Southern Vancouver Island
Marine Waters and Seabird Islands
Important Bird Areas Conservation Plan

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Foreword

The issue

The east coast of southern Vancouver Island and associated Gulf Islands represent extremely important habitat for a wide variety of birds, during the breeding and non-breeding seasons. Recently, several Important Bird Areas were designated in this area. These include two seabird colonies (Chain Islets and Great Chain Island and Snake Island) and three marine areas (Porlier Pass, Active Pass, and Sidney Channel). Despite the variety of habitats represented here, there is at least one conservation concern in common for all five of these sites: human disturbance. Disturbance can affect seabirds in a variety of ways including physiological stress, egg and nestling mortality, premature fledging, and colony abandonment. While this is a common concern in all five IBAs, there is no formal mechanism to address this issue.

Summary

This conservation plan provides an overview of the birds present within these five IBAs, the issues that may affect these birds and the habitats that they use. It also introduces and highlights ways in which disturbance could be addressed. This plan was written in conjunction with the federal and provincial governments, as well as a number of action-oriented non-government organizations active in the region. It is intended to lay the groundwork for a strategy to address this conservation concern.

Availability of report:

This report is available in digital format from the Important Bird Areas web page: www.ibacanada.com.

Executive Summary

The **purpose** of this conservation plan is to: 1) describe the wildlife values of the IBAs in the waters around southern Vancouver Island and associated Gulf Islands, 2) discuss the issues that may affect these values, 3) introduce and highlight the initiatives that will be required to address some of these issues and, 4) to focus and direct future initiatives that could further address identified concerns.

What is an Important Bird Area (IBA)?

An Important Bird Area (IBA) is a site providing essential habitat for one or more species of breeding or non-breeding birds. These sites may contain threatened species, endemic species, species representative of a biome, or highly exceptional concentrations of birds.

The goals of the Canadian IBA program are to: 1) identify a network of sites that conserve the natural diversity of Canadian bird species; and 2) ensure the conservation of sites through partnerships of local stakeholders who develop and implement appropriate on-the-ground conservation plans

The IBAs of Southern Vancouver Island

The marine areas along the east coast of southern Vancouver Island and the Gulf Islands represent one of the most fertile areas for seabirds in BC. The marine coastline in this area provides a wide variety of habitats that attract birds year round. Five Important Bird Areas (IBAs) have been designated in the marine waters that include Nanaimo, the Gulf Islands, the Saanich Peninsula, and the small islands immediately off the shores of Victoria. They include two seabird colonies (Chain and Great Chain Islets, and Snake Island) and three marine areas (Porlier Pass, Active Pass and Sidney Channel). This area is also one of the fastest growing areas in Canada, and is experiencing a growth in tourism related activities.

There are a number of conservation concerns that may affect these IBAs. They include eagle predation and disturbance, human disturbance, water pollution, and commercial fishing. Human disturbance is common to all IBAs and is of concern because it can result in physiological stress, egg and nestling mortality, premature fledging, and colony abandonment. While this is a common concern in all five IBAs, there is no formal mechanism to address this issue.

Current Conservation Activities

Some of the IBAs in this area are ecological reserves (Chain Islets) while others are parts or provincial parks (Sidney Channel); others are destined to become national parks in the near future (Active Pass). Despite these protective measures, birds in this area continue to come under pressure from the recreational public.

Conservation Goals and objectives

This conservation plan provides an overview of the birds present within these five IBAs, the issues that may affect these birds and the habitats that they use. It also introduces and highlights ways in which disturbance could be addressed. The desired conservation goals and objectives for southern Vancouver Island are relevant to many other areas in BC. At present, two broad categories of conservation activities are being considered: broad scale promotion of the area as places of significance for seabirds, and ways in which to mitigate disturbance at these sites.

Broad scale promotion of wildlife values/resources on southern Vancouver Island

Certain branches of both provincial and local governments, as well as local citizens, are in many ways unaware of the significance of the wildlife resources that are present in their areas of jurisdiction and backyards. Without this recognition, there is a tendency for these sites to be visited, treated, and

managed without due care and attention. It is hoped that making the importance of these areas known to the public will help protect them in the long-term. The promotion of these sites as extremely valuable areas can be done by through the following initiatives: interpretive programs, static displays, and the mapping of sensitive areas.

Mitigating disturbance

Disturbance at these sites will likely increase as both the population of the region grows, and as the popularity of wildlife viewing increases. It is therefore important that the public be made aware of how disturbance affects wildlife, and of how to share the waters with wildlife without causing undue disturbance. There are ongoing initiatives that address wildlife viewing, particularly marine mammals, but there are no specific programs geared towards seabirds. BC Parks in Victoria has produced a general set of guidelines that are intended specifically for the wildlife-viewing public. It is important, however, to develop a system and a strategy to develop and disseminate information pertaining specifically to seabirds. It will be important to develop a multi-faceted approach that targets a wide range of users that also includes these users in program development. There are a number of different ways to address the issue of disturbance. These include: an active outreach program, the development of appropriate material, development of signage at selected sites, and the development of viewing guidelines for seabirds.

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1. Introduction

The marine areas along the east coast of southern Vancouver Island and the Gulf Islands represent one of the most fertile areas for seabirds[1] in BC. The marine coastline in this area provides a wide variety of habitats that attract birds year round. In this area, extraordinary numbers of loons, gulls and cormorants congregate during the winter season to feed in rich up-welling areas such as Active Pass and Porlier Pass. Small rocky islands in proximity to rich feeding areas provide suitable nesting sites for gulls, guillemots, cormorants and oystercatchers. These areas have recently received international recognition. Five Important Bird Areas (IBAs) have been designated in the marine waters that include Nanaimo, the Gulf Islands, the Saanich Peninsula, and the small islands immediately off of the shores of Victoria (Figure 1, Table 1).

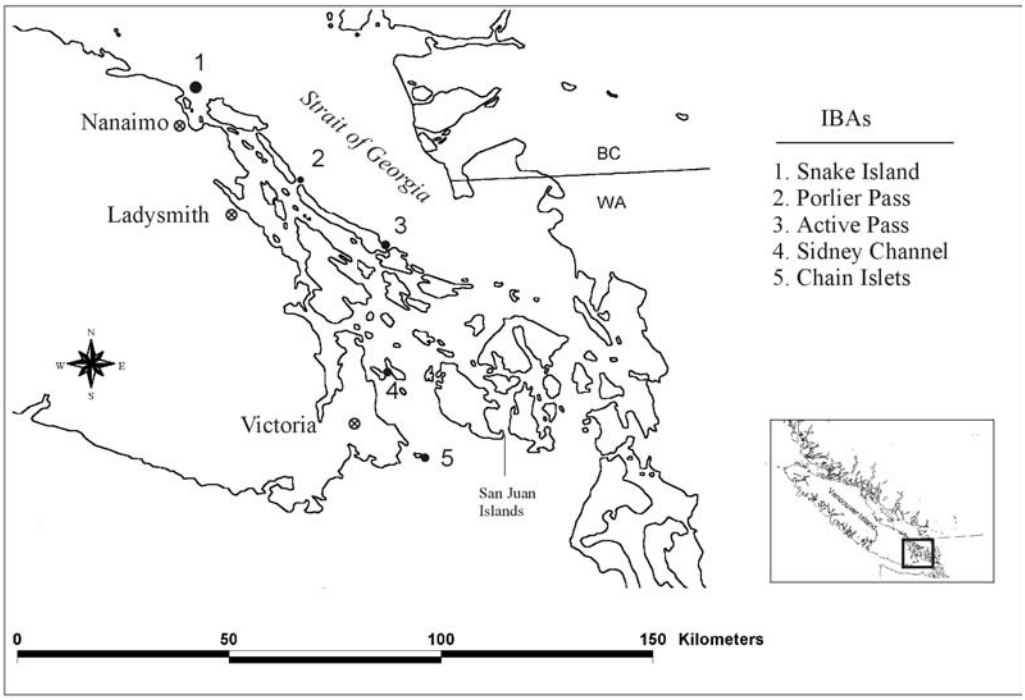

Figure 1. Locations of five IBAs in Southern Vancouver Island

The east coast of Vancouver Island is one of the fastest growing areas in Canada. The area is presently experiencing an annual growth rate of 7% (MABRF 1999). Human population growth in some areas has increased upwards of 40% in the last 10 years (Table 2).

Table 1. IBAs in the marine areas of southeastern Vancouver Island

IBA name	Type of IBA
Snake Island	seabird breeding colony
Porlier Pass	wintering area
Active Pass	wintering area, spring and fall migration
Sidney Channel	seabird breeding colony, spring and fall migration
Chain and Great Chain Islets	seabird breeding colony and fall migration

Table 2. Human Population Growth in Vancouver Island Regional Districts discussed in this document

Regional District	1989	1991	1993	1995	1997	Percent change
Capital (Victoria)	294,795	308,443	320,025	327,468	333,074	13%
Cowichan Valley	57,904	62,444	67,014	71,873	74,821	29%
Nanaimo	93,165	104,695	114,185	123,140	129,435	39%
Vancouver Island	571,580	607,306	638,800	668,573	689,278	21%
British Columbia	3,209,195	3,379,847	3,575,619	3,766,221	3,933,273	23%

Adapted from (CFIBC 1999). Source: Population Section, BC Stats, Ministry of Finance and Corporate Relations, Government of British Columbia. Notes: All figures are as of July 1st of the year stated. 1991 figures include estimates of the net census undercount. Last Updated: November 1997.

There have been downturns in the forestry and fishing industries throughout the region. This is being offset to a certain degree with a rise in tourism and other service industries. There is a feeling that tourism, secondary manufacturing, and the service sector offer hope for future economic development. A number of regions are developing regional trails systems to increase ecotourism and believe they will have positive economic impacts (CFIBC 1999).

This document examines the marine IBAs that are located in the waters off the east coast of southern Vancouver Island, including the Gulf Islands. For each IBA a brief site description is presented, as is the reason for its initial designation. Potential threats to the species present at these sites are discussed, as are some of the options that are available for mitigating these threats or concerns. The sites that are discussed here have been evaluated using internationally agreed upon criteria. They have been compiled or nominated by either Moira Lemon or Rob Butler of the Canadian Wildlife Service.

2. The IBA program

The IBA program is an international initiative co-ordinated by BirdLife International, a partnership of member-based organizations in over 100 countries seeking to identify and conserve sites important to all bird species worldwide. Through the protection of birds and habitats, they also promote the conservation of the world's biodiversity. There are currently IBA programs in Europe, Africa, the Middle East, Asia, and the Americas.

The Canadian BirdLife co-partners are the Canadian Nature Federation (CNF) and Bird Studies Canada (BSC). The Canadian IBA program is part of the Americas IBA program, which includes the United States, Mexico, and 17 countries in Central and South America.

The goals of the Canadian IBA program are to:

1. identify a network of sites that conserve the natural diversity of Canadian bird species and are critical to the long-term viability of naturally occurring bird populations;
2. determine the type of protection or stewardship required for each site, and ensure the

conservation of sites through partnerships of local stakeholders who develop and implement appropriate on-the-ground conservation plans; and

3. establish and support ongoing local involvement in site protection and monitoring.

IBAs are identified by the presence of birds falling under one or more of the following internationally agreed-upon categories:

1. Sites regularly holding significant numbers of an endangered, threatened, or vulnerable species.
2. Sites regularly holding an endemic species, or species with restricted ranges.
3. Sites regularly holding an assemblage of species largely restricted to a biome.
4. Sites where birds concentrate in significant numbers when breeding, in winter, or during migration.

3. IBA Site Descriptions

3.1 Snake Island

3.1.1 Location and General Description of site

Snake Island is a small (3.4 ha plus marine area) island that is located in the Strait of Georgia about 3 km off the northwest point of Gabriola Island along the east coast of Vancouver Island close to Nanaimo (Figure 2). Snake Island lies outside the mouth of Northumberland Channel between Rainbow Channel to the north and Fairway Channel to the south in the approach to Nanaimo Harbour. The island is long and narrow and is oriented north-south. It is composed primarily of sandstone. Tidal beach and rock shelf connect offshore ribs of rock on either side of the main island. The eroded sandstone forms a honeycomb of wave-cut pockets and galleries on the cliff-bound western side of the island. These cliffs provide nesting ledges for cormorants and gulls. On its eastern side, the island slopes steeply down to the water's edge. The flat top of the island is covered by a dense growth of grass with patches of shrubs such as rose (*Rosa spp.*). Gulls nest within this habitat as well. The proposed Important Bird Area includes the marine waters in a one-kilometre radius around the island

3.1.2 Bird species found within the bounds of the IBA

Two colonial nesting birds that breed on Snake Island meet nationally significant levels (Table 3). Surveys conducted in 1986 and 1987 recorded 673 pairs of Glaucous-winged Gulls (*Larus glaucescens*) (Vermeer and Devito 1989) and 74 pairs of Pelagic Cormorants (*Phalacrocorax pelagicus*) (Vermeer et al 1989). Previous and additional surveys since 1987 indicate that nesting populations of these species have fluctuated. A survey early in the 1999 breeding season recorded only 204 Glaucous-winged Gull nests and 16 pairs of Pelagic Cormorants (BSC 2001a, Sullivan et al. 2001).

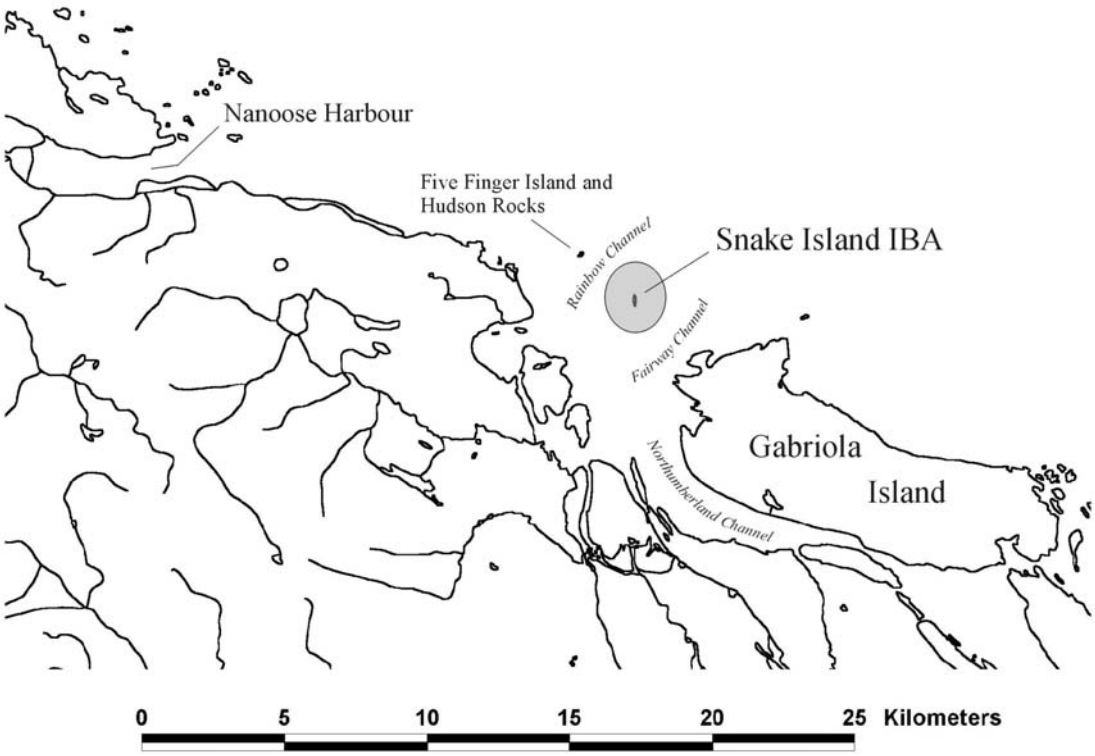

Figure 2. Location of Snake Island IBA and Five Finger Island and Hudson Rocks

Table 3. IBA species, the time at which they are present in the area, the approximate percentage of the population, the significance at the global (G), continental (C) or national (N) level, and the provincial status for the for Snake Island IBA.

Species or Groups meeting IBA criteria	Season*	Number	Approximate % of population	Sig.	Provincial ranking
Pelagic Cormorant	B	74 pairs (1986/87)	1 (CDN)	N	Not ranked
Glaucous-winged Gull	B	673 pairs (1986/87)	3 (CDN)	N	Not ranked

*B = breeding

3.2.3 Additional wildlife values

Although not present in numbers that qualify for an Important Bird Area, Black Oystercatchers (*Haematopus bachmani*) (five pairs in 1999; CWS unpublished data) and Pigeon Guillemots (*Cepphus columba*) (10 pairs; Emms and Morgan 1989) also nest on the island. Snake Island is also a location where Harbour Seals breed, haul-out and rest.

3.1.4 Conservation measures taken, in progress, or proposed

Snake Island is an ecological reserve. Gull and cormorant populations are monitored on a regular basis by area naturalists.

3.2 Active Pass

3.2.1 Location and General Description of site

Active Pass is a tidally active body of water approximately 4.5 km long (~450 ha) between Galiano and Mayne islands (Figure 3). At either end of the Pass, strong tidal currents (up to 6.5 knots) hit submarine walls and are forced upward, bring cold, nutrient rich water, as well as plankton and fish, to the surface (GBEI 2000). This area is a major marine transportation corridor. BC Ferries pass through this area on trips between Vancouver and Victoria, and between Vancouver and the Gulf Islands.

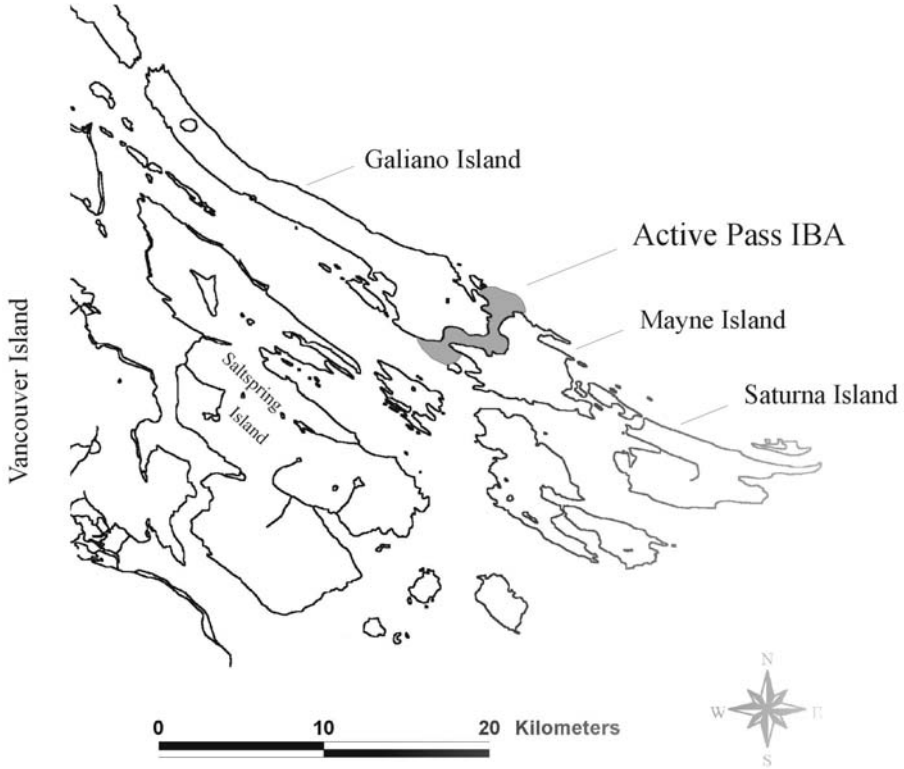

Figure 3. Location of Active Pass IBA.

3.2.2 Bird species found within the bounds of the IBA

Active Pass is a globally significant wintering area for three species of birds (Table 4). Surveys conducted in 1977 recorded 2,000 Pacific Loons (*Gavia pacifica*) in the Pass (Vermeer 1977). This number of loons occurs on a regular basis in the Pass and represents the largest concentration in the Straits of Georgia. In addition, upwards of 4,000 Pacific Loons have been recorded in the area on occasion (CDC 2000). During the 1977 surveys 4,000 Brandt's Cormorant (*Phalacrocorax penicillatus*) were also recorded in the area (Vermeer 1977) and upwards of 7,500 Brant's Cormorants have been recorded on occasion (CDC 2000). Active Pass is also a globally significant migration staging area for Bonaparte's Gulls (*Larus philadelphia*). Vermeer (1977) recorded 4000 Bonaparte's Gulls in Active Pass during spring migration, and up to 10,000 have been recorded in fall migration.

Table 4. IBA species, the time at which they are present in the area, the approximate percentage of the population, the significance at the global (G), continental (C) or national (N) level, and the provincial status for the Active Pass IBA.

Species or Groups meeting IBA criteria	Season*	Highest Number Recorded	Approximate % of population	Sig.	Provincial ranking
Pacific Loons	W	2,000	4 (NA)	G	
Brandt's Cormorants	W	4,000	5 (G)	G	Blue
Bonaparte's Gulls	SM	4,000	1 (G)	G	
Bonaparte's Gulls	FM	10,000	3 (G)	G	

*W = winter, SM = spring migration, FM = fall migration

3.2.3 Additional wildlife values

A rich intertidal and subtidal fauna is also present in Active Pass: marine mammals such as Northern and California Sea Lions (*Eumetopias jubatus* and *Zalophus californianus,* respectively) are often seen and Killer Whales (*Orcinus orca*) occasionally forage in the pass (CDC 2000). Several pairs of Bald Eagles (*Haliaeetus leucocephalus*) nest along the shores of the pass, and upwards of 100 occasionally forage in the waters during the winter (BSC 2001b).

3.2.4 Conservation measures taken, in progress, or proposed

Active Pass is a candidate site for a possible Marine Protected Area

3.3 Porlier Pass

3.3.1 Location and General Description of site

Porlier Pass is the channel between the southern end of Valdes Island and the northern end of Galiano Island within the southern Gulf Islands in the Strait of Georgia (Figure 4). It lies about 17 kilometres east of Ladysmith and about 30 kilometres southeast of Nanaimo. It is a tidally active body of water about two kilometres long and less than one kilometre wide. Strong tides run through the pass each day as the waters flood and ebb between the Strait of Georgia to the east, and Trincomali Channel and the other inner channels of the Gulf Islands to the west. As with Active Pass and Gabriola Pass, Porlier Pass is a site of strong topographic up-welling, caused by deep waters being brought to the surface in the narrow and shallow passage. This intense tidal mixing creates a biologically rich feeding area for fish-eating birds in spring, fall and winter. The suggested boundaries of the Important Bird Area encompass the waters of Porlier Pass in a 1.5 kilometre radius and extending along the northern shoreline of Galiano Island from Alcala Point to Dionisio Point, and from Shah Point to Cardale Point on the southern shoreline of Valdes Island.

3.3.2 Bird species found within the bounds of the IBA

Although the bird use of Porlier Pass is not as well known as that of Active Pass to the south, the proximity and similar characteristics of the two sites leads to comparable assemblages of seabirds. A wide variety of seabirds waterfowl, cormorants, loons, grebes, gulls and alcids are attracted to this IBA, particularly in the winter. Periodic surveys of the region in the 1970's and the 1990's included globally significant levels of Mew Gulls (*Larus canus)* and large flocks of cormorants (Table 5). In January 1993, a high count of 3010 cormorants were recorded (CWS unpublished data 1993). A flock of this size is within the range of national significance for the three species' populations occurring in the area: the Pacific coast population of the Double-crested Cormorant (*Phalacrocorax auritus*), the north Pacific population of the Pelagic Cormorant and Brandt's Cormorant. Considering that large numbers Brandt's

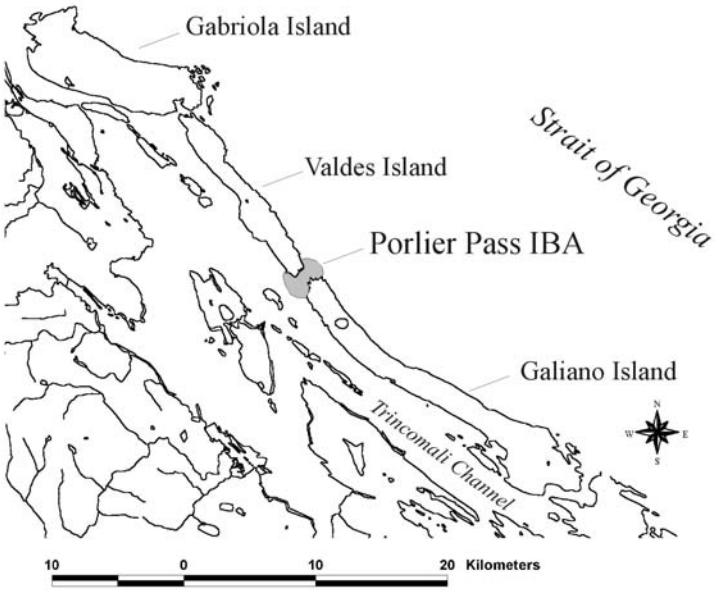

Figure 4. Location of Porlier Pass IBA.

Cormorants are common in the southern Gulf Islands in winter, it is likely that most of that flock consisted of this species. If so, this would meet global level IBA criteria.

Table 5: IBA species, the time at which they are present in the area, the approximate percentage of the population, the significance at the global (G), continental (C) or national (N) level, and the provincial status for the Porlier Pass IBA.

Species or Groups meeting IBA criteria	Season*	Highest Number Recorded	Approximate % of population	Sig.	Provincial ranking
Mew Gull	W	1,000	2 (NA)	G	
Cormorants	W	3,010	-	N	

*W = winter

3.3.3 Additional wildlife values

There is also a small colony of breeding Glaucous-winged Gulls and Black Oystercatchers on Canoe Islet, an Ecological Reserve north of Porlier Pass along the east coastline of Valdes Island.

3.3.4 Conservation measures taken, in progress, or proposed

Canoe Islet, located along the east coastline of Valdes Island, is an Ecological Reserve.

3.4 Chain Islets and Great Chain Island

3.4.1 Location and General Description of site

The Chain Islets and Great Chain Island are located in Oak Bay, Victoria (Figure 5). The Chain Islets include Great Chain Island and a cluster of at least 18 or more small islets and rocks in Mayor Channel about midway between the southeastern shore of Vancouver Island and Discovery and Chatham Islands to the east. The low rounded islets are rocky and barren except for Great Chain Island, which supports a nearly continuous grass and herbaceous cover with occasional shrub thickets. Shoreline features include a few steep faces, rocky outcroppings, boulders, crevices, wave-cut chasms and small gravel beaches. The islets are surrounded by shallow waters from which many rocky reefs emerge. Intertidal and subtidal communities are rich and diverse. The proposed IBA includes the surrounding shallow marine waters included in the Oak Bay Islands Ecological Reserve. This Ecological Reserve has a radius of approximately 700 m or approximately 160 hectares in total, of which the area of the islands totals approximately 7 ha.

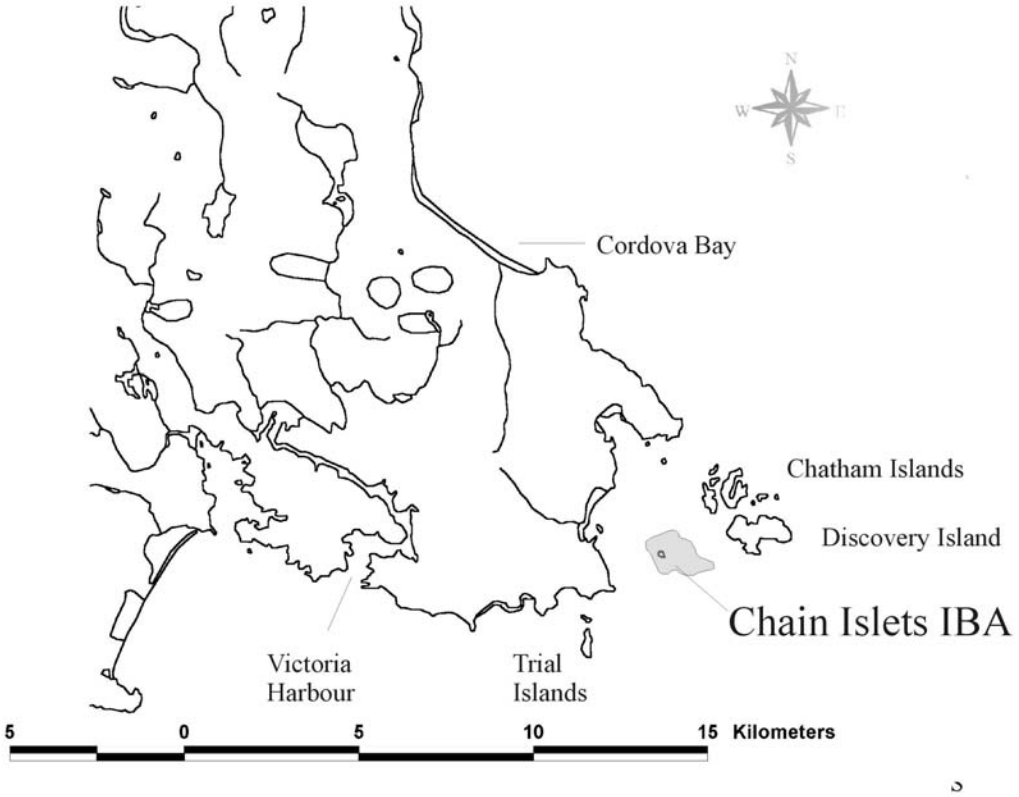

Figure 5. Location of Chain Islets and Great Chain Island IBA.

3.4.2 Bird species found within the bounds of the IBA

Chain Islets, including Great Chain Island, is a site of global importance, supporting a significant breeding population of Glaucous-winged Gulls, and a significant migratory population of Brandt's

Cormorants (Table 6). Surveys in 1986 and 1987 recorded 2,432 pairs of Glaucous-winged Gulls (Vermeer and Devito 1989). The colony of Glaucous-winged Gulls on the Chain Islets is the largest in British Columbia, and together with the other two similar sized colonies in the Strait of Georgia, Mandarte and Mitlenatch Islands, these three sites support almost half of the species' breeding population in the Strait of Georgia and a quarter of the breeding gulls in BC. In fall, up to 2,000 Brandt's Cormorants have been recorded in the area (Campbell et al. 1990b), which is over 2% of the estimated world population. A Pelagic Cormorant colony is also present at this site. In 1987, the population peaked at 248 pairs (Vermeer et al. 1989), but since that time has steadily declined to only 7 pairs in 1999 (M. Lambert, pers. comm.). Additionally, 510 pairs of Double-crested Cormorants, which in British Columbia breed only in the Strait of Georgia, were recorded nesting in the Chain Islets (Vermeer et al. 1989). This is the second largest colony of this species in British Columbia. Recent surveys have indicated that breeding populations of Double-crested Cormorant species have declined (Chatwin et al. 2001).

Table 6. IBA species, the time at which they are present in the area, the approximate percentage of the population, the significance at the global (G), continental (C) or national (N) level, and the provincial status for the Chain and Great Chain Islets IBA

Species or Groups meeting IBA criteria	Season*	Highest Number Recorded	Approximate % of population	Sig.	Provincial ranking
Brandt's Cormorant	FM	2,000	2 (G)	G	Blue
Glaucous-winged Gull	B	2432 pair (1986-1987)	1 (G)	G	

*FM = fall migration, B = breeding

3.4.3 Additional wildlife/habitat values

Pigeon Guillemots and Black Oystercatchers also nest on the islets, but estimates of their breeding numbers do not meet the threshold of an IBA (74 birds, and 4 pairs, respectively; Emms and Morgan 1989, Vermeer et al. 1989). Harlequin Ducks (*Histrionicus histrionicus*) and other seabirds occur seasonally among the reefs and islands. The Chain Islets are also a regular summer haul out site for Harbour Seals.

3.4.4 Conservation measures taken, in progress, or proposed

The Chain Islets are part of the B.C. Provincial Ecological Reserve # 94, Oak Bay Islands. A local naturalist and volunteer warden monitors this site on a regular basis.

3.5 Sidney Channel

3.5.1 Location and General Description of site

Sidney Channel lies along the extreme southeast shore of Vancouver Island between James Island the Saanich Peninsula and Sidney Island (Figure 6). Along with Haro Strait, it connects Juan de Fuca Strait with Georgia Strait. James and Sidney islands are largely composed of sandstone; weathering of this material has given rise to the extensive sand beaches in the area. Large schools of Pacific sandlance (*Ammodytes hexapterus*) reproduce in the sand in the area, and their presence attracts large flocks of seabirds in spring and summer. The eroded sand has formed a lagoon (100 ha) on Sidney Island that also attracts hundreds of sandpipers in spring and summer.

3.5.2 Bird species found within the bounds of the IBA

Sidney Channel is noted for its variety of seabirds throughout the year. While most places along the south coast of the Strait of Georgia have relatively few seabirds in summer, Sidney Channel and the associated lagoon on Sidney Island are well known for the presence of Marbled Murrelets

(*Brachyramphus marmoratus*), Rhinoceros Auklets (*Cerorhinca monocerata*), cormorants, gulls, and shorebirds in summer. During winter seaducks can be found throughout the area. In the spring they are joined by migrating grebes, loons, Brant (*Branta bernicla)*, and shorebirds. Brant frequent the shores of Island View Beach Regional Park.

Of particular interest at this site are the globally significant concentrations of Brandt's Cormorants during fall migration, and the nationally significant numbers of Mew Gulls and Brant during spring migration (Table 7; R. Butler unpubl. data). About 300 Brant over-wintered in 1996-1997 (R. Butler Unpubl. data). During fall, winter, and spring, nationally significant numbers of Pigeon Guillemots are also present (R. Butler Unpubl. data). In addition, nationally significant numbers (20 pairs) of nesting Black Oystercatchers nest on islets located in the area (R. Butler unpubl. data).

3.5.3 Additional wildlife values

As many as 50 Marbled Murrelets (nationally threatened, COSEWIC) have been observed at this site (CWS unpublished data). These observations might indicate that there is a remnant local breeding

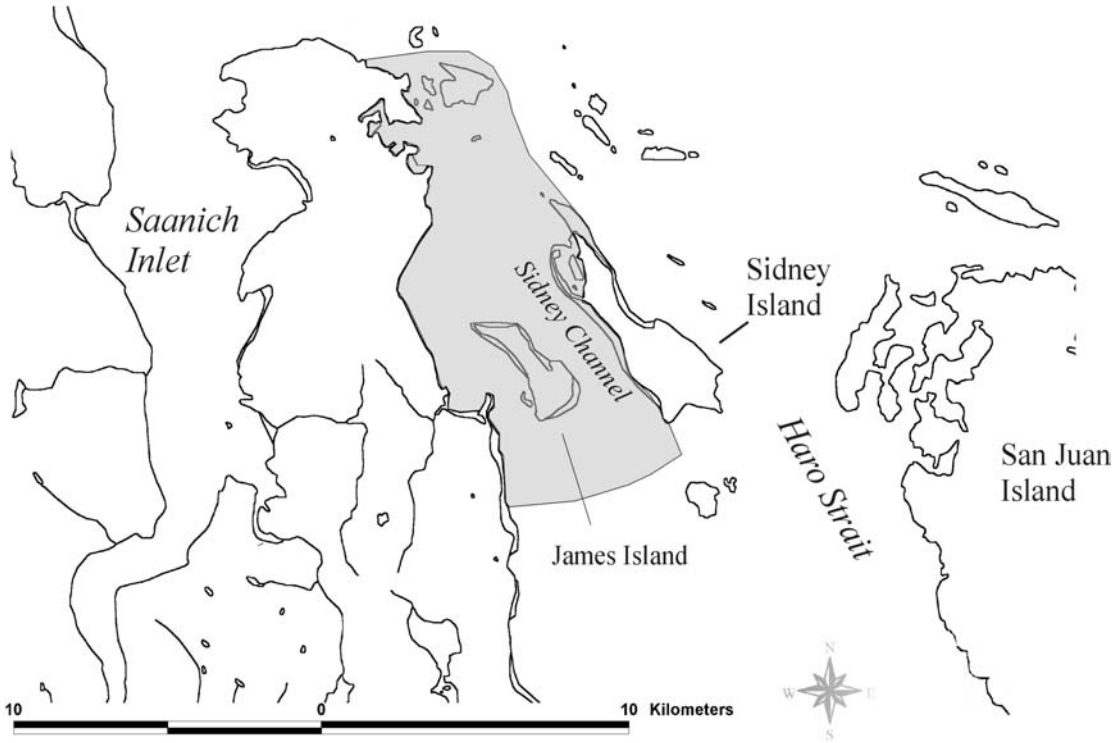

Figure 6. Location of Sidney Channel IBA

population nesting in the Greater Victoria watershed (BSC 2001b). In addition, about 50 Great Blue Herons (*Ardea herodias fannini*) (nationally vulnerable, COSEWIC) are also regularly seen feeding at this site. In 1988, 100 pairs were reported to nest on Sidney Island, but since then the colony has been abandoned (Butler 1997).

Table 7 IBA species, the time at which they are present in the area, the approximate percentage of the population, the significance at the global (G), continental (C) or national (N) level, and the provincial status for the Sidney Channel IBA.

Species or Groups meeting IBA criteria	Season*	Highest Number Recorded	Approximate % of population	Sig.	Provincial ranking
Brandt's Cormorant	FM	900	1 (G)	G	Blue
Brant	SM	1000-3000	2 (NA**)	C	
Black Oystercatcher	B	20 pairs	2 (CDN)	N	
Mew Gull	SM	500	1 (NA)	G	
Pigeon Guillemot	W	300	3 (CDN)	N	

* SM = spring migration, FM = fall migration, B = breeding, W = winter,
** – percentage of North American subspecies population

3.5.4 Conservation measures taken, in progress, or proposed

The western end of Sidney Island is a Class A Park in the BC Parks system. The southern end of Sidney Island, and all of James Island, is privately owned

4. Other areas of significance

4.1 Five Finger Island and Hudson Rocks

4.1.1 Location and General Description of site

Five Finger Island and Hudson Rocks are two small assemblages of low-lying rocky islets located in the Strait of Georgia about 1.5 km off the east coast of Vancouver Island northeast of Nanaimo. These two groups of islands lie in Horswell Channel northwest of Rainbow Channel. Five Finger Island is 0.5 km northeast of Hudson Rocks, and 2.3 km northwest across Rainbow Channel from the Snake Island Important Bird Area (Figure 2).

4.1.2 Species present

Five Finger Island and Hudson Rocks was initially considered as an Important Bird Area of national significance for breeding Glaucous-winged Gulls and Pelagic Cormorants. In 1986 and 1987 researchers recorded 918 pairs of Glaucous-winged Gulls and 159 pairs of Pelagic Cormorants (Vermeer et al 1989). However, recent surveys indicate that both species have suffered significant declines on these islands. During 2000 only five Pelagic Cormorant nests were found at this site (Chatwin et al. 2001), while less than 100 nesting pairs of Glaucous-winged Gulls were recorded (B. Merillees and G. Monty, Unpublished data, June 15 and July 31, 2000).

A total of 137 pairs of Double-crested Cormorants were recorded nesting on Five Finger Island in 1987 (Vermeer et al. 1987); however, Chatwin et al. (2001) recorded only 15 pairs of in 2001. The nine pairs of breeding Black Oystercatchers were recorded on these two colonies during surveys in 1999 fell two individuals short of the threshold for a site of national significance (CWS unpub. Data).

5. Species Accounts

5.1 Pigeon Guillemot

Pigeon Guillemots breed from the Kurile Islands between Kamchatka Peninsula and northern Japan and the Bering Sea, south to southern California. In BC, this species breeds throughout most coastal

areas. It nests either singly, or in loose colonies (Campbell et al. 1990b). Nests sites can be found in rock crevices, under large pieces of driftwood on rocky beaches or in soil burrows (Campbell et al. 1990b, Drever 1999.

On the south coast, birds arrive at nesting sites in the last two weeks of April. During the summer, sub-adult birds and non-breeding adults are often found in small flocks close to breeding areas. Autumn movements from nesting areas are not well defined. There is a slow but steady dispersal of birds from colonies in August and September. There is also a general southward movement from colonies in the south to main wintering areas in the Queen Charlotte Islands and the Strait of Georgia and Juan de Fuca (Campbell et al. 1990b). During winter, this species is widely distributed along most of the coastal areas of the province. It inhabits the nearshore area, especially along stretches of rocky coastline. It is often found in bays, inlets, channels, surge narrows, sounds, coves, and harbours (Campbell et al. 1990b).

Clutch initiation dates range from May 10 to August 17th with most (60%) being recorded between June the 5th and 22nd. Pigeon Guillemots generally lay 2 eggs, which are incubated by both parents for 30-35 days. The fledgling period averages 35 days (Drent et al. 1964).

Guillemots feed near their nesting colonies in inshore waters during nesting season (Drent 1965). Little is known about the diet of this species during the breeding season, but shallow subtidal fishes such as sculpins and blennoid fishes (e.g., gunnels) make up a large part of their diet at this time (Vermeer and Ydenberg 1989). Outside of the breeding season Guillemots feed on both fish and invertebrates. During this time this species has been known to feed on crabs, and shrimp, and fish such as capelin (*Mallotus vilosus*) (Vermeer and Ydenberg 1989).

5.2 Black Oystercatcher

Black Oystercatchers are a resident of the Pacific Coast of North America, from the western Aleutian Islands eastward and southward to islands of central Baja California. Black Oystercatchers breed along the most of the inner and outer coastal areas of BC. Nesting areas can occur on large forested islands, with beaches and rocky headlands to small bare islets (Campbell et al. 1990b). This species tends to nest singly or in loose colonies in suitable areas. They nest just above the high tide lines on bare exposed rock, shell, gravel and sand beaches, among driftwood, and in areas of short-grass on rocky headlands (Campbell et al. 1990b).

Clutch initiation dates range from May 1 to August 19th with most (90%) being recorded between May 18 and June 13. Black Oystercatchers generally lay 2-3 eggs that are incubated for 26 days (Groves 1984). The chicks can fly within 35 days, but are dependent on parents for food for an extended period of time (Hazlitt 1999).

Seasonal movements are not well known but there is a general movement from outer exposed coastal coasts to more sheltered areas in winter. Post-breeding (September) birds disperse to known areas where numbers build and peak in late October and early November. In spring, large numbers are often associated with herring spawning areas (Campbell et al. 1990b).

Oystercatchers occur singly or in large groups along rocky shorelines in the province at all times of the year. They frequent rocky islets, reefs and spits, but also utilize lagoons, gravel and mudflats, rocky beaches, sand bars and inlets. They tend to feed along open rocky coasts from the highest tide line to the lowest intertidal area where they search for prey such as mussels and limpets hidden in the marine algae (Verbeek and Butler 1989, Hazlitt 1999).

5.3 Pacific Loon

Pacific Loons breed on fresh water lakes and ponds in eastern Siberia and in North America from the Arctic coast of Alaska and the northern part of Canada including BC, east to Baffin Island and Hudson's Bay (Campbell et al. 1990a, M. Chutter, pers. comm.). Autumn migration begins in late August and carries though November with the main southward movement taking place in late September and October. In wintering areas, flocks of several thousand Pacific Loons in up-welling areas are not uncommon. This species tends to frequent deeper waters that other loons, but can also be found in coastal

habitats such as bays, estuaries, surge narrows, channels and coves (Campbell et al. 1990a). Spring migration occurs as early as February and March in southern parts of the species range, which coincides with the Pacific herring (*Clupea pallasi*) spawning season. Large flocks of Pacific Loons congregate to feed on spawning herring at those times (Campbell et al. 1990a, Haegele 1993).

5.4 Pelagic Cormorant

Two subspecies of Pelagic Cormorants breed in BC. The northern subspecies, *Phalacrocorax pelagicus pelagicus***,** is a resident from Japan north to eastern Siberia, the Bering Sea, and the Aleutian Islands, and southeast to the Queen Charlotte Islands (Cannings 1998). The southern subspecies, *Phalacrocorax pelagicus resplendens,* breeds from northern Vancouver Island and the mainland coast south to central Baja California. Pelagic Cormorants breed in colonies throughout inner and outer coastal areas of BC on cliffs of forested and grassy rocky islands and headlands. They also nest in caves and on artificial structures such as navigation beacons and bridge pylons (Campbell et al. 1990a).

Clutch initiation dates for range from April 25th to August 30th with most (52%) being recorded between June 19th and July 8th. Pelagic Cormorants lay between 1-8 eggs with 61% having 3 or 4 eggs. The incubation period averages 31 days (Campbell et al. 1990a)

Autumn movement from nesting areas begins in September and continues through October while spring migration occurs primarily in late March and early April. There can be major shifts in the distribution of Pelagic Cormorants throughout their range. These shifts coincide with seasonal changes in the availability of fish. During winter, Pelagic Cormorants are found along rocky coasts and feed in bays, harbours, lagoons, surge narrows and coves. During both summer and winter, this species feeds primarily on bottom-dwelling fishes (Fraser et al. 1999), but also congregate around herring spawning areas where they feed on adult herring (Haegele 1993, Vermeer et al. 1997).

The number of nesting Pelagic Cormorants have dropped significantly along the southeast coast of Vancouver Island in the past two decades (Table 8, Moul 2000, Chatwin et al. 2001). The decline in breeding pairs has been largely attributed to disturbance effects of Bald Eagles and boaters (Moul 2000). Disturbance by both sources causes the adult cormorants to temporarily abandon their nests, which allows increased predation on eggs and young by gulls and corvids (crows and ravens). In addition, eagles have been observed to predate directly on cormorants (Moul 2000).

Table 8. Numbers of active Pelagic Cormorant nests at selected colonies along southeast Vancouver Island 1959-2000.

	Number of Active nests in each year													
Colony name	**1959**	**1974**	**1983**	**1987**	**1990**	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**	**1998**	**1999**	**2000**
Chain Islets	74	183	203	248	204	-	-	41	51	30	-	20	7	41
Mandarte Island	375	443	550	536	311	-	297	405	280	206	-	91	37	270
Hudson Rocks-Five Finger Island	38	-	145	159	51	77	157	83	155	139	-	-	0	5
Ballingal Islets	11	-	0	2	0	0	0	0	0	0	0	0	0	0
Gordon Head Cliffs	-	20	13	24	-	-	-	-	-	-	-	0		0
Chemainus	50	118	373	142	40	-	-	-	-	-	-	26	8	0
Chrome Island	-	54	78	141	80	67	122	171	220	212	-	-	134	57
Mittlenatch Island	155	286	318	315	334	330	332	311	337	337	-	222	311	234

*- = not data collected for that year, adapted from Chatwin et al. (2000)

5.5 Brandt's Cormorants

Brandt's Cormorants are restricted to the Pacific coast of North America. They breed in colonies on bare rocky islands from south-coastal Alaska south to central California and the Baja Peninsula, often

sharing the site with breeding Pelagic Cormorants and Glaucous-winged Gulls. In BC, Brandt's Cormorants breed on the west coast of Vancouver Island. They winter mainly from the south coast of BC southward. During winter they frequent bays, lagoons, harbours and narrows with strong currents adjacent to nearby rocks or islets that provide suitable roosting habitat. Spring movement occurs from mid-March to mid-may. Autumn movement from breeding colonies along the coastal areas in the US occurs in July and August. In the wintering areas of BC, there are pronounced seasonal movements that appear to be associated with changes in the availability of fish. Large concentrations of birds congregate in areas of spawning Pacific herring (Vermeer and Ydenberg 1989, Haegele 1993, Campbell et al. 1990a).

5.6 Double-crested Cormorant

Double-crested Cormorants breed from south-western Alaska, central Alberta, James Bay, and Newfoundland south to Mexico and the Bahamas. In BC, Double-crested Cormorants nest in colonies, often with Pelagic Cormorants. Where they overlap, Pelagic Cormorants nest on rock ledges while Double crested Cormorants usually nest in flatter habitats on the ground, or in low trees/shrubs. Nests are located on bare areas of rocky islands from Southern Vancouver Island north to Franklin Island and east to Christie Islet on the Sunshine Coast. There are also recent records of Double-crested Cormorants nesting on Stum Lake in the interior of the province (M. Chutter, pers. comm.). Nest sites are constructed on the ground on bare rock, but trees, drift logs, pilings and other artificial structures are also used (Vermeer et al. 1989, Campbell et al. 1990a).

Clutch initiation ranges from April 20 to September 2 with most (54%) recorded between June 22 and July 10. Double-crested Cormorants lay between 1 and 11 eggs with most nests having 2-4 eggs that are incubated for approximately 28 days. The fledgling period is 35-42 days (Lewis 1929 *in* Campbell et al. 1990a).

During the summer, Double-crested Cormorants tend to feed on fish such as gunnels and shiner perch obtained from deep water (Robertson 1974 *in* Campbell et al. 1990a). During the non-breeding season, Double-crested Cormorants occur in marine habitats such as bays, inlets, harbours, lagoons and estuaries. They also visit coastal freshwater lakes on southern Vancouver Island and the Fraser Lowlands. Seasonal movements on the inner coast are not well known. There is an apparent influx of migrant birds in early September; however, they are widely distributed during the winter. Birds begin to congregate in February and March during the spawning of Pacific herring and Pacific sandlance. The spring movement occurs from mid-March to late May, but is most pronounced during late April and early May.

The numbers of nesting Double-crested Cormorant numbers have declined along the southeast coast of Vancouver Island over the past two decades (Table 11, Moul 2000, Chatwin et al. 2001). The decline in breeding pairs has been largely attributed to disturbance effects of Bald Eagles and boaters (Moul 2000). Disturbance by both sources causes the adult cormorants to temporarily abandon their nests, which allows increased predation on eggs and young by gulls and corvids. In addition, eagles have been observed to predate directly on cormorants (Moul 2000).

5.7 Brant

The Brant is a species of marine goose that breeds in the arctic regions of North America and Eurasia and winters along the Pacific coast from southeastern Alaska and the Queen Charlottes to Baja California, and along the Atlantic Coast from Massachusetts to North Carolina. In winter, Brant are found in estuaries, bays, and lagoons, and on beaches, and mudflats. In BC, Brant are considered a spring migrant (February-March) during which time thousands can be found spread out along coastal areas. There are, however, overwintering flocks in coastal areas of the Queen Charlotte Islands, the Lower Mainland and to a lesser extent on Vancouver Island. The distribution of Brant in coastal areas is closely associated with the distribution of eel grass (*Zostera marina*), which is a common food source in winter (Campbell et al. 1990a). Brant have also been known to congregate during herring spawn where they feed on herring eggs (Haegele 1993). While Brant are abundant visitors to the coast of BC, this species has

declined dramatically in coastal BC during the fall and winter over the last 100 years, most likely due to past over-harvesting activities (Campbell et al. 1990a).

Table 9. Numbers of active Double-crested Cormorant nests at selected colonies along southeast Vancouver Island 1959-2000.

	Number of Active nests in each year													
Colony name	**1959**	**1974**	**1983**	**1987**	**1990**	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**	**1998**	**1999**	**2000**
Chain Islets	-	-	135	510	686	-	-	339	444	432	-	300	100	95
Mandarte Island	150	482	1110	972	473	-	280	458	403	288	-	178	43	215
Hudson Rocks-Five Finger Island	0	-	0	145	153	185	221	331	494	300	-	43	42	
Ballingal Islets	28	14	20	25	0	0	0	0	0	0	0	0	0	0
Rose Islets	0	80	12	2	0	0	0	0	0	0	0	0	0	15
Crofton				65	44	78	74	74	75	71	-	-	83	-
Chemainus	0	-	198	0	18	-	-	-	-	-	23	19	11	0
Mittlenatch Island	0	0	0	0	0	0	0	10	33	43	-	46	47	70

* - = not data collected for that year, adapted from Chatwin et al. (2000)

5.8 Bonaparte's Gulls

Bonaparte's Gulls breed in the vicinity of freshwater lakes, ponds, muskeg, and alpine marshes in coniferous woodlands from western and central Alaska east to James Bay and south to south-central BC, central Alberta, Saskatchewan, and central Ontario (Campbell et al. 1990b). During the non-breeding season, Bonaparte's Gulls can be found throughout BC, from sea level to 1700 m. On the coast, they frequent bays, harbours, lagoons, estuaries and areas of tidal convergence and up-wellings, as well as rivers and sewage lagoons. The movement of birds from breeding to wintering areas on the coast begins as early as mid-July and continues into early November (Campbell et al. 1990b). During winter, birds feed primarily on euphausid shrimp that are common at up-welling sites such as Active Pass. Away from up-welling sites, this species is also known to feed on fish such as Pacific herring and Pacific sandlance (Vermeer and Ydenberg 1989). Spring migration usually begins in late March and early April. Numbers build throughout the month and peak in late April and early May. During this time Bonaparte's Gulls are often associated with Pacific herring spawning areas (Campbell et al. 1990b).

5.9 Mew Gull

Mew gulls breed on small freshwater lakes, marshes, ponds or other wetlands, either singly or in small colonies, from central and southeast Alaska to northwestern North America (Yukon and Northwest territories as well as portions of northern Saskatchewan) and in northern and coastal BC. During winter, this gull is widely distributed along coastal BC in a variety of habitats including bays, estuaries, surge narrows, beaches, mudflats, and harbours. It also follows rivers and inlets up to 150 km inland (Campbell et al. 1990b). On the coast, Mew Gulls may begin to arrive at their wintering areas as early as August, with numbers peaking in December. Spring migration occurs from early March through mid-May (Campbell et al. 1990b). In winter, this species feeds primarily on euphausids that are common at up-welling sites such as Active Pass. Away from up-welling sites, this species is also known to feed on fish such as Pacific herring. In addition, Mew Gulls are commonly observed in large numbers at both Pacific herring and eulachon (*Thaleichthys pacificus*) spawning sites (Vermeer and Ydenberg 1989).

5.10 Glaucous-winged Gull

Glaucous-winged Gulls are one of the most common gulls in BC. They breed from the southern Bering Sea and southern Alaska south along the Pacific coast to northwestern Washington. This species is generally a colonial nester, but frequently nests singly. It prefers to nest on small, offshore islands that are

usually treeless and are often bare, or are covered with patches of grass or shrubs (Campbell et al. 1990b). This gull has also taken to nesting in urban and suburban environments that are in proximity to coastal waters.

Clutch initiation dates range from April 30th to August 20th with most (78%) being recorded between June the 5th and 6th. Glaucous-winged Gulls lay between 1-5 eggs with 55% of clutches having 3 eggs. Eggs are incubated for approximately 27 days and the fledgling period averages 44 days (Campbell et al. 1990b).

During winter, this species is widely distributed along the entire BC coast in various habitats including bays, harbours, estuaries, and areas where spawning salmon, eulachon (*Thaleichthys pacificus*) and Pacific herring are found. They are also often found in large numbers over schools of sandlance and Pacific herring (Vermeer and Ydenberg 1989, Campbell et al. 1990b). Over the past 50 years, the population of this species in BC has increased up to 3.5 times in size. The total breeding population in BC was estimated to be approximately 25,000 pairs in 1987 (Campbell et al. 1990b). It is believed that the huge increase in gulls on Mandarte Island in particular, from c. 1950 to 1985, coincided with trash management practices in the Georgia Basin that allowed gulls nearly unlimited access to food (P. Arcese, pers. comm.). Declines of Glaucous-winged Gulls in the southern Strait of Georgia have been noted in recent studies (Sullivan et al. 2001). These declines have been linked with the increased frequency of disturbance and predation by Bald Eagles, and the recent closure of land fills in the lower mainland (P. Arcese, pers. comm.).

6. Conservation concerns: factors that may influence bird abundance, distribution, and productivity

Seabirds of southern Vancouver Island IBAs are subjected to a wide range of factors that influence abundance, distribution, and productivity. These include the impact of eagles, human disturbance, water pollution, and fishing pressure. These threats are summarized in Table 10.

Table 10. Threats to birds in IBAs in the southern Vancouver Island area.

		Human disturbance from		Water	Commercial
IBA	Eagles	Water	Land	Pollution	Fishing
Snake Island	x	x		x	x
Active Pass		x		x	
Porlier Pass		x		x	
Chain and Great Chain Islets	x	x		x	x
Sidney Channel		x	x	x	

6.1 Predation and disturbance from Eagles

The number of nesting Bald Eagles in the Strait of Georgia has increased by 30% between 1974 and 1987 (Vermeer *et al.* 1989). Since the late 1980's to the present, the Bald Eagle population has continued to increase (Elliot et. al 1998). Similarly, U.S. eagle populations have been increasing in the contiguous 48 states: the number of nesting territories nearly tripled between 1980 and 1990 (Kjos 1992 as cited from ABI 2000). In the lower 48 states, the Bald Eagle breeding population has doubled every 6-7 years since the late 1970s (USFWS, Federal Register as cited from ABI 2000). The large eagle population has significant consequences for several species of birds that nest in the southern Vancouver Island area. Eagles have been known to prey on nesting Glaucous-winged Gulls (Butler *et al.* 1980, Vermeer and Devito 1989, Vermeer *et al.* 1989), cormorants (Carter et. al. 1992, Moul 2000, Giesbrecht 2001) and Great Blue Herons (Forbes 1987, Butler 1997, Vennesland 2000). Recent research suggests

that eagle predation has resulted in declines in Glaucous-winged Gulls, Double-crested Cormorants, and Great Blue Herons throughout the Strait (Butler 1997, Vennesland 2000, Giesbrecht 2001, Sullivan et. al. 2001).

Disturbance from Eagles can also lead to increased egg and chick predation by gulls and corvids (Verbeek 1982). In numerous cases, eagles have been seen to disturb nesting birds by either flying over a colony or perching within a colony (Moul 2000, Sullivan et al. 2001). When eagles are present, the entire colony of gulls and/or cormorants flush from their nests. The cormorants flock and fly in a wide circle out over the water before returning to their nests during which time either eagles, or other opportunistic predators such as gulls, and corvids feed on the unprotected eggs or juvenile birds (Vermeer 1982, Moul 2000).

The reasons for the high impacts by eagles are complicated. It has been speculated that the preponderance of eagles feeding on cormorants and herons may be a result of the decreased availability of fish, a common food source. Furthermore, it has been speculated that eagles are perching within colonies because of the lack of suitable habitat on adjacent foreshores due to increased urban development. Finally, Verbeek (1982) suggested, that eagles frequently fly over colonies because they are often disturbed from preferred perch sites by boaters and sea–side visitors.

6.2 Human disturbance: people visiting colonies

Disturbance from people visiting breeding bird colonies has been well documented in the Strait of Georgia (Drent et al. 1964, Verbeek 1982, Henny et al. 1989, Moul 2000). Disturbance of seabirds at high-density nesting colonies is of particular concern because a large portion of the population relies on successful breeding in a small area (for example, a rocky island; Rodgers and Smith 1995). The disturbance at seabird colonies is varied and can affect birds in numerous ways including: egg and nestling mortality, premature fledging, colony abandonment, increased susceptibility to predation, and increased stress leading to changes in adult behaviour and condition.

6.2.1 Egg and Nestling Mortality

Disturbance at nesting colonies can adversely affect both eggs and nestlings. There is ample evidence that documents the incidence of egg predation of various species of birds after humans have flushed adults. When humans approach, adult birds take to the air, leaving their nests, eggs and chicks vulnerable to predation by gulls and corvids (Henney et. al. 1989, Giese 1999, Moul 2001, Chatwin et al. 2001). Ellison and Cleary (1978) pointed out that by approaching nests close enough to flush the adults, they caused the immediate failure of some sub-colonies of late nesting cormorants by facilitating gull predation.

Hatching rates can also be affected. Hunt (1972) found that gull colonies frequented by picnickers had lower hatching success than undisturbed colonies. Human disturbance can also negatively affect the normal growth of young birds. The reduced nestling body mass and slower growth documented at colonies that encounter disturbance can lead to mortality (Drent et. al. 1964, Kurry and Gochfield 1975, Rodgers and Smith 1995). In addition, human disturbance has also been linked to the direct mortality of young birds. For example, when people walk among nests causing adults to flush, nestlings can die of prolonged exposure to heat or cold (Ellison and Cleary 1978). Furthermore, Ashmole (1963) noted that mortality caused by the pecking of chicks by adults was greatly increased where there was human disturbance at Sooty Tern (*Sterna fuscata*) colonies.

6.2.2 Premature fledging or colony abandonment

People approaching nesting seabirds have caused them to abandon nests, and in certain cases, to permanently abandon entire colonies (Henny el. al. 1989, Parnell et al. 1988, Chardine and Mendenhall 1998, Moul 2000, Vennesland 2000). Henny et al. (1989) attributes the abandonment of Double-crested Cormorant colonies in the San Juan Islands to the high number of human visitors. Moul (2000) also suggested that the abandonment of a cormorant colony on Henry Island (southeast of Mandarte) as being due to people throwing sticks and rocks from above.

Human disturbance that may lead to abandonment has also been documented in the southern Strait of Georgia. People have been seen landing at some of the colonies such as Chain Islets, Snake Island and Mandarte Island. Visitors boating around Chain Islets have sometimes allowed their dogs to walk on islands while they stay on their boats (M. Lambert, pers. obs). These activities are of concern because dogs have resulted in the serious colony reductions and early fledging among Rhinoceros Auklets (Henney et. al. 1989) and Spectacled Guillemots (*Cepphus carbo*) (Chardine and Mendenhall 1998).

6.2.3 Increased stress responses

Adult behaviour may be modified by disturbance resulting in less efficient foraging that could lead to the starvation of young (Safina and Burger 1983, Skagen et al 1991) as well as increased aggression leading to mortality by parents pecking eggs and chicks (Robert and Ralph 1975). While flight is the most obvious reaction to disturbance, human presence can have more subtle affects as well. Seigel-Causey and Hunt (1981) described how Double-crested Cormorants attempting to defend their nests from gulls and people may regurgitate food upon the ground in an attempt to distract the 'predator' from the nest. In most cases the gulls would then consume the bolus, and fly off thereby resulting in a net energy loss to the parents and ultimately the chicks.

Studies of penguins (Wilson, et al. 1991) and frigatebirds (Tindle 1979) show that although these birds do not appear perturbed by the approach of humans (e.g., no visible signs are recorded), they do show signs of physiological stress, as indicated by significant increases in heart rate. Adverse physiological responses have also been noted in studies of Adelie Penguins (*Pygoscelis adeliae*), Gentoo Penguins (*Pygoscelis papau*), Herring Gulls (*Larus argentatus*) and Redshanks (*Tringa tetanus*). The heart rate of Adelie Penguins can increase by 52% when approached to 5 m by a human, but increases by only 25% when the birds are approached by other Adelie Penguins. Short-term increases in heart rate are unlikely to result in direct mortality of seabirds, but these physiological responses do indicate a stress response, which has been linked to increased energy consumption and suppression of the immune system (Giese 1999). The increased stress can also result in higher aggression levels among the birds and subsequently less attentiveness to their nests (Olsson and Gabrielsen 1990).

6.3 Human disturbance: boater traffic

All of the IBAs in the area covered by this conservation plan are subject to disturbance from boating traffic. In some cases, disturbance is part of day-to-day operations (e.g., ferry traffic, travel to and from marinas). In other cases, wildlife (generally whales, but in many instances birds) are actively being sought out, either as part of a commercial operation, or as part of a self-directed recreational experience.

Wildlife viewing, either commercial, or non-commercial, is a fast-growing past-time in BC. Commercial operations have expanded considerably in the last number of years. The commercial whale-watching industry operating out of the Victoria harbour has grown from one company and one boat in 1987, to approximately 20 companies operating 35–40 boats in 2000 (D. Kukat, pers. comm). In addition to the commercial wildlife viewing community, there are a growing number of individuals that are seeking outdoor experiences separate from commercially guided tours. As a result, there is a general increase in the number of water-based interactions between people and wildlife along the coastal waters of BC. Recreational boating in this area is also on the increase. In the Victoria/ Saanich Peninsula area there are upwards of eight marinas, nine government wharves, and at least ten public boat ramps. Over 650 boats are moored at two marinas (Oak Bay Marina and the Royal Victoria Yacht Club) alone.

Near southern Vancouver Island, seabird islands are often visited by commercial operations as part of their tour packages, while other companies visit these areas during times when whales cannot be located. Recreational boaters also visit these areas often, approaching cliffs and circumnavigating islands while remaining in their boats. The increasing popularity of kayaks may also lead to significant disturbance. Kayakers can approach cliffs with nesting birds very closely and linger for greater amounts of time than many other boats. Sullivan (in Moul, 2000) observed Pelagic Cormorants flushing in apparent response to boat traffic, including kayakers that came in close proximity to the cliff faces on Mandarte Island.

While not necessarily as significant as disturbance from people walking through colonies, disturbance from boater traffic can represent a similar type of threat and impose the same potential impacts. In fact, disturbance from recreational boaters leading to predation by Glaucous-winged Gulls and Northwestern Crows (*Corvus caurinus*) has been a significant problem at many colonies since the 1950s and may account for the abandonment or irregular use of these colonies (Drent and Guiguet 1961, Rodway and Campbell 1977, Vermeer et al. 1989, Carter et. al. 1995). Furthermore, Verbeek (1982) observed significantly more mortality to cormorant eggs and chicks on weekends compared with weekdays. This result was due to the greater numbers of boaters and visitors to beaches during weekends. During these times, people approached too close to colonies and disturbed resident Bald Eagles from perches at nearby beaches.

In some cases, boats can disturb large numbers, or rafts, of birds on the water. Depending upon the season, many of these birds are moulting (i.e., they are in the process of replacing their flight feathers and are incapable of flying). This disturbance often occurs as fast-moving boats are traveling to and from whale-watching areas, when boaters travel close to rocky shorelines, or when they pass through areas of high bird concentrations (e.g., Active and Porlier Pass). In some places, bird such as Harlequin Ducks moult during the mid-summer months, a time that is typically peak recreational boating (especially kayaking) season. In response to these disturbances, birds may be forced to repeatedly dive to avoid contact (B. Booth per. obs., M. Lambert per. obs.,) resulting in increased energetic costs that may ultimately have an effect on their survival or productivity in subsequent breeding seasons.

6.4 Water pollution: oil spills and discharge from boats

Many of the IBAs in the vicinity of southern Vancouver Island see large numbers of birds congregating on the water in relatively small areas. As a result, the birds occurring in these areas are vulnerable to water pollution, either in the form of oil spills or from discharge from boats. For example, many of the IBAs are situated in major travel corridors or in heavily used boating areas. Snake Island is in close proximity to the Nanaimo Harbour and Active Pass is the main route for BC Ferry traffic as well as being a popular recreational boating area. Sidney Channel is in the shipping channel of oil tanker traffic to and from a large oil refinery at Cherry Point, Washington. It is also subject to heavy recreational boater traffic because of the location of a Canada Customs Station in Sidney as is the Chain Islets and Great Chain Island IBA because it is in close proximity to one of the largest marinas on Vancouver Island.

6.5 Commercial fishing

The potential effects of commercial fishing have widely been speculated as a causal agent, or as a potential threat for declines of seabird populations. This is not surprising because: a) most seabirds, during the breeding season, feed on abundant, small, densely schooling pelagic fishes (Montevecchi 1993); b) there is often a large overlap with commercial fisheries for these species (Montevecchi 1993, Furness 1996, 1999); and c) these fisheries are often over-exploited (Montevecchi 1993).

One of the important things to consider when discussing the potential impacts of fishing, and food reduction in general is the life history of seabirds. Seabirds differ significantly from the prey species that they consume: they are generally long-lived, produce few fledglings that have delayed maturation, and they produce few young per year (Furness 1999). They also have a strong fidelity to nesting sites and show strong fidelity to natal areas (e.g., they tend to breed where they were born; Furness 1996, 1999). As a result, their populations increase and decrease slowly (Furness 1999). Conversely, prey species of fish have short life spans with early and highly variable recruitment and, as a result, their abundance fluctuates rapidly and unpredictably (Furness 1999). Consequently, seabirds must be able to employ behavioural buffering mechanisms to be able to cope with changes in the availability of food. These mechanisms include prey switching, selecting high-density patches of prey, seasonal migrations, flexible time budgets (i.e., increased parental effort), brood reduction, flexible chick growth rates and periodic non-breeding and emigration according to food abundance (Furness 1996). Seabirds do not track short term changes in prey abundance; rather, they have buffering mechanisms to cope with variations in food supplies (Furness

1999). These buffering mechanisms vary among species in "strength" and form (Furness 1996, Phillips et al. 1996)

Regardless of the ability of species to buffer changes in prey availability, there is evidence that reduced food supplies has been shown to lead to increases in mortality (Vader et al. 1990, Harris and Bailey 1992, Barrett and Krasnov 1996) and to decreases in chick growth and/or breeding success (Hunt et al. 1996, Ratcliff et al. 1998). Furthermore, high rates of emigration and non-breeding have also been observed under conditions of food shortage (Furness 1996, Furness and Tasker 2000). While there is evidence to suggest that reduced abundance of prey fish can lower breeding success, it is difficult to say how much a stock must be reduced in order to exceed the buffering capacity of seabirds (Furness 1996).

Commercial fishing is of concern because it can lead to dramatic changes in fish populations. Furness (1999) suggests three potential ways that commercial or industrial fishing could affect seabird populations. First, industrial fishing could potentially reduce stock biomass such that it falls below levels that would sustain breeding success and/or survival. Second, long-term over-fishing may result in reductions in the mean level, or increase the variability of the fished stock, thereby resulting in long-term reductions in food supply. Third, fishing could alter the food-web of aquatic systems by affecting the competitive balance of fished or un-fished stocks, or between heavily and lightly fished stocks (e.g., fishing could result in a decrease of one species, but result in the increase of a second species due to a relaxation of predation pressure). The effect on seabirds would depend upon which prey species increase or decrease. In some cases, commercial fisheries can also make food available to scavenging birds that would normally be unavailable (Furness 1996).

Except in extreme cases, the effects of over-fishing are difficult to document (Montevecchi 1993). Nonetheless there are ample examples where this has occurred. For instance, over-fishing of anchoveta and its affect on Peruvian guano birds (Schaefer 1970, as cited in Montevecchi 1993), anchovies and pelicans in Southern California (Anderson and Gress 1984 as cited in Montevecchi 1993), and capelin and alcids in Norway (Vader et al. 1990).

While there are examples of how fishing has led to declines in seabirds, dramatic declines in some fish stocks have not necessarily been associated with changes in seabird numbers (Barnett and Krasnov 1996). Despite the well-known examples of dramatic crashes in seabirds, there is also ample evidence indicating that marine fisheries can lead to general increases in avian food supplies (Montevecchi 1993, Barnett and Krasnov 1996, Furness 1999). For example, in the North Sea most stocks of large predatory fish have been depleted for some time: herring and mackerel were greatly reduced in the early 1970's (Furness 1999). Currently, the fishery in the North Sea is focused on sandlance (1 million tons/year), a species of fish that many of the over 4 million seabirds rely on during the breeding season, yet seabird numbers have increased over recent decades (Furness 1999). In other words, there does not appear to be any strong evidence that the commercial sandlance fishery in the North Sea has affected seabird numbers or breeding success (Furness 1999).

It is unclear why seabirds have continued to persist in the North Sea despite significant fishing pressure. One of the factors may be due to the overwhelming importance of the removal of mackerel, a keystone predator in this system. The reduction in predation by mackerel may have enabled the sandlance population to increase despite a significant industrial fishery (Furness 1999). A similar situation may have occurred in Barnets Sea where increase in capelin stocks (a common prey item of several species of seabirds in this area) was the result of the overfishing of herring, the capelin's main predator (Barnett and Krasnov 1996).

Despite this general trend of the persistence of seabirds with commercial fishing, there is nonetheless cause for concern. Seabirds do appear to possess behavioural mechanisms to cope with short-term changes in prey abundance. However, as previously stated the buffering mechanisms vary among species in "strength" and form (Furness 1996). Factors that affect vulnerability to variations in food abundance include the importance of limited forage range, limited ability to dive, little time to allow for increases in foraging effort, energy expensive foraging methods, and the low ability to switch to alternate diets. (Furness and Tasker 2000). Furthermore, due to the reliance of seabirds on a target species where

alternative food sources do not exist, attention should be paid to where human fishing pressure may be greatest (Furness and Tasker 2000).

In the Strait of Georgia, over 100 species of fish are potential prey for birds (Hay et al. 1989). Of these, adult salmon and herring are subject to commercial fishing pressures, while their juvenile stages represent potential prey for seabirds, (Hay et al. 1989). The younger age classes of both herring and salmon rear in the Strait and then leave to open waters before returning as adults to spawn (Hay et al. 1989). It is during the rearing period that both salmon and herring are available as food for seabirds. Herring are probably the single most important prey species for seabirds in the Strait. Juvenile herring, in their first year of life, are mainly resident in the Strait, although some seem to move into the Johnstone Strait area (D. Hay, pers. comm.). During this time they tend to be in relatively shallow waters and are potential prey for seabirds (Hay et al. 1989). Conversely, after their second year, herring migrate out of the Strait making them unavailable to seabirds until they return to spawn (Hay et al. 1989). As a result of the migratory nature of these fish, they are likely to represent an opportunistic food source for resident seabirds (Hay et al. 1989). There are, however, many areas of the Strait of Georgia that retain some resident or non-migratory herring throughout the summer, but the distribution and abundance of these stocks changes among years. (DFO 2001).

Prior to the 1960s, the overexploitation of the herring fishery resulted in significant decreases in abundance of herring throughout the Strait of Georgia, to the point where the commercial fishery collapsed in 1967 (DFO 2001). Since that time, however, stocks have rebounded to near, or in excess of, historic levels (DFO 2001, D. Hay, pers. comm.). Little is known about the status of the resident stocks of herring at this time, although it is believed that the population has been low for the last 20 years (D. Hay, pers. comm.), and in some quarters it is believed that present herring management is leading to the reduction and potential extirpation of this population.

7. Conservation Options

There are several reoccurring conservation concerns throughout the IBAs in this area. These include: 1) threats to water quality, primarily from ship discharge or oil spills, but also homes and businesses; 2) unintentional disturbance by boaters that are unaware of the locations of seabird islands; 3) disturbance from inappropriate approaches to colonies by private boaters and the ecotourisim industry; and 4) predation, due either directly to Bald Eagles or as a result of eagles disturbing nesting birds and allowing other predators such as gulls and corvids access to their eggs and young.

For some of the conservation concerns, mitigation measures are already in place (e.g., BC Oil Spill Workforce). In other cases, mitigation can come from initiatives that arise from either government or non-government agencies (e.g., BC Parks, BC Ministry of Water, Air, and Land Protection (MWALP), BC IBA program). The cases that can be influenced by government and non-government agencies fall into four main areas. These are:

1. broad-scale outreach and education programs that raise the awareness of birds in these marine areas;
2. a directed outreach program that examines the relationship between boaters and seabirds;
3. an additional outreach program including the development of seabird viewing guidelines that focuses on the disturbance caused by the boating community and is directed towards ecotourism operations and recreationalists,; and
4. an examination of stewardship initiatives addressing water quality issues that focuses on businesses operating in the waterfront areas.

Given the scope of these initiatives, it will be important to examine the formation of potential partnerships for the completion of this work.

7.1 Broad scale promotion of wildlife values/resources on southern Vancouver Island.

The first and foremost initiative should be a broad scale promotion of the **values** of the IBAs from an international perspective. In many ways, certain branches of provincial and local governments, as well as local citizens, are unaware of the significance of the wildlife resources that are present in their areas of jurisdiction and backyards. Without this recognition, there is a tendency for these sites to be visited, treated, and managed without due care and attention. Any efforts to advertise these areas as sites of significance must be tempered with a likely increase in viewing pressure. Consequently, efforts to promote these areas must be accompanied with an active program that addresses the potential conflict between wildlife viewing and the welfare of the wildlife. The promotion of these areas as extremely valuable resources can be done through the following initiatives: interpretive programs, static displays, and the mapping of sensitive areas.

7.1.1 Interpretive programs

There are ample opportunities for the promotion of the values of these sites both locally (e.g., Vancouver Island) and globally. One of the ways to highlight these sites, while at the same time promoting responsible viewing etiquette would be to work in conjunction with BC Ferries. The positioning of interpreters on board all major BC Ferry routes would be an extremely effective way to reach a wide audience. Interpreters are currently present on the inside passage run; and there have been interpreters on some of the Gulf Island runs. Positioning interpreters on sailings between Vancouver and Victoria, and between Vancouver and Nanaimo could expound the virtues of the marine IBAs in the waters of southern Vancouver Island to a large audience.

7.1.2 Static displays

The development of both signage and informational material is an additional means by which to disseminate information pertaining to these IBAs. Static displays either on board BC Ferries, or at selected places at the five main terminals (Swartz Bay, Tsawwassen, Horseshoe Bay, Duke Point and Nanaimo), would provide information to a broad audience. In addition to the location of such displays at terminals, BC Ferries has agreed in principal to house 19 x 25” panels on the ships running between Vancouver Island and the Lower Mainland (M. Cummings, pers. comm.). Static displays could also be erected at selected marinas, especially those marinas that receive visitors from international waters.

Apart from BC Ferries, there are numerous opportunities for the development of educational material and signage throughout the region (e.g., Victoria inner harbour, Cattle Point).

7.1.3 Mapping of IBAs on nautical charts or some similar medium

One of the issues that is problematic with respect to IBAs is the lack of knowledge of their location. While the concept of an IBA is new, some of the sites are also ecological reserves (e.g., Chain Islets, Snake Island) yet these designations do not appear on nautical charts. It may be unrealistic to have these sites identified on nautical charts in the short term, however, providing maps of these areas, and activities that are permitted on them, at marinas would potentially lead to more responsible use of these areas.

7.2 Mitigating disturbance

Disturbance at these IBAs will likely increase as the human population grows, and as the popularity of wildlife viewing increases. It is therefore important that the public be made aware of how disturbance affects wildlife, and how to share the waters with wildlife without causing undue disturbance. There are ongoing initiatives that address wildlife viewing, particularly marine mammals, but there are no specific programs geared towards seabirds. BC Parks in Victoria has produced a general set of guidelines that are intended specifically for the wildlife-viewing public. It is important, however to develop a system and a strategy to develop and disseminate information pertaining specifically to seabirds. It is also

important to develop a multi-faceted approach that targets a wide range of "users". The target audience for this program should include individuals and organization from both the commercial and non-commercial sector (Table 12).

There are a number of different ways to address the issue of disturbance. These include: an active outreach program, the development of appropriate educational material, signage at selected sites and the development of viewing guidelines.

7.2.1 Active outreach program

One aspect of an active outreach program would involve the development of slide presentations to yacht clubs, kayak and canoe clubs, and whale-watching companies. These presentations would be designed around delivering a message on the value of protecting seabirds, their island colonies and why it is important not to disturb the birds, especially during the breeding season. This program could be developed as an informal presentation, or as a more formal program for specific audiences. There are also a number of different formal meetings and training sessions that could be included in this type of a program. These could include an annual marine naturalist training series (UVIC), and potentially training sessions could be conducted by organizations such as the BC Sea Kayak Guides Alliance or the Association of Canadian Sea Kayak Guides, Ecomarine Ocean Kayak Centre etc., as well as schools offering outdoor programs. In addition, there are a number of different media outlets that can be used in conjunction with this program. Community television and the development of school-based programs could also be used to reach a broader range on individuals with this message.

Table 11. Individuals and organizations that should be a part of a strategy designed to address disturbance at nesting seabird islands, and marine areas.

Commercial operations	**Non-commercial operations**
sea kayaking guiding association	kayaking community
whale watching industry	recreational boaters including international visitors
other eco-tour operators	pedestrians, including people with dogs
marinas	Birders/naturalists
outdoor outfitting stores	Divers

7.2.2 Educational material (e.g., brochure, magazine articles) for distribution to various user groups

The development of an informational brochure outlining a range of issues should be prepared. This material should include information on the location of sensitive areas, the natural history of seabirds in the area, the potential affects of disturbance, ways to detect the signs of disturbance, appropriate behaviours while viewing wildlife, including distances to stay back from colonies and roosting birds. These brochures could be distributed in a wide range of places including marinas, outdoor stores, aboard BC Ferries, and at boat stores. A series of brochures should be considered given the wide audience that needs to be addressed (e.g., water-based traffic, pedestrians, commercial and non-commercial users). For example, a more formalized brochure may need to be produced for distribution to the kayaking guiding association for incorporation into their code of conducts and permitting system that is being developed. The kayaking community in BC publishes at least one locally produced electronic and print magazine that has a wide circulation. This magazine would be an excellent venue to promote a responsible ethic regarding seabird viewing.

7.2.3 Development of signage at strategic locations

There are ample places in this region to place signs promoting responsible boating when in the vicinity of either nesting or roosting seabirds. Signs could be placed at strategic locations in the area, such as marinas, government wharves, or public boat ramps. Signs alerting boaters to the potential for

disturbance to seabird colonies have already been erected in some of these areas. Signs should also be considered on seabird islands. Although distasteful to some, these signs have proven successful at specific locations in the area (T. Chatwin, pers. comm.).

7.2.4 Development of guidelines

Outreach material that is general in nature should be followed up with the establishment of guidelines to limit disturbance around nesting colonies. It will be most advantageous if protocols for boaters near colonies can be established in cooperation with various members of the boating community, as well as from seabird biologists, and regulatory agencies (e.g., Department of Fisheries and Oceans, Environment Canada, and the Ministry of Water, Air, and Land Protection, Ministry of Small Business and Tourism). Guidelines for viewing seabird colonies should consider the following: buffer zones or set back distances, the timing of activities around colonies, and the monitoring of compliance and efficacy of guidelines.

7.2.4.1 Set-back distances

A set-back distance, as defined by Rodgers and Smith (1995), is a minimum distance of non-intrusion by humans measured from the perimeter of the colony that will preclude disturbances to nesting birds. Previous recommendations for set-backs have ranged from 50-600 m (Erwin 1989, Anderson 1988). Rodgers and Smith (1995) studied colonial nesting birds in Florida and tested distances that the birds flushed when approached by boat and on foot. They found that Double-crested Cormorants needed a set-back distance of 96 m from walking approaches, and 71 m from motorboat approaches. Schreiber and Schreiber (1978 as cited in Rodgers and Smith 1995) also recommend that Double-crested Cormorants not be approached closer than 75 m. Rodgers and Smith (1995) calculated set-back distances for Great Blue Herons as 100 m from walking approaches and 82 m from motorboats. However, Vennesland (2000) recommended a set-back distance of 165 m from walking approaches to Heron colonies in south-western BC. As set-back distances vary among sites as well within species, it will be important to incorporate this variability into their development. Some preliminary observations on critical approach distances at an island may be necessary before management prescriptions can be formulated for a particular setting (WBM Oceanics and Claridge, 1997); however, these trials need to be carefully designed and implemented.

7.2.4.2 Timing of visits to nesting colonies

Attempts should be made to discourage companies and the general public from approaching colonies during critical times in the breeding season. If colonies are to be visited, this should be done as late in the nesting cycle as possible, preferably when the young are at least half grown and thus less susceptible to predation (Kurry and Gochfeld 1975, Ellison and Cleary 1978).

7.2.4.2 Monitoring of activities around nesting colonies

Should guidelines be implemented, it will be important to monitor breeding colonies for changes in colony status and species composition so that the set-back distances can be adjusted.

7.2.5 Dog walking community

One of the most controversial aspects of disturbance of seabirds is the impact of foot traffic, particularly if unleashed dogs accompany people on foot. Many jurisdictions have taken a landscape approach to dealing with human/dog disturbance. In many areas, regional districts have designated “dog friendly” or leash-free areas where dogs are allowed to run unencumbered. The Capital Regional District should attempt to address the disturbance caused by dogs and dog owners in a similar way. Consideration could be given to applying seasonal restrictions to sensitive areas. For example, during the time at which Brant are using Sidney Channel, dogs should have to be leashed while in Island View Beach Park. Community television broadcasts, and a brochure specifically geared towards how dog owners interact with seabirds may prove to be a useful tool to reduce the impacts to seabirds.

7.3 Water quality issues: sound management of marinas

Water quality is an important issue to address when one considers the well-being of seabirds. Significant efforts have been made to inform boaters about how to conduct boating activities in an environmentally friendly manner (e.g., Baynes Sound Boaters Guide, Protecting the aquatic environment: a boaters guide). One area that has not received as much attention is the operation of marinas. To help marina operators carry out business in an ecologically sensitive manner, the Comox Valley Project Watershed is developing a program that will provide educational opportunities to marina operators, via workshops and access to Best Management Practices information. Consideration could be given to the expansion of this program to include other marine waters off southern Vancouver Island.

8. Groups active in the areas that encompass the IBA(s)

- The **Department of Fisheries and Oceans Canada (DFO)** has responsibility for the management and regulation of all commercial fisheries in the region. In addition, DFO also plays a role in stewardship initiatives in the area, and the establishment of Marine Protected Areas.
- The **Canadian Wildlife Service (Environment Canada)** is the federal agency responsible for the management of migratory birds that inhabit the area. CWS also plays a major role in the Pacific Coast Joint Venture. The **Pacific Coast Joint Venture** (PCJV) under the auspices of the Pacific Coast Estuary Conservation Plan is a major player in land acquisition along the coastal areas of BC
- **Parks Canada** is responsible, or will be responsible for National Marine Conservation Areas in the vicinity of southern Vancouver Island - some of which are IBAs
- **BC Parks** has several provincial parks and ecological reserves in the area.
- The **Ministry of Water, Land and Air Protection (MWLAP)** is the provincial agency responsible for the management of many of the species wildlife in the province.
- **Veins of Life Watershed Society** is a community-based environmental organization operating in the Capital Region District (Victoria) that focuses on a watershed-based approach, and initiates habitat restoration projects, stream cleanups, environmental education programs and public outreach activities**.**
- **LifeForce Foundation** develops and distributes information on whales and whale watching activities in the Strait of Georgia.

9. Opportunities

There are ample opportunities to address the impacts of disturbance on seabirds in the area encompassed by these IBAs. There is a will on behalf of numerous levels of government, and also the capacity within the non-governmental community to execute a wide range of actions to address this issue. Several initiatives that address the issue of marine mammal viewing are on-going in this area. With careful planning these initiatives could be expanded upon to encompass many of the issues described here. Fundamental to this will be the need to coordinate efforts in order to reduce project overlap.

10. Evaluating success

The IBAs in the vicinity of southern Vancouver Island encompass a large geographic area that share common concerns. Disturbance of seabird colonies and of birds on the water represents a conservation concern that is prevalent throughout the area and in other parts of the province. Not surprisingly, this issue also presents a significant challenge in terms of coordinating a wide variety of government and non-government agencies. It is clear that there is both a need and a desire to see the issue of disturbance being addressed. Success will be measured by the implementation of all, or parts of this plan. To accomplish this would likely require a fulltime coordinator that is funded from sources outside of government to do some of this work, especially during the current climate of fiscal restraint.

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Appendix 1: IBA Canada Partners

Federation of BC Naturalists (FBCN)

"To know nature and to keep it worth knowing"

The Federation of BC Naturalists is a family of naturalist organizations dedicated to fostering an appreciation and understanding of our natural environment, so that it may be used wisely and maintained for future generations. We believe that negotiation and cooperation are ways to build a lasting conservation strategy in British Columbia. Through partnerships with other organizations and governments we strive to further conservation and natural history education in the province of BC. Our membership is open without prejudice to all who share our goals.

The FBCN was founded in 1969, although many of its member clubs have been in existence for much longer. There are currently 51 federated and affiliated member clubs and approximately 5,300 members from communities all around British Columbia. The FBCN is an affiliate of the Canadian Nature Federation. The FBCN is active in nature education and conservation, and is the British Columbia lead agency for two major projects: The Living by Water Project and the BC Important Bird Areas Program. The FBCN website is www.naturalists.bc.ca

WBT Wild Bird Trust of BC

Wild Bird Trust is non-profit society dedicated to the protection of birds and their habitats, on the principle that all wildlife must benefit. This mission is carried out through the establishment and management of wildlife sanctuaries, the production of various publications that address conservation and management concerns for birds and their habitats throughout the Province, the housing of the largest regional electronic database and reference library for birds, reptiles and amphibians in the Province, school- and home-based wildlife education programs, volunteer-based inventory programs and an active Heron stewardship program in the Georgia Basin of BC.

BirdLife International

A pioneer in its field, BirdLife International (BL) is the first non-government organization dedicated to promoting world-wide interest in and concern for the conservation of all birds and the special contribution they make to global biodiversity. BirdLife operates as a partnership of non-governmental conservation organizations, grouped together within geographic regions (e.g. Europe, Africa, Americas) for the purpose of planning and implementing regional programs. These organizations provide a link to on-the-ground conservation projects that involve local people with local expertise and knowledge. There are currently 20 countries involved in the Americas program throughout North, Central and South America.

For further information about BirdLife International, check the following web site: http://www.birdlife.net/.

The Canadian Important Bird Areas Program has been undertaken by a partnership of two lead agencies. The Canadian Nature Federation and Bird Studies Canada are the Canadian BirdLife International partners.

The Canadian Nature Federation (CNF) The Canadian Nature Federation is a national conservation organization with a mission to be Canada's voice for the protection of nature, its diversity, and the processes that sustain it. The CNF represents the naturalist community and works closely with our provincial, territorial and local affiliated naturalists organizations to directly reach 100,000 Canadians. The strength of our grassroots naturalists' network allows us to work effectively and knowledgeably on national conservation issues that affect a diversity of ecosystems and human populations in Canada. The CNF also works in partnership with other environmental organizations, government and industry, wherever possible.

Our approach is open and cooperative while remaining firm in our goal of developing ecologically-sound solutions to conservation problems. CNF's web site is http://www.cnf.ca.

Bird Studies Canada (BSC)

The mission of Bird Studies Canada is to advance the understanding, appreciation and conservation of wild birds and their habitats, in Canada and elsewhere, through studies that engage the skills, enthusiasm and support of its members, volunteers, staff and the interested public. Bird Studies Canada believes that thousands of volunteers working together, with the guidance of a small group of professionals, can accomplish much more than could the two groups working independently. Current programs collectively involve over 10,000 volunteer participants from across Canada.

Bird Studies Canada is recognized nation-wide as a leading and respected not-for-profit conservation organization dedicated to the study and understanding of wild birds and their habitats. Bird Studies Canada's web site is www.bsc-eoc.org/.