

# KITTLITZ'S MURRELET *BRACHYRAMPHUS BREVIROSTRIS* IN THE KODIAK ARCHIPELAGO, ALASKA

IAIN J. STENHOUSE<sup>1</sup>, STACY STUDEBAKER<sup>2</sup>, & DENNY ZWIEFELHOFER<sup>3</sup>

<sup>1</sup>Audubon Alaska, 715 L Street, Anchorage, Alaska, 99501, USA  
(istenhouse@audubon.org)

<sup>2</sup>PO Box 970, Kodiak, Alaska, 99615, USA

<sup>3</sup>Kodiak National Wildlife Refuge, Kodiak, Alaska, 99615, USA

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## SUMMARY

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The Kittlitz's Murrelet *Brachyramphus brevirostris* is a poorly known alcid of the Bering Sea region. It is one of the rarest breeding seabirds in the North Pacific and is listed as Critically Endangered on the IUCN Red List. It has a highly restricted breeding range, with a patchy distribution in Alaska and the Russian Far East. In this paper, we highlight its use of the Kodiak Archipelago, Alaska—an area that has received little research or monitoring attention as breeding or wintering habitat for this species. Based on observational data from the last 30+ years, we conclude that Kittlitz's Murrelets are present year round in the area and we present maps of their distribution around the archipelago. We include a description of the location and habitat characteristics of the first confirmed case of Kittlitz's Murrelet breeding on Kodiak Island and map potential nesting habitat across the archipelago. Given the conservation status and increasingly high profile of this species, we encourage increased and focused management attention on Kittlitz's Murrelets in this location.

Key words: Kittlitz's Murrelet, *Brachyramphus brevirostris*, Kodiak Archipelago, Alaska, seabird, nest site

## INTRODUCTION

Kittlitz's Murrelet *Brachyramphus brevirostris* is a small, rather mysterious alcid of the Bering Sea region, the general ecology of which is poorly understood. It is thought to be one of the rarest breeding seabirds in the North Pacific, and it has a highly restricted breeding range and patchy distribution in Alaska and the Russian Far East (Day *et al.* 1999). Widely recognized as being of high conservation concern, Kittlitz's Murrelet is listed as Critically Endangered on the IUCN Red List (BirdLife International 2004), and as a highly ranked "candidate" for protection in the United States under the Endangered Species Act (US Department of the Interior 2007). It is included in a recent list of the top 10 most endangered birds in the United States (National Audubon Society 2006) and is highlighted as "at risk" on the Alaska WatchList (Stenhouse & Senner 2005).

The world population of Kittlitz's Murrelet is estimated to be in the thousands or very low tens of thousands, the bulk of which (approximately 95%) are thought to breed, molt and winter in Alaska (van Vliet 1993, Day *et al.* 1999). Although few accurate historical data exist, making it difficult to establish population trends for this species (Day *et al.* 1999), Kittlitz's Murrelet is reported to have experienced severe population declines in core breeding areas in Alaska (Prince William Sound, Glacier Bay, Kenai Fjords, Malaspina Forelands—van Vliet & McAllister 1994, Kuletz *et al.* 2003). For example, birds known to nest in uplands adjacent to Prince William Sound appear to have declined by up to 84% between 1989 and 2000 (Kuletz *et al.* 2003) and have shown extremely low productivity in recent years (Day & Nigro 2004). This particular population is estimated to have lost more than 500

birds in the *Exxon Valdez* oil spill and has not yet fully recovered (Piatt *et al.* 1990, van Vliet & McAllister 1994).

Although fewer than 40 nests have ever been found, Kittlitz's Murrelets appear to select rocky scree and talus slopes in recently deglaciated coastal regions (Day *et al.* 1999). Across their range, foraging during the breeding season is thought to be restricted to fjords with large ice fields and glaciers, particularly in regions where glaciers or glacial-fed streams meet saltwater and produce areas of high turbidity (Day *et al.* 2000, 2003). This apparent association with glacial ice and recently deglaciated landscapes has led researchers to dub this species the "glacier murrelet" (van Vliet 1993, Piatt & Kuletz 2005); however, Kittlitz's Murrelets are also found in non-glacial waters in Alaska, including the Kodiak Archipelago, the Alaska Peninsula, Bristol Bay, the Aleutian Islands, and the Seward and Lisburne peninsulas (van Vliet & Piatt 1994), albeit probably in smaller numbers (Day *et al.* 1999).

Here, we highlight the use by Kittlitz's Murrelets of the Kodiak Archipelago, an area that has received little research or monitoring attention as breeding or wintering habitat for this species. Specifically, we aim to

- summarize the known distribution of Kittlitz's Murrelets around the Kodiak Archipelago, based on observations from systematic surveys and from casual sightings over the last 30+ years;
- report the details of the first confirmed Kittlitz's Murrelet nest in the Kodiak Archipelago; and
- present the first map of potential Kittlitz's Murrelet breeding habitat for the area, based on common features of the Kodiak nest and others found in western Alaska.

## STUDY AREA AND METHODS

### Study area

The Kodiak Archipelago lies at the western edge of the Gulf of Alaska and is separated from the Pacific coast of the Alaska Peninsula by Shelikof Strait (approximately 50 km wide). The area has a maritime climate and an annual mean temperature of approximately 4°C; total annual precipitation varies from more than 250 cm along eastern coasts to less than 60 cm over western areas adjacent to Shelikof Strait. During the last glacial advance of the Pleistocene Era, some 20 000 years ago, only the highest peaks on the archipelago and a refugium in the southwestern portion of Kodiak Island remained ice free. Kodiak Island and adjacent islands have irregular coastlines of bays, inlets and rugged mountains that feature a broad range of habitats within a small geographic area. The mountainous interior of Kodiak Island has several peaks more than 1220 m in elevation; the island is covered by dense vegetation during the summer, with alpine vegetation or bare rock on the highest ridges and slopes. Sitka spruce *Picea sitchensis* forest dominates Afognak Island and extends southward onto the northern end of Kodiak Island. The southwestern portion of Kodiak Island features tundra vegetation, a variety of wetlands and lush, mixed forbs. There are no tidewater glaciers on Kodiak Island today, and only small remnant alpine glaciers occur on a few of the highest mountains.

### Observations

We pooled information on Kittlitz's Murrelet observations from systematic coastal and marine bird surveys carried out by the US Fish and Wildlife Service (USFWS), records from other USFWS surveys in the area and casual accounts by local birdwatchers, from the early 1970s to the present. All observations were made from small boats or skiffs. Observations are drawn from two types of marine bird survey:

- annual winter surveys (1979–2006, except 1997), which followed transects back and forth across bays within the headlands of each bay (before 1985, transects varied annually; from 1985 on, transects followed the same line); and
- summer shoreline surveys (1989–2006, except 1991–1993), involving counts within 200 m of shore, along random stretches of shoreline (totaling more than 100 km), repeated several times over the breeding season (1989–1990) and along continuous stretches of shoreline (totaling more than 400 km), repeated twice during the breeding season (1994–2006).

Because it is impractical to survey the entire coastline of the Kodiak Archipelago in a single summer, shoreline surveys sampled different regions in different years within the study period.

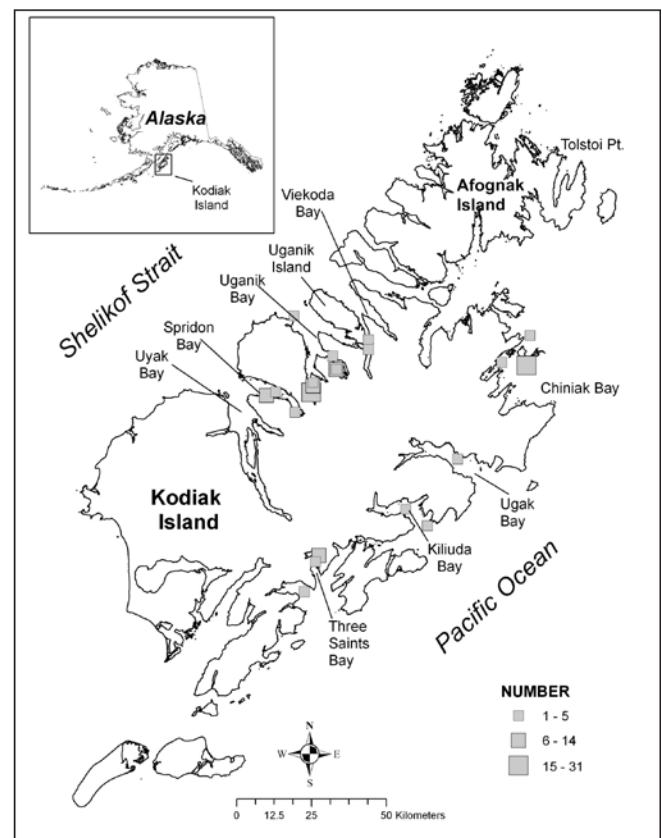
Although some of the information is anecdotal in nature and may reflect the distribution of observer effort, combining all of this information provides the first assessment of the frequency, phenology, and distribution of Kittlitz's Murrelet observations for the Kodiak Archipelago. All observations are listed, with specific coordinates of sightings when possible (Appendices 1 and 2). Observations with enough detail were plotted on maps of the region to identify coastal habitats most frequently used by Kittlitz's Murrelets during the non-breeding and breeding seasons.

### Potential nesting habitat

Critical distributional information was provided by botanical survey teams working in the Kodiak National Wildlife Refuge. Based on the characteristics of a single nest found on Kodiak Island in 2006 (discussed in the Results section), and habitat details from nests elsewhere in the Alaskan breeding range of Kittlitz's Murrelet (Day *et al.* 1983, 1999), we present the first geographic information system analysis of potential nesting habitat across the archipelago. We used a recent habitat classification (Fleming & Spencer 2006) to highlight outcrops of bedrock bordering areas of scree or talus above 570 m elevation (see Day *et al.* 1983) as a presumptive indicator of potential nesting habitat for Kittlitz's Murrelets in the Kodiak Archipelago.

## RESULTS

Kittlitz's Murrelets are regularly observed on the marine waters of the Kodiak Archipelago, although the number of records and individuals reported varies annually. Our combined observations span a period of 32 years, with adults reported from 28 of those years and juveniles from 5. Over this period, adults have been recorded in every month of the year; juveniles have been observed only during July–September. Collectively, these observations indicate that Kittlitz's Murrelets are present in the waters of the Kodiak Archipelago year round, are distributed around the entire archipelago, and are successful breeders in the area in at least some years (see Appendices 1 and 2).



**Fig. 1.** Distribution of Kittlitz's Murrelet *Brachyramphus brevirostris* observations during the non-breeding season (October–April) around the Kodiak Archipelago, 1974–2006.

**Non-breeding season**

During the non-breeding season (October–April), Kittlitz's Murrelets have been observed in the upper reaches of the major fjords of Kodiak Island (Fig. 1). On the eastern side, the largest counts occurred around the islands of northern Chiniak Bay, but this pattern may reflect the proximity of the area to the largest community on the island, the City of Kodiak. Kittlitz's Murrelets have also been recorded in Ugak Bay, Kiliuda Bay and Three Saints Bay. On the western side of Kodiak Island, observations are mostly from Uganik and Spiridon bays.

**Breeding season**

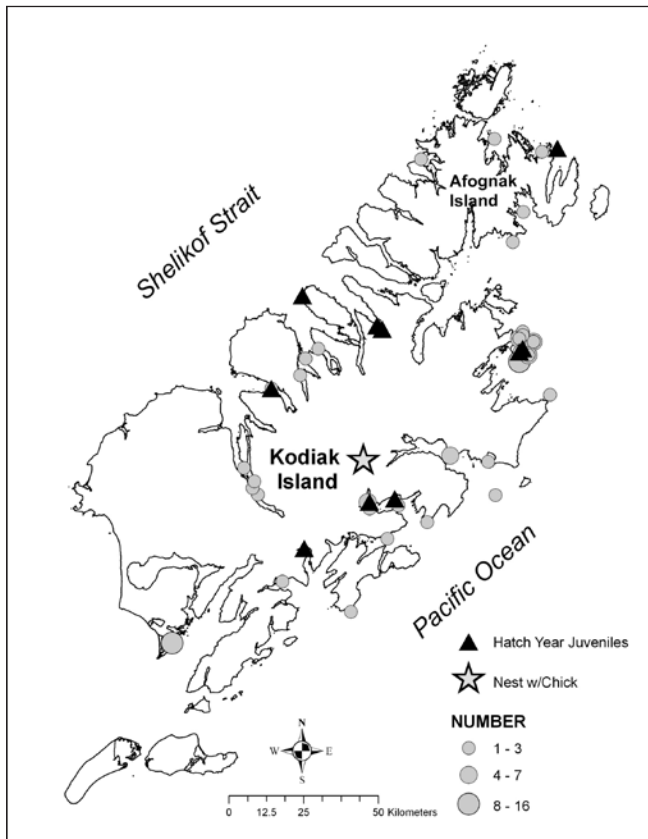
*At-sea distribution*

During the breeding season (May–September), Kittlitz's Murrelet observations are more widely distributed around the archipelago (Fig. 2). Again, on the eastern side of Kodiak Island, the largest counts and most frequent records are from waters around the islands of northern Chiniak Bay. However, Kittlitz's Murrelets have been recorded in the upper reaches of most major fjords along the eastern coast, including eastern Afognak Island, with juveniles reported from northeastern Afognak Island, northern Chiniak Bay, Kiliuda Bay and Three Saints Bay. On the western side of the archipelago, observations are concentrated in the upper reaches of Uyak Bay, Spiridon Bay and Uganik Bay. Juveniles have been recorded in Spiridon Bay and Viekada Bay, and at Noisy Passage on the western end of Uganik Island. The data include few sightings along western Afognak Island.

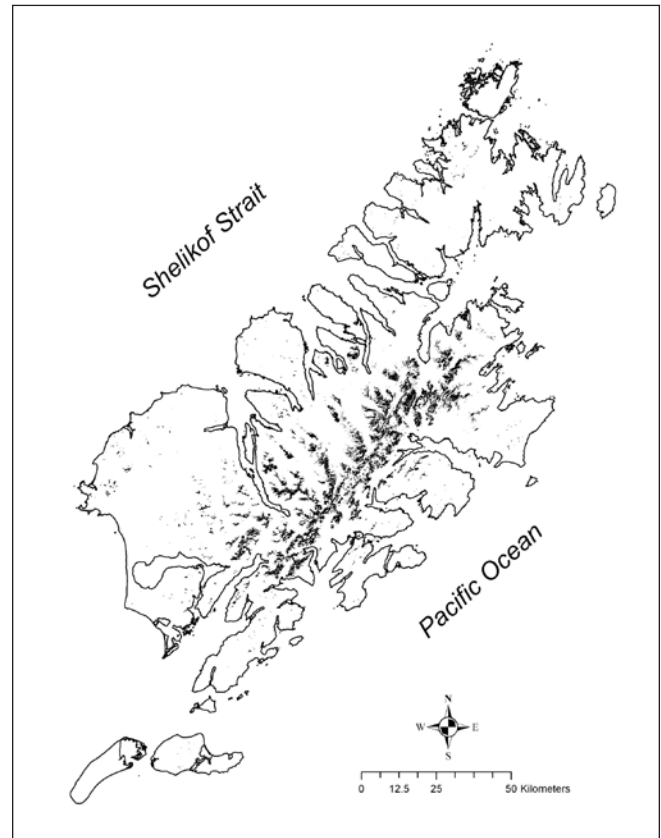
*Nesting habitat*

Because of the timing of observations of juveniles in the waters of the Kodiak Archipelago, local ornithologists have long suspected that Kittlitz's Murrelets were nesting in the immediate area. Further, among three specimens from the Kodiak area in the University of Alaska Museum's Ornithological Collection (D.D. Gibson pers. comm.), two birds collected off the southern end of Long Island in Chiniak Bay on 6 July 1975 showed evidence of breeding: an adult male with a brood patch and an adult female with an egg in its ovary (R.A. MacIntosh pers. comm.).

Breeding was confirmed in 2006. On 6 August of that year, a simple nest scrape was found by a botanical survey team working in alpine habitats near Mount Glotoff within the Kodiak National Wildlife Refuge. A large downy chick was present at the nest site. Photographs taken of the chick and nest location allowed the identification to be confirmed later by numerous seabird experts. The nest, a shallow depression in a small patch of moss and lichens, was located on the downhill side of a bedrock outcrop on an otherwise sparsely vegetated, south-facing, quartz diorite ridge. Dried feces lined the eastern and western edges of the nest depression. The nest site was at an elevation of 901 m and was just above an alpine lake, near small remnant alpine glaciers and permanent snowfields. Although the surrounding area, including the closest alpine lake, drains to the western side of Kodiak Island, the nearest saltwater was approximately 8 km away at Ugak and Kiliuda bays on the eastern side of Kodiak Island (Fig. 2).



**Fig. 2.** Distribution of Kittlitz's Murrelet *Brachyramphus brevirostris* observations during the breeding season (May–September) around the Kodiak Archipelago, 1975–2006, and nest locations in 2006.



**Fig. 3.** Distribution of potential Kittlitz's Murrelet *Brachyramphus brevirostris* breeding habitat (black stippling), based on characteristics of the 2006 Kodiak nest and other nests described for western Alaska.

Although exploratory in nature, our map of potential nesting habitat (Fig. 3) suggests that much of the high-elevation region of the archipelago, particularly the rocky alpine spine of Kodiak Island itself, could be used by breeding Kittlitz's Murrelets. However, a 2007 pilot radar survey for Kittlitz's Murrelets focused on the glacial refugium in southwestern Kodiak Island, an area again identified by a botanical survey team as having high murrelet activity. Preliminary results from that survey suggest that southwestern Kodiak Island is heavily used by Kittlitz's Murrelets (but not Marbled Murrelets *Brachyramphus marmoratus*) and may prove to be an important breeding area, despite its lower elevation (Day & Barna 2007).

## DISCUSSION

The presence of Kittlitz's Murrelets around the Kodiak Archipelago year round and the recently confirmed nesting on Kodiak Island provide additional evidence that this species is not an obligate forager near tidewater glaciers. This point has been noted before, even within core breeding areas, but researchers are usually quick to point out that birds *generally* occur in areas with at least high-elevation remnant glaciers (see Kendall & Agler 1998). Still, the recent and unprecedented discovery of 12 active Kittlitz's Murrelet nests on the island of Agattu in the western Aleutian Islands [1 in 2005 and 11 in 2006 (Kaler 2006, R. Kaler pers. comm.)] indicates that this species *can* nest at high densities in areas far from glaciers. Clearly, nesting in such areas would be possible only where foraging habitat is available. Although suitable foraging conditions for Kittlitz's Murrelets may be more likely around ice fields, they are not exclusive to the proximity of tidewater glaciers or glacial-fed rivers.

Interestingly, unlike other reported nests, the Kittlitz's Murrelet nest found on Kodiak Island was located on exposed bedrock and not in the midst of scree or talus habitat, as appears to be more usual (see Day *et al.* 1983, Day 1995, Piatt *et al.* 1999). Also, unlike other nests described for this species (Piatt *et al.* 1999), the Kodiak nest was not lined or rimmed with small rocks.

As with all species for which data deficiency is an issue, extreme caution must be exercised in the interpretation of the few existing biologic details, and an overall precautionary approach to management and conservation must be adopted. Given the existing high degree of conservation concern for Kittlitz's Murrelet, we recommend that increased management attention be given to this species in the Kodiak Archipelago, with the aim of accurately assessing the distribution, abundance, population trends, productivity, and threats to the species. We specifically suggest dedicated surveys for Kittlitz's Murrelets, including repeated, systematic, multi-season marine surveys around the Kodiak archipelago, initially focusing on the marine areas identified in this examination of the existing observational data; radar and audiovisual surveys of alpine regions for activity in the late breeding season (mid-July to early August), initially focusing on the potential breeding habitat identified in this analysis; and continued radar and audiovisual surveys of southwestern Kodiak Island, where it appears that only Kittlitz's Murrelets occur, before additional research is conducted at other coastal areas of the archipelago where Marbled Murrelets may also occur.

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**Fig. 4.** View of Kittlitz's Murrelet chick and nest on diorite bedrock ledge with small remnant alpine glaciers in the background. Elevation 901m. Photographed August 6th, 2006 by Stacy Studebaker.



**Fig. 5.** View of Kittlitz's Murrelet chick and nest on diorite bedrock ledge facing west, elevation 901m. Photographed on August 6th, 2006 by Stacy Studebaker.



**Fig. 6.** View of Kittlitz's Murrelet chick and nest on diorite ledge facing north with Mt. Glottof in the distance. Elevation 901m. Photographed on August 6th, 2006 by Stacy Studebaker.



**Fig. 7.** Close up of Kittlitz's Murrelet chick on nest from the rear right. Elevation 901m. Photographed on August 6th, 2006 by Stacy Studebaker.



**Fig. 8.** Close-up of Kittlitz's Murrelet chick on nest from front left. Egg tooth barely visible. Elevation 901m. Photographed on August 6th, 2006 by Stacy Studebaker.



**APPENDIX 1**  
**Kittlitz's Murrelets *Brachyramphus brevirostris* observed around the Kodiak Archipelago, Alaska,**  
**during systematic coastal and marine bird surveys, 1980–2005**

Year	Date	Location	Latitude	Longitude	Observed (n)
1980	5 Dec	Kiliuda Bay	57.26	–152.87	4
1981	25 Jan	Three Saints Bay	57.15	–153.49	3
		Three Saints Bay	57.17	–153.47	14
	7 Feb	Spiridon Bay	57.60	–153.61	2
		Spiridon Bay	57.65	–153.77	6
		Spiridon Bay	57.66	–153.72	2
	8 Feb	Broken Point	57.89	–153.62	3
	9 Feb	S arm Uganik Bay	57.66	–153.52	31
		S arm Uganik Bay	57.68	–153.51	8
		NE arm Uganik Bay	57.73	–153.38	7
		NE arm Uganik Bay	57.73	–153.38	3
		NE arm Uganik Bay	57.77	–153.40	2
	10 Feb	Terror Bay	57.79	–153.20	1
		Terror Bay	57.82	–153.20	2
	17 Nov	S arm Uganik Bay	57.69	–153.51	5
1983	10 Feb	E of Gull Cape	57.34	–152.55	2
	12 Feb	N arm of Kiliuda Bay	57.33	–153.15	1
1984	16 Jul	Kaiugnak Bay	57.08	–153.63	1
1985	23 Jul	Kiliuda Bay	57.33	–153.01	1 (juv)
1986	15 Jul	Kiliuda Bay	57.32	–153.15	1 (juv)
	28 Jul	Spiridon Bay	57.66	–153.70	2 (1 juv)
1987	30 Jul	Three Saints Bay	57.18	–153.51	1 (juv)
1989	20 Jun	NE arm Uganik Bay	57.78	–153.44	2
	22 Jun	Uyak Bay	57.34	–153.77	2
		Uyak Bay	57.38	–153.79	1
	18 Jul	Perenosa Bay	58.37	–152.17	1
		Tolstoi Point	58.38	–152.08	1 (juv)
	4 Aug	Izhut Bay	58.19	–152.28	1
1991	2 May	Packer's Spit, Uganik Bay	57.75	–153.51	1
1992	11 Nov	Spiridon Bay	57.70	–153.83	1
1993	10 Jun	E Sitkalidak Strait	57.21	–153.05	2
	23 Jun	Kiliuda Bay	57.32	–153.16	4
	31 Jul	Noisy Island Passage	57.94	–153.53	1 (juv)
	3 Aug	Viekoda Bay	57.84	–153.08	1 (juv)
		Viekoda Bay	57.85	–153.11	1 (juv)
1997	7 Jun	Uyak Bay	57.42	–153.85	2
	20 Aug	South Arm Uganik	57.70	–153.54	1
1998	12 May	Outer Right Cape	57.26	–152.83	2
	10 Aug	Kiliuda Bay	57.30	–153.15	1
2001	15 May	Black Point, Sitkalidak Island	56.99	–153.25	1
2002	25 Aug	Uyak Bay	57.36	–153.80	1
2003	29 Oct	Kaiugnak Bay	57.06	–153.55	1
2005	27 Jun	SW of Ugak Island	57.34	–152.45	2

juv = juvenile.

## APPENDIX 2

Casual observations of Kittlitz's Murrelets *Brachyramphus brevirostris* around the Kodiak Archipelago, Alaska, 1974–2006

Year	Date	Location	Observed (n)
1974	31 Mar	Kupreanof Strait	14
1975	6 Jul	S end of Long Island	16
	30 Aug	N end of Long Island	2
1976	11 Jun	N of Woody Island	6
	9 Jul	Off Cape Izhut	1
	23 Jul	Perenosa Bay	1
	3 Aug	Foul Bay	2
1978	7 Apr	Gibson Cove	1
	19 Jun	N end of Woody Island	2
1981	2 Apr	S of Long Island	20
	6 Sep	Kiliuda & Ugak bays	10
	7 Sep	Ugak Bay	8
1982	20 Jun	Long Island	4
1983	21 Aug	N end of Long Island	1
1986	1 Jan	E side of Kodiak	6
1987	2 Aug	Long Island	1
1988	20–21 Dec	Ugak Bay	2
1989	19–27 Oct	Kiliuda & Ugak bays	2
1990	8–10 Mar	Ugak Bay	1
1991	4–8 Jan	Dangerous Cape	“A few”
	12 Jul	N of Long Island	3
	18 Jul	Woody & Long islands	1
	10 Aug	Woody Island channel	1 (juv)
1994	5 Jun	Spruce Cape	2
1995	16 May	Ugak Bay	“A few”
1997	17 May	Kiliuda Bay	2
	17 Sep	Long Island channel	0
	5–10 Sep	Alitak Bay	2
1998	21 May	Ugak Bay	7
1999	2 Jun	Hanin Rocks	“Several”
	22–23 Jul	Spruce Cape	1
	24 Jul	N of Long Island	5
2001	22–31 Jun	E bays of Kodiak Island	“A few”
2002	3 Sep	Unknown	1
2003	29 Apr	Spruce Cape	3
	17 May	Lazy Bay	“Dozen”
	10 Jul	N of Long Island	3
	30 Jul	Cape Chiniak	2
	3 Aug	N of Woody Island	1
2004	25 Mar	Spruce Cape	2
	14 Apr	NE of Spruce Cape	2
2006	“Early” Jun	Dangerous Cape–Gull Point	24
	20 Jun	Spruce Cove	2
	5–12 Jul	Pasagshak Bay	1