pinniped carcasses showed evidence that they may have been intentionally killed by humans. In addition, we were able to examine and sample five whale carcasses east of the survey area while we were in Cordova to conduct scheduled surveys of the Delta.

Introduction/History

The Copper River Delta has long been recognized as an area of overlap between salmon fisheries and marine mammals, often resulting in serious injury and mortality to marine mammals due to incidental take in gillnets (Matkin 1980, Wynne 1990, Barlow et al. 1994). This recognition led NMFS to prioritize Prince William Sound and the Copper River Delta for data collection in the Alaska Marine Mammal Observer Program (AMMOP). AMMOP is a program established to meet incidental take monitoring requirements of the 1988 amendments to the Marine Mammal Protection Act. The program used available funding to monitor high priority Category II fisheries (occasional incidental mortality or serious injury of marine mammals) in Alaska discontinuously on a rotational basis from 1990-2013. In 1991, AMMOP implemented an observer program of the salmon driftnet fishery in Prince William Sound and the Copper River Delta. The program observed approximately 5% of estimated net retrievals, and extrapolated marine mammal interactions to estimate that 83 marine mammals (95% CI = 7 to 296) were injured or killed in that fishery between May 16 and September 1, 1991 (Wynne et al. 1992).

Monitoring of marine mammal incidental take of every State fishery in Alaska annually is not possible due to funding and other considerations. The NMFS Alaska Region Stranding Response Program relies in large part on observations from the public and statewide Stranding Network partners to notify us regarding marine mammal carcasses. On June 1, 2015, the NMFS Stranding Response Program received reports of at least five dead Steller sea lions near Softuk cabin on the Copper River Delta. Two NMFS biologists conducted a survey of all barrier islets in front of the Delta via floatplane on June 2, 2015. They recorded at least 18 pinniped carcasses, most of which were Steller sea lions. On June 3 and 5, the PRD biologists and an officer with NOAA's Office of Law Enforcement (OLE) flew with the USCG via Jayhawk 60 helicopter to 12 of the Steller sea lion carcasses, one harbor porpoise (*Phocoena phocoena*), one sea otter (*Enhydra lutris*), and one gray whale (*Eschrichtius robustus*). The carcasses were examined for cause of death, and measurements and samples were taken (including whiskers, organ tissues, and skin). A majority of the carcasses had evidence that they had been intentionally killed by humans. Subsequent surveys on July 3, July 27, and August 18, 2015 resulted in locating two additional Steller sea lions and five additional harbor seals, some showing evidence suggestive that they had been intentionally killed. PRD conducted another survey of the Copper River Delta on September 14, 2015, and did not find any marine mammal carcasses.

Based on the 2015 reports and findings, PRD designed a 2016 survey plan for the Copper River Delta focused on the time period of greatest overlap between the salmon driftnet fishery and marine mammals. The purpose of the surveys was to determine if the intentional killing observed

in 2015 continued, and to collect cause of death evidence and samples for health assessments. The following report describes the 2016 surveys and results. Steller sea lions in the Copper River Delta area are listed as endangered under the Endangered Species Act, and all marine mammals are protected under the Marine Mammal Protection Act. Intentional killing of these species, except for subsistence purposes, is illegal. Evidence of intentional killing is provided to NOAA's OLE to pursue and investigate for criminal charges. In addition, this report and all associated data will inform stock assessment reports for the species under NMFS's authority, which will aid in management of the stocks by refining mortality estimates and increasing understanding of potential stressors.

Methods

The 2016 plan included six scheduled aerial surveys. Each survey was scheduled to begin at 14:30 pm on flight day. Flights were conducted in a Cessna 206 on either wheels (May 10 and August 9) or floats (May 31, June 21, July 5, July 19). The same Alaska Wilderness Air pilot flew each of the six surveys. Surveys were conducted between 300-500 feet above ground, at relatively slow speeds (variable depending on tail winds). Surveys were flown from west to east beginning at the western edge of Egg Island, and finishing at Point Martin, at the east side of Softuk Bar (Figure 1).

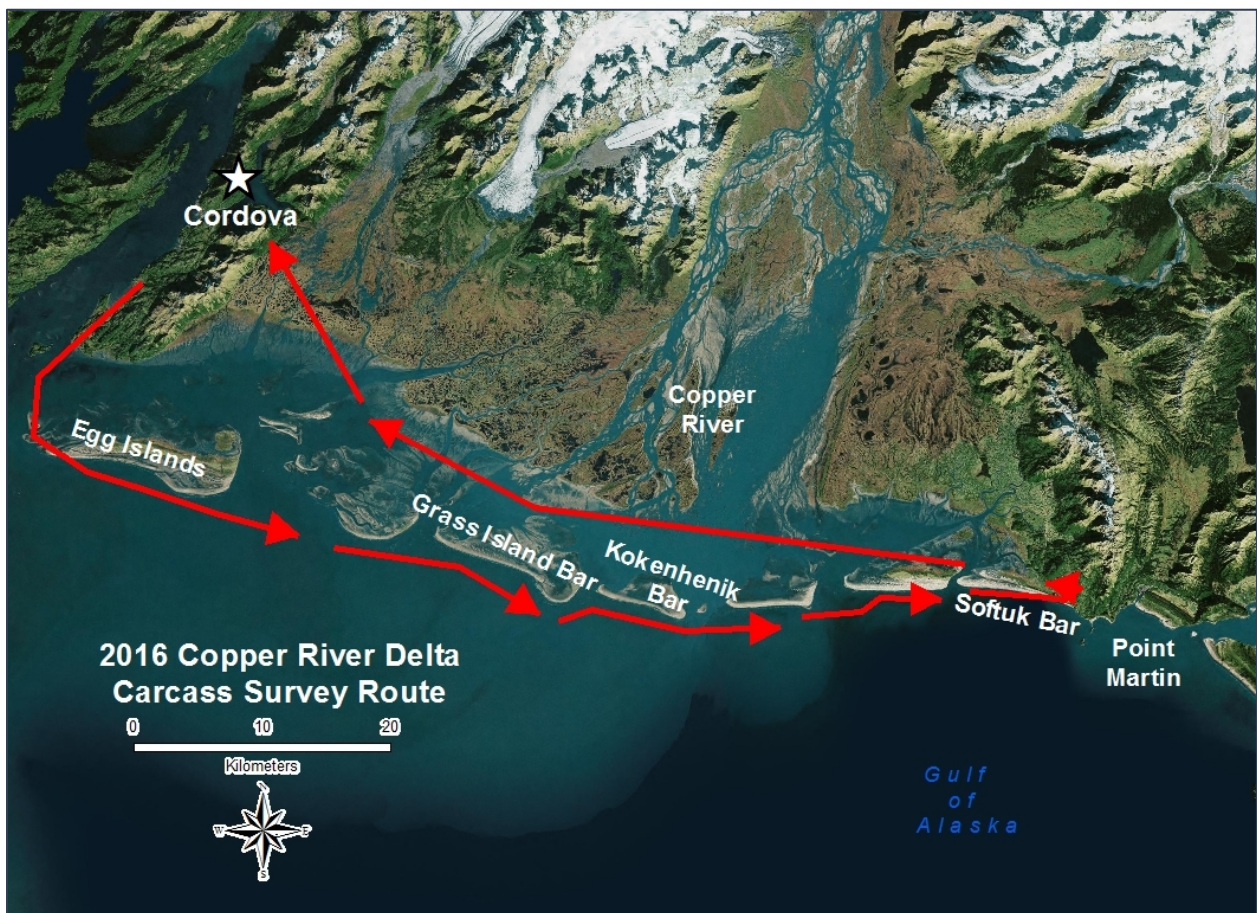


Figure 1. Satellite image showing the approximate survey route and direction taken by the biologists conducting the Copper River Delta marine mammal carcass aerial surveys in 2016.

We collected Lat/Long data for each observed carcass using a Garmin 76x GPS unit. Upon completion of each survey flight we made a decision based on carcass observations whether to request USCG helicopter support the following day. We contacted the USCG to work out the details of flight time, flight path, and duration. If we flew with the USCG, we examined the new carcasses observed on the survey flight first, and if there was time, we also examined carcasses that had been reported outside of the Delta.

At each carcass we verified the GPS Lat/Long location and took numerous photos of the disposition of the carcass from multiple angles. At some carcasses we also recorded video. Depending on the decomposition level of the carcass, we took measurements including total length, fluke width, and blubber depth. When possible we recorded the sex and age class of the animal. We closely examined each carcass to look for evidence of human interaction or other possible causes of death. We categorized each carcass based on its level of decomposition (Code 2 = freshly dead; Code 3 = fair condition, mild odor; Code 4 = advanced decomposition, strong odor, bloated; Code 5 = severe decomposition, mummified, skeletal). Depending on species and decomposition level, we collected biological samples including skin (which we placed in DMSO preservative), whiskers (from pinnipeds), bones, organ tissues, and other body parts. We scanned each pinniped with a Garrett-brand, flat wand, handheld metal detector; first on the exposed side, and then on the opposite side after flipping the carcass (which we did by looping a length of line around the exposed pectoral flipper and pulling the carcass over).

One lead biologist participated in each survey along with a second biologist/observer. The lead biologist coordinated the logistics and provided continuity to data collection through communication with the USCG and Alaska Wilderness Air (contracted for scheduled survey flights), and by ensuring consistent application of project protocols. Survey dates were scheduled to target periods of high probable overlap between marine mammals and fisheries in the Delta, with the first survey occurring a few days prior to the first opener, and the last survey occurring after most marine mammals have left the area and most of the fishing effort is complete.

Results

May 10: PRD biologists observed one heavily scavenged sea otter carcass, and one whale carcass on May 10. The whale carcass was approximately 8 meters (m) in length, was mostly buried in a sandbank on the islet west of Softuk Bar (Figure 2), and was very decomposed (Code 5). We decided not to ask the USCG to fly us to the whale because it may have been a known carcass from last year (we later concluded that this was a new whale), and the usefulness of the samples we would be able to collect from the carcass would be limited. We observed a number of live Steller sea lions and harbor seals in the Delta, including one sea lion haulout upriver with over 200 individuals, and a second haulout of approximately 15 large sea lion bulls (Figure 2). At least 50 harbor seals were observed hauled out upriver on May 10 as well (Figure 2).

May 31-June 1: One dead Steller sea lion (SSL1: AKR# 2016055) was observed on Egg Island on the May 31 survey flight (Figure 2). The PRD biologists searched for the decomposed whale from the May 10 survey but did not see it. On June 1, PRD biologists flew with the USCG via Jayhawk 60 to the 2.38 m male Steller sea lion and conducted a complete necropsy (Figure 3). The sea lion showed evidence of blunt trauma, perhaps having been stuck by a boat or killer whale. The USCG helicopter crew observed killer whales in the area during the necropsy, leading us to conclude the injuries to the Steller sea lion were possibly related to attempted killer whale predation. No metal was detected in the carcass.

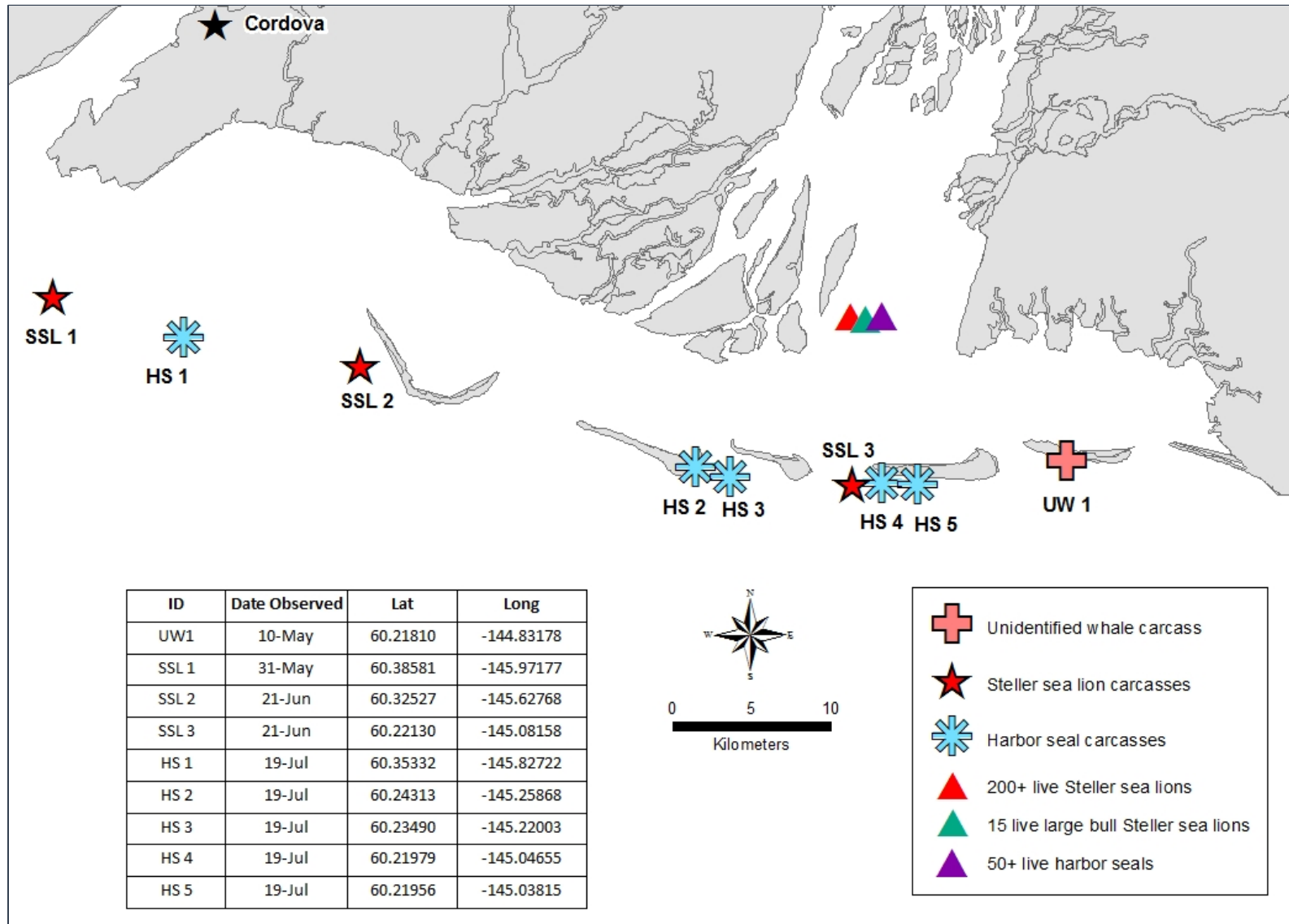


Figure 2. Map showing the locations of marine mammal carcasses observed on the barrier islands of the Copper River Delta during scheduled survey flights, or site visits with USCG support.



Figure 3. Dead Steller sea lion (SSL 1) first observed on the May 31 survey flight, and necropsied with USCG helicopter support on June 1.

June 21-22: Two dead Steller sea lions were observed on the June 21 survey flight. Both animals appeared to be subadult males. PRD biologists flew to the carcasses on June 22 with the USCG. The first Steller sea lion that we examined on June 22 (SSL 2: AKR# 2016080) was near the Grass Island Bar (Figure 2), and was significantly decomposed (Code 4: Figure 4). We determined it was too decomposed to conduct a full necropsy but we collected measurements, whiskers, a skin sample, and scanned the entire carcass for metal (no metal was detected). Openings in the abdomen and near the head allowed access for predation. The second carcass we examined on June 22 was a Steller sea lion (SSL 3: AKR# 2016081) near the Kokenhenik Bar (Figure 2). It was fairly decomposed (Code 3: Figure 5), and we took the same samples and measurements that we collected on SSL 2. Something in the head area of the carcass triggered the metal detector and we made several incisions in an effort to locate the metal. Although we didn't see a bullet hole initially, the incisions revealed hemorrhaged, injured tissue near the back of the skull. We also located a hole near the back of the skull surrounded by bone fragments. We collected the entire head and conducted a radiograph at a Juneau veterinary facility on July 29. The resulting x-ray images showed metal lodged in the tissue in and around the skull (Figure 6).

In addition to the two Steller sea lion carcasses, PRD also flew with the USCG helicopter crew on June 22 to two gray whale carcasses (Gray whale 1 and 2) in the Cape Yakataga region to collect measurements and skin samples (Figure 7). Gray whale 1 (AKR# 2016069) was an adult female, 12 m in length (Figure 8). Gray whale 2 (AKR# 2016070) was a juvenile or subadult, 9.9 m in length, and sex was not determined (Figure 9).



Figure 4. First dead Steller sea lion (SSL 2) observed on the June 21 survey flight, and examined with USCG helicopter support on June 22.



Figure 5. Second dead Steller sea lion (SSL 3) observed on the June 21 survey flight, and examined with USCG helicopter support on June 22.



Figure 6. Radiograph of the head of SSL 3 (AKR# 2016080: collected from near Kokenhenik Bar on June 22) showing metal fragments lodged in the tissue.

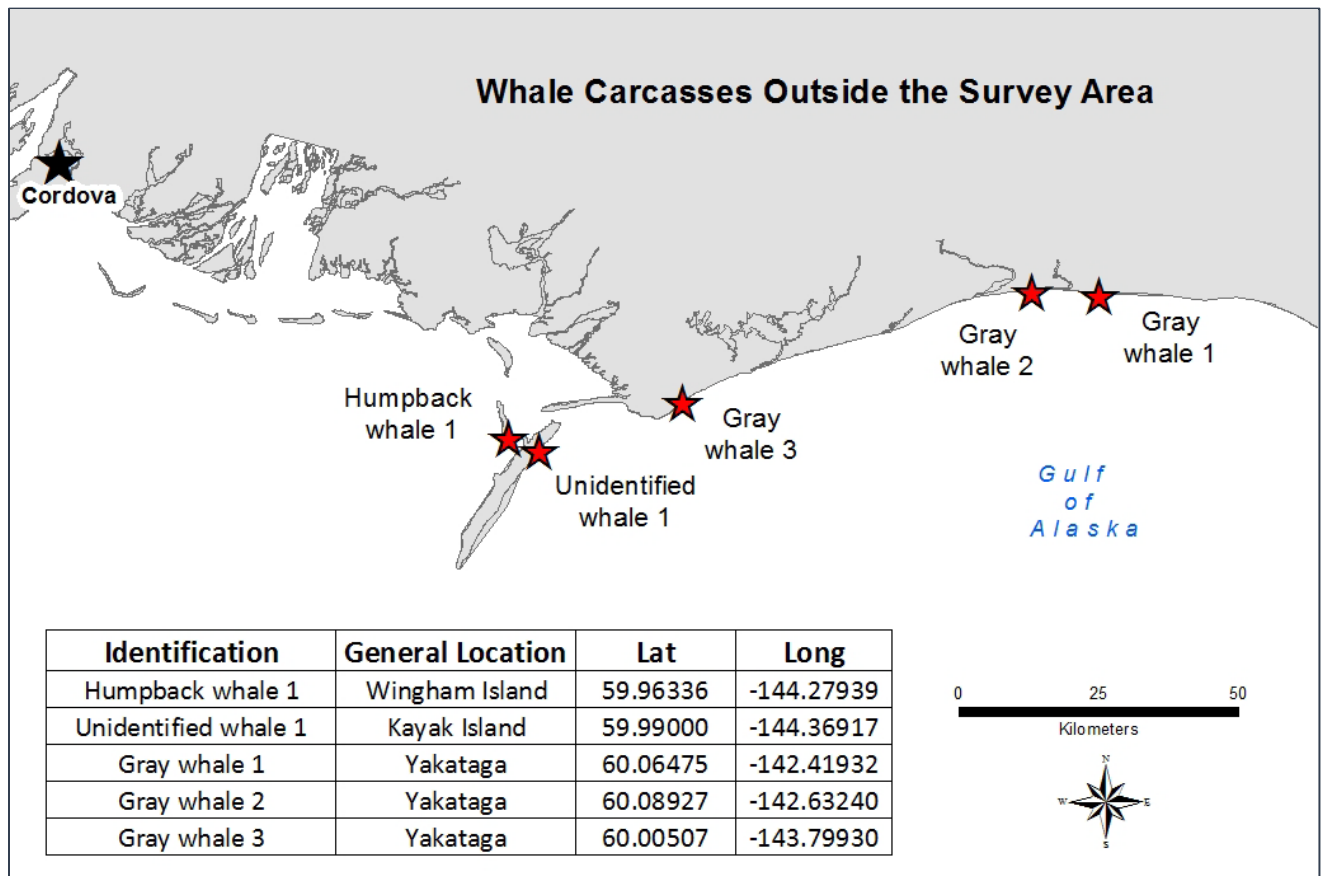


Figure 7. Map showing the location of five whales observed to the east of the survey area. These carcasses were examined by PRD biologists with USCG helicopter support.



Figure 8. Adult female gray whale (Gray whale 1) first reported on Cape Yakataga on June 19, and examined by PRD with USCG support on June 22.



Figure 9. Juvenile or subadult gray whale (Gray whale 2) first reported on Cape Yakataga on June 19, and examined by PRD with USCG support on June 22.

July 5-6: Weather curtailed our scheduled survey on July 5. We were only able to conduct a survey of Egg Island before the clouds dropped too low to allow us to complete the survey route. We contacted the USCG and they were willing to fly the entire survey route with us the next day. We did not observe any marine mammal carcasses on the survey route on July 5 or 6. After completing the survey with the USCG, we examined three whale carcasses outside of the survey area [Humpback whale 1 (*Megaptera novaeangliae*), Unidentified whale 1, and Gray whale 3: Figure 7]. Humpback whale 1 (AKR# 2016043) was initially observed and identified from photos taken on May 14, and was located on the SE corner of Wingham Island. The condition of the whale had deteriorated significantly when we examined it on July 6 (Figure 10), and we collected some tissue from between the vertebrae. The width of the base of the skull was 1.70 m, and the length of the skull (tip of lower mandible to base of skull) was 4.47 m. The second whale we examined on July 6 is an unidentified large whale on the NE side of Kayak Island (AKR# 2016042). When initially observed on May 14 it was already in a state of advanced decomposition, and only portions of the skeletal structure remained when we examined the site (Figure 11). We collected an intervertebral disc to determine species at a later date.

The third whale we examined on July 6 was an adult male gray whale at Cape Suckling (Gray whale 3, AKR# 2016071: Figure 7). The animal was in a state of moderate to advanced decomposition (Figure 12), so we collected moist tissue in the absence of skin. The whale was 11.35 m in length, and the width of its fluke was 2.75 m.



Figure 10. Decomposed humpback whale on SE Wingham Island; initially observed on May 14, and examined by PRD biologists with USCG helicopter support on July 6.



Figure 11. Skeletal pieces of a large unidentified whale carcass on NE Kayak Island; initially observed on May 14, and examined by PRD biologists with USCG helicopter support on July 6.



Figure 12. Adult male gray whale (Gray whale 3) at Cape Suckling; initially observed on June 19, and examined by PRD biologists with USCG helicopter support on July 6.

July 19-20: PRD biologists observed four dead harbor seals on the scheduled survey on July 19. They examined the four carcasses and found an additional harbor seal carcass on July 20 with USCG helicopter support (Figure 2). Findings for the first four animals were similar in many ways. All were adults, appeared robust, and in a similar Code 3-4 state of decomposition with bloating and skin sloughing (Figure 13). Evidence of scavenging was apparent in all, likely eagles and gulls which were observed feeding on a number of the carcasses, especially around the head and neck. HS 1 and HS 4 showed evidence of trauma to the head/skull, including what may have been a wound from a firearm in HS 1 and a fractured skull in HS 4. While the skull was intact in HS 2, four holes were found in the dorsal thorax when the carcass was flipped. Little information was available for HS 3.

Harbor seal 5 was a fresh carcass of a robust, young female. While most of the soft tissues of the head and neck were gone, the rest of the body was intact (Figure 14). Aside from evidence of some lung pathology (likely nonlethal), organs of the thoracic and abdominal cavities appeared within normal limits. Samples of urine, bile, and feces were collected for harmful algal bloom testing. No metal was detected in the five harbor seal carcasses scanned on July 20.

August 9: PRD biologists did not observe any marine mammal carcasses on the scheduled Copper River Delta survey flight on August 9. The beaches appeared wind and wave swept from a recent weather event, and were clear of most debris, including any carcasses. We had not received reports about any additional marine mammal carcasses outside of the Delta area, so we did not ask the USCG for assistance on this last survey effort.

Discussion

We did not observe any whale or porpoise carcasses on the Delta during this time period. The whale carcasses that we assessed east of the Delta did not show any external evidence of human interaction, but were in states of moderate to severe decomposition, making it difficult to determine cause of death.

We were unable to retrieve the bullet from the head of Steller sea lion AKR# 2016080. We have since learned that the Garrett-brand wand style metal detector we relied on during the necropsy is inconsistent at detecting bullets. This is an important lesson learned, and we will refine our protocols for future carcass examinations where we think gunshot injury is a potential cause of death or injury.

Intentional killing by humans appears to be continuing and was the leading cause of death of the pinnipeds we assessed on the Copper River Delta from May 10 to August 9, 2016. Without continuous monitoring in past years it is impossible to know if the lack of reported carcasses in the decade prior to 2015 accurately reflects past intentional killings by humans. Numbers of marine mammals found dead with evidence of human interaction did drop considerably between 2015 and 2016, and may be a result of increased OLE, PRD, and USCG presence and activity in the Delta.

Contact

Contact the Protected Resources Division Alaska Region with questions or to request additional information regarding this report: (907) 586-7235.



Figure 13. Images of the four dead adult harbor seals initially observed by PRD biologists on the scheduled July 19 survey flight, and examined on July 20 with USCG helicopter support.



Figure 14. Photo of PRD biologist Kate Savage scanning harbor seal 5 (HS 5) with a metal detector. This seal was initially observed by PRD on July 20 when biologists examined HS 4 to collect samples.

Literature Cited

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- Wynne, K. 1990. Marine mammal interactions with the salmon drift gillnet fishery on the Copper River Delta, Alaska 1988-1989. Alaska Sea Grant College Program Technical Report No. 90-05:41.
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APPENDIX A:

Initial Obs. (2016)	Date Visited (2016)	Species	Field ID(s)	AKR #	General Location	Age/Sex	Length	Dor. Ax. Blubber Depth	Samples Collected	Evidence of Human Interaction
May 10	N/A	Unidentified whale	UW1	2016035	Eastern Copper River Delta	Unknown	~8 x 2 m	N/A	No	CBD*
May 31	June 1	Steller sea lion	SSL 1	2016055	Egg Island	Subadult Male	2.38 m	1.8 cm	Skin, whiskers	No
June 21	June 22	Steller sea lion	SSL 2 , J22-1	2016080	Grass Island Bar	Subadult Male	2.34 m	N/A	Skin, whiskers	Suspected
June 21	June 22	Steller sea lion	SSL 3, J22-2	2016081	East of Kokenhenik Bar	Subadult Male	2.06 m	1.6 cm	Skin, whiskers, head	Yes
June 19	June 22	Gray whale	Gray whale 1, J22-3	2016069	Cape Yakataga	Adult Female	12 m	N/A	Skin	CBD*
June 19	June 22	Gray whale	Gray whale 2, J22-4	2016070	Cape Yakataga	Juvenile Unknown	9.90 m	N/A	Moist tissue	CBD*
May 14	July 6	Humpback whale	Humpback whale 1, JY-01	2016043	SE Wingham Island	Adult Unknown	N/A	N/A	Tissue, bone fragment	CBD*
May 14	July 6	Unidentified whale	Unidentified whale 1, JY-02	2016042	NE Kayak Island	Adult Unknown	N/A	N/A	Intervertebral disc, tissue	CBD*
June 19	July 6	Gray whale	Gray whale 3, JY-03	2016071	Cape Suckling	Adult Male	11.35 m	N/A	Skin	CBD*
July 19	July 20	Harbor seal	HS 1	2016136	Egg Island	Adult Male	1.58 m	0.9 cm	Skin	Yes
July 19	July 20	Harbor seal	HS 2	2016137	Kokenhenik Bar	Adult Unknown	1.44 m	N/A	Skin	Yes
July 19	July 20	Harbor seal	HS 3	2016138	Kokenhenik Bar	Adult Male	1.57 m	N/A	Skin	CBD*
July 19	July 20	Harbor seal	HS 4	2016139	East of Kokenhenik Bar	Adult Male	1.50 m	N/A	Skin	Yes
July 20	July 20	Harbor seal	HS 5	2016140	East of Kokenhenik Bar	Subadult Female	0.90 m	1.9 cm	Skin, urine, bile, feces	Yes

These data were collected from marine mammal carcasses assessed during the Copper River Delta surveys conducted by NMFS PRD May 10-August 9, 2016. Additional data are presented in the full report above.

*Could not be determined