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Aerial Surveys of Beluga Whales, *Delphinapterus leucas*, in Cook Inlet, Alaska, June 2005 to 2012

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ABSTRACT

The National Marine Fisheries Service (NMFS) has conducted aerial surveys of the beluga population in Cook Inlet, Alaska, each June and/or July since 1993. Results from 1993 to 2000 and 2001 to 2004 were published previously. The current document is a compilation of data from field reports for the subsequent years, from 2005 to 2012. Surveys during these year occurred 31 May-9 June 2005 (54.5 flight hours), 6-15 June 2006 (58.4 flight hours), 7-15 June 2007 (47.2 flight hours), 3-12 June 2008 (47.7 flight hours), 2-9 June 2009 (39.4 flight hours), 1-10 June 2010 (48.4 flight hours), 31 May-9 June 2011 (47.0 flight hours), and 29 May-7 June 2012 (53.0 flight hours). All surveys were flown in twin-engine, high-wing aircraft (i.e., an Aero Commander or Twin Otter) at a target altitude of 244 m (800 ft) and speed of 185 km/hour (100 knots), consistent with NMFS' surveys of Cook Inlet conducted in previous years. Tracklines were flown 1.4 km from the shoreline, along the entire Cook Inlet coast, including islands. Offshore transects were designed to run the length of Cook Inlet or in a sawtooth pattern across the inlet, minimizing overlap within each season, as well as between years. These aerial surveys effectively covered 25% to 34% of the total surface area of Cook Inlet in each of the 8 years and nearly 100% of the coastline (with the exception of 2007: 71%). In particular, most of the upper inlet, north of the Forelands where beluga whales are consistently found, was surveyed five to six times each year. Paired, independent observers searched on the coastal side of the plane, where virtually all beluga sightings occur, while a single observer searched on the offshore side. A computer operator/data recorder periodically monitored distance from the shoreline (1.4 km) with a clinometer (angle 10°). After finding beluga groups, a series of aerial passes allowed all four observers to each make four or more independent counts of every group, (i.e., typically 16 counts of each group conducted during 8 passes). In addition, whale groups were video recorded for later analysis and more precise counts in the laboratory.

During the 8 years of surveys from 2005 to 2012, belugas were not seen in lower Cook Inlet (south of East and West Foreland) nor in the upper inlet south of North Foreland and Point Possession until 2012 when a group of at least seven belugas was observed headed toward West Foreland on 31 May. Before 1996, it was common to see beluga groups south of North Foreland

in Trading Bay. Since the mid-1990s to early 2000s, only one or two beluga groups have been found in lower Cook Inlet south of East and West Foreland and none in the region between the Forelands and North Foreland. Groups of more than one or two whales have not been seen in the lower inlet since 1995. During the 2012 survey, this beluga group moved into the upper inlet and was observed in Trading Bay for the remainder of the survey (highest median count = 21 whales). The annual sums of medians from aerial counts provide a quick index of relative abundance, not corrected for estimates of whales missed and assuming there may be some exchange of whales between areas. Annual index counts from 2005 to 2012 (192, 153, 224, 126, 303, 291, 208, and 319, respectively) included the lowest (2008) and highest (2012) counts recorded since surveys began in 1993 (1993-2004 counts: 302, 276, 322, 287, 261, 192, 217, 184, 210, 181, 174, and 187).

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INTRODUCTION

Belugas (*Delphinapterus leucas*) are distributed around most of Alaska from Yakutat Bay to the Alaska/Yukon Territory boundary (Hazard 1988). Five stocks are recognized in this region: Cook Inlet, Bristol Bay, Eastern Bering Sea, Eastern Chukchi Sea, and the Beaufort Sea (O'Corry-Crowe et al. 1997, Allen and Angliss 2013). The most isolated of these is the Cook Inlet stock, separated from the others by the Alaska Peninsula (Laidre et al. 2000). Belugas in Cook Inlet are concentrated in a few river mouths and bays during parts of the year (Rugh et al. 2000a, 2005a). The small population size (approximately 400 whales; Hobbs et al. 2000a, in press) and geographic and genetic isolation of the whales in Cook Inlet (O'Corry-Crowe et al. 1997, Laidre et al. 2000, Rugh et al. 2000a), in combination with their strong site fidelity, has made this stock vulnerable to anthropogenic impacts. Until 1999, these whales were subject to an unregulated hunt (Mahoney and Shelden 2000), but on 31 May 2000, the stock of belugas in Cook Inlet was designated as depleted under the Marine Mammal Protection Act (65 FR 34590) and is now managed with a small, regulated, subsistence hunt by Alaska Natives (65 FR 59164).

Each June/July since 1993, the National Marine Fisheries Service (NMFS) has conducted annual aerial surveys to study the distribution and abundance of belugas in Cook Inlet (Withrow et al. 1994, Rugh et al. 1995, 1996, 1997a, 1997b, 1999, 2000b, 2001, 2002, 2003, 2004; 2005b, 2006, 2007, Shelden et al. 2008, 2009, 2010, 2011, 2012)[1]. These surveys have been made in cooperation with the Cook Inlet Marine Mammal Council (CIMMC) and the Alaska Beluga Whale Commission (ABWC). Aerial surveys have proven to be the most efficient method for collecting distribution and abundance data for belugas in Cook Inlet and were used for many years prior to the start of the NMFS surveys (e.g., Klinkhart 1966, Calkins et al. 1975, Murray and Fay 1979, Calkins 1984). The NMFS studies have been the most thorough and intensive in terms of coverage and effort (Rugh et al. 2000a). The primary objectives for the current study are to document sighting locations and count belugas in Cook Inlet while maintaining continuity with preceding studies to allow for inter-year trend analyses. Results from 1993 to 2000 and

[1] Unpublished field reports are available at: http://alaskafisheries.noaa.gov/protectedresources/whales/beluga/research.htm#ci, accessed 25 May 2013.

2001 to 2004 were published in Rugh et al. (2000a, 2005a), respectively. The current document is a collation of field reports for subsequent years from 2005 to 2012.

Study Area

Cook Inlet is a major inland sea in south-central Alaska covering approximately 20,000 km^2 (Fig. 1). The southern boundary, which opens to the Gulf of Alaska, is approximately 85 km across from Cape Douglas to Elizabeth Island. The northern limit, at the Susitna River, is 315 km north of Cape Douglas. From there two substantial tidal estuaries extend to the northeast (Knik Arm, roughly 55 km long) and southeast (Turnagain Arm, 75 km long). The shoreline of Cook Inlet (1,810 km) is highly irregular and interrupted by many rivers and creeks which contribute considerable freshwater input and glacial melt into the inlet. Detritus from glacial erosion and strong tidal fluxes keep the waters of upper Cook Inlet (north of the East and West Forelands) extremely turbid and nearly opaque with silt. A description of beluga habitat in Cook Inlet can be found in Moore et al. (2000) and Goetz et al. (2007, 2012a). Anchorage, the largest city in Alaska, served as the base of operations for these aerial surveys. The surveys covered coastal areas of nearly all of Cook Inlet as well as much of the offshore waters.

METHODS

Aircraft and Data Entry

In general, survey aircraft were twin-engine, high-wing platforms with 6 to 8-hour flying capability. In 2005-2006 and 2008-2010, the aircraft was an Aero Commander (680 FL (*N7UP* and *98UP*, respectively) (Fig. 2). Bubble windows were inserted at all observer positions to maximize the search area. In 2007, the survey aircraft was a NOAA Twin Otter (*N46RF*), and in 2011 and 2012 an Aero Commander 690 (*N222ME*); both of these aircraft had large bubble windows at the right- and left-forward observer positions, however, unlike surveys in previous

years, the left-rear observer window was flat (Fig. 2). An opening window allowed for video recording and photography (with the exception of 2011 when recordings occurred through a flat window). Two observers were on the coastal side of the aircraft providing independent search effort on the side where virtually all belugas were seen. A single observer searched on the offshore side of the aircraft because of the paucity of beluga sightings more than 3 km from the coast. A data recorder sat at a computer desk in the rear portion of the aircraft. The data recorder and pilots also searched for belugas but were instructed not to alert observers until a sighting was beyond view.

An intercom system provided communication among the observers, data recorder, and pilots, but a selective listening device provided audio isolation for each observer position in all years but 2011 and 2012. Observer seating positions were noted each time there was a change. Location data were collected from a portable global positioning system (GPS) interfaced with the laptop computer used to enter sighting data. Data entries included routine updates of time, location (latitude/longitude), beginning and end of search effort, percent cloud cover, sea state (Beaufort scale as a function of the wind on the water surface), glare (on the coastal and offshore sides of the plane), and visibility (on the coastal and offshore sides of the plane).

Visibility was documented in five subjective categories from excellent to useless. Best counting conditions (excellent visibility) were when sea state was less than 3 on the Beaufort scale (no white caps), there was a light overcast (reduced glare), the sun was well above the horizon (good lighting), windows were clean (no dust particles or smears to distract from sighting effort), and the observer was comfortable (no back pain, air sickness, etc., which can reduce search effort). Areas where visibility was considered poor or useless (as determined by the left-forward observer) were treated in the analysis as unsampled. Only the typical search area (e.g., > 10° below the horizon and 10° to 60° to the side) was considered when selecting a visibility category.

Tracklines

Coastal surveys were conducted approximately 1.4 km offshore. The objective was to search all nearshore, shallow waters, where belugas are typically seen in late spring/early summer (Rugh et al. 2000a, 2005a). The trackline distance from shore was monitored with a clinometer such that the shoreline was generally kept 10° below horizontal while the aircraft was at the standard altitude of 244 m (800 ft). Ground speed was approximately 185 km/hour (100 knots). This coastal survey included searches up rivers until the water appeared to be less than 1 m deep, based on the appearance of rapids or riffles or as recommended by Alaska Native hunters who have flown with us in the past.

In addition to the coastal surveys, systematic transects were flown across the inlet. Offshore tracklines were designed to run the length of Cook Inlet or in a sawtooth pattern across it, minimizing overlap. Each year there has been an attempt to alter the offshore sampling effort to conduct as broad an array of searches as is practical.

Tides and Light

The broad geographical range of these surveys in conjunction with rapidly changing tide heights – as much as 9.5 m (30 ft) – made it impractical to survey at specific tidal conditions (such as at low tide) throughout Cook Inlet. However, there was an attempt to synchronize flights with low tides in the Susitna delta and Knik Arm. This was primarily to reduce the area that would need to be searched, as a large proportion of upper Cook Inlet has exposed mudflats only at low tide, that would otherwise have to be surveyed. It has proved best to survey Knik Arm during a rising tide because whale groups were relatively more concentrated as they followed the flooding tide up channels. Whales seen near Anchorage usually could not be circled (see Counting Protocol) due to high air traffic in that area.

Tidal changes in Turnagain Arm can create tide rips that compromise visibility, so we surveyed this area during a slack, high tide, when possible. Turnagain Arm was also usually surveyed in the morning when wind speeds were often lower. While the tide was still high, we

surveyed Chickaloon Bay after completing Turnagain Arm. Belugas in Chickaloon Bay are sometimes grouped close to shore or in the Chickaloon River (at the southeastern edge of Chickaloon Bay) where they are relatively easy to count. The timing of aerial surveys in areas south of Point Possession and North Foreland was a function of weather, not tides.

Increased emphasis on surveying during preferred tidal conditions is thought to improve the efficiency of the aerial surveys but probably does not significantly affect the visibility of whales, as long as the whales are still over shallow waters. When beluga groups are in deeper water, groups tend to be more scattered making counting and video recording more difficult.

Although there are many daylight hours in the Cook Inlet area during early June (just prior to the summer solstice), light levels become low enough to limit our survey to hours between 07:30 and 20:30, local time. The flight schedule for every survey day was designed to take advantage of tidal patterns, as described above, relative to workable daylight hours.

Counting Protocol

Immediately upon seeing a beluga group, each observer independently reported the sighting to the recorder (computer operator). As the aircraft passed abeam of the whales, the observer informed the recorder of the clinometer angle, whale travel direction, and notable behaviors when possible, but not group size. With each sighting, the observer's position (left-forward, left-rear, or right-forward) was also recorded. An important component of the survey protocol was the independence of the paired observers (i.e., observers do not cue each other to their sightings). In addition to audio isolation with headsets, visual barriers were used between the observers to ensure independent observations (in all years before 2011, thereafter the plane configuration allowed greater separation between the left-forward and left-rear positions). After a group of whales was reported, the trackline was maintained until the group was well behind the wing; then the aircraft returned to the group to mark its location and begin a circling routine. This allowed each observer an opportunity to independently sight and report whale groups. The pilot and data recorder did not cue the observers to the presence of a whale group until the whale group was behind the plane and it was clear as to whether an observer had seen saw the group.

The location of each whale group was established at the onset of the aerial counting passes by flying directly over the group, then recording the group perimeters. The flight pattern used to count a whale group involved an extended oval around the longitudinal axis of the group with turns made well beyond the ends of the group (see fig. 1 in Hobbs et al. 2000b). Counts of whales were usually made on each pass down the long axis of the oval unless poor visibility (usually due to glare) limited counts to only one side of the long axis of the oval. There were typically eight or more separate counting opportunities per whale group, with two observers counting during each pass, then rotating positions after four good counts to allow another pair of observers to count. Counts began and ended on a cue from the front observer, starting when the leading edge of the group was close enough to be counted and ending when the trailing edge went behind the wing of the aircraft. This provided a precise record of the duration of each counting pass. The paired observers each made independent counts and wrote down their results along with date, time, pass number, and quality of the count.

The quality of a count was a function of how well the observers saw the location of a group, not how many whales were at the surface on the respective pass. Ratings were A (if glare, whitecaps, or distance did not compromise the counting effort) through F (if it was not practical to count whales on the respective pass). Only quality A and B estimates were used in the analysis. Only whales that were at the surface during a counting pass were included; whale tracks in the muddy water or ripples were not counted. Count records were not shared among aerial team members until each season's surveys were complete. This was done to maximize the independence of each observer's counts.

Because most whale groups were counted on eight different aerial passes, and because two observers were counting on each pass, there were usually 16 counts made per group per day, not including counts made later from video recordings (see Hobbs et al. 2000b, in press). The daily aerial counts are represented by medians of each of the four observers' median counts on multiple passes over a group. The process of using medians instead of maximums or means reduces the effect of outliers (extremes in high or low counts) and makes the results more comparable to other surveys which lack multiple passes over whale groups. Medians are also more appropriate than maximums when counts are corrected for missed whales.

After median counts were calculated for each location (e.g., Chickaloon Bay) on each day, annual index counts were established from the highest daily sums. This procedure of using high counts ameliorates problems with partially or totally missing whale groups in certain areas on some days (Rugh et al. 2005a). Previously, the highest median count for each area (e.g., Susitna, Knik Arm, Turnagain Arm, Chickaloon Bay, lower inlet) was used as the index count irrespective of survey day (Rugh et al. 2000a). However, because of the evident movement of whales between these areas in upper Cook Inlet on some days, over-counting was avoided by not adding counts from different days, except for sightings made in the lower inlet since it takes two days to complete a lower inlet survey.

Cameras

Two digital video cameras mounted on a board were operated together on most counting passes. The "standard" camera was adjusted to keep the entire group of belugas in view (generally at maximum wide angle). Magnification was kept constant throughout a pass. The second "zoomed" camera was kept at maximum optical zoom (12×). The zoomed video is used to determine correction factors for missed animals (see Hobbs et al. 2000b, in press) and to examine color ratios of white adults relative to dark juveniles (Litzky 2001, Sims et al. 2003).

Sony DVCAMs, DSR-PDX10 Model L10A and DSR PD100a, were used as the "standard" and "zoomed" camera, respectively, from 2003 to 2005 (Rugh et al. 2005a). From 2006 to 2010, two High Definition (HD) JVC GR-HD1 digital video cameras were used to document beluga groups. The new HD cameras provided higher resolution (1280 × 720 pixels) compared to the "standard" Sony DVCAM (720 × 480 pixels). As of 2011, a pair of Sony HXR-NX5U HD digital video cameras with 1920 × 1080 pixel resolution replaced the JVC cameras.

Images isolated from the video recorded on the "standard" camera were analyzed. Each video counting pass was reviewed for quality and rated on a scale (excellent, good, fair, poor, and unacceptable). Video passes rated excellent and good were analyzed using a computer-aided system (introduced in 2004). With this program (called "Beluga Dots"), analysts were able to catalog the individual whale images found in the survey video, track the images across the

computer screen, and measure image size and color; all of these data were stored in a text file used by the program. Video counts were then used to calculate abundance estimates[2] (Hobbs et al. in press). Images from the camera kept at maximal zoom were examined for subtle surfacings that did not show up in the standard video and for color ratios (white adults vs. dark juveniles) within the respective groups (as described in Litzky 2001). Analysis of both the aerial counts and counts from the video recordings are detailed in Hobbs et al. (2000b) for 1994-2000 data and Hobbs et al. (in press) for the later years.

In addition, on half of the aerial passes in 2005, a digital still camera (Nikon D1X with a 300 mm Nikkor AF lens) was mounted alongside the video camera used for standard wide angle video. This method was also used during the 2003 and 2004 surveys (Rugh et al. 2005a). The still camera was fired when there were whales in view, unlike the video camera which recorded well before and after a whale group passed through the field of view. The digital still images provided greater detail to detect calves, which are darker than the adults and do not rise above the surface as much as the white adults (Sims et al. 2003). The digital still camera was replaced in 2006 with HD video that provided enough resolution to detect calves. Results from the photographic aspects of these aerial surveys will be reported in subsequent documents and are not included here.

RESULTS

Survey Effort

The number of flights for the 2005-2012 surveys ranged from 12 to 18 each season, and individual flights ranged from 0.6 to 6.4 hours (Table 1). Flight hours, the sum of time spent in the air whether or not a search effort was underway, ranged from 39.4 to 58.4 hours per season. Systematic search effort, not including time spent circling whale groups, deadheading without a

[2]Although whale counts made from video were used in abundance estimates, the median counts made by observers in the aircraft provided a quick, efficient approximation of relative abundance. Aerial counts could also be used as a proxy (with appropriate corrections relative to each observer and group density) for video counts when video was inadequate for a particular group.

search effort, or periods with poor visibility varied from 21.0 to 31.2 hours per season (Table 1). Poor visibility interfered with search effort between 0.6 and 2.8 hours per season (2.0 - 12.0% of the search effort; Table 1). This is the sum of time spent in the air when excess glare, fog, white caps, or similar problems interfered with the survey effort, as determined by the left-forward observer.

The composite of these annual aerial surveys provided a thorough coverage of the coast of Cook Inlet (1,810 km) for most of the area within approximately 3 km of shore. In addition, there were many kilometers of systematic transects flown across the inlet (Table 1). The percent coverage (25 - 34%) shown in Table 1 uses 20,943 km^2 as the surface area of Cook Inlet and assumes a 2.0 km transect swath (1.4 km on the left plus 1.4 km on the right, less the 0.8 km blind zone beneath the aircraft). However, each year these surveys covered virtually 100% of the coastal areas, with the exception of 2007 (71%). Most of upper Cook Inlet was surveyed five or six times each year, especially areas where belugas have consistently been found in the past – such as the Susitna delta, Knik Arm, and Chickaloon Bay. Survey tracklines and beluga sighting locations are provided in Figures 3 - 10.

Three of the primary observers (authors of this report) have flown with this project on almost all of these surveys since 1993 (DJR, BAM, KWS). The other observers have flown on two to seven of the surveys (JAM, LVB, CLS, BKS, KTG) (Table 1). Differences between observers' sighting performances (whether or not an observer found whale groups seen by others and how high or low that observer's counts were relative to the other observers) are incorporated into correction factors for the abundance estimates (see Hobbs et al. 2000b, in press), but in the analyses used here, medians account for most differences between observers. The use of medians (instead of means or maximum counts) and the consistency of the observation team have meant that changes in index counts between years are probably not a function of observer performance.

Summary Counts

Median counts of beluga groups are shown for each area and survey in Tables 2 to 9. Typically, there were four good counts made by each observer for each group; therefore,

medians were usually calculated using 16 counts per group. The annual median index counts for all observers for 2005-2012 were 192, 153, 224, 126, 303, 291, 208, and 319 respectively, and included the lowest (2008) and highest (2012) counts recorded since surveys began in 1993. These summary counts do not reflect any correction for missed whales. Calculations for whale groups missed during these aerial surveys and estimates of abundance are described in Hobbs et al. (2000a, b, in press). The abundance estimates are on average 1.8 times larger than the index counts (Fig. 11). This correction factor could be used to calculate a crude estimate of absolute abundance when only aerial counts are available, but it does not factor in variables such as densities of whale groups, individual observer performance, search time, etc.

During these surveys, belugas were not seen in lower Cook Inlet (south of East and West Foreland) nor in the upper inlet south of North Foreland and Point Possession until 2012 when a group of at least seven belugas was observed headed toward West Foreland on 31 May (Fig. 10). Before 1996, it was not uncommon to see beluga groups south of North Foreland (Rugh et al. 2000a, 2010), but from the mid-1990s to 2001, only one or two beluga groups have been found in lower Cook Inlet south of East and West Foreland and none in the region between the Forelands and North Foreland (Rugh et al. 2010). Belugas have not been observed in the lower inlet during our surveys since 2001 (Rugh et al. 2005a), and not in numbers of this size (7 whales) since 1995 (Rugh et al. 2000a). The group observed in 2012, moved into the upper inlet and was observed in Trading Bay (median counts ranging from 12 to 21 whales) for the remainder of the survey (Fig. 10, Table 9). While counts in the Susitna delta have remained fairly constant during the 20-year span of these surveys, whales were not observed in Knik Arm the past 5 years (2008-2012, Table 10). In 2005, and again in 2010, beluga groups were observed near Fire Island. We saw belugas near the entrance to Turnagain Arm (southeast of Anchorage) several times, but only on two occasions was a group seen in Turnagain Arm (50 belugas on 9 June 2004 near Six Mile Creek (Rugh et al. 2005a) and 21 belugas on 9 June 2005 near Bird Point) (Table 10). Belugas were usually seen in Chickaloon Bay near the south shore, most often in an area 3 km southeast of Point Possession east to the Chickaloon River. Annual counts in Chickaloon Bay were often in the range of 20-60 belugas. However, in 2004, counts were as high as 176, and for the first time there appeared to be exchanges of belugas

between the Susitna delta and Chickaloon Bay/Turnagain Arm within the timeframe of the survey; that is, when counts were low in the Susitna area, they were high in Chickaloon and vice versa (Rugh et al. 2005a). Similar exchanges were seen in 2007, 2010, and 2011 (Table 10).

Daily reports for each survey year from 2005 to 2012 are presented below (excerpted and updated from Rugh et al. 2005b, 2006, 2007, Shelden et al. 2008, 2009, 2010, 2011, 2012).

Daily Reports: 2005

31 May 2005

The survey began in Knik Arm just after a rising tide (low at 09:03 at Anchorage). Prior to entering Knik Arm, we flew west as far as the Little Susitna River to make a thorough check of the area around Knik Arm. A group of belugas (Group 1) was found at the Little Susitna River, but no counts were made in order to keep good timing with the tide in Knik Arm. No belugas were seen in Knik Arm although conditions were ideal. From Knik Arm, the survey continued around Fire Island to Turnagain Arm. Conditions were only fair in the lower (western) part of Turnagain Arm. After getting past the entrance, conditions improved, and we had a good view of most of the Arm. No whales were seen. Chickaloon Bay also had winds and glare compromising visibility, but the coastal area was good and a group of belugas (Group 2: 9 counting and video passes) was found near the boulder field along the bluffs as we approached Point Possession. From Chickaloon Bay, we flew a coastal route south to Kenai and landed.

From Kenai, we flew to West Foreland and flew a coastal survey around the Susitna delta, including surveys up the Susitna and Little Susitna rivers. Conditions were good throughout. A big group of belugas was found at the Ivan River (Group 3: 10 counting and video passes), and two small groups that appeared to have merged at some point (Group 4: 5 counting and video passes) were near the Little Susitna River. There were researchers on a boat counting belugas in the area. After completing four counting passes, two boats with tagging teams arrived. The whales dispersed and became difficult to locate so we abandoned effort after five counting passes and ended the day's survey. The tagging team put a tag on one of these whales about the time we left the area, and we heard several VHF transmissions on the plane's receiver. Other

marine mammal sightings included harbor seals (*Phoca vitulina*) in Chickaloon Bay (group sizes = 4, 10, 4, and 16), at McArthur River (n = 7), at Beluga River (n = 1), and at Theodore River (n = 3).

1 June 2005

We surveyed Turnagain Arm in good to excellent conditions: tide was low, there were few rips, and it was calm throughout. However, no belugas were seen. Chickaloon Bay was flat calm. Large mud flats were exposed in the middle of the bay. Similar to 31 May 2005, one group of belugas was found near the boulder field. The whales were concentrated and easy to count (Group 1: 11 counting and video passes). From Point Possession, the survey continued to the Little Susitna River and into Knik Arm, which had excellent viewing conditions but no whales. From Point Woronzof, we flew directly to North Foreland then followed a coastal route around the Susitna delta. Belugas were found at the mouth of the Ivan River (Group 2: 11 counting and video passes); another group was nearby but farther offshore (Group 3: 15 counting and video passes); and a third group (Group 4: 4 counting and video passes) was located farther east, just south of the Susitna River. No belugas were seen in the Little Susitna River. Harbor seals were seen in Chickaloon Bay (n = 70), Beluga River (n = 10), and at Little Susitna River (n = 6).

2 June 2005

We surveyed from Anchorage south to East Foreland, crossed the inlet to West Foreland, then flew north to the Susitna delta and around Knik Arm. Survey conditions were excellent. Two belugas were found midway between Anchorage and Point Possession (Group 1: 4 counting passes and no video passes). One large group (Group 2: 9 counting and video passes) was found at the west side of the Susitna River, as on previous days. A small group (Group 3: 7 counting and video passes) was located near Goose Bay in Knik Arm, even though it was a low, falling tide. The survey covered Turnagain Arm and Chickaloon Bay, again in excellent conditions. One group of belugas (Group 4: 8 counting and video passes) was found in Chickaloon Bay, in the same area as on the previous 2 days. The group was compact and easy to count. Harbor seals

were seen between the Beluga and Theodore Rivers (n = 7), and at the Lewis River (n = 10).

3 June 2005

The weather and marine forecast predicted good conditions in the lower inlet, so we flew south on offshore transects to Cape Douglas and returned on a coastal route along the west side, including Augustine Island and transects to and from Homer. Conditions were generally good to excellent throughout. A group of belugas was seen at the Little Susitna River but was not circled and counted as this was a focused lower inlet survey day. In the lower inlet, sightings included 1 gray whale (*Eschrichtius robustus*), 1 male killer whale (*Orcinus orca*) in mid-inlet, 2 fin whales (*Balaenoptera physalus*), 17 humpback whales (*Megaptera novaeangliae*), 394 sea otters *(Enhydra lutris kenyoni*), and 104 Steller sea lions (*Eumetopias jubatus*), many more than have been seen in past years. Harbor seals were seen near Douglas Reef (n = 11), Horseshoe Cove (n = 16 and 12), Akjemguiga Cove (n = 1), Chenik (n = 8), Augustine Island (n = 15), Ursus Cove (n = 3), Iliamna Bay (n = 17), Iniskin Bay (n = 53), between Iniskin and Oil Bays (n = 54 and 2), Chinitna Bay (n = 1), between Chinitna and Tuxedni bays (n = 43), in Tuxedni Bay (n = 57, 63, 10, 7, 40, 20, 1, and 1), and Redoubt Bay (n = 50). Many brown bears (*Ursus arctos horribilis*) were observed along the west side of Cook Inlet, and one walrus (*Odobenus rosmarus*) in Tuxedni Bay, but no harbor porpoise (*Phocoena phocoena vomerina*) (Appendix).

4 June 2005

Flying from Anchorage to Point Possession, we flew along the east side of lower Cook Inlet. The Kenai and Kasilof rivers were surveyed from the coast to several miles inland. Although conditions were good, no marine mammals were seen until we approached Kachemak Bay. Sea otters were more common than in past years; 58 sightings (927 animals) in Kachemak Bay, many were in large rafts. Harbor seals were abundant at Bradley River (n = 250 and 170). One humpback whale and four killer whales were seen on the south side of Kachemak Bay. We crossed north across Kachemak Bay to land in Homer, then returned to the same location on the coast and continued surveying into bays around the peninsula until we circled Elizabeth Island.

On the south side of the Kenai Peninsula, the winds rose to 36 knots, lowering visibility. Due to rough seas, we did not cross the inlet to Cape Douglas and instead flew to a waypoint in the middle of the inlet, north of the incoming wind. On the trackline heading north up the inlet, no marine mammals were seen except two harbor porpoise (the only porpoise seen this season). Kalgin Island was circled once; no marine mammals were seen.

While on the transect through the upper inlet, a pilot in a nearby aircraft reported a dead whale, so we deviated from our route and found an upside down gray whale on the mudflats near the airstrip. The whale was fairly decomposed and had a stick in its mouth (which the pilot in the other aircraft had reported as a harpoon in the head). Other reports indicated that the whale had been dead in upper Cook Inlet for at least a week.

In summary, the lower inlet was well surveyed with very few areas lost to poor visibility. Most marine mammals were more abundant than usual, but harbor porpoise were rare (Appendix).

5 June 2005

We surveyed Turnagain Arm and Chickaloon Bay on a falling tide in excellent conditions. No belugas were seen in Turnagain Arm, but one large group of belugas (Group 1: 10 counting and video passes) was seen very close to Burnt Island (northeast Chickaloon Bay), swimming southwest along the coast. After a brief stop in Anchorage, the survey continued south to Moose Point, across the inlet to North Foreland, around the Susitna delta (only surveying up the Little Susitna River). A large beluga group was found in the Susitna delta, in the same area as on previous days. The group formed a long, thin line, making it very easy to count (Group 2: 10 counting and video passes). No belugas were found elsewhere, including in Knik Arm, in spite of good conditions. Three groups of harbor seals were seen in Chickaloon Bay (n = 12, 101, and 35)

6 June 2005

No survey flown on this day because the pilot had exceeded hour limitations.

7 June 2005

Winds were forecast to rise in the afternoon, so we started the survey by flying around Fire Island and entering Turnagain Arm. However, the bay was already so windblown that visibility was poor or useless. We turned instead to Knik Arm to see if there were any whales that the tagging team could approach. Although the waters were calm and visibility good to excellent, no whales were seen, so the survey was terminated.

8 June 2005

In spite of high wind forecasts and heavy overcast, a survey was conducted around upper Cook Inlet in adequate conditions. Surveys at Fire Island and Turnagain Arm were marginal in places with fair or poor visibility due to glare on rough waters, but large areas had suitable visibility. Chickaloon Bay had fair conditions. Belugas were found from Chickaloon River to the boulder field by the bluffs and continuing halfway to Point Possession (where there were boats doing pipeline repair). The belugas were located in many small groups (Group 1: 8 counting and video passes, Group 2: 1 counting pass and no video, Group 3: 9 counting and video passes, Group 4: 5 counting and video passes, and Group 5: 5 counting and video passes), mostly near shore. We took a break in Anchorage, waiting for the tide to drop. On the survey from Anchorage to Point Possession, we located three beluga groups (Group 6: 11 counting and video passes; Group 7: 9 counting and video passes; and Group 8: 1 counting pass and no video) just east of Fire Island (the first time groups have been encountered in this area since surveys began in 1993). From Point Possession, we crossed the inlet to North Foreland and flew up the coast around the Susitna delta. Because of the low tide, we skipped surveying up the rivers except for crossing the delta of the Susitna River near Big Island and flying a mile up the Little Susitna River. One group of belugas was found (Group 9: 8 counting and video passes) at the Theodore River. The two tagging boats were a few miles to the east and had not seen the whales until we circled them. After our counts, the boats proceeded to make approaches for tagging but did not deploy any tags. We continued the survey into Knik Arm. Conditions were excellent. One small beluga group (Group 10: 4 counting and video passes) was found in Goose Bay. Other marine

mammal sightings included harbor seals in Chickaloon Bay (n = 60) and northern Goose Bay (n = 75).

9 June 2005

We surveyed upper Cook Inlet for the sixth time. While visibility in some areas of Turnagain Arm and Chickaloon Bay were compromised (wind, glare, rain, and turbulence), most areas had fair or good visibility. A group of belugas was found in Turnagain Arm opposite Bird Point, along the shore (Group 1: 8 counting and video passes). In Chickaloon Bay, a group was found at the mouth of the river (Group 2: 8 counting and video passes) and another near the bluff (Group 3: 6 counting and video passes). We found one more group on the east side of Fire Island (Group 4: 6 counting and video passes). We flew from Moose Point to Shirleyville and up the coast, around the Susitna delta. A lone beluga whale was seen offshore east of the Theodore River (Group 5: 1 counting pass and no video), and a large group was found near the Theodore River - where a group has been seen each day this season (Group 6: 9 counting and video passes). Several small groups were seen along the edge of the mouth of the Susitna delta (Group 7: 4 counting and video passes; Group 8: 1 counting pass and no video; Group 9: 2 counting and video passes; and Group 10: 1 counting pass and no video). The tagging boats were traveling to the east as we passed over them, not far from some of these whales. The scattered appearance of some of the whales may have been a function of the boats traveling through the area. We surveyed Knik Arm on a rising tide. No whales were seen in Goose Bay on this day, but a large group was found in Eagle Bay (Group 11: 8 counting and video passes). After surveying Knik Arm, we flew transects across the upper inlet, trying to cover more offshore areas, but the wind rose and compromised search effort. Three groups of harbor seals were seen in Chickaloon Bay (n = 20, 5, and 60).

Summary

In 2005, the daily medians ranged from 118 to 192 (Table 2), varying little from day to day. Consistent with most years, belugas were found in small groups near river mouths along the northwestern shores of upper Cook Inlet, in particular near the Susitna River, Little Susitna

River, Knik Arm, and along the shores of Chickaloon Bay (Fig. 3). On these annual surveys, belugas have often been seen in the Susitna area, Knik Arm, Turnagain Arm, and Chickaloon Bay, but this year, for the first time, they were also seen near Fire Island (Table 2). Other marine mammal sightings are listed in the Appendix.

Daily Reports: 2006

6 June 2006

This season's project began with a survey of upper Cook Inlet. After circling Fire Island, we flew to Point Possession. Group 1 (5 counting and video passes), a small group of belugas, was seen traveling east into Chickaloon Bay from an area near Point Possession (Table 3). Just south of Point Possession, we flew across Cook Inlet to the Native village of Tyonek and then north along the coast of the Susitna delta. The rivers in this area were not surveyed because the water was very shallow at low tide. Group 2 (3 counting and video passes) was found in the mouth of the Susitna River. While counting Group 2, a boat approached from the east. The disturbance to the whales caused us to abandon beluga counts (the belugas stayed below the surface longer and were harder to find).

In the Little Susitna River, a small group of belugas (Group 3: 4 counting passes with no video) was found swimming up the river. Across the mouth of this river, there was a larger group (Group 4: 4 counting and video passes), and a short distance to the east was Group 5 (5 counting and 4 video passes), a large group in a thin line perpendicular to shore. Group 5 moved north during the counting passes and eventually consolidated close to shore, moving slowly westward.

Although conditions were excellent in Knik Arm, and the survey went to the Knik River Bridge, no belugas were seen. After surveying Knik Arm (1-2 hours after low tide), we landed in Anchorage for a break and to wait for a high, slack tide in Turnagain Arm. However, winds were too high in Turnagain Arm to complete an adequate survey. Chickaloon Bay had relatively calm waters in coastal areas, and many beluga groups were found (Groups 6, 7, and 10: 4 counting and video passes each; Group 8: 5 counting and video passes; Group 9: 4 counting and 3 video

passes; and Group11: 1 counting pass and no video) (Table 3). Other marine mammal sightings included harbor seals at Point Possession (n = 1), Beluga River (n = 2), Lewis River (n = 3), Little Susitna River (n = 10), and two groups in Chickaloon Bay (n = 70 and 4).

7 June 2006

Upper Cook Inlet was surveyed a second time. Although the entry to Turnagain Arm was windy and difficult to search, Turnagain Arm itself had relatively placid water with good to excellent viewing conditions. Chickaloon Bay had good conditions in coastal areas. Two beluga groups were found along the south shore of Chickaloon Bay: Group 1 (9 counting and video passes) was near a mudflat, and Group 2 (8 counting and video passes) was close to shore along a steep bluff (Fig. 4).

The coastal survey continued south from Point Possession to the Kenai River. From there, the survey crossed the inlet to West Foreland and to the north, including searches up the McArthur and Beluga rivers. In general, conditions were good to excellent; however, after a break in Kenai, the survey was no longer synchronized with low tide, and instead the area was surveyed 2-3 hours after low tide. Belugas were found in several groups south of the Susitna River mouth (Group 3: 9 counting and video passes; Group 4:10 counting and video passes; and Group 5: 5 counting and video passes), and some whales (Group 6: 6 counting and video passes) were in the Little Susitna River. No belugas were seen in Knik Arm, in spite of excellent viewing conditions. Harbor seals were seen in Chickaloon Bay (n = 25 and 20), near Birch Hill (n = 4) between Moose Point and Boulder Point, McArthur River (n = 120, 50, and 2), Trading Bay (n = 2), Lewis River (n = 2 and1), and between the Ivan and Lewis Rivers (n = 4).

8 June 2006

Upper Cook Inlet was surveyed a third time. Turnagain Arm was again windy with high sea states from Fire Island to Beluga Point, but farther east the viewing conditions were good to excellent. Chickaloon Bay had a range of conditions due to winds, but whales were found along the coast and at the mouth of Chickaloon River (Group 1: 5 counting and no video passes; and Group 2: 4 counting and no video passes). From Chickaloon Bay, the survey continued around

Point Possession to Moose Point, across the inlet to North Foreland, along the coast to the Susitna delta, and then around Knik Arm. Group 3 (6 counting and 5 video passes) was observed near the Beluga River. We found Group 4 (6 counting and video passes) and Group 5 (8 counting and video passes) at the Susitna River. Group 6 (11 counting and 8 video passes) was in the Little Susitna River and Group 7 (7 counting and video passes) was found at Windy Point in central Knik Arm. Harbor seals were seen in Chickaloon Bay (n = 100 and 23), Beluga River (n = 1), and Lewis River (n = 100).

9 June 2006

Weather conditions deteriorated, so no surveys were flown on this day.

10 June 2006

Wind forecasts for upper Cook Inlet were worse than for the lower inlet; therefore, a survey was conducted along the east shore of the inlet from Point Possession south to Elizabeth Island, including Kachemak Bay. The return flight was over open water and included a survey around Kalgin Island. Belugas were found near Point Possession, both on the outbound and inbound flights, but no belugas were seen farther south. Instead, large numbers of sea otters (n = 891) and harbor seals (at least 653 animals) were in Kachemak Bay; 11 humpback whales were near Elizabeth Island; and west of Kachemak Bay there was a group of 20 Steller sea lions and one minke whale (*Balaenoptera acutorostrata*) (Appendix).

11 June 2006

The fourth survey of upper Cook Inlet was flown in mostly good and excellent conditions; only a relatively small area in the western portion of Turnagain Arm had poor viewing conditions. Beluga groups were found near Chickaloon River (Group 1: 9 counting and video passes), close to shore on the south perimeter of Chickaloon Bay (Group 2: 5 counting and video passes), between Point Possession and Fire Island (Group 3: 5 counting and video passes; and Group 4: 8 counting and video passes), at Beluga River (Group 5: 7 counting and video passes), near the Susitna River (Group 6: 11 counting and video passes), and at Eagle Bay, in

central Knik Arm (Group 7: 4 counting and video passes). Harbor seals were hauled out in Chickaloon Bay (n = 5, 12, 40, and 3).

12 June 2006

To avoid low overcast, fog, and rain in Turnagain Arm in the morning, the fifth survey of upper Cook Inlet deviated from our typical flight pattern. Instead of starting with a survey of Turnagain Arm and then surveying the Susitna delta and Knik Arm at low tide, we flew around Fire Island, then south past Point Possession, almost to Boulder Point, before crossing the inlet to McArthur River (Trading Bay) and flying north around the Susitna delta and Knik Arm. As a result, Susitna and Knik areas were surveyed at high tide. Although conditions were generally good, only one group of belugas was found in the Susitna delta. The whales (Group 1: 13 counting and video passes) were far from shore but near the edge of the mudflats where they are often found at low tide. Along the shore between the Little Susitna River and Point MacKenzie, 14 small boats were seen with set nets running perpendicular to shore. This level of fishing activity has not been observed in the past and may partially explain the lack of beluga sightings in this area. No whales were seen in Knik Arm. The survey of Turnagain Arm was flown during low tide in marginal weather conditions due to high winds and whitecaps. However, the observers were able to see across most of the channels in Turnagain Arm. In Chickaloon Bay, viewing conditions were good. Three groups (Group 2: 12 counting and video passes; Group 3: 5 counting and video passes; and Group 4: 6 counting and video passes) were found near the mudflats and bluffs along the south shore of Chickaloon Bay. Harbor seals were found at Theodore River (n = 62), Lewis River (n = 50), and in Chickaloon Bay (n = 1).

13 June 2006

The west side of lower Cook Inlet was surveyed in good viewing conditions along all coastal areas (100% coverage) from Cape Douglas to West Foreland. Although fog compromised the search effort on portions of the offshore transects, the coastal effort was ideal with heavy overcast, no wind, and flat seas. Many sea otters (n = 759) and harbor seals (n = 258) were seen. Steller sea lions were seen on rocks near Cape Douglas and Shaw Island (n = 64), and three

humpback whales were found in the inlet, midway between Kamishak and Kachemak Bays (Appendix). Unlike most years, no killer whales, gray whales, or harbor porpoise were seen in lower Cook Inlet.

14 June 2006

The sixth survey of upper Cook Inlet was a standard flight covering Fire Island, Turnagain Arm, and Chickaloon Bay at high tide, and the Susitna delta and Knik Arm at low tide. Heavy overcast and almost no wind made for ideal survey conditions. Belugas were found in Chickaloon Bay (Group 1: 1 counting pass, no video; Group 2: 4 counting and video passes; Group 3: 1 counting pass and no video; Group 4: 8 counting and video passes; and Group 5, a new group identified when Groups 2 and 4 merged: 5 counting and video passes), near Point Possession (Group 6: 1 counting pass and no video), near Beluga River (Group 7: 15 counting and video passes), near Susitna River (Group 8: 5 counting and video passes), and at the Little Susitna River (Group 9: 5 counting and video passes). No belugas were found in Knik Arm despite excellent viewing conditions. Harbor seals were hauled out (n = 2) and in the water (n = 1) in Chickaloon Bay, and in the water in the Beluga River (n = 2).

15 June 2006

The seventh and final survey of upper Cook Inlet concentrated on coastal and offshore areas where belugas had been seen during the past 10 days. The survey was conducted at high tide. The flight path included coastal areas of Fire Island, Turnagain Arm (as far as Bird Point), Chickaloon Bay, and Point Possession to the Native Village of Tyonek, the Susitna delta, and Knik Arm (to the Knik River bridge). Survey conditions were ideal with almost no wind and a heavy overcast; however, insect densities were high enough to compromise visibility on the forward side of the bubble windows. Belugas were found in the usual places: near Chickaloon River (Group 1: 10 counting and video passes); along the south shore of Chickaloon Bay (Group 2: 5 counting and video passes); near Beluga River (Group 3: 9 counting and video passes); and south of Susitna River (Group 4: 8 counting and video passes; and Group 5: 7 counting and video passes). No whales were found at the Little Susitna River and in Knik Arm. Harbor seals

were seen in Chickaloon Bay (n = 15 and 2), Beluga River (n = 4), between Beluga and Theodore River (n = 1), and in Theodore River (n = 100 and

Summary

In 2006, the daily medians ranged from 81to 153 (Table 3), varying little from day to day. As in most years, belugas were found in small groups, near river mouths along the shores of upper Cook Inlet, in particular near the Susitna River, Little Susitna River, Knik Arm, and Chickaloon Bay (Fig. 4). Other marine mammal sightings are listed in the Appendix.

Daily Reports: 2007

7 June 2007

The season began with a survey of lower Cook Inlet. We flew along the east coast of the inlet, proceeding from Anchorage to Chickaloon Bay, around Point Possession, south to East Foreland, and then south to Homer, where the plane was refueled. The coastal survey included flying up the Kenai, Kasilof, and Fox rivers. From Homer, the survey continued on offshore transects in and around Kachemak Bay almost to Koyuktolik Bay, where weather (rain and low cloud ceilings) forced us to turn the plane north. We then flew offshore transects to Anchorage, with a circuit around Kalgin Island. Viewing conditions were generally good except near the Gulf of Alaska.

One beluga group was seen in Chickaloon Bay, but no other beluga sightings were made that day. More than 900 harbor seals were seen in Kachemak Bay, including about 650 seals hauled out near the mouth of Fox River. In addition, almost 250 sea otters were counted, mostly in northern Kachemak Bay (Appendix).

8 June 2007

Because the weather forecast for lower Cook Inlet was more favorable than for the upper inlet, we attempted to fly south to survey the western shoreline. We proceeded on offshore

transects as far south as Augustine Island, but high winds (> 50 knots), fog, and rain made us abandon the effort. Visibility remained poor throughout offshore transects back to Anchorage.

Similar to 7 June, only one beluga group was seen, and typical of the spring and summer distribution, the belugas were in upper Cook Inlet, near the Little Susitna River. Other marine mammal sightings included approximately 50 harbor seals hauled out on a sandbar north of Kalgin Island, and 247 sea otters near Augustine Island. Many sea otters were hauled out on Augustine Island, perhaps because of the storm. In addition, one humpback whale was seen on the southeast side of Augustine Island, and four harbor porpoise were seen in mid-inlet (Appendix).

9 June 2007

This was the first survey of upper Cook Inlet this season. We started our survey at low tide in Knik Arm and found belugas in Goose Bay (Group 1: 4 counting and video passes) and Eagle Bay (Group 2: 11 counting and video passes). Fire Island was surveyed after Knik Arm, and then we continued down the coastline from Point Possession to East Foreland. From East Foreland, we flew to the north end of Kalgin Island to check on a report of two dead, stranded belugas. After finding what appeared to be a dead beluga, we flew to West Foreland and continued the survey around the Susitna delta, Turnagain Arm, and Chickaloon Bay. Viewing conditions were excellent all day.

In the Susitna delta, we found three beluga groups (Group 3:12 counting and video passes; Group 4: 5 counting and video passes; and Group 5: 4 counting and video passes) and at least 150 harbor seals. Two beluga groups were seen in Turnagain Arm, one near Potter's Creek (Group 6: 9 counting and video passes), and another near Hope (Group 7: 4 counting passes and video passes), and three beluga groups were in Chickaloon Bay (Group 8: 5 counting and video passes; Group 9: 4 counting and video passes; and Group 10: 6 counting and video passes). Harbor seals were hauled out on the north end of Kalgin Island (n = 70), at Theodore River (n = 150), and Lewis River (n = 20). One lone seal was seen splashing near McArthur River, and a seal was seen near the town of Hope in Turnagain Arm.

10 June 2007

We departed Anchorage on an ebb tide and circled Fire Island before heading to Point Possession. One beluga group (Group 1: 6 counting and video passes) was found between Fire Island and Point Possession. The survey effort continued south along the coast to Moose Point where we crossed Cook Inlet to North Foreland, and then we flew north along the west coast, surveying Susitna delta and Knik Arm. After refueling in Anchorage, we surveyed Turnagain Arm and Chickaloon Bay. Viewing conditions were very good all day.

Two beluga groups were seen near Beluga River (Group 2: 9 counting and video passes; and Group 3: 9 counting and video passes), and three beluga groups were in the Little Susitna area (Group 4: 5 counting and video passes; Group 5: 4 counting and video passes; and Group 6: 1 counting pass and no video). One beluga group (Group 7: 5 counting and video passes) was found in Knik Arm north of Eagle Bay. No whales were seen in Turnagain Arm, but four beluga groups were found in Chickaloon Bay (Groups 8 and 9: 1 counting pass each with no video; Group 10: 9 counting and video passes; and Group 11: 8 counting and video passes). More than 70 harbor seals were counted in the Susitna delta and at least 40 were in Chickaloon Bay.

11 June 2007

The survey began in upper Cook Inlet nearly 3 hours before low tide. After leaving Anchorage, we surveyed Turnagain Arm and Chickaloon Bay before crossing the inlet from Point Possession to the Native Village of Tyonek. From there we surveyed north around the Susitna delta and Knik Arm on a flood tide. This survey, as with the previous upper Cook Inlet surveys, was conducted under excellent viewing conditions.

Only one beluga whale was sighted in Turnagain Arm (Group 1: 4 counting passes and no video), and three beluga groups were found in Chickaloon Bay (Group 2: 5 counting and video passes; Group 3: 1 counting pass and no video; and Group 4: 11 counting and video passes). Similar to earlier surveys, beluga groups were found in the Susitna delta (Group 5: 8 counting and video passes; and Group 6: 11 counting and video passes), and one group was seen in Knik Arm (Group 7: 7 counting and video passes). Again, harbor seals were found in both Chickaloon Bay (n = 10, 4, 5, and 3) and the Susitna delta (n = 15).

12 June 2007

We made a second attempt to survey the west side of lower Cook Inlet. The survey team left Anchorage and flew south following offshore transects almost to Cape Douglas, where weather deteriorated. We flew to Homer to refuel, and then from Homer we crossed the inlet, staying north of fog and rain, until we reached Chinitna Bay. Survey conditions along the west coast were good until winds picked up north of Tuxedni Bay; as a result, Redoubt Bay was not surveyed this year. Harbor seals were hauled out in Tuxedni Bay (n = 18 and 10), and one lone seal was seen between Tuxedni Bay and Chinitna Bay. Two humpback whales were seen in lower Cook Inlet, between Kachemak Bay and Augustine Island (Appendix).

13 June 2007

We did not survey today due to mandatory down time for the pilots after flying 6 days in a row.

14 June 2007

The fourth upper Cook Inlet survey began in Turnagain Arm and around Chickaloon Bay. From Point Possession, the survey continued south along the coast to Kenai River, before landing in Kenai to refuel and to wait for low tide in the Susitna delta. We crossed the inlet from Kenai to West Foreland and surveyed north, along the coast to the Susitna delta, before surveying Knik Arm and Fire Island. This survey was conducted in excellent viewing conditions.

No whales were seen in Turnagain Arm, but three beluga groups were found in Chickaloon Bay (Group 1: 7 counting and video passes; Group 2: 4 counting and video passes; and Group 3: 6 counting and video passes). One beluga group was found at the mouth of the Beluga River (Group 4: 6 counting and video passes), and five beluga groups were located in the Susitna River (Group 5: 4 counting and video passes; Group 6: 11 counting and video passes; Group 7: 5 counting and video passes; Group 8: 4 counting and video passes; and Group 9: 1 counting pass and no video). One beluga group (Group 10: 5 counting and video passes) was found in Knik Arm, near Birchwood, at high tide. In addition, two belugas (Group 11: 1 counting pass and no video) were spotted northeast of Fire Island when the aircraft was making the

approach into Anchorage. Harbor seals were seen in Beluga River (n = 1), Theodore River (n = 1), and north of Fire Island (n = 1).

15 June 2007

The last survey of upper Cook Inlet was an abbreviated trackline, covering all areas where belugas have typically been found in the past. The survey went into Turnagain Arm as far as Bird Point, then around Chickaloon Bay as far as Point Possession. From there, we crossed the inlet to North Foreland, surveying north around the Susitna delta and up Knik Arm as far as Birchwood before returning to Anchorage. Viewing conditions were excellent, as they had been on all upper Cook Inlet surveys this season.

A single beluga was seen in Turnagain Arm (Group1: 1 counting pass and no video), and three beluga groups were found in Chickaloon Bay (Group 2: 5 counting and video passes; Group 3: 7 counting and video passes; and Group 4: 5 counting and video passes). One beluga group was found at the mouth of the Beluga River (Group 5: 5 counting and video passes), and a large beluga group (Group 6: 4 counting and video passes) was located near the Susitna River. Harbor seals were seen in Chickaloon Bay (n = 61 and 1), mid inlet (n = 1), and in Susitna River (n = 1).

Summary

Although aircraft altitude, air speed, and coastal search patterns were kept as constant as possible between years, and most observers were experienced in these beluga surveys, a different aircraft was used this year; instead of an Aero Commander, we flew in a Twin Otter aircraft with slightly different windows than previous survey efforts (Fig. 2). Rather than two equal-sized bubble windows for the two left observers, the left-forward observer had one very large bubble window and the left-rear observer had a flat window. In 2007, the daily medians ranged from 132 to 224 (Table 4). The 2007 index count, that is, the median count from the best survey day (224 belugas) is higher than index counts made annually since 1998 but lower than index counts made prior to 1998. As in most years, belugas were found in small groups near river mouths and shallow waters in upper Cook Inlet, in particular near the Susitna River, Little Susitna River,

Knik Arm, Turnagain Arm, and Chickaloon Bay (Fig. 5). Other marine mammal sightings are listed in the Appendix.

Daily Reports: 2008

3 June 2008

The season began with a survey of upper Cook Inlet. We departed Anchorage 3 hours past high tide (Anchorage, Knik Arm station) and flew the coast of Fire Island. Next, we proceeded into Turnagain Arm up to Twenty-mile River, surveyed Chickaloon Bay and Chickaloon River (up to shallow water), the east coast to East Foreland, crossed the inlet to West Foreland and completed the west coast to Little Susitna River. Belugas (Group 1: 7 video and counting passes) were first encountered at the mouth of the Beluga River (Fig. 6). We attempted video and counting passes but the group was spread out from the mouth of the river and scattered offshore. We decided to land in Anchorage and wait for the low tide before completing the survey. On transit to Anchorage, belugas (Group 2) were observed offshore of the Little Susitna River (Fig. 6). Their location was marked in the record for the next flight. After 45 minutes at the airport, we returned to the Beluga River. Afternoon conditions had worsened with high winds and lots of whitecaps. We did not find Group 1, so we continued the coastal survey, flying up river to the power lines on the Susitna and Little Susitna rivers, and completing Knik Arm, surveying up to the bridge. Group 2 (11 counting and video passes) was still at the Little Susitna River. Birds and whitecaps made counting extremely difficult. Other marine mammal sightings included: 15 harbor seals at Chickaloon River and 55 harbor seals on the Susitna River mudflats (Appendix).

4 June 2008

On the first flight of the day, we completed a full survey of the upper inlet (including major rivers and an offshore trackline one mile off the Susitna delta) north of Moose Point and the McArthur River. The survey began an hour after high tide at Anchorage and included returning to Chickaloon Bay after completing Knik Arm to survey this area again closer to low

tide. We encountered only one large, compact group of belugas (Group 1, 11 video and counting passes) offshore of the Susitna River (Fig. 6). After an hour break in Anchorage, we transited to East Foreland and surveyed the coast to Kenai River, crossed the inlet to Drift River and surveyed the coast to West Foreland. No beluga groups were encountered during the flight though viewing conditions were good to excellent. On the transit back to Anchorage, Group 1 was sighted a second time offshore of the Susitna River. Other marine mammal sightings included adult harbor seals with pups at Chickaloon River (n = 10 and 8), hauled out near Theodore River (n = 192), on the Susitna mudflats (n = 11), near the Little Susitna River (n = 2), and hauled out near Big River (n = 82).

5 June 2008

We completed a full survey of the upper inlet north of Point Possession and North Foreland (including major rivers and a trackline one mile off the Susitna delta). The survey began a half hour after high tide at Anchorage and was timed to coincide with high, slack tide in Turnagain Arm. Belugas were in two groups: Group 1 (10 video and counting passes) at the Chickaloon River and Group 2 (16 video and counting passes) offshore of the Susitna River (Fig. 6). Other marine mammal sightings included: 55 harbor seals hauled out at Chickaloon River, 44 harbor seals offshore of the Susitna River, and an additional 4 harbor seals near the mouth of the Little Susitna River.

6 June 2008

We completed a full survey of the upper inlet north of Point Possession and the town of Beluga (including major rivers and a trackline one mile off the Susitna delta). Similar to 5 June, the survey began a half hour after high tide at Anchorage and was timed to coincide with high, slack tide in Turnagain Arm. Belugas were found in three groups: Group 1 (5 video and counting passes) at the Chickaloon River; Group 2, a pair of whales seen by one observer near the Lewis River; and Group 3 (14 video and counting passes) offshore of the Little Susitna River (Fig. 6). Other marine mammal sightings included: harbor seals hauled out at Chickaloon River (n = 55),

Lewis River (n = 140), Theodore River (n = 220), Susitna River (n = 4) and Little Susitna River (n = 2).

7 June 2008

The survey began at high tide at Anchorage and was timed to coincide with high, slack tide in Turnagain Arm; however, winds were higher than expected, gusting to 29 knots in Turnagain Arm. As a result, we surveyed the west side of Fire Island and crossed to Point Possession. From there, we surveyed one mile offshore from Point Possession across Chickaloon Bay to a mile past Burnt Island. We then turned toward shore and began the coastal survey from Burnt Island to Moose Point (including Chickaloon River), crossed the inlet to the town of Beluga, and continued the coastal survey (including Beluga and Little Susitna River) through Knik Arm (as far as Eklutna). Belugas were in two groups: Group 1 (5 video and counting passes) at the Chickaloon River was spread out along the coast and offshore in an L-shape; while belugas in Group 2 (10 video and counting passes) were in a large, tight group offshore of the Susitna River (Fig. 6). Whitecaps and the spread of the group at Chickaloon Bay compromised counts and video. After completing the first flight, we landed in Anchorage, waited an hour, and then returned to Chickaloon Bay closer to low tide. Group 1 (renamed as Group 3 in the abundance analysis: 11 video and counting passes) had moved to the area along the bluffs between Chickaloon River and Point Possession and belugas were now scattered along the coastline in a long line (Fig. 6). High winds continued in Turnagain Arm, precluding any survey of that area. Harbor seals were hauled out at Chickaloon River (n = 108), Theodore River (n = 150), Lewis River (n = 50), and Little Susitna River (n = 2).

8 June 2008

We did not survey today because of mandatory down time for the pilots after flying 6 days in a row.

9 June 2008

After completing five circuits of upper Cook Inlet, we began the lower inlet surveys flying the coastline from Point Possession to Elizabeth Island, and an offshore trackline before taking a refueling break in Homer. Sightings included 275 sea otters in Kachemak Bay, 122 harbor seals hauled out at Fox River, and 5 humpback whales off Elizabeth Island. The second flight continued the offshore trackline survey from Homer to the upper inlet, with a break to circle Kalgin Island. Sightings included two sea otters, one harbor seal, and three harbor porpoise (Appendix). In general, viewing conditions were fair to excellent for the coastal survey.

10 June 2008

Lower inlet surveys continued for a second day, beginning with an offshore trackline, with a break to circle Augustine Island. The coastal survey from Cape Douglas to Chinitna Point was completed before flying a trackline from Chinitna Point to Homer for refueling. Sightings included 75 harbor seals on a shoal north of Kalgin Island, one humpback whale mid-inlet and one humpback whale near Augustine Island, 3 harbor porpoise on the offshore trackline, 75 Steller sea lions hauled out near Shaw Island, 337 harbor seals and 28 sea otters between Cape Douglas and Chinitna Point, and 120 sea otters near Augustine Island. The second flight of the day included a trackline from Homer back to Chinitna Point and a coastal survey that ended at West Foreland. Sightings included 3 sea otters in Kachemak Bay and 201 harbor seals hauled out in Tuxedni Bay. Viewing conditions were fair to excellent for much of the coastal survey.

11 June 2008

Although five circuits of upper Cook Inlet had been completed and tides were not favorable (positive low tides at 3-4 ft (0.9-1.2 m)), we decided to survey the entire upper inlet north of Point Possession and Beluga River to check the distribution of beluga groups after our 3-day absence. Beluga groups were widely scattered on the flooding tide: in Chickaloon Bay, belugas were scattered from the river mouth out toward Point Possession (Group 1); a small group was found near the mouth of the Beluga River (Group 2; 5 video and counting passes); a large, scattered group about a mile offshore in the delta extended 3.5 miles (5.6 km) from the

Susitna River to the Little Susitna River (Group 3); and another small group was in the first bend of the Little Susitna River (Group 4). Other sightings included harbor seals in the waters near Chickaloon River (n = 2), Beluga River (n = 5), Theodore River (n = 72), and Ivan River (n = 2).

12 June 2008

For the final survey of the season, we decided to attempt one more survey of the upper inlet and to survey as close as possible with low tide in each region: Susitna delta and Chickaloon Bay. We ran a trackline directly from Anchorage to Beluga River where we began a coastal survey that included surveying up the Little Susitna River, and Knik Arm as far as Goose Bay and Eagle Bay. We continued the survey around the south side of Fire Island to Turnagain Arm, crossing to Burnt Island, and flew along the coast to Point Possession. In addition, we flew an offshore trackline one mile from the coast from Point Possession to Chickaloon River (surveying up the river to shallow water), finishing with a coastal survey of Turnagain Arm. Sighting conditions were good to excellent with winds in Turnagain less than 10 knots. Beluga groups were seen at great distances, first by the right front observer on the trackline from Anchorage to Beluga River. We continued on effort and began the coastal survey where the groups were seen by one or both left side observers. Group 1 was lined up across the mouth of the Beluga River (10 video and counting passes) and Group 2 was in the Little Susitna River as far as the first bend and just outside the mouth (5 video and counting passes) (Fig. 6). A few (n = 11) harbor seals were seen in the water at the mouth of the Beluga River.

Summary

In 2008, the daily medians ranged from 58 to 126 (Table 5). The 2008 index count (the median count from the best survey day) of 126 belugas is lower than index counts made annually since 1993 (Table 10). Belugas were found in one or two groups on most days, unlike the scatter of small groups observed in 2007 (Table 5), and none were found in Knik Arm or Turnagain Arm (Fig. 6). Other marine mammal sightings are listed in the Appendix.

Daily Reports: 2009

2 June 2009

The season began with a survey of upper Cook Inlet. We departed Anchorage 2 hours before low tide (Anchorage, Knik Arm station), flew across Chickaloon Bay to Point Possession, and then followed the coast to Moose Point where we turned and crossed the inlet to North Foreland. Here the coastal survey resumed, including flying up river to the power lines on the Beluga, Susitna and Little Susitna rivers, up Knik Arm to the bridge, and ending the survey after circling Fire Island. Belugas (Group 1, 12 video and counting passes) were first encountered at the west tributary of the Susitna River at low tide (Fig. 7). We completed video and counting passes as the group continued to travel west along the mudflat edge toward the Ivan River. Group 2 (9 video and counting passes) was observed along the mudflats of the east tributary of the Susitna River, also traveling west (Fig. 7). We landed and took a brief break in Anchorage to refuel after which Turnagain Arm and Chickaloon Bay were surveyed. Belugas (Group 3, 9 video and counting passes) were found east of the Chickaloon River in a line running from shore to about 2 miles (3.2 km) offshore traveling east toward Turnagain Arm. Sighting conditions were fair to excellent during the survey with intermittent patches of glare. Sea states ranged from Beaufort 1 to 3 with a few small areas in Turnagain Arm at Beaufort 4. Other marine mammal sightings included: 63 harbor seals on the Susitna River mudflats, 5 harbor seals at the Little Susitna River, and 12 harbor seals hauled out west of Chickaloon River (Appendix).

3 June 2009

We followed a pattern similar to the 2 June survey with the exception of extending the coastal survey south to the Forelands. We encountered one large group of belugas (Group 1, 9 video and counting passes) at the mouth of the Little Susitna River (Fig. 7). Two beluga groups were observed in Chickaloon Bay. Group 2 (9 video and counting passes) was west and offshore of Chickaloon River, and Group 3 (5 video and counting passes) was in the notch of Chickaloon Bay where the bluffs meet the mudflats. Other marine mammal sightings included 152 harbor

seals hauled out at the McArthur River. Sightings conditions were similar to the previous day with calm sea states and fair to excellent visibility.

4 June 2009

We began search effort at East Foreland following the coast to the Kenai River. We surveyed up the river, then crossed the inlet to Drift River where we resumed the coastal survey heading north to Point MacKenzie. Two large groups of belugas were found: one west of the Little Susitna River (Group 1: 9 video and counting passes) and the other along the coast and in the mouth of the Little Susitna River (Group 2: 11 video and counting passes) (Fig. 7). The second flight of the day coincided with low tide in Knik and Turnagain Arms. We began the survey at Point MacKenzie, surveyed Knik Arm (Goose and Eagle Bay), rounded Fire Island, flew up Turnagain Arm (as far as Bird Point), and completed coastal and offshore tracklines in Chickaloon Bay. Two groups of belugas were found after extensive off-effort searching[3] in Chickaloon Bay. Group 3, a group of two belugas, was seen by the pilot just west of the Chickaloon River while Group 4 (7 video and counting passes) was seen where the mudflats meet the bluffs (Fig. 7). Other marine mammal sightings included three groups of harbor seals hauled out near Big River (n = 70) and another harbor seal group near Kenai River (n = 4). Winds increased during the day with heavy overcast and light rain. This affected sighting conditions in Turnagain Arm and Chickaloon Bay, particularly during the negative low tide when whitecaps were scattered across the mudflats.

5 June 2009

We completed a full survey of the upper inlet north of Point Possession and the Beluga River. The morning flight coincided with the falling tide in Turnagain Arm and low tide in the Susitna delta. Belugas were seen in two groups: Group 1 (12 video and counting passes) at the Chickaloon River and Group 2 (5 video and counting passes) where the bluffs meet the mudflats in Chickaloon Bay. Although we planned to survey the Susitna delta and Knik Arm after

[3] In addition to poor visibility due to high winds, the headset isolation unit battery died during the offshore transects, and we did not have a replacement, resulting in open communication among the observers.

completing Chickaloon Bay, we abandoned this plan when a low fog bank covered the entire region from Fire Island across the Susitna delta. After landing for an hour in Anchorage to allow the fog to move out of the area, the second flight covered the coast from the Beluga River to Point Woronzof. Belugas were found traveling rapidly east along the mudflat edge on the west tributary of the Susitna River (Group 3: 9 video and counting passes) and in the mouth of the Little Susitna River (Group 4: 8 video and counting passes) (Fig. 7). This was the fourth consecutive day that belugas were found in the same regions in Cook Inlet. Other marine mammal sightings included: an unidentified pinniped swimming near Beluga Point in Turnagain Arm and 22 harbor seals hauled out and in the water at Chickaloon River. Sighting conditions were fair to excellent with calm winds in the morning and sea states of Beaufort 1 to 3 in the afternoon.

6 June 2009

We did not fly this day so that we could spend the day repairing broken video equipment. Observer (LVB) arrived to replace exiting observer (CLS).

7 June 2009

After completing four circuits of upper Cook Inlet, we began surveys of the lower inlet with offshore tracklines heading south to Cape Douglas and then the coastal survey from Cape Douglas to Ursus Cove. A trackline along the south coast of Augustine Island was completed before surveying across the inlet to Homer. After departing Homer, the survey effort resumed on the north coast of Augustine Island crossing to Ursus Cove and continuing along the west coast to Drift River. Species sighted included harbor porpoise, sea otters, Steller sea lions, harbor seals, humpback whales, gray whales, and an unidentified pinniped (Appendix). Harbor porpoise (31 sightings, 41 animals) were seen on an offshore trackline (20 to 30 km from the western shore) between Chinitna Point and Redoubt Point. Sea otters were seen in Kachemak Bay (n = 76), and along the west side of the inlet from Cape Douglas to Chinitna Bay (n = 371). In addition, 20 Steller sea lions were sighted near Cape Douglas and 19 on the southern shore of Augustine Island, a gray whale was seen just north of Douglas River, and 3 humpback whales

were sighted approximately 35 km southeast of Augustine Island, and 284 harbor seals (7 sightings) were seen along the western side of Cook Inlet from Kamishak Bay to Redoubt Bay. Viewing conditions were excellent for much of the survey except for brief periods where fog or glare reduced conditions to poor or useless.

8 June 2009

Lower inlet surveys continued for a second day, covering the coastline from the Kenai River to Elizabeth Island, and an offshore trackline (20-30 km offshore) from Elizabeth Island back to Anchorage. During the coastline survey sightings included: 568 sea otters (36 sightings) in Kachemak Bay, 670 harbor seals hauled out at Fox River, 1 harbor porpoise on the north coast of Kachemak, and 2 humpback whales offshore of English Bay. Low fog and high sea states prevented a survey of the coastline of Elizabeth Island and truncated the offshore transect. After a break in Homer, the second flight continued the offshore trackline survey from Homer to Anchorage with a break to circle Kalgin Island. Sightings included one sea otter approximately 45 km south of Kalgin Island and two beluga whale groups in the Susitna delta. In general, viewing conditions were fair to excellent for the coastal survey but deteriorated during the offshore trackline survey because of fog, glare and high winds.

9 June 2009

Although four circuits of upper Cook Inlet were completed, we decided to survey the entire upper inlet north of Point Possession and Beluga River to check the distribution of beluga groups after our 3-day absence. The morning flight coincided with the high tide in Turnagain Arm. In Chickaloon Bay, a lone beluga (Group 1) was found in the Chickaloon River, and Group 2 was scattered from the mouth to about 2 miles (3.2 km) offshore. In the Susitna delta, Group 3 was scattered from the Theodore River to the western tributary of the Susitna River and Group 4 was in the mouth of the Little Susitna River. Because animals were too dispersed to count or video, we landed to wait for the low tide. On the second flight, we surveyed a reverse route to catch the low tide at the Susitna delta and then at Chickaloon Bay. Beluga whales were found at the mouth

of the Little Susitna River (renamed Group 5: 6 video and counting passes), in the channel along the mudflat edge of the eastern tributary of the Susitna River (Group 6: 4 video and counting passes), traveling in a line westbound in the mudflat channel from the Theodore River to the western tributary of the Susitna River (Group 7: 5 video and counting passes), and scattered from Point Possession to the Chickaloon Bay mudflats (Group 8: 6 counting passes, but too dispersed to video). Because one of the HD cameras was damaged, only standard video was obtained for Groups 5-7. Sighting conditions were mostly fair to excellent. Harbor seals were seen in three groups in Chickaloon Bay (n = 50), six groups along the Susitna delta (n = 71), and a group in the Little Susitna River (n = 10).

Summary

In 2009, the daily medians ranged from 136 to 303 (Table 6). The 2009 index count (the median count from the best survey day) of 303 belugas is within the range of index counts made annually since 1993 (Table 10). Belugas were found in three or four groups on most days in the Susitna delta and Chickaloon Bay, similar to 2008. Again, no belugas were found in Knik Arm or Turnagain Arm (Fig. 7). Other marine mammal sightings are listed in the Appendix.

Daily Reports: 2010

1 June 2010

The season began with a survey of upper Cook Inlet extending south to the Kenai and Drift rivers. We departed Anchorage and circled Fire Island where we encountered the first beluga group of the season just off the southern tip of the island. Whitecaps precluded videotaping Group 1 (Fig. 8) during counting passes. Next, we surveyed Turnagain Arm, Chickaloon Bay to Point Possession, and then followed the coast to Kenai where we surveyed upriver. Belugas were found along the shore between Burnt Island and Chickaloon River (Group 2: 6 video and counting passes), in Chickaloon River (Group 3: 7 video and counting passes), and where the bluffs and mudflats meet near Point Possession (Group 4: counting passes but no video due to whitecaps) (Fig. 8). After landing in Kenai to refuel, the survey continued across the

inlet to Drift River following the coastline north into Knik Arm. Sighting conditions deteriorated significantly in the Susitna delta. Group 5 was encountered just east of the mouth of the Little Susitna River (Fig. 8). Again, high sea states precluded videotaping this group during counting passes. Airspace restrictions near Anchorage, Point MacKenzie, and Elmendorf Air Force Base prevented surveys along those portions of the coastline. Off-effort searches (due to malfunction of the audio isolation system) occurred in Goose Bay, waters off Birchwood, and in Eagle Bay. Sighting conditions were fair to excellent during the survey, with the exception of Turnagain Arm between Portage and Bird Point (heavy rain), and the Susitna delta. Sea states ranged from Beaufort 1 to 3, with areas in Turnagain Arm and the Susitna delta at Beaufort 4 to 5. Other marine mammal sightings included groups of 23 and 44 harbor seals on the Chickaloon River mudflats and 80 harbor seals on the mudflats mid-inlet between Kenai and Drift River (Appendix).

2 June 2010

We completed a survey of the upper inlet north of Moose Point and North Foreland. The flight coincided with high tide in Turnagain Arm and falling tide in the Susitna delta. Belugas were found in two groups: Group 1 (9 video and counting passes) extended along 5 miles (8 km) of shoreline from the bluffs along Chickaloon Bay up to the first bend in the Chickaloon River and Group 2 (11 video and counting passes), a large, compact group, was seen between the Susitna River and the Little Susitna River (Fig. 8). Other marine mammal sightings included: 1 harbor seal swimming near Beluga River and about 150 harbor seals hauled out at the Theodore River (Appendix). Sightings conditions were much improved from the previous day with calm sea states and fair to excellent visibility.

3 June 2010

We attempted a survey of the lower inlet given marginal conditions in the upper inlet. While deadheading across Chickaloon Bay to Kenai, four beluga whales (Group 1) were spotted off the Chickaloon Bay bluffs (Fig. 8). The flight ended in Kenai as we needed to land to secure the aft door. After taking off, we began the coastal survey at the mouth of the Kenai River

heading south toward Homer. Conditions rapidly deteriorated with heavy rain, low clouds, and fog. We aborted the survey about 10 miles (16 km) south of the Kasilof River. We returned to Chickaloon Bay and began an upper inlet survey at the entry of Turnagain Arm. We completed tracklines in Turnagain Arm and Chickaloon Bay to Point Possession (including a survey up the Chickaloon River). Belugas were in a group (Group 2) scattered along the shoreline from the Chickaloon Bay bluffs to east of the mouth of the Chickaloon River (belugas were not seen in the river) (Fig. 8). Unfortunately, rain squalls and low clouds forced us to abort the survey before counting and video passes could occur. Other marine mammal sightings included 50 harbor seals (including at least 10 pups) hauled out at the mouth of the Chickaloon River (Appendix).

4 June 2010

We completed a full survey of the upper inlet north of Point Possession and North Foreland. The flight coincided with the rising tide in Turnagain Arm and high tide in the Susitna delta. Despite excellent sighting conditions, belugas were in dispersed or small groups throughout the survey area that made collecting counts and video extremely difficult. Group 1 (no video passes) was a lone white beluga encountered in Turnagain Arm on the shore east of Six Mile Creek (Fig. 8). Group 2 (6 counting and video passes) was dispersed from the mouth of the Chickaloon River to about 2 miles (3.2 km) offshore. Group 3 (8 counting and video passes) was scattered along the Chickaloon Bay bluffs. Group 4 (no video passes) included two white whales and one dark gray whale swimming east of the Susitna River. Finally, Group 5 (5 counting and video passes) was a large, dispersed group in the east tributary of the Susitna River near Big Island (Fig. 8). Other marine mammal sightings included 35 harbor seals hauled out at Chickaloon River and 6 harbor seals in the water near Beluga River. Sighting conditions were fair to excellent with sea states ranging from Beaufort 0 to 3.

5 June 2010

A lower inlet survey was completed in lieu of another upper inlet survey because both low tides in the upper inlet were +8 feet (similar to 4 June when whales were widely dispersed on the positive tides). We conducted an offshore transect, crossed the inlet to south of the Kenai

River where the coastal survey began. We surveyed the coastline to Elizabeth Island, circled the island, and then resumed surveying the offshore trackline (20-30 km offshore) until abeam of Homer. We surveyed across the inlet back to Kachemak Bay and ended the survey to refuel in Homer. During the coastline survey, marine mammal sightings included 994 sea otters in Kachemak Bay; groups of 305, 60, 10 and 2 harbor seals hauled out at Fox River; 2 humpback whales, an adult with calf, in a small cove south of English Bay; and 2 (possibly 3) killer whales seen on the offshore transect (Appendix). The second flight continued the offshore trackline survey from Homer to Kenai with a break to circle Kalgin Island. Marine mammal sightings included 143 sea otters in Kachemak Bay (likely the same animals counted during the morning flight) and four sightings of 5 harbor porpoise along the trackline (Appendix). In general, viewing conditions were fair to excellent for the entire survey.

6 June 2010

We did not fly a survey today due to a scheduled aircraft inspection. Observer (DJR) arrived to replace exiting observer (CLS).

7 June 2010

Lower inlet surveys were continued for a second day, covering offshore tracklines heading south to Cape Douglas, a coastal survey of the west shoreline north to Drift River, and circling Augustine Island. Low ceilings prevented us from surveying south to Cape Douglas and forced us to abort the offshore trackline. Instead the coastal survey was resumed about 15 miles (24 km) north of Cape Douglas. Marine mammals sighted included harbor porpoise, sea otters, a Steller sea lion, harbor seals, and killer whales (Appendix). Harbor porpoise (five sightings, five animals) were seen on an offshore trackline (20-30 km from the western shore) and on the coastal survey from just south of Chinitna Bay to Redoubt Bay. Sea otters were seen on the offshore trackline (1 otter) and along the west side of the inlet from Cape Douglas to Chinitna Bay (14 sightings of 122 animals) and Augustine Island. One unidentified marine mammal (probable Steller sea lion) was sighted offshore as we approached for the coastal survey (about 15 miles (24 km) north of Cape Douglas). Two large groups of killer whales were seen on the

offshore trackline and one lone male killer whale was observed off Augustine Island. Finally, 156 harbor seals (12 sightings) were seen along the western side of Cook Inlet from Kamishak Bay to Tuxedni Bay. An additional two harbor seals (two sightings) were seen in the northern inlet as we were transiting south. Viewing conditions were excellent for much of the survey except for brief periods where low clouds or glare reduced conditions to poor or useless.

8 June 2010

After completing surveys of the lower inlet, we resumed surveys of upper Cook Inlet north of Point Possession and Beluga River. Surveys were timed to coincide with the falling/low tide (now at only +4 feet) in the Susitna delta. Beluga whale groups were found in Six Mile Creek in Turnagain Arm (Group 1: 5 counting passes, no video), Chickaloon Bay from west of the river mouth along shore to the bluffs (Group 2: 6 counting and video passes), between the Beluga River and Lewis River (Group 3: 6 video and counting passes), and in the Susitna River (Group 4: 4 counting and video passes; and Group 5: 7 counting and video passes) (Fig. 8). Belugas were not seen in Knik Arm. Other marine mammal sightings included 7 harbor seals in the water near Chickaloon River, 78 (3 sightings) hauled out at Susitna River, and 3 (1 sighting) at the Little Susitna River (Appendix). Sighting conditions were fair to excellent.

9 June 2010

We continued surveys of upper Cook Inlet north of Point Possession and Beluga River. Surveys were timed to coincide with the falling/low tide (now at only +2.45 feet) in the Susitna delta. Beluga whale groups were found along shore west of the Chickaloon River (Group 1: 6 counting and video passes), near the bluffs east of Point Possession (Group 2: 5 counting and video passes), between the Theodore and Lewis Rivers (Group 3: 7 counting and video passes), near the mudflats on the west tributary of the Susitna River (Group 4: 5 counting and video passes), in a large scattered offshore group from the east tributary of the Susitna River to mid-inlet north of Point Possession (Group 5: 12 counting and video passes), in the mouth of the Little Susitna River (Group 6: 6 counting and video passes), and in the first bend of the Little Susitna River (Group 7: 6 counting and video passes) (Fig. 8). Again, belugas were not seen in

Knik Arm but we were not able to survey all of Eagle Bay due to restricted air space. A camera malfunction discovered in the evening after the survey resulted in the loss of all standard video from Group 3 (Pass 5) through Group 7. Other marine mammal sightings included 20 harbor seals in the water near Chickaloon River and 61 between the Beluga and Lewis rivers (Appendix). Sighting conditions were fair to excellent.

10 June 2010

We continued surveys of upper Cook Inlet north of Point Possession and Beluga River. Surveys were timed to coincide with the falling/low tide (now at only +0.7 feet). Belugas were found off the southwest tip of Fire Island (Group 1: 7 counting and video passes); near Gull Rock in Turnagain Arm (Group 2: 4 counting and video passes); off the mudflats offshore of Burnt Island (Group 3: 2 passes no video); west of Chickaloon River along shore heading toward the bluffs (Group 4: 7 counting and video passes); off the mudflats near the bluffs (Group 5: 4 passes no video); rounding Point Possession heading into the bay (Group 6: 7 counting and video passes); along the mudflats on the Ivan River and west tributary of the Susitna River (Group 7: 8 counting and video passes); in a small scattered group just offshore from Group 7 (Group 8: 4 passes no video); along the mudflats mid-Susitna River (Group 9: 4 counting and video passes); along the mudflats on the east tributary of the Susitna River (Group 10: 6 counting and video passes); in a small group offshore from Group 10 (Group 11: 5 counting and video passes); and finally, in the first bend of the Little Susitna River (Group 12: 4 passes no video) (Fig. 8). Again, belugas were not seen in Knik Arm (air space was not restricted and all of Eagle Bay was surveyed). Other marine mammal sightings included 11 harbor seals in the water near Chickaloon River and 1 seal near Point Possession, and 51 hauled out along the Susitna mudflats (Appendix). Sighting conditions were good to excellent with Beaufort ranging from 0 to 2.

Summary

In 2010, the daily medians ranged from 82 to 291 (Table 7). The 2010 index count (the median count from the best survey day) of 291 belugas is within the range of index counts made annually since 1993 (Table 10). The number of beluga groups seen per day ranged from 2 to 12

groups in the Susitna delta and Chickaloon Bay, none were found in Knik Arm (Fig. 8). Only a few belugas were seen near Fire Island (Table 7), similar to 2005 (Table 2). Other marine mammal sightings are listed in the Appendix.

Daily Reports: 2011

31 May 2011

The season began with a survey of upper Cook Inlet extending south to Moose Point and McArthur River (Trading Bay). Surveys were timed to coincide with the falling/low tide (+0.48 ft (0.15 m)) at Susitna River and Knik Arm. We departed Anchorage and circled the west shore of Fire Island before crossing Chickaloon Bay and entering Turnagain Arm. We surveyed the entire Arm and conducted video experiments through the belly port over Bird Point. The HD cameras were set at wide-angle and maximum zoom and then changed to 50% zoom and 75% zoom for passes over the stone belugas in the Bird Point parking lot at 700, 800, and 900 ft (214-275 m). We continued the survey into Chickaloon Bay, surveying up Chickaloon River and along the bluffs where belugas (Group 1: 5 video and 6 counting passes) were encountered (Fig. 9). We resumed the coastal survey around Point Possession to Moose Point where we crossed the inlet to the McArthur River. We surveyed up the river before resuming the coastal survey to Beluga River. We surveyed up Beluga River to the power lines before crossing the mouth of the Susitna River to the Little Susitna River where a large group of belugas (Group 2: 8 video and counting passes; the older JVC HD camera replaced one of the new Sony HD cameras during the last four passes for comparison purposes) was found along the shore near the river mouth with part of the group entering the Little Susitna River (Fig. 9). Other marine mammal sightings included harbor seals (n = 12) hauled out on the Chickaloon River mudflats and in the water at the McArthur River (n = 20), Beluga River (n = 4), and just before the Susitna mudflats (n = 1) (Appendix). After a short break in Anchorage, we conducted a second flight from the Little Susitna River, around Point MacKenzie, and along the coast around most of Knik Arm with the exception of restricted airspace south of Eagle Bay to Anchorage. No marine

mammals were observed in Knik Arm. Sighting conditions were fair to excellent with Beaufort ranging from 1 to 4.

1 June 2011

We departed Anchorage, circled Fire Island, and then followed the shoreline before crossing Turnagain Arm and into Chickaloon Bay. High winds (30 knots) and low clouds precluded surveying Turnagain Arm and offshore waters of Chickaloon Bay. Belugas (Group 1: 6 video and counting passes) were observed by the right-forward observer just offshore of Chickaloon River (Fig. 9). Near the same location (Chickaloon Bluffs) as Group 1 on the previous day, a second group of belugas (Group 2: 6 video and counting passes) was sighted. We then continued the coastal survey from Point Possession to Kenai. After surveying up Kenai River, we continued to fly south to Clam Gulch where rain and low clouds forced us to turn back on a trackline about 1 mile offshore. After landing in Kenai to refuel, the survey continued across the inlet to West Foreland following the coastline north into Knik Arm and ending at Anchorage. A large group of belugas (Group 3: 10 counting and video passes) was sighted west of the Little Susitna River, similar to the group seen the day before. Two offshore tracklines across the Susitna delta were attempted but sighting conditions deteriorated significantly. We surveyed Knik Arm with no airspace restrictions between Elmendorf and Anchorage. Sighting conditions were fair to excellent during the survey with the exception of Turnagain Arm (30 knot winds), south of Clam Gulch and mid-inlet (heavy rain) and offshore in the Susitna delta (high sea states). Sea states ranged from Beaufort 0 to 3 with areas in Chickaloon Bay and the Susitna delta at Beaufort 4 to 5. Other marine mammal sightings included: 8 harbor seals hauled out near Chickaloon River, 2 harbor seals in the water near Beluga River, and 10 harbor seals hauled out on the Susitna delta mudflats (Appendix).

2 June 2011

We completed a full survey of the upper inlet north of Point Possession and North Foreland (including Turnagain Arm, Chickaloon Bay, Susitna delta, and Knik Arm and offshore transects in Chickaloon Bay). The flight coincided with the high tide in Turnagain Arm and

falling tide in the Susitna delta. Belugas were in three groups: Group 1 (7 video and counting passes) was scattered along the bluffs of Chickaloon Bay, Group 2 (6 video and counting passes) was near Lewis River, travelling toward Beluga River, and Group 3 (9 video and counting passes), a large, compact group, was between Susitna River and Little Susitna River (Fig. 9). Other marine mammal sightings included harbor seals hauled out at Chickaloon River (n = 2 and 14) and about 70 harbor seals hauled out at the Theodore River (Appendix). Sighting conditions were much improved from the previous day with calm sea states and fair to excellent visibility.

3 June 2011

We completed a full survey of the upper inlet north of Point Possession and North Foreland, with the exception of Turnagain Arm (due to high winds). The morning flight coincided with the rising tide in Turnagain Arm and high tide in the Susitna delta. Belugas were found in dispersed groups throughout Chickaloon Bay (Group 1) and scattered from the mouth of the Little Susitna and into the first bends of the river (Group 2) which made obtaining counts and video extremely difficult. We also counted 26 harbor seals hauled out at Chickaloon River. After completing a morning coastal survey, we landed in Anchorage to wait for the low tide (15:28 at -0.95 ft (-0.29 m)). During the afternoon flight, sighting conditions continued to deteriorate (Beaufort sea states ranging from 3 to 6). The Chickaloon Bay group was amassed along the bluffs (Group 1B: 7 video and counting passes) and in a small group in the mouth of the Chickaloon River (Group 1A: 4 video and counting passes) (Fig. 9). The Little Susitna River group had moved out of the river and was traveling along the east tributary of the Susitna River, heading west (Group 2: 9 counting passes but only 2 video passes due to high sea states). Other marine mammal sightings included: 41 harbor seals hauled out at Chickaloon River and about 120 harbor seals hauled out at the Lewis River (Appendix).

4 June 2011

We completed a full survey of the upper inlet north of Point Possession and Beluga River. The flight coincided with the high tide in Turnagain Arm and falling tide in the Susitna delta. Belugas were in dispersed or small groups throughout the survey area, which compromised

counting and video recording. Winds also increased throughout the day, along with sun breaks and intermittent rain, affecting counts and video with whitecaps, glare, and obscured visibility through the bubble windows. Group 1 (no video passes) was a pair of large, white whales encountered off the south tip of Fire Island (Fig. 9). Group 2 (4 counting and video passes) was traveling from the mouth of the Chickaloon River toward Turnagain Arm. Group 3 (4 counting and video passes) was scattered along the Chickaloon Bay bluffs. Group 4 (12 counting and video passes) was in the mouth of the Theodore River and spread in a line headed toward Beluga River. Finally, Group 5 was a large, dispersed group in the Little Susitna River. One counting pass was attempted before we decided to continue the survey into Knik Arm. After surveying Knik Arm, we returned to Group 5 (7 counting and video passes). Only about 3-5 whales remained in the Little Susitna River while the rest of the group was found heading east toward the eastern tributary of the Susitna River (Fig. 9). Sighting conditions were excellent to poor with sea states of Beaufort 0 to 6. Other marine mammal sightings included 31 harbor seals (in groups of 17, 9, and 5) hauled out at Chickaloon River, more than 200 hauled out at the Theodore River, more than 200 hauled out at the Lewis River, and at least 207 hauled out at the Susitna River (Appendix).

5 June 2011

We completed a full survey of the upper inlet north of Point Possession and Beluga River. The flight coincided with the high tide in Turnagain Arm and falling tide in the Susitna delta. Winds were calm with excellent to fair (due to rain squalls) sighting conditions throughout the upper inlet. Beluga groups were observed in Chickaloon Bay and the Susitna delta. Group 1 (9 counting and video passes) was in the mouth of the Chickaloon River (Fig. 9). Group 2 (8 counting and video passes) was travelling west toward the bluffs in Chickaloon Bay. Group 3 (9 counting and video passes) was a large, dispersed group between the east tributary of the Susitna River and the Little Susitna River. This group was consolidated between the mudflats as the tide continued to fall. Other marine mammal sightings included 44 harbor seals hauled out at Chickaloon River (n = 25 and 19), 200 hauled out at the Theodore River, 200 hauled out at the Lewis River, and at least 209 at the Susitna River (Appendix).

6 June 2011

A lower inlet survey was completed in lieu of another upper inlet survey because winds were predicted to be calm in the southern inlet. The survey began in the Susitna delta and followed sawtooth transects offshore that ended 5 km northwest of Elizabeth Island, where we flew coastal survey north to Homer to refuel. After refueling, we surveyed the coastline to Elizabeth Island, circled the island, and then flew across the inlet to Cape Douglas. We resumed the coastal survey heading north to West Foreland with a brief transit offshore to circle Kalgin Island. Marine mammals sighted included harbor porpoise, sea otters, Steller sea lions, harbor seals, and humpback whales (Appendix). Harbor porpoise (17 sightings, 24 animals) were seen along the offshore tracklines between Kalgin Island and Augustine Island and on the coastal survey near Bruin Bay, in Illiamna Bay, and near Big River in Redoubt Bay. Sea otters were seen on offshore tracklines and along the west side of the inlet from Cape Douglas to Harriet Point (56 sightings, 230 animals). One group of 100 Steller sea lions was seen hauled out close to Cape Douglas. There were six humpback whales (4 sightings); the first group of two whales was located mid-inlet between Augustine Island and Elizabeth Island, two sightings (3 individuals) were spotted close to Elizabeth Island, and one whale was located mid-inlet between Elizabeth Island and Kamishak Bay. Finally, 100 harbor seals (4 sightings) were hauled out near Cape Douglas, in Tuxedni Bay, and on mudflats 5 km south of Kalgin Island. Viewing conditions were excellent for much of the survey except for brief periods where low clouds or glare reduced conditions to poor or useless.

7 June 2011

Lower inlet surveys continued for a second day, covering the coastline from Clam Gulch (where surveys ended on 1 June) to just north of Elizabeth Island, where offshore tracklines were flown in a sawtooth pattern north to Anchorage. Low ceilings, high sea states, and rain forced us to abort the offshore trackline from Elizabeth Island to Kamishak Bay and part of the trackline from Kamishak Bay to the west side of the inlet (Fig. 9). In addition, high sea states forced us to end the survey early before reaching the end of the trackline near Fire Island. Marine mammal sightings included 295 sea otters (20 sightings) in Kachemak Bay and a group of two otters on

the offshore transect near Tuxedni Bay; groups of harbor seals hauled out at Fox River (n = 10, 6, and 55 animals) and on mudflats 5 km south of Kalgin Island (too far to estimate numbers but these could have been the same animals seen on 6 June); 3 humpback whales (2 sightings) on the offshore trackline north of Anchor Point; and 4 harbor porpoise sightings (6 individuals) on offshore tracklines north of Tuxedni Bay and south of Kalgin Island (Appendix).

8 June 2011

After completing surveys of the lower inlet, we resumed surveys of upper Cook Inlet north of Point Possession and Beluga River. Surveys were timed to coincide with the rising tide (6+ ft (1.8 m) low tide) in the Susitna delta. Beluga whale groups were found near Burnt Island and were headed toward Turnagain Arm (Group 1: 4 counting and video passes), east of Chickaloon River (Group 2: 4 counting passes, no video due to small group size), in Chickaloon River (Group 3: 2 whales, one white and the other light gray, no video due to small group size), west of Chickaloon River (Group 4: 4 counting passes, no video due to glare and whitecaps), along the Chickaloon Bluffs (Group 5: 5 video and counting passes), and between the Beluga River and Susitna River (Group 6: attempted 7 counting passes, no video due to the widely spaced nature of the group) (Fig. 9). As during previous flights, belugas were not seen in Turnagain Arm or Knik Arm. Other marine mammal sightings included harbor seals near Chickaloon River (n = 28), in the water and hauled out near Beluga River (n = 8), Theodore River (n = 180), Lewis River (n = 147), Ivan River (n = 2), Susitna River (n = 4), and Little Susitna River (n = 17) (Appendix). Sighting conditions were fair to excellent.

9 June 2011

We continued surveys of upper Cook Inlet north of Moose Point and Beluga River. Surveys were timed to coincide with the low/rising tide (+5 ft (1.5 m)). Beluga whale groups were found dispersed over a large area of Chickaloon Bay (Group 1: no counting and video passes), in the Beluga River (Group 2: 5 counting and video passes), in the Theodore River (Group 3: circled to obtain a count but too small for video passes), dispersed from the Ivan River across the mouth of the Susitna River (Group 4: no counting and video passes), and in the Little

Susitna River (Group 5: counting passes but no video due to the small size of the group.) (Fig. 9). We were not able to obtain a median count for the day given the behavior of the whales. Again, belugas were not seen in Turnagain Arm or Knik Arm. Other marine mammal sightings included: harbor seals hauled out near Chickaloon River (n = 3), at Theodore River (n = 47), and the Lewis River (n = 90) (Appendix). Sighting conditions were fair to excellent.

Summary

In 2011, the daily medians ranged from 138 to 208 (Table 8). The 2011 index count (the median count from the best survey day) of 208 belugas, is within the range of index counts made annually since 1993 (Table 10). Belugas were found in three to six groups in the Susitna delta and Chickaloon Bay, none were found in Knik Arm or Turnagain Arm (Fig. 9). Other marine mammal sightings are listed in the Appendix.

Daily Reports: 2012

29 May 2012

Lower inlet surveys were planned for the beginning of the project since tides were more favorable (negative tides later in the day) for upper inlet surveys beginning in June. The survey started from Anchorage and followed offshore sawtooth transects that ended northwest of Anchor Point, where we flew to Homer to refuel. We continued the sawtooth pattern ending at the waypoint north of Cape Douglas. At Cape Douglas, we began the coastal survey heading north with a brief transit offshore to circle Augustine Island. Conditions deteriorated near Ursus Cove and the coastal survey was aborted at Chinitna Bay due to high winds. Marine mammals sightings included: harbor porpoise, sea otters, Steller sea lions, harbor seals, an unidentified marine mammal (possible sea otter) and unidentified whales (possibly killer whales) (Appendix). Harbor porpoise (5 sightings, 7 animals) were seen along the offshore tracklines between Kalgin Island and Anchor Point despite fairly poor sighting conditions. Sea otters (14 sightings, 77 animals) were seen on offshore tracklines, in Kachemak and Kamishak bays, and near Augustine Island. Two groups of Steller sea lions (65 animals) were hauled out close to Cape Douglas. Two

unidentified cetaceans (possibly killer whales) were seen mid-inlet between Elizabeth Island and Kamishak Bay. Finally, 450 harbor seals (10 sightings) were hauled out or in the water from Shaw Island to Bruin Bay. Viewing conditions were good to poor with high winds (Beaufort sea state 4-5) throughout much of the survey area.

30 May 2012

Lower inlet surveys continued for a second day, covering the eastern coastline from Point Possession to just north of Elizabeth Island where offshore tracklines were flown in a sawtooth pattern north to Anchorage. Low ceilings, high sea states, and rain forced us to abort part of the offshore trackline from Elizabeth Island to Kamishak Bay and part of the trackline from Kamishak Bay to the west side of the inlet (Fig. 10). High sea states forced us to end the survey after reaching the end of the trackline near Moose Point. Marine mammal sightings included sea otters (48 sightings, 960 animals) in Kachemak Bay, Kamishak Bay, and on the offshore transect; four groups of harbor seals hauled out (n = 55, 100, 20 and 10) and two groups of seals (n = 5 and 3) swimming at Bradley River and off Point Bede, one humpback whale en route from Homer on an offshore transect; three groups of killer whales including a pair of males between offshore waypoints, and a pod of seven (juveniles and females) en route to Homer; two harbor porpoise (one sighting) on the offshore trackline north of Anchor Point; and one harbor porpoise on the offshore trackline north of Tuxedni Bay and south of Kalgin Island (Appendix).

31 May 2012

We continued the lower inlet survey for a third day, including a circuit around Kalgin Island and covering the western coastline from Ursus Cove to North Foreland (Fig. 10). Marine mammal sightings included eight sea otters between Iniskin and Oil bays; one harbor seal in the water near Kalgin Island, harbor seals in the water in Iniskin Bay (n = 12) and hauled out at Tuxedni Bay (2 groups, 85 and 10 animals) and on the shoreline from Big River to Kustatan River (4 groups, 125 animals); one harbor porpoise between Chinitna and Tuxedni bays; and seven beluga whales just southeast of West Foreland headed toward Trading Bay.

1 June 2012

The first survey of upper Cook Inlet also extended south into the lower inlet to Kenai River and Kustatan River. Surveys were timed to coincide with the falling/low tide (11:29, +0.91 ft (0.28 m)) at Susitna River and Knik Arm. We departed Anchorage and circled the west shore of Fire Island before crossing Chickaloon Bay and entering Turnagain Arm. We surveyed the entire Arm and continued the survey into Chickaloon Bay, surveying up Chickaloon River and along the bluffs where a lone beluga (Group 1) was encountered (Fig. 10). We resumed the coastal survey around Point Possession where another lone beluga (Group 2) was seen headed offshore. We crossed the inlet to the Beluga River where we surveyed up the river before resuming the coastal survey, crossing the mouth of the Susitna River where another lone whale was observed. After circling, at least eight whales were observed in Group 3 but were too scattered for counting/video passes. We continued the coastal survey to the Little Susitna River where a large group of belugas (Group 4: 9 video and counting passes) was found along the shore, near the river mouth with part of the group entering the Little Susitna River (Fig. 10). Whales were not seen in Knik Arm. Other marine mammal sightings included harbor seals hauled out on the Chickaloon River mudflats (n = 16) and hauled out on the Susitna mudflats (n = 183) (Appendix). After a short break in Anchorage, we conducted a second survey, crossing Chickaloon Bay to Point Possession and following the coast to Kenai River, up the river and then crossing the inlet to Kustatan River. Here we resumed the coastal survey, heading north into Trading Bay where we encountered a northbound group of belugas approaching the mouth of the McArthur River (Group 5: 6 video and counting passes). The coastal survey was terminated at Beluga River. A single harbor seal was seen in the water near Tyonek. Sighting conditions were fair to excellent with Beaufort sea states ranging from 0 to 3.

2 June 2012

We completed a full survey of the upper inlet north of Kenai River and West Foreland. The survey began by circling Fire Island, following the mudflats into Turnagain Arm, Chickaloon Bay (including the river and bluffs), and the east coast to Kenai River (up river to the bridge) before landing to refuel. We departed Kenai for West Foreland and completed a survey

of the west coast to Anchorage including transit up the McArthur River, Beluga River, Susitna River, and Little Susitna River. The flights coincided with the falling tide in Turnagain Arm and rising tide in the Susitna delta (low tide at 12:21, -1.39 ft (-0.42 m)). Belugas were in six groups: Group 1 was a lone white whale headed west along the Potter Marsh mudflats, Group 2 was a lone white whale seen west of Beluga Point (on which we were unable to get an accurate location), Group 3 (8 video and counting passes) was scattered along the bluffs of Chickaloon Bay, Group 4 (10 video and counting passes) was near Shirleyville/Granite Point, Group 5 (9 video and counting passes) was initially two groups that combined into one large compact group and continued traveling west toward the east tributary of the Susitna River, and Group 6 (11 video and counting passes) was a large group in the Little Susitna River (Fig. 10). Other marine mammal sightings included 48 harbor seals hauled out in five groups at Chickaloon River, 1 hauled out on a rock near Point Possession, 1 swimming north near Moose Point, and 8 (5 sightings) in the water near McArthur River (Appendix). Sightings conditions were much improved from the previous day with calm sea states and good to excellent visibility.

3 June 2012

We completed a full survey of the upper inlet north of Kenai River and West Foreland, this time on the falling tide in Turnagain Arm and low tide in the Susitna delta (13:12, -3.24 ft (-0.99 m)). Belugas were in three groups: Group 1 (5 video and counting passes) was south of McArthur River; Group 2 (no video, circled to count) included two adults with a small calf near the eastern tributary of the Susitna River; and Group 3 (11 video and counting passes) was a large group west of the Little Susitna River (Fig. 10). Other marine mammal sightings included 2 harbor seals in the water at Chickaloon River, 8 harbor seals hauled out at McArthur River, and 2 groups (n = 35 and 7) hauled out at the Susitna delta (Appendix). Sightings conditions deteriorated slightly from the previous day with mostly calm sea states with patches of poor visibility due to higher Beaufort and rain near Fire Island.

4 June 2012

We continued to follow the same pattern as the two previous days, completing a full survey of the upper inlet north of Kenai River and West Foreland, this time on the high tide in Turnagain Arm and low tide in the Susitna delta (14:02, -4.39 ft (-1.34 m)). Belugas were seen in five groups: Group 1 in mid-Chickaloon Bay (8 counting passes, but no video as the group was scattered in deep water); Group 2 (9 video and counting passes) just north of McArthur River, Group 3 (6 video and counting passes) traveling east from the Susitna River, Group 4 and 5 (7 and 4 counting and video passes, respectively) just west of the Little Susitna River, which converged into Group 6 (5 video and counting passes) (Fig. 10). Other marine mammal sightings included two harbor seals hauled out at Chickaloon River and one seal swimming off Chickaloon Bluffs, two harbor seals swimming by West Foreland, two groups (n = 5 and 6) in the water near McArthur River, and three groups (n = 4, 60, and 80) hauled out at the Susitna delta (Appendix). Sightings conditions were much improved from the previous day with calm sea states and fair to excellent visibility.

5 June 2012

We continued to follow the same pattern completing a full survey of the upper inlet north of Kenai River and West Foreland, on the high tide in Turnagain Arm and low tide in the Susitna delta (14:50, -4.70 ft (-1.43 m)). Belugas were in three groups: Group 1 was perpendicular to the Chickaloon Bay bluffs (7 counting passes, but no video as the group was small and scattered); Group 2 (5 video and counting passes) just north of McArthur River; and Group 3 (11 counting and video passes) just west of the Little Susitna River (Fig. 10). Other marine mammal sightings included 2 harbor seals hauled out at Chickaloon River and 33 in the water near McArthur River (Appendix). Sightings conditions continued to improve with calm sea states and fair to excellent visibility.

6 June 2012

The weather forecast for the day was not promising: winds gusting up to 30 knots at Bird Point in Turnagain Arm and rain predicted for the afternoon. We circled Fire Island then cut across Chickaloon Bay to escape the high winds. We were not able to safely survey Turnagain

Arm at this time. Conditions were calm along the south shore and Chickaloon Bay bluffs where Group 1 (6 video and counting passes) was encountered. We continued to survey the coastline from Point Possession to Moose Point, completed an offshore trackline to the mudflats in Trading Bay between West Foreland and McArthur River, and resumed the coastal survey along the west side of the inlet. Group 2 (5 video and counting passes) was just north of the mouth of the McArthur River. Sighting conditions began to deteriorate as we approached the Susitna River delta. Belugas were scattered offshore along the unexposed edge of the mudflats as the tide was starting to fall (Group 3). Video and counting passes were aborted as winds continued to rise and rains began. Wind gusts up to 35 knots prevented us from surveying Knik Arm. Other marine mammal sightings included 3 harbor seals hauled out at Chickaloon River, 125 hauled out near McArthur River, 17 hauled out by Beluga River, and groups of 100 hauled out at both the Theodore and Lewis rivers (Appendix).

7 June 2012

We completed a full survey of the upper inlet north of Moose Point and the mudflats between West Foreland and McArthur River. The flight coincided with the high tide in Turnagain Arm and falling tide in the Susitna delta (low at 16:27, -2.8 ft (-0.85 m)). Winds were calm with excellent to fair (due to glare) sighting conditions throughout the upper inlet. Beluga groups were observed in the mouth of Chickaloon River (Group 1: 3 counting passes, no video) and a mile off the mudflats, swimming rapidly toward the bluffs (Group 2: 4 counting passes, no video); at McArthur River (Group 3: 5 video and counting passes); offshore along the submerged mudflats off Lewis River (Group 4: 6 video and counting passes); and west of the Little Susitna River (Group 5: 10 video and counting passes). Other marine mammal sightings included: 16 harbor seals hauled out at Chickaloon River, 50 in shallow water at McArthur River, 1 swimming at Beluga River, and 20 hauled out and 1 swimming at the Lewis River (Appendix).

Summary

In 2012, the daily medians ranged from 149 to 319 (Table 9). The 2012 index count (the median count from the best survey day) of 319 belugas, is within the range of index counts made annually since 1993, and is the highest index count since 1995 (Table 10). Similar to past years, belugas were found in the Susitna delta and Chickaloon Bay (Fig. 10). Two belugas were found in Turnagain Arm, none were seen in Knik Arm, and a group of seven belugas was observed south of the Forelands. Belugas have not been observed in the lower inlet during our surveys since 2001, and not in numbers of this size since 1995 (Table 10). We believe this lower inlet group moved into the upper inlet and was observed in Trading Bay for the remainder of the survey. We have not observed belugas in Trading Bay since our 1995 surveys. Other marine mammal sightings are listed in the Appendix.

DISCUSSION

In Cook Inlet, belugas concentrate near river mouths or shallow bays during late spring and early summer across the northernmost reaches of the inlet, especially in the Susitna delta, Knik Arm, and Chickaloon Bay (Rugh et al. 2000a, 2005a). These concentrations usually last from mid-May to July or later and are very likely associated with the migration of anadromous fish, particularly eulachon (*Thaleichthys pacificus*) and several species of Pacific salmon (*Oncorhynchus* spp.; Moore et al. 2000) .

Historically many belugas were seen in both upper and lower Cook Inlet in June and July (Rugh et al. 2000a). However, between 1993 and 1995, during the first 3 years of the NMFS surveys, very few belugas (less than 3% of all of the annual sightings) were in the lower inlet, south of the East and West Forelands (Table 10), and in subsequent years, 1996-2011, hardly any (one whale in Tuxedni Bay in 1997 and two in Kachemak Bay in 2001) have been seen in the lower inlet during these surveys. Furthermore, in the southern half of the upper inlet, south of North Foreland and Point Possession, sighting rates dropped from an annual average of 1.5% in 1993-1995 to zero for all subsequent years until June 2012. Sighting conditions have generally been ideal during these aerial surveys, but until 2012 the only places where belugas were

consistently found were in the northern portion of the upper inlet (Table 10). Many marine mammals were seen in the lower inlet throughout the study period: sea otters, harbor seals, harbor porpoise, gray whales, fin whales, humpback whales, and killer whales (Appendix), so the lack of beluga sightings was not due to poor visibility.

Research protocol and coverage area for the annual aerial surveys of Cook Inlet have been kept consistent to minimize variables in inter-year analyses. The type of aircraft, window configuration, altitude, air speed, and coastal search patterns were constant, and most of the observers have been on many or all of the surveys, maintaining continuity in effort. On all but one of these 20 annual surveys, flights were in the first half of June. Each year there have been 4-6 replicate flights around upper Cook Inlet. The large number of flights per year across many years and the consistency of effort have helped us detect patterns of whale distribution. Although these aerial surveys do provide a broad-scale picture of the whale distribution each June, tagging provides much more detail, albeit of only a few whales (e.g., 14 belugas tagged by Hobbs et al. 2005, Goetz et al. 2012b). Results from tagged whales show that the beluga distribution seen during the June aerial surveys is representative of most of the summer through late autumn. In winter, the whales dispersed into deeper waters and farther south, but they never left Cook Inlet (Hobbs et al. 2005, Goetz et al. 2012b).

Median estimates presented in Table 10 are a rough index of relative abundance. Calculated abundances with their respective CVs (see Hobbs et al. in press), include corrections for whales missed within the viewing range of observers and whales missed because they were beneath the surface throughout an aerial counting pass. The abundance estimates, with their associated CVs, are the appropriate values to be used in inter-year trend analyses. Still, both median index counts and the abundance estimates reflect a similar trend (Fig. 11) showing declines until 1998 and no clear trend in numbers thereafter.

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Before acquiring our own HD video cameras in 2011, Chris Rooper of the Alaska Fisheries Science Center kindly loaned us two HD video cameras for the 2006-2010 surveys.

Prior to 2003, data entries were made using a program created by James Cubbage (Cascadia Research Collective, Olympia, WA). From 2003 to 2005, data entries were made on a program originally developed for harbor porpoise surveys in the northeast Atlantic (made available through Debi Palka, Woods Hole, MA; software designed by Lex Hiby of

Conservation Research Ltd., UK and Phil Lovell of Sea Mammal Research Unit, Scotland). Starting in 2006, survey data were entered using a new software program specifically developed for the Cook Inlet beluga aerial survey by Niel and Kimberly Goetz.

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Table 1. -- Summaries of effort during beluga whale aerial surveys, Cook Inlet, Alaska, 2005-2012.

	2005	2006	2007	2008	2009	2010	2011	2012
Survey dates	31 May-9 June	6-15 June	7-15 June	3-12 June	2-9 June	1-10 June	31 May-9 June	29 May-7 June
Total flights	16	16	13	14	14	12	15	18
Flight hours	54.5	58.4	47.2	47.7	39.4	48.4	47.0	53.0
Systematic search hours	31.2	31.2	23.5	29.5	21.0	26.0	30.1	30.5
Poor visibility	1.2 h (3.9%)	1.7 h (5.3%)	2.8 h (12.0%)	2.8 h (9.5%)	1.6 h (7.0%)	0.6 h (2.0%)	1.2 h (4.0%)	1.2 h (4.0%)
Offshore Tracklines (km)	1,363	1,552	1,342	1,776	1,074	1,251	1,585	1,300
Total coverage of Cook Inlet surface area	26%[a]	32%	25%	34%	28%	29%	32%	30%
Total coverage of Cook Inlet coastline	~100%[b]	~100%	71%	100%	100%	100%	100%	100%
Observers	Rugh Mahoney Smith Goetz Ruszkowski	Rugh Mahoney Smith Goetz Sims Shelden Shpak	Rugh Mahoney Smith Goetz Mocklin	Shelden Rugh Goetz Vate-Brattström Mahoney	Shelden Rugh Goetz Vate-Brattström Sims	Shelden Rugh Goetz Vate-Brattström SIms	Shelden Goetz Vate-Brattström Sims	Shelden Sims Vate-Brattström Mocklin

[a] Originally calculated as 28% based on a surface area of 19,863 km^2. Cook Inlet surface area was recalculated in 2006 as 20,943 km^2.

[b] In 2006, the coastline measurement was revised from 1,388 km to 1,810 km.

Table 2. -- Beluga counts made during aerial surveys of Cook Inlet in June 2005. Counts are medians from multiple counts of each whale group. Dashes indicate no survey effort and zeros indicate that the area was surveyed, but no whales were seen. Sites are listed in a clockwise order around Cook Inlet starting with Turnagain Arm.

Location	5/31	6/1	6/2	6/3	6/4	6/5	6/8	6/9
Turnagain Arm (not including Chickaloon Bay)	0	0	0	---	---	0	0	21
Chickaloon Bay/ Point Possession	24	37	25	---	---	33	50	66
Point Possession to East Foreland	0	---	0	---	---	---	---	---
Mid-inlet east of Trading Bay	---	---	---	0	0	---	---	---
East Foreland to Homer	---	---	---	---	0	---	---	---
Kachemak Bay	---	---	---	---	0	---	---	---
West side of lower Cook Inlet	---	---	---	0	---	---	---	---
Redoubt Bay	---	---	---	0	---	---	---	---
Trading Bay	0	---	0	---	---	---	---	---
Susitna delta [a]	97	155	110	---	---	116	23	36
Knik Arm	0	0	2	---	---	0	16	43
Fire Island	0	0	2	---	---	0	29	16
Index counts	121	**192**	139	0	0	149	118	182

[a] For purposes of dividing Cook Inlet into coverage areas, this table includes all coastline between North Foreland and Point MacKenzie as a part of the Susitna delta.

Table 3. -- Beluga counts made during aerial surveys of Cook Inlet in June 2006. Counts are medians from multiple counts of each whale group. Dashes indicate no survey effort and zeros indicate that the area was surveyed, but no whales were seen. Sites are listed in a clockwise order around Cook Inlet starting with Turnagain Arm

Location	6/6	6/7	6/8	6/10	6/11	6/12	6/13	6/14	6/15
Turnagain Arm	---	0 [a]	0	---	0 [a]	0 [a]	---	0	0
Chickaloon Bay/ Point Possession	40	17	8	---	18	60	---	28	15
Point Possession to East Foreland	---	0	---	15 [b]	---	0 [a]	---	---	---
Mid-inlet east of Trading Bay	---	---	---	0	---	0	0	---	---
East Foreland to Homer	---	---	---	0	---	---	---	---	---
Kachemak Bay	---	---	---	0	---	---	---	---	---
West side of lower Cook Inlet	---	---	---	---	---	---	0	---	---
Redoubt Bay	---	---	---	---	---	---	0	---	---
Trading Bay	---	0	---	---	---	0	---	---	---
Susitna delta [c]	97	55	70	---	126	73	---	110	89
Knik Arm	0	0	4	---	9	0	---	0	0
Fire Island	0	0	0	---	0	0	---	0	0
Index counts	136	72	81		**153**	133		138	104

[a] Viewing conditions were compromised by high winds in some areas.
[b] This group of whales was seen near Point Possession on both the outbound and inbound legs of the survey of lower Cook Inlet.
[c] For purposes of dividing Cook Inlet into coverage areas, this table includes all coastline between North Foreland and Point MacKenzie as a part of the Susitna delta, although belugas were only found between the Beluga and Little Susitna Rivers.

Table 4. -- Beluga counts made during aerial surveys of Cook Inlet in June 2007. Counts are medians from multiple counts of each whale group. Dashes indicate no survey effort and zeros indicate that the area was surveyed, but no whales were seen. Sites are listed in a clockwise order around Cook Inlet starting with Turnagain Arm.

Location	6/7	6/8	6/9	6/10	6/11	6/12	6/14	6/15
Turnagain Arm	---	---	76	0	1	---	0	1
Chickaloon Bay/ Point Possession	40 [a,b]	---	47	50	30	---	44	20
Point Possession to East Foreland	0	---	0	---	---	---	0	---
Mid-inlet east of Trading Bay	0	0	---	---	---	0	---	---
East Foreland to Homer	0	---	---	---	---	---	---	---
Kachemak Bay	0	---	---	---	---	---	---	---
West side of lower Cook Inlet	---	0 [a]	---	---	---	0	---	---
Redoubt Bay	---	---	---	---	---	---	---	---
Trading Bay	---	---	0	---	---	---	0	---
Susitna delta [c]	---	30 [b]	74	131	132	---	152	111
Knik Arm	---	---	27	23	20	---	0 [d]	0
Fire Island	---	---	0	0	---	---	2	---
Index counts			**224**	204	183		198	132

[a] Viewing conditions were compromised by high winds in some areas.
[b] This group of whales was seen on the outbound leg of the survey of lower Cook Inlet.
[c] For purposes of dividing Cook Inlet into coverage areas, this table includes all coastline between North Foreland and Point MacKenzie as a part of the Susitna delta, although belugas were only found between the Beluga and Little Susitna Rivers.
[d] Small group seen near Fire Creek, median count of zero.

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Table 5. -- Beluga counts made during aerial surveys of Cook Inlet in June 2008. Counts are medians from multiple counts of each whale group. Dashes indicate no survey effort and zeros indicate that the area was surveyed, but no whales were seen. Sites are listed in a clockwise order around Cook Inlet starting with Turnagain Arm.

Location	6/3	6/4	6/5	6/6	6/7	6/9	6/10	6/11	6/12
Turnagain Arm	0	0	0	0	---	---	---	0	0
Chickaloon Bay/ Point Possession	0	0	32	5	33 [a]	---	---	[b]	0
Point Possession to Moose Point/ East Foreland	0	0	---	---	0	0	---	---	---
Mid-inlet east of Trading Bay	0	0	0	0	0	0	0	0	---
East Foreland to Homer	---	0 [c]	---	---	---	0	---	---	---
Kachemak Bay to Elizabeth Island	---	---	---	---	---	0	---	---	---
West side of lower Cook Inlet	---	---	---	---	---	---	0	---	---
Redoubt Bay	---	0 [c]	---	---	---	---	0	---	---
Trading Bay	0	0	---	---	---	---	---	---	---
Susitna delta [d]	58	93	34	85	93	---	---	10 [b]	103
Knik Arm	0	0	0	0	0	---	---	0	0
Fire Island	0	0	0	0	0	---	---	0	0
Index counts	58	93	66	90	**126**			[b]	103

[a] Median count for Chickaloon Bay includes the morning and afternoon counts.

[b] Groups too dispersed to video or count in Chickaloon Bay and near the Susitna and Little Susitna rivers. A group of 10 whales (median count) was counted and videoed at the Beluga River.

[c] Surveyed to Kenai River (up river to shallow water) before crossing the inlet to Drift River in Trading Bay and surveying to West Foreland.

[d] For purposes of dividing Cook Inlet into coverage areas, this table includes all coastline between North Foreland and Point MacKenzie as a part of the Susitna delta, although beluga groups (1-3 per day) were found only between the Beluga and Little Susitna rivers.

Table 6. -- Beluga counts made during aerial surveys of Cook Inlet in June 2009. Counts are medians from multiple counts of each whale group. Dashes indicate no survey effort and zeros indicate that the area was surveyed, but no whales were seen. Sites are listed in a clockwise order around Cook Inlet starting with Turnagain Arm.

Location	6/2	6/3	6/4	6/5	6/7	6/8	6/9
Turnagain Arm	0	0	0	0	---	---	0
Chickaloon Bay/ Point Possession	21	40	23	30	---	---	13
Point Possession to Moose Point/ East Foreland	0	0	---	---	---	---	---
Mid-inlet east of Trading Bay	0	---	---	---	0	0	---
East Foreland to Homer	---	---	0 [a]	---	---	0	---
Kachemak Bay to Elizabeth Island	---	---	---	---	---	0	---
West side of lower Cook Inlet	---	---	---	---	0	---	---
Redoubt Bay	---	---	0 [a]	---	---	---	---
Trading Bay	---	0	0	---	0 [b]	---	---
Susitna delta [c]	116	130	150	174	---	[d]	290
Knik Arm	0	0	0	0	---	---	0
Fire Island	0	0	0	0	---	---	0
Index counts	136	170	173	204			**303**

[a] Surveyed to Kenai River (upriver to shallows) before crossing inlet to Drift River and surveying north to West Foreland.

[b] Surveyed Harriet Point to Drift River.

[c] The coast between North Foreland and Point MacKenzie is defined as the Susitna delta, however, beluga groups (1-2/day) were found only between the western tributary of the Susitna River and Point MacKenzie in 2009.

[d] Two groups of belugas were observed from offshore trackline Waypoint 5 but were not counted or videoed.

Table 7. -- Beluga counts made during aerial surveys of Cook Inlet in June 2010. Counts are medians from multiple counts of each whale group. Dashes indicate no survey effort and zeros indicate that the area was surveyed, but no whales were seen. Sites are listed in a clockwise order around Cook Inlet starting with Turnagain Arm.

Location	6/1	6/2	6/3	6/4	6/5	6/7	6/8	6/9	6/10
Turnagain Arm	0	0	0	1	---	---	4	0	1
Chickaloon Bay/ Point Possession	48	131	0 [a]	15	---	---	23	10	27
Point Possession to Moose Point/ East Foreland	0	0	---	---	---	---	---	---	---
Mid-inlet east of Trading Bay	---	---	---	---	0	0	---	---	---
East Foreland to Homer	0 [b]	---	0 [c]	---	0 [c]	---	---	---	---
Kachemak Bay to Elizabeth Island	---	---	---	---	0	---	---	---	---
West side of lower Cook Inlet	---	---	---	---	---	0	---	---	---
Redoubt Bay	0[b]	---	---	---	---	0	---	---	---
Trading Bay	0	---	---	---	---	---	---	---	---
Susitna delta [d]	64	160	---	66	---	0 [e]	159	128	145
Knik Arm	0	0	---	0	---	---	0	0	0
Fire Island	7	0	---	0	---	---	0	0	10
Index counts	119	**291**	0	82	0	0	186	138	183

[a] A small group was seen near the bluffs while transiting to the lower inlet on the morning flight, a large group was observed along the shore from Chickaloon River to the bluffs during the afternoon flight but we were unable to count due to deteriorating weather.

[b] Surveyed to Kenai River (upriver to shallows) before crossing inlet to Drift River and surveying north to West Foreland.

[c] Surveyed from Kenai River to 10 miles (16 km) south of Kasilof River where low clouds and fog ended the survey on 6/3, resumed lower inlet survey at this point on 6/5.

[d] The coast between North Foreland and Point MacKenzie is defined as the Susitna delta.

[e] A group of belugas was observed en route to offshore trackline but was not counted or videoed.

Table 8. -- Beluga counts made during aerial surveys of Cook Inlet in June 2011. Counts are medians from multiple counts of each whale group. Dashes indicate no survey effort and zeros indicate that the area was surveyed, but no whales were seen. Sites are listed in a clockwise order around Cook Inlet starting with Turnagain Arm.

Location	5/31	6/1	6/2	6/3	6/4	6/5	6/6	6/7	6/8	6/9
Turnagain Arm	0	---	0	---	0	0	---	---	0	0
Chickaloon Bay/ Point Possession	31	17	33	72	10	21	---	---	40	[a]
Point Possession to Moose Point/ East Foreland	0	0	---	---	---	---	---	---	---	0
Mid-inlet east of Trading Bay	---	---	---	---	---	---	---	0	---	---
East Foreland to Homer	---	0 [b]	---	---	---	---	---	0 [c]	---	---
Kachemak Bay to Elizabeth Island	---	---	---	---	---	---	0	0	---	---
West side of lower Cook Inlet	---	---	---	---	---	---	0	---	---	---
Redoubt Bay	---	---	---	---	---	---	0	---	---	---
Trading Bay	0	0	---	---	---	---	---	---	---	---
Susitna delta [d]	127	170	105	83	117	187	---	---	128	[d]
Knik Arm	0	0	0	0	0	0	---	---	0	0
Fire Island	0	0	0	0	2	0	---	---	0	0
Index counts	158	187	138	155	129	**208**	0	0	168	[d]

[a] Groups were either too small or widely dispersed to obtain video. A large, dispersed group was in Chickaloon Bay. Small groups were in the Beluga River (median count: 23 whales), Theodore River (6 whales) and Little Susitna River (2 whales). Another large, dispersed group covered the entire region from the Ivan River, the Susitna River mudflats, to just beyond the east tributary of the Susitna River.

[b] Surveyed to Kenai River (upriver to shallows) and south to Clam Gulch where low clouds and fog ended the survey on 6/1.

[c] Survey began at Clam Gulch (where the 6/1 survey ended) and ended at Waypoint 1 where offshore transects were run in a sawtooth pattern back to Anchorage.

[d] The coast between North Foreland and Point MacKenzie is defined as the Susitna delta.

Table 9. -- Beluga counts made during aerial surveys of Cook Inlet in June 2012. Counts are medians from multiple counts of each whale group. Dashes indicate no survey effort and zeros indicate that the area was surveyed, but no whales were seen. Sites are listed in a clockwise order around Cook Inlet starting with Turnagain Arm.

Location	5/29	5/30	5/31	6/1	6/2	6/3	6/4	6/5	6/6	6/7
Turnagain Arm	---	---	---	0	2	0	0	0	---	0
Chickaloon Bay/ Point Possession	---	---	---	2	30	0	17	4	12	9
Point Possession to Moose Point/ East Foreland	---	0	---	0	0	0	0	0	0	0
Mid-inlet east of Trading Bay	0	0	7 [a]	0	---	---	---	---	0	---
East Foreland to Homer	0 [b]	0	---	0 [c]	0 [d]	0 [d]	0 [d]	0 [d]	---	---
Kachemak Bay to Elizabeth Island	0 [b]	0	---	---	---	---	---	---	---	---
West side of lower Cook Inlet	0 [b]	0 [e]	---	---	---	---	---	---	---	---
Redoubt Bay	---	---	---	0 [c]	---	---	---	---	---	---
Trading Bay	---	---	---	14	21	14	16	17	12	14
Susitna delta [f]	---	---	---	126	219	178	286	256	[g]	232
Knik Arm	---	---	---	0	0	0	---	0	---	0
Fire Island	---	---	---	0	0	0	---	0	---	0
Index counts	0	0	7	142	272	192	**319**	277	24 [g]	255

[a] Whales were just southeast of West Foreland headed toward land from offshore.
[b] Surveyed offshore sawtooth tracklines from Anchorage to Cape Douglas, aborted coastal survey at Chinitna Bay due to high winds.
[c] Surveyed to Kenai River and Kustatan River in lower inlet
[d] Surveyed to Kenai River in lower inlet
[e] Surveyed offshore sawtooth tracklines from Elizabeth Island north to Moose Point.
[f] The coast between North Foreland and Point MacKenzie is defined as the Susitna delta.
[g] Whales too dispersed in the Susitna River delta to get accurate counts or video.

Table 10. -- Summary of index counts made during aerial surveys of belugas in Cook Inlet in June/July 1993-2012. Highest median counts of belugas in each of six zones are shown. The sum of these high counts does not necessarily equal the index counts because, in the latter case, highest daily sums were used, not highest counts per site (see Tables 2-9).

Year	Index count	Zones in Cook Inlet (highest median count per zone per survey)					
		1	2	3	4	5	6
1993	302	1	9	169	80	8	49
1994	276	10	1	248	0	6	17
1995	322	14	4	287	1	0	18
1996	287	0	0	368	29	0	41
1997	261	1	0	73	161	0	29
1998	192	0	0	109	93	0	42
1999	217	0	0	160	28	0	30
2000	184	0	0	114	42	0	28
2001	210	2	0	114	127	10	34
2002	181	0	0	93	97	0	11
2003	174	0	0	41	94	25	65
2004	187	0	0	99	0	50	176
2005	192	0	0	155	43	21	66
2006	153	0	15	126	9	0	60
2007	224	0	0	152	27	76	50
2008	126	0	0	103	0	0	33
2009	303	0	0	290	0	0	40
2010	291	0	0	160	0	4	131
2011	208	0	0	187	0	0	72
2012	319	7	21	286	0	2	30

ZONES:

1) Lower Cook Inlet, including all areas south of East and West Foreland
2) Mid-inlet, bordered on the south by East/West Foreland and north by Point Possession/North Foreland
3) Susitna delta, bordered by Beluga River and Point MacKenzie, including Fire Island.
4) Knik Arm, with a southern boundary defined by Point MacKenzie and Point Woronzof
5) Turnagain Arm, including waters east of Fire Island, but not Chickaloon Bay
6) Chickaloon Bay, bordered by Point Possession and Burnt Island

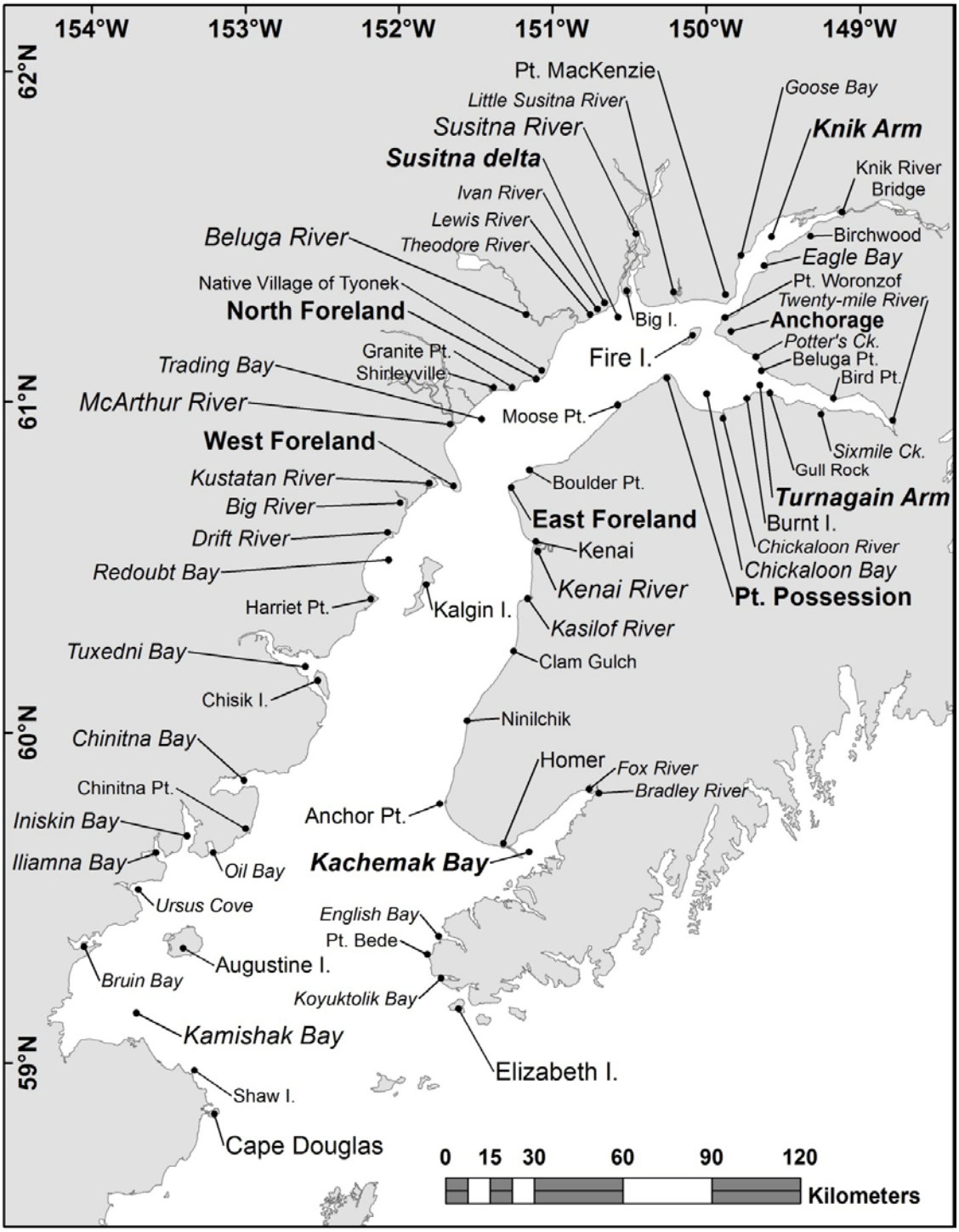

Figure 1. -- Map of Cook Inlet, Alaska, with place names mentioned in text.

a.

b.

c.

Figure 2. -- Survey aircraft for Cook Inlet beluga surveys, 2005-2012: a) Aero Commander 680 (most years), b) Twin Otter (2007), and c) Aero Commander 690 (2011-2012).

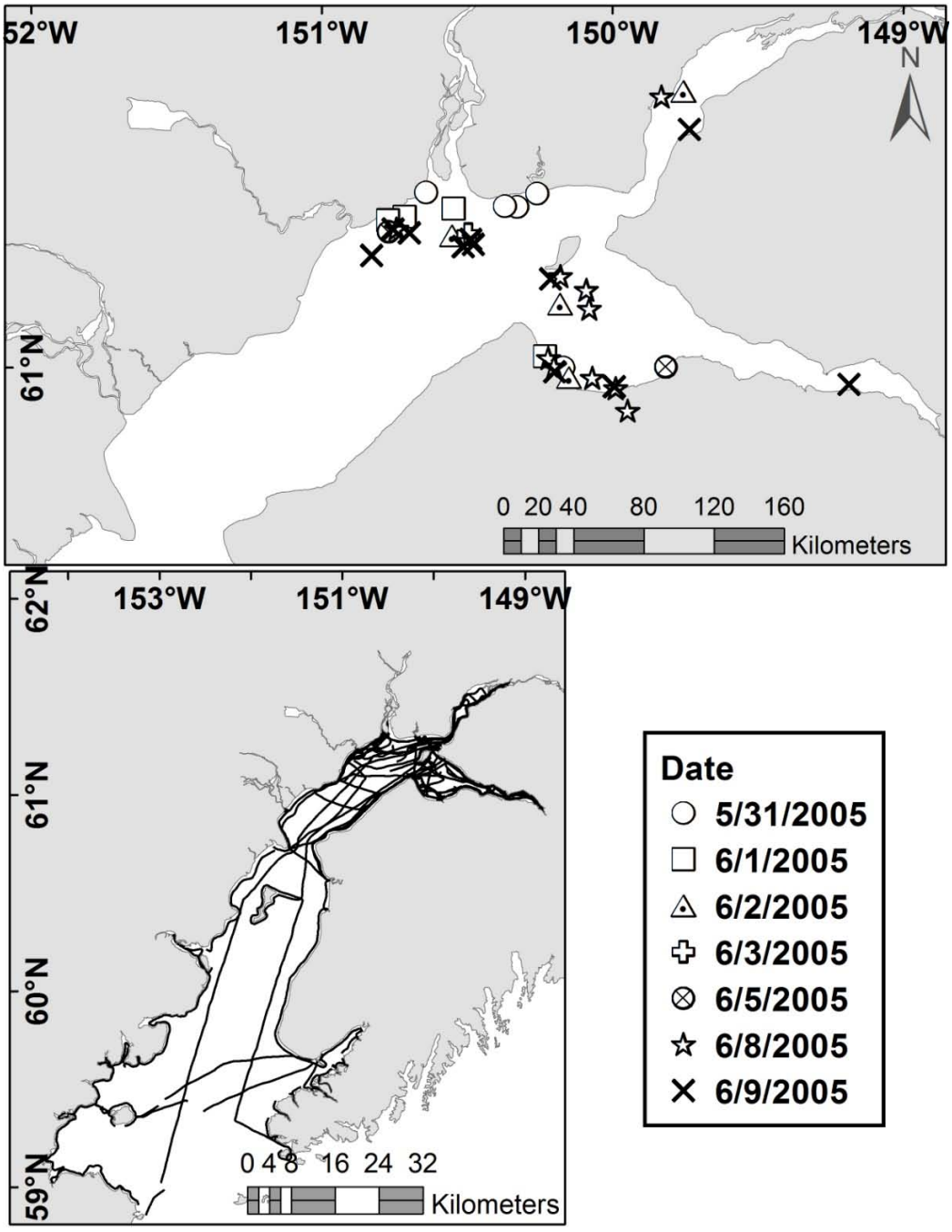

Figure 3. -- On-effort trackline and beluga whale sightings during 2005 aerial abundance survey, Cook Inlet, Alaska.

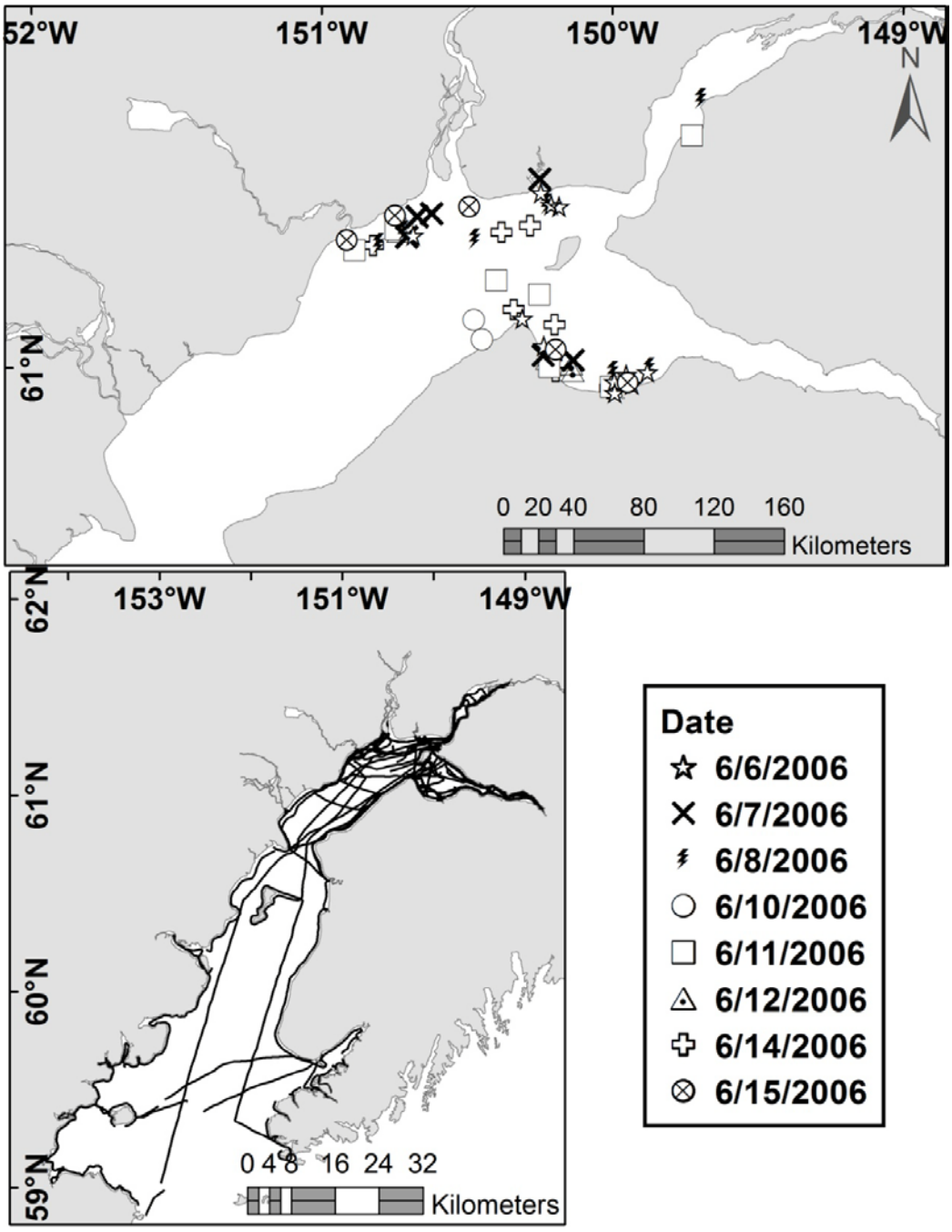

Figure 4. -- On-effort trackline and beluga whale sightings during 2006 aerial abundance survey, Cook Inlet, Alaska.

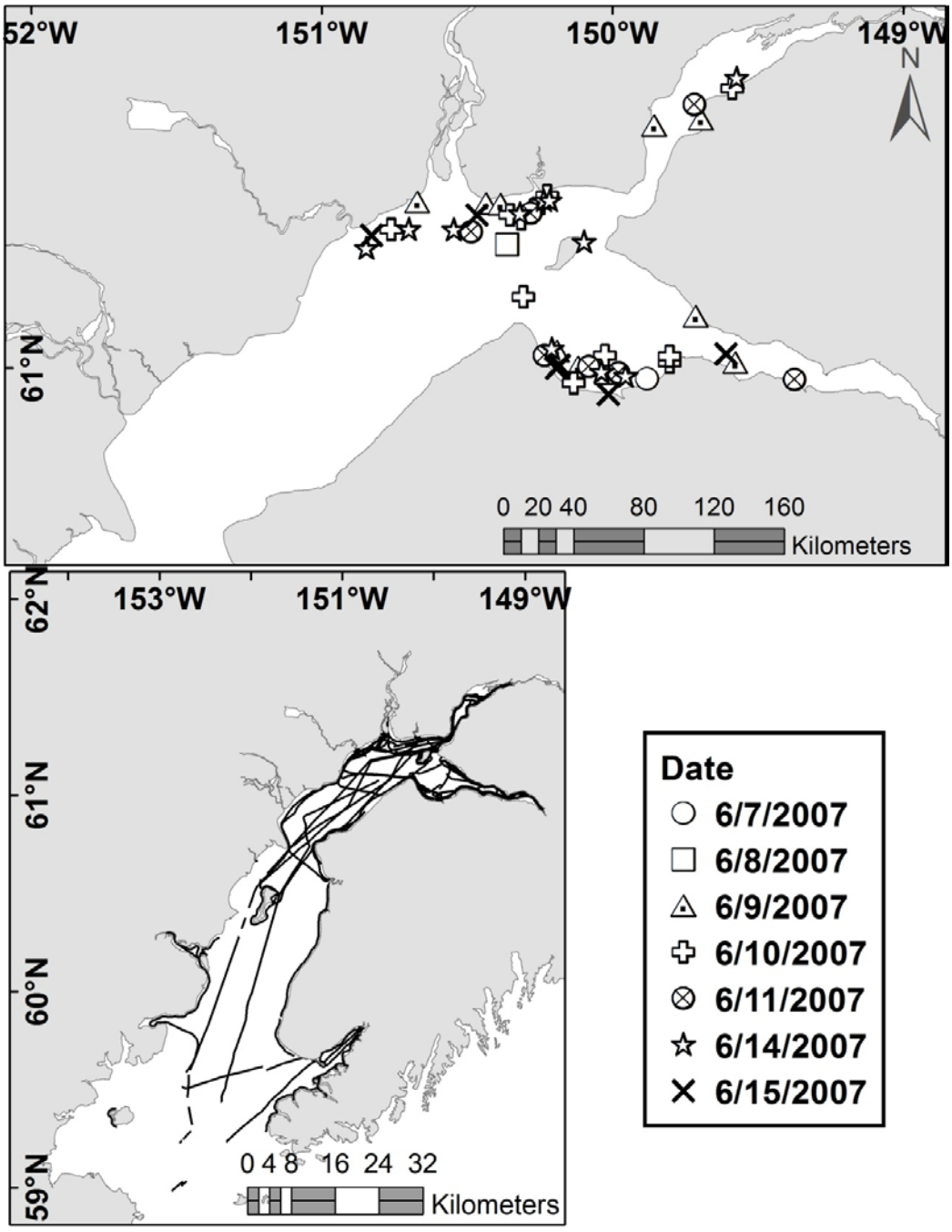

Figure 5. -- On-effort trackline and beluga whale sightings during 2007 aerial abundance survey, Cook Inlet, Alaska.

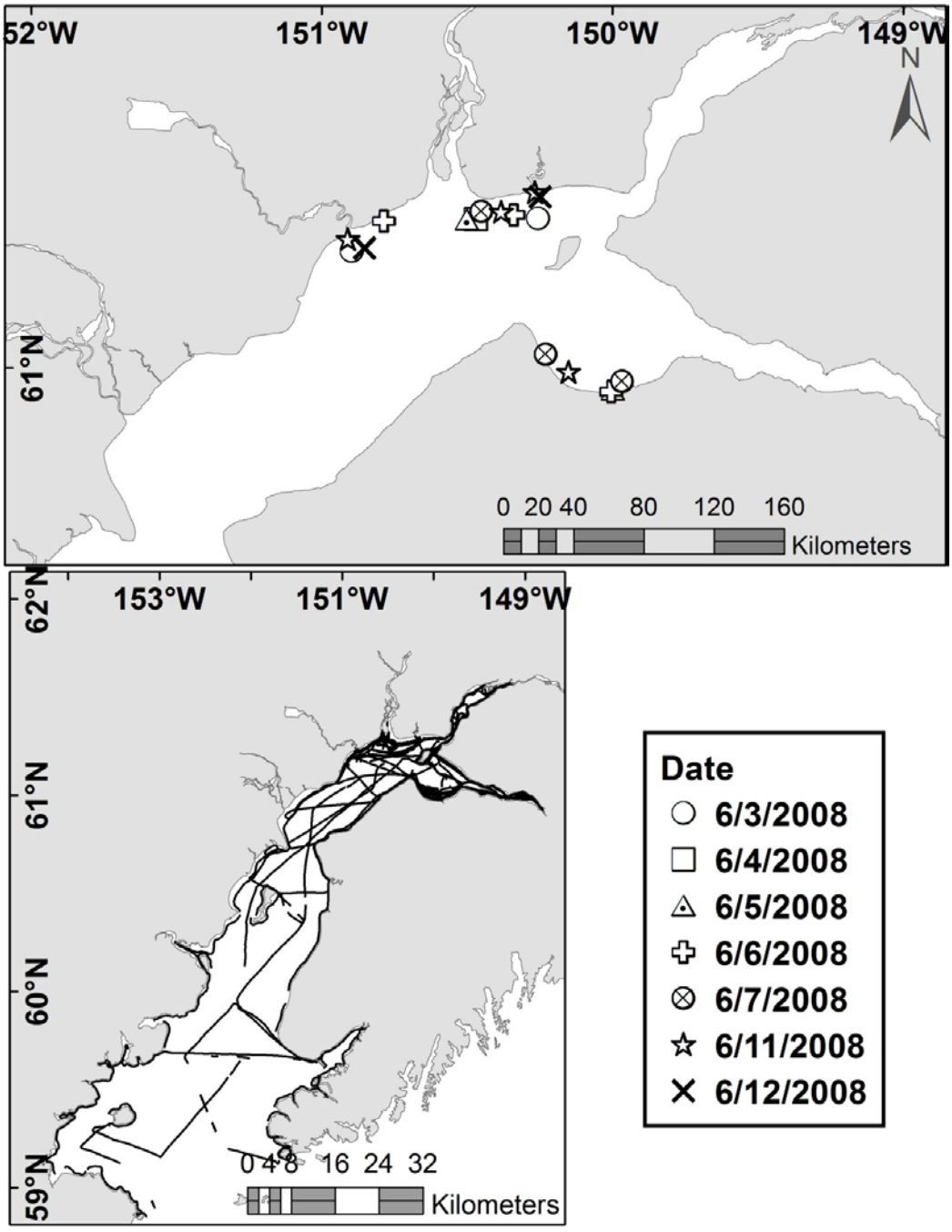

Figure 6. -- On-effort trackline and beluga whale sightings during 2008 aerial abundance survey, Cook Inlet, Alaska.

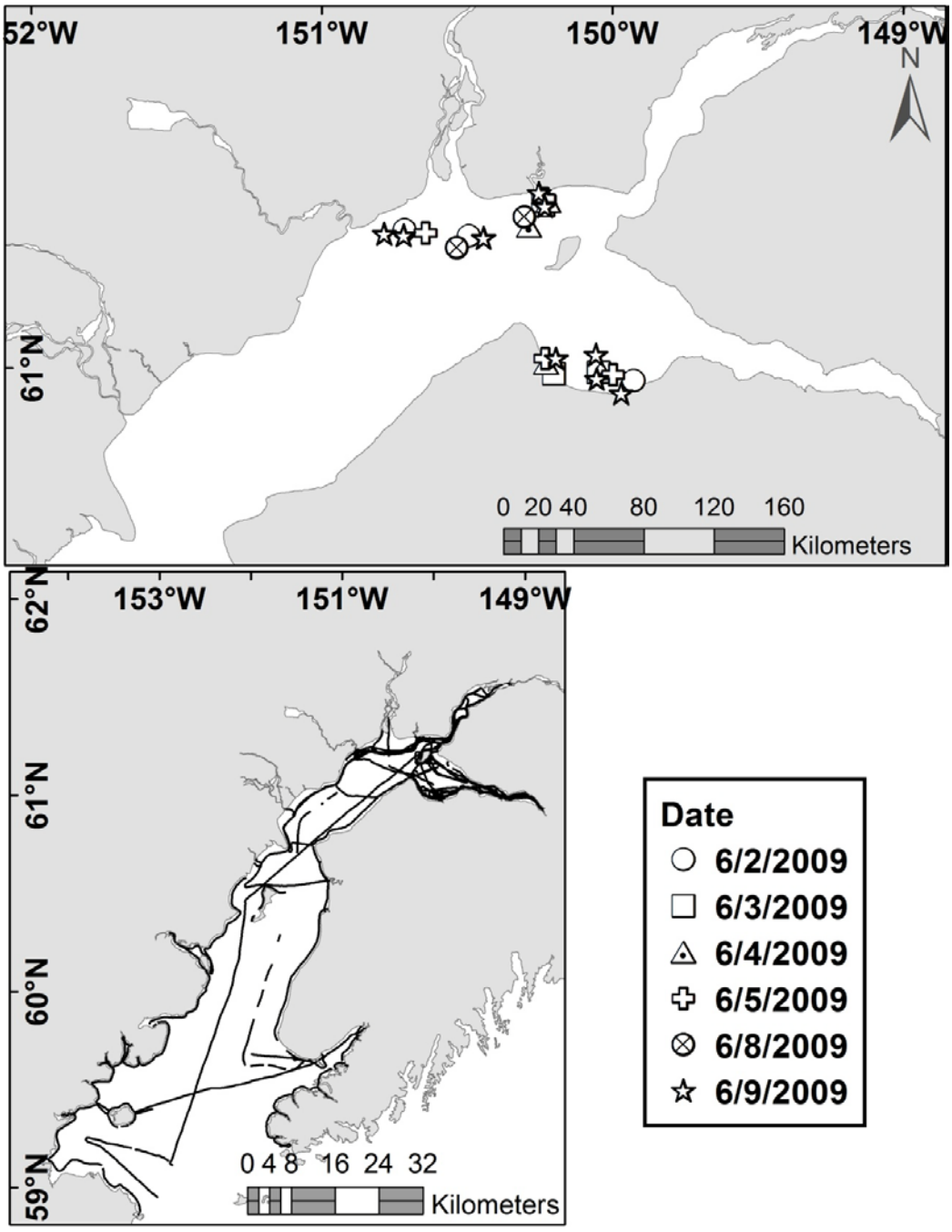

Figure 7. -- On-effort trackline and beluga whale sightings during 2009 aerial abundance survey, Cook Inlet, Alaska.

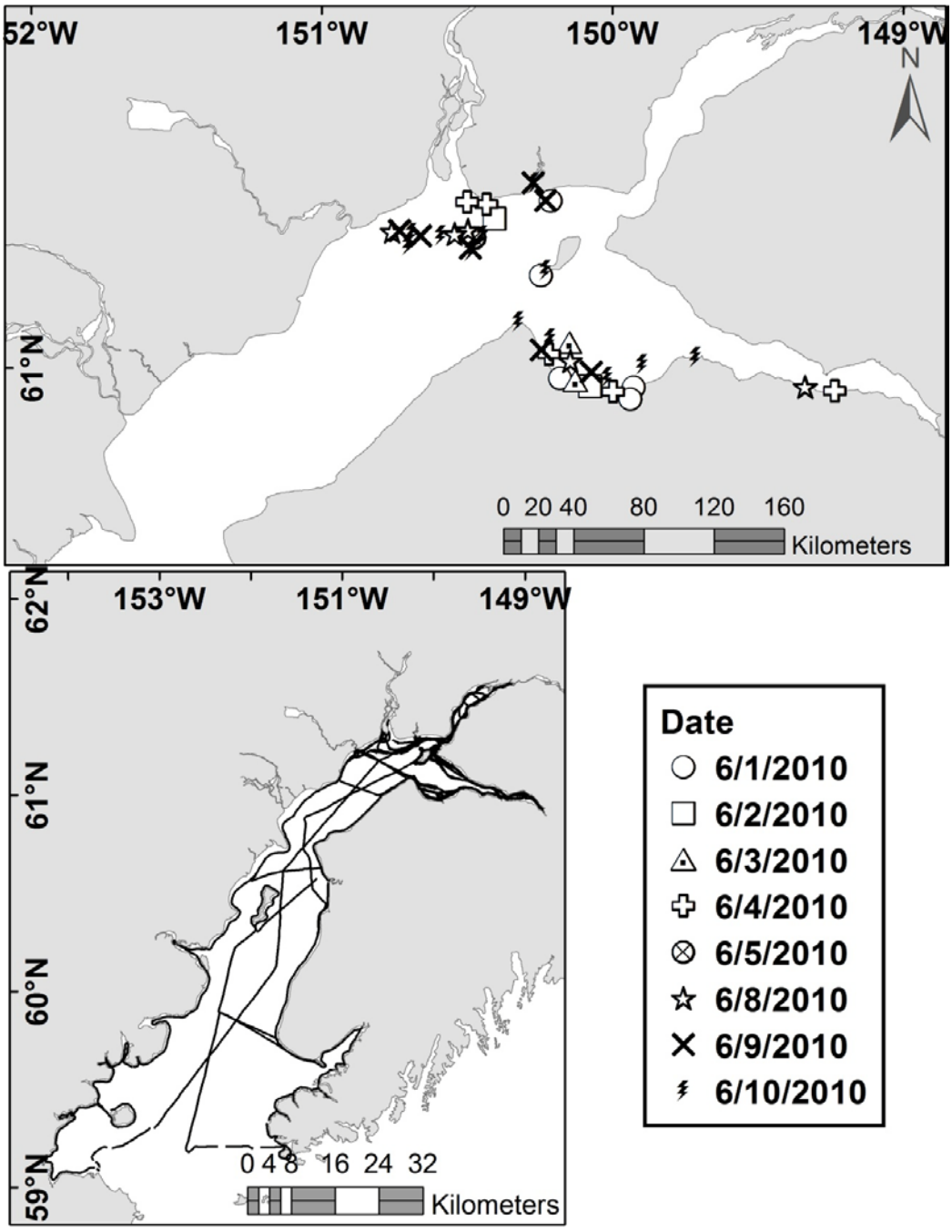

Figure 8. -- On-effort trackline and beluga whale sightings during 2010 aerial abundance survey, Cook Inlet, Alaska.

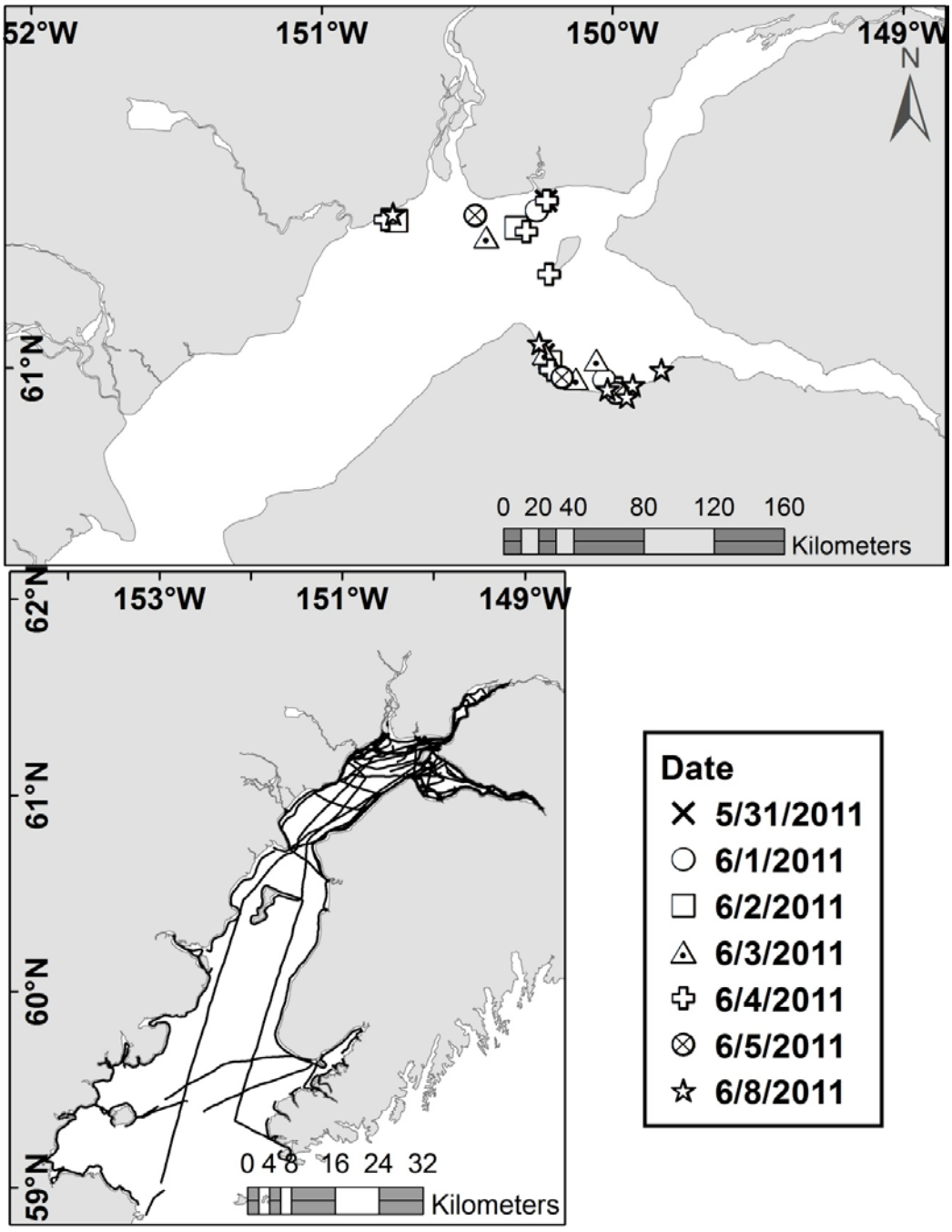

Figure 9. -- On-effort trackline and beluga whale sightings during 2011 aerial abundance survey, Cook Inlet, Alaska.

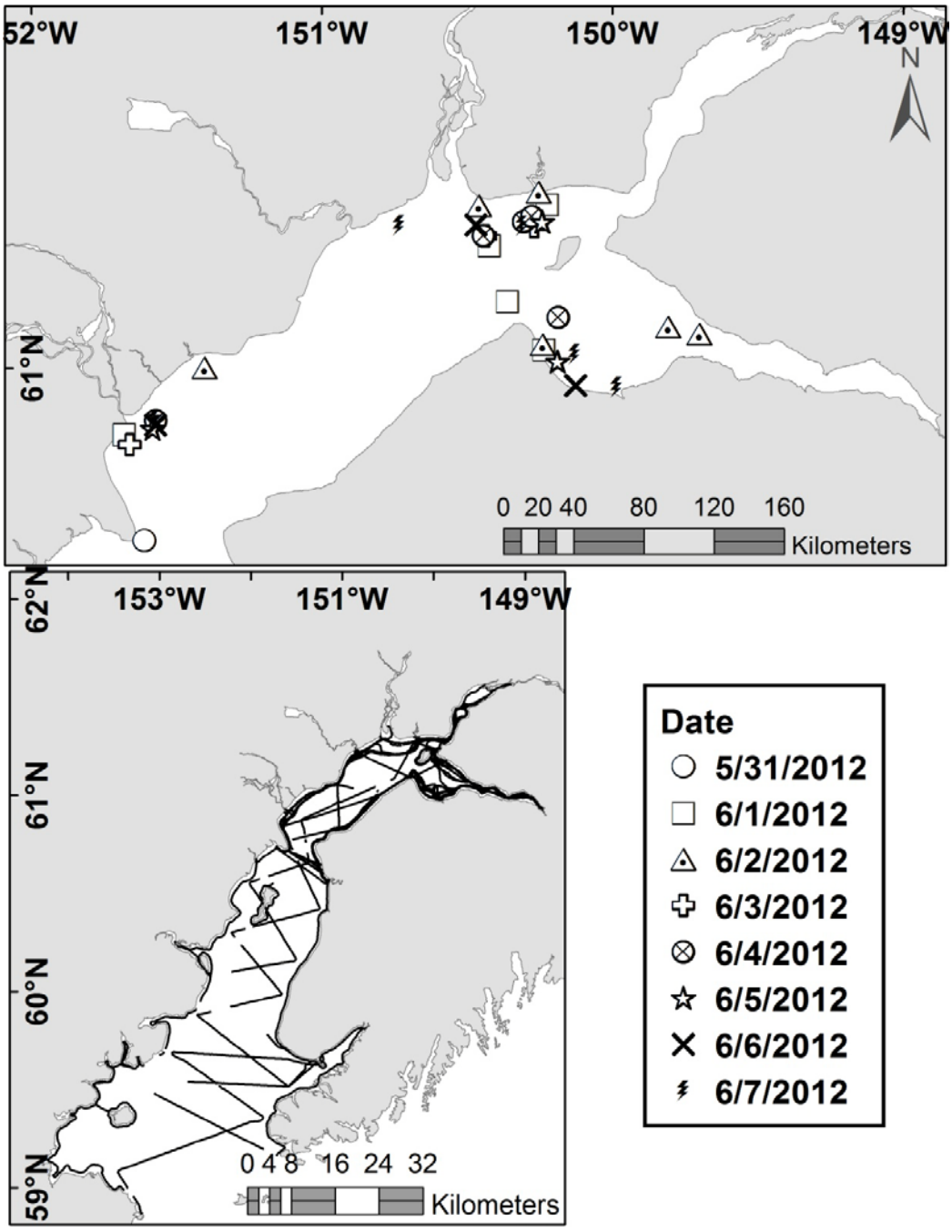

Figure 10. -- On-effort trackline and beluga whale sightings during 2012 aerial abundance survey, Cook Inlet, Alaska.

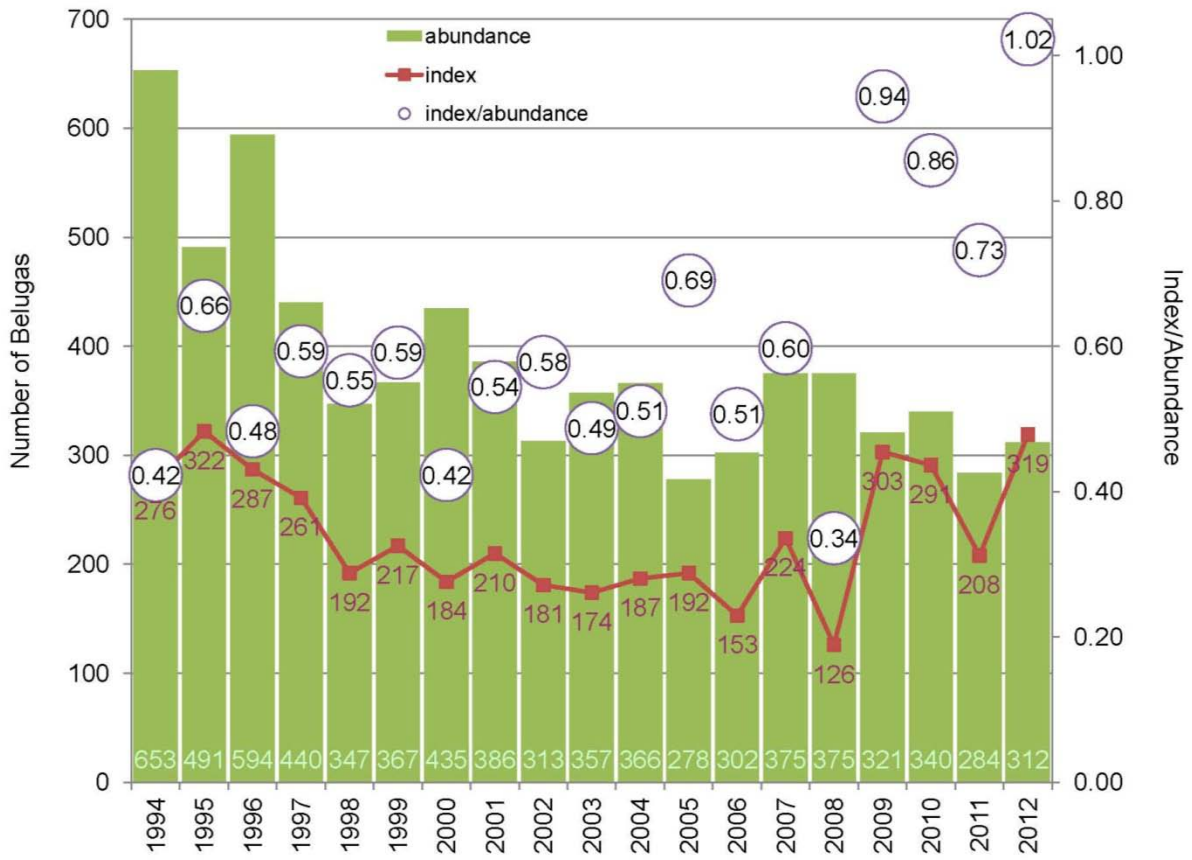

Figure 11. -- Annual abundance estimates (bars) and median index counts (line) for beluga aerial surveys, Cook Inlet, Alaska, 1994-2012. Circles show index counts divided by abundance estimates (note: in most years the index count is between 50% and 70% of the total abundance estimate).

APPENDIX

Sighting data for other marine mammals observed during beluga abundance surveys, 1993-2012.

Appendix.-- Marine mammals (other than beluga whales) observed during the Cook Inlet Beluga Whale Aerial Abundance Surveys, 1993 – 2012. Note: includes corrections to Appendix II in Rugh et al. (2005a) based on review of the Cook Inlet Beluga Whale Survey database, Nov. 2013.

Common name	Group size	Date	Latitude (decimal degrees)	Longitude (decimal degrees)	Time (AK DST)	Flight no.	General location
Fin Whale	2	6/8/2001	59.0775	152.3227	15:16:31	8	N of Barren I.
Fin Whale	3	6/7/2003	59.1362	152.9627	13:13:04	10	NW of Barren I.
Fin Whale	13	6/12/2003	59.0967	152.4323	12:57:43	16	NW of Barren I.
Fin Whale	1	6/5/2004	59.0428	152.3925	14:19:45	7	NW of Barren I.
Fin Whale	1	6/5/2004	59.0493	152.3983	14:20:00	7	NW of Barren I.
Fin Whale	1	6/6/2004	59.4978	152.4658	15:19:29	9	SW of Anchor Pt./ mid inlet
Fin Whale	2	6/3/2005	58.9907	153.0227	10:43:28	6	NW of Barren I.
Gray Whale	2	6/4/1994	59.6200	153.3028	12:57:18	6	Btwn Iniskin/ Oil Bay
Gray Whale	1	6/4/1994	59.3808	151.9227	13:51:50	6	Port Graham
Gray Whale	2	6/9/2000	58.9673	152.3085	14:02:02	4	N of Barren I.
Gray Whale	1	6/8/2001	59.1435	151.8917	14:46:45	8	Elizabeth I.
Gray Whale	1	6/8/2001	59.1767	151.8642	14:53:53	8	Elizabeth I.
Gray Whale	1	6/3/2005	58.9987	153.4610	11:02:19	6	Shaw I.
Gray Whale	1	6/4/2005	61.1655	150.9963	16:14:24	9	S of Beluga R.
Gray Whale	1	6/7/2009	59.0970	153.6520	11:28:39	9	Kamishak Bay
Minke Whale	1	6/14/1998	59.8352	152.0503	13:40:29	7	NW of Anchor Pt./ mid inlet
Minke Whale	1	6/10/1999	59.7030	151.8223	11:15:17	3	Kachemak Bay
Minke Whale	1	6/10/2006	59.6192	151.8530	12:56:02	6	Kachemak Bay
Humpback Whale	3	6/4/1994	59.2910	152.0120	14:14:49	6	S of Port Graham
Humpback Whale	5	6/14/1996	59.0612	152.2917	12:48:56	5	N of Barren I.
Humpback Whale	1	6/14/1999	59.2188	151.9560	15:06:00	12	NW Elizabeth I.
Humpback Whale	4	6/14/1999	59.1208	152.7598	15:25:45	12	NW of Barren I.
Humpback Whale	1	6/9/2000	59.1678	151.9960	17:22:02	5	W of Elizabeth I.
Humpback Whale	1	6/9/2000	59.0270	153.1745	17:50:26	5	E of Shaw I.
Humpback Whale	5	6/9/2000	59.2222	152.5732	18:15:12	5	N of Barren I.
Humpback Whale	2	6/9/2000	59.2648	152.3788	18:19:51	5	N of Barren I.
Humpback Whale	2	6/10/2000	59.5835	151.3190	14:50:36	7	Kachemak Bay
Humpback Whale	2	6/8/2001	59.1623	151.8993	14:42:24	8	Elizabeth I.
Humpback Whale	1	6/8/2001	59.1668	151.8880	14:43:30	8	Elizabeth I.
Humpback Whale	1	6/8/2001	59.1507	151.7807	14:49:12	8	Elizabeth I.
Humpback Whale	1	6/8/2001	59.1583	151.9900	14:57:48	8	W of Elizabeth I.
Humpback Whale	1	6/8/2001	59.1323	152.0815	15:08:13	8	W of Elizabeth I.
Humpback Whale	8	6/8/2001	59.1095	152.2150	15:12:01	8	N of Barren I.
Humpback Whale	2	6/8/2001	59.0852	152.2792	15:13:31	8	N of Barren I.
Humpback Whale	2	6/8/2001	59.0817	152.2757	15:13:38	8	N of Barren I.
Humpback Whale	3	6/8/2001	59.0813	152.2525	15:14:03	8	N of Barren I.
Humpback Whale	3	6/8/2001	59.0805	152.2685	15:14:43	8	N of Barren I.
Humpback Whale	1	6/8/2001	59.0755	152.3760	15:19:27	8	N of Barren I.
Humpback Whale	10	6/8/2001	59.1212	152.4137	15:27:59	8	N of Barren I.
Humpback Whale	5	6/9/2001	59.2025	153.0592	11:32:58	9	Kamishak Bay
Humpback Whale	3	6/9/2001	59.1725	153.0285	11:36:17	9	Kamishak Bay
Humpback Whale	2	6/9/2001	59.1688	153.0233	11:37:30	9	Kamishak Bay
Humpback Whale	1	6/9/2001	59.1492	153.1395	11:41:37	9	Kamishak Bay
Humpback Whale	1	6/9/2001	59.1260	153.1117	11:48:31	9	Kamishak Bay
Humpback Whale	2	6/4/2002	59.1485	152.9385	11:37:24	1	NW of Barren I.
Humpback Whale	6	6/4/2002	59.1717	152.9592	11:39:00	1	NW of Barren I.
Humpback Whale	2	6/5/2002	59.1943	151.8128	14:32:22	4	Elizabeth I.
Humpback Whale	1	6/5/2002	59.1800	151.9055	14:41:47	4	Elizabeth I.
Humpback Whale	3	6/5/2002	59.1440	151.9248	14:44:31	4	Elizabeth I.
Humpback Whale	2	6/5/2002	59.1457	151.9610	14:46:57	4	Elizabeth I.
Humpback Whale	2	6/5/2002	59.1312	151.8862	14:49:44	4	Elizabeth I.
Humpback Whale	2	6/5/2002	59.1177	151.8445	14:52:40	4	Elizabeth I.
Humpback Whale	4	6/7/2003	59.1382	152.9277	13:04:06	10	NW of Barren I.
Humpback Whale	1	6/7/2003	59.5920	152.4847	15:55:30	11	SW of Anchor Pt./ mid inlet
Humpback Whale	3	6/12/2003	59.1248	152.3205	12:49:35	16	N of Barren I.
Humpback Whale	12	6/12/2003	59.0835	152.4533	12:55:54	16	NW of Barren I.
Humpback Whale	2	6/12/2003	59.6410	151.8875	15:22:36	16	Kachemak Bay
Humpback Whale	3	6/5/2004	59.0443	152.3995	14:17:08	7	NW of Barren I.
Humpback Whale	1	6/5/2004	59.0457	152.3888	14:18:11	7	NW of Barren I.
Humpback Whale	2	6/6/2004	59.8615	151.9647	11:11:24	8	NW of Anchor Pt.
Humpback Whale	1	6/6/2004	59.7237	152.1050	11:32:10	8	SW of Anchor Pt./ mid inlet
Humpback Whale	1	6/6/2004	59.6590	152.1313	11:54:32	8	W of Kachemak Bay

Appendix -- Cont.

Common name	Group size	Date	Latitude (decimal degrees)	Longitude (decimal degrees)	Time (AK DST)	Flight no.	General location
Humpback Whale	1	6/6/2004	59.0345	152.7142	12:14:43	8	NW of Barren I.
Humpback Whale	1	6/6/2004	59.0302	152.6608	12:17:29	8	NW of Barren I.
Humpback Whale	2	6/6/2004	59.0398	152.7335	12:18:48	8	NW of Barren I.
Humpback Whale	1	6/6/2004	59.0437	152.7408	12:21:05	8	NW of Barren I.
Humpback Whale	2	6/6/2004	59.4988	152.0520	15:13:41	9	W of Kachemak Bay
Humpback Whale	1	6/3/2005	59.3237	153.5327	12:06:48	6	Augustine I.
Humpback Whale	2	6/3/2005	59.3082	153.5285	12:10:26	6	Augustine I.
Humpback Whale	1	6/3/2005	59.4155	152.7248	12:32:50	6	SE of Iniskin Bay/ mid inlet
Humpback Whale	2	6/3/2005	59.4050	152.7412	12:33:42	6	SE of Iniskin Bay/ mid inlet
Humpback Whale	1	6/3/2005	59.3943	152.7323	12:34:06	6	E of Augustine I./ mid inlet
Humpback Whale	3	6/3/2005	59.3902	152.7248	12:34:19	6	E of Augustine I./ mid inlet
Humpback Whale	1	6/3/2005	59.4115	152.7187	12:35:17	6	E of Augustine I./ mid inlet
Humpback Whale	1	6/3/2005	59.4167	152.7400	12:41:15	6	E of Augustine I./ mid inlet
Humpback Whale	3	6/3/2005	59.3793	153.5958	15:18:13	7	Augustine I.
Humpback Whale	1	6/3/2005	59.3793	153.5958	15:18:15	7	Augustine I.
Humpback Whale	1	6/3/2005	59.3870	153.6065	15:20:50	7	Augustine I.
Humpback Whale	1	6/4/2005	59.6435	151.2347	11:15:16	8	Kachemak Bay
Humpback Whale	7	6/10/2006	59.1608	151.9008	11:42:00	6	W of Elizabeth I.
Humpback Whale	1	6/10/2006	59.1348	151.8487	11:55:51	6	S of Elizabeth I.
Humpback Whale	1	6/10/2006	59.1305	151.8288	11:58:25	6	S of Elizabeth I.
Humpback Whale	1	6/10/2006	59.1269	151.8044	11:59:00	6	S of Elizabeth I.
Humpback Whale	1	6/10/2006	59.1802	152.2824	12:18:03	6	W of Elizabeth I.
Humpback Whale	2	6/13/2006	59.5604	152.3460	12:42:36	12	W of Kachemak Bay/ mid inlet
Humpback Whale	1	6/13/2006	59.4392	152.9122	15:08:09	13	SE of Iniskin Bay/ mid inlet
Humpback Whale	1	6/8/2007	59.3306	153.3612	12:09:43	3	Augustine I.
Humpback Whale	2	6/12/2007	59.3621	152.7735	11:36:44	9	E of Augustine I./ mid inlet
Humpback Whale	5	6/9/2008	59.1426	151.8875	11:23:34	9	Elizabeth I.
Humpback Whale	1	6/10/2008	59.5693	152.3554	9:50:42	11	W of Kachemak Bay/ mid inlet
Humpback Whale	1	6/10/2008	59.3153	153.5861	10:50:52	11	Augustine I.
Humpback Whale	3	6/7/2009	59.1320	152.9720	10:30:42	9	NW of Barren I.
Humpback Whale	2	6/8/2009	59.2880	152.0110	11:32:15	11	N of Koyuktolik Bay
Humpback Whale	2	6/5/2010	59.3290	151.9850	11:45:17	7	N of Koyuktolik Bay
Humpback Whale	2	6/6/2011	59.3510	152.7750	11:38:47	10	E of Augustine I./ mid inlet
Humpback Whale	1	6/6/2011	59.1560	151.9020	14:15:04	11	Elizabeth I.
Humpback Whale	2	6/6/2011	59.1560	151.7830	14:21:56	11	Elizabeth I.
Humpback Whale	1	6/6/2011	59.0630	152.4210	14:37:49	11	N of Barren I.
Humpback Whale	2	6/7/2011	59.8890	152.0400	11:52:53	12	N of Anchor Pt./ mid inlet
Humpback Whale	1	6/7/2011	59.8900	152.0310	11:53:05	12	N of Anchor Pt./ mid inlet
Humpback Whale	1	5/30/2012	59.5630	151.6120	14:16:02	4	Kachemak Bay
Killer Whale	3	6/4/1994	59.1833	153.0000	10:50:41	6	Kamishak Bay
Killer Whale	5	6/9/1997	59.5453	151.4595	11:39:35	2	Kachemak Bay
Killer Whale	4	6/8/2001	59.3635	151.9385	14:25:57	8	Port Graham
Killer Whale	2	6/8/2001	59.3660	151.9407	14:27:00	8	Port Graham
Killer Whale	1	6/8/2001	59.3497	151.9488	14:27:51	8	Port Graham
Killer Whale	4	6/8/2001	59.3497	151.9448	14:27:55	8	Port Graham
Killer Whale	2	6/8/2001	59.3632	151.9457	14:30:50	8	Port Graham
Killer Whale	2	6/8/2001	59.3578	151.9573	14:31:08	8	Port Graham
Killer Whale	1	6/3/2005	59.4462	153.0285	14:54:12	7	SE of Iniskin Bay/ mid inlet
Killer Whale	4	6/4/2005	59.5893	151.3192	11:24:47	8	Kachemak Bay
Killer Whale	2	6/5/2010	59.1940	152.0670	12:09:20	7	NW of Elizabeth I.
Killer Whale	10	6/7/2010	59.3060	153.1310	10:41:41	9	E of Augustine I.
Killer Whale	20	6/7/2010	59.3010	153.1500	10:45:36	9	E of Augustine I.
Killer Whale	1	6/7/2010	59.3960	153.5660	12:04:12	9	Augustine I.
Killer Whale	1	5/30/2012	59.5210	152.3530	12:37:41	3	W of Kachemak Bay/ mid inlet
Killer Whale	1	5/30/2012	59.5210	152.3400	12:37:56	3	W of Kachemak Bay/ mid inlet
Killer Whale	7	5/30/2012	59.5470	151.6780	12:51:41	3	Kachemak Bay
Dall's Porpoise	2	6/9/1997	59.6497	153.4377	16:45:29	3	Iniskin Bay
Dall's Porpoise	6	6/14/1999	59.1210	152.7402	15:26:09	12	NW of Barren I.
Dall's Porpoise	5	6/9/2000	59.1875	152.1717	17:18:26	5	NW of Elizabeth I.
Dall's Porpoise	3	6/9/2000	59.1803	152.1082	17:19:42	5	NW of Elizabeth I.
Dall's Porpoise	1	6/9/2000	59.1280	152.1353	17:33:51	5	W of Elizabeth I.
Dall's Porpoise	3	6/9/2000	59.0870	152.5512	17:40:27	5	NW of Barren I.
Dall's Porpoise	3	6/9/2000	59.0890	153.1683	18:03:57	5	Kamishak Bay
Dall's Porpoise	1	6/9/2000	59.1365	152.9582	18:07:54	5	NW of Barren I.
Dall's Porpoise	1	6/9/2000	59.1452	152.9192	18:08:39	5	NW of Barren I.

Appendix -- Cont.

Common name	Group size	Date	Latitude (decimal degrees)	Longitude (decimal degrees)	Time (AK DST)	Flight no.	General location
Harbor Porpoise	1	6/4/1993	59.6327	151.6008	11:41:29	3	Kachemak Bay
Harbor Porpoise	1	6/4/1993	59.6305	151.5772	11:41:58	3	Kachemak Bay
Harbor Porpoise	1	6/4/1993	59.5485	151.4782	11:48:09	3	Kachemak Bay
Harbor Porpoise	1	6/4/1993	59.4955	151.7972	12:00:25	3	Kachemak Bay
Harbor Porpoise	1	6/4/1993	60.3912	152.2152	12:45:01	3	Harriet Pt.
Harbor Porpoise	1	7/27/1993	59.4937	151.6478	12:04:54	3	Kachemak Bay
Harbor Porpoise	2	7/27/1993	60.4903	152.2917	12:49:13	3	Drift R.
Harbor Porpoise	1	7/27/1993	60.5067	152.2682	12:49:48	3	Drift R.
Harbor Porpoise	1	6/3/1994	59.7792	150.9833	11:13:56	4	Fox R.
Harbor Porpoise	1	6/3/1994	59.7310	152.5285	13:09:28	5	NW of Anchor Pt./ mid inlet
Harbor Porpoise	1	6/3/1994	59.8733	152.5617	13:25:33	5	NW of Anchor Pt./ mid inlet
Harbor Porpoise	1	6/3/1994	59.9658	152.2043	13:45:17	5	NW of Anchor Pt./ mid inlet
Harbor Porpoise	1	6/4/1994	59.2460	154.1182	12:01:49	6	Kamishak Bay
Harbor Porpoise	2	6/4/1994	59.6707	153.1185	13:07:01	6	N of Oil Bay
Harbor Porpoise	1	6/4/1994	59.6483	152.4137	15:45:07	7	SW of Anchor Pt./ mid inlet
Harbor Porpoise	1	6/4/1994	59.6350	153.1587	15:56:48	7	N of Oil Bay
Harbor Porpoise	1	6/4/1994	59.6350	153.1587	15:56:49	7	N of Oil Bay
Harbor Porpoise	2	6/4/1994	59.7407	153.0007	16:03:32	7	N of Oil Bay
Harbor Porpoise	1	6/4/1994	60.0095	152.5835	16:14:12	7	S of Tuxedni Bay
Harbor Porpoise	1	6/4/1994	60.0155	152.5765	16:14:23	7	S of Tuxedni Bay
Harbor Porpoise	1	6/4/1994	60.0230	152.5707	16:14:38	7	S of Tuxedni Bay
Harbor Porpoise	1	6/4/1994	60.0230	152.5707	16:14:39	7	S of Tuxedni Bay
Harbor Porpoise	1	6/4/1994	60.0393	152.5602	16:15:07	7	S of Tuxedni Bay
Harbor Porpoise	1	6/4/1994	60.0467	152.5537	16:15:22	7	S of Tuxedni Bay
Harbor Porpoise	1	6/4/1994	60.0498	152.5508	16:15:28	7	S of Tuxedni Bay
Harbor Porpoise	1	6/4/1994	60.0542	152.5477	16:15:35	7	S of Tuxedni Bay
Harbor Porpoise	1	6/4/1994	60.0620	152.5438	16:15:50	7	S of Tuxedni Bay
Harbor Porpoise	1	6/4/1994	60.0667	152.5433	16:15:59	7	S of Tuxedni Bay
Harbor Porpoise	1	6/4/1994	60.0678	152.5435	16:16:00	7	S of Tuxedni Bay
Harbor Porpoise	1	6/4/1994	60.0690	152.5438	16:16:02	7	S of Tuxedni Bay
Harbor Porpoise	1	6/4/1994	60.0723	152.5460	16:16:09	7	S of Tuxedni Bay
Harbor Porpoise	1	6/4/1994	60.0733	152.5470	16:16:10	7	S of Tuxedni Bay
Harbor Porpoise	1	6/4/1994	60.0743	152.5482	16:16:11	7	S of Tuxedni Bay
Harbor Porpoise	1	6/4/1994	60.0743	152.5482	16:16:12	7	S of Tuxedni Bay
Harbor Porpoise	1	6/4/1994	60.0785	152.5525	16:16:20	7	S of Tuxedni Bay
Harbor Porpoise	1	6/4/1994	60.0795	152.5537	16:16:21	7	S of Tuxedni Bay
Harbor Porpoise	1	6/4/1994	60.0795	152.5537	16:16:22	7	S of Tuxedni Bay
Harbor Porpoise	1	6/4/1994	60.0795	152.5537	16:16:23	7	S of Tuxedni Bay
Harbor Porpoise	1	6/4/1994	60.0807	152.5548	16:16:24	7	S of Tuxedni Bay
Harbor Porpoise	1	6/4/1994	60.0807	152.5548	16:16:25	7	S of Tuxedni Bay
Harbor Porpoise	1	6/4/1994	60.0858	152.5602	16:16:35	7	S of Tuxedni Bay
Harbor Porpoise	1	6/4/1994	60.0868	152.5612	16:16:36	7	S of Tuxedni Bay
Harbor Porpoise	1	6/4/1994	60.0868	152.5612	16:16:37	7	S of Tuxedni Bay
Harbor Porpoise	1	6/4/1994	60.0887	152.5635	16:16:39	7	S of Tuxedni Bay
Harbor Porpoise	1	6/4/1994	60.0887	152.5635	16:16:40	7	S of Tuxedni Bay
Harbor Porpoise	1	6/4/1994	60.0887	152.5635	16:16:41	7	S of Tuxedni Bay
Harbor Porpoise	1	6/4/1994	60.0907	152.5658	16:16:44	7	S of Tuxedni Bay
Harbor Porpoise	1	6/4/1994	60.0907	152.5658	16:16:48	7	S of Tuxedni Bay
Harbor Porpoise	1	6/4/1994	60.0907	152.5658	16:16:49	7	S of Tuxedni Bay
Harbor Porpoise	1	6/4/1994	60.0935	152.5695	16:16:50	7	Tuxedni Bay
Harbor Porpoise	3	6/4/1994	60.0935	152.5695	16:16:51	7	Tuxedni Bay
Harbor Porpoise	1	6/4/1994	60.0945	152.5708	16:16:53	7	Tuxedni Bay
Harbor Porpoise	2	6/4/1994	60.0963	152.5732	16:16:56	7	Tuxedni Bay
Harbor Porpoise	1	6/4/1994	60.0973	152.5745	16:16:58	7	Tuxedni Bay
Harbor Porpoise	1	6/4/1994	60.0973	152.5745	16:16:59	7	Tuxedni Bay
Harbor Porpoise	1	6/4/1994	60.0983	152.5755	16:17:04	7	Tuxedni Bay
Harbor Porpoise	1	6/4/1994	60.1013	152.5792	16:17:07	7	Tuxedni Bay
Harbor Porpoise	1	6/4/1994	60.1023	152.5803	16:17:09	7	Tuxedni Bay
Harbor Porpoise	1	6/4/1994	60.1710	152.6607	16:19:29	7	Tuxedni Bay
Harbor Porpoise	3	6/4/1994	60.3507	152.2857	16:46:29	7	Harriet Pt.
Harbor Porpoise	3	6/4/1994	60.3795	152.2283	16:47:39	7	Harriet Pt.
Harbor Porpoise	1	7/22/1995	59.5497	151.4803	11:26:04	9	Kachemak Bay
Harbor Porpoise	3	7/22/1995	59.0080	153.4927	15:19:16	10	Kamishak Bay
Harbor Porpoise	1	7/22/1995	60.2023	152.5502	17:44:14	10	Tuxedni Bay
Harbor Porpoise	1	6/14/1996	60.1587	152.1058	16:03:56	6	S of Kalgin I.
Harbor Porpoise	1	6/15/1996	60.0143	152.4717	11:39:47	7	SE of Tuxedni Bay/ mid inlet

Appendix -- Cont.

Common name	Group size	Date	Latitude (decimal degrees)	Longitude (decimal degrees)	Time (AK DST)	Flight no.	General location
Harbor Porpoise	1	6/15/1996	59.7410	152.4690	12:03:40	7	SW of Anchor Pt./ mid inlet
Harbor Porpoise	1	6/15/1996	59.7382	152.5357	12:04:45	7	SW of Anchor Pt./ mid inlet
Harbor Porpoise	1	6/15/1996	59.7210	152.9288	12:11:00	7	Btwn Oil/ Chinitna Bay
Harbor Porpoise	1	6/15/1996	59.7183	153.0065	12:12:12	7	Btwn Oil/ Chinitna Bay
Harbor Porpoise	1	6/15/1996	60.0052	152.5900	17:40:03	8	Btwn Chinitna/ Tuxedni Bay
Harbor Porpoise	1	6/15/1996	60.2205	152.5350	18:03:21	8	Tuxedni Bay
Harbor Porpoise	3	6/8/1997	60.7318	151.6958	15:58:50	1	West Foreland
Harbor Porpoise	1	6/9/1997	59.4873	151.7777	12:25:09	2	Kachemak Bay
Harbor Porpoise	1	6/9/1997	59.6183	153.5475	16:30:14	3	Illiamna Bay
Harbor Porpoise	1	6/9/1997	59.7317	153.4237	16:35:04	3	Iniskin Bay
Harbor Porpoise	1	6/13/1998	60.1122	152.0157	17:58:35	5	E of Chisik I./ mid inlet
Harbor Porpoise	1	6/13/1998	60.2192	152.2208	18:03:48	5	S of Kalgin I./ mid inlet
Harbor Porpoise	1	6/14/1998	60.0622	152.5522	13:28:14	7	Tuxedni Bay
Harbor Porpoise	1	6/14/1998	59.9420	152.3113	13:34:51	7	NW of Anchor Pt./ mid inlet
Harbor Porpoise	2	6/14/1998	59.9310	152.2838	13:35:27	7	NW of Anchor Pt./ mid inlet
Harbor Porpoise	2	6/14/1998	59.9020	152.2115	13:37:02	7	NW of Anchor Pt./ mid inlet
Harbor Porpoise	1	6/14/1998	59.7310	152.5435	13:57:22	7	SW of Anchor Pt./ mid inlet
Harbor Porpoise	1	6/14/1998	59.7200	152.9018	14:04:13	7	Btwn Oil/ Chinitna Bay
Harbor Porpoise	1	6/14/1998	59.7183	152.9987	14:06:08	7	Btwn Oil/ Chinitna Bay
Harbor Porpoise	1	6/14/1998	59.6403	152.7153	14:12:22	7	SW of Anchor Pt./ mid inlet
Harbor Porpoise	1	6/14/1998	59.6387	152.7075	14:12:29	7	SW of Anchor Pt./ mid inlet
Harbor Porpoise	1	6/14/1998	59.6120	152.5703	14:14:48	7	SW of Anchor Pt./ mid inlet
Harbor Porpoise	1	6/14/1998	59.4937	151.9615	14:25:01	7	Kachemak Bay
Harbor Porpoise	1	6/10/1999	59.8365	152.4713	15:25:32	4	NW of Anchor Pt./ mid inlet
Harbor Porpoise	2	6/10/1999	60.0467	152.1948	15:47:48	4	E of Chisik I./ mid inlet
Harbor Porpoise	2	6/10/1999	60.2403	151.9943	16:06:57	4	S of Kalgin I./ mid inlet
Harbor Porpoise	1	6/10/1999	60.2408	151.9748	16:07:18	4	S of Kalgin I./ mid inlet
Harbor Porpoise	1	6/10/1999	60.2410	151.9632	16:07:31	4	S of Kalgin I./ mid inlet
Harbor Porpoise	1	6/10/1999	60.2425	151.8772	16:09:08	4	S of Kalgin I./ mid inlet
Harbor Porpoise	1	6/10/1999	60.4018	151.6998	16:29:46	4	E of Kalgin I./ mid inlet
Harbor Porpoise	1	6/10/1999	60.4415	151.7835	16:32:01	4	E of Kalgin I./ mid inlet
Harbor Porpoise	1	6/10/1999	60.6262	151.8078	16:46:37	4	N of Kalgin I./ mid inlet
Harbor Porpoise	1	6/11/1999	60.4505	152.1492	11:24:28	5	Redoubt Bay
Harbor Porpoise	1	6/11/1999	60.3873	152.2142	11:35:14	5	Harriet Pt.
Harbor Porpoise	1	6/14/1999	60.3705	152.1813	11:01:48	11	Harriet Pt.
Harbor Porpoise	1	6/14/1999	60.0075	152.3360	11:28:07	11	SE of Tuxedni Bay/ mid inlet
Harbor Porpoise	1	6/14/1999	60.0018	152.4068	11:29:18	11	SE of Tuxedni Bay/ mid inlet
Harbor Porpoise	1	6/14/1999	59.9992	152.4377	11:29:49	11	SE of Tuxedni Bay/ mid inlet
Harbor Porpoise	1	6/14/1999	59.9980	152.4520	11:30:05	11	SE of Tuxedni Bay/ mid inlet
Harbor Porpoise	1	6/14/1999	59.9965	152.4707	11:30:24	11	SE of Tuxedni Bay/ mid inlet
Harbor Porpoise	1	6/14/1999	59.9942	152.4982	11:30:52	11	SE of Tuxedni Bay/ mid inlet
Harbor Porpoise	1	6/14/1999	59.9932	152.5113	11:31:07	11	SE of Tuxedni Bay/ mid inlet
Harbor Porpoise	2	6/14/1999	59.9095	152.4932	11:37:09	11	NW of Anchor Pt./ mid inlet
Harbor Porpoise	1	6/14/1999	59.9043	152.4795	11:37:27	11	NW of Anchor Pt./ mid inlet
Harbor Porpoise	1	6/14/1999	59.9035	152.4768	11:37:31	11	NW of Anchor Pt./ mid inlet
Harbor Porpoise	1	6/14/1999	59.8935	152.4498	11:38:08	11	NW of Anchor Pt./ mid inlet
Harbor Porpoise	1	6/14/1999	59.8627	152.3687	11:40:00	11	NW of Anchor Pt./ mid inlet
Harbor Porpoise	1	6/14/1999	59.8610	152.3643	11:40:07	11	NW of Anchor Pt./ mid inlet
Harbor Porpoise	1	6/14/1999	59.8573	152.3547	11:40:19	11	NW of Anchor Pt./ mid inlet
Harbor Porpoise	1	6/14/1999	59.8355	152.2967	11:41:40	11	NW of Anchor Pt./ mid inlet
Harbor Porpoise	1	6/14/1999	59.5893	152.3305	14:14:08	12	SW of Anchor Pt./ mid inlet
Harbor Porpoise	1	6/14/1999	59.5897	152.3985	14:15:22	12	SW of Anchor Pt./ mid inlet
Harbor Porpoise	1	6/14/1999	59.0819	152.7905	15:28:52	12	NW of Barren I.
Harbor Porpoise	1	6/14/1999	59.7770	152.9768	16:52:34	12	Btwn Oil/ Chinitna Bay
Harbor Porpoise	1	6/14/1999	59.8425	153.0423	16:55:30	12	Chinitna Bay
Harbor Porpoise	1	6/14/1999	60.1195	152.5388	17:19:28	12	Tuxedni Bay
Harbor Porpoise	2	6/9/2000	59.5195	153.7412	12:40:30	4	Ursus Cove
Harbor Porpoise	1	6/9/2000	59.2358	154.1032	13:03:54	4	N of Nordyke I.
Harbor Porpoise	1	6/9/2000	59.0970	153.6600	13:30:16	4	Kamishak Bay
Harbor Porpoise	1	6/9/2000	59.7148	152.8193	18:44:28	5	SE of Chinitna Bay/ mid inlet
Harbor Porpoise	1	6/9/2000	59.7952	152.9795	18:48:01	5	Btwn Oil/ Chinitna Bay
Harbor Porpoise	1	6/9/2000	59.7903	152.5162	18:55:53	5	SE of Chinitna Bay/ mid inlet
Harbor Porpoise	1	6/10/2000	60.6018	151.3757	10:44:01	6	N of Kenai R.
Harbor Porpoise	1	6/10/2000	60.3722	151.6662	10:54:36	6	E of Kalgin I./ mid inlet
Harbor Porpoise	2	6/10/2000	60.5160	151.5533	11:25:16	6	E of Kalgin I./ mid inlet
Harbor Porpoise	1	6/10/2000	60.4262	151.9070	11:54:23	6	Kalgin I.
Harbor Porpoise	3	6/10/2000	60.1695	151.9135	12:23:22	6	S of Kalgin I./ mid inlet

Appendix -- Cont.

Common name	Group size	Date	Latitude (decimal degrees)	Longitude (decimal degrees)	Time (AK DST)	Flight no.	General location
Harbor Porpoise	2	6/10/2000	60.1670	151.9803	12:24:30	6	S of Kalgin I./ mid inlet
Harbor Porpoise	1	6/10/2000	60.1652	152.0315	12:25:22	6	S of Kalgin I./ mid inlet
Harbor Porpoise	1	6/10/2000	60.1625	152.0980	12:26:29	6	S of Kalgin I./ mid inlet
Harbor Porpoise	1	6/10/2000	60.1582	152.2100	12:28:25	6	S of Kalgin I./ mid inlet
Harbor Porpoise	1	6/10/2000	60.1292	152.5205	12:34:03	6	Tuxedni Bay
Harbor Porpoise	1	6/10/2000	60.1112	152.4742	12:35:06	6	E of Chisik I./ mid inlet
Harbor Porpoise	2	6/10/2000	60.0075	152.2963	12:39:49	6	SE of Tuxedni Bay/ mid inlet
Harbor Porpoise	1	6/10/2000	59.6340	151.5450	12:58:30	6	Kachemak Bay
Harbor Porpoise	1	6/10/2000	59.6447	151.4350	15:18:42	7	Kachemak Bay
Harbor Porpoise	1	6/10/2000	59.9227	152.6532	15:50:30	7	Btwn Chinitna/ Tuxedni Bay
Harbor Porpoise	2	6/10/2000	60.4163	151.6943	16:43:06	7	E of Kalgin I./ mid inlet
Harbor Porpoise	1	6/8/2001	59.6778	151.1610	12:00:27	7	Kachemak Bay
Harbor Porpoise	1	6/8/2001	59.4932	151.6625	12:26:29	7	Kachemak Bay
Harbor Porpoise	1	6/8/2001	59.5587	152.2782	15:58:12	8	SW of Anchor Pt./ mid inlet
Harbor Porpoise	1	6/8/2001	59.5705	152.2112	16:03:24	8	SW of Anchor Pt./ mid inlet
Harbor Porpoise	1	6/8/2001	60.1325	151.8700	16:25:52	8	E of Chisik I./ mid inlet
Harbor Porpoise	1	6/8/2001	60.3768	152.0807	16:50:46	8	Kalgin I.
Harbor Porpoise	1	6/8/2001	60.5020	151.6333	17:06:15	8	E of Kalgin I./ mid inlet
Harbor Porpoise	1	6/9/2001	60.0703	152.4235	10:57:36	9	SE of Tuxedni Bay/ mid inlet
Harbor Porpoise	2	6/9/2001	59.7528	152.6803	11:10:43	9	SE of Chinitna Bay/ mid inlet
Harbor Porpoise	1	6/9/2001	59.7410	152.6870	11:11:12	9	SE of Chinitna Bay/ mid inlet
Harbor Porpoise	1	6/9/2001	59.7152	152.7013	11:12:12	9	SE of Chinitna Bay/ mid inlet
Harbor Porpoise	1	6/9/2001	59.6605	152.7315	11:14:18	9	SE of Chinitna Bay/ mid inlet
Harbor Porpoise	1	6/9/2001	59.5818	152.7857	11:17:25	9	SE of Chinitna Bay/ mid inlet
Harbor Porpoise	2	6/9/2001	59.5133	152.8348	11:20:11	9	SE of Iniskin Bay/ mid inlet
Harbor Porpoise	1	6/9/2001	59.4927	152.8490	11:21:01	9	SE of Iniskin Bay/ mid inlet
Harbor Porpoise	1	6/9/2001	59.3925	152.9203	11:25:06	9	E of Augustine I./ mid inlet
Harbor Porpoise	1	6/9/2001	59.6247	153.2223	13:50:31	9	Oil Bay
Harbor Porpoise	1	6/9/2001	59.6792	152.9645	13:55:15	9	Btwn Oil/ Chinitna Bay
Harbor Porpoise	2	6/9/2001	59.6788	152.9293	13:55:50	9	Btwn Oil/ Chinitna Bay
Harbor Porpoise	1	6/9/2001	59.8762	152.7893	16:00:59	10	Chinitna Bay
Harbor Porpoise	1	6/9/2001	59.8893	152.7522	16:01:52	10	N of Chinitna Bay
Harbor Porpoise	1	6/9/2001	59.9010	152.7145	16:02:43	10	N of Chinitna Bay
Harbor Porpoise	1	6/5/2004	59.2583	153.3175	14:50:51	7	Kamishak Bay
Harbor Porpoise	1	6/5/2004	59.5312	153.0772	15:18:09	7	SE of Iniskin Bay/ mid inlet
Harbor Porpoise	1	6/5/2004	59.5802	153.0125	15:20:10	7	SE of Iniskin Bay/ mid inlet
Harbor Porpoise	1	6/5/2004	59.7475	152.7917	15:26:47	7	SE of Chinitna Bay/ mid inlet
Harbor Porpoise	1	6/5/2004	59.9682	152.4960	15:35:43	7	SE of Tuxedni Bay/ mid inlet
Harbor Porpoise	1	6/5/2004	60.0473	152.3895	15:38:50	7	SE of Tuxedni Bay/ mid inlet
Harbor Porpoise	1	6/5/2004	60.0638	152.3668	15:39:28	7	SE of Tuxedni Bay/ mid inlet
Harbor Porpoise	1	6/5/2004	60.3683	151.9480	15:51:51	7	Kalgin I.
Harbor Porpoise	1	6/5/2004	60.3960	151.9215	15:52:52	7	Kalgin I.
Harbor Porpoise	1	6/6/2004	59.7362	152.1082	11:33:11	8	SW of Anchor Pt./ mid inlet
Harbor Porpoise	1	6/6/2004	59.6903	152.1190	11:49:20	8	SW of Anchor Pt./ mid inlet
Harbor Porpoise	1	6/6/2004	59.0397	152.7465	12:21:14	8	NW of Barren I.
Harbor Porpoise	1	6/6/2004	58.9677	153.3720	12:33:52	8	Shaw I.
Harbor Porpoise	1	6/6/2004	59.0873	153.6527	12:43:49	8	Kamishak Bay
Harbor Porpoise	1	6/6/2004	59.1365	154.1588	12:54:39	8	Akumwarvik Bay
Harbor Porpoise	1	6/6/2004	59.2118	154.0723	12:59:43	8	Nordyke I.
Harbor Porpoise	1	6/6/2004	59.4448	153.6878	13:14:55	8	Ursus Cove
Harbor Porpoise	1	6/6/2004	59.4925	152.7922	15:23:52	9	SE of Iniskin Bay/ mid inlet
Harbor Porpoise	1	6/6/2004	59.5382	153.5813	15:34:30	9	Ursus Cove
Harbor Porpoise	2	6/6/2004	59.6020	153.5348	15:37:04	9	Illiamna Bay
Harbor Porpoise	1	6/6/2004	59.6155	153.5638	15:44:46	9	Illiamna Bay
Harbor Porpoise	1	6/6/2004	59.6217	153.5253	15:45:30	9	Illiamna Bay
Harbor Porpoise	1	6/6/2004	59.6238	153.5170	15:45:39	9	Illiamna Bay
Harbor Porpoise	1	6/6/2004	59.6483	153.4553	15:47:04	9	Iniskin Bay
Harbor Porpoise	1	6/6/2004	59.6538	153.4503	15:47:15	9	Iniskin Bay
Harbor Porpoise	1	6/6/2004	59.6392	153.2862	15:56:55	9	Oil Bay
Harbor Porpoise	1	6/6/2004	59.6448	153.2833	15:59:07	9	Oil Bay
Harbor Porpoise	1	6/6/2004	59.6262	153.2470	15:59:59	9	Oil Bay
Harbor Porpoise	1	6/6/2004	59.6265	153.2507	16:00:01	9	Oil Bay
Harbor Porpoise	3	6/6/2004	59.6813	153.0640	16:03:44	9	Btwn Oil/ Chinitna Bay
Harbor Porpoise	1	6/6/2004	59.6850	153.0513	16:03:56	9	Btwn Oil/ Chinitna Bay
Harbor Porpoise	1	6/6/2004	59.6878	153.0422	16:04:07	9	Btwn Oil/ Chinitna Bay
Harbor Porpoise	1	6/6/2004	59.6917	153.0348	16:04:16	9	Btwn Oil/ Chinitna Bay
Harbor Porpoise	1	6/6/2004	59.7085	153.0207	16:04:52	9	Btwn Oil/ Chinitna Bay

Appendix -- Cont.

Common name	Group size	Date	Latitude (decimal degrees)	Longitude (decimal degrees)	Time (AK DST)	Flight no.	General location
Harbor Porpoise	1	6/6/2004	59.7105	153.0193	16:04:54	9	Btwn Oil/ Chinitna Bay
Harbor Porpoise	1	6/6/2004	59.7115	153.0188	16:04:56	9	Btwn Oil/ Chinitna Bay
Harbor Porpoise	1	6/6/2004	59.7115	153.0188	16:04:57	9	Btwn Oil/ Chinitna Bay
Harbor Porpoise	3	6/6/2004	59.7215	153.0113	16:05:17	9	Btwn Oil/ Chinitna Bay
Harbor Porpoise	1	6/6/2004	59.7215	153.0113	16:05:18	9	Btwn Oil/ Chinitna Bay
Harbor Porpoise	1	6/6/2004	59.7225	153.0105	16:05:19	9	Btwn Oil/ Chinitna Bay
Harbor Porpoise	3	6/6/2004	59.7225	153.0105	16:05:20	9	Btwn Oil/ Chinitna Bay
Harbor Porpoise	1	6/6/2004	59.7235	153.0098	16:05:21	9	Btwn Oil/ Chinitna Bay
Harbor Porpoise	1	6/6/2004	59.7265	153.0073	16:05:27	9	Btwn Oil/ Chinitna Bay
Harbor Porpoise	1	6/6/2004	59.7275	153.0065	16:05:28	9	Btwn Oil/ Chinitna Bay
Harbor Porpoise	1	6/6/2004	59.7285	153.0057	16:05:30	9	Btwn Oil/ Chinitna Bay
Harbor Porpoise	1	6/6/2004	59.7305	153.0042	16:05:36	9	Btwn Oil/ Chinitna Bay
Harbor Porpoise	1	6/6/2004	59.7315	153.0035	16:05:37	9	Btwn Oil/ Chinitna Bay
Harbor Porpoise	1	6/6/2004	59.7347	153.0018	16:05:43	9	Btwn Oil/ Chinitna Bay
Harbor Porpoise	1	6/6/2004	59.7387	152.9997	16:05:50	9	Btwn Oil/ Chinitna Bay
Harbor Porpoise	2	6/6/2004	59.7440	152.9970	16:06:01	9	Btwn Oil/ Chinitna Bay
Harbor Porpoise	1	6/6/2004	59.7450	152.9965	16:06:02	9	Btwn Oil/ Chinitna Bay
Harbor Porpoise	1	6/6/2004	59.7492	152.9945	16:06:12	9	Btwn Oil/ Chinitna Bay
Harbor Porpoise	3	6/6/2004	59.7623	152.9868	16:06:38	9	Btwn Oil/ Chinitna Bay
Harbor Porpoise	3	6/6/2004	59.7633	152.9860	16:06:39	9	Btwn Oil/ Chinitna Bay
Harbor Porpoise	2	6/6/2004	59.7633	152.9860	16:06:40	9	Btwn Oil/ Chinitna Bay
Harbor Porpoise	3	6/6/2004	59.7643	152.9850	16:06:41	9	Btwn Oil/ Chinitna Bay
Harbor Porpoise	1	6/6/2004	59.7653	152.9842	16:06:43	9	Btwn Oil/ Chinitna Bay
Harbor Porpoise	1	6/6/2004	59.7662	152.9833	16:06:44	9	Btwn Oil/ Chinitna Bay
Harbor Porpoise	3	6/6/2004	59.7662	152.9833	16:06:46	9	Btwn Oil/ Chinitna Bay
Harbor Porpoise	2	6/6/2004	59.7672	152.9825	16:06:48	9	Btwn Oil/ Chinitna Bay
Harbor Porpoise	2	6/6/2004	59.7682	152.9817	16:06:49	9	Btwn Oil/ Chinitna Bay
Harbor Porpoise	2	6/6/2004	59.7682	152.9817	16:06:50	9	Btwn Oil/ Chinitna Bay
Harbor Porpoise	2	6/6/2004	59.7690	152.9808	16:06:52	9	Btwn Oil/ Chinitna Bay
Harbor Porpoise	15	6/6/2004	59.7738	152.9772	16:07:00	9	Btwn Oil/ Chinitna Bay
Harbor Porpoise	1	6/6/2004	59.7768	152.9753	16:07:08	9	Btwn Oil/ Chinitna Bay
Harbor Porpoise	1	6/6/2004	59.8088	152.9670	16:08:08	9	Btwn Oil/ Chinitna Bay
Harbor Porpoise	2	6/4/2005	60.2102	151.7353	15:02:48	9	SW of Kalgin I./ mid inlet
Harbor Porpoise	2	6/8/2007	59.8979	152.4154	12:34:23	3	E of Chinitna Bay/ mid inlet
Harbor Porpoise	1	6/8/2007	59.9099	152.4074	12:34:47	3	NE of Chinitna Bay/ mid inlet
Harbor Porpoise	1	6/8/2007	59.9354	152.3792	12:35:42	3	NE of Chinitna Bay/ mid inlet
Harbor Porpoise	2	6/9/2008	60.0580	152.1040	14:07:24	10	SE of Tuxedni Bay/ mid inlet
Harbor Porpoise	1	6/9/2008	60.4455	151.7719	14:47:18	10	E of Kalgin I./ mid inlet
Harbor Porpoise	3	6/10/2008	60.3140	152.1563	9:23:49	11	S of Kalgin I./ mid inlet
Harbor Porpoise	1	6/7/2009	60.0980	152.2850	10:03:32	9	E of Tuxedni Bay/ mid inlet
Harbor Porpoise	1	6/7/2009	59.8200	152.4810	10:11:18	9	E of Chinitna Bay/ mid inlet
Harbor Porpoise	1	6/7/2009	59.8160	152.4840	10:11:25	9	E of Chinitna Bay/ mid inlet
Harbor Porpoise	1	6/7/2009	59.8030	152.4930	10:11:47	9	E of Chinitna Bay/ mid inlet
Harbor Porpoise	1	6/7/2009	59.7790	152.5070	10:12:26	9	E of Chinitna Bay/ mid inlet
Harbor Porpoise	1	6/7/2009	59.7300	152.5480	10:13:47	9	SE of Chinitna Bay/ mid inlet
Harbor Porpoise	2	6/7/2009	59.7250	152.5520	10:13:55	9	SE of Chinitna Bay/ mid inlet
Harbor Porpoise	1	6/7/2009	59.7190	152.5560	10:14:05	9	SE of Chinitna Bay/ mid inlet
Harbor Porpoise	1	6/7/2009	59.7160	152.5580	10:14:09	9	SE of Chinitna Bay/ mid inlet
Harbor Porpoise	4	6/7/2009	59.7110	152.5610	10:14:18	9	SE of Chinitna Bay/ mid inlet
Harbor Porpoise	1	6/7/2009	59.7050	152.5650	10:14:27	9	SE of Chinitna Bay/ mid inlet
Harbor Porpoise	1	6/7/2009	59.7030	152.5660	10:14:31	9	SE of Chinitna Bay/ mid inlet
Harbor Porpoise	1	6/7/2009	59.6930	152.5730	10:14:47	9	SE of Chinitna Bay/ mid inlet
Harbor Porpoise	1	6/7/2009	59.6840	152.5800	10:15:02	9	SE of Chinitna Bay/ mid inlet
Harbor Porpoise	1	6/7/2009	59.6680	152.5900	10:15:28	9	SE of Chinitna Bay/ mid inlet
Harbor Porpoise	2	6/7/2009	59.6540	152.6010	10:15:51	9	SE of Chinitna Bay/ mid inlet
Harbor Porpoise	2	6/7/2009	59.5350	152.6920	10:19:06	9	SE of Iniskin Bay/ mid inlet
Harbor Porpoise	1	6/7/2009	59.4920	152.7190	10:20:17	9	SE of Iniskin Bay/ mid inlet
Harbor Porpoise	2	6/7/2009	59.7600	152.9920	16:10:35	10	S of Chinitna Bay
Harbor Porpoise	1	6/7/2009	59.7770	152.9810	16:11:10	10	S of Chinitna Bay
Harbor Porpoise	1	6/7/2009	59.7850	152.9770	16:11:28	10	S of Chinitna Bay
Harbor Porpoise	1	6/7/2009	60.0010	152.5600	16:31:06	10	Btwn Chinitna/ Tuxedni Bay
Harbor Porpoise	1	6/7/2009	59.9870	152.5720	16:31:36	10	Btwn Chinitna/ Tuxedni Bay
Harbor Porpoise	1	6/7/2009	59.9960	152.5880	16:32:06	10	Btwn Chinitna/ Tuxedni Bay
Harbor Porpoise	1	6/7/2009	59.9950	152.5870	16:33:22	10	Btwn Chinitna/ Tuxedni Bay
Harbor Porpoise	2	6/7/2009	60.0330	152.5700	16:34:51	10	Btwn Chinitna/ Tuxedni Bay
Harbor Porpoise	1	6/7/2009	60.1560	152.5410	16:56:38	10	Tuxedni Bay
Harbor Porpoise	1	6/7/2009	60.1660	152.5460	17:02:05	10	Tuxedni Bay

Appendix -- Cont.

Common name	Group size	Date	Latitude (decimal degrees)	Longitude (decimal degrees)	Time (AK DST)	Flight no.	General location
Harbor Porpoise	3	6/7/2009	60.3750	152.2340	17:12:29	10	Harriet Pt.
Harbor Porpoise	1	6/7/2009	60.5250	152.2540	17:18:13	10	S of Drift R.
Harbor Porpoise	1	6/7/2009	60.5370	152.2300	17:18:46	10	S of Drift R.
Harbor Porpoise	1	6/8/2009	59.7260	151.1640	10:38:16	11	Kachemak Bay
Harbor Porpoise	1	6/5/2010	60.0430	152.3770	15:06:43	8	SE of Tuxedni Bay/ mid inlet
Harbor Porpoise	1	6/5/2010	60.1410	152.3290	15:11:07	8	E of Tuxedni Bay/ mid inlet
Harbor Porpoise	1	6/5/2010	60.2410	152.2120	15:16:08	8	S of Kalgin I./ mid inlet
Harbor Porpoise	2	6/5/2010	60.2770	152.1130	15:18:39	8	S of Kalgin I./ mid inlet
Harbor Porpoise	1	6/7/2010	59.6430	153.1590	12:54:36	9	Btwn Oil/ Chinitna Bay
Harbor Porpoise	1	6/7/2010	59.7120	153.0100	12:58:20	9	Btwn Oil/ Chinitna Bay
Harbor Porpoise	1	6/7/2010	59.7720	152.9750	13:00:31	9	Btwn Oil/ Chinitna Bay
Harbor Porpoise	1	6/7/2010	60.0500	152.5520	13:20:31	9	S of Tuxedni Bay
Harbor Porpoise	1	6/7/2010	60.3330	152.3390	13:43:16	9	S of Harriet Pt.
Harbor Porpoise	1	6/6/2011	60.0320	152.3640	10:29:36	10	SE of Tuxedni Bay/ mid inlet
Harbor Porpoise	3	6/6/2011	59.9290	152.3650	10:34:55	10	SE of Tuxedni Bay/ mid inlet
Harbor Porpoise	1	6/6/2011	59.9290	152.3640	10:34:56	10	SE of Tuxedni Bay/ mid inlet
Harbor Porpoise	1	6/6/2011	59.9190	152.3470	10:35:23	10	SE of Tuxedni Bay/ mid inlet
Harbor Porpoise	1	6/6/2011	59.9190	152.3460	10:35:24	10	SE of Tuxedni Bay/ mid inlet
Harbor Porpoise	4	6/6/2011	59.9160	152.3410	10:35:32	10	SE of Tuxedni Bay/ mid inlet
Harbor Porpoise	2	6/6/2011	59.8880	152.2890	10:36:51	10	SE of Tuxedni Bay/ mid inlet
Harbor Porpoise	2	6/6/2011	59.5470	152.6370	11:05:40	10	W of Kachemak Bay/ mid inlet
Harbor Porpoise	1	6/6/2011	59.5380	152.9060	11:09:48	10	SE of Iniskin Bay/ mid inlet
Harbor Porpoise	1	6/6/2011	59.4190	153.1410	11:31:12	10	SE of Iniskin Bay/ mid inlet
Harbor Porpoise	1	6/6/2011	59.3950	153.0080	11:33:47	10	E of Augustine I./ mid inlet
Harbor Porpoise	1	6/6/2011	59.6020	151.6100	13:57:40	11	Kachemak Bay
Harbor Porpoise	1	6/6/2011	59.4140	153.7870	15:46:21	11	N of Bruin Bay
Harbor Porpoise	1	6/6/2011	59.4160	153.7750	15:46:36	11	N of Bruin Bay
Harbor Porpoise	1	6/6/2011	59.6330	153.5930	15:58:55	11	Iliamna Bay
Harbor Porpoise	1	6/6/2011	60.3850	152.1810	17:39:32	11	Harriet Pt.
Harbor Porpoise	1	6/6/2011	60.6400	151.9940	17:51:16	11	Big R.
Harbor Porpoise	2	6/7/2011	60.1770	152.3840	13:42:51	13	E of Tuxedni Bay/ mid inlet
Harbor Porpoise	2	6/7/2011	60.2080	152.4110	13:44:40	13	E of Tuxedni Bay/ mid inlet
Harbor Porpoise	1	6/7/2011	60.2310	152.1790	13:49:04	13	S of Kalgin I.
Harbor Porpoise	1	6/7/2011	60.2620	151.8170	13:56:03	13	SE of Kalgin I./ mid inlet
Harbor Porpoise	1	5/29/2012	60.6210	151.5870	11:02:05	1	S of Forelands/ mid inlet
Harbor Porpoise	1	5/29/2012	60.1300	151.7910	11:26:52	1	E of Tuxedni Bay/ mid inlet
Harbor Porpoise	1	5/29/2012	60.1040	152.1740	11:32:20	1	E of Tuxedni Bay/ mid inlet
Harbor Porpoise	3	5/29/2012	60.0340	152.4240	11:38:44	1	E of Tuxedni Bay/ mid inlet
Harbor Porpoise	1	5/29/2012	60.0110	152.3790	11:39:50	1	SE of Tuxedni Bay/ mid inlet
Harbor Porpoise	2	5/30/2012	59.7870	152.4750	14:35:27	4	W of Anchor Pt./ mid inlet
Harbor Porpoise	1	5/30/2012	60.3690	151.6200	15:28:33	4	E of Kalgin I./ mid inlet
Harbor Porpoise	1	5/31/2012	59.9440	152.6490	11:40:39	5	Btwn Chinitna/ Tuxedni Bay
Walrus	57	6/3/2005	60.2115	152.7813	16:40:25	7	Tuxedni Bay
Steller Sea Lion	1	6/4/1994	58.8865	153.2960	11:25:04	6	Cape Douglas
Steller Sea Lion	3	6/4/1994	58.8865	153.2960	11:25:05	6	Cape Douglas
Steller Sea Lion	1	6/4/1994	58.9722	153.3903	11:28:27	6	Shaw I.
Steller Sea Lion	1	6/4/1994	58.9757	153.3937	11:28:35	6	Shaw I.
Steller Sea Lion	1	6/4/1994	58.9793	153.4027	11:28:48	6	Shaw I.
Steller Sea Lion	1	6/4/1994	59.0850	153.6837	11:35:27	6	Shaw I.
Steller Sea Lion	1	6/4/1994	59.0853	154.0315	11:41:30	6	Akumwarvik Bay
Steller Sea Lion	1	6/4/1994	59.6200	153.3028	12:57:19	6	Btwn Iniskin/ Oil Bay
Steller Sea Lion	31	7/22/1995	58.9957	153.4088	15:17:18	10	Kamishak Bay
Steller Sea Lion	40	7/22/1995	59.1090	153.6850	15:24:39	10	Akumwarvik Bay
Steller Sea Lion	35	7/22/1995	59.1148	153.7178	15:25:17	10	Akumwarvik Bay
Steller Sea Lion	75	7/22/1995	59.6320	153.4455	16:48:44	10	Iniskin Bay
Steller Sea Lion	40	7/22/1995	59.6163	153.3208	16:50:47	10	Iniskin Bay
Steller Sea Lion	1	6/14/1996	59.2037	151.8675	12:22:52	5	Elizabeth I.
Steller Sea Lion	1	6/14/1996	59.1620	151.8950	12:25:15	5	Elizabeth I.
Steller Sea Lion	25	6/14/1996	59.1413	151.8733	12:26:51	5	Elizabeth I.
Steller Sea Lion	70	6/14/1996	59.1402	151.8632	12:27:07	5	Elizabeth I.
Steller Sea Lion	1	6/15/1996	59.6065	152.4802	12:22:37	7	SW of Anchor Pt./ mid inlet
Steller Sea Lion	1	6/15/1996	59.5452	152.1973	12:27:21	7	SW of Anchor Pt./ mid inlet
Steller Sea Lion	1	6/15/1996	59.3783	153.9517	16:20:16	8	Bruin Bay
Steller Sea Lion	1	6/9/1997	59.4840	151.5818	11:49:03	2	Kachemak Bay
Steller Sea Lion	25	6/9/1997	59.1377	151.8718	12:08:08	2	Elizabeth I.

Appendix -- Cont.

Common name	Group size	Date	Latitude (decimal degrees)	Longitude (decimal degrees)	Time (AK DST)	Flight no.	General location
Steller Sea Lion	1	6/10/1999	59.8303	152.7258	15:20:19	4	Chinitna Bay
Steller Sea Lion	1	6/14/1999	59.5160	153.2965	14:39:01	12	NE of Augustine I.
Steller Sea Lion	3	6/9/2000	58.8432	153.3302	13:43:26	4	Cape Douglas
Steller Sea Lion	1	6/9/2000	58.8553	153.2177	13:45:51	4	Cape Douglas
Steller Sea Lion	6	6/9/2000	59.1608	151.9060	14:30:47	4	Elizabeth I.
Steller Sea Lion	2	6/8/2001	59.4660	151.7270	12:28:22	7	Kachemak Bay
Steller Sea Lion	1	6/8/2001	59.3473	151.9355	14:29:12	8	Port Graham
Steller Sea Lion	1	6/8/2001	59.1372	151.8620	14:47:15	8	Elizabeth I.
Steller Sea Lion	2	6/9/2001	58.8367	153.3183	12:01:25	9	Cape Douglas
Steller Sea Lion	20	6/9/2001	58.9810	153.3798	12:09:49	9	Shaw I.
Steller Sea Lion	1	6/4/2002	58.9290	153.3257	12:00:18	1	Cape Douglas
Steller Sea Lion	42	6/4/2002	58.9702	153.3930	12:02:21	1	Shaw I.
Steller Sea Lion	1	6/4/2002	59.6157	153.3280	16:10:27	2	Oil Bay
Steller Sea Lion	4	6/4/2002	59.6405	153.1715	16:19:49	2	Oil Bay
Steller Sea Lion	6	6/4/2002	59.6515	153.1462	16:20:24	2	Oil Bay
Steller Sea Lion	2	6/5/2002	59.1505	151.8822	14:59:24	4	Elizabeth I.
Steller Sea Lion	76	6/7/2003	59.1378	151.8763	12:42:48	10	Elizabeth I.
Steller Sea Lion	1	6/7/2003	59.1285	151.8128	12:44:07	10	Elizabeth I.
Steller Sea Lion	1	6/6/2004	59.1420	153.9168	12:49:20	8	Kamishak Bay
Steller Sea Lion	5	6/3/2005	58.8522	153.2472	10:52:33	6	Cape Douglas
Steller Sea Lion	82	6/3/2005	58.9787	153.3935	11:00:36	6	Shaw I.
Steller Sea Lion	10	6/3/2005	58.9895	153.4685	11:03:56	6	Shaw I.
Steller Sea Lion	2	6/3/2005	58.9978	153.5140	11:06:59	6	Shaw I.
Steller Sea Lion	5	6/3/2005	58.9933	153.5297	11:07:21	6	Shaw I.
Steller Sea Lion	20	6/10/2006	59.6147	151.8427	12:37:02	6	Kachemak Bay
Steller Sea Lion	10	6/13/2006	58.9755	153.3848	10:57:21	12	Shaw I.
Steller Sea Lion	53	6/13/2006	58.9759	153.3854	10:57:22	12	Shaw I.
Steller Sea Lion	1	6/13/2006	59.2967	154.0962	11:40:58	12	S of Bruin Bay
Steller Sea Lion	75	6/10/2008	58.9709	153.3885	11:31:25	11	Shaw I.
Steller Sea Lion	20	6/7/2009	58.9790	153.3920	11:21:39	9	Shaw I.
Steller Sea Lion	4	6/7/2009	59.3100	153.5060	12:06:47	9	Augustine I.
Steller Sea Lion	15	6/7/2009	59.3160	153.4130	12:11:06	9	Augustine I.
Steller Sea Lion	100	6/6/2011	58.9780	153.3950	15:07:25	11	Shaw I.
Steller Sea Lion	20	5/29/2012	58.9710	153.3750	14:55:29	2	Shaw I.
Steller Sea Lion	45	5/29/2012	58.9720	153.3910	15:04:28	2	Shaw I.
Sea Otter	1	6/4/1993	59.5410	151.4975	11:48:40	3	Kachemak Bay
Sea Otter	1	6/4/1993	59.4883	151.6132	11:52:06	3	Kachemak Bay
Sea Otter	1	6/4/1993	59.4930	151.6427	11:52:45	3	Kachemak Bay
Sea Otter	3	6/4/1993	59.4775	151.7002	11:54:07	3	Kachemak Bay
Sea Otter	2	6/4/1993	59.4628	151.7217	11:54:53	3	Kachemak Bay
Sea Otter	1	6/4/1993	59.5212	151.8285	12:01:39	3	Kachemak Bay
Sea Otter	1	6/4/1993	59.5288	151.8383	12:02:01	3	Kachemak Bay
Sea Otter	1	6/4/1993	59.5745	151.8872	12:04:01	3	Kachemak Bay
Sea Otter	1	6/4/1993	59.5872	151.9000	12:04:34	3	Kachemak Bay
Sea Otter	1	7/27/1993	59.4825	151.6905	12:05:38	3	Kachemak Bay
Sea Otter	1	7/27/1993	59.4778	151.7050	12:05:55	3	Kachemak Bay
Sea Otter	1	7/27/1993	59.4767	151.7087	12:05:58	3	Kachemak Bay
Sea Otter	1	7/27/1993	59.4703	151.7263	12:06:18	3	Kachemak Bay
Sea Otter	1	7/27/1993	59.4697	151.7280	12:06:21	3	Kachemak Bay
Sea Otter	2	6/3/1994	59.6707	151.7383	10:50:55	4	Kachemak Bay
Sea Otter	1	6/3/1994	59.6750	151.3428	10:57:32	4	Kachemak Bay
Sea Otter	1	6/3/1994	59.7058	151.2457	10:59:15	4	Kachemak Bay
Sea Otter	1	6/3/1994	59.4777	151.6887	12:51:52	5	Kachemak Bay
Sea Otter	2	6/3/1994	59.4760	151.7040	12:52:13	5	Kachemak Bay
Sea Otter	1	6/3/1994	59.4615	151.7400	12:52:56	5	Kachemak Bay
Sea Otter	2	7/22/1995	59.6410	151.6283	10:58:13	9	Kachemak Bay
Sea Otter	25	7/22/1995	59.6362	151.6017	10:58:38	9	Kachemak Bay
Sea Otter	12	7/22/1995	59.6348	151.5925	10:58:45	9	Kachemak Bay
Sea Otter	2	7/22/1995	59.6335	151.5833	10:58:53	9	Kachemak Bay
Sea Otter	2	7/22/1995	59.6290	151.5560	10:59:17	9	Kachemak Bay
Sea Otter	1	7/22/1995	59.6047	151.4512	11:00:56	9	Kachemak Bay
Sea Otter	25	7/22/1995	59.3677	151.8818	11:37:28	9	English Bay
Sea Otter	20	7/22/1995	59.3315	151.7878	11:39:21	9	English Bay
Sea Otter	1	7/22/1995	59.3397	151.7782	11:40:51	9	Port Graham
Sea Otter	2	7/22/1995	59.3567	151.8062	11:41:33	9	Port Graham
Sea Otter	3	7/22/1995	59.0182	153.3752	15:16:18	10	Shaw I.

Appendix -- Cont.

Common name	Group size	Date	Latitude (decimal degrees)	Longitude (decimal degrees)	Time (AK DST)	Flight no.	General location
Sea Otter	1	7/22/1995	59.0930	153.8138	15:26:59	10	Akumwarvik Bay
Sea Otter	15	7/22/1995	59.3697	154.0298	15:57:44	10	Bruin Bay
Sea Otter	3	6/14/1996	59.6382	151.4487	11:42:43	5	Kachemak Bay
Sea Otter	2	6/14/1996	59.6993	151.2622	11:46:25	5	Kachemak Bay
Sea Otter	10	6/14/1996	59.7562	151.1302	11:49:12	5	Kachemak Bay
Sea Otter	100	6/14/1996	59.7623	151.1118	11:49:32	5	Kachemak Bay
Sea Otter	45	6/14/1996	59.5488	151.4688	12:05:32	5	Kachemak Bay
Sea Otter	1	6/15/1996	59.4803	151.8833	12:32:35	7	Kachemak Bay
Sea Otter	1	6/15/1996	59.4160	153.4707	15:10:43	8	Augustine I.
Sea Otter	4	6/15/1996	59.4148	153.4737	15:10:47	8	Augustine I.
Sea Otter	3	6/15/1996	59.4127	153.4780	15:10:54	8	Augustine I.
Sea Otter	1	6/15/1996	59.4105	153.4823	15:11:00	8	Augustine I.
Sea Otter	1	6/15/1996	59.4077	153.4882	15:11:07	8	Augustine I.
Sea Otter	1	6/15/1996	59.4045	153.5455	15:12:07	8	Augustine I.
Sea Otter	1	6/15/1996	59.4012	153.5645	15:12:25	8	Augustine I.
Sea Otter	1	6/15/1996	59.3590	153.3235	15:19:53	8	Augustine I.
Sea Otter	9	6/15/1996	59.3890	153.3417	15:20:56	8	Augustine I.
Sea Otter	1	6/15/1996	58.9470	153.3713	15:42:27	8	Cape Douglas
Sea Otter	1	6/15/1996	58.9532	153.3778	15:42:42	8	Cape Douglas
Sea Otter	1	6/15/1996	59.0722	153.8997	15:54:06	8	Cape Douglas
Sea Otter	1	6/15/1996	59.3805	153.9810	16:20:45	8	Bruin Bay
Sea Otter	1	6/15/1996	59.3803	153.9412	16:26:51	8	Bruin Bay
Sea Otter	1	6/15/1996	59.5123	153.7137	16:33:30	8	S of Ursus Cove
Sea Otter	1	6/15/1996	59.5320	153.7523	16:37:36	8	Ursus Cove
Sea Otter	1	6/15/1996	59.6437	153.4375	17:06:25	8	Iniskin Bay
Sea Otter	2	6/15/1996	59.6368	153.4313	17:06:40	8	Iniskin Bay
Sea Otter	1	6/15/1996	59.6327	153.4175	17:06:56	8	Iniskin Bay
Sea Otter	1	6/15/1996	59.6200	153.3610	17:07:59	8	Btwn Iniskin/ Oil Bay
Sea Otter	1	6/9/1997	59.6207	151.5175	11:10:20	2	Kachemak Bay
Sea Otter	6	6/9/1997	59.6950	151.2607	11:18:03	2	Kachemak Bay
Sea Otter	7	6/9/1997	59.7178	151.1953	11:19:24	2	Kachemak Bay
Sea Otter	20	6/9/1997	59.7295	151.1653	11:20:03	2	Kachemak Bay
Sea Otter	4	6/9/1997	59.7413	151.1425	11:20:37	2	Kachemak Bay
Sea Otter	8	6/9/1997	59.7482	151.1297	11:20:56	2	Kachemak Bay
Sea Otter	1	6/9/1997	59.7593	151.1015	11:21:32	2	Kachemak Bay
Sea Otter	1	6/9/1997	59.6558	151.2185	11:31:53	2	Kachemak Bay
Sea Otter	1	6/9/1997	59.5608	151.3835	11:38:03	2	Kachemak Bay
Sea Otter	11	6/9/1997	59.5592	151.4008	11:38:21	2	Kachemak Bay
Sea Otter	22	6/9/1997	59.5507	151.4735	11:40:19	2	Kachemak Bay
Sea Otter	1	6/9/1997	59.5228	151.9840	14:29:23	3	Kachemak Bay
Sea Otter	1	6/9/1997	59.5115	152.0082	14:29:49	3	Kachemak Bay
Sea Otter	1	6/9/1997	59.4985	152.0342	14:30:19	3	Kachemak Bay
Sea Otter	2	6/9/1997	59.0695	153.6712	15:05:13	3	Kamishak Bay
Sea Otter	2	6/9/1997	59.1002	153.6727	15:06:23	3	Kamishak Bay
Sea Otter	1	6/9/1997	59.1055	153.6807	15:06:36	3	Kamishak Bay
Sea Otter	1	6/9/1997	59.1110	153.7013	15:06:58	3	Kamishak Bay
Sea Otter	40	6/9/1997	59.0928	154.0265	15:13:08	3	Kamishak Bay
Sea Otter	1	6/9/1997	59.1277	154.1670	15:26:58	3	Kamishak Bay
Sea Otter	1	6/9/1997	59.4118	153.8823	15:46:50	3	N of Bruin Bay
Sea Otter	1	6/9/1997	59.3157	153.4255	15:57:16	3	Augustine I.
Sea Otter	2	6/9/1997	59.3223	153.3860	15:58:04	3	Augustine I.
Sea Otter	2	6/9/1997	59.4265	153.4313	16:02:50	3	Augustine I.
Sea Otter	1	6/9/1997	59.4240	153.4430	16:03:05	3	Augustine I.
Sea Otter	5	6/9/1997	59.4147	153.4743	16:03:44	3	Augustine I.
Sea Otter	1	6/9/1997	59.4278	153.6862	16:07:32	3	N of Bruin Bay
Sea Otter	1	6/9/1997	59.6483	153.6150	16:26:37	3	Iliamna Bay
Sea Otter	1	6/13/1998	59.6382	151.6550	12:40:11	4	Kachemak Bay
Sea Otter	7	6/13/1998	59.6253	151.5918	12:41:25	4	Kachemak Bay
Sea Otter	1	6/13/1998	59.6237	151.5677	12:41:50	4	Kachemak Bay
Sea Otter	5	6/13/1998	59.6088	151.4670	12:43:44	4	Kachemak Bay
Sea Otter	2	6/13/1998	59.6618	151.3613	12:48:35	4	Kachemak Bay
Sea Otter	2	6/13/1998	59.6732	151.3230	12:49:21	4	Kachemak Bay
Sea Otter	1	6/13/1998	59.6758	151.3128	12:49:34	4	Kachemak Bay
Sea Otter	2	6/13/1998	59.6895	151.2687	12:50:27	4	Kachemak Bay
Sea Otter	4	6/13/1998	59.7515	151.1195	12:53:51	4	Kachemak Bay
Sea Otter	55	6/13/1998	59.5603	151.4188	13:11:15	4	Kachemak Bay
Sea Otter	1	6/13/1998	59.5370	151.4660	13:12:41	4	Kachemak Bay

Appendix -- Cont.

Common name	Group size	Date	Latitude (decimal degrees)	Longitude (decimal degrees)	Time (AK DST)	Flight no.	General location
Sea Otter	1	6/13/1998	59.4905	151.5190	13:14:49	4	Kachemak Bay
Sea Otter	1	6/13/1998	59.5678	151.7685	14:49:16	4	Kachemak Bay
Sea Otter	1	6/13/1998	59.5692	151.7670	14:49:19	4	Kachemak Bay
Sea Otter	1	6/13/1998	59.5918	151.7172	14:50:28	4	Kachemak Bay
Sea Otter	1	6/13/1998	59.6335	151.5882	14:53:13	4	Kachemak Bay
Sea Otter	1	6/14/1998	61.0262	151.1458	11:26:50	6	Kachemak Bay
Sea Otter	1	6/14/1998	59.6010	151.4535	14:35:21	7	Kachemak Bay
Sea Otter	1	6/14/1998	59.6277	151.5783	15:47:22	8	Kachemak Bay
Sea Otter	1	6/14/1998	59.6273	151.6110	15:48:02	8	Kachemak Bay
Sea Otter	1	6/14/1998	59.6138	151.7985	15:51:38	8	Kachemak Bay
Sea Otter	1	6/14/1998	59.4280	153.4198	16:23:28	8	Augustine I.
Sea Otter	1	6/14/1998	59.4280	153.4215	16:23:30	8	Augustine I.
Sea Otter	1	6/14/1998	59.4240	153.4483	16:24:01	8	Augustine I.
Sea Otter	3	6/14/1998	59.4155	153.4768	16:24:39	8	Augustine I.
Sea Otter	1	6/14/1998	59.4063	153.5402	16:26:00	8	Augustine I.
Sea Otter	1	6/14/1998	59.3920	153.3368	16:35:19	8	Augustine I.
Sea Otter	1	6/14/1998	59.0303	153.6067	17:02:41	8	Kamishak Bay
Sea Otter	1	6/14/1998	59.0327	153.6087	17:02:49	8	Kamishak Bay
Sea Otter	5	6/14/1998	59.0457	153.6238	17:03:22	8	Kamishak Bay
Sea Otter	1	6/14/1998	59.0450	153.6233	17:08:17	8	Kamishak Bay
Sea Otter	2	6/14/1998	59.0827	153.8242	17:09:41	8	Kamishak Bay
Sea Otter	4	6/14/1998	59.0722	153.8652	17:10:37	8	Kamishak Bay
Sea Otter	12	6/14/1998	59.0757	153.9105	17:11:36	8	Kamishak Bay
Sea Otter	1	6/14/1998	59.0775	153.9302	17:11:57	8	Kamishak Bay
Sea Otter	4	6/14/1998	59.0785	153.9418	17:12:12	8	Kamishak Bay
Sea Otter	4	6/14/1998	59.0830	153.9718	17:12:48	8	Kamishak Bay
Sea Otter	1	6/14/1998	59.0877	154.0333	17:13:59	8	Akumwarvik Bay
Sea Otter	180	6/14/1998	59.0857	154.0658	17:14:38	8	Akumwarvik Bay
Sea Otter	1	6/14/1998	59.1930	154.1312	17:28:45	8	Nordyke I.
Sea Otter	1	6/14/1998	60.3962	151.9595	18:28:25	8	Kalgin I.
Sea Otter	1	6/10/1999	59.6760	151.7442	11:16:59	3	Kachemak Bay
Sea Otter	1	6/10/1999	59.6755	151.7425	11:17:00	3	Kachemak Bay
Sea Otter	2	6/10/1999	59.6747	151.7398	11:17:04	3	Kachemak Bay
Sea Otter	2	6/10/1999	59.6617	151.7093	11:17:48	3	Kachemak Bay
Sea Otter	1	6/10/1999	59.6543	151.6878	11:18:17	3	Kachemak Bay
Sea Otter	5	6/10/1999	59.6502	151.6768	11:18:32	3	Kachemak Bay
Sea Otter	2	6/10/1999	59.6482	151.6705	11:18:42	3	Kachemak Bay
Sea Otter	5	6/10/1999	59.6468	151.6658	11:18:50	3	Kachemak Bay
Sea Otter	1	6/10/1999	59.6408	151.6327	11:19:27	3	Kachemak Bay
Sea Otter	1	6/10/1999	59.6405	151.6303	11:19:30	3	Kachemak Bay
Sea Otter	12	6/10/1999	59.6403	151.6285	11:19:32	3	Kachemak Bay
Sea Otter	1	6/10/1999	59.6388	151.6165	11:19:45	3	Kachemak Bay
Sea Otter	1	6/10/1999	59.6362	151.5917	11:20:13	3	Kachemak Bay
Sea Otter	2	6/10/1999	59.6257	151.5130	11:21:46	3	Kachemak Bay
Sea Otter	70	6/10/1999	59.6750	151.3658	11:36:46	3	Kachemak Bay
Sea Otter	2	6/10/1999	59.6720	151.1493	11:56:04	3	Kachemak Bay
Sea Otter	1	6/10/1999	59.5590	151.3812	12:03:41	3	Kachemak Bay
Sea Otter	2	6/10/1999	59.4837	151.5922	12:08:52	3	Kachemak Bay
Sea Otter	1	6/10/1999	59.3438	151.9770	12:18:54	3	Kachemak Bay
Sea Otter	3	6/10/1999	59.6220	151.4782	13:06:46	3	Kachemak Bay
Sea Otter	1	6/10/1999	60.2643	151.4113	16:21:50	4	S of Kasilof R.
Sea Otter	1	6/14/1999	59.6248	151.7473	11:54:35	11	Kachemak Bay
Sea Otter	2	6/14/1999	59.5972	151.5225	14:00:45	12	Kachemak Bay
Sea Otter	1	6/14/1999	59.5850	151.5990	14:01:51	12	Kachemak Bay
Sea Otter	1	6/14/1999	59.5840	151.6058	14:01:58	12	Kachemak Bay
Sea Otter	1	6/14/1999	59.5813	151.7018	14:03:24	12	Kachemak Bay
Sea Otter	1	6/14/1999	59.5818	151.7608	14:04:18	12	Kachemak Bay
Sea Otter	2	6/14/1999	59.5818	151.7718	14:04:27	12	Kachemak Bay
Sea Otter	2	6/14/1999	59.5820	151.7807	14:04:35	12	Kachemak Bay
Sea Otter	1	6/14/1999	59.5823	151.8168	14:05:09	12	Kachemak Bay
Sea Otter	1	6/14/1999	59.5825	151.8190	14:05:13	12	Kachemak Bay
Sea Otter	3	6/14/1999	59.5840	151.9635	14:07:34	12	Kachemak Bay
Sea Otter	6	6/14/1999	59.5848	151.9843	14:07:56	12	Kachemak Bay
Sea Otter	2	6/14/1999	59.0182	153.4078	15:43:57	12	Shaw I.
Sea Otter	1	6/14/1999	59.5367	153.7380	16:21:18	12	Ursus Cove
Sea Otter	3	6/9/2000	59.0795	154.1402	13:12:45	4	Akumwarvik Bay
Sea Otter	1	6/9/2000	59.0815	153.9280	13:24:49	4	Kamishak Bay

Appendix -- Cont.

Common name	Group size	Date	Latitude (decimal degrees)	Longitude (decimal degrees)	Time (AK DST)	Flight no.	General location
Sea Otter	1	6/9/2000	59.0770	153.9048	13:25:16	4	Kamishak Bay
Sea Otter	1	6/9/2000	59.0733	153.8858	13:25:36	4	Kamishak Bay
Sea Otter	1	6/9/2000	59.0698	153.8685	13:25:53	4	Kamishak Bay
Sea Otter	1	6/9/2000	59.0898	153.6570	13:30:29	4	Kamishak Bay
Sea Otter	1	6/9/2000	59.0660	153.6573	13:31:16	4	Kamishak Bay
Sea Otter	1	6/9/2000	59.0340	153.6135	13:32:32	4	Kamishak Bay
Sea Otter	1	6/9/2000	58.9535	153.3683	13:38:25	4	Shaw I.
Sea Otter	1	6/9/2000	58.9502	153.3645	13:38:34	4	Shaw I.
Sea Otter	1	6/9/2000	58.9502	153.3645	13:38:35	4	Shaw I.
Sea Otter	1	6/9/2000	59.3132	152.0065	14:36:03	4	S of Port Graham
Sea Otter	1	6/9/2000	59.4767	153.4402	16:27:44	5	Augustine I.
Sea Otter	10	6/9/2000	59.4752	153.4967	16:28:43	5	Augustine I.
Sea Otter	2	6/9/2000	59.4748	153.5063	16:28:53	5	Augustine I.
Sea Otter	2	6/9/2000	59.4745	153.5160	16:29:02	5	Augustine I.
Sea Otter	1	6/9/2000	59.4403	153.5820	16:34:29	5	Augustine I.
Sea Otter	10	6/9/2000	59.4345	153.5547	16:35:00	5	Augustine I.
Sea Otter	1	6/9/2000	59.3388	153.1687	16:57:52	5	Augustine I.
Sea Otter	25	6/10/2000	59.7025	151.8048	12:53:17	6	Kachemak Bay
Sea Otter	40	6/10/2000	59.6538	151.4497	13:01:25	6	Kachemak Bay
Sea Otter	6	6/10/2000	59.4222	151.7182	14:35:59	7	Kachemak Bay
Sea Otter	6	6/10/2000	59.4340	151.7268	14:36:40	7	Kachemak Bay
Sea Otter	2	6/10/2000	59.4718	151.7175	14:38:14	7	Kachemak Bay
Sea Otter	50	6/10/2000	59.4775	151.6977	14:38:38	7	Kachemak Bay
Sea Otter	2	6/10/2000	59.4850	151.6753	14:39:10	7	Kachemak Bay
Sea Otter	1	6/10/2000	59.4773	151.5640	14:41:42	7	Kachemak Bay
Sea Otter	1	6/10/2000	59.5558	151.3887	14:49:02	7	Kachemak Bay
Sea Otter	6	6/10/2000	59.7048	151.2480	15:14:32	7	Kachemak Bay
Sea Otter	4	6/10/2000	59.6940	151.2815	15:15:14	7	Kachemak Bay
Sea Otter	3	6/10/2000	59.6928	151.2845	15:15:21	7	Kachemak Bay
Sea Otter	1	6/10/2000	59.6928	151.2845	15:15:22	7	Kachemak Bay
Sea Otter	2	6/10/2000	59.6877	151.2987	15:15:38	7	Kachemak Bay
Sea Otter	3	6/10/2000	59.6867	151.3013	15:15:43	7	Kachemak Bay
Sea Otter	2	6/10/2000	59.6808	151.3215	15:16:08	7	Kachemak Bay
Sea Otter	9	6/10/2000	59.6792	151.3303	15:16:20	7	Kachemak Bay
Sea Otter	1	6/10/2000	59.6760	151.3477	15:16:39	7	Kachemak Bay
Sea Otter	4	6/10/2000	59.6732	151.3628	15:17:00	7	Kachemak Bay
Sea Otter	1	6/10/2000	59.6705	151.3742	15:17:10	7	Kachemak Bay
Sea Otter	1	6/10/2000	59.6695	151.3792	15:17:16	7	Kachemak Bay
Sea Otter	15	6/10/2000	59.6630	151.4073	15:17:51	7	Kachemak Bay
Sea Otter	32	6/10/2000	59.6620	151.4105	15:17:54	7	Kachemak Bay
Sea Otter	1	6/8/2001	59.6843	151.2832	11:36:41	7	Kachemak Bay
Sea Otter	3	6/8/2001	59.6843	151.2832	11:36:42	7	Kachemak Bay
Sea Otter	2	6/8/2001	59.6880	151.2680	11:37:02	7	Kachemak Bay
Sea Otter	1	6/8/2001	59.7168	151.1638	11:42:15	7	Kachemak Bay
Sea Otter	1	6/8/2001	59.7648	151.0772	11:51:17	7	Kachemak Bay
Sea Otter	1	6/8/2001	59.7667	151.0730	11:51:22	7	Kachemak Bay
Sea Otter	23	6/8/2001	59.7057	151.1290	11:59:05	7	Kachemak Bay
Sea Otter	1	6/8/2001	59.4872	151.5077	12:22:32	7	Kachemak Bay
Sea Otter	2	6/8/2001	59.4095	151.7045	12:30:37	7	Kachemak Bay
Sea Otter	1	6/8/2001	59.4722	151.7170	12:33:39	7	Kachemak Bay
Sea Otter	1	6/8/2001	59.3850	151.9172	14:17:24	8	Port Graham
Sea Otter	1	6/8/2001	59.3685	151.8937	14:24:58	8	Port Graham
Sea Otter	7	6/8/2001	59.3688	151.9047	14:25:16	8	Port Graham
Sea Otter	2	6/8/2001	59.3672	151.9188	14:25:31	8	Port Graham
Sea Otter	1	6/8/2001	59.3568	151.9262	14:29:45	8	Port Graham
Sea Otter	6	6/9/2001	59.0867	153.6482	12:17:54	9	Kamishak Bay
Sea Otter	1	6/9/2001	59.1497	153.9197	12:24:51	9	Kamishak Bay
Sea Otter	1	6/9/2001	59.1213	154.0210	12:27:19	9	Akumwarvik Bay
Sea Otter	1	6/9/2001	59.1155	154.0288	12:27:34	9	Akumwarvik Bay
Sea Otter	1	6/9/2001	59.1092	154.0352	12:27:50	9	Akumwarvik Bay
Sea Otter	4	6/9/2001	59.1050	154.0383	12:28:02	9	Akumwarvik Bay
Sea Otter	2	6/9/2001	59.4112	153.8012	12:50:09	9	N of Bruin Bay
Sea Otter	1	6/9/2001	59.4472	153.6150	12:54:07	9	Kamishak Bay
Sea Otter	1	6/4/2002	59.0857	154.0573	12:27:30	1	Akumwarvik Bay
Sea Otter	1	6/4/2002	59.0852	154.0632	12:27:36	1	Akumwarvik Bay
Sea Otter	10	6/4/2002	59.4472	153.6173	13:02:46	1	Ursus Cove
Sea Otter	20	6/4/2002	59.4442	153.5917	13:03:16	1	Augustine I.

Appendix -- Cont.

Common name	Group size	Date	Latitude (decimal degrees)	Longitude (decimal degrees)	Time (AK DST)	Flight no.	General location
Sea Otter	25	6/4/2002	59.4395	153.5560	13:03:58	1	Augustine I.
Sea Otter	1	6/4/2002	59.6193	151.7243	13:37:20	1	Kachemak Bay
Sea Otter	1	6/4/2002	59.6233	151.6817	13:37:50	1	Kachemak Bay
Sea Otter	1	6/4/2002	59.5747	151.6253	14:47:23	2	Kachemak Bay
Sea Otter	1	6/5/2002	59.6358	151.6172	11:18:21	3	Kachemak Bay
Sea Otter	1	6/5/2002	59.6310	151.5785	11:18:59	3	Kachemak Bay
Sea Otter	6	6/5/2002	59.6265	151.5440	11:19:33	3	Kachemak Bay
Sea Otter	2	6/5/2002	59.6660	151.3772	11:26:05	3	Kachemak Bay
Sea Otter	15	6/5/2002	59.6750	151.3333	11:26:50	3	Kachemak Bay
Sea Otter	3	6/5/2002	59.6808	151.3062	11:27:18	3	Kachemak Bay
Sea Otter	25	6/5/2002	59.6820	151.3023	11:27:25	3	Kachemak Bay
Sea Otter	9	6/5/2002	59.6853	151.2917	11:27:36	3	Kachemak Bay
Sea Otter	25	6/5/2002	59.6907	151.2760	11:27:53	3	Kachemak Bay
Sea Otter	6	6/5/2002	59.7010	151.2488	11:28:25	3	Kachemak Bay
Sea Otter	1	6/5/2002	59.7095	151.2250	11:28:53	3	Kachemak Bay
Sea Otter	6	6/5/2002	59.7143	151.2112	11:29:10	3	Kachemak Bay
Sea Otter	1	6/5/2002	59.7712	151.0782	11:31:57	3	Kachemak Bay
Sea Otter	1	6/5/2002	59.5752	151.3082	11:53:07	3	Kachemak Bay
Sea Otter	1	6/5/2002	59.4333	151.7267	14:06:40	4	Seldovia Bay
Sea Otter	2	6/5/2002	59.3397	151.7780	14:17:02	4	Seldovia Bay
Sea Otter	1	6/5/2002	59.3607	151.8345	14:18:26	4	Seldovia Bay
Sea Otter	4	6/5/2002	59.2228	151.9218	14:29:57	4	Seldovia Bay
Sea Otter	1	6/5/2002	59.1617	151.8767	14:58:58	4	Elizabeth I.
Sea Otter	1	6/7/2003	59.6313	151.6030	11:04:58	10	Kachemak Bay
Sea Otter	1	6/7/2003	59.6237	151.5202	11:06:25	10	Kachemak Bay
Sea Otter	1	6/7/2003	59.6070	151.4642	11:07:34	10	Kachemak Bay
Sea Otter	20	6/7/2003	59.6652	151.3863	11:12:18	10	Kachemak Bay
Sea Otter	15	6/7/2003	59.6705	151.3667	11:12:40	10	Kachemak Bay
Sea Otter	3	6/7/2003	59.6798	151.3155	11:13:33	10	Kachemak Bay
Sea Otter	19	6/7/2003	59.6952	151.2710	11:14:24	10	Kachemak Bay
Sea Otter	40	6/7/2003	59.7045	151.2463	11:14:55	10	Kachemak Bay
Sea Otter	6	6/7/2003	59.7117	151.2262	11:15:19	10	Kachemak Bay
Sea Otter	8	6/7/2003	59.7135	151.2212	11:15:25	10	Kachemak Bay
Sea Otter	4	6/7/2003	59.7158	151.2145	11:15:34	10	Kachemak Bay
Sea Otter	3	6/7/2003	59.7255	151.1882	11:16:05	10	Kachemak Bay
Sea Otter	1	6/7/2003	59.7398	151.1567	11:16:47	10	Kachemak Bay
Sea Otter	1	6/7/2003	59.6057	151.2508	11:38:58	10	Kachemak Bay
Sea Otter	56	6/7/2003	59.5605	151.3955	11:45:51	10	Kachemak Bay
Sea Otter	20	6/7/2003	59.5535	151.4245	11:46:25	10	Kachemak Bay
Sea Otter	1	6/7/2003	59.6003	151.5743	14:24:29	10	Kachemak Bay
Sea Otter	2	6/7/2003	59.5790	151.7120	15:42:09	11	Kachemak Bay
Sea Otter	1	6/7/2003	59.5808	151.7543	15:43:00	11	Kachemak Bay
Sea Otter	5	6/12/2003	59.6422	152.0102	15:20:44	16	Kachemak Bay
Sea Otter	1	6/12/2003	59.6333	151.7615	15:34:37	16	Kachemak Bay
Sea Otter	8	6/12/2003	59.6330	151.7492	15:34:49	16	Kachemak Bay
Sea Otter	1	6/12/2003	59.6128	151.7177	16:39:12	17	Kachemak Bay
Sea Otter	2	6/12/2003	59.6117	151.7290	16:39:26	17	Kachemak Bay
Sea Otter	1	6/12/2003	59.6107	151.7365	16:39:34	17	Kachemak Bay
Sea Otter	11	6/12/2003	59.6105	151.7385	16:39:36	17	Kachemak Bay
Sea Otter	41	6/12/2003	59.6088	151.7567	16:39:56	17	Kachemak Bay
Sea Otter	1	6/12/2003	59.6042	151.8123	16:40:56	17	Kachemak Bay
Sea Otter	1	6/12/2003	59.6037	151.8180	16:41:02	17	Kachemak Bay
Sea Otter	1	6/12/2003	59.5988	151.8670	16:41:54	17	Kachemak Bay
Sea Otter	2	6/12/2003	59.5967	151.8862	16:42:14	17	Kachemak Bay
Sea Otter	1	6/12/2003	59.5842	151.9963	16:44:09	17	Kachemak Bay
Sea Otter	1	6/12/2003	59.5827	152.0098	16:44:23	17	Kachemak Bay
Sea Otter	1	6/12/2003	59.5825	152.0118	16:44:25	17	Kachemak Bay
Sea Otter	1	6/12/2003	59.5793	152.0413	16:44:55	17	W of Kachemak Bay
Sea Otter	1	6/12/2003	59.4997	152.7705	16:56:47	17	SE of Iniskin Bay/ mid inlet
Sea Otter	3	6/12/2003	59.5088	153.3498	17:24:18	17	N of Augustine I.
Sea Otter	1	6/5/2004	59.7502	151.8828	10:59:24	6	Anchor Pt.
Sea Otter	3	6/5/2004	59.6277	151.5878	11:06:06	6	Kachemak Bay
Sea Otter	12	6/5/2004	59.6203	151.5282	11:07:04	6	Kachemak Bay
Sea Otter	15	6/5/2004	59.6050	151.4873	11:08:03	6	Kachemak Bay
Sea Otter	26	6/5/2004	59.6020	151.5080	11:08:28	6	Kachemak Bay
Sea Otter	27	6/5/2004	59.6060	151.4715	11:10:42	6	Kachemak Bay
Sea Otter	16	6/5/2004	59.6033	151.4655	11:10:51	6	Kachemak Bay

Appendix -- Cont.

Common name	Group size	Date	Latitude (decimal degrees)	Longitude (decimal degrees)	Time (AK DST)	Flight no.	General location
Sea Otter	7	6/5/2004	59.6270	151.4160	11:13:27	6	Kachemak Bay
Sea Otter	12	6/5/2004	59.6382	151.4085	11:13:53	6	Kachemak Bay
Sea Otter	2	6/5/2004	59.6678	151.3197	11:15:36	6	Kachemak Bay
Sea Otter	1	6/5/2004	59.6888	151.2572	11:16:49	6	Kachemak Bay
Sea Otter	4	6/5/2004	59.6963	151.2340	11:17:14	6	Kachemak Bay
Sea Otter	10	6/5/2004	59.7045	151.2140	11:17:39	6	Kachemak Bay
Sea Otter	5	6/5/2004	59.7072	151.2073	11:17:46	6	Kachemak Bay
Sea Otter	2	6/5/2004	59.7085	151.2040	11:17:50	6	Kachemak Bay
Sea Otter	2	6/5/2004	59.7112	151.1972	11:17:58	6	Kachemak Bay
Sea Otter	3	6/5/2004	59.7145	151.1885	11:18:08	6	Kachemak Bay
Sea Otter	2	6/5/2004	59.7190	151.1765	11:18:23	6	Kachemak Bay
Sea Otter	8	6/5/2004	59.7217	151.1700	11:18:31	6	Kachemak Bay
Sea Otter	1	6/5/2004	59.7230	151.1667	11:18:35	6	Kachemak Bay
Sea Otter	4	6/5/2004	59.7245	151.1633	11:18:38	6	Kachemak Bay
Sea Otter	2	6/5/2004	59.7307	151.1488	11:18:56	6	Kachemak Bay
Sea Otter	3	6/5/2004	59.7333	151.1427	11:19:05	6	Kachemak Bay
Sea Otter	1	6/5/2004	59.7405	151.1275	11:19:26	6	Kachemak Bay
Sea Otter	2	6/5/2004	59.7442	151.1198	11:19:35	6	Kachemak Bay
Sea Otter	28	6/5/2004	59.6882	151.1440	11:28:05	6	Kachemak Bay
Sea Otter	11	6/5/2004	59.6863	151.1453	11:28:09	6	Kachemak Bay
Sea Otter	1	6/5/2004	59.5645	151.3808	11:36:52	6	Kachemak Bay
Sea Otter	2	6/5/2004	59.5628	151.3873	11:37:01	6	Kachemak Bay
Sea Otter	2	6/5/2004	59.5587	151.4060	11:37:22	6	Kachemak Bay
Sea Otter	3	6/5/2004	59.5580	151.4093	11:37:26	6	Kachemak Bay
Sea Otter	1	6/5/2004	59.5558	151.4175	11:37:37	6	Kachemak Bay
Sea Otter	3	6/5/2004	59.5552	151.4208	11:37:41	6	Kachemak Bay
Sea Otter	2	6/5/2004	59.5463	151.4755	11:38:45	6	Kachemak Bay
Sea Otter	1	6/5/2004	59.5398	151.5060	11:39:21	6	Kachemak Bay
Sea Otter	1	6/5/2004	59.4902	151.6707	11:53:18	6	Kachemak Bay
Sea Otter	3	6/5/2004	59.4767	151.7055	11:59:41	6	Kachemak Bay
Sea Otter	2	6/5/2004	59.5747	151.6125	13:29:05	7	Kachemak Bay
Sea Otter	1	6/5/2004	59.3530	151.8128	13:39:52	7	Port Graham
Sea Otter	1	6/5/2004	59.3418	151.7948	13:40:20	7	Port Graham
Sea Otter	2	6/5/2004	59.3353	151.7880	13:40:35	7	Port Graham
Sea Otter	2	6/5/2004	59.3575	151.8208	13:42:50	7	Port Graham
Sea Otter	1	6/5/2004	59.4290	153.3923	14:56:46	7	Augustine I.
Sea Otter	2	6/5/2004	59.4297	153.4207	14:57:15	7	Augustine I.
Sea Otter	17	6/5/2004	59.4283	153.4302	14:57:26	7	Augustine I.
Sea Otter	1	6/5/2004	59.4270	153.4373	14:57:34	7	Augustine I.
Sea Otter	2	6/5/2004	59.4267	153.4392	14:57:36	7	Augustine I.
Sea Otter	2	6/5/2004	59.4228	153.4530	14:57:52	7	Augustine I.
Sea Otter	8	6/5/2004	59.4175	153.4700	14:58:11	7	Augustine I.
Sea Otter	2	6/5/2004	59.4142	153.4797	14:58:23	7	Augustine I.
Sea Otter	1	6/5/2004	59.4087	153.4978	14:58:46	7	Augustine I.
Sea Otter	1	6/5/2004	59.4033	153.5523	14:59:44	7	Augustine I.
Sea Otter	4	6/5/2004	59.3263	153.3750	15:06:27	7	Augustine I.
Sea Otter	9	6/5/2004	59.3333	153.3565	15:06:49	7	Augustine I.
Sea Otter	4	6/5/2004	59.3363	153.3500	15:06:57	7	Augustine I.
Sea Otter	3	6/6/2004	58.9840	153.3830	12:34:25	8	Shaw I.
Sea Otter	16	6/6/2004	58.9988	153.3648	12:35:00	8	Shaw I.
Sea Otter	4	6/6/2004	59.0145	153.3687	12:35:34	8	Shaw I.
Sea Otter	1	6/6/2004	59.0168	153.3860	12:35:51	8	Shaw I.
Sea Otter	1	6/6/2004	59.0158	153.3920	12:35:57	8	Shaw I.
Sea Otter	1	6/6/2004	59.0143	153.3997	12:36:05	8	Shaw I.
Sea Otter	3	6/6/2004	59.0102	153.4943	12:38:45	8	Shaw I.
Sea Otter	5	6/6/2004	59.0098	153.4963	12:38:48	8	Shaw I.
Sea Otter	13	6/6/2004	59.0740	153.6522	12:43:21	8	Kamishak Bay
Sea Otter	3	6/6/2004	59.0807	153.6525	12:43:36	8	Kamishak Bay
Sea Otter	1	6/6/2004	59.1103	153.6782	12:44:47	8	Kamishak Bay
Sea Otter	27	6/6/2004	59.1293	153.8450	12:47:56	8	Kamishak Bay
Sea Otter	1	6/6/2004	59.1337	153.8625	12:48:17	8	Kamishak Bay
Sea Otter	1	6/6/2004	59.1347	153.8675	12:48:23	8	Kamishak Bay
Sea Otter	2	6/6/2004	59.1455	153.9458	12:49:53	8	Kamishak Bay
Sea Otter	3	6/6/2004	59.1380	153.9747	12:50:27	8	Kamishak Bay
Sea Otter	1	6/6/2004	59.1360	153.9792	12:50:32	8	Kamishak Bay
Sea Otter	1	6/6/2004	59.1313	154.1505	12:54:25	8	Akumwarvik Bay
Sea Otter	3	6/6/2004	59.6312	152.2713	13:37:57	8	SW of Anchor Pt./ mid inlet

Appendix -- Cont.

Common name	Group size	Date	Latitude (decimal degrees)	Longitude (decimal degrees)	Time (AK DST)	Flight no.	General location
Sea Otter	1	6/6/2004	59.5855	151.7640	13:44:28	8	Kachemak Bay
Sea Otter	1	6/6/2004	59.5823	151.7400	13:44:46	8	Kachemak Bay
Sea Otter	1	6/6/2004	59.5467	153.5725	15:34:50	9	Ursus Cove
Sea Otter	2	6/6/2004	59.5628	153.5537	15:35:32	9	Ursus Cove
Sea Otter	1	6/6/2004	59.6402	153.6198	15:41:57	9	Illiamna Bay
Sea Otter	1	6/6/2004	59.6422	153.4415	15:53:09	9	Iniskin Bay
Sea Otter	3	6/6/2004	59.6372	153.4372	15:53:21	9	Iniskin Bay
Sea Otter	4	6/6/2004	59.6170	153.3713	15:54:50	9	Oil Bay
Sea Otter	6	6/6/2004	59.7105	153.0193	16:04:53	9	Btwn Oil/ Chinitna Bay
Sea Otter	2	6/3/2005	58.9933	153.5360	11:07:31	6	Shaw I.
Sea Otter	1	6/3/2005	59.1032	153.6727	11:13:28	6	Kamishak Bay
Sea Otter	4	6/3/2005	59.1128	153.7017	11:14:16	6	Kamishak Bay
Sea Otter	2	6/3/2005	59.1132	153.7120	11:14:29	6	Kamishak Bay
Sea Otter	15	6/3/2005	59.1130	153.7163	11:14:35	6	Kamishak Bay
Sea Otter	2	6/3/2005	59.1127	153.7240	11:14:45	6	Kamishak Bay
Sea Otter	1	6/3/2005	59.0843	153.8260	11:17:26	6	Kamishak Bay
Sea Otter	1	6/3/2005	59.0727	153.9078	11:19:37	6	Kamishak Bay
Sea Otter	1	6/3/2005	59.0728	153.9162	11:19:48	6	Kamishak Bay
Sea Otter	2	6/3/2005	59.0805	153.9527	11:20:41	6	Kamishak Bay
Sea Otter	2	6/3/2005	59.0810	153.9587	11:20:49	6	Kamishak Bay
Sea Otter	1	6/3/2005	59.0818	153.9677	11:21:01	6	Kamishak Bay
Sea Otter	1	6/3/2005	59.0663	154.1013	11:24:12	6	Akumwarvik Bay
Sea Otter	1	6/3/2005	59.0572	154.1077	11:28:21	6	Akumwarvik Bay
Sea Otter	60	6/3/2005	59.0893	154.0872	11:29:41	6	Akumwarvik Bay
Sea Otter	10	6/3/2005	59.0920	154.0830	11:29:50	6	Akumwarvik Bay
Sea Otter	5	6/3/2005	59.0967	154.0597	11:30:17	6	Akumwarvik Bay
Sea Otter	250	6/3/2005	59.0972	154.0542	11:30:24	6	Akumwarvik Bay
Sea Otter	12	6/3/2005	59.0992	154.0747	11:31:24	6	Akumwarvik Bay
Sea Otter	1	6/3/2005	59.5252	151.9597	12:58:30	6	Kachemak Bay
Sea Otter	2	6/3/2005	59.4297	153.4190	15:14:01	7	Augustine I.
Sea Otter	2	6/3/2005	59.4252	153.4525	15:14:41	7	Augustine I.
Sea Otter	3	6/3/2005	59.4247	153.4557	15:14:46	7	Augustine I.
Sea Otter	1	6/3/2005	59.4230	153.4672	15:14:59	7	Augustine I.
Sea Otter	1	6/3/2005	59.4230	153.4672	15:15:00	7	Augustine I.
Sea Otter	1	6/3/2005	59.4202	153.4868	15:15:24	7	Augustine I.
Sea Otter	8	6/3/2005	59.4142	153.5272	15:16:14	7	Augustine I.
Sea Otter	1	6/3/2005	59.3917	153.6582	15:22:13	7	W of Augustine I.
Sea Otter	1	6/3/2005	59.6455	153.2853	16:00:09	7	Oil Bay
Sea Otter	3	6/4/2005	59.6268	151.5987	10:33:53	8	Kachemak Bay
Sea Otter	1	6/4/2005	59.6213	151.5660	10:34:34	8	Kachemak Bay
Sea Otter	31	6/4/2005	59.6070	151.4977	10:36:01	8	Kachemak Bay
Sea Otter	1	6/4/2005	59.5937	151.4465	10:37:12	8	Kachemak Bay
Sea Otter	3	6/4/2005	59.6432	151.4288	10:40:36	8	Kachemak Bay
Sea Otter	40	6/4/2005	59.6453	151.4237	10:40:45	8	Kachemak Bay
Sea Otter	56	6/4/2005	59.6477	151.4168	10:40:54	8	Kachemak Bay
Sea Otter	1	6/4/2005	59.6568	151.3917	10:41:32	8	Kachemak Bay
Sea Otter	2	6/4/2005	59.6698	151.3462	10:42:31	8	Kachemak Bay
Sea Otter	2	6/4/2005	59.6733	151.3305	10:42:52	8	Kachemak Bay
Sea Otter	2	6/4/2005	59.6797	151.3100	10:43:20	8	Kachemak Bay
Sea Otter	1	6/4/2005	59.6887	151.2853	10:43:54	8	Kachemak Bay
Sea Otter	162	6/4/2005	59.6995	151.2527	10:44:40	8	Kachemak Bay
Sea Otter	1	6/4/2005	59.7060	151.2328	10:45:06	8	Kachemak Bay
Sea Otter	77	6/4/2005	59.7075	151.2283	10:45:12	8	Kachemak Bay
Sea Otter	2	6/4/2005	59.7195	151.1997	10:45:54	8	Kachemak Bay
Sea Otter	1	6/4/2005	59.7245	151.1875	10:46:12	8	Kachemak Bay
Sea Otter	1	6/4/2005	59.7350	151.1633	10:46:49	8	Kachemak Bay
Sea Otter	30	6/4/2005	59.7403	151.1538	10:47:06	8	Kachemak Bay
Sea Otter	1	6/4/2005	59.7453	151.1463	10:47:20	8	Kachemak Bay
Sea Otter	3	6/4/2005	59.7488	151.1408	10:47:30	8	Kachemak Bay
Sea Otter	2	6/4/2005	59.7567	151.1242	10:47:55	8	Kachemak Bay
Sea Otter	6	6/4/2005	59.7633	151.1072	10:48:21	8	Kachemak Bay
Sea Otter	54	6/4/2005	59.7688	151.0875	10:48:46	8	Kachemak Bay
Sea Otter	36	6/4/2005	59.7697	151.0827	10:48:52	8	Kachemak Bay
Sea Otter	10	6/4/2005	59.7705	151.0727	10:49:04	8	Kachemak Bay
Sea Otter	1	6/4/2005	59.7720	151.0628	10:49:17	8	Kachemak Bay
Sea Otter	2	6/4/2005	59.5598	151.3810	11:30:01	8	Kachemak Bay
Sea Otter	1	6/4/2005	59.5222	151.4632	11:40:10	8	Kachemak Bay

Appendix -- Cont.

Common name	Group size	Date	Latitude (decimal degrees)	Longitude (decimal degrees)	Time (AK DST)	Flight no.	General location
Sea Otter	30	6/10/2006	59.6715	151.7480	10:26:23	6	Kachemak Bay
Sea Otter	25	6/10/2006	59.6369	151.6499	10:28:52	6	Kachemak Bay
Sea Otter	6	6/10/2006	59.6317	151.6103	10:29:45	6	Kachemak Bay
Sea Otter	24	6/10/2006	59.6312	151.6011	10:29:57	6	Kachemak Bay
Sea Otter	2	6/10/2006	59.6308	151.5942	10:30:06	6	Kachemak Bay
Sea Otter	28	6/10/2006	59.6307	151.5910	10:30:10	6	Kachemak Bay
Sea Otter	30	6/10/2006	59.6279	151.5693	10:30:39	6	Kachemak Bay
Sea Otter	1	6/10/2006	59.6250	151.5520	10:31:03	6	Kachemak Bay
Sea Otter	1	6/10/2006	59.6236	151.5452	10:31:13	6	Kachemak Bay
Sea Otter	1	6/10/2006	59.6194	151.5226	10:31:46	6	Kachemak Bay
Sea Otter	40	6/10/2006	59.6178	151.5121	10:32:01	6	Kachemak Bay
Sea Otter	45	6/10/2006	59.6168	151.5065	10:32:09	6	Kachemak Bay
Sea Otter	40	6/10/2006	59.6163	151.5035	10:32:13	6	Kachemak Bay
Sea Otter	50	6/10/2006	59.6145	151.4926	10:32:28	6	Kachemak Bay
Sea Otter	24	6/10/2006	59.6140	151.4897	10:32:32	6	Kachemak Bay
Sea Otter	150	6/10/2006	59.6040	151.4629	10:33:14	6	Kachemak Bay
Sea Otter	1	6/10/2006	59.6024	151.4593	10:33:20	6	Kachemak Bay
Sea Otter	25	6/10/2006	59.6002	151.4547	10:33:28	6	Kachemak Bay
Sea Otter	1	6/10/2006	59.5904	151.4243	10:34:13	6	Kachemak Bay
Sea Otter	1	6/10/2006	59.6733	151.3274	10:38:44	6	Kachemak Bay
Sea Otter	2	6/10/2006	59.6846	151.2890	10:39:32	6	Kachemak Bay
Sea Otter	8	6/10/2006	59.6852	151.2864	10:39:35	6	Kachemak Bay
Sea Otter	3	6/10/2006	59.6902	151.2673	10:39:57	6	Kachemak Bay
Sea Otter	4	6/10/2006	59.6926	151.2597	10:40:06	6	Kachemak Bay
Sea Otter	7	6/10/2006	59.7022	151.2365	10:40:36	6	Kachemak Bay
Sea Otter	1	6/10/2006	59.7043	151.2309	10:40:43	6	Kachemak Bay
Sea Otter	34	6/10/2006	59.7048	151.2293	10:40:45	6	Kachemak Bay
Sea Otter	32	6/10/2006	59.7146	151.1959	10:41:26	6	Kachemak Bay
Sea Otter	1	6/10/2006	59.7286	151.1596	10:42:16	6	Kachemak Bay
Sea Otter	1	6/10/2006	59.7308	151.1549	10:42:23	6	Kachemak Bay
Sea Otter	50	6/10/2006	59.7347	151.1456	10:42:36	6	Kachemak Bay
Sea Otter	23	6/10/2006	59.7353	151.1442	10:42:38	6	Kachemak Bay
Sea Otter	5	6/10/2006	59.7382	151.1378	10:42:47	6	Kachemak Bay
Sea Otter	57	6/10/2006	59.7409	151.1320	10:42:55	6	Kachemak Bay
Sea Otter	1	6/10/2006	59.7473	151.1195	10:43:13	6	Kachemak Bay
Sea Otter	22	6/10/2006	59.7593	151.0892	10:43:54	6	Kachemak Bay
Sea Otter	1	6/10/2006	59.7608	151.0834	10:44:01	6	Kachemak Bay
Sea Otter	1	6/10/2006	59.7646	151.0686	10:44:19	6	Kachemak Bay
Sea Otter	1	6/10/2006	59.6055	151.2151	11:01:44	6	Kachemak Bay
Sea Otter	27	6/10/2006	59.5586	151.4108	11:07:51	6	Kachemak Bay
Sea Otter	3	6/10/2006	59.5572	151.4359	11:08:15	6	Kachemak Bay
Sea Otter	8	6/10/2006	59.5413	151.4897	11:13:09	6	Kachemak Bay
Sea Otter	12	6/10/2006	59.4871	151.6766	11:19:55	6	Kachemak Bay
Sea Otter	4	6/10/2006	59.4765	151.7109	11:20:37	6	Kachemak Bay
Sea Otter	1	6/10/2006	59.5199	152.1120	12:30:44	6	Kachemak Bay
Sea Otter	5	6/10/2006	59.6186	151.6784	13:04:57	6	Kachemak Bay
Sea Otter	2	6/10/2006	59.6136	151.5270	13:07:37	6	Kachemak Bay
Sea Otter	10	6/10/2006	59.6337	151.5505	14:40:20	7	Kachemak Bay
Sea Otter	40	6/10/2006	59.6352	151.5884	14:40:58	7	Kachemak Bay
Sea Otter	2	6/13/2006	59.0299	153.6194	11:06:23	12	Kamishak Bay
Sea Otter	2	6/13/2006	59.0328	153.6223	11:06:29	12	Kamishak Bay
Sea Otter	2	6/13/2006	59.0428	153.6294	11:06:49	12	Kamishak Bay
Sea Otter	1	6/13/2006	59.0531	153.6332	11:07:09	12	Kamishak Bay
Sea Otter	1	6/13/2006	59.0578	153.6341	11:07:18	12	Kamishak Bay
Sea Otter	1	6/13/2006	59.1033	153.6568	11:08:49	12	Kamishak Bay
Sea Otter	1	6/13/2006	59.1114	153.6708	11:09:09	12	Kamishak Bay
Sea Otter	1	6/13/2006	59.1129	153.6766	11:09:15	12	Kamishak Bay
Sea Otter	1	6/13/2006	59.1171	153.6946	11:09:33	12	Kamishak Bay
Sea Otter	1	6/13/2006	59.1191	153.7293	11:12:38	12	Kamishak Bay
Sea Otter	1	6/13/2006	59.1205	153.7443	11:12:52	12	Kamishak Bay
Sea Otter	1	6/13/2006	59.1207	153.7519	11:12:59	12	Kamishak Bay
Sea Otter	2	6/13/2006	59.1207	153.7552	11:13:02	12	Kamishak Bay
Sea Otter	1	6/13/2006	59.1205	153.7834	11:13:28	12	Kamishak Bay
Sea Otter	1	6/13/2006	59.1206	153.7844	11:13:29	12	Kamishak Bay
Sea Otter	2	6/13/2006	59.1208	153.7898	11:13:34	12	Kamishak Bay
Sea Otter	1	6/13/2006	59.1208	153.7909	11:13:35	12	Kamishak Bay
Sea Otter	1	6/13/2006	59.1209	153.7931	11:13:37	12	Kamishak Bay

Appendix -- Cont.

Common name	Group size	Date	Latitude (decimal degrees)	Longitude (decimal degrees)	Time (AK DST)	Flight no.	General location
Sea Otter	1	6/13/2006	59.1219	153.8083	11:13:51	12	Kamishak Bay
Sea Otter	1	6/13/2006	59.1226	153.8182	11:14:00	12	Kamishak Bay
Sea Otter	12	6/13/2006	59.1252	153.8328	11:14:14	12	Kamishak Bay
Sea Otter	10	6/13/2006	59.1271	153.8395	11:14:21	12	Kamishak Bay
Sea Otter	15	6/13/2006	59.1308	153.8543	11:14:36	12	Kamishak Bay
Sea Otter	2	6/13/2006	59.1333	153.8640	11:14:46	12	Kamishak Bay
Sea Otter	5	6/13/2006	59.1341	153.8669	11:14:49	12	Kamishak Bay
Sea Otter	6	6/13/2006	59.1343	153.8679	11:14:50	12	Kamishak Bay
Sea Otter	3	6/13/2006	59.1376	153.8878	11:15:09	12	Kamishak Bay
Sea Otter	7	6/13/2006	59.1365	153.8960	11:15:17	12	Kamishak Bay
Sea Otter	1	6/13/2006	59.1356	153.8985	11:15:20	12	Kamishak Bay
Sea Otter	11	6/13/2006	59.1340	153.9008	11:15:24	12	Kamishak Bay
Sea Otter	42	6/13/2006	59.1285	153.9036	11:15:36	12	Kamishak Bay
Sea Otter	6	6/13/2006	59.1235	153.9030	11:15:47	12	Kamishak Bay
Sea Otter	45	6/13/2006	59.1142	153.9004	11:16:08	12	Kamishak Bay
Sea Otter	1	6/13/2006	59.1078	153.9033	11:16:22	12	Kamishak Bay
Sea Otter	1	6/13/2006	59.1068	153.9039	11:16:24	12	Kamishak Bay
Sea Otter	1	6/13/2006	59.1064	153.9041	11:16:25	12	Kamishak Bay
Sea Otter	1	6/13/2006	59.1059	153.9043	11:16:26	12	Kamishak Bay
Sea Otter	4	6/13/2006	59.1050	153.9048	11:16:28	12	Kamishak Bay
Sea Otter	4	6/13/2006	59.1021	153.9056	11:16:34	12	Kamishak Bay
Sea Otter	4	6/13/2006	59.0915	153.9012	11:16:58	12	Kamishak Bay
Sea Otter	1	6/13/2006	59.1050	153.9722	11:18:58	12	Kamishak Bay
Sea Otter	6	6/13/2006	59.1064	153.9739	11:19:01	12	Kamishak Bay
Sea Otter	2	6/13/2006	59.1093	153.9771	11:19:07	12	Kamishak Bay
Sea Otter	3	6/13/2006	59.1098	153.9777	11:19:08	12	Kamishak Bay
Sea Otter	4	6/13/2006	59.1103	153.9782	11:19:09	12	Kamishak Bay
Sea Otter	4	6/13/2006	59.1108	153.9788	11:19:10	12	Kamishak Bay
Sea Otter	11	6/13/2006	59.1174	153.9923	11:19:27	12	Kamishak Bay
Sea Otter	21	6/13/2006	59.1120	154.0231	11:20:00	12	Kamishak Bay
Sea Otter	40	6/13/2006	59.1074	154.0295	11:20:11	12	Akumwarvik Bay
Sea Otter	127	6/13/2006	59.0995	154.0411	11:20:30	12	Akumwarvik Bay
Sea Otter	1	6/13/2006	59.0942	154.0512	11:20:44	12	Akumwarvik Bay
Sea Otter	60	6/13/2006	59.1095	154.1159	11:22:10	12	Akumwarvik Bay
Sea Otter	1	6/13/2006	59.1108	154.1369	11:22:32	12	Akumwarvik Bay
Sea Otter	1	6/13/2006	59.1310	154.1254	11:23:37	12	Akumwarvik Bay
Sea Otter	5	6/13/2006	59.1613	154.0715	11:25:16	12	Nordyke I.
Sea Otter	1	6/13/2006	59.1719	154.0535	11:25:49	12	Nordyke I.
Sea Otter	1	6/13/2006	59.1731	154.0523	11:25:52	12	Nordyke I.
Sea Otter	25	6/13/2006	59.1977	154.0532	11:26:45	12	Nordyke I.
Sea Otter	40	6/13/2006	59.1995	154.0784	11:27:14	12	Nordyke I.
Sea Otter	35	6/13/2006	59.1627	154.1219	11:28:42	12	Nordyke I.
Sea Otter	1	6/13/2006	59.1527	154.1363	11:29:07	12	Nordyke I.
Sea Otter	1	6/13/2006	59.1618	154.1791	11:34:48	12	Nordyke I.
Sea Otter	2	6/13/2006	59.1677	154.1467	11:35:36	12	Nordyke I.
Sea Otter	2	6/13/2006	59.2274	154.0926	11:38:19	12	N of Nordyke I.
Sea Otter	1	6/13/2006	59.2296	154.0950	11:38:24	12	N of Nordyke I.
Sea Otter	1	6/13/2006	59.2344	154.1020	11:38:36	12	N of Nordyke I.
Sea Otter	1	6/13/2006	59.4243	153.7280	11:57:48	12	S of Ursus Cove
Sea Otter	1	6/13/2006	59.4615	153.6187	12:01:49	12	Ursus Cove
Sea Otter	1	6/13/2006	59.4591	153.6087	12:02:02	12	Ursus Cove
Sea Otter	1	6/13/2006	59.4590	153.6079	12:02:03	12	Ursus Cove
Sea Otter	12	6/13/2006	59.4565	153.5932	12:02:21	12	Ursus Cove
Sea Otter	1	6/13/2006	59.4519	153.5592	12:03:03	12	Ursus Cove
Sea Otter	25	6/13/2006	59.4499	153.5368	12:03:30	12	Ursus Cove
Sea Otter	3	6/13/2006	59.4459	153.4884	12:04:28	12	Augustine I.
Sea Otter	1	6/13/2006	59.4502	153.4698	12:04:52	12	Augustine I.
Sea Otter	1	6/13/2006	59.4519	153.4561	12:05:09	12	Augustine I.
Sea Otter	35	6/13/2006	59.4455	153.4387	12:05:35	12	Augustine I.
Sea Otter	2	6/13/2006	59.4343	153.4295	12:06:04	12	Augustine I.
Sea Otter	5	6/13/2006	59.4322	153.4309	12:06:09	12	Augustine I.
Sea Otter	3	6/13/2006	59.4284	153.4371	12:06:20	12	Augustine I.
Sea Otter	7	6/13/2006	59.4242	153.4490	12:06:36	12	Augustine I.
Sea Otter	1	6/13/2006	59.4240	153.4498	12:06:37	12	Augustine I.
Sea Otter	1	6/13/2006	59.4212	153.4772	12:07:07	12	Augustine I.
Sea Otter	7	6/13/2006	59.3336	153.5660	12:11:49	12	Augustine I.
Sea Otter	4	6/13/2006	59.4315	153.4222	12:20:43	12	Augustine I.

Appendix -- Cont.

Common name	Group size	Date	Latitude (decimal degrees)	Longitude (decimal degrees)	Time (AK DST)	Flight no.	General location
Sea Otter	2	6/13/2006	59.4306	153.4308	12:20:52	12	Augustine I.
Sea Otter	1	6/13/2006	59.4296	153.4527	12:21:15	12	Augustine I.
Sea Otter	4	6/13/2006	59.4384	153.4647	12:21:37	12	Augustine I.
Sea Otter	2	6/13/2006	59.4389	153.4647	12:21:38	12	Augustine I.
Sea Otter	2	6/13/2006	59.4472	153.4525	12:22:01	12	Augustine I.
Sea Otter	2	6/13/2006	59.4478	153.4361	12:22:19	12	Augustine I.
Sea Otter	3	6/13/2006	59.4464	153.4246	12:22:32	12	Augustine I.
Sea Otter	3	6/13/2006	59.4474	153.4057	12:22:53	12	Augustine I.
Sea Otter	4	6/13/2006	59.4527	153.3787	12:23:24	12	Augustine I.
Sea Otter	2	6/13/2006	59.4593	153.3292	12:24:23	12	Augustine I.
Sea Otter	1	6/13/2006	59.5982	151.9032	12:55:04	12	Kachemak Bay
Sea Otter	1	6/13/2006	59.6027	151.8655	12:55:46	12	Kachemak Bay
Sea Otter	1	6/13/2006	59.6030	151.8628	12:55:49	12	Kachemak Bay
Sea Otter	1	6/13/2006	59.6092	151.5638	14:41:58	13	Kachemak Bay
Sea Otter	5	6/13/2006	59.3832	153.6882	15:30:00	13	Augustine I.
Sea Otter	1	6/13/2006	59.4487	153.7131	15:32:26	13	S of Ursus Cove
Sea Otter	1	6/13/2006	59.5071	153.7161	15:34:42	13	Ursus Cove
Sea Otter	1	6/13/2006	59.5582	153.5619	15:41:49	13	Ursus Cove
Sea Otter	1	6/13/2006	59.6246	153.5199	15:50:49	13	Brwn Iliamna/ Iniskin Bay
Sea Otter	1	6/13/2006	59.6357	153.4724	15:51:44	13	Iniskin Bay
Sea Otter	2	6/13/2006	59.6349	153.4328	16:05:48	13	Iniskin Bay
Sea Otter	1	6/13/2006	59.6229	153.3704	16:07:02	13	Btwn Iniskin/ Oil Bay
Sea Otter	2	6/13/2006	59.6636	153.1411	16:15:24	13	N of Oil Bay
Sea Otter	50	6/7/2007	59.6451	151.6731	11:54:11	1	Kachemak Bay
Sea Otter	1	6/7/2007	59.6321	151.4488	12:00:30	1	Kachemak Bay
Sea Otter	4	6/7/2007	59.6476	151.4378	12:01:01	1	Kachemak Bay
Sea Otter	6	6/7/2007	59.6498	151.4352	12:01:06	1	Kachemak Bay
Sea Otter	7	6/7/2007	59.6566	151.4283	12:01:21	1	Kachemak Bay
Sea Otter	4	6/7/2007	59.6583	151.4263	12:01:25	1	Kachemak Bay
Sea Otter	1	6/7/2007	59.6696	151.3876	12:02:15	1	Kachemak Bay
Sea Otter	2	6/7/2007	59.6754	151.3430	12:03:06	1	Kachemak Bay
Sea Otter	17	6/7/2007	59.6762	151.3367	12:03:13	1	Kachemak Bay
Sea Otter	3	6/7/2007	59.6787	151.3234	12:03:27	1	Kachemak Bay
Sea Otter	8	6/7/2007	59.6893	151.2854	12:04:14	1	Kachemak Bay
Sea Otter	8	6/7/2007	59.6934	151.2742	12:04:29	1	Kachemak Bay
Sea Otter	2	6/7/2007	59.6955	151.2670	12:04:38	1	Kachemak Bay
Sea Otter	7	6/7/2007	59.7007	151.2473	12:05:02	1	Kachemak Bay
Sea Otter	1	6/7/2007	59.7141	151.2109	12:05:50	1	Kachemak Bay
Sea Otter	15	6/7/2007	59.7148	151.2097	12:05:51	1	Kachemak Bay
Sea Otter	1	6/7/2007	59.7224	151.1985	12:06:11	1	Kachemak Bay
Sea Otter	1	6/7/2007	59.7285	151.1892	12:06:26	1	Kachemak Bay
Sea Otter	1	6/7/2007	59.7595	151.1242	12:07:55	1	Kachemak Bay
Sea Otter	1	6/7/2007	59.7621	151.1174	12:08:05	1	Kachemak Bay
Sea Otter	1	6/7/2007	59.7669	151.1063	12:08:21	1	Kachemak Bay
Sea Otter	5	6/7/2007	59.7329	151.1314	12:15:01	1	Kachemak Bay
Sea Otter	1	6/7/2007	59.7011	151.2095	12:16:22	1	Kachemak Bay
Sea Otter	27	6/7/2007	59.6969	151.1673	14:02:07	2	Kachemak Bay
Sea Otter	2	6/7/2007	59.7006	151.1563	14:02:19	2	Kachemak Bay
Sea Otter	1	6/7/2007	59.7275	151.1002	14:03:31	2	Kachemak Bay
Sea Otter	2	6/7/2007	59.7391	151.0801	14:04:02	2	Kachemak Bay
Sea Otter	21	6/7/2007	59.5552	151.4078	14:20:17	2	Kachemak Bay
Sea Otter	25	6/7/2007	59.5538	151.4165	14:20:23	2	Kachemak Bay
Sea Otter	29	6/7/2007	59.5521	151.4346	14:20:39	2	Kachemak Bay
Sea Otter	45	6/8/2007	59.4134	153.4848	12:01:15	3	Augustine I.
Sea Otter	1	6/8/2007	59.4025	153.5395	12:02:05	3	Augustine I.
Sea Otter	45	6/8/2007	59.4008	153.5615	12:02:23	3	Augustine I.
Sea Otter	5	6/8/2007	59.4000	153.5650	12:02:26	3	Augustine I.
Sea Otter	10	6/8/2007	59.3960	153.5778	12:02:38	3	Augustine I.
Sea Otter	16	6/8/2007	59.3891	153.5903	12:02:53	3	Augustine I.
Sea Otter	100	6/8/2007	59.3336	153.5602	12:04:59	3	Augustine I.
Sea Otter	25	6/8/2007	59.3163	153.4115	12:08:31	3	Augustine I.
Sea Otter	12	6/12/2007	59.6140	151.9860	14:01:18	10	Kachemak Bay
Sea Otter	3	6/12/2007	59.5995	152.0763	14:05:22	10	W of Kachemak Bay
Sea Otter	12	6/9/2008	59.6428	151.6533	9:53:32	9	Kachemak Bay
Sea Otter	1	6/9/2008	59.6407	151.6376	9:53:48	9	Kachemak Bay
Sea Otter	6	6/9/2008	59.6357	151.6024	9:54:22	9	Kachemak Bay
Sea Otter	4	6/9/2008	59.6746	151.3360	10:02:04	9	Kachemak Bay

Appendix -- Cont.

Common name	Group size	Date	Latitude (decimal degrees)	Longitude (decimal degrees)	Time (AK DST)	Flight no.	General location
Sea Otter	1	6/9/2008	59.6781	151.3230	10:02:17	9	Kachemak Bay
Sea Otter	1	6/9/2008	59.6895	151.2856	10:02:57	9	Kachemak Bay
Sea Otter	1	6/9/2008	59.6979	151.2588	10:03:26	9	Kachemak Bay
Sea Otter	1	6/9/2008	59.7090	151.2322	10:04:01	9	Kachemak Bay
Sea Otter	25	6/9/2008	59.7103	151.2290	10:04:05	9	Kachemak Bay
Sea Otter	1	6/9/2008	59.7300	151.1837	10:05:04	9	Kachemak Bay
Sea Otter	1	6/9/2008	59.7361	151.1714	10:05:21	9	Kachemak Bay
Sea Otter	62	6/9/2008	59.7398	151.1641	10:05:30	9	Kachemak Bay
Sea Otter	50	6/9/2008	59.7427	151.1582	10:05:38	9	Kachemak Bay
Sea Otter	50	6/9/2008	59.7446	151.1545	10:05:44	9	Kachemak Bay
Sea Otter	12	6/9/2008	59.7533	151.0376	10:12:41	9	Kachemak Bay
Sea Otter	11	6/9/2008	59.7476	151.0499	10:13:00	9	Kachemak Bay
Sea Otter	6	6/9/2008	59.5393	151.4726	10:33:58	9	Kachemak Bay
Sea Otter	1	6/9/2008	59.4578	151.4116	10:39:28	9	Kachemak Bay
Sea Otter	12	6/9/2008	59.4124	151.7028	10:48:25	9	Seldovia Bay
Sea Otter	5	6/9/2008	59.3236	152.0002	11:04:06	9	S of Port Graham
Sea Otter	12	6/9/2008	59.6460	151.6615	12:24:28	9	Kachemak Bay
Sea Otter	2	6/9/2008	59.9620	152.2620	14:03:36	10	SE of Tuxedni Bay/ mid inlet
Sea Otter	120	6/10/2008	59.4169	153.4709	10:45:32	11	Augustine I.
Sea Otter	1	6/10/2008	58.9989	153.5642	11:35:04	11	Kamishak Bay
Sea Otter	1	6/10/2008	59.0039	153.5773	11:35:21	11	Kamishak Bay
Sea Otter	8	6/10/2008	59.0844	153.6640	11:38:49	11	Kamishak Bay
Sea Otter	1	6/10/2008	59.1049	153.6729	11:39:37	11	Kamishak Bay
Sea Otter	11	6/10/2008	59.1100	154.0153	11:47:05	11	Akumwarvik Bay
Sea Otter	1	6/10/2008	59.1964	154.1100	11:56:09	11	Nordyke I.
Sea Otter	4	6/10/2008	59.3794	153.9860	12:09:05	11	Bruin Bay
Sea Otter	1	6/10/2008	59.6161	153.5789	12:28:02	11	Iniskin Bay
Sea Otter	1	6/10/2008	59.6337	151.6516	14:54:05	12	Kachemak Bay
Sea Otter	1	6/10/2008	59.6345	151.6592	14:54:13	12	Kachemak Bay
Sea Otter	1	6/10/2008	59.6353	151.6666	14:54:21	12	Kachemak Bay
Sea Otter	45	6/7/2009	59.2560	153.7920	10:54:35	9	Kamishak Bay
Sea Otter	8	6/7/2009	59.2570	153.8020	10:54:44	9	Kamishak Bay
Sea Otter	1	6/7/2009	59.0100	153.5650	11:25:13	9	Kamishak Bay
Sea Otter	1	6/7/2009	59.0660	153.6440	11:27:37	9	Kamishak Bay
Sea Otter	18	6/7/2009	59.0690	153.6440	11:27:43	9	Kamishak Bay
Sea Otter	3	6/7/2009	59.0700	153.6440	11:27:45	9	Kamishak Bay
Sea Otter	1	6/7/2009	59.0760	153.6450	11:27:57	9	Kamishak Bay
Sea Otter	2	6/7/2009	59.0820	153.6470	11:28:09	9	Kamishak Bay
Sea Otter	2	6/7/2009	59.0880	153.6490	11:28:21	9	Kamishak Bay
Sea Otter	25	6/7/2009	59.0940	153.6650	11:29:38	9	Kamishak Bay
Sea Otter	12	6/7/2009	59.0850	153.6530	11:29:58	9	Kamishak Bay
Sea Otter	1	6/7/2009	59.1210	153.6970	11:33:07	9	Kamishak Bay
Sea Otter	3	6/7/2009	59.1230	153.7760	11:34:23	9	Kamishak Bay
Sea Otter	44	6/7/2009	59.1230	153.7900	11:34:36	9	Kamishak Bay
Sea Otter	2	6/7/2009	59.1230	153.7970	11:34:43	9	Kamishak Bay
Sea Otter	15	6/7/2009	59.1330	153.8660	11:35:53	9	Akumwarvik Bay
Sea Otter	80	6/7/2009	59.1360	153.8800	11:36:08	9	Akumwarvik Bay
Sea Otter	1	6/7/2009	59.1400	153.8950	11:36:24	9	Akumwarvik Bay
Sea Otter	25	6/7/2009	59.1440	153.9270	11:36:58	9	Akumwarvik Bay
Sea Otter	3	6/7/2009	59.1440	153.9340	11:37:05	9	Akumwarvik Bay
Sea Otter	1	6/7/2009	59.1440	153.9460	11:37:17	9	Akumwarvik Bay
Sea Otter	1	6/7/2009	59.1440	153.9470	11:37:18	9	Akumwarvik Bay
Sea Otter	28	6/7/2009	59.1070	154.0320	11:39:09	9	Akumwarvik Bay
Sea Otter	1	6/7/2009	59.1050	154.0330	11:39:12	9	Akumwarvik Bay
Sea Otter	1	6/7/2009	59.1000	154.0420	11:39:25	9	Akumwarvik Bay
Sea Otter	1	6/7/2009	59.1430	154.1960	11:42:54	9	Akumwarvik Bay
Sea Otter	1	6/7/2009	59.3700	153.9320	11:52:37	9	Bruin Bay
Sea Otter	1	6/7/2009	59.3730	153.9420	11:52:48	9	Bruin Bay
Sea Otter	5	6/7/2009	59.3750	153.9680	11:53:13	9	Bruin Bay
Sea Otter	1	6/7/2009	59.4090	153.8130	11:59:29	9	N of Bruin Bay
Sea Otter	7	6/7/2009	59.3570	153.5890	12:04:40	9	Augustine I.
Sea Otter	5	6/7/2009	59.3510	153.5850	12:04:51	9	Augustine I.
Sea Otter	6	6/7/2009	59.3390	153.5750	12:05:15	9	Augustine I.
Sea Otter	1	6/7/2009	59.3280	153.5610	12:05:40	9	Augustine I.
Sea Otter	1	6/7/2009	59.4160	153.1560	12:19:01	9	NE of Augustine I.
Sea Otter	30	6/7/2009	59.6020	151.5750	12:45:56	9	Kachemak Bay
Sea Otter	30	6/7/2009	59.6030	151.5620	12:46:08	9	Kachemak Bay

Appendix -- Cont.

Common name	Group size	Date	Latitude (decimal degrees)	Longitude (decimal degrees)	Time (AK DST)	Flight no.	General location
Sea Otter	15	6/7/2009	59.6170	151.4910	12:47:22	9	Kachemak Bay
Sea Otter	1	6/7/2009	59.6310	151.7090	14:53:17	10	Kachemak Bay
Sea Otter	3	6/7/2009	59.4300	153.4170	15:16:34	10	Augustine I.
Sea Otter	1	6/7/2009	59.4280	153.4390	15:16:56	10	Augustine I.
Sea Otter	2	6/7/2009	59.4200	153.4660	15:17:26	10	Augustine I.
Sea Otter	1	6/7/2009	59.4070	153.5340	15:18:40	10	Augustine I.
Sea Otter	3	6/7/2009	59.4060	153.5450	15:18:51	10	Augustine I.
Sea Otter	4	6/7/2009	59.4000	153.5760	15:19:24	10	Augustine I.
Sea Otter	1	6/7/2009	59.5170	153.7340	15:25:44	10	Ursus Cove
Sea Otter	1	6/7/2009	59.6190	153.5360	15:44:25	10	Brwn Iliamna/ Iniskin Bay
Sea Otter	1	6/7/2009	59.6390	153.4630	15:45:48	10	Iniskin Bay
Sea Otter	1	6/7/2009	59.8660	152.8470	16:22:24	10	Chinitna Bay
Sea Otter	1	6/8/2009	59.6180	151.5250	10:29:35	11	Kachemak Bay
Sea Otter	10	6/8/2009	59.6120	151.5030	10:30:01	11	Kachemak Bay
Sea Otter	7	6/8/2009	59.6090	151.4940	10:30:13	11	Kachemak Bay
Sea Otter	2	6/8/2009	59.6610	151.3530	10:34:48	11	Kachemak Bay
Sea Otter	5	6/8/2009	59.6710	151.3180	10:35:24	11	Kachemak Bay
Sea Otter	8	6/8/2009	59.6720	151.3160	10:35:25	11	Kachemak Bay
Sea Otter	5	6/8/2009	59.6740	151.3100	10:35:32	11	Kachemak Bay
Sea Otter	2	6/8/2009	59.6770	151.3000	10:35:43	11	Kachemak Bay
Sea Otter	1	6/8/2009	59.6800	151.2920	10:35:52	11	Kachemak Bay
Sea Otter	10	6/8/2009	59.6840	151.2780	10:36:07	11	Kachemak Bay
Sea Otter	10	6/8/2009	59.6860	151.2690	10:36:16	11	Kachemak Bay
Sea Otter	2	6/8/2009	59.6890	151.2600	10:36:25	11	Kachemak Bay
Sea Otter	1	6/8/2009	59.6970	151.2370	10:36:52	11	Kachemak Bay
Sea Otter	80	6/8/2009	59.6980	151.2350	10:36:55	11	Kachemak Bay
Sea Otter	9	6/8/2009	59.7030	151.2240	10:37:08	11	Kachemak Bay
Sea Otter	3	6/8/2009	59.7040	151.2200	10:37:12	11	Kachemak Bay
Sea Otter	80	6/8/2009	59.7060	151.2140	10:37:19	11	Kachemak Bay
Sea Otter	2	6/8/2009	59.7080	151.2090	10:37:24	11	Kachemak Bay
Sea Otter	3	6/8/2009	59.7100	151.2020	10:37:32	11	Kachemak Bay
Sea Otter	1	6/8/2009	59.7130	151.1950	10:37:40	11	Kachemak Bay
Sea Otter	50	6/8/2009	59.7140	151.1910	10:37:44	11	Kachemak Bay
Sea Otter	1	6/8/2009	59.7160	151.1860	10:37:49	11	Kachemak Bay
Sea Otter	6	6/8/2009	59.7230	151.1710	10:38:08	11	Kachemak Bay
Sea Otter	1	6/8/2009	59.7420	151.1320	10:38:56	11	Kachemak Bay
Sea Otter	25	6/8/2009	59.7480	151.1180	10:39:12	11	Kachemak Bay
Sea Otter	5	6/8/2009	59.7500	151.1070	10:39:21	11	Kachemak Bay
Sea Otter	4	6/8/2009	59.7510	151.0960	10:39:32	11	Kachemak Bay
Sea Otter	4	6/8/2009	59.7330	151.0790	10:47:28	11	Kachemak Bay
Sea Otter	30	6/8/2009	59.7200	151.1020	10:48:01	11	Kachemak Bay
Sea Otter	50	6/8/2009	59.7190	151.1030	10:48:04	11	Kachemak Bay
Sea Otter	45	6/8/2009	59.7040	151.1260	10:48:40	11	Kachemak Bay
Sea Otter	1	6/8/2009	59.6780	151.1620	10:49:43	11	Kachemak Bay
Sea Otter	1	6/8/2009	59.5600	151.4270	10:59:43	11	Kachemak Bay
Sea Otter	52	6/8/2009	59.5580	151.4330	10:59:49	11	Kachemak Bay
Sea Otter	21	6/8/2009	59.4570	151.7480	11:18:13	11	Seldovia Bay
Sea Otter	30	6/8/2009	59.3270	152.0010	11:31:00	11	S of Port Graham
Sea Otter	1	6/8/2009	59.9480	152.0330	13:52:57	12	NW of Anchor Pt.
Sea Otter	1	6/5/2010	59.6330	151.6200	10:39:00	7	Kachemak Bay
Sea Otter	40	6/5/2010	59.6320	151.6140	10:39:07	7	Kachemak Bay
Sea Otter	100	6/5/2010	59.6310	151.6090	10:39:14	7	Kachemak Bay
Sea Otter	2	6/5/2010	59.6270	151.5780	10:39:51	7	Kachemak Bay
Sea Otter	10	6/5/2010	59.6260	151.5660	10:40:06	7	Kachemak Bay
Sea Otter	40	6/5/2010	59.6190	151.5130	10:41:15	7	Kachemak Bay
Sea Otter	80	6/5/2010	59.6160	151.5010	10:41:31	7	Kachemak Bay
Sea Otter	100	6/5/2010	59.6140	151.4930	10:41:43	7	Kachemak Bay
Sea Otter	25	6/5/2010	59.6120	151.4790	10:42:02	7	Kachemak Bay
Sea Otter	1	6/5/2010	59.6050	151.4620	10:42:28	7	Kachemak Bay
Sea Otter	2	6/5/2010	59.6670	151.3940	10:47:09	7	Kachemak Bay
Sea Otter	1	6/5/2010	59.6680	151.3890	10:47:15	7	Kachemak Bay
Sea Otter	55	6/5/2010	59.6700	151.3700	10:47:38	7	Kachemak Bay
Sea Otter	1	6/5/2010	59.6700	151.3680	10:47:40	7	Kachemak Bay
Sea Otter	34	6/5/2010	59.6720	151.3550	10:47:56	7	Kachemak Bay
Sea Otter	5	6/5/2010	59.6760	151.3360	10:48:20	7	Kachemak Bay
Sea Otter	40	6/5/2010	59.6770	151.3260	10:48:32	7	Kachemak Bay
Sea Otter	3	6/5/2010	59.6800	151.3150	10:48:47	7	Kachemak Bay

Appendix -- Cont.

Common name	Group size	Date	Latitude (decimal degrees)	Longitude (decimal degrees)	Time (AK DST)	Flight no.	General location
Sea Otter	3	6/5/2010	59.6830	151.3080	10:48:57	7	Kachemak Bay
Sea Otter	3	6/5/2010	59.6850	151.3000	10:49:08	7	Kachemak Bay
Sea Otter	1	6/5/2010	59.6870	151.2950	10:49:16	7	Kachemak Bay
Sea Otter	7	6/5/2010	59.6890	151.2890	10:49:24	7	Kachemak Bay
Sea Otter	140	6/5/2010	59.6910	151.2810	10:49:35	7	Kachemak Bay
Sea Otter	10	6/5/2010	59.6920	151.2770	10:49:40	7	Kachemak Bay
Sea Otter	3	6/5/2010	59.7030	151.2460	10:50:27	7	Kachemak Bay
Sea Otter	70	6/5/2010	59.7740	151.0630	10:55:06	7	Kachemak Bay
Sea Otter	30	6/5/2010	59.7740	151.0610	10:55:08	7	Kachemak Bay
Sea Otter	1	6/5/2010	59.7460	151.0610	11:02:36	7	Kachemak Bay
Sea Otter	1	6/5/2010	59.7150	151.1040	11:03:48	7	Kachemak Bay
Sea Otter	1	6/5/2010	59.7060	151.1180	11:04:10	7	Kachemak Bay
Sea Otter	9	6/5/2010	59.6760	151.1440	11:05:15	7	Kachemak Bay
Sea Otter	2	6/5/2010	59.6640	151.1750	11:05:54	7	Kachemak Bay
Sea Otter	6	6/5/2010	59.5570	151.4020	11:13:04	7	Kachemak Bay
Sea Otter	16	6/5/2010	59.5560	151.4040	11:13:06	7	Kachemak Bay
Sea Otter	6	6/5/2010	59.5540	151.4220	11:13:24	7	Kachemak Bay
Sea Otter	1	6/5/2010	59.4880	151.6720	11:25:30	7	Kachemak Bay
Sea Otter	1	6/5/2010	59.4880	151.6730	11:25:31	7	Kachemak Bay
Sea Otter	80	6/5/2010	59.6330	151.5940	14:43:09	8	Kachemak Bay
Sea Otter	63	6/5/2010	59.6360	151.6150	14:43:31	8	Kachemak Bay
Sea Otter	1	6/7/2010	60.0570	151.9400	10:07:40	9	E of Tuxedni Bay/ mid inlet
Sea Otter	40	6/7/2010	59.0790	153.9230	11:13:56	9	Kamishak Bay
Sea Otter	4	6/7/2010	59.0790	153.9270	11:14:00	9	Kamishak Bay
Sea Otter	2	6/7/2010	59.0800	153.9470	11:14:19	9	Kamishak Bay
Sea Otter	1	6/7/2010	59.0830	154.0320	11:15:39	9	Kamishak Bay
Sea Otter	1	6/7/2010	59.0830	154.0400	11:15:45	9	Kamishak Bay
Sea Otter	1	6/7/2010	59.0820	154.0460	11:15:52	9	Kamishak Bay
Sea Otter	30	6/7/2010	59.0820	154.0490	11:15:55	9	Kamishak Bay
Sea Otter	4	6/7/2010	59.0800	154.0700	11:16:13	9	Akumwarvik Bay
Sea Otter	1	6/7/2010	59.0770	154.0840	11:16:28	9	Akumwarvik Bay
Sea Otter	32	6/7/2010	59.1720	154.1630	11:24:48	9	Akumwarvik Bay
Sea Otter	1	6/7/2010	59.4140	153.7830	11:45:32	9	N of Bruin Bay
Sea Otter	2	6/7/2010	59.4040	153.5510	12:06:15	9	Augustine I.
Sea Otter	2	6/7/2010	59.4140	153.6590	12:14:55	9	Ursus Cove
Sea Otter	1	6/7/2010	59.7610	152.9820	13:00:05	9	Btwn Oil/ Chinitna Bay
Sea Otter	3	6/6/2011	60.1170	151.7480	10:17:27	10	Ninilchik
Sea Otter	1	6/6/2011	60.0770	151.8080	10:20:20	10	Ninilchik
Sea Otter	1	6/6/2011	60.0770	151.8210	10:20:33	10	Ninilchik
Sea Otter	1	6/6/2011	59.8100	152.1400	10:40:33	10	W of Anchor Pt.
Sea Otter	1	6/6/2011	59.8020	152.1250	10:40:56	10	W of Anchor Pt.
Sea Otter	1	6/6/2011	59.8000	152.1200	10:41:04	10	W of Anchor Pt.
Sea Otter	1	6/6/2011	59.7930	152.1080	10:41:21	10	W of Anchor Pt.
Sea Otter	1	6/6/2011	59.7910	152.1040	10:41:28	10	W of Anchor Pt.
Sea Otter	4	6/6/2011	59.6250	151.7940	10:49:00	10	Kachemak Bay
Sea Otter	3	6/6/2011	59.6230	151.7910	10:49:04	10	Kachemak Bay
Sea Otter	5	6/6/2011	59.6150	151.7750	10:49:28	10	Kachemak Bay
Sea Otter	4	6/6/2011	59.6120	151.7700	10:49:36	10	Kachemak Bay
Sea Otter	1	6/6/2011	59.6040	151.7550	10:49:59	10	Kachemak Bay
Sea Otter	6	6/6/2011	59.6020	151.7500	10:50:07	10	Kachemak Bay
Sea Otter	1	6/6/2011	59.5980	151.7430	10:50:17	10	Kachemak Bay
Sea Otter	2	6/6/2011	59.5740	151.7780	10:52:00	10	Kachemak Bay
Sea Otter	3	6/6/2011	59.5740	151.7870	10:52:08	10	Kachemak Bay
Sea Otter	4	6/6/2011	59.5730	151.7970	10:52:17	10	Kachemak Bay
Sea Otter	1	6/6/2011	59.5730	151.8220	10:52:41	10	Kachemak Bay
Sea Otter	4	6/6/2011	59.5640	152.0980	10:57:20	10	W of Kachemak Bay
Sea Otter	4	6/6/2011	59.4860	153.5150	11:23:40	10	E of Ursus Cove
Sea Otter	2	6/6/2011	59.3810	151.9290	12:07:04	10	Port Graham
Sea Otter	2	6/6/2011	59.3880	151.9260	12:07:20	10	Port Graham
Sea Otter	1	6/6/2011	59.6050	151.5560	12:17:24	10	Kachemak Bay
Sea Otter	50	6/6/2011	59.6100	151.5430	12:17:40	10	Kachemak Bay
Sea Otter	70	6/6/2011	59.6160	151.5260	12:18:00	10	Kachemak Bay
Sea Otter	1	6/6/2011	59.6140	151.4760	12:19:11	10	Kachemak Bay
Sea Otter	1	6/6/2011	59.3980	151.9160	14:05:48	11	Port Graham
Sea Otter	1	6/6/2011	59.3950	151.9200	14:05:56	11	Port Graham
Sea Otter	2	6/6/2011	59.0670	153.6550	15:12:36	11	Kamishak Bay
Sea Otter	1	6/6/2011	59.1160	153.7750	15:15:17	11	Kamishak Bay

Appendix -- Cont.

Common name	Group size	Date	Latitude (decimal degrees)	Longitude (decimal degrees)	Time (AK DST)	Flight no.	General location
Sea Otter	1	6/6/2011	59.1090	153.7950	15:15:40	11	Kamishak Bay
Sea Otter	2	6/6/2011	59.0800	153.8450	15:16:52	11	Kamishak Bay
Sea Otter	3	6/6/2011	59.0780	153.8530	15:16:59	11	Kamishak Bay
Sea Otter	2	6/6/2011	59.1120	154.0030	15:19:16	11	Akumwarvik Bay
Sea Otter	1	6/6/2011	59.1130	154.0130	15:19:24	11	Akumwarvik Bay
Sea Otter	4	6/6/2011	59.1100	154.0240	15:19:33	11	Akumwarvik Bay
Sea Otter	2	6/6/2011	59.0810	154.1470	15:22:17	11	Akumwarvik Bay
Sea Otter	1	6/6/2011	59.1300	154.1700	15:23:51	11	Akumwarvik Bay
Sea Otter	2	6/6/2011	59.2090	154.0880	15:29:00	11	Nordyke I.
Sea Otter	1	6/6/2011	59.2100	154.0870	15:29:01	11	Nordyke I.
Sea Otter	1	6/6/2011	59.2460	154.1120	15:30:12	11	N of Nordyke I.
Sea Otter	1	6/6/2011	59.2570	154.1150	15:30:32	11	N of Nordyke I.
Sea Otter	1	6/6/2011	59.2780	154.1100	15:31:12	11	N of Nordyke I.
Sea Otter	2	6/6/2011	59.2840	154.1080	15:31:23	11	N of Nordyke I.
Sea Otter	2	6/6/2011	59.2920	154.1030	15:31:40	11	N of Nordyke I.
Sea Otter	1	6/6/2011	59.3010	154.0860	15:32:08	11	N of Nordyke I.
Sea Otter	1	6/6/2011	59.4060	153.8990	15:44:04	11	Bruin Bay
Sea Otter	5	6/6/2011	59.4170	153.7660	15:46:47	11	N of Bruin Bay
Sea Otter	6	6/6/2011	59.4290	153.7210	15:47:44	11	N of Bruin Bay
Sea Otter	1	6/6/2011	59.6210	153.5720	15:59:29	11	Iliamna Bay
Sea Otter	3	6/6/2011	59.6440	153.4410	16:07:48	11	Iniskin Bay
Sea Otter	1	6/6/2011	59.6290	153.2930	16:11:16	11	Oil Bay
Sea Otter	1	6/6/2011	59.6420	153.2880	16:11:41	11	Oil Bay
Sea Otter	1	6/6/2011	60.2820	152.3960	17:12:27	11	Redoubt Pt.
Sea Otter	1	6/6/2011	60.2860	152.3880	17:12:39	11	Redoubt Pt.
Sea Otter	10	6/7/2011	59.6360	151.4430	9:48:12	12	Kachemak Bay
Sea Otter	15	6/7/2011	59.6400	151.4390	9:48:20	12	Kachemak Bay
Sea Otter	2	6/7/2011	59.6660	151.4000	9:49:29	12	Kachemak Bay
Sea Otter	1	6/7/2011	59.6660	151.3980	9:49:32	12	Kachemak Bay
Sea Otter	3	6/7/2011	59.6700	151.3720	9:50:01	12	Kachemak Bay
Sea Otter	1	6/7/2011	59.6770	151.3210	9:51:05	12	Kachemak Bay
Sea Otter	7	6/7/2011	59.6890	151.2910	9:51:43	12	Kachemak Bay
Sea Otter	40	6/7/2011	59.7050	151.2490	9:52:36	12	Kachemak Bay
Sea Otter	2	6/7/2011	59.7210	151.2100	9:53:28	12	Kachemak Bay
Sea Otter	1	6/7/2011	59.7490	151.1470	9:54:57	12	Kachemak Bay
Sea Otter	5	6/7/2011	59.7580	151.0690	9:57:00	12	Kachemak Bay
Sea Otter	20	6/7/2011	59.7570	151.1000	9:57:35	12	Kachemak Bay
Sea Otter	20	6/7/2011	59.7590	151.1020	9:57:39	12	Kachemak Bay
Sea Otter	62	6/7/2011	59.7530	151.0870	9:58:48	12	Kachemak Bay
Sea Otter	1	6/7/2011	59.6890	151.1430	10:08:20	12	Kachemak Bay
Sea Otter	3	6/7/2011	59.6670	151.1760	10:09:08	12	Kachemak Bay
Sea Otter	1	6/7/2011	59.5760	151.3370	10:13:36	12	Kachemak Bay
Sea Otter	50	6/7/2011	59.5540	151.4230	10:15:00	12	Kachemak Bay
Sea Otter	1	6/7/2011	59.4750	151.6710	10:20:52	12	Kachemak Bay
Sea Otter	50	6/7/2011	59.4840	151.6560	10:21:15	12	Kachemak Bay
Sea Otter	2	6/7/2011	60.2200	152.3050	13:46:43	13	E of Tuxedni Bay/ mid inlet
Sea Otter	2	5/29/2012	60.1650	151.6720	11:24:14	1	N of Ninilchik
Sea Otter	35	5/29/2012	59.6100	151.5730	13:41:21	2	Kachemak Bay
Sea Otter	1	5/29/2012	59.5570	152.5890	14:09:12	2	SW of Anchor Pt./ mid inlet
Sea Otter	1	5/29/2012	59.0910	153.9730	15:16:44	2	Akumwarvik Bay
Sea Otter	3	5/29/2012	59.1990	154.1000	15:27:20	2	Nordyke I.
Sea Otter	2	5/29/2012	59.2080	154.0890	15:27:44	2	Nordyke I.
Sea Otter	1	5/29/2012	59.2710	154.1110	15:29:48	2	Nordyke I.
Sea Otter	1	5/29/2012	59.2800	154.1070	15:30:07	2	Nordyke I.
Sea Otter	1	5/29/2012	59.2840	154.1060	15:30:13	2	Nordyke I.
Sea Otter	1	5/29/2012	59.3100	154.0460	15:31:52	2	Nordyke I.
Sea Otter	2	5/29/2012	59.3400	153.9700	15:33:44	2	Nordyke I.
Sea Otter	2	5/29/2012	59.4040	153.6540	15:43:32	2	Augustine I.
Sea Otter	23	5/29/2012	59.3400	153.5720	15:46:49	2	Augustine I.
Sea Otter	2	5/29/2012	59.3970	153.3450	15:54:52	2	Augustine I.
Sea Otter	1	5/30/2012	60.2050	151.4700	10:34:30	3	N of Ninilchik
Sea Otter	2	5/30/2012	60.1220	151.5930	10:37:41	3	N of Ninilchik
Sea Otter	1	5/30/2012	59.9190	151.7840	10:44:41	3	S of Ninilchik
Sea Otter	1	5/30/2012	59.7120	151.8400	10:51:53	3	Kachemak Bay
Sea Otter	1	5/30/2012	59.6940	151.8060	10:52:44	3	Kachemak Bay
Sea Otter	1	5/30/2012	59.6850	151.7850	10:53:14	3	Kachemak Bay
Sea Otter	3	5/30/2012	59.6770	151.7650	10:53:43	3	Kachemak Bay

Common name	Group size	Date	Latitude (decimal degrees)	Longitude (decimal degrees)	Time (AK DST)	Flight no.	General location
Sea Otter	2	5/30/2012	59.6600	151.7220	10:54:42	3	Kachemak Bay
Sea Otter	6	5/30/2012	59.6430	151.6650	10:55:56	3	Kachemak Bay
Sea Otter	15	5/30/2012	59.6390	151.6450	10:56:22	3	Kachemak Bay
Sea Otter	7	5/30/2012	59.6320	151.6060	10:57:11	3	Kachemak Bay
Sea Otter	15	5/30/2012	59.6240	151.5390	10:58:33	3	Kachemak Bay
Sea Otter	1	5/30/2012	59.5990	151.4560	11:00:46	3	Kachemak Bay
Sea Otter	1	5/30/2012	59.6550	151.4210	11:04:53	3	Kachemak Bay
Sea Otter	3	5/30/2012	59.6620	151.3920	11:05:32	3	Kachemak Bay
Sea Otter	100	5/30/2012	59.6670	151.3700	11:06:01	3	Kachemak Bay
Sea Otter	2	5/30/2012	59.6810	151.3020	11:07:29	3	Kachemak Bay
Sea Otter	42	5/30/2012	59.6830	151.2960	11:07:37	3	Kachemak Bay
Sea Otter	16	5/30/2012	59.6970	151.2630	11:08:26	3	Kachemak Bay
Sea Otter	5	5/30/2012	59.7110	151.2240	11:09:22	3	Kachemak Bay
Sea Otter	2	5/30/2012	59.7300	151.1810	11:10:33	3	Kachemak Bay
Sea Otter	6	5/30/2012	59.7410	151.1590	11:11:09	3	Kachemak Bay
Sea Otter	11	5/30/2012	59.7500	151.1370	11:11:43	3	Kachemak Bay
Sea Otter	10	5/30/2012	59.7540	151.1270	11:11:58	3	Kachemak Bay
Sea Otter	20	5/30/2012	59.7620	151.1090	11:12:26	3	Kachemak Bay
Sea Otter	20	5/30/2012	59.7680	151.0920	11:12:50	3	Kachemak Bay
Sea Otter	15	5/30/2012	59.7750	151.0680	11:13:22	3	Kachemak Bay
Sea Otter	7	5/30/2012	59.7780	151.0560	11:13:37	3	Fox R.
Sea Otter	12	5/30/2012	59.7800	151.0450	11:13:51	3	Fox R.
Sea Otter	50	5/30/2012	59.7050	151.1260	11:23:00	3	Kachemak Bay
Sea Otter	4	5/30/2012	59.6750	151.1500	11:24:05	3	Kachemak Bay
Sea Otter	2	5/30/2012	59.6560	151.2110	11:25:18	3	Kachemak Bay
Sea Otter	2	5/30/2012	59.5690	151.3700	11:30:02	3	Kachemak Bay
Sea Otter	1	5/30/2012	59.5600	151.3920	11:30:31	3	Kachemak Bay
Sea Otter	80	5/30/2012	59.5590	151.3970	11:30:36	3	Kachemak Bay
Sea Otter	5	5/30/2012	59.5530	151.4340	11:31:16	3	Kachemak Bay
Sea Otter	1	5/30/2012	59.5500	151.4470	11:31:30	3	Kachemak Bay
Sea Otter	2	5/30/2012	59.5400	151.4650	11:31:58	3	Kachemak Bay
Sea Otter	150	5/30/2012	59.4890	151.6660	11:36:23	3	Kachemak Bay
Sea Otter	20	5/30/2012	59.4850	151.6860	11:36:44	3	Kachemak Bay
Sea Otter	1	5/30/2012	59.4660	151.7460	11:37:54	3	Seldovia Bay
Sea Otter	1	5/30/2012	59.4420	151.8540	11:39:51	3	Btwn Seldovia/ Port Graham
Sea Otter	4	5/30/2012	59.3620	151.9430	11:43:33	3	Port Graham
Sea Otter	250	5/30/2012	59.6170	151.5560	12:55:11	3	Kachemak Bay
Sea Otter	6	5/30/2012	59.5290	151.8500	14:20:57	4	Kachemak Bay
Sea Otter	1	5/30/2012	59.5640	151.9310	14:22:47	4	Kachemak Bay
Sea Otter	50	5/30/2012	59.5780	151.9650	14:23:34	4	Kachemak Bay
Sea Otter	2	5/30/2012	59.6070	152.0350	14:25:18	4	Kachemak Bay
Sea Otter	8	5/31/2012	59.6230	153.3870	11:06:47	5	Btwn Iniskin/ Oil Bay
Harbor Seal	55	6/2/1993	61.1987	150.6370	12:16:01	1	Susitna R.
Harbor Seal	1	6/3/1993	61.0288	150.3238	11:23:10	2	Pt. Possession
Harbor Seal	1	6/3/1993	61.0422	150.3513	13:18:01	2	Pt. Possession
Harbor Seal	7	6/4/1993	60.5555	151.3143	10:49:46	3	Kenai R.
Harbor Seal	3	6/4/1993	60.4530	151.2992	10:54:22	3	Btwn Kenai/ Kasilof R.
Harbor Seal	1	6/5/1993	61.1398	150.0933	12:29:11	4	Btwn Anchorage/ Fire I.
Harbor Seal	1	7/27/1993	59.6497	151.6740	11:55:23	3	Kachemak Bay
Harbor Seal	1	7/27/1993	59.4937	151.5787	12:03:40	3	Kachemak Bay
Harbor Seal	1	6/2/1994	60.9277	150.0598	11:16:32	2	Chickaloon Bay
Harbor Seal	25	6/3/1994	59.7823	150.9473	11:14:29	4	Fox R.
Harbor Seal	6	6/3/1994	59.7968	150.9452	11:15:49	4	Fox R.
Harbor Seal	1	6/3/1994	59.8833	152.6132	13:24:40	5	NW of Anchor Pt./ mid inlet
Harbor Seal	1	6/3/1994	59.8768	152.5767	13:25:17	5	NW of Anchor Pt./ mid inlet
Harbor Seal	50	6/3/1994	60.5330	152.2538	15:05:24	5	NW of Anchor Pt./ mid inlet
Harbor Seal	25	6/4/1994	60.2747	152.0252	10:14:14	6	NW of Anchor Pt./ mid inlet
Harbor Seal	2	6/4/1994	59.9547	152.3275	10:25:17	6	NW of Anchor Pt./ mid inlet
Harbor Seal	1	6/4/1994	58.8833	153.2943	11:24:58	6	Cape Douglas
Harbor Seal	1	6/4/1994	59.4198	153.7533	12:17:11	6	Btwn Bruin Bay/ Ursus Cove
Harbor Seal	2	6/4/1994	59.4787	153.6968	12:21:50	6	Btwn Bruin Bay/ Ursus Cove
Harbor Seal	1	6/4/1994	59.5418	153.7168	12:24:18	6	Btwn Ursus Cove/ Iliamna Bay
Harbor Seal	35	6/4/1994	59.7332	153.4480	12:44:15	6	Iniskin Bay
Harbor Seal	3	6/4/1994	59.6380	153.4365	12:54:52	6	Btwn Iniskin/ Oil Bay
Harbor Seal	2	6/4/1994	59.6320	153.4227	12:55:13	6	Btwn Iniskin/ Oil Bay
Harbor Seal	1	6/4/1994	59.6317	153.2007	13:05:17	6	N of Oil Bay

Appendix -- Cont.

Common name	Group size	Date	Latitude (decimal degrees)	Longitude (decimal degrees)	Time (AK DST)	Flight no.	General location
Harbor Seal	1	6/4/1994	59.7692	152.9860	13:10:56	6	Chinitna Bay
Harbor Seal	1	6/4/1994	59.8427	153.0088	13:13:27	6	Chinitna Bay
Harbor Seal	1	6/4/1994	59.6053	152.0325	13:40:44	6	Kachemak Bay
Harbor Seal	1	6/4/1994	59.2628	151.9903	13:58:09	6	Koyuktolik Bay
Harbor Seal	1	6/4/1994	59.2475	151.8747	14:00:33	6	Koyuktolik Bay
Harbor Seal	2	6/4/1994	59.6453	153.1628	15:59:29	7	N of Oil Bay
Harbor Seal	5	6/4/1994	60.3048	152.9703	16:26:17	7	Tuxedni Bay
Harbor Seal	50	6/4/1994	60.2312	152.8528	16:33:28	7	Tuxedni Bay
Harbor Seal	23	6/4/1994	60.6672	152.0343	16:58:57	7	Drift R.
Harbor Seal	1	6/4/1994	60.9062	151.6652	17:23:26	7	McArthur R.
Harbor Seal	1	6/4/1994	60.9062	151.6652	17:23:27	7	McArthur R.
Harbor Seal	4	6/4/1994	61.2575	150.2957	18:09:11	7	Little Susitna R.
Harbor Seal	1	6/5/1994	60.9395	150.0425	14:11:13	8	Chickaloon Bay
Harbor Seal	20	7/18/1995	60.9558	150.0212	16:55:46	2	Chickaloon Bay
Harbor Seal	26	7/20/1995	61.3085	150.5868	17:54:22	6	Susitna R.
Harbor Seal	27	7/21/1995	61.2070	150.6047	11:24:19	7	Susitna R.
Harbor Seal	25	7/21/1995	61.3125	150.5867	11:50:47	7	Susitna R.
Harbor Seal	30	7/21/1995	60.9095	150.0592	14:47:01	8	Chickaloon Bay
Harbor Seal	140	7/22/1995	59.7790	151.0133	11:10:49	9	Fox R.
Harbor Seal	1	7/22/1995	59.0182	153.3752	15:16:17	10	Shaw I.
Harbor Seal	40	7/22/1995	59.0695	153.8527	15:27:57	10	Akumwarvik Bay
Harbor Seal	120	7/22/1995	59.0903	154.1293	15:38:53	10	McNeil R.
Harbor Seal	100	7/22/1995	59.0998	154.1383	15:39:12	10	McNeil R.
Harbor Seal	2	7/22/1995	59.3697	154.0403	15:57:33	10	Bruin Bay
Harbor Seal	11	7/22/1995	59.6100	153.5487	16:36:54	10	Iliamna Bay
Harbor Seal	2	7/22/1995	59.6232	153.5162	16:37:31	10	Iliamna Bay
Harbor Seal	150	7/22/1995	59.7368	153.4262	16:45:03	10	Iniskin Bay
Harbor Seal	50	7/22/1995	59.6278	153.4387	16:48:53	10	Iniskin Bay
Harbor Seal	100	7/22/1995	59.6250	153.4240	16:49:08	10	Iniskin Bay
Harbor Seal	60	7/22/1995	59.8317	153.1823	17:06:31	10	Chinitna Bay
Harbor Seal	40	7/22/1995	59.8292	153.1607	17:08:57	10	Chinitna Bay
Harbor Seal	15	7/22/1995	60.2195	152.8142	17:36:01	10	Tuxedni Bay
Harbor Seal	5	7/22/1995	60.6503	152.0340	18:32:30	10	Big R.
Harbor Seal	185	7/22/1995	60.6553	152.0073	18:33:16	10	Big R.
Harbor Seal	18	7/22/1995	60.7137	151.8730	20:10:56	11	Kustatan R.
Harbor Seal	13	7/22/1995	60.9092	151.6890	20:21:01	11	McArthur R.
Harbor Seal	2	7/24/1995	60.6400	152.0233	11:06:24	12	Big R.
Harbor Seal	11	7/24/1995	60.9067	151.6933	11:57:26	12	McArthur R.
Harbor Seal	2	7/24/1995	61.2040	150.7955	12:22:10	12	Susitna R.
Harbor Seal	13	7/24/1995	61.2148	150.7808	12:36:28	12	Lewis R.
Harbor Seal	9	6/11/1996	61.2238	150.8000	13:10:55	1	Lewis R.
Harbor Seal	9	6/12/1996	61.1920	150.6442	11:11:21	2	Susitna R.
Harbor Seal	100	6/12/1996	61.2040	150.6117	13:21:12	2	Susitna R.
Harbor Seal	1	6/13/1996	60.9700	150.2533	12:08:23	4	Turnagain Arm
Harbor Seal	1	6/13/1996	60.9705	150.6917	12:17:23	4	Moose Pt.
Harbor Seal	2	6/13/1996	60.9083	150.8488	12:20:34	4	S of Moose Pt.
Harbor Seal	120	6/14/1996	59.7765	150.9797	11:51:54	5	Kachemak Bay
Harbor Seal	2	6/15/1996	59.4077	153.4882	15:11:08	8	Augustine I.
Harbor Seal	1	6/15/1996	59.4023	153.5610	15:12:21	8	Augustine I.
Harbor Seal	1	6/15/1996	58.9003	153.3095	15:40:18	8	Cape Douglas
Harbor Seal	1	6/15/1996	59.3478	153.9550	16:18:59	8	Bruin Bay
Harbor Seal	1	6/15/1996	59.5213	153.7302	16:33:55	8	S of Ursus Cove
Harbor Seal	32	6/15/1996	59.8268	153.2185	17:27:25	8	Chinitna Bay
Harbor Seal	12	6/15/1996	60.2862	153.0155	17:53:55	8	Tuxedni Bay
Harbor Seal	15	6/15/1996	60.2405	152.8773	17:57:26	8	Tuxedni Bay
Harbor Seal	70	6/15/1996	60.2203	152.8157	17:58:43	8	Tuxedni Bay
Harbor Seal	115	6/15/1996	60.3637	152.2750	18:09:46	8	Polly Crk./ Redoubt Bay
Harbor Seal	100	6/15/1996	60.5217	152.2532	18:15:35	8	Drift R.
Harbor Seal	120	6/15/1996	60.6697	151.9855	18:30:16	8	Btwn Big/ Kustatan R.
Harbor Seal	75	6/15/1996	60.6997	151.9205	18:31:33	8	Btwn Big/ Kustatan R.
Harbor Seal	45	6/15/1996	60.7072	151.8900	18:32:04	8	Btwn Big/ Kustatan R.
Harbor Seal	115	6/16/1996	60.9632	149.9803	13:06:14	9	Chickaloon R.
Harbor Seal	50	6/16/1996	60.9660	150.0152	13:06:48	9	Chickaloon R.
Harbor Seal	25	6/16/1996	60.9653	150.0842	13:07:54	9	Chickaloon R.
Harbor Seal	1	6/8/1997	61.4798	149.3338	12:49:37	1	Knik R.
Harbor Seal	4	6/8/1997	60.8800	151.6612	16:04:46	1	McArthur R.
Harbor Seal	80	6/9/1997	59.7712	151.0448	11:22:35	2	Fox R.

Appendix -- Cont.

Common name	Group size	Date	Latitude (decimal degrees)	Longitude (decimal degrees)	Time (AK DST)	Flight no.	General location
Harbor Seal	34	6/9/1997	59.7760	151.0218	11:23:01	2	Fox R.
Harbor Seal	250	6/9/1997	59.7773	151.0155	11:23:07	2	Fox R.
Harbor Seal	100	6/9/1997	59.7793	151.0063	11:23:18	2	Fox R.
Harbor Seal	100	6/9/1997	59.7843	150.9843	11:23:42	2	Fox R.
Harbor Seal	2	6/9/1997	59.8350	153.2242	17:10:44	3	Chinitna Bay
Harbor Seal	7	6/9/1997	60.2148	152.7853	17:37:07	3	Tuxedni Bay
Harbor Seal	50	6/9/1997	60.2213	152.8060	17:37:32	3	Tuxedni Bay
Harbor Seal	10	6/9/1997	60.2272	152.8262	17:37:56	3	Tuxedni Bay
Harbor Seal	5	6/9/1997	60.2303	152.8427	17:38:13	3	Tuxedni Bay
Harbor Seal	4	6/10/1997	61.2110	150.7813	17:05:24	4	Btwn Theodore/ Lewis R.
Harbor Seal	35	6/10/1997	61.1910	150.6252	17:37:35	4	Susitna R.
Harbor Seal	20	6/10/1997	61.1870	150.6323	17:37:47	4	Susitna R.
Harbor Seal	6	6/13/1998	59.7640	151.0532	12:55:13	4	Fox R.
Harbor Seal	700	6/13/1998	59.7747	150.9732	12:56:45	4	Fox R.
Harbor Seal	1	6/13/1998	59.9245	152.2868	17:42:14	5	N of Anchor Pt./ mid inlet
Harbor Seal	1	6/13/1998	60.2218	152.2260	18:03:58	5	S of Kalgin I./ mid inlet
Harbor Seal	1	6/13/1998	60.6718	151.8733	18:48:12	5	Btwn Big/ Kustatan R.
Harbor Seal	5	6/14/1998	59.4222	153.3752	16:22:30	8	Augustine I.
Harbor Seal	10	6/14/1998	59.0790	153.8305	17:09:50	8	Kamishak Bay
Harbor Seal	25	6/14/1998	60.3632	152.2643	18:21:48	8	Harriet Pt.
Harbor Seal	1	6/14/1998	60.5147	152.2652	18:50:33	8	S of Drift R.
Harbor Seal	54	6/14/1998	60.5228	152.2505	18:50:57	8	S of Drift R.
Harbor Seal	45	6/14/1998	60.5273	152.2428	18:51:09	8	S of Drift R.
Harbor Seal	52	6/15/1998	61.2227	150.8105	15:01:57	9	Theodore R.
Harbor Seal	180	6/15/1998	61.2018	150.6117	15:17:35	9	Susitna R.
Harbor Seal	1	6/9/1999	61.1483	151.0183	11:25:11	2	Tyonek
Harbor Seal	1	6/9/1999	61.1838	150.9057	11:35:17	2	Beluga R.
Harbor Seal	1	6/9/1999	61.2073	150.7990	11:40:47	2	Btwn Theodore/ Lewis R.
Harbor Seal	2	6/9/1999	61.2127	150.7948	11:41:01	2	Btwn Theodore/ Lewis R.
Harbor Seal	2	6/9/1999	61.2095	150.8083	11:42:01	2	Btwn Theodore/ Lewis R.
Harbor Seal	6	6/9/1999	61.2110	150.8037	11:42:08	2	Btwn Theodore/ Lewis R.
Harbor Seal	7	6/9/1999	61.2125	150.7675	11:44:02	2	Lewis R.
Harbor Seal	10	6/9/1999	61.2083	150.6755	11:55:46	2	Btwn Ivan/ Susitna R.
Harbor Seal	2	6/9/1999	61.2052	150.7663	11:57:35	2	Lewis R.
Harbor Seal	4	6/9/1999	61.1867	150.5130	12:05:57	2	Susitna R.
Harbor Seal	37	6/9/1999	60.9120	150.0902	14:18:04	2	Chickaloon R.
Harbor Seal	40	6/10/1999	59.7888	151.0067	11:44:49	3	Fox R.
Harbor Seal	35	6/10/1999	59.7912	150.9805	11:45:24	3	Fox R.
Harbor Seal	1	6/10/1999	59.6102	151.4520	13:06:11	3	Kachemak Bay
Harbor Seal	2	6/10/1999	59.8368	152.4547	15:25:52	4	NW of Anchor Pt./ mid inlet
Harbor Seal	3	6/10/1999	60.2348	152.2982	16:01:33	4	S of Kalgin I./ mid inlet
Harbor Seal	1	6/10/1999	60.6007	152.0407	16:41:49	4	Btwn Drift/ Big R.
Harbor Seal	127	6/11/1999	60.2223	152.8300	12:25:28	5	Tuxedni Bay
Harbor Seal	80	6/11/1999	60.5313	152.2527	14:55:27	6	S of Drift R.
Harbor Seal	15	6/11/1999	60.7177	151.8610	15:21:02	6	Kustatan R.
Harbor Seal	20	6/11/1999	61.2335	150.7478	15:50:41	6	Ivan R.
Harbor Seal	5	6/12/1999	60.9562	149.9467	11:32:36	7	Chickaloon Bay
Harbor Seal	20	6/12/1999	60.9617	150.1043	11:41:54	7	Chickaloon R.
Harbor Seal	1	6/12/1999	61.0165	150.3177	11:48:46	7	Pt. Possession
Harbor Seal	1	6/12/1999	60.9748	151.4890	14:48:54	8	Trading Bay
Harbor Seal	2	6/12/1999	61.2090	150.8037	15:30:07	8	Theodore R.
Harbor Seal	22	6/14/1999	60.2713	152.0137	11:06:07	11	S of Kalgin I./ mid inlet
Harbor Seal	1	6/8/2000	61.3798	150.5365	11:25:53	3	Susitna R.
Harbor Seal	1	6/8/2000	61.2367	150.7328	11:36:27	3	Ivan R
Harbor Seal	1	6/8/2000	61.2273	150.7718	11:37:07	3	Lewis R.
Harbor Seal	2	6/8/2000	60.8862	151.7147	12:09:16	3	McArthur R.
Harbor Seal	21	6/8/2000	60.9225	150.1042	12:54:13	3	Chickaloon R.
Harbor Seal	20	6/8/2000	60.9225	150.0847	12:54:37	3	Chickaloon R.
Harbor Seal	30	6/8/2000	60.9225	150.0830	12:54:39	3	Chickaloon R.
Harbor Seal	10	6/8/2000	60.9213	150.0640	12:55:04	3	Chickaloon R.
Harbor Seal	40	6/9/2000	60.6962	151.9010	10:28:00	4	Kustatan R.
Harbor Seal	50	6/9/2000	60.3663	152.2590	10:54:06	4	Harriet Pt.
Harbor Seal	205	6/9/2000	60.2243	152.8178	11:07:10	4	Tuxedni Bay
Harbor Seal	12	6/9/2000	60.0175	152.5847	11:39:44	4	Btwn Chinitna/ Tuxedni Bay
Harbor Seal	25	6/9/2000	60.0030	152.6050	11:40:26	4	Btwn Chinitna/ Tuxedni Bay
Harbor Seal	5	6/9/2000	59.8268	153.1715	11:54:17	4	Chinitna Bay
Harbor Seal	12	6/9/2000	59.8235	153.1498	11:54:45	4	Chinitna Bay

Appendix -- Cont.

Common name	Group size	Date	Latitude (decimal degrees)	Longitude (decimal degrees)	Time (AK DST)	Flight no.	General location
Harbor Seal	16	6/9/2000	59.6242	153.3938	12:14:38	4	Iniskin Bay
Harbor Seal	8	6/9/2000	59.6248	153.4097	12:14:56	4	Iniskin Bay
Harbor Seal	10	6/9/2000	59.6358	153.4407	12:15:41	4	Iniskin Bay
Harbor Seal	50	6/9/2000	59.6412	153.4427	12:15:53	4	Iniskin Bay
Harbor Seal	23	6/9/2000	59.6430	153.4427	12:15:56	4	Iniskin Bay
Harbor Seal	75	6/9/2000	59.7395	153.4325	12:20:12	4	Iniskin Bay
Harbor Seal	160	6/9/2000	59.7408	153.4370	12:20:19	4	Iniskin Bay
Harbor Seal	8	6/9/2000	59.6248	153.5217	12:27:38	4	Iniskin Bay
Harbor Seal	4	6/9/2000	59.6165	153.5765	12:34:03	4	Illiamna Bay
Harbor Seal	2	6/9/2000	59.2350	154.1018	13:03:56	4	N of Nordyke I.
Harbor Seal	1	6/9/2000	59.1970	154.1063	13:05:23	4	N of Nordyke I.
Harbor Seal	40	6/9/2000	59.0997	154.1438	13:12:02	4	Akumwarvik Bay
Harbor Seal	1	6/9/2000	59.0900	154.1420	13:12:23	4	Akumwarvik Bay
Harbor Seal	80	6/9/2000	59.0718	154.1403	13:13:00	4	Akumwarvik Bay
Harbor Seal	1	6/9/2000	59.0597	154.1427	13:13:26	4	Akumwarvik Bay
Harbor Seal	1	6/9/2000	59.0907	153.9553	13:24:15	4	Kamishak Bay
Harbor Seal	1	6/9/2000	59.0915	153.8193	13:27:07	4	Kamishak Bay
Harbor Seal	1	6/9/2000	59.1055	153.7995	13:27:41	4	Kamishak Bay
Harbor Seal	65	6/9/2000	59.1137	153.6930	13:29:30	4	Kamishak Bay
Harbor Seal	1	6/9/2000	59.0445	153.6303	13:32:06	4	Kamishak Bay
Harbor Seal	8	6/9/2000	58.9693	153.3820	13:37:50	4	Shaw I.
Harbor Seal	20	6/9/2000	58.9603	153.3753	13:38:09	4	Shaw I.
Harbor Seal	15	6/9/2000	59.0085	153.4005	17:56:09	5	Shaw I.
Harbor Seal	1	6/9/2000	60.9643	150.7147	19:49:19	5	Moose Pt.
Harbor Seal	1	6/10/2000	60.9052	151.6357	10:30:02	6	McArthur R.
Harbor Seal	65	6/10/2000	60.5150	152.2638	11:37:19	6	S of Drift R.
Harbor Seal	15	6/10/2000	59.7560	151.0545	15:07:18	7	Kachemak Bay
Harbor Seal	10	6/10/2000	59.7728	151.0302	15:08:00	7	Kachemak Bay
Harbor Seal	2	6/10/2000	59.7775	151.0182	15:08:17	7	Fox R.
Harbor Seal	700	6/10/2000	59.7810	150.9975	15:08:42	7	Fox R.
Harbor Seal	3	6/10/2000	59.6567	151.4183	15:18:09	7	Kachemak Bay
Harbor Seal	35	6/11/2000	61.2113	150.6260	11:28:47	8	Susitna R.
Harbor Seal	1	6/11/2000	61.2095	150.7802	11:31:15	8	Lewis R.
Harbor Seal	1	6/11/2000	61.2058	150.7990	11:31:32	8	Theodore R.
Harbor Seal	75	6/12/2000	60.9337	150.1005	9:52:41	9	Chickaloon R.
Harbor Seal	36	6/12/2000	60.9425	150.1113	9:53:01	9	Chickaloon R.
Harbor Seal	5	6/12/2000	61.1865	150.6483	11:46:15	9	Susitna R.
Harbor Seal	40	6/12/2000	61.2125	150.6052	12:00:23	9	Susitna R.
Harbor Seal	1	6/12/2000	61.2048	150.7922	12:03:14	9	Theodore R.
Harbor Seal	1	6/12/2000	61.1928	150.8267	12:03:53	9	Theodore R.
Harbor Seal	3	6/12/2000	61.2323	150.7548	16:32:54	10	Ivan R.
Harbor Seal	1	6/13/2000	60.9983	150.1850	8:49:42	11	Chickaloon Bay
Harbor Seal	1	6/13/2000	60.9067	150.0433	9:14:12	11	Chickaloon R.
Harbor Seal	2	6/5/2001	60.8615	151.6710	12:44:05	1	McArthur R.
Harbor Seal	70	6/5/2001	61.2142	150.6507	13:36:07	1	Susitna R.
Harbor Seal	1	6/5/2001	60.9197	150.0898	17:11:12	1	Chickaloon R.
Harbor Seal	37	6/5/2001	60.9147	150.0837	19:00:45	2	Chickaloon R.
Harbor Seal	1	6/6/2001	60.7958	151.7353	12:52:07	3	N of West Foreland
Harbor Seal	1	6/8/2001	59.7607	151.0865	11:51:02	7	Fox R.
Harbor Seal	98	6/8/2001	59.7827	151.0072	11:52:53	7	Fox R.
Harbor Seal	292	6/8/2001	59.7745	151.0280	11:53:48	7	Fox R.
Harbor Seal	3	6/8/2001	59.7630	151.0537	11:54:40	7	Fox R.
Harbor Seal	42	6/8/2001	59.7522	151.0457	11:55:09	7	Fox R.
Harbor Seal	10	6/8/2001	59.7550	151.0678	11:55:57	7	Fox R.
Harbor Seal	3	6/8/2001	60.9430	150.1013	17:48:19	8	Chickaloon R.
Harbor Seal	1	6/9/2001	60.5570	152.0068	10:36:36	9	Drift R.
Harbor Seal	1	6/9/2001	59.7203	152.6983	11:12:00	9	SE of Chinitna Bay/ mid inlet
Harbor Seal	10	6/9/2001	59.6083	153.5443	13:24:30	9	Illiamna Bay
Harbor Seal	3	6/9/2001	59.6123	153.5578	13:24:51	9	Illiamna Bay
Harbor Seal	1	6/9/2001	59.6638	153.4418	13:35:25	9	Iniskin Bay
Harbor Seal	40	6/9/2001	59.7267	153.4413	13:37:53	9	Iniskin Bay
Harbor Seal	40	6/9/2001	59.7322	153.4432	13:38:05	9	Iniskin Bay
Harbor Seal	80	6/9/2001	59.7368	153.4432	13:38:16	9	Iniskin Bay
Harbor Seal	8	6/9/2001	59.7395	153.4447	13:38:22	9	Iniskin Bay
Harbor Seal	1	6/9/2001	59.6478	153.4428	13:43:19	9	Btwn Iniskin/ Oil Bay
Harbor Seal	12	6/9/2001	59.6445	153.4462	13:43:27	9	Btwn Iniskin/ Oil Bay
Harbor Seal	10	6/9/2001	59.6407	153.4465	13:43:34	9	Btwn Iniskin/ Oil Bay

Appendix -- Cont.

Common name	Group size	Date	Latitude (decimal degrees)	Longitude (decimal degrees)	Time (AK DST)	Flight no.	General location
Harbor Seal	20	6/9/2001	59.6397	153.4460	13:43:37	9	Btwn Iniskin/ Oil Bay
Harbor Seal	5	6/9/2001	59.6377	153.4455	13:43:40	9	Btwn Iniskin/ Oil Bay
Harbor Seal	4	6/9/2001	59.6275	153.3987	13:44:37	9	Btwn Iniskin/ Oil Bay
Harbor Seal	2	6/9/2001	59.6773	153.0537	13:53:47	9	Btwn Oil/ Chinitna Bay
Harbor Seal	1	6/9/2001	60.2122	152.7822	16:17:56	10	Tuxedni Bay
Harbor Seal	12	6/9/2001	60.2167	152.8072	16:18:28	10	Tuxedni Bay
Harbor Seal	4	6/9/2001	60.2187	152.8148	16:18:38	10	Tuxedni Bay
Harbor Seal	8	6/9/2001	60.2238	152.8380	16:19:06	10	Tuxedni Bay
Harbor Seal	4	6/9/2001	60.2243	152.8397	16:19:09	10	Tuxedni Bay
Harbor Seal	30	6/9/2001	60.3600	152.2608	16:46:13	10	Harriet Pt.
Harbor Seal	1	6/9/2001	60.4702	152.3005	16:51:15	10	S of Drift R.
Harbor Seal	45	6/9/2001	60.5290	152.2438	16:53:42	10	S of Drift R.
Harbor Seal	18	6/10/2001	60.9323	150.0908	13:01:41	11	Chickaloon R.
Harbor Seal	8	6/10/2001	60.9202	150.0847	13:02:11	11	Chickaloon R.
Harbor Seal	12	6/10/2001	60.9132	150.0647	13:02:39	11	Chickaloon R.
Harbor Seal	14	6/10/2001	61.2085	150.5992	15:01:19	11	Susitna R.
Harbor Seal	39	6/10/2001	61.2057	150.6230	15:01:48	11	Susitna R.
Harbor Seal	190	6/10/2001	61.2073	150.6545	15:02:32	11	Susitna R.
Harbor Seal	100	6/11/2001	60.9072	150.0557	12:42:00	13	Chickaloon R.
Harbor Seal	20	6/11/2001	60.9052	150.0477	12:42:10	13	Chickaloon R.
Harbor Seal	1	6/11/2001	61.2147	150.7862	13:50:01	13	Lewis R.
Harbor Seal	10	6/11/2001	61.2027	150.6077	14:05:07	13	Ivan R.
Harbor Seal	45	6/11/2001	60.9680	149.9500	17:13:19	14	Chickaloon Bay
Harbor Seal	1	6/11/2001	60.9453	150.1082	17:16:58	14	Chickaloon R.
Harbor Seal	100	6/12/2001	60.9208	150.0798	10:42:53	15	Chickaloon R.
Harbor Seal	72	6/12/2001	60.9162	150.0772	10:43:05	15	Chickaloon R.
Harbor Seal	10	6/12/2001	60.9247	150.1017	10:48:40	15	Chickaloon R.
Harbor Seal	180	6/12/2001	61.2090	150.8172	11:48:28	15	Theodore R.
Harbor Seal	30	6/12/2001	61.2173	150.7903	11:49:04	15	Lewis R.
Harbor Seal	100	6/12/2001	61.1937	150.6453	16:45:45	16	Susitna R.
Harbor Seal	25	6/4/2002	60.6087	151.8347	10:40:49	1	N of Kalgin I./ mid inlet
Harbor Seal	30	6/4/2002	58.9932	153.4023	12:05:02	1	Shaw I.
Harbor Seal	4	6/4/2002	59.0843	153.8102	12:17:45	1	Kamishak Bay
Harbor Seal	20	6/4/2002	59.0988	153.9040	12:24:02	1	Kamishak Bay
Harbor Seal	25	6/4/2002	59.0697	154.1528	12:30:01	1	Akumwarvik Bay
Harbor Seal	29	6/4/2002	59.0780	154.1478	12:30:22	1	Akumwarvik Bay
Harbor Seal	12	6/4/2002	59.0823	154.1453	12:30:32	1	Akumwarvik Bay
Harbor Seal	12	6/4/2002	59.1033	154.1527	12:31:17	1	Akumwarvik Bay
Harbor Seal	33	6/4/2002	59.1255	154.1623	12:32:04	1	Akumwarvik Bay
Harbor Seal	13	6/4/2002	59.1842	154.1448	12:37:10	1	Nordyke I.
Harbor Seal	5	6/4/2002	59.1703	154.0995	12:38:26	1	Nordyke I.
Harbor Seal	30	6/4/2002	59.1693	154.0928	12:38:35	1	Nordyke I.
Harbor Seal	25	6/4/2002	59.1868	154.0805	12:39:37	1	Nordyke I.
Harbor Seal	5	6/4/2002	59.1878	154.0883	12:39:46	1	Nordyke I.
Harbor Seal	12	6/4/2002	59.4133	153.4817	15:22:25	2	Augustine I.
Harbor Seal	12	6/4/2002	59.4077	153.5030	15:22:52	2	Augustine I.
Harbor Seal	12	6/4/2002	59.4075	153.5142	15:23:03	2	Augustine I.
Harbor Seal	1	6/4/2002	59.4075	153.5268	15:23:17	2	Augustine I.
Harbor Seal	30	6/4/2002	59.4015	153.5603	15:23:54	2	Augustine I.
Harbor Seal	1	6/4/2002	59.3638	153.5845	15:25:25	2	Augustine I.
Harbor Seal	2	6/4/2002	59.3557	153.5723	15:25:48	2	Augustine I.
Harbor Seal	2	6/4/2002	59.3170	153.4280	15:29:23	2	Augustine I.
Harbor Seal	25	6/4/2002	59.3345	153.3505	15:30:58	2	Augustine I.
Harbor Seal	1	6/4/2002	59.3552	153.3240	15:31:47	2	Augustine I.
Harbor Seal	5	6/4/2002	59.4060	153.4820	15:35:17	2	Augustine I.
Harbor Seal	4	6/4/2002	59.4442	153.7185	15:39:31	2	Ursus Cove
Harbor Seal	3	6/4/2002	59.5097	153.7228	15:42:08	2	Ursus Cove
Harbor Seal	31	6/4/2002	59.6083	153.5518	15:48:42	2	Iliamna Bay
Harbor Seal	24	6/4/2002	59.6127	153.5623	15:48:58	2	Iliamna Bay
Harbor Seal	41	6/4/2002	59.6173	153.5787	15:49:16	2	Iliamna Bay
Harbor Seal	4	6/4/2002	59.6283	153.4962	15:58:21	2	Brwn Iliamna/ Iniskin Bay
Harbor Seal	200	6/4/2002	59.7405	153.4185	16:02:50	2	Iniskin Bay
Harbor Seal	45	6/4/2002	59.7447	153.4412	16:03:26	2	Iniskin Bay
Harbor Seal	43	6/4/2002	59.7400	153.4425	16:03:36	2	Iniskin Bay
Harbor Seal	52	6/4/2002	59.7310	153.4187	16:04:16	2	Iniskin Bay
Harbor Seal	15	6/4/2002	59.6398	153.4375	16:08:07	2	Iniskin Bay
Harbor Seal	27	6/4/2002	59.6363	153.4330	16:08:14	2	Iniskin Bay

Appendix -- Cont.

Common name	Group size	Date	Latitude (decimal degrees)	Longitude (decimal degrees)	Time (AK DST)	Flight no.	General location
Harbor Seal	56	6/4/2002	59.6340	153.4282	16:08:23	2	Iniskin Bay
Harbor Seal	50	6/4/2002	59.6280	153.3968	16:09:02	2	Iniskin Bay
Harbor Seal	15	6/4/2002	60.0065	152.5862	16:44:46	2	Oil Bay
Harbor Seal	8	6/4/2002	60.2157	152.7885	16:56:45	2	Tuxedni Bay
Harbor Seal	14	6/4/2002	60.2195	152.8038	16:58:41	2	Tuxedni Bay
Harbor Seal	10	6/4/2002	60.2233	152.8178	16:58:56	2	Tuxedni Bay
Harbor Seal	3	6/4/2002	60.2243	152.8343	17:02:19	2	Tuxedni Bay
Harbor Seal	3	6/4/2002	60.2175	152.8043	17:02:53	2	Tuxedni Bay
Harbor Seal	2	6/4/2002	60.2122	152.7663	17:03:35	2	Tuxedni Bay
Harbor Seal	20	6/4/2002	60.3600	152.2600	17:24:37	2	Harriet Pt.
Harbor Seal	14	6/4/2002	60.6513	152.0307	17:37:23	2	Big R.
Harbor Seal	8	6/4/2002	60.6705	152.0578	17:39:32	2	Big R.
Harbor Seal	8	6/4/2002	60.6433	152.0450	17:40:28	2	Big R.
Harbor Seal	60	6/4/2002	60.6410	152.0423	17:40:33	2	Big R.
Harbor Seal	40	6/4/2002	60.6475	151.9720	17:42:02	2	Btwn Big/ Kustatan R.
Harbor Seal	40	6/4/2002	60.7083	151.8667	17:46:37	2	Kustatan R.
Harbor Seal	150	6/5/2002	59.7822	151.0242	11:32:55	3	Fox R.
Harbor Seal	120	6/5/2002	59.7817	150.9767	11:33:38	3	Fox R.
Harbor Seal	10	6/6/2002	61.1950	150.6550	10:47:14	5	Susitna R.
Harbor Seal	6	6/6/2002	60.9078	151.6692	14:28:45	6	McArthur R.
Harbor Seal	1	6/6/2002	61.0397	150.4063	14:55:41	6	Pt. Possession
Harbor Seal	4	6/6/2002	60.9308	150.0837	15:13:57	6	Chickaloon R.
Harbor Seal	1	6/7/2002	60.8902	151.6405	11:00:41	7	McArthur R.
Harbor Seal	5	6/7/2002	60.8960	151.6032	11:01:29	7	McArthur R.
Harbor Seal	6	6/7/2002	61.1878	150.7918	11:27:28	7	Theodore R.
Harbor Seal	50	6/7/2002	61.2017	150.5960	11:42:16	7	Susitna R.
Harbor Seal	1	6/7/2002	61.1263	150.8757	11:49:32	7	Beluga R.
Harbor Seal	3	6/7/2002	60.9167	150.0822	16:41:03	8	Chickaloon R.
Harbor Seal	40	6/9/2002	60.9438	150.1005	12:52:46	10	Chickaloon R.
Harbor Seal	44	6/3/2003	60.9203	150.0563	11:46:58	4	Chickaloon R.
Harbor Seal	30	6/3/2003	61.1720	150.6185	14:14:32	4	Susitna R.
Harbor Seal	3	6/4/2003	61.1855	150.0408	16:42:36	6	S of Pt. Woronzof
Harbor Seal	7	6/5/2003	60.9453	149.9307	10:41:44	7	Chickaloon Bay
Harbor Seal	150	6/5/2003	60.9398	149.9483	10:41:59	7	Chickaloon Bay
Harbor Seal	50	6/5/2003	60.9102	150.0765	10:44:10	7	Chickaloon R.
Harbor Seal	150	6/5/2003	61.2130	150.8183	11:30:38	7	Theodore R.
Harbor Seal	50	6/5/2003	61.2220	150.7805	11:31:19	7	Lewis R.
Harbor Seal	15	6/6/2003	61.2040	150.8642	10:58:12	8	Btwn Beluga/ Theodore R.
Harbor Seal	2	6/6/2003	61.2780	150.6462	11:03:31	8	Susitna R.
Harbor Seal	1	6/6/2003	61.2662	150.6702	11:12:04	8	Susitna R.
Harbor Seal	1	6/7/2003	59.6272	151.5445	11:06:00	10	Kachemak Bay
Harbor Seal	1	6/7/2003	59.6835	151.3007	11:13:48	10	Kachemak Bay
Harbor Seal	140	6/7/2003	59.7753	150.9888	11:19:57	10	Kachemak Bay
Harbor Seal	10	6/7/2003	59.7528	151.0582	11:27:14	10	Kachemak Bay
Harbor Seal	20	6/7/2003	59.7078	151.1152	11:31:27	10	Kachemak Bay
Harbor Seal	10	6/7/2003	59.7065	151.1177	11:31:30	10	Kachemak Bay
Harbor Seal	1	6/7/2003	59.5815	151.2907	11:43:49	10	Kachemak Bay
Harbor Seal	55	6/7/2003	59.1125	154.1308	13:34:23	10	Akumwarvik Bay
Harbor Seal	100	6/8/2003	61.2163	150.8227	9:58:04	12	Theodore R.
Harbor Seal	20	6/8/2003	60.9180	150.0583	16:15:19	13	Chickaloon R.
Harbor Seal	10	6/10/2003	60.8908	151.6632	10:23:45	14	McArthur R.
Harbor Seal	6	6/10/2003	60.8898	151.6360	10:24:11	14	McArthur R.
Harbor Seal	12	6/11/2003	60.9497	149.9117	10:14:15	15	Chickaloon Bay
Harbor Seal	1	6/11/2003	61.0222	150.3015	10:51:53	15	Pt. Possession
Harbor Seal	10	6/12/2003	58.9813	153.3877	13:36:20	16	Shaw I.
Harbor Seal	2	6/12/2003	59.0803	153.8000	13:48:16	16	Kamishak Bay
Harbor Seal	15	6/12/2003	59.6672	153.4098	14:54:17	16	Iniskin Bay
Harbor Seal	3	6/12/2003	59.6362	153.4323	14:55:25	16	Iniskin Bay
Harbor Seal	1	6/12/2003	59.8667	152.8577	17:46:46	17	Chinitna Bay
Harbor Seal	50	6/12/2003	60.0148	152.5833	17:54:10	17	Btwn Chinitna/ Tuxedni Bay
Harbor Seal	62	6/12/2003	60.2287	152.8478	18:07:32	17	Tuxedni Bay
Harbor Seal	1	6/12/2003	60.2215	152.8135	18:08:06	17	Tuxedni Bay
Harbor Seal	1	6/12/2003	60.3638	152.2523	18:30:00	17	Harriet Pt.
Harbor Seal	95	6/12/2003	60.6483	152.0367	18:41:48	17	Big R.
Harbor Seal	36	6/12/2003	60.6620	151.9847	18:46:08	17	Big R.
Harbor Seal	35	6/2/2004	60.6298	151.9933	10:43:56	1	Big R.
Harbor Seal	75	6/2/2004	61.1990	150.6073	11:34:33	1	Susitna R.

Appendix -- Cont.

Common name	Group size	Date	Latitude (decimal degrees)	Longitude (decimal degrees)	Time (AK DST)	Flight no.	General location
Harbor Seal	52	6/3/2004	60.9122	150.0712	9:51:20	2	Chickaloon R.
Harbor Seal	62	6/3/2004	60.6232	151.9968	12:27:10	3	Big R.
Harbor Seal	50	6/3/2004	60.6520	151.9657	12:28:24	3	Big R.
Harbor Seal	35	6/3/2004	60.6520	151.9657	12:28:25	3	Big R.
Harbor Seal	25	6/3/2004	60.8038	151.7417	12:39:09	3	Trading Bay
Harbor Seal	50	6/3/2004	60.8795	151.6412	12:42:50	3	McArthur R.
Harbor Seal	35	6/4/2004	60.9178	150.0922	10:42:51	4	Chickaloon R.
Harbor Seal	250	6/5/2004	59.7807	151.0158	11:21:35	6	Fox R.
Harbor Seal	50	6/5/2004	59.7572	151.0463	11:24:51	6	Fox R.
Harbor Seal	150	6/5/2004	59.7462	151.0520	11:25:15	6	Fox R.
Harbor Seal	1	6/5/2004	59.1225	152.0218	14:05:32	7	W of Elizabeth I.
Harbor Seal	1	6/5/2004	58.8667	153.2550	14:37:08	7	Cape Douglas
Harbor Seal	20	6/6/2004	59.0028	153.3617	12:35:09	8	Shaw I.
Harbor Seal	45	6/6/2004	59.0940	153.6540	12:44:03	8	Kamishak Bay
Harbor Seal	110	6/6/2004	59.1050	154.0378	12:51:59	8	Akumwarvik Bay
Harbor Seal	7	6/6/2004	59.1140	154.1212	12:53:36	8	Akumwarvik Bay
Harbor Seal	16	6/6/2004	59.3472	153.9348	13:06:17	8	Bruin Bay
Harbor Seal	26	6/6/2004	59.6320	153.4277	15:53:36	9	Iniskin Bay
Harbor Seal	1	6/6/2004	60.1947	152.7208	16:31:36	9	Tuxedni Bay
Harbor Seal	12	6/6/2004	60.2212	152.8137	16:33:15	9	Tuxedni Bay
Harbor Seal	1	6/6/2004	60.2088	152.7508	16:37:31	9	Tuxedni Bay
Harbor Seal	1	6/6/2004	60.2055	152.7292	16:37:53	9	Tuxedni Bay
Harbor Seal	2	6/6/2004	60.2050	152.7250	16:37:58	9	Tuxedni Bay
Harbor Seal	3	6/6/2004	60.2082	152.5307	16:53:38	9	Tuxedni Bay
Harbor Seal	100	6/7/2004	60.9157	150.0770	11:07:24	10	Chickaloon R.
Harbor Seal	20	6/7/2004	61.2082	150.8070	13:45:19	10	Theodore R.
Harbor Seal	300	6/7/2004	61.2168	150.8068	13:59:25	10	Theodore R.
Harbor Seal	60	6/7/2004	61.2240	150.7937	14:01:49	10	Lewis R.
Harbor Seal	30	6/8/2004	61.2087	150.8220	8:41:24	11	Theodore R.
Harbor Seal	32	6/8/2004	60.9182	150.0677	10:13:56	11	Chickaloon R.
Harbor Seal	34	6/8/2004	60.9195	150.0865	14:31:02	12	Chickaloon R.
Harbor Seal	20	6/8/2004	60.9163	150.0785	14:31:12	12	Chickaloon R.
Harbor Seal	100	6/9/2004	61.2063	150.8223	9:28:37	13	Theodore R.
Harbor Seal	75	6/9/2004	60.9132	150.0740	14:25:40	14	Chickaloon R.
Harbor Seal	4	5/31/2005	60.9457	150.0997	10:35:10	1	Chickaloon R.
Harbor Seal	10	5/31/2005	60.9413	150.0898	10:35:26	1	Chickaloon R.
Harbor Seal	4	5/31/2005	60.9332	150.0780	10:35:48	1	Chickaloon R.
Harbor Seal	16	5/31/2005	60.9460	150.0827	10:42:01	1	Chickaloon R.
Harbor Seal	7	5/31/2005	60.9082	151.7000	13:54:08	2	McArthur R.
Harbor Seal	1	5/31/2005	61.2018	150.8707	14:21:57	2	Btwn Beluga/ Theodore R.
Harbor Seal	3	5/31/2005	61.2157	150.8123	14:23:00	2	Theodore R.
Harbor Seal	70	6/1/2005	60.9472	150.0757	9:49:52	3	Chickaloon R.
Harbor Seal	10	6/1/2005	61.1965	150.9537	12:01:07	3	Beluga R.
Harbor Seal	6	6/1/2005	61.2527	150.2582	14:19:20	3	Little Susitna R.
Harbor Seal	7	6/2/2005	61.1900	150.8528	10:07:18	4	Btwn Beluga/ Theodore R.
Harbor Seal	10	6/2/2005	61.2017	150.7655	10:09:16	4	Lewis R.
Harbor Seal	1	6/3/2005	59.8730	152.5812	9:59:54	6	E of Chinitna Bay
Harbor Seal	11	6/3/2005	59.0885	153.8197	11:17:14	6	Kamishak Bay
Harbor Seal	16	6/3/2005	59.0905	154.1430	11:32:55	6	Akumwarvik Bay
Harbor Seal	12	6/3/2005	59.0952	154.1532	11:33:10	6	Akumwarvik Bay
Harbor Seal	1	6/3/2005	59.1627	154.1782	11:37:32	6	Akumwarvik Bay
Harbor Seal	8	6/3/2005	59.2315	154.1140	11:40:49	6	N of Nordyke I.
Harbor Seal	15	6/3/2005	59.4263	153.3960	15:13:34	7	Augustine I.
Harbor Seal	3	6/3/2005	59.5067	153.7192	15:28:36	7	Ursus Cove
Harbor Seal	17	6/3/2005	59.6095	153.5497	15:35:26	7	Iliamna Bay
Harbor Seal	53	6/3/2005	59.6433	153.4417	15:52:41	7	Iniskin Bay
Harbor Seal	54	6/3/2005	59.6297	153.4080	15:56:59	7	Btwn Iniskin/ Oil Bay
Harbor Seal	2	6/3/2005	59.6158	153.3395	15:58:29	7	Btwn Iniskin/ Oil Bay
Harbor Seal		6/3/2005	59.8305	153.1680	15:59:59	7	Chinitna Bay
Harbor Seal	43	6/3/2005	60.0040	152.5930	16:30:39	7	Btwn Chinitna/ Tuxedni Bay
Harbor Seal	63	6/3/2005	60.2220	152.8200	16:41:19	7	Tuxedni Bay
Harbor Seal	10	6/3/2005	60.2238	152.8273	16:41:28	7	Tuxedni Bay
Harbor Seal	7	6/3/2005	60.2257	152.8328	16:41:36	7	Tuxedni Bay
Harbor Seal	40	6/3/2005	60.2287	152.8412	16:41:48	7	Tuxedni Bay
Harbor Seal	20	6/3/2005	60.2568	152.8953	16:43:23	7	Tuxedni Bay
Harbor Seal	1	6/3/2005	60.2215	152.8017	16:48:06	7	Tuxedni Bay
Harbor Seal	1	6/3/2005	60.2285	152.5215	17:18:05	7	Tuxedni Bay

Appendix -- Cont.

Common name	Group size	Date	Latitude (decimal degrees)	Longitude (decimal degrees)	Time (AK DST)	Flight no.	General location
Harbor Seal	50	6/3/2005	60.5200	152.2410	17:31:32	7	S of Drift R.
Harbor Seal	250	6/4/2005	59.7693	151.0042	10:50:35	8	Bradley R.
Harbor Seal	170	6/4/2005	59.7740	150.9910	10:50:54	8	Bradley R.
Harbor Seal	12	6/5/2005	60.9577	149.9533	11:37:51	10	Chickaloon Bay
Harbor Seal	101	6/5/2005	60.9505	150.1033	11:46:21	10	Chickaloon R.
Harbor Seal	35	6/5/2005	60.9530	150.0942	11:53:50	10	Chickaloon R.
Harbor Seal	60	6/8/2005	60.9107	150.0657	10:00:26	13	Chickaloon R.
Harbor Seal	75	6/8/2005	61.3962	149.8238	16:31:26	14	Goose Bay/ Knik Arm
Harbor Seal	20	6/9/2005	60.9168	150.0942	11:02:16	15	Chickaloon R.
Harbor Seal	5	6/9/2005	60.9165	150.0833	11:02:31	15	Chickaloon R.
Harbor Seal	60	6/9/2005	60.9163	150.0788	11:02:38	15	Chickaloon R.
Harbor Seal	1	6/6/2006	61.0407	150.3699	10:15:40	1	Pt. Possession
Harbor Seal	2	6/6/2006	61.1728	150.9199	10:38:12	1	Beluga R.
Harbor Seal	3	6/6/2006	61.2013	150.7522	10:43:06	1	Lewis R.
Harbor Seal	10	6/6/2006	61.2373	150.2615	11:44:47	1	Little Susitna R.
Harbor Seal	40	6/6/2006	61.4883	149.3013	12:31:23	1	Knik R.
Harbor Seal	70	6/6/2006	60.9151	150.0949	17:14:29	2	Chickaloon R.
Harbor Seal	4	6/6/2006	60.9376	149.9842	17:55:53	2	Chickaloon R.
Harbor Seal	25	6/7/2006	60.9167	150.0867	9:50:22	3	Chickaloon R.
Harbor Seal	20	6/7/2006	60.9545	150.0883	9:59:18	3	Chickaloon R.
Harbor Seal	4	6/7/2006	60.9370	150.7456	11:19:59	3	S of Moose Pt.
Harbor Seal	120	6/7/2006	60.9124	151.7058	12:31:26	4	McArthur R.
Harbor Seal	50	6/7/2006	60.9125	151.7077	12:31:28	4	McArthur R.
Harbor Seal	2	6/7/2006	60.8967	151.6630	12:35:17	4	McArthur R.
Harbor Seal	2	6/7/2006	60.9607	151.5030	12:38:49	4	Trading Bay
Harbor Seal	2	6/7/2006	61.2081	150.7867	13:02:46	4	Lewis R.
Harbor Seal	1	6/7/2006	61.2130	150.7721	13:03:05	4	Lewis R.
Harbor Seal	4	6/7/2006	61.2273	150.7499	13:11:37	4	Btwn Ivan/ Lewis R.
Harbor Seal	100	6/8/2006	60.9559	150.0830	11:13:43	5	Chickaloon R.
Harbor Seal	23	6/8/2006	60.9548	150.0874	11:13:48	5	Chickaloon R.
Harbor Seal	1	6/8/2006	61.1706	150.9144	12:03:01	5	Beluga R.
Harbor Seal	100	6/8/2006	61.1999	150.8043	12:23:54	5	Lewis R.
Harbor Seal	1	6/10/2006	60.4766	151.3097	9:47:18	6	S of Kenai R.
Harbor Seal	650	6/10/2006	59.7712	151.0025	10:45:31	6	Fox R.
Harbor Seal	1	6/10/2006	60.3070	151.9230	15:13:14	7	S of Kalgin I./ mid inlet
Harbor Seal	1	6/10/2006	60.4362	151.8531	15:17:24	7	Kalgin I.
Harbor Seal	5	6/11/2006	60.9151	150.0787	9:46:29	8	Chickaloon R.
Harbor Seal	12	6/11/2006	60.9211	150.0981	9:54:07	8	Chickaloon R.
Harbor Seal	40	6/11/2006	60.9175	150.0860	9:54:23	8	Chickaloon R.
Harbor Seal	3	6/11/2006	60.9167	150.0830	9:54:27	8	Chickaloon R.
Harbor Seal	62	6/12/2006	61.2084	150.8161	10:10:43	10	Theodore R.
Harbor Seal	50	6/12/2006	61.2232	150.7742	10:11:42	10	Lewis R.
Harbor Seal	1	6/12/2006	60.9293	150.0922	16:30:49	11	Chickaloon R.
Harbor Seal	65	6/13/2006	60.5988	151.8579	9:37:59	12	N of Kalgin I.
Harbor Seal	2	6/13/2006	58.9959	153.5308	11:04:37	12	Kamishak Bay
Harbor Seal	1	6/13/2006	58.9983	153.5511	11:04:58	12	Kamishak Bay
Harbor Seal	2	6/13/2006	59.1185	153.7241	11:12:33	12	Kamishak Bay
Harbor Seal	34	6/13/2006	59.0993	153.9053	11:16:40	12	Kamishak Bay
Harbor Seal	40	6/13/2006	59.0984	153.9050	11:16:42	12	Kamishak Bay
Harbor Seal	30	6/13/2006	59.1983	154.0815	11:27:18	12	Nordyke I.
Harbor Seal	8	6/13/2006	59.1946	154.0897	11:27:29	12	Nordyke I.
Harbor Seal	1	6/13/2006	59.1744	154.1133	11:28:17	12	Nordyke I.
Harbor Seal	1	6/13/2006	59.1444	154.1862	11:30:02	12	Nordyke I.
Harbor Seal	3	6/13/2006	59.3054	154.0735	11:41:32	12	S of Bruin Bay
Harbor Seal	10	6/13/2006	59.4443	153.6977	11:58:49	12	S of Ursus Cove
Harbor Seal	1	6/13/2006	59.4040	153.4947	12:07:49	12	Augustine I.
Harbor Seal	1	6/13/2006	59.4017	153.5000	12:07:56	12	Augustine I.
Harbor Seal	1	6/13/2006	59.7021	153.4295	15:54:08	13	Iniskin Bay
Harbor Seal	8	6/13/2006	60.2126	152.7931	16:55:22	13	Tuxedni Bay
Harbor Seal	10	6/13/2006	60.2134	152.7953	16:55:25	13	Tuxedni Bay
Harbor Seal	2	6/13/2006	60.2187	152.8121	16:55:48	13	Tuxedni Bay
Harbor Seal	5	6/13/2006	60.2192	152.8135	16:55:50	13	Tuxedni Bay
Harbor Seal	4	6/13/2006	60.2234	152.8249	16:56:06	13	Tuxedni Bay
Harbor Seal	8	6/13/2006	60.2306	152.8454	16:56:34	13	Tuxedni Bay
Harbor Seal	1	6/13/2006	60.2489	152.8916	16:57:41	13	Tuxedni Bay
Harbor Seal	1	6/13/2006	60.2224	152.8426	17:05:56	13	Tuxedni Bay
Harbor Seal	5	6/13/2006	60.2241	152.8198	17:06:22	13	Tuxedni Bay

Appendix -- Cont.

Common name	Group size	Date	Latitude (decimal degrees)	Longitude (decimal degrees)	Time (AK DST)	Flight no.	General location
Harbor Seal	2	6/13/2006	60.2200	152.7884	17:06:57	13	Tuxedni Bay
Harbor Seal	2	6/13/2006	60.2155	152.7495	17:07:37	13	Tuxedni Bay
Harbor Seal	1	6/13/2006	60.1968	152.6307	17:10:25	13	Tuxedni Bay
Harbor Seal	4	6/13/2006	60.5601	152.1738	17:38:43	13	Drift R.
Harbor Seal	1	6/13/2006	60.6581	152.0333	17:43:27	13	Big R.
Harbor Seal	4	6/13/2006	60.6537	152.0271	17:47:16	13	Big R.
Harbor Seal	2	6/14/2006	60.9088	150.0677	10:40:46	14	Chickaloon R.
Harbor Seal	1	6/14/2006	61.0224	150.3038	11:44:36	14	Pt. Possession
Harbor Seal	2	6/14/2006	61.1805	150.8778	15:29:51	15	Beluga R.
Harbor Seal	15	6/15/2006	60.9120	150.0819	8:23:48	16	Chickaloon R.
Harbor Seal	2	6/15/2006	60.9196	149.9907	8:58:37	16	Chickaloon R.
Harbor Seal	4	6/15/2006	61.2001	150.9400	10:02:04	16	Beluga R.
Harbor Seal	1	6/15/2006	61.2049	150.8829	10:37:57	16	Btwn Beluga/ Theodore R.
Harbor Seal	4	6/15/2006	61.2105	150.8390	10:38:41	16	Theodore R.
Harbor Seal	100	6/15/2006	61.2205	150.8426	11:00:36	16	Theodore R.
Harbor Seal	1	6/7/2007	59.6626	151.4189	12:01:37	1	Kachemak Bay
Harbor Seal	10	6/7/2007	59.7709	151.0300	12:09:47	1	Fox R.
Harbor Seal	7	6/7/2007	59.7706	151.0258	12:09:51	1	Fox R.
Harbor Seal	2	6/7/2007	59.7710	151.0185	12:09:59	1	Fox R.
Harbor Seal	30	6/7/2007	59.7778	150.9944	12:10:26	1	Fox R.
Harbor Seal	30	6/7/2007	59.7837	150.9910	12:10:37	1	Fox R.
Harbor Seal	650	6/7/2007	59.7800	151.0225	12:11:31	1	Fox R.
Harbor Seal	50	6/7/2007	59.7563	151.0494	14:04:46	2	Fox R.
Harbor Seal	50	6/7/2007	59.7616	151.0471	14:04:55	2	Fox R.
Harbor Seal	15	6/7/2007	59.7629	151.0455	14:04:59	2	Fox R.
Harbor Seal	16	6/7/2007	59.7653	151.0399	14:05:06	2	Fox R.
Harbor Seal	4	6/7/2007	59.7657	151.0380	14:05:07	2	Fox R.
Harbor Seal	54	6/7/2007	59.7653	151.0275	14:05:18	2	Fox R.
Harbor Seal	1	6/7/2007	59.7424	151.0477	14:06:17	2	Kachemak Bay
Harbor Seal	12	6/7/2007	59.7061	151.1226	14:09:59	2	Kachemak Bay
Harbor Seal	50	6/8/2007	60.5982	151.8484	11:23:55	3	N of Kalgin I.
Harbor Seal	70	6/9/2007	60.6118	151.8534	11:52:13	4	N of Kalgin I.
Harbor Seal	1	6/9/2007	60.9119	151.6514	12:05:15	4	McArthur R.
Harbor Seal	150	6/9/2007	61.2104	150.8072	12:29:07	4	Theodore R.
Harbor Seal	20	6/9/2007	61.2352	150.7837	12:52:15	4	Lewis R.
Harbor Seal	6	6/9/2007	61.2536	150.2715	14:22:32	4	Little Susitna R.
Harbor Seal	1	6/9/2007	60.9252	149.4336	17:57:10	5	Hope/ Turnagain Arm
Harbor Seal	1	6/10/2007	61.1907	150.8640	10:04:04	6	Beluga R.
Harbor Seal	23	6/10/2007	61.2028	150.8067	10:15:18	6	Theodore R.
Harbor Seal	1	6/10/2007	61.2067	150.8037	10:24:02	6	Theodore R.
Harbor Seal	4	6/10/2007	61.1970	150.7981	10:27:20	6	Theodore R.
Harbor Seal	41	6/10/2007	61.1730	150.9133	10:45:07	6	Beluga R.
Harbor Seal	41	6/10/2007	60.9152	150.0549	16:54:12	7	Chickaloon R.
Harbor Seal	10	6/11/2007	60.9440	150.0690	10:17:36	8	Chickaloon R.
Harbor Seal	4	6/11/2007	60.9540	150.0968	10:24:36	8	Chickaloon R.
Harbor Seal	5	6/11/2007	60.9558	150.0895	10:32:14	8	Chickaloon R.
Harbor Seal	3	6/11/2007	60.9714	150.1343	10:41:04	8	Chickaloon R.
Harbor Seal	15	6/11/2007	61.1856	150.5371	12:22:02	8	Susitna R.
Harbor Seal	1	6/12/2007	60.0292	152.4191	11:12:30	9	SE of Tuxedni Bay/ mid inlet
Harbor Seal	18	6/12/2007	60.2144	152.7997	14:55:54	10	Tuxedni Bay
Harbor Seal	10	6/12/2007	60.2311	152.8484	14:57:00	10	Tuxedni Bay
Harbor Seal	1	6/14/2007	61.1858	150.8769	14:34:51	12	Beluga R.
Harbor Seal	1	6/14/2007	61.2017	150.8420	15:19:59	12	Theodore R.
Harbor Seal	1	6/14/2007	61.1880	150.1475	17:49:19	12	N of Fire I.
Harbor Seal	61	6/15/2007	60.9216	150.1171	8:59:25	13	Chickaloon R.
Harbor Seal	1	6/15/2007	60.9226	150.1054	9:08:55	13	Chickaloon R.
Harbor Seal	1	6/15/2007	61.0775	150.8668	9:54:47	13	S of Beluga R./ mid inlet
Harbor Seal	1	6/15/2007	61.2326	150.5713	10:35:35	13	Susitna R.
Harbor Seal	13	6/3/2008	60.9439	150.1089	10:43:01	1	Chickaloon R.
Harbor Seal	2	6/3/2008	60.9190	150.0840	10:46:06	1	Chickaloon R.
Harbor Seal	55	6/3/2008	61.2079	150.6070	15:01:54	2	Susitna R.
Harbor Seal	6	6/4/2008	60.9162	150.0991	9:47:55	3	Chickaloon R.
Harbor Seal	4	6/4/2008	60.9058	150.0678	9:48:38	3	Chickaloon R.
Harbor Seal	17	6/4/2008	61.2112	150.8047	10:47:47	3	Theodore R.
Harbor Seal	25	6/4/2008	61.2134	150.7992	10:47:54	3	Theodore R.
Harbor Seal	150	6/4/2008	61.2207	150.7790	10:48:19	3	Lewis R.
Harbor Seal	1	6/4/2008	61.2124	150.4979	11:36:59	3	Susitna R.

Appendix -- Cont.

Common name	Group size	Date	Latitude (decimal degrees)	Longitude (decimal degrees)	Time (AK DST)	Flight no.	General location
Harbor Seal	10	6/4/2008	61.2119	150.4913	11:37:06	3	Susitna R.
Harbor Seal	2	6/4/2008	61.2455	150.2884	11:47:44	3	Little Susitna R.
Harbor Seal	8	6/4/2008	60.9598	150.0996	12:58:03	3	Chickaloon R.
Harbor Seal	8	6/4/2008	60.7211	151.8806	15:44:08	4	Big R.
Harbor Seal	12	6/4/2008	60.7202	151.8834	15:44:11	4	Big R.
Harbor Seal	62	6/4/2008	60.7071	151.9178	15:44:48	4	Big R.
Harbor Seal	11	6/5/2008	60.9134	150.0806	10:04:32	5	Chickaloon R.
Harbor Seal	40	6/5/2008	60.9107	150.0766	10:04:39	5	Chickaloon R.
Harbor Seal	4	6/5/2008	60.9220	149.9808	10:13:34	5	Chickaloon R.
Harbor Seal	44	6/5/2008	61.2108	150.5176	12:29:55	5	Sustina R.
Harbor Seal	4	6/5/2008	61.2495	150.2600	12:35:36	5	Little Susitna R.
Harbor Seal	5	6/6/2008	60.9073	150.0780	10:40:27	6	Chickaloon R.
Harbor Seal	50	6/6/2008	60.9036	150.0739	10:45:57	6	Chickaloon R.
Harbor Seal	80	6/6/2008	61.2106	150.8055	11:43:31	6	Theodore R.
Harbor Seal	140	6/6/2008	61.2261	150.7970	11:47:07	6	Lewis R.
Harbor Seal	140	6/6/2008	61.2206	150.8094	11:47:23	6	Theodore R.
Harbor Seal	4	6/6/2008	61.2243	150.4986	12:13:25	6	Susitna R.
Harbor Seal	2	6/6/2008	61.2507	150.2634	12:44:07	6	Little Susitna R.
Harbor Seal	50	6/7/2008	60.9091	150.1051	10:37:14	7	Chickaloon R.
Harbor Seal	50	6/7/2008	60.9075	150.0849	10:37:34	7	Chickaloon R.
Harbor Seal	8	6/7/2008	60.9073	150.0736	10:37:45	7	Chickaloon R.
Harbor Seal	150	6/7/2008	61.2154	150.8128	11:55:03	7	Theodore R.
Harbor Seal	50	6/7/2008	61.2226	150.7897	11:55:32	7	Lewis R.
Harbor Seal	2	6/7/2008	61.2533	150.3036	13:02:28	7	Little Susitna R.
Harbor Seal	50	6/9/2008	59.7756	151.0246	10:08:05	9	Fox R.
Harbor Seal	12	6/9/2008	59.7748	150.9917	10:08:37	9	Fox R.
Harbor Seal	30	6/9/2008	59.7795	150.9548	10:09:13	9	Fox R.
Harbor Seal	30	6/9/2008	59.7856	150.9962	10:11:13	9	Fox R.
Harbor Seal	1	6/9/2008	59.9660	152.2566	14:03:45	10	SE of Tuxedni Bay/ mid inlet
Harbor Seal	75	6/10/2008	60.6022	151.8420	9:10:02	11	N of Kalgin I.
Harbor Seal	35	6/10/2008	59.1088	153.6831	11:39:52	11	Kamishak Bay
Harbor Seal	2	6/10/2008	59.1104	153.7370	11:40:53	11	Kamishak Bay
Harbor Seal	37	6/10/2008	59.0895	153.8156	11:42:36	11	Kamishak Bay
Harbor Seal	25	6/10/2008	59.0810	154.1436	11:50:22	11	Akumwarvik Bay
Harbor Seal	34	6/10/2008	59.0939	154.1487	11:50:50	11	Akumwarvik Bay
Harbor Seal	14	6/10/2008	59.6050	153.5439	12:27:13	11	Iliamna Bay
Harbor Seal	82	6/10/2008	59.6485	153.4561	12:37:01	11	Iniskin Bay
Harbor Seal	15	6/10/2008	59.6425	153.4505	12:44:01	11	Iniskin Bay
Harbor Seal	8	6/10/2008	59.6344	153.4513	12:44:21	11	Iniskin Bay
Harbor Seal	50	6/10/2008	59.6313	153.4489	12:44:29	11	Iniskin Bay
Harbor Seal	12	6/10/2008	59.6277	153.4446	12:44:38	11	Iniskin Bay
Harbor Seal	1	6/10/2008	59.6249	153.4406	12:44:46	11	Iniskin Bay
Harbor Seal	18	6/10/2008	59.6230	153.4236	12:45:08	11	Iniskin Bay
Harbor Seal	4	6/10/2008	59.6265	153.4173	12:45:18	11	Iniskin Bay
Harbor Seal	32	6/10/2008	60.2211	152.8079	15:58:13	12	Tuxedni Bay
Harbor Seal	1	6/10/2008	60.2251	152.8214	15:58:29	12	Tuxedni Bay
Harbor Seal	30	6/10/2008	60.2168	152.7776	16:02:48	12	Tuxedni Bay
Harbor Seal	130	6/10/2008	60.2166	152.7767	16:02:49	12	Tuxedni Bay
Harbor Seal	2	6/10/2008	60.2041	152.7180	16:03:54	12	Tuxedni Bay
Harbor Seal	6	6/10/2008	60.1853	152.5346	16:07:06	12	Tuxedni Bay
Harbor Seal	1	6/11/2008	60.9487	150.1030	10:42:10	13	Chickaloon R.
Harbor Seal	1	6/11/2008	60.9428	150.1101	10:49:47	13	Chickaloon R.
Harbor Seal	1	6/11/2008	61.1830	150.9415	11:09:58	13	Beluga R.
Harbor Seal	4	6/11/2008	61.1938	150.9141	11:19:31	13	Beluga R.
Harbor Seal	72	6/11/2008	61.2118	150.8141	11:31:11	13	Theodore R.
Harbor Seal	2	6/11/2008	61.2332	150.7371	11:32:35	13	Ivan R.
Harbor Seal	10	6/12/2008	61.1753	150.8796	9:17:55	14	Beluga R.
Harbor Seal	1	6/12/2008	61.1688	150.9471	9:22:40	14	Beluga R.
Harbor Seal	5	6/2/2009	61.2020	150.8270	9:15:19	1	Theodore R.
Harbor Seal	25	6/2/2009	61.1930	150.5970	10:00:08	1	Susitna R.
Harbor Seal	20	6/2/2009	61.1840	150.5430	10:09:24	1	Susitna R.
Harbor Seal	4	6/2/2009	61.1820	150.5040	10:14:23	1	Susitna R.
Harbor Seal	9	6/2/2009	61.1880	150.5770	10:29:16	1	Susitna R.
Harbor Seal	5	6/2/2009	61.2350	150.2560	10:39:56	1	Little Susitna R.
Harbor Seal	12	6/2/2009	60.9260	150.0970	14:44:37	2	Chickaloon R.
Harbor Seal	152	6/3/2009	60.8860	151.6510	9:23:38	3	McArthur R.
Harbor Seal	4	6/4/2009	60.5520	151.3190	8:55:33	5	Kenai R.

Appendix -- Cont.

Common name	Group size	Date	Latitude (decimal degrees)	Longitude (decimal degrees)	Time (AK DST)	Flight no.	General location
Harbor Seal	10	6/4/2009	60.6480	152.0020	9:25:21	5	Big R.
Harbor Seal	25	6/4/2009	60.6320	152.0340	9:34:39	5	Big R.
Harbor Seal	35	6/4/2009	60.6550	151.9560	9:36:39	5	Big R.
Harbor Seal	2	6/5/2009	60.9460	150.1080	10:38:20	7	Chickaloon R.
Harbor Seal	4	6/5/2009	60.9510	150.1360	10:54:37	7	Chickaloon R.
Harbor Seal	16	6/5/2009	60.9590	150.1200	11:24:55	7	Chickaloon R.
Harbor Seal	13	6/7/2009	59.1000	154.1220	11:41:00	9	Akumwarvik Bay
Harbor Seal	60	6/7/2009	59.1080	154.1350	11:41:21	9	Akumwarvik Bay
Harbor Seal	10	6/7/2009	59.6340	153.4320	15:57:15	10	Iniskin Bay
Harbor Seal	100	6/7/2009	59.9980	152.5910	16:29:44	10	Btwn Chinitna/ Tuxedni Bay
Harbor Seal	5	6/7/2009	60.2280	152.8350	16:43:13	10	Tuxedni Bay
Harbor Seal	36	6/7/2009	60.2580	152.8980	16:44:38	10	Tuxedni Bay
Harbor Seal	60	6/7/2009	60.5290	152.2480	17:18:23	10	S of Drift R.
Harbor Seal	27	6/8/2009	59.7540	151.0760	10:39:51	11	Fox R.
Harbor Seal	47	6/8/2009	59.7560	151.0540	10:40:12	11	Fox R.
Harbor Seal	10	6/8/2009	59.7570	151.0510	10:40:16	11	Fox R.
Harbor Seal	47	6/8/2009	59.7590	151.0400	10:40:27	11	Fox R.
Harbor Seal	16	6/8/2009	59.7660	151.0170	10:40:52	11	Fox R.
Harbor Seal	300	6/8/2009	59.7680	151.0100	10:41:00	11	Fox R.
Harbor Seal	220	6/8/2009	59.7570	151.0600	10:43:52	11	Fox R.
Harbor Seal	1	6/8/2009	59.7430	151.0500	10:46:52	11	Fox R.
Harbor Seal	2	6/8/2009	59.7420	151.0540	10:46:56	11	Fox R.
Harbor Seal	6	6/9/2009	60.9130	150.0820	10:08:36	13	Chickaloon R.
Harbor Seal	45	6/9/2009	60.9100	150.0750	10:08:44	13	Chickaloon R.
Harbor Seal	10	6/9/2009	61.2380	150.2570	15:39:19	14	Little Susitna R.
Harbor Seal	15	6/9/2009	61.1850	150.5070	16:07:19	14	Susitna R.
Harbor Seal	3	6/9/2009	61.1850	150.5080	16:07:20	14	Susitna R.
Harbor Seal	45	6/9/2009	61.1850	150.5370	16:07:45	14	Susitna R.
Harbor Seal	4	6/9/2009	61.1850	150.5420	16:07:49	14	Susitna R.
Harbor Seal	2	6/9/2009	61.1900	150.6250	16:29:36	14	Susitna R.
Harbor Seal	2	6/9/2009	61.2090	150.8030	17:04:03	14	Theodore R.
Harbor Seal	1	6/9/2009	60.9430	150.0300	18:02:20	14	Chickaloon R.
Harbor Seal	23	6/1/2010	60.9330	149.9280	10:35:59	1	Chickaloon R.
Harbor Seal	44	6/1/2010	60.9180	150.0890	10:50:31	1	Chickaloon R.
Harbor Seal	80	6/1/2010	60.5900	151.8320	13:54:27	2	N of Kalgin I.
Harbor Seal	1	6/2/2010	61.1920	150.9450	12:57:13	3	Beluga R.
Harbor Seal	150	6/2/2010	61.2110	150.8090	12:59:43	3	Theodore R.
Harbor Seal	50	6/3/2010	60.9120	150.0820	11:35:37	5	Chickaloon R.
Harbor Seal	35	6/4/2010	60.9160	150.1070	11:28:58	6	Chickaloon R.
Harbor Seal	5	6/4/2010	61.2010	150.9190	12:20:39	6	Beluga R.
Harbor Seal	1	6/4/2010	61.1940	150.8980	12:25:58	6	Beluga R.
Harbor Seal	305	6/5/2010	59.7810	151.0150	10:56:12	7	Fox R.
Harbor Seal	10	6/5/2010	59.7860	151.0290	10:57:32	7	Fox R.
Harbor Seal	60	6/5/2010	59.7880	150.9880	10:58:23	7	Fox R.
Harbor Seal	2	6/5/2010	59.7840	151.0040	11:00:58	7	Fox R.
Harbor Seal	1	6/7/2010	61.1870	150.4740	9:15:16	9	Susitna R.
Harbor Seal	1	6/7/2010	61.0800	150.8190	9:22:40	9	S of Beluga R./ mid inlet
Harbor Seal	15	6/7/2010	59.3780	153.9920	11:40:25	9	Bruin Bay
Harbor Seal	10	6/7/2010	59.6410	153.4380	12:43:13	9	Iniskin Bay
Harbor Seal	3	6/7/2010	59.6400	153.4370	12:43:15	9	Iniskin Bay
Harbor Seal	4	6/7/2010	59.6340	153.4270	12:43:36	9	Iniskin Bay
Harbor Seal	2	6/7/2010	60.2090	152.7810	13:27:41	9	Tuxedni Bay
Harbor Seal	2	6/7/2010	60.2120	152.7890	13:27:52	9	Tuxedni Bay
Harbor Seal	34	6/7/2010	60.2230	152.8140	13:28:27	9	Tuxedni Bay
Harbor Seal	2	6/7/2010	60.2260	152.8370	13:32:36	9	Tuxedni Bay
Harbor Seal	1	6/7/2010	60.2190	152.7960	13:33:21	9	Tuxedni Bay
Harbor Seal	20	6/7/2010	60.2120	152.7450	13:34:17	9	Tuxedni Bay
Harbor Seal	60	6/7/2010	60.2110	152.7280	13:34:36	9	Tuxedni Bay
Harbor Seal	3	6/7/2010	60.2110	152.5400	13:37:52	9	Tuxedni Bay
Harbor Seal	1	6/8/2010	60.9490	150.1350	10:18:13	10	Chickaloon R.
Harbor Seal	3	6/8/2010	60.9390	150.0960	10:19:01	10	Chickaloon R.
Harbor Seal	3	6/8/2010	60.9390	150.0860	10:19:12	10	Chickaloon R.
Harbor Seal	54	6/8/2010	61.1840	150.5310	12:27:28	10	Sustina R.
Harbor Seal	17	6/8/2010	61.1940	150.5550	12:30:56	10	Sustina R.
Harbor Seal	7	6/8/2010	61.2140	150.5550	12:51:20	10	Sustina R.
Harbor Seal	3	6/8/2010	61.2340	150.2730	13:19:04	10	Beluga R.
Harbor Seal	1	6/9/2010	60.9460	150.0880	9:25:30	11	Chickaloon R.

Appendix -- Cont.

Common name	Group size	Date	Latitude (decimal degrees)	Longitude (decimal degrees)	Time (AK DST)	Flight no.	General location
Harbor Seal	19	6/9/2010	60.9390	150.1050	10:04:13	11	Chickaloon R.
Harbor Seal	10	6/9/2010	61.1860	150.8790	10:49:49	11	Beluga R.
Harbor Seal	50	6/9/2010	61.1930	150.8260	11:22:26	11	Theodore R.
Harbor Seal	1	6/9/2010	61.1910	150.7280	11:35:16	11	Lewis R.
Harbor Seal	1	6/10/2010	60.9410	150.1090	11:25:46	12	Chickaloon R.
Harbor Seal	10	6/10/2010	60.9430	150.0810	11:26:18	12	Chickaloon R.
Harbor Seal	1	6/10/2010	61.0510	150.4000	11:59:16	12	Pt. Possession
Harbor Seal	50	6/10/2010	61.1860	150.5440	13:34:31	12	Susitna R.
Harbor Seal	1	6/10/2010	61.1900	150.5300	13:54:44	12	Susitna R.
Harbor Seal	12	5/31/2011	60.9440	150.1290	12:14:32	1	Chickaloon R.
Harbor Seal	20	5/31/2011	60.8950	151.6370	13:09:12	1	McArthur R.
Harbor Seal	2	5/31/2011	61.1600	150.9560	13:30:36	1	Beluga R.
Harbor Seal	2	5/31/2011	61.1830	150.8790	13:32:05	1	Beluga R.
Harbor Seal	1	5/31/2011	61.1910	150.8010	13:40:04	1	Theodore R.
Harbor Seal	8	6/1/2011	60.9530	149.9440	10:15:46	3	Chickaloon R.
Harbor Seal	1	6/1/2011	61.1600	150.9650	14:10:26	4	Beluga R.
Harbor Seal	1	6/1/2011	61.1630	150.9390	14:10:58	4	Beluga R.
Harbor Seal	10	6/1/2011	61.1740	150.4340	14:21:14	4	Btwn Susitna R./ Fire I.
Harbor Seal	2	6/2/2011	60.9140	150.0790	10:17:54	5	Chickaloon R.
Harbor Seal	14	6/2/2011	60.9100	150.0730	10:18:04	5	Chickaloon R.
Harbor Seal	70	6/2/2011	61.2070	150.8000	11:21:38	5	Theodore R.
Harbor Seal	6	6/3/2011	60.9130	150.0880	10:11:14	6	Chickaloon R.
Harbor Seal	20	6/3/2011	60.9080	150.0790	10:11:27	6	Chickaloon R.
Harbor Seal	120	6/3/2011	61.2230	150.7660	10:51:46	6	Lewis R.
Harbor Seal	41	6/3/2011	60.9440	150.1350	14:32:23	7	Chickaloon R.
Harbor Seal	17	6/4/2011	60.9160	150.0910	11:12:36	8	Chickaloon R.
Harbor Seal	5	6/4/2011	60.9150	150.0890	11:12:39	8	Chickaloon R.
Harbor Seal	9	6/4/2011	60.9060	150.0610	11:13:08	8	Chickaloon R.
Harbor Seal	200	6/4/2011	61.2260	150.7880	12:27:11	8	Lewis R.
Harbor Seal	200	6/4/2011	61.2190	150.8140	12:27:41	8	Theodore R.
Harbor Seal	207	6/4/2011	61.2050	150.5140	13:11:47	8	Susitna R.
Harbor Seal	25	6/5/2011	60.9130	150.0970	11:15:00	9	Chickaloon R.
Harbor Seal	19	6/5/2011	60.9120	150.0960	11:15:01	9	Chickaloon R.
Harbor Seal	400	6/5/2011	61.2170	150.7800	12:28:41	9	Btwn Lewis/Theodore R.
Harbor Seal	2	6/5/2011	61.2280	150.5240	12:36:42	9	Susitna R.
Harbor Seal	200	6/5/2011	61.1940	150.5330	13:01:57	9	Susitna R.
Harbor Seal	7	6/5/2011	61.1910	150.5090	13:02:30	9	Susitna R.
Harbor Seal	64	6/6/2011	60.2760	152.0000	10:10:52	10	S of Kalgin I.
Harbor Seal	25	6/6/2011	59.0850	153.9140	15:17:49	11	Kamishak Bay
Harbor Seal	6	6/6/2011	60.2150	152.7930	16:56:40	11	Tuxedni Bay
Harbor Seal	5	6/6/2011	60.2390	152.8690	16:58:04	11	Tuxedni Bay
Harbor Seal	10	6/7/2011	59.7790	150.9840	10:01:28	12	Fox R.
Harbor Seal	55	6/7/2011	59.7800	150.9800	10:01:32	12	Fox R.
Harbor Seal	6	6/7/2011	59.7820	150.9710	10:01:43	12	Fox R.
Harbor Seal		6/7/2011	60.2490	151.9680	13:53:05	13	S of Kalgin I.
Harbor Seal	13	6/8/2011	60.9340	149.9220	10:50:10	14	Chickaloon Bay
Harbor Seal	2	6/8/2011	60.9150	150.0770	11:05:40	14	Chickaloon R.
Harbor Seal	1	6/8/2011	60.9140	150.0550	11:12:01	14	Chickaloon R.
Harbor Seal	12	6/8/2011	60.9080	150.0630	11:12:15	14	Chickaloon R.
Harbor Seal	2	6/8/2011	61.2250	150.9210	12:05:51	14	Beluga R.
Harbor Seal	5	6/8/2011	61.2010	150.8810	12:10:29	14	Btwn Beluga/ Theodore R.
Harbor Seal	1	6/8/2011	61.2030	150.8600	12:10:49	14	Btwn Beluga/ Theodore R.
Harbor Seal	2	6/8/2011	61.2500	150.5500	12:15:51	14	Susitna R.
Harbor Seal	2	6/8/2011	61.2390	150.7460	12:19:22	14	Ivan R.
Harbor Seal	102	6/8/2011	61.2290	150.7840	12:20:04	14	Lewis R.
Harbor Seal	45	6/8/2011	61.2260	150.7950	12:20:15	14	Lewis R.
Harbor Seal	165	6/8/2011	61.2200	150.8180	12:20:37	14	Theodore R.
Harbor Seal	15	6/8/2011	61.2140	150.8440	12:21:03	14	Theodore R.
Harbor Seal	1	6/8/2011	61.2430	150.5620	13:43:46	14	Susitna R.
Harbor Seal	1	6/8/2011	61.2380	150.5200	13:44:26	14	Susitna R.
Harbor Seal	17	6/8/2011	61.2530	150.2760	13:48:47	14	Little Susitna R.
Harbor Seal	3	6/9/2011	60.9400	150.1170	9:54:55	15	Chickaloon R.
Harbor Seal	2	6/9/2011	61.2100	150.8060	10:54:41	15	Theodore R.
Harbor Seal	60	6/9/2011	61.2330	150.7870	10:55:45	15	Lewis R.
Harbor Seal	20	6/9/2011	61.2320	150.7920	10:55:51	15	Lewis R.
Harbor Seal	10	6/9/2011	61.2300	150.7980	10:55:59	15	Lewis R.
Harbor Seal	45	6/9/2011	61.2150	150.8400	10:56:54	15	Theodore R.

Appendix -- Cont.

Common name	Group size	Date	Latitude (decimal degrees)	Longitude (decimal degrees)	Time (AK DST)	Flight no.	General location
Harbor Seal	40	5/29/2012	59.0800	153.9040	15:15:44	2	Kamishak Bay
Harbor Seal	50	5/29/2012	59.0940	154.0520	15:18:40	2	Akumwarvik Bay
Harbor Seal	40	5/29/2012	59.0850	154.1080	15:21:47	2	Akumwarvik Bay
Harbor Seal	120	5/29/2012	59.0910	154.1040	15:22:00	2	Akumwarvik Bay
Harbor Seal	75	5/29/2012	59.1000	154.1030	15:22:17	2	Akumwarvik Bay
Harbor Seal	20	5/29/2012	59.1090	154.1100	15:22:35	2	Akumwarvik Bay
Harbor Seal	50	5/29/2012	59.1310	154.1640	15:23:32	2	Akumwarvik Bay
Harbor Seal	10	5/29/2012	59.1340	154.1800	15:23:47	2	Akumwarvik Bay
Harbor Seal	20	5/29/2012	59.1710	154.1290	15:26:12	2	Nordyke I.
Harbor Seal	25	5/29/2012	59.2490	154.1080	15:29:05	2	Nordyke I.
Harbor Seal	55	5/30/2012	59.7820	151.0290	11:14:10	3	Fox R.
Harbor Seal	100	5/30/2012	59.7830	151.0150	11:14:26	3	Fox R.
Harbor Seal	20	5/30/2012	59.7820	151.0030	11:14:39	3	Fox R.
Harbor Seal	10	5/30/2012	59.7750	150.9800	11:15:08	3	Bradley R.
Harbor Seal	5	5/30/2012	59.7940	150.9100	11:16:37	3	Bradley R.
Harbor Seal	3	5/30/2012	59.3230	151.9960	11:45:14	3	S of Port Graham
Harbor Seal	1	5/31/2012	60.5100	151.9790	9:59:09	5	N Kalgin I.
Harbor Seal	12	5/31/2012	59.7430	153.4390	11:01:38	5	Iniskin Bay
Harbor Seal	85	5/31/2012	60.2220	152.8280	12:07:11	5	Tuxedni Bay
Harbor Seal	10	5/31/2012	60.2180	152.8020	12:07:37	5	Tuxedni Bay
Harbor Seal	17	5/31/2012	60.6580	152.0330	12:36:30	5	Big R.
Harbor Seal	70	5/31/2012	60.6630	151.9810	12:42:41	5	Big R.
Harbor Seal	20	5/31/2012	60.6910	151.8960	12:44:34	5	Btwn Big/ Kustatan R.
Harbor Seal	18	5/31/2012	60.7010	151.8640	12:45:14	5	Btwn Big/ Kustatan R.
Harbor Seal	16	6/1/2012	60.9440	150.1410	10:27:43	7	Chickaloon R.
Harbor Seal	3	6/1/2012	61.1650	150.4630	11:21:32	7	Btwn Susitna R./ Fire I.
Harbor Seal	60	6/1/2012	61.1830	150.5190	11:24:06	7	Btwn Susitna R./ Fire I.
Harbor Seal	120	6/1/2012	61.1800	150.5250	11:24:14	7	Btwn Susitna R./ Fire I.
Harbor Seal	1	6/1/2012	61.0490	151.1290	16:45:27	8	North Foreland
Harbor Seal	6	6/2/2012	60.9420	150.1390	11:11:23	9	Chickaloon R.
Harbor Seal	17	6/2/2012	60.9390	150.1370	11:11:29	9	Chickaloon R.
Harbor Seal	14	6/2/2012	60.9610	150.1020	11:13:54	9	Chickaloon R.
Harbor Seal	9	6/2/2012	60.9770	150.0990	11:14:28	9	Chickaloon R.
Harbor Seal	1	6/2/2012	61.0310	150.3150	11:19:43	9	Pt. Possession
Harbor Seal	1	6/2/2012	60.9920	150.6070	12:17:10	9	Btwn Moose Pt./ Pt. Possession
Harbor Seal	3	6/2/2012	60.9020	151.7350	14:58:04	10	McArthur R.
Harbor Seal	2	6/2/2012	60.8910	151.6950	14:58:50	10	McArthur R.
Harbor Seal	1	6/2/2012	60.8940	151.6800	14:59:06	10	McArthur R.
Harbor Seal	1	6/2/2012	60.9150	151.6370	15:00:04	10	N of McArthur R.
Harbor Seal	1	6/2/2012	60.9960	151.4180	15:04:18	10	Granite Pt.
Harbor Seal	2	6/3/2012	60.9340	150.1300	10:46:03	11	Chickaloon R.
Harbor Seal	8	6/3/2012	60.8960	151.6660	13:27:38	12	McArthur R.
Harbor Seal	7	6/3/2012	61.1830	150.5090	14:19:01	12	Btwn Susitna R./ Fire I.
Harbor Seal	35	6/3/2012	61.1800	150.5100	14:19:07	12	Btwn Susitna R./ Fire I.
Harbor Seal	2	6/4/2012	60.9350	150.1300	11:13:56	13	Chickaloon R.
Harbor Seal	1	6/4/2012	61.0510	150.2780	11:29:23	13	Pt. Possession
Harbor Seal	2	6/4/2012	60.6620	151.5430	14:13:40	14	SW of E Foreland/ mid inlet
Harbor Seal	5	6/4/2012	60.9050	151.6660	14:24:36	14	McArthur R.
Harbor Seal	6	6/4/2012	60.9140	151.6380	14:27:04	14	McArthur R.
Harbor Seal	4	6/4/2012	61.1820	150.4740	15:21:15	14	Btwn Susitna R./ Fire I.
Harbor Seal	60	6/4/2012	61.1870	150.5100	15:21:56	14	Btwn Susitna R./ Fire I.
Harbor Seal	80	6/4/2012	61.1880	150.5140	15:22:00	14	Btwn Susitna R./ Fire I.
Harbor Seal	2	6/5/2012	60.9100	150.0650	10:52:48	15	Chickaloon R.
Harbor Seal	33	6/5/2012	60.8910	151.6390	14:25:32	16	McArthur R.
Harbor Seal	3	6/6/2012	60.9100	150.0770	10:18:18	17	Chickaloon R.
Harbor Seal	125	6/6/2012	60.8940	151.6660	11:40:07	17	McArthur R.
Harbor Seal	17	6/6/2012	61.1990	150.9360	12:09:51	17	Beluga R.
Harbor Seal	100	6/6/2012	61.2040	150.8070	12:12:15	17	Theodore R.
Harbor Seal	100	6/6/2012	61.2220	150.7550	12:13:13	17	Btwn Lewis/ Ivan R.
Harbor Seal	16	6/7/2012	60.9080	150.0740	11:24:22	18	Chickaloon R.
Harbor Seal	50	6/7/2012	60.8840	151.6420	12:55:18	18	McArthur R.
Harbor Seal	1	6/7/2012	61.1810	150.9120	13:29:50	18	Beluga R.
Harbor Seal	20	6/7/2012	61.2040	150.7960	13:31:54	18	Theodore R.
Harbor Seal	1	6/7/2012	61.2120	150.8070	13:35:14	18	Theodore R.

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