

# 2017 Copper River Delta Carcass Surveys

## NMFS PROTECTED RESOURCES DIVISION Annual Report

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**Fixed Wing Surveys Flown by:** Wrangell Mountain Air, Inc.

**Helicopter and Sampling Support:** USCG, Air Station Kodiak; MH-60 Jayhawk and MH-65 Dolphin



## **Executive Summary**

NMFS Protected Resources Division biologists conducted six survey flights of the shifting sand shoals of the Copper River Delta (Delta) from May 17 to August 17, 2017. The purpose of the flights was to search for marine mammal carcasses in an area with a history of incidental and intentional killings of marine mammals by humans, and to conduct necropsies of any observed carcasses in order to establish cause of death and collect biological samples. Carcasses were observed on all six flights, but some of the carcasses were located outside of the Copper River Delta (either in Prince William Sound or east of the Delta).

At least four Steller sea lion (*Eumetopias jubatus*), one humpback whale (*Megaptera novaeangliae*), one gray whale (*Eschrichtius robustus*), and seven harbor seal (*Phoca vitulina*) carcasses were observed on the survey flights on the Delta. Four of the 11 pinniped carcasses showed evidence that they may have been intentionally killed by humans. Biologists were unable to collect samples from five pinniped carcasses, and at least one pinniped carcass was too decomposed to determine cause of death. The gray whale was too decomposed to determine cause of death. A team was able to necropsy the fresh dead humpback whale. Although cause of death was not conclusive, bruising and other tissue damage tentatively suggested vessel strike. We opportunistically examined and sampled one Steller sea lion carcass east of the survey area, and two humpback whales and an additional Steller sea lion west of the survey area, in Prince William Sound, but did not survey outside of the Delta extensively.

## **Introduction/History**

The Copper River Delta has long been recognized as an area of overlap between salmon fisheries and marine mammals, resulting in some level of 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 was 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).

Annual monitoring of every State fishery in Alaska to assess interactions with marine mammals 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. In June 2015, NMFS biologists assisted by the US Coast Guard (USCG) conducted surveys of the Copper River Delta in response to a report from the Alaska Department of Fish and Game of dead sea lions near Softuk cabin. NMFS biologists observed at least 18 pinniped carcasses (mostly Steller sea lions), one harbor porpoise (*Phocoena phocoena*), one sea otter (*Enhydra lutris*), and one gray whale. The majority of the assessed carcasses showed 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.

Based on the 2015 reports and findings, NMFS 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 results of that effort are detailed in the 2016 Copper River Delta Carcass Surveys Annual Report (Wright et al. 2016). A similar effort was implemented in 2017, and this report describes the 2017 surveys and results.

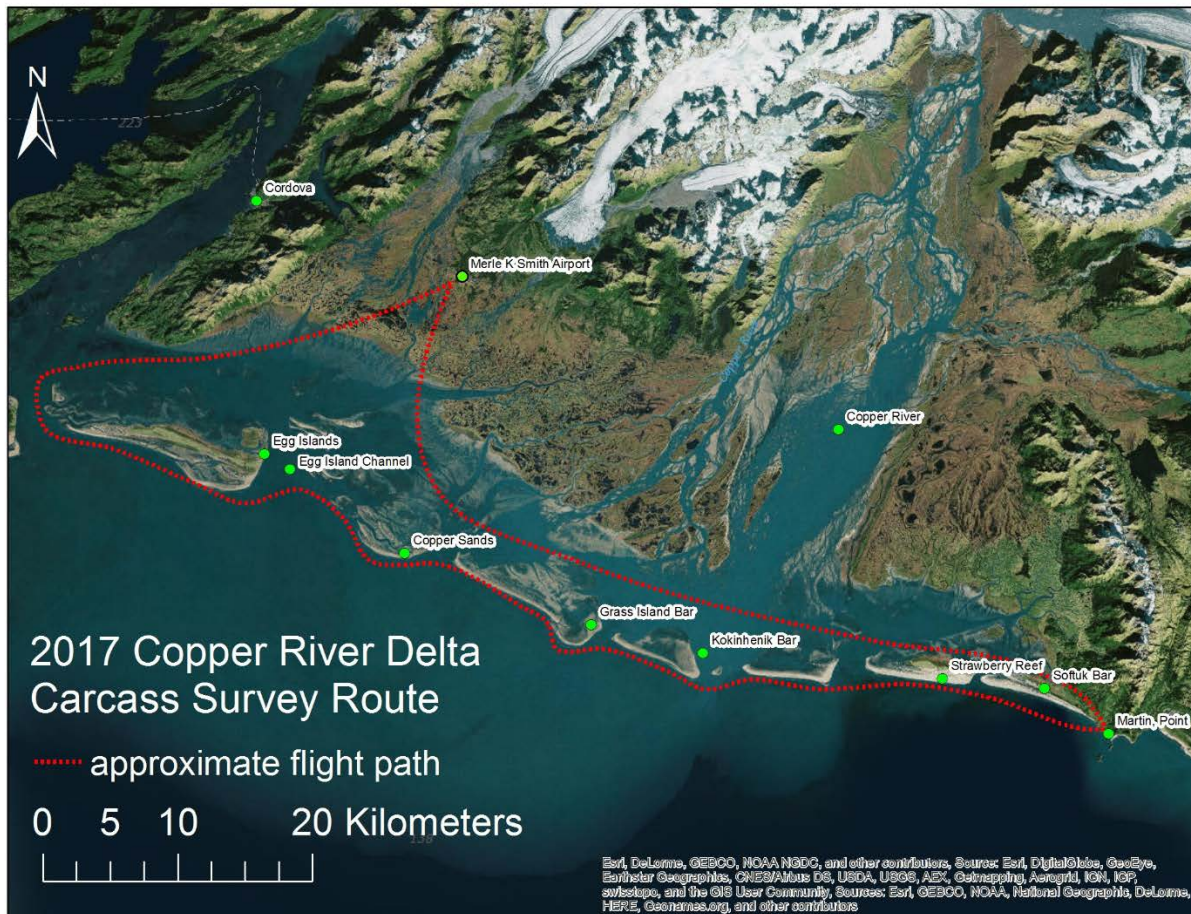
Steller sea lions in the Copper River Delta area are listed as endangered under the Endangered Species Act, and all marine mammals are protected under the Marine Mammal Protection Act. Intentional killing of these species is illegal with specific exceptions, such as for subsistence hunting by Alaska Natives. Evidence of intentional killing is provided to NOAA's Office of Law Enforcement (OLE) to investigate. In addition, this report and all associated data will inform marine mammal stock assessment reports, which will aid in management of the stocks by refining mortality estimates and increasing understanding of potential stressors.

### **Methods**

The 2017 plan included six scheduled aerial surveys to begin at 14:30 on each flight day. The first two surveys were conducted with USCG support in an MH-60 Jayhawk helicopter (May 18, June 8), while the four subsequent surveys were flown in a chartered fixed-wing Cessna 206 on wheels (June 28, July 12, July 26, August 16). The same Wrangell Mountain Air pilot flew each of the four Cessna-based surveys. Surveys were conducted at an altitude of 200-500 feet above ground, at a speed of approximately 80-120 knots over ground (variable depending on wind speed and direction). The USCG helicopter-supported surveys flew at 70-80 knots. Surveys were flown from either west to east beginning at the western edge of Egg Island, and finishing at Point Martin, at the east side of Softuk Bar; or east to west covering the same track (Figure 1).

Lat/Long data were collected for each observed carcass using a Garmin 76x GPS unit. If available (e.g., not engaged in an unscheduled search and rescue effort) the USCG transported NMFS biologists to carcasses observed on the scheduled fixed-wing surveys. If there was time, the USCG transported the biologists to carcasses that had been reported outside of the Delta.

At each carcass biologists verified the GPS Lat/Long location and took numerous photos of the carcass from multiple angles. At some carcasses video was also recorded. Measurements were taken, including total length, fluke width, and blubber depth. When possible the sex and age class of the animal were recorded. Biologists closely examined each carcass to look for evidence of human interaction or other possible causes of death. Each carcass was categorized 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, NMFS biologists conducted necropsies and collected biological samples including skin, whiskers (from sea lions), bones, feces, 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). We also made long incisions from head to flippers on several pinnipeds through the blubber layer to search for injured tissues.

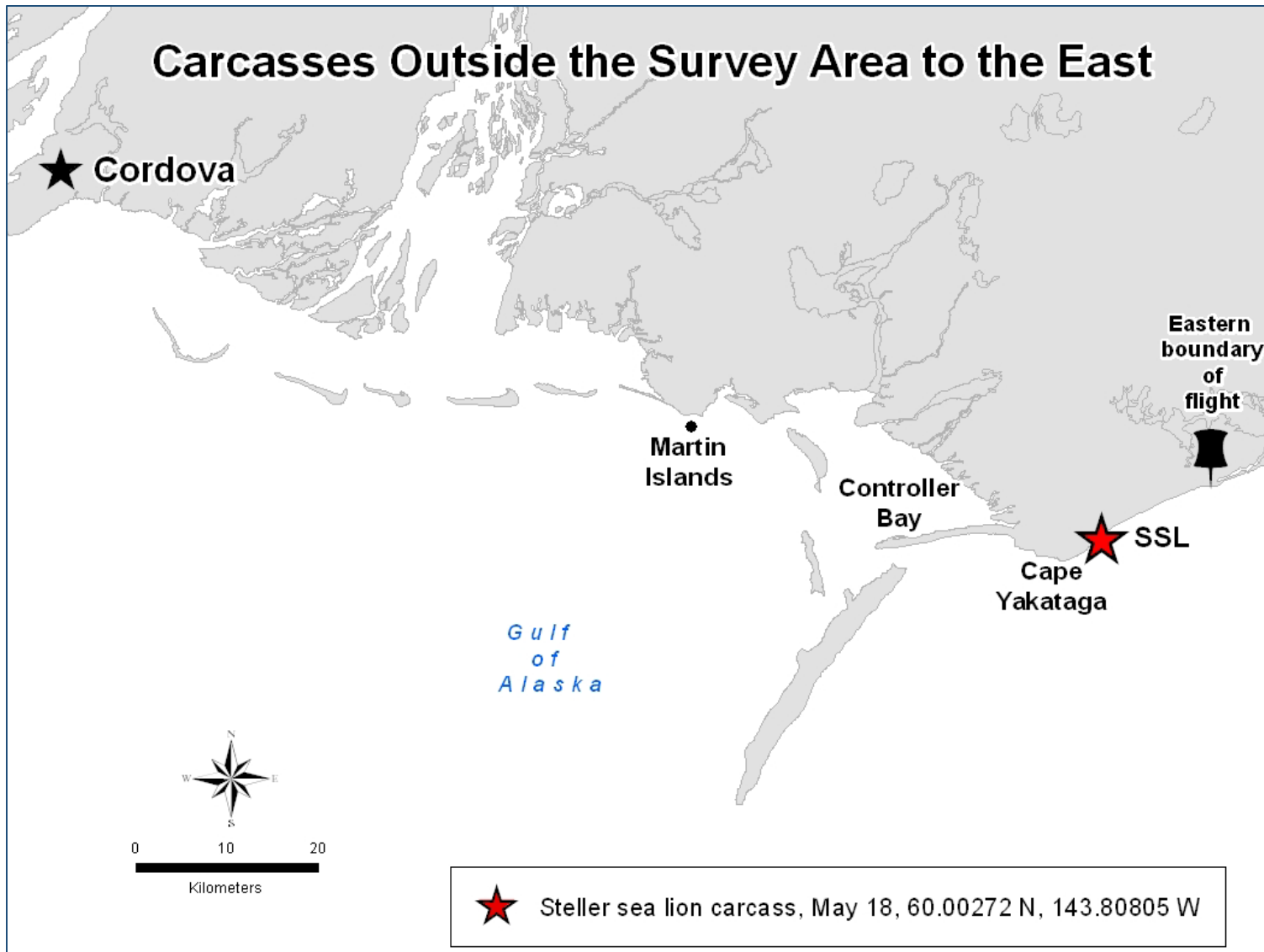


**Figure 1.** Satellite image showing the approximate survey route taken by the biologists conducting the Copper River Delta marine mammal carcass aerial surveys in 2017.

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 Wrangell Mountain 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 during the first commercial opener, but after the first subsistence opener; and the last survey occurring after most marine mammals are expected to have left the area.

## **Results**

**May 18:** NMFS biologists observed one dead bald eagle on the Copper River Delta survey trackline (Figure 1). In addition, they observed a number of live marine mammals along the trackline: one Dall's porpoise, one harbor porpoise, two Northern sea otters, and approximately 80 Steller sea lions. After completing the survey from west to east, the biologists continued to survey the coastline east of the Delta, beginning with the Martin Islands. Approximately 100 Steller sea lions were hauled out on the west side of Martin Island. The biologists surveyed the coastline of Controller Bay and continued east along the coast of Cape Yakataga. They observed one large, male Steller sea lion carcass (2017031: Figure 2). They completed the survey approximately 12 miles east of Cape Yakataga (Figure 2). On the return flight, the USCG landed the MH-60 Jayhawk at the Steller sea lion carcass enabling the biologists to collect samples and take measurements (310 cm in length, no head; 330 cm estimated total length: Figure 3).



**Figure 2.** Map showing the location of a Steller sea lion carcass (2017031) observed and sampled on May 18, 2017, east of the Copper River Delta survey area.

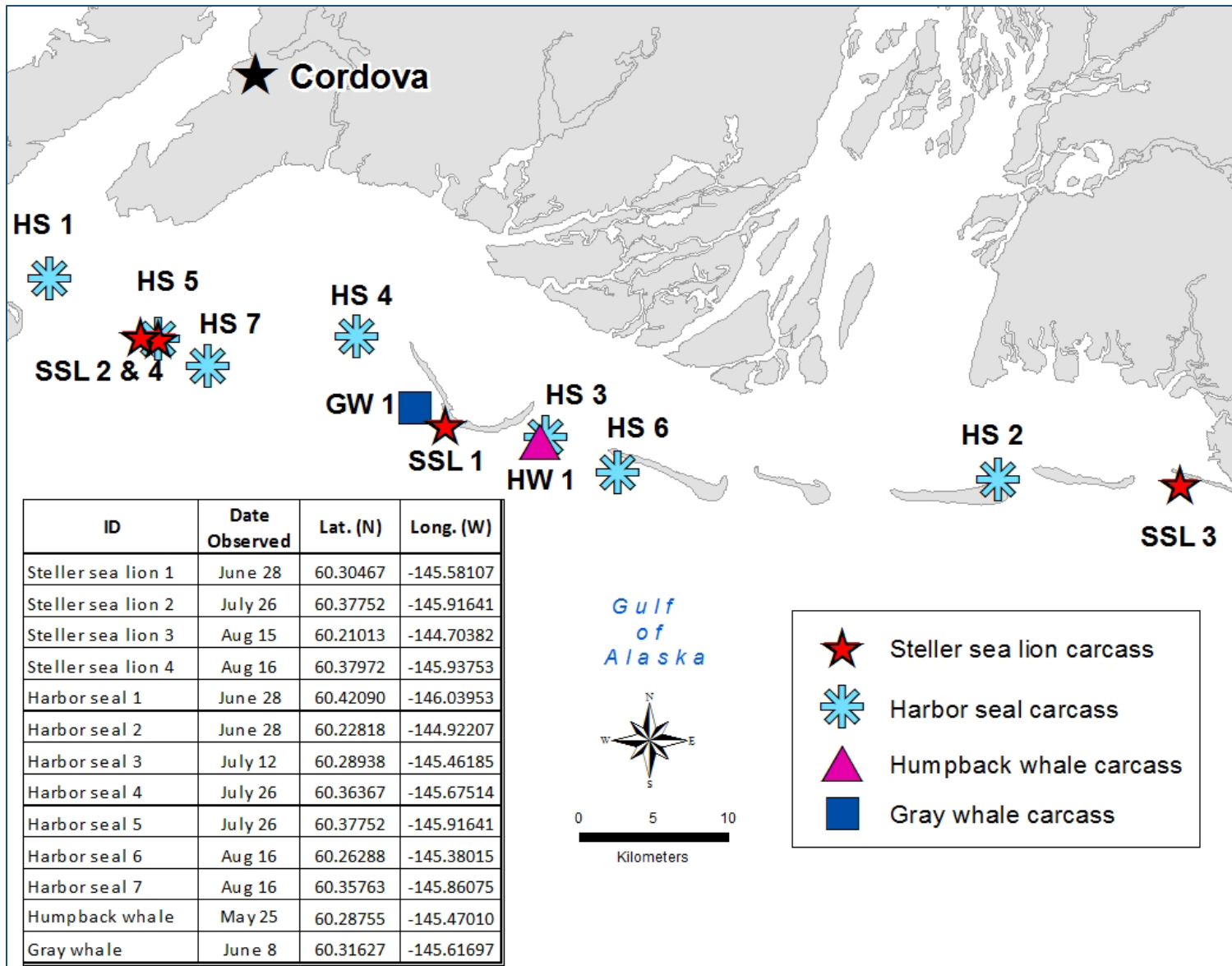


**Figure 3.** Biologist Verena Gill provides size perspective for this photo next to a male Steller sea lion carcass (2017031) observed and sampled on May 18, 2017, at Cape Yakataga, Alaska.

The carcass (2017031) was very decomposed (Code 4); the head was gone (with no evidence that it had been forcibly removed), the flippers were nearly rotted away, and the organs were lumped together in one 2-inch high green mound. Two tissue samples were collected and preserved in DMSO.

**May 25 & 29:** The USCG observed a fresh dead humpback whale on the Delta during a routine overflight and reported it to NMFS. It was the same crew that had flown the NMFS May 18 survey, and they knew this animal had not been there six days before. NMFS and the USCG coordinated to transport a necropsy team to the whale on May 29, 2017 (2017034: HW1, Figure 4 and Figure 5). Preliminary evidence from the partial necropsy of this 12.5 m long young adult/subadult female whale suggests blunt trauma (bruising around the eye and swelling on the left side of the whale). Although cause of death was not determined, incidental findings include prominent uterine vessels and swollen uterine horn, possibly associated with a failed pregnancy. There was insufficient time to assess the thoracic cavity and skeletal system. Aside from the indications of potential trauma, the animal appeared to be in average condition.

Urine samples analyzed for the presence of algal toxins were negative for saxitoxins and positive for domoic acid near the detection limit at 0.4 ng/ml. The low domoic acid level in urine does confirm that oral exposure occurred at levels high enough to be absorbed from the gastrointestinal tract and excreted in urine at detectable levels. However, 0.4 ng/ml is not definitive for health impacts, so the role of domoic acid exposure cannot be determined in the death of this humpback (2017034) due to unknown variables about total exposure concentration, duration, and timing (Lefebvre et al. 2016).



**Figure 4.** Map showing the locations of all carcasses of marine mammals under NMFS' jurisdiction observed during the 2017 NMFS marine mammal carcass surveys of the Copper River Delta.



**Figure 5.** Photo of a young adult female humpback whale (2017034) on the Copper River Delta on May 29, 2017, prior to necropsy. The whale was first observed by the USCG on May 25.

**June 8:** Biologists conducted an afternoon coastline survey of the barrier islands on the USCG MH-60 Jayhawk helicopter from Egg Island to the eastern shore of Softuk Bar. After completing the designated survey route, they back-tracked to land at the single observed carcass, a gray whale in a state of advanced decomposition (Code 4; Figure 6). This was the only gray whale carcass observed by NMFS on the Copper River Delta in 2017 (2017046, GW1). The carcass was located on or near Copper Sands (Figure 1, Figure 4). Externally, biologists noted three parallel grooves in the left dorsal fluke, and at least three hairless indentations on the dorsal tail stock (Figure 6). The possibility of propeller strike as a cause of the former and an old entanglement for the latter were considered, but evidence was insufficient to confirm. It was a 7.72 m long subadult gray whale, and sex was unknown. Due to the level of decomposition, only a skin sample for genetics was collected.

**June 28:** Prior to the scheduled survey flight, NMFS biologists flew with the USCG into Prince William Sound, west of the survey area, in order to assess three previously reported carcasses; two humpback whales and one Steller sea lion. First they landed at humpback whale 1 (2017036: HW1), on the east side of Knight Island, in Hogan Bay (Figure 7). Although this whale had been reported as “fresh dead” when it was first observed and reported to NMFS on May 27, 2017, it had deteriorated to a Code 4 when NMFS was able to visit the carcass (Figure 8). It was a large (1510 cm length) adult female humpback whale. Cause of death was not determined. Baleen was collected from this animal on the June 28 visit. Additional samples (e.g., eye, skin, blubber) were collected from this whale (2017036) by an authorized USGS seabird research team on May 30, 2017. The whale’s pectoral fin was 4.5 m long, and the fluke was 4.7 m wide. The tongue of the animal was intact, suggesting it did not die as a result of predation.



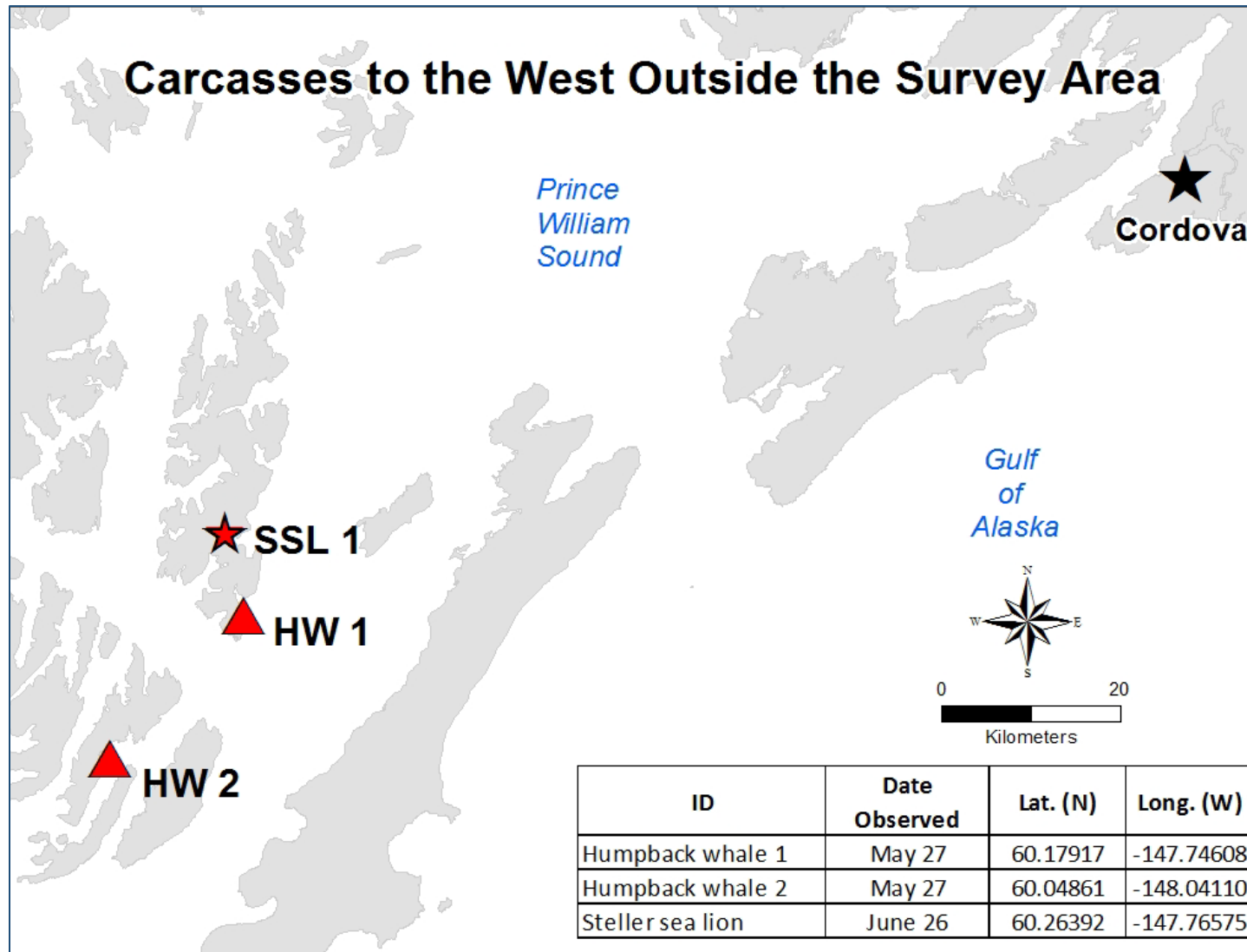


**Figure 6.** Biologist Dave Gann provides size perspective for this photo of a juvenile gray whale (2017046) observed and measured near Copper Sands on the June 8, 2017, carcass survey. A gill netter is visible in the background. Three grooves are visible in the whale's dorsal tail fluke.

The USCG was not able to locate a safe landing zone near where humpback whale 2 (2017038: HW 2) had beached, therefore no samples were collected from it on June 28. That whale had been initially observed and reported floating between Latouche and Evans Islands on May 27 (Figure 7), and beached on Evans Island on May 30 (Figure 9). One of the people who had originally reported the carcass was able to collect baleen from this humpback (2017038) on July 12. The USCG retrieved the baleen from the collector on July 25, and transferred it to NMFS biologists in Cordova on July 26.

On June 28, the biologists had limited time at the Steller sea lion carcass that had first been observed on Knight Island on June 25, 2017 (reported to NMFS on June 26). It was a subadult male Steller sea lion (2017061). The biologists collected external tissues and measurements and did not determine a cause of death. A complete necropsy was conducted on July 2, 2017, that determined the animal was very thin, had several abscessed teeth, and had indications of chronic systemic infection. It likely died as a result of malnutrition and infection.

Later in the day on June 28, biologists flew the scheduled Cessna-based carcass survey from the western shore of Egg Island to the eastern shore of Softuk Bar. Three carcasses were observed and identified: two harbor seals (2017082 and 2017084) and a Steller sea lion (2017083). A fourth carcass was observed but was thought most likely to be a Northern sea otter. Unfortunately, the USCG was unable to fly the biologists to closely examine the carcasses as planned on June 29. Therefore, they were unable to assess the carcasses to determine cause of death.



**Figure 7.** Map showing the location of three carcasses in Prince William Sound that were assessed opportunistically on June 28, 2017, by biologists who were in Cordova to conduct a scheduled survey of the Copper River Delta. Samples were collected from SSL 1 (2017061) and HW 1 (2017036) at the locations where they were initially reported. HW 2 (2017038) was initially sighted floating on May 27, and samples were collected at the shown location on July 12.



**Figure 8.** An adult humpback whale (2017036) on the southeast corner of Knight Island in Prince William Sound. This animal was first observed and reported to NMFS on May 27, 2017. This photo was taken on June 28, 2017, when NMFS biologists were able to assess the carcass.



**Figure 9.** An adult humpback whale (2017038) beached on Evans Island, taken on June 10, 2017. The carcass was first observed floating between Evans and Latouche Islands on May 27, 2017.



**Figure 10.** Dead Steller sea lion (2017061) initially observed on June 25 on Knight Island, Prince William Sound, and assessed by NMFS biologists on June 28, 2017.

**July 12-13:** During the scheduled survey on July 12, biologists observed a harbor seal carcass, the humpback whale carcass necropsied on May 29, the Steller sea lion first observed on the June 28 survey, the gray whale carcass observed on the June 8 survey, a second possible harbor seal on the very western edge of the survey route, and a dead Northern sea otter on the western edge of the survey route as well.

On July 13, the USCG provided helicopter support via MH-65 Dolphin helicopter to transport the biologists to the carcasses. First, they landed at the fresh harbor seal (2017092: HS3 in Figure 4). It was a subadult male, 61 cm in length, and weighed approximately 100 pounds (Figure 11). Axillary blubber depth was 2.8 cm. Dorsal blubber depth was not available because the tissue on the head and back of the animal's neck had been removed, likely due to predators accessing a head wound that had penetrated the animal's hide. In addition, the injury that had torn the hide had also broken and cracked the bones of the skull and jaw. Due to the lack of tissue on the skull, broken bones of the skull and jaw, and otherwise apparent average health of the animal, we suspect death was due to a head wound caused by a firearm.

Incidental findings of the necropsy (seal 2017092) include hepatic parasites, which are a common finding in harbor seals. Additionally, feces from this animal tested negative for domoic acid but positive with very low levels of saxitoxin (4.5 ng/g). The significance of this level of saxitoxin is unclear (due to unknown covariates, such as time since death) but it is unlikely that this low level contributed to individual fitness (Lefebvre et al. 2016).



**Figure 11.** Harbor seal 3 (2017092) on July 13, 2017. The skull and jaw of this seal were broken, and tissue had been removed from the skull by predators, while the rest of the body appeared intact and healthy.

The USCG next took the biologists to the Steller sea lion carcass. This animal (2017083: SSL1, Figure 4) was an adult male, 249 cm in length (Figure 12). The carcass was very decomposed (Code 5), and it was not possible to establish cause of death. The biologists transported the skull to Juneau for further inspection, but there was no clear evidence of injury. The stomach of the animal had decayed to the point that many fish bones were visible in the gut cavity.

At the western edge of the survey route where the biologists had observed a possible pinniped carcass the day before, no carcass remained on July 13. The USCG crew and NMFS biologists found discolored sand at the location, and fresh bear tracks and drag marks from the carcass waypoint location, up the beach, and through the grass. The helicopter crew attempted to track the bear/carcass across the island from the helicopter several times, but no bear or carcass remains were discovered. Because the biologists were unable to definitively identify the carcass as a marine mammal, it is not included on the final map in this report.



**Figure 12.** Biologist Tammy Olson verifying Lat/Long of adult male Steller sea lion 2017083 on the Copper River Delta. This carcass was first observed on the June 28, 2017, survey, but biologists were unable to sample it until July 13, 2017.

**July 26-27:** On the afternoon of July 26, biologists flew the Cessna-based carcass survey from the western shore of Egg Island to the eastern shore of Softuk Bar. Carcasses of a Steller sea lion and two harbor seals were observed as well as a set of whale vertebrae and other bones. On the morning of July 27, the USCG transported biologists to the three pinniped carcasses for examination and sample collection. There was not time to land at the whale bones, but later mapping analysis concluded that the bones were from a carcass sampled in 2016. Evidence of traumatic injury was apparent with the two harbor seals. Heads of all three pinniped carcasses were collected for radiographic assessment.

The Steller sea lion (2017110: SSL, Figure 4) was a large adult male (310 cm length: Figure 13), with a dorsal axillary blubber layer 1.2 cm deep. Metal detector results were negative, but because there was no obvious cause of death and the animal appeared healthy, the biologists brought the head back to Juneau for radiography. No metal or injuries were found in the skull or head region. Cause of death remains unknown.

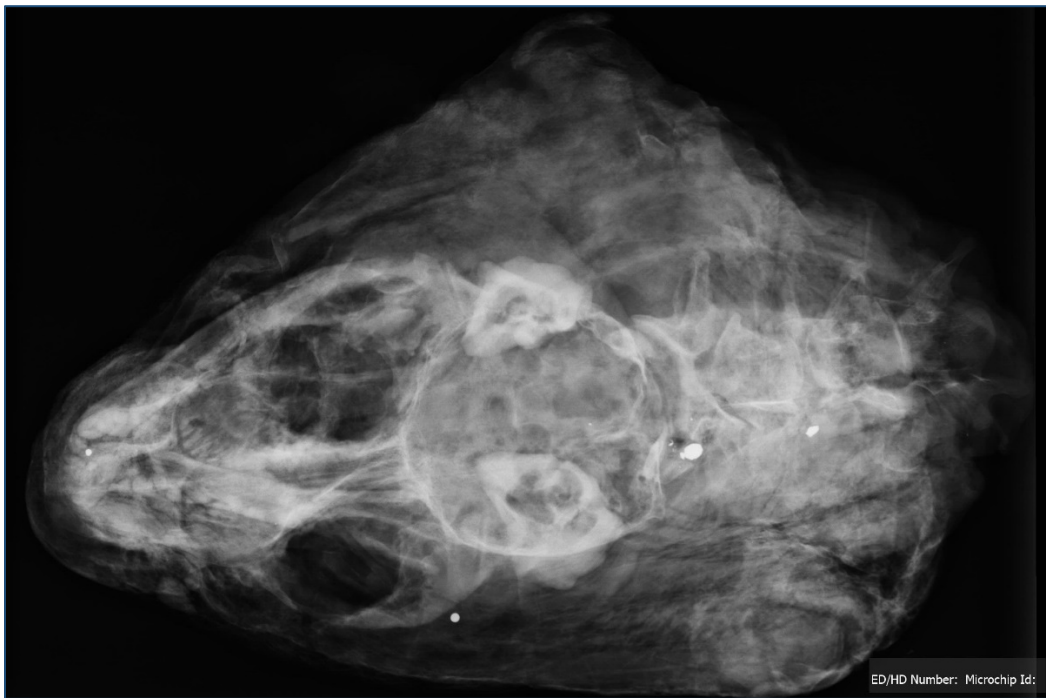


**Figure 13.** Biologists Kate Savage and Kim Raum-Suryan measuring the length of this adult male Steller sea lion (2017110) first observed on the scheduled July 26 carcass survey, and assessed and sampled on July 27, 2017, with USCG helicopter support.

The first harbor seal (2017111: Harbor seal 4, Figure 4) was an adult male, 148 cm in length, with dorsal axillary blubber depth of 1.7 cm. The animal had a full thickness hole with bruising and hemorrhage in the right dorsal neck (Figure 14). Although the metal detector had negative results in the field, a radiograph of the head back in Juneau clearly showed a bullet and fragments at the base of the skull (Figure 15). The second harbor seal (2017112: Harbor seal 5, Figure 4) was also an adult male, 146 cm in length, with dorsal axillary blubber depth of 1.8 cm. There was a full thickness hole in the left dorsal skull of the animal (Figure 16), and subsequent radiographs showed a fractured skull with metal fragments (likely from a bullet) inside the injury (Figure 17).



**Figure 14.** Harbor seal 4 (2017111) showing an injury behind its head. The eyes were removed by scavengers, but the other injury was determined to be pre-mortem firearm injury. See bullet and fragments in Figure 15.

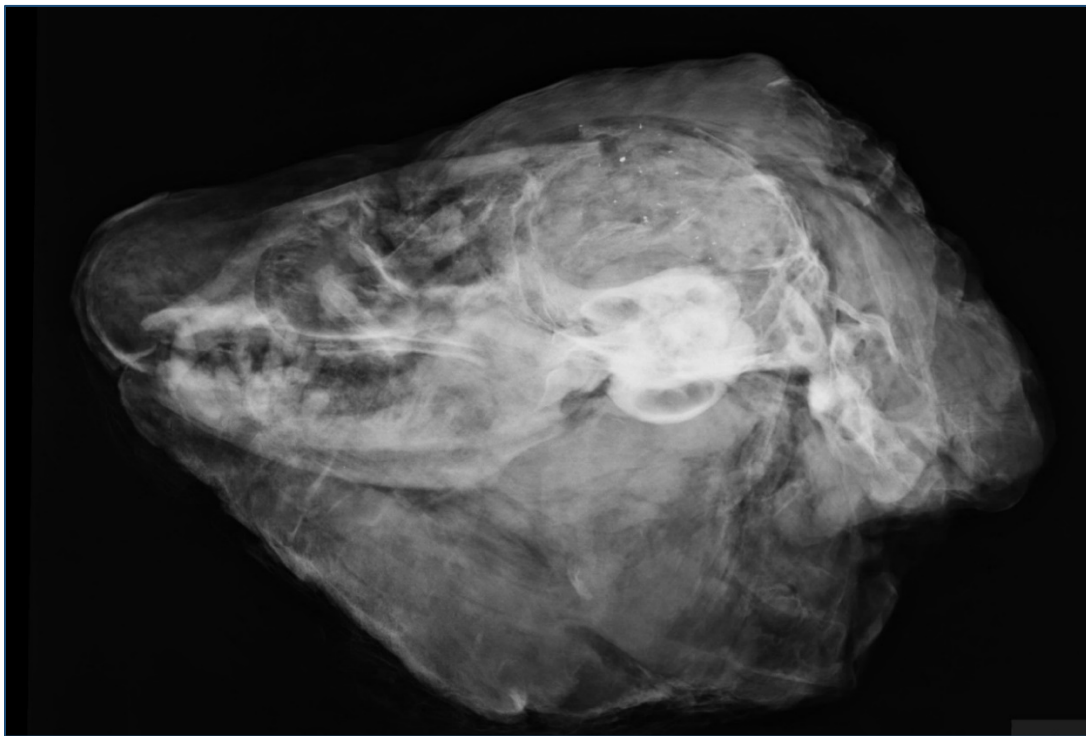


**Figure 15.** Radiograph of the head of harbor seal 4 (2017111) retrieved on July 27, 2017, from a carcass first observed on a scheduled overflight of the Copper River Delta on July 26. The bright white spots overlapping with the upper vertebrae and behind the skull are pieces of a bullet.





**Figure 16.** Harbor seal 5 (2017112) with forceps indicating a hole determined to be from a firearm injury. The eyes were removed by scavengers, and the cut on the back is from the blubber depth measurement (1.8 cm depth). This carcass was first observed on the scheduled overflight on July 26, 2017, and assessed and sampled on July 27.



**Figure 17.** Radiograph of the skull of harbor seal 5 (2017112) showing displaced fracture and possible bullet fragments at the top of the skull. The carcass of this animal was first observed on the Copper River Delta survey flight on July 26, and the head was collected on July 27.

**August 15:** A NOAA Office of Law Enforcement officer conducted a partial survey of the Copper River Delta with USCG aerial support. They flew from the approximate mid-point of the designated survey route, east to Softuk Bar (Figure 1). The officer observed one relatively fresh dead Steller sea lion (Code 2-3) on the western edge of Softuk Bay (2017041: SSL 3, Figure 4), and took photos of the carcass (Figure 18). No samples were collected and cause of death cannot be determined from the photos.



**Figure 18.** A dead Steller sea lion (2017141) on Softuk Bar on the Copper River Delta. This carcass was observed by NOAA OLE and the USCG on August 15, 2017. Biologists were not able to visit this carcass to assess cause of death or collect samples.

**August 16-17:** Weather curtailed the scheduled fixed wing survey on August 16. Biologists were able to fly approximately four-fifths of the western portion of the survey (Egg Island to Strawberry Reef) before returning to Cordova due to unsafe weather conditions. They observed one new Steller sea lion carcass (2017147), and two new harbor seal carcasses (2017148 and 2017253) on the scheduled survey. On August 17, the USCG flew the biologists to the new Steller sea lion (2017147: SSL 4, Figure 4 and Figure 19). The biologists were able to conduct a partial necropsy, cutting several longitudinal slices through the skin and blubber to follow damaged tissue. The handheld metal detector signaled several times across the animal's back and abdomen during the scan of the carcass, but no metal was located during the partial necropsy. Tissue samples, measurements, and photographs were collected. The metal detections in the carcass, and the pre-mortem damaged, hemorrhaged tissues strongly suggest that this animal died as a result of firearm injuries.

The USCG received an emergency response call and returned the biologists to Cordova before the necropsy of Steller sea lion 4 carcass (2017147) could be completed and before carcasses 2017148, 2017141, and 2017253 could be assessed.



**Figure 19.** Biologist Julie Scheurer documenting potential injuries on Steller sea lion 2017147 on the Copper River Delta. This carcass was initially observed on August 16, 2017, and examined by NMFS biologists with USCG helicopter support on August 17.

### **Discussion & Conclusion**

NMFS biologists confirmed observations of carcasses of 11 pinnipeds (seals and sea lions) and two large whales on the Copper River Delta in 2017. Biologists were able to assess the two whale carcasses; one gray whale and one humpback whale. The gray whale was too decomposed to determine the cause of death. The humpback whale showed evidence of blunt force trauma (e.g., slight bruising and damaged tissue), but data collected from the necropsy were insufficient to conclusively determine cause of death.

NMFS biologists radiographed the heads of three pinnipeds (one Steller sea lion and two harbor seals) and found metal fragments in the two harbor seal heads. In total, three harbor seal skulls showed evidence of firearm injury. Metal was detected in one Steller sea lion carcass in the field, and examination revealed damaged tissues, leading us to suspect firearm injury was the cause of death.

Intentional killing by humans appears to be continuing and was the leading known cause of death of the pinnipeds we assessed on the Copper River Delta from May 18 to August 17, 2017. It is unlikely that the presence of the carcasses observed in the 2016 and 2017 surveys would have been reported without these dedicated surveys in this remote area. Without dedicated monitoring in past years it is impossible to know whether intentional killings by humans increased in 2015-

17 relative to prior years. Numbers of marine mammals found dead with evidence of human interaction dropped considerably between 2015 and 2016, but increased between 2016 and 2017.

**Contact**

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

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**APPENDIX A:**

AKR ID #	Species	Initial Obs. (2017)	Samples Collected (2017)	Field ID	General Location	Age/Sex	Condition Code	Length (m)	Dor. Ax. Blubber Depth	Samples Collected	Evidence of Human Interaction
2017031	Steller sea lion	May 18	May 18	MC-001, SSL	Cape Yakataga	Adult/ Male	4	3.3	N/A	skin	CBD*
2017034	Humpback whale	May 25	May 29	HW 1	Grass Island Bar, CRD	Subadult or Adult/ Female	2	12.5	6.5cm	Full Necropsy: multiple samples	suspected
2017046	Gray whale	June 8	June 8	GW 1	Copper Sands, CRD	Subadult/ Unk	4	7.72	N/A	skin	CBD*
2017036	Humpback whale	May 27	May 30 June 28	HW 1	Hogan Bay, Knight Island, PWS	Adult/ Female	initial - 2, sampled - 2, 4	15.1	N/A	May 30 - eye, skin, blubber June 28 - baleen	CBD*
2017038	Humpback whale	May 27	July 12	HW 2	Chenega Bay, PWS	Adult/ Unk	initial - 3, sampled - 4	14.88	N/A	baleen	CBD*
2017061	Steller sea lion	June 25	June 28/ July 2	SSL 1	Knight Island, PWS	Subadult/ Male	initial - 2, sampled - 3.5	2.47	Unk	Full Necropsy: multiple samples	no
2017082	Harbor seal	June 28	N/A	HS1	Egg Island, CRD	Unk/ Unk	Unk	Unk	Unk	none	CBD*
2017083	Steller sea lion	June 28	July 13	SSL 1	Copper Sands, CRD	Adult/ Male	initial - Unk, sampled - 5	2.49	N/A	skull, jaw, skin	CBD*
2017084	Harbor seal	June 28	N/A	HS 2	Eastern CRD	Unk/ Unk	Unk	Unk	Unk	none	CBD*
2017092	Harbor seal	July 12	July 13	HS 3	Grass Island Bar, CRD	Subadult/ Male	2	0.61	2.8cm	Full Necropsy: multiple samples	Yes
2017110	Steller sea lion	July 26	July 27	SSL 2	Egg Island, CRD	Adult/ Male	3	3.1	1.2cm	head	CBD*
2017111	Harbor seal	July 26	July 27	HS 4	Copper Sands, CRD	Adult/ Male	3	1.48	1.7cm	head	Yes
2017112	Harbor seal	July 26	July 27	HS 5	Egg Island, CRD	Adult/ Male	3	1.46	1.8cm	head	Yes
2017141	Steller sea lion	August 15	no	SSL 3	Softuk Bar, CRD	Unk/ Unk	2	Unk	Unk	none	CBD*
2017147	Steller sea lion	August 16	August 17	SSL 4	Western CRD	Adult/ Male	3	3.05	1.6cm	skin, whisker	suspected
2017148	Harbor seal	August 16	N/A	HS 6	Grass Island Bar, CRD	Adult/ Unk	2	Unk	Unk	none	CBD*
2017253	Harbor seal	August 16	N/A	HS 7	Copper Sands, CRD	Unk/ Unk	Unk	Unk	Unk	none	CBD*

These data were collected from marine mammal carcasses assessed during the Copper River Delta surveys conducted by NMFS PRD May 18-August 17, 2017. Additional data are presented in the full report above.

\*Could not be determined