

# Seabirds and Marine Mammals Recorded in Western Hecate Strait, British Columbia, in Spring and Early Summer, 1984-1989

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We made systematic observations of marine birds and marine mammals in the vicinity of Reef Island, in the Queen Charlotte Islands, in April-June of 1984-1989. Our sightings extend considerably the information available on the occurrence of seabirds in Hecate Strait. The frequency of sightings and numbers of individuals involved varied widely from year to year for non-breeding visitors, especially Sooty Shearwaters, Herring Gulls and Black-legged Kittiwakes. These fluctuations appeared to be related to the local abundance of euphausiid crustacea. Sightings of offshore-feeding seabirds occurred especially during periods of strong south-east winds, associated with the passage of depressions.

**Key Words:** Seabirds, marine mammals, Hecate Strait, inter-year variation.

Although little studied, Hecate Strait has an abundance of marine birds and mammals. It is the probable foraging area for twelve species of locally breeding seabirds. Their combined populations total more than half a million birds (Rodway 1990). It is also used by thousands of migrating and wintering loons, shearwaters, phalaropes, gulls and auks. Marine mammals are also abundant, although probably much less so than in the past. Knowledge of the marine birds of Hecate Strait is poor (Campbell et al. 1990), with only sporadic sightings, except for periodic boat surveys carried out in 1976 and 1977 (Vermeer et al. 1983), and in 1983 and 1984 (Vermeer and Rankin 1984), and limited aerial surveys in the fall and winter of 1977 to 1978 (Savard 1979). No information is available on year-to-year variation in seabirds and marine mammals using the area.

## Study Area and Methods

Hecate Strait separates the Queen Charlotte Islands archipelago from the mainland of British Columbia. It is connected broadly to the Pacific via Queen Charlotte Sound in the south, and more narrowly, through Dixon Entrance, to the north. The strait is mainly more than 200 m deep at the southern end, but shallows rapidly in the centre, with two deeper channels running up the east and west coasts (Figure 1). To the east of Graham Island, shallow banks create large areas less than 40 m deep. Coasts are mainly rocky, but approaching Dixon Entrance they are sandy or muddy, with long bars reaching offshore (Sandspit, Rose Spit).

During 1984 to 1989, the Canadian Wildlife Service maintained a camp on Reef Island, on the east side of the Queen Charlotte Islands, to conduct research on Ancient Murrelets, *Synthliboramphus antiquus*. While this work was in progress, we made

regular observations of marine birds and mammals in the adjacent waters of Hecate Strait. Reef Island is the furthest island from the rest of the archipelago, and water more than 100 m deep occurs within 1 km of the eastern tip. The deep water forms the northernmost branch of a submarine canyon which extends up the east coast of the Moresby archipelago. Tidal currents in the area of Reef Island set northwards during the flood, reversing during the ebb. Velocities offshore are of the order of 0.5 m s<sup>-1</sup> (Thomson 1981). The island's exposed position, and the proximity of deep water, make Reef Island a useful platform for observing pelagic birds which are not seen otherwise near to land (Figure 2).

Observations from Reef Island were made with a 25× spotting scope from a lookout point about 15 m above the sea, in the middle of the north coast. At least one watch, for a minimum of 15 min, was made daily between 0900-1300 h, and additional watches were made at other times of day when conditions and time allowed. At times of heavy seabird passage, or high marine mammal activity, several watches were made throughout the day. Additional observations were made during periodic boat trips around Reef Island, up to 10 km east into Hecate Strait and as far north as Skedans Islands. The periods covered by observations were 13 April to 22 June 1984, 6 April to 15 June 1985, 10 May to 14 June 1986, 22 April to 17 June 1987, 30 March to 20 June 1988 and 23 March to 16 June 1989. Our daily observations were usually brief, and made only when other work permitted, but they provide comparable data for May and June for six years and for April for four years. Hence they provide the first indication of how predictable the occurrence of various species may be.

In the species accounts that follow, we have used several local place names that do not appear on maps or charts of the area in order to describe previously



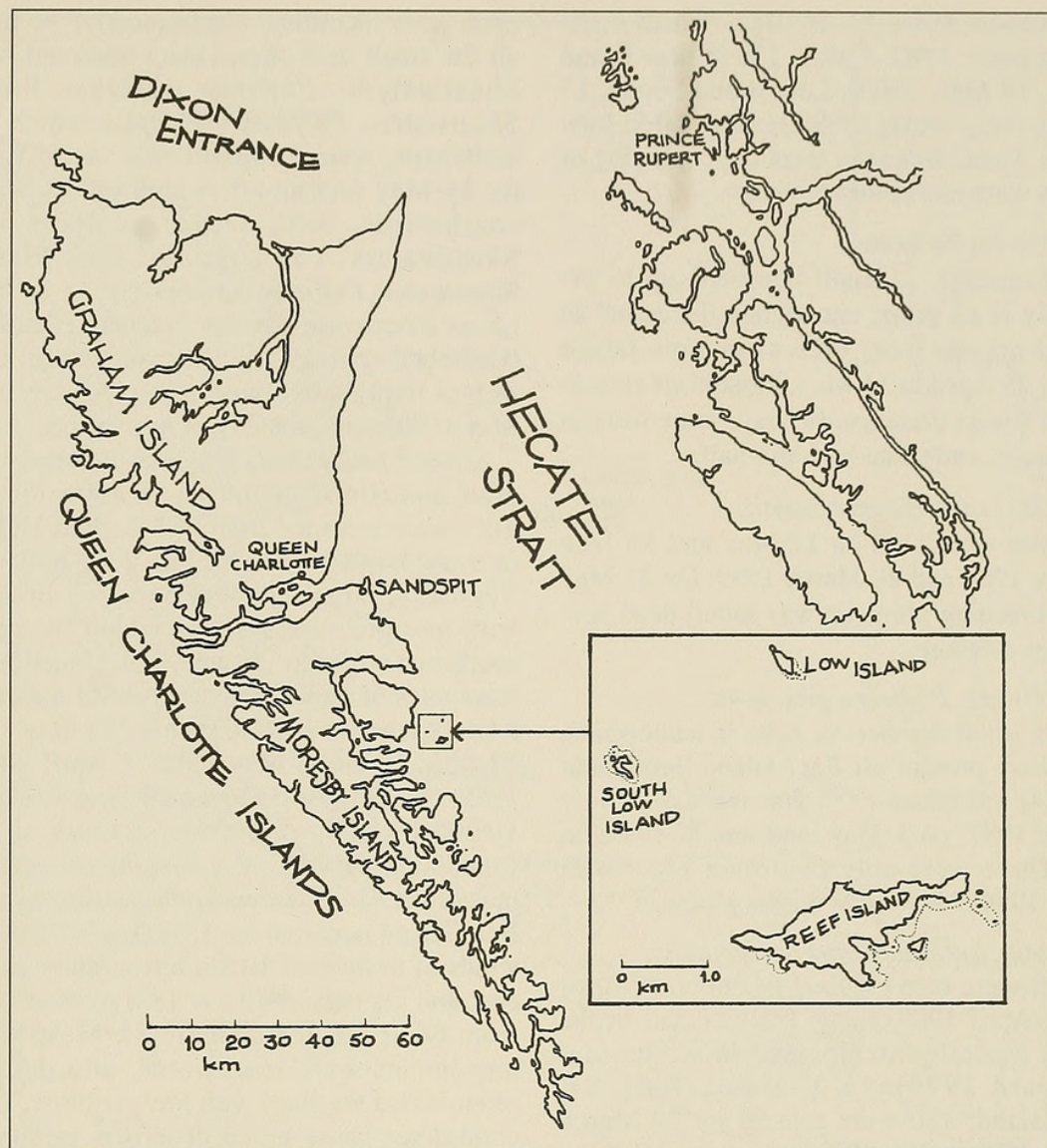


FIGURE 1. Map of Hecate Strait, showing bathymetry and the position of Reef Island.

unnamed features (Figure 2). Observations of birds within 500 m of Reef Island are described as, "off Reef Island". Birds to the north of Reef Island, but south of Low Island, are described as in "Low Island Sound". Those seen from the lookout to the east or northeast of Low Island are so described, while any described as "between Low Island and Skedans Islands" or "in Hecate Strait" were seen on boat trips up to 10 km east and north of Reef Island. Observations made in inshore waters (<1 km from shore) away from Reef Island are excluded, except for a few involving unusual species or numbers. All observations referring to rates of passage were made from the camp lookout and were based on counts of from 10 to 30 minutes duration. For comparison, all have been converted to birds/h. We used the following classification to categorize abundance: *Abundant*: seen on at least 50% of days, often in large numbers; *Common*: at least one seen on more than 50% of days; *Uncommon*: seen on more than five dates, but on less than 50% of days of observations; *Rare*: seen on five dates or less. Wherever the

status observed in the Reef Island area differed from that given in *The Birds of British Columbia* (Campbell et al. 1990) we have drawn attention to it.

## Results

### Species Accounts: Birds

#### RED-THROATED LOON, *Gavia stellata*.

Rare migrant. Single birds in summer plumage off Reef Island on 29 and 31 May 1985 and 30 May 1987. The species is resident on Graham Island (Campbell et al. 1990).

#### PACIFIC LOON, *Gavia pacifica*.

Abundant migrant. Recorded regularly in all years, from early April, but highest numbers occurred in May, when a steady northwards passage was discernable, except when unfavourable weather conditions altered the direction of movement. Peak numbers were: in 1984, 31 May, 100/h moving north; 1985, 15 June, 100–150 between Skedans and



Limestone Islands; 1986, 13–25 May, “small numbers” moving north; 1987, 1 May, 150 in Low Island Sound; 1988, 14 May, 200 in Low Island Sound, 15 May, 600/h moving south; 1989, 24 May, 60 in Low Island Sound. Most birds seen from the beginning of May onwards were in summer plumage.

COMMON LOON, *Gavia immer*.

Migrant. Common, in small numbers, up to the middle of May in all years; uncommon thereafter. In 1985 several dozens were present in Low Island Sound during 25 April to 15 May. Most birds seen in April were in winter plumage. In May, some were in summer plumage, and some half-and-half.

YELLOW-BILLED LOON, *Gavia adamsii*.

Rare. Singles were seen on 12 May and 13 June 1985, 30 May 1986 and 28 March 1989. On 31 May 1985 one in breeding plumage was found dead several kilometres offshore.

RED-NECKED GREBE, *Podiceps grisegena*

Common in small numbers in April in some years. One or two were present off Reef Island throughout April in 1984, 1985 and 1988, but there was only one record in 1987, on 1 May, and one in 1989, on 23 March. There were only two other records in May, both in 1984. All were in winter plumage.

WESTERN GREBE, *Aechmophorus occidentalis*.

Single birds were seen off Reef Island on 17 April 1988 and 23 April 1989. Large flocks occur in the inlets of the Moresby archipelago in winter and spring (Savard 1979). In Thurston Harbour, Talunkwan Island, 150 were present on 29 March and 11 April 1988, while 400 were seen in Selwyn Inlet on 12 April 1989.

BLACK-FOOTED ALBATROSS, *Diomedea nigripes*.

Rare visitor. Singles passed northwards with heavy movements of shearwaters on 14 May 1985 and 1 April 1989. This albatross is common in spring and summer off the west coast of the Queen Charlotte Islands, but few are observed in Hecate Strait, except during or after storms (Campbell et al. 1990).

NORTHERN FULMAR, *Fulmarus glacialis*.

Uncommon migrant. Small numbers were recorded during 17 to 30 May 1986, including one feeding on a floating sealion carcass off Reef Island. Five, all dark-phase, passed south on 30 March 1989.

SHEARWATERS, *Puffinus* spp.

We have lumped all species together, because many of them were seen at several kilometres range, making specific identification difficult. We regularly examined shearwaters seen close inshore to check for the presence of Short-tailed Shearwaters, *Puffinus tenuirostris*, which have been reported in May in Hecate Strait (Campbell et al. 1990), but

none were identified. Consequently, we believe that all the small dark shearwaters observed were Sooty Shearwaters, *Puffinus griseus*. Pink-footed Shearwaters, *Puffinus creatopus*, which have pale underparts, were identified only in 1985, when one on 24 May and about twelve on 28 May passed southwards, with larger numbers of Sooty Shearwaters. The large, all-dark Flesh-footed Shearwater, *Puffinus carneipes*, may be a rare visitor, as it occurs in summer in Queen Charlotte Sound (Campbell et al. 1990). Three very large, dark shearwaters flying south with Sooty Shearwaters on 15 May 1988 were probably of this species.

Sooty Shearwaters, *Puffinus griseus*, were common, sometimes abundant, non-breeding visitors. They were recorded from 26 March to 17 June, often in very large numbers, but very unpredictable. Typically, large numbers occurred in association with low pressure systems which brought east or south-east winds to Hecate Strait. Under these conditions rates of movement observed to the east of Reef Island exceeded 5000 birds/h on 21 May 1984, 18 to 23 May 1986, 26 May 1988, 1 April and 13 June 1989. On 23 May 1986 and 13 June 1989 more than 10 000 birds/h were moving south at the peak. Combining data for all years, movements involving more than 100 shearwaters/h passing to the east of Reef Island occurred on 32% ( $n = 107$ ) of days with winds of more than 10 km/h from the east, or south-east, but on only 5% ( $n = 188$ ) of days with winds from other quarters (Figure 3). Most of the large movements were southwards, into the wind, and often in bad weather, with low visibility. Under such conditions, shore-based observers presumably saw only a small proportion of the birds passing. Many were probably passing too far out to be counted. Hence, rates of movement of more than 5000/h, which continued all day on several occasions, presumably indicated the presence of hundreds of thousands of shearwaters in Hecate Strait.

On several occasions large feeding flocks occurred within sight of Reef Island, to the northeast. In 1985, 10 000+ were present on 28 to 30 April. On 14 May, 100 000 were estimated present at 1130 hrs and by 1700 hrs this had risen to between a quarter and a half a million. Rafts of up to 30 000 continued to be present in the same area until 2 June. In 1986, several thousand were present from 26 to 28 May and in 1988 1000–2000 were present on 31 March and “hundreds” on 19 May. Five thousand were present between Reef Island and Skedans on 15 June 1989. No significant feeding flocks were seen in 1987, when only small numbers were recorded before 31 May. Our counts of Sooty Shearwaters are the largest recorded in British Columbia, except for a flock of half a million off Ramsay Island, 30 km south of Reef Island, on 2 May 1977 (Campbell et al. 1990). A flock of about 10 000 was seen 8–10 km



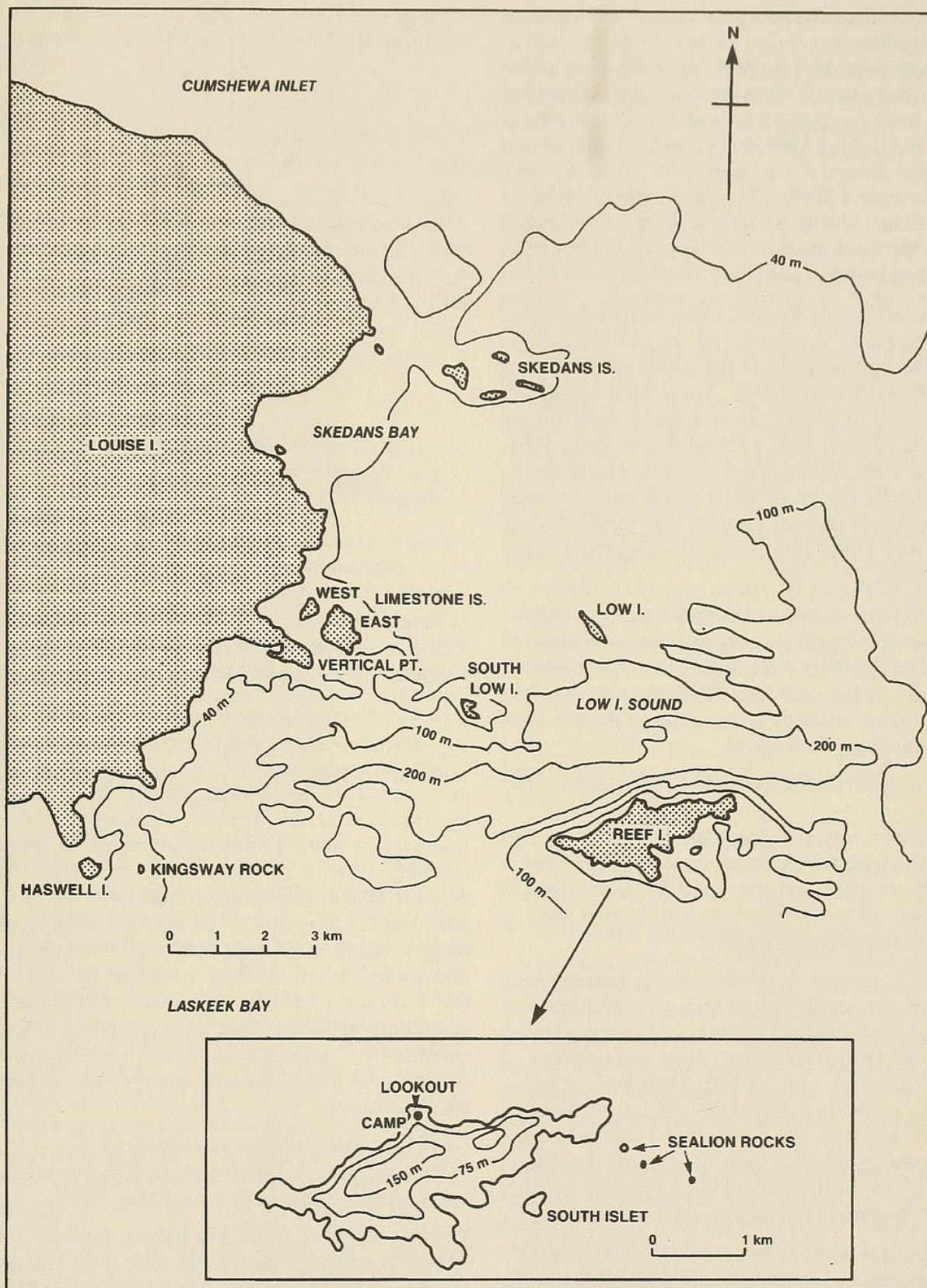


FIGURE 2. Map of Reef Island and adjacent waters.

east of East Copper Island on 15 May 1985 (M. Lemon and M. Rodway, Canadian Wildlife Service, P.O. Box 340, Delta, British Columbia, personal communication). Shearwaters, probably Sooties, have been recorded in small numbers in Hecate Strait throughout the winter (Savard 1979).

In 1985, close examination of feeding flocks showed that they were feeding on swarms of euphausiid crustacea, taking them either by diving from the surface and swimming underwater, or by hydroplaning along the surface, with wings flapping, heads underwater and bills agape. Similarly, in 1989,



feeding flocks were closely associated with swarms of euphausiids.

Many birds present in 1985 and 1989 were undergoing primary moult, showing clear gaps where one or more inner primaries were missing. The tideline at Reef Island in May 1985 was littered with thousands of moulted shearwater primaries. In 1989, no signs of moult were visible on birds examined up to 11 April, but many of those seen feeding in the second half of May had lost their inner primaries. Hence primary moult began in late April.

#### FORK-TAILED STORM-PETREL, *Oceanodroma furcata*.

Several hundred pairs breed on Low Island and some also on the islet off the south coast of Reef Island (Rodway et al. 1988). A few were heard calling and seen displaying over a rocky bluff on the south side of Reef Island on several dates in 1986, 1987, and 1988. Seldom seen offshore, except during strong south-east winds when small numbers were sometimes seen passing through Low Island Sound. On 13 May 1985, five were seen feeding in Low Island Sound.

#### LEACH'S STORM-PETREL, *Oceanodroma leucorhoa*.

This species breeds on Lost Islands, 8 km south of Reef Island (Rodway et al. 1988). One was mist-netted on Low Island on 6 May 1986, but although they must occur in offshore waters, only one was ever seen by day from Reef Island.

#### DOUBLE-CRESTED CORMORANT, *Phalacrocorax auritus*.

Uncommon non-breeding visitor. Up to five seen around Reef Island on seven dates in 1985, two in 1986, one in 1987 and four in 1988. Commoner in 1989 when up to five were present on five dates in March, 14 in April and 6 in May.

#### BRANDT'S CORMORANT, *Phalacrocorax penicillatus*.

Uncommon non-breeding visitor. Seen occasionally every year in small numbers. Maximum counts were on 23 April 1985, when fifteen were present on Sealion Rocks, and on 15 May 1986 when 29 flew south in groups of two to four. Most birds were in immature plumage, but on 6 April 1988 there were six in breeding plumage near the eastern tip of Reef Island. Campbell et al. (1990) considered this species a vagrant in the Queen Charlotte Islands.

#### PELAGIC CORMORANT, *Phalacrocorax pelagicus*.

Common non-breeding visitor, breeds in some years. A small breeding colony near the east end of Reef Island, one of only three in South Moresby (Rodway et al. 1988), was occupied in 1985 and 1986, when a minimum of ten and eleven pairs nested. In 1985 four clutches were being incubated on 13 June, and in 1986 three clutches were being incubated on 31 May. In 1987 to 1989 up to 350, of which more than 90% were in immature plumage, roosted regularly on the south coast of Reef Island, but no

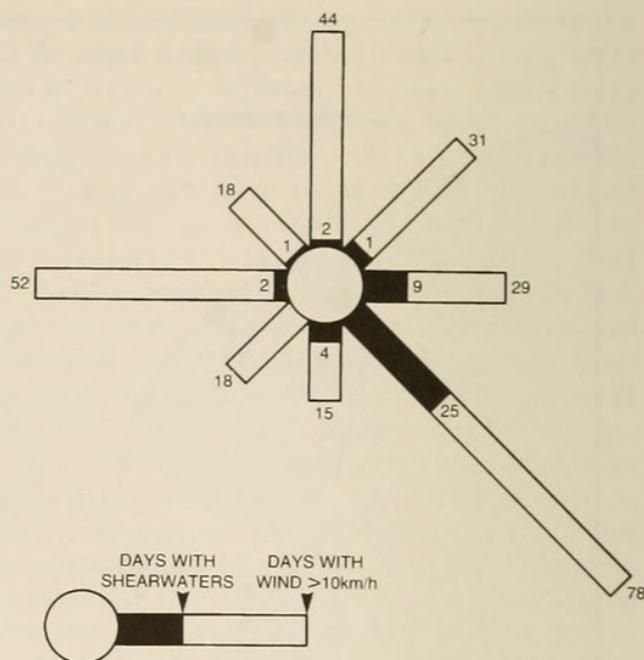


FIGURE 3. The occurrence of days with a heavy passage of shearwaters, in relation to wind direction.

evidence of breeding was found. Roost birds commuted daily to inshore waters in Laskeek Bay and at the mouth of Cumshewa Inlet.

#### BALD EAGLE, *Haliaeetus leucocephalus*.

Common resident and non-breeding visitor. Five or six pairs were resident on Reef Island in all years, and another on South Islet, just off the south coast. During May large numbers of non-breeders, the majority in adult plumage, occurred in the area roosting either on the Skedans Islands, Low Island, or Reef Island. Maximum counts were 75 on Low Island on 22 May 1985, 100 on Reef Island and 45 on Low Island on 14 June 1987, 100+ on Low Island and several dozen on Reef Island on 31 May 1988 and 150 on Low Island on 9 May 1989. These concentrations are larger than any reported in spring or summer by Campbell et al. (1990). Large gatherings were always associated with the presence of herring shoals offshore.

#### RED PHALAROPE, *Phalaropus fulicarius*.

Rare migrant. A flock of about 250 was seen during a strong south-east gale on 7 May 1984.

#### RED-NECKED PHALAROPE, *Phalaropus lobatus*.

Uncommon migrant. Flocks were seen feeding to the north-east of Reef Island in May in 1985, 1986 and 1989. Highest counts were 250 in Low Island Sound on 18 May 1985, and 150 to the east of Low Island on 17 May 1989. Flocks totalling 400 flew north off Reef Island on 10 May 1989. All were in breeding plumage.

#### POMARINE JAEGER, *Stercorarius pomarinus*.

Uncommon migrant. One or two were seen in Hecate Strait on 31 May and 9 June 1985, 18 and 22



May 1986, and 25 May, 2 June and 15 June 1989. All but the last bird were in adult, pale-phase plumage.

PARASITIC JAEGER, *Stercorarius parasiticus*.

Rare migrant. One or two pale-phase adults in Hecate Strait on 31 May and 9 June 1985, 24 May 1986 and 22 May 1989.

SOUTH POLAR SKUA, *Catharacta maccormicki*.

Rare migrant. One "skua species" seen from Reef Island on 3 June 1987, was presumably of this species. Apart from this record, the earliest reported for British Columbia is 13 June. There is one previous summer record from Hecate Strait (Campbell et al. 1990).

MEW GULL, *Larus canus*.

Rare visitor. One, near Reef Island, on 27 April 1984 and 7 May 1985. The species is common in winter in the Queen Charlotte Islands (Campbell et al. 1990).

CALIFORNIA GULL, *Larus californicus*.

Uncommon non-breeding visitor. Small numbers were recorded occasionally in all years, with a maximum of 40 present in Low Island Sound on 8 May 1984. One immature was picked up dead in Laskeek Bay on 15 May 1988. Like Thayer's Gull, this species may have been overlooked sometimes among Herring Gulls. Campbell et al. (1990) characterised the species as casual in the Queen Charlotte Islands in spring and summer.

HERRING GULL, *Larus argentatus*.

Common in all years, but numbers were extremely variable. In 1984, only small numbers were seen in April and on one date in May. In 1985, hundreds, practically all immatures, were present in Low Island Sound during 27 April to 2 May. In 1986, up to 20 were recorded almost daily in May and June. In 1987, large numbers, practically all immatures, were present around Reef Island from 29 April to 23 May, with peaks of 4000 to 5000 on 30 April, 'thousands' on 5 May and 500 to 1000 on 15 May. Although there were generally less than a hundred present after 23 May, 500 to 1000 were present on 1 June. In 1988, small numbers were recorded throughout the season, but up to 3000 were feeding east of Low Island on 10 April and 500 on 2 May. On 2 April 240/h and on 15 May 600/h were moving south off Reef Island. A similar pattern was seen in 1989, when hundreds of immatures were present from 24 April to 25 May, with peaks of 1500 on 1 May and 2500 on 14 May. Up to 500 roosted on Sealion Rocks throughout the period.

THAYER'S GULL, *Larus thayeri*.

Uncommon migrant (?). The status of this species is unclear, because it could only be identified with certainty at close range, and some individuals seen at

a distance must have been overlooked. Small numbers were recorded in all years in April and up to 17 May. The maximum number recorded was 12 on Sealion Rocks on 23 April 1984. Most of those seen were with flocks of Glaucous-winged Gulls and Herring Gulls roosting on the Sealion Rocks.

GLAUCOUS-WINGED GULL, *Larus glaucescens*.

Common resident. Breeds on Low Island and Kingsway Rock, and a few pairs generally nest on the Sealion Rocks. Rodway et al. (1988) recorded 18 colonies exceeding 10 pairs in the South Moresby area.

Breeding on Low Island was apparently disrupted in 1987 by large numbers of Bald Eagles roosting in the colony area. At least 15 nests were built, or refurbished, and laying had begun at several by 5 June. However, on 14 June 40 eagles were perched in the area and no gulls were incubating. Likewise, in 1989 there was probably no breeding on Low Island. Thirty pairs were present on 27 June, and at least ten nests had been built, but no eggs were found. Laying on Low Island began about 10 June 1984, 30 May 1986, 5 June 1987 and 8 June 1988.

Large flocks of immatures were present in the area occasionally. Two hundred were present on Low Island on 9 June 1985 and "hundreds" on Sealion Rocks on 3 June 1987. Flocks of less than 100 immatures fed on herring shoals throughout May in 1989, along with adult Glaucous-winged Gulls and immature Herring Gulls.

GLAUCOUS GULL, *Larus hyperboreus*.

Rare visitor. One, in all white, second summer plumage, was seen on 19 May 1984.

BLACK-LEGGED KITTIWAKE, *Rissa tridactyla*.

Common, sometimes abundant, non-breeding visitor. Not recorded in 1984, and seen on only three dates in 1986, but very common in other years, although numbers seen after April varied greatly. In March and April the majority of birds seen were in breeding plumage, but in May and June immatures made up more than 90% of those observed in all years.

In 1985, kittiwakes were very common from 21 April to 25 May, with more than 10 000 present to the northeast of Reef Island on 13 to 14 May. On 9 June, 200 were present on Low Island and 1000 between there and Skedans Islands, all immatures. In 1986, only small numbers were seen, on 12, 13 and 25 May. In 1987, hundreds of immatures were present throughout May, but no more than 15 were seen after 1 June. In 1988, up to 1000 were present in Low Island Sound up to 10 April, but the only record otherwise was of 20 immatures in Hecate Strait on 19 May. In 1989, adults were very numerous throughout April, with up to 5000 present in Low Island Sound. Hundreds of immatures continued to



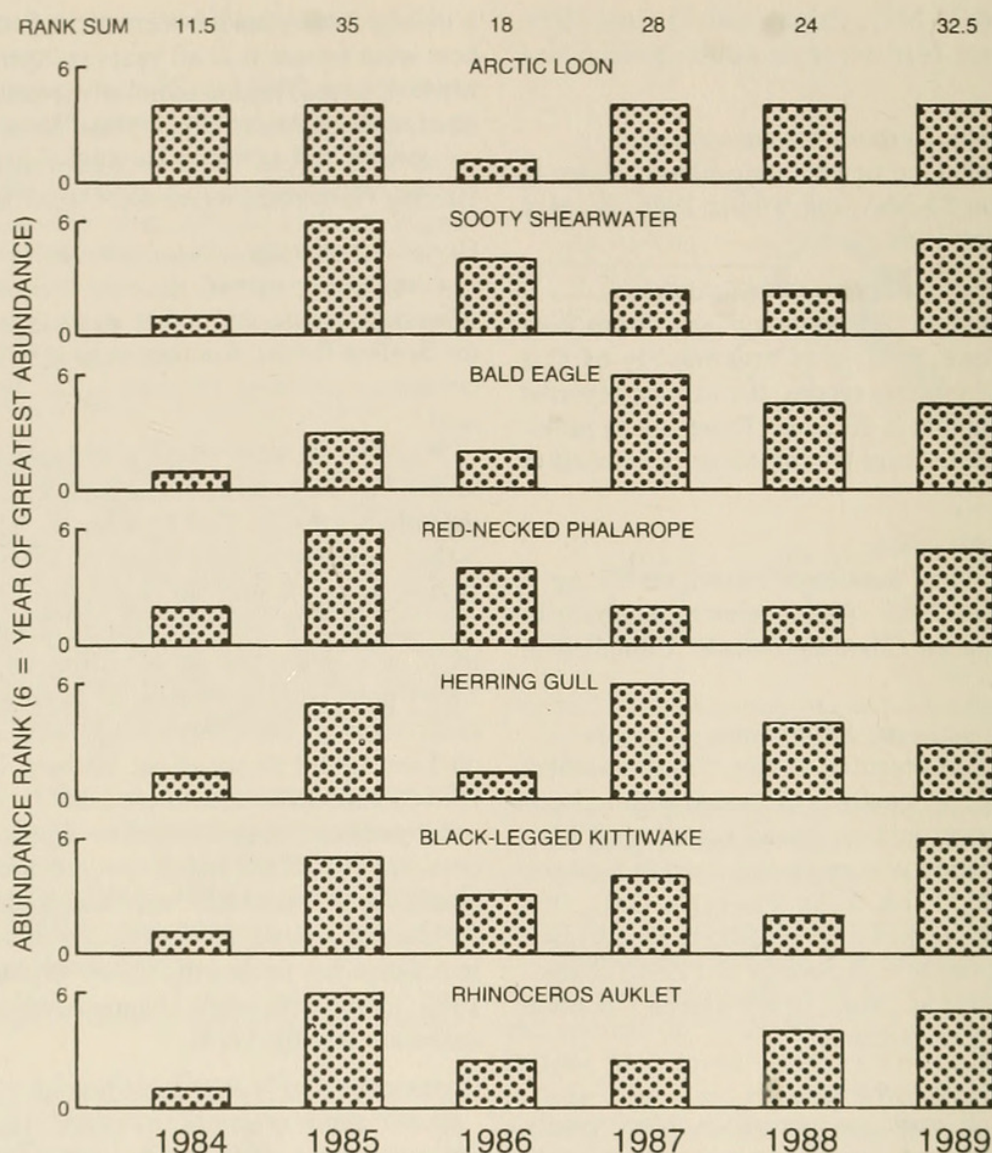


FIGURE 4. The relative abundance of selected seabird species in Hecate Strait over six years.

be present in the area until 15 June. These numbers exceed those recorded anywhere else in British Columbia (Campbell et al. 1990).

**SABINE'S GULL, *Xema sabini*.**

Uncommon migrant. Seen in Hecate Strait on four dates between 2 to 18 May in 1985, on 19 May 1986 and 19 May 1988. The largest number seen was a flock of 30 to 40 feeding with Black-legged Kittiwakes on 3 May 1985. All were in breeding plumage.

**ARCTIC TERN, *Sterna paradisaea*.**

Uncommon migrant. Terns, probably of this species, were seen on 19 May 1984, when 25 flew east off Reef Island and on 24 May 1989, when two flew north. Campbell et al. (1990) do not list any sightings for Hecate Strait.

**COMMON MURRE, *Uria aalge*.**

Uncommon non-breeding visitor. Seen in small numbers, practically throughout the season, in all

years. Most common in 1988 when hundreds were present in Hecate Strait in groups of 6–20 on 12 April. The majority of these were in winter plumage. On 16 May 1988, a southward movement of 100/h was seen. Several thousand pairs of Common Murres breed at Triangle Island in Queen Charlotte Sound (Rodway 1990).

**THICK-BILLED MURRE, *Uria lomvia*.**

Rare non-breeding visitor. We observed three 5 km NE of Reef Island on 8 May and one on 30 May 1985. Others may have been overlooked among Common Murres. There are no other spring records for British Columbia (Campbell et al. 1990).

**PIGEON GUILLEMOT, *Cephus columba*.**

Common resident. Breeds on practically all islands in the area, including Reef and Low islands (Rodway et al. 1988). Maximum counts of birds attending nesting areas on Reef Island were: 1984, 280 on 6 June; 1985, 338 on 30 May; 1988, 400 on 1 April; and 1989, 563 on 30 April. In 1989, counts



made in April were higher than those in May or June, perhaps because some birds moved out of the area as the season progressed.

**MARbled MURRELET, *Brachyramphus marmoratus*.**

Uncommon resident. This species occurs commonly in inshore waters around the Queen Charlotte Islands during the breeding season, and is presumably a common breeder (Campbell et al. 1990). At Reef Island it was recorded in small numbers in all years, mainly from May onwards. Highest numbers were seen in 1987 when maxima of 20, 26 and 35 were recorded off the south coast in June. None was ever seen on passage.

**ANCIENT MURRELET, *Synthliboramphus antiquus*.**

Common resident, breeding on Reef and Limestone islands, and perhaps on Low Island. The Ancient Murrelet has been the subject of detailed research at Reef Island and the results have been published elsewhere (e.g., Gaston et al. 1988; Jones et al. 1990). About 5000 pairs breed on Reef Island (Rodway et al. 1988), and the birds associated with this colony stage in Low Island Sound from mid-afternoon onwards when the sea conditions permit. Most birds apparently feed well offshore in Hecate Strait, because many flocks are seen heading eastward, away from the staging area, in the morning. Family parties stay well offshore after leaving the colony (Duncan and Gaston 1990). Up to a few hundred were seen feeding in Low Island Sound and between Low Island and Skedans Islands in May and June, especially in 1985 and 1989. No substantial passage of murrelets was ever seen.

**CASSIN'S AUKLET, *Ptychoramphus aleuticus*.**

Common resident. Breeds commonly on most islands in the area, including Reef Island and Low Island (Rodway et al. 1988). Small numbers were observed in Hecate Strait and Low Island Sound on most boat trips. On 5 June 1984 "hundreds" were feeding between Reef Island and Skedans Islands; on 9 June 1985, several hundred were present in the same area.

**RHINOCEROS AUKLET, *Cerorhinca monocerata*.**

Common visitor, probably breeds. The nearest substantial colony is on Kunghit Island, 90 km to the south (Rodway et al. 1988), but up to 100 were seen in Low Island Sound on most evenings in May and June, and birds were heard calling from land on many occasions. A few burrows were located on Reef Island in 1977, by a crew from the British Columbia Provincial Museum (B.C. Provincial Museum files; now Royal British Columbia Museum). Though we never found any, it seems almost certain that some must continue to breed on Reef Island.

Large numbers were seen feeding in Hecate Strait and north of Low Island in 1985 and 1989. On 5

June 1985, "hundreds" were feeding in Low Island Sound and on 9 June, 1000 to 2000 were feeding between Low Island and Skedans Islands in flocks of up to 100. In the late afternoon many were carrying fish, presumably to feed to chicks that night. From the number involved they could not have originated from Reef Island, and hence must have been commuting from the colonies at Kunghit Island (2500 pairs, Rodway et al. 1988), or in the Moore Islands – Byers Islands group, on the east side of Hecate Strait (>90 000 pairs, M. Lemon personal communication). On 22 May 1989, 200 were seen in Hecate Strait and 100 in Low Island Sound, and on 25 May and 2 and 15 June, "hundreds" were feeding in Hecate Strait. Heavy passage was seen to the east of Reef Island on 15 and 24 May 1988, when 1200/h and 600/h were flying south.

**TUFTED PUFFIN, *Fratercula cirrhata*.**

Uncommon. One or two seen on two dates in June 1984, two in April, three in May and five in June in 1985, two in May in 1986, two in April in 1988, and two in June in 1989. The nearest breeding colony is on Kunghit Island (Rodway et al. 1988).

**HORNED PUFFIN, *Fratercula corniculata*.**

Rare. Single birds seen on 9 June 1984, on 11 May and 13 June 1985, on 3 April 1988 and on 30 March 1989. The nearest breeding station is on Anthony Island (Rodway 1990).

**Species Accounts: Marine Mammals**

**HUMPBAC WHALE, *Megaptera novaeangliae*.**

Up to three were seen almost daily from 2 to 14 May 1985, and on four dates thereafter, the latest being 6 June. One was seen on 17 May 1987. In 1989, up to three were seen to the north and east of Low Island on five days between 14 to 23 May. On 25 May, about five were present in Hecate Strait to the northeast of Low Island.

**FIN WHALE, *Balaenoptera physalus*.**

One or two were seen daily from 3 to 8 May 1985. In 1989, two were seen to the northeast of Low Island on 20 May, and several spouts which looked like those of this species were seen in Hecate Strait on 25 May.

**MINKE WHALE, *Balaenoptera acutorostrata*.**

Singles were seen on 28 April 1984, on four dates in April and three in May 1985, on 17 May 1986, and on 29 May 1989.

**KILLER WHALE, *Orcinus orca*.**

Pods of up to 12, presumably transient, were seen from Reef Island on 8 May 1984, 30 April 1985 (8–10), 14 May 1986 (12), and 22 May (4) and 13 June 1989 (4).

**HARBOUR PORPOISE, *Phocoena phocoena*.**

A pod of about 10 was seen between South Low Island and Vertical Point on 8 May 1988.



PACIFIC WHITE-SIDED DOLPHIN *Lagenorhynchus obliquidens*.

Small numbers were seen in Low Island Sound on 1 and 8 May 1984, on 14 and 15 May and 3 June 1985, and on 22 May 1989.

DALL'S PORPOISE, *Phocoenoides dalli*.

Several were seen in Low Island Sound on 11 and 12 May, and two on 9 June 1985. Two were seen on 14 and 16 June 1987. In 1989, one was seen on 22 April, four on 22 May and at least four on 31 May.

HARBOUR SEAL, *Phoca vitulina*.

Regular haul-outs occur on Low Island, where up to 40 animals were seen, including small pups, and on the south coast of Reef Island, where up to 15 were recorded.

NORTHERN ELEPHANT SEAL, *Mirounga angustirostris*.

One male was seen on 13 April 1988. In 1989, a single male was recorded on 25 and 28 March, 1 and 23 April, and 3 and 4 May.

STELLER'S SEALION, *Eumetopias jubatus*.

A regular, year-round haul-out is situated on the Sealion Rocks, just to the south-east of Reef Island. It was never without animals, when visited. Counts were made on 11 June 1988 (200), and in 1989 on 29 March (455), 5 April (425), 17 April (445), 30 April (240), 1 May (150), 2 June (100), and 27 June (210). On 2 May 1989 there were 25 hauled out on the easternmost Skedans Island.

NORTHERN FUR SEAL, *Callorhinus ursinus*.

One seen moving north between Lost Islands and Reef Island on 30 May 1985.

## Discussion

Observations made at Reef Island considerably extend the information available on seabirds in Hecate Strait. The regularity with which we recorded Sooty Shearwaters and Black-legged Kittiwakes, and the large numbers involved, suggest that Hecate Strait is an important non-breeding area for both species. Black-legged Kittiwakes present after the end of April were nearly all in immature plumage. These birds presumably originated from the large colonies in Alaska (Sowls et al. 1978). Counts of Sooty Shearwaters suggest that in good years there were a minimum of several hundreds of thousands present in Hecate Strait, and sometimes many more. Vermeer and Rankin estimated over 4 million Sooty Shearwaters in Hecate Strait and Queen Charlotte Sound in May 1983, compared to only 145 000 in the same month of 1982, and only 15 000 in April 1984. Likewise they estimated 1600 Black-legged Kittiwakes in Hecate Strait in May 1982, 9500 in May 1983, but only 136 in April 1984. In the latter year, we saw none at all. The magnitude of the varia-

tion seen by Vermeer and Rankin accords with the year-to-year fluctuations seen at Reef Island.

Briggs and Chu (1986) noted that numbers of Sooty Shearwaters off California were lower in May 1983 than in earlier years, presumably as a result of the intense El Nino event of that year. They suggested that the large numbers recorded by Vermeer and Rankin could have been birds displaced from California. However, our observations suggested that large numbers of Sooty Shearwaters are a frequent feature of Hecate Strait, and are not necessarily dependent on events of the magnitude of the 1982-1983 El Nino.

The fact that many Sooty Shearwaters were moulting in May is consistent with observations by Brown (1988) off California. The same author found no moult among Sooty Shearwaters seen off Newfoundland at the same time of year. He suggested that most birds off Newfoundland were non-breeders which moulted before departing from the breeding grounds, whereas those moulting in the eastern Pacific were post-breeding adults. If this is true of birds seen in Hecate Strait in April, the migration from their breeding grounds must be very rapid, because the adults do not leave their australasian breeding grounds until early April (Lindsey 1986).

A striking feature of observations at Reef Island was the range of variation among years. This applied particularly to Sooty Shearwaters, Black-legged Kittiwakes, and Herring Gulls, all of which occurred in thousands in some years, and were either absent, or seen in only small numbers, in others. There seemed to be some correspondence between the numbers of various species seen, with the most variable species being very numerous in 1985, and 1989, and poorly represented in 1984 (Figure 4). The two years of highest numbers coincided with the presence of larger-than-usual numbers of baleen whales, with feeding flocks of Ancient Murrelets within sight of Reef Island, and with the sighting of large swarms of euphausiid crustacea. It seems likely that these events were connected, and that whales and seabirds were all attracted to the area by an above-average abundance of euphausiids. Sooty Shearwaters and Black-legged Kittiwakes were seen feeding heavily on euphausiid swarms in both years. In contrast, the numbers of Pacific Loons and Common Murres, presumably largely fish-eaters, seen feeding in the area, varied little from year to year, suggesting that these birds were less opportunistic in their foraging.

Although the run of years is still small, it is impossible not to be struck by the fact that, at least since 1983 (including the observations of Vermeer and Rankin (1984)), numbers of Sooty Shearwaters and Black-legged Kittiwakes in Hecate Strait appear to have been high and low in alternate years. In



1990, as in previous even years, numbers of both species were low in the Reef Island area, and kittiwakes were not recorded at all in March-June (Laskeek Bay Conservation Society *unpublished*). At present no oceanographic phenomenon has been found to account for such a two-year periodicity.

Because Reef Island is the only station in Hecate Strait where systematic observations have been made over several years, we have no way to know how representative our observations were of other areas around the South Moresby archipelago. However, several factors suggest that the area offshore from between Skedans Islands and Low Island is particularly attractive to feeding seabirds and marine mammals. Although we made our land-based observations in an arc from due east to a little north of west of Reef Island, the majority of feeding flocks of seabirds and sightings of large whales were either north or east of Low Island. Likewise, during boat trips into Hecate Strait, densities of feeding birds were usually higher north of Low Island than elsewhere. Moreover, although we made observations from the southeast coast of Reef Island on two or three dates in May each year, we never saw feeding concentrations of kittiwakes, gulls, or shearwaters in that area.

The trough of deep water which extends up the west side of Hecate Strait terminates just to the east of Low Island, with fairly abrupt narrowing and shallowing. Northward-flowing flood tides, meeting this rapid shallowing, may cause upwelling, bringing slow-swimming organisms, such as euphausiids, to the surface. Such an effect might account for the concentrations of surface, or near-surface feeders; shearwaters, kittiwakes and gulls, in that area. A concentration of surface feeding seabirds off Briar Island, Nova Scotia, created by a similar tidal upwelling mechanism, was described by Brown (1980).

The magnitude of inter-year variation in seabird numbers off Reef Island makes it difficult to generalize about their status in Hecate Strait. Presumably, in years when no large numbers of kittiwakes and shearwaters were recorded, these birds were uncommon in Hecate Strait. Even in good years, they were not always seen daily. The periodic occurrence of large numbers visible from Reef Island probably indicates that they were present continuously in Hecate Strait, but moved into and out of the waters adjacent to Reef Island in response to changes in weather conditions and local feeding opportunities. The presence of feeding flocks of passage migrants, such as phalaropes and Sabine's Gulls, in some years but not in others, likewise suggests that these species will feed in the area when conditions are good, but pass through without stopping when they are not. The unpredictability of seabird numbers, both within and between years, emphasizes the fact that we can-

not rely on surveys made over a short period, or in only a single year, to provide an adequate basis from which to assess the impact of potential developments. This needs to be kept in mind in any future consideration of our information base for assessing the effects of offshore oil developments in Hecate Strait.

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### Literature Cited

- Briggs, K. T., and E. W. Chu.** 1986. Sooty Shearwaters off California: abundance and habitat use. *Condor* 88: 355-364.
- Brown, R. G. B.** 1980. Seabirds as marine animals. Pages 1-39 in *Behaviour of marine animals. Volume 4: marine birds. Edited by J. Burger, B. L. Olla and H. E. Winn.* Plenum Press, New York.
- Brown, R. G. B.** 1988. The wing-moult of fulmars and shearwaters (Procellariidae) in Canadian Atlantic waters. *Canadian Field-Naturalist* 102: 203-208.
- Campbell, R. W., N. Dawe, I. McTaggart-Cowan, J. M. Cooper, G. W. Kaiser, and M. C. E. McNall.** 1990. *The birds of British Columbia.* Canadian Wildlife Service and Royal British Columbia Museum, Victoria, B.C.
- Duncan, D., and A. J. Gaston.** 1990. Movements of Ancient Murrelet broods at sea, after leaving their breeding colony. *Studies in Avian Biology* 14: 109-113.
- Gaston, A. J., I. L. Jones, and D. G. Noble.** 1988. Methods for monitoring Ancient Murrelets breeding populations. *Colonial Waterbirds* 11: 58-68.
- Jones, I. L., A. J. Gaston, and J. B. Falls.** 1990. Factors affecting colony attendance by Ancient Murrelets (*Synthliboramphus antiquus*). *Canadian Journal of Zoology* 68: 433-441.
- Lindsey, T. R.** 1986. *The seabirds of Australia.* Angus and Robertson, London, U.K.
- Rodway, M. S., M. J. F. Lemon, and G. W. Kaiser.** 1988. British Columbia seabird colony inventory: report #1 - East coast Moresby Island. Technical Report Series Number 50. Canadian Wildlife Service, Pacific and Yukon Region, British Columbia.
- Rodway, M. S.** 1990. Status and conservation of breeding seabirds in British Columbia. Pages 43-102 in *Supplement to the Status and Conservation of the World's Seabirds. Edited by J. P. Croxall.* International Council for Bird Preservation Technical Report Number 11.
- Savard, J-P.** 1979. Marine birds of Dixon Entrance, Hecate Strait and Chatham Sound, B.C. during fall 1977 and winter 1978. Canadian Wildlife Service Ms. Report, Delta, B.C.



- Sowls, A. L., S. A. Hatch, and C. J. Lensink.** 1978. Catalogue of Alaskan seabird colonies. U.S. Fish and Wildlife Service, Anchorage.
- Thomson, R. E.** 1981. Oceanography of the British Columbia coast. Canadian Special Publication of Fisheries and Aquatic Sciences Number 56.
- Vermeer, K., and L. Rankin.** 1984. Pelagic seabird populations in Hecate Strait and Queen Charlotte Sound: comparison with the west coast of the Queen Charlotte Islands. Canadian Technical Report of Hydrography and Ocean Sciences Number 52. 40 pages.
- Vermeer, K., I. Robertson, R. W. Campbell, G. W. Kaiser, and M. Lemon.** 1983. Distribution and densities of marine birds on the Canadian West coast. Canadian Wildlife Service, Delta, British Columbia.

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