POPULATION STATUS OF THE COMMON MURRE *URIA AALGE* IN BRITISH COLUMBIA, CANADA

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The Common Murre *Uria aalge* is one of the most abundant breeding seabirds in the northern hemisphere (Ainley *et al.* 2002). The species has a rather disjointed breeding distribution along the Pacific coast of North America: hundreds of thousands of individuals breed on colonies in Oregon and northern and central California, and more than a million breed on colonies from the Gulf of Alaska to the north and west, but fewer than 40 000 individuals breed on colonies from Washington State north to southeast Alaska (Ainley *et al.* 2002). That latter stretch includes the entire coast of British Columbia, Canada, which supports fewer than 10 000 breeding birds (Campbell *et al.* 1990).

The Common Murre is the most frequent victim of bycatch in commercial net fisheries operating along the British Columbia coast (J. Smith & K. Morgan, unpubl. data). It is also the species most frequently found oiled on beached bird surveys in the province (Burger 2002). Most of the Common Murres killed as a result of bycatch and oiling in waters off southern British Columbia are thought to originate from breeding colonies to the south, although birds from more northerly areas could also be involved (Carter *et al.* 2001). In response to concerns about the potential population-level impacts of this mortality, and because of a lack of current information on the status of Common Murres in British Columbia, I surveyed all historically documented breeding colonies in the province during the 2003 and 2004 breeding seasons.

Based on Campbell *et al.* (1990) and Carter *et al.* (2001), Common Murres have been known to breed at six sites in British Columbia (Fig. 1):

- The Kerouard Islands in the Haida Gwaii archipelago
- Triangle Island (including Puffin Rock, Castle Rock and Murre Rock) and Sartine Island in the Scott Island chain
- Cleland Island (including Murre Reef), Florencia Island and Starlight Reef, along the west coast of Vancouver Island.

All six sites were surveyed in either 2003 or 2004, using methods outlined below.

The Kerouard Islands were surveyed between 11h00 and 11h30 on 24 June 2004 from the water below the colony. Using a 3.1-megapixel digital camera, I took photographs of all breeding areas. A subsequent inspection on foot confirmed that coverage was complete. Later, each image was enlarged to a suitable size, and individual murres were counted using ArcView GIS software.
Triangle Island (including Puffin and Murre rocks) was surveyed between 18h00 and 20h00 on 28 July 2003 by taking 3.1-megapixel digital images of all breeding areas from the water below the colony. The protocol followed that used by Rodway (1990) on the most recent survey, in 1989, although he used black-and-white print film. Again, birds were counted from suitably enlarged images using ArcView software. Castle Rock, which lies about 0.8 km east of Triangle Island, was observed regularly both from helicopters transporting field crews to and from the research station on Triangle, and also periodically from the top of Puffin Rock using a 20–60× spotting scope.

Sartine Island was surveyed from a helicopter returning from Triangle Island on the morning of 9 July 2004. Cleland Island, including Murre Reef (on 1 June and 6 July 2004), plus Florencia Island (on 30 June 2004) and Starlight Reef (on 30 June 2004), were surveyed first by boat from the ocean, then by two people walking across the islands in tandem and counting all Common Murres seen.

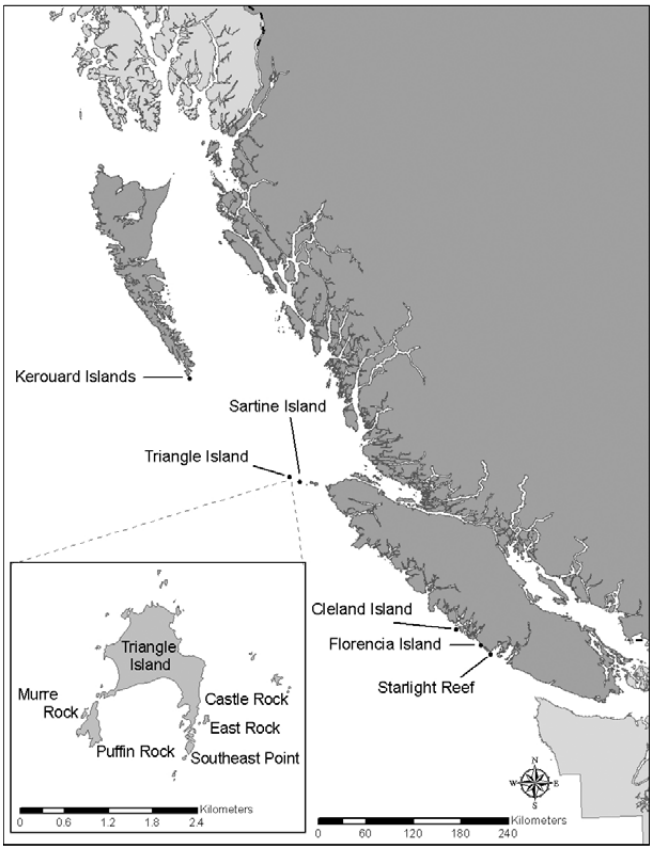

Fig. 1. Map of the coast of British Columbia (darkened area) showing the locations of all historically documented Common Murre *Uria aalge* breeding colonies.

In 2003 and 2004, Common Murres bred at only two sites in British Columbia (Table 1): Puffin Rock, part of the Triangle Island complex (about 4300 birds), and the Kerouard Islands (about 400 birds). Although none bred in 2004, Common Murres were seen on the ocean near Starlight Reef and Cleland Island, and several flew over Cleland Island on 6 July (P. Clarkson, pers. comm.). Only very small numbers are ever known to have bred at any of those sites (Carter 2004), although large numbers occur off the west coast of Vancouver Island throughout most of the year (Campbell *et al.* 1990).

The small Common Murre colony at the Kerouard Islands has been known since at least 1977, although murres apparently do not breed there every year (Carter *et al.* 2001). The 2004 count of 377 murres was similar to the highest previous count of 400 murres in 1987 (Campbell *et al.* 1990). Based on visual inspection of the condition of the eggs measured (none appeared to be older than about one week of age), I estimate that the survey fell near the middle of the egg-laying period in 2004.

The Common Murre colony at Triangle Island, British Columbia's largest, was last surveyed in 1989 (Rodway 1990). A comparison with Rodway's results for 17 August 1989, the best match in terms of breeding phenology to the 2003 date (both fell just before the start of chick departures), reveals two things. First, there were about 27% fewer murres overall on the colony in 2003 than in 1989 (the result is similar using any of the five complete 1989 counts, which ranged from 5846 to 6144 birds; see Rodway 1990); and second, Common Murres redistributed themselves around Triangle Island in the intervening years (Table 1). Although no murres were present at Southeast Point, Castle Rock or Sartine Island, and only 30 were congregated, but not breeding, at the base of Murre Rock, I found almost 1000 more murres on Puffin Rock in 2003. Thus, murres have abandoned several subcolonies around Triangle and congregated in larger numbers on the main colony. In fact, since 1989, murres have colonized two new areas on Puffin Rock, at which 378 birds were counted in 2003.

Notably, Triangle Island also supports small numbers (<25 pairs) of Thick-billed Murres *Uria lomvia*, the Arctic congener of the Common Murre (Vallée & Cannings 1983). These birds would have been included in the total count, but on periodic inspections in 2003, I saw none at their usual breeding sites. The fact that 2003 was a mild El Niño year might or might not be a coincidence.

The 2003 survey results pose two questions. First, has the Common Murre population at Triangle Island actually declined since 1989? And second, why have Common Murres redistributed around Triangle in recent years?

It can be difficult to interpret single, unreplicated counts at murre colonies because attendance can vary dramatically within days, within seasons and among seasons (Hatch & Hatch 1989). As in 1989, the 2003 survey was conducted during the daily evening peak in attendance at Triangle (Rodway 1990), and during the seasonal period of low variability before the start of fledging (Hatch & Hatch 1989). It was also conducted on a day of calm weather, in a year in which numbers of Common Murres breeding on small monitoring plots were normal, and breeding was successful (76% of pairs raised offspring that departed the colony, and chicks grew quickly; Triangle Island Research Station, unpubl. data). Thus, there is no reason to believe that the low counts in 2003 were due merely to survey timing. If the counts are real, neither the timing nor the cause of the decline around Triangle is known. However, Common Murre populations declined in neighbouring Washington State between 1979 and 1995, and both natural factors (predation and harassment by Bald Eagles *Haliaeetus leucocephalus*, El Niño events) and anthropogenic factors (oiling, bycatch) have been implicated (Carter *et al.* 2001, Parrish *et al.* 2001).

Why have Common Murres redistributed around Triangle Island in recent years?

Murres experienced total or near-total breeding failure on Castle Rock in 1984 and 1989 (Rodway 1990), and on Murre Rock in 1995 (Parrish 1996). Parrish believed that Bald Eagles caused the failure, because they depredated some adult murres and caused others to abandon their eggs, which were then taken by Glaucous-winged Gulls *Larus glaucescens*. Bald Eagle populations have increased across North America in recent years (Buehler 2000). At Triangle Island, the number of nesting pairs increased from three in 1989 (Rodway *et al.* 1990) to five in 2003 (Triangle Island Research Station, unpubl. data). Elsewhere, Common Murres

TABLE 1
Results of 2003 and 2004 surveys of total numbers of Common Murres *Uria aalge* at sites in British Columbia at which they have historically bred

Colony		Survey date	Birds (n)	Previous estimate (year) [a]
Kerouard Islands		24 Jun 2004	377	400 (1987)
Triangle I.	Total	2003, 2004	4327	5937 (1989)
	Southeast Pt	18 Jul 2003	0	568
	Puffin Rock	18 Jul 2003	4297	3370
	Murre Rock	18 Jul 2003	30	987
	Castle Rock	2003, 2004	0	1012
Sartine Island		9 Jul 2004	0	600 (1975)
Cleland Island		6 Jul 2004	0	8 pairs (1975)
Florencia Island		30 Jun 2004	0	1 pair (1969)
Starlight Reef		30 Jun 2004	0	2 pairs (1980)
Total			4704	

[a] Estimates (total birds, unless stated otherwise) for Kerouard Islands from Campbell *et al.* (1990); for Triangle Island from Rodway (1990), using observations on 17 August (best match of breeding chronology to survey date in 2003). All others from sources summarized in Campbell *et al.* (1990) and Carter *et al.* (2001).

faced with persistent pressure from eagles have abandoned small subcolonies (Parrish *et al.* 2001), so that increasing pressure from an expanding Bald Eagle population seems a likely explanation for the abandonment of subcolonies around Triangle Island.

Peregrine Falcon *Falco peregrinus* populations have also increased across North America in recent years (White *et al.* 2002). There was only one active falcon eyrie on Puffin Rock in 1989 (Rodway *et al.* 1990), but two in 2003 (Triangle Island Research Station, unpubl. data), the second site within five metres of the main murre colony. Unlike eagles, Peregrine Falcons do not normally kill murres, which are too large to be taken easily, but they do very actively exclude Bald Eagles from the vicinity of their eyries. Eagles were not seen flying over Puffin Rock in either 2003 or 2004. Thus, many Common Murres may have shifted from smaller, local sites to Puffin Rock so as to benefit from an umbrella of security provided by breeding falcons.

To summarize, Common Murres bred at only two of six historically documented colonies in British Columbia, Canada, in 2003 and 2004. Numbers at Triangle Island, the larger of the two active colonies, were about 27% lower in 2003 than in 1989. The lower number may reflect a true population decline, but if so, one of unknown cause and timing. In addition, the distribution of breeding birds around Triangle changed between 1989 and 2003: a number of small satellite colonies were abandoned, but more birds bred on the main colony. That redistribution may reflect changes in the raptor population and behavioural dynamics.

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Common Murre delivering Pacific sandlance to its chick, Triangle Island, July 2003. (photo, Mark Hipfner)