



Observations of Cook Inlet Beluga Whales, *Delphinapterus leucas*, along the Anchorage Coast between 2008 and 2011

**Anchorage Coastal Beluga Survey
Friends of the Anchorage Coastal Wildlife Refuge (FAR)
May 31, 2012, updated September 20, 2012**



Cover:

Anchorage Coastal Beluga Survey volunteers, Sarah Saunders and Danielle Williams, savor the sight of snow falling on belugas in Turnagain Arm. Photograph: Barbara Carlson, Friends of the Anchorage Coastal Wildlife Refuge (FAR), October 31, 2010.

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GLOSSARY AND ACRONYMS

ACE	Alaska Center for the Environment
ADF&G	Alaska Department of Fish & Game
ACBS	Anchorage Coastal Beluga Survey
ACWR	Anchorage Coastal Wildlife Refuge
AFSC	Alaska Fisheries Science Center
CIBRT	Cook Inlet Beluga Recovery Team
BF	Beaufort Force (derived from the Beaufort Wind Scale)
CI	Cook Inlet
CIRI	Cook Inlet Region, Inc. is one of 12 land-based Alaska Native regional corporations created by the Alaska Native Claims Settlement Act of 1971 (ANCSA).
Dedicated	Observation sites chosen and allocated for the Anchorage Coastal Beluga Survey. Data quantified for these sites will be “on-effort” or complete.
DoW	Defenders of Wildlife
EPA	Environmental Protection Agency
FAR	Friends of the Anchorage Coastal Wildlife Refuge, formerly known as Friends of Potter Marsh & the Anchorage Coastal Wildlife Refuge Nature Center
GIS	Geographic Information System, a geographically referenced set of data
Incidental	In FAR projects these are sightings that are outside of a scheduled wildlife survey, but still valuable information, depending on how much detail is included. Also known as “off-effort” or incomplete sightings.
km	kilometer
Loess	Soil deposits formed by wind-blown silt. These typically unstratified soils contain calcium carbonate and clay particles. The Kincaid Park area dunes were created by seasonal winds picking up glacial deposits from mountains, braided riverbeds and mudflats.

MOA	Municipality of Anchorage
MotoX	Motocross bluff observation site at Kincaid (Jodhpur) parking area
MX	Also refers to Motocross observation site on some project documents
NOAA	National Oceanic Atmospheric Administration
No Name	If a peak or mountain has no official recorded name it is sometimes listed as “No Name.”
NMFS	National Marine Fisheries Service
NMML	National Marine Mammal Laboratory
<i>Nutul’iy</i>	‘Object that Stands in Water,’ in the <i>Dena’ina</i> language (Kari and Fall 2003). Known as Fire Island.
Opportunistic	In most wildlife surveys this includes data that is outside of a scheduled wildlife survey, but at the National Marine Mammal Laboratory it also includes scheduled surveys if they are not part of the Laboratory’s specific work. For example, the Anchorage Coastal Beluga Survey, although a scientifically designed and scheduled survey, is considered “opportunistic” at NMML.
POA	Port of Anchorage
PP#1	Private Property number one
PP#2	Private Property number two
Supplemental	Observation sites included in the Anchorage Coastal Beluga Survey for their on-effort, complete, and desired data
TA	Turnagain Arm
TSAIA	Ted Stevens Anchorage International Airport
<i>Tuyqun</i>	‘Place of calm waters,’ in the <i>Dena’ina</i> language (Kari and Fall 2003). Known as Point Possession.
UAF	University of Alaska Fairbanks
VABM	Vertical Angle Benchmark-A bench mark with elevation established by vertical angle methods.

ABSTRACT

The Anchorage Coastal Beluga Survey (ACBS) is an independent survey staffed by trained citizen scientists, developed and run by Friends of the Anchorage Coastal Wildlife Refuge (FAR) in collaboration with the National Marine Fisheries Service (NMFS), National Marine Mammal Laboratory (NMML), Defenders of Wildlife (DoW), and the Alaska Center for the Environment (ACE). The goals of the project were to document the presence, absence, color, numbers, and behavior of beluga whales, *Delphinapterus leucas*, and to create an archival record of beluga observations along the coast of Anchorage, the largest city in Alaska. The endangered Cook Inlet (CI) population of beluga whales was the target species for the survey. With NMFS's listing of the population as endangered under the U.S. Endangered Species Act in 2008 and subsequent designation of Critical Habitat in 2011, FAR asserts that much collaboration is necessary to recover the species and be able to judiciously continue coastal resource development. Federal, state, and municipal government agency, academic institution, and industry researchers are currently studying belugas in upper Cook Inlet. FAR's intention was to help researchers interested in CI belugas by filling some data gaps. FAR facilitators prioritized data needs after communicating with key biologists and then selected seasonal shore-based observation sites based on resources available. Trained volunteers recorded information from 12 observation sites along the Anchorage coast between 2008 and 2011, during daylight hours of ice-free months. The ACBS does not currently identify individual belugas, so many were likely observed multiple times each season. Over the course of the four years of the project and 444 observation hours, the ACBS documented 507 beluga whales, in 77 groups, of which 31 of the whales were identified as calves. When incidental reports are included, over the four-year period, the total is 680 belugas whales, in 106 groups, of which 43 of the whales were identified as calves. Volunteers documented the greatest number of sightings, as project designers anticipated, when FAR scheduled surveys to coincide with predicted fish runs and higher tides that sometimes allowed whales to enter nearby creeks and rivers within range of project binoculars and scopes. In 2009, when survey timing, during all months except June, was not set to coincide with fish runs and/or neap tides (using random or blind scheduling), only five belugas were documented during 81 survey days. Only one site, MotoX, was used during the entire four-year study. Most data were obtained at this site, Private Property #2, and a site along Turnagain Arm (TA Past Bird). Post-season evaluation led to changes in scheduling and site use each season. The project leadership is currently investigating whether or not to continue the survey beyond 2012 based on how well the project goals and objectives were met and whether FAR has the resources necessary to continue.

KEY WORDS:

Beluga whales, *Delphinapterus leucas*, Cook Inlet, Alaska, land-based whale survey, FAR, ACBS, Friends, Anchorage Coastal Wildlife Refuge, calves, volunteers, fish, tide

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Sylvia Brunner, Ph.D.

EXECUTIVE SUMMARY

Background

In a fraction of a human lifetime, the Cook Inlet population of beluga whales (*Delphinapterus leucas*) plummeted from 1,300 individuals in 1979, to an estimated 284 in 2011. While yearly estimates vary, the National Marine Fisheries Service (NMFS) reports that the most recent 10-year trend in abundance continues downward by 1.1% a year. During a time of unprecedented resource development in upper Cook Inlet, Alaska, biologists and decision-makers from federal, state, and municipal agencies, industry, academic institutions, and non-governmental groups are involved with studies associated with the recovery of the endangered Cook Inlet (CI) beluga whale population. The Anchorage Coastal Beluga Survey (ACBS) is an independent land-based project staffed by citizen scientists who seek to fill data gaps for researchers. In so doing, ACBS participants help with necessary collaborative conservation and problem solving. Friends of the Anchorage Coastal Wildlife Refuge (FAR) is the lead organization for the project. The purpose of this report is to share information about CI belugas observed by FAR citizen scientists between 2008 and 2011 as part of the ACBS.

This study includes the 2008 pilot survey and subsequent surveys conducted during 2009, 2010 and 2011. ACBS project observation sites were located along the Anchorage shoreline from Ship Creek, rounding Point Woronzof opposite Fire Island (*Nutul'iy*, 'Object that Stands in Water,' in the *Dena'ina* language (Kari and Fall 2003)), and along Turnagain Arm as far as Twenty-Mile River. The land-based surveys documented behavior, numbers, presence and absence of belugas along the Anchorage coast.

Goals: i) To gather information on the distribution, presence, absence, and behavior of CI beluga whales along the Anchorage coast, and ii) to create an archive of beluga data for reference purposes.

Objectives:

1. To use trained citizen scientists to collect needed beluga data during high tides around predicted fish runs at pre-selected observation sites.
2. To create and maintain a database to store the information.
3. To share the resulting information with NOAA/NMFS, ADF&G and others interested in the science and well-being of the CI beluga.
4. To increase awareness of and education about CI belugas and their habitat (via education of volunteers and education of the public by volunteers).
5. To promote stewardship of the CI beluga and the habitats upon which they depend.
6. To scan for and report any live or dead strandings of marine mammals during each scheduled shift.

The survey database included, in addition to sightings collected during the ACBS, relevant local knowledge and incidental sightings reported by volunteers and the public, outside of scheduled survey shifts in upper Cook Inlet. This paper details changes in methods and protocols made during the course of the survey. The appendices include greater detail for those interested in data sheets, monitoring instructions, daylight and tide charts, summaries of beluga-populated observer sighting maps with grid overlays, and select raw data.

Methods

FAR selected survey sites based on various factors, namely: data on CI belugas desired by research and management institutions; usefulness in helping meet project objectives; relevance to the lead organization's mission; and the personnel available to meet staffing needs for each.

FAR narrowed the choices from an initial 27 possible survey areas to nine observation sites, and included three supplemental sites to collect desired data, for a total of 12 sites (see Figure 2.4.1,

ACBS Observation Site Location Overview; and Figure 3.1.3.4, Overview of ACBS study sites, dedicated, supplemental, and incidental beluga whale sightings, 2008-2011). Of these, there were nine dedicated sites where scheduled surveys took place and three supplemental sites with complete data that were not regularly scheduled. FAR collected data from more than 20 localities of incidental sightings; some were project sites (between observation sites or off survey time) and others were simply places where informants observed belugas and reported them to us.

Dedicated ACBS Sites:

- Ship Creek Boat Ramp (Ship Creek)
- Motocross (MotoX) Bluff
- Private Property #1 (PP#1)
- Turnagain Arm Potter Section House (TA Potter)
- TA Windy Corner (TA Windy)
- TA first pull-out past Bird Point (TA Past Bird)
- TA Tidewater Slough (TA Tidewater)
- TA Avalanche
- TA Twenty-Mile River Boat Launch (TA 20-Mile)

Supplemental ACBS Sites:

- Private Property #2 (PP#2)
- Point Woronzof Beach and Bluff (Woronzof Beach/Bluff)
- Between Past Bird and Tidewater

Incidental ACBS Sites:

- Any site FAR considered, but were unable to staff
- Any of the above if a person observed belugas there and sent the report to FAR and the information was incomplete (per ACBS Monitoring Instructions)
- Any location where a person observed belugas and sent the report to FAR

The MotoX observation site was the only continuously used location during the four year span of the ACBS. This report includes descriptions of dedicated project sites, prospective sites that

FAR would include if it was logistically and financially feasible, and some of the informal sites from which FAR receives incidental beluga reports. Sections 2.1, 2.2 and 2.3 includes the following for each site: GPS coordinates; map reference points, photographs of directional views from the site, a physical description, human activity, and physical features or localities visible from each site.

Effort consisted of land-based whale surveys, lead by experienced leaders with trained crew members. Time spent on site documenting belugas was a mere fraction of the time needed to conduct the survey which encompassed general FAR office time, beluga survey office time, and additional volunteer time (travel, organization, data entry, data checking, etc.)

Factors that determined when FAR would schedule surveys included: the number of trained volunteers available, tides, daylight hours, and what particular CI beluga data were desired. A shift was offered to crew members if experienced leaders were available to mentor new trainees. In addition to crew leaders, two, preferably three, additional crew members were required to complete requisite survey tasks. FAR sought to schedule surveys around high tides during predicted fish runs which would presumably bring belugas closer to shore and into nearby creeks and rivers. The higher the tides, the more likely belugas would move closer to shore where volunteers would be able to observe and record desired information. FAR created schedules around daylight hours, and made use of civil twilight when days were short. Since ACBS scheduling targets probable fish availability, FAR observation site scheduling took into account neap tides for flatfish (e.g. yellowfin sole (*Limanda aspera*), starry flounder (*Platichthys stellatus*)) presence as well as the timing of anadromous fish runs such as eulachon “hooligan” (*Thaleichthys pacificus*) and Pacific salmon (*Oncorhynchus* sp.) runs.

Training for ACBS observers consisted of a minimum 2½ hour class; an assigned 44-page monitoring instructions handbook; and an orientation to observation sites. Volunteers with leadership potential were placed as crew leaders who were always on the lookout for back-up leaders to help with management tasks for the crew. The opportunity to work with experienced observers helped volunteers become comfortable with the exacting tasks required for good data collection and documentation.

The ACBS minimized the amount of gear required so that the project could be sustained at low monetary cost. In addition to the data sheets, clipboard boxes, compasses, write-in-all-weather pens, and thermometers, the ACBS project required only a moderate quality scope on a sturdy tripod and marine binoculars. Optical gear specifications are noted in Section 2.9.

Sighting protocols for the survey are described briefly in Section 2.10; these are specified in the data sheets (Appendix 6.1) and monitoring instructions (Appendix 6.5). The rationale for decisions on survey methods for each season is described in sections 2.4 through 2.7.4.

FAR also collected incidental observations of belugas from volunteers and the general public. These incidental sightings add to what we can learn about belugas but have incomplete beluga sighting and environmental data and were analyzed separately from dedicated observation site reports. Cook Inlet waters are turbid, so viewing belugas underwater is virtually impossible. Any beluga behavior FAR recorded was that which was visible above water. Categories of behavior included milling, body contact, resting, diving, spy hopping, tail waving, tail slapping, vocalizing, porpoising, and spouting. Human activities, in particular boat traffic, were also documented during this study.

FAR designed, and now maintains, its own database with help and support from NMML and volunteers. Our training focuses all volunteers on the importance of precise adherence to sighting and recording protocols, so that the information observers document will be valid and useful. Although it has taken project collaborators several years to complete the FAR Fieldwork and Volunteer Database, it is now fully functional. FAR and colleagues developed a protocol to ensure integrity of data which is detailed at Section 2.12. We use the database to help manage the small organization without costly overhead, so it is proprietary and there are no plans to post it online.

Results

Between 2008 and 2011, ACBS volunteers spent 444 hours on scheduled watches scanning for belugas over a total of 348 survey shifts. ACBS volunteers collected at least four months of data

at five project locations: 1. Ship Creek (at the small boat launch); 2. MotoX (also known as Kincaid Motocross or Jodhpur bluff); 3. TA Potter (Potter Section House on Turnagain Arm); 4. TA Past Bird (first pull-out past Bird Point on Turnagain Arm); and 5. TA Tidewater (Tidewater Slough on Turnagain Arm)). We staffed seven other project sites for less than four months: 1. Woronzof Beach/Bluff (at Point Woronzof); 2. PP#1 (Private Property #1, near the north end of Potter Marsh); 3. PP#2 (Private Property #2, near Campbell Creek); 4. TA Windy (Windy Corner on Turnagain Arm); 5. Between Past Bird and Tidewater; 6. TA Avalanche (on Turnagain Arm); and 7. TA 20-Mile (near Twenty-mile River on Turnagain Arm)). Surveys were scheduled for 175 days, of which 160 were completed; the remainder were canceled due mostly to inclement weather and poor visibility. The ACBS does not currently identify individual belugas, so many were likely observed multiple times each season. Over the course of the four years of the project and 444 observation hours, the ACBS documented 507 beluga whales, in 77 groups, of which 31 of the whales were identified as calves, excluding incidental sightings.

Beluga behaviors were observed and recorded at all sites and observers primarily charted general direction of movement and categories of behavior requested on the data sheets. Milling, porpoising, and spouting were the most commonly documented behaviors. More lengthy behavioral comments noted descriptions of surfacing behavior as well as group composition. Changes in beluga surfacing was associated with boats traffic and the take off of an F-15 jet at Ship Creek and movement patterns varied around the mouth of Campbell Creek, where foraging was suspected. Observers documented groups of belugas moving in and out of Campbell Creek exhibiting milling and diving behaviors suggesting feeding. Body contact, tail waving, and spyhopping were observed at the MotoX. Observers both at MotoX and PP#2 documented instances of beluga groups possibly chasing prey into tidal guts, then going out further into the inlet and coming back to repeat the behaviors several times during shifts. During one such observation the belugas alternated with periods of apparent rest, where they would remain mostly submerged for several minutes, then, begin spouting and possibly feeding again.

Results for individual survey sites varied according to effort expended per location and the presence, visibility and observable behavior at each. The ascending order based on the best total counts of belugas is: PP#1 (4.23 hrs/four belugas); Woronzof Beach/Bluff (low and high

vantages) (1.20 hrs/five belugas, including one calf); Between Past Bird and Tidewater (.22 hrs/9 belugas); TA 20-Mile (3.22 hrs/10 belugas, including one calf); Ship Creek (94.53 hrs/13 belugas); TA Windy (19.08 hrs/15 belugas, including two calves); TA Avalanche (6.32 hrs/23 belugas); TA Tidewater (20.03 hrs/26 belugas, one of which was a calf); TA Potter (21.17 hrs/33 belugas, three of which were calves); PP#2 (9.30 hrs/83 belugas, five of which were calves); TA Past Bird (29.21 hrs/ 84 belugas, including two calves); and MotoX (260.18 hrs/202 belugas, 16 of which were calves). Digitized maps provide an overview of ACBS beluga whale sightings (including group sizes) documented per year and show reference points such as mountains, inlet channels, tidal guts, mudflats, creeks and rivers. Copies of these maps with grid overlays are in Appendix 6.6.

Human activities appeared to have some effect on beluga detections. ACBS observers documented only 13 belugas (2 groups) at the Ship Creek site over the course of two years (2008-2009), despite over 94 hours of observation time. At the same time, Ship Creek observers recorded significantly greater boat traffic at this site compared to other observation sites. At the MotoX site, FAR volunteers documented a total of 202 belugas in 27 groups over a four-year period (2008-2011). Numbers of belugas observed at MotoX during 2009 were significantly reduced compared with those in subsequent years, with no whales documented there during surveys in June, July and October, despite logging over 55 hours of observation time. As with Ship Creek, days in which boat traffic was documented at the MotoX site was greatest during 2009, with six days recorded as having boat traffic present, which is twice the number recorded for years 2010 and 2011 combined.

Discussion

People have long observed beluga whales offshore along the 16-mile Anchorage Coastal Wildlife Refuge (ACWR), most often during the ice-free months of the year. Whales move freely along the shore and up into some nearby rivers and creeks, bringing their young to feed in the Campbell Creek estuary. The proximity of the refuge to Anchorage, Alaska's largest city, makes it an important place for public education and enjoyment, but also makes the refuge, and its inhabitants, vulnerable to the effects of habitat degradation and disturbance.

The effect of boat traffic on beluga whales in and around areas they inhabit may benefit from further study. Beluga whales are known to frequent Ship Creek, an area currently undergoing significant development. During 2009 Ship Creek was scheduled during low tide and during all but June, both MotoX and Ship Creek were scheduled randomly, when facilitators avoided scheduling when they predicted observers would see belugas.

Development around Fire Island is ongoing and FAR understands that it would be particularly useful to have more data on CI belugas traversing the narrow passage of water between the northern tip of Fire Island and Point Woronzof Beach/Bluff and Point Campbell, to supplement sightings documented at MotoX and PP#2 sites (southeast of Point Campbell). Volunteers at MotoX and PP#2 document belugas between their respective sites and Fire Island. Shortly before the survey began, on 2 October 2008, Carlson documented more than 150 belugas between Campbell Creek and MotoX. FAR currently lacks the resources to gather more information on the use of the channels by belugas between Fire Island and further west along the Anchorage coast than we have already done, due to limited staffing and challenging access for the desired Point Campbell observation site (northwest of PP#2 and MotoX sites).

Conclusions of 2008 to 2011 ACBS

This report provides a summary of the data collected for the ACBS. At this time, statistical analyses of the data have not yet occurred. FAR will consider analyses as part of Phase 2 for the project if funding and resources can be attained. Over the course of four years, volunteers for the ACBS logged 444 observation hours at 12 survey sites along the Anchorage coastline. A combined total of FAR on-effort observations and incidental sightings over four years, with many individuals likely observed multiple times each season, yielded 680 beluga whales, in 106 groups, of which 43 of the whales were identified as calves.

We strive to collect the best information about CI belugas along the Anchorage coast, while creating an engaging and rewarding experience for participating citizen scientists. Sustaining volunteer participation is critical to the success of the ACBS and needs to be considered when

planning further survey seasons. FAR's Board discussed project priorities during spring and summer of 2012. For the ACBS this led to a reduced number of observation sites during the 2012 season. Realizing that the level of activity dedicated to the ACBS as a part of FAR's mission requires more individuals in positions of responsible leadership and management than previously existed, FAR developed a new leadership model. In 2012 five continuing volunteers with leadership experience committed to work as ACBS Project Coordinators, greatly enhancing chances for survey sustainability. If agency and volunteer interest remains high, FAR may seek funds to build on our ACBS efforts.

1. INTRODUCTION

The subarctic saltmarsh system of the Anchorage Coastal Wildlife Refuge (ACWR) supports an unusual diversity of plants, birds, mammals and invertebrates and is of continental conservation importance (National Audubon Society 2012). The endangered Cook Inlet beluga whale, *Delphinapterus leucas*, frequents the waters of the ACWR and brings its young to feed in the Campbell Creek estuary. The proximity of the refuge to Anchorage, Alaska's largest city, makes it important for public education and enjoyment but also makes it highly vulnerable. Cook Inlet belugas have a tendency toward site fidelity in summer (Rugh *et al.*, 2000) and, at perilously low population numbers, are at risk for loss of genetic variety for the health of the species (O'Corry-Crowe *et al.* 2007, 2008). For these reasons, in 2006, Friends of the Anchorage Coastal Wildlife Refuge (FAR) initiated a volunteer-based beluga monitoring study to document beluga presence along the Anchorage coastline.

1.1 FAR Mission Statement

Friends of the Anchorage Coastal Wildlife Refuge (FAR) is a 501 (c-3) non-profit organization of citizens and professionals whose mission is "To preserve the integrity and biological diversity of the Anchorage Coastal Wildlife Refuge."

1.2 FAR Species of Focus

At least 220 species of birds, many mammals, fish, one amphibian and numerous invertebrates visit or live in or near the ACWR which is part of a recognized Important Bird Area (IBA) of continental importance (National Audubon Society 2012). A wide diversity of flora grows there (Alaska Department of Fish & Game 1991). FAR's species of focus are the snow goose, *Chen caerulescens*, sandhill crane, *Grus canadensis*, and Cook Inlet beluga, *D. leucas*.

The Cook Inlet (CI) population of beluga whales is geographically isolated and genetically distinct from Alaska's four other beluga whale stocks (O'Corry-Crowe *et al.* 2007, 2008). The CI population numbered about 1,300 in 1979 (Migura *et al.* 2008), but plummeted to about 375

by 2008, a reduction of 50% from 1994 to 1998 alone (Hobbs *et al.* 2008). In 1988 the U.S. government identified CI belugas as a “species of concern” (NMFS 2007). In 1999, Alaska Native subsistence hunters voluntarily agreed not to take CI belugas and worked with the National Marine Fisheries Service (NMFS) to develop harvest regulations (Mahoney and Sheldon 2000). In 2000, NMFS designated Cook Inlet belugas as a “depleted” stock under the Marine Mammal Protection Act, and a legislative moratorium on hunting the whales became official (NMFS 2000). In 2006, the International Union for the Conservation of Nature (IUCN) determined that the Cook Inlet subpopulation of beluga whales were “critically endangered” and at risk of extinction (Lowry *et al.* 2006). Late in 2008 the federal government finally listed the CI beluga whale as an endangered species under the Endangered Species Act (ESA) (NMFS 2008). A designation of ESA critical habitat was announced in April of 2011, habitat that includes much of upper Cook Inlet and the ACWR (NMFS 2011).

Visitors and nearby residents have long-witnessed beluga whales offshore along the 16-mile ACWR, most often during the ice-free months of the year. Combined, local observers and researchers (using satellite tagging to track CI belugas) have documented beluga whales off the Refuge during every month except February (B.S. Carlson, pers. obs; NMFS National Marine Mammal Laboratory (NMML) website: <http://www.afsc.noaa.gov/nmml/cetacean/belugatags/>). In the early 2000s, FAR members were among the first local stewards to send sightings of live and dead belugas to NMFS. FAR members and other local stewards have found, reported, and/or helped to salvage at least 26 dead belugas since 2000.

FAR noted that most aerial survey estimates of CI beluga whales by NMFS are conducted at low tide because there is less area to survey in upper Cook Inlet when tidal mudflats are exposed. This survey timing suggests a need for more information about use of habitat by belugas during high tides. It is during high tides that beluga whales are observed most often along the Anchorage coast (B.S. Carlson, per. obs.). In 2006, the FAR Board of Directors decided to make beluga whales a formal part of the organization’s stewardship effort by supporting the design and facilitation of the Anchorage Coastal Beluga Survey (ACBS). Sightings of CI belugas in and near this unique wildlife refuge, next to the densest human population in the state, can provide valuable information on habitat use and population distribution of this endangered species. The

shore-based ACBS has become a prominent FAR wildlife survey along with the Annual Snow Goose/Sandhill Crane Survey.

On June 20, 2007, Barbara Carlson (President and Executive Director of FAR) convened the first formal meeting at the NMFS office in Anchorage to discuss the feasibility of a citizen-run science project that would become the ACBS. Present at the meeting were Les Cockreham (NMFS Enforcement), Kimberly Klein (Alaska Department of Fish and Game (ADF&G) Habitat Biologist) Matthew LaCroix (ADF&G Habitat Biologist), and Barbara Mahoney (NMFS Marine Mammal Biologist). Drafted information was also provided to David Rugh and Christy Sims (NMML); Rick Sinnott (Manager, ACWR and ADF&G Area 2 Biologist); and Brad Smith (NMFS).

1.3 Anchorage Coastal Beluga Survey Goals and Objectives

Good conservation goes hand in glove with wise development. The information provided through the ACBS will contribute to the tools that management agencies require to chart a prudent course for CI belugas to recover, while also considering human resource development. We support agency and industry biologists as well as the CI Beluga Recovery Team (CIBRT) and respect the difficult jobs they have as they address conflicts with positive determination. The following lists the goals and objectives of the ACBS project:

Goals: i) To gather information on the distribution, presence, absence, and behavior of Cook Inlet beluga whales along the Anchorage coast; and, ii) To create an archive of data for reference purposes.

Objectives:

1. Use trained citizen scientists to collect needed beluga data during high tides around predicted fish runs at pre-selected observation sites.
2. Create and maintain a database to store the information.
3. Share the resulting information with NOAA/NMFS, ADF&G and others interested in the science and well-being of the CI beluga.

4. Increase awareness of and education about CI belugas and their habitat (via education of volunteers and education of the public by volunteers).
5. Promote stewardship of the CI beluga and the habitats upon which they depend.
6. Scan for and report any live or dead strandings of marine mammals during each scheduled shift.

1.4 Study Sites for the Anchorage Coastal Beluga Survey

FAR selected a number of dedicated survey sites, after consulting with NMFS and early discussants, based on the need for information at various localities in Cook Inlet. ACBS volunteer crews attended these sites on a scheduled basis. FAR also included a number of sites where belugas sightings occurred incidentally during the course of the project. When data from these incidental project sites included the complete suite of monitoring information collected at dedicated sites (i.e., effort, reference maps, observations forms, etc.) they were incorporated into the dedicated study site analyses as supplemental sites. All other incidental sightings were not included in these analyses. Dedicated, supplemental, and incidental sites comprised the following.

1.4.1 Dedicated Survey Sites

Dedicated (scheduled regularly during at least one season) ACBS sites were Ship Creek, MotoX, PP#1, TA Potter, TA Windy, TA Past Bird, TA Tidewater, TA Avalanche, and TA 20-Mile.

1.4.2 Supplemental Survey Sites

Supplemental sites (with complete and desired data) were Wornzoff Beach/Bluff, PP#2, “between Bird and Tidewater.”

1.4.3 Incidental Survey Sites

Incidental sites were many as these can be anywhere people see belugas and report them to FAR. Sometimes people view at one of the dedicated or supplemental ACBS sites, but unless the information is recorded on a scheduled project survey or is complete per project specifications, it

is an incidental site for the purposes of keeping numbers separate for analysis. Because the above sites are not official ACBS sites most of them have no project reference points except for Point Campbell, which holds promise as a future dedicated study site.

2. METHODS

2.1 Dedicated Survey Sites

2.1.1 Ship Creek

Coordinates: Projection=Albers, Datum=NA 1927: Latitude N 61.225; Longitude W 149.91; elevation 12'

Project Map Reference Points: Sea cliff, Port MacKenzie, and tug boat dock

The Ship Creek observation site was located on the creek's south bank atop the paved jetty just north of the small boat harbor dock and launch ramp. The observation spot was roughly on top of the helicopter landing pad. To the left (south) there are often tugs and barges anchored (Fig. 2.1.1.1). To the right (north) is the Port of Anchorage (POA) with container docks (Fig. 2.1.1.2). Visible from the site are Point Woronzof, Point MacKenzie, the mouth of Knik Arm, tidal mudflats, POA, and Ship Creek.

Chinook salmon, *Oncorhynchus tshawytscha*, run late May to mid-July at Ship Creek (and are present in August). Coho salmon, *O. kisutch*, run mid-July through September; sockeye salmon, *O. nerka*, run during June and July; pink salmon, *O. gorbuscha*, run in early July to mid-August; and chum salmon, *O. keta*, run from early July to mid-August, at Ship Creek (M. Miller, D.E. Bosch, and M. Willette, spring and summer, 2010, Alaska Department of Fish and Game biologists, pers. comm. with B.S. Carlson, via telephone and email.).



Figure 2.1.1.1. View south from ACBS Ship Creek observation site. To the right in the frame is the Cook Inlet Tug & Barge Co. dock behind the small boat launch. Photograph: B. Carlson, June 7, 2008.



Figure 2.1.1.2. View north of ACBS Ship Creek observation site showing the mouth of Knik Arm in the distance, mouth of Ship Creek to immediate north, and Port of Anchorage container loading docks. Photograph: B. Carlson, June 7, 2008.

2.1.2 Motocross (Kincaid (Jodhpur)) Bluff

Coordinates: Projection=Albers, Datum=NA 1927: Latitude N 61.142; Longitude W 150.021; elevation 191 ft (GPS viewing platform bluff shelf)

Project Map Reference Points: Cedar Mtn., (2848 ft), Point Possession, and south end of Fire Island

Covered with a thick layer of loess, the Kincaid (Jodhpur) motocross bluff area (MotoX observation site) is a coastal dune, fed by wind-blown sediments of centuries of area glacial silt and volcanic ash deposits (Moore 2001). The MotoX bluff height ranges from roughly 244' to 400' high. ACBS observers descend about 10' to a small shelf that crosses part of the grassy cliff. The broad span of bluff that is not forested affords observers a great vantage of about 180 degrees. The area below the bluff is characterized by a wide variety of coastal habitats from saltwater marshes, estuaries, tide flats, riparian, forested marsh and shrub bog (USFWS 2007). Along the shore are a number of tidal guts where observers logged belugas mostly when the tide was in (high), and when it was receding. Given the locale and height of this observation site, observers have a number of reference points located east (Fig. 2.1.2.1), south (Fig. 2.1.2.2), southwest (Fig. 2.1.2.3), and west (Fig. 2.1.2.4). Visible from the site are many of the 16 miles of the Refuge and its coastline; the shallow waters where belugas come close in to the marsh during high tides; and the once illegal peat dump that is now part of Carr/Gottstein Park;

Eulachon (hooligan), *Thaleichthys pacificus*, run in upper Cook Inlet sometime between mid-April and mid-June and have been observed off the MotoX bluff by locals (B.S. Carlson). In Campbell Creek, Chinook salmon run late May to mid-July (and are present in August); Coho salmon run mid-July through September; sockeye salmon run during June and July; and pink salmon run in early July to mid-August (and are present in September); chum salmon run from early July to mid August (and are present in September) (M. Miller, D. E. Bosch, and M. Willette, spring and summer, 2010, Alaska Department of Fish & Game biologists, pers. comm. with B.S. Carlson, via telephone and email communications; D.E. Bosch, December 2011, email communication.)



Figure 2.1.2.1. View east from MotoX observation site showing part of Campbell Creek, part of the Campbell Creek estuary, mouth of Campbell Creek, and channel that meanders out into Cook Inlet waters; waters off Potter Section House, mouth of Turnagain Arm and Cedar Mountain (tallest peak in group of Kenai Mountains across Turnagain Arm from observation site). Photograph: B. Carlson, September 10, 2010.



Figure 2.1.2.2. View south from MotoX observation site includes Kenai Mountains to left, Chickaloon Bay in far distance, and covers a vast expanse of water. Photograph: B. Carlson, September 9, 2010.



Figure 2.1.2.3. View southwest from MotoX observation site includes the famous boulder field between Chickaloon River and Point Possession and waters between Point Possession (land mass on left side of frame) and the southern end of Fire Island (on right side of frame) The Mt. Redoubt volcano is sometimes in view in the distance. Photograph: B. Carlson, September 26, 2011.



Figure 2.1.2.4. View west from MotoX observation site includes most waters between the southwest part of Fire Island and the Anchorage coast. The NW shore and waters off the northern tip of Fire Island are obscured by the coastal bluff promontory west of the MotoX observation site. Photograph: B. Carlson, September 26, 2011.

2.1.3 Private Property #1

Coordinates: Datum: WGS 84: Latitude N 61.08642; Longitude W 149.83592; elevation 123'

Project Map Reference Points: Cedar Mtn., Point Possession, and south end of Fire Island

Private Property #1 (PP#1) was selected for the ACBS 2008 and the 2009 seasons and is now held in reserve for possible future use. It is located on the coast, near the northeast end of Potter Marsh, across and separated with a parking lot buffer from the Seward Highway. PP#1 sits between the MotoX and TA Potter observation sites. Directly below the property is part of the ACWR. A shooting range is nearby. Views southeast (Fig. 2.1.3.1) and south (Fig. 2.1.3.2) are similar to those at PP#2 but further east and at a much lower elevation.



Figure 2.1.3.1. View to southeast from Private Property #1 observation site includes the mouth of Turnagain Arm and, across the inlet, the Kenai Mountains (on a clear day). Photograph: B. Carlson, October 21, 2008.



Figure 2.1.3.2. View to south southwest from Private Property #1 observation site showing (along the horizon) Pt. Possession and Fire Island. Photograph: B. Carlson, October 21, 2008.

2.1.4 Potter Section House

Coordinates: Projection=Albers, Datum=NA 1927: Latitude N 61.05161; Longitude W 149.7969; elevation 23'

Project Map Reference Points: South end of Fire Island, Point Possession, and Cedar Mtn.

The Potter Section House site (TA Potter) represents the eastern extent of the ACWR and sits at Milepost 115, situated on the inlet side of the Seward Highway near the east end of Potter Marsh. The building houses the Chugach State Park Headquarters and there is a buffer for the site from the highway. The site, at the southeast end of Potter Marsh, was created by the entrapment of water during the building of the railroad and Seward Highway, and there is often a lot of wildlife activity coming and going from the marsh habitat. The project viewing platform was the wooden deck alongside a display train with a mounted rotary snowplow that was once used to clear avalanches from the railroad tracks. If there were many visitors present, volunteers set up

observation on the grass just off the parking lot to avoid obstructing the flow of people. The site was particularly handy since the wooden platform has a roof which provides shelter and the display train blocks north winds. Unobstructed views (except when passenger and freight trains traversed the tracks) occurred in all directions (Figs. 2.1.4.1 – 2.1.4.3).

At Rabbit Creek, Chinook salmon run late May to mid-July (and are present in August); Coho salmon run from mid August through October; sockeye salmon run during June and July; pink salmon run in early July to mid-August (greatest abundance on even numbered years); and chum salmon run from early July to mid-August (and are present in September) (M. Miller, D. E. Bosch, and M. Willette, spring and summer, 2010, Alaska Department of Fish & Game biologists, pers. comm. with B.S. Carlson, via telephone and email communications; D.E. Bosch, December 2011, email communication.).



Figure 2.1.4.1. View southeast from TA Potter observation site (at low tide) with Kenai Mountains visible across the Inlet. Photograph: B. Carlson, July 12, 2010.



Figure 2.1.4.2. View to south southwest from TA Potter observation site at low tide showing extensive mudflats. Photograph: B. Carlson, July 12, 2010.



Figure 2.1.4.3. View west from TA Potter observation site at low tide showing (along the horizon) Pt. Possession on left and south end of Fire Island on right. Photograph: B. Carlson, July 12, 2010.

2.1.5 Windy Corner

Coordinates: Projection=Albers, Datum=NA 1927: Latitude N 60.98474; Longitude W 149.6095; elevation 38'

Project Map Reference Points: Cowan Mtn., Point Possession, south end of Fire Island

Citizens stopping at Windy Corner (TA Windy), between the TA Potter and TA Past Bird observation sites, are often among the first to send reports of incidental beluga sightings in Turnagain Arm each season. It is a place where people often spot belugas from their vehicles as they are driving by, but also a place, as the name indicates, where it is usually very windy. Often the whitecaps off the site made it difficult to see or determine whether belugas were present or not. There is a narrow grass buffer between the highway and the parking lot. The riprap bluff is steep, but short. Passenger trains pass directly below the site. Small vessels only occasionally transit these turbulent waters. Views were unobstructed in all directions (Figs. 2.1.5.1 and 2.1.5.2).

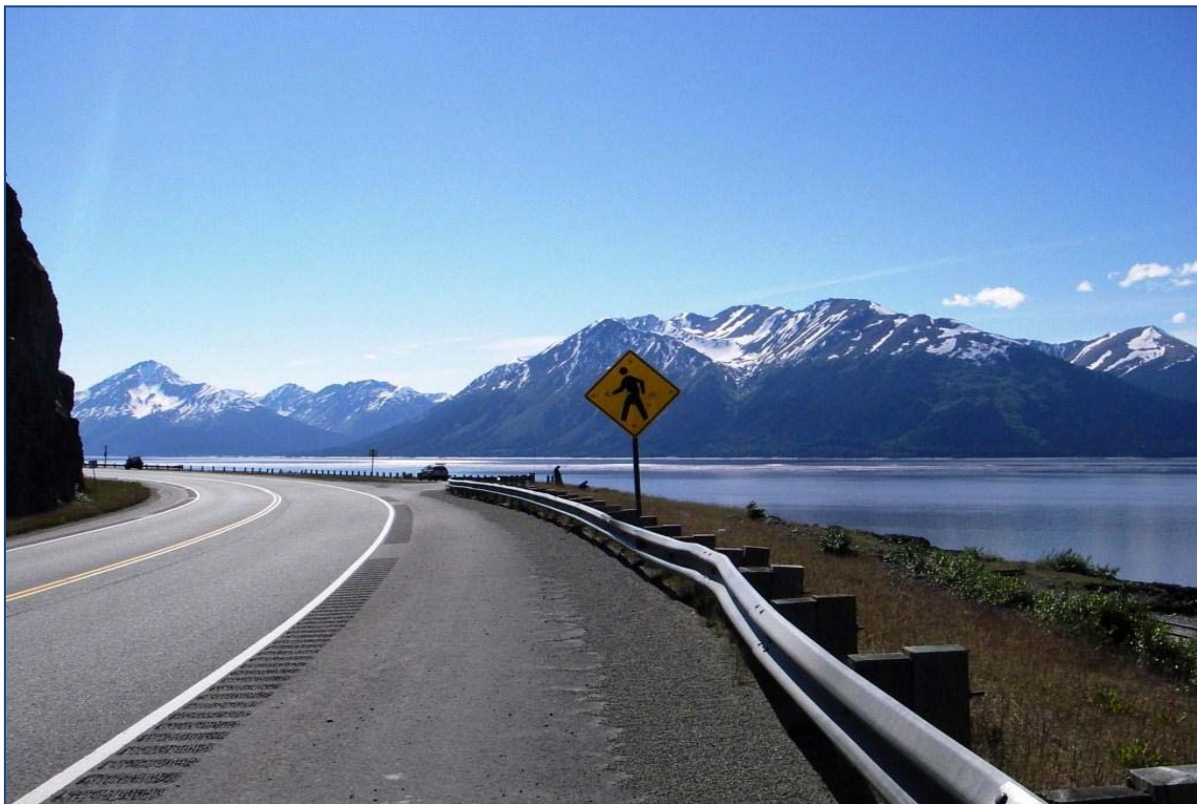


Figure 2.1.5.1. View east at Windy Corner observation site in Turnagain Arm with Kenai Mountains across the Inlet. Photograph: B. Carlson, June 20, 2010.



Figure 2.1.5.2. View south at Windy Corner observation site in Turnagain Arm with railroad tracks below the site. Cowan Mtn. is the pointed peak in the middle of the frame. Bradley Peak is the larger, broader mountain left of Cowan. Photograph: B. Carlson, June 20, 2010.

2.1.6 First Pull-out Past Bird Point

Coordinates: Latitude N 60.932; Longitude W 149.323; elevation 17'

Project Map Reference Points: VABM Mtn., (3378 ft), Kern Mtn., (3255 ft), and Bradley Peak, (2828 ft)

At Seward Highway milepost 95.4, the first pull-out past Bird Point (TA Past Bird), between the TA Windy and TA Tidewater observation sites, has a wide vantage from atop a small riprap parking area built out over the coast line (Figs. 2.1.7.1 – 2.1.7.3). While the pullout is almost right at water level, there are no vegetative obstructions giving this pull-out a more desirable view. In contrast, the nearby Bird Point roadside attraction has public facilities and a higher viewing platform, but the view is partly obstructed by trees and the site is farther back from the water. A grass divider between the highway and this observation site's parking lot provide a

small safety buffer for observers. Belugas often forage in nearshore channels just off Bird Point.

At Bird Creek, Chinook salmon run late May to mid-July (and are present in August); sockeye salmon run during June and July; pink salmon run in early July to mid-August (greatest abundance on even numbered years); and chum salmon run from early July to mid-August (and are present in September) (M. Miller, D. E. Bosch, and M. Willette, spring and summer, 2010, Alaska Department of Fish & Game biologists, pers. comm. with B.S. Carlson, via telephone and email communications; D.E. Bosch, December 2011, email communication.).



Figure 2.1.7.1. View east at TA Past Bird observation site looking toward Sawmill, Slate, and Seattle Creeks, on the other side of Turnagain Arm. Kern Mtn. is one of the small peaks just right of center and the project map referenced VABM is the farthest right peak in this frame. Photograph: B. Carlson, June 20, 2010.



Figure 2.1.7.2. Broader view east showing TA Past Bird observation site looking toward terminus of lower Turnagain Arm. Photograph: B. Carlson, June 20, 2010.



Figure 2.1.7.3. View south southwest from TA Past Bird observation site with Bird Point roadside attraction in lower right frame, showing a number of Kenai Mtn. peaks looking towards the town of Hope and Resurrection Creek in the distance. Photograph: John Zarnetske, October 13, 2010.

2.1.7 Tidewater Slough

Coordinates: Projection=Albers, Datum=NA 1927: Latitude N 60.944; Longitude W 149.188; elevation 38'

Project Map Reference Points: VABM Mtn. (3378 ft), No Name Mtn. (3894 ft), and Bradley Peak

The Tidewater Slough observation site (TA Tidewater) was located near Seward Highway milepost 91.5 at the last riprap pull-off built out into Turnagain Arm, just before the slough bridge headed away from Anchorage. There is a slight bay with a tidal gut that sweeps in close to shore that belugas enter, presumably when chasing prey (possibly chum salmon pink salmon and Dolly Varden char, *Salvelinus malma malma*). Across the highway, a bike trail meanders through the associated wetlands but few bikers brave the traffic to visit this nearby coastal spot of interest due to high speed vehicular traffic. Overall, views were unobstructed from this observation site (Figs. 2.1.8.1 – 2.1.7.4).



Figure 2.1.7.1. View east from Tidewater Slough observation site (at low tide) showing project map reference point VABM on the left and a “no name” reference in the center. Photograph: B. Carlson, June 20, 2010.



Figure 2.1.7.2. View southeast from Tidewater Slough observation site (at low tide) showing the terminus of Turnagain Arm. Photograph: B. Carlson, June 20, 2010.



Figure 2.1.7.3. View southwest from Tidewater Slough observation site showing Bradley Peak. Photograph: B. Carlson, June 20, 2010.



Figure 2.1.7.4. View west from Tidewater Slough observation site showing the Kenai Mountains across Turnagain Arm. On the far shore, the town of Hope and east of Hope (left) the mouths of Sawmill, Slate, and Seattle Creeks. Photograph: B. Carlson, June 20, 2010.

2.1.8 Avalanche

Coordinates: Projection=Albers, Datum=NA 1927: Latitude N 60.91628; Longitude W 149.11943; elevation 23'

Project Map Reference Points: VABM Mtn. (3378 ft), No Name Mtn. (3894 ft), and Bradley Peak (2828 ft)

Avalanche (TA Avalanche) is an informal roadside pull-out onto rough gravel at about Seward Highway milepost 87.4, between the TA Tidewater and TA 20-Mile observation sites. It is the location of an avalanche control gun emplacement near the southwest border of the Chugach State Forest. A distance marker southbound shows “Portage Glacier Road Junction 9 miles, Whittier 20 miles.” The viewing area was set farther back from the road compared to most of the TA observation sites giving observers a larger buffer from road traffic (Figs. 2.1.8.1 – 2.1.8.2). There is a steep rocky promontory with some trees and shrubs but also with several

wide, clear vantages. Belugas sometimes come in close when chasing prey, affording observers a good look. Nearby Kern Creek hosts runs of chum salmon, pink salmon, and Dolly Varden char, *Salvelinus malma malma*, (D. E. Bosch, pers. comm. with B.S. Carlson, 2011).



Figure 2.1.8.1. View south southeast from Avalanche observation site showing project reference point “no name” peak in the Kenai Mountains across Turnagain Arm. Volunteers, Betsy McGregor and Helen Peters, scan for belugas. Along the far shore are Sawmill, Slate, and Seattle Creeks. Photograph: Barbara Bennett, October 3, 2011. See appendix 6.2 for computerized images of Avalanche site reference points noted on project map.



Figure 2.1.8.2. View southeast from Avalanche observation site showing project reference VABM through mist at the terminus of Turnagain Arm. Betsy McGregor and Helen Peters record environmental data. Photograph: Barbara Bennett, October 3, 2011.

2.1.9 Twenty-Mile River

Coordinates: Projection=Albers, Datum=NA 1927: Latitude N 60.846; Longitude W 148.99; elevation 30'

Project Map Reference Points: Cleo Mtn. (2288 ft), VABM (3378 ft), No Name Mtn. (3802 ft)

The Twenty-Mile River (TA 20-Mile) observation site was located on the right bank at the end of a small parking lot next to the Seward Highway, S Mile 80.7, just before the bridge. Citizens have reported seeing belugas up the river (Figs. 2.1.9.1 – 2.1.9.2), beyond the bridge, so there is great interest in gathering information here. The river originates out of the Twenty-Mile Glacier and the Harriman Glacier, among others, and empties into Turnagain Arm northwest of Portage. This site was the project's final stop closest to the terminus of Turnagain Arm. Twenty-Mile River hosts seasonal runs of pink salmon, Coho salmon, and sockeye salmon, as well as Dolly Varden char year-round. A run of Chinook salmon also enters Twenty-Mile River and spawns in Carmen Creek (D.E. Bosch, ADF&G, personal email communication with B.S. Carlson, 2011).



Figure 2.1.9.1. View south southwest of 20-Mile observation site with tracks where boaters access the river from a parking lot Inletward of the bridge. Photograph: B. Carlson, October 31, 2010.



Figure 2.1.9.2. View northeast from 20-Mile observation site with a beluga visible mid-frame (1 of about 10 belugas present). For view south from 20-Mile River observation site with beluga adult and calf see Fig. 3.4.2.1. Photograph: Caleb Barrett, May 19, 2011.

2.2 Supplemental Survey Sites

FAR chose not to regularly schedule Woronzof Beach/Bluff observation site for the ACBS because the noise level from the airport could be damaging to volunteers' ears and because the vantage is not wide enough to see where belugas go when they are observed passing through.

2.2.1 Woronzof Beach and Bluff

Coordinates: Latitude N 61.202; Longitude W 150.055392; elevation 78'

Woronzof Beach/Bluff was a supplementary site at the Point Woronzof promontory between Fire Island and the Anchorage coast. The ACBS logged one supplemental sighting with complete information, recorded by Barbara Carlson at this site's beach and overlooking bluff, which were included in the dedicated study site analysis. FAR occasionally received incidental beluga sightings from volunteers visiting several locations near the Point Woronzof promontory. There is another site a little farther west (also known locally as Point Woronzof), but the site we used has access to the gravel beach just below the bluff (Figs. 2.2.1.1 – 2.2.1.2). The Woronzof sites are between Ship Creek and Point Campbell. All Woronzof sites are at the north end of a runway for Ted Stevens Anchorage International Airport (TSAIA) with a popular parking lot for viewing the area from the bluff. The Coastal Trail is not visible from Woronzof Beach/Bluff as it is blocked by the cliffs, as shown in the site photographs, and, therefore, it is not possible to visually follow belugas southward (unless crews leave the site and drive south), or concurrent crews are posted at Point Campbell and/or MotoX observation sites.).



Figure 2.2.1.1. View south of the Woronzof Beach/Bluff observation site parking lot across the channel toward the southwest end of Fire Island, partially blocked by the coastal bluff. Photograph: B. Carlson, May 26, 2010.



Figure 2.2.1.2. View north of Woronzof Beach/Bluff site parking lot includes the coastal bluff and in the far distance, the mouth of Knik Arm between Point Mackenzie and Anchorage. Photograph: B. Carlson, May 26, 2010.

2.2.2 Private Property #2

Coordinates: Datum: WGS 84: Latitude N 61.13847; Longitude W 149.99320; elevation 233'

Project Map Reference Points: Cedar Mtn., Point Possession (*Tuyqun* meaning 'Calm Water' in the *Dena'ina* language (Kari and Fall 2003)), and the south end of Fire Island

Private Property #2 (PP #2) site was located between Campbell Creek and the MotoX observation site and is the home of the Project Leader, Barbara Carlson. PP#2 served as project headquarters and was sometimes used as a site for collaboration and confirmation of observations for the MotoX site, and less occasionally, the TA Potter observation site. PP#2 was also a location for incidental sightings when the ACBS was not underway. Views of the inlet were clear to the east (Fig. 2.2.2.1), southeast (Fig. 2.2.2.2), and south (Fig. 2.2.2.3), and partially obstructed by trees to the southwest (Fig. 2.2.2.4) and west (Fig. 2.2.2.5). Fish runs are the same as is listed at MotoX for Campbell Creek.



Figure 2.2.2.1. View east to Campbell Creek and mouth of Turnagain Arm from PP# 2 observation site includes the rocky prominence beyond Potter Section House, and Cedar Mtn. (on a clear day). Photograph: B. Carlson, September 1, 2007.



Figure 2.2.2.2. View southeast overlooking mouth of Campbell Creek from PP#2 observation site with Kenai Mountains and Cedar Mtn. visible across Inlet. Photograph: B. Carlson, May 2, 2010.



Figure 2.2.2.3. View south looking towards Chickaloon Bay and River across inlet from PP#2 observation site. Photograph: B. Carlson, August 31, 2007.



Figure 2.2.2.4. View southwest from PP#2 observation site looking toward Mt. Redoubt between Point Possession and Fire Island. Photograph: B. Carlson, September 26, 2007.



Figure 2.2.2.5. View west from PP#2 observation site looking through trees toward Fire Island. Photograph: B. Carlson, September 26, 2007.

2.2.3 Between Past Bird and Tidewater

Coordinates: Projection=Albers, Datum-NA 1927: Latitude N 60.93862: Longitude W 149.2407; elevation 20'



Figure 2.2.3.1 ACBS crew at “between Past Bird and Tidewater” observation sites. Snow was falling and the ceiling was low, but volunteers, Sarah Saunders, Andrew Hartsig, and Danielle Williams, documented 13 belugas on this survey day; four belugas at the Past Bird observation site, and nine belugas between Past Bird and Tidewater Slough. Photograph: B. Carlson, October 31, 2010.

2.3 Incidental Sites

FAR also documented incidental beluga whale sightings and has such records from various localities, including the Anchorage Coastal Trail, official ACBS project sites (when not scheduled or when data is incomplete (as when a leader elects to not get the gear out or stop long enough to gather complete information (i.e. environmental data or compass bearing, etc.), and from spots with no official names.

2.3.1 Anchorage Coastal Trail

Coordinates or Location Description: Start: Latitude N 61.208708; Longitude W 149.922970; elevation 14'; End: Latitude N 61.153427; Longitude W 150.0555535; elevation 221'

The Tony Knowles Coastal Trail extends more than 10 miles from 2nd Avenue in downtown Anchorage through neighborhoods and meandering in and out of parks along the coast to the public chalet at Kincaid Park. The popular, paved, multi-use trail stretches between the ACBS Ship Creek and MotoX observation sites with gaps at either end. The Coastal Trail begins near sea level and was constructed partially in a railroad right-of-way. The trail rises in elevation approaching Point Woronzof with the majority of the gain near the Kincaid Park chalet. Much of the trail was constructed on a wooded plain about 30-40 feet above the beach where it avoids the bluff to prevent causing further erosion. Since 1909, the bluff has retreated at a mean rate of about 2 feet per year (Kramer *et al.* 1983).

2.3.2 Point Campbell

Coordinates: Projection=Albers, Datum=NA 1927: Latitude N 61.1528; Longitude W 150.0685; elevation 72' (There are much higher spots to elevation 455' that would also be useful.)

Project Map Reference Points: Mt. Susitna, southwest end of Fire Island, Point Possession, and Cedar Mtn.

Situated above the ACWR and within Kincaid Park, the Point Campbell vantage overlooks a wide swath of the waters between Fire Island and the Anchorage coast. In addition to the Point

Campbell site, there are higher spots along the trails that we have visited that could be useful beluga observation sites.

This high coastal bluff is part of the same continuous dune as the MotoX observation site, located eastward of that observation site and created from the same loess deposits. Although there is a small tidal lagoon that is visible from the lower observation spots, much of the area below this spot is characterized by a gravel beach and mudflats instead of marsh.

From several high sandy bluff spots the following are visible: about half the shoreline from north point to the southwest end of Fire Island; waters between Fire Island and Kincaid Park and the ACWR; some of Anchorage coastline (part of it is obscured when observers are up high); several tidal guts where FAR suspect that belugas trap fish; a small lagoon that fills when tide is highest; and along the horizon: Point Possession; Mt. Susitna; and Mt. Redoubt. It is possible to view a variety of natural features in Cook Inlet from different spots along the trails at Point Campbell. The subtle promontory, located south of Point Woronzof, has trails with large ranges in elevation. One cannot see eastward to the MotoX observation site or make out Campbell Creek from Point Campbell (Fig. 2.3.2.1), but the view generally covers an area between Fire Island and the Anchorage coast that can neither be completely observed from Point Woronzof nor the MotoX bluff (Fig. 2.3.2.2).

Fish runs here are those listed at MotoX for Campbell Creek, about three and a half miles east of Point Campbell.



Figure 2.3.2.1. View east from points along Point Campbell trails shows vast water surface but the coastal bluff blocks views of Motocross bluff, Campbell Creek and south portion of ACWR. Photograph: B. Carlson, September 4, 2011.



Figure 2.3.2.2. Views north of Point Campbell show the northwest end of Fire Island , deeper channels exposed at lower tides and Mt. Susitna in the distance. Photograph: B. Carlson, July 27, 2011.

2.3.3 Other Incidental Sites

There were more than 20 other sites from which incidental observations were sent to FAR, some of them were also project or supplemental sites (incomplete but useful data collected off survey time or in between observation sites).

2.4 Determination of Survey Sites

On 7 June 2008, following initial planning (which took place during 2007), project leader, Barbara Carlson, convened a working group meeting with Barbara Mahoney (NMFS) and Tamara McGuire (biologist with in LGL, AK Alaska Research Associates) to propose, discuss, and visit potential observation sites for the land-based beluga survey. The working group visited sites, previously identified by FAR and early discussants as areas of interest that would meet objectives of the project goals. Figure 2.4.1 shows all sites used between 2008 and 2011. Doug Tosa, Geographic Information System (GIS) specialist with Alaska Center for the Environment (ACE) created the site and location overview maps for the project. This color-coded telegraphic tool clearly illustrates what land and water areas are visible from each project observation site. Some reference points serve more than one site. The site descriptions include some of the project map reference points (Fig. 2.4.1: red triangles) plotted on each of the site specific project maps in the photograph captions.

The 2008 survey sites comprised:

- PP#1
- PP#2
- MotoX
- Ship Creek

PP#1 was selected as a useful place to collect more information about beluga whales staging to move up Turnagain Arm on the incoming tide. The PP#1 site was across the Seward Highway from Potter Marsh, on a bluff above the ACWR, target habitat for FAR's mission, making it a strong candidate for a survey site. Volunteers have observed duck hunting in progress at the shooting range near PP#1 during September, October and November. The site was less useful as

a general education site as it is private property. The owners necessarily restricted survey access to avoid conflict with the owner organization's activities that are sometimes unpredictable making scheduling survey access difficult especially since the ACBS targets specific tides.

PP#2 is the home of the ACBS Project Leader, Barbara Carlson, and served as a supplemental project site. Subsequently, FAR has access to notable beluga information including data from PP#2 pre-dating the ACBS by several years. The site was not useful as a general education site because it is private property. Carlson facilitates the ACBS from here and collects data from this site. Sometimes while crews were out they collaborated with the project lead on specific beluga sightings. For instance, if the crew at the MotoX site was not able to clearly see the group composition southbound belugas, they sometimes called to ask the lead to get a closer look from PP#2. Conversely, if the project lead was able to direct the MotoX crew to a pod headed their direction, it was slightly more likely that the crew would spot and document those belugas.

FAR selected the MotoX site for its wide vantage from a high bluff that overlooks waters and tidal flats, and spans the waters off the southwest side of Fire Island to the mouth of Turnagain Arm. In the years prior to the survey, many beluga sightings (dead and live) have been documented by FAR members and friends in the ACWR mostly between Johns Park and Kincaid Park. The MotoX site also overlooks the ACWR again supporting FAR's mission and objectives. The bluff near the Jodhpur Road parking lot at Kincaid Park is a major observation site for FAR's annual Snow Goose/Sandhill Crane Survey, the ACBS, as well as for focused clean-up and educational activities. Access to this section of the park is blocked by four gates that are often locked to help prevent vandalism, such as starting fires, and dumping stolen vehicles, trash bins, and port-a-potties over the bluff. FAR obtained a user-group key from the Municipality of Anchorage (MOA) to access the site with crews and gear during off hours. ADF&G manages the ACWR which begins at the 20-foot contour of this sea bluff, from the marsh.

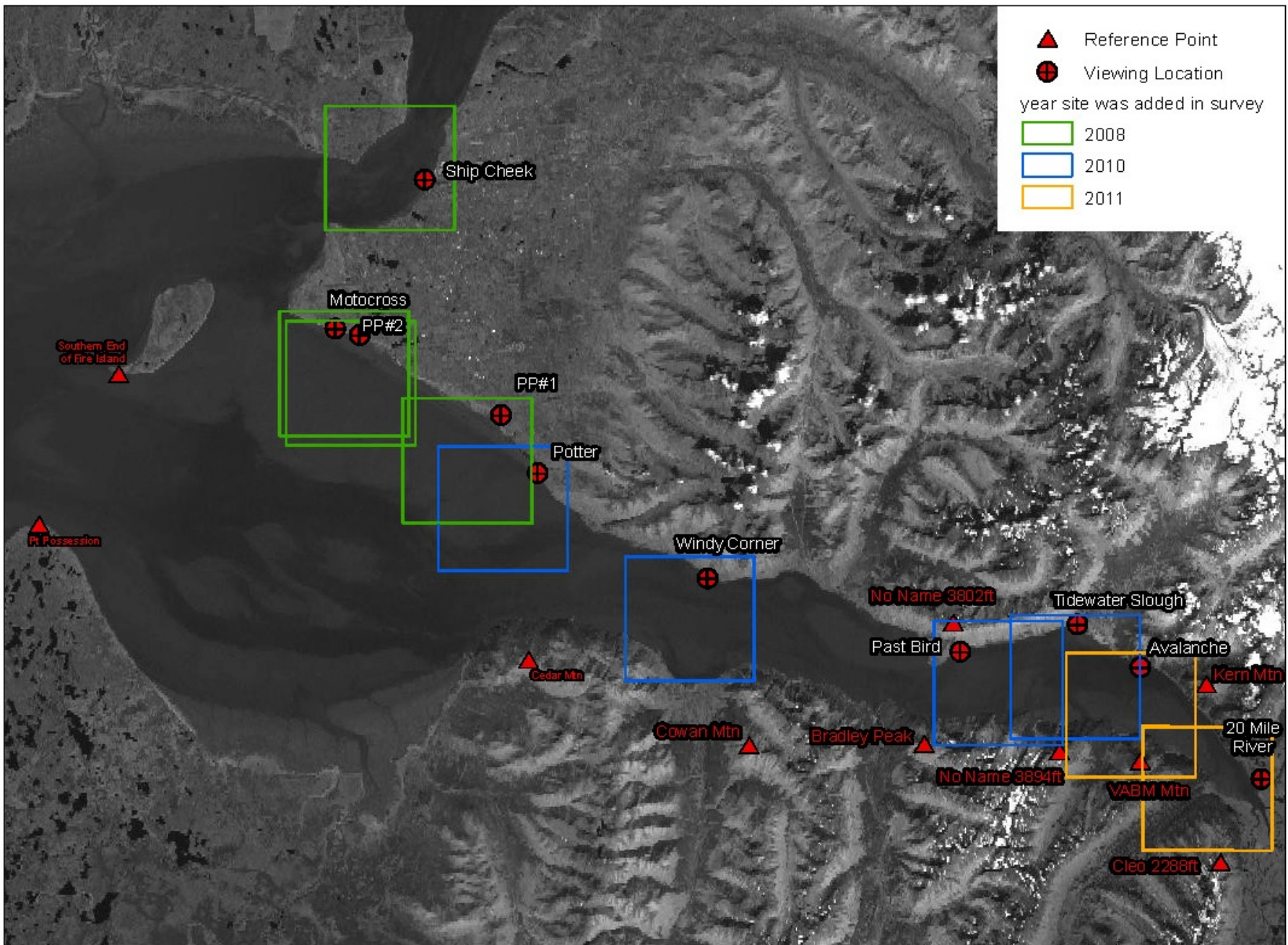


Figure 2.4.1. Anchorage Coastal Beluga Survey observation site location overview, 2008-2011.

Ship Creek was chosen so that project partner, Karla Dutton with Defenders of Wildlife (DoW), could easily manage that site's surveys due to its proximity to DoW's downtown Anchorage office. Industry and agency biologists also expressed special interest for the ACBS to gather low-tide beluga data from the site near the POA, in contrast to the ACBS objective to collect data during high tides and when prey species were present. Both the MotoX and Ship Creek observation sites are valuable for public education because they are places visited by Alaskan residents and visitors alike.

The 2009 survey sites comprised:

- MotoX
- Ship Creek
- PP#2

PP#1 was also selected in 2009 but was dropped due to lack of sufficient numbers of available volunteers.

The 2010 survey sites comprised:

- MotoX
- PP#2
- TA Potter
- TA Windy
- TA Past Bird
- TA Tidewater
- TA 20-Mile (exploratory only)

In 2010, FAR dropped the Ship Creek site because there was a significant effort already focused there by POA observation crews. The near sea level viewing platform from which ACBS Ship Creek crews observed was inferior to that used by POA observers located at a higher height above sea level. The higher platforms maximized the probability of detecting belugas in POA project areas (Markowitz and Maguire 2007; Cornick and Kendall 2008). The MotoX

observation site was retained for continuity of data set collection and because it has been an important observation site for belugas along the ACWR.

As the project grew, various TA survey sites were added in 2010. The TA Potter observation site is near PP#1 but has an improved vantage, and was logistically easier to schedule since it is a public, not a privately owned site. Biologists from both NMFS and NMML requested FAR collect beluga data related to fish runs in Turnagain Arm, including fish streams, creeks and rivers. By adding TA survey sites, not only did FAR fill gaps in the data and meet information needs of biologists, but the ACBS project also increased the chance of observing belugas which, in turn, reinvigorated volunteer enthusiasm and expanded the potential for public education and focus on CI belugas.

In 2011 survey sites comprised:

- MotoX
- PP#2
- TA Potter
- TA Windy
- TA Past Bird
- TA Tidewater
- TA Avalanche
- TA 20-Mile (only a few times)

FAR scheduled 6 days in May to include TA sites at Potter, Windy, Past Bird, Tidewater, and 20-Mile to watch for belugas around predicted runs of eulachon (“hooligan”). These five Turnagain Arm sites also provided continuity with the 2010 survey season.

During the May survey, FAR discovered that while beluga data along TA is valuable, the time required to cover the distance for these observation sites was considerable and significantly lengthened the time commitment required by volunteers (6 ½ hrs for crew members; 8 hrs for crew leaders). Volunteer feedback indicated it would be unwise to schedule such long shifts if FAR wished to sustain maximum volunteer participation. Thus, during the August and

September 2011 surveys, FAR omitted the TA 20-Mile site and included TA Tidewater only when crew leaders felt that they had extra time.

Consistently inclement viewing conditions at some sites, and interest in other areas along TA, required further changes to survey sites in the fall portion of the 2011 ACBS. The TA Windy observation site, true to its name, was often too windy to set up the viewing scopes; on occasion, high winds nearly ripped the clipboard boxes out of the observers' hands. Given the paucity of data from the TA Windy and TA Potter observation sites in August and September, and increased interest in beluga information from Twenty-mile River, FAR took the opportunity to change sites for the remaining portion of the survey. We reinstated the TA 20-Mile survey site, and selected a location called "Avalanche" between the TA Tidewater and TA 20-Mile sites. Once again, time commitment of volunteers was taken into account and TA Potter was dropped in hopes of adding new data from the TA Avalanche and TA 20-Mile observation sites.

FAR did not use the MotoX site for the May eulachon run due to limited volunteer resources (there were only enough participants to staff just one crew that month). FAR conducted additional outreach and held a second training session during the summer to augment the number of trained volunteers during the survey season. Some ACBS volunteers were occupied during May with FAR's Annual Snow Goose/Sandhill Crane Survey, but were able to join the ACBS in progress once the main portions of the bird survey were complete for the year. Some volunteers were able to fit the original training session into their schedules, but others were only able to participate when we offered the second training session.

2.5 Effort

The expertise and availability of leaders varied, so sometimes FAR dropped sites or scheduled fewer days. FAR occasionally included, by special permission only, untrained volunteers who served as extra pairs of eyes with a trained crew. We counted these volunteer hours, but did not quantify those individuals as part of the crew for scheduling purposes because FAR had not trained them to fulfill the requisite tasks, nor could we count on them to be available for said purpose.

In 2011, the creation of a database allowed FAR to track office hours spent on the project's administrative tasks. Volunteer hours spent preparing for each survey season, training volunteers, managing equipment and paperwork are a critical component of a successful survey. The office time spent on specific beluga survey-related tasks, as well as general FAR administrative tasks was only a fraction of the true time spent managing and running the volunteer-based FAR organization and the ACBS. The FAR director and ACBS Lead (Barbara Carlson) did not usually log her 40+ work hours per week as time-keeping had not been a major concern until recently when FAR was asked to quantify its contributions to various efforts. Timekeeping is only entered into the database as specific tasks or people are pulled in to help manage the administrative tasks.

2.6 Determination of Survey Times

FAR originally planned to run the ACBS during ice-free months of the year (generally May through October). Coverage each season was limited by availability of volunteer observers and types of data desired.

2.6.1 Volunteers

Volunteers are the single most important contributing attribute of the ACBS. FAR's diverse group of volunteers includes biologists, students, engineers, clergy and homemakers. FAR trained all volunteer observers for the ACBS. A minimum of two back-to-back training sessions were scheduled per season for 2½ hours each, of which the volunteers attended one. If numbers of trained and available volunteers responding were insufficient, another advertisement and class or two was organized. Without a sufficient number of trained volunteers, the alternative was to cancel part or all of the survey for the year.

It was not possible to know in advance how many volunteers would attend training and how many would be reliable and available consistently, for scheduling. FAR planned the season's survey after the first training sessions were completed, when many of those who signed up, signed in, completed the class(es), attended orientations, and remained committed. FAR assessed the quantity and quality of leadership candidates among the year's volunteers, and the remaining numbers available to fill the crews. When scheduling crews and crew leaders, it

helped to have as many returning volunteers as possible to balance crews with experience and known attributes of individuals and leaders.

Despite best intentions it was inevitable that even the most devoted volunteers sometimes suddenly became unavailable. Occasionally a volunteer decided after training that they did not enjoy the various aspects required to participate in the project. To help break even for the effort spent training volunteers, FAR asked for a time commitment of at least three shift completions per person.

2.6.2 Tides

The ACBS used the tides posted in the Fred Meyer tide book each year as well as the corrections listed for Fire Island for tidal time and height in feet. The corrections for 2008-2010 were Fire Island high tide time = -0:25; Height in feet = $\times 0.94$ and for 2011, Fire Island high tide time = -0:17; Height in feet = $\times 0.92$.

FAR scheduled the survey around high tides, with the exception of the Ship Creek observation site which in 2008 and 2009 was scheduled around the low tides as requested by interested parties. Fire Island corrections were used at the MotoX site, PP#2, Woronzof Beach/Bluff, and PP#1, as well as for any incidental site in the vicinity, such as Point Campbell. FAR predicted tidal movements within Turnagain Arm to get crews to their assigned observation sites around high tide (allowing that variables such as currents, winds, and weather systems may affect these calculations). For the TA sites, FAR used a correction per mile to predict approximately when tides would reach high at each site but have not calculated tide height. With such variation in tides, FAR tested these predictions before each season started.

2.6.3 Daylight Hours

The number of daylight hours available to scan for belugas varies widely from May to the end of October. During September and October, fewer days were available for scheduling because to be a useful survey day a high tide must fall during daylight hours. FAR used an online calculator (at sunrisesunset.com by Steve Edwards) to chart sunrises and sunsets and to figure daylight

hours. In 2011, we used the service at sunrisesunset.com to include scheduling during civil twilight to maximize insufficient daylight hours.

2.7 ACBS Scheduling

2.7.1 2008

FAR and DoW originally planned to begin in spring of 2008, but preparation took longer than anticipated due to work and health issues of survey partners. We agreed to complete a trial run of the survey in October and the first part of November using two to three observation sites. Managers scheduled 1 & ½ hours around the targeted tide during daylight hours at each site (Table 2.7.7.1). The longest shift scheduled was three hours. It was the intent of the project that both sites be scheduled on concurrent days, but we were unable to successfully coordinate that. Survey days were scheduled to coincide with neap tides. Such tides are known to concentrate flatfish (a prey item of belugas) in areas close to a number of the observation sites. Exceptions included:

1. FAR prepared the schedule for both PP#1 and MotoX observation sites at which the targeted tides were high. The marsh and mudflats in both areas are extensive during low tide so the tide must be fairly far in for volunteers to observe belugas.
2. DoW managed and scheduled the Ship Creek observation site at which the targeted tide was low.

This short pilot season helped leaders determine whether the days and times chosen for shifts; protocols; and equipment would accomplish objectives towards the project goals. Results from the trial season helped us make improvements to maps, data sheets and methods before launching a full season survey in spring of 2009.

Table 2.7.1.1. 2008 ACBS schedules were set to coincide with the neap tides (shown as “best” in the table) when beluga whale prey species (such as flatfish) were likely to be present, taking into consideration daylight hours and target tide levels at different observation sites

Ship Creek ACBS Observation Site								
Day	Date	Sunrise	Start	Low	End	Sunset	Tide in ft	Chance
Sat	12-Oct-08	8:34 AM	12:20 PM	12:52 PM	12:40 PM	6:58 PM	2.1	best
Thu	16-Oct-08	8:45 AM	1:57 PM	3:27 PM	4:57 PM	6:37 PM	2.7	best
Thu	23-Oct-08	9:03 AM	9:00 AM	9:47 AM	11:00 AM	6:25 PM	2.9	
Sat	25-Oct-08	9:08 AM	11:10 AM	12:11 PM	1:11 PM	6:19 PM	2.2	best
Wed	12-Nov-11	8:57 AM	11:50 AM	12:37 PM	1:30 AM	4:30 PM	4	best
Motocross ACBS Observation Site								
Day	Date	Sunrise	Start	FI high	End	Sunset	FI tide ft	Chance
Sat	18-Oct-08	8:50 AM	8:58 AM	10:28 AM	11:58 AM	6:40 PM	29.9	best
Sun	19-Oct-08	8:52 AM	10:55 AM	11:19 AM	12:27 PM	6:37 PM	28.8	best
Mon	20-Oct-08	8:55 AM	10:51 AM	12:21 PM	1:00 PM	6:34 PM	27.6	best
Tue	21-Oct-08	8:58 AM	12:50 PM	1:41 PM	2:35 PM	6:31 PM	27	best
Wed	22-Oct-08	9:00 AM	2:10 PM	2:59 PM	3:50 PM	6:28 PM	27.3	best
Private Property # 1 ACBS Observation Site								
Day	Date	Sunrise	Start	FI high	End	Sunset	FI tide ft	Chance
Tue	21-Oct-08	8:58 AM	12:42 PM	1:41 PM	3:05 AM	6:31 PM	27	best
Wed	22-Oct-08	9:00 AM	1:50 PM	2:59 PM	3:50 PM	6:28 PM	27.3	best

2.7.2 2009

FAR intended to schedule around neap tides as in 2008, however, when NMML requested that we not schedule only when we expected to see belugas, we dropped the focus on days we had estimated to be optimal for whale sightings. During June we scheduled around neap tides as in 2008, but during July through the end of October we scheduled regardless of whether beluga sightings were expected (i.e., blind scheduling) (Table 2.7.2.1.). FAR and DoW scheduled on the same days when possible. If weather was excessively windy or cold, the time was reduced equally on both sides of the tide. FAR scheduled during daylight hours and after polling volunteers reduced the length of shifts by ½ hour to increase volunteer availability after responsiveness began to wane, scheduling one hour around the targeted tide at each site. Similar to in 2008, exceptions included:

1. FAR prepared the schedule and managed the MotoX site at which the targeted tide was high.
2. DoW scheduled and managed the Ship Creek observation site for which the targeted tide was low.

Table 2.7.2.1. 2009 ACBS switched to blind scheduling for July through October
 The June schedule coincided with neap tides (shown as “best”) then random (“blind”) timing, correlated only with high tide at MotoX and PP#2 and low tide at Ship Creek for the bulk of the season.

Motocross ACBS Observation Site: June 2009								
Day	Date	Sunrise	Start	FI high	End	Sunset	Tide in ft	Chance
Wed	10-Jun-09	4:24 AM	7:20 AM	8:36 AM	10:07 AM	11:34 PM	26.79	
Sat	13-Jun-09	4:22 AM	9:30 AM	10:43 AM	12:15 PM	11:37 PM	24.91	best
Tue	16-Jun-09	4:20 AM	12:02 PM	1:32 PM	3:02 PM	11:40 PM	21.4	best
Thu	18-Jun-09	4:20 AM	3:15 PM	4:15 PM	5:15 PM	11:41 PM	22.4	best
Mon	22-Jun-09	4:20 AM	5:38 AM	6:38 AM	7:38 AM	11:43 PM	28.9	
Tue	23-Jun-09	4:21 AM	6:28 AM	6:28 AM	8:28 AM	11:43 PM	29.6	best
Sat	27-Jun-09	4:23 AM	9:50 AM	10:50 AM	11:50 AM	11:42 PM	28	
Mon	29-Jun-09	4:25 AM	11:56 AM	1:56 PM	1:56 PM	11:41 PM	26.4	
Tue	30-Jun-09	4:26 AM	1:12 PM	2:12 PM	3:12 PM	11:40 PM	23.2	best
Motocross ACBS Observation Site: July 2009								
Day	Date	Sunrise	Start	FI high	End	Sunset	FI tide ft	Chance
Wed	1-Jul-09	4:27 AM	2:41 PM	3:41 PM	4:41 PM	11:40 PM	22.84	blind
Sat	4-Jul-09	4:31 AM	5:35 PM	6:35 PM	7:35 PM	11:37 PM	24.44	blind
Mon	6-Jul-09	4:34 AM	5:39 AM	6:39 AM	7:39 AM	11:35 PM	25.66	blind
Wed	8-Jul-09	4:37 AM	6:39 AM	7:39 AM	8:39 AM	11:32 PM	26.7	blind
Sat	11-Jul-09	4:43 AM	8:35 AM	9:35 AM	10:35 AM	11:27 PM	25.94	blind
Mon	13-Jul-09	4:47 AM	10:07 AM	11:07 AM	12:07 PM	11:24 PM	24.16	blind
Thu	16-Jul-09	4:53 AM	1:09 PM	2:09 PM	3:09 PM	11:18 PM	21.53	blind
Sat	18-Jul-09	4:57 AM	4:05 PM	5:05 PM	6:05 PM	11:14 PM	23.41	blind
Mon	20-Jul-09	5:02 AM	4:33 AM	5:33 AM	6:33 AM	11:10 PM	27.64	blind
Sat	25-Jul-09	5:14 AM	8:44 AM	9:44 AM	10:44 AM	10:58 PM	29.89	blind
Mon	27-Jul-09	5:19 AM	10:25 AM	11:25 AM	12:25 PM	10:53 PM	26.79	blind
Wed	29-Jul-09	5:24 AM	12:36 PM	1:36 PM	2:36 PM	10:48 PM	22.94	blind
Fri	31-Jul-09	5:29 AM	3:37 PM	4:37 PM	5:37 PM	10:43 PM	22.65	blind

2.7.3 2010

After five months of surveys 2009 in which few whales were observed, in 2010, FAR returned to scheduling around expected fish opportunities for belugas. After discussions with research parties at NMML, NMFS, Audubon, ADF&G, DoW, and industry, FAR chose to schedule surveys to time with Pacific salmon runs along the ACWR and Turnagain Arm, knowing that other beluga prey items may also be present such as saffron cod (*Eleginus gracilis*), Pacific cod (*Gadus macrocephal*), yellowfin sole (*Limanda aspera*), starry flounder (*Platichthys stellatus*); other whitefish such as walleye pollock (*Theragra Chalcogramma*); steelhead trout (*Oncorhynchus mykiss*); Dolly Varden; and invertebrates (i.e. shrimp, polychaetes, amphipods).

A test run of the new sites along Turnagain Arm occurred in June, with training and orientations for volunteers in July. During August we had sufficient volunteers to staff only one site and elected to start with the MotoX site. We then expanded to the new sites along Turnagain Arm after we had completed training and orienting another group of volunteers. FAR assumed managing and scheduling all sites and volunteers during daylight hours when we expected there to be fish runs with the following differences:

1. The MotoX site was scheduled 1 & ½ hours around the high tides during daylight.
2. Turnagain Arm sites were scheduled so that crews would drive from one site to the next to be able to observe close to high tide at each of the survey sites assigned (Appendix 6.4.).

Table 2.7.4.1 (for 2011) is an example of the same spreadsheet FAR used as in 2010 to calculate times for the feasible shifts on each day of the month before narrowing it down first with leaders, then with the rest of the crew members. The difference was that in 2011 we included civil twilight columns before sunrise and after sunset, instead of trying to remember what it might be, which helped the person figuring out schedules be more accurate. Sometimes crews arrived or departed in the dark, but no one was scanning for belugas unless there was sufficient light.

2.7.4 2011

The 2011 survey built on knowledge gained during 2010 by continuing to schedule around neap tides and anadromous fish runs to optimize chances to see and document belugas. Leaders and experienced crew members conducted the project's first run of observation sites around the expected eulachon run in Turnagain Arm which occurs in upper Cook Inlet during late April to mid-June (ADF&G 2010). For the spring survey, FAR only scheduled a Turnagain Arm crew because we did not have enough volunteers available to include the MotoX site, although that information would have been valuable as well. For the remainder of the season FAR scheduled crews as during 2010 with the following differences:

1. FAR scheduled crews on all the same days except that we tried to make up for lost weather days at the MotoX observation site since there is a high interest by scientists and industry in beluga activity in the vicinity of Fire Island.
2. FAR changed the specific sites to decrease the shift time and to focus on desired beluga information. Not all sites were used the full season.

As in 2010, the MotoX crews were scheduled to start and finish earlier than those at TA sites, because of the later tides in Turnagain Arm. The TA crews began their shifts while the MotoX crew was in session, but finished long afterward because of the later tides at the farthest sites and also due to the longer drive (Table 2.7.4.1).

Table 2.7.4.1. ACBS September 2011 scheduling data for seven observation sites.

Of the options shown below, surveys were scheduled on 2, 3, 8, 9, 11, 15, 16, 17, 21, 24, 25, 28, 29, and 30 September 2011, subject to leader and crew availability. A few shifts were cancelled for weather.

Day	Date	Civil twi	Sunrise	Fl hi - 0:17	Potter hi	Windy hi	Past Bird	Tidewater	Avalanche	20-Mile	Sunset	Civil twi	High'	Fire Isl'	Neap	Constraints	DayJob	#1 Short time	#2 Short time	#3 Short time
Shift	Offset			0:00	0:35	1:01	1:35	1:49	1:59	2:19			Tide bd	Correc						
r	1-Sep-11	6:02 AM	5:30 AM	9:53 AM	10:28 AM	10:54 AM	11:28 AM	11:42 AM	11:52 AM	12:12 PM	9:10 PM	9:57 PM	32.0	29.4						
f	2-Sep-11	6:05 AM	6:52 AM	10:41 AM	11:16 AM	11:42 AM	12:16 PM	12:30 PM	12:40 PM	1:00 PM	9:07 PM	9:54 PM	30.8	28.3						
st	3-Sep-11	6:08 AM	6:55 AM	11:35 AM	12:10 PM	12:36 PM	1:10 PM	1:24 PM	1:34 PM	1:54 PM	9:04 PM	9:51 PM	29.2	26.9	neap		x			
sn	4-Sep-11	6:11 AM	6:57 AM	12:43 PM	1:18 PM	1:44 PM	2:18 PM	2:32 PM	2:42 PM	3:02 PM	9:01 PM	9:47 PM	27.3	25.1	neap		x			
m	5-Sep-11	6:13 AM	7:00 AM	2:08 PM	2:43 PM	3:09 PM	3:43 PM	3:57 PM	4:07 PM	4:27 PM	8:58 PM	9:44 PM	26	23.9		tide low				
t	6-Sep-11	6:16 AM	7:02 AM	3:36 PM	4:11 PM	4:37 PM	5:11 PM	5:25 PM	5:35 PM	5:55 PM	8:54 PM	9:40 PM	25.9	23.8		tide low				
w	7-Sep-11	6:19 AM	7:05 AM	4:54 PM	5:29 PM	5:55 PM	6:29 PM	6:43 PM	6:53 PM	7:13 PM	8:51 PM	9:37 PM	27	24.8	neap		x			
r	8-Sep-11	6:22 AM	7:07 AM	5:52 PM	6:27 PM	6:53 PM	7:27 PM	7:41 PM	7:51 PM	8:11 PM	8:48 PM	9:34 PM	28.2	25.9	neap		x			
f	9-Sep-11	6:24 AM	7:10 AM	6:36 PM	7:11 PM	7:37 PM	8:11 PM	8:25 PM	8:35 PM	8:55 PM	8:45 PM	9:30 PM	28.9	26.6	neap	twilight TA 3	x			7:25-9:25 PM
st	10-Sep-11	6:27 AM	7:12 AM	6:23 AM	6:58 AM	7:24 AM	7:58 AM	8:12 AM	8:22 AM	8:42 AM	8:42 PM	9:27 PM	28.6	26.3		too dark MX & TA 2	x			
sn	11-Sep-11	6:30 AM	7:15 AM	7:04 AM	7:39 AM	8:05 AM	8:39 AM	8:53 AM	9:03 AM	9:23 AM	8:39 PM	9:23 PM	29.5	27.1		too dark MX & TA 2	x			
m	12-Sep-11	6:32 AM	7:17 AM	7:41 AM	8:16 AM	8:42 AM	9:16 AM	9:30 AM	9:40 AM	10:00 AM	8:35 PM	9:20 PM	30	27.6		dark early MX				
t	13-Sep-11	6:35 AM	7:20 AM	8:15 AM	8:50 AM	9:16 AM	9:50 AM	10:04 AM	10:14 AM	10:34 AM	8:32 PM	9:17 PM	30.2	27.8		dark early MX				
w	14-Sep-11	6:38 AM	7:22 AM	8:49 AM	9:24 AM	9:50 AM	10:24 AM	10:38 AM	10:48 AM	11:08 AM	8:29 PM	9:13 PM	30.1	27.7		dark early MX				
r	15-Sep-11	6:40 AM	7:24 AM	9:23 AM	9:58 AM	10:24 AM	10:58 AM	11:12 AM	11:22 AM	11:42 AM	8:26 PM	9:10 PM	29.6	27.2						
f	16-Sep-11	6:43 AM	7:27 AM	9:58 AM	10:33 AM	10:59 AM	11:33 AM	11:47 AM	11:57 AM	12:17 PM	8:23 PM	9:07 PM	28.8	26.5						
st	17-Sep-11	6:46 AM	7:29 AM	10:35 AM	11:10 AM	11:36 AM	12:10 PM	12:24 PM	12:34 PM	12:54 PM	8:19 PM	9:03 PM	27.8	25.6		tide low	x			
sn	18-Sep-11	6:48 AM	7:32 AM	11:18 AM	11:53 AM	12:19 PM	12:53 PM	1:07 PM	1:17 PM	1:37 PM	8:16 PM	9:00 PM	26.4	24.3		tide low				
m	19-Sep-11	6:51 AM	7:34 AM	12:11 PM	12:46 PM	1:12 PM	1:46 PM	2:00 PM	2:10 PM	2:30 PM	8:13 PM	8:57 PM	24.9	22.9		tide low				
t	20-Sep-11	6:53 AM	7:37 AM	1:24 PM	1:59 PM	2:25 PM	2:59 PM	3:13 PM	3:23 PM	3:43 PM	8:10 PM	8:53 PM	23.8	21.9		tide low				
w	21-Sep-11	6:56 AM	7:39 AM	2:47 PM	3:22 PM	3:48 PM	4:22 PM	4:36 PM	4:46 PM	5:06 PM	8:07 PM	8:50 PM	23.7	21.8		tide low				
r	22-Sep-11	6:58 AM	7:42 AM	4:04 PM	4:39 PM	5:05 PM	5:39 PM	5:53 PM	6:03 PM	6:23 PM	8:03 PM	8:47 PM	24.9	22.9		tide low				
f	23-Sep-11	7:01 AM	7:44 AM	5:02 PM	5:37 PM	6:03 PM	6:37 PM	6:51 PM	7:01 PM	7:21 PM	8:00 PM	8:44 PM	26.7	24.6		tide low				
st	24-Sep-11	7:04 AM	7:47 AM	5:47 PM	6:22 PM	6:48 PM	7:22 PM	7:36 PM	7:46 PM	8:06 PM	7:57 PM	8:40 PM	28.7	26.4		twilight TA 3	x			6:36-8:40 PM
sn	25-Sep-11	7:06 AM	7:49 AM	6:26 PM	7:01 PM	7:27 PM	8:01 PM	8:15 PM	8:25 PM	8:45 PM	7:54 PM	8:37 PM	30.5	28.1		too dark TA				
m	26-Sep-11	7:09 AM	7:52 AM	7:03 PM	7:38 PM	8:04 PM	8:38 PM	8:52 PM	9:02 PM	9:22 PM	7:51 PM	8:34 PM	32	29.4		too dark				
t	27-Sep-11	7:11 AM	7:54 AM	7:20 AM	7:55 AM	8:21 AM	8:55 AM	9:09 AM	9:19 AM	9:39 AM	7:48 PM	8:31 PM	32.5	29.9		dark early MX & TA 2		7:30-9:30 AM	7:15-9:45 AM	
w	28-Sep-11	7:14 AM	7:57 AM	8:07 AM	8:42 AM	9:08 AM	9:42 AM	9:56 AM	10:06 AM	10:26 AM	7:44 PM	8:27 PM	33	30.4		dark early MX & TA 2		7:35-9:45 AM	7:15-9:55 AM	
r	29-Sep-11	7:16 AM	7:59 AM	8:53 AM	9:28 AM	9:54 AM	10:28 AM	10:42 AM	10:52 AM	11:12 AM	7:41 PM	8:24 PM	32.9	30.3		dark early MX				
f	30-Sep-11	7:19 AM	8:02 AM	9:41 AM	10:16 AM	10:42 AM	11:16 AM	11:30 AM	11:40 AM	12:00 PM	7:38 PM	8:21 PM	32.3	29.7						
st	1-Oct-11	7:21 AM	8:04 AM	10:30 AM	11:05 AM	11:31 AM	12:05 PM	12:19 PM	12:29 PM	12:49 PM	7:35 PM	8:18 PM	31.2	28.7						

2.8 Training Observers

Participants completed a volunteer application, sign the requisite waiver and indemnity agreement and indicated their general times of availability. Training consisted of the following three parts:

2.8.1 ACBS Class

ACBS instructors taught with a 60-slide power point presentation which included any improvements or changes each year. Returning volunteers took the class each year if possible, otherwise they read the revisions and worked the first shift or two with a leader who attended the current training session.

The class included a short history of the decline of the Cook Inlet beluga FAR's involvement with belugas; a clarification of the goals and scope of the ACBS; the description of the year's project observation sites; and why the project sites were selected. The presentation highlighted proper set-up; use and break-down of the project spotting scope and features of the marine binoculars. The class taught the use of a compass; the Beaufort Wind Scale (BF); and how to fill out each project form. FAR instructed volunteers to count belugas for the purpose of the survey by counting only when they see "skin" and described methods of scanning for belugas. During instruction participants practiced documenting weather conditions shown on slides; counting belugas; and deciding beluga sizes and colors. As part of documenting beluga groups, FAR asked volunteers to watch for beluga adults with calves and estimate their proximity to one another and the size of the calf.

As part of the ACBS training, FAR presented an overview of marine mammal species that volunteers are most likely to encounter in upper Cook Inlet. Leaders emphasized the importance of checking email and responding promptly for the purpose of scheduling and organization. FAR taught volunteers how to use the free applications of the online Doodle scheduler used for the ACBS. The instructor assigned homework which included reading and studying the ACBS Monitoring Instructions (Appendix 6.5); studying sample forms; links to review regarding calf size and proximity to beluga adult and the codes for descriptions; important links for background

reading about Cook Inlet belugas; and other tasks to help volunteers prepare for working on beluga survey crews.

2.8.2 ACBS Monitoring Instructions

The ACBS Monitoring Instructions, 44 pages (Appendix 6.5), were updated each year. If the project was testing a new protocol at the beginning of the survey, volunteers were cautioned to always pay attention to the date on the bottom and have on hand a copy of the most recent version. For example, in 2011 the first trainees received one version dated April, but there was a revised version published in July.

Monitoring instructions included an indexed reference that volunteers read and studied before scheduling began. The sections included a project summary, goals, objectives, and season sites; a description of the responsibility of volunteer positions; a list of equipment required and detailed explanation of care. The instructions provided examples and discussion of how each form is completed, including defining when one chooses from a range of given responses and when one supplies written but succinct descriptions. The packet provided a specific priority list of tasks for the occasion of possible stranded marine mammals being spotted (dead or alive) and a description of the scanning protocol including: rotation of tasks, what the tasks entailed, a recommendation for how long a rotation should last, specific types of scans to use, and what to do at the end of a shift. Crew leaders had some leeway to make minor changes; for example, along Turnagain Arm, it usually made sense for volunteers to assume a task for the duration of time at one observation site, while at the MotoX site, where a crew remains in the same spot for three hours, it made sense to rotate duties every 20 minutes (Figure 2.10.1).

The instructions included additional information to help managers, leaders and crew members understand hunting regulations in the ACWR; and reporting dead bears or moose. Special considerations for site managers and leaders included directives regarding safety, such as volcanic ash fall, poor air quality; and extreme weather.

2.8.3 ACBS Site Orientations

FAR scheduled site orientations for volunteers after they had completed the training class, and prior to scheduling of crews (Fig. 2.8.3.1). FAR encouraged volunteers to make themselves available for scheduling at all sites, if possible, so that project organizers had optimal flexibility to create balanced crews. Flexibility in scheduling between survey sites allowed FAR to maximize the number of observers and leaders available to complete the surveys each season.

When possible the facilitator or crew leaders pointed out the features at each site on maps or Google reference images; this practice helped volunteers reference what they saw and aided them in placing belugas on their project maps.



Figure 2.8.3.1. Orientation of volunteers at MotoX site
Observers, Elaine Hulse, Kate Duder, David Black, and Hannah Voorhees, visited sites with project lead, Barbara Carlson (yellow raincoat), and compared maps to reference points, compass directions, and prominent features visible at each site. Photograph: Barbara Bennett, 12 July 2010.

2.9 Equipment

The ACBS is a thrifty project. FAR has requested no funding and operate through volunteer participation at every level although we gratefully accept in-kind assistance and donated supplies. This is in keeping with FAR's practices as a small organization which endeavors to sustain stewardship along the ACWR in perpetuity. Administrators have kept equipment to an absolute minimum while making sure that what has been selected is suitable, durable and with a mind toward sustainability of the project with the least expense.

Equipment was stowed and maintained by the project lead and checked out and in by crew leaders before and after each shift.

- Binoculars (Bushnell waterproof 7x50 with illuminated compass and range-finding reticle)
- Spotting scope (Zhumell waterproof and anti-fog 22x with zoom to 68x90 mm Superior) and
- Sturdy tripod (Zhumell heavy-duty)

Or

- Bogen Manfrotto 190XB 3 Section Aluminum Tripod (with Bogen also need head with quick release plate (see next)
- Manfrotto 808RCR 3-Way Standard Head with Quick Release Plate 410PL
- Data sheets (on clipboard with attached, closed box to shield from precipitation)
- Project map(s) of assigned sites
- All-weather pen
- Celsius Thermometer
- Copy of Beaufort Wind Scale showing both "on water" and "on land" effects
- Monopod to steady binoculars
- GPS (version with 2-way radio is used at some sites as decided by FAR)

2.10 Sighting Protocols

Trained observers followed sighting protocols that included recording a number of specific start/end times, listing names of leader and crew members, reporting environmental conditions during the shift, and documenting what observers saw at specific sites during the scheduled times. The descriptions below explain what information was recorded on each given survey form. See attached forms in Appendix 6.1 for a detailed look at examples of all forms used during the survey. Volunteers assigned a formulaic PDF name, found at the top of each page, to aid in finding archived forms. Each page had a box to check if there was also information written or sketched on the reverse. Volunteers completed a shift form for every site each scheduled day. They completed beluga and map forms only when belugas were observed.



Figure 2.10.1. ACBS volunteers demonstrate schedule of rotation tasks at MotoX site. Kim Klein at scope; Ellie Simpson recording data; Amy Johnson standing and scanning with binoculars; and Kathy Doty sitting and scanning. Photograph: B. Carlson, June 12, 2009.

2.10.1 Shift Form

The shift form is the receptacle for information that ties to beluga sightings the specific day, time, crew, environmental conditions and some general statements for the crew to describe the shift more completely. Times recorded here are the scan times, the meet-up times and the extra hours. “Scan” time is the time for which a shift is scheduled during which scanning the waters for belugas and stranded marine mammals took place. The meet-up and extra hour times help quantify the volunteer effort for each day’s surveys. “Meet-up” time reflects the time crews met at a chosen parking lot to car pool to assigned observation sites. Added to the “back-to-the parking lot” time were the “extra hours.” This varied depending on whether a volunteer was a leader, for which there was usually an extra 1 & ½ hours or more of work, or whether a volunteer was a crew member, for which the extra drive time ranged from 15 minutes to two hours, depending on where they lived. Volunteers have driven from as far away as Wasilla and Palmer to participate in the ACBS.

The shift form tells the specific site location; whether live belugas or stranded (dead or alive) other marine mammals were seen during the shift; if belugas were observed, how many groups there were; the environmental conditions at each site (temperature in Celsius, Beaufort wind force (BF), wind direction, precipitation, percentage of cloud coverage, sea conditions, and general viewing conditions); and comments on each if warranted. Also recorded on the shift form was the notice of other wildlife; human activity (such as dog walkers, motorized land vehicles; boats and planes); and whether or not a formal oral history interview was conducted. Volunteers completed a beluga form and a map form for each group if belugas were observed.

2.10.2 Beluga Form

The beluga form ties together the specific site location; the date; the time belugas were observed; and which group the form represents (first, second, third, etc., if more than one group was observed at the site during that day’s shift). It gives the grid where the group was spotted initially; a minimum, maximum and best count of belugas (including colors, sizes & proximity of calf to adult, when possible); and behaviors observed with comments about those behaviors. Volunteers completed a map form for each beluga group when belugas were seen during a shift.

2.10.3 Map Form

The map form shows the area surveyed from each observation site with a one km (about ¾ mi) grid overlay and the compass rose rotated to magnetic north. Most project maps between 2008 and 2011 were created for the ACBS by Doug Tosa (ACE). The color maps illustrate the nearest creeks and the observation location. The color-coding divides the water into near shore, middle distance and far distance from the shore and shows prominent tidal guts and channels. Red triangles on maps specify reference points for natural features viewed outside the map boundaries so that observers may more easily orient themselves for the most exact placement of sightings on the map. A clipboard crew box or accordion file contained digital images that point out the natural features referenced on the maps if volunteers need them.

2.10.4 Oral History Form

The oral history form records contact details of people who were encountered during the survey, and who had potentially valuable information on beluga observations.

2.11 Incidental Sightings

“Incidental” beluga sightings refer to reports outside the designated survey. Trained observers sometimes used ACBS incidental data forms for belugas sightings that occurred en route between sites during a survey, or when observers were off duty. Anyone may use these forms to report sightings to FAR, who will then include them in the database with a specific code so that the information is retrievable, but separate from the survey effort. Incidental reports are valuable because they give us more information about Cook Inlet belugas that would not otherwise be available.

2.12 Data Management

FAR designed and maintains its own database with assistance from NMML and local volunteers who work or have worked with databases and database management. The FAR Fieldwork and Volunteer Database is an MS Access 2007 data collection system. FAR initiated the system in December 2010 and FAR’s Data Manager maintains it with technical support from NMML and local volunteers with database expertise. The data belong to FAR and there are currently no

plans to put the database online, but interested researchers may contact FAR if they wish to request data for which they must sign the terms of use agreement.

2.12.1 Data Collection

Trained field volunteers submitted field observation data reports daily, verifying correct and accurate data. These reports described status of beluga sightings, locations and environmental conditions. The field team leader reviewed the data sheets for accuracy and completeness then submitted them to the FAR Data Manager for data entry. The Data Manager aggregated and reviewed all data for quality assurance.

2.12.2 Data Entry

Data entry for the beluga survey has been completed mostly with pairs of volunteers, one of which was the facilitator. This method was used to minimize errors and maximize speed. One person holds the data and reads it to the typist and at the same time spot checks what the person entered on a large screen.

2.12.3 Integrity of Data

The FAR Fieldwork and Volunteer Database System features the following procedures to ensure accurate data:

1. Annual volunteer training regarding requirements and procedures for reporting data;
2. Detailed data sheets prompt volunteers to collect all relevant data from environmental variables, to specifics about beluga groups.
3. Use of an MS Access data form for easier and more accurate data entry. Data input masks force consistent formatting of the data, such as date and time, as well as implementing dropdown lists to avoid keying errors. Required data entry fields ensure pertinent information is not missing (e.g., date, field location, member identification numbers); and

4. Semiannual data proofing to identify anomalies (data outliers and trends) by volunteers and data manager.

2.12.3.1 Ensuring Valid, Accurate and Timely Data

Edit Checking and Verification

The FAR Data Manager reviewed data for missing and/or illogical data entry (i.e. dates out of range) on an ongoing basis. Data entry sheets were reviewed by field location and date to find a specific report error, if any were present. The Data Manger then discussed errors with the field team lead when possible and made corrections. The database management team then compared data tables for consistency.

The FAR database management team incorporated data checking procedures during and after data entry to verify accurate and complete data; for example, the values of date of sighting yielded expected months and years, and if not, the end-user was alerted to an error in the date. The Data Manager, who knows the survey project well, was one of each pair of data entry volunteers.

Reliability

Reliability of the data involved several steps.

- Consistency of measurement:
 - The FAR data sheets provided detailed fields for collecting data to provide consistent reporting.
 - Field volunteers were asked to provide feedback on the consistency of the data and field experience.
 - The FAR database system utilized queries to check reliability of data entry throughout the year.
- If data format adjustments were necessary, the FAR Data Manager and programming volunteers re-examined the data formats and volunteer guidance or training; corrections

were made to the training protocol and corrected information was disseminated to end-users and programming volunteers.

Validity and Validation

Field volunteers had the first level of responsibility for submitting accurate data. FAR trained volunteers annually to highlight and review survey and data-collecting protocols for both new and returning participants. Survey crew leaders were a second level of responsibility for checking data sheets. The FAR Data manager was a third level of responsibility, reviewing all survey data sheets for completeness, and following up on any questions in a timely manner. A trained data entry volunteer working with the FAR Data Manager's overview of entries and immediate resolution of questions provided a fourth level of validation during data entry. Summary queries to check for outlying data and blank data fields provided a fifth level of validation. The data management team compared summaries of data of dates and volunteers from the Access database to Excel spreadsheets used to schedule survey shifts. FAR reviews current data as soon as possible after the end of each season, and reviews trend data every few years (the interval of which is yet to be determined). Peer review provides incentive to improve results.

Data entry training was provided to new volunteers as needed and focused on the importance of accurate data entry and data management. Follow-up training information was provided as needed and is ongoing.

2.12.3.2 Ensuring Security and Confidentiality of Data

There is one computer that houses the FAR data system. Backups of the data are completed regularly. This computer is housed in a secured room with restricted access. All volunteer end-users worked off line on a copy of the database. The FAR Data Manager limited use of the physical computer housing FAR data. Database training for new volunteer included reviews of this information and the requirements of confidentiality.

3. RESULTS

This section summarizes ACBS data collected between 2008 and 2011 and covers overall beluga observations, behavior, number of survey days, precipitation and other weather conditions, and boat traffic.

3.1 Overall Survey Results

In Sections 3.1.1 and 3.1.2 effort is quantified by days per year, per site, and time ranges as well as volunteer hours spent scanning for belugas, hours dedicated to survey related work, and in organizational support work. Section 3.1.3 is a recap of overall beluga observations and the depiction of belugas documented throughout the project on digitized maps.

3.1.1 Effort in Survey Days per Year and Time Ranges

The 2008 ACBS occurred from October 12th through November 8th. In 2009, the ACBS ran from June 9th through October 30th. The 2010 ACBS took place between August 10th and October 31st. The 2011 ACBS occurred in three time blocks - between May 8th and May 22nd; between August 13th and September 28th; and, from October 1st through November 1st (Table 3.1.1.1).

Over the course of four years, ACBS volunteers logged 444 observation hours (see Fig. 3.1.2.1) at 12 survey sites around Anchorage waters (Table 3.1.1.2). Volunteers collected the most data sets for the MotoX site, at which FAR maintained a 4-year observation regimen, counting the trial run during 2008. The ACBS surveyed one site (Ship Creek) for 2008 and 2009 only, whereas FAR included additional sites in 2010 as a response to requests by NMML for data at these localities.

Table 3.1.1.1. List of survey sites with time ranges during each season*.

* Although dedicated beluga data exists for PP#2, Woronzof Beach, and one site between Past Bird and Tidewater they are not included in the time range table because those survey shifts although complete, were additions to the schedule.

Survey site	Survey time span			
	2008	2009	2010	2011
MotoX	18 - 22 Oct.	10 Jun. - 30 Oct.	10 - 28 Aug. 5 Sep. - 31 Oct.	13 Aug. – 28 Sept. 1 Oct. – 1 Nov.
PP#1	21-22 Oct.			
Ship Creek	12 Oct. - 12 Nov.	9 Jun. - 30 Oct.		
TA Potter			5 Sept. – 31 Oct.	8-22 May 13 Aug. – 28 Sept.
TA Windy			5 Sept. – 31 Oct.	8-22 May 13 Aug. – 28 Sept.
TA Past Bird			5 Sept. – 31 Oct.	8-22 May 13 Aug. – 28 Sept. 1-31 Oct.
TA Tidewater			5 Sept. – 31 Oct.	8-22 May 1-31 Oct.
TA Avalanche				8-22 May 1-31 Oct.
TA 20-Mile				8-22 May 1-31 Oct.

During 2008 to 2011, FAR volunteers dedicated beluga observation shift time on 175 days. Of those 175 scheduled days, volunteers completed 160 days, the discrepancy due to cancellations, mostly for excessively inclement weather. 2008 was the trial season for which the ACBS scheduled crews on 10 days; 81 days in 2009; 28 days in 2010; and 41 days in 2011. The ACBS gathered most data in 2008 from Ship Creek and the MotoX sites; close to the same amount at those two sites in 2009; the MotoX site in 2010; and TA Past Bird in 2011.

Table 3.1.1.2. Number of Days Surveyed per Season from each Project Site.

Table illustrates the number of days that ACBS crews completed shifts at each observation site per season; the number of shifts scheduled per site per season; the days scheduled for the survey per season; the days with complete shifts (that were not cancelled) per season; and totals.

ACBS Observation Site	Pre-survey	2008	2009	2010	2011	Totals	Total seasons
PP#1		2				2	1
PP#2	ne*	ne	ne	ne	8	8	>4
MotoX	dne	5	50	29	22	106	>4
Ship Creek		5	42			47	2
TA Potter				18	22	40	2
TA Windy				18	22	40	2
TA Past Bird				18	29	47	2
Between PastBird/ Tidewater				1		1	
TA Tidewater				18	15	33	2
TA 20-Mile					7	7	1
TA Avalanche					8	8	1
Woronzof Beach/Bluff					1	1	1
<i>Total complete ACBS shifts</i>		12	92	102	134	340	
<i>Number of shifts scheduled</i>		12	105	106	150	373	
<i>Days With Complete shift</i>		10	81	28	41	160	
<i>Days scheduled</i>		10	89	30	46	175	

*Project lead spot data entered for 2011. *Ne=not entered.*

3.1.2 Total Number of Volunteer Hours and Observers (per year)

A total of 444 scheduled hours were spent by ACBS volunteers scanning the waters of Cook Inlet for belugas, over a total of 348 survey shifts for the four years of the survey (Fig. 3.1.2.1). A total of 133 volunteers participated in survey shifts, often multiple times throughout the season. If counting each individual volunteer's effort time separately, there were 1472 hours and 23 minutes of ACBS volunteers scanning for belugas. In addition, ACBS volunteers expended another 1481 hours and 39 minutes of volunteer time preparing for shifts and traveling to and from survey sites (Fig. 3.1.3.2.). The inclusion of time keeping for office work in 2011 shows an additional 419 hours 23 minutes spent on the ACBS project with another 732 hours and 50 minutes spent on required duties to support the FAR organization. The number of survey shifts each year reflects available volunteer man-power as well as weather conditions.

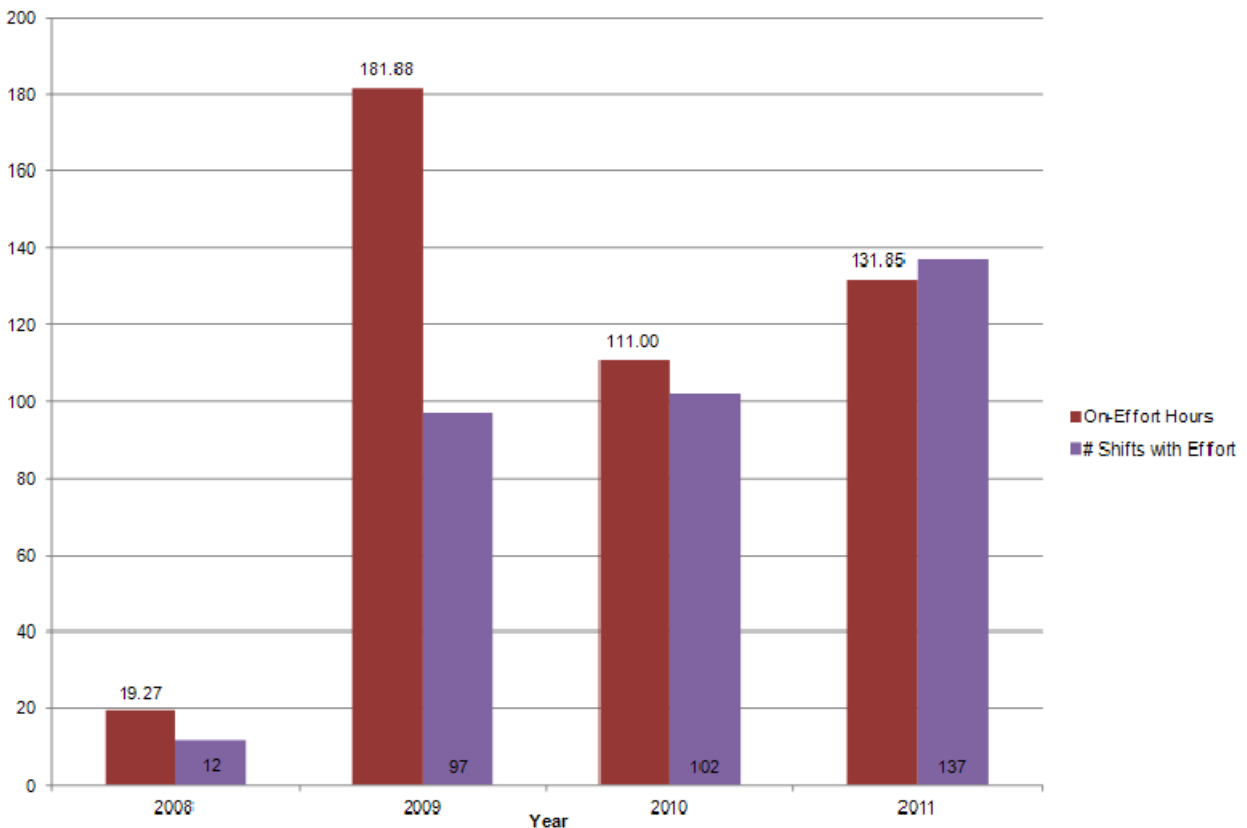


Figure 3.1.2.1. Cumulative ACBS beluga-scanning effort and shifts from 2008 to 2011. ACBS time spent scanning for belugas along with the total number of survey shifts. (Number above red bars=hours spent scanning for belugas. Numbers at bottom of purple bars=number of beluga survey shifts.)

These numbers do not include the 29 shifts that were cancelled before volunteers arrived and set up on site, but include those shifts where survey efforts began but were cancelled due to weather conditions. Where records of incidental beluga sightings by volunteers were actually part of a scheduled shift (when transiting between official project sites) the time is included in the graph below (Fig. 3.1.2.2).

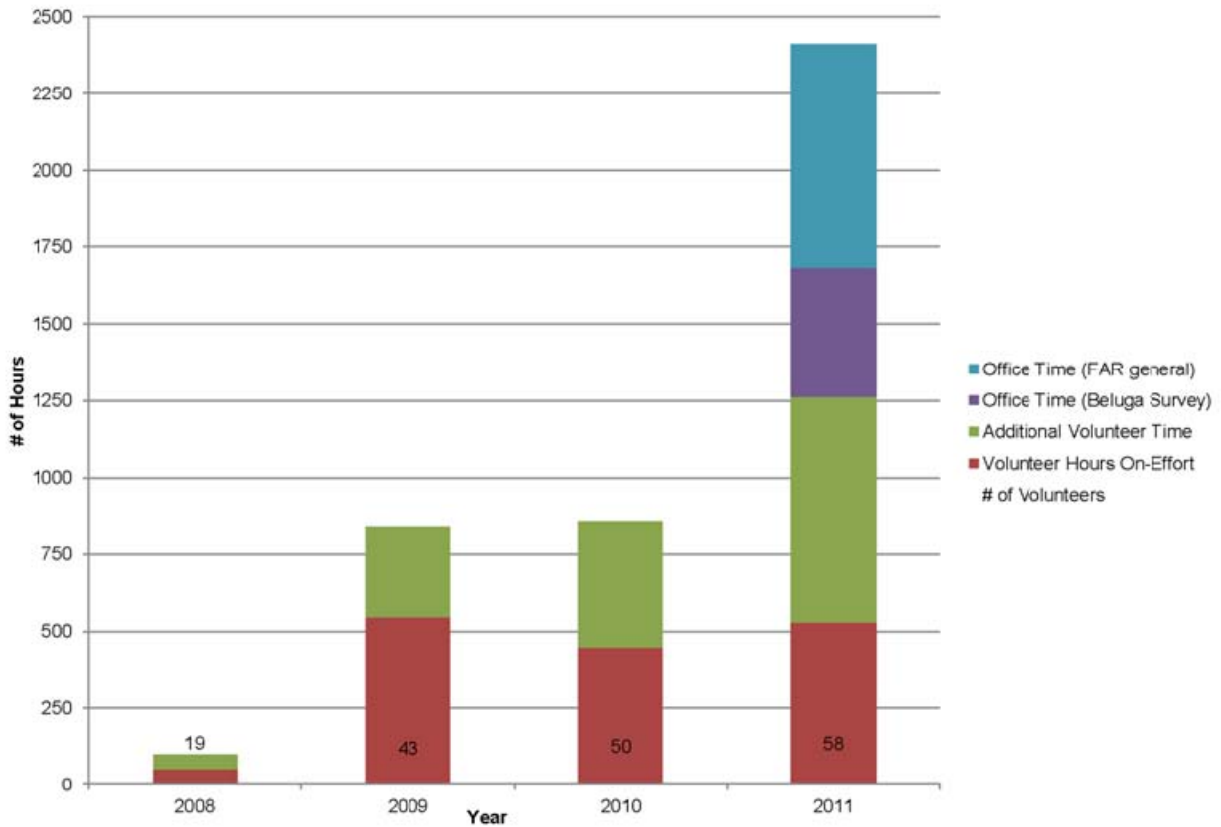


Figure 3.1.2.2. Total Volunteer hours that contribute to beluga survey.

Total volunteer hours spent scanning for belugas during shifts are shown in red. Additional volunteer time (green) reflects preparation time and travel for beluga survey shifts. Office time (only recorded for 2011) shows the additional time it takes to prepare for the beluga survey during the off-season and supporting the survey outside of direct participation in survey shifts. The number of volunteers per year reflects individuals that participated in survey shifts, often multiple times throughout the season.

In 2008, the ACBS trained 26 volunteers and 17 were actually available for scheduling. In 2009, of 50 trained volunteers, 39 were available for scheduling. That number was enough for just two sites. In 2010, of 61 trained volunteers, 46 were available for scheduling, and in 2011, of 71 trained volunteers, 51 were available for scheduling. Not all volunteers were available at the same times during a given season. Over the course of the survey 133 different individuals served as trained volunteers on observation crews.

The number of trained volunteers available in 2011 was as follows: May=26; August=41; September=45; and October=40. While these numbers were sufficient to staff two crews, it was not enough to include the third crew which we had hoped to do this season. Scheduling spreadsheets using tides and daylight hours, data sheets and maps were ready to include a third crew. Plans for the third crew included a split of the Turnagain Arm sites to help keep shift times low, as we have found that longer shifts are harder to staff.

At the close of the 2011 season, six of the 17 original volunteers have stayed with the project since its trial run; five others have been with us since 2009; 10 others have been with us since 2010; and 29 were new in 2011. Those not included in this accounting were with the project for only one of the listed seasons.

3.1.3 Total Number of Belugas Observed (per year)

Dedicated and supplemental study site records, also known as “on-effort” and complete data, are graphed in Figure 3.1.3.1. The ACBS does not currently identify individual belugas, so many were likely observed multiple times each season. Over the course of the four years of the project at dedicated and supplemental sites volunteers recorded 507 beluga whales in 77 groups, of which 31 of the whales were identified as calves, excluding incidental sightings. When incidental reports are included, over the four-year period, with many whales likely observed multiple times each season, the total is 680 belugas whales (Fig. 3.1.3.2), in 106 groups, of which 43 of the whales were identified as calves.

The observation site that had the largest total number of beluga observations was the MotoX site with 202 whales (27 groups), 16 of which were calves (Fig. 3.1.3.3). This survey site also had the highest number of effort hours by a significant margin. The site with the lowest number of belugas observed was PP#1, with a best total of four; this site had only 4.23 hrs of dedicated survey time. Ship Creek had one of the lowest numbers of belugas observed, yet had the second highest observation time of almost 95 hrs over a two-year period.

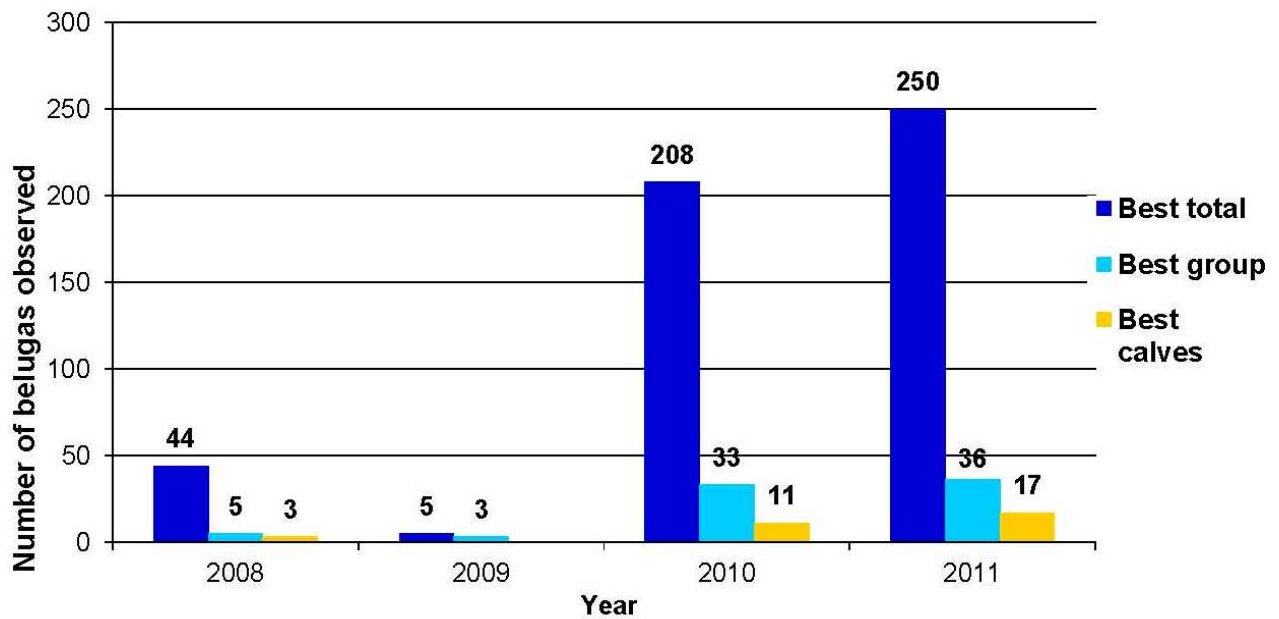


Figure 3.1.3.1. Number belugas observed on-effort by ACBS volunteers, 2008-2011. Total individual dedicated and supplemental beluga sightings throughout project.

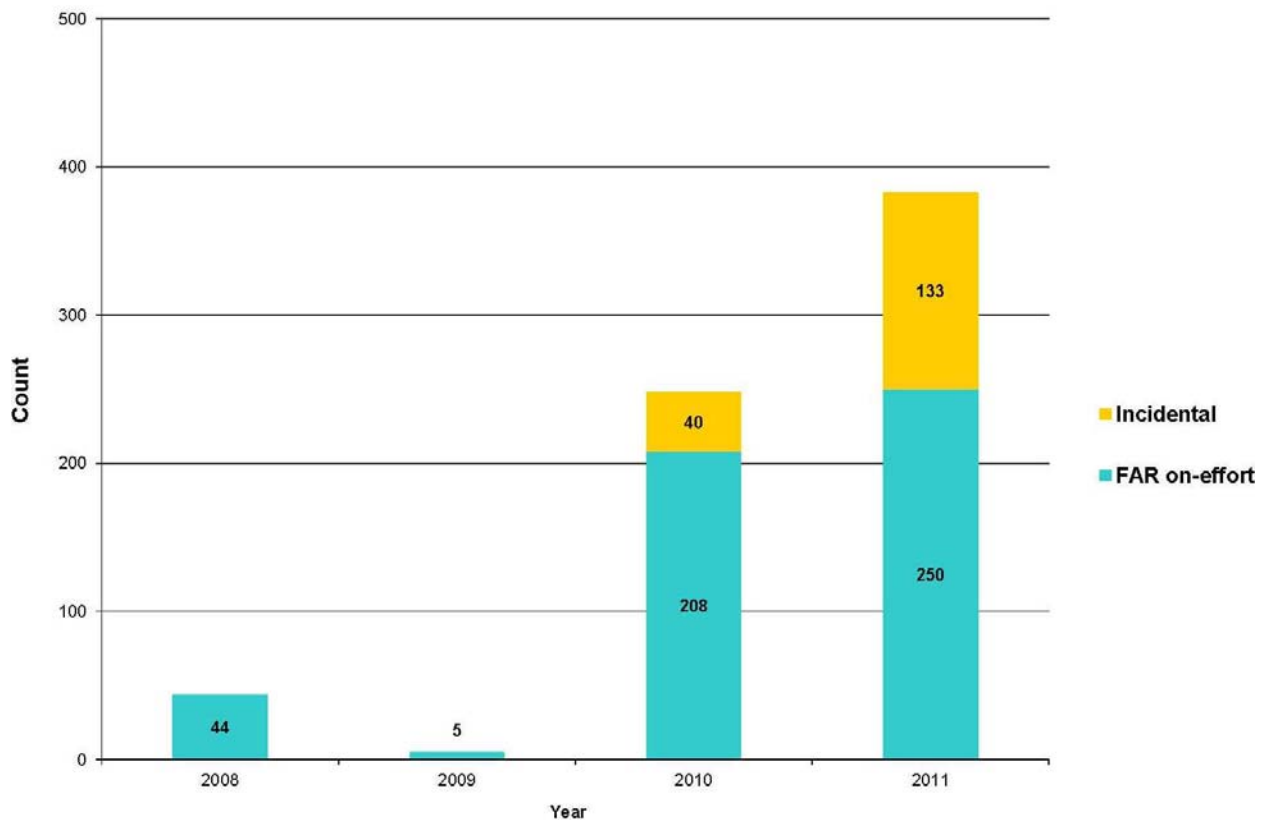


Figure 3.1.3.2. Total number of beluga observations (dedicated, supplemental, and incidental) for the entire ACBS project period, 2008-2011. On-effort refers to dedicated and supplemental totals.

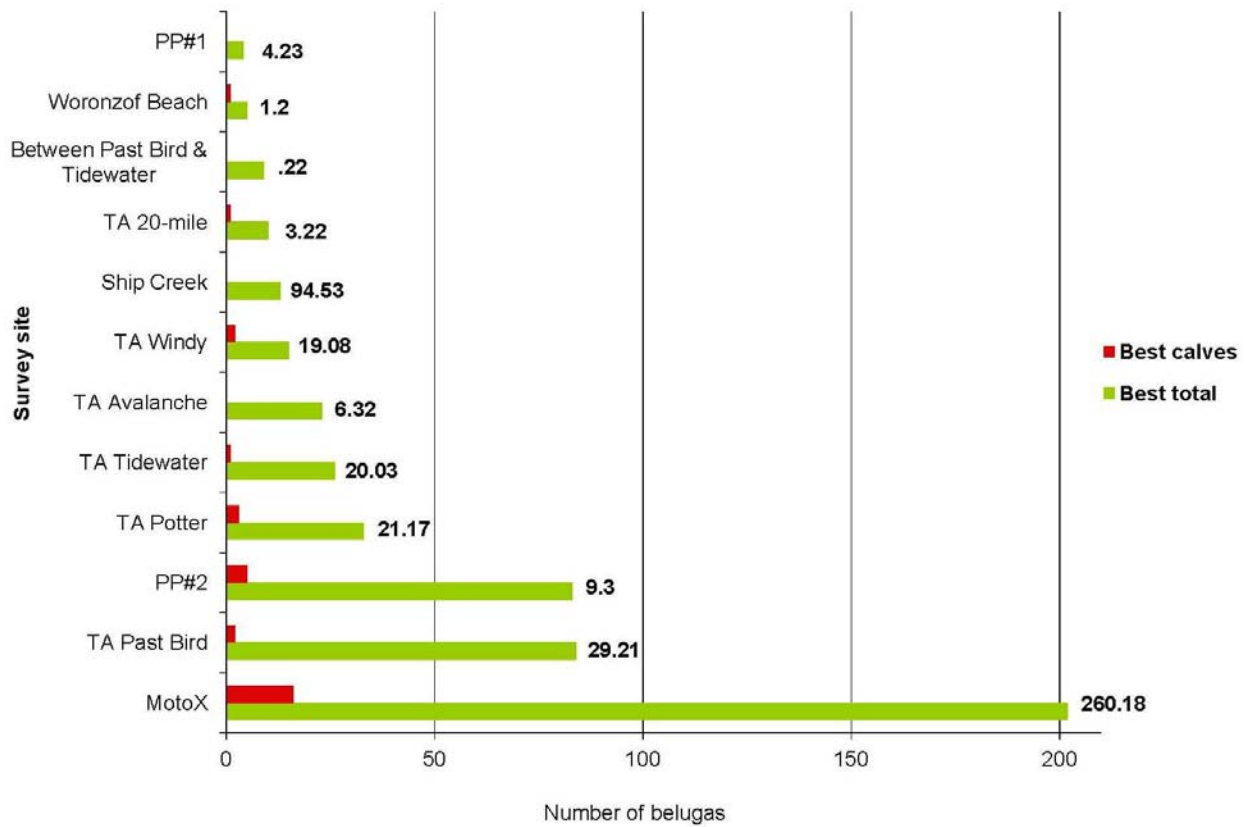


Figure 3.1.3.3. Number of belugas observed at each ACBS project site 2008-2011 (Numbers after bars indicate total observation hours for each survey site).

Figure 3.1.3.4 shows all project locations; dedicated, supplemental (both on-effort), indicated by the red dots, and incidental (off –effort) beluga sightings, indicated by the yellow diamonds; and nearby features such as creeks, part of Fire Island, bays, mudflats, channels, and tidal guts. This figure places the coastal project area in the context of the MOA bowl. Generally the coastal wetlands, mud flats and offshore waters between Point Woronzof and Potter Section House are the areas that comprise the 16-mile ACWR (Figs. 3.1.3.5 – 3.1.3.7). As noted in the maps and figures (Figs. 3.1.3.4 – 3.1.3.9), beluga sightings are often clustered near the mouths of fresh water sources with known salmon runs such as Ship, Fish, Campbell, Bird, Glacier, Kern, and Seattle Creeks, and Twenty-Mile River. These maps illuminate area Inlet channels, mudflats, tidal guts and creeks, all important to predict where to watch for belugas. The water is shallow in most of the project area, and to swim when the water level is not extremely high, belugas stick mainly in said channels, tidal guts and creek outflows. Volunteers have been surprised to observe that belugas cannot only swim in water barely deep enough to cover them, but they can

also remain mostly invisible to observers on the shore if they stay mostly submerged as they sometimes do. Figures 3.1.3.5 and 3.1.3.6 include lower TA beluga sightings by year and group size, respectively, while Figure 3.1.3.7 zooms in for a closer look at specific beluga group sizes between Campbell Point and Private Property #1. Figures 3.1.3.8 and 3.1.3.9 provide views of beluga sightings and groups sizes observed at the lower to upper TA sites.

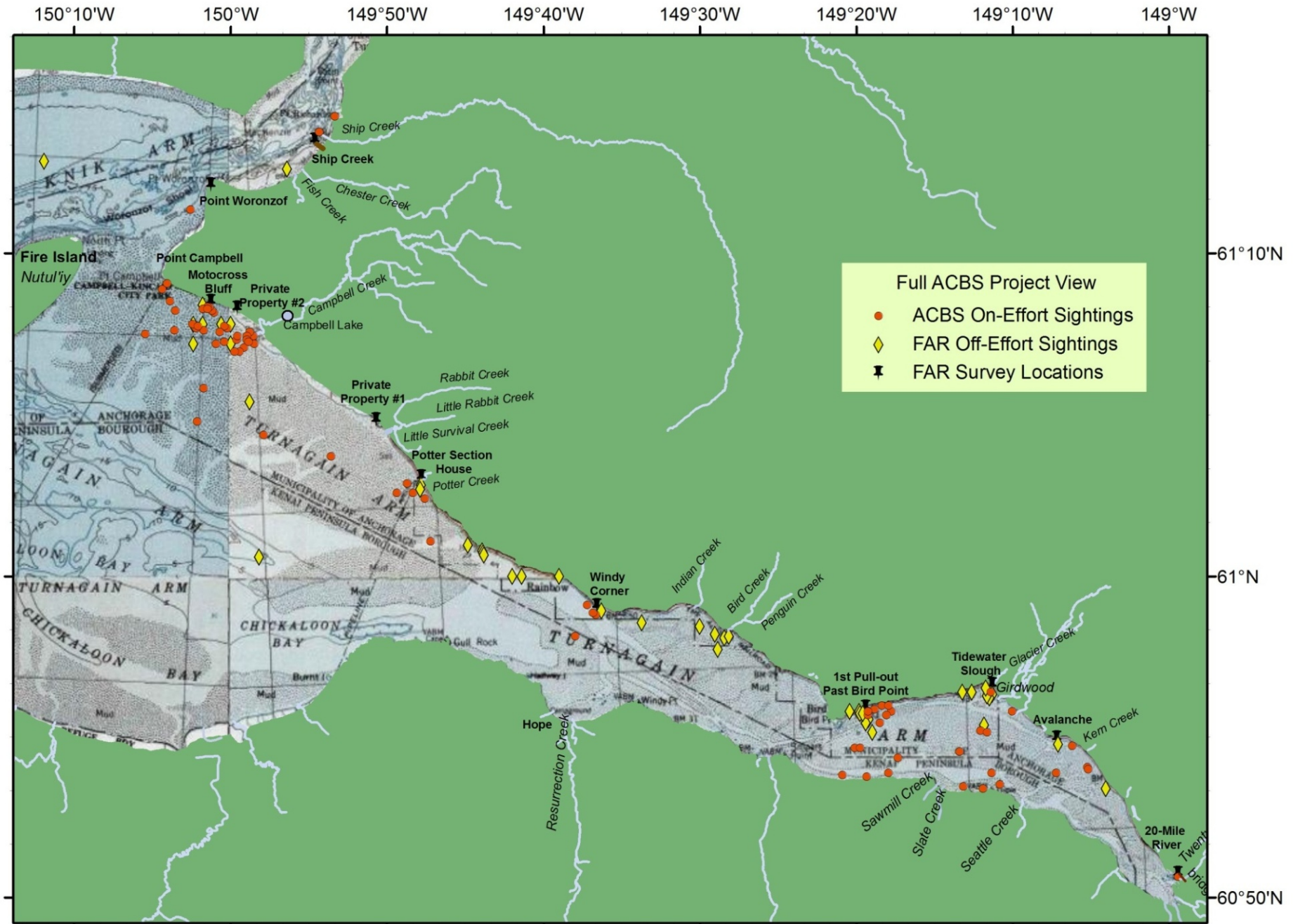


Figure 3.1.3.4. Overview of ACBS study sites, dedicated, supplemental, and incidental beluga whale sightings, 2008-2011.

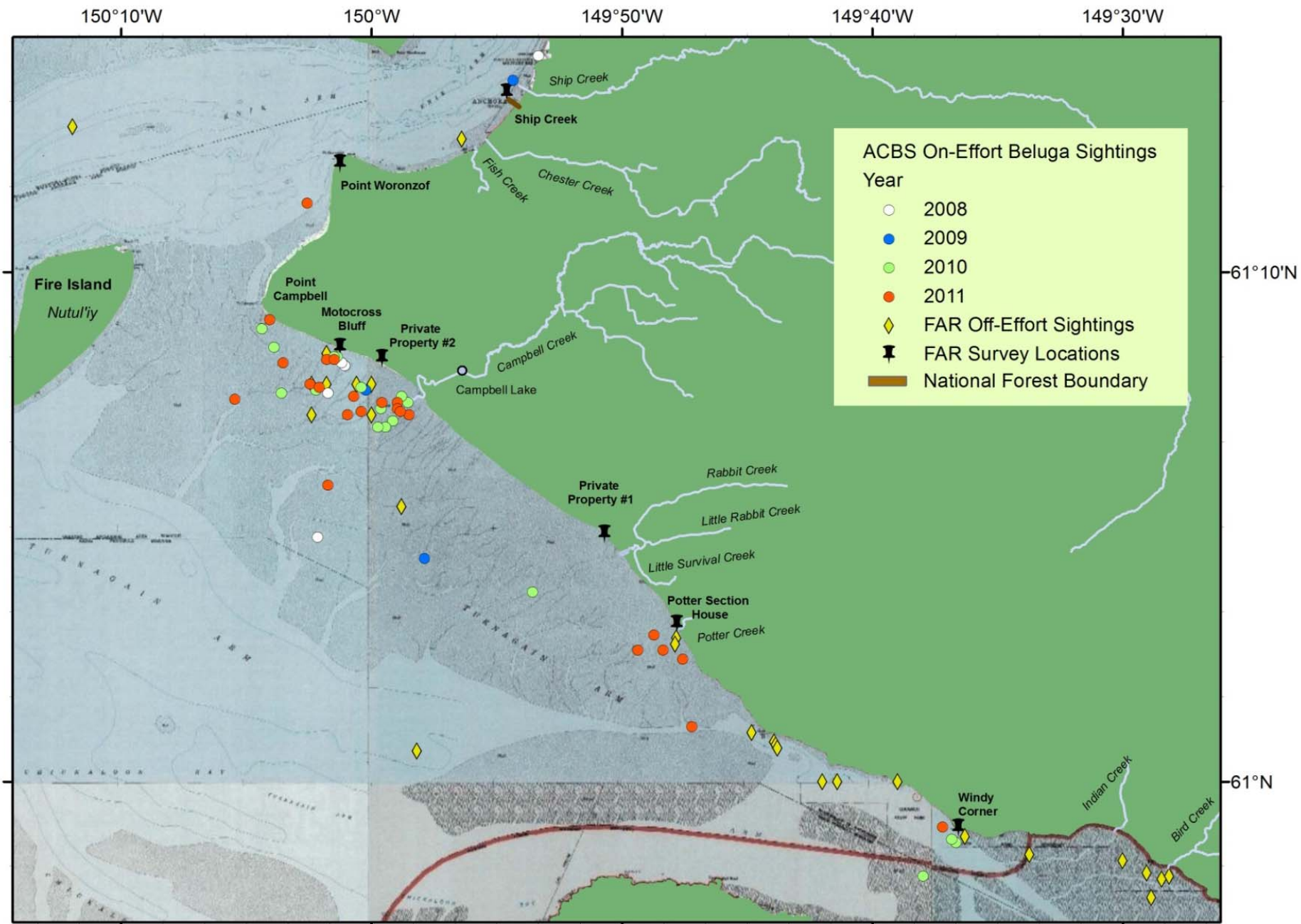


Figure 3.1.3.5. Map of ACBS project area showing beluga sightings by year for sites Ship Creek to Windy Corner.

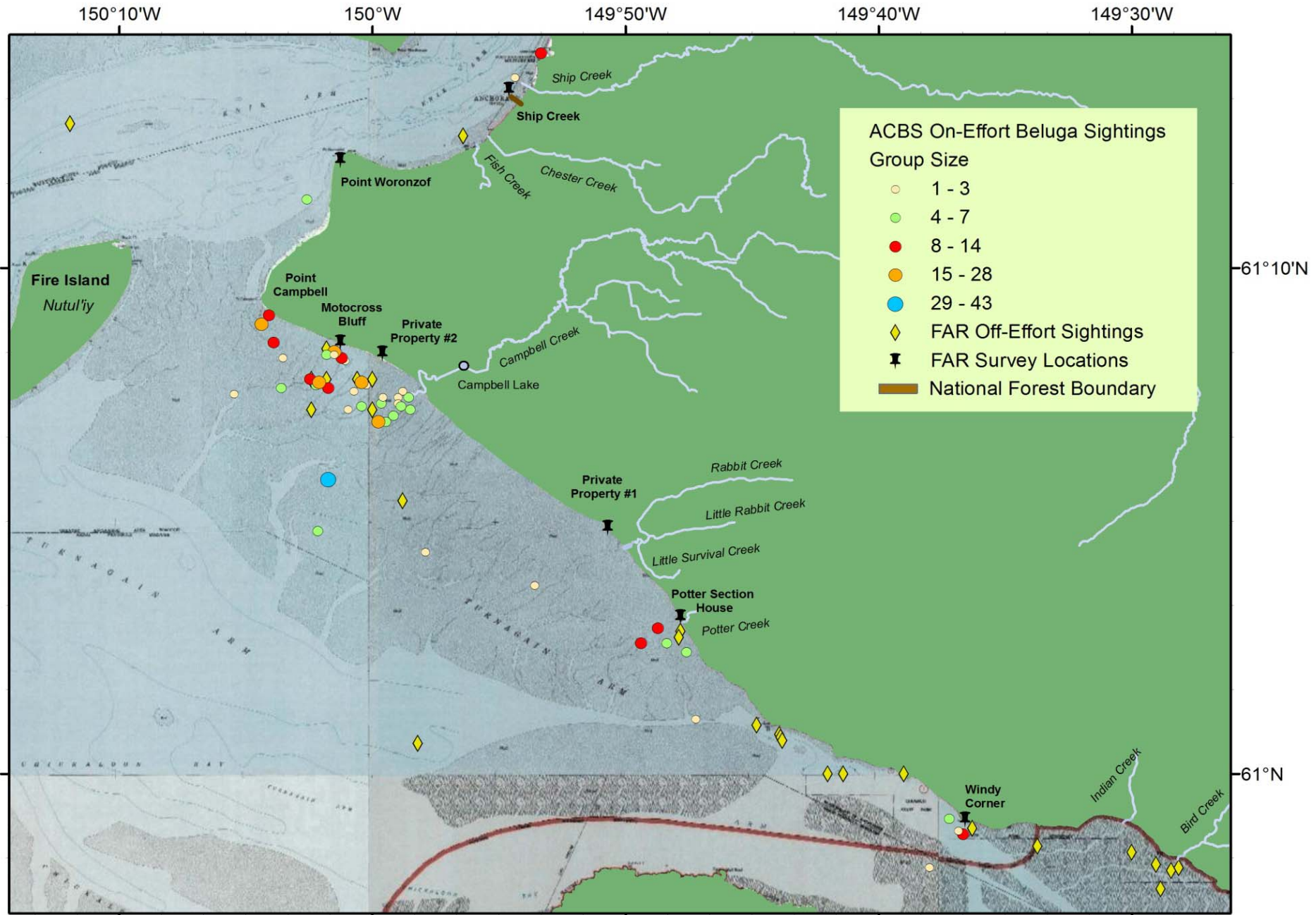


Figure 3.1.3.6. Map of ACBS project area showing beluga group sizes for sites Ship Creek to Windy Corner.

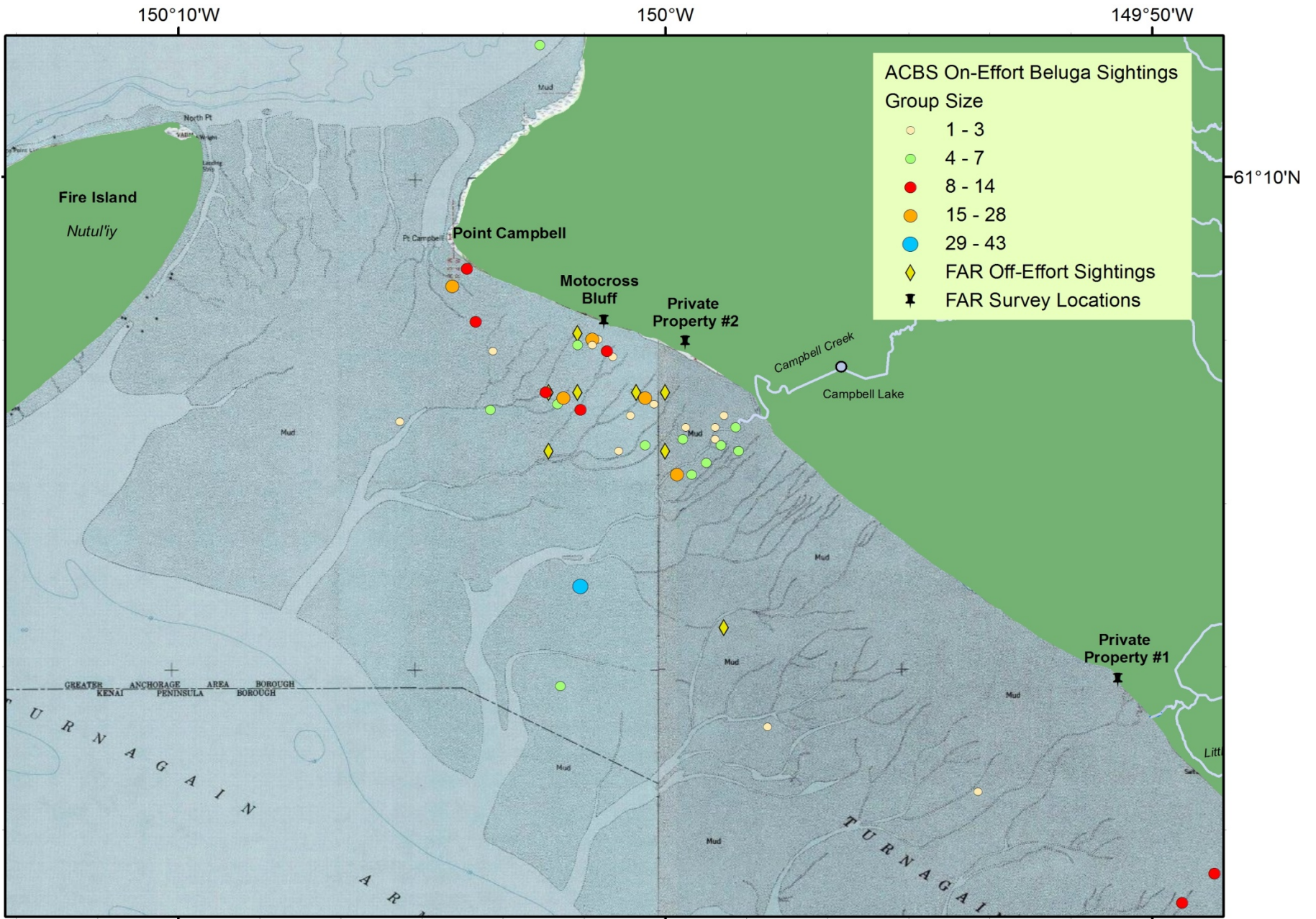


Figure 3.1.3.7. Map of ACBS project area showing beluga group sizes (zoomed in) roughly between Point Woronzof and PP#1.

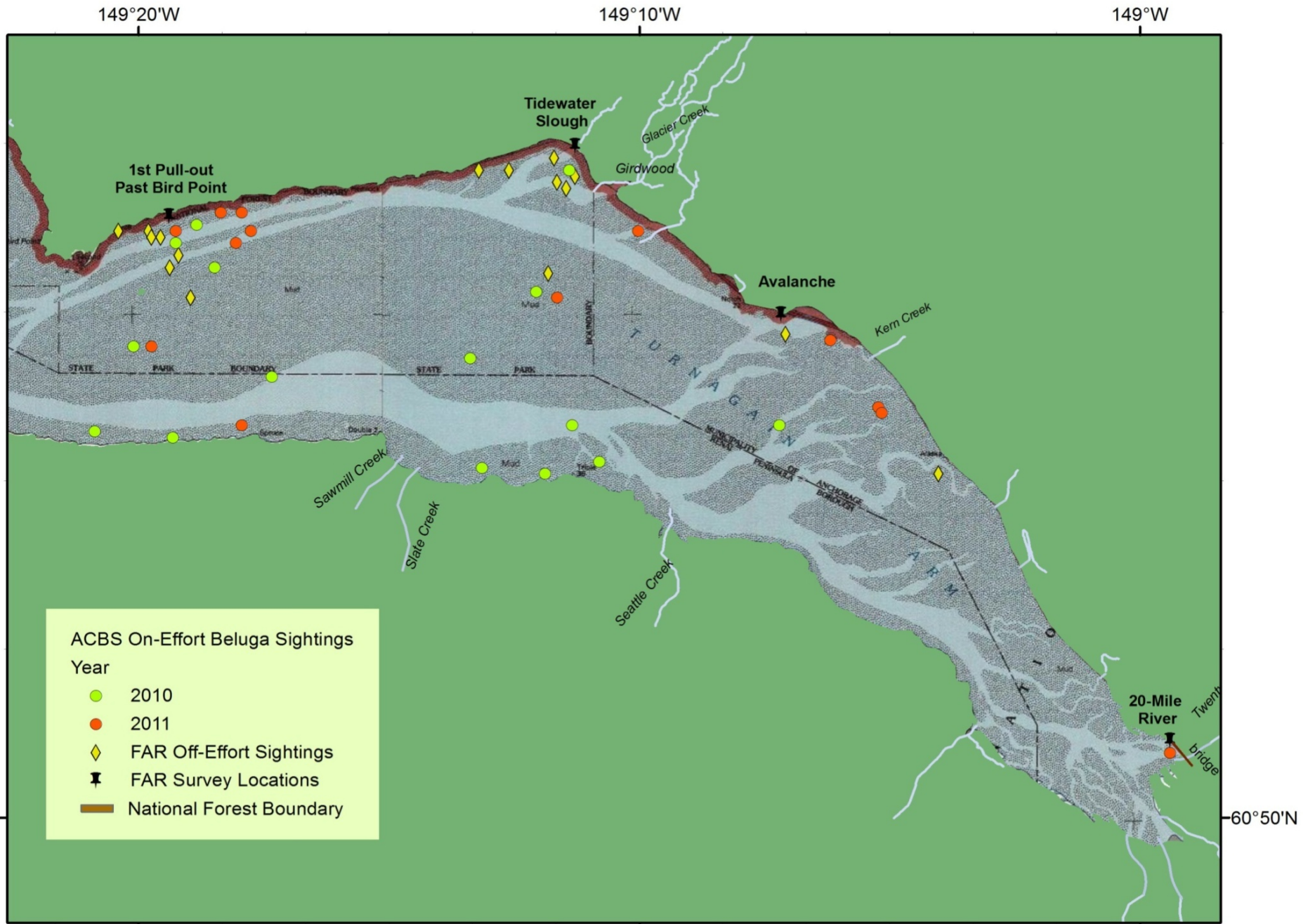


Figure 3.1.4.8. Map of ACBS lower and upper Turnagain Arm sites showing beluga sightings by year.

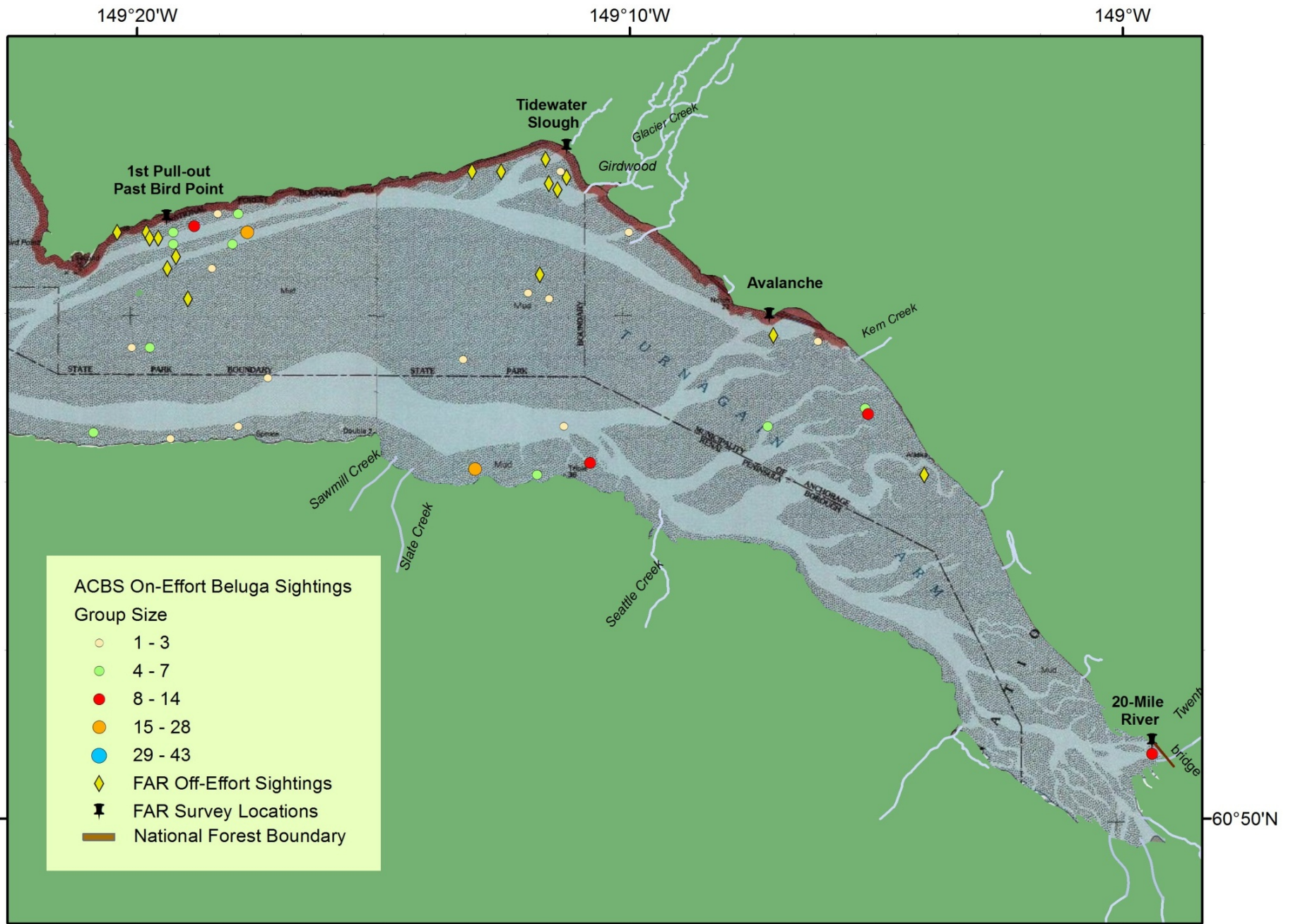


Figure 3.1.4.9. Map of ACBS lower and upper Turnagain Arm sites showing beluga group sizes.

3.2 Beluga Behavior Observed

Given the turbidity of Cook Inlet waters, underwater observation of whale behavior was nearly impossible; thus most behavior noted was that which occurred above the water line. Use of spotting scopes and binoculars helped observers track and watch whales from a distance. Behavioral categories on ACBS data sheets included: milling, body contact, resting, diving, spy hopping, tail waving, tail slapping, vocalizing, porpoising, and spouting. Of 106 beluga groups observed and charted by ACBS volunteers, 31% of the groups included milling activity, 38% porpoising, and 33% spouting.

During sighting events, observers primarily charted location and direction of movement as best possible using maps and other survey equipment. In addition to noting the presence of the before mentioned behavior categories, more lengthy behavioral comments also noted more complex surfacing behavior as well as group composition. Most notable comments focused on surfacing behavioral changes around boat activity as well as movement patterns around creek mouths and possible foraging behavior. Notable behaviors recorded at specific project observation sites are described in section 3.3 with the observation site to which the statements refer.

3.3 Survey Sites with Four or more Months of Effort

3.3.1 Ship Creek

Volunteers collected weather data at Ship Creek during the 2008 and 2009 survey period. October 2008 had both the coldest temperature (-6.7°C) and the warmest (28°C), with a mean temperature for that year of 5.3°C (Fig. 3.3.1.1.). Mean air temperatures for Ship Creek during the survey period ranged from 3.1°C - 13.7°C . Mean wind force for Ship Creek ranged between force 1 and 3 on the Beaufort Wind Scale (BF) (Fig. 3.3.1.2.). The strongest winds were recorded in October 2009 (7 BF), and a minimum of 0 documented in the months of June, July, August and September 2009. Observers recorded fog and snow 50% of the time at Ship Creek during survey observations in October 2008 (Fig. 3.3.1.3.). November 2008 had only one survey day (during which no precipitation was recorded). The remaining months showed rain between 10% and 22% of the time during survey efforts.

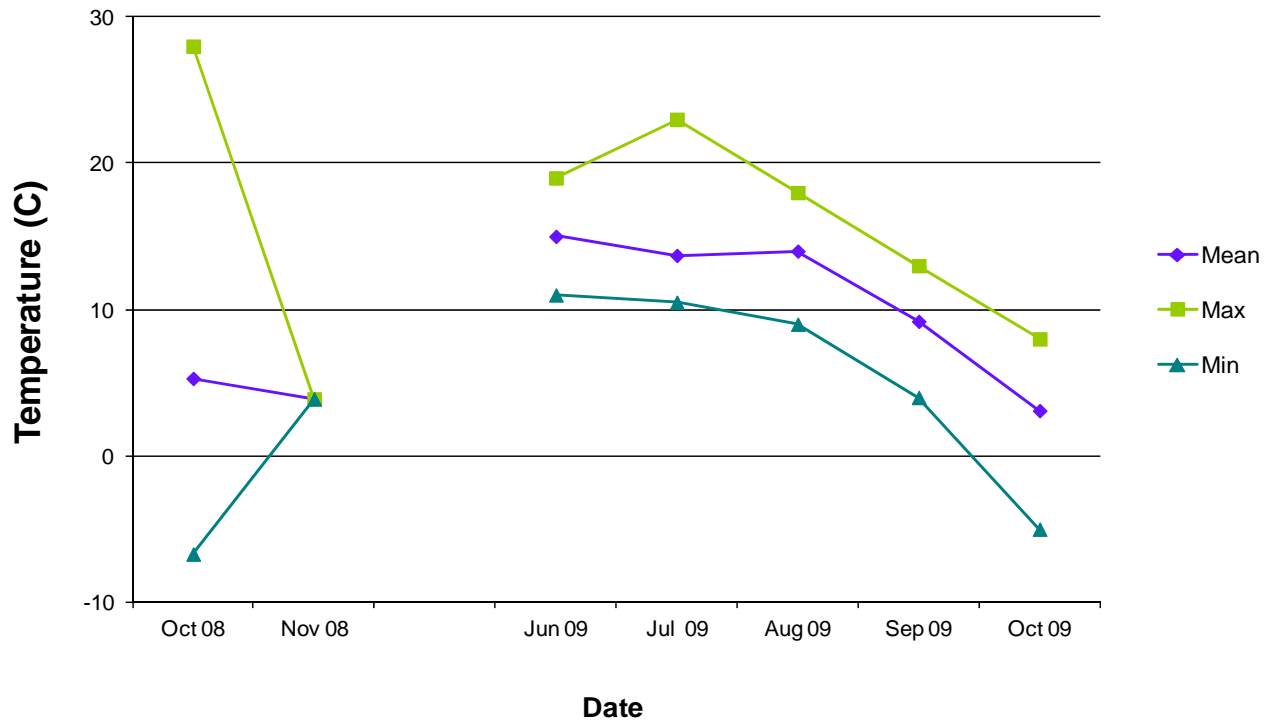


Figure 3.3.1.1. Temperatures recorded at Ship Creek during the ACBS in 2008 and 2009 (note: one data point only for November 2008 survey period).

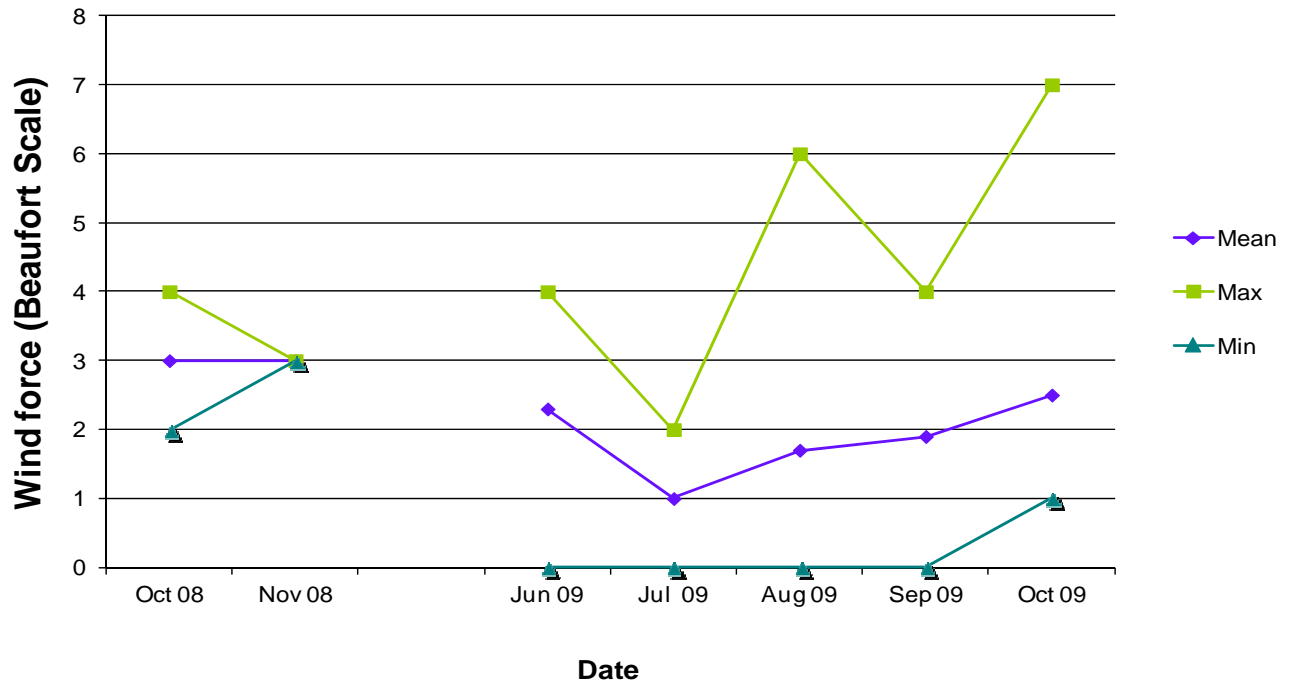


Figure 3.3.1.2. Wind force recorded at Ship Creek during the 2008 and 2009 ACBS (note: one data point only for November 2008 survey period).

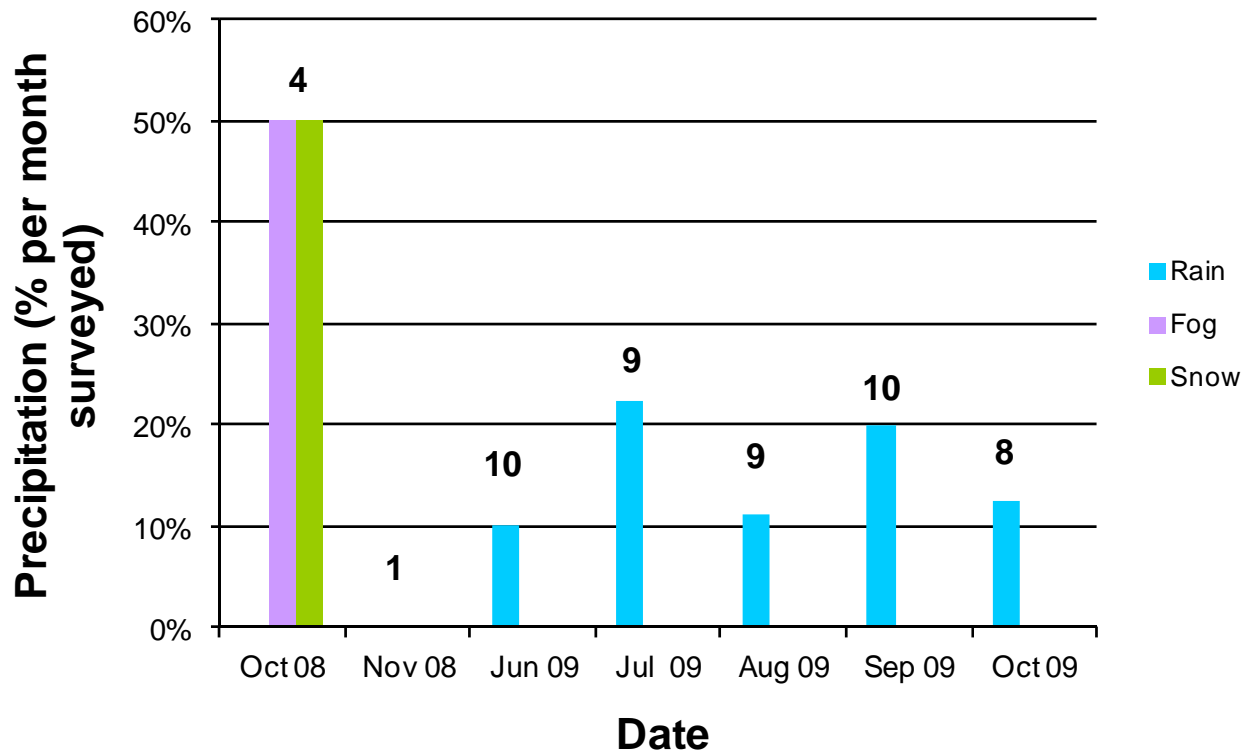


Figure 3.3.1.3. Precipitation recorded at Ship Creek during the 2008 and 2009 ACBS (Numbers above bars indicate number of days precipitation was recorded for each survey month).

ACBS volunteers at Ship Creek recorded the lowest number of beluga whales observed during the two years of surveys. Despite over 94 hours of scan time, observers were able to document one group of twelve whales in November 2008 and only a single whale in 2009 (Fig. 3.3.1.4). Volunteers documented no calves during the survey period. Boat traffic was high at Ship Creek, compared to other survey sites and crews were scheduled at low tide at this location. During 2009, there were 29 days in which boats were observed at the survey site, the highest traffic period being in August 2009 (Fig. 3.3.1.4).

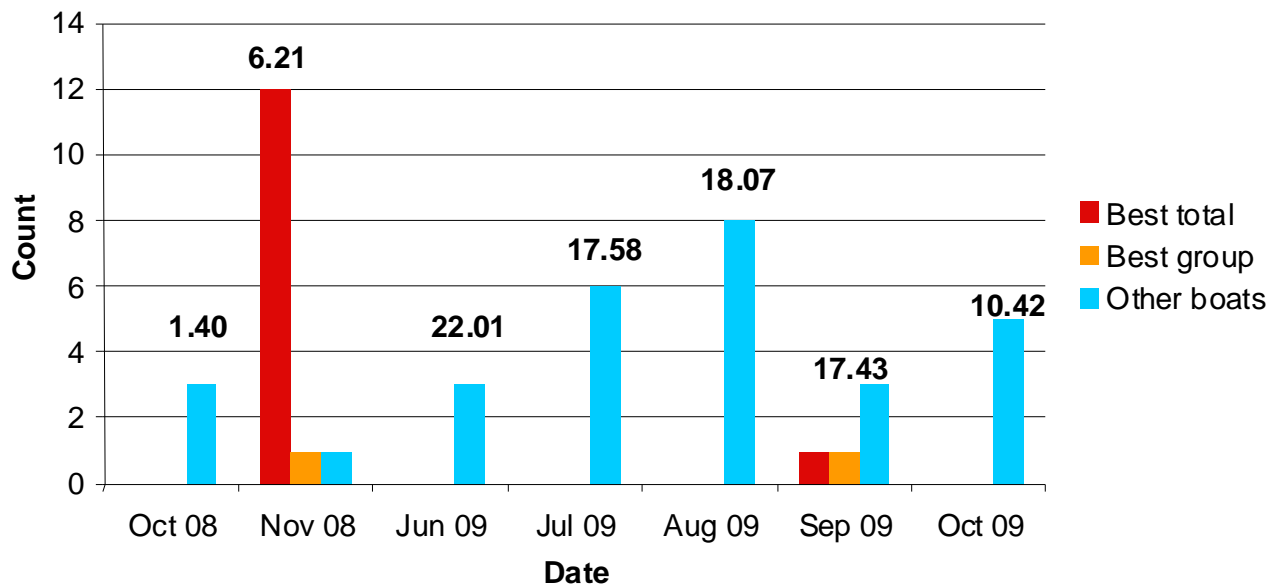


Figure 3.3.1.4. Ship Creek beluga and boat observations. Numbers of belugas and days boats were observed at Ship Creek during the ACBS project period 2008-2009 (Numbers above bars denote observation time for each month surveyed).

3.3.1.5 Ship Creek beluga Behavior Observations

During the observations of belugas at Ship Creek, the behavior description of the one group of whales observed in 2008 noted porpoising movements associated with travelling; decreased surfacing associated with boat traffic; and noise associated with an F-15 jet take-off. The only other observation of belugas at Ship Creek was of a single whale that spent time around the Ship Creek outflow.

3.3.1.6 Human Activity

Ship Creek is a popular fishing destination and a good place to watch wildlife. Local fishermen frequent this spot as well as visitors from Anchorage and around the world, who stop to take in the activity of the scenic spot next to the busy POA. To the immediate left of the jetty is the ramp where owners of small boat lower them to launch and take out on the high tides.

3.3.2 MotoX

FAR volunteers documented a range of temperatures at the MotoX observation site over the four year survey period, with the coldest recorded in October 2008 and 2010 (min. -1°C), and the warmest days in June 2009 (max. 27°C) (Fig. 3.3.2.1). Wind force at the MotoX site was strongest in the months of July and August 2009 (7 BF). The average wind force for MotoX was between 2 and 3 BF (Fig. 3.3.2.2). Rain was the predominant form of precipitation recorded at the MotoX survey site, with all months having rain except October 2008 and August 2008 (Fig. 3.3.2.3). In October 2008, volunteers documented fog for 20% of survey days in which precipitation was recorded. Snow was not recorded at the MotoX site during active survey days, although snow may have been present on days when surveys were canceled due to weather. Artificial fog for the filming of a movie at nearby Jewel Lake obscured visibility at the MotoX site on three days during October 2010 (Fig. 3.3.2.4) when it drifted to settle along the coast.

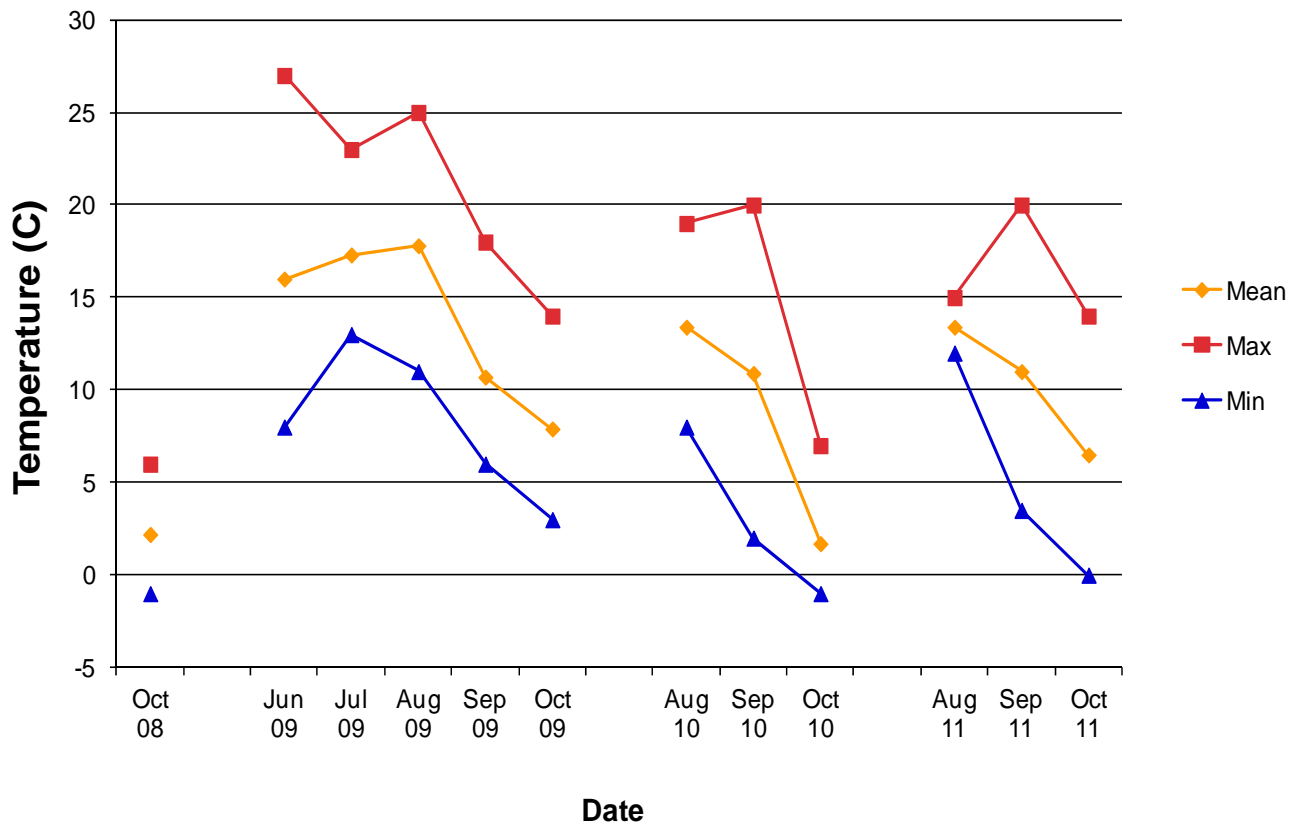


Figure 3.3.2.1. Temperatures recorded at MotoX during the ACBS, 2008-2011.

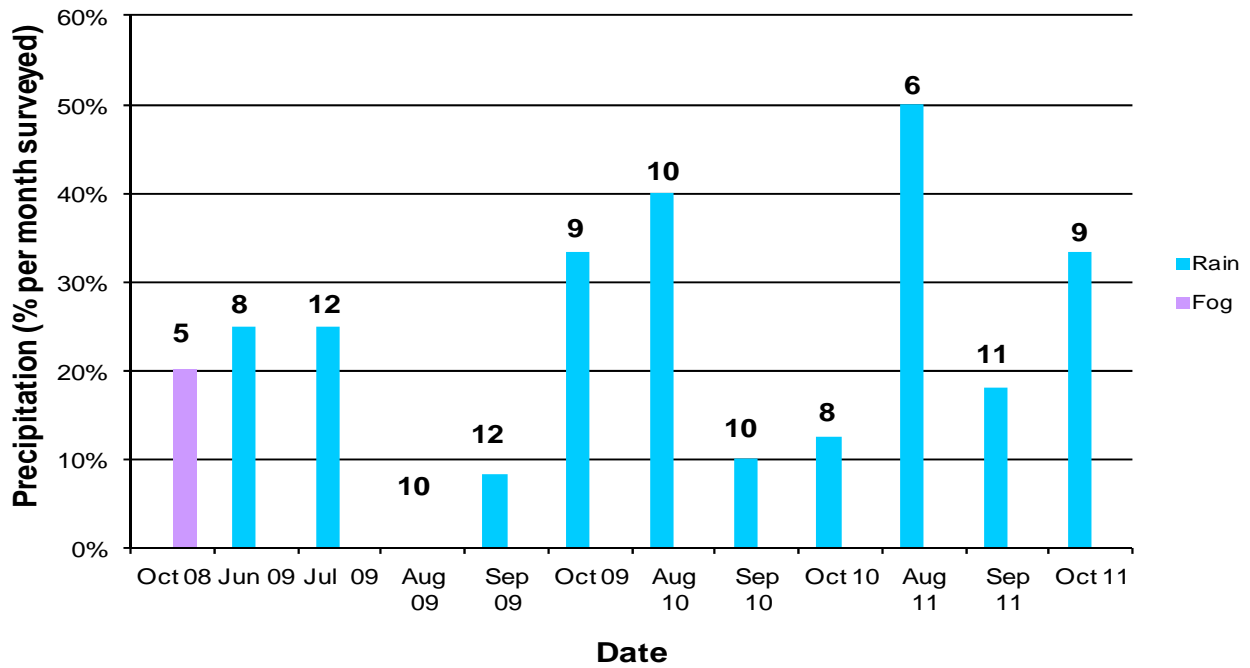


Figure 3.3.2.2 Wind force recorded at MotoX during the ACBS, 2008-2011.

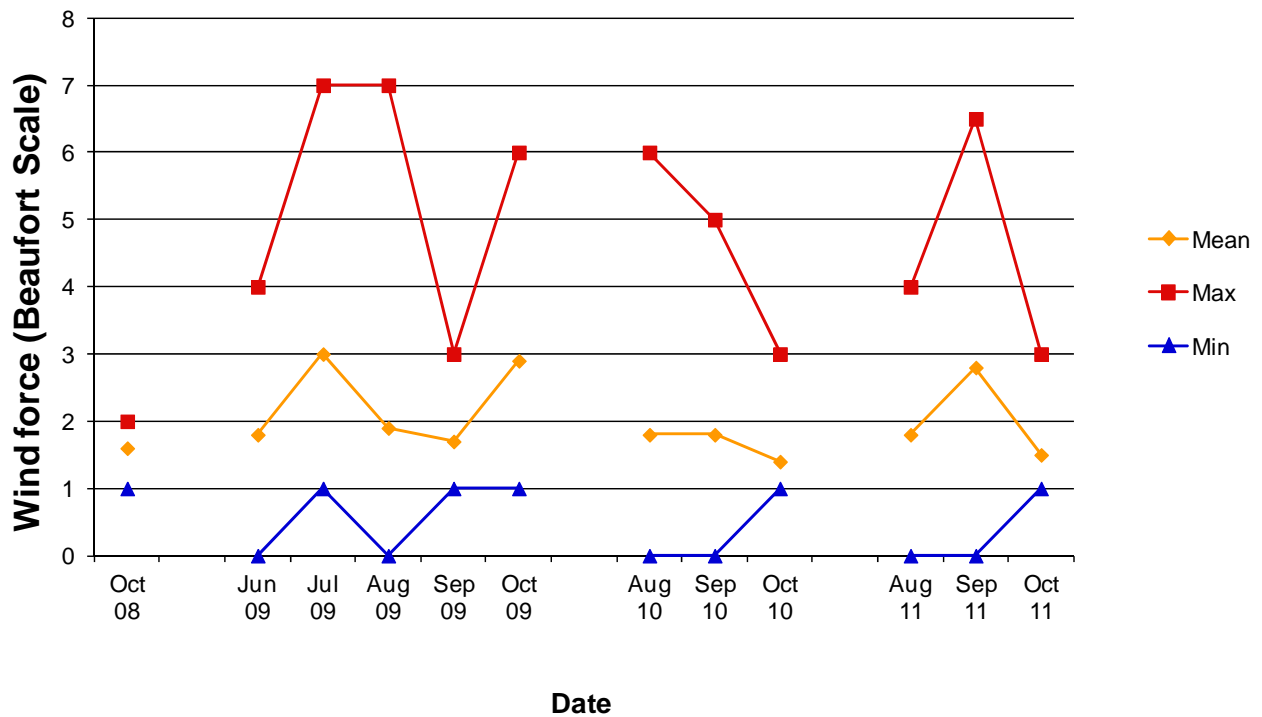


Figure 3.3.2.3. Precipitation recorded at MotoX during the ACBS, 2008-2011. (Numbers above bars indicate number of days precipitation was recorded for each survey month).



Figure 3.3.2.4. Artificial fog obscured visibility for 3 survey days at MotoX site during filming of the movie “Big Miracle.” The movie company agreed consider not fogging for the remaining few scheduled days of the field project season. Volunteer, Deborah (Shocky) Greenberg scans for belugas. Photograph: John Zarnetske, 13 October 2010.

Volunteers documented more belugas in waters near the MotoX site and PP#2 than other sites in nearby localities. FAR volunteers documented a total of 202 beluga observations in 27 groups at the MotoX site over the four year period, with a maximum best count of 75 individuals observed in September 2010 (Fig. 3.3.2.5). Numbers of belugas observed during 2009 were significantly reduced compared with those in subsequent years. FAR volunteers observed no whales at MotoX during surveys in June, July and October 2009, despite logging over 55 hours of observation time. During August and September 2009, four beluga whales were observed during 39 hours of observation time. Over the four-year period a total of 16 calves were observed: three in 2008, none in 2009, nine in 2010, and four in 2011. Beluga group sizes varied during the four years from one to 43 belugas, whereas before the ACBS began, for example, a local resident reported having seen a group of more than 150 belugas between Campbell Creek and the MotoX bluff.

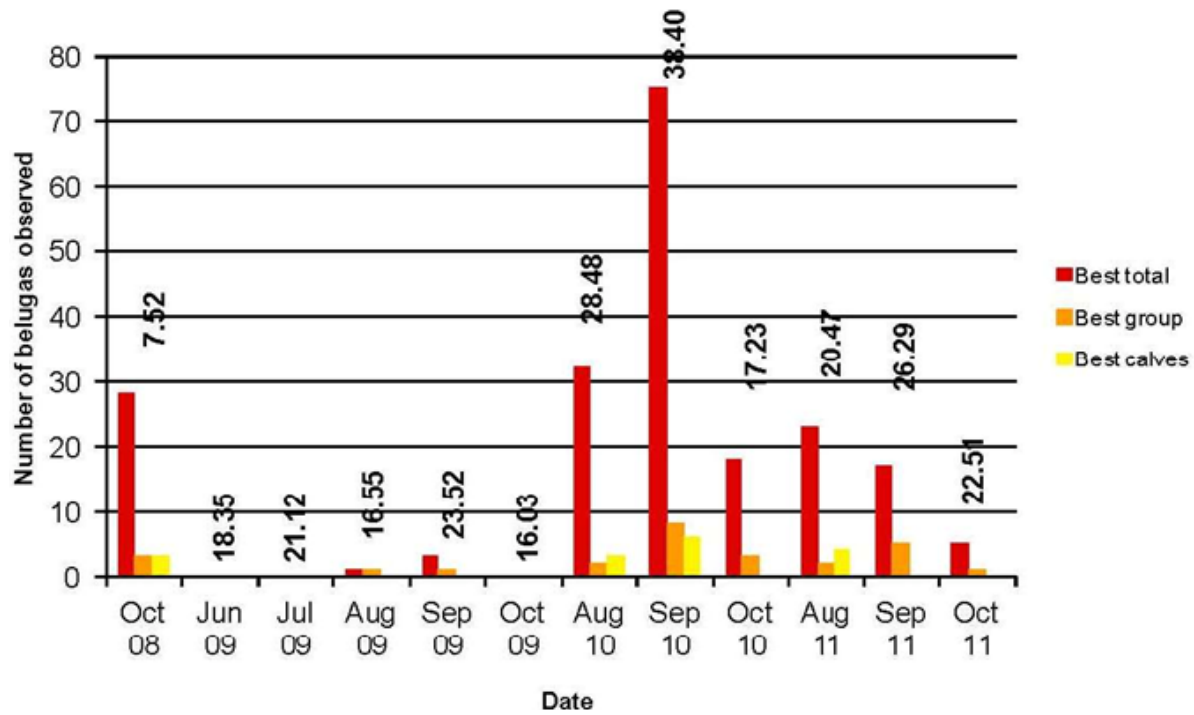


Figure 3.3.2.5. MotoX beluga observations during the ACBS project period 2008-2011. (Numbers above bars denote observation time for each month surveyed).

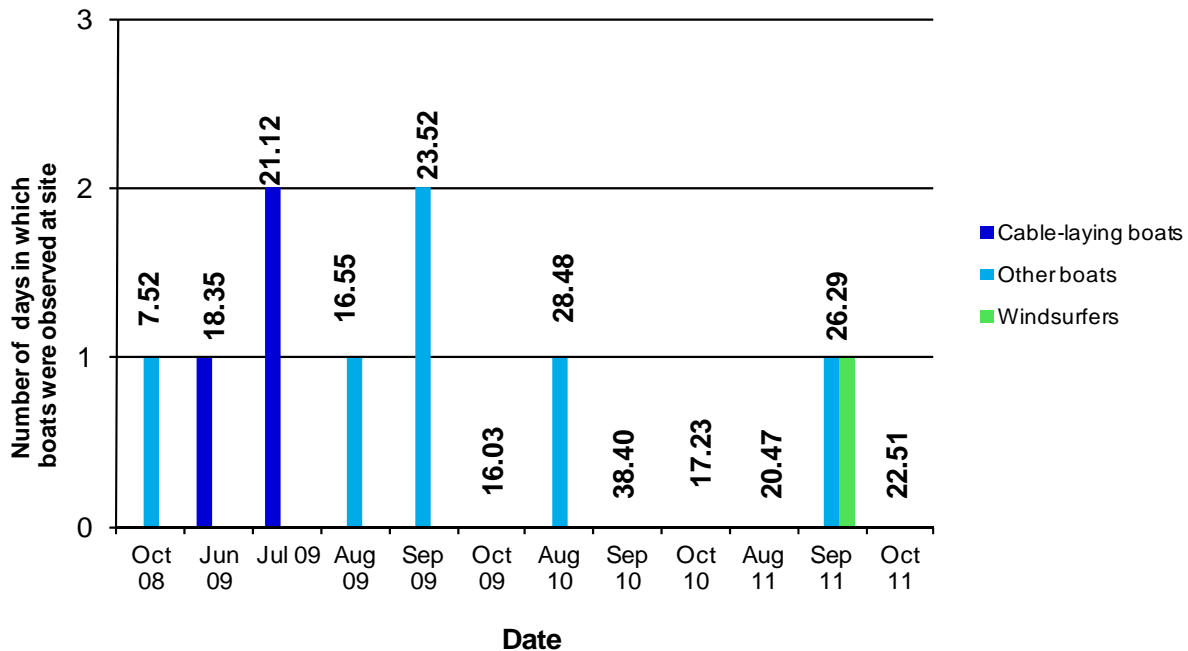


Figure 3.3.2.6. Boat activity observed at MotoX site. Number of days in which boat activity was observed at MotoX during the ACBS project period 2008-2011 (Numbers above bars denote observation time for each month surveyed).

Days in which boat traffic was documented at the MotoX site was greatest during 2009, with six days recorded as having boat traffic present, twice that for 2010 and 2011 combined (Fig. 3.3.2.5).

3.3.2.6 MotoX beluga Behavior Observations

Of 27 groups observed from MotoX, behavior was documented for 19 groups. Milling was the most frequently documented behavior, occurring in 12 groups. There were nine observations of spouting, six occurrences of porpoising, with body contact, diving, and spyhopping each observed three times. Tail waving and vocalizing were each documented twice with one documented resting group.

At least one observation off the MotoX site described belugas going out and swimming straight in toward shore several times, then swimming along the shore for a period and doing it again. Observers suspect that belugas were chasing prey into smaller tidal guts and then capturing it.

Volunteers recorded one observation of what is believed to have been a Dall's porpoise near a beluga group at the MotoX observation site on 6 September 2010 (and about ½ mile west of the site, FAR volunteers assisted with the necropsy and salvage of a Dall's porpoise on 17 September 2011). On 10 September 2010, observers documented "fish flying" when describing suspected beluga feeding.

3.3.2.7 Human Activity

The MotoX site is popular to many user groups. Naturalists, marine mammal observers, birders, walkers, hikers, runners, motocross bikers, kite flyers and others frequent this spot. The site is very noisy due to motocross practice and racing during spring, summer and early fall, but when volunteers drop down to the shelf 10' down the bluff, the sound is somewhat muted. Sometimes volunteers arrive to find a large motocross event in session with hundreds of people, motor-homes and port-a-potties parked in several parking lots. Other times survey volunteers arrive to hear only the sounds of nature.

Infrequently, there are small boats such as canoes or kayaks in the area due to the extreme tidal changes and wild currents. Few larger boats have been documented but occasionally observers have seen vessels practicing oil spill drills; boats involved with cable work for utilities, and in the far distance, with the aid of a scope, commerce ships traversing between the forelands and the POA (Fig. 3.3.2.6). Volunteers have observed the largest ships between Point Possession and the south end of Fire Island. Observers have also noticed smaller boats presumed to be land mammal hunters heading across Turnagain Arm to the Kenai Peninsula. Both cargo jets and passenger aircraft fly over the area, depending on predominant winds, traffic and schedules. Also contributing to aircraft traffic in and around the observation vicinity are small planes and/or helicopters from Lake Hood, Sand Lake, Campbell Lake, Jewell Lake and others.

3.3.3 TA Potter

The TA Potter site was surveyed by ACBS volunteers in September and October 2010, and May, August and September 2011. Mean temperatures during survey periods ranged from 0°C to 11.9°C (Fig. 3.3.3.1.), with winds at a maximum of 6 BF, and the lowest mean wind force recorded in August 2011 (Fig. 3.3.3.2.). Mean wind force at the TA Potter site ranged between 0.7 and 2.8 BF. Precipitation recorded at the TA Potter site was greatest in August 2011, with rain present 38% of the time during survey periods (Fig. 3.3.3.3.). No precipitation was recorded in May 2011, and rain and fog were documented in September 2010.

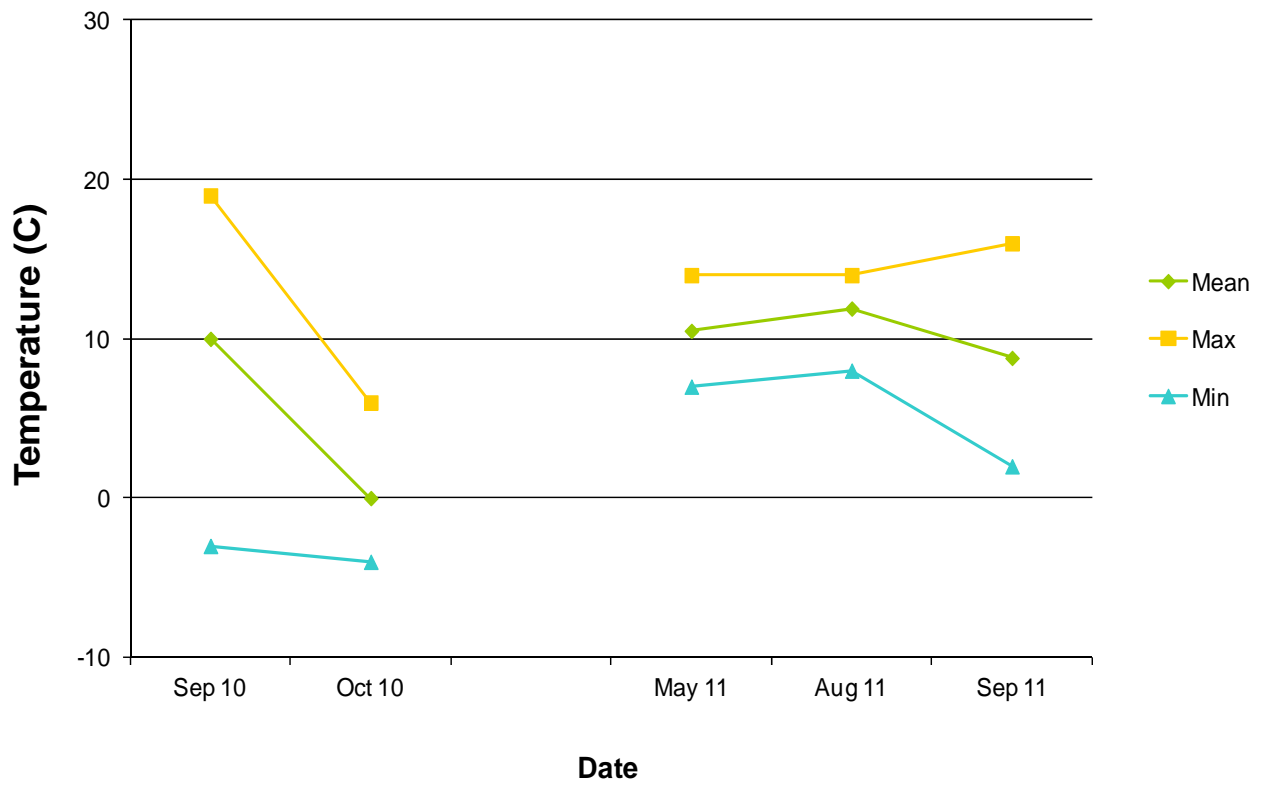


Figure 3.3.3.1. Temperatures recorded at TA Potter during the ACBS in 2010-2011.

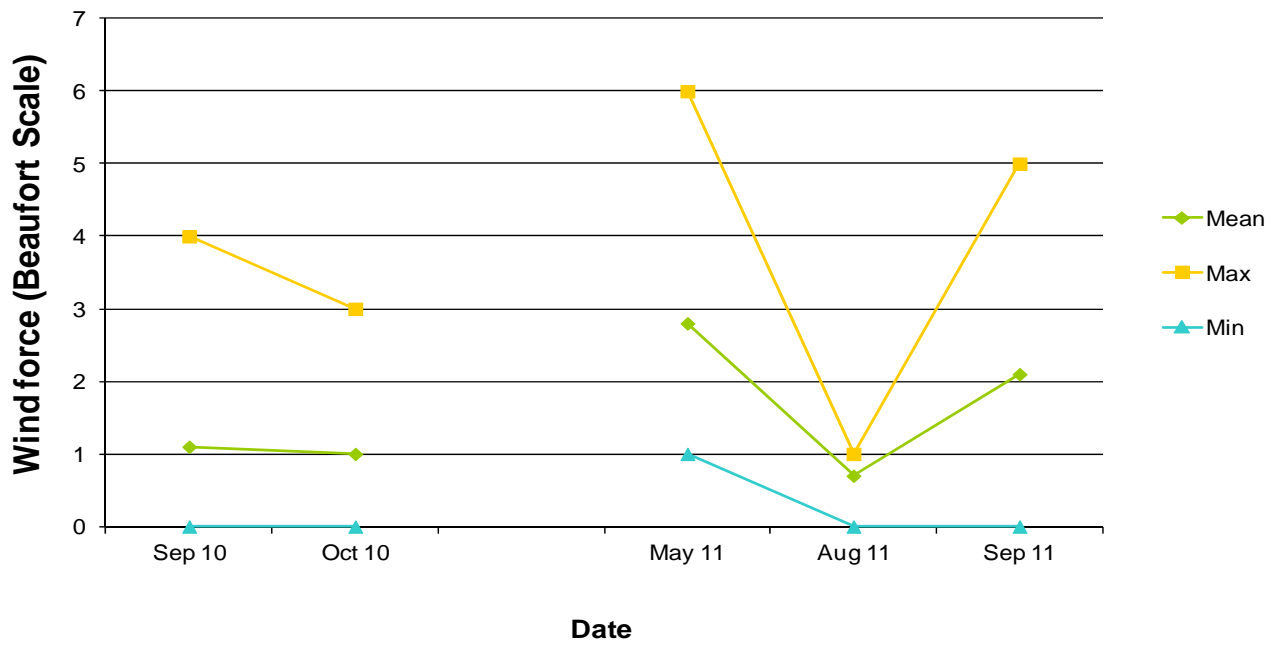


Figure 3.3.3.2. Wind force recorded at TA Potter during the ACBS in 2010-2011.

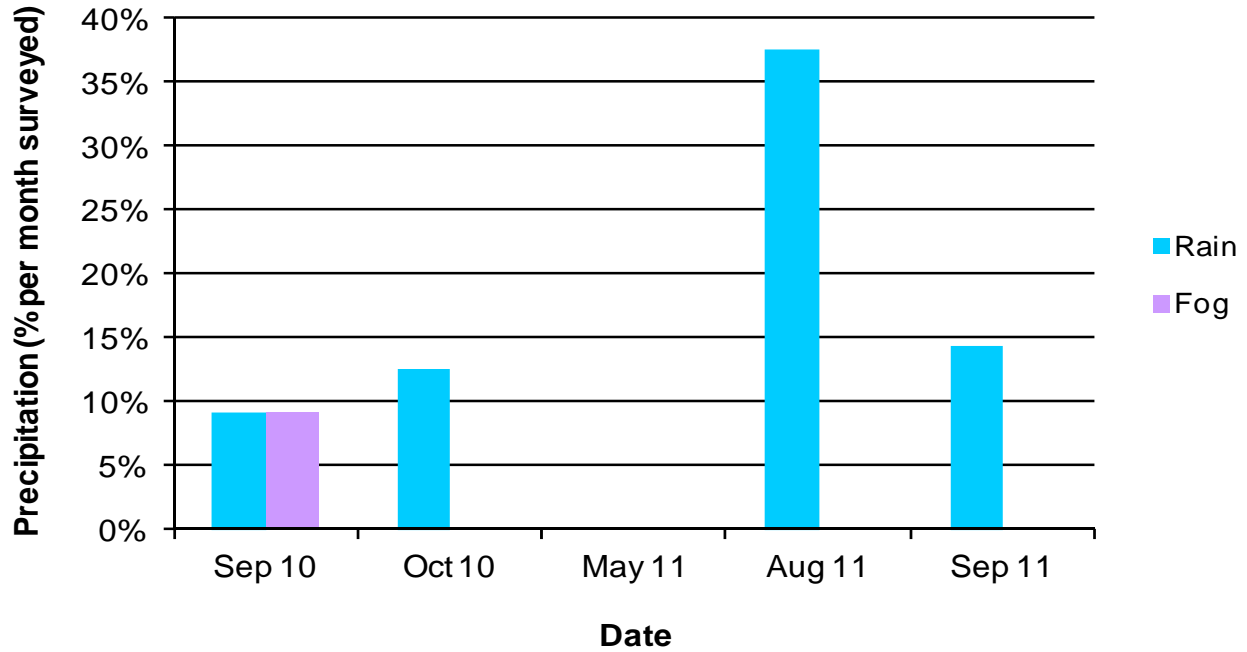


Figure 3.3.3.3. Precipitation recorded at TA Potter during the ACBS in 2010-2011
 (Numbers above bars indicate number of days precipitation was recorded for each survey month).

The number of beluga whales observed at the TA Potter site was low for most months of the survey period; two were observed in one group in September 2010, then nothing until August 2011 when volunteers documented three individuals in one group (Fig. 3.3.3.4.). In September 2011, observers recorded 28 whales (in three groups) at the TA Potter site, three of which were identified as calves. Figure 3.3.3.5 (photograph taken outside of the project) shows three belugas, one of which is a charcoal-colored calf in close proximity with an adult.

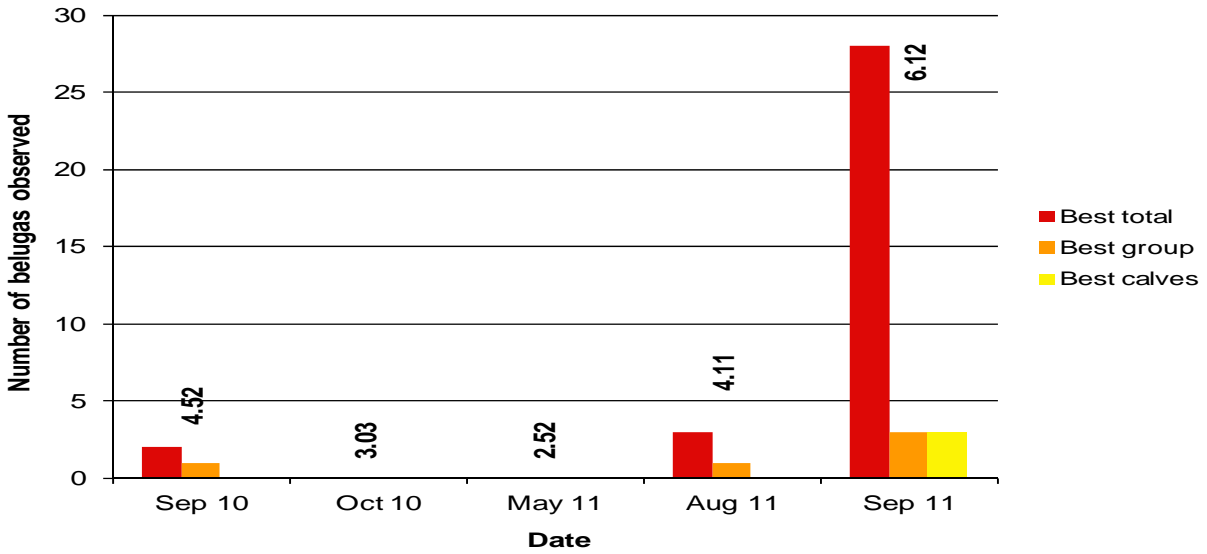


Figure 3.3.3.4. Beluga observations at TA Potter site. Number of belugas observed at TA Potter during the ACBS project period 2010-2011 (Numbers above bars denote observation time for each month surveyed).



Figure 3.3.3.5. Two adult belugas and one charcoal-colored calf in Turnagain Arm. Note the close proximity of the calf to the adult nearest suggesting a familial relationship. Photograph: Marlene Buccione, 2008.

3.3.3.5 Beluga Behavior Observations at TA Potter

Four of the five beluga group observations at TA Potter noted porpoising behavior with one of the porpoising groups also showing some milling behavior. The fifth group exhibited slow travelling behavior.

3.3.3.6 Human Activity

Many residents and visitors stop at the Potter Section House roadside attraction year-round. There is a train and educational signage. Photographers, tour groups, school field trips and casual visitors interested in history, scenic viewpoints and wildlife viewing stop here. Wind surfers and people with small boats sometimes use the waters adjacent to this site. There are numerous nearby points of interest. Road noise is constant. Volunteers documented boat traffic at the TA Potter site on six survey days in which they saw what resembled previously observed cable-laying boats in September 2010 and again in September 2011; wind surfers on two survey days, one in May 2011 and another in September 2011. Survey crews documented kayaks in September 2010 and other traffic in September 2011. This report summarizes watercraft traffic data for TA Potter in a table combining lower and upper TA survey sites (Table 3.6.1).

3.3.4 TA Windy

The TA Windy survey site had its warmest weather recorded in September 2010, with a maximum of 22°C and a mean temperature of 12.9°C (Fig. 3.3.4.1.). The coldest month recorded was October 2010, in which temperatures reached -2°C. Mean temperatures for the Windy site ranged from 1.4 to 12.9°C. ACBS observers recorded lowest mean wind force in September and October 2010 and the highest mean in May 2011 (Fig. 3.3.4.2.). Although the lowest mean wind force was recorded in September and October 2010, the highest maximum of 7 BF was also observed in September 2010 and again in September 2011. Precipitation recorded at the TA Windy site showed a little more than 10% of snow and rain in October 2010 with August 2011 having the highest rate of precipitation of more than 40% of the survey time (Fig. 3.3.4.3.)

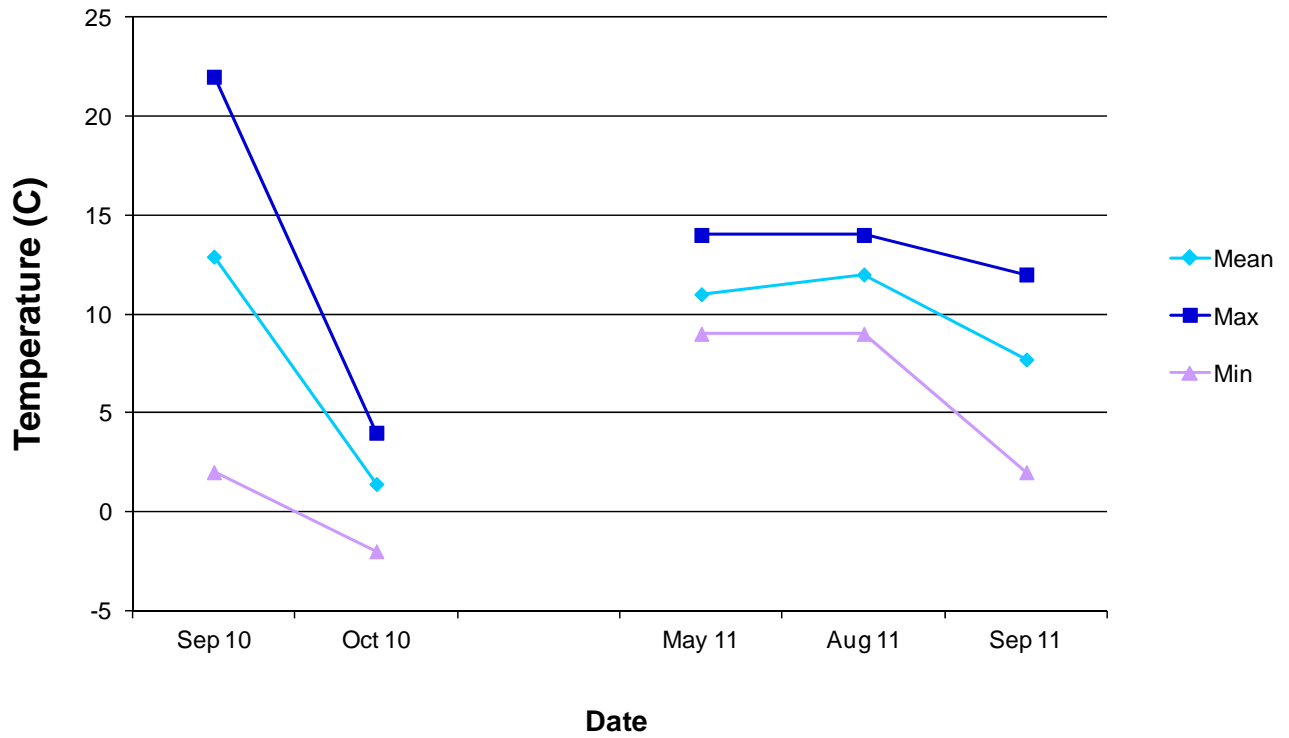


Figure 3.3.4.1. Temperature recorded at TA Windy during the ACBS, 2010-2011.

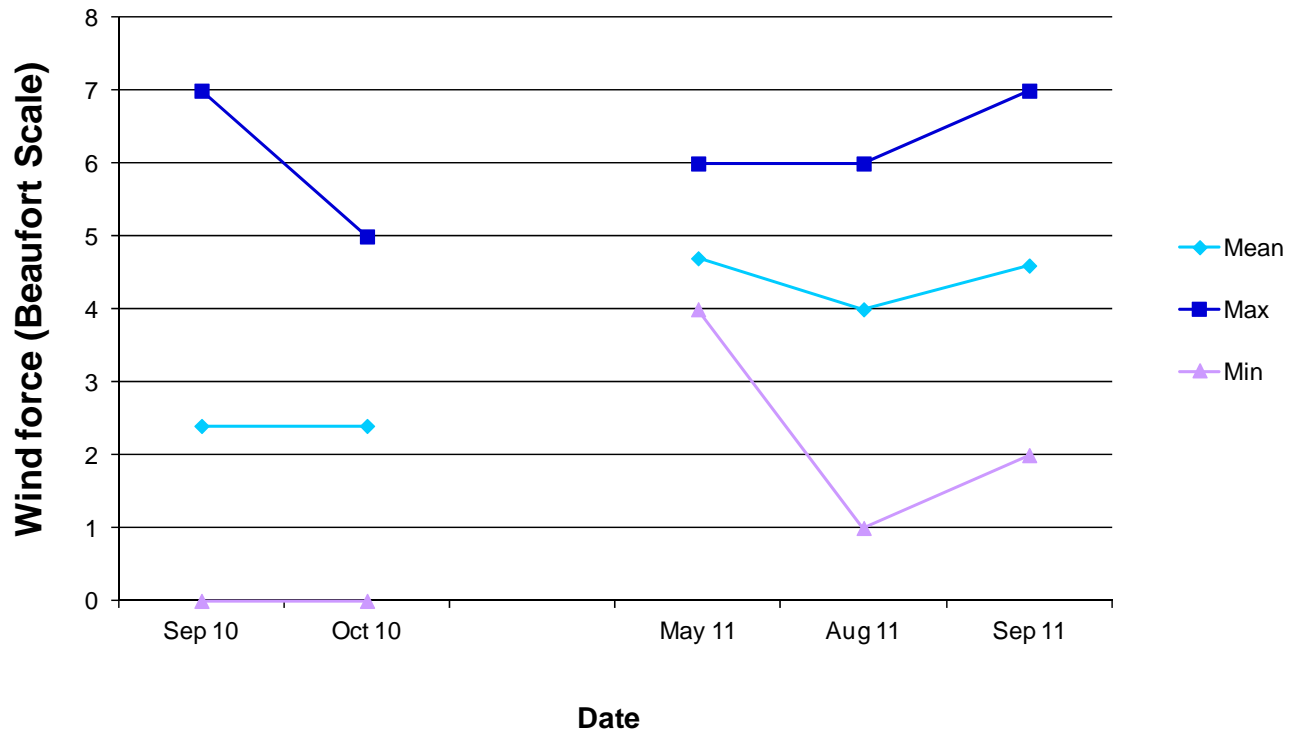


Figure 3.3.4.2. Wind force recorded at TA Windy during the ACBS, 2010-2011.

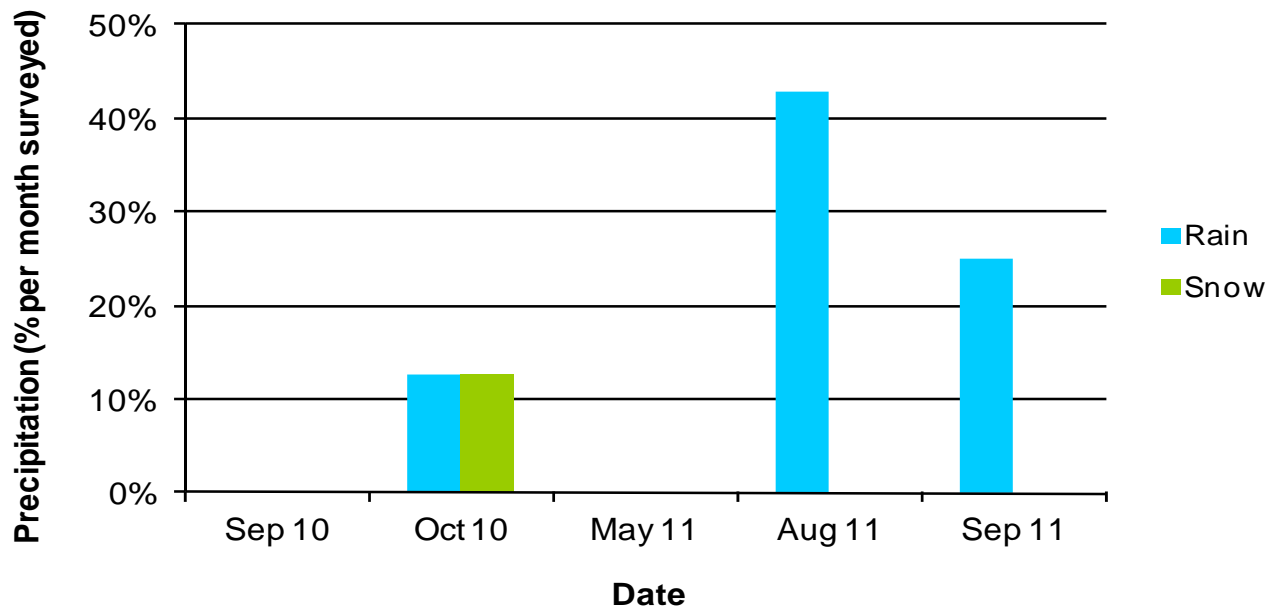


Figure 3.3.4.3. Precipitation recorded at TA Windy during the ACBS, 2010-2011.

In October 2010, observers documented 11 belugas, including one calf, at the TA Windy survey site. The whales were observed in three separate groups (Fig. 3.3.4.4). Again in August 2011, volunteers recorded four whales, including one calf. For the remaining months of survey effort at TA Windy (September 2010: 4.16 hours observation time; May 2011: 2.37 hours; September 2011: 4.44 hours), FAR volunteers did not see any beluga whales.

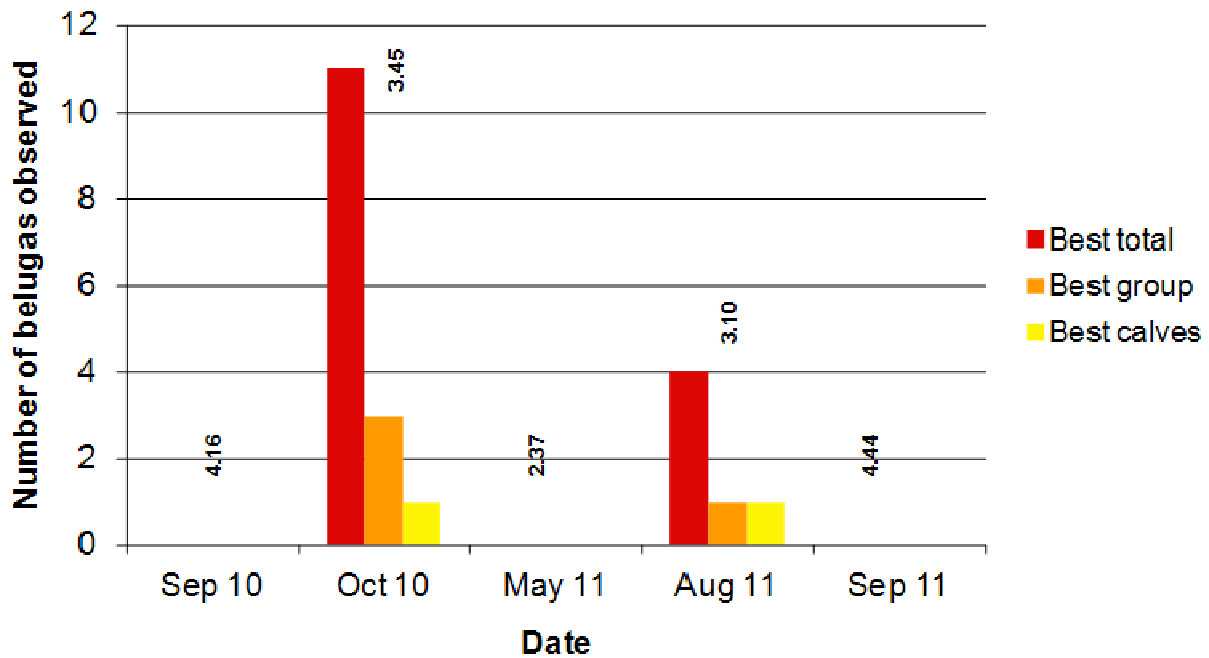


Figure 3.3.4.4. Belugas observed at TA Windy during the ACBS, 2010-2011.

3.3.4.5 Beluga Behavior Observations at TA Windy

Of the four groups observed at TA Windy, there was one instance of diving with spy hopping and two occurrences of porpoising with spouting.

3.3.4.6 Human Activity

During the survey period, FAR volunteers recorded no boat traffic present near the TA Windy site. The Windy Corner pull-out is small, so only a few vehicles can park here at a time. Most people stop here either to rest, take in the panoramic view, take photographs, or watch for wildlife. Observers often see Dall sheep (*Ovis dalli*) on the steep slopes across the Seward Highway, behind the observation site.

3.3.5 TA Past Bird

ACBS observers recorded the warmest mean temperature at the TA Past Bird site in August 2011 at 11.7°C (Fig. 3.3.5.1). The maximum temperature was observed in September 2010 at 17°C; this month also had the greatest variation in temperatures, ranging from 0 to 17 °C.

Average wind force at TA Past Bird ranged from 2.3-4 BF, with maximum strengths of 6 BF in August and September 2010 (Fig. 3.3.5.2). During survey periods, volunteers recorded snow in September and October 2010, and rain in all months but September 2010 and May 2011 (Fig. 3.3.5.3). The most rain was recorded in the final two months of surveys, occurring 38% of the time.

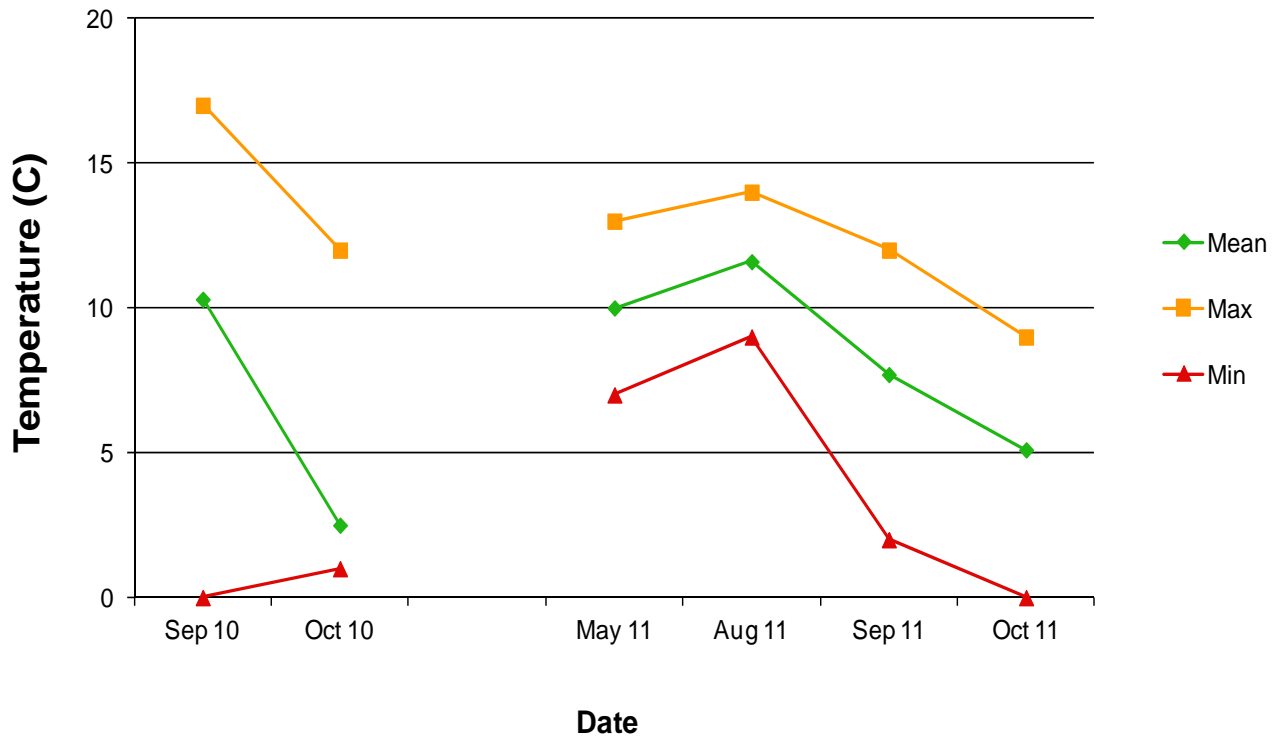


Figure 3.3.5.1. Temperature recorded at TA Past Bird during the ACBS, 2010-2011.

During the course of the project, volunteers documented a total of 103 belugas (in 15 groups) at the TA Past Bird site, with the greatest number of individuals observed in August 2011 (33 belugas in three different groups) (Fig. 3.3.5.4). Observers recorded two calves in September 2011 and FAR volunteers saw no animals at all in May 2011. No boat traffic was observed at the TA Past Bird survey site during the project period.

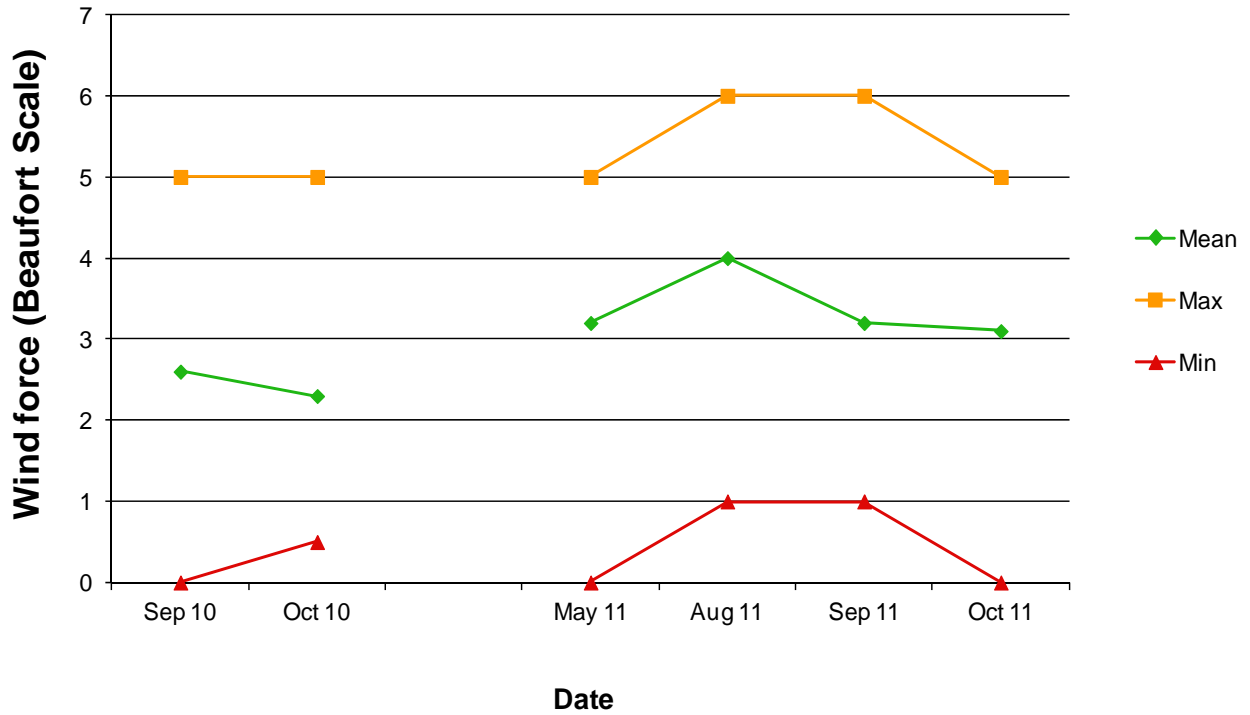


Figure 3.3.5.2. Wind force recorded at TA Past Bird during ACBS, 2010-2011.

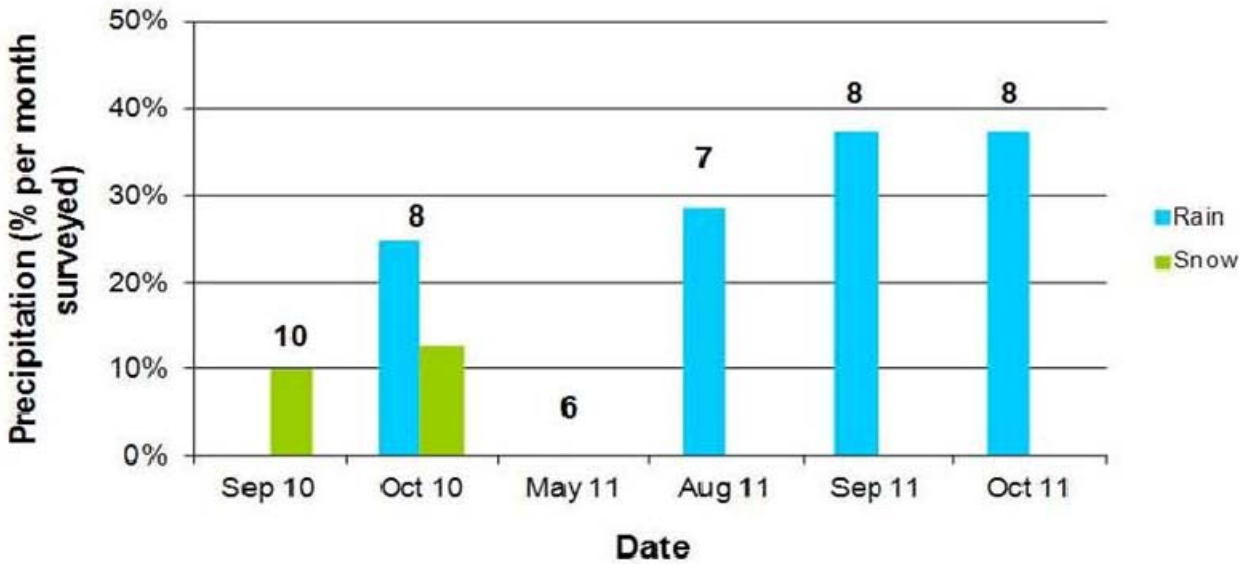


Figure 3.3.5.3. Precipitation recorded at TA Past Bird during the ACBS, 2010-2011.

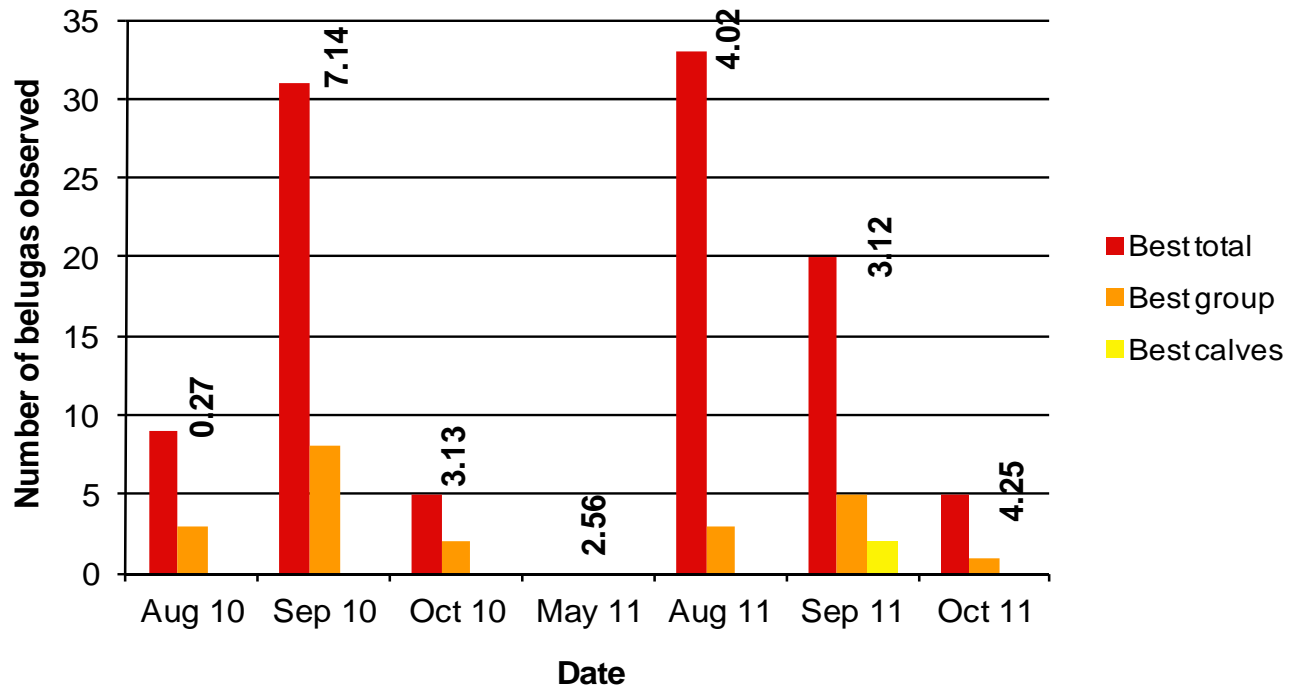


Figure 3.3.5.4. Belugas observed at TA Past Bird survey site during 2010-2011 ACBS (numbers above bars denote observation time for each month observed.).

3.3.5.1 Beluga Behavior Observations at TA Past Bird

Of 17 groups observed from Past Bird, behavior was documented for eight groups. Porpoising, occurring in 13 groups, was the most frequently documented behavior, followed closely behind by spouting, occurring in eight groups. There were seven observations of milling, and five observations of tail waving with some observations of circling. On September 6th 2010 volunteers documented seeing entire beluga bodies during porpoising and circling behavior.

3.3.5.2 Human Activity

Visitors to TA Past Bird scan the waters for marine life and birds as well as glassing the slopes across the highway for mountain sheep, goats and bears. Road noise is close and ever-present. Photographers frequent this and most spots along Turnagain Arm. Wind surfers have been observed from this site. This report summarizes watercraft traffic data for TA Past Bird in a table combining lower and upper TA survey sites (Table 3.6.1).

3.3.6 TA Tidewater

Weather conditions at TA Tidewater showed a similar trend with the TA Past Bird survey site, in that the warmest temperatures, with the greatest temperature range, occurred during the September 2010 survey period (Fig. 3.3.6.1). The mean temperature at TA Tidewater for that month was 11.7°C, with a maximum of 22°C and a minimum of 3°C. The lowest temperature recorded at this site was -1°C in October 2010. Wind force was least variable in May 2011 (Between 2 and 3 BF) and most variable during the September 2011 survey period (-6 BF) (Fig. 3.3.6.2). Rainfall was recorded during survey periods in October 2010, May 2011 and October 2011 (29%, 17%, 29% of survey time, respectively), with snow occurring in September and October 2010 (Fig. 3.3.6.3). No precipitation was documented in September 2011, although only two survey hours were logged for that month.

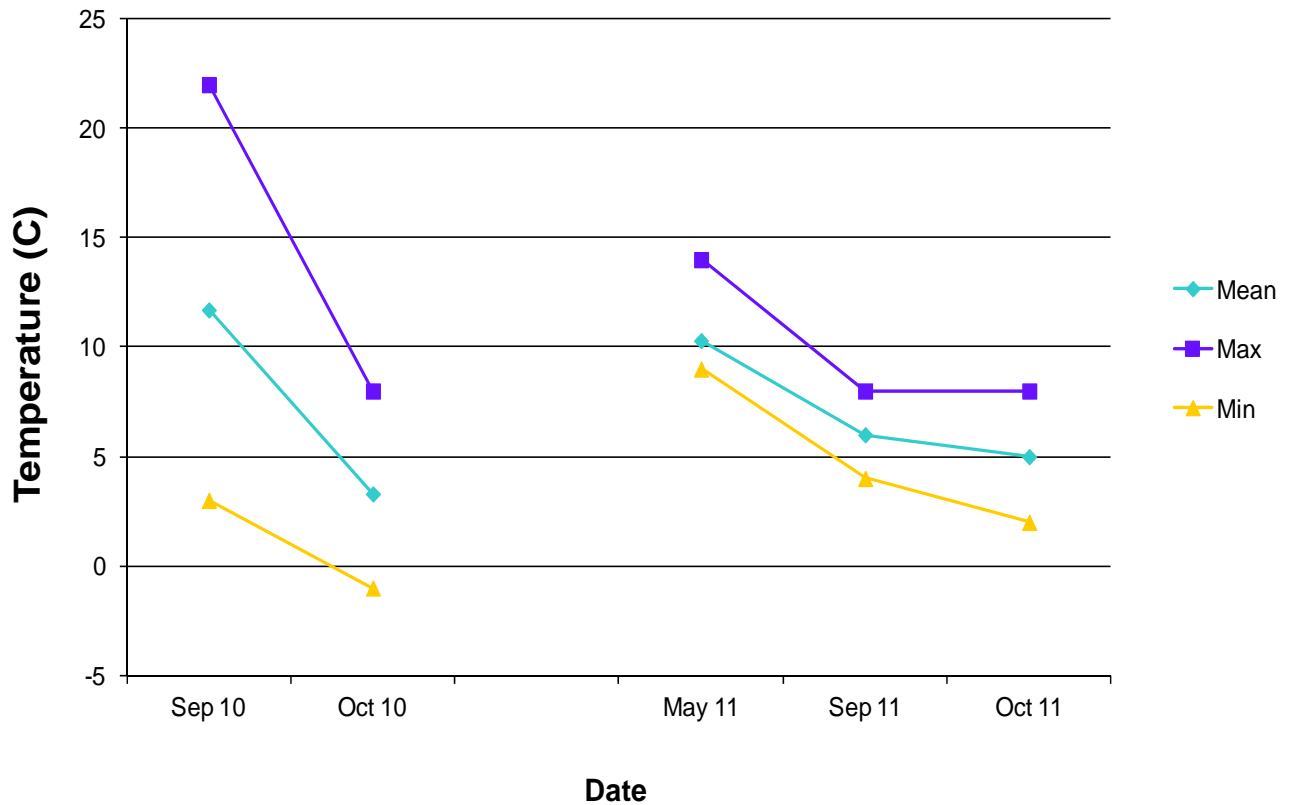


Figure 3.3.6.1. Temperature at TA Tidewater during the ACBS, 2010-2011.

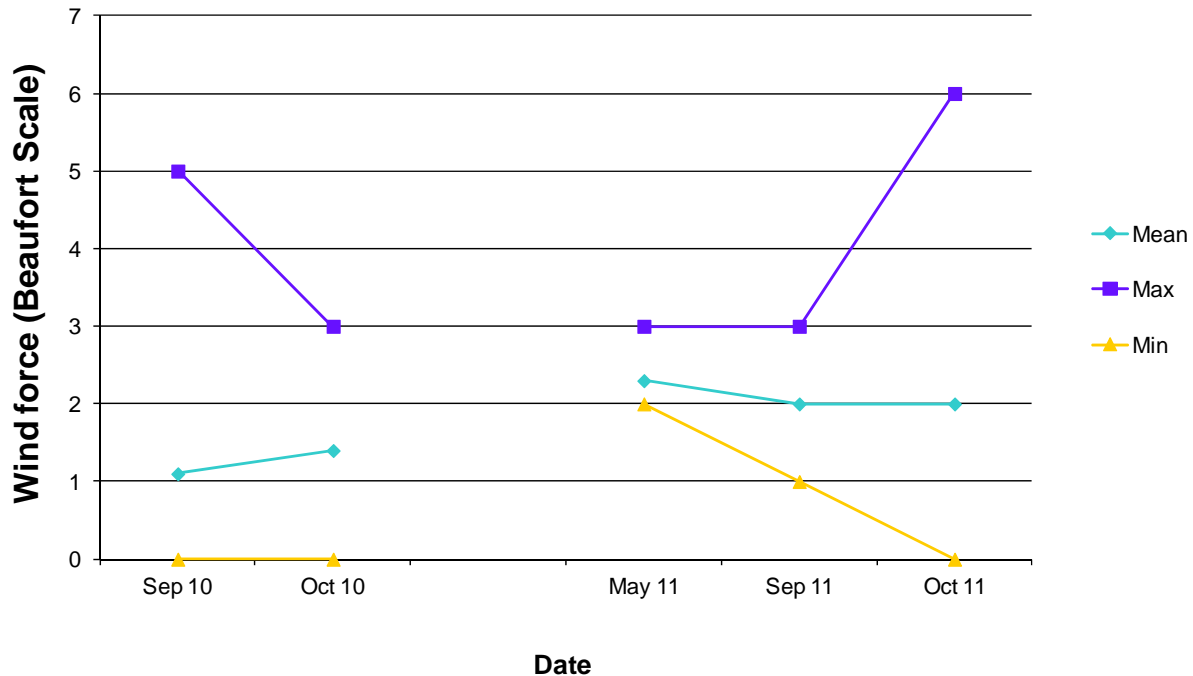


Figure 3.3.6.2. Wind force recorded at TA Tidewater during the ACBS, 2010-2011.

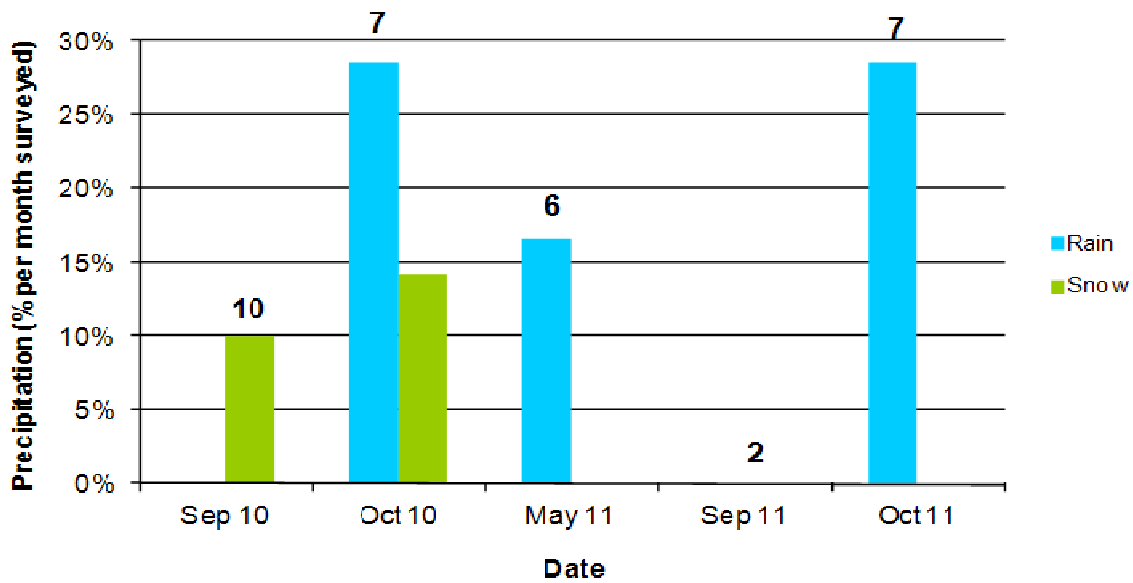


Figure 3.3.6.3. Precipitation recorded at TA Tidewater during the ACBS, 2010-2011. (Numbers above bars indicate number of days precipitation was recorded for each survey month).

ACBS volunteers documented the highest number of beluga sightings in August and September 2010 at the TA Tidewater site, with 11 individuals August and 25 individuals (one of which was identified as a calf) in September (Fig. 3.3.6.4). For the remainder of the survey period,

observers recorded only two whales, one in September 2011 and the other in October 2011. Neither of these were calves. During the course of the project, watercraft were documented near the site; in this instance, kayaks in September 2010. This report summarizes watercraft traffic data for TA Tidewater in a table combining lower and upper TA survey sites (Table 3.6.1).

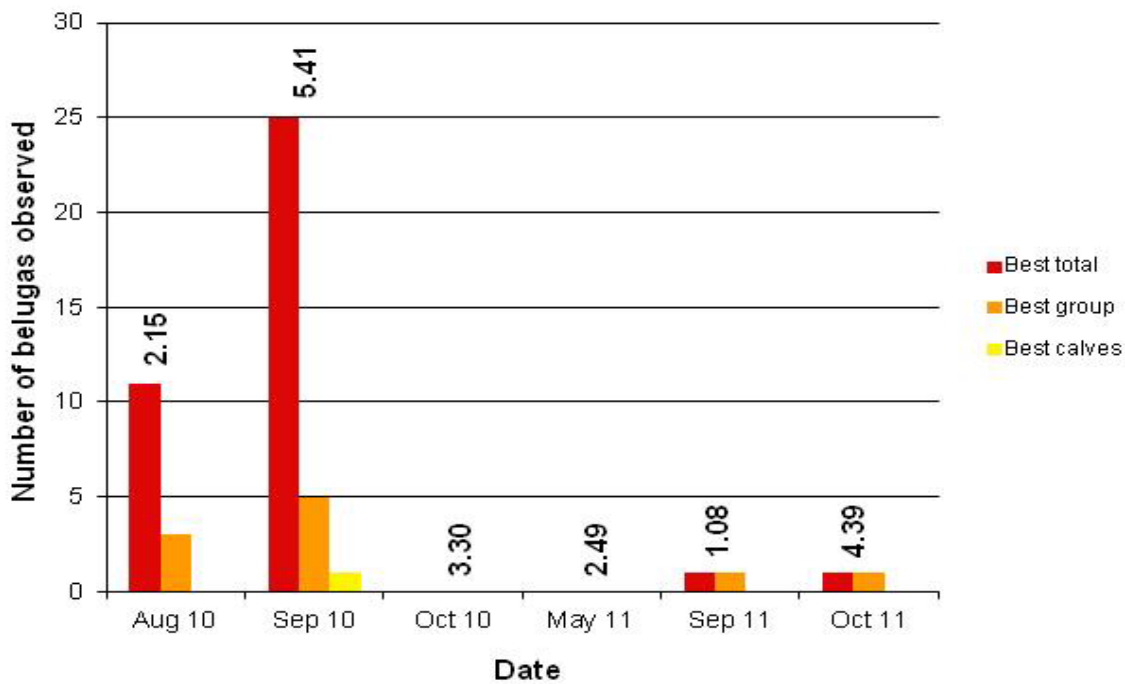


Figure 3.3.6.4. Beluga observations at TA Tidewater site during the 2010-2011 ACBS. (Numbers above bars denote observation time for each month observed).

3.3.6.1 Beluga Behavior Observations at TA Tidewater

The few behaviors recorded for groups at TA Tidewater included two observations of porpoising along with slow swimming and two observations of circling and diving that would suggest possible feeding. There was one group observation of potentially stranded whales, on the far shore across the Inlet, which was never confirmed. FAR called it in to NOAA who forwarded the alert to NMFS, but weather on succeeding days was too inclement for aerial fly-overs. NMFS reported they had received a report of live belugas stranded near the same spot about the same time from people near Hope, but that was never confirmed, also due to weather. Both FAR and NMFS put out alerts for people to watch for beluga carcasses following these reports, but none were found.

3.3.6.2 Human Activities

Tidewater Slough is a small pull-out so there are fewer vehicles parked here than at larger roadside attractions. It is a scenic spot; residents and tourists stop here en route to Girdwood, Alyeska, Portage, Kenai or Seward.



Figure 3.3.6.5. Cook Inlet beluga whales in Turnagain Arm.
Photograph: John Zarnetske, October 13, 2010.

3.4 Sites with Fewer than Four Survey Months

3.4.1 Lower TA Sites (PP#1, PP#2 and Woronzof Beach/Bluff)

FAR staffed Private Property #1 (PP#1) only two survey days (21 and 22 Oct. 2008). ACBS volunteers counted a total of four belugas whales in the space of 4.23 hours on 21 October and none on the 22nd. For days one and two respectively: the temperature was 4°C; wind force, 1 and

2 BF; and precipitation recorded as light fog and snow. Volunteers recorded no boat traffic at PP#1.

Volunteers undertook a total of 9.30 hours of survey effort at PP#2 over a three-month period from September-November 2011. During this time, volunteers observed 87 belugas whales (five of which were calves) in eight groups. A cable-laying boat was observed from PP#2 on 27 Oct. 2008, but no beluga surveys were undertaken on that day. Mean temperatures at PP#2 for each of the three months respectively, were: 9.7°C, 1.8°C and -4°C. Mean wind force was 0 BF, 2 BF, and 0 BF, respectively. Precipitation was mostly clear with one survey day of rain in September 2011 and a survey day of snow in October 2011.

FAR volunteers observed five belugas, including one calf, at Woronzof Beach/Bluff on 21 Aug 2011 over a period of 1.20 hours. Temperature during the sighting was 18°C. No boat traffic was recorded during the period surveyed.

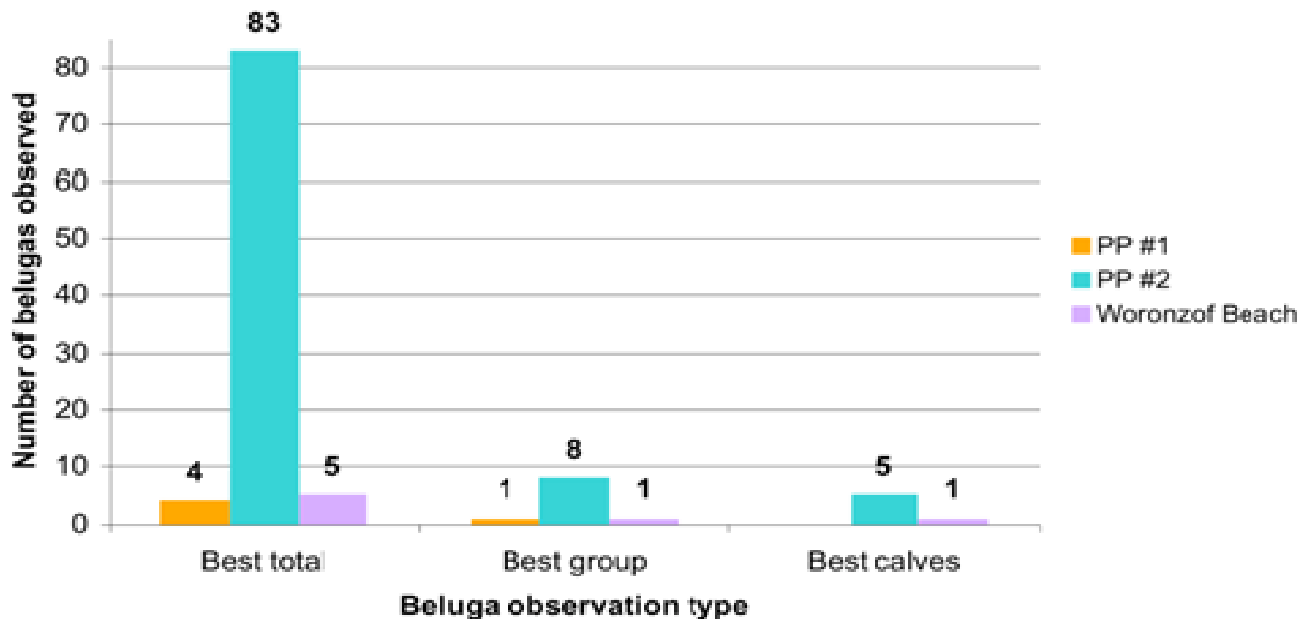


Figure 3.4.1.1. Number of belugas observed at lower TA sites (PP#1, PP#2 & Woronzof Beach/Bluff). During the ACBS (Note: effort at these sites was less than four months, ranging from 1 day (WBB) to 3 months (PP#2)).

3.4.1.2 Beluga Behavior Observations at Lower TA Sites (PP#1, PP#2 and Woronzof Beach/Bluff)

From PP#1 belugas were suspected to be feeding while observed milling in about the same location for about 23 minutes. At PP#2 where behavior was noted for eight groups, milling was the most frequently documented behavior, occurring in seven groups, followed closely by diving, occurring in six groups. There were two incidences of tail waving, two reports of porpoising, three reports of spouting, one report of fins showing, one side flop, and one report of traveling fast. On 21 September 2011, a group of at least 43 belugas were suspected to be alternately feeding and resting. They appeared to be chasing prey into a large tidal gut, where lots of spouting was observed, then, they would rest, then, go out further from the bluff, and do it again. Two of the beluga sightings included observations of the groups moving in and out of Campbell Creek and exhibiting milling and diving behavior suggesting feeding. The Woronzof Beach/Bluff sighting noted the group as traveling close to shore with one tail slap observed.

3.4.1.3 Human Activity

Point Woronzof is a popular Anchorage viewing spot with a large parking lot hosting hundreds of visitors over the course of a day. The parking lot is directly behind the bluff, so there can be a lot of noise depending on the number of visitors and their activities. Observers may frequently see boats from this overlook. The noise from jets and airplanes taking off from TSAIA can be deafening.

3.4.2 Upper TA Sites (TA 20-Mile and TA Avalanche)

ACBS observers collected data for the TA 20-Mile survey site over seven days in May 2011, with a total 3.13 hours observation time. On 20 May 2011, volunteers documented ten belugas, including one calf (Fig. 3.4.2.1; Fig. 3.4.2.2.1). No other whales were seen at this site during the course of the survey period. Volunteers observed boat traffic at TA 20-Mile on four of the seven survey days. Average temperature at TA 20-Mile during the survey period was 10°C, with wind ranging between 2 to 4 BF. Steady rain was recorded on one survey day, the remainder being clear.



Figure 3.4.2.1. View south from 20-Mile River observation site with beluga adult and calf. Photo taken just below bridge (visible on left side of frame). Photograph: Caleb Barrett, May 19, 2011.

Observers documented a best total of 23 belugas at TA Avalanche, two individuals in May 2011, the remainder in October 2011. Volunteers recorded four groups. No calves were observed during the survey period. Over eight days FAR volunteers logged nine minutes sighting time in May 2011 and 6.23 hours in October 2011. One motorboat was present during the May observation and none were recorded during the October survey period. The temperature at TA Avalanche on 15 May 2011 was 7°C, with a wind force of 2 BF and no precipitation. During the October surveys, mean temperature was 4.6°C and mean wind was 1.6 BF. Precipitation included rain on three of the eight survey days.

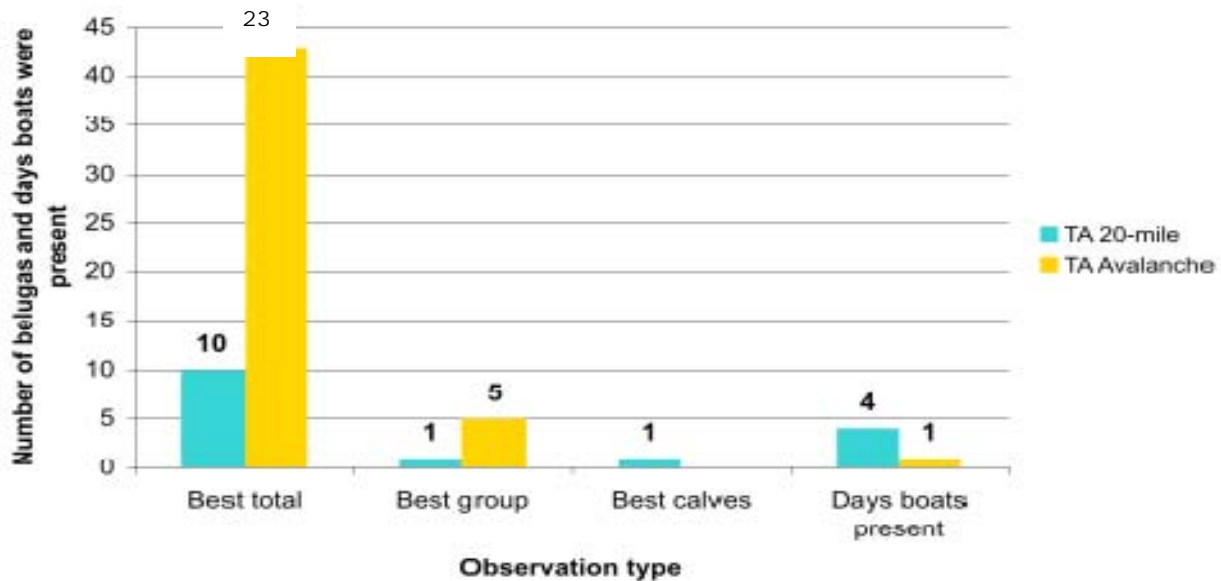


Figure 3.4.2.2. Number of belugas and boats near upper TA sites (20-Mile & Avalanche) during ACBS. (Note; effort at these sites ranged from one to seven days).

3.4.2.3 Beluga Behavior Observations at TA 20-Mile and Avalanche

Most times beluga group behavior observed at TA 20-Mile was travelling, sometimes rapidly with the tide, with one occurrence of circling and milling, suggesting possible feeding.

3.4.2.4 Human Activity

Fewer people appear to stop at the Avalanche pull-out along the Seward Highway, compared with other project sites. Nevertheless, with a large gravel parking area and a spectacular view, evidence of illegal shooting, drinking and camping leaves signs that plenty of people have found this spot at various times. This location is used for academic field trips, academic or Industry research, sight-seeing, and wildlife viewing. Trains, road traffic and air traffic are common along the Avalanche pull-out site, whereas boat traffic is minimal. Conversely, many motorized and un-motorized boaters put in and take out at the TA 20-Mile site. There is another parking lot with access across the bridge on the landward side of the highway. Many of the boaters are fishermen and others are sight-seers, photographers, hunters, and wildlife viewers. Fishermen also crowd the river banks during runs of eulachon or salmon. Wind surfers are often observed putting in and taking out at TA 20-Mile.

3.5 Incidental Observations

FAR recorded a number of incidental observations for the years 2010 and 2011 (see Figs 3.1.3.4 – 3.1.3.9). For results, incidental observations were grouped into three broad localities: 1) Upper TA (Beluga Point, between Mile 112 & Beluga Point, between Windy & Bird (Point), between Windy & Past Bird, between Past Bird & Windy (indicates different direction of travel), Mile 108, Mile 109, near Weigh Station); 2) Upper TA (between Past Bird & Tidewater Slough, Mile 84.8, Mile 91.5 (Tidewater Slough), Mile 96.5, Mile 96.7); and 3) Near Fire Island and Ship Creek (W of Susitna River, Woronzof Beach, Coastal Trail). A best total of 185 beluga whales in 32 groups were recorded from incidental observations between 2010 and 2011 (Fig. 3.5.1). Among these sightings 12 whales were identified as calves. Many whales were likely observed multiple times each season.

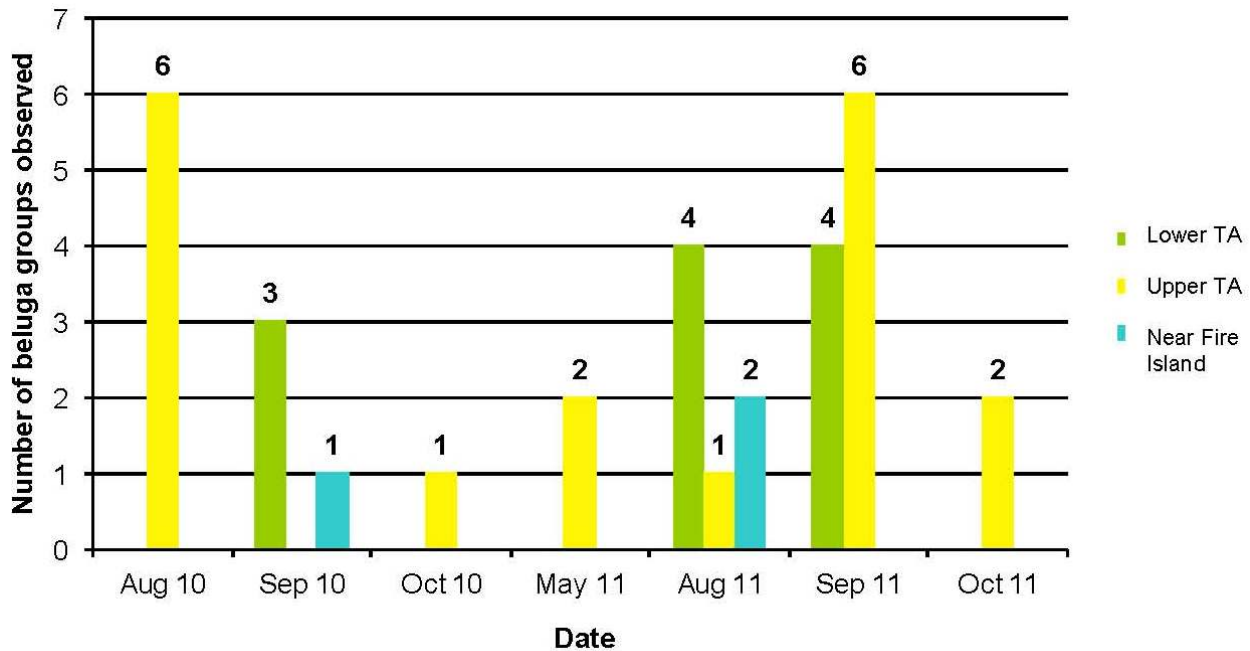


Figure 3.5.1. Incidental observations of beluga groups during 2010-2011 (note: this graph does not include incidental sightings sent by FAR to NMML between 2008 and 2010 because that data have not yet been entered into the project database).

In lower TA, incidental reports documented a best total of 79 belugas, 11 of which were identified as calves (Fig. 3.5.2.). Fifteen individuals from three groups were seen in September 2010. Observers again documented fifteen individuals in August 2011, and counted the remaining 49, including the calves, in September 2011.

In upper TA, incidental reports logged a best total of 78 individuals in 18 groups over the course of 2010-2011 (Fig. 3.5.3). No calves were observed at these sites. A best total for incidental observations near Fire Island and Ship Creek was 38 beluga whales, one of which was identified as a calf (Fig. 3.5.4). Twenty-three individuals were observed in August 2011, the remaining whales, including the calf, were seen in September 2010. It is of interest to note that volunteers observed more beluga groups close to the project shore along the Seward Highway during 2011 and more beluga groups along the opposite shore, further away from the observation sites, during 2010.

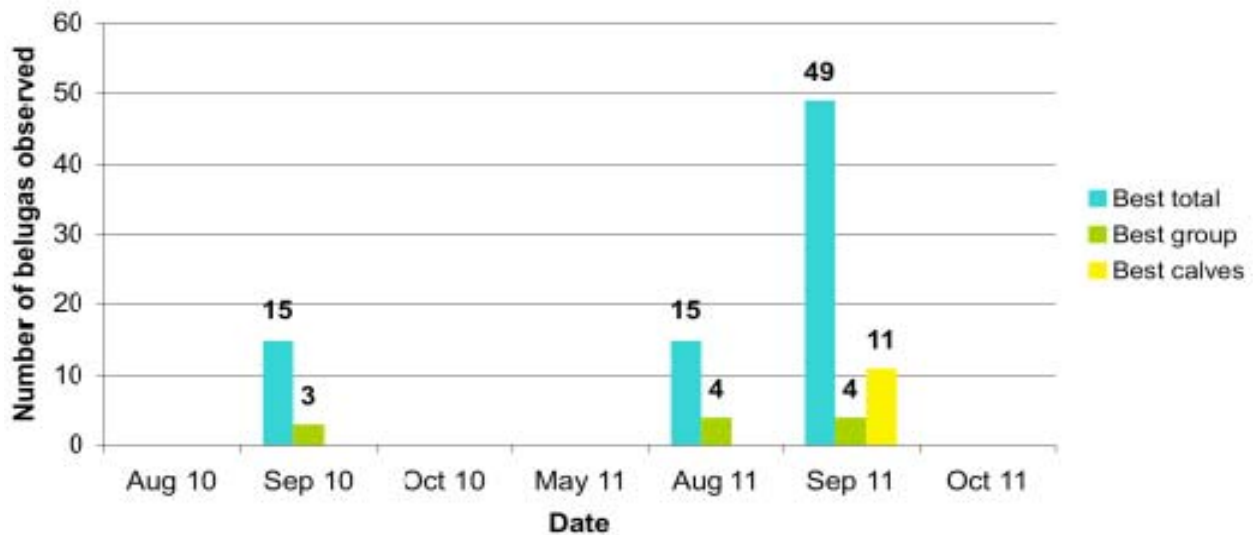


Figure 3.5.2. Incidental observations of beluga groups during 2010-2011 at Lower TA sites (note: this graph does not include incidental sightings sent by FAR to NMML between 2008 and 2010 because these have not yet all been entered into the project database).

3.5.2 Beluga Behavior Observations Based on Incidental Sightings

Incidental sightings in the FAR ACBS database are mostly sightings that occur along Turnagain Arm while survey crews are in transit from one survey site to the next. Other sightings come from trained volunteers that opportunistically see beluga groups and record as much information as possible. Since these sightings occur in transit or opportunistically, full data collection is not the usual protocol. However, the data that has been collected from these incidental sightings show most behavior to be travelling with some porpoising behaviors. Although milling behavior is also documented, the most frequently reported information is the travel direction associated with these beluga groups.

3.5.3 Human Activity

The Coastal Trail is used year-round by visitors and residents of Anchorage. Walkers, dog walkers, runners, roller-bladers, roller skiers, skate boarders, cyclists, cross-country skiers in winter and people pushing strollers or pulling wagons, use the trail regularly. Next to Anchorage, the largest city in Alaska, sounds of traffic, construction, boats, large and small, aircraft, large and small, and trains are ever-present. Conversely, the Point Campbell trail observation sites probably have the least human activity of all ACBS sites because its only access is via unmarked and unimproved trails along the coastal bluff in Kincaid Park. The most frequent users of the area are hikers, dog walkers, runners and fitness enthusiasts. Boats are visible approaching Fire Island and air traffic is considerable with the very near proximity to TSAIA, Lake Hood, Campbell Lake, Jewell Lake, Sand Lake and other areas that host departures and landings.

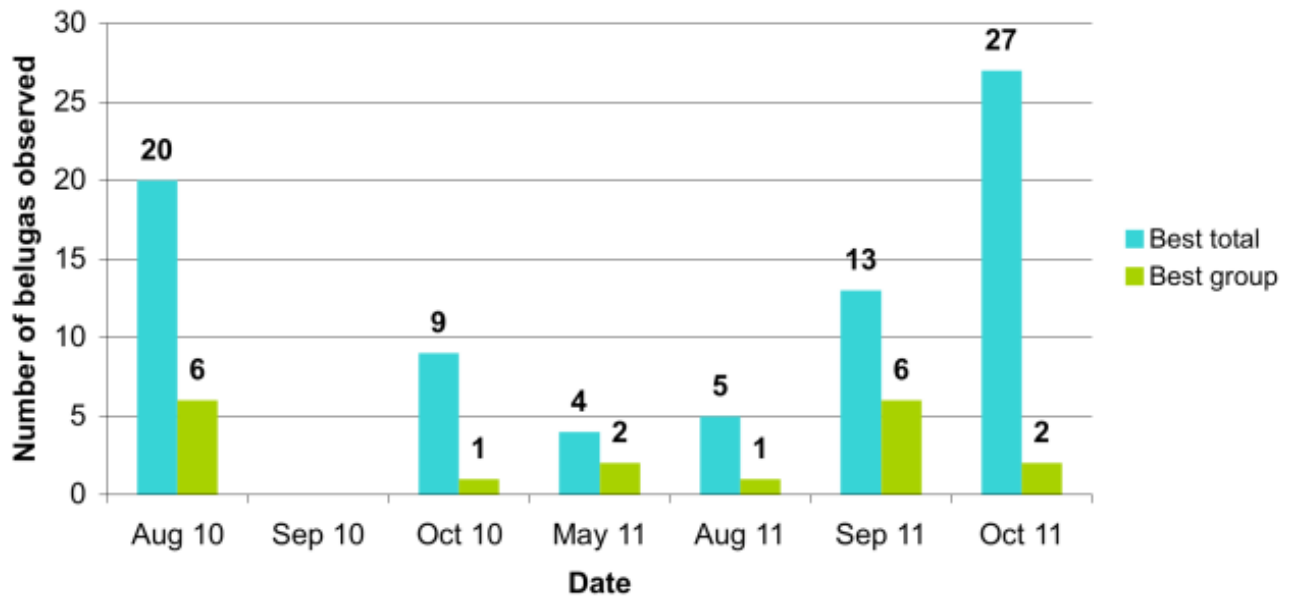


Figure 3.5.3. Incidental observations of beluga groups during 2010-2011 at Upper TA sites (note: this graph does not include incidental sightings sent by FAR to NMML between 2008 and 2010 because these have not yet all been entered into the project database).

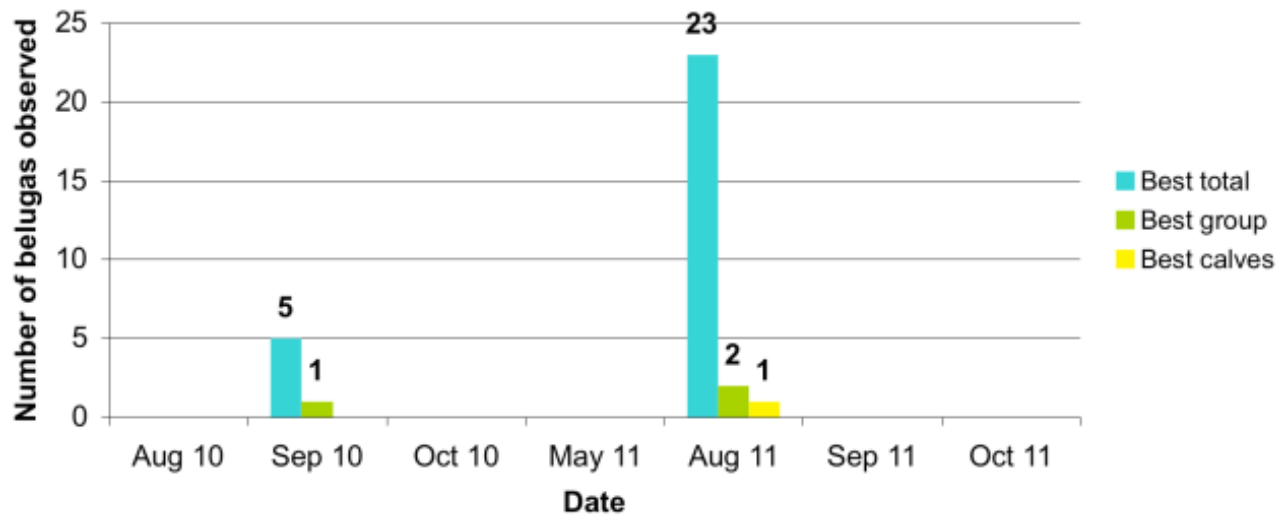


Figure 3.5.4. Incidental observations of beluga groups during 2010-2011 near Fire Island and Ship Creek sites (note: this graph does not include incidental sightings sent by FAR to NMML between 2008 and 2010 because these have not yet all been entered into the project database).

3.6 Boat Activity

Although the survey focus was on belugas and not boats, observers began to notice a variety of watercraft at most project sites. Observers documented ships, tugs, dredgers, barges, and other large work boats as well as skiffs, kayaks, canoes and wind-surfers. Boat traffic was heaviest at Ship Creek near the POA and 20-Mile, but there were numerous sightings at the MotoX, TA Potter, and TA Past Bird.

Table 3.6.1. TA localities in which FAR observers recorded boat traffic during surveys. Volunteers documented boat traffic at project sites in upper and lower Turnagain Arm as summarized below.

Date	Cable-laying boats		Other boats		Wind surfers		Kayaks	
	Lower TA	Upper TA	Lower TA	Upper TA	Lower TA	Upper TA	Lower TA	Upper TA
Oct 2008	X							
Sep 2010	X						X	X
Oct 2010								
May 2011				X	X			
Aug 2011								
Sep 2011	X		X		X			
Oct 2011								

4. DISCUSSION

4.1 Achievement of Goals and Objectives

Wildlife surveys conducted along the Anchorage coast during summer and early fall, when many Alaskans have vacation plans and visitors, are a time-intensive scheduling challenge. This is particularly true for the ACBS since the project is administered and run solely by volunteers. FAR and partners have worked steadily towards its goals of gathering information on the distribution, presence, absence, and behavior of CI beluga whales along the Anchorage coast, and creating an archive of data for reference purposes. Project objectives towards our goals have all been realized, although several were not completed until the end of the 2011 season and changes during the course of the survey have left fewer sets of data for some sites compared to others. FAR is able to share its CI beluga information with NMFS, ADF&G and others interested in the science and conservation of CI beluga whales, with the posting of this report.

The ACBS uses trained citizen scientists to collect data on CI belugas, at high tides and around predicted fish runs at pre-selected observation sites. From July through October of 2009 NMFS biologists asked that we schedule blindly instead of when volunteers could expect to document belugas (pers. comm. between R. Hobbs (NMFS-NMML) and B.S. Carlson, June 2009). While blind scheduling is a valuable scientific tool, it may be better used with paid observers than volunteers in a citizen science survey such as the ACBS, because a volunteer's reward is based on experience, which is lacking when no belugas are observed. During 2008, June of 2009, 2010, and 2011, ACBS scheduling was focused around predicted flat fish tides and salmon runs when possible. In May of 2011, the ACBS conducted its first survey around a predicted eulachon run, but did not see many whales. FAR also received fewer than usual incidental beluga reports during this period suggesting there may not have been a large enough concentration of the fish for belugas to hunt during the last half of May 2011. More surveys during eulachon runs would be necessary to detect beluga trends in relation to this anadromous fish.

In November of 2011, a volunteer who lives in Girdwood suggested that FAR consider changing the timing for lower Turnagain Arm because locals there say that belugas feeding on eulachon or salmon follow the fish in with the tide, and with a report that the fish arrive ahead of the bore

tide, which is 2 to 2.5 hours after low tide (K. Wilkinson, pers. comm. with B.S. Carlson November 2011). Local experience has been that belugas appear 200 yards to a mile behind the bore tide. In contrast, the ACBS has logged sightings during high tides and one incidental sighting at a -2 tide (on 31 August 2011). FAR will consider the differences between reported sightings from locals and documentations from survey volunteers in future plans. Typically we schedule surveys at high tide so that the whales will be close enough for observers to see and to document as much as possible about numbers, color, sizes, and behavior. The farther out the tide is, the harder it is for shore-based observers to see, even with project scopes and binoculars. If resources allowed the use of more powerful scopes, it might be possible to see significantly farther out during lower tides. However, viewing platforms along the Seward Highway are fairly close to sea level, so we would have to experiment to see if more powerful scopes would be worth the added expense. LGL Research Associates had an observer actually hike up the side of the mountain to Bird Ridge along Turnagain Arm (Markowitz *et al.* 2007), but that would not be appropriate for ACBS volunteer crews. Logistically, conducting this hike would be time-consuming, physically challenging and would offer limited return on the time invested.

While observers often documented belugas on the far shore of Turnagain Arm and project schedules were centered on incoming high tides, the number of sites at which crews stopped; the overall driving time for volunteers; and the time it took to get from one observation site to the others made it difficult to spend much time at each observation site. Relatively short observation times at the Turnagain Arm sites made it difficult to be at each location when the high tide was incoming. Without longer observation times at each site, it was difficult to gather much information on the direction from which belugas came and where they went after they left the locality. Sometimes belugas just seemed to appear and disappear.

The objective of creating and maintaining an ACBS database to store the information required several years to meet, and it was not until 2011 that FAR was able to put the database to practical use. FAR intended to have the Access database designed and complete for data entry before the project began, and since it was not immediately available we began by entering data into Excel workbooks. During the 2011 season, it became evident that there are too many tasks for one project leader to manage. While actively managing survey logistics, the project leader was

unable to address data checking and data cleaning procedures until the survey season was over. After a focused series of repeated post-survey data checks and specific data cleaning, FAR volunteers and NMML collaborated to create their ideal protocol for data management to which they will adhere henceforth.

The ACBS has increased public awareness of CI belugas and their habitat significantly, through educating volunteers and, in turn, trained volunteers educating the public. The increased outreach by FAR, ACE, and DoW expanded the number of volunteers who wanted to participate in the ACBS. Further, friends and families of volunteer members are more knowledgeable about CI belugas because of the experiences gained by the volunteers. People who pass our crews along the Seward Highway often recognize who we are and what we are doing without stopping to ask. Sometimes they write FAR saying, for example, “We saw your crew out this afternoon near Potter Marsh. After we passed them we noticed a pod of about five belugas headed their way.” (B.S. Carlson, pers. obs.)

This informal educational component goes hand in glove with FAR’s success in promoting stewardship of the CI beluga and the habitats upon which they depend. As a measureable objective, FAR invited friends, volunteers, and members to read CI beluga documents that were out for review which had requests for comments and public testimony. When citizens make time in their busy lives to participate in a carefully designed survey on an endangered species, they most often want to make whatever changes in their lives might be necessary to increase the chance of survival for that species. Most of FAR’s volunteers are not only highly educated, but they are also among the most actively involved people in the community. Some observers even take time off from work to participate and while the majority of volunteers live in Anchorage, people do drive from as far away as Wasilla, Palmer, Eagle River, and Girdwood to participate.

ACBS volunteers have successfully scanned for and reported on, any live or dead strandings of marine mammals during most scheduled shifts. Since 2004, FAR has worked with volunteers in the Congress-mandated Alaska Marine Mammal Stranding Network. Although it is not part of the ACBS, FAR frequently provides assistance with coordination and facilitation for researchers

participating in NMFS-approved necropsies and salvage work of stranded marine mammals, particularly if the animals are found within the ACWR.

4.2 Survey Sites

FAR volunteers reported a total of 738 beluga sightings between 2008-2011, not counting the incidental sightings between 2008 and 2010 that have not yet been entered into the database. The potential value of each survey site is discussed below.

Ship Creek is an interesting and valuable site because belugas have long been observed in the vicinity and because it is an area of high development. Local media often film footage for beluga stories at FAR's chosen observation site. The ACBS only documented two groups (13 belugas) here over the course of two years. The paucity of documented beluga sightings at Ship Creek may be due partly to blind scheduling from July through early November in 2009, or to scheduling focused at low tide, a time of specific interest to biologists (pers. comm. with T. McGuire; B. Mahoney to B.S. Carlson, September 2008). While this is valuable biological information it may be more practical for NMFS or industry to hire observers for times when few belugas are likely to be seen, rather than citizen volunteers. Currently, it is redundant to post a crew at Ship Creek as long as the POA has a reliable observation crew present, with more dedicated survey hours and a higher viewing platform (which optimizes chances of observing belugas). It would be interesting to compare FAR's data with that of the POA, particularly with regards, to noise and boat traffic.

Development around Fire Island is ongoing and FAR understands that it would be particularly useful to have more CI beluga data from Point Woronzof and Point Campbell to supplement the information documented at the MotoX and PP#2 sites. The Woronzof site is extremely loud due to its proximity to the airport and may cause damage to the ears of volunteers if they were scheduled there frequently without ear protection. Ear protection might make volunteers less aware of their surroundings, which could be unsafe. The Point Campbell site presents more constraints than other sites because it is farther from a road and requires a vigorous hike carrying gear to and from the site. This means that volunteers staffing the site have to be strong enough to do the physical work and have the additional time required for set-up and return to transport.

Additionally, access to the Point Campbell site requires an agreement with the MOA Department of Parks and Recreation and a key to unlock the gates.

The Kincaid Park (Jodhpur) Motocross bluff is the ACBS project's nearest observation site with a fair vantage of Fire Island and the waters from West Point to about half way across the south side of the island. North Point, on Fire Island, is not visible from the MotoX observation site. FAR currently lacks the resources to gather information, entirely, on use of the channels by belugas between Fire Island and the Anchorage coast, due to limited staffing for the Point Campbell observation sites. Balancing the need for additional CI beluga data with the limited staffing and support of a volunteer wildlife survey is a dilemma, especially during these important resource development times. FAR will do everything possible to continue to collect data at the MotoX site where volunteers have documented more than 200 belugas over 260 hours. The site is near the heart of the ACWR and is also the location of several other FAR volunteer stewardship projects.

Private Property #2 is staffed by the project facilitator who will continue to either send data to NMFS through the ACBS or private correspondence. Volunteers at PP#2 documented 79 belugas, five of which were identified as calves, not counting data not entered into the database for 2008-2010. Shortly before the survey began in 2008, Carlson documented more than 150 belugas between Campbell Creek and the Motocross site during one sighting event.

Private Property #1 will not likely be staffed again unless we have considerably more resources as far as scheduling help. It could still be a useful site; particularly if there were interest by the user groups of the owners in volunteering. Since the organization/owners do considerable other volunteer work, their further participation in the ACBS is not likely.

The Potter Section House site is of continued interest, particularly since observers documented 33 belugas, three of which were identified as calves. The TA Potter site is great for public education, and is convenient for volunteers since it has nearby outhouses and a covered platform which may be used when there are not too many visitors. The inclusion of the TA Potter site

depends on which other TA sites are planned for surveys in a given season and what particular data requests are received by FAR.

Despite many early incidental sightings FAR received from Windy Corner, it is a low yield survey site and should only be considered if the project is flush with resources. During 19 hours of observation, volunteers documented 15 belugas, two of which were calves. Adverse weather has been the predominant factor in scheduling decisions at TA Windy, not because volunteers are reluctant to brave it, rather the conditions at the “windy corner” very often prevent crews from being able to see belugas if they are present, with winds sometimes nearly ripping the clipboard boxes right out of the hands of volunteers.

The 1st pull-out Past Bird Point (TA Past Bird) site is a high yield site of great interest to biologists, industry and decision-makers, and is a high priority for future surveys should the ACBS continue. In over 29 hours of scanning, volunteers documented 83 belugas, two of which were identified as calves. Volunteers find the site to be easy to use logistically as it is a quick pull-off and set-up station with no obstructions of the view.

TA Tidewater is a lower yield site; however, Tidewater Slough has been a site where NMFS has indicated belugas sometimes wash up dead. It thus has additional interest to researchers and should be considered during prioritizing for future efforts.

Volunteers at the TA Avalanche site documented 43 belugas with just 6.32 hours of scanning, making it a high yield site. The depth of the tidal gut close to the rocky cliff makes it possible to see belugas close to shore if they are present. In 2011, volunteers encountered a sediment study crew while at Avalanche, with whom it might be interesting to compare notes.

The TA 20-Mile site is of great interest to biologists, industry and decision-makers because locals have reported belugas follow fish up the river, but little to no documentation exist to show that belugas go under the bridge on the Seward Highway. FAR was only able to dedicate 3.22 scanning hours at the site during 2011 to a yield of about 10 belugas, including one calf. This site should receive a high rank in priority while taking into consideration that the site is the

furthest from Anchorage. Staffing the site with a trained crew and leader from Girdwood may make the use of the site feasible, but would require extra outreach, equipment, training effort and additional logistical consideration.

Although there are not good records of fish runs in Turnagain Arm, we know from ADF&G records that eulachon run in upper Cook Inlet during late April to mid-June. Chinook salmon run late May to mid-July at Ship Creek, Campbell Creek, Rabbit Creek, Bird Creek (and are present in August). Kings run up Twenty-Mile River to spawn in Carmen Creek (and likely other 20-Mile watershed areas). Coho salmon run mid-July through September in Ship Creek, Campbell Creek, and Chester Creek, and from mid-August through October at Rabbit Creek and 20-Mile River. Sockeye salmon run at Ship Creek, Campbell Creek, Rabbit Creek and Bird Creek during June and July. Pink salmon run in early July to mid-August at Ship Creek, Campbell Creek, Chester Creek, Rabbit Creek, Bird Creek (greatest abundance on even numbered years), and Kern Creek. Chum salmon run from early July to mid-August at Ship Creek, Campbell Creek, Rabbit Creek, Bird Creek, and Kern Creek (and are present in September). Fish run outside these times but few escapement records are yet available for this area. (M. Miller, D. E. Bosch, and M. Willette, spring and summer, 2010, Alaska Department of Fish & Game biologists, pers. comm. with B.S. Carlson, via telephone and email communications; D.E. Bosch, December 2011, email communication.) Consideration of specific fish presence and fish runs have and should be included in prioritizing survey sites and seasonal timing in future ACBS work.

4.3 Archival Record

The ACBS is an archival wildlife survey and not a population estimate or count. Although leaders and crews endeavor to not double count belugas, it is not always easy to tell whether one is documenting one or two groups (particularly when belugas are submerged in sediment heavy waters for most of the time); or whether a pod sighted later in the shift is the same group or a different group than the one recorded earlier. The ACBS protocols stipulate that observers count only when they see skin; thus, our numbers are conservative as we do not use a calculation to estimate for belugas under water. FAR understands that biologists, industry and other decision-makers will be able to make use of such extant records as the ACBS between 2008 and 2011 and

in a perfect world will be able to continue documenting said beluga data as long as belugas are present in upper Cook Inlet.

FAR's decision to drop various sites at points in time to gather beluga information at others, affected overall survey results, despite obtaining the desired data. There are insufficient resources to post crews everywhere for which beluga data is desired. Communication with NMFS, NMML, other beluga researchers, and the CIBRT helps FAR decide how to best prioritize each year's survey, but difficult choices abound given FAR's lean and uncertain resources, and priorities seem to change as projects and various deadlines for decisions morph.

The project strives to collect the best information about CI belugas along the Anchorage coast, while creating an engaging and rewarding experience for participating citizen scientists. During 2008 and 2009, when the ACBS scheduled around low tide at Ship Creek, and during four of five months when we scheduled blindly; during those times, beluga counts were either low or non-existent. While the purpose of FAR's intense dedication is to learn more about belugas and meticulously share that data with biologists, industry and decision-makers, it is important to remember that sustaining volunteer participation is critical to success of our effort.

A particular challenge for a volunteer organization such as FAR is staffing shifts that require longer time commitment or more rigorous physical activity. Not all participants are in good enough physical condition to carry gear to sites we might like to include (e.g., Point Campbell), let alone hike to and from sites that require some climbing and bush whacking. Some of our staff takes time off from their jobs to volunteer and others hire babysitters so that they may participate. Extended travel time and increased physical demands to hike to remote survey sites can be an issue for unpaid volunteers, making scheduling difficult for such sites.

4.4 Possible Trends to Follow

While it may be coincidental that more boats are documented when there are fewer or no belugas, it is possible that certain boat activity and/or noise affects the presence, numbers, or surfacing behavior of belugas in the same vicinity. It is similarly possible that when belugas were being documented, observers were distracted from noticing and recording the presence of boats in the areas. FAR may consider changing the protocol to ensure that both belugas and

boats in the project area are carefully monitored. Further accumulation of boat and beluga data, and subsequent analyses, may shed light on this phenomenon.

The authors considered summarizing noise since there were a number of notes about noise at several sites. The survey, as it is currently designed, does not provide an adequate way for observers to quantify the variety of examples of noise heard at sites. To be able to learn more about the noise factor, FAR would have to consider developing a measureable protocol for the data.

4.5 End Note

This report provides a summary of the data collected for the ACBS, but no significant statistical analyses. FAR hastened to prepare this report prior to any significant data analysis, in an effort to provide timely information to biologists, developers, and other decision-makers. We will consider analyses as part of Phase 2 of the project, assuming funding and resources can be attained. FAR is currently discussing whether or not to continue the survey, based on whether the project has met its goals and objectives and whether we have the resources to continue. The FAR Board met to prioritize projects and did some reorganization during spring and summer of 2012. The level of activity dedicated to the ACBS as part of FAR's mission required more individuals in positions of responsible leadership and management than previously existed, so we developed a new leadership model. During the 2012 season five experienced survey leaders committed to work as ACBS Project Coordinators, greatly enhancing chances for survey sustainability. For the ACBS, this led to a reduced number of observation sites during 2012, but we were able to, once again, gather beluga data at the MotoX observation site. It has always been FAR's intent to continue to at least gather data at the MotoX site, worst case scenario. This is the site for which the ACBS has gathered the most beluga data. FAR asks that NMFS, NMML, and the CIBRT write the ACBS facilitator to annually alert FAR to what they would most like to see from us as soon as they know. If these groups prioritize their desired beluga data, FAR will be able to most logically determine which endeavors would be most feasible during a given season. Ideally, the aforementioned will alert FAR to said prioritized needs well before the season begins so that FAR may undertake the requisite planning to make any necessary changes to data forms, maps and training materials.

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6. APPENDICES

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(Include Avalanche looking south & Avalanche looking west)

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6.1.1 Shift Form

(Next page)

PDF name: _____
(e.g. 21.jul.11.pastbird.s1.pdf)

SHIFT: Page 1 ANCHORAGE COASTAL BELUGA SURVEY 2011

MEET-UP TIME: _____ AM/PM (circle one) BACK TO PARKING LOT TIME: _____ AM/PM (circle one)

SCAN TIME: Begin Shift: _____ AM/PM (circle one) End Shift: _____ AM/PM (circle one)

Site (circle):

- a. Motocross (motox)
- b. Potter Sec House platform (potter) **Mi S 115.2**
- c. Windy Corner (windy) **Mi S 106.7**
- d. 1st pull-out past Bird Point (pastbird) **Mi S 95.4**
- e. Tidewater Slough (tide) **Mi S 91.5**
- f. Point Campbell (campbell)
- g. Avalanche gun-emplacement (avalanche) **Mi S 87.4**
- h. 20-Mile Boat Ramp (20mbr) **Mi S 80.7**

LIVE BELUGAS SEEN? Y/N (circle one) How many groups? _____

DEAD MARINE MAMMAL(S) SEEN? Y/N Circle one
Species, if known? _____

Dead or Stranded MM Comments: _____

VOLUNTEER'S HOURS

Observer ID#	Last name, 1 st Initial	Extra Hrs only
Lead:		
1 st :		
2 nd :		
3 rd :		
4 th :		
5 th :		

List each volunteer's extra hrs, drive & prep time

VIEWING CONDITIONS

Air temp _____ (C°) Wind _____ (Beaufort Force #) Wind direction _____ (N, NW, W, SW, S, SE, E, NE, Variable, Calm)

Wind Comments: _____

Precipitation (circle): none rain snow hail fog
Precipitation Comments: _____

Percentage of cloud coverage (circle one): 100% 75% 50% 25% Clear
Cloud Comments: _____

Sea conditions (circle): Whitecaps? Y/N Ice? Y/N
Wave Comments: _____

*Check this blank if there are notes or drawings continued on the back of this paper.

PDF name: _____
(e.g. 21.jul.11.pastbird.s2.pdf)

SHIFT: Page 2 ANCHORAGE COASTAL BELUGA SURVEY 2011

Viewing conditions (circle one): Excellent Good Fair Poor

Viewing Conditions Comments: _____

OTHER WILDLIFE OBSERVED? Describe.

HUMAN ACTIVITIES? Describe

FORMAL ORAL HISTORY INTERVIEW CONDUCTED: Y/N (Circle one)

GENERAL COMMENTS ABOUT SHIFT:

Check this blank if there are notes or drawings continued on the back of this paper.

6.1.2 Beluga Form

(Next page)

FILE name: (e.g. 21.jul.11.motox.b1.pdf If 2 beluga groups ...b2.pdf, etc.)

BELUGA FORM: USE 1 PAGE WITH EACH MAP FOR EACH BELUGA GROUP.

1. Site (circle):

- a. Motocross (motox)
- b. Potter Sec House platform (potter) **Mi S 115.2**
- c. Windy Corner (windy) **Mi S 106.7**
- d. 1st pull-out past Bird Point (pastbird) **Mi S 95.4**
- e. Tidewater Slough (tide) **Mi S 91.5**
- f. Point Campbell (campbell)
- g. Avalanche gun-emplacement (avalanche) **Mi S 87.4**
- h. 20-Mile Boat Ramp (20mbr) **Mi S 80.7**

- 2. **Group number:** ____ (NOT number of animals, but order of groups seen on shift, i.e. 1st, 2nd, etc.)
- 3. **Begin group observation:** ____ AM/PM (Circle) **End group observation:** ____ AM/PM (Circle)
- 4. **Location of beluga or group (v):** ____ near shore ____ middle distance ____ far distance

Grid(s): 1st sighted _____ Other grids: Document on Map form in order of sighting

- 5. **Minimum count:** # white ____ # gray ____ # calves ____ # unknown ____ # total ____
- 6. **Maximum count:** # white ____ # gray ____ # calves ____ # unknown ____ # total ____
- 7. **Best count:** # white ____ # gray ____ # calves ____ # unknown ____ # total ____

- Proximity calf 1 to adult (circle #):** 1. touching 2. 1 whale length 3. 2-3 whale lengths 5. Alone
- Proximity calf 2 to adult (circle #):** 1. touching 2. 1 whale length 3. 2-3 whale lengths 5. Alone
- Proximity calf 3 to adult (circle #):** 1. touching 2. 1 whale length 3. 2-3 whale lengths 5. Alone

- Estimated size calf 1 (circle):** 55% 66% 70% 80% or larger
- Estimated size calf 2 (circle):** 55% 66% 70% 80% or larger
- Estimated size calf 3 (circle):** 55% 66% 70% 80% or larger

Count Comments: _____

8. Behaviors Observed (circle all that apply):

- a. Feeding (observed or suspected)
- b. Direction of travel (please sketch on map with arrow)
- c. Milling
- d. Body Contact
- e. Resting
- f. Diving
- g. Spy hopping
- h. Tail waving
- i. Tail slapping
- j. Vocalizing
- k. Porpoising
- l. Nursing
- m. Spouting or "blowing"
- n. Other (describe)

Behavior Comments (Important): _____

Stranded beluga or other marine mammal? Y/N (circle one)

- a. What is it? _____ Alive or dead? _____
- b. Record location on map and describe:

*Check this box if there is writing or drawing on back.

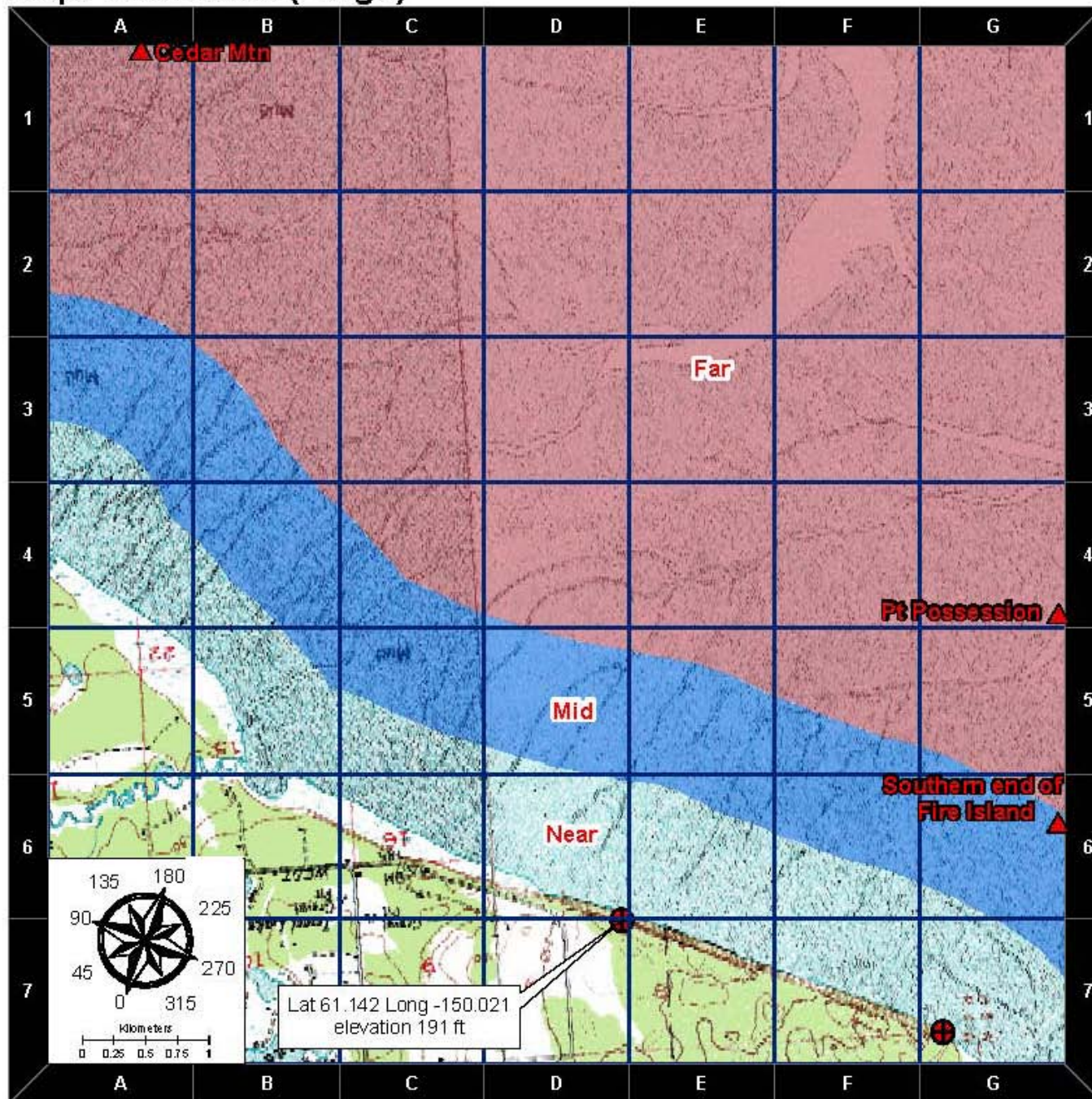


6.1.3 Map Form Example

Each ACBS observations site has a specially designed map used to mark the location of beluga sightings. The next page shows an example of the MotoX observation site map was designed in collaboration with Doug Tosa, GIS specialist with the Alaska Center for the Environment.

Map: Motocross (Large)

.pdf__



i.e. 30.jun.11.motoxlg.m1.pdf (If 2 beluga maps...m2.pdf, etc)

Mark "X" in map grid where first seen.
Record grid, compass bearing (degrees) & brief behavior notes sequentially. Example:
1. 6B, 135° @ 7:55 AM—milling, see fish flying—suspect feeding.

1. _____, _____ @ _____
grid degrees time

2. _____, _____ @ _____

3. _____, _____ @ _____

4. _____, _____ @ _____

5. _____, _____ @ _____

6. _____, _____ @ _____

7. _____, _____ @ _____

**Note THIS compass rose rotation!

*Check box if data on back.



6.1.4 Incidental Sightings Form

(Next page)

Beluga Sightings Report for Anywhere in Cook Inlet

This form is for sightings not seen during the Anchorage Coastal Beluga Survey and may be sent by anyone to Barbara Carlson at beluga@farak.org. We send sightings to the National Marine Mammal Laboratory that manages the database for the entire Pacific Northwest for NOAA/NMFS. Kindly give us as much of the following as you are able.

***Date:**

***Time:**

***Are the belugas dead or alive?**

***How many belugas (count or estimate)?**

***Where did you see them?**

Were there any beluga calves?

If so, how many?

Which way were the belugas headed?

What were they doing?

What else can you tell us?

***Name of Reporter:**

***Email address (So we may contact you if we have questions):**

***Phone (same as above):**

***Required for data entry.**

Thank you for sharing your beluga sighting information as soon as possible. It is very helpful for us to have this in writing so that we may make timely and accurate reports.

6.1.5 Oral History Form

(Next page)

File name: (21.jul.11.motox.oh1.pdf If 2 histories in day at site ...oh2.pdf, etc.)

ANCHORAGE COASTAL BELUGA SURVEY ORAL HISTORY
DATA SHEET 2011

FAR ID# & Volunteer:

Name of speaker (Print neatly):

Signature of speaker:

I give my permission for FAR to use my oral history account of Cook Inlet beluga for their ongoing Anchorage Coastal Beluga Survey work which may include quotes on their website.

Phone number:

email:

(In case we need to reach you to clarify anything or ask another question.)

Location: (Which observation site or nearby location?)

Questions:

1. How long have you lived here (or how many years have you been coming to this area)?
2. Why do you usually come here? (fish, photography, drive, etc.)
3. Have you seen belugas go up this creek (name the stream or river)? **Y/N (Circle one)** If so, how far up have you seen them?
4. Have you seen belugas go under a bridge? **Y/N (Circle one)** If so, what river (creek or stream)?
When did you observe this?
5. What can you tell us about the belugas you have seen in Turnagain Arm?
6. Is there an area where you have seen them most often?
7. When are you most likely to see them? Why?
8. Have you seen killer whales in this area? **Y/N (Circle one)** If so, where? When?
9. Have you seen killer whales elsewhere in upper Cook Inlet? **Y/N (Circle one)** If so where & when?
10. What can you tell us about the fish runs here?
11. Anything else you would like to tell us about your experiences with belugas in upper Cook Inlet?

* Check this box if writing or drawings on back.

6.2 Examples of Reference Points for Maps

For most of the observations sites Doug Tosa, GIS specialist with the Alaska Center for the Environment, created digitized Google images that show volunteers what reference points would be visible in different directions on project maps. The following are examples that point out the reference mountain peaks for the TA Avalanche observation site's project map.

Figure 6.2.1 Looking west from TA Avalanche observation site at Bradley Peak with Bradley Peak as a reference. Digital picture courtesy of Google Images.

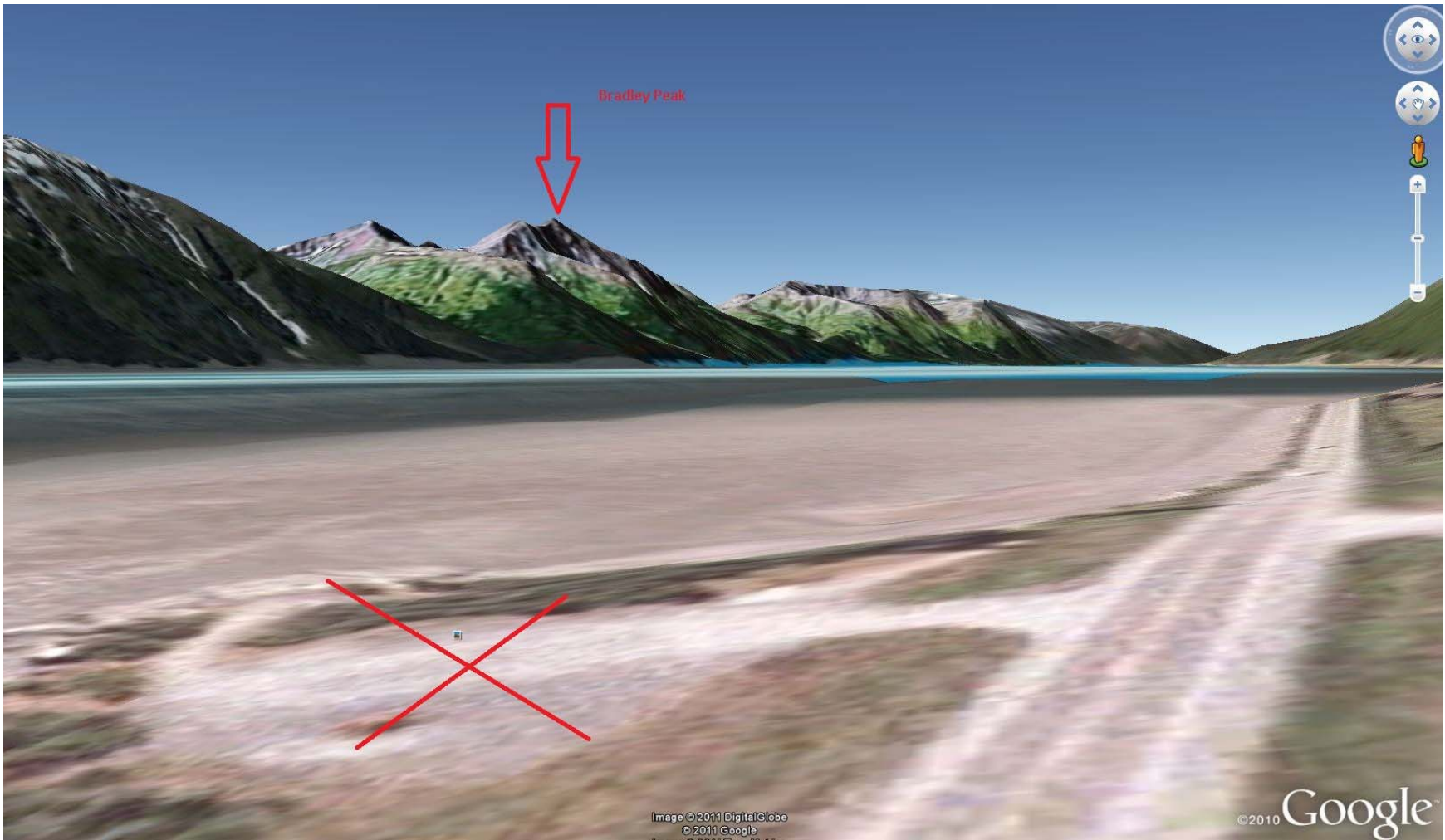
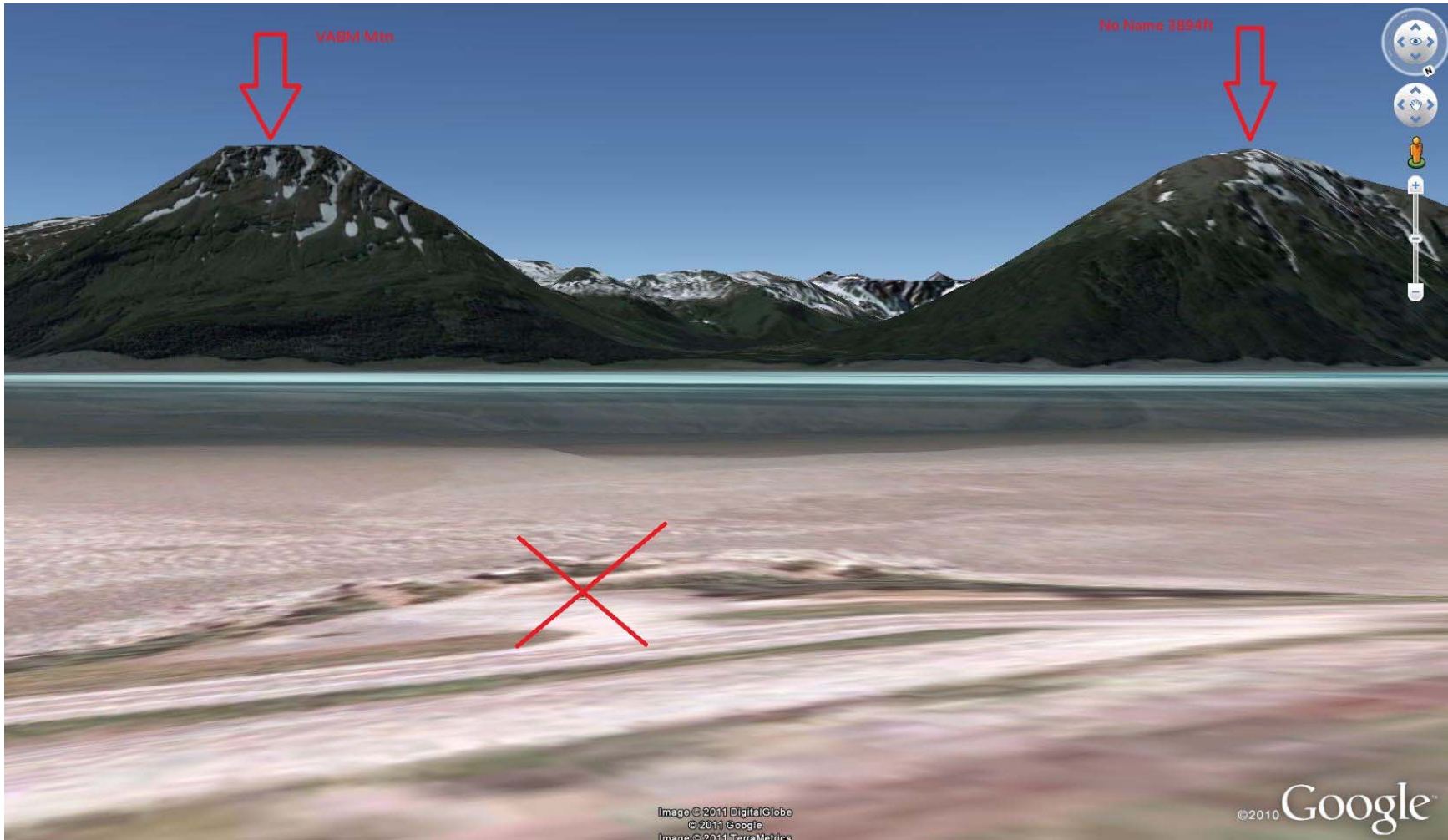


Figure 6.2.2 Looking south from TA Avalanche observation site with peak references of a “VABM” Mountain & a 3894’ No Name Mountain. Digital picture courtesy of Google Images.



6.3 Volunteers

FAR appreciates support National Marine Fisheries Service staff, the National Marine Mammal Laboratory biologists, Alaska Department of Fish & Game biologists, and Audubon Alaska; as well as the partnership of, the Alaska Center for the Environment, Defenders of Wildlife, and McCool/Carlson/Green Architects, Inc., but the Anchorage Coastal Beluga Survey depends on frequent collaboration with a variety of scientists and mentors and, perhaps most importantly, generous donation of time by many volunteers each season and through the winter to do work with the data and organization. We deeply value the generous service of each and every one of the individuals who have played a part in the success of this ongoing wildlife survey. The individuals listed on the next pages have helped in one or more important ways. We regret any errors or inadvertent omissions.

* Survey volunteers & data entry (one asterisk per year with 3 or more volunteer shifts)

+ Provided expertise during planning or review

Ongoing advice or technical support

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Matthew LaCroix, ADF&G
Barbara Mahoney, NMFS
John Schoen, Audubon AK
Rick Sinnott, ADF&G
Randy Virgin, ACE

+Long Term Support

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Les Cockreham, NMFS
Karla Dutton, DoW
Kim Klein, USFWS
Kim Shelden, NMML
Toby Smith, ACE
Doug Tosa, ACE

+#Core Mentors

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+Early consultation

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Dave Rugh, NMML
Kim Shelden, NMML

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Smiley & Sue Shields
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Kent Wohl
Chuck Wood
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6.4 ACBS Tide Calculations and Daylight Hours

Scheduling considerations are graphically illustrated showing twilight, sunrise, sunset, high tide time at successive observation sites, Anchorage tide book high tide in feet, corrected high tide in feet for Fire Island, and the time increments used to figure the differences. Volunteer project scheduling also considers time and day of the week depending on the balance of individuals who have other work around which they must schedule survey time. For example, if during a season there are more people with other work commitments during the week, we schedule more shifts on the weekend and vice-versa. Color coding indicates days that the ACBS will send to leaders and volunteers and attempt to get full crews (green shading); days when shifts will be affected by sunrise or sunset (orange shading); days that are too dark during the requisite tides to be useful (grey shading); and days that are not notable for scheduling purposes (no shading).

Miles from Anchorage						11.80	20.30	31.70	36.50	39.60	46.30					
Minuets/Miles						3.00	3.00	3.00	3.00	3.00	3.00					
Minutes Offset from Fire Island						35.40	60.90	95.10	109.50	118.80	138.90					
Hours Offset						-	1	1	1	1	2					
Minutes Offset						35.40	0.90	35.10	49.50	58.80	18.90					
day	date	civil twi	sunrise	high tide	Fl hi - 0:17	Potter hi	Windy hi	past Bird	Tidewater	Avalanche	20-Mile	sunset	civil twi	high'	Fl cor'	neap
Shift Offset						0:00	0:35	1:01	1:35	1:49	1:59	2:19			tide book	
st	1-Oct-11	7:21 AM	8:04 AM	10:47 AM	10:30 AM	11:05 AM	11:31 AM	12:05 PM	12:19 PM	12:29 PM	12:49 PM	7:35 PM	8:18 PM	31.2	28.7	
sn	2-Oct-11	7:24 AM	8:07 AM	11:41 AM	11:24 AM	11:59 AM	12:25 PM	12:59 PM	1:13 PM	1:23 PM	1:43 PM	7:32 PM	8:15 PM	29.8	27.4	x
m	3-Oct-11	7:26 AM	8:09 AM	12:45 PM	12:28 PM	1:03 PM	1:29 PM	2:03 PM	2:17 PM	2:27 PM	2:47 PM	7:29 PM	8:12 PM	28.2	25.9	x
t	4-Oct-11	7:29 AM	8:12 AM	2:00 PM	1:43 PM	2:18 PM	2:44 PM	3:18 PM	3:32 PM	3:42 PM	4:02 PM	7:25 PM	8:08 PM	26.9	24.7	x
w	5-Oct-11	7:31 AM	8:14 AM	3:21 PM	3:04 PM	3:39 PM	4:05 PM	4:39 PM	4:53 PM	5:03 PM	5:23 PM	7:22 PM	8:05 PM	26.4	24.3	x
r	6-Oct-11	7:34 AM	8:17 AM	4:38 PM	4:21 PM	4:56 PM	5:22 PM	5:56 PM	6:10 PM	6:20 PM	6:40 PM	7:19 PM	8:02 PM	27.1	24.9	x
f	7-Oct-11	7:36 AM	8:19 AM	5:35 PM	5:18 PM	5:53 PM	6:19 PM	6:53 PM	7:07 PM	7:17 PM	7:37 PM	7:16 PM	7:59 PM	28.1	25.9	x
st	8-Oct-11	7:39 AM	8:22 AM	6:18 PM	6:01 PM	6:36 PM	7:02 PM	7:36 PM	7:50 PM	8:00 PM	8:20 PM	7:13 PM	7:56 PM	28.8	26.5	x
sn	9-Oct-11	7:41 AM	8:25 AM	6:51 PM	6:34 PM	7:09 PM	7:35 PM	8:09 PM	8:23 PM	8:33 PM	8:53 PM	7:10 PM	7:53 PM	29.2	26.9	x
m	10-Oct-11	7:44 AM	8:27 AM	7:16 PM	6:59 PM	7:34 PM	8:00 PM	8:34 PM	8:48 PM	8:58 PM	9:18 PM	7:07 PM	7:50 PM	29.7	27.3	x
t	11-Oct-11	7:46 AM	8:30 AM	7:42 AM	7:25 AM	8:00 AM	8:26 AM	9:00 AM	9:14 AM	9:24 AM	9:44 AM	7:04 PM	7:47 PM	29.4	27.0	x
w	12-Oct-11	7:49 AM	8:32 AM	8:15 AM	7:58 AM	8:33 AM	8:59 AM	9:33 AM	9:47 AM	9:57 AM	10:17 AM	7:00 PM	7:44 PM	29.8	27.4	x
r	13-Oct-11	7:51 AM	8:35 AM	8:49 PM	8:32 PM	9:07 PM	9:33 PM	10:07 PM	10:21 PM	10:31 PM	10:51 PM	6:57 PM	7:41 PM	29.9	27.5	
f	14-Oct-11	7:54 AM	8:37 AM	9:24 AM	9:07 AM	9:42 AM	10:08 AM	10:42 AM	10:56 AM	11:06 AM	11:26 AM	6:54 PM	7:38 PM	29.7	27.3	x
st	15-Oct-11	7:56 AM	8:40 AM	10:00 AM	9:43 AM	10:18 AM	10:44 AM	11:18 AM	11:32 AM	11:42 AM	12:02 PM	6:51 PM	7:35 PM	29.1	26.8	x
sn	16-Oct-11	7:59 AM	8:43 AM	10:37 AM	10:20 AM	10:55 AM	11:21 AM	11:55 AM	12:09 PM	12:19 PM	12:39 PM	6:48 PM	7:32 PM	28.3	26.0	x
m	17-Oct-11	8:01 AM	8:45 AM	11:17 AM	11:00 AM	11:35 AM	12:01 PM	12:35 PM	12:49 PM	12:59 PM	1:19 PM	6:45 PM	7:29 PM	27.1	24.9	x
t	18-Oct-11	8:04 AM	8:48 AM	12:04 PM	11:47 AM	12:22 PM	12:48 PM	1:22 PM	1:36 PM	1:46 PM	2:06 PM	6:42 PM	7:26 PM	26	23.9	x
w	19-Oct-11	8:06 AM	8:50 AM	1:02 PM	12:45 PM	1:20 PM	1:46 PM	2:20 PM	2:34 PM	2:44 PM	3:04 PM	6:39 PM	7:23 PM	25.1	23.1	x
r	20-Oct-11	8:09 AM	8:53 AM	2:15 PM	1:58 PM	2:33 PM	2:59 PM	3:33 PM	3:47 PM	3:57 PM	4:17 PM	6:36 PM	7:20 PM	24.9	22.9	x
f	21-Oct-11	8:11 AM	8:56 AM	3:30 PM	3:13 PM	3:48 PM	4:14 PM	4:48 PM	5:02 PM	5:12 PM	5:32 PM	6:33 PM	7:18 PM	25.9	23.8	x
st	22-Oct-11	8:14 AM	8:58 AM	4:31 PM	4:14 PM	4:49 PM	5:15 PM	5:49 PM	6:03 PM	6:13 PM	6:33 PM	6:30 PM	7:15 PM	27.6	25.4	x
sn	23-Oct-11	8:16 AM	9:01 AM	5:21 PM	5:04 PM	5:39 PM	6:05 PM	6:39 PM	6:53 PM	7:03 PM	7:23 PM	6:27 PM	7:12 PM	29.5	27.1	x
m	24-Oct-11	8:19 AM	9:04 AM	6:05 PM	5:48 PM	6:23 PM	6:49 PM	7:23 PM	7:37 PM	7:47 PM	8:07 PM	6:24 PM	7:09 PM	31.3	28.8	x
t	25-Oct-11	8:21 AM	9:06 AM	6:45 PM	6:28 PM	7:03 PM	7:29 PM	8:03 PM	8:17 PM	8:27 PM	8:47 PM	6:21 PM	7:07 PM	32.8	30.2	
w	26-Oct-11	8:24 AM	9:09 AM	7:25 PM	7:08 PM	7:43 PM	8:09 PM	8:43 PM	8:57 PM	9:07 PM	9:27 PM	6:18 PM	7:04 PM	33.8	31.1	
r	27-Oct-11	8:26 AM	9:12 AM	8:06 PM	7:49 PM	8:24 PM	8:50 PM	9:24 PM	9:38 PM	9:48 PM	10:08 PM	6:15 PM	7:01 PM	34.3	31.6	
f	28-Oct-11	8:28 AM	9:14 AM	8:59 AM	8:42 AM	9:17 AM	9:43 AM	10:17 AM	10:31 AM	10:41 AM	11:01 AM	6:12 PM	6:59 PM	32.2	29.6	
st	29-Oct-11	8:31 AM	9:17 AM	9:46 AM	9:29 AM	10:04 AM	10:30 AM	11:04 AM	11:18 AM	11:28 AM	11:48 AM	6:10 PM	6:56 PM	31.9	29.3	
sn	30-Oct-11	8:33 AM	9:20 AM	10:34 AM	10:17 AM	10:52 AM	11:18 AM	11:52 AM	12:06 PM	12:16 PM	12:36 PM	6:07 PM	6:53 PM	31.1	28.6	
m	31-Oct-11	8:36 AM	9:23 AM	11:26 AM	11:09 AM	11:44 AM	12:10 PM	12:44 PM	12:58 PM	1:08 PM	1:28 PM	6:04 PM	6:51 PM	30.1	27.7	x

6.5. ACBS Monitoring Instructions

2011 Anchorage Coastal Beluga Survey Monitoring Instructions

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ANCHORAGE COASTAL BELUGA SURVEY MONITORING INSTRUCTIONS

Prepared by Barbara Svarny Carlson, Friends of the Anchorage Coastal Wildlife Refuge

Acknowledgements: This land-based beluga whale survey is a citizen science project led by Friends of the Anchorage Coastal Wildlife Refuge (FAR); in collaboration with the National Marine Fisheries Service (NMFS) and the National Marine Mammal Laboratory (NMML); with the partnership of the Alaska Center for the Environment (ACE) and Defenders of Wildlife (DoW). FAR especially thanks Christy Sims and Dr. Rodney Hobbs (NMML); Dr. John Schoen (Audubon Alaska); Barbara Mahoney; Dr. Tamara McGuire, and Dr. Sylvia Brunner (formerly with the UAF Museum of the North, then the University of New Mexico); Karla Dutton (DoW); Toby Smith and Doug Tosa (ACE). We also acknowledge the early support and continuing encouragement of biologists with the Alaska Department of Fish and Game (ADF&G) of this undertaking as it relates to the Anchorage Coastal Wildlife Refuge.

Goal:

To gather information on the distribution, presence, absence, and behavior of Cook Inlet beluga whales along the Anchorage coast creating an archive of data for reference purposes.

Objectives:

1. To use trained citizen scientists to collect needed beluga data based on high tides around predicted fish runs at pre-selected observation sites.
2. To create and maintain a database to store the information.
3. To share the resulting information with NOAA/NMFS, ADF&G and others interested in the science and well-being of the Cook Inlet beluga.
4. To increase awareness of and education about Cook Inlet belugas and their habitat (via education of volunteers and education of the public by volunteers).
5. To promote stewardship of the Cook Inlet beluga and the habitats upon which they depend.
6. To scan for and report any live or dead strandings of marine mammals during each scheduled shift.

2011 Sites:

- Kincaid (Johdpur) MotoCross (August through October)
- Lower Turnagain Arm (Potter Section House; Windy Corner; & 1st pull-out past Bird Point; Tidewater Slough; Avalanche; & 20-Mile River (1/2 May; August through October)

Essential:

Site Manager: A site manager can be an agency, a business, a non-governmental organization or an individual. Currently, FAR is managing all sites with partnership support from ACE & DoW.

Lead Observer: If one has not been assigned, designate one person to fill that description from the crew, either the most experienced biologist, the person most familiar with the species, or the person most familiar with the observation area the group will cover.

1. This person makes decisions when necessary;
2. Helps with scheduling arrangements and logistics;
3. Checks to see that data sheets and maps have been properly completed before leaving each site;
4. For the Motocross site the lead will
 - a. Stop by FAR to pick up the key for the gates and the gear, and
 - b. Stop by FAR afterward to return all.
5. For the Turnagain Arm runs the leader (or their designee) will
 - a. Stop by FAR to pick up survey gear & paperwork and decide who will drive for the day, &
 - b. Stop by FAR afterward to return all.

Safety:

1. Each volunteer must have a signed waiver/indemnity agreement on file with FAR before being allowed to participate. No exceptions.
2. There will be at least two crew members scheduled to each shift for each observation site, for safety reasons and to ensure the best data collection. Three members are preferable as it spreads the work load nicely. If there are enough volunteers a fourth person would be useful to serve as the person who could interact with the interested public when there are other people around as well as replace other shift members so that they can use the restroom, etc. FYI: A bear rarely approaches a group as large as four.
3. At least one person scheduled to a crew must have a cell phone with them for safety and to enable communication between crews to share information during concurrent shifts.
4. Emergency phone numbers are provided in clipboard box for instances such as the following:

- ¹NMFS stranding cell # (for marine mammal stranding), NOAA Enforcement# (for suspected violation of regulation), NMFS Stranding hotline (after hours, weekends and holidays), APD (for human problems), ADF&G (for wildlife problems), Alaska State Trooper dispatch (after hours, weekends and holidays)
 - MOA Animal Care & Control Dispatch (e.g. loose dogs in ACWR)
 - FAR survey lead (and site managers when we have them)
 - Reminder to Lead Observers to make sure they have the cell phone number of other crews if they will be scheduled concurrently
5. Highway Safety: If you are assigned a shift which includes driving yourself and crew members along the Seward Highway, use extra care to drive safely and defensively, keeping an eye out for unsafe drivers. Additionally, when working next to the highway volunteers must stay off the road and watch for errant traffic. Always remember: Safety first; data second.
 6. Safety Vest or Brightly Colored Coat: If for any reason you will be descending into the Refuge during hunting season (September 1 to March 31), check with FAR first, and be sure to wear a reflective safety vest or brightly colored coat. If in doubt, don't go down: Call FAR first.
 7. Proper Gear for Coastal Field Work: *It is your responsibility to dress appropriately for your safety and so that your crew members will not need to quit early because you are cold or wet.* Along the coast weather can change very quickly and hypothermia is a danger during all months of the year. Generally, it is best to not wear cotton anything as it tends to keep you wet if you get wet and make you cold faster if the wind comes up (which it usually does). Dress in smart layers. Wear fabrics that dry quickly, such as ski pants or hiking pants and polypropylene or similar shirts. Over that wear a wool or fleece layer or two, depending on the weather. Top that with a waterproof, windproof layer of pants and jacket and you are set for most anything. A fleece headband and neck warmer, rain hat and gloves are important even in summer. Bring a personal pack so that you can always have the extra layers to wear if you need them.
 8. Optional safety considerations are the following
 - Air horn
 - Bear blast (not recommended because it is often windy at observation sites)

¹ All of these numbers and protocols are subject to change, so FAR must check each before finalizing the numbers for inclusion at the start of each season.

- GPS with two-way radio will be used for some sites which will be decided by project lead (FAR)
- First aid kit
- Hand/foot warmer packets
- Spare charge pack for cell phone
- Sun screen/lip sunscreen

Equipment:

Essential (boldface indicates what volunteers must provide):

- **Watch or clock**
- **Safety items described on pages 4 and 5**
- **Your own small waterproof notebook & pen to keep in your pocket**
- Binoculars (Bushnell waterproof 7 X 50 with illuminated compass and range-finding reticle)
- Spotting scope (Zhumell waterproof and anti-fog 22X with zoom to 68 X 90 mm Superior) and
- sturdy tripod (Zhumell heavy-duty OR
- Bogen Manfrotto 190XB 3 Section Aluminum Tripod (With Bogen also need head with quick release plate (see next)
- Manfrotto 808RC4 3-Way Standard Head with Quick Release Plate 410PL
- Data sheets (on clipboard with clipboard with attached, closed box to shield from precipitation)
- Project map(s) of assigned site(s)
- All-weather pen (Make Sure these are returned to the clipboard box each shift.)
- Thermometer (Celsius)
- Copy Beaufort Wind Scale showing both “on the water” and “on land” effects
- Monopod to steady binoculars
- GPS (GPS with 2-way radio may be used at some sites as decided by project lead (FAR))
- Waterproof notebook for tallying belugas before recording on datasheets (return to clipboard box)

Optional (boldface indicates what is NOT provided):

- **Some safety items described on pages 4, 5 and 6**

- **Volunteers are welcome to bring higher quality scopes and binoculars, for example, some with greater light-gathering capabilities. In this case, please, clearly indicate on the Shift Form under “General Comments” the brand, power and lens size used, e.g. Leica, 20-90x 120 mm lens**

General instructions for recording data

1. Use shift pages 1 and 2 for each observation site and shift.
2. Use one map and one beluga form to record each beluga sighting, whether group or individual.
3. Use a new map and beluga form for a dead marine mammal, floating or beached.
4. Fill in all data on the shift form pages.
5. Complete both shift pages for each observation post and day, even if you don't see any belugas on that occasion. “Negative data” (zero in the “# in group” space) are important for the monitoring program.
6. The data sheet is designed **only** for belugas. If you think that other species are influencing the belugas (such as a predator, noise, disturbance by a boat, or other species of whale or pinnipeds), record these species and events in “Other wildlife observed” and “human activities.” If there is notable noise in the area, describe it also under “human activities.” Observe from your assigned survey site. The data you record must correlate with the date, time and location for your scheduled site to make sense to those analyzing the information later.

Do not record great detail about other species that have nothing to do with the survey. A brief mention of noted wildlife present will suffice, with identification of species you know. Do not go to great lengths to identify birds. That is not the purpose of this survey. The reason to include animals that are not affecting the belugas would be that sometimes the presence of certain wildlife cues humans to be alert to the possibility of another at certain times of year.

7. **Poor viewing conditions:** If you can only see well enough to count *some belugas*, indicate Viewing Conditions are *poor* (instructions below). If you *cannot see most of the area* you are supposed to monitor from a site, *discontinue observation at that site and call your site manager to let them know in case they want to try to reschedule it*. Note that survey crews are sometimes scheduled for concurrent observation with other teams (to help determine whether volunteers are

seeing one or more groups of individual belugas.) For this reason, volunteers must stay in close contact with the facilitators about when to survey a site.

8. Direction: *Familiarize yourself with the general compass directions* as seen from observation sites. Identify landmarks (e.g., mountain peaks) that help you understand your location with reference to north, south, east, or west. These will vary from site to site. Check the compass to verify your assumptions. See page 35 for Compass Cheat Sheet that correlates degree numbers with N, NE, S, etc.

RECORDING INFORMATION ON SHIFT PAGE ONE

File (PDF) Name: In the header neatly write the formulaic PDF name. Follow the formula as this is how we sort each type of data page and keep track of the hard copies. For shift page one the formula is **day.mon.year.site.s1.pdf**, so for July 21st at the motocross site the PDF name would be **“21.jul.11.motox.s1.pdf.”**

***SEE INSERT ON NEW VOLUNTEER TIME PROCEDURE, 16 JULY 2011.**

Time: Give start and end time of entire scanning period on site, whether you are at site for 3 minutes or an hour. Record the time you begin scanning to collect data, which should be as soon as you set up the equipment. Record End time when you stop scanning and recording. Circle AM or PM. DO NOT use military time.

Volunteer Hours (prep to finish for day): To quantify our contributions in various capacities, FAR keeps track of volunteer hours. Ask each crew member to estimate the time from leaving home (including preparation, for leaders, if they prepared paperwork or scheduled other volunteers) to the time they reached the crew’s meet-up spot. It doesn’t need to be exact—double drive time to reflect the time it takes folks to get home, then, round it up to the nearest half hour. The first line should be the Lead Observer. The totals will be different if people live different distances from where they are volunteering and if their service includes more duties, such coordinating volunteers, returning equipment to a central location or driving hard copies to FAR. Write each volunteer’s FAR ID # in the left column; write the volunteer’s last name and first initial in the middle column; and each person’s estimated extra hours of contribution in the far right column. Complete the hours column on JUST ONE BOX for each shift day. All hours for one day should be included in one box, on the last site of the day’s page 1 data sheet. Over the Volunteer’s hours boxes on the shift pages for the first sites of a multiple site run, write “see 20-Mile” if that site will be the last shift of the day.

Lead (observer): Record the FAR Identification number and the last name & 1st initial of the lead observer on the “Name (lead) line. Responsibilities are outlined on page 4.

Other volunteers: List the same information for each volunteer participating at the same site. This is helpful if the person reviewing or recording the data has questions later.

Live Belugas Seen? Circle Y for yes if any belugas are seen during your shift and N for no, if there were none. If yes, write the number of groups on the line (NOT the # of belugas). This is a cue to ensure that anyone looking at the data later also has all of the map data and the accompanying beluga form data should the pages get separated. If no belugas were observed write 0 in the space. Zero is important data!

Dead Marine Mammals Seen? If any dead marine mammals are seen during your shift, circle Y for yes. If not, circle N for no. If you can tell what it is, write the identity in the space. If not, write “unknown.” Write concise but complete notes in the comments section. Continue on reverse if necessary, after checking box in lower right hand corner.

***Tide:** We have removed the requirement to record tide times and levels this year and now enter these numbers to the database from an Excel chart with corrections for different sites.

Viewing Conditions

Temperature: Measure with a dry thermometer suspended in the shade. Do not set the thermometer in the snow or on an object that is hot or cold. Please record the temperature in Celsius, not Fahrenheit.

Wind Speed: Use Beaufort Wind Scale (page 37) which shows appearances of wind effects both on water and on land. Record force, not knots or mph. Record wind where volunteers stand. If water appearance indicates a different force number, that should be demonstrated under “Sea conditions,” further down the page. You may also comment under wind. E.g. Wind force on bluff was null but there were whitecaps on inlet waters adjacent to the observation site. Although in some cases you will descend to a shelf on the bluff as at the MotoX site, & it is true that it is most accurate to read the wind conditions about 10 meters back from the top of the bluff, however, we want you to record wind where

volunteers stand so that we will know what conditions you are dealing with as you observe and record data. At the edge of the bluff the wind force will often be accelerated and on the shelf it will generally be different than it is on the flats or the top of the bluff (just so you know).

Wind Direction: Estimate whether wind is coming mainly from the N, NW, W, SW, S, SE, E, NE, or if it is calm. Sometimes the best description is “Variable.”

Precipitation: Circle “none, rain, snow, hail, or fog,” if any occurs during your observations at site. Do not use a word that is not given on the data sheet as an option, except in the comments section. Record the conditions when you arrive on site. You may add notes if the weather changes while you are on duty. E.g. Rain changed to snow by 11 AM.

Percentage Cloud Coverage: Circle whether clouds cover sky by 100%, 75%, 50%, 25%, or if it is clear. Likewise, record conditions when you arrive on site. You may add notes under “Cloud Comments” if conditions change during your shift.

Sea Conditions: Circle Y for yes if you observe whitecaps when you arrive on shift, and N for no if you do not. Similarly, circle Y for yes if there is ice on the surface of the water or beach, and N for no if not. If conditions change significantly during your shift, note those changes under “Wave Comments.”

RECORDING INFORMATION ON SHIFT PAGE TWO

Viewing Conditions: Critical for comparing day-to-day observations. Scientific field observations are affected by light levels and weather; they need to take conditions into account when comparing data.

Excellent means you can count belugas as well as on the best day; **Good** means you can see pretty well, but may miss some belugas; **Fair** means you cannot count everything, but are able to count some of the group(s); **Poor** means you can barely count the belugas *because they are too hard to see*. **Consider:** Is the light strong or too dull, or causing glare that interferes? Is the air clear, or is the view obscured by mist or heat waves? Is wind shaking your spotting scope? Are trees hiding some belugas? Remember, it is fine to state that viewing conditions may affect your count; it is bad to present misleading data (inaccurate data without explanation). Note: “Excellent” has nothing to do with how you are feeling. If there is fog obscuring part of the field of vision, “excellent” will not be one of your options for this line.

PDF or File Name: In the header write the formulaic file name. Follow the formula as this is how we sort each type of data page and keep track of the hard and electronic copies. For shift page two the formula is **day.mon.year.site.s2.pdf**, so for July 21st at the motocross site the PDF name would be **“21.jul.11.motox.s2.pdf.”**

Other Wildlife Observed: Record other mammals, birds, etc., under this heading if it is notable. It is important to note animals that may be affecting the belugas in any way. If a seal is feeding with a pod of belugas, make notes to describe what you see. Remember that the focus is on belugas, and not what kind of other wildlife may be in the area.

Human Activities: Document the presence in the area of boats, wave runners, Para-surfers, planes, construction, and other human activities. Record the information *whether or not* you think it affects the whales. Is it noisy? What is causing the noise? If you observe any interaction or indication affecting the whales, please describe what you see or hear. Be concise but complete.

Oral History: The oral history component is for those special situations when a person who has local knowledge about belugas in the area comes by the observation sites and is eager to share. If an oral history form was used during the shift to interview a person with beluga knowledge, circle Y for yes. If not, circle N for no. Generally this will only be possible with a 3rd or 4th crew member on duty, because its priority is secondary to beluga data for this project and we must have observers scanning and recording data when shifts are scheduled. Note: DO NOT circle yes for “Oral History” if a crew member simply talked with someone and has not filled out a detailed Oral History form, complete with signature, correctly spelled name, informant’s permission to use their information and their contact information. For an Oral History to be useful it must be carefully conducted and meticulously documented. One need not have a response to every question, but ideally, each question should be asked of the person as this is information in which our scientists are specifically interested.

General Comments about Shift: If you have other brief comments about the shift note them under “General Comments.” Let us know what happens on your shift by writing it down for the survey record. Unless you write something, there will be no record. Continue on the back if you need more space.

Check Box if Writing on Back: If you write or draw an illustration on the back of a data sheet or map, mark the box to signal the need to scan both sides for electronic back-up.

EDUCATIONAL COMPONENT

We are ambassadors for the Cook Inlet beluga and must continually work to broaden the diversity of its constituency. Project collaborators worked with Defenders of Wildlife to put together an educational brochure about the Cook Inlet beluga and this survey. Remember to keep a small stash in the clipboard box to share with interested passers-by. Familiarize yourself with the contents and be willing to talk briefly with anyone who is interested in belugas and what you are doing. Do not let this distract you from your job, though. After you have shared your information, thank them for their interest and tell them that you must get back to work. At observation sites where there tend to be more curious people, managers should consider trying to schedule an extra volunteer to help address the need for talking with the public. Volunteers can take turns alternating this into the rotation of tasks to give their eyes and arms a break.

PDF name: 21.jul.11.motox.s1.pdf

(e.g. 28.apr.11.motox.s1.pdf)

SHIFT: Page 1 ANCHORAGE COASTAL BELUGA SURVEY 2011

SCAN TIME: Begin Shift: 6:55 AM/PM (circle one) End Shift: 9:55 AM/PM (circle one)
MEET-UP TIME: 6:30 AM/PM BACK TO PARKING LOT TIME: 10:30 AM/PM

Site (circle):

- a. Motocross (motox)
- b. Potter Sec House platform (potter) **Mi S 115.2**
- c. Windy Corner (windy) **Mi S 106.7**
- d. 1st pull-out past Bird Point (pastbird) **Mi S 95.4**
- e. Tidewater Slough (tide) **Mi S 90.5**
- f. Point Campbell (campbell)
- g. Avalanche gun-emplacement (avalanche) **Mi S 87.4**
- h. 20-Mile Boat Ramp (20mbr) **Mi S 80.7**

LIVE BELUGAS SEEN? Y/N (circle one) How many groups? 1

DEAD MARINE MAMMAL(S) SEEN? Y/N (circle one) Species, if known? zero

Dead or Stranded MM Comments: _____

VOLUNTEER'S HOURS

Observer ID#	Last name, 1 st initial	Extra Hrs only
Lead: 113	Mitchell, B	3
1 st : 126	Fowler, A	2
2 nd : 194	Appleyard, B	1.5
3 rd : 206	Stergiou, E	1.5
4 th :		

List each volunteer's extra hours (drive & prep time)

VIEWING CONDITIONS

Air temp 10 (C°) Wind 0 (Beaufort Force #) Wind direction calm (N, NW, W, SW, S, SE, E, NE, Variable, Calm)

Wind Comments: 8:05 AM: Wind increased to Force 1 from south.

Precipitation (circle): none rain snow hail fog
Precipitation Comments: _____

Percentage of cloud coverage (circle one): 100% 75% 50% 25% Clear
Cloud Comments: Slight fog at sea surface far out on horizon first thing this morning; burned off by high tide

Sea conditions (circle): Whitecaps? Y/N ○ Ice? Y/N ○
Wave Comments: Calm, almost glassy

Check this blank if there are notes or drawings continued on the back of this paper.



PDF name: 21.jul.11.motox.s2.pdf
(e.g. 28.apr.11.motox.s2.pdf)

SHIFT: Page 2 ANCHORAGE COASTAL BELUGA SURVEY 2011



Viewing conditions (circle one): Excellent Good Fair Poor

Viewing Conditions Comments: _____

OTHER WILDLIFE OBSERVED? Describe.

- 7 AM: 2 SACR colts feeding at tideline; 2 others flew in to grass. 50-60 birds (unknown) in water about 50 meters offshore—ducks of some kind.
- 7:30 AM: Eagle caught (apparently) large fish @ mouth of Campbell Creek. 2 others moved in on him. Raven calling.
- 8:40 AM: 4 SACR landed in mudflat @ 114° magnetic.
- 9:24 AM: Cranes calling nearby.

HUMAN ACTIVITIES? Describe

- Occasional aircraft.
- 8:22 Am: aircraft overhead—ERA Aviation
- Blue balloon settled on water about 50 yds offshore @ 161° magnetic.

FORMAL ORAL HISTORY INTERVIEW CONDUCTED: Y/N (Circle one)

GENERAL COMMENTS ABOUT SHIFT:



Full moon in western sky. Moon is down (before 8:30 AM). Beautiful weather—great day!

Check this blank if there are notes or drawings continued on the back of this paper.



RECORDING DATA ON BELUGA FORM

PDF Name: In the header write the formulaic file name. Follow the formula as this is how we sort each type of data page and keep track of the hard copies. For the beluga form the formula is **day.mon.year.site.b1.pdf**, so for July 21st at the motocross site the file name would be **21.jul.11.motocross.b1.pdf**. If there is a 2nd beluga group, use a 2nd data form and name it **...b2.pdf**; a 3rd **...b3.pdf**, etc.

1. **Observation Site:** Circle the observation site for the shift you are working. If asked to check out a site that is not listed write the name in the space between Site & the next section, labeling it “i.”
2. **Group Number:** Record the sequential order for each group of belugas at each site. 1, 2, 3, and so forth. Use one map AND one beluga form for each group.
3. **Begin AND End Group Observation Time:** Record time observation of this specific group begins. Circle AM or PM. DO NOT use military time. Similarly, record time the observation of this specific beluga group ends. (If this “group” is dead-beached, the end time, written on the map next to the “X dead marine mammal” will be the time you leave the observation site, unless the tide carries it away.)
4. **Location of Beluga or Group:** Mark the blank(s) describing the beluga or group’s proximity to shore. Is it near shore, middle distance or far distance, as shown on the map? It is possible to mark all blanks if belugas are seen in all locations during your observation.

Grid(s): List the grid in which the beluga or group was first sighted, i.e. 7G, in the example. In this survey, the number comes first, then the letter. Document on the Map form other grids where you saw the belugas in the order of sighting. The format is “grid; degrees @ time,” e.g., 7G; 260° @ 7:43 AM.

Lines 5, 6 and 7—Minimum Count, Maximum Count & Best Count: To select best counts consider recording on a scratch sheet to minimize erasing and crossing out. You may also simply tally marks on the back. First, record after counting the group at least thrice, if time allows before they are out of sight, the minimum count, the maximum count and the best count. Try to count the number of white, gray and calves, whales that are smaller than the others. If you are unable to distinguish the colors and sizes, record the number in the “unknown” blank. The most important things to get first are the total numbers; whether there are very small whales with the group; and the behavior. If you can differentiate the grey from the white that is good, too, but sometimes the light makes it impossible to see the variation in color, so do not worry about it if you cannot tell.

Count Skin: *Count only belugas that you actually see. Do not estimate for whales beneath the surface.*

Tips: Count the belugas in each pod or group. For large pods, you may count by sets of 5 or 10; be sure to count some *complete sets of that number* first (to avoid under-estimation, which is common when counting by sets). In the margin, on the reverse or on scratch paper, pencil in a total, then go back and try to count number of white, gray, and calves (which are smaller than the others) and enter those numbers in the appropriate columns. When a pod is sighted everyone counts at least 3 times and this helps the group come up with a better count.

Proximity of Calf to Adult: Circle the code which best describes the proximity or position of closeness of the beluga calf to the beluga cow, if you think that they are together, as in mother/child. The choices are 1. Touching; 2. One whale length apart; 3. Two-three whale lengths apart; and 5. Alone. If you are describing more than one calf/cow pair, you may circle more than one response if they are different.

Estimated Calf Size: Circle the estimated size of the calf relative to the parent beluga. The choices are that the baby beluga or calf is about 55% the size; about 66% the size; about 70% the size; or about 80% the size of the adult. Note: If it is about 80% the size of the adult, it is not a calf, but, rather, it is an adult beluga. Some adult belugas are smaller than others.

Count Comments: Use this space to describe any explanation about count such as if a swimming formation made it easier or harder to be sure of the actual number of belugas present.

8. Behaviors Observed:

- a. **Feeding:** You assume by flying fish or the way they are moving through the water that belugas are feeding.
- b. **Direction of Travel:** Please sketch an arrow on the map itself to indicate the direction belugas are traveling.
- c. **Milling:** The belugas appear to be moving around in a churning confusion, not traveling far in a wide direction.
- d. **Body Contact:** If you observe belugas engaging in bodily contact with one another, circle behavior and write comments if you can provide further description. Are they feeding close together? Playing? Fighting? Mating? Nursing? Why do you think so?

- e. **Resting:** Belugas appear still or extremely slow moving in the water. Specify whether they are at the surface or beneath water.
- f. **Diving:** Belugas appear at surface and submerge for extended periods of time. Estimate time between dives if possible and note in comments. If you cannot tell if you are observing a single beluga, do not try to time a dive.
- g. **Spy Hopping:** Whale sticks its head up above the surface and appears to be looking around.
- h. **Tail Waving:** Sometimes belugas appear to stand on their heads with their tails waving in the air. They are probably feeding.
- i. **Tail Slapping:** When belugas visibly and audibly slap their tails against the surface of the water. This can be an indication that they are agitated.
- j. **Vocalizing:** If you are so lucky as to hear belugas vocalizing circle this behavior and describe in written comments the sounds if you are able. You might hear breathing, chirps, clicks, moos, or other of the little white whale's diverse repertoire.
- k. **Porpoising:** Whales move in small jumping arcs to travel, falling and rising repeatedly, like porpoises are sometimes seen doing.
- l. **Nursing:** You may see a mature beluga swimming very slowly with a calf. Note if you think they may be nursing. **Calf Position:** If you can describe the position of the calf, please include that information in your comments. I.E., is the calf on the shore-side or inlet-ward of the beluga cow? Is the calf swimming near the fluke or the head of the adult beluga?
- m. **Spouting or "blowing":** Water vapor is seen as whales exhale.
- n. **Other (describe):** Please carefully describe any other behavior you observe that is not included.

Behavior Comments (important): Completely, but succinctly describe why you identified the above circled behaviors to help researchers understand what you saw. For example, if you circle "feeding," tell if they appear to be feeding or if you actually see fish jumping to try to escape them or a fish in a beluga's mouth, etc.

COMMENT TIPS

Use brief but precise notes to explain what you have recorded, or unusual conditions that aren't included in the data blanks. Specify clearly to which data line the comments refer by matching the number of the data line to the number of the comment if it is written on the back. If it might be important, include the time you noticed these conditions in the comments. If there is a place for a comment on the front of any data sheet or map that is the best place for it. Use the back sides only if necessary.

Stranded Beluga or Other Marine Mammal (dead or alive): In addition to scanning the water, scan the intertidal zone for suspicious-looking lumps that might be a stranded live or dead marine mammal. If you spot something, zoom in for a closer look.

- a. If you confirm a stranded animal, circle Y for yes. (Indicate on the map where you mark it with an "X," whether it is dead or alive.) See Priority List of Tasks on page 29 for when a stranded marine mammal is found.
- b. If you can identify it, write the species in the blank (i.e. beluga or seal). If you cannot identify the creature, which can easily be the case, write "unidentified." Unless you are asked to check it out by FAR, others will follow through to do so, either NMFS, the SeaLife Center or FAR. The mudflats can be dangerous! DO NOT venture out onto the mudflats.
- c. Write any additional information in the comments section, such as color, nearby objects at the time, the direction bearing on the compass; a description such as, "near a large driftwood snag with a large root system to the west of the observation site by about 30 meters."

Check Box to indicate Notes or Drawings on Back of Form: If you include additional comments or sketches on the reverse of the beluga form, check the box at the bottom and number the comments accordingly on the back. For example, if you have more comments than will fit about a dead marine mammal spotted during your shift, you would begin your comments by writing "10" along the left margin on the back side of the data sheet. Then, write your comments to the right of the "10."

FILE name: (e.g. 28.apr.11.motox.b1.pdf If 2 beluga groups ...b2.pdf, etc.)

BELUGA FORM: USE 1 PAGE WITH EACH MAP FOR EACH BELUGA GROUP.

1. Site (circle):

- a. Motocross (motox)
- b. Potter Sec House platform (potter) **Mi S 115.2**
- c. Windy Corner (windy) **Mi S 106.7**
- d. 1st pull-out past Bird Point (pastbird) **Mi S 95.4**
- e. Tidewater Slough (tide) **Mi S 90.5**
- f. Point Campbell (campbell)
- g. Avalanche gun-emplacement (avalanche) **Mi S 87.4**
- h. 20-Mile Boat Ramp (20mbr) **Mi S 80.7**

2. **Group number:** ___ (NOT number of animals, but order of groups seen on shift, i.e. 1st, 2nd, etc.)

3. **Begin group observation:** 7:43 AM/PM (Circle) **End group observation:** 9:38 AM/PM (Circle)

4. **Location of beluga or group (v):** v near shore v middle distance ___ far distance

Grid(s): 1st sighted 7G ___ Other grids: Document on Map form in order of sighting

5. **Minimum count:** # white 6 # gray 2 # calves ___ # unknown 4 # total 12

6. **Maximum count:** # white 8 # gray 4 # calves 2 # unknown 4 # total 16

7. **Best count:** # white 8 # gray 4 # calves 2 # unknown 4 # total 16

Proximity calf to adult (circle #): 1. touching 2. 1 whale length 3. 2-3 whale lengths 5. Alone

Estimated calf size (circle): 55% 66% 70% 80% or larger

Count Comments: Because of patterning and distance apart, very good count

8. Behaviors Observed (circle all that apply):

- a. Feeding (observed or suspected)
- b. Direction of travel (please sketch on map with arrow)
- c. Milling
- d. Body Contact
- e. Resting
- f. Diving
- g. Spy hopping
- h. Tail waving
- i. Tail slapping
- j. Vocalizing
- k. Porpoising
- l. Nursing
- m. Spouting or "blowing"
- n. Other (describe)

Behavior Comments (Important): Traveling in group of a few hundred yards long. Can hear them breath and chattering (only at 7:52 AM). Abeam of observation point at 7:56 AM. 7:59 AM: Distance from front to back about 500 yds. Front at 185° magnetic to tail @ 230° magnetic. 8 AM: Slowed rate of travel moving slightly offshore, spouting throughout traveling period. Excessive spouting at 127° magnetic. 8:27 AM: Half body, including head out of water.

Stranded beluga or other marine mammal? Y/N (circle one)

- a. What is it? _____ Alive or dead? _____
- b. Record location on map and describe: _____

*Check this box if there is writing or drawing on back.



RECORDING DATA ON MAP SHEET

File Name: In the header write the formulaic PDF name. Follow the formula as this is how we sort each type of data page and keep track of the hard copies. For the map the formula is **day.mon.year.site.m1.pdf**, so for July 21st at the motocross site the file name would be **21.jul.11.motocross.m1.pdf**.

Grids, Degrees and Time: New this year is a special place to sequentially record the grid where you see a beluga or group of belugas; the bearing or degrees viewed in the binoculars when you sighted it or them in that location; and the time. It is important for that information to be recorded together to make the best sense for later analysis. Along the right side of the map are numbers. It looks like this:

1. _____; _____, @ _____
grid degrees time
2. _____; _____, @ _____ *etc.*

Begin with number 1 and record the grid where you marked your first sighting of the day, in this guide's example (see page 23), it was 7G. Do this as soon as you have made your marks on the map or you will lose track of the order in which the separate measurements are taken & the time is noted. When the belugas were in 7G the compass reading was 260°. That number goes on the 2nd space in line 1. The time of the sighting, 7:43 AM, is listed on the 3rd space in line 1, and so on. Grid, degrees, time should follow in that order all the way down for each time the crew can record anything about the beluga(s). If you record something but are missing one of those numbers, leave the space for it blank. In this guide's example, line 2 is missing the grid, but it has the degrees, time and the note that "there were 2 grays, 6 whites: heard lots of spouting." Pretty exciting stuff! It is understandable to miss recording a grid when so much is going on. If you print neatly and not too largely, there will be room for concise comments and descriptions of specific observations.

Marking Location of Belugas on Map: Mark the group of belugas on the on the site map with an "X," with species and approximate number for each group (e.g. "8 belugas"). Also on the map itself, draw one or more arrows to show direction of movement. It is important to mark the location with an "X" because the writing itself will be likely be spread over a larger area in which case, without the "X" the most precise location would be lost. The grid is to help you figure the best way to place the belugas on

the map so we will know what areas they use during your observation. Do the best you can. If you see more than 1 beluga, the X represents the center of where you first spot the group. If the group covers a large area, use an ellipse to show the area it covers. You can describe the grids they occupy using the numbers and letters on the side, e.g. 2B, as well as using the color coded descriptive zones buffered out from the shore (near shore—light blue; middle distance from shore—bright blue; and far distance from shore to the horizon or far shore--purple).

Recording Behavior on Map: If beluga behavior changes when the group moves to another location on the map, correlate the next X with time recordings in notes section. Use arrows to draw direction of movement from one area to the next. For examples see page 23.

Marking Location of Stranded Dead or Alive Marine Mammals on Map: Mark with an “X” and label the approximate location on the site where it is situated, i.e. X dead beluga. Use a separate map to document dead or alive stranded marine mammals.

- a. Next to the X write (on the map) the compass bearing of the dead marine mammal from the observation site, e.g. 140°.
- b. Write, also on the map, the time it was spotted, underneath the X and the direction in degrees.
- c. Next, in the numbered space to the right of the map, record the same information for the grid, degrees and time as for live belugas. Record the carcass only once unless it floats to another location.

NOTES: Use the available note space for information not included on the Beluga Form, such as drawings to show group formation or recording a beluga group that swam off the map. Elaborate on information already recorded if it relates to the map and is important. For example, if you recorded an airboat on shift page 2 under “human activities” and that boat come near belugas you can draw its location on the map, like this: X airboat. Also draw an arrow for direction of travel and make notes. DO NOT include other mammals or boats on the map unless they seem to be affecting the behavior.

HABITAT: As you record your specific observations on the maps know that scientists are interested in the kinds of habitats that are utilized by the group while observing from this site.

Creek or River Channel: *Belugas are within a creek or its channel that extends into the Inlet.*

Near Shore Waters: *Belugas are very near, within 1 kilometers of shore.*

Middle Distance Waters: *Belugas are farther out, between 1 and 2 kilometers of shore.*

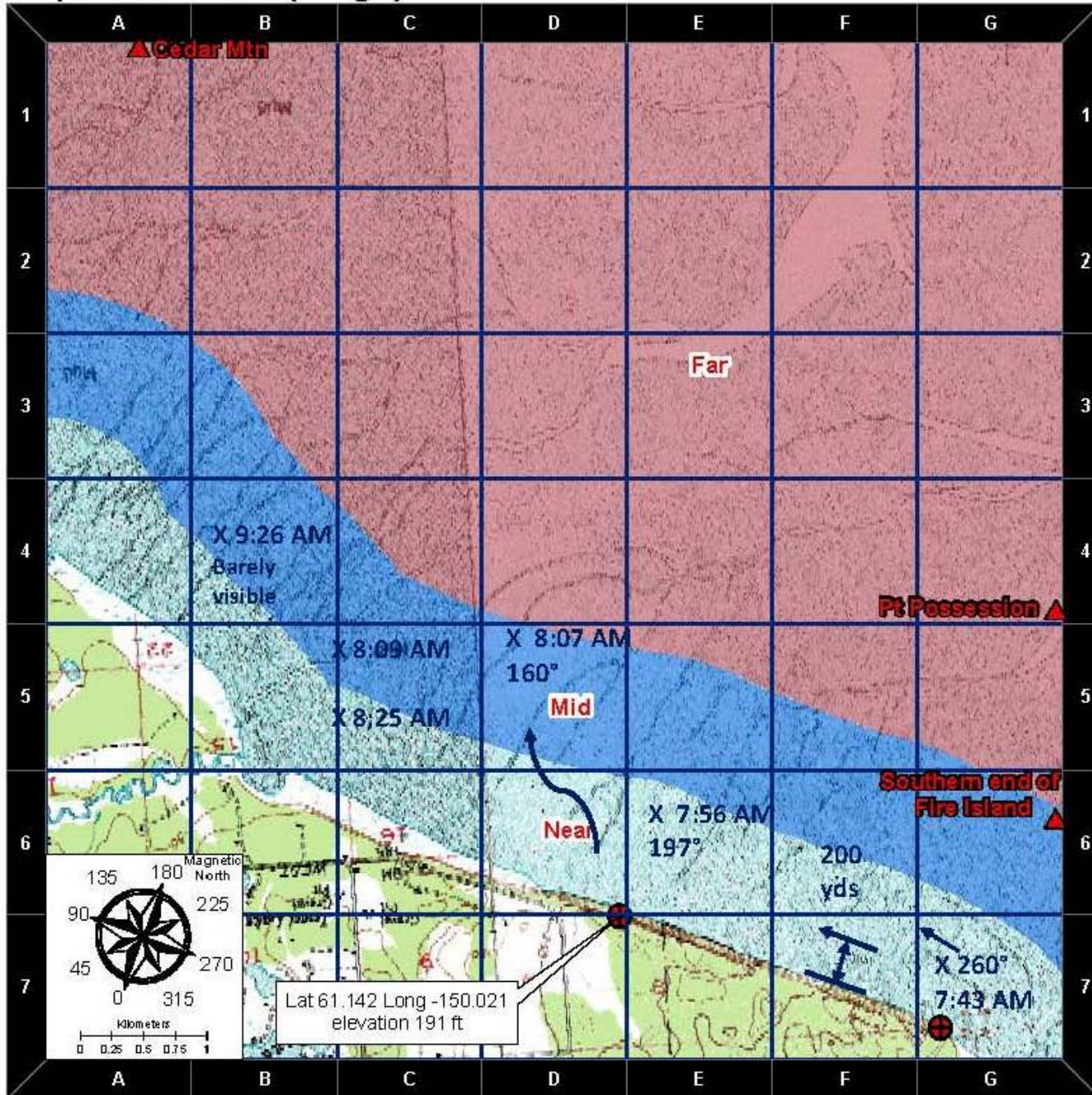
FAR Distance Waters: *Belugas are far way, from 2 kilometers to the horizon or opposite shore.*

Live or Dead/beached Marine Mammal Strandings: Documenting the location of these strandings not only helps retrieve data from this individual and the incident, but also provides a running log of how many and what kinds of strandings happen where and when.

Check Box to indicate Notes or Drawings on Back of Form: If you include additional comments or sketches on the back of the beluga form, check the box at the bottom and number the comments accordingly on the reverse. For example, if you have comments about a dead marine mammal spotted during your shift, you would begin your comments by writing “10” along the left margin on the back side of the data sheet. Then, write your comments to the right of the “10.”

Map: Motocross (Large)

21.jul.11.motoxlg.m1.pdf__



i.e. 30.jun.11.motoxlg.m1.pdf (If 2 beluga maps...m2.pdf, etc)

Mark "X" in map grid where first seen.
Record grid, compass bearing (degrees) & brief behavior notes sequentially. Example:
1. 6B, 135° @ 7:55 AM—milling, see fish flying—suspect feeding.

1. 7G, 260° @ 7:43 AM
grid degrees time
moving parallel to shoreline @ 200 yds

2. _____, 247° @ 7:48 AM

2 gray 6 white: heard lots of spouting

3. 6E, 197° @ 7:56 AM
8 AM: Group spreading out in width.
Stalled abeam of site.

4. 5D, 160° @ 8:07 AM

Heading out offshore

5. 5C, _____ @ 8:09
Turned East. Slowed rate of travel, suspected feeding. Lot of surfacing.
8:16 AM: With sun angle was able to see lots of spouting.

6. 5C, 127° @ 8:25 AM

7. 4B, _____ @ 9:26 AM

Barely visible past the mouth of Campbell Creek.

*Check box if data on back.



21.jul.11.motoxlg.m1b.pdf
(...m for map, 1 for 1, b for back)

When the box at the bottom right hand corner is checked for writing or drawing on back, the reverse will be named as shown above. On the back side of the map was the following data, continued from the other side.

8:30 AM: Moving slowly but parallel to shoreline.

8:45 AM: Lead @ 119° magnetic just past mouth of Campbell Creek;

Tail @ 122° magnetic

Turning right/heading offshore @ + 45° angle to shoreline

8:50 AM: Moving about 80-90° angle to shoreline

8:52 AM: Group turned, heading back toward shoreline, following rip tide.

9:07 AM: Group seems to be milling about. Spouting/surfacing. Bearing 120° magnetic, 200 yards east of Campbell Creek. Occasionally popping partially out, getting air

9:25 AM: Belugas barely visible off [illegible]

9:34 AM: Still seeing a few spouts near location of 9:25 report.

9:38 AM: ¼ mile offshore (116°)

RECORDING INFORMATION ON AN ORAL HISTORY FORM

What is an oral history? Oral history is the systematic collection of a person's testimony about their own experiences. In this case we are interested in individuals who have considerable knowledge about Cook Inlet belugas. Oral history is not hearsay, or rumor. Through this interview we will attempt to place findings in an accurate historical context. If findings are found to be significant to the project they will be archived for possible use by later scholars.

In oral history projects, an interviewee recalls an event for an interviewer who records the recollections and creates a historical record. In this case, we enter useful information into the same FAR database that houses beluga information. The questions on the oral history form in your packet are those in which our scientists are currently most interested. Familiarize yourself with the questions before you do an interview. If you have not read the questions ahead of time, do not attempt to conduct one.

Is the information being shared worth the time and effort? A person is a good candidate for an interview if they seem to have a lot of knowledge about belugas in Cook Inlet or elsewhere that they are eager to share. If there are just a few yes and no answers with no elaboration or desired information being given by the speaker it might not be worth their time or yours to record this information. Do not simply ask anyone who walks by to let you interview them. That will be a waste of both your times. To conduct an interview you must have a sense that the person with whom you are talking has important beluga information. Just because you talk with someone does not mean you need to conduct a formal interview.

Why are we doing this if there is so little time to do a bonafide oral history? When volunteers first began in 2008 they immediately began to recognize that some of the people who stopped by their observation sites to talk with them had real knowledge about belugas. We believe that when such individuals show up at our sites, that we should have a way to record some of that information and a way to contact them again if we need to do so. Once in awhile when people hear what we are doing they have information they feel compelled to share with us. This procedure will provide a means to gather that information.

Make your interview quotable: Oral history depends upon human memory and the spoken word. The means of collection can vary. In this project we rely on hand taken notes instead of tape recorders. While listening carefully to what the speaker is responding, record what they have to say as accurately as possible while being concise. If they say something that strikes you as particularly significant ask them to slow it down so you can get the best of it word for word. It is useful to be able to quote the person on an important piece of information.

There are just 11 questions on the interview sheet and not everyone will have an answer for every question. Ask one question at a time and be sure to give them a chance to think about what they want to say. There will not be time for an in depth interview at the Turnagain Arm sites, in particular, because crews only stay at each site about 30 minutes. This is also probably the most likely place we will run into prospective interviewees. Oral history interviews would normally last at least 2 hours, so this will be a very abbreviated session in comparison.

PDF Name: In the header write the formulaic file name. Follow the formula as this is how we sort each type of data page and keep track of the hard copies. For the beluga form the formula is **day.mon.year.site.oh1.pdf**, so for July 21st at the motocross site the file name would be **21.jul.11.motox.oh1.pdf**. If there is a 2nd oral history at the same site, use a 2nd data form and name it **...oh2.pdf**; a 3rd **...oh3.pdf**, etc.

FAR ID # & Volunteer: Record your FAR ID # and name so that we will know who conducted the interview.

Name of Speaker: Print neatly and correctly spell the speaker's name.

Signature of Speaker: Without the signature of the speaker we cannot use this information, so make sure that they understand that we are asking their permission to use what they tell us if it is helpful for the Anchorage Coastal Beluga Survey.

Contact Information: It is helpful to have an email address for the person who is interviewed in case we need to write them. Occasionally we will call them so need their phone number. If they do not have an email address, try to get a snail mail address.

Thank the Person you Interview: Please give the speaker a brochure with the beluga@farak.org email address and tell them that they may write if they wish to contact us. Be sure to let your interviewee know that you appreciate them taking the time to talk with you about their beluga experiences. Thank them sincerely.

If you are having trouble getting away, say, sincerely, “It has been wonderful talking with you, but now I must get back to my other duties,” which by this time will probably be helping to pack up to head to your next observation site, if you are on the Turnagain Arm run.

.pdf

File name: (21.jul.11.motox.oh1.pdf If 2 histories in day at site ...oh2.pdf, etc.)

ANCHORAGE COASTAL BELUGA SURVEY ORAL HISTORY DATA SHEET 2011

FAR ID# & Volunteer: _____

Name of speaker (Print neatly): _____

Signature of speaker: _____

I give my permission for FAR to use my oral history account of Cook Inlet beluga for their ongoing Anchorage Coastal Beluga Survey work which may include quotes on their website.

Phone number: _____ email: _____

(In case we need to reach you to clarify anything or ask another question.)

Location: _____ (Which observation site or nearby location?)

Questions:

1. How long have you lived here (or how many years have you been coming to this area)?
2. Why do you usually come here? _____ (fish, photography, drive, etc.)
3. Have you seen belugas go up this creek (name the stream or river)? **Y/N (Circle one)** If so, how far up have you seen them?
4. Have you seen belugas go under a bridge? **Y/N (Circle one)** If so, what river (creek or stream)?
When did you observe this?
5. What can you tell us about the belugas you have seen in Turnagain Arm?
6. Is there an area where you have seen them most often?
7. When are you most likely to see them? Why?
8. Have you seen killer whales in this area? **Y/N (Circle one)** If so, where? When?
9. Have you seen killer whales elsewhere in upper Cook Inlet? Y/N (Circle one) If so where & when?
10. What can you tell us about the fish runs here?
11. Anything else you would like to tell us about your experiences with belugas in upper Cook Inlet?

* Check this box if writing or drawings on back.

PRIORITY LIST OF TASKS

If a stranded marine mammal is spotted (dead or alive),

1. First finish counting and recording any live belugas in the area, then,
2. Immediately call the Marine Mammal Stranding cell line on the project phone list to report it. Leave a message if there is no answer.
3. If there is no answer from the stranding cell, also call the National Marine Fisheries Service (NMFS) Hotline to report it. Although they are out of state, they have the ability to quickly reach local staff members on duty. Again, leave a message with your cell phone number in case they have to call you back. Note the times you left the messages to which phone numbers on the back of the map sheet.
4. If you must leave messages at both previous numbers, also call the SeaLife Center (SLC) Rescue and Rehabilitation hotline on the phone list.
5. Call your site manager if that person is not on site, to report the stranding incident.
6. *Site manager will call FAR to report stranding incident after above calls that are appropriate have been made.
7. It is important to do all of the above as described because often coordinating the various crews for stranding responses (dead or alive) takes a great deal of repetitive confirmation which must happen very quickly to help scientists get the freshest samples and to make a necropsy possible.
8. Call Photo ID Project. If no answer, leave a message with time and location of close beluga sightings.

* FAR is part of the Alaska Marine Stranding Network and follows a strict protocol with a letter holder of agreement with NMFS to work with dead marine mammal remains collecting tissue samples for repositories (etc) and helping perform other salvage work. If you are in good physical condition and would like to help with salvages, send an email to beluga@farak.org and ask us to put you on our call list.

Scanning Protocol

Once on site, immediately set up the scope and complete data on top half of the Shift Form. Then, observers should immediately begin to alternate performing the following scans:

1. Rotation of Tasks: No matter how many crew members there are, each crew member and leader will take turns performing every task to get the job done. Use a timer or watch to divide the time by 10 or 15 minutes. If there are 6 observers, 2 people can be scanning with the naked eye while the others are performing the following duties:
 - a. Set up and begin scan with scope.
 - b. Scan with binoculars.
 - c. Neatly & concisely record data given by others.
 - d. Take measurements of wind, temperature. This person will then become the public contact person so that crew members will not be interrupted by curious by-passers while performing their observation tasks. This person can explain what we are doing; point out the belugas; relate a summary of the history of belugas in Cook Inlet; give interested people a copy of the ACBS brochure or FAR's brochure (which will be a flat piece of paper in 2011); and if someone is very knowledgeable about Cook Inlet belugas, ask if they will give their permission for you to ask them some questions and record their responses for the project. See Oral History on page 25-28.
 - e. Alternately, sometimes a leader will bring two scopes &/or two sets of binoculars. When this is the case, take extra care to make sure that nothing is damaged or lost.
2. If there are at least 3 observers, one person should serve as the recorder, making sure that they fully understand what observers are asking them to record. *Each volunteer should keep a small notebook and pen or pencil handy to record first numbers that are likely to change with recounts to avoid having to mess up the data sheets too much with erasing or scratching out of numbers. There is 1 waterproof notebook in the clipboard box that one crew member may use. Make sure it is returned to the clipboard box each shift.*
3. If there are at least 2 observers, one person can scan with the binoculars while the other scans with the scope. Then, both volunteers to watch the area unaided by binoculars or scope for 20 minutes unless they think they see something to record. After 20 minutes, the person who

scanned with binoculars scans with the scope and visa-versa. Repeat. If you doing the Turnagain Arm run, you may choose to rotate tasks when you change locations, because the time at each site is much shorter than staying the entire shift at one spot. We do a better job when every person learns every job. It helps prevent fatigue and keeps everyone sharp.

4. While recording data observed, the scope should be left focused on the area that was being observed, so that volunteers may easily take turns rechecking and switching for double and triple attempts by different individuals to count, distinguish and describe behavior.
5. Types of scans: Some people favor certain types of scans while others prefer alternating methods. Do what makes you most comfortable about covering the area thoroughly.
 - **Scanning in BANDS**: Beginning at the left side of the viewing area, choose to start at the horizon and moving from left to right, then right to left. Scan successively closer after each swipe until you have covered the entire viewing area. Conversely, one may choose to start as close in as possible and move out towards the horizon, making sure to cover all of the viewing area on the map. Repeat.
 - **Scanning in RAYS**: Similarly, beginning at the left side of the viewing area, choose to begin either at the horizon or close in, and scan either from the horizon in, or out to the horizon, moving from top to bottom (or bottom to top). Scan successively to the right until you have covered the entire area. Repeat.
6. Volunteers will discuss and come to an agreement of what to record. The lead observer will decide if there is any discrepancy between accounts.

End of shift

1. Lead observer checks to make sure all data sheets and maps are completed correctly.
2. Safely secure all equipment and data to the site manager's specified location.
3. If you ever need to mail anything, FAR's PO Box 220196 Anchorage, AK 00522-0196.

Additional Background

Hunting in the ACWR:

September 1 to December 31 is waterfowl season. September 1 to March 31 is open for taking of small mammals such as snowshoe hares. It is also spruce grouse season. In season, hunting is legal in the Refuge; generally, below Potter Marsh and as far west as just past John's Park. Heading westward the area, from a line near Johns Park to the radio tower at the Kincaid Motocross is closed to hunting with firearms. The entire refuge is open to bow hunting.

This does not pose a general safety issue as the survey is conducted mainly from the bluffs above where the hunting takes place. If, however, a crew is asked to descend into the Refuge to get GPS coordinates on a stranded marine mammal in an area where hunting is allowed, great care should be taken to avoid any dangerous situation. For example, if it is necessary to go down there when hunting is obviously in session, wear a brightly colored coat or vest. Never put yourself or others at risk. If in doubt, call FAR.

Reporting Dead Bears or Moose:

If you see a dead bear or moose in the area, please report it to the Alaska Department of Fish and Game and FAR. Use the phone numbers on the phone list in the clipboard box. Do not let this report take away from the beluga survey objectives. If there is not time during your shift, simply make the call at the end. **ONLY IF YOU HAVE TIME**, make notes about its approximate location on the Shift Form and mark with an "X" its location on a separate Beluga Group map.

Special Considerations for Site Managers

Extreme Conditions:

Safety: If you have a safety concern, discuss it with Barbara Carlson. Safety is enhanced by scheduling at least three or four people per shift. There is a lot of work to be done on each shift with the required set up, scanning, recording of data and auxiliary phone calls necessary in certain situations. Having this many observers per shift could also enhance the integrity of the data and enable one crew member at a

time to interact with interested passers-by as part of the educational outreach or to conduct an oral history interview with a willing person with local knowledge of beluga sightings in the area.

Volcanic Ash Fall: Reschedule shifts if there is ash fall headed towards Anchorage. We do not want our volunteers out in conditions that would be harmful to their health. If the wind makes ash already in place an issue, similarly, reschedule the shifts for a later date.

Poor Air Quality: During periods of poor air quality due to either smoke from wildfires or high particulate matter from windstorms, consider postponing or cancelling shifts to avoid endangering the health of volunteers.

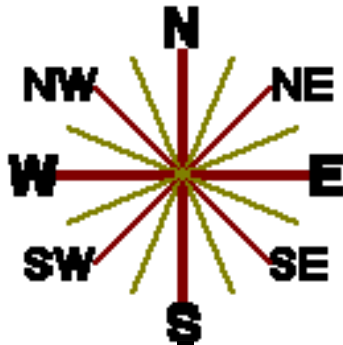
Extreme Weather: All of the project observation sites have the potential for **winds** that will be too great to allow the survey work to be conducted. Note when volunteers say it becomes difficult to see belugas because of the whitecaps and when the wind is blowing so hard that they cannot steady the scopes and binoculars enough to be able to focus on the targeted areas for scanning. Similarly, **sometimes the blowing rain or snow**, make it impossible for observers to see what they need to see to complete their tasks. Each Lead Observer has the responsibility and the authority to call a shift on account of extreme weather if they reach the site and find conditions too inclement to be safe for volunteers or favorable for collecting survey data. Leaders should be aware that if the Beaufort wind force recorded for a site is 5 or greater, the validity of the data will be in question. While sometimes the wind will die down, or if you are traveling along Turnagain Arm the next site will be much less windy, you must consider how valid your data will be considering the wind conditions. If in doubt, call FAR.

Temperatures below 20 degrees F (-7 Celsius): The tasks to complete the objectives towards this project's goals are fairly sedentary, so the cold can be a problem. If the wind-chill factor makes real conditions dangerous or terribly uncomfortable, reschedule the work for a warmer day. Become familiar with these weather forecast links as an aid to your decision-making. <http://www.arh.noaa.gov/> <http://www.adn.com/news/weather/> The ADN site has a link that you can click on for "hour by hour" predictions.



How to Use the FAR Compass

1. Face the object or direction whose bearing you seek.
2. Hold level compass with dial on top.
3. Notice which end of needle points north (red).
4. Point large arrow at the object or direction you seek.
5. Holding base still, turn compass until inside arrow points to "N." "Keep red Fred in the shed."
6. Bearing =degrees on dial next to mark. (In the picture above the bearing, or direction is 160°.) This is what you record next to the beluga "X" on the map.



Compass Cheat Sheet

The bearing system divides direction into four quadrants of 90 degrees. In this system, north and south are the dominant directions. Measurements are determined in degrees from one of these directions. FAR citizen science projects rely on magnetic north for our wildlife survey data collection.

North: 0 degrees
Northeast: 45 degrees
East: 90 degrees
Southeast: 135 degrees
South: 180 degrees
Southwest: 225 degrees
West: 270 degrees
Northwest: 315 degrees

***COMPASS NOTE:** Make sure that when using a compass, or the binoculars with the built-in compass, that you do not get within six feet of a large metal object such as a car or two to three feet from a smaller metal object such as an iron stake or tripod that could corrupt the direction reading. You can quickly determine if an object is affecting the compass by stepping several feet away and making the same reading again.



FAR 2011 ACBS Emergency Phone List

1. National Marine Fisheries Service Stranding Cell (local): 360-3481 ***A**

National Marine Fisheries Service Violations & Stranding Hotline: 1-800-853-1964 **B** (after hours and weekends) If they are very busy you may get a generic wait message and hear canned music while waiting.

2. SeaLife Center (marine mammals & water fowl): 1-888-774-7325 **C**

3. NOAA (NMFS) Enforcement: 271-3021 **D**

4. Anchorage Police Department (people emergency): 911 Dispatch: 786-8900

5. ADF&G: 267-2257 (wildlife concerns/during week)

Alaska State Trooper Dispatch (FOR LAWS BEING BROKEN): 352-5401 DIRECT DISPATCH; 269-5511 (you may be routed to 1 of 3 dispatch numbers around the state, but if you are, they are on duty for Anchorage and will contact the appropriate person if you are patient and communicate clearly.)

6. Cook Inlet Beluga Photo ID Project: Tamara McGuire, LGL, Alaska

Research Associates, cell: [REDACTED] **E**

7 Animal Care & Control (Dispatch): 343-8119 (M-F 11-7; St Sn 10-6; or message)

8. Bird TLC (mostly raptors, corvids, songbirds): 562-4852

PET Emergency (after hrs): 274-5636

9. FAR: Barbara Carlson [REDACTED]; cell: [REDACTED] (if not answering land line)

Leaders (subject to substitution): *Check cell phone number for each scheduled crew leaders before the shift, in case there is a different lead. You will know this by staying in close email contact with your crew Leader and FAR when scheduling begins.*

*Red, bold-faced caps indicate order of dead or live stranding phone calls. See page 29.

Beaufort Wind Scale

Beaufort Number or Force	Wind Speed			Description	Effects Land / Sea
	mph	km/hr	knots		
0	<1	<1	<1	Calm	Still, calm air, smoke will rise vertically. Water is mirror-like.
1	1-3 mph	1-5 kph	1-3 knots	Light Air	Rising smoke drifts, wind vane is inactive. Small ripples appear on water surface.
2	4-7 mph	6-11 kph	4-6 knots	Light Breeze	Leaves rustle, can feel wind on your face, wind vanes begin to move. Small wavelets develop, crests are glassy.
3	8-12 mph	12-19 kph	7-10 knots	Gentle Breeze	Leaves and small twigs move, light weight flags extend. Large wavelets, crests start to break, some whitecaps.
4	13-18 mph	20-28 kph	11-16 knots	Moderate Breeze	Small branches move, raises dust, leaves and paper. Small waves develop, becoming longer, whitecaps.
5	19-24 mph	29-38 kph	17-21 knots	Fresh Breeze	Small trees sway. White crested wavelets (whitecaps) form, some spray.
6	25-31 mph	39-49 kph	22-27 knots	Strong Breeze	Large tree branches move, telephone wires begin to "whistle", umbrellas are difficult to keep under control. Larger waves form, whitecaps prevalent, spray.
7	32-38 mph	50-61 kph	28-33 knots	Moderate or Near Gale	Large trees sway, becoming difficult to walk. Larger waves develop, white foam from breaking waves begins to be blown.
8	39-46 mph	62-74 kph	34-40 knots	Gale or Fresh Gale	Twigs and small branches are broken from trees, walking is difficult. Moderately large waves with blown foam.
9	47-54 mph	75-88 kph	41-47 knots	Strong Gale	Slight damage occurs to buildings, shingles are blown off of roofs. High waves (6 meters), rolling seas, dense foam, Blowing spray reduces visibility.
10	55-63 mph	89-102 kph	48-55 knots	Whole Gale or Storm	Trees are broken or uprooted, building damage is considerable. Large waves (6-9 meters), overhanging crests, sea becomes white with foam, heavy rolling, reduced visibility.
11	64-72 mph	103-117 kph	56-63 knots	Violent Storm	Extensive widespread damage. Large waves (9-14 meters), white foam, visibility further reduced.
12	73+ mph	118+ kph	64+ knots	Hurricane	Extreme destruction, devastation. Large waves over 14 meters, air filled with foam, sea white with foam and driving spray, little visibility.

CARE OF CRITICAL ANCHORAGE COASTAL BELUGA SURVEY GEAR

FAR, Barbara Švarný Carlson 2011

See Monitoring Instructions for recommended power and size. FAR gear includes the scope with head & tripod; marine binoculars with built-in compass & reticles; a clipboard box with a compass & a Celsius thermometer; the data sheets & maps; & a write-in-all-weather pen.

- **Do not hurry. That is usually when stuff gets broken.**
 - **Handle with extreme care. Be careful with all FAR gear—especially the scope & binoculars. Even inexpensive items cost money to replace.**
 - **Stow scopes connected to the tripod & head. It puts extra wear on them to remove & replace them.**
 - **Try to never leave them unattended in a car (IF you must so, cover with blanket BEFORE leaving site and driving to where you will be leaving the locked car).**
1. Think of the scope & binoculars as valuable extensions of your body and treat them well. When I first experienced using a scope to scout for birds I felt like I'd gotten a new pair of eyes!
 2. Having one volunteer hold an umbrella over the scope can salvage a shift if the rain is coming straight down, but won't work if it is very windy and raining.
 3. When putting the lens caps back on start screwing them in to the left, briefly, then, turn to the right slowly. Do not put them on crooked and strip the threads.
 4. Do not over-tighten lens caps or adjustments. They should be firm, but not tight.
 5. Do not lay the scope in the mud or dirt. If you must lay it down, have a plastic bag or pack to put it on to protect it from dirt and excess water.
 6. As a rule, try to keep lenses of scope and binoculars clean & dry to avoid having to clean them in the field. This will help avoid inadvertent scratches. It is safer to clean them when you are indoors and it is easier to take good care.
 7. If it is necessary to clean optical lenses, first, remove any visible dust or debris by blowing or using a lens brush.
 8. Then, use included lens cloth or packet (from clipboard box) or other soft, lint-free cloth. To remove smudges or prints, rub gently in a circular motion with a lens cloth or other soft cotton cloth. Coarse fabric can scratch your lenses.
 9. If further cleaning is required, use lens cleaner or diluted isopropyl alcohol - other chemicals may damage your equipment. Always apply solution to a lens cloth first, never directly to the lens.

10. If the scope gets wet, be sure to set it up to dry as soon as you can get it inside, and then clean it. If you turn in a dirty or wet scope, let FAR know about it right away so that it can be taken care of before the next shift.

SET –UP, USE AND BREAK-DOWN

- **Set-up**
- **Use**
 - **Adjust height**
 - **Adjust vertical control**
 - **Adjust horizontal control**
 - **Set magnification**
 - **Focus**

- **Break-down**

1. Before you move a scope, ALWAYS make sure that every part is screwed securely so that nothing will flop around or fall off.
2. To set up the scope, find the most level spot that will work and release the bottom leg section as far as it will go, by flicking the clips on each leg in succession. Legs may be adjusted to accommodate an uneven location.
3. Next, extend the 2nd section part way. The conveniently angled scope must be set so that the shortest crew member can use it. Taller members can bend a little. If you must readjust between users you may, but it is better to leave it set at one height so that you may quickly look at each other's sightings for optimal data collection.
4. Raise the center pole of the scope carefully by loosening the handle near the red button with an arrow. Support the body of the scope while raising or lowering to avoid having it slam into the tripod.
5. The scope angle may be adjusted sideways, vertically or horizontally with the use of the levers, by loosening and tightening their handles. Again, support the body of the scope so that it does not flop and slam into the tripod.
6. Remove the lens covers & place them in the same spot every time, the leader's pocket or a pack, so that you will always be able to find and remember to replace them.

7. To set the eyepiece magnification, twist the Eyepiece Zoom between the ranges of magnification on the scope. The numbers and white dot on the eyepiece will show the current magnification setting.
8. To focus the spotting scope on an object, begin by setting the Eyepiece Zoom to the lowest magnification. Slowly turn the focus roller on the top of the spotting scope body until the image in the eyepiece becomes clear. You may need to make adjustments to the focus as you zoom in on an object.
9. When you break down the scope, do everything, carefully, in reverse. Make sure that every adjustment is secure so that there are no flopping parts. When a person picks up a scope to move it, nothing should move.
10. Be sure to replace all lens covers for binoculars and scope when packing up after each stop.

ANCHORAGE COASTAL BELUGA SURVEY PROJECT RULES

Enjoy this survey and the outstanding opportunities it provides to observe and learn more about Cook Inlet belugas and the habitats upon which they depend. We have established these rules to protect the integrity and continuity of this timely and important work.

General Survey Rules:

1. Do not discuss politics, religion or private agendas.
2. All project data sheets, maps, etc., are for use only with FAR's ACBS. Do not distribute.
3. Plan for restroom stops. Do not use bushes or roadside as bathroom.
4. Do not take photographs for yourself while on beluga survey duty. If a few pictures are taken to document the work, be sure to send them to FAR. Honor property privacy rules. (We are not using any private property sites in 2011.)
5. The pull-outs are small and the more cars pull over there, the harder it will be for us to find a spot for our vehicle or two! Do not advertise our specific observation sites to others.
6. Carpool from the meeting site your leader specifies and take as few cars as possible during the survey. This is both for safety and efficient use of time. The more cars we take, the more time it takes to get crew members on site at the same time.
7. No dogs at observation sites. We can neither afford to be distracted by their wonderfulness, nor concerned for their well-being during surveys. Having a dog get loose in the Refuge or along the Seward Highway could be disastrous in more ways than one.

8. Absolutely no guests (without permission in advance from FAR). Before permission is granted you must provide a signed waiver to Barbara Carlson for FAR's files from the person you want to take with the crew.
9. Barbara Carlson is the official spokesperson for the project.

Learn where the nearest public bathrooms are because you are likely to need them. Consider stopping at the last one you come by before arriving at your observation site after driving any distance.

There are two exceptions to rule #3. 1 is if you need to document a suspected regulation violation such as people harassing wildlife. The 2nd exception is if you are documenting a part of the survey for FAR.

This beluga survey is an intense observation and documentation process. If a person is taking pictures they will miss observations or neglect recording them in a timely and complete manner. If an individual is taking pictures that are not part of the process, they are wasting the time of other crew participants.

At public access sites, you may come back any time you like and photograph to your heart's content. As a survey participant you will have the benefit of a greater understanding of when and where to spot belugas. *Thank you for volunteering and for following ACBS project rules!*

Homework: 2011 Anchorage Coastal Beluga Survey 😊

Volunteers who do their homework have more fun. They feel more confident about the tasks involved with the survey and find it easier to do a good job. Their crew members appreciate how much they know and care.

1. Read carefully & study ACBS Monitoring Instructions, as you
2. Study sample Shift, Beluga, and Oral History forms
3. Click on this link for pictures of calf proximity to beluga mom & code for description:

ftp://ftp.afsc.noaa.gov/posters/pSims02_calf-proximity-beluga.pdf

- A. Code 1: Touching whale
 - B. Code 2: 1 whale length apart
 - C. Code 3: 2-3 whale lengths apart
 - D. Code 4: In same field of view: Look at this one, but we won't use it.
 - E. Code 5: Alone in field of view
4. Write beluga@farak.org if you have questions. Visit FAR's website to learn more about us: <https://sites.google.com/site/fardoc2010/>
 5. Practice using the Beaufort Wind Scale
 6. Practice using a compass
 7. Put together a pack with your survey clothes
 8. Exercise
 9. Check your email frequently
 10. Read & respond to ACBS emails promptly, including responding to Doodle polls
 11. Check out these websites and return there to learn more about the history of the Cook Inlet beluga and other species that inhabit upper Cook Inlet.

<http://www.fakr.noaa.gov/protectedresources/whales/beluga.htm>

<http://www.afsc.noaa.gov/nmml/index.php>

12. If you see belugas send an email with this information to beluga@farak.org (date, time, location, how many, which way the belugas were headed, what they were doing, were there any calves with the pod) Kindly email the information so that we will have a timely and written record of your sighting to share with the National Marine Mammal Laboratory (NMML) for the Pacific Northwest Marine Mammal database. We have a form that you may use on the next page, which is also on our website, so you may tell others who would like to send sightings about it. It will help folks easily give us the specific information we need to provide NMML with the data they need.

Thank you for volunteering with the Anchorage Coastal Beluga Survey!!!!

BELUGA SIGHTINGS REPORT FOR ANYWHERE IN COOK INLET

This form is for sightings not seen during the Anchorage Coastal Beluga Survey and may be sent by anyone to Barbara Carlson at beluga@farak.org. We send sightings to the National Marine Mammal Laboratory that manages the database for the entire Pacific Northwest for NOAA/NMFS. Kindly give us as much of the following as you are able.

***Date:**

***Time:**

***Are the belugas dead or alive?**

***How many belugas (count or estimate)?**

***Where did you see them?**

Were there any beluga calves?

If so, how many?

Which way were the belugas headed?

What were they doing?

What else can you tell us?

***Name of Reporter:**

***Email address (So we may contact you if we have questions):**

***Phone (same as above):**

***Required for data entry.**

Thank you for sharing your beluga sighting information as soon as possible. It is very helpful for us to have this in writing so that we may make timely and accurate reports.

What is Doodle?

<http://www.doodle.com/> <http://www.doodle.com/about/faq.html>

What is it? Doodle is a scheduling tool. We will use only the free features.

How does it work? FAR sends you an email asking you respond to the poll by clicking on a link and following directions. We can also send the email through Doodle.

What is a hidden poll & why does FAR use it? This is a poll where only your responses are visible to you. This is a choice we make to protect the privacy of volunteers.

How does it work? When you get a Doodle poll or email from FAR with a Doodle link, READ EVERYTHING IN THE EMAIL, then,

1. Click on the link.
2. Read the message you see at the link carefully, BEFORE clicking on your available days, so that you know what is being asked of you. Select ALL days you could possibly help, because we need to quickly find the days when we have 3-4 people who can work together on a crew. The responses will be 1) yes; 2) (yes)—which means, if need be; and 3) no.
3. If you need to comment there is a place to do that before you save your response and send it. For example, “I can work T, W, and R, but if I work those days I cannot also help on F. So, we would know not to schedule you for all four days, even though you could work 3 of those days.
4. Send your response by clicking on the “save” button.
5. If you used this last year, the appearance of the poll has changed slightly, but it is very similar and might even be easier.
6. If you have problems with Doodle when you are trying to use it, if you have read all instructions carefully, and checked the Doodle site for Frequent Questions, try restarting your computer and doing it again. Doodle works with both PCs and Macs.

We will send an email or two shortly to get us all started.

What if I don't get an email from you? Check your spam box or junk email trap. If it is not there, write me to see if it has been sent. Please put Barbara Carlson beluga@farak.org and bc@farak.org in your address books to prevent the spam trap issues.

Thank you for helping make scheduling a breeze—AND thank you for volunteering!!!!

6.6. ACBS Project Maps with 1-mi or two-mi grid overlays

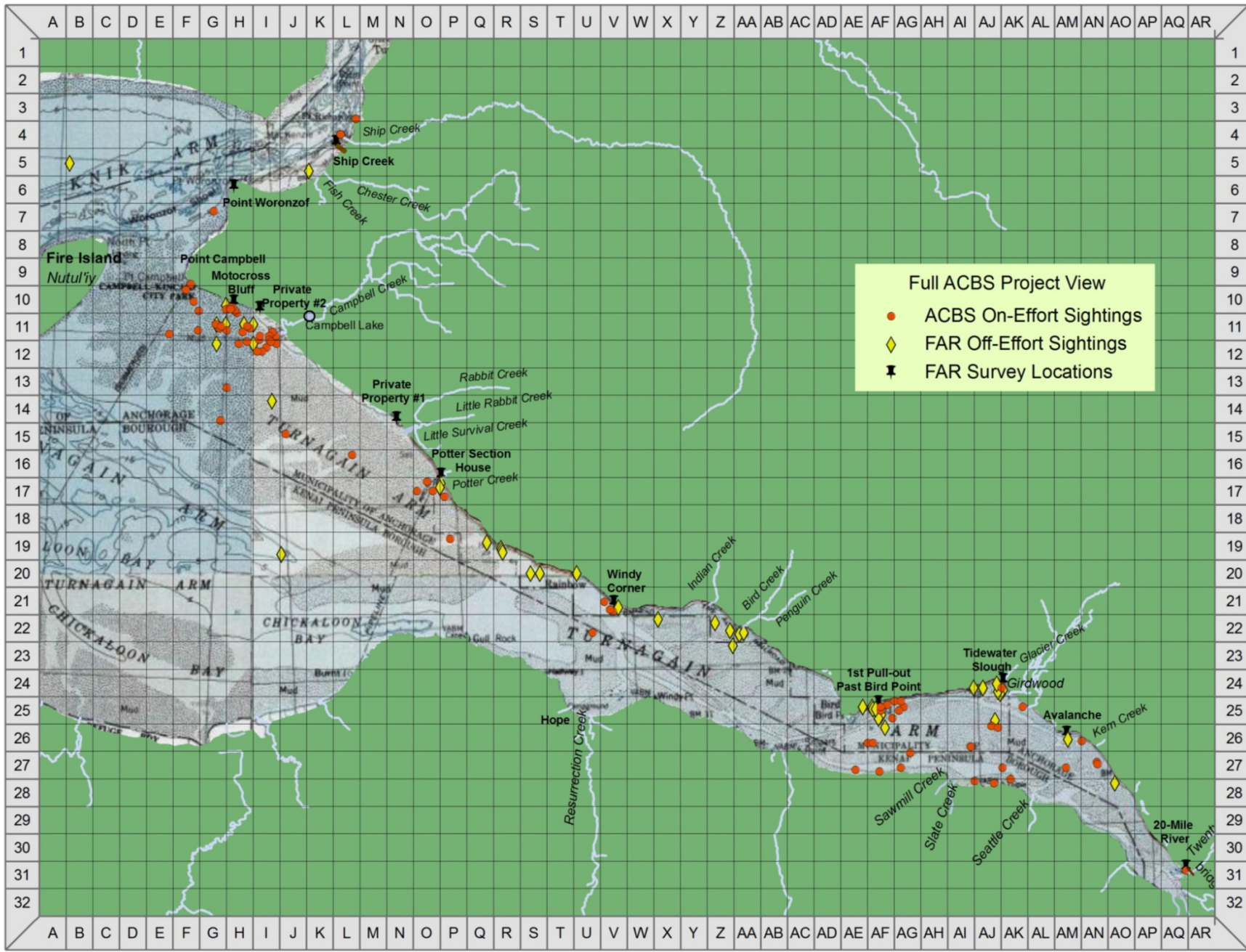


Figure 6.6.1. FAR Full Project View (two-mile grid).

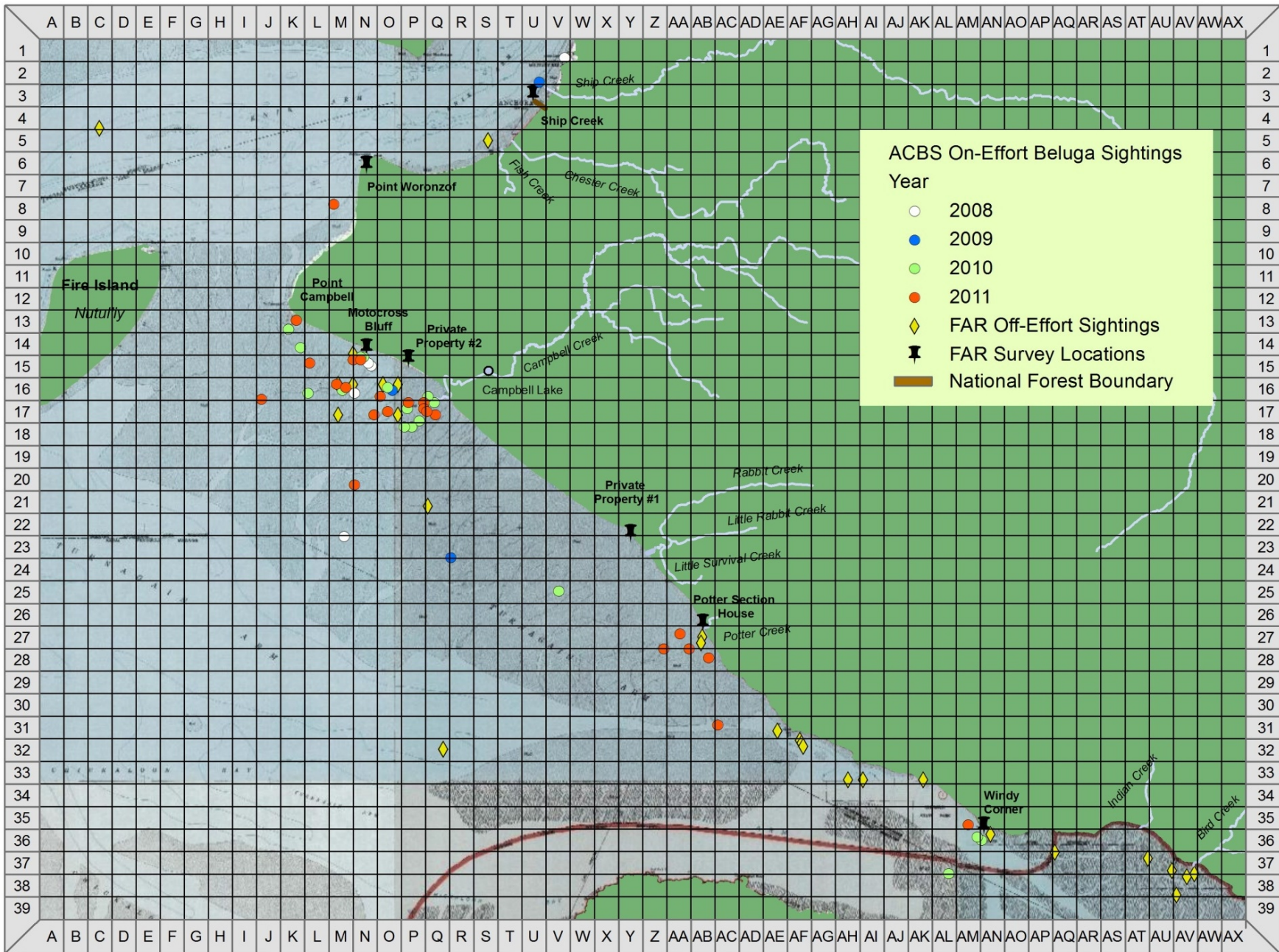


Figure 6.6.2 Fire Island Vicinity by Year (one-mile grid).

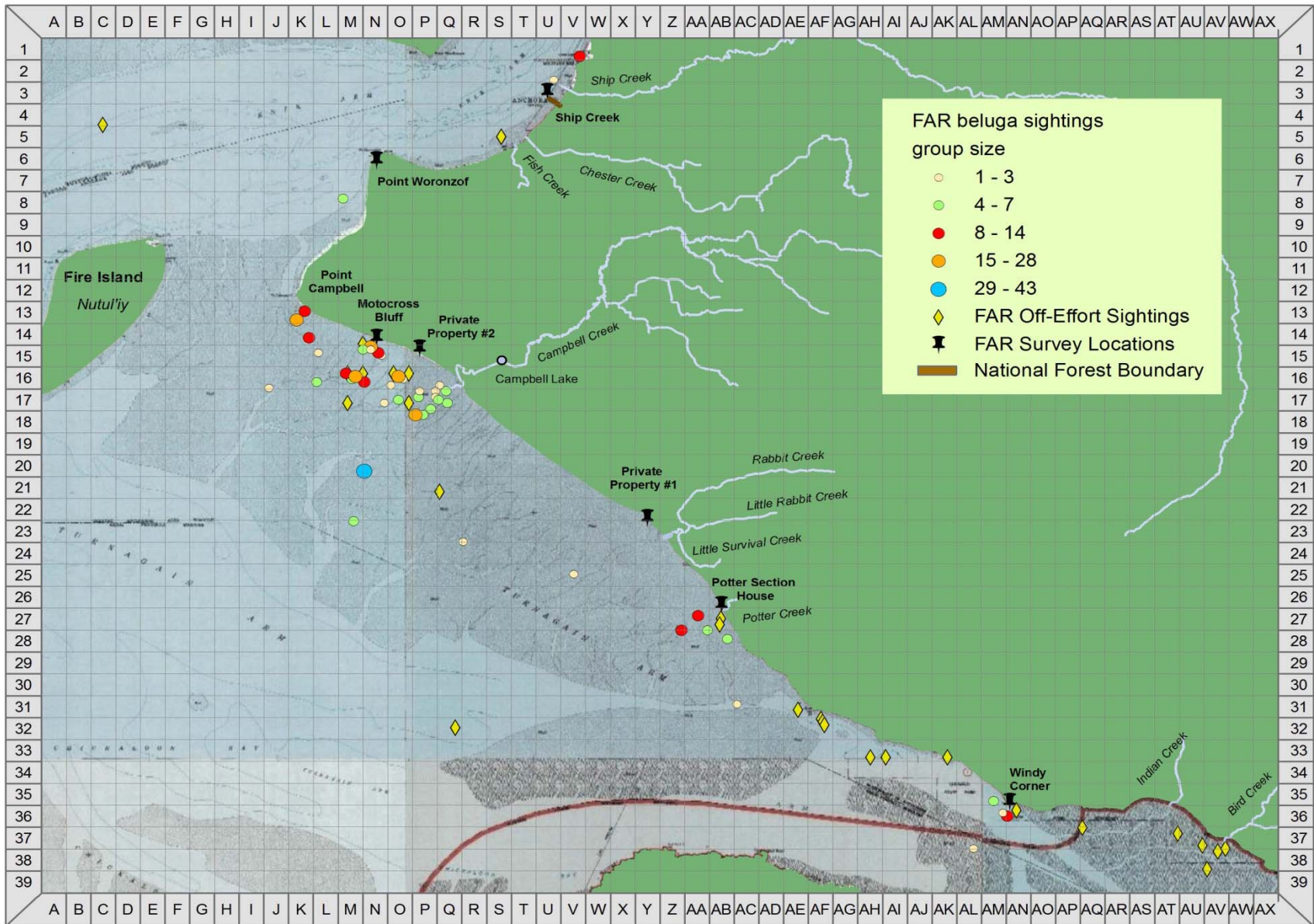


Figure 6.6.3 FAR Fire Island & Vicinity by Group Size (one-mile grid).

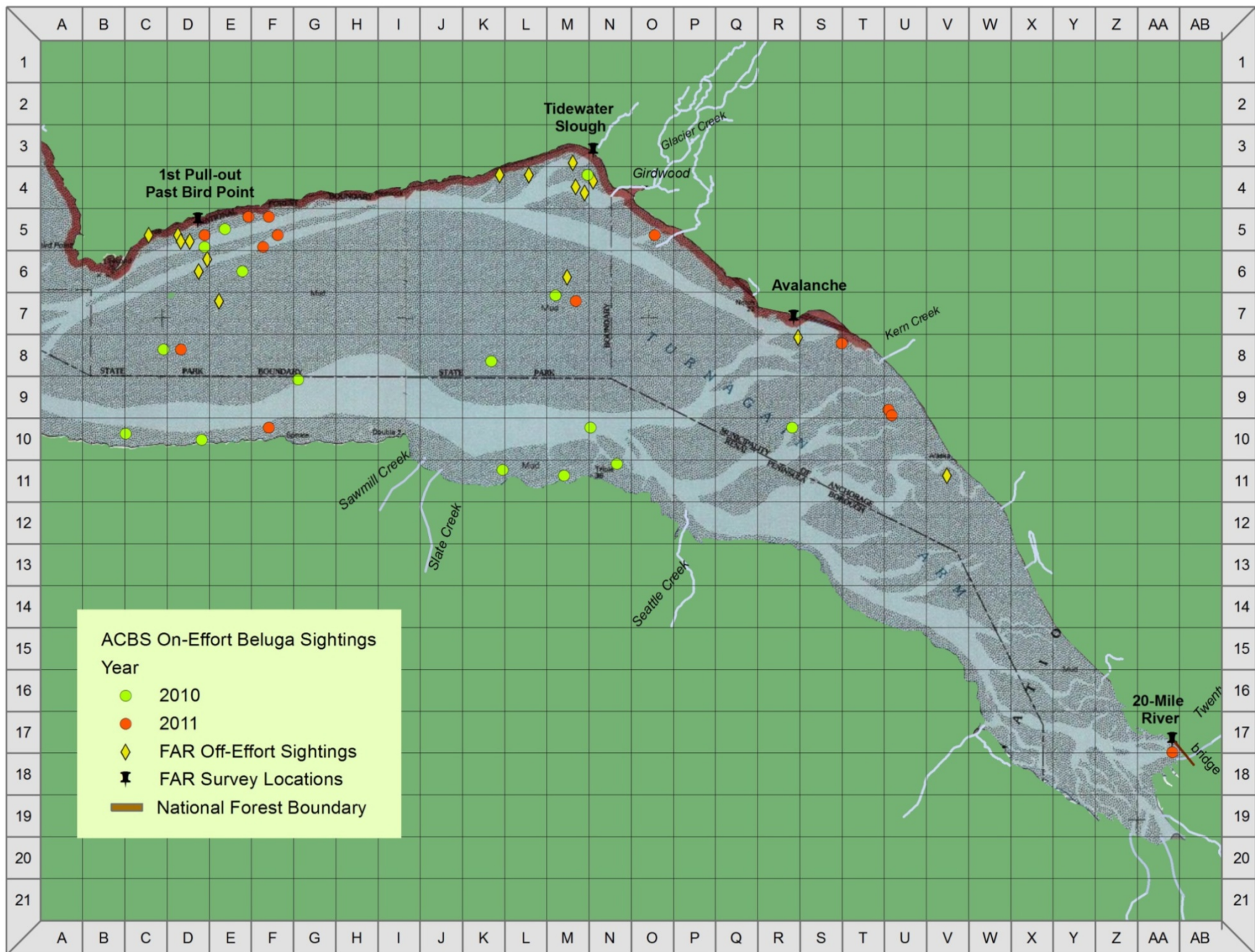


Figure 6.6.4 FAR lower and upper TA by year (one-mile grid).

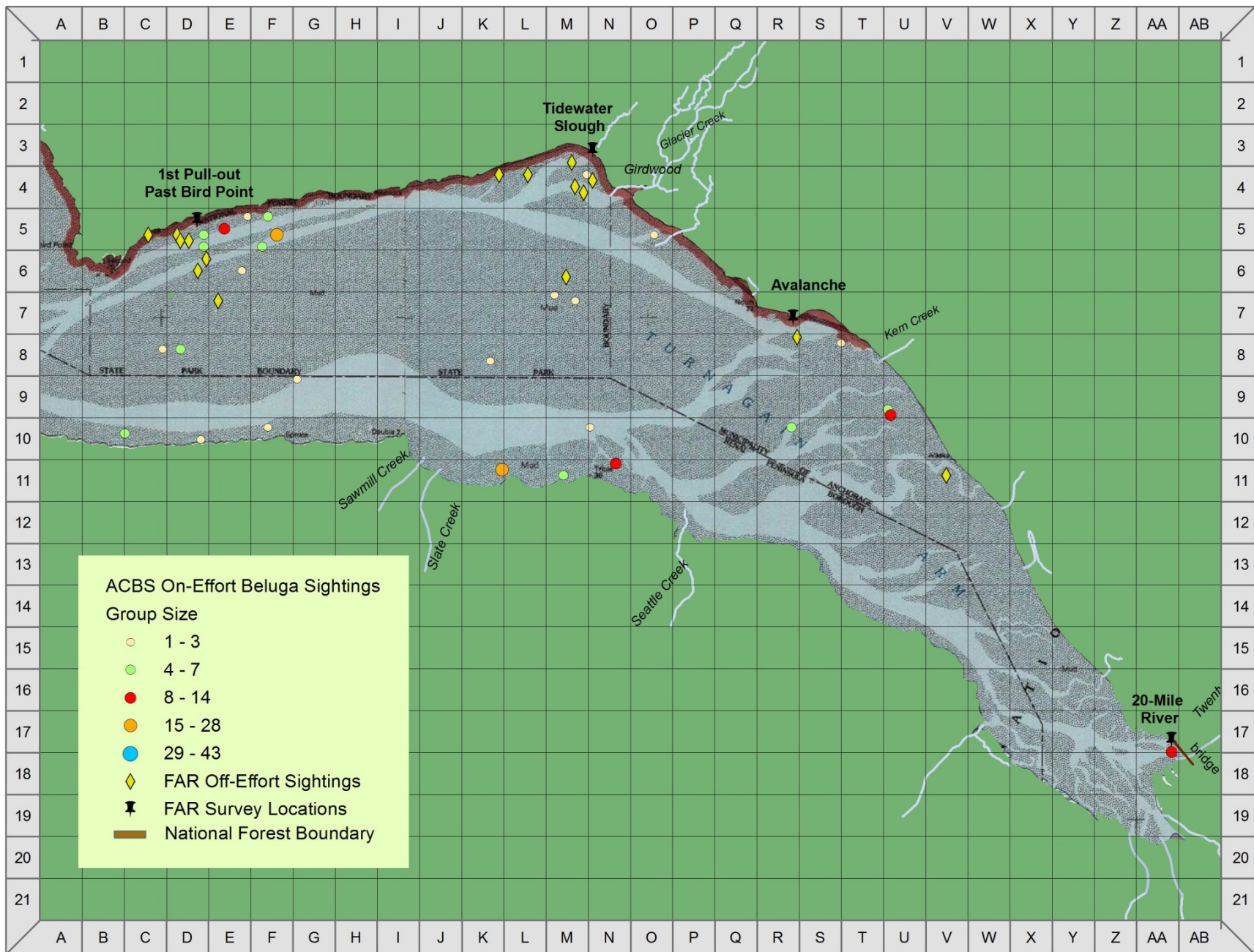


Figure 6.6.5. FAR lower and upper TA by group size (one-mile grid).

6.7 Raw Data

(Next pages)

Table 6.7.1. Off-effort sightings of belugas from FAR members

Latitude and Longitude are estimated based on description of location of beluga group.

Date	Sighting location	Latitude	Longitude	Group location	Beluga group #	Best group size	Best calf count
28-Aug-10	TA PastBird	60.919	-149.316	Middle distance	1	2	
28-Aug-10	TA PastBird	60.926	-149.32	Near shore	2	6	
28-Aug-10	TA PastBird	60.924	-149.323	Near shore	3	1	
28-Aug-10	TA TideWater	60.937	-149.191	Near shore	1	2	
28-Aug-10	TA TideWater	60.938	-149.194	Near shore	2	5	
28-Aug-10	TA TideWater	60.923	-149.197	Middle distance	3	4	
11-Sep-10	Between Windy & Bird	60.962	-149.481		1	8	
11-Sep-10	Knik River	61.485	-149.266		1	5	
12-Sep-10	between Potter & Windy	61.013	-149.732	Near shore	1	6	
12-Sep-10	Between Windy & Past Bird	60.968	-149.474		1	1	
12-May-11	Mile 84.8	60.974	-149.5		1	3	
14-May-11	Between Avalanche & 20-Mile	60.89	-149.067		1	1	
14-Aug-11	W of Susitna River	61.214	-150.199		1	20	
21-Aug-11	Beluga Point	61.0064	149.6934	Near shore	1	5	
21-Aug-11	Coastal Trail	61.1999	149.9652	Near shore	1	3	1
30-Aug-11	Between Past Bird & Windy	60.97	-149.484		1	5	
30-Aug-11	Between Windy & Past Bird	60.969	-149.469		1	1	
31-Aug-11	Near Weigh Station	61.047	-149.797	Near shore	1	4	
31-Aug-11	TA PastBird	60.929	-149.329		1	5	
2-Sep-11	Mile 96.5	60.976	-149.562	Middle distance	1	1	
3-Sep-11	Mile A 109	61.012	-149.731		1	6	2
4-Sep-11	TA TideWater	60.942	-149.195	Near shore	1	1	
10-Sep-11	TA PastBird	60.929	-149.326	Near shore	1	5	
11-Sep-11	Mile 108	61.011	-149.73	Near shore	1	13	1
11-Sep-11	TA Windy	60.982	-149.605		1	3	0
16-Sep-11	Mile 96.7	61.016	-149.747	Near & Mid	2	5	
18-Sep-11	Between mile 112 & Beluga Point	61.045	-149.798	Near shore	1	25	8
17-Oct-11	Mile 91.5 (Tidewater)	60.944	149.188	Near shore	1	7	
21-Oct-11	TA Avalanche	60.913	-149.118	Near shore	1	20	

Table 6.7.2. On-Effort Beluga sightings from Anchorage Coastal Beluga Survey
Latitude and Longitude estimated from mapping grids used during survey shifts.

Date	Survey location	Latitude	Longitude	Beluga group#	Best group size	Best calf count
20-Oct-08	MotoX	61.127	-150.029	1	13	2
20-Oct-08	MotoX	61.136	-150.018	2	2	
21-Oct-08	MotoX	61.137	-150.02	1	13	1
21-Oct-08	PP#1	61.021	-150.071	1	4	
12-Nov-08	Ship Creek	61.237	-149.889	1	12	0
3-Aug-09	MotoX	61.073	-149.965	1	1	
14-Sep-09	Ship Creek	61.229	-149.906	1	1	
15-Sep-09	MotoX	61.128	-150.004	1	3	
24-Aug-10	MotoX	61.129	-150.007	1	16	1
25-Aug-10	MotoX	61.148	-150.073	1	16	2
6-Sep-10	MotoX	61.116	-149.991	1	4	0
6-Sep-10	MotoX	61.128	-150.037	2	7	0
6-Sep-10	MotoX	61.118	-149.986	3	6	3
6-Sep-10	MotoX	61.127	-150.06	4	4	0
6-Sep-10	TA PastBird	60.909	-149.223	1	2	0
6-Sep-10	TA PastBird	60.895	-149.348	2	4	0
6-Sep-10	TA PastBird	60.896	-149.322	3	2	0
6-Sep-10	TA Potter	61.062	-149.893	1	2	0
6-Sep-10	TA TideWater	60.89	-149.198	1	5	
10-Sep-10	TA TideWater	60.898	-149.12	1	5	0
11-Sep-10	MotoX	61.139	-150.023	1	2	1
11-Sep-10	TA PastBird	60.911	-149.335	1	1	0
12-Sep-10	MotoX	61.139	-150.025	1	28	2
12-Sep-10	TA PastBird	60.906	-149.289	1	3	0
18-Sep-10	TA PastBird	60.889	-149.219	1	16	0
18-Sep-10	TA TideWater	60.892	-149.18	1	9	1
19-Sep-10	MotoX	61.116	-149.996	1	18	0
26-Sep-10	TA PastBird	60.92	-149.201	1	1	
26-Sep-10	TA PastBird	60.92	-149.201	2	2	0
27-Sep-10	MotoX	61.124	-149.976	1	6	0
27-Sep-10	TA TideWater	60.94	-149.19	1	3	
28-Sep-10	TA TideWater	60.898	-149.189	1	3	0
10-Oct-10	MotoX	61.122	-149.994	1	6	
11-Oct-10	TA PastBird	60.924	-149.308	1	1	0
12-Oct-10	MotoX	61.142	-150.065	1	11	
13-Oct-10	TA Windy	60.98	-149.611	1	9	1
13-Oct-10	TA Windy	60.981	-149.614	2	1	0

Date	Survey location	Latitude	Longitude	Beluga group#	Best group size	Best calf count
26-Oct-10	TA Windy	60.969	-149.633	1	1	0
30-Oct-10	MotoX	61.126	-149.98	1	1	
	between Past Bird &					
31-Oct-10	Tidewater	60.931	-149.314	1	9	0
31-Oct-10	TA PastBird	60.928	-149.321	1	4	0
15-May-11	TA Avalanche	60.912	-149.103	1	2	
20-May-11	TA 20-Mile	60.844	-148.99	1	10	1
16-Aug-11	MotoX	61.13	-150.041	1	11	1
16-Aug-11	TA Potter	61.018	-149.787	1	3	
18-Aug-11	TA PastBird	60.93	-149.296	1	24	
19-Aug-11	TA PastBird	60.93	-149.321	1	4	0
21-Aug-11	Wornzoff Beach	61.189	-150.043	1	5	1
30-Aug-11	MotoX	61.137	-150.059	1	3	0
30-Aug-11	MotoX	61.151	-150.067	2	9	3
30-Aug-11	TA Windy	60.985	-149.62	1	4	1
2-Sep-11	TA Potter	61.048	-149.812	1	14	2
2-Sep-11	TA Potter	61.043	-149.806	2	7	1
3-Sep-11	MotoX	61.12	-150.016	1	2	0
3-Sep-11	MotoX	61.126	-150.012	2	1	0
3-Sep-11	TA PastBird	60.928	-149.301	1	7	1
3-Sep-11	TA PastBird	60.895	-149.299	2	1	
3-Sep-11	TA Potter	61.04	-149.793	1	7	
11-Sep-11	pp#2	61.121	-150.007	1	6	3
15-Sep-11	MotoX	61.124	-149.983	1	2	
16-Sep-11	MotoX	61.125	-150.091	1	2	
16-Sep-11	TA PastBird	60.933	-149.306	1	2	
17-Sep-11	TA PastBird	60.933	-149.299	1	5	1
21-Sep-11	PP#2	61.097	-150.029	1	43	
25-Sep-11	MotoX	61.043	-149.823	1	10	0
30-Sep-11	PP#2	61.12	-149.975	1	7	2
1-Oct-11	MotoX	61.138	-150.03	1	5	
3-Oct-11	PP#2	61.124	-149.968	1	3	
10-Oct-11	PP#2	61.138	-150.025	1	2	
15-Oct-11	TA Avalanche	60.901	-149.087	1	7	0
15-Oct-11	TA TideWater	60.93	-149.167	1	1	
16-Oct-11	TA Avalanche	60.9	-149.086	1	12	
22-Oct-11	TA PastBird	60.911	-149.329	1	5	
27-Oct-11	PP#2	61.129	-150.035	1	16	
29-Oct-11	TA Avalanche	60.919	-149.194	1	2	0

31-Oct-11	PP#2	61.124	-149.993	1	2
1-Nov-11	PP#2	61.121	-149.981	1	4

Table 6.7.3. ACBS Shifts including cancelled shifts due to weather or personnel reasons

Date	Field location	Shift day	# of Beluga groups	# of Volunteers	Start shift time	End shift time	Total shift time
12-Oct-08	Ship Creek	1	0	3	12:20 PM	12:40 PM	0.33
16-Oct-08	Ship Creek	1	0	2	1:45 PM	3:45 PM	2.00
18-Oct-08	MotoX	1	0	3	10:10 AM	11:50 AM	1.67
19-Oct-08	MotoX	1	0	3	10:55 AM	12:27 PM	1.53
20-Oct-08	MotoX	1	2	3	11:35 AM	12:35 PM	1.00
21-Oct-08	MotoX	1	1	3	12:50 PM	1:50 PM	1.00
21-Oct-08	PP#1	1	1	3	12:42 PM	3:05 PM	2.38
22-Oct-08	MotoX	1	0	3	2:10 PM	3:50 PM	1.67
22-Oct-08	PP#1	1	0	3	1:50 PM	3:50 PM	2.00
23-Oct-08	Ship Creek	1	0	2	9:00 AM	11:00 AM	2.00
25-Oct-08	Ship Creek	1	0	2	11:10 AM	1:11 PM	2.02
12-Nov-08	Ship Creek	1	1	3	11:50 AM	1:30 PM	1.67
09-Jun-09	Ship Creek	1	?	5	2:33 PM	5:22 PM	2.82
10-Jun-09	MotoX	1	0	6	7:20 AM	10:07 AM	2.78
13-Jun-09	MotoX	1	0	5	9:30 AM	12:15 PM	2.75
13-Jun-09	Ship Creek	1	0	4	4:41 PM	7:05 PM	2.40
14-Jun-09	Ship Creek	1	0	2	4:52 AM	7:16 AM	2.40
16-Jun-09	MotoX	1	0	3	12:30 PM	3:03 PM	2.55
17-Jun-09	Ship Creek	1	0	2	8:32 AM	10:40 AM	2.13
18-Jun-09	MotoX	1	0	4	3:20 PM	4:50 PM	1.50
18-Jun-09	Ship Creek	1	0	4	9:40 AM	11:38 AM	1.97
19-Jun-09	Ship Creek	1	0	4	10:40 AM	12:38 PM	1.97
20-Jun-09	Ship Creek	1	0	4	11:40 AM	1:40 PM	2.00
22-Jun-09	MotoX	1	0	3	5:53 AM	7:53 AM	2.00
22-Jun-09	Ship Creek	1	0	2	1:35 PM	3:35 PM	2.00
23-Jun-09	MotoX	1	0	3	6:45 AM	8:10 AM	1.42
26-Jun-09	Ship Creek	1	0	1	4:35 PM	6:40 PM	2.08
27-Jun-09	MotoX	1	0	2	9:57 AM	12:00 PM	2.05
29-Jun-09	MotoX	1	0	3	11:54 AM	1:56 PM	2.03
30-Jun-09	MotoX	1	0	3	1:28 PM	3:18 PM	1.83
30-Jun-09	Ship Creek	1	0	2	7:45 PM	10:00 PM	2.25
04-Jul-09	MotoX	1	0	3	5:35 PM	6:35 PM	1.00
06-Jul-09	MotoX	1	0	3	5:52 AM	8:04 AM	2.20
07-Jul-09	Ship Creek	0		2	12:00 AM	12:00 AM	0.00
08-Jul-09	MotoX	1	0	3	6:45 AM	8:45 AM	2.00
09-Jul-09	Ship Creek	1	0	4	3:06 PM	5:06 PM	2.00
10-Jul-09	Ship Creek	1	0	3	3:40 PM	5:38 PM	1.97
11-Jul-09	MotoX	1	0	4	8:45 AM	10:45 AM	2.00

Date	Field location	Shift day	# of Beluga groups	# of Volunteers	Start shift time	End shift time	Total shift time
13-Jul-09	MotoX	1	0	3	10:18 AM	12:14 PM	1.93
15-Jul-09	Ship Creek	1	0	2	6:34 AM	8:34 AM	2.00
16-Jul-09	MotoX	1	0	3	1:00 PM	3:00 PM	2.00
17-Jul-09	Ship Creek	1	0	3	8:50 AM	10:53 AM	2.05
18-Jul-09	MotoX	1	0	3	4:05 PM	6:05 PM	2.00
20-Jul-09	MotoX	1	0	3	4:45 AM	6:33 AM	1.80
21-Jul-09	Ship Creek	1	0	2	1:17 PM	3:17 PM	2.00
22-Jul-09	Ship Creek	1	0	3	2:04 PM	4:04 PM	2.00
25-Jul-09	MotoX	1	0	3	8:55 AM	10:56 AM	2.02
25-Jul-09	Ship Creek	1	0	4	4:09 PM	6:09 PM	2.00
27-Jul-09	MotoX	1	0	2	10:45 AM	12:05 PM	1.33
29-Jul-09	MotoX	1	0	2	12:40 PM	1:35 PM	0.92
29-Jul-09	Ship Creek	1	0	4	6:59 AM	8:59 AM	2.00
30-Jul-09	Ship Creek	1	0	4	7:59 AM	9:59 AM	2.00
31-Jul-09	MotoX	1	0	2	3:40 PM	5:40 PM	2.00
01-Aug-09	MotoX	1	0	4	4:42 PM	5:40 PM	0.97
03-Aug-09	MotoX	1	1	4	6:07 PM	8:04 PM	1.95
04-Aug-09	MotoX	0		2	6:33 PM	6:33 PM	0.00
06-Aug-09	Ship Creek	1	0	3	2:22 PM	4:11 PM	1.82
08-Aug-09	MotoX	1	0	3	8:10 AM	9:55 AM	1.75
10-Aug-09	Ship Creek	1	0	4	4:07 PM	6:07 PM	2.00
11-Aug-09	MotoX	1	0	3	9:50 AM	11:35 AM	1.75
13-Aug-09	Ship Creek	1	0	4	6:06 PM	8:06 PM	2.00
16-Aug-09	MotoX	1	0	2	3:40 PM	5:45 PM	2.08
17-Aug-09	Ship Creek	1	0	2	10:57 AM	12:57 PM	2.00
18-Aug-09	MotoX	1	0	3	5:45 PM	7:45 PM	2.00
20-Aug-09	Ship Creek	1	0	2	1:45 PM	3:45 PM	2.00
22-Aug-09	MotoX	1	0	4	7:56 AM	10:00 AM	2.07
25-Aug-09	MotoX	1	0	2	10:08 AM	12:02 PM	1.90
25-Aug-09	Ship Creek	1	0	3	4:50 PM	6:50 PM	2.00
27-Aug-09	Ship Creek	1	0	3	6:08 PM	8:08 PM	2.00
29-Aug-09	MotoX	1	0	2	3:09 PM	5:10 PM	2.02
29-Aug-09	Ship Creek	1	0	3	8:18 AM	10:36 AM	2.30
31-Aug-09	MotoX	35	0	3	5:14 PM	5:40 PM	0.43
31-Aug-09	Ship Creek	1	0	3	10:57 AM	12:57 PM	2.00
01-Sep-09	MotoX	1	0	3	5:38 PM	7:32 PM	1.90
03-Sep-09	MotoX	1	0	3	6:30 PM	8:30 PM	2.00
06-Sep-09	MotoX	1	0	3	7:45 AM	9:35 AM	1.83
07-Sep-09	Ship Creek	1	0	3	3:11 PM	5:11 PM	2.00
09-Sep-09	MotoX	1	0	3	9:35 AM	11:30 AM	1.92

Date	Field location	Shift day	# of Beluga groups	# of Volunteers	Start shift time	End shift time	Total shift time
09-Sep-09	Ship Creek	0		2	12:00 AM	12:00 AM	0.00
11-Sep-09	Ship Creek	1	0	3	5:44 PM	7:44 PM	2.00
12-Sep-09	MotoX	1	0	3	12:30 PM	2:30 PM	2.00
13-Sep-09	Ship Creek	1	0	4	8:02 AM	9:45 AM	1.72
14-Sep-09	Ship Creek	1	1	3	9:17 AM	11:17 AM	2.00
15-Sep-09	MotoX	1	1	3	4:30 PM	7:05 PM	2.58
19-Sep-09	Ship Creek	1	0	3	2:05 PM	4:05 PM	2.00
20-Sep-09	MotoX	1	0	3	7:52 AM	9:52 AM	2.00
20-Sep-09	Ship Creek	1	0	2	2:41 PM	4:41 PM	2.00
21-Sep-09	Ship Creek	1	0	4	3:20 PM	5:20 PM	2.00
23-Sep-09	MotoX	1	0	3	9:48 AM	11:38 AM	1.83
24-Sep-09	Ship Creek	1	0	3	4:50 PM	6:50 PM	2.00
25-Sep-09	MotoX	1	0	2	11:17 AM	1:15 PM	1.97
26-Sep-09	MotoX	1	0	2	12:32 PM	2:32 PM	2.00
27-Sep-09	Ship Creek	1	0	3	7:28 AM	9:28 AM	2.00
29-Sep-09	MotoX	1	0	3	4:12 PM	6:10 PM	1.97
30-Sep-09	MotoX	1	0	2	4:58 PM	6:50 PM	1.87
01-Oct-09	MotoX	1	0	2	5:37 PM	7:17 PM	1.67
01-Oct-09	Ship Creek	1	0	2	11:50 AM	1:50 PM	2.00
02-Oct-09	MotoX	1	0	3	5:55 PM	7:46 PM	1.85
05-Oct-09	Ship Creek	1	0	3	2:15 PM	4:15 PM	2.00
07-Oct-09	MotoX	1	0	3	8:45 AM	10:40 AM	1.92
08-Oct-09	Ship Creek	1	0	3	3:56 PM	5:56 PM	2.00
10-Oct-09	MotoX	1	0	2	11:13 AM	1:13 PM	2.00
10-Oct-09	Ship Creek	1	0	2	5:30 PM	7:30 PM	2.00
12-Oct-09	MotoX	1	0	2	1:50 PM	3:52 PM	2.03
14-Oct-09	Ship Creek	35	0	2	10:11 AM	10:41 AM	0.50
15-Oct-09	Ship Creek	1	0	3	11:19 AM	1:19 PM	2.00
23-Oct-09	MotoX	1	0	2	10:05 AM	12:05 PM	2.00
24-Oct-09	MotoX	1	0	2	10:40 AM	12:45 PM	2.08
25-Oct-09	MotoX	1	0	3	11:45 AM	1:45 PM	2.00
26-Oct-09	MotoX	35	0	4	12:55 PM	1:25 PM	0.50
29-Oct-09	Ship Creek	35		2	11:15 AM	11:20 AM	0.08
30-Oct-09	MotoX	35		2	4:30 PM	4:30 PM	0.00
30-Oct-09	Ship Creek	35		2	11:08 AM	11:20 AM	0.20
10-Aug-10	MotoX	1	0	5	7:07 PM	9:42 PM	2.58
11-Aug-10	MotoX	1	0	5	6:50 AM	9:45 AM	2.92
12-Aug-10	MotoX	1	0	4	7:25 AM	10:29 AM	3.07
13-Aug-10	MotoX	1	0	5	8:15 AM	11:15 AM	3.00
14-Aug-10	MotoX	1	0	5	9:04 AM	12:03 PM	2.98

Date	Field location	Shift day	# of Beluga groups	# of Volunteers	Start shift time	End shift time	Total shift time
24-Aug-10	MotoX	1	0	4	6:26 PM	9:26 PM	3.00
24-Aug-10	MotoX	1	1	2	8:26 PM	8:44 PM	0.30
25-Aug-10	MotoX	1	1	4	6:55 AM	9:55 AM	3.00
26-Aug-10	MotoX	1	0	3	6:54 AM	10:00 AM	3.10
27-Aug-10	MotoX	1	0	4	7:40 AM	10:23 AM	2.72
28-Aug-10	MotoX	1	0	4	8:07 AM	10:15 AM	2.13
28-Aug-10	TA PastBird	2	3	11	9:53 AM	10:20 AM	0.45
	TA						
28-Aug-10	TideWater	2	2	11	10:30 AM	11:15 AM	0.75
05-Sep-10	MotoX	1	0	5	4:20 PM	7:15 PM	2.92
05-Sep-10	TA PastBird	1	0	5	7:44 PM	8:22 PM	0.63
05-Sep-10	TA Potter	1	0	5	5:53 PM	6:28 PM	0.58
	TA						
05-Sep-10	TideWater	1	0	5	8:38 PM	9:08 PM	0.50
05-Sep-10	TA Windy	1	0	5	6:45 PM	7:20 PM	0.58
06-Sep-10	MotoX	1	4	4	5:10 PM	7:59 PM	2.82
06-Sep-10	TA PastBird	1	3	5	7:45 PM	8:15 PM	0.50
06-Sep-10	TA Potter	1	1	5	5:54 PM	6:29 PM	0.58
	TA						
06-Sep-10	TideWater	1	1	5	8:28 PM	9:00 PM	0.53
06-Sep-10	TA Windy	1	0	5	6:53 PM	7:20 PM	0.45
07-Sep-10	MotoX	35		4	5:39 PM	5:39 PM	0.00
07-Sep-10	TA Potter	35		4	5:51 PM	5:51 PM	0.00
10-Sep-10	MotoX	1	0	3	7:25 AM	10:14 AM	2.82
10-Sep-10	TA PastBird	1	0	4	10:50 AM	11:22 AM	0.53
10-Sep-10	TA Potter	1	0	4	9:00 AM	9:30 AM	0.50
	TA						
10-Sep-10	TideWater	1	1	4	11:40 AM	12:15 PM	0.58
10-Sep-10	TA Windy	1	0	4	10:00 AM	10:31 AM	0.52
11-Sep-10	MotoX	1	1	4	8:07 AM	11:05 AM	2.97
11-Sep-10	TA PastBird	1	1	5	11:28 AM	12:08 PM	0.67
11-Sep-10	TA Potter	1	0	5	9:46 AM	10:15 AM	0.48
	TA						
11-Sep-10	TideWater	1	0	5	12:21 PM	12:43 PM	0.37
11-Sep-10	TA Windy	1	0	5	10:46 AM	11:00 AM	0.23
11-Sep-10	Knik River	2	1	1	10:10 AM	10:15 AM	0.08
12-Sep-10	MotoX	1	1	4	8:52 AM	11:45 AM	2.88
12-Sep-10	TA PastBird	1	1	5	11:45 AM	12:05 PM	0.33
12-Sep-10	TA Potter	1	0	5	10:25 AM	10:40 AM	0.25
	TA						
12-Sep-10	TideWater	1	0	5	12:25 PM	1:15 PM	0.83

Date	Field location	Shift day	# of Beluga groups	# of Volunteers	Start shift time	End shift time	Total shift time
12-Sep-10	TA Windy	1	0	5	10:55 AM	11:25 AM	0.50
18-Sep-10	MotoX	1	0	5	3:30 PM	6:44 PM	3.23
18-Sep-10	TA PastBird	1	1	4	6:37 PM	7:40 PM	1.05
18-Sep-10	TA Potter	1	0	4	4:56 PM	5:26 PM	0.50
18-Sep-10	TA TideWater	1	1	4	7:50 PM	8:20 PM	0.50
18-Sep-10	TA Windy	1	0	4	5:43 PM	6:15 PM	0.53
19-Sep-10	MotoX	1	1	4	4:27 PM	8:15 PM	3.80
19-Sep-10	TA PastBird	1	0	5	7:35 PM	8:00 PM	0.42
19-Sep-10	TA TideWater	1	0	5	8:14 PM	8:35 PM	0.35
19-Sep-10	TA Windy	1	0	5	6:48 PM	7:15 PM	0.45
19-Sep-10	TA Potter	1	0	6	5:39 PM	6:15 PM	0.60
26-Sep-10	MotoX	1	0	5	7:50 AM	10:52 AM	3.03
26-Sep-10	TA PastBird	1	2	5	11:27 AM	12:20 PM	0.88
26-Sep-10	TA PastBird	1	2	5	11:27 AM	12:20 PM	0.88
26-Sep-10	TA Potter	1	0	5	9:50 AM	10:20 AM	0.50
26-Sep-10	TA TideWater	1	0	5	12:36 PM	1:06 PM	0.50
26-Sep-10	TA Windy	1	0	5	10:40 AM	11:10 AM	0.50
27-Sep-10	MotoX	1	1	3	8:35 AM	11:25 AM	2.83
27-Sep-10	TA PastBird	1	0	3	11:20 AM	11:40 AM	0.33
27-Sep-10	TA Potter	1	0	3	10:10 AM	10:30 AM	0.50
27-Sep-10	TA TideWater	1	1	3	11:50 AM	12:40 PM	0.83
27-Sep-10	TA Windy	1	0	3	10:50 AM	11:00 AM	0.17
28-Sep-10	MotoX	1	0	2	9:07 AM	12:02 PM	2.92
28-Sep-10	TA PastBird	1	0	4	12:13 PM	12:43 PM	0.50
28-Sep-10	TA Potter	1	0	4	10:50 AM	11:12 AM	0.37
28-Sep-10	TA TideWater	1	1	4	12:51 PM	1:32 PM	0.68
28-Sep-10	TA Windy	1	0	4	11:30 AM	11:50 AM	0.33
10-Oct-10	MotoX	1	1	5	9:05 AM	11:15 AM	2.17
10-Oct-10	TA PastBird	1	0	5	10:55 AM	11:20 AM	0.42
10-Oct-10	TA Potter	1	0	5	9:19 AM	9:40 AM	0.35
10-Oct-10	TA TideWater	1	0	5	11:34 AM	11:55 AM	0.35
10-Oct-10	TA Windy	1	0	5	9:57 AM	10:35 AM	0.63
11-Oct-10	MotoX	1	0	2	9:15 AM	11:50 AM	2.58
11-Oct-10	TA PastBird	1	1	3	11:20 AM	11:45 AM	0.42
11-Oct-10	TA Potter	1	0	3	10:02 AM	10:26 AM	0.40

Date	Field location	Shift day	# of Beluga groups	# of Volunteers	Start shift time	End shift time	Total shift time
	TA						
11-Oct-10	TideWater	1	0	3	11:54 AM	12:35 PM	0.68
11-Oct-10	TA Windy	1	0	3	10:45 AM	11:00 AM	0.25
12-Oct-10	MotoX	1	1	3	9:40 AM	12:20 PM	2.67
12-Oct-10	TA PastBird	1	0	3	12:05 PM	12:25 PM	0.33
12-Oct-10	TA Potter	1	0	3	10:45 AM	11:18 AM	0.55
	TA						
12-Oct-10	TideWater	1	0	3	12:35 PM	1:05 PM	0.50
12-Oct-10	TA Windy	1	0	3	11:38 AM	11:49 AM	0.18
13-Oct-10	MotoX	1	0	3	10:15 AM	1:11 PM	2.93
13-Oct-10	TA PastBird	1	0	3	1:05 PM	1:25 PM	0.33
13-Oct-10	TA Potter	1	0	3	11:39 AM	11:59 AM	0.33
	TA						
13-Oct-10	TideWater	1	0	3	1:37 PM	1:51 PM	0.23
13-Oct-10	TA Windy	1	2	3	12:17 PM	12:45 PM	0.47
26-Oct-10	MotoX	1	0	2	9:57 AM	11:32 AM	1.58
26-Oct-10	TA PastBird	1	0	3	11:08 AM	11:30 AM	0.37
26-Oct-10	TA Potter	1	0	3	9:48 AM	9:59 AM	0.18
	TA						
26-Oct-10	TideWater	1	0	3	11:38 AM	12:05 PM	0.45
26-Oct-10	TA Windy	1	1	3	10:30 AM	10:50 AM	0.33
27-Oct-10	MotoX	1	0	3	9:30 AM	11:26 AM	1.93
27-Oct-10	TA PastBird	1	0	4	12:05 PM	12:29 PM	0.40
27-Oct-10	TA Potter	1	0	4	10:27 AM	10:51 AM	0.40
	TA						
27-Oct-10	TideWater	1	0	3	12:37 PM	1:04 PM	0.45
27-Oct-10	TA Windy	1	0	4	11:15 AM	11:45 AM	0.50
28-Oct-10	MotoX	35		3	10:10 AM	10:10 AM	0.00
28-Oct-10	TA Potter	35		3	11:07 AM	11:07 AM	0.00
30-Oct-10	MotoX	1	1	3	12:06 PM	2:06 PM	2.00
30-Oct-10	TA PastBird	1	0	6	2:43 PM	3:10 PM	0.45
30-Oct-10	TA Potter	1	0	6	1:05 PM	1:35 PM	0.50
	TA						
30-Oct-10	TideWater	1	0	6	3:20 PM	3:45 PM	0.42
30-Oct-10	TA Windy	1	0	6	1:50 PM	2:20 PM	0.50
31-Oct-10	MotoX	1	0	4	1:29 PM	3:00 PM	1.52
31-Oct-10	TA PastBird	1	1	3	3:35 PM	4:05 PM	0.50
31-Oct-10	TA Potter	1	0	3	2:26 PM	2:46 PM	0.33
	TA						
31-Oct-10	TideWater	1	0	3	4:25 PM	4:50 PM	0.42
31-Oct-10	TA Windy	1	0	3	3:00 PM	3:25 PM	0.42

Date	Field location	Shift day	# of Beluga groups	# of Volunteers	Start shift time	End shift time	Total shift time
08-May-11	TA 20-Mile	1	0	3	1:20 PM	1:45 PM	0.42
08-May-11	TA PastBird	1	0	3	12:01 PM	12:30 PM	0.48
08-May-11	TA Potter	1	0	3	10:43 AM	11:03 AM	0.33
	TA						
08-May-11	TideWater	1	0	3	12:45 PM	1:05 PM	0.33
08-May-11	TA Windy	1	0	3	11:17 AM	11:37 AM	0.33
12-May-11	TA 20-Mile	1	0	5	5:40 PM	6:10 PM	0.50
12-May-11	TA PastBird	1	0	5	3:50 PM	4:20 PM	0.50
12-May-11	TA Potter	1	0	5	2:00 PM	2:29 PM	0.48
	TA						
12-May-11	TideWater	1	0	5	4:30 PM	5:00 PM	0.50
12-May-11	TA Windy	1	0	4	2:45 PM	3:15 PM	0.50
14-May-11	TA 20-Mile	1	0	5	8:00 PM	8:30 PM	0.47
14-May-11	TA PastBird	1	0	5	6:15 PM	6:47 PM	0.53
14-May-11	TA Potter	1	0	5	4:40 PM	5:08 PM	0.47
	TA						
14-May-11	TideWater	1	0	5	6:57 PM	7:26 PM	0.48
14-May-11	TA Windy	1	0	5	5:23 PM	5:53 PM	0.50
15-May-11	TA 20-Mile	1	0	5	8:26 PM	8:55 PM	0.48
15-May-11	TA PastBird	1	0	5	7:05 PM	7:25 PM	0.33
15-May-11	TA Potter	1	0	5	5:30 PM	6:05 PM	0.58
	TA						
15-May-11	TideWater	1	0	5	7:37 PM	8:07 PM	0.50
15-May-11	TA Windy	1	0	5	6:25 PM	6:45 PM	0.33
20-May-11	TA 20-Mile	1	1	1	9:47 AM	9:57 AM	0.17
21-May-11	TA 20-Mile	1	0	5	10:41 AM	11:45 AM	1.07
21-May-11	TA PastBird	1	0	5	12:56 PM	1:26 PM	0.50
21-May-11	TA Potter	1	0	5	8:43 AM	9:13 AM	0.50
	TA						
21-May-11	TideWater	1	0	5	12:08 PM	12:46 PM	0.63
21-May-11	TA Windy	1	0	5	9:35 AM	10:05 AM	0.50
22-May-11	TA 20-Mile	1	0	6	12:58 PM	1:30 PM	0.53
22-May-11	TA PastBird	1	0	6	11:15 AM	11:50 AM	0.58
22-May-11	TA Potter	1	0	6	9:40 AM	10:10 AM	0.50
	TA						
22-May-11	TideWater	1	0	6	12:05 PM	12:27 PM	0.37
22-May-11	TA Windy	1	0	6	10:30 AM	10:57 AM	0.45
13-Aug-11	MotoX	1	0	8	5:54 AM	8:49 AM	2.92
13-Aug-11	TA PastBird	1	0	5	8:35 AM	9:05 AM	0.50
13-Aug-11	TA Potter	1	0	5	6:55 AM	7:25 AM	0.50
13-Aug-11	TA Windy	1	0	5	7:45 AM	8:15 AM	0.50

Date	Field location	Shift day	# of Beluga groups	# of Volunteers	Start shift time	End shift time	Total shift time
14-Aug-11	MotoX	1	0	6	6:30 AM	9:28 AM	2.97
14-Aug-11	TA PastBird	1	0	6	9:20 AM	9:48 AM	0.47
14-Aug-11	TA Potter	1	0	6	7:35 AM	8:15 AM	0.67
14-Aug-11	TA Windy	1	0	6	8:40 AM	9:05 AM	0.42
	w of Susitna						
14-Aug-11	River	2	1	1	9:00 AM	9:30 AM	0.50
16-Aug-11	MotoX	1	1	4	7:25 AM	10:35 AM	3.17
16-Aug-11	TA PastBird	1	0	5	10:55 AM	11:45 AM	0.83
16-Aug-11	TA Potter	1	1	5	8:50 AM	9:37 AM	0.78
16-Aug-11	TA Windy	1	0	5	10:06 AM	10:30 AM	0.40
17-Aug-11	MotoX	0		3	8:14 AM	8:14 AM	0.00
17-Aug-11	TA PastBird	1	0	4	11:25 AM	12:00 PM	0.58
17-Aug-11	TA Potter	1	0	4	9:30 AM	9:55 AM	0.42
17-Aug-11	TA Windy	1	0	4	10:20 AM	11:05 AM	0.75
18-Aug-11	MotoX	1	0	4	8:45 AM	11:54 AM	3.15
18-Aug-11	TA PastBird	1	1	4	11:50 AM	12:55 PM	1.08
18-Aug-11	TA Potter	1	0	4	9:54 AM	10:30 AM	0.60
18-Aug-11	TA Windy	1	0	4	10:55 AM	11:30 AM	0.58
19-Aug-11	MotoX	1	0	4	9:45 AM	12:20 PM	2.58
19-Aug-11	TA PastBird	1	1	4	12:12 PM	1:05 PM	0.88
19-Aug-11	TA Potter	1	0	4	10:34 AM	11:14 AM	0.67
19-Aug-11	TA Windy	1	0	4	11:40 AM	11:55 AM	0.25
21-Aug-11	Beluga Point	2	1	1	2:30 PM	3:00 PM	0.50
21-Aug-11	Coastal Trail	2	1	1	2:45 PM	2:55 PM	0.17
	Wornzoff						
21-Aug-11	Beach	1	1	2	3:10 PM	4:30 PM	1.33
30-Aug-11	MotoX	1	2	3	6:52 AM	9:52 AM	3.00
30-Aug-11	TA PastBird	1	0	3	9:32 AM	10:03 AM	0.52
30-Aug-11	TA Potter	1	0	3	7:55 AM	8:28 AM	0.55
30-Aug-11	TA Windy	1	1	3	8:50 AM	9:15 AM	0.42
31-Aug-11	MotoX	35		4	7:37 AM	7:37 AM	0.00
31-Aug-11	TA Potter	35		4	8:42 AM	8:42 AM	0.00
	near Weigh						
31-Aug-11	station	2	1	1	2:00 PM	2:20 PM	0.33
31-Aug-11	TA PastBird	2	1	1	8:25 AM	8:35 AM	0.17
02-Sep-11	MotoX	1	0	4	9:13 AM	12:10 PM	2.95
02-Sep-11	TA PastBird	1		5	11:55 AM	12:20 PM	0.42
02-Sep-11	TA Potter	1	2	5	10:15 AM	11:05 AM	0.83
02-Sep-11	TA Windy	1		5	11:32 AM	11:45 AM	0.22
02-Sep-11	Mile 96.5	2	1	1	11:50 AM	11:51 AM	0.02

Date	Field location	Shift day	# of Beluga groups	# of Volunteers	Start shift time	End shift time	Total shift time
03-Sep-11	MotoX	1	2	5	9:52 AM	12:52 PM	3.00
03-Sep-11	TA PastBird	1	2	5	12:54 PM	1:45 PM	0.85
03-Sep-11	TA Potter	1	1	5	11:05 AM	11:45 AM	0.67
03-Sep-11	TA Windy	1		5	12:10 PM	12:33 PM	0.38
03-Sep-11	Mile A 109	2	1	1	1:10 PM	1:20 PM	0.17
04-Sep-11	Pt. Campbell TA	2	0	2	1:15 PM	2:30 PM	1.25
04-Sep-11	TideWater	2	1	1	11:00 AM	11:10 AM	0.17
08-Sep-11	MotoX	35	0	4	4:27 PM	5:45 PM	1.30
08-Sep-11	TA PastBird	1	0	5	7:05 PM	7:35 PM	0.50
08-Sep-11	TA Potter	1	0	5	5:35 PM	6:05 PM	0.50
08-Sep-11	TA Windy	1	0	5	6:15 PM	6:45 PM	0.50
09-Sep-11	MotoX	35	0	4	5:05 PM	5:22 PM	0.28
09-Sep-11	TA Potter	35		5	6:11 PM	6:11 PM	0.00
10-Sep-11	TA PastBird	2	1	1	7:23 PM	7:42 PM	0.32
11-Sep-11	Mile 108	2	1	1	3:40 PM	3:50 PM	0.17
11-Sep-11	PP#2	1	1	1	9:20 AM	12:30 PM	3.08
11-Sep-11	TA Windy	2	1	1	4:00 PM	4:10 PM	0.17
15-Sep-11	MotoX	1	1	3	8:00 AM	10:23 AM	2.38
16-Sep-11	MotoX	1	1	3	8:28 AM	11:28 AM	3.00
16-Sep-11	TA PastBird	1	1	4	11:45 AM	12:35 PM	0.83
16-Sep-11	TA Potter	1	0	4	9:33 AM	10:15 AM	0.70
16-Sep-11	TA Windy	1	0	4	10:35 AM	11:15 AM	0.67
17-Sep-11	MotoX	1	0	4	9:20 AM	12:06 PM	2.77
17-Sep-11	TA PastBird	1	1	4	12:05 PM	1:00 PM	0.92
17-Sep-11	TA Potter	1	0	4	10:10 AM	10:50 AM	0.67
17-Sep-11	TA Windy	1	0	4	11:05 AM	11:45 AM	0.67
	between mile 112 &						
18-Sep-11	Beluga Point	2	1	2	5:00 PM	5:30 PM	0.50
21-Sep-11	PP#2	1	1	2	5:00 PM	6:30 PM	1.50
24-Sep-11	MotoX	35	0	5	4:17 PM	4:45 PM	0.47
24-Sep-11	TA PastBird	1	0	4	6:56 PM	7:26 PM	0.50
24-Sep-11	TA Potter TA	1	0	4	5:15 PM	5:45 PM	0.50
24-Sep-11	TideWater	1	0	4	7:38 PM	8:06 PM	0.47
24-Sep-11	TA Windy	1	0	4	6:00 PM	6:30 PM	0.50
25-Sep-11	MotoX	1	1	5	5:05 PM	7:56 PM	2.85
28-Sep-11	MotoX	1	0	4	7:45 AM	9:51 AM	2.10
28-Sep-11	TA PastBird	1	0	3	9:26 AM	10:00 AM	0.57

Date	Field location	Shift day	# of Beluga groups	# of Volunteers	Start shift time	End shift time	Total shift time
28-Sep-11	TA Potter TA	1	0	3	7:55 AM	8:23 AM	0.47
28-Sep-11	TideWater	1	0	3	10:10 AM	10:40 AM	0.50
28-Sep-11	TA Windy	1	0	3	8:40 AM	9:05 AM	0.42
29-Sep-11	MotoX	1	0	3	8:00 AM	10:23 AM	2.38
29-Sep-11	TA PastBird	1	0	3	10:50 AM	11:40 AM	0.83
29-Sep-11	TA Potter	1	0	3	8:40 AM	9:15 AM	0.58
29-Sep-11	TA Windy	1	0	3	9:35 AM	10:10 AM	0.58
30-Sep-11	PP#2	1	1	1	8:15 AM	9:33 AM	1.30
01-Oct-11	TA Avalanche	1	0	4	1:10 PM	2:10 PM	1.00
01-Oct-11	MotoX	1	1	3	9:02 AM	12:00 PM	2.97
01-Oct-11	TA PastBird TA	1	0	4	11:37 AM	12:02 PM	0.42
01-Oct-11	TideWater	1	0	4	12:07 PM	1:00 PM	0.88
02-Oct-11	MotoX	1	0	4	10:05 AM	12:50 PM	2.75
02-Oct-11	TA PastBird	35		5	11:59 AM	11:59 AM	0.00
03-Oct-11	TA Avalanche	1	0	4	2:29 PM	2:52 PM	0.38
03-Oct-11	MotoX	1	0	4	11:05 AM	1:40 PM	2.58
03-Oct-11	PP#2	1	1	1	12:30 PM	12:55 PM	0.42
03-Oct-11	TA PastBird TA	1	0	4	1:16 PM	1:42 PM	0.43
03-Oct-11	TideWater	1	0	4	1:56 PM	2:15 PM	0.32
08-Oct-11	MotoX	1	0	5	4:30 PM	7:30 PM	3.00
10-Oct-11	PP#2	1	1	1	7:30 PM	7:32 PM	0.03
14-Oct-11	TA 20-Mile	35		5	9:42 AM	9:42 AM	0.00
14-Oct-11	MotoX	35	0	4	8:37 AM	8:37 AM	0.00
15-Oct-11	TA Avalanche	1	1	4	12:05 PM	1:05 PM	1.00
15-Oct-11	MotoX	1	0	3	8:45 AM	11:30 AM	2.75
15-Oct-11	TA PastBird TA	1	0	4	10:15 AM	10:40 AM	0.42
15-Oct-11	TideWater	1	1	4	10:55 AM	11:50 AM	0.92
16-Oct-11	TA Avalanche	1	1	4	12:45 PM	1:55 PM	1.17
16-Oct-11	TA PastBird TA	1	0	4	10:55 AM	11:35 AM	0.67
16-Oct-11	TideWater	1	0	4	11:45 AM	12:30 PM	0.75
17-Oct-11	Mile 91.5	2	1	1	9:25 AM	9:35 AM	0.17
22-Oct-11	TA Avalanche	1	0	3	5:45 PM	6:15 PM	0.50
22-Oct-11	MotoX	1	0	4	2:50 PM	5:44 PM	2.90
22-Oct-11	TA PastBird TA	1	1	3	4:00 PM	5:00 PM	1.00
22-Oct-11	TideWater	1	0	3	5:10 PM	5:35 PM	0.42

Date	Field location	Shift day	# of Beluga groups	# of Volunteers	Start shift time	End shift time	Total shift time
23-Oct-11	TA Avalanche	1	0	6	6:00 PM	6:30 PM	0.50
23-Oct-11	MotoX	1	0	4	3:36 PM	6:30 PM	2.90
23-Oct-11	TA PastBird	1	0	6	4:05 PM	4:52 PM	0.78
23-Oct-11	TA TideWater	1	0	6	5:05 PM	5:45 PM	0.67
24-Oct-11	MotoX	35		5	3:30 PM	3:30 PM	0.00
27-Oct-11	PP#2	1	1	4	10:45 AM	10:55 AM	0.17
29-Oct-11	TA Avalanche	1	1	3	12:15 PM	1:05 PM	0.83
29-Oct-11	MotoX	1	0	3	9:00 AM	12:00 PM	3.00
29-Oct-11	TA PastBird	1	0	3	10:04 AM	10:46 AM	0.70
29-Oct-11	TA TideWater	1	0	3	11:08 AM	11:50 AM	0.70
30-Oct-11	MotoX	35		4	9:10 AM	9:10 AM	0.00
30-Oct-11	TA PastBird	35		5	10:52 AM	10:52 AM	0.00
31-Oct-11	MotoX	35		4	9:39 AM	9:39 AM	0.00
31-Oct-11	TA PastBird	35		6	11:44 AM	11:44 AM	0.00
31-Oct-11	PP#2	1	1	1	10:35 AM	11:15 AM	0.67
01-Nov-11	PP#2	1	1	2	11:00 AM	1:20 PM	2.33
16-Oct-11	MotoX	35		4	8:50 AM	8:50 AM	0.00
01-Jul-09	Ship Creek	0		2	8:51 AM	8:51 AM	0.00
15-Aug-09	Ship Creek	0		1	8:17 AM	8:17 AM	0.00
15-Aug-09	MotoX	35		2	2:18 PM	2:18 PM	0.00
01-Jul-09	MotoX	0		2	2:41 PM	2:41 PM	0.00
15-Sep-11	TA Potter	1		1	8:33 AM	9:00 AM	0.45
15-Sep-11	TA Windy	1		1	9:22 AM	10:00 AM	0.63
15-Sep-11	TA PastBird	1	0	1	10:12 AM	11:00 AM	0.80
11-Sep-10	between Windy & Bird	2	1	5	11:38 AM	12:00 PM	0.37
12-Sep-10	between Potter & Windy	2	1	5	10:40 AM	10:55 AM	0.33
12-Sep-10	between Windy & Past Bird	2	1	5	11:25 AM	11:45 AM	0.33
31-Oct-10	between Past Bird & Tidewater	2	1	5	4:07 PM	4:20 PM	0.22
12-May-11	Mile 84.8	2	1	5	5:00 PM	5:30 PM	0.50
14-May-11	btwAvalanche & 20-Mile	2	1	5	7:45 PM	7:59 PM	0.23

Date	Field location	Shift day	# of Beluga groups	# of Volunteers	Start shift time	End shift time	Total shift time
30-Aug-11	btw Windy & Past Bird	2	1	6	9:25 AM	9:30 AM	0.08
30-Aug-11	btw Past Bird & Windy	2	1	3	10:15 AM	10:20 AM	0.08
02-Sep-11	Mile 96.5	2	1	5	11:50 AM	11:51 AM	0.02
16-Sep-11	Mile 96.7	2	1	4	11:20 AM	11:30 AM	0.17
21-Oct-11	TA Avalanche	2	1	1	1:00 PM	2:00 PM	1.00
15-May-11	TA Avalanche	1	1	5	8:59 PM	9:08 PM	0.15