

Exxon Valdez Oil Spill
Restoration Project Final Report

Status of Seabird Colonies in Northeast Prince William Sound

Restoration Project 99381
Final Report

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November 1999

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Study History: Restoration Project 99381 began and was completed in 1999. Field work occurred in June 1999. This is the final report on activities conducted by this project.

Abstract: We located and surveyed 7 active seabird colonies in northeast Prince William Sound (Port Gravina to Nelson Bay), including 3 colonies not previously reported. Additionally at 2 historic colonies, Redhead and Hanks Island, we were not able to confirm nesting but did observe small numbers of pigeon guillemot (*Cepphus columba*) and mew gull (*Larus canus*), respectively. Within colonies, we recorded nests for 4 species: Aleutian tern (*Sterna aleutica*), Arctic tern (*S. paradisaea*), black-legged kittiwake (*Rissa tridactyla*), and black oystercatcher (*Haimatopus bachmani*). The highest number of nests for any species at a colony was 16 Arctic tern nests. Breeding numbers in 1999 may be low for all seabirds due to an unusually harsh and late winter. Shoreline surveys for black oystercatcher located 66 birds, and breeding pair densities were estimated at 0.11 pair/km for the study area. Areas around northeast Prince William Sound were recently purchased by the Trustee Council to aid in the restoration of injured species. The conversion of these acquired parcels from private land to public land, increased wildlife and fishing tours generated by cruise ship stopovers in Cordova and greater access to Prince William Sound due to the construction of the road from Portage to Whittier will increase human/wildlife interactions. Because of its high potential for human disturbance, we recommend the Chugach National Forest consider options to minimize human interactions during the nesting season at Hells Hole in Port Gravina. Seabird colonies should also be revisited every 5 years to provide data on possible colony shifts and increases in human/seabird colony interactions.

Key Words: seabird colony, black oystercatcher, Arctic tern, Aleutian tern, pigeon guillemot, Prince William Sound.

Project Data: *Description of data*—Seabird colony data and black oystercatcher abundance data were collected by the author during June 1999 boat surveys. *Format*—The data were entered on Excel spreadsheets. *Custodian*—Mary Anne Bishop, Prince William Sound Science Center, PO Box 705, Cordova, Alaska 99574, (work phone: (907) 424-5800, fax: (907) 424-5820). *Availability*—Copies of the data can be provided on diskette.

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EXECUTIVE SUMMARY

Seabird colony activity and distribution was studied in northeast Prince William Sound during June 1999. This project was designed to update colony information collected 6-27 years ago and to assess each colony's vulnerability to human disturbance. Our findings will provide a management tool for the U.S.D.A. Forest Service and the U.S. Fish and Wildlife Service (USFWS) whereby they can best protect these colonies while human activities increase exponentially in Prince William Sound. The objectives of this study are to:

- 1) Determine the status, species composition, and population of known seabird colonies in northeast Prince William Sound.
- 2) Systematically survey northeast Prince William Sound shoreline, islands, and offshore rocks for undocumented seabird colonies.

In addition, the project aimed to incorporate a local high school student and other community members in data collection. We successfully recruited R. Masolini, an accomplished birder and 10th grader at Cordova High School to assist with all surveys.

Seabird colony surveys occurred between 3-16 June 1999 in northeast Prince William Sound. We confirmed 7 active seabird colonies including 3 colonies not previously reported. Additionally, we observed small numbers of seabirds in and around 2 historic colonies (Redhead and Hanks Island), but were unable to confirm if birds were nesting. Of the 9 suspected and confirmed colonies, 7 were offshore. Among the bays, Port Gravina had the highest number of colonies including 5 confirmed and 1 suspected colony. We found no evidence of any colony at the north end of Sheep Bay where an Arctic tern (*Sterna paradisaea*) colony was active in 1972.

Within colonies, we recorded nests for 4 species: Aleutian tern (*Sterna aleutica*), Arctic tern, black-legged kittiwake (*Rissa tridactyla*), and black oystercatcher (*Haimatopus bachmani*). Suspected nesting was recorded for pigeon guillemot (*Cephus columba*) and mew gull (*Larus canus*). Within colonies, the maximum number of nesting species observed was 2. Colonies tended to be small: the highest number of nests for any species at a colony was 16 Arctic tern nests. Overall, nest numbers may be low for all seabirds due to an unusually harsh and late winter.

Black oystercatcher, a shorebird that frequently nests in seabird colonies, were observed at 5 of the 7 active seabird colonies, and at 1 of the 2 suspected colonies. In all, 66 black oystercatchers were observed at 26 locations throughout the study area. Assuming all observed pairs were breeders, breeding pair densities in northeast Prince William Sound (0.11 pair/km) are much lower than those at Green and Montague Islands (0.63 pairs/km) but similar to densities at Knight Island (0.08 pair/km; Andres 1998).

Of the 9 colonies, 3 have high potential for human disturbance: Simpson Bay colony, and Gravina Rocks and Hells Hole in Port Gravina. The Simpson Bay colony is a small tree-covered island suitable for kayakers to camp on. Gravina Rocks is situated near an anchorage commonly used by fish tenders (Lethcoe and Lethcoe 1985). Hells Hole has the highest likelihood of human disturbance because of its high recreational value and potential for future development.

We recommend that Chugach National Forest consider options to minimize human interactions at Hells Hole from mid-May through the end of July when chicks have fledged. We also recommend that every 5 years the colonies be revisited. This would provide ongoing data on possible colonies shifts and any increases in human/seabird colony interactions.

INTRODUCTION

The recent purchase of fee simple lands and conservation easements in northeast Prince William Sound (PWS) by the *Exxon Valdez* Oil Spill (EVOS) Trustee Council are considered among the most valuable lands in the Sound for the recovery of species injured by the *Exxon Valdez* Oil Spill (EVOS 1997). However, the conversion from private lands to public lands also increases recreational opportunities and public access. It is important to understand where wildlife is at risk of disturbance to make sound management decisions.

In northeast PWS there have been no systematic surveys for seabird colonies, and existing documentation is inadequate or outdated. Prior to this study there were 7 known seabird colonies from Port Gravina to Simpson Bay (U.S. Fish and Wildlife Service 1998a), and an eighth suspected pigeon guillemot colony in Nelson Bay (northern Orca Inlet; Sanger and Cody 1994). At least four of these colonies supported two species injured by the *Exxon Valdez* Oil Spill (black oystercatcher, *Haimatopus bachmani*, and pigeon guillemot, *Cepphus columba*), but only two of these colonies were surveyed since the 1989 *Exxon Valdez* oil spill. The other five were surveyed either 14 or 27 years ago (U.S. Fish and Wildlife Service 1998a).

Precise information on seabird colonies is extremely important for the conservation of seabirds (U.S. Fish and Wildlife Service 1998b). For many seabird species, colonies may change size and location from year to year in response to food availability and food quality (Hawksley 1957; Irons et al. 1998). Seabird colonies can also be negatively affected by human disturbance (Gillet et. al 1975, Ellison and Cleary 1978, Anderson and Keith 1980).

With colony information now 6-27 years old, this study was undertaken during June 1999 to investigate the current status of seabird colonies in northeast PWS. Our objectives were to: a) determine the status, species composition, and population of known seabird colonies in northeast PWS; and, b) systematically survey northeast PWS shoreline, islands, and offshore rocks for undocumented seabird colonies. In addition, the project aimed to incorporate a local high school student and other community members in data collection.

STUDY AREA AND METHODS

We surveyed the shoreline, islands and offshore rocks in northeast Prince William Sound. This area includes Port Gravina (and all adjoining bays), Sheep Bay, Simpson Bay, the Narrows (Channel Islands), and Nelson Bay (northern Orca Inlet). This area coincides with lands recently purchased from Tatitlek and Eyak Corporations by the *Exxon Valdez* Oil Spill Trustee Council.

Surveys were conducted 3-16 June 1999. This time period corresponds with breeding activity for most species of seabirds and is the recommended time to survey for pigeon guillemot (Sanger and Cody 1994). We surveyed all shoreline, islands, and offshore rocks for seabirds and black oystercatchers. Travelling at approximately 5 knots, we used a 8.5 m cabin cruiser and a 3m inflatable raft (for shallow areas) to survey Port Gravina and Sheep Bay. For Simpson Bay, the Narrows, and Nelson Bay we used a 5.2-m skiff.

We defined a colony as a group of 2 or more nests. We recorded colonies and all black oystercatcher locations on 1:64,000 aerial photographs. GPS coordinates were also noted for each colony. We determined the number of birds present using protocols developed by U.S. Fish and Wildlife Service for the Alaska Seabird Colony Database (U.S. Fish and Wildlife Service 1998c). Depending on species, counts were conducted from the boat offshore or from land by walking within the colony (U.S. Fish and Wildlife Service 1998c). Counts at historic or suspected pigeon guillemot colonies were conducted around high tide (Sanger and Cody 1994). We attempted to count entire colonies, recording for each species the number of individual birds (or pairs) and the number of nests and clutch size. We also recorded signs of predators. Habitat information collected include area (length and width), substrate, vegetation type, height of cliff, and aspect, and means to access (U.S. Fish and Wildlife Service 1998c).

For all surveys, the primary observers included the principal investigator, M. Bishop, and R. Masolini, a 10th grade student from Cordova High School. Additionally, personnel from the Cordova Ranger District and the Prince William Sound Science Center assisted on several occasions.

RESULTS AND DISCUSSION

Number, Distribution, and Composition of Colonies

We confirmed 7 active seabird colonies including 3 colonies not previously reported. Additionally, we observed small numbers of seabirds in and around 2 historic colonies (Redhead and Hanks Island), but were unable to confirm if birds were nesting. Of the 9 suspected and confirmed colonies, 7 are offshore. All colonies were accessed by skiff and surveyed on foot except for Redhead. Offshore colonies occurred primarily on islets with little vegetation, and usually were no more than 40 m long, 15-20 m wide, and 10 m high. Two exceptions were Simpson Bay and the suspected Hanks Island colonies, located on islands dominated by conifers.

Among the bays, Port Gravina had the highest number of colonies including 5 confirmed and 1 suspected colony (Fig. 1, Tables 1, 2). We found no evidence of any colony at the north end of Sheep Bay where an Arctic tern (*Sterna paradisaea*) colony was observed in 1972. On a small island in south-central Simpson Bay we found 2 broken eggshells from 1 or 2 tern nests. This island is close (<1.2 km) from the Simpson Bay colony and may serve be an active colony in some years.

Historic surveys in our study area estimated breeding species composition within colonies based on behavior and numbers of adult birds. In some instances past surveys occurred in August after chicks had potentially fledged. During our June 1999 colony surveys we located nests of 4 species: Aleutian tern (*Sterna aleutica*), Arctic tern, black-legged kittiwake (*Rissa tridactyla*), and black oystercatcher. Suspected nesting was recorded for pigeon guillemot and mew gull (*Larus canus*). Within colonies, the maximum number of nesting species observed was 2 (Tables 1, 2).

Colonies tended to be small: the highest number of nests for any species at a colony was 16 Arctic tern nests (Table 2). Overall, the number of nests may be low compared with other

years. The 1999 breeding season was characterized by an unusually late spring and lower numbers of seabirds nesting in other parts of PWS (S. Stephenson USFWS and D. Irons, USFWS pers. comm.).

Species composition had changed at 3 historic colonies. During an August 1972 survey at Hells Hole, mew gulls and glaucous-winged gulls (*Larus glaucescens*) were recorded as breeders. While we observed both species roosting around Hells Hole, we found no evidence of either species nesting. We did observe Aleutian tern at Hells Hole, a species previously not recorded at that site. At Gravina Rocks, black-legged kittiwake no longer nested (see below) and no black oystercatchers were observed in the immediate vicinity. At Hanks Island, pigeon guillemots were recorded during a 1985 survey, but not in 1993 or during our 1999 survey. Mew gulls had not previously been recorded at Hanks Island although we observed 2 territorial pairs in trees that we believe were nesting.

Species Occurrence

Aleutian Tern. An uncommon local breeder east on the Copper and Bering River Deltas the Aleutian tern is rare in eastern Prince William Sound (Isleib and Kessel 1989). We observed Aleutian terns only at Hells Hole (estimated 40 birds), and found them nesting in small numbers with Arctic terns (9 nests for both species combined; Table 2). This is the first record for their breeding in Prince William Sound (S. Stephenson, USFWS, pers. comm.).

Arctic Tern. Arctic tern is an abundant breeder in the North Gulf Coast-Prince William Sound region (Isleib and Kessel 1989) and was the most prolific breeding seabird during our surveys of northeast Prince William Sound. Arctic terns nested at all 7 confirmed seabird colonies. The number of nests ranged from 1-16 nests/colony and the number of birds 2-65 birds/colony (Table 2). We may have surveyed colonies early for Arctic tern nests. Of the 54 tern nests we located, 59% contained 1 egg, and 37% contained 2 eggs.

Black-legged Kittiwake. Although the black-legged kittiwake is the most numerous gull in North Gulf Coast-Prince William Sound region (Isleib and Kessel 1989), historically, few kittiwakes nested in northeast Prince William Sound. A small colony of up to 56 pairs of black-legged kittiwakes nested at the Gravina Rocks colony through 1996 (D. Irons, USFWS, pers. comm.). During our surveys, we located nesting kittiwakes only at the Sheep Point Colony (Table 2). Although this colony is not yet listed in the Alaska Seabird Colony Catalog, nesting was first observed in 1989 (D. Irons, USFWS, pers. comm.). We surveyed this colony on 12 June 1999 and located 7 empty kittiwake nests. Irons surveyed this colony for kittiwakes 4 days later and located 9 empty kittiwake nests.

The small number of nesting kittiwakes in the study area is likely due to the lack of nesting habitat. Kittiwakes prefer coastal bluffs, steep islands and sea stacks where they typically build their nests into the rock faces. Colonies also shift in response to food availability. Irons et al. (1998) found substantial changes in black-legged kittiwake colonies over time in Prince William Sound, probably due to changes in forage fish composition and abundance.

Mew Gull. Mew gull breeds throughout Prince William Sound and the Copper River Delta as scattered pairs and loose aggregations on marshes, beaches, barrier islands, and in coniferous forest (Isleib and Kessel 1989; Fairall and Bishop 1994). We believe that 2 pair of mew gulls were nesting at Hanks Island (an unconfirmed colony) but this was the only colony where pairs were observed. We also observed 1 isolated mew gull nest with 2 eggs on a small island in northwest Simpson Bay.

Pigeon Guillemot. We recorded 8 pigeon guillemots at 6 locations during surveys. We believe that only 2 sightings were at or near a breeding site. Previously, pigeon guillemot nesting in northeast Prince William Sound was recorded only at Redhead, a colony located at the mouth of Port Gravina. There 9 guillemots were observed in the immediate area during a 1993 survey (Sanger and Cody 1994). We surveyed the area around Redhead twice around the high tide. We observed 2 pigeon guillemots in the vicinity on one of those occasions, indicating that nesting probably is still occurring at that site. Our other potential nest site was recorded just outside Alice Cove on 12 June and was based on the site tenacity of a swimming bird and the adjacent habitat.

Sanger and Cody had located a suspected breeding colony on the west side of Nelson Bay during 1993 surveys. We surveyed this area twice but observed no pigeon guillemots in the vicinity. Our results for Nelson Bay are consistent with what Bishop et al. (1997) observed during 1996 surveys of eastern Nelson Bay. Although they observed guillemots on 11 of 13 surveys from early February through early June, none were observed on any surveys between mid-June through September, indicating that guillemots probably were not nesting nearby.

Black Oystercatcher. This was the first complete shoreline survey for black oystercatcher in northeast Prince William Sound. A total of 66 black oystercatcher were observed at 26 locations. Birds occurred at 5 of the 7 active seabird colonies, and at 1 of the 2 suspected colonies (Fig. 2). Most seabird colonies hosted 1 pair, although at Hells Hole (Port Gravina) we observed 11 birds, including 4 pairs (Table 2). Among all areas surveyed, highest densities occurred at Port Gravina (0.57 bird/km, $n = 28$), and lowest at Nelson Bay (0.12 bird/km, $n = 2$; Table 3). We may have underestimated densities at Nelson Bay. During 1996 shoreline surveys of eastern Nelson Bay, Bishop et al. (1997) observed 3 pairs whereas we observed only 2 single birds for the whole Bay: at Humpback Creek and on a nest at North Island, in the center of Nelson Bay.

Assuming all observed pairs were breeders, breeding pair densities in northeast Prince William Sound (0.11 pair/km) are much lower than those at Green and Montague Islands (0.63 pairs/km) but similar to densities at Knight Island (0.08 pair/km; Andres 1998). Andres (op. cit.) attributed Green and Montague Islands' high density to shorelines dominated by low-sloping gravel or rocky shorelines where intertidal prey are abundant. Shorelines in the northeast Prince William Sound study area are similar to Knight Island in that they are dominated by steep, rocky shorelines. We observed oystercatchers on the mainland shoreline only 8 times (24% of all observations). Those observations occurred primarily at cobble and gravel beaches or on small reefs jutting out from the mainland. The remaining oystercatchers were observed on islands, huge boulders and very small islands, or intertidal rocks.

Threats to Seabird Colonies

Increases in human activity in PWS are expected in the future. The Alaska Department of Transportation (ADOT) has estimated that human activity in PWS will increase 600% by 2015 (ADOT 1995), much of it due to the opening of the Portage to Whittier Road. Northeast PWS is an increasingly popular destination for guided sport fishing as well as recreational boaters. The recent conversion of Eyak and Tatitlek Corporation lands from private to public lands will stimulate further recreational opportunities and broaden public access in this area. At the same time, wildlife and fishing tours for cruise ship passengers visiting Cordova, will create additional use of these lands and their adjacent waters.

Seabird colonies are often susceptible to human disturbance (Gillet et. al 1975, Ellison and Cleary 1978, Anderson and Keith 1980). Of the 9 colonies, 3 have high potential for human disturbance: Simpson Bay colony, and Gravina Rocks and Hells Hole in Port Gravina. The Simpson Bay colony is a small tree-covered island suitable for kayakers to camp on. Gravina Rocks is situated near an anchorage commonly used by fish tenders (Lethcoe and Lethcoe 1985).

Of the 3 sites, Hells Hole has the highest likelihood of human disturbance. Hells Hole includes a flat, grassy spit with a low-sloping cobble beach suitable for landing kayaks or small rafts and for tent camping. This area is also a popular sport fishing area, and hosts some of the first silver salmon runs in the area (M. Schelske, U.S. Forest Service, pers. comm.). Nearby, Tatitlek Corporation has future plans to build a fishing lodge (C. Baker, U.S. Forest Service, pers. comm.). Hells Hole has high numbers of black oystercatchers (≥ 11 birds), and is the only colony in Prince William Sound where Aleutian terns nest. Along with Arctic terns that also nest there, these species' nests and chicks are sensitive to human disturbance. All 3 species have been known to abandon colonies in response to disturbance and/or habitat degradation (Hawksley 1957, Andres and Falxa 1995, North 1997).

Management Recommendations

1. Given the vulnerability of the Hells Hole seabird colony to human disturbance, we recommend that Chugach National Forest consider options to minimize human interactions at Hells Hole from mid-May through the end of July when chicks have fledged.
2. Prior to our surveys, it had been 6-27 years since colonies had been surveyed. We recommend that every 5 years the colonies be revisited. This would provide ongoing data on possible colonies shifts and any increases in human/seabird colony interactions.

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The findings and conclusions presented by the author are her own and do not necessarily reflect the views or position of the Trustee Council.

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Table 1. Status of seabird colonies in northeast Prince William Sound, June 1999. Nesting species, ARTE = Arctic tern, ALTE = Aleutian tern, BLKI = black-legged kittiwake, BLOY = black oystercatcher, MEGU = mew gull, PIGU = pigeon guillemot.

Colony name	Bay	FWS No.	Previous Survey	Status 6/99	Nesting Species 6/99
<u>Historic Colonies</u>					
Gravina Rocks	Gravina	15	6/84	Active	ARTE
Hells Hole	Gravina	17	8/72	Active	ARTE, ALTE, BLOY
Olsen Bay	Gravina	34	1985	Active	ARTE, BLOY
Olsen Bay	Gravina	35	1985	Active	ARTE, BLOY
Redhead	Gravina	45	6/93	Uncertain	Possible PIGU
NE Sheep	Sheep	16	8/72	Not Active	
Hanks Island	Simpson	36	6/93	Uncertain	Possible MEGU
Nelson Bay	Nelson	07003	6/93	Not Active	
<u>New Colonies</u>					
Parshas Bay	Gravina			Active	ARTE, BLOY
Sheep Point	Sheep		1989 ^a	Active	ARTE, BLKI
Simpson Bay	Simpson			Active	ARTE

^aColony first observed in 1989 (D. Irons, USFWS, pers. comm.), no historic information available.

Table 2. Species abundance and status at seabird colonies in northeast Prince William Sound, June 1999.

Hells Hole, Port Gravina, 60° 42.10' N, 146° 22.89' W

Survey dates: 6/3, 6/5 and 6/6/99

Species	No. Birds	Nests	Comments
Aleutian Tern	40	9 both tern species	All with 1 egg
Arctic Tern	20		
Black Oystercatcher	11-13	2, 1 suspected	1 w 2 egg
Glaucous-winged Gull	25		Roosting birds only
Mew Gull	5		Roosting birds only

Unnamed Islet near mouth Olsen Bay, Port Gravina, 60° 42.25' N, 146° 10.47' W

Survey date: 6/5/99

Species	No. Birds	Nests	Comments
Arctic Tern	40	11	6 w 1 egg, 4 w 2 eggs, 1 w none
Black Oystercatcher	2	1	3 egg clutch

Unnamed Islet, near mouth Olsen Bay, Port Gravina, 60° 43.21' N, 146° 10.48' W

Survey date: 6/5/99

Species	No. Birds	Nests	Comments
Arctic Tern	25	16	6 w 1 egg. 9 w 2 eggs, 1 w 3 eggs
Black Oystercatcher	2	Possible 1	Suspected nest

Unamed Boulder, mouth Parshas Bay, Port Gravina, 60° 43.67' N, 146° 08.28' W

Survey date: 6/6/99

Species	No. Birds	Nests	Comments
Arctic Tern	2	Possible 1	Suspected nest
Black Oystercatcher	2	Possible 1	Suspected nest

Gravina Rocks, Port Gravina, 60° 39.86' N, 146° 15.64' W

Survey date: 6/6/99

Species	No. Birds	Nests	Comments
Arctic Tern	25	8	5 w 1 egg, 3 w 2 egg
Black-legged Kittiwake	5		Roosting birds
Glaucous-winged Gull	3		Roosting birds

Redhead, Port Gravina, 60° 40.16' N, 146° 29.76' W
Survey date: 6/6/99

Species	No. Birds	Nests	Comments
Pigeon Guillemot	2	?	Suspected nest(s)

Sheep Point, se Sheep Bay, 60° 37.5' N, 146° 01.0' W
Survey date: 6/12/99

Species	No. Birds	Nests	Comments
Arctic Tern	3	1	1 w 2 eggs
Black-legged Kittiwake	25	7	No eggs in nests
Pelagic Cormorant	6		Roosting birds
Black Oystercatchers	4		Nearby roosting

Hanks Island, sw of Simpson Bay, 60° 36.79' N, 145° 58.61' W
Survey Date: 6/12/99

Species	No. Birds	Nests	Comments
Black Oystercatcher	2	?	Flew in
Mew Gull	4	2?	Suspected nests

Simpson Bay, northwest arm Simpson Bay, 60° 38.14' N, 145° 53.81' W
Survey date: 6/11/99

Species	No. Birds	Nests	Comments
Arctic Tern	65	9	6 w 1 egg, 3 w 2 eggs

Table 3. Number and density of black oystercatcher by bays and breeding status. Northeast Prince William Sound, June 1999.

Bay	km/ shoreline	Birds/km	Total Birds	With Colony		Not with Colony		
				Pairs	Non- breeders	Pairs	Non- breeders	Singles
Port Gravina	49.1	0.57	28	7	3	4	3	
St. Matthews Bay	15.3	0		-	-	-	-	-
Olsen Bay	12.1	0.17	2	-	-	1	-	-
Parshas Bay	5.2	0		-	-	-	-	-
Beartrap Bay	9.7	0		-	-	-	-	-
Comfort Cove	4.0	0.50	2	-	-	1	-	-
Sheep Bay	53.9	0.35	19	1	-	5	7	-
Simpson Bay & Hanks Island	38.6	0.34	15	1	-	3	3	2
Orca Narrows & Channel Island	14.5	0	2	1	-	-	-	-
Nelson Bay	16.1	0.12	2	-	-	1*	-	1
Total	218.4	0.30	66	9	3	15	13	3

*single observed on nest

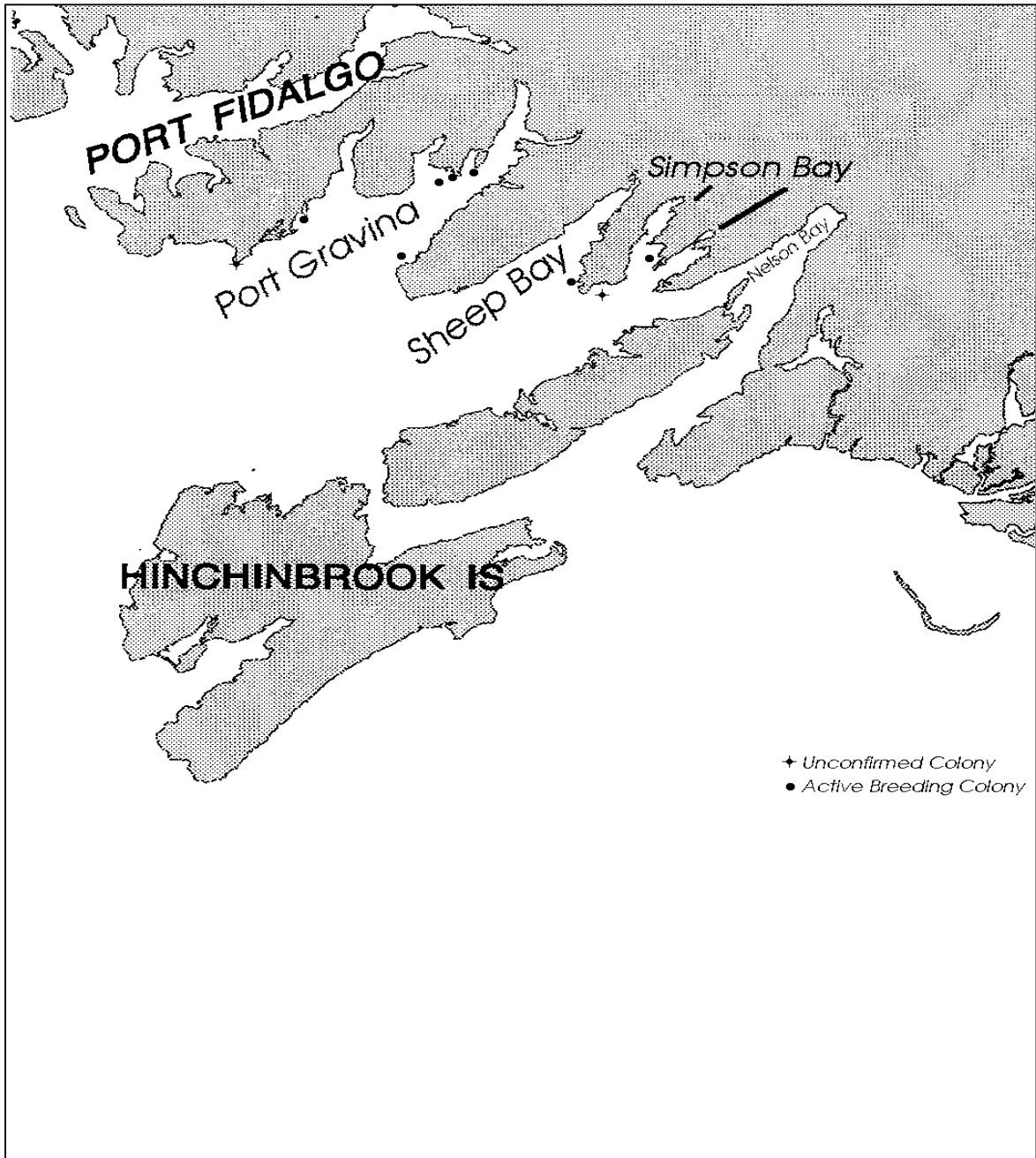


Fig. 1. Seabird Colonies in Northeast Prince William Sound, June 1999.

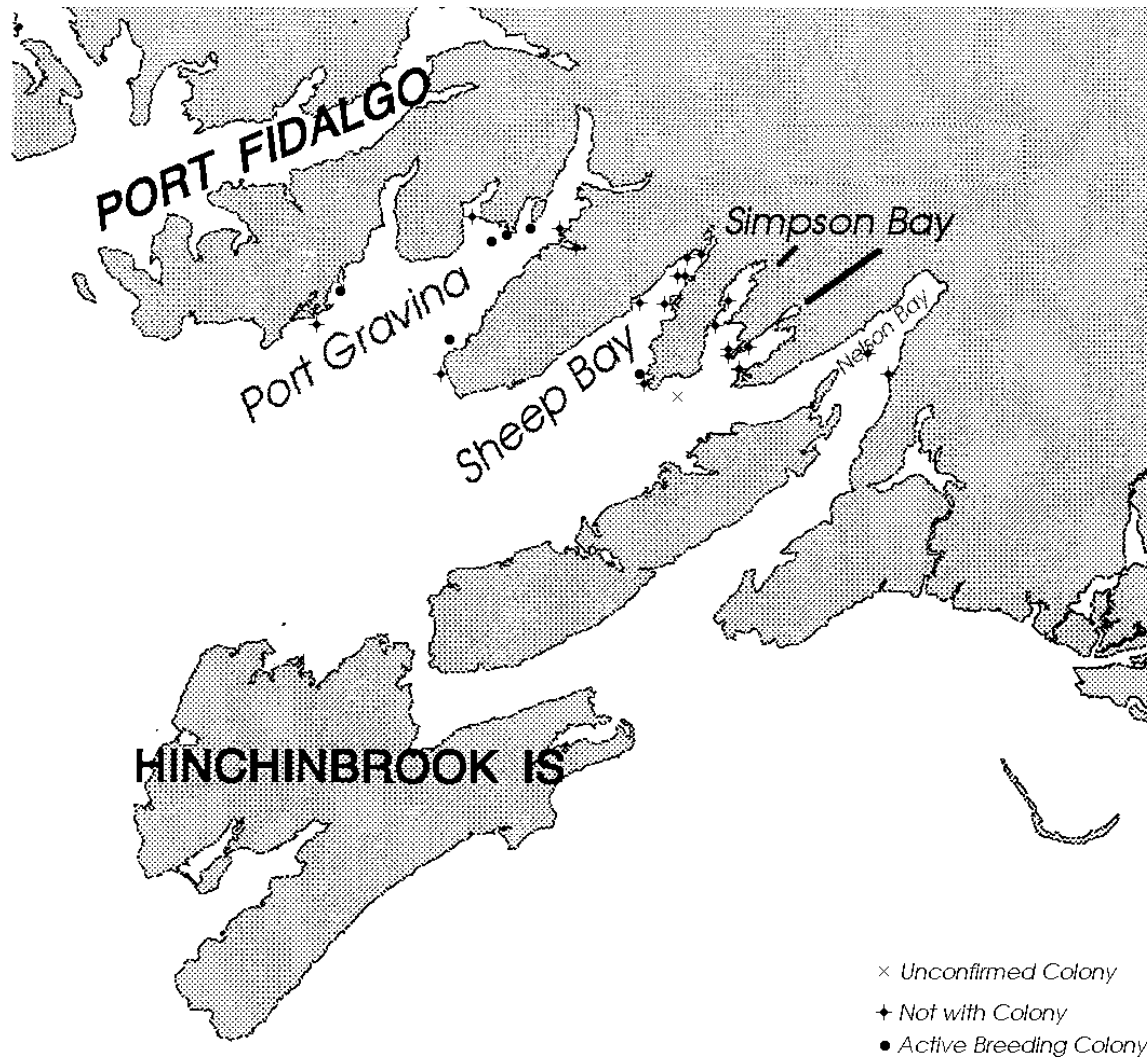


Fig. 2. Locations of black oystercatchers, June 1999, Northeast Prince William Sound. Unconfirmed colony = oystercatchers observed at suspected seabird colony. Not with colony = oystercatchers observed on shoreline or flying apart from any seabird colony. Active breeding colony = oystercatchers observed at seabird colony.