

Chuitna Coal Project

Monthly project report for marine fish and mammal studies – June 1 through June 30, 2006

Submitted electronically

To

DRven Corporation
711 H St., Suite 350
Anchorage, AK 99501

By

Matt Nemeth, Chris Kaplan, Amanda Prevel-Ramos,
and Danielle Savarese
LGL Alaska Research Associates, Inc
1101 E. 76th Ave, Suite B
Anchorage, AK 99518

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Introduction

This progress report covers surveys conducted in the month of June, 2006 to describe marine fish and mammals on the west side of upper Cook Inlet. Some information not included in the monthly report from May is also described. In June, all project components were operated full time, including both nearshore and offshore components. Weather was poor, however, limiting the effort from some forms of boat-based surveys. June also marks the first report of observations of beluga whales from commuter flights over the shoreline along the Susitna Flats area. The purpose of this report is to describe the extent and dates of effort spent on each of these tasks, and to provide preliminary data summaries of the most important information.

Marine mammals were surveyed from land on twenty-two different dates in June, spread evenly throughout the month (Tables 1 and 2). The Ladd Landing station was used on all survey dates; in addition, observations were also made from two other stations on a few other dates. Marine mammals were surveyed from boats on eighteen dates (both boats combined), spread evenly throughout the month of June. Marine fish were surveyed in the nearshore area with beach seines on eight dates. Marine fish were also surveyed in the offshore area with acoustics on eight dates, and with trawl nets on eleven dates (including two at the end of May; Table 1).

From the shore, beluga whales were seen from two different observation stations on a total of six dates (Figure 1; Table 2). The number of whales seen ranged from 1 to 25 on the different dates. From the research vessels, whales were seen throughout June, but usually in small groups. On June 1, a group of 51 whales was sighted near the Susitna River Flats; after this, no more than 17 whales were seen in any one group.

Seventeen species of fish were captured in beach seine tows conducted at seven sites in the area near Ladd Landing (Table 8). These sites ranged from the mouth of the Chuit River to the mouth of Three Mile Creek, and included the major habitat types seen along this stretch of shoreline. The most consistently captured species were eulachon (aka hooligan), threespine stickleback, saffron cod, Pacific tomcod, and juveniles of all 5 species of Pacific salmon known in Alaska.

Offshore, acoustic surveys were conducted on nine dates in waters ranging from the North Forelands to the Susitna Flats, and were generally conducted for one to three hours of survey time. Weather was often unsuitable for acoustics in June, reducing survey time or eliminating the potential altogether. Mean daily fish densities ranged from 3 to 19 fish per hectare. Maximum fish density detected during the surveys was 175 fish per hectare during a brief period on June 5 (Table 5). Based on trawl surveys, these fish were likely a mix of eulachon and juvenile salmon.

Acoustic surveys and trawls were also conducted along and adjacent to the bulkhead support at Port Mackenzie on five dates in June.

Surveys – effort and results

Land-based whale observations

Locations

The Ladd Landing observation station (LLS) was used on all 22 survey dates in June, continuing the data set begun in April (Figure 1). Observations were also conducted on five of these dates at the Beluga River station and on two of these dates at the Airstrip Bluff station (Table 2). These 2 stations are to the north of Ladd Landing, and were used opportunistically when staff were freed from other tasks.

Effort

Observation coverage at Ladd was spread evenly throughout June. Effort ranged from 6 to 10 hrs per day on all survey dates, with the majority being exactly 6 hours. A total of 177 observation hours were spent at the four shore stations in June – 147 at the Ladd Landing station, 21 at the Beluga River station, and 11 at the Airstrip Bluff station (Table 2). All major tidal stages were covered during the observations at Ladd Landing and the Airstrip Bluff. The Beluga River observations covered high flood, high slack, and high ebb tidal stages at least twice in June, as well as one event during low tidal ebb.

Beluga whale sightings

Overall, beluga whale groups were sighted on 5 of the 22 survey dates conducted from Ladd Landing in June. Three of these groups were sighted on June 21, 22, and 23, and ranged in size from 15 adults to 1 sub adult beluga. The other two groups were one or two belugas sighted in early June (Table 2).

Beluga whale groups were sighted on both survey dates conducted from the Airstrip Bluff in June. Two groups were actually seen on each of these dates, for a total of 47 whales seen (Table 2). On one of these dates (June 19), no belugas had been seen at Ladd Landing, but 22 were seen at the Airstrip Bluff. On the other date (June 23), 6 whales were detected at Ladd Landing and 25 were recorded at the Airstrip Bluff. The draft final report will include assessments of overlap of the whale groups between the two stations on these dates.

No whales were seen from the Beluga River observation site in June (Table 2).

Boat-based whale surveys

R/V Leucas

Five surveys for marine mammals were conducted from the R/V Leucas in June, 2006 (Table 1). These surveys covered an area from ½ km to 3 km offshore, and ranged from the North Foreland to slightly southwest of the Beluga River (Figure 2). The exact survey area varied by date, depending on tidal stage and weather conditions.

Beluga whales were seen during two of the five surveys conducted in June. On June 16, 2 adults and 1 calf were observed 1.5 km offshore near the mouth of the Susitna River. On June 20, a group of 8 whales (4 adults, 3 subadults and 1 calf) were observed 2.5 km offshore near the mouth of the Lewis River.

R/V Nerka

Surveys for marine mammals were also conducted from the R/V Nerka on eight dates in June. Surveys had also been conducted on six dates in May that were not included in the May monthly report. These surveys covered an area ranging from the City of Anchorage to Ladd Landing, usually within 10 km of shore (Figure 3).

Twenty-one groups of beluga whales were seen in May and June during surveys from the R/V Nerka (Table 5), with a total of 235 whales seen. Group size ranged from 1 to 58 whales. Only 3 groups contained more than 20 whales, none after June 1. Of the three largest groups, adults comprised the vast majority (55 of 58 whales) on May 15, a slight minority (22 of 48) on May 25, and a slight majority (29 of 51) on June 1. The maximum number of calves observed in a single group was 4.

Most sightings were between the Big Susitna and the Little Susitna rivers. The largest group of beluga whales, however, was sighted between the Beluga and Susitna rivers (Figure 3). Belugas were observed during low slack, low flood, high slack, and high ebb tides. Belugas were observed during all hours between 10:00 and 20:00. Estimates of group sighting rates by tidal stage will be included in the final report.

Aerial observations of beluga whales in Susitna Flats

Throughout this study, biologists have accessed the Ladd site via commuter flights between Anchorage and the Beluga airstrip. Portions of this flight offer good aerial views of the Susitna Flats from an elevation of approximately 350 m. These flights are opportunistic, cannot be controlled by biologists, and are not directly comparable to surveys from the boats. LGL biologists believe they could nevertheless be a good source of information on whale presence by time period and location within the Susitna Flats area. More detail was included in the May monthly report.

A standardized form was developed to classify the quality of aerial observation conditions for five stretches of the nearshore area along Cook Inlet and six of the rivers flowing into Cook Inlet. These 11 locations range from Point Mackenzie, west and south to the area southwest of the Beluga River. The observation conditions and number of whales were recorded during 12 flights in June (Table 5). Because these flights were opportunistic, they were not spread evenly throughout the month; instead, all but one came after June 11. Twice, two of these flights were made in the same day (coming from, then returning to, Anchorage). Observations covered all but the high ebb tidal stage.

Observation conditions were rated as 1, 2, or 3 for offshore surveys, in increasing order of observation quality. These offshore surveys were geographically classified as south of the southern edge of the Chuit River mouth (Area 1), north to the southwest edge of the Beluga River mouth (Area 2), northeast to the west edge of the Big Susitna River mouth

(Area 3), east to the west edge of the Little Susitna River mouth (Area 4), and west to Point Mackenzie (Area 5; Figure 3).

Observation conditions were also rated as 1, 2, or 3 for upriver conditions. In addition, upriver observations were classified as full, partial, or none. These conditions were recorded for the Beluga, Theodore, Lewis, Ivan, Big Susitna, and Little Susitna rivers.

In June, conditions were rated as full or partial 8 times on the Lewis and Ivan Rivers, 9 times on the Beluga River, and 10 times on the Big Susitna, Little Susitna, and Theodore rivers (Figure 4a). Of these, the only group of whales seen was a group of 2 whales in the Beluga River on June 22. This group was in the river during high flood tidal stage.

In June, conditions were rated as 2 or 3 on at least seven surveys in each of the areas north of the Chuit River (Areas 2 through 5; Figure 3). There were no aerial flights south of the Chuit River (Area 1). Beluga whale groups were seen on 5 of the 10 surveys in Area 3, which includes those areas offshore from the mouths of the Beluga, Theodore, Lewis, and Ivan rivers. No beluga whale groups were seen during the 7 observations south of this area (Area 2, south of the Beluga River), or during the 9 observations to the east (Area 4, between the Big Susitna and Little Susitna rivers). One whale group was seen during 9 observations between Point Mackenzie and the mouth of the Little Susitna River (Area 5; Figure 4b).

Whale groups were seen offshore during high slack, high flood, low slack, and low flood tidal stages.

Fish surveys

Intertidal surveys – beach seining

Beach seine catches were separated into hauls made with the large seine (3 sites) and the small seine (7 sites, including 3 of the ones used with the large seine), as described in the May monthly report.

In June, seventeen species were captured in the large beach seine and thirteen in the small beach seine. The most abundant fish in both seines were eulachon, which had been increasing in late May, peaked in early June, and were rarely caught by the end of June. Salmon smolts (five species), threespine stickleback, saffron cod, and Pacific tomcod were caught on low but consistent numbers throughout June (Tables 8a and 8b). Assessments of catch by tide stage and differences among gear types and stations will be conducted later in the summer.

Scales were collected from Dolly Varden and from juvenile coho, Chinook, and sockeye salmon for age determination. Samples of saffron cod, Pacific tomcod, juvenile chinook salmon, and juvenile coho salmon were also retained in June for diet analysis.

Offshore surveys – acoustic sampling and trawl netting

Offshore surveys were conducted using split-beam acoustic gear on 13 dates in June. Eight of these dates were in west side of Cook Inlet and five were near Port Mackenzie.

The eight surveys on the west side of Cook Inlet ranged from North Foreland to the Susitna River flats, depending on the day. Weather was frequently poor in June, limiting the surveys to between 1 and 3 hours each. Surveys covered all tidal stages except for low ebb and high flood tides (Table 9).

Fish were detected on all surveys in June except during one short period in which the survey gear was tested in rough water. Mean daily density ranged from 3 to 19 fish per hectare, with brief stretches of up to 175 fish per hectare (Table 9). These densities must still be corrected for signal effectiveness (i.e., the proportion of operational time in which the gear was effectively processing data), which is influenced by gear position, weather, depth, and surface conditions.

The acoustic sampling in this area was paired with trawl net tows on 10 dates in June (Table 6). Tows were conducted during all hours between 11:00 and 17:00 and during all stages of the tide except low ebb and high flood. Eulachon dominated the catch in late May and early June, but their abundance decreased by late June. During May, only pink salmon were collected. In June, chum, coho, and sockeye salmon were also captured. A herring was caught on June 21 and 2 flounders were caught on June 23 and 28.

Invertebrates were collected throughout the sampling period, and appeared to belong to 3 distinct groups. These invertebrates approached salmon smolt size, and are being identified and quantified for inclusion in subsequent reports. Catch estimates were made in June, and voucher samples were saved.

Bulkhead surveys – acoustic sampling and trawl netting

During the month of May, tests of the acoustic sampling system were conducted at Port Mackenzie. Mean daily density ranged from 7 to 49 fish per hectare, with brief stretches of up to 457 fish/hectare. On those same dates, 7 trawls were conducted at Port Mackenzie to examine the fish species. Species caught included pink, chum, coho and sockeye salmon, eulachon, threespine stickleback, flounder and several invertebrates.

Data analysis and reporting

All data collected through June for fish catches and whale sightings have been entered electronically. GPS Databases for the acoustic surveys and the boat-based whale surveys need to be proofed, filtered, and linked to whale sighting data before whale positions can be described.

This report marks the third monthly progress report. The next monthly report will be delivered August 15, and will include an overview of project effort and results in July.

Project logistics and coordination

Items from June

Food and lodging for the crew at Ladd continues to be provided at the Heilman cabin, and has been entirely satisfactory thus far. There is effective, daily communication between the crew and the Heilman's, and both parties appear to enjoy the arrangement.

Air logistics consist of flights between Anchorage and Beluga with Spernak airways, coordinated by Conce Rock. The air schedule works well for the LGL crew's work plan.

On the ground logistics varied in June, primarily because of changes in vehicles. This has caused some difficulty and lost work time.

The R/V Leucas continues to be moored at an anchorage off the shore from the barge landing near Ladd, and trailered during foul weather. Thus far, the only trailering option has been to get Bob Freeman's assistance. Mr. Freeman has been obliging, but relying on him to pull the boat is still an imperfect solution. This problem has lingered since April. The only other solution appears to be to have a vehicle capable of pulling the boat from the water, either at the boat launch itself or in front of the fishermen's cabin. The vehicle the project currently has is not trustworthy for this.

The R/V Nerka continues to be moored at the Cook Inlet Tug and Barge (CITAB) facility in Anchorage. This has been an effective option thus far.

Upcoming work in July

The inability to get the R/V Leucas off the water in the foul weather is a problem. None of the current options are foolproof; we can use a sheltered moorage at Three-Mile Creek, but only at high tide; we can ask Bob Freeman to pull our boat, but we are then dependent on his schedule to re-launch it; and leaving the boat moored over the weekend is risky if the weather turns foul or if the boat mooring is moved by a tree. The best scenario is one in which the crew has access to a vehicle that can load and launch the boat at their convenience, or during emergencies.

The hand-held radios continue to be a spotty form of communication. We can usually juggle to schedule so that the bluff observer has either a satellite phone or a vehicle, but there are times when the only communication tool is the hand-held that does not reach back to the support cabin.

Figures

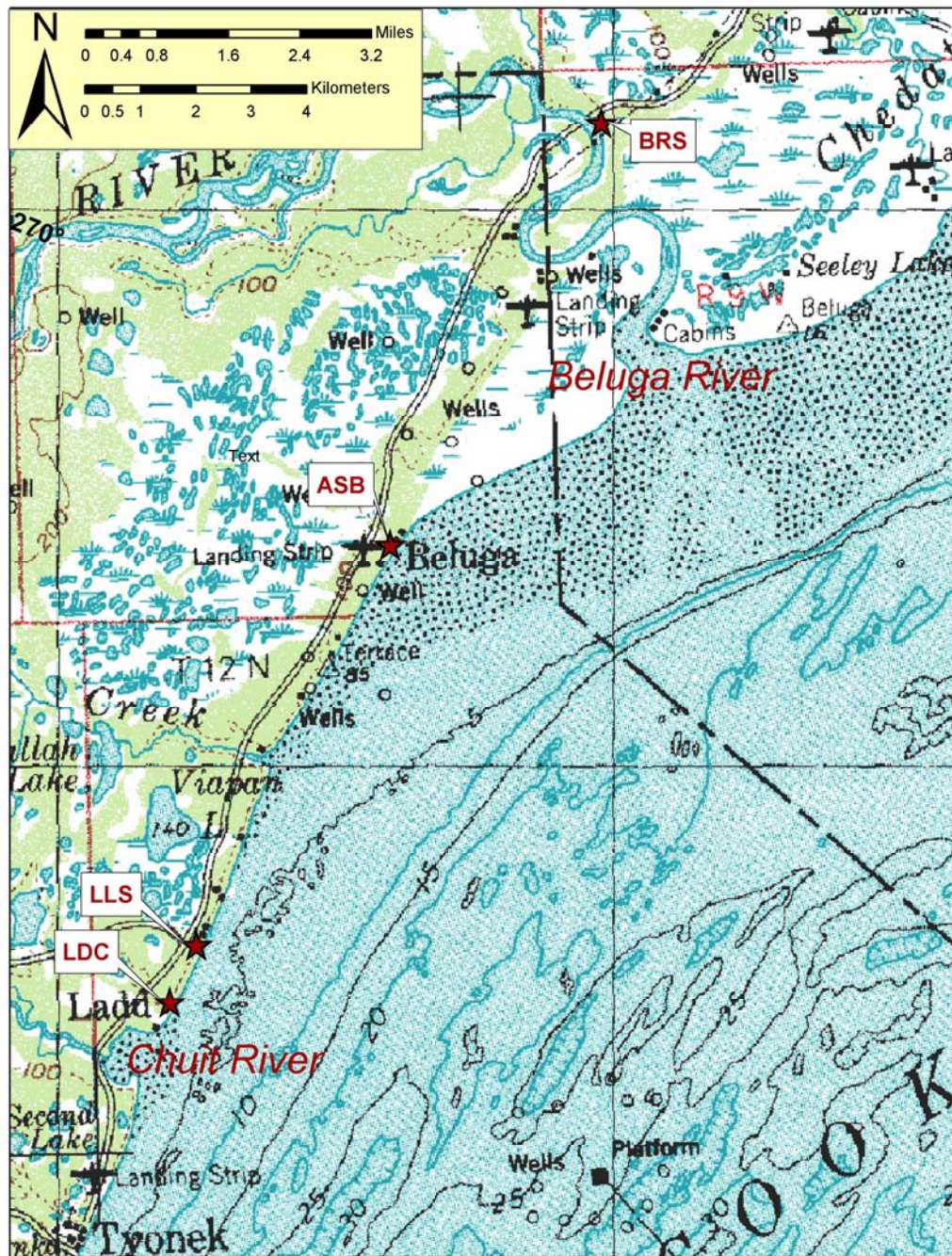


Figure 1. Map showing location of land-based observation stations used in May on the west side of Cook Inlet at Ladd Landing. Grid cells (1 km²) will be superimposed on this map to track marine mammal movements and distribution in the area.



Figure 2. Core (solid line) and expanded (dashed lines) area surveyed for marine mammals from the R/V Leucas in June, 2006.

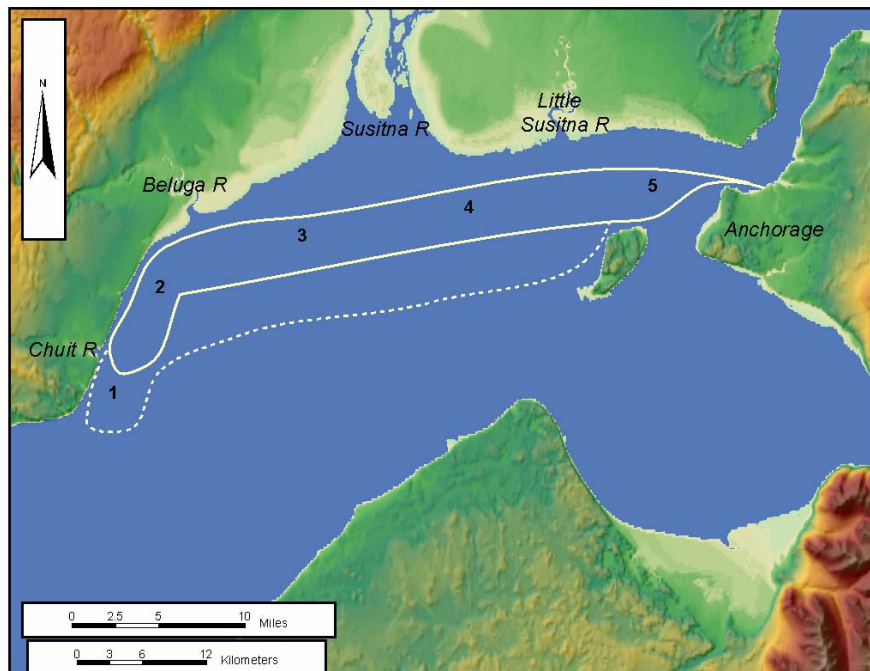
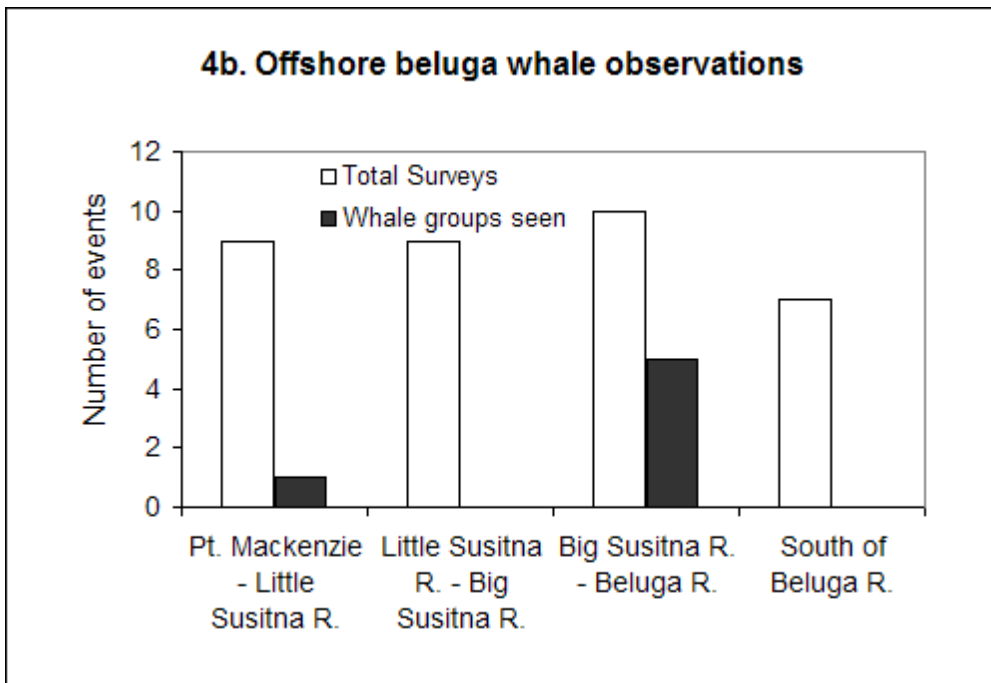
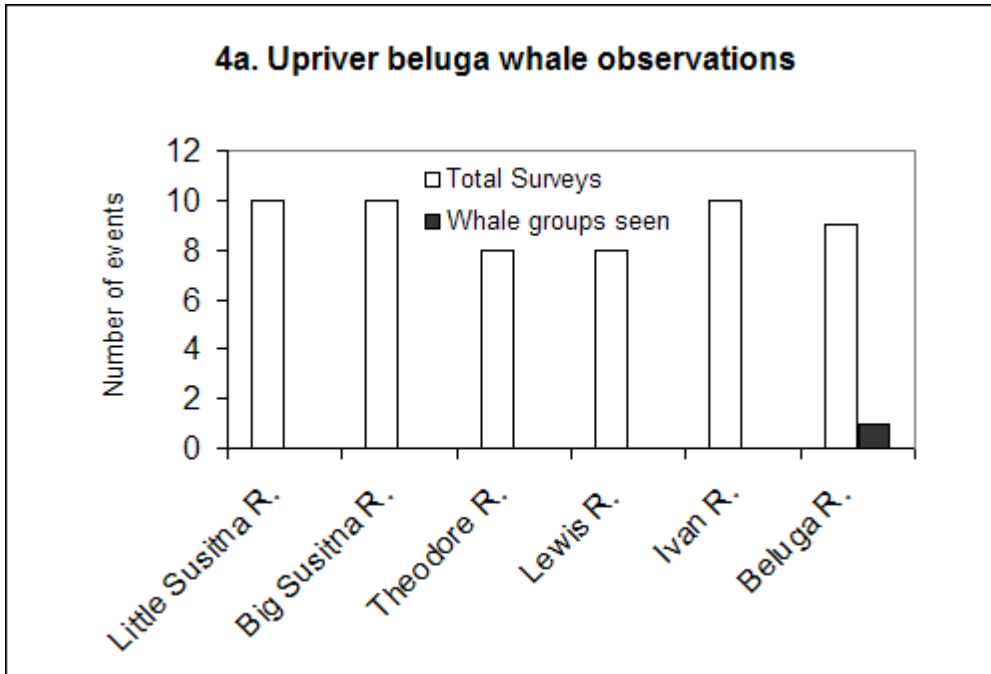


Figure 3. Core (solid line) and expanded (dashed line) area surveyed by the R/V Nerka for marine mammals in June, 2006. Numbers refer to locations referenced in table throughout this report.



Figures 4a and 4b. Whale observation events and groups sighted during aerial flights over the Susitna River Flats and adjacent areas in June 2006. Observations with low ratings were removed from the analysis.

Table 1. Overview of activities by date in June, 2006.

Date	Fish capture with beach seines	Marine mammal observations (land-based)	Marine mammal observations (boat-based from R/V Leucas)	Marine mammal and fish acoustic surveys (from R/V Nerka)	Marine fish trawling (from R/V Nerka)
1-Jun	X	X		X	X
2-Jun		X	X	X	
3-Jun					
4-Jun					
5-Jun		X		X	X
6-Jun	X	X	X	X	X
7-Jun	X	X		X	X
8-Jun		X		X	
9-Jun		X			
10-Jun					
11-Jun					
12-Jun	X	X		X	X
13-Jun	X	X		X	X
14-Jun	X	X		X	
15-Jun		X		X	X
16-Jun	X	X	X	X	X
17-Jun					
18-Jun					
19-Jun		X			
20-Jun	X	X	X	X	X
21-Jun		X		X	X
22-Jun		X		X	
23-Jun		X		X	X
24-Jun					
25-Jun					
26-Jun		X			
27-Jun	X	X	X		
28-Jun		X		X	X
29-Jun		X		X	X
30-Jun		X			
Number of events	8	22	5	17	13

Table 2. Observer effort and beluga whale sightings by date and tidal stage at the three shore based stations used in June 2006. Tidal stages are based on predictions at Anchorage, Alaska.

Date	Observation effort (hrs)	Tidal stage						Beluga whale sightings					Total
		High slack	High ebb	Low ebb	Low slack	Low flood	High flood	Beluga whale groups	Adults	Subadults	Calves	Unknown	
Ladd Landing Station													
June 1, 2006	6.0			X	X	X		0	0	0	0	0	0
June 2, 2006	6.0		X	X	X			0	0	0	0	0	0
June 5, 2006	10.0	X	X	X			X	1	0	1	0	0	1
June 6, 2006	6.0			X	X	X	X	0	0	0	0	0	0
June 7, 2006	6.0			X	X	X	X	0	0	0	0	0	0
June 8, 2006	6.0			X	X	X		0	0	0	0	0	0
June 9, 2006	6.0		X	X	X	X		0	0	0	0	0	0
June 12, 2006	6.0		X	X	X	X		0	0	0	0	0	0
June 13, 2006	9.8	X	X	X	X			1	1	0	0	1	2
June 14, 2006	9.0	X	X				X	0	0	0	0	0	0
June 15, 2006	9.7	X	X	X				0	0	0	0	0	0
June 16, 2006	6.0	X	X				X	0	0	0	0	0	0
June 19, 2006	6.0	X	X			X	X	0	0	0	0	0	0
June 20, 2006	6.0	X			X	X	X	0	0	0	0	0	0
June 21, 2006	6.0			X	X	X		1	15	0	0	0	15
June 22, 2006	6.0			X	X	X	X	1	0	1	0	0	1
June 23, 2006	6.0							1	0	0	0	6	6
June 26, 2006	6.0		X	X	X			0	0	0	0	0	0
June 27, 2006	6.0	X	X			X	X	0	0	0	0	0	0
June 28, 2006	6.3	X	X	X	X			0	0	0	0	0	0
June 29, 2006	6.0			X	X	X		0	0	0	0	0	0
June 30, 2006	6.0	X	X					0	0	0	0	0	0
Subtotal	146.8	10 events	13 events	15 events	14 events	12 events	9 events	5	16	2	0	7	25
Beluga River Station													
June 5, 2006	5.3	X	X				X	0	0	0	0	0	0
June 8, 2006	4.0	X	X				X	0	0	0	0	0	0
June 16, 2006	6.0		X	X				0	0	0	0	0	0
June 19, 2006	5.3	2 events	3 events	1 event			2 events	0	0	0	0	0	0
Subtotal	20.6							0	0	0	0	0	0
Airstrip Bluff Station													
June 19, 2006	6.0	X	X			X	X	2	0	0	0	22	22
June 23, 2006	5.0			X	X	X		2	24	1	0	0	25
Subtotal	11.0	1 event	1 event	1 event	1 event	2 event	1 event	4	24	1	0	22	47

Table 3. Beluga whale sightings from R/V Leucas in Ladd area in June, 2006

Date	Group #	Adults	Subadults	Calves	Unknown	Total	Approximate location
June 16, 2006	1	2	0	1	0	3	1.5 km offshore of Susitna River
June 20, 2006	1	4	3	1	0	8	2.5 km offshore of Lewis River

Table 4. Beluga whale sightings by date during nearshore and offshore surveys conducted by the R/V Nerka in May and June, 2006. Locations refer to areas shown in Figure 3.

Date	Group Number	Location	Time	Tide Stage	Adults	Subadults	Calves	Unknown	Total Count
May 11, 2006	1	4	16:56	LF	1				1
May 15, 2006	1	3	13:11	HE	55	1		2	58
May 17, 2006	1	2	16:38	LS	1				1
May 17, 2006	2	3	17:15	LS	2				2
May 17, 2006	3	3	18:30	LF	1				1
May 17, 2006	4	5	19:41	LF	1	1			2
May 24, 2006	1	4	10:41	HE	9	1			10
May 25, 2006	1	4	10:33	HE	22	23	3		48
May 25, 2006	2	4	10:49	HE	2				2
May 26, 2006	1	4	11:08	HE	1				1
June 1, 2006	1	4	19:17	LF	29	18	4		51
June 1, 2006	2	4	18:37	LS	1				1
June 2, 2006	1	4	14:47	HE	7	1			8
June 5, 2006	1	4	16:53	HE	3				3
June 12, 2006	1	5	11:17	HE	3	1			4
June 14, 2006	1	4	10:28	HE	3			1	4
June 20, 2006	1	3	10:47	LF	4				4
June 21, 2006	1	4	10:56	LS	2				2
June 21, 2006	2	4	14:35	LF	15	2			17
June 21, 2006	3	4	14:54	LF	7	1			8
June 29, 2006	1	4	10:22	HS	6	1			7
Total	21 groups	4 areas		4 stages	175	50	7	3	235

Table 5. View ratings and whale sightings both offshore and upriver while flying over shoreline near Susitna River Flats in June, 2006.

Date	Observation start time	Tide stage	Upriver view rating (Yes, Partial, No)						Offshore view rating (3, 2, 1)			
			Little Susitna R.	Big Susitna R.	Theodore R.	Lewis R.	Ivan R.	Beluga R.	Pt. Mackenzie - Susitna R.	Little Susitna R.	Big Susitna R. - Beluga R.	South of Beluga R.
1-Jun	7:46	LF	Y	Y	N	N	P	N	2	2	3	3
1-Jun	18:07	LS	P	P	N	N	P	Y	3	3	3	3
12-Jun	7:28	HS	P	P	P	P	P	P	2	2	3	NA
16-Jun	16:30	LE	Y	Y	Y	Y	Y	Y	3	3	3	3
19-Jun	7:30	LE	N	N	N	N	N	N	1	1	1	1
21-Jun	12:08	LS	Y	Y	Y	Y	Y	Y	1	1	1	1
22-Jun	16:50	HF	Y	Y	Y	Y	Y	Y	1	1	3	NA
22-Jun	18:03	HS	Y	Y	Y	Y	Y	Y	2	2	2	2
23-Jun	16:39	HF	Y	Y	Y	Y	Y	Y	3	3	3	3
26-Jun	7:36	HS	Y	Y	Y	Y	Y	Y	3	2	3	3
27-Jun	16:30	LS	P	P	P	P	P	P	2	2	3	3
30-Jun	16:51	LS	N	N	N	N	N	N	2	2	2	NA

Yes = unobstructed views upriver, different angles, long enough for full scan (ie, ~ 10 seconds)

Partial = View upriver, but at a poor angle, obstructed by cargo, or too short for full scan

3 = same as land obs, plus close enough to see whales at waterline w/ naked eye

2 = same as land obs, and/or could only see whales at waterline with binoculars

1 = Would not see whales at waterline for much of trip (bouncy ride, waves, etc)

Table 6. Dates and results of trawl net tows conducted by R/V Nerka in May and June, 2006. Trawl locations refer to areas shown in Figure 3.

Date	Time	Trawl Location	Tide Stage	Catch
25-May	14:17	3	LF	53 eulachon, 95 invertebrates
26-May	15:27	2	LF	2 pink salmon, 20 invertebrates
26-May	15:57	2	LF	2 pink salmon, 1 eulachon
1-Jun	17:44	4	LS	30 eulachon, 311 invertebrates
5-Jun	15:59	4	HS	18 eulachon, 6 pink salmon, 42 invertebrates
6-Jun	13:14	Port Mackenzie	LF	1 pink salmon, 123 invertebrates
6-Jun	13:58	Port Mackenzie	LF	1 eulachon, 60 invertebrates
8-Jun	11:10	2	LS	21 eulachon, 3 pink salmon, 212 invertebrates 2 chum salmon, 1 coho salmon, 1 sockeye salmon, 1 3-spine stickleback, 87 invertebrates
12-Jun	12:53	Port Mackenzie	HE	invertebrates
12-Jun	14:17	Port Mackenzie	LS	63 invertebrates
13-Jun	13:55	2	HE	5 eulachon, 3 sockeye salmon, 1 coho salmon
13-Jun	14:30	2	HE	2 eulachon
15-Jun	11:56	Port Mackenzie	HS	Many invertebrates - not counted 2 eulachon, 1 coho salmon, 1 chum salmon, many invertebrates - not counted
16-Jun	13:02	2	HE	
20-Jun	11:06	3	LF	350 invertebrates
20-Jun	11:47	3	LF	1 chum salmon, 220 invertebrates
20-Jun	12:26	3	LF	1 eulachon, 20 invertebrates
21-Jun	13:46	4	LF	1 herring, 400 invertebrates
23-Jun	13:15	Port Mackenzie	LS	1 chum salmon, 1 flounder, 130 invertebrates
28-Jun	14:48	Port Mackenzie	HE	1 flounder, 254 invertebrates
29-Jun	11:29	2	HE	20 invertebrates
29-Jun		2	HE	1 pink salmon, 80 invertebrates

Table 7. Effort by date for acoustic and trawl surveys of bulkheads at Port Mackenzie in May and June, 2006.

Date	Acoustics Begin	Acoustics End	Total Time	Trawls	Location
May 8, 2006	Test day	Test day	NA	0	Port Mackenzie
June 6, 2006	11:19	12:43	1:24	2	Port Mackenzie
June 12, 2006	11:08	12:20	1:12	2	Port Mackenzie
June 15, 2006	10:42	11:27	0:45	1	Port Mackenzie
June 23, 2006	11:27	12:53	1:26	1	Port Mackenzie
June 28, 2006	13:16	14:31	1:15	1	Port Mackenzie

Table 8a. Number of fish captured by species and date in the large beach seine in June, 2006. Numbers are not standardized for effort.

Species	Date						Total
	1-Jun	6-Jun	12-Jun	21-Jun	26-Jun	27-Jun	
Chum salmon (juvenile)	1	14	1	3		1	20
Coho salmon (juvenile)	12	39		7	1		59
Herring		5					5
Eulachon	1,139	1,154	202	1	3	4	2,503
King salmon (juvenile)	2	1					3
Pacific cod	1						1
Pink salmon (juvenile)		1	1				2
Pacific tomcod	1			5			6
SASP						1	1
Sculpin spp.		1			1		2
Saffron cod			6	3	3	4	16
Snake prickleback	2						2
Sockeye salmon (juvenile)	2	4		2		1	9
Starry flounder			4			2	6
Rainbow/steelhead trout		3		1			4
Threespine stickleback	15	35	17	1		1	69
Walleye pollock						1	1
Total	1,175	1,257	231	23	8	15	2,709

Table 8b. Number of fish captured by species and date in the small beach seine in June, 2006. Numbers are not standardized for effort.

Species	Date						Total
	7-Jun	8-Jun	13-Jun	14-Jun	22-Jun	28-Jun	
Bering cisco		1					1
Chum salmon (juvenile)	17			2			19
Coho salmon (juvenile)	41	3	1	8	2	1	56
Eulachon	157			16			173
King salmon (juvenile)				6			6
LMSP	1						1
Pink salmon (juvenile)	1	1		1	1		4
Pacific tomcod				1			1
Saffron cod						1	1
Sockeye salmon (juvenile)	2			1	1	1	5
Starry flounder	1			6	1	1	9
Rainbow/steelhead trout			1				1
Threespine stickleback	3		1	6		2	12
Total	223	5	3	47	5	6	289

Table 9. Acoustic sampling effort, area, and fish density by date in June, 2006. Fish densities are preliminary, and are uncorrected for signal effectiveness.

Date	Time start	Time stop	Sampling time (hrs)	Area(s)	High slack	High ebb	Tidal stages				Fish density (fish / ha)			
							Low ebb	Low slack	Low flood	High flood	Mean	Minimum	Maximum	
West side of Cook Inlet														
1-Jun	14:25	17:09	2:44	Beluga and Susitna Flats		X		X				3.9	0.0	38.3
2-Jun	11:54	13:45	1:51	Ladd to Beluga R flats	X	X						18.8	0.0	49.7
5-Jun	12:55	15:33	2:38	Beluga and Susitna Flats	X	X						14.4	0.0	175.2
13-Jun	11:40	12:38	0:58	3-Mile R to Ladd		X						3.3	0.0	48.2
14-Jun	9:51	12:48	2:57	Beluga and Susitna Flats	X	X						2.6	0.0	40.9
16-Jun	11:00	12:34	1:34	Beluga R flats to 3-Mile R	X	X						2.8	0.0	23.4
20-Jun	10:25	10:51	0:26	Beluga R Flats				X	X			14.2	0.0	89.9
21-Jun	10:08	13:14	3:06	Susitna Flats				X	X			12.1	0.0	99.2
29-Jun	13:14	13:18	0:04	Test of acoustics in rough water		X						0.0	0.0	0.0
East side of Cook Inlet (bulkhead surveys)														
6-Jun	11:19	12:43	1:24	Port Mackenzie				X	X			17.4	0.0	96.5
12-Jun	11:08	12:20	1:12	Port Mackenzie		X						49.1	0.0	457.2
15-Jun	10:42	11:27	0:45	Port Mackenzie	X	X						7.1	0.0	26.5
23-Jun	11:27	12:53	1:26	Port Mackenzie				X				9.7	0.0	74.0
28-Jun	13:16	14:31	1:15	Port Mackenzie		X		X				6.2	0.0	71.9