

## OCCURRENCES OF KITTLITZ'S MURRELETS SOUTH OF THE BREEDING RANGE ALONG THE WEST COAST OF NORTH AMERICA

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**ABSTRACT**—Even though Kittlitz's Murrelets (*Brachyramphus brevirostris*) remain almost entirely within the species' breeding range throughout the year, 20 records were obtained south of the breeding range along the west coast of North America between 1969 and 2010. Eight records between southern British Columbia and southern California (1969–2010), within the California Current region (33°–49° N), were considered to be vagrants, occurring far from the nearest breeding areas (1060 to 2920 km). Twelve records in southern Southeast Alaska and northern British Columbia (1994–2001) were relatively close to southernmost breeding areas (<730 km), still within the southern Alaska Current region (51°–56° N), and were considered to reflect occasional use of the southern part of the non-breeding range. With no records south of breeding areas prior to 1969, vagrancy and movements just south of the breeding range may have increased in recent decades because more qualified observers have covered the coastal areas, as well as due to changes in weather, reproduction, and movements. Increased search effort and better documentation of records will facilitate future confirmation and identification of changes in the type or frequency of these occurrences.

**Key words:** *Brachyramphus brevirostris*, distribution, Kittlitz's Murrelet, movements, non-breeding, vagrancy

The breeding range of Kittlitz's Murrelet (*Brachyramphus brevirostris*) is centered in the Bering Sea and Aleutian Islands and extends: (1) eastward to northern Southeast Alaska; (2) northward to the Chukchi Sea and Wrangel Island; and (3) westward to the Kamchatka Peninsula and northwestern Sea of Okhotsk (Gaston and Jones 1998; Shuntov 1998; Day and others 1999; Vyatkin 1999; Kondratyev and others 2000; Artukhin and others 2011). This distribution is generally similar to the Parakeet Auklet (*Aethia psittacula*), Crested Auklet (*A. cristatella*), Whiskered Auklet (*A. pygmaea*), and Least Auklet (*A. pusilla*), although numerical centers of abundance among these species are not the same (Gaston and Jones 1998; Kondratyev and others 2000). Compared to many other alcids, these species tend to occur closer to breeding areas

in the non-breeding season, with few moving to waters off the west coast of North America in winter. However, some Parakeet Auklets regularly vacate the Bering Sea and move far offshore in the central North Pacific south to approximately 40° N (Gaston and Jones 1998; Jones and others 2001). At the other extreme, Kittlitz's Murrelet, the least numerous of these species, is rarely recorded south of its breeding range at any time of year, with 5 individuals south of Alaska and Russia in 1969–1986 considered simply as vagrants (Gaston and Jones 1998; Brazil 1991; Day and others 1999). Our understanding of why some birds move south of the breeding range off the west coast of North America, however, has been hampered primarily by the paucity of records. For Kittlitz's Murrelet, strong attachment to the Bering Sea and

nearby regions throughout the year, nesting in association with Pleistocene-remnant glaciers in many areas, and the tendency to stay within the breeding range during the non-breeding season may reflect ecological adaptations related to their unique evolutionary history in the Bering Sea (Udvardy 1963).

In 2004, the US Fish and Wildlife Service designated Kittlitz's Murrelet a candidate species under the US Endangered Species Act (USFWS 2004, 2010), due to concerns about population declines related to global climate change, glacial recession, and marine regime shifts, as well as other factors such as mortality in oil spills and gill nets. Although not yet listed, many studies have been conducted in Alaska over the past decade to assess abundance, distribution, and population trends within the breeding range (Kissling and Hatch 2011), but no attention has been given to occurrences south of the breeding range on the west coast of North America. In this paper, we summarize all known published and unpublished southern records of Kittlitz's Murrelet on the west coast and re-examine historical literature. In addition to previously confirmed records, we attempted to confirm as many unpublished records as possible by obtaining details from the observers or other unpublished sources. We also took the unusual step of including certain recent unverified records that we considered credible (that is, descriptions consistent with Kittlitz's Murrelets by experienced observers but insufficient for our confirmation due to limited information and without photographs or drawings) in our summary. Inclusion of unverified but credible records was necessary because: (1) historical patterns of occurrence south of the breeding range have not been described because no southern records were obtained prior to 1969 (this paper; see Carter and others 2011); (2) some unverified records have not yet been assessed by local experts or records committees; (3) a records committee has not functioned in British Columbia since 1997 (G Davidson, pers. comm.); (4) few observers have worked intensively over many years in parts of southern Southeast Alaska and northern British Columbia and some parts are rarely visited; and (5) by identifying problems with the confirmation of certain records, more detailed descriptions of records of Kittlitz's Murrelet south of the breeding range will be encouraged in the future. We therefore believe that an improper perspec-

tive on occurrences south of the breeding range would result if we only considered records accepted by committees. Given the current conservation need to update knowledge of this species, we used confirmed and unverified but credible records to best (1) identify southern areas of occurrence; (2) examine temporal patterns of southern occurrences; (3) examine ages, plumages, and flock sizes of birds involved; and (4) identify possible factors related to southern occurrences. Little information is available on these aspects of the southern non-breeding distribution of Kittlitz's Murrelets in North America (Gaston and Jones 1998, Day and others 1999). A 2nd paper examines similar occurrences in southeastern Russia and Japan, south of the breeding range in northeastern Russia (Carter and others 2011).

#### METHODS

We searched library holdings and online literature for records of Kittlitz's Murrelets in southern Southeast Alaska, British Columbia, Washington, Oregon, California, Baja California, and western Mexico. Museum specimens were identified using ORNIS (Ornithological Information System) online databases, contacting curators, and visiting some museums. Some observations were obtained from the eBird online database (CLO and NAS 2009). In addition to clarifying "historical" information prior to 1969, "recent" records since 1969 were considered to be "confirmed" or "unverified but credible" depending on whether they were accepted by records committees, published, included by others in unpublished reports, or confirmed with information summarized in this paper obtained from observers. We did not include records rejected by records committees but we cited relevant literature to assist possible re-review of these records in the future.

Minimum distances south of the breeding range were determined using an online distance calculator that examined straight-line distances between the south tip of Baranof Island, Alaska (that is, southernmost suspected breeding area of Kittlitz's Murrelets in northern Southeast Alaska; approximately 56°N) and selected points, rounded to the nearest 10 km ([mapsof.net/distance-calculator/North\\_America](http://mapsof.net/distance-calculator/North_America)). Approximate latitude and longitude (nearest tenth of a degree) were determined for each record.

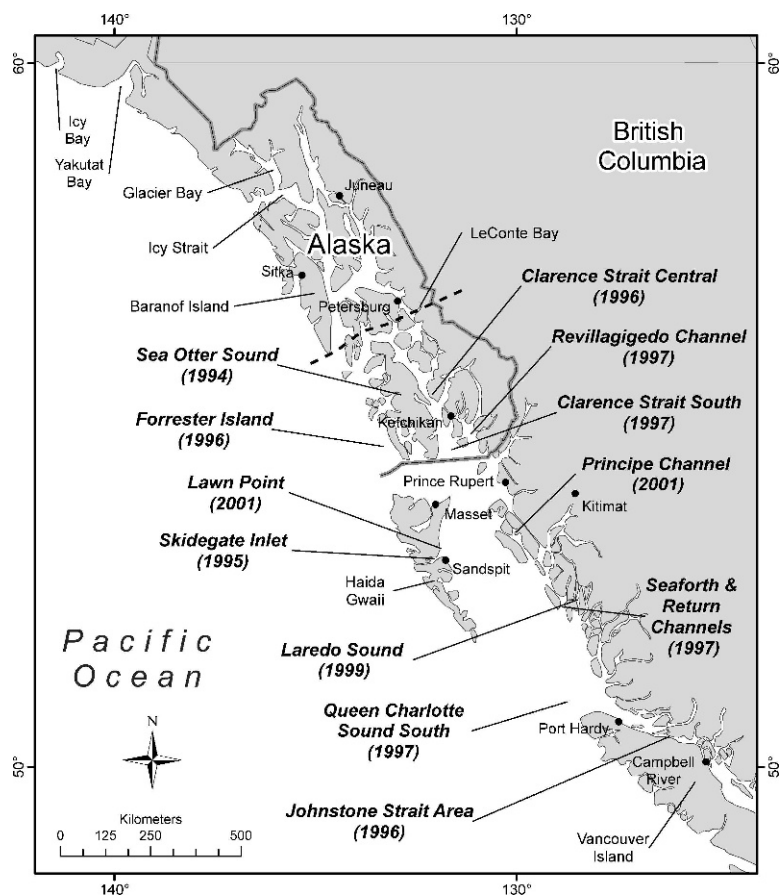


FIGURE 1. Southeast Alaska and northern British Columbia (World Geodetic System map), showing locations of Kittlitz's Murrelet records (bold italics), southern limit of the breeding range (heavy dashed line), and other locations mentioned in the text.

We followed Pyle (2008) for plumage and age categories, but used Humphrey–Parkes terminology for ease of reference. Plumages were referred to as juvenal, first-basic, basic, first-alternate, or alternate. For aging birds, we used the following abbreviations: HY (hatch-year or juveniles – <6 mo); SY (second-year – 6 to 18 mo old); and AHY (after-hatch-year or adults – >6 mo).

## RESULTS

### *Southern Southeast Alaska*

**Historical.**—There were no records of Kittlitz's Murrelet prior to 1994 south of southernmost suspected breeding habitats in northern Southeast Alaska at LeConte Bay and Baranof Island (for example: Gabrielson and Lincoln 1959; Day and others 1999).

**Recent.**—Two birds were observed on the water in northwestern Sea Otter Sound, on 24 June 1994, apparently exploiting a productive feeding area (Kendall and Agler 1998; USFWS, unpubl. survey data [North Pacific Pelagic Seabird Database]; D Irons, pers. comm.; Fig. 1; Table 1). This previously confirmed observation was made by experienced observers surveying *Brachyramphus* murrelets. Four unverified records of Kittlitz's Murrelets in southern Southeast Alaska were recorded between May and September 1996–1997 by R Burrows and submitted to eBird (CLO and NAS 2009). These birds were observed from the deck of the cruise ship *Nieuw Amsterdam*, where Burrows worked as an on-board naturalist. Burrows (pers. comm.) had observed many Kittlitz's Murrelets and Marbled Murrelets (*B. marmoratus*) on Glacier Bay but saw

TABLE 1. Confirmed and unverified records of Kittlitz's Murrelet south of the breeding range on the west coast of North America. Records are listed from north to south. Locations are indicated on Figures 1 and 2.

State/province	Location	Lat. (°N)	Long (°W)	Date	No. birds	Main source	Status
Southern Southeast Alaska	Sea Otter Sound	55.9	133.7	28 Jun 1994	2	Kendall and Agler 1998	Confirmed
	Clarence Strait Central	55.5	132.1	24 Sep 1996	1	R Burrows, pers. comm. (eBird 67281142)	Unverified
	Revillagigedo Channel	55.0	131.1	3 Jul 1997	2	R Burrows, pers. comm. (eBird 67389338)	Unverified
	Forrester Island (10–15 km offshore)	54.9	133.2	18–25 Jun 1996 ( <i>n</i> = 2)	2–3	R Burrows, pers. comm. (eBird 67058595, 67064379)	Unverified
Northern British Columbia	Clarence Strait South (10–15 km offshore)	54.8	131.6	25 May 1997	4	R Burrows, pers. comm. (eBird 67341478)	Unverified
	Principe Channel	53.6	130.9	8 Jun 2001	2	R Burrows, pers. comm. (eBird 54787814)	Unverified
	Lawn Point	53.4	131.9	12 Oct 2001	2	Toochin and Fenneman 2008; G Holland, pers. comm.	Confirmed
	Skidegate Inlet	53.2	132.0	8–9 Nov 1995	1	Davidson 1999; P Hamel, pers. comm.	Confirmed
	Seaforth and Return Channels	52.6	128.5	18 Jul 1997	4	R Burrows, pers. comm. (eBird 54480316)	Unverified
Southern British Columbia	Laredo Sound	52.5	128.9	11 May 1999	2	Toochin and Fenneman 2008; B Korol, pers. comm.	Confirmed
	Queen Charlotte Sound South (107 km offshore)	51.0	128.7	13–27 Jun 1997 ( <i>n</i> = 3)	1–2	R Burrows, pers. comm. (eBird 53661339, 53663542, 53677656)	Unverified
	Johnstone Strait Area	50.5	126.2	10 Jul–11 Sep 1996 ( <i>n</i> = 4)	1–2	R Burrows, pers. comm. (eBird 53619108, 53583881, 53583962, 53583985)	Unverified
	Elphinstone	49.4	123.6	18 Dec 2010	1	R Rudland, pers. comm.	Confirmed
	Botanical Beach	48.5	124.4	24 Aug 2008	1	Toochin and Fenneman 2008	Confirmed
Washington Oregon	Shirley	48.4	123.9	20 Jun 2006	1	Toochin 2010	Confirmed
	Victoria	48.4	123.4	24 Nov–12 Apr 1985–86	1	Mattocks 1985	Confirmed
	Friday Harbor	48.5	123.0	2 or 4 Jan 1974	1	Tweit and Paulson 1994	Confirmed
	Boiler Bay	44.8	124.1	8 May 2005	1	P Pickering, pers. comm.	Unverified
California	Florence (173 km offshore)	44.0	126.2	7 Jul 2005	2	P Pyle, pers. comm.	Unverified
	La Jolla	32.8	117.3	16 Aug 1969	1	Devillers 1972	Confirmed

only a few Kittlitz's Murrelets farther south and stated that "All birds were critically observed and identified and should be considered as valid records." This ship discontinued travel along the outer coast from Sitka after 1997 and Burrows's work ceased in 2001; these issues partly accounted for observations only during the cruise season in May–September in these areas and years. At Forrester Island, 2 or 3 birds were observed on 2 occasions 7 d apart in June 1996, which we have treated as the same group that stayed in this area for some time. At Clarence Strait, 1 bird was observed in the central portion of the strait in September 1996 and 4 birds were observed at the southern entrance in May 1997, possibly reflecting overwintering, given the common strait of these locations. With only 1 observer, limited details, and no other review of records, we cannot confirm these records; however, we consider them credible because there are confirmed records in northern British Columbia (see below) and these areas of occurrence are relatively close to breeding areas, whereas the lack of additional records by other observers may simply reflect few observers in many parts of Southeast Alaska. No sightings have been made between October and April in this region, perhaps partly because of even fewer observers at this time of year (Day and others 1999). No summer or winter sightings were made in the Ketchikan area, where an extensive effort to document year-round avifauna was made between 1990 and 2008 (Heinl and Piston 2009).

#### *British Columbia*

*Historical.*—Macoun (1900:20) reported: "One young bird collected by Dr. G. M. Dawson, Queen Charlotte Sound, September, 1885." In a later edition, Macoun and Macoun (1909) removed all reference to this specimen but retained the rest of the original section about Kittlitz's Murrelet in Alaska. In a letter (dated 28 July 1923) to P. A. Taverner, A. Brooks questioned: "Is there any record to support Macoun's report of *Brachyramphus kittlitzii* for B.C., Vol. I, p. 20? Can you find time to look over your murrelets and find out what Dawson got in Q. C. Sound [?]" Taverner replied (letter dated 3 August 1923): "According to the Summary reports Dawson brought in 44 mammal and bird skins from northern Vancouver Island in 1885. Of these but 11 birds were extant when I came here. Amongst them are singles of Marbled Murrelet and

Cassin's Auklet [*Ptychoramphus aleuticus*] but I find nothing of Kittlitz M. [sic] and without evidence would throw it out." Kittlitz's Murrelet was not mentioned by Brooks and Swarth (1925), Taverner (1926, 1928), and other summaries (Fannin 1891, 1898; Kermode 1904; Brooks and Dawson 1909; Munro and Cowan 1947). We presume that this bird originally was misidentified as a Kittlitz's Murrelet but this error was discovered between 1900 and 1909. M. Gosselin (pers. comm.) clarified that one Marbled Murrelet specimen (CMNAV #97; original collection number 522/2) was catalogued by Taverner in 1911 as a mounted, male Marbled Murrelet; it was collected by Dawson in 1885 at the "North end of Vancouver Island", consistent with the Queen Charlotte Sound locality, collector and year reported by Macoun (1900). However, this specimen vanished between 1911 and 1976.

*Recent.*—Seven confirmed and 4 unverified but credible records have been obtained in British Columbia since 1985. Previously confirmed records include: (1) 1 HY bird in first-basic plumage photographed at the entrance to Victoria harbor (Fig. 2, Fig. 3) from 24 November 1985 to 12 April 1986 (Mattocks 1985; Campbell and others 1990; Toochin and Fenneman 2008; Toochin 2010); and (2) 1 bird in basic plumage (HY or AHY) observed at Skidegate Inlet, Haida Gwaii, on 8 November 1995 (Queen Charlotte City) by C. Husband and independently on 9 November 1995 (Sandspit; approximately 17 km east of Queen Charlotte City) by P. Hamel (pers. comm.). Hamel provided his notes from that day, which indicated clearly that he observed this bird close to shore in calm water with binoculars for about 30 min from a distance of about 80 m; it had white above the eye and on the face and neck, small black bill, grayish-black cap, white on the outer tail feathers, and a dark breast band. Many seabirds typically occur off Sandspit in this productive feeding area (P. Hamel and S. G. Sealy, pers. obs.). Hamel further mentioned that Husband also noted the white face and small dark gray cap. Both observers were familiar with Marbled Murrelets in all plumages. This record was accepted by the British Columbia Field Ornithologists' (BCFO) Bird Records Committee (Davidson 1999; Toochin and Fenneman 2008).

We obtained sufficient information to confirm 5 other unpublished observations by competent observers that have not been considered by



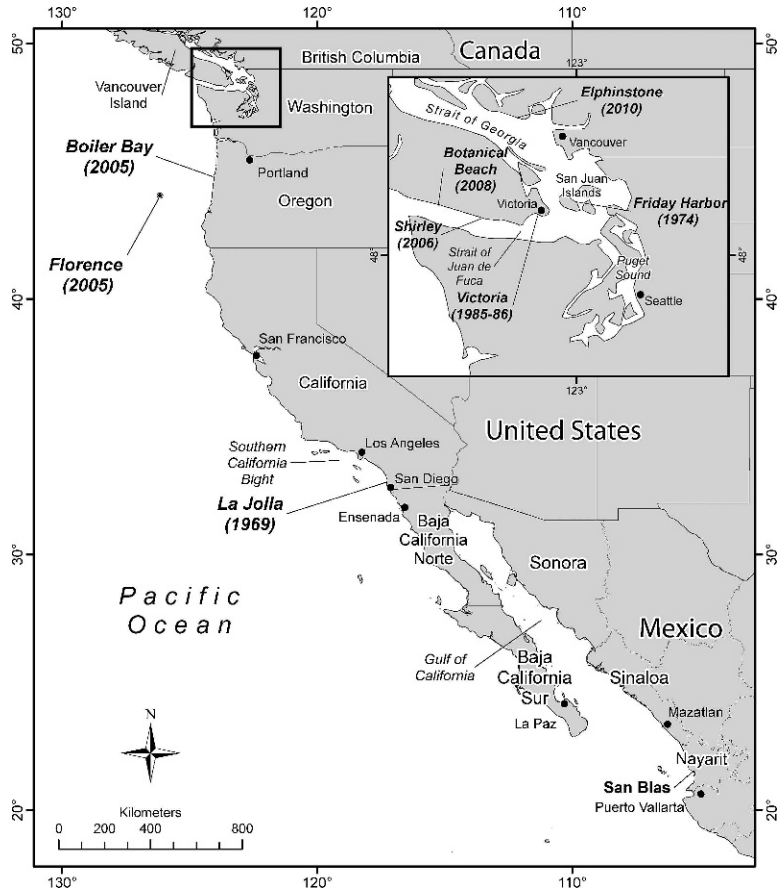


FIGURE 2. Southern British Columbia to western Mexico (World Geodetic System map), showing locations of Kittlitz's Murrelet records (bold italics) and other locations mentioned in the text.



FIGURE 3. Kittlitz's Murrelet in first-basic plumage observed off Victoria Harbor, British Columbia, 30 November 1985 (photo by T Zurowski). Brownish tips of the primaries and brown feathers scattered on the back indicate first-basic plumage (see Pyle 2008).

records committees: (1) 2 birds observed in Laredo Sound by B Korol from a cruise ship on 11 May 1999 (Toochin and Fenneman 2008). Korol (pers. comm.) recorded white outer rectrices, pale belly, and "sandy brown above," which we considered to reveal AHY birds in alternate plumage. On 12–14 May 1999, Korol also observed 8 other Kittlitz's Murrelets in alternate plumage in the Juneau area, Icy Straits, and mouth of Glacier Bay. Korol was confident of the validity of this record, although it was his 1st observation of this species; (2) 2 birds in basic plumage (HY or AHY) with very white faces and short bills observed by G Holland and C Curtis within 100 m of the ferry "Queen of the North" off Lawn Point (near Lawnhill), Haida Gwaii, about 3.5 km from shore, on 12 October 2001 (Toochin and Fenneman 2008; G Holland, pers. comm.) Holland is a well-known

birder, who currently resides in Ontario and was one of the key contributors to *The Birds of Manitoba* (MNS 2003); (3) one AHY bird in alternate plumage observed on the water about 40–50 m from shore off the Sheringham Point Lighthouse at Shirley by R Toochin on 20 June 2006 (Toochin 2010, pers. comm.). Under sunny conditions, this bird was observed diving for about 10 min below the Sheringham Lighthouse near 2 pairs of Marbled Murrelets, before it flew away. Toochin is an experienced observer and has studied Marbled Murrelets; (4) 1 HY bird in first-basic plumage (with a distinct darkish neck band) observed in flight about 75 to 100 m off Botanical Beach by R Toochin and L Haviland on 24 August 2008 (Toochin and Fenneman 2008; Toochin 2010, pers. comm.). This bird was seen from shore with a telescope during a break in heavy rain after a storm with moderate wind. Other seabirds rarely seen off southeastern Vancouver Island also were observed in relatively large numbers, including thousands of shearwaters, 33 Cassin's Auklets, and 18 Brown Pelicans (*Pelecanus occidentalis*) (R Toochin, pers. comm.). Marbled Murrelets were seen nearby; and (5) 1 bird in basic plumage (HY or AHY) observed on the water about 500 m off Ocean Beach Esplanade at Bonniebrook in Elphinstone, BC, by R Rudland (pers. comm.) on 18 December 2010 during a Christmas Bird Count (CBC). This bird was seen from shore with a telescope during moderate rain and 20 km/h wind. It flew in from farther offshore to join 2 Marbled Murrelets diving and apparently feeding in the area. It was observed for 5 min before it could no longer be found. A CBC rare sighting form was submitted and accepted by T Greenfield (pers. comm.). Rudland, an experienced local birder, was certain of his identification.

Four unverified but credible records were obtained in northern British Columbia between 1996 and 2001 and submitted to eBird by R Burrows who considered them to be valid records (see Alaska above; CLO and NAS 2009; R Burrows, pers. comm.; Table 1). Toochin and Fenneman (2008, pers. comm.) did not include these records because they were not aware of them. We combined some sightings into single records where they may reflect the same or different groups of birds: (1) at Johnstone Strait Area, 1 to 2 birds were observed 4 times over 63 d in July–September 1996; and (2) at Queen Charlotte Sound South, 1 to 2 birds also were observed 3 times over 14 d in June 1997. If these

records were the same group of birds, they would have reflected overwintering within the same large inlet area off northern Vancouver Island. As noted under Alaska, we could not confirm Burrows's records because only 1 observer was involved, limited details were provided, and the records were not subjected to outside review. Nevertheless, we included them as unverified but credible records because: (1) they were reported in northern British Columbia during the same general period in 1995–2001 as 3 confirmed records by other observers; and (2) 1 confirmed record also was obtained from a cruise ship [Laredo Sound – 1999] and occurred at a similar location as one of Burrows's records [Seaforth and Return Channels – 1997], although 2 y later.

### Washington

*Historical*.—Coues (1868:63) described the range of Kittlitz's Murrelet (then referred to as *B. wrangeli*) as: "Aleutian Islands, and north-west coast of America; south to Puget's Sound, and perhaps further." At this time, only 1 specimen (USNM #A11457) was known south of Alaska, which had been collected by CB Kennerly at "Oreas [sic] Inlet, Puget Sound" (likely East Sound at Orcas Island) in February 1858. Prior to 1895, this specimen was re-identified as a Marbled Murrelet; identification was reconfirmed as a Marbled Murrelet by C Angle (pers. comm.) in 2009. By 1895, the range (then *B. kittlitzii*) had been corrected to not regularly extend south of Alaska (AOU 1895). Prior to 1974, Kittlitz's Murrelet had not otherwise been recorded in Washington (for example: Dawson and Bowles 1909; Jewett and others 1953).

*Recent*.—One previously confirmed record was obtained on 2 or 4 January 1974, when 1 bird in basic plumage (HY or AHY) was photographed at Friday Harbor, San Juan Island (Tweit and Paulson 1994; Wahl and others 2005). San Juan Island is slightly east of and geographically associated with 4 records from southern British Columbia, also approximately 1100 km from nearest breeding areas (Fig. 1). Three other records (1981, 1989 and 1998) were not accepted by the Washington Bird Records Committee (WBRC), but reasons for rejection were not provided (Tweit and Paulson 1994; Aanerud 2002). Another record (1994) apparently was not submitted to the WBRC for consideration for unknown reasons (Mattocks



FIGURE 4. Juvenile Kittlitz's Murrelet collected at La Jolla, California, 16 August 1969 (SDNMH #37215; photo by P Unitt and G Williams).

1997); we did not consider it because of insufficient details.

#### *Oregon*

*Historical.*—No records are available prior to 1969 (for example: Gabrielson and Jewett 1940; Marshall and others 2006).

*Recent.*—Three records (1969, 1978 and 1992) were not accepted by the Oregon Bird Records Committee (OBRC), but reasons for rejection were not provided (Nehls 2009). Two more recent records have not been considered by the OBRC (H Nehls, pers. comm.). On 8 May 2005, 1 flying SY bird in first-basic plumage (white above the eye and a complete darkish neck band) was observed briefly by P Pickering (pers. comm.) at Boiler Bay, Lincoln County. With few details, we considered this to be an unverified but credible record by an experienced observer, but in addition another unverified but better-described record with similar plumage was recorded nearby about 2 mo later. On 7 July 2005, 2 birds in basic or first-alternate plumage (SY or AHY) were observed during standardized marine mammal and seabird surveys from the flying bridge of the NOAA Ship *MacArthur II* by P Pyle and H Fearnbach, about 173 km off Florence, Lane County (P Pyle, pers. comm.). These birds were first seen sitting on the water about 250 m in front of the ship and observed with 8× binoculars for about 40 s as the ship passed by as close as 40 m almost directly

below the observation post. They jumped off the water and submerged for brief moments (<1 sec). Sketches and detailed descriptions were made but due to the unexpected location off Oregon, the brevity of the observation (<1 min), lack of confirmation of all field marks, and lack of a photograph, Pyle and Fearnbach considered it a probable rather than a confirmed sight record. Even though these observers are highly skilled and provided an excellent description, we have treated this record as unverified. These 2 records were about 1460 km south of nearest breeding areas.

#### *California*

*Historical.*—No records are available prior to 1969 (for example: Grinnell and Miller 1944).

*Recent.*—One previously confirmed record was obtained on 16 August 1969, when 1 HY bird (SDNHM #37215) in juvenal plumage (Fig. 4) was found weak but alive on the beach at La Jolla, San Diego County, about 2920 km south of nearest breeding areas; it died the next day (Devillers 1972). This record was the first and furthest south (approximately 33° N) of breeding areas on the west coast, as well as the furthest south occurrence known for the species. Two other sight records in northern California in 1991 and 2000 were not accepted by the California Bird Records Committee, but reasons for rejection were not provided (Heindel and Garrett 1995; McKee and Erickson 2002; Hamilton and others 2007).



*Baja California and Western Mexico*

**Historical.**—Vigors (1829) described *Uria brevirostris* based on a type specimen “shot at San Blas” (Nayarit, western Mexico; near Tepic [see Ridgway 1919]; 4550 km from nearest breeding areas; approximately 21.5° N; Fig. 2) during the Beechey voyage to the North Pacific Ocean aboard the *Blossom* (1825–28). This specimen, in alternate plumage (AHY), is in the Natural History Museum in Tring, United Kingdom (NHM Reg. No. 2004.6.1; Sharpe and Ogilvie-Grant 1898; Ridgway 1919; MP Walters, M Adams, and K van Grouw, pers. comm.). The *Blossom* had an extended stopover at San Blas from 15 December 1827 to 27 January 1828 on its way back to England (Beechey 1831 [vol. II, p 323–324]). However, Kittlitz’s Murrelets have not been observed since in Baja California or western Mexico and the date of collection and plumage of this specimen were not consistent with the timing of the stopover at San Blas. The specimen actually was obtained on 9 August 1826 by Lieutenant E Belcher (MP Walters, pers. comm.). The *Blossom* was in the Chukchi Sea on this date, near “Cape Beaufort,” between Cape Lisburn and Icy Cape, Alaska (Beechey 1831 [vol. I, p 369–371]), at the extreme northern limit of the North American breeding range of Kittlitz’s Murrelet. The specimen apparently had been relabeled at San Blas, possibly because its original tag had been destroyed by saltwater, an affliction suffered by several other bird specimens on this voyage (Vigors 1839).

**Recent.**—No recent records were located for Baja California or western Mexico (for example: Howell and Webb 1995).

## DISCUSSION

*Vagrancy*

Eight records of Kittlitz’s Murrelets from southern British Columbia (approximately 49°N) to southern California (approximately 33°N) were far from the nearest breeding areas (approximately 1060 to 2920 km) and in clearly different marine habitats, within or adjacent to the California Current region. Five records were in summer (May–August; 3 confirmed and 2 unverified) and 3 confirmed records were in fall-winter (November–April). Seven of 8 records involved single birds. These records probably represented true vagrants, displaced over long distances from their

usual range. Few records of vagrants only after 1968 suggest highly unusual and recent factors leading to a relatively low degree of vagrancy. The lack of historical records prior to 1969 could be partly attributed to lower observer effort and ability, although even limited past effort should have produced at least a few records. With much greater observer effort and skill since the 1960s in coastal parts of this region, several occurrences have been documented, but descriptions of some records have been inadequately prepared and incompletely reviewed. The interesting but unverified record 173 km offshore of the Oregon coast (Florence – 2005) suggests that some Kittlitz’s Murrelets also occur offshore where detection is unlikely due to low observer effort. Five of these 8 records occurred within the central Salish Sea (comprised of the Strait of Juan de Fuca, San Juan Islands, and southern Strait of Georgia – see Fig. 2), from 1974 to 2010. This region has relatively high observer effort, is approximately 1060 to 1130 km south of the nearest breeding areas, is approximately 220 to 290 km south of Johnstone Strait Area (southern extent of southern movements near the breeding range – see below), and has marine habitats and prey resources similar to nearshore waters in northern British Columbia and southern Southeast Alaska. However, birds would have to travel relatively long distances over water (approximately 380 to 650 km) from the north end of Vancouver Island around either the east or west side of Vancouver Island to reach the central Salish Sea region (Fig. 1 and Fig. 2). Only 3 records (1 confirmed; 2 unverified but credible) in Oregon and California (where there is generally high observer effort) may suggest different factors affecting vagrancy south of the Salish Sea (see below).

Vagrancy in certain Pacific alcids, especially the Ancient Murrelet (*Synthliboramphus antiquus*) and Long-billed Murrelet (*B. perdix*), has been well described along the west coast, within interior North America, and as far away as Europe (Munyer 1965; Verbeek 1966; Sealy and others 1982, 1991; Mlodinow 1997; Maumary and Knaus 2000; Sealy and Carter 2004, unpubl. data). Most vagrant Ancient Murrelets and many vagrant Long-billed Murrelets were juveniles (HY) and the vagrancy was often associated with inclement weather during fall movements or in winter. Many vagrant Kittlitz’s Murrelets also were or may have been juveniles. While only 1

bird was in identifiable juvenal plumage (La Jolla – 1969), 2 other juveniles in late summer and fall were in first-basic plumage (Victoria – 1985–86; Botanical Beach – 2008); in the former case, overwinter survival was documented. Summer observations of possible SY birds (Boiler Bay – 2005; Florence – 2005) also may reflect arrival of juveniles during the previous fall or winter and survival until the subsequent breeding season. Birds reported in basic plumage (Friday Harbor – 1974; Skidegate Inlet – 1995; Lawn Point – 2001; Elphinstone – 2010) also may have been juveniles. Only 1 record (Botanical Beach – 2008) was associated with inclement weather at the time of observation, but other birds may have arrived earlier under different weather conditions.

An unverified record of 1 Kittlitz's Murrelet in basic plumage (HY or AHY) also has been documented far inland in North America (approximately 3000 km east of the west coast), observed for 45 min (by 4 observers and accompanied by a detailed description and sketch) on Lake Michigan just off Michigan City, IN (south end of Lake Michigan) on 16 January 1983 (Mlodinow 1984, pers. comm.). This record was listed as "hypothetical" by Mumford and Keller (1984) and was not accepted by the Indiana Bird Records Committee. In addition, a confirmed record of 1 vagrant Kittlitz's Murrelet in basic plumage (HY or AHY bird) was documented at Jogashima near Tokyo Bay on 28 November 2004 (Godo 2005), approximately 950 km south of the next most southern Asian record in Hokkaido and possibly related to unusual weather conditions (Carter and others 2011).

Long-distance vagrancy in Long-billed Murrelets from breeding or wintering areas in eastern Russia, Japan, Korea, and China (Kondratyev and others 2000; Nelson and others 2002) to North America was first reported in 1979 and has subsequently occurred frequently (Sealy and others 1982, 1991; Mlodinow 1997). Only 2 historical North American records in coastal Alaska in 1845 and 1897 have been subsequently accepted (Sealy and others 1982; Konyukhov and Kitaysky 1995; Mlodinow 1997; Gibson and Byrd 2007). This recent and frequent long-distance vagrancy likely reflects predominantly westerly winds in the North Pacific since the 1970s during the warm phase of the Pacific decadal oscillation (PDO; Mantua and Hare 2002) promoting cross-ocean travel, as well as other habitat and

population impacts in northeastern Asia. In contrast, long-distance vagrancy of the Marbled Murrelet, which breeds from the Aleutian Islands and southeastern Bering Sea to central California on the west coast of North America, has not yet been recorded despite better-documented changes in breeding habitat and impacts on populations.

For Kittlitz's Murrelet, which breeds in the northern Russian Far East and much of coastal Alaska, 8 records of west-coast vagrancy after 1968 with none historically suggests recent vagrancy possibly associated with climate change and population impacts known to be affecting this species (for example: Kuletz and others 2003; USFWS 2010). However, we currently suspect that most west-coast vagrancy in Kittlitz's Murrelets, especially to the central Salish Sea region, is mainly related to conditions in the northeastern Pacific Ocean promoting far-south flights from Alaska by some individuals. For instance, strong northerly winds extend from southern Alaska to the west coast during cool periods of the PDO; at least 2 recent observations (Botanical Beach – 2008; Elphinstone – 2010) occurred during such cool periods. Larger breeding populations and extensive movements occur within coastal Alaska (with small numbers reaching south to northern Vancouver Island in certain years; see later), further suggesting that southern Alaska was the primary source of these vagrants. However, westerly winds during predominantly warm PDO periods in the North Pacific since the 1970s could also facilitate long-distance flights by Kittlitz's Murrelets from Asia. The 3 locations of vagrant Kittlitz's Murrelets in Oregon and California better match the general area with most observations of Long-billed Murrelets on the west coast of North America (Mlodinow 1997). The few Long-billed Murrelets observed in the Salish Sea may have moved north after first arriving farther south on the west coast. Certain central Salish Sea records of Kittlitz's Murrelets also may represent Asian vagrants that moved north after arrival, possibly aided by southerly winds blowing up the west coast during warm periods of the PDO (Mantua and Hare 2002). Although we have suggested possible mechanisms that may assist travel by vagrants, we were unable to link records with specific weather conditions largely because we could not determine source areas or exactly

when and where birds actually arrived on the west coast. With more confirmed records in the future and continued improvement in understanding changes in weather and breeding, possible changes in the degree of vagrancy and sources of vagrant Kittlitz's Murrelets can be better assessed. Molecular genetic analysis of tissues of salvaged specimens or captured individuals may permit some source populations to be identified (Birt and others 2011).

#### *Southern Movements Near the Breeding Range*

After breeding, many Kittlitz's Murrelets move away from the breeding areas, but we know little about where they spend the post-breeding season. Prebasic molting areas (when individuals are flightless) and wintering areas are poorly known (Day and others 1999), although several specimens in molt were obtained nearshore near Barrow, Alaska, in late July to late September (Sealy 1977). Most birds in the northern Bering Sea and southern Chukchi Sea move south to avoid pack ice in winter, but many apparently stay in the southeastern Bering Sea (K Kuletz and J Piatt, pers. comm.). A few also have been recorded in winter in polynyas within the sea ice off islands in the northern Bering Sea (for example: 23–24 March 2009 off St. Lawrence Island; K Kuletz, pers. comm.). Unpublished data from a preliminary satellite telemetry study in 2009–10 revealed that some birds radio-tagged in Icy Bay (northern Southeast Alaska) and Prince William Sound headed west in September. Icy Bay birds followed the shelf along the Gulf of Alaska and apparently molted mainly in coastal waters along the Alaska Peninsula before at least a few birds moved farther west into the Bering Sea. Other individuals apparently molted along the coast near their breeding areas but possibly later moved farther away (J Piatt, pers. comm.). The proportion that leave breeding areas before molting likely depends on timing of breeding, reproductive success, and prey availability in both breeding and molting areas in late summer and early fall, as suggested for Marbled Murrelets (Carter and Stein 1995; Peery and others 2008).

Twelve records of small numbers of Kittlitz's Murrelets in southern Southeast Alaska and northern British Columbia in 1994–2001 indicate occasional relatively short movements south of the breeding range in certain recent years,

especially in 1996, 1997, and 2001 when: (1) more than 1 record was obtained per year; and (2) some birds apparently remained at certain locations (Forrester Island; Queen Charlotte Sound South; Johnstone Strait Area) for some time, and possibly overwintered (Clarence Strait; Queen Charlotte Sound/Johnstone Strait region) in 1996–1997. However, we could not determine the frequency of these movements because so few records are available, some are unverified, and we do not know how many occurrences might have been missed. The relatively short distance from breeding areas and similarity of marine habitats in southern Southeast Alaska and northern British Columbia to those in breeding areas in northern Southeast Alaska suggest that these southern movements reflect a little-used and little-known part of the non-breeding range that extends to about 730 km south of the breeding range to the north end of Vancouver Island, within the southern Alaska Current region. The widely scattered distribution of records in this region (Fig. 1), with flock sizes of 1 to 4 birds, suggest wide movements by individuals or small flocks within these habitats. While most (75%) records in this region were less than 5 km from shore, 1 record was about 107 km from shore (Queen Charlotte Sound South – 1997) and 2 records were 10 to 15 km from shore (Clarence Strait South – 1997; Forrester Island – 1996). Small numbers of Marbled Murrelets also move a comparable distance up to 750 km south of nearest breeding areas in central California in certain years, but within an area with many more skilled observers (Carter and Erickson 1992; Erickson and others 1995; Peery and others 2008).

Reasons for a lack of historical records in this region may reflect low observer effort, but we suspect a few observations should have accumulated over time if movements occurred occasionally. Observations since 1994 and especially in 1996–1997 likely reflect: (1) increased observer skill and effort, especially intense observing in Southeast Alaska and northern British Columbia by R Burrows; and (2) unusual circumstances related to a period of large population declines and poor reproduction evident by the 1990s (Kuletz and others 2003) when failed breeders, non-breeding adults, or subadults (AHY) likely left breeding areas earlier than usual. If unconstrained by continued attendance at breeding areas early in the breeding season, some adults

may move a relatively short distance south of breeding areas. Most (75%) observations in this region were made in summer (May–August), including 1 confirmed record of AHY birds in alternate plumage (Laredo Sound – 1999). Most juveniles do not fledge in northern Southeast Alaska until early July to mid-August (J Piatt, pers. comm.). Southerly movements in early summer by adults or subadults occur weeks to months before the flightless prebasic molt that usually begins in late summer (Sealy 1977). Similar unusual early movements far to the south by radio-tagged Marbled Murrelets that were failed breeders, non-breeding adults, or subadults have been documented in south-central California (Peery and others 2008). Additional surveys, greater annual observer effort, and well-described observations of Kittlitz's Murrelets in southern Southeast Alaska and northern British Columbia are needed to enhance our understanding of the irregular use of these non-breeding habitats.

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