Species at Risk Act
Recovery Strategy Series

Recovery Strategy for the Short-tailed Albatross (*Phoebastria albatrus*) and Pink-footed Shearwater (*Puffinus creatopus*) in Canada

Short-tailed Albatross and Pink-footed Shearwater

2008

Environment Canada Environnement Canada

Canada

About the *Species at Risk Act* Recovery Strategy Series

What is the *Species at Risk Act* (SARA)?

SARA is the Act developed by the federal government as a key contribution to the common national effort to protect and conserve species at risk in Canada. SARA came into force in 2003, and one of its purposes is *"to provide for the recovery of wildlife species that are extirpated, endangered or threatened as a result of human activity."*

What is recovery?

In the context of species at risk conservation, **recovery** is the process by which the decline of an endangered, threatened, or extirpated species is arrested or reversed, and threats are removed or reduced to improve the likelihood of the species' persistence in the wild. A species will be considered **recovered** when its long-term persistence in the wild has been secured.

What is a recovery strategy?

A recovery strategy is a planning document that identifies what needs to be done to arrest or reverse the decline of a species. It sets goals and objectives and identifies the main areas of activities to be undertaken. Detailed planning is done at the action plan stage.

Recovery strategy development is a commitment of all provinces and territories and of three federal agencies — Environment Canada, Parks Canada Agency, and Fisheries and Oceans Canada — under the Accord for the Protection of Species at Risk. Sections 37–46 of SARA (www.sararegistry.gc.ca/the_act/default_e.cfm) outline both the required content and the process for developing recovery strategies published in this series.

Depending on the status of the species and when it was assessed, a recovery strategy has to be developed within one to two years after the species is added to the List of Wildlife Species at Risk. A period of three to four years is allowed for those species that were automatically listed when SARA came into force.

What's next?

In most cases, one or more action plans will be developed to define and guide implementation of the recovery strategy. Nevertheless, directions set in the recovery strategy are sufficient to begin involving communities, land users, and conservationists in recovery implementation. Cost-effective measures to prevent the reduction or loss of the species should not be postponed for lack of full scientific certainty.

The series

This series presents the recovery strategies prepared or adopted by the federal government under SARA. New documents will be added regularly as species get listed and as strategies are updated.

To learn more

To learn more about SARA and recovery initiatives, please consult the SARA Public Registry (www.sararegistry.gc.ca/) and the Web site of the Recovery Secretariat (www.speciesatrisk.gc.ca/recovery/).

Recovery Strategy for the Short-tailed Albatross (*Phoebastria albatrus*) and the Pink-footed Shearwater (*Puffinus creatopus*) in Canada

2008

Recommended citation:

Environment Canada. 2008. Recovery Strategy for the Short-tailed Albatross (*Phoebastria albatrus*) and the Pink-footed Shearwater (*Puffinus creatopus*) in Canada. *Species at Risk Act* Recovery Strategy Series. Environment Canada, Ottawa. vii + 46 pp.

Additional copies:

Additional copies can be downloaded from the SARA Public Registry (www.sararegistry.gc.ca/).

Cover illustrations: Short-tailed Albatross: Hiroshi Hasegawa, Toho University, Japan
Pink-footed Shearwater: Peter Hodum, Oikonos-Ecosystem Knowledge

Également disponible en français sous le titre
« Programme de rétablissement de l'Albatros à queue courte (*Phoebastria albatrus*) et du Puffin à pieds roses (*Puffinus creatopus*) au Canada »

ISBN 978-0-662-48382-3
Catalogue no. En3-4/56-2008E-PDF

DECLARATION

This recovery strategy has been prepared in cooperation with the jurisdictions responsible for the Short-tailed Albatross and the Pink-footed Shearwater. Environment Canada has reviewed and accepts this document as its recovery strategy for the Short-tailed Albatross and the Pink-footed Shearwater, as required under the *Species at Risk Act* (SARA). This recovery strategy also constitutes advice to other jurisdictions and organizations that may be involved in recovering the species.

The goals, objectives and recovery approaches identified in the strategy are based on the best existing knowledge and are subject to modifications resulting from new findings and revised objectives.

This recovery strategy will be the basis for one or more action plans that will provide details on specific recovery measures to be taken to support conservation and recovery of the species. The Minister of the Environment will report on progress within five years, as required under SARA.

Success in the recovery of these species depends on the commitment and cooperation of many different constituencies that will be involved in implementing the directions set out in this strategy and will not be achieved by Environment Canada or any other jurisdiction alone.
In the spirit of the Accord for the Protection of Species at Risk, the Minister of the Environment invites all responsible jurisdictions and Canadians to join Environment Canada in supporting and implementing this strategy for the benefit of the Short-tailed Albatross and the Pink-footed Shearwater and Canadian society as a whole.

RESPONSIBLE JURISDICTIONS

Environment Canada (lead)
Fisheries and Oceans Canada (participating)
Parks Canada Agency (participating)
Province of British Columbia (participating)

AUTHORS

Joanna L. Smith – University of Washington
Nadine R. Parker – Transport Canada
Ken H. Morgan – Environment Canada
Louise K. Blight – University of British Columbia
Michael J. Chutter – BC Ministry of Environment
Peter J. Hodum – Oikonos-Ecosystem Knowledge
Tamee Mawani – Fisheries and Oceans Canada
David Cunnington - Environment Canada

ACKNOWLEDGMENTS

This recovery strategy was originally drafted by Jo Smith and Nadine Parker and was then revised by Ken Morgan and Louise Blight. Members of the Recovery Team, as well as David Cunnington and Lucy Reiss (Environment Canada), provided extensive comments. We thank the following individuals for their contributions to the development of the recovery strategy: Jamie Kenyon (Environment Canada); Pat O'Hara (University of Victoria/Environment Canada), David Hyrenbach (Duke University/University of Washington); Rob Suryan (Oregon State University, Hatfield Marine Science Center); Michelle Wainstein (Washington Sea Grant); Gary Drew, John Piatt and Jenny Wetzel (US Geological Survey, Alaska Science Center); Greg Balogh and Maura Naughton (US Fish and Wildlife Service); Tracee Geernaert (International Pacific Halibut Commission) and Ross Vennesland (Parks Canada Agency). Critical reviews by Maura Naughton (USFWS, Portland), Roberto Schlatter (Universidad Austral de Chile), Paul Sievert (USGS, Massachusetts Cooperative Fish & Wildlife Research Unit) and Rob Suryan helped improve the strategy. We especially thank Peter Hodum and Hiroshi Hasegawa (Toho University) for generously granting us permission to use their photographs.

STRATEGIC ENVIRONMENTAL ASSESSMENT

A strategic environmental assessment (SEA) is conducted on all SARA recovery planning documents, in accordance with the *Cabinet Directive on the Environmental Assessment of Policy, Plan and Program Proposals*. The purpose of a SEA is to incorporate environmental considerations into the development of public policies, plans, and program proposals to support environmentally sound decision-making.

Recovery planning is intended to benefit species at risk and biodiversity in general. However, it is recognized that strategies may also inadvertently lead to environmental effects beyond the intended benefits. The planning process based on national guidelines directly incorporates consideration of all environmental effects, with a particular focus on possible impacts on non-target species or habitats. The results of the SEA are incorporated directly into the strategy itself, but are also summarized below.

This recovery strategy will clearly benefit the environment by promoting the recovery of the Short-tailed Albatross and the Pink-footed Shearwater. The potential for the strategy to inadvertently lead to adverse effects on other species was considered. The SEA concluded that this strategy will clearly benefit the environment and will not entail any significant adverse effects. The reader should refer to the following sections of the document in particular: description of the species' habitat and biological needs, ecological role, and limiting factors; effects on other species; and the recommended approaches for recovery.

RESIDENCE

SARA defines residence as: *a dwelling-place, such as a den, nest or other similar area or place, that is occupied or habitually occupied by one or more individuals during all or part of their life cycles, including breeding, rearing, staging, wintering, feeding or hibernating* **[Subsection 2(1)]**.

Residence descriptions, or the rationale for why the residence concept does not apply to a given species, are posted on the SARA Public Registry: www.sararegistry.gc.ca/plans/residence_e.cfm.

PREFACE

The Short-tailed Albatross and the Pink-footed Shearwater are migratory birds protected under the *Migratory Birds Convention Act (1994)* and are under the management jurisdiction of the federal Ministry of the Environment. The Migratory Birds Convention Act, 1994 (MBCA) is the updated statute that implements the 1916 Migratory Birds Convention between Canada and the United States. The Family Diomedeidae is not listed in Article I of the Convention, but well-established policy dictates that albatrosses are protected under the MBCA by virtue of their inclusion in the Environment Canada document entitled Birds Protected in Canada under the Migratory Birds Convention Act (CWS 1991). SARA (Section 37) requires the competent minister to prepare recovery strategies for listed extirpated, endangered, or threatened species. Both species were listed as threatened under SARA in 2005.

Environment Canada, Canadian Wildlife Service - Pacific and Yukon Region led the development of this recovery strategy through the Short-Tailed Albatross and Pink-footed Shearwater Recovery Team.

The recovery strategy was developed in cooperation or consultation with:

Fisheries and Oceans Canada
Parks Canada Agency
Government of British Columbia

International conservation efforts are critical to the recovery of these species. This recovery strategy outlines recommended approaches within Canada. A number of other conservation plans exist to address these species internationally, including: the Pink-footed Shearwater North American Conservation Action Plan (Commission for Environmental Cooperation [CEC] 2005), developed cooperatively by Canada, the U.S. and Mexico; and the Draft Recovery Plan for Short-tailed Albatross, prepared by the U.S. Fish and Wildlife Service. This recovery strategy is consistent with and supports these international efforts.

EXECUTIVE SUMMARY

The Short-tailed Albatross (*Phoebastria albatrus*) and the Pink-footed Shearwater (*Puffinus creatopus*) are listed as threatened in Canada under the *Species at Risk Act*. These species have similar geographic distributions in Canadian waters, and share threats in marine habitats throughout their range. This recovery strategy takes a multi-species approach to their recovery.

The Short-tailed Albatross breeds on islands near the coast of Japan, with more than 85 percent of the population nesting on one island, an active volcano. Historically, Short-tailed Albatrosses were estimated to number in the millions but due to feather hunting pressure, the population was reduced to less than an estimated 50 individuals in the 1930s. Hunting no longer occurs, and conservation actions on the nesting island have resulted in improved breeding success. Today, the population of Short-tailed Albatrosses is estimated at 2,130 individuals and the population is increasing at 6-8 percent per year. Prior to the species' decline, these birds were once common visitors to the coast of British Columbia. Since 1996, 35 Short-tailed Albatrosses have been observed in or within 100 km of Canada's Exclusive Economic Zone.

The Pink-footed Shearwater is known to breed on only three islands in Chile. On their colonies, major threats include introduced predators and an illegal harvest of chicks. Pink-footed Shearwaters have been observed in Canadian waters from late March through late October.

Short-tailed Albatrosses and Pink-footed Shearwaters observed in Canada have similar distributions over the continental shelf and upper slope waters off the west coast. Canadian threats to both species are similar and include potential interactions with commercial longline or gillnet fisheries, oil pollution, the ingestion of plastics, and the bioaccumulation of heavy metals and other pollutants. The potential interactions between these species and the commercial fishing industry include incidental take during fishing, and injury or entanglement in discarded nets and lines. Offshore oil and gas activities pose a potential threat, and planned offshore wind farms may degrade or prevent access to certain foraging locations. Climate change poses a potential threat.

The recovery goal is to support and augment international efforts to restore and increase populations of Short-tailed Albatrosses and Pink-footed Shearwaters. Recovery objectives for the species in Canada are to: minimize or remove threats under Canadian jurisdiction; identify and conserve Canadian marine habitats of importance; promote, support and augment international initiatives contributing to the recovery throughout their range; develop and implement educational activities that support recovery in Canada; and address knowledge gaps concerning threats and Short-tailed Albatross and Pink-footed Shearwater ecology in Canada.

Critical habitats for these species in Canada have not been identified. A schedule of studies is given to determine whether the concept of critical habitat applies to these species in Canadian waters, and if so, how to identify it. Until the applicability of critical habitat to these species is assessed, this represents a significant knowledge gap. Other knowledge gaps include the percentage of the total population that occurs in Canada, the residency period in Canada, the potential overlap with commercial fisheries, the potential impact of future oil and windfarm development, and a global population estimate for the number of breeding Pink-footed Shearwaters. An action plan will be completed by July 2009.

TABLE OF CONTENTS

DECLARATION i
RESPONSIBLE JURISDICTIONS i
AUTHORS i
ACKNOWLEDGMENTS ii
STRATEGIC ENVIRONMENTAL ASSESSMENT ii
RESIDENCE iii
PREFACE iii
EXECUTIVE SUMMARY iv
List of Tables vii
List of Figures vii
1. BACKGROUND 1
1.1 Species Assessment Information from the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) 1
1.2 Description 2
1.2.1 Short-tailed Albatross 2
1.2.2 Pink-footed Shearwater 2
1.3 Populations and Distribution 2
1.3.1 Short-tailed Albatross 2
1.3.2 Pink-footed Shearwater 5
1.4 Needs of the Short-tailed Albatross and the Pink-footed Shearwater 7
1.4.1 Habitat and biological needs 7
1.4.2 Ecological role 14
1.4.3 Limiting factors 14
1.5 Threats 15
1.5.1 Threats at sea 15
1.5.2 Threats on the breeding grounds 21
1.6 Actions Already Completed or Underway 23
1.6.1 Legal status and protection 23
1.6.2 Research: breeding colonies 24
1.6.3 Fisheries related research and management 24
1.7 Knowledge Gaps 25
2. RECOVERY 26
2.1 Recovery Feasibility 27
2.2 Recovery Goal 27
2.3 Population and Distribution Objectives 28
2.4 Recovery Objectives 29
2.5 Approaches Recommended to Meet Recovery Objectives 29
2.5.1 Narrative to support Recovery Planning Tablerecovery planning table 29
2.5.2 Recovery planning 30
2.6 Performance Indicators 33
2.7 Critical Habitat 35
2.7.1 Identification of the species' critical habitat 35
2.7.2 Studies to identify critical habitat 35
2.8 Existing and Recommended Approaches to Habitat Protection 36

2.9 Effects on Other Species 37
2.10 Recommended Approach for Recovery Implementation 37
2.11 Statement on Action Plans 37
3. REFERENCES 38
4. RECOVERY TEAM MEMBERS 45

LIST OF TABLES

Table 1. Threat classification table – summary of at-sea threats facing the Short-tailed Albatross (STAL) and the Pink-footed Shearwater (PFSH) in Canada and elsewhere in their range 20

Table 2. Threat classification table – summary of threats facing the Short-tailed Albatross (STAL) and the Pink-footed Shearwater (PFSH) on the breeding grounds ... 22

Table 3. Recovery planning table 30

Table 4. List of general indicators of progress to assist in determining the extent that recovery is being achieved 33

Table 5. Schedule of studies to identify critical habitat 36

LIST OF FIGURES

Figure 1. Map of the west coast of Canada showing places and marine areas referred to in the text 3

Figure 2. Distribution of Short-tailed Albatross sightings in Canada and adjacent waters (1960-2008). 4

Figure 3a. Track line of a hatch year (< 1 year old) Short-tailed Albatross along the west coast of North America, during November 2003 8

Figure 3b. Track line of a hatch year Short-tailed Albatross throughout the Gulf of Alaska and along the west coast of North America, during the summer and fall of 2006 9

Figure 4. Average grid cell densities of Pink-footed Shearwaters during spring (March 16 - June 15, 1982 - 2005). 11

Figure 5. Average grid cell densities of Pink-footed Shearwaters during summer (June 16 - September 15, 1982 - 2005) 12

Figure 6. Average grid cell densities of Pink-footed Shearwaters during fall (September 16 - December 15, 1982 - 2005). 13

1. BACKGROUND

1.1 Species Assessment Information from the Committee on the Status of Endangered Wildlife in Canada (COSEWIC)

Date of Assessment: November 2003

Common Name (population): Short-tailed Albatross

Scientific Name: *Phoebastria albatrus*

COSEWIC Status: Threatened

Reason for Designation: This species was once an abundant seabird along the coast of British Columbia but its numbers declined to near extinction in early 20th century. Numbers are now slowly increasing. Albatross populations in general are very sensitive to incidental catch by commercial fisheries and oil spills; while these impacts have not been documented for this species in Canadian waters, they pose a significant potential threat.

Canadian Occurrence: British Columbia

COSEWIC Status History: Designated Threatened in November 2003. Assessment based on a new status report.

Date of Assessment: May 2004

Common Name (population): Pink-footed Shearwater

Scientific Name: *Puffinus creatopus*

COSEWIC Status: Threatened

Reason for Designation: This seabird breeds on only three islands off the coast of Chile, where it has suffered significant but unmeasured declines due to nest predation by introduced predators, exploitation by humans and habitat degradation. It likely incurs mortality due to incidental take by fisheries off the coast of British Columbia during the non-breeding season and would be sensitive to any offshore oil spills there.

Canadian Occurrence: British Columbia

COSEWIC Status History: Designated Threatened in May 2004. Assessment based on a new status report.

1.2 Description

1.2.1 Short-tailed Albatross

The Short-tailed Albatross (*Phoebastria albatrus*; Pallas 1769) is a large-bodied seabird with long narrow wings adapted for soaring just above the water's surface. Of the North Pacific albatrosses, the Short-tailed Albatross is the largest. The large hooked bill, a distinguishing characteristic across age classes, is pink with a bluish tip.

Adults are mostly black and white, with a pale-yellow head and back of neck, and pale legs and feet. Adult length varies from 84-94 cm and wingspan from 213-229 cm. First year birds are wholly chocolate brown, closely resembling the juvenile Black-footed Albatross (*Phoebastria nigripes*). However, the pink bill of the Short-tailed Albatross provides a clear distinguishing feature in the field. The sexes look alike across age classes, and plumage does not vary seasonally (Harrison 1983, Sibley 2000).

1.2.2 Pink-footed Shearwater

The Pink-footed Shearwater (*Puffinus creatopus*; Coues 1864) is a medium-sized seabird with a stocky body and long (average length 109 cm), broad (10 - 11 cm, P. Hodum, pers. comm. 2007) wings. This species is closely related to the Flesh-footed Shearwater (*Puffinus carneipes*). While the Pink-footed Shearwater is currently afforded valid species status (e.g. Warham 1990, Brooke 2004, Onley and Scofield 2007), the taxonomy of the Flesh-footed and Pink-footed Shearwaters is not completely determined; Palmer (1962), Bourne (1983) and Penhallurick and Wink (2004) have suggested that the Pink-footed Shearwater is a subspecies of the Flesh-footed Shearwater (but see Rheindt and Austin 2005).

Pink-footed Shearwaters have variable plumage but are generally distinguishable from other shearwaters by the combination of greyish-brown upperparts, a white belly with greyish markings, mottled white and grey wing linings, a dusky head and a pink bill with a dark tip (Harrison 1983). Juveniles and adults have similar plumage, and males are slightly larger and heavier than females (Guicking et al. 2004).

1.3 Populations and Distribution

1.3.1 Short-tailed Albatross

The most recent estimate of the global population of Short-tailed Albatrosses is 2,130 individuals (H. Hasegawa, pers. comm. 2006). The species currently breeds on two islands in Japan: 85% of the population nests in two colonies on Torishima, and the remaining 15% on Minami-kojima and Kita-kojima in the Senkaku Islands. Historically, breeding colonies were known from at least nine sites, all within the sub-tropical western North Pacific (Hasegawa 1984).

In the last 20 years, the breeding population on Torishima has been increasing at a rate of between 6.5% and 8.0% annually (United States Fish and Wildlife Service [USFWS] 2005). Breeding populations on the Senkaku Islands are estimated to be increasing at a rate approximately equal to that on Torishima (H. Hasegawa, pers. comm. 2006). The rapid growth rates are likely due to an extremely low population size compared to historical estimates. As the population increases, density-dependent factors will likely slow the annual growth rate; however, this is not likely to occur for several decades (Cochrane and Starfield 1999).

The Short-tailed Albatross is listed on the World Conservation Union (IUCN) Red List as Vulnerable; the Convention on the Conservation of Migratory Species of Wild Animals (the CMS, or Bonn Convention) lists the species under Appendix 1 (migratory species categorized as being in danger of extinction throughout all or a significant proportion of their range). The global conservation status rank (G1 – critically imperilled) has not changed since the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) released the Canadian status report in 2003. The species is Red-listed in British Columbia (BC) due to its global G-1 status. Additionally, the Short-tailed Albatross is listed on the Japanese Red List as a Vulnerable species, and under the United States Endangered Species Act as Endangered (USFWS 2005).

Figure 1 shows the locations of places (within Canada and adjacent areas) mentioned in this document. The marine range of the Short-tailed Albatross extends from Japan and the Kuril Islands (Russia), east into the Bering Sea and the Gulf of Alaska, south to Baja California, and throughout the North Pacific. Historically the species was considered common throughout the aforementioned range irrespective of season (review by Sanger 1972, American Ornithologists' Union [AOU] 1998). Recent data suggest most adult and immature birds are concentrated near the breeding colonies during the breeding season (December to April; McDermond and Morgan 1993), although individuals may forage hundreds of kilometres from their colony (USFWS 2005). Outside the breeding season, Short-tailed Albatrosses are distributed throughout the sub-arctic convergence zone in the North Pacific (Camp 1993, McDermond and Morgan 1993, Sherburne 1993, Piatt et al. 2006), spending the greatest proportion of their time in Alaskan, and secondarily, in Russian waters (Suryan et al. 2007).

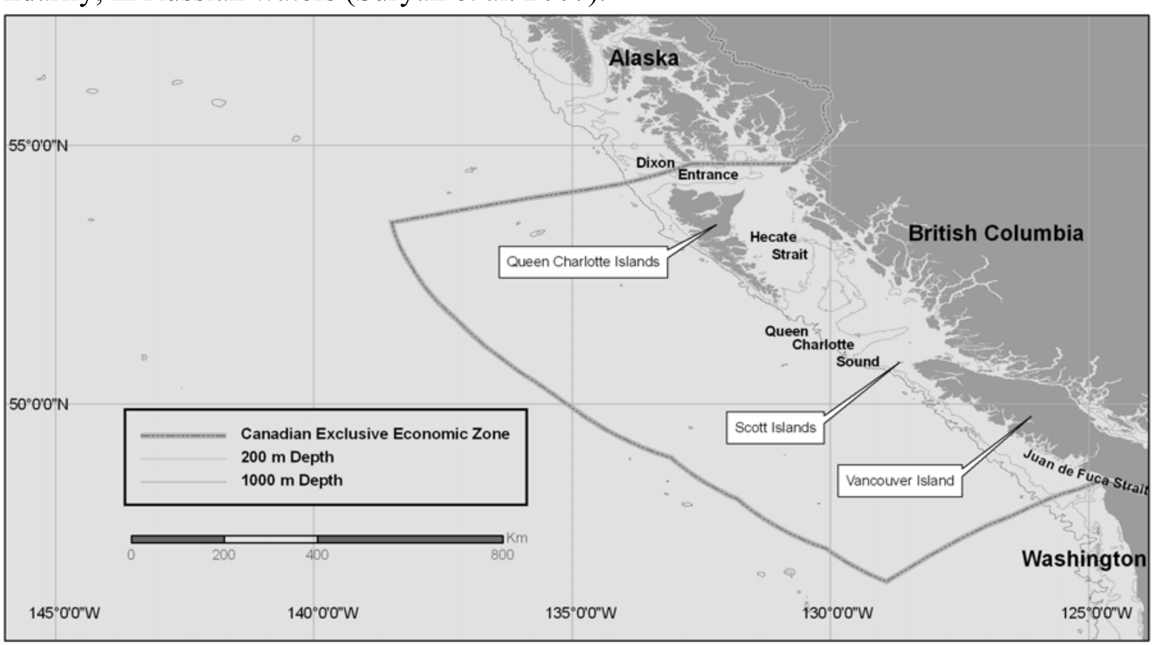

Figure 1. Map of the west coast of Canada showing places and marine areas referred to in the text.

At-sea marine bird survey data (Figure 2) and data derived from satellite tagged after-hatch year birds (Suryan et al. 2006, R. Suryan and G. Balogh unpubl. data 2006; Figures3a, b) show where Short-tailed Albatrosses have occurred in and adjacent to Canada, and along the northwest coast of the conterminous USA.

In Canada, the Short-tailed Albatross occurs exclusively as a non-breeding species off the coast of BC and historically it may have been the dominant 'near-shore albatross'. Its marine range in Canada includes Canada's 200 nm Exclusive Economic Zone (EEZ), Dixon Entrance, Queen Charlotte Sound, and Hecate Strait. It may also have occurred in the Strait of Juan de Fuca and in coastal inlets (COSEWIC 2003). Since 1996, 35 Short-tailed Albatrosses have been observed in or within 100 km of Canada’s EEZ (Kenyon et al. in prep). It is likely that many more undetected birds occur within Canadian territory throughout the year. There is currently no accurate estimate of the number of Short-tailed Albatrosses that travel and forage within Canada's EEZ.

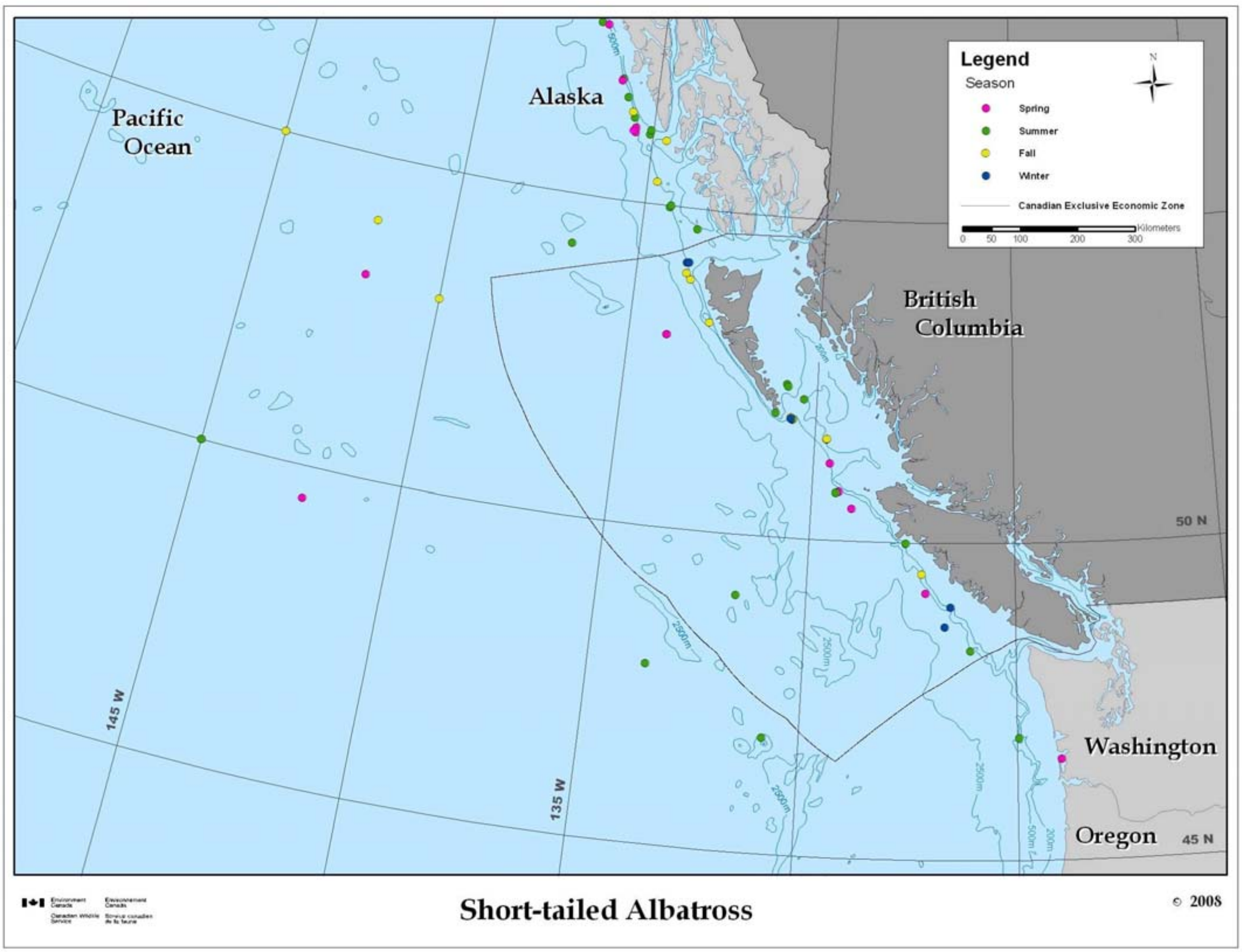

Figure 2. Distribution of Short-tailed Albatross sightings in Canada and adjacent waters (1960 - 2008). Image and sources from Kenyon et al. (in prep).

1.3.2 Pink-footed Shearwater

The only known Pink-footed Shearwater nesting colonies occur in Chile: two islands in the Juan Fernández Archipelago, Isla Santa Clara and Isla Robinson Crusoe; and Isla Mocha, (approximately 800 km south of the Juan Fernández Archipelago). BirdLife International provides a global estimate of around 20,000 breeding pairs of Pink-footed Shearwaters (BirdLife International 2007).

On the Juan Fernández Islands, Brooke (1987) estimated 4,000-4,500 pairs. In 2003, a detailed census of all burrows on Isla Santa Clara estimated a minimum of 2,544 pairs at this one colony (Hodum and Wainstein 2003). Following the eradication of rabbits from Santa Clara in 2003, the island's breeding population increased about 36% to an estimated 3,470 pairs (P. Hodum unpubl. data 2006). On Isla Robinson Crusoe, a 2003–2006 island-wide census estimated 8,500 Pink-footed Shearwater burrows. Data on burrow occupancy on Isla Robinson Crusoe are largely lacking due to the birds' long, inaccessible burrows; however, Hodum and Wainstein used the island-wide burrow count and limited data on burrow occupancy to estimate 5,100 breeding pairs for this island (unpubl. data 2006). On Isla Mocha, a 1988 census using transects and sub-plots on the colony estimated 13,000–17,000 breeding pairs (Guicking 1999).

The breeding activity data from Isla Santa Clara suggest that this population is stable and possibly increasing (P. Hodum and M. Wainstein unpubl. data 2006). All documents and reports published since 1999 state that the population of Pink-footed Shearwaters on Isla Robinson Crusoe has been "more or less stable over the past 15 years"; however, there are insufficient data to accurately assess population trends (Guicking 1999, COSEWIC 2004, Commission for Environmental Cooperation [CEC] 2005). At Isla Mocha, the Pink-footed Shearwater is believed to be declining (Guicking 1999) but it is not possible to accurately assess the population trend without a complete census.

Based upon the above, it is estimated that there are likely between 21,500 and 25,500 breeding pairs. However, the full breeding distribution and status of the species in Chile may be incomplete. The Isla Mocha estimate was based on a single survey and the associated error is unknown. It is also important to note that there may well be as-yet-undiscovered breeding colonies on islands south of 44°S.

The global conservation status rank of the Pink-footed Shearwater (G1G2Q – critically imperilled to imperilled, questionable taxonomy) has not changed since the writing of the COSEWIC status report. The species is considered Vulnerable by the IUCN, and is listed in Appendix 1 of the CMS. The Pink-footed Shearwater is listed as Vulnerable in Chile (Rottmann and López-Callejas 1992, Glade 1993). The BC conservation status rank for the Pink-footed Shearwater is currently SNA, meaning "a conservation status rank is not applicable because the species is not a suitable target for conservation activities" (BC Conservation Data Centre 2005). In this case, a provincial conservation status was not assigned due to the difficulty of assigning a rank to a species that does not breed in BC, and when it does occur, it is found irregularly and in disparate groups (L. Ramsay, pers. comm. 2006).

During the breeding season (November to May), the Pink-footed Shearwater is common in coastal Chile, especially north of 40–42°S (Guicking 1999). Following breeding, birds move north along the western coasts of South America towards North America, with the non-breeding (May to October) marine range extending north to the south coast of Alaska. Although Pink-footed Shearwaters have been observed in coastal BC as far north as the west side of Dixon Entrance, relatively few birds are encountered north of the southern tip of the Queen Charlotte Islands (K. Morgan, pers. comm. 2008). In Canada, Pink-footed Shearwaters occur from late March through late October (Martin and Myers 1969, Campbell et al. 1990, Morgan et al. 1991, Burger 2003), with the majority of birds observed from late June through early September. There are no winter records of Pink-footed Shearwaters in Canadian waters (Figures 4 - 6). Based on the density of birds observed during Environment Canada's pelagic surveys and the geographic extent of the species' occurrence (COSEWIC 2004), possibly between 10,000 and 20,000 Pink-footed Shearwaters may occur within Canadian waters for varying lengths of time (K. Morgan, pers. comm. 2006). However, that estimate is based strictly on extrapolation of average at-sea densities and does not take into account spatial/temporal variability in survey effort. Consequently, the precise number of Pink-footed Shearwaters that occur off the west coast of Canada during the non-breeding season is unknown. There are few data sets available in published or accessible sources to generate statistically rigorous estimates of possible changes in geographical distributions or compare historical and current at-sea population sizes throughout the species range.

1.4 Needs of the Short-tailed Albatross and the Pink-footed Shearwater

1.4.1 Habitat and biological needs

For more detailed information on the habitat and biological needs of these two species, see the COSEWIC status reports (COSEWIC 2003, 2004).

Short-tailed Albatross

Short-tailed Albatrosses are colonial breeders that nest on isolated, offshore islands, with restricted human access (Sherburne 1993). Historically, the species used level, open areas adjacent to tall clumps of grass for nesting. Tickell (in Hasegawa and DeGange 1982) described the nests as scoops in the volcanic ash, lined with and built up by grass.

At-sea observations (Sanger 1972, Camp 1993, Sherburne 1993, Federal Register 2000, Piatt et al. 2006) and recent satellite tracking studies (Suryan et al. 2006, 2007) indicate that Short-tailed Albatrosses are associated with the outer continental shelf and upper slope waters; marine habitats that are characterised by upwelling and high biological productivity (USFWS 2005, Piatt et al. 2006). In Canada, pelagic bird surveys by Environment Canada and the International Pacific Halibut Commission indicate that Short-tailed Albatrosses are found over the outer continental shelf (< 200 m) and upper slope waters (200-1000 m), although they also occur over deeper waters (> 1000 m).

The Short-tailed Albatross feeds at the surface during the day or night (Hasegawa and DeGange 1982, Prince and Morgan 1987, Sherburne 1993) and is known to feed on squid, fish, flying fish eggs, shrimp and other crustaceans (Prince and Morgan 1987, Federal Register 2000).

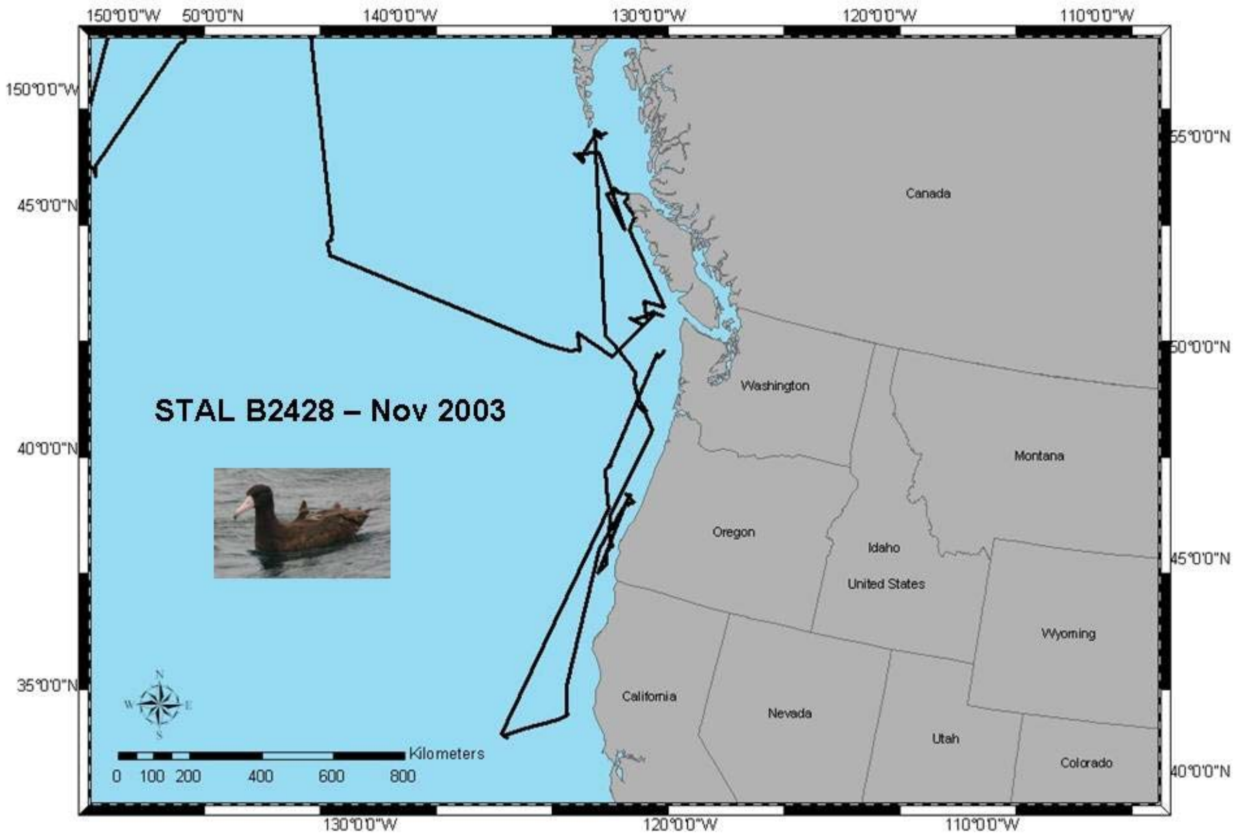

Figure 3a. Track line of a hatch year (< 1 year old) Short-tailed Albatross along the west coast of North America, during November 2003. The bird was captured at sea in Seguam Pass (52˚ 26' N x 172˚ 46' W) in the Aleutian Islands, Alaska, in mid-August (2003) and was fitted with a satellite transmitter. Figure used with permission, data from Suryan et al. 2006.

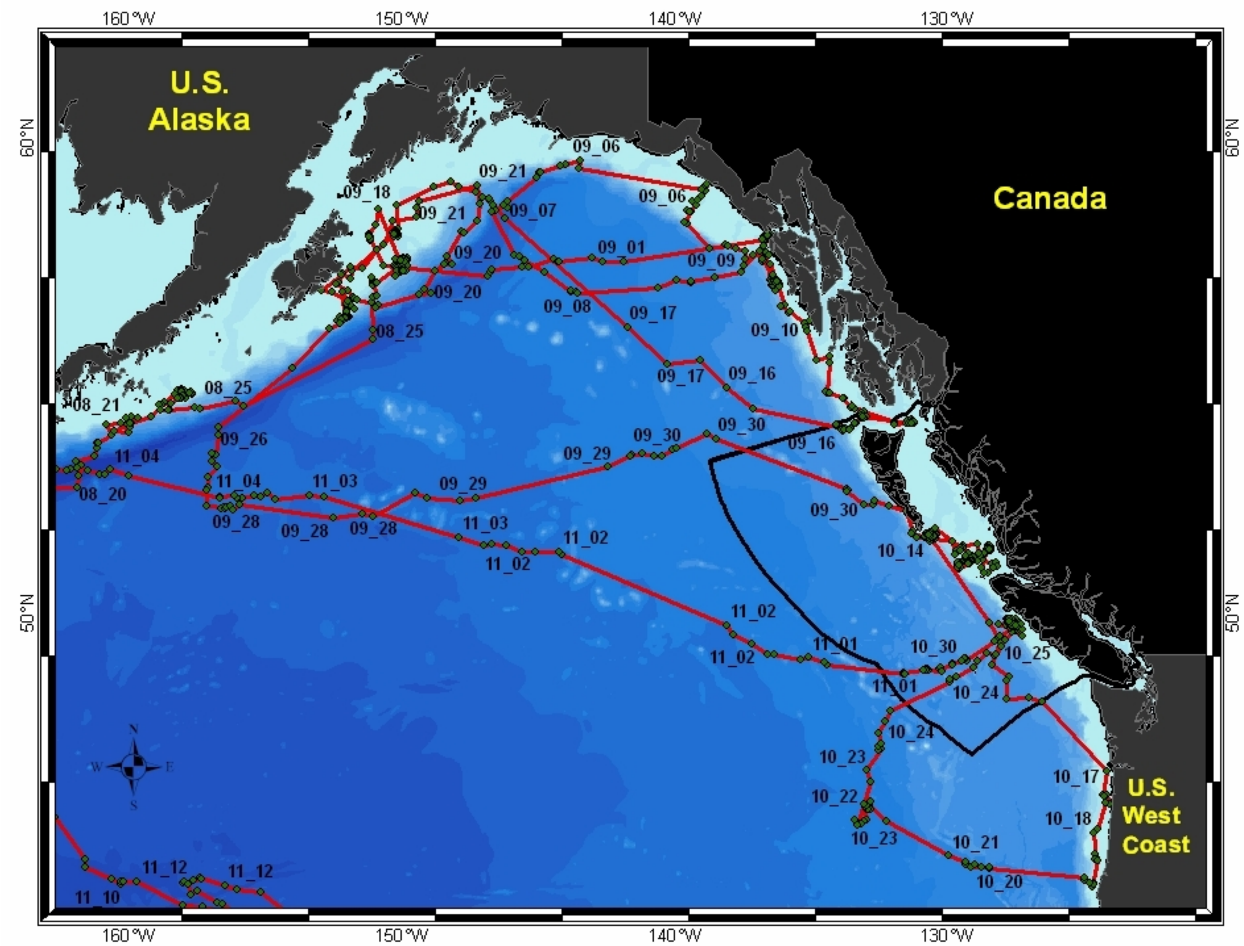

Figure 3b. Track line of a hatch year Short-tailed Albatross throughout the Gulf of Alaska and along the west coast of North America, during the summer and fall of 2006. The bird was captured at sea in Seguam Pass, in July (2006) and was fitted with a satellite transmitter. Figure used with permission; from: R. Suryan and G. Balogh unpubl. data, http://www.wfu.edu/biology/albatross/shorttail/shorttail2.htm

Pink-footed Shearwater

The Pink-footed Shearwater nests in burrows on grassy or sparsely vegetated slopes, up to 380 m above sea level. On Isla Santa Clara, they nest in relatively short burrows (0.5-2.2 m) on denuded to moderately vegetated slopes, whereas on Isla Robinson Crusoe they nest in burrows that regularly exceed 3 m in length, in fragile terrain that typically lacks dense vegetation cover or soil stability and contains numerous subterranean rocks and boulders (P. Hodum unpubl. data 2008).

Satellite tracking of three adult Pink-footed Shearwaters from Isla Mocha during the chick-rearing period identified a major foraging area up to 300 km north of the colony, near the Chilean mainland (Guicking et al. 2001). On Isla Santa Clara, a multi-year satellite-tracking study of chick-rearing Pink-footed Shearwaters revealed that they travelled eastward to the cool, productive waters at the shelfbreak off the coast of Chile, the same region in the Humboldt

Current used by the birds tracked north from Isla Mocha (P. Hodum, D. Hyrenbach and M. Wainstein unpubl. data 2006). As well, some birds from Isla Santa Clara made short foraging trips north and southwest of the colony, remaining over deep waters (> 2000 m; P. Hodum unpubl. data 2005, 2006). In Chile, both breeding and non-breeding Pink-footed Shearwaters associate with warm (14-18°C), high salinity, surface waters (Guicking et al. 2001). As in Chile, most birds in Canada and the USA are encountered over the continental shelf and along the upper slope. In British Columbia, Pink-footed Shearwaters have been observed off the west coast of Vancouver Island, Queen Charlotte Sound, Hecate Strait, Dixon Entrance, and the west coast of the Queen Charlotte Islands (Guzman and Myres 1983, Briggs et al. 1987, Campbell et al. 1990, Kenyon et al. in press; Figures 4-6).

Pink-footed Shearwaters feed at the surface, as well as surface and aerial plunge-dive to pursue prey (Ainley and Sanger 1979, Ribic and Ainley 1988/1989, P. Hodum, pers. comm. 2006). Foraging dives average 2.1 m deep (n=1,362), with less than 5% greater than 5 m deep; the maximum known depth is 36 m (P. Hodum and S. Shaffer unpubl. data 2006).

The diet of breeding and wintering Pink-footed Shearwaters in Chile and Peru consists mainly of forage fish, especially sardines (*Sardinops sagax*) and anchovies (*Engraulis ringens*; Ainley 1976, Guicking et al. 2001). Stable isotope analyses of chick and breeding adult blood confirmed that the diet of both adults and immature birds is dominated by forage fish. Low numbers of squid beaks found in diet samples of breeding birds suggest that squid are a minor prey item compared with forage fish (P. Hodum unpubl. data 2006). However, Baltz and Morejohn (1977) found a high proportion of squid in the stomachs of five Pink-footed Shearwaters collected off Monterey, California, possibly suggesting a shift in diet away from their nesting colonies.

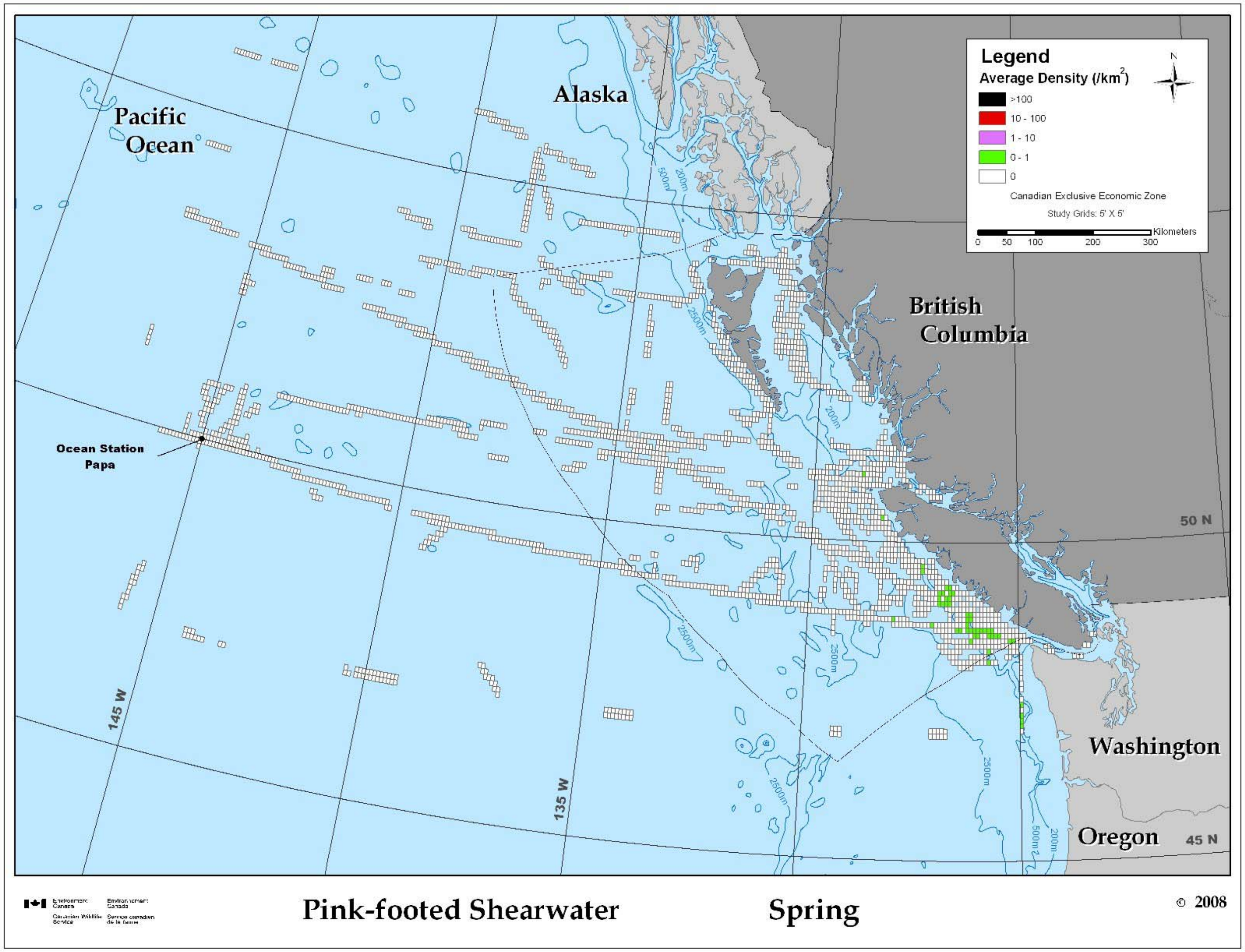

Figure 4. Average grid cell densities of Pink-footed Shear waters during spring (March 16 - June 15, 1982 - 2005). Image from Kenyon et al., (in prep).

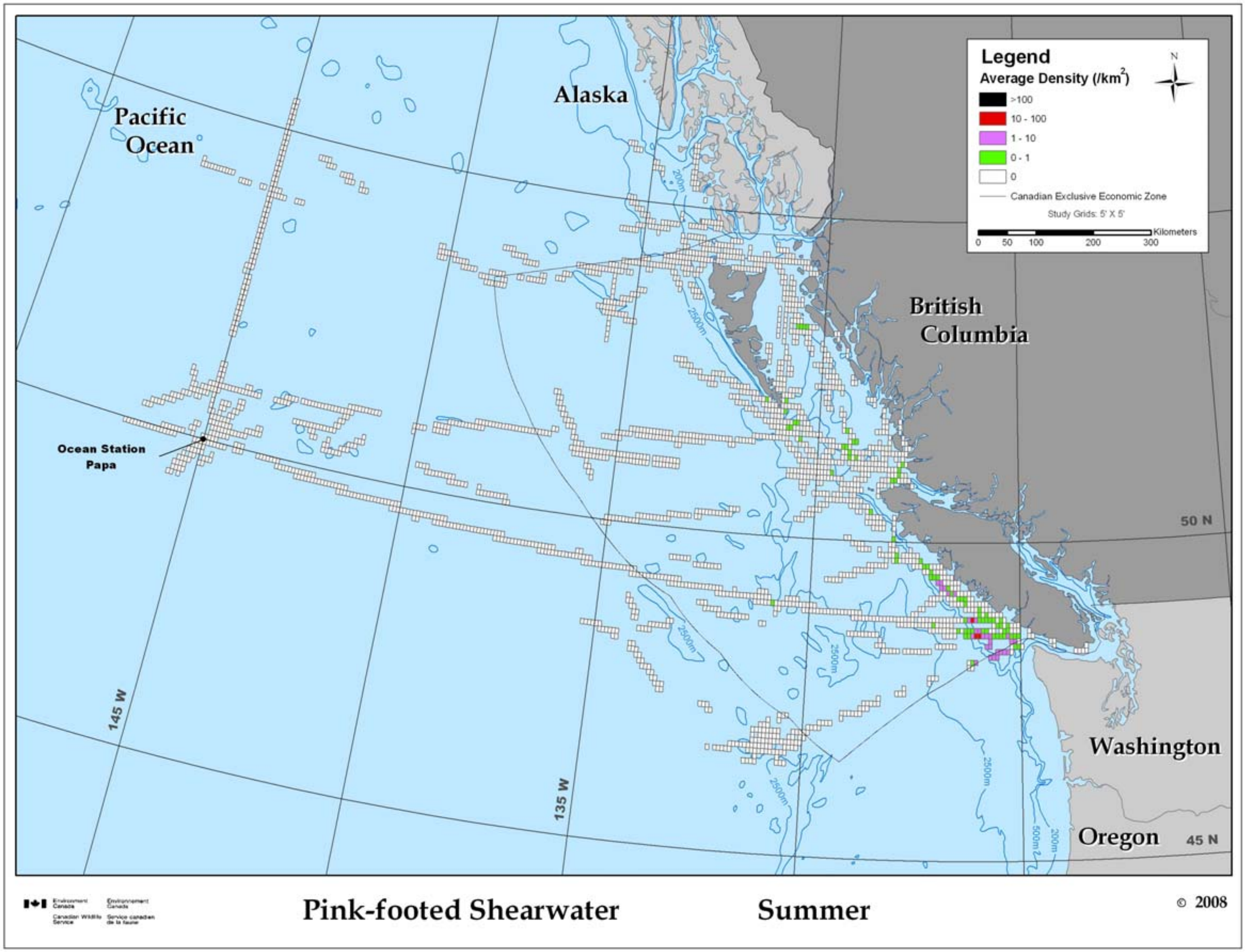

Figure 5. Average grid cell densities of Pink-footed Shearwaters during summer (June 16 - September 15, 1982 - 2005). Image from Kenyon et al. (in prep.).

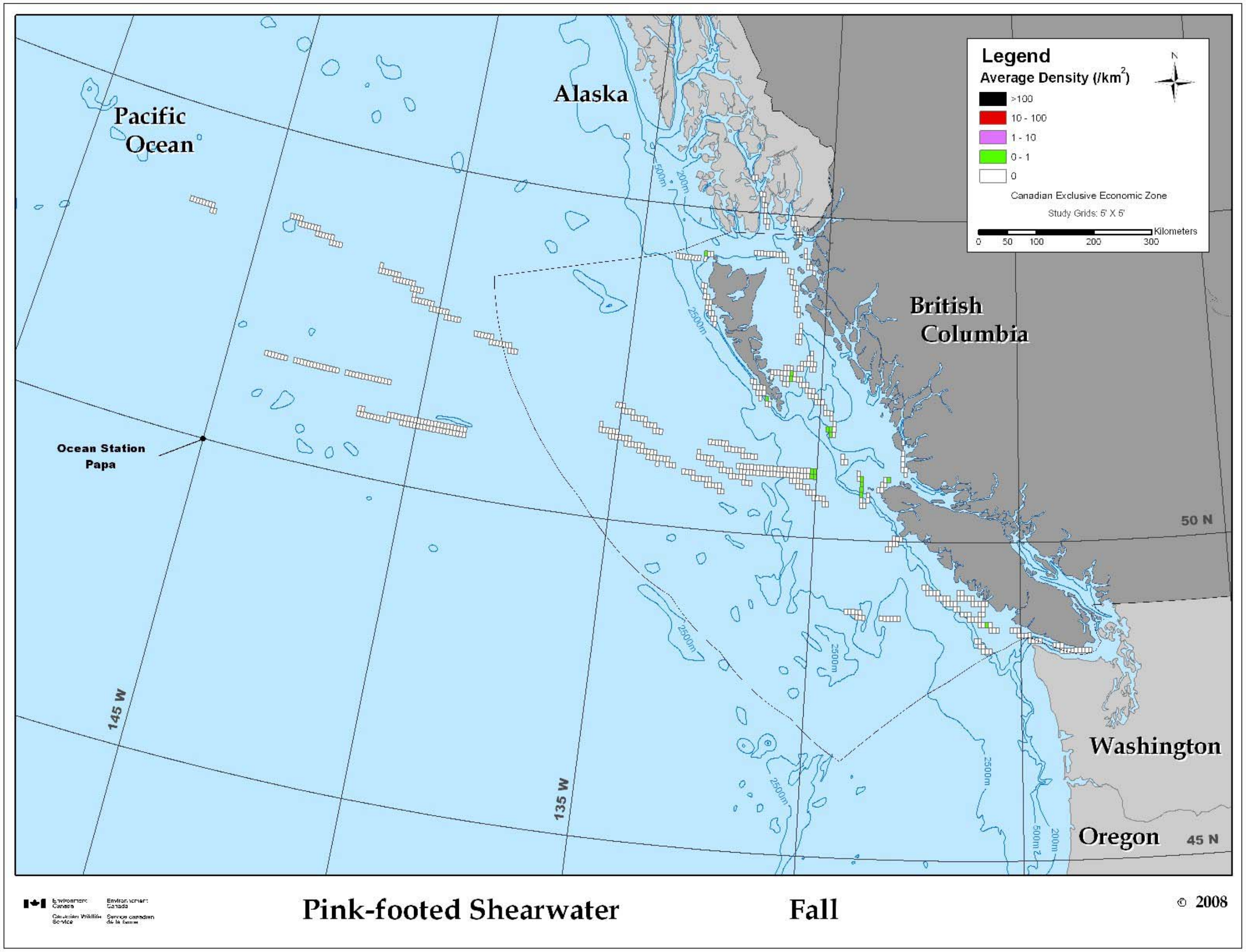

Figure 6. Average grid cell densities of Pink-footed Shearwaters during fall (September 16 - December 15, 1982 - 2005). Image from Kenyon et al. (in prep.).

1.4.2 Ecological role

The ecological role of the Short-tailed Albatross and the Pink-footed Shearwater is similar to that of other surface-feeding seabirds that consume similar prey items within Canadian waters. These seabirds occupy an upper trophic level position and consume secondary producers (e.g., forage fish and squid). Short-tailed Albatrosses and Pink-footed Shearwaters are members of the order Procellariiformes (or tube-nosed birds which includes albatrosses, shearwaters, petrels and fulmars). In albatrosses, the nostrils stick out from both sides of the bill; whereas in shearwaters and other tube-nosed birds, the nostrils sit at the base of the upper bill. Tube-nosed birds differ from most other birds in that they have a highly developed sense of smell, which helps them locate food and breeding sites. During both the breeding and non-breeding seasons, tube-nosed birds may travel long distances to locate prey patches to feed themselves and their chicks (e.g., > 1,700 km, Sooty Shearwaters [*Puffinus griseus*]; Weimerskirch 1998), and these patches may be predictable in space or time because of their relation to seasonal coastal upwelling, seamounts or the continental shelf. Using an allometric equation developed by Birt-Friesen et al. (1989), Hunt et al. (2000) calculated that the daily energy requirements of the Short-tailed Albatross and the Pink-footed Shearwater were approximately 8,165 kJ and 1,370 kJ each day, respectively. The estimated daily energetic requirement of each Short-tailed Albatross is more than double that needed by individual Black-footed Albatross (4,000 kJ/day) or Laysan Albatross (*Phoebastria immutabilis*, 3,900 kJ/day). Of the seven species of shearwaters known to occur within Canada's west coast EEZ, only the Sooty Shearwater requires more daily energy (1,460 kJ/day; Hunt et al. 2000) than the Pink-footed Shearwater.

Short-tailed Albatrosses may serve as prey for other upper trophic level predators; for example, in recent years, a few chicks have been taken by Steller's Sea Eagles (*Haliaeetus pelagicus*) on their breeding grounds in Japan. Both Short-tailed Albatrosses and Pink-footed Shearwaters (eggs, chicks or adults) may also serve as prey for a number of introduced vertebrate predators on their colonies (see Threats, Section 1.5).

1.4.3 Limiting factors

Globally, population growth in both the Short-tailed Albatross and the Pink-footed Shearwater is limited by factors characteristic of all procellariiforms: low fecundity (one egg per year, maximum); delayed maturity (age at first breeding is 5-6 years); and high mate fidelity (if a mate is lost during the breeding season, breeders may have several failed breeding attempts or lose their nest site). Both species are limited by a restricted number of breeding locations. Short-tailed Albatrosses may lose nesting habitat due to volcanic eruption and both species are affected by anthropogenic factors, e.g., predation by non-native species; and Pink-footed Shearwaters are threatened by an illegal harvest on the breeding grounds (see Threats on the breeding grounds, Section 1.5.2). In Canada, both species may be limited by prey availability, especially where their prey are affected by changing oceanographic conditions.

1.5 Threats

This recovery strategy emphasises and addresses all threats in Canadian waters but it is acknowledged that threats at the breeding colonies likely have a greater effect on the two species than threats occurring in Canada. The threats outside Canada are the main reasons for the COSEWIC assessment of both species and influence their ability to recover within Canada; therefore they are included here. Threats at sea (ones that can be addressed locally) and threats on the breeding grounds (not able to be directly addressed in Canada) are discussed separately. The threat categorization in Tables 1 and 2 is based on the federal threat identification guidance document (Environment Canada 2006).

1.5.1 Threats at sea

Threats at sea fall under the threat categories of “Accidental Mortality”, “Pollution” and “Climate and Natural Disasters”, and are summarized in Table 1. The identified threats are relevant and applicable to both species when they are in Canadian waters, but are also applicable elsewhere in their range. Negative interactions with commercial fisheries, oil pollution and the ingestion of plastics and other pollutants (Cifuentes et al. 2003) threaten individual birds. Oil pollution could affect individual birds and marine habitat quality. The development of marine wind farms and construction of oil platforms along the BC coast have the potential to restrict access to important foraging areas, to degrade marine habitats, and to change the distribution of prey populations. The oil platforms and wind farm structures also pose a potential risk to birds through the birds colliding with the structures, as well as incineration in oil platform flares.

Accidental Mortality: Bycatch and entanglement from interactions with commercial fisheries

Entanglement and incidental mortality in the commercial Pacific demersal (just above the seafloor) longline, and coastal gillnet fisheries is considered to be a potential threat to both species and was listed as one of the reasons for their designation in Canada (COSEWIC 2003, 2004). While bycatch and entanglement are issues throughout their range, this section focuses on these threats in Canadian territorial waters.

Incidental mortality in longline fisheries occurs when a seabird attempts to steal bait from hooks set from a fishing vessel. Birds are sometimes accidentally hooked and pulled underwater with the groundline and drown. The surface foraging behaviour of both species, but in particular Short-tailed Albatrosses, may increase their risk of incidental mortality if vessels discharge fish and fish parts when they are setting their hooks (USFWS 2005). Mortality in coastal gillnets occurs when seabirds (including shearwaters) dive below the surface to pursue prey and become entangled; there are no records of albatross mortality in Canadian gillnets.

In Canada, the Pacific commercial demersal longline fishing effort (for Pacific halibut, *Hippoglossus stenolepis,* and rockfish, *Sebastes* spp.) is concentrated along the continental shelf with additional effort along the coast of northern Vancouver Island and Queen Charlotte Sound (Smith and Morgan, 2005). Black-footed Albatrosses were the most frequently caught seabird in Pacific longline fisheries (Smith and Morgan 2005). The maximum overlap between fishing effort and Black-footed Albatrosses occurs during the summer months along the shelfbreak (Wiese and Smith 2003). Most observations of Short-tailed Albatrosses and Pink-footed Shearwaters are from the outer continental shelf and the upper slope regions (Figures 2-6), but no studies have been done to estimate the potential overlap between longline fisheries and Short-tailed Albatrosses or Pink-footed Shearwaters in Canada. Between 1995 and 2003, six Short-tailed Albatrosses were reported as bycatch in the Gulf of Alaska and the Bering Sea, (USFWS 2005), illustrating the potential for similar interactions in BC waters. The Alaskan fishery for groundfish and halibut has mandatory seabird avoidance measures (Melvin et al. 2006). The coastal commercial gillnet fishery targets Pacific salmon (*Oncorhynchus* spp.) and the gillnet sets coincide with many species of marine birds in space and time (Smith and Morgan 2005). The gillnet fisheries off the west coast of Vancouver Island, where Pink-footed Shearwaters co-occur with other species of shearwaters, have reported the incidental take of Short-tailed (*Puffinus tenuirostris*) and Sooty Shearwaters (Smith and Morgan 2005); however, there have been no reports of Pink-footed Shearwater bycatch in BC waters.

To date, Canadian at-sea fishery observer programs have not reported bycatch of Short-tailed Albatrosses or Pink-footed Shearwaters in either commercial longline or gillnet fisheries (L. Yamanaka, pers. comm. 2005). No Short-tailed Albatrosses or Pink-footed Shearwaters were salvaged from a seabird bycatch salvage program between 2000 and 2005 but a Short-tailed Shearwater was salvaged from the halibut longline fishery. That bird was misidentified as a Pigeon Guillemot (*Cepphus columba*), highlighting the importance of a salvage program in order to obtain accurate species identifications (Smith and Morgan 2005).

In 2002, Fisheries & Oceans Canada (DFO) introduced mandatory seabird avoidance measures for all licensed longline vessels. Initially, compliance was inconsistent as many vessels believed that the use of the mitigation devices was voluntary. However, since 2004, DFO has actively enforced compliance, all groundfish hook and line management plans have seabird avoidance as an enforcement priority, and charges are regularly made (T. Mawani, pers. comm., 2007).

The bycatch of albatrosses can be age- or sex-biased, depending on the location and timing of albatross foraging in relation to local fishery concentrations (Cochrane and Starfield 1999). Six of seven Short-tailed Albatrosses reported as bycatch in Alaska (between 1983 and 1998) were immature (Cochrane and Starfield 1999). This is a potential concern for Canada's mitigation programs because to date, the majority of Short-tailed Albatross sightings within Canadian waters have been reported as immature birds (COSEWIC 2003). Since 1996 there have been 35 Short-tailed Albatrosses observed within or in close proximity to the Canadian EEZ; only six were identified as adult birds (Kenyon et al., in prep.). Immature Short-tailed Albatrosses may be more susceptible to being accidentally caught as bycatch than adults as young birds more readily approach fishing vessels (R. Suryan, pers. comm., 2007). All albatross population models clearly demonstrate that increasing adult survival rates have a far greater effect on population growth rates than corresponding increases in juvenile survival rates. However, an increase in juvenile survival/recruitment will also increase the adult population, if the adult survival rate remains constant. Thus, as suggested by Cochrane and Starfield (1999), an increase in the immature survival rate, for example through a reduction in fishery-related mortality, will likely have a positive effect on the population growth rates of the Short-tailed Albatross.

An International Plan of Action (Seabirds) was adopted by the FAO Committee on Fisheries in 1999. Member nations were encouraged to assess the levels of seabird mortality in their longline fisheries, and where necessary produce their own National Plans of Action (NPOAs) to reduce this mortality. The Pink-footed Shearwater was one of nine species in Peru listed as vulnerable to bycatch and needing special attention (Goya and Cárdenas 2003). Peru's pelagic longline fishery has reported a seabird bycatch rate of 0.74-1.75 birds/1,000 hooks (all seabird species). However, despite that report, the Pink-footed Shearwater was not included in the annex list of seabirds accorded priority for studies and conservation in Peru. To date, Peru has not prepared an NPOA, and no mitigation measures have been adopted in their longline fisheries (J. Cooper, pers. comm. 2005)

With respect to derelict fishing gear, all seabirds are vulnerable to becoming entangled although the magnitude of these impacts is unknown for the two species covered in this recovery strategy. On Torishima Island, three to four Short-tailed Albatrosses come ashore entangled in fishing line each year, some of which die as a result (H. Hasegawa, pers. comm. 2001). Lost or abandoned gear (e.g., sections of gill nets that float at or near the surface) is a potential threat to both the Short-tailed Albatross and the Pink-footed Shearwater throughout their marine range (BirdLife International 2007). The magnitude of this impact is unknown in Canada.

Accidental Mortality: Marine industrial development: oil exploration and wind farms

Marine wind farms and oil platforms can cause direct mortality through collisions or indirect mortality by degrading or preventing access to foraging areas. In addition, oil platforms would increase oil tanker traffic; thereby increasing the chances of an oil spill (see 1.5.1.3, below). Marine wind farms are not presently thought to be a threat to the Short-tailed Albatross and the Pink-footed Shearwater, due to an assumed lack of spatial overlap between currently proposed wind farm sites and the marine range of these two species in Canada. Future wind farm proposals for Canadian coastal waters should be evaluated for potential impacts on these species. Studies have shown that migrating waterbirds (e.g., loons, seaducks, etc.) appear to avoid wind farms in Europe (e.g., Desholm and Kahlert 2005), but taxon-specific information will be required to determine if this is also the case with these procellariiform species. If proposed energy developments are placed in critical foraging areas for either species and excluded birds die because of changes in their foraging areas, this could ultimately affect population survival rates. Similarly, if the current moratorium on oil exploration along BC’s coast is lifted, the potential for spatial conflict between oil development and seabirds exists; thus all proposed locations and facilities should be evaluated for impacts on both species.

Pollution: Oil spills, chronic oil pollution, plastics and other pollutants

Oil at the surface of the water causes physiological problems for seabirds as a result of petroleum toxicity (ingested or absorbed) and interference with the affected bird’s ability to thermoregulate. Fouling of seabirds from oil could arise from the dumping of oily bilge water into marine habitats, chronic spills or leakage from oil platforms or terrestrial sources, or from acute oil spill accidents (CEC 2005, USFWS 2005). Oil spills or discharges in or near key foraging areas could pose a high risk to the Short-tailed Albatross and the Pink-footed Shearwater. Oil spills and illegal discharges of petroleum occur in many parts of the species’ marine range, including

Canada. On the basis of the marine distribution of the Short-tailed Albatross and the Pink-footed Shearwater, the potential exists for negative interactions between these birds and oil pollution. In general, seabirds are more at risk from smaller chronic spills than from large, catastrophic ones, as timing, frequency and location of spills are better predictors of the impact than is spill size alone (Burger 1993; Wiese and Robertson 2004).

For Canada specifically, recent discussions concerning the potential lifting of the federal moratorium on gas and oil exploration off the coast of BC highlights this risk. Drilling might occur in shallow areas within Hecate Strait, Queen Charlotte Sound and the northwest coast of Vancouver Island. Certain levels of hydrocarbon discharges are permissible during offshore oil and gas production, which may lead to light sheens around offshore rigs. Short-tailed Albatrosses and Pink-footed Shearwaters will occasionally form large single or mixed species rafts at sea (e.g., 135 Short-tailed Albatrosses were observed around a single fishing vessel in Alaska; Piatt et al. 2006), which increases the potential effects of a marine oil pollution event.

Existing commercial vessel traffic (tanker, cargo, passenger, fishing vessels) also pose an ongoing oil spill risk for coastal BC waters through collision, grounding, or illegal disposal of oily bilge. If Short-tailed Albatrosses and Pink-footed Shearwaters travel and forage along the continental shelf–upper slope, they move along a relatively narrow band bisected by shipping lanes. Thus, there is a high potential for these species to encounter either catastrophic or chronic discharges of oil. Most West Coast tanker traffic remains well offshore as a result of a voluntary tanker exclusion zone; however, other vessels use shipping lanes that parallel the shelfbreak off the west coast of Vancouver Island and the Queen Charlotte Islands (P. O'Hara pers. comm. 2006).

Discarded plastic creates another pollution threat to seabirds (Baltz and Morejohn 1976). Most procellariiforms consume floating plastic objects, presumably mistaking them for prey (Blight and Burger 1997). The harmful effects of plastic ingestion include mortality or internal injury from sharp pieces of plastic, a reduction in ingested food volumes and dehydration (Sievert and Sileo 1993). Young birds being fed by their parents may be particularly vulnerable before developing their ability to regurgitate (Sherburne 1993). Short-tailed Albatrosses breeding on Torishima regurgitate plastic debris (Federal Register 2000); and Pink-footed Shearwaters are also known to ingest plastic, based on diet samples from adult birds on Isla Santa Clara (P. Hodum, pers. comm. 2006). Though procellariiforms will regurgitate hard objects such as plastic and squid beaks, this behaviour may not mitigate long-term effects on the birds – for example, ingestion of plastic particles may provide an additional pathway by which organochlorine contaminants can be taken up by seabirds (Tanabe et al. 2004) as studies indicate that a high proportion of adult seabirds retain a plastic load in the gizzard and proventriculus (e.g., Blight & Burger 1997).

Toxic chemicals in the marine environment pose a threat to seabirds. Becker (2000) documented elevated levels of mercury in the feathers of nesting Pink-footed Shearwater adults and in the downy plumage of young chicks on Isla Mocha (i.e., reflecting parentally-derived contaminant levels in the egg), whereas the body feathers of older chicks did not contain mercury. The author suggested that the contamination occurred during adult migration and wintering. Polychlorinated biphenyl residues have also been isolated from Pink-footed Shearwater eggs in Chile (Cifuentes et al. 2003). Data are limited on heavy metals and organochlorines in Short-tailed Albatross tissues (USFWS 2005), but high levels are well documented for other North Pacific albatross species (Finkelstein et al. 2006).

Climate and Natural Disasters: Climate change

The role of climate change on the marine environment, and on seabirds in particular, is an active area of research for both biological oceanographers and seabird biologists (cf. Robinson et al. 2005). The effects of decadal-scale regime shifts, the El Niño Southern Oscillation, and longer time scale trends on the habitats of marine birds are not well understood. However, mass adult mortality due to the out of phase timing of prey availability and the arrival of millions of Short-tailed Shearwaters in the Bering Sea, and a possible link to climate change, was described by Baduini et al. (2001). Decreased food availability and/or quality can also decrease the reproductive output of breeding seabirds, or the survival of their offspring (Crick 2004, Kitaysky et al. 2006).

Table 1. Threat classification table – summary of at-sea threats facing the Short-tailed Albatross (STAL) and the Pink-footed Shearwater (PFSH) in Canada and elsewhere in their range. See text for details.

1	**Bycatch and entanglement from interactions with commercial fisheries**	**Threat Information**		
Threat Category	**"Accidental Mortality"**	**Extent**	Widespread	
			Local	**Range-wide**
General Threats	Fishing and derelict gear	**Occurrence**	Current	Current
		Frequency	Seasonal	Recurrent
Specific Threats	Bycatch in commercial longline and gillnet gear and entanglement in derelict gear	**Causal Certainty**	STAL = Medium PFSH = Low	STAL = Medium PFSH = Low
		Severity	STAL = Moderate PFSH = Unknown	STAL = Moderate PFSH = Unknown
Stresses	Increased mortality, reduced population size	**Level of Concern**	STAL = Medium PFSH = Low	STAL = Medium PFSH = Low
2	**Marine industrial development: oil exploration and wind farms**	**Threat Information**		
Threat Category	**"Accidental Mortality"**	**Extent**	Localised	
			Local	**Range-wide**
General Threats	Presence of oil platforms and/or wind turbines in foraging areas and/or travel corridors	**Occurrence**	Anticipated	N/A
		Frequency	PFSH = Seasonal STAL = Continuous	N/A
Specific Threats	Mortality from collision with turbines, exclusion from foraging areas	**Causal Certainty**	Unknown	N/A
		Severity	Unknown	N/A
Stresses	Increased mortality, reduced population size	**Level of Concern**	Unknown	N/A
3	**Oil spills, chronic oil pollution, plastics and other pollutants**	**Threat Information**		
Threat Category	**"Pollution"**	**Extent**	Widespread	
			Local	**Range-wide**
General Threats	Catastrophic and chronic releases of oil into marine environment; littering of marine environment with plastics; releases of heavy metals and organochlorine pollutants	**Occurrence**	Anticipated	Current
		Frequency	Unknown	Unknown
Specific Threats	Direct exposure to oil, consuming plastics, bioaccumulation of pollutants	**Causal Certainty**	Medium	Medium
		Severity	Moderate	Moderate

3	Oil spills, chronic oil pollution, plastics and other pollutants	Threat Information		
Stresses	Increased mortality, reduced population size, reduced productivity; lethal and sub-lethal effects	**Level of Concern**	Medium	Medium

4	Climate change	Threat Information		
Threat Category	**"Climate and Natural Disasters"**	**Extent**	Widespread	
			Local	**Range-wide**
General Threats	Altered distribution and timing of availability of prey	**Occurrence**	Anticipated	Anticipated
		Frequency	Continuous	Continuous
Specific Threats	Reduced foraging success	**Causal Certainty**	Medium	Medium
		Severity	Unknown	Unknown
Stresses	Decreased breeding success, possible increase in adult mortality	**Level of Concern**	Medium	Medium

1.5.2 Threats on the breeding grounds

Threats on the breeding grounds fall under the threat categories of "Climate and Natural Disasters", "Consumptive Use", and "Exotic and Invasive Species". The threats identified under these three categories are only applicable to the species on their breeding grounds in Japan (Short-tailed Albatrosses) and Chile (Pink-footed Shearwaters). They are discussed in a single section for each species below and have been combined and referred to in Table 2 as threats A, B and C, respectively.

Climate and Natural Disasters, Consumptive Use, Exotic or invasive Species

Short-tailed Albatross

Approximately 80 percent of the Short-tailed Albatross population breeds at one of the two colonies on Torishima Island. Torishima is an active volcano that has erupted explosively in the past; an eruption during the breeding season could kill adults and chicks, as well as destroy nest sites and habitat (Hasegawa and DeGange 1982). Additionally, breeding habitat and nesting birds are threatened by frequent volcanic ash slides and erosion caused by monsoon rains that occur on the island (Federal Register 2000). It is suspected that ship rats (*Rattus rattus*) prey on eggs or hatchlings, although there is no direct evidence (Hasegawa 1984). In the past, feral cats posed a threat; however, they are no longer present on Torishima (USFWS 2005) Short-tailed Albatrosses raft together near Torishima and the Senkaku Islands (P. Sievert, R. Suryan, pers. comm. 2007) and oil pollution near the breeding colony could significantly affect the breeding population.

Pink-footed Shearwater

Threats to Pink-footed Shearwaters at or near their colonies include predation from introduced and native predators, harvesting of chicks, nesting habitat degradation and loss as a result of browsing activity by goats (*Capra* spp.), burrow-competition with European rabbits (*Oryctolagus cuniculus*; Hodum and Wainstein 2004, CEC 2005) or trampling from cattle (*Bos* spp.), and light pollution from nearby towns (M. Wainstein, pers. comm. 2006).

Introduced and native predators threaten eggs, nestlings and adults on Isla Mocha (cats, rats) and Isla Robinson Crusoe (cats, rats, coatimundis [*Nasua nasua*]) (Guicking 1999, Guicking and Fiedler 2000, Hodum and Wainstein 2003, 2004). Estimated maximum predation rates vary from 0-4%, depending on the colony (Hodum and Wainstein 2003, 2004). Introduced cattle and goats (on Isla Robinson Crusoe) and rabbits (on Isla Robinson Crusoe and Isla Santa Clara) cause habitat destruction. Cattle and goats trample burrows and their grazing leads to soil erosion. Rabbits were successfully removed from Isla Santa Clara in 2003 after a six-year eradication project (Ojeda et al. 2003, P. Hodum, pers. comm. 2006). On Isla Mocha, up to 20% of chicks are illegally harvested for food annually, which results in the loss of the young birds, the destruction of burrows, and may prevent future breeding (for multiple seasons) by destroying pair bonds.

Table 2. Threat classification table – summary of threats facing the Short-tailed Albatross (STAL) and the Pink-footed Shearwater (PFSH) on the breeding grounds. See text for details.

1	Threats on the breeding grounds	Threat Information		
Threat Categories	A) “Climate and Natural Disasters”; B) “Consumptive Use”; C) “Exotic and Invasive Species”	**Extent**	Localized at breeding grounds	
			Local	**Range-wide**
General Threats	A) Volcanic activity (STAL); B) Harvesting of birds (PFSH); C) Introduced species (STAL, PFSH)	**Occurrence**	From Current to Historic	N/A
		Frequency	From Recurrent to Continuous	N/A
Specific Threats	A) Loss of adults, chicks and eggs dues to ash slides; B) Hunting of birds for feathers, harvesting of chicks; C) Predation, competition, and habitat loss due to introduced species	**Causal Certainty**	From Low to High	N/A
		Severity	From Unknown to High	N/A
Stresses	Increased adult mortality, reduced productivity, reduced population, habitat alteration	**Level of Concern**	From Low to High	N/A

1.6 Actions Already Completed or Underway

1.6.1 Legal status and protection

Short-tailed Albatross:

- Listed under Appendix 1 of The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES);
- Listed as Endangered throughout its range under the United States *Endangered Species Act* (ESA) (65 Federal Register 147: 46643-46654). Short-tailed Albatrosses are also listed as Endangered in the State of Alaska (Alaska Statutes, Article 4, Sec. 16.20.19);
- In 2005, the U.S. Fish and Wildlife Service released a Draft Recovery Plan for the Short-tailed Albatross for public review;
- Designated by the Japanese Government as a Special Natural Monument (Hasegawa and DeGange 1982), as a Special Bird for Protection, and a Domestic Endangered Species under the *Species Conservation Act*; and
- Torishima Island was designated as a Natural Monument (USFWS 2005); harvest is prohibited, and human activities and disturbance are restricted.

Pink-footed Shearwater:

- Listed as Vulnerable in Chile (Rottmann and López-Callejas 1992, Glade 1993).
- The Juan Fernández Archipelago was declared a Chilean National Park in 1935, a UNESCO Biosphere Reserve in 1977, and is included in the World Heritage List (Schlatter 1984, Guicking and Fiedler 2000); and
- In the late 1980s, Isla Mocha was declared a national reserve (Reserva Nacional Isla Mocha). Both the Juan Fernández Archipelago and Isla Mocha are managed by the Corporación Nacional Forestal (Bourne et al. 1992, Guicking 1999).

Short-tailed Albatross and Pink-footed Shearwater:

Most migratory birds in Canada are protected under the *Migratory Birds Convention Act* (MBCA); the *Act* fulfilled the terms of the Migratory Birds Convention (of 1916) between Canada and the U.S.A. The purpose of the *Act* is to implement the Convention by protecting and conserving migratory birds; as populations and individual birds, and their nests. In 2005, amendments were made to the MBCA and the *Canadian Environmental Protection Act* (CEPA) to more effectively protect migratory birds and the marine environment from the negative effects caused by the discharges of harmful substances, such as oil, into marine waters. The enactment (Bill C-15) extended enforcement and judicial powers to the EEZ and refined tools required to enforce and prosecute violations that occur in this zone. The MBCA, the CEPA, the *Canadian Shipping Act*, the *Oceans Act* and the *Fisheries Act* affirm the sovereign rights and jurisdiction of Canada over its EEZ. Game officers under the MBCA and enforcement officers under CEPA can now take action against harmful substances discharged at sea, to protect wildlife and marine waters.

The *British Columbia Wildlife Act* (BCWA) protects all native bird species listed on the American Ornithologists' Union checklist; the *Act* also states that anything included in the MBCA is also covered by the BCWA. The Short-tailed Albatross and the Pink-footed Shearwater are protected under Section 34 of the BCWA, which makes it an offence to possess, take, injure, molest or destroy a bird, its nest or egg.

1.6.2 Research: breeding colonies

The Short-tailed Albatross breeding colony on Torishima Island is being monitored, and efforts to attract breeding birds to safer nesting areas are underway. In addition, in early 2008, 10 immature chicks (approximately 3-months from fledging) were translocated from Torishima to Mukojima (a historic nesting island in Japan's Bonin Islands) in an attempt to establish a viable breeding colony in a safer location. The chicks will be hand-reared until they are ready to leave the colony. The current plan is to repeat this with at least 10 more chicks translocated annually for the next five years (BirdLife International 2008). Satellite telemetry studies are elucidating movement patterns during the breeding and non-breeding seasons (USFWS 2005). That information will be extremely important for assessing the spatial/temporal overlap between commercial fishing and the distribution of Short-tailed Albatrosses in Japanese waters, as well as other areas where Short-tailed Albatrosses range, including Canada.

The Pink-footed Shearwater colonies in the Juan Fernández Islands have been monitored regularly since 2001, with most breeding biology work conducted on Isla Santa Clara (Hodum and Wainstein 2003, 2004). The Isla Mocha population remains virtually unstudied, with the work of Guicking (1999) being the only colony-based investigation conducted since partial surveys were undertaken in the mid-1980s. Satellite transmitters are being used to study movements during both the breeding and the non-breeding seasons (P. Hodum and M. Wainstein unpubl. data 2006, P. Hodum, pers. comm. 2007).

1.6.3 Fisheries related research and management

As noted previously, the International Plan of Action (Seabirds) was adopted by the FAO Committee on Fisheries in 1999. Canada has produced an NPOA-Seabirds to reduce seabird bycatch in longline fisheries (Fisheries and Oceans Canada 2007).

In 2002, Canada introduced mandatory seabird avoidance measures as a condition of licensing for all commercial longline vessels. Phased in over several years, more than 90% of all longline vessels are now monitored electronically. The remaining few longline vessels must carry an observer on each fishing trip and all vessels must record in their logbooks any seabirds caught (T. Mawani, pers. comm. 2007).

Numerous fisheries-related studies are being and have been conducted by the Washington Sea Grant Program to investigate ways to reduce seabird bycatch. These include investigating the effectiveness of gear modifications to reduce bycatch and analyzing the spatial/temporal distribution of Short-tailed Albatrosses and other seabirds (USFWS 2005).

In 2004, the Agreement on the Conservation of Albatrosses and Petrels (ACAP) was established under the auspices of the Convention on the Conservation of Migratory Species of Wild Animals. The Agreement currently focuses on Southern Hemisphere albatross and petrel species but provides outreach about albatrosses in general (USFWS 2005). The species covered by ACAP will likely be expanded to include the three northern hemisphere breeding albatross species (K. Morgan, pers. comm. 2007).

The Pink-footed Shearwater was selected as a Marine Species of Common Conservation Concern by the CEC, an organisation mandated in 1994 by the North American Agreement for Environmental Cooperation under the North American Free Trade Agreement. The shearwater was selected as a pilot species to begin cooperative conservation work between Canada, the U.S. and Mexico. The CEC developed a Pink-footed Shearwater North American Conservation Action Plan (NACAP, CEC 2005), and thus a plan for international cooperation and conservation actions exists to protect the Pink-footed Shearwater. This includes a pilot study initiated in 2006 intended to gain a better understanding of the species' migration, identify important foraging grounds, and determine the residency period and movement patterns in waters off the west coast of North America (P. Hodum and D. Hyrenbach unpubl. data 2006, P. Hodum and K. Morgan, pers. comm. 2006).

1.7 Knowledge Gaps

There are a number of gaps in our knowledge of the foraging habitats used by Short-tailed Albatrosses and Pink-footed Shearwaters in Canadian waters, as well as breeding success, burrow occupancy (Pink-footed Shearwaters) and demographic data (both species) from their breeding grounds. Increasing our understanding in the following areas would help evaluate the success of this recovery strategy and determine if recovery efforts in Canada were biologically meaningful.

Ecology and Biology

1. Collate at-sea survey data to develop long-term population indices and establish rigorous estimates of the seasonal distribution and abundance of Short-tailed Albatrosses and Pink-footed Shearwaters, including possible long-term changes in their marine habitat use, as data allow. Establish the length of stay of individual birds in Canadian waters.

2. Identify important (predictable, well-used) foraging habitats of populations of Short-tailed Albatrosses and Pink-footed Shearwaters in Canadian waters.

3. Collect demographic data from any birds reported as fisheries bycatch, and support and participate in ongoing demographic research and modelling to improve our understanding of the species' specific vulnerabilities to threats and their ability to recover.

4. Identify ways to use data from biotic (e.g., prey) and abiotic (e.g., temperature gradients) factors to model their potential influence on the seasonal distribution of Short-tailed Albatrosses and Pink-footed Shearwaters in Canadian waters.

Threats

1. Quantify known or potential threats to Short-tailed Albatrosses and Pink-footed Shearwaters on foraging grounds and along travel corridors within Canada. Monitor and determine causes of mortality and injury in these areas.

2. Determine the spatial/temporal overlap of commercial fisheries with Short-tailed Albatrosses and Pink-footed Shearwaters to determine where and when fisheries may have the potential to interact with either species. Evaluate the frequency and impact of all fishing gear types currently in use, and rank according to potential impact.

3. Assist efforts to estimate the frequency and severity of bycatch of Short-tailed Albatrosses and Pink-footed Shearwaters in commercial fisheries within Canada's EEZ and international waters, including the analysis of data from existing fishery observer programs to identify where additional coverage may be needed in order to generate this estimate.

4. Based on Threats 2 and 3, evaluate the use of fishing gear modifications to reduce the incidence of Short-tailed Albatross and Pink-footed Shearwater interactions/ mortality.

5. Evaluate the frequency and impact of petroleum discharges in the Canadian waters used by Short-tailed Albatross and Pink-footed Shearwater, and determine additional ways Canada can help to reduce these discharges.

6. Investigate the impact of heavy metals and organochlorine pollutants on Short-tailed Albatrosses and Pink-footed Shearwaters, and determine ways in which Canada can help to reduce these impacts.

2. RECOVERY

The recovery of the Short-tailed Albatross and the Pink-footed Shearwater cannot be accomplished by Canadian efforts alone. Both species are listed as threatened in Canada due to the limited number of breeding sites and low population levels that exist outside Canada. Short-tailed Albatrosses breed in Japan and, during the nesting season, have an extensive marine range in the North Pacific. Pink-footed Shearwaters breed in Chile and range along the coasts of South and Central America during the breeding season. Both species also move seasonally between international, US and Canadian territorial waters. Both the Short-tailed Albatross and the Pink-footed Shearwater face significant threats on the breeding grounds that cannot be addressed in Canada, but the intent of this strategy is to support international efforts to restore and increase populations by reducing potential mortalities while the birds are in Canadian territory. The need for international cooperation is therefore considered essential to the successful recovery of these species.

In addressing recovery of three species of whales in Pacific Canadian waters, Gregr et al. (2005) stated: *"...an effective recovery strategy will consider the long time scales associated with the longevity of these pelagic vertebrates, and the relatively slow response of their associated life history parameters to change. It would address imminent threats and immediate conservation concerns that affect these species and recognize that marine habitats are dynamic, at both short and long time scales, and that physical oceanographic processes that contribute to the creation of habitat are largely beyond human control. The recovery strategy should therefore focus on human actions and activities that can be directly managed".*

These comments are also relevant to the recovery of both the Short-tailed Albatross and the Pink-footed Shearwater.

2.1 Recovery Feasibility

Recovery of the Short-tailed Albatross and the Pink-footed Shearwater is biologically and technically feasible. Recovery for both species in Canadian waters is inextricably connected with what occurs on their breeding grounds, which are outside of Canada's jurisdiction.

In determining overall, range-wide feasibility, the four criteria outlined in the draft federal "Policy on the Feasibility of Recovery" (Environment Canada, 2005) were considered. Individuals capable of reproduction are available to increase the population growth rates. There is sufficient marine habitat to support both species in Canada, and although the low number of breeding colonies currently being used in their respective nesting locations is a concern for both species, most marine birds have evolved as island-nesters and thus, this habitat limitation is not a threat *per se*. The significant threats to these species, such as current threats to the breeding habitat, incidental take, entanglement, and oil pollution can be avoided or mitigated. The threat of ingestion of plastics and other pollutants may be difficult to address, but the severity of these threats most likely do not compromise recovery. The necessary recovery techniques do exist and are demonstrated to be effective.

2.2 Recovery Goal

The recovery goal of the Short-tailed Albatross and the Pink-footed Shearwater recovery strategy is to support and augment international efforts to restore and increase populations.

Rationale:

The Short-tailed Albatrosses and Pink-footed Shearwaters reported in Canadian waters belong to populations that move seasonally from their breeding colonies in Japan and Chile, respectively, to their non-breeding foraging areas in the North Pacific. In both cases, the COSEWIC status in Canada is in part determined by the limited number of breeding locations and by threats on the breeding grounds. Therefore, the Canadian goal is to support international efforts to conserve these two species. Additionally, the COSEWIC status of the Short-tailed Albatross is partially determined by the low number of individuals found in Canada (less than 1000). The population size and trend in Canadian waters depends on the global recovery; however, mortality of birds in Canadian waters could in turn have some impact on global recovery.

2.3 Population and Distribution Objectives

The population and distribution objectives for the Short-tailed Albatross and the Pink-footed Shearwater are:

- To maintain their current Canadian distribution; and
- To maintain, and to increase if possible, the seasonal populations that occupy Canadian waters.

If international efforts are successful on the breeding grounds of the Short-tailed Albatross and the Pink-footed Shearwater, and if threat mitigation is successful (internationally and in Canada), then the populations utilizing Canadian territorial waters are expected to increase. If on the other hand, threat mitigation is unsuccessful elsewhere, the populations utilizing Canadian waters may remain constant or decrease despite our best efforts at reducing threats within our own jurisdiction.

Canadian recovery actions for the Short-tailed Albatross will support and augment international efforts, notably the joint U.S.-Japan Short-tailed Albatross Draft Recovery Strategy (USFWS 2005). The following breeding population objectives (and criteria) are from that document. To be considered for down-listing in the U.S. (from Endangered to Threatened) the draft strategy recommends that the following conditions should be met: a minimum breeding population of 750 pairs, a 3-year running average population growth rate of ≥ 6 percent for ≥ 7 years and at least three successful colonies with more than 5 breeding pairs, of which at least two are on non-volcanic islands. To de-list the species entirely in the U.S., the breeding population must reach a minimum of 1,000 pairs, a 3-year running average population growth rate of ≥ 6 percent for ≥ 7 years, at least 250 pairs on at least two non-volcanic islands, and at least 10 percent (or ≥ 25 pairs) on islands other than the Senkaku Islands.

The Canadian goals and objectives support and augment the recommended measures for international conservation. For the conservation of the Pink-footed Shearwater, BirdLife International suggests eight measures (numbering does not imply priority): 1) remove all introduced mammals, initially within a feasibility study area (2) determine the distribution of nesting birds on Robinson Crusoe and Santa Clara and the densities on all islands; 3) reduce chick harvesting; 4) replant native flora, initially within the feasibility study area but also at forest edges; 5) enforce grazing restrictions on national park lands; 6) plant fast-growing, soil-binding trees along highly eroded slopes; 7) assess the threat posed by the fishing industry, especially in Chilean waters; and 8) monitor population trends (BirdLife International 2007). The Pink-footed Shearwater NACAP (CEC 2005) provides guidance for the development of the goals and objectives, which are supported by this recovery strategy. The NACAP, which focuses exclusively on issues in North American waters, suggests five measures: 1) evaluate the conservation status of the Pink-footed Shearwater at the North American continental level; 2) clarify threats on the wintering grounds; 3) build capacity for research and at-sea monitoring in

Mexico; 4) develop an awareness program for the species throughout its North American range; and 5) catalyze conservation actions.

2.4 Recovery Objectives

Implementing the following recovery objectives will enable the conditions necessary to achieving the recovery strategy's population and distribution objectives (Section 2.3).

Objective 1: Threat Reduction and Understanding.

Minimize or remove threats to Short-tailed Albatrosses and Pink-footed Shearwaters under Canadian jurisdiction (on-going).

Objective 2: Habitat Identification and Conservation.

Identify and conserve marine habitats of importance to Short-tailed Albatrosses and Pink-footed Shearwaters in Canada (2012).

Objective 3: International Initiatives.

Promote, support and augment international initiatives contributing to the recovery of Short-tailed Albatrosses and Pink-footed Shearwaters throughout their range (on-going).

Objective 4: Public awareness.

Develop and implement educational activities that support the recovery of the Short-tailed Albatross and the Pink-footed Shearwater in Canada (2012).

Objective 5: Addressing knowledge gaps.

Identify and understand threats to Short-tailed Albatrosses and Pink-footed Shearwaters in Canadian waters. Support research and monitoring that will fill knowledge gaps concerning the ecology of the Short-tailed Albatross and the Pink-footed Shearwater in Canada (2012).

2.5 Approaches Recommended to Meet Recovery Objectives

2.5.1 Narrative to support Recovery Planning Table

The general approach taken in the Recovery Planning Table (Table 3) is to address the global status of the two species by focusing on actions that can be taken in Canada, while also supporting international initiatives to recover the species. Approaches to address the threats of bycatch and entanglement, oil spills, chronic oil pollution, and plastic pollution in Canadian waters are to varying degrees based on research, because the current state of knowledge about threats to Short-tailed Albatrosses and Pink-footed Shearwaters in Canada is poor. Much more information (and synthesis) is needed to guide recovery activities. The current state of knowledge about the basic biological, and habitat requirements of these two species in Canada is relatively poor, and a better understanding is required for effective recovery efforts. Lack of full knowledge or understanding of these threats and ecological requirements should not preclude proactive work to reduce known risks to Short-tailed Albatrosses and Pink-footed Shearwaters, and reduction of current threats is a primary focus of this strategy.

As threats are discovered, identified or better understood it may be necessary to develop or refine recovery activities to mitigate them. Many mitigation activities, including stewardship, will be developed based on the outcomes of research and inventory, threats reduction, and communication and extension activities identified in the above recovery objectives.

Canada has the opportunity to play a role in the recovery and conservation of Short-tailed Albatrosses and Pink-footed Shearwaters throughout their range. A variety of Canadian organizations and agencies can influence activities in other countries, ultimately contributing to improvements in the overall conservation status of the species. While the broad strategies in the Recovery Planning Table focus on actions that can be taken in Canada, and threats in other countries and on the breeding grounds are not discussed in detail, participation in and support of international efforts will be key to the recovery of these species (see USFWS 2005, CEC 2005, BirdLife International 2007).

2.5.2 Recovery planning

Table 3. Recovery Planning Table.

Priority	Threats addressed	Broad strategy to address threat	Recommended approaches to meet recovery objectives
Objective 1: Threat Reduction. Minimize or remove threats to Short-tailed Albatrosses and Pink-footed Shearwaters under Canadian jurisdiction.			
Urgent	Bycatch and entanglement from interactions with commercial fisheries Oil spills, chronic oil pollution, plastics and other pollutants Marine industrial development: oil exploration and wind farms	Stewardship and/or regulation	a) Implement and/or develop mitigation measures to minimize human-induced mortality. Continue implementation of Canada's NPOA. b) Utilize stewardship programs developed under Objective 5 to engage stakeholders in the implementation of mitigation measures c) Assess potential for impacts to these species and/or their habitats during Environmental Impact Assessments

Priority	Threats addressed	Broad strategy to address threat	Recommended approaches to meet recovery objectives
Objective 2: Habitat Identification and Conservation. Identify and conserve habitat of importance to Short-tailed Albatrosses and Pink-footed Shearwaters in Canadian waters.			
Necessary	Bycatch and entanglement from interactions with commercial fisheries Oil spills, chronic oil pollution, plastics and other pollutants Marine industrial development: oil exploration and wind farms Climate change	Habitat protection	a) Undertake research to identify the range of marine habitat used by Short-tailed Albatrosses and Pink-footed Shearwaters in Canada; include historical data where appropriate to the analysis. b) Assess the distribution and abundance of the prey of the Short-tailed Albatross and the Pink-footed Shearwater (and/or develop oceanographic proxies for albatross and shearwater prey that can be assessed using existing sampling programs and/or by remote sensing) c) Assess and evaluate tools for marine habitat identification and conservation d) Assess potential for impacts to these species and/or their habitats during Environmental Impact Assessments
Objective 3: International Initiatives. Promote, support and augment international initiatives contributing to the recovery of Short-tailed Albatrosses and Pink-footed Shearwaters throughout their range.			
Necessary	Threats on the breeding grounds Bycatch and entanglement from interactions with commercial fisheries Oil spills, chronic oil pollution, plastics and other pollutants Marine industrial development: oil exploration and wind farms	International initiatives and collaboration	a) Investigate options for Canadian participation in and promotion of international agreements and conventions to promote protection and recovery of the Short-tailed Albatross and the Pink-footed Shearwater (e.g., the Agreement on the Conservation of Albatrosses and Petrels) b) Collaborate with US agencies, other range nations, and international bodies, on Short-tailed Albatross and Pink-footed Shearwater conservation initiatives and research (e.g., working with Chile, through the Canada-Chile Agreement on Environmental Cooperation to find solutions to problems at the breeding colonies and adjacent foraging areas; working as a member of relevant Regional Fisheries Management Organisations to promote bycatch reduction measures)

Priority	Threats addressed	Broad strategy to address threat	Recommended approaches to meet recovery objectives
Objective 4: Public Awareness. Develop and implement education activities that support the recovery of Short-tailed Albatrosses and Pink-footed Shearwaters in Canada			
Necessary	Bycatch and entanglement from interactions with commercial fisheries Oil spills, chronic oil pollution, plastics and other pollutants Marine industrial development: oil exploration and wind farms	Education and compliance promotion	a) Develop programs and initiatives to educate and train stakeholders and the general public about the conservation needs of the Short-tailed Albatross and the Pink-footed Shearwater, and of their role in the conservation of the two species b) Develop tools (e.g., brochures, identification cards, etc.) to explain to fishers and vessel operators (in BC and elsewhere) the conservation issues the two species face and to aid in identification of the species as a means to get stakeholders to follow best management practices to avoid catching birds on fishing gear or fouling birds with petroleum releases
Objective 5: Addressing Knowledge Gaps. Identify and understand threats to Short-tailed Albatrosses and Pink-footed Shearwaters in Canadian waters. Support research and monitoring that will fill knowledge gaps relevant to the ecology of the two species in Canadian waters.			
Necessary	Bycatch and entanglement from interactions with commercial fisheries	Research	a) Synthesize and evaluate existing data on commercial fishing activities known to, or having the potential to, impact survival and recovery
	Oil spills, chronic oil pollution, plastics and other pollutants		b) Assess the level of threat to Short-tailed Albatrosses and Pink-footed Shearwaters from marine pollution, and identify ways Canada can reduce these
	Marine industrial development: oil exploration and wind farms Climate change		c) Identify and evaluate other activities that may pose a threat to Short-tailed Albatrosses and Pink-footed Shearwaters (e.g., offshore oil and gas exploration and development) d) Synthesize existing knowledge from research and monitoring activities undertaken regarding Short-tailed Albatrosses and Pink-footed Shearwaters e) Support research on basic knowledge gaps identified from (d) including foraging ecology, distribution and demographics

2.6 Performance Indicators

Measurable performance indicators will be a critical component of the recovery strategy for the Short-tailed Albatross and the Pink-footed Shearwater to gauge the extent that recovery activities are successful in contributing to the stated recovery goal for the species. For the approaches identified under each of the five recovery objectives in this Recovery Strategy, a set of progress indicators should be devised. At this stage, some of the indicators will reflect the current lack of knowledge about the Short-tailed Albatross and the Pink-footed Shearwater, and will be related to research activities.

During regular or scheduled intervals when the recovery strategy will be reviewed, progress indicators should be revised to reflect increasing knowledge. Indicators outlined in Table 4 therefore are preliminary. They represent the current thinking and are subject to change as recovery actions are implemented.

Table 4. List of general indicators of progress to assist in determining the extent that recovery is being achieved. Each set of indicators corresponds to a specific recovery objective.

Recovery Objective	Indicators of Progress
Threat Reduction	• Effectiveness of threat reduction measures and stakeholder engagement plans are assessed. • Stakeholders are engaged in the development, implementation and testing of current and future of mitigation measures. • Action Plan is completed.
Habitat Identification and Conservation	• Critical and/or important habitats in Canada are identified to the extent possible. • Tools for habitat protection are developed, implemented and their effectiveness evaluated. • Draft action plan for the protection of critical habitat in Canada, if considered appropriate, is developed.
International Initiatives	• Collaboration has commenced with other nations (e.g., with the US/Japan Short-tailed Albatross Recovery Team, or through the Canada-Chile agreement on environmental cooperation) on Short-tailed Albatross and Pink-footed Shearwater conservation initiatives.
Public awareness and stewardship compliance	• Information on Short-tailed Albatrosses and Pink-footed Shearwaters is produced and distributed to federal and provincial governments. • Public awareness materials (e.g., briefing kits, web resources, brochures) are produced and distributed. • Initiatives to educate and train stakeholders about their role in the conservation of the Short-tailed Albatross and the Pink-footed Shearwater are developed and implemented.

Addressing knowledge gaps	• Distribution and abundance of Short-tailed Albatrosses and Pink-footed Shearwaters frequenting Canadian waters are quantified. • Length (and range) of time individual birds remain in Canadian territory is determined. • Historic and current sightings are compiled and organized in a database. • Knowledge from research and monitoring activities are compiled in a comprehensive, living reference document that is regularly updated and accessible to a broad range of user groups. • Research on foraging ecology, movements and behaviour of Short-tailed Albatrosses and Pink-footed Shearwaters in Canadian waters is initiated. • Research is initiated on the oceanographic correlates that relate to the spatial/ temporal distribution of Short-tailed Albatrosses and Pink-footed Shearwaters in Canadian waters. • Survey program are established to develop indices of abundance (e.g., long term population trends).

2.7 Critical Habitat

2.7.1 Identification of the species' critical habitat

SARA defines critical habitat as the "habitat that is necessary for the survival and recovery of a listed wildlife species and that is identified as the species' critical habitat in the recovery strategy or in an action plan for the species". Given the limited knowledge and lack of predictability about the marine habitat associations of Short-tailed Albatrosses and Pink-footed Shearwaters, and the present difficulties associated with rigorously defining critical habitat in marine environments, it is not possible to identify critical habitat for these two species in this recovery strategy. A schedule of studies for identifying critical habitat is included below (Section 2.7.2); although it is acknowledged that these studies may instead determine that the critical habitat concept does not apply to one or both of these species.

Critical habitat for Short-tailed Albatrosses and Pink-footed Shearwaters, if found to be a relevant concept, would likely be characterised by seasonal oceanographic features and bathymetry. If it exists in Canadian waters, critical habitat for Short-tailed Albatrosses and Pink-footed Shearwaters will likely be dynamic and consist primarily of important foraging areas structured by oceanic conditions (cf. Hyrenbach et al. 2000, Gubbay 2006). To qualify as critical habitat for recovery in Canada, these areas would need to be identifiable and used annually/regularly by a significant proportion of the Canadian population. Piatt et al. (2006) stated that there are predictable Short-tailed Albatross hotspots, and that the hotspots can be protected via management of the potential threats in the areas or through the creation of marine protected areas (MPAs). Whether such hotspots occur within Canadian waters and could be considered for protection, or indeed designation as critical habitat, is unknown at this time. However, the hypothesis presents a reasonable focus for future research and discussions of critical habitat for the Short-tailed Albatross and the Pink-footed Shearwater in Canada.

2.7.2 Studies to identify critical habitat

The following is a list of efforts required in order to fill Canadian critical habitat knowledge gaps and determine (a) whether the concept of critical habitat applies to one or both species; and (b) identify critical habitat if the concept does apply.

Table 5. Schedule of studies to identify critical habitat.

Description of Activity	Outcome/Rationale	Timeline (Year)
1. Investigate methods to identify and describe marine critical habitat in Canada and other jurisdictions, and determine how or whether these apply to Short-tailed Albatrosses or Pink-footed Shearwaters in Canada.	Determination of whether critical habitat applies to Short-tailed Albatrosses and Pink-footed Shearwaters. Methods to identify marine critical habitat if the concept applies.	2007 – 2009
2. If the concept applies, conduct targeted ship-based surveys and remote-sensing studies (e.g., satellite tags) in Canadian waters or at colonies during the breeding season to identify specific marine habitats that may be critical to Short-tailed Albatrosses and Pink-footed Shearwaters while in Canadian waters. These areas could include foraging “hotspots” or travel corridors. Include available at-sea data where adequate to conduct statistical analyses.	Identification of areas of important habitat; determination of whether these constitute critical habitat.	2008 – 2013
3. In concert with Activity 2, determine whether remote-sensing data (sea surface temperature, chlorophyll) can serve as proxies for shearwater and albatross prey distribution, to provide alternate methods of marine critical habitat identification and conservation.	Determination of cost-effective tools for habitat identification; determination of focal study sites for studies conducted under Activity 2.	2008 - 2013

2.8 Existing and Recommended Approaches to Habitat Protection

There are currently no marine areas designated specifically to conserve and protect the habitat of Short-tailed Albatrosses or Pink-footed Shearwaters in Canada. If and when critical habitat is identified, approaches for its protection under the provisions of the SARA will be more easily determined.

Under the *Canada National Marine Conservation Areas Act*, Parks Canada is responsible for the creation of National Marine Conservation Areas (NMCAs) which will be managed for sustainable use, and protected from industrial activities such as marine dumping, mining, and oil and gas exploration and development. A proposed NMCA in the southern Queen Charlotte Islands will extend 10 km offshore from Gwaii Haanas National Park Reserve. This will provide some protection to a small portion of near-shore habitat that may be occasionally used by Short-tailed Albatrosses and Pink-footed Shearwaters. Consultations on the proposed NMCA are on hold pending negotiations with the Council of the Haida Nation (M. Dunn, pers. comm. 2006).

MPAs may be established under the *Oceans Act*, and Marine Wildlife Areas (MWAs) can be established under the *Canada Wildlife Act*. Currently Environment Canada has a project underway that is examining the feasibility of setting up a MWA around the Scott Islands. The study area covers 25,812 km^2, the majority of which is in deep waters beyond the continental shelf and shelfbreak. Under the auspices of a federal-provincial memorandum of understanding, a shared regulatory regime and management plan for the Scott Islands MWA will be developed with the conservation of seabirds and their habitats as the primary focus (M. Dunn, pers. comm.

2007). Since 1999 there have been four confirmed sightings of Short-tailed Albatrosses in the Scott Islands MWA study area, and two satellite-tracked birds have passed through the area (Figures 3a, b). Pink-footed Shearwaters have been recorded within the MWA study area from May through October (K. Morgan unpubl. data 2006).

2.9 Effects on Other Species

In Canada, Short-tailed Albatrosses and Pink-footed Shearwaters occur primarily along the continental shelf and upper slope habitats and occasionally in near-shore waters. Efforts to recover both of these species in Canadian waters could benefit other migratory, pelagic or continental shelf vertebrates including other species at risk (e.g., Leatherback Turtle [*Dermochelys coriacea*], at-risk cetaceans, Black-footed Albatross), particularly if critical habitat is designated and managed. Public outreach activities will also increase general awareness of the need for marine conservation.

2.10 Recommended Approach for Recovery Implementation

This recovery strategy takes a multi-species and international approach to implementation. In the future, other marine species that occupy similar habitats and face similar threats may be added to this strategy (e.g., the Black-footed Albatross). From the perspective of global distribution of breeding individuals, Japan and Chile represent the centre of distribution for the Short-tailed Albatross and the Pink-footed Shearwater, respectively.

To ensure that recovery efforts in Canada complement and augment the US recovery goals, as well as make the best use of limited resources, it would be advantageous for the Canadian recovery team to communicate with the international Short-tailed Albatross Recovery Team in order to receive updates and reports on the success of their recovery efforts, to report on progress in Canada, and occasionally to attend the U.S.-based meetings. A Canadian recovery strategy will facilitate coordination and communication with the international Short-tailed Albatross Recovery Team

Throughout its range, only Canada and Chile have listed the Pink-footed Shearwater as at risk. The CEC has encouraged Canada, the United States and Mexico to adopt a “continental approach” to enhance the effectiveness of conservation measures to conserve this species (CEC 2005). It will be advantageous for Canada to coordinate its conservation efforts with Chile in order to obtain reliable population and trend estimates at the breeding colonies, to provide expertise on mitigating threats at the colonies, and to evaluate the effectiveness of this recovery strategy.

2.11 Statement on Action Plans

A single action plan for both the Short-tailed Albatross and the Pink-footed Shearwater will be written as these two species occupy similar marine habitats and face similar threats in Canada. It will be completed by July 2009.

3. REFERENCES

Ainley, D.G. 1976. The occurrence of seabirds in the coastal region of California. Western Birds 7(2): 33-68.

Ainley, D.G., and G.A. Sanger. 1979. Trophic relations of seabirds in the northeastern Pacific Ocean and Bering Sea *in* Bartonek, J.C., and D.N. Nettleship (eds.). Conservation of marine birds of northern North America. U.S. Dept. Int., Fish and Wildlife Service Res. Rep. 11. 319 pp.

American Ornithologists' Union (AOU). 1998. Checklist of North American Birds. 7th edition. Washington D.C.

Baduini, C.L., K. D. Hyrenbach, K. O. Coyle, A. Pinchuk, V. Mendenhall, and G. L. Hunt Jr. 2001. Mass mortality of short-tailed shearwaters in the south-eastern Bering Sea during summer 1997. Fisheries Oceanography 10:117-130.

Baltz, D.M., and G.V. Morejohn. 1976. Evidence from seabirds of plastic particle pollution off central California. Western Birds 7: 111–112

Baltz, D.M. and G.V. Morejohn 1977. Food habits and niche overlap of seabirds wintering on Monterey Bay, California. Auk 526-543.

BC Conservation Data Centre. 2005. BC Species and Ecosystems Explorer. BC Ministry. of Environment,. Victoria, BC. Available: http://srmapps.gov.bc.ca/apps/eswp/ (accessed 15 March 2006).

BirdLife International 2007. Puffinus creatopus. 2007 IUCN Red List of Threatened Species. Available: www.iucnredlist.org (accessed 31 March 2008

BirdLife International. 2008. Short-tailed albatross chicks moved out of the shadow of the volcano. Available: http://www.birdlife.org/news/news/2008/03/start_translocation.html (accessed 30 March 2008).

Birt-Friesen, V.L., W.A. Montevecchi, D.K. Cairns, and S.A. Macko. 1989. Activity-specific metabolic rates of free-living northern gannets and other seabirds. Ecology 70:357-367.

Blight, L., and A.E. Burger. 1997. Occurrence of plastic particles in seabirds from the Eastern North Pacific. Marine Pollution Bulletin. 34(5): 323-325.

Bourne, W.R.P. 1983. Preliminary report on the ornithological situation at Juan Fernández; Unpublished report to ICBP, Cambridge.

Bourne, W.R.P., M. de L. Brooke, G.S. Clark, and T. Stone. 1992. Wildlife conservation problems in the Juan Fernández Archipelago, Chile. Oryx 26(1): 43-51.

Briggs, K.T., W.B. Breck Tyler, D.B. Lewis, and D.R. Carlson. 1987. Bird communities at sea off California: 1975 to 1983. Studies in avian Biology No. 11. Cooper Ornithological Society, Kansas.74 pp.

Brooke, M. 2004. Albatrosses and Petrels across the World. Oxford University Press. New York. U.S.A.

Brooke, M. de L. 1987. The birds of the Juan Fernández Islands, Chile. International Council for Bird Preservation, Cambridge.

Burger, A.E. 1993. Estimating the mortality of seabirds following oil spills: effects of spill volume. Marine Pollution Bulletin 26: 140-143.

Burger, A.E. 2003. Effects of the Juan de Fuca eddy and upwelling on densities and distributions of seabirds off southwest Vancouver Island, British Columbia. Marine Ornithology 31: 113-122.

Camp, K. 1993. Observations of Short-tailed Albatrosses (*Diomedea albatrus*) in the Bering Sea. Colonial Waterbirds 16(2): 221-222.

Campbell, R.W., N.K. Dawe, I. McTaggart-Cowan, J.M. Cooper, G.W. Kaiser, and M.C.E. McNall. 1990. The Birds of British Columbia. Volume 1. Non-passerines: Introduction, Loons through Waterfowl. Royal British Columbia Museum and Ministry of Environment, Victoria, British Columbia. xv + 514 pp.

Canadian Wildlife Service (CWS). 1991. Birds Protected in Canada Under the Migratory Birds Convention Act. Occasional Paper Number 1, Canadian Wildlife Service, Environment Canada, Ottawa.

Cifuentes, J.M, P.H. Becker, U. Sommer, P. Pacheco, and R. Schlatter. 2003. Seabird eggs as bioindicators of chemical contamination in Chile. Environmental Pollution 126(1): 123-137.

Cochrane, J.F., and A.M. Starfield. 1999. A simulated assessment of incidental take effects on a Short-tailed Albatross population. National Marine Fisheries Service, Juneau, Alaska, and U.S. Fish and Wildlife Service, Anchorage, Alaska. 37 pp.

Commission for Environmental Cooperation (CEC). 2005. Pink-footed Shearwater North American Conservation Action Plan. Commission for Environmental Cooperation, Montreal, Quebec, p. 1-23.

Committee on the Status of Endangered Wildlife in Canada (COSEWIC). 2003. COSEWIC assessment and status report on the Short-tailed Albatross *Phoebastria albatrus* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. 31 pp.

COSEWIC. 2004. COSEWIC assessment and status report on the Pink-footed Shearwater *Puffinus creatopus* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. 22 pp.

Cooper, J. pers. comm. 2005. University of Cape Town, South Africa

Crick, H.Q.P. 2004. The impact of climate change on birds. Ibis 146 (Suppl. 1): 48-56.

Desholm, M. and J. Kahlert. 2005. Avian collision risk at an offshore wind farm. Biology Letters 1:296-298.

Dunn, M. pers. comm. 2006, 2007. Environment Canada, Delta, British Columbia, Canada.

Environment Canada. 2005. Policy on the Feasibility of Recovery (draft). *Species at Risk Act* Policy. Environment Canada.

Environment Canada. 2006. Guidelines on identifying and mitigating threats to species at risk (draft). *Species at Risk Act* Implementation Guidance. Environment Canada, Ottawa. 29 pp.

Federal Register. 2000. Endangered and Threatened Wildlife and Plants: Final Rule to List the Short-tailed Albatross as Endangered in the United States. Federal Register 65(147): 46643.

Finkelstein, M.E., B.S. Keitt, D.A. Croll, B. Tershy, W.M. Jarman, S. Rodriguez-Pastor, D.J. Anderson, P.R. Sievert, and D.R. Smith. 2006. Albatross species demonstrate regional differences in North Pacific marine contamination. Ecological Applications 16:678-686.

Fisheries and Oceans Canada. 2007. National Plan of Action for Reducing the Incidental Catch of Seabirds in Longline Fisheries. Fisheries and Oceans Canada, Ottawa. 29 pp.

Goya, E., and G. Cardenas. 2003. Longline fisheries and seabirds in Peru. In: Lokkeborg, S. and W. Thiele (Eds.). Report of the FAO/BirdLife South American Workshop on Implementation of NPOA-Seabirds and Conservation of Albatrosses and Petrels. Valdivia, Chile, 2-6 December 2003. FAO Fisheries Report No. 751. FAO 2004. 32 pp.

Glade, A. (Ed.) 1993. Libro rojo de los vertebrados terrestres de Chile., 2nd edition. CONAF. Ministerio de Agricultura. Santiago de Chile. 68 pp.

Gregr, E.J., J. Calambokidis, L. Convey, J.K.B. Ford, R.I. Perry, L. Spaven, and M. Zacharis. 2005. Proposed Recovery Strategy for Blue, Fin and Sei Whales (*Balaenoptera musculus*, *B. physalus*, and *B. borealis*) in Pacific Canadian waters. Nanaimo: Fisheries and Oceans Canada vi + 54 pp.

Gubbay, S. 2006. Marine nature conservation in the pelagic environment: a case for pelagic Marine Protected Areas? Report to World Wildlife Fund, Godalming, UK.

Guicking, D. 1999. Pink-footed shearwaters on Isla Mocha, Chile. World Birdwatch. 21: 20-23.

Guicking, D., and W. Fiedler. 2000. Report on the excursion to the Juan Fernández Islands, Chile 4-23 February 2000. Unpublished report.

Guicking, D., D. Ristow, P.H. Becker, R. Schlatter, P. Berthold, and U. Querner. 2001. Satellite tracking of the Pink-footed shearwater in Chile. Waterbirds 24: 8-15.

Guicking D., W. Fiedler, C. Leuther, R.P. Schlatter, and P.H. Becker, P.H. 2004. Morphometrics of the Pink-footed shearwater (*Puffinus creatopus*): influence of sex and breeding site. Journal of Ornithology 145: 64-68.

Guzman, J.R., and M.T. Myres. 1983. The occurrence of shearwaters (*Puffinus* spp.) off the west coast of Canada. Canadian Journal of Zoology 61(9): 2064-2077.

Harrison, P. 1983. Seabirds, an identification guide. Houghton Mifflin Company, Boston, Massachusetts. 448 pp.

Hasegawa, H. 1984. Status and conservation of seabirds in Japan, with special attention to the Short-tailed Albatross. Pp. 487-500 *in* Croxall, J.P., P.G.H. Evans and R.W. Schreiber, (eds.). Status and Conservation of the World's Seabirds. International Council for Bird Preservation Technical Publication No. 2.

Hasegawa, H. and A.R. DeGange. 1982. The Short-tailed Albatross, *Diomedea albatrus*, its status, distribution and natural history. American Birds 36(5): 806-814.

Hasegawa, H. pers. comm. 2001, 2006. Toho University, Chiba, Japan.

Hodum, P., and M. Wainstein. 2003. Annual Report: JFIC. Biology and conservation of the Juan Fernández Archipelago seabird community. Unpublished report. Juan Fernández Islands Conservancy. University of Washington, Seattle.

Hodum, P., and M. Wainstein. 2004. Annual Report: JFIC. Biology and conservation of the Juan Fernández Archipelago seabird community. Unpublished report. Juan Fernández Islands Conservancy. University of Washington, Seattle.

Hodum, P. pers. comm. 2006, 2007. Oikonos-Ecosystem Knowledge, Seattle, WA, USA.

Hunt, G.L. Jr., H. Kato, and S.M. McKinnell. 2000. Predation by marine birds and mammals in the subarctic North Pacific Ocean. PICES Scientific Report No. 14. North Pacific Marine Science Organization, Sidney, BC.

Hyrenbach, K.D., K.A. Forney, and P.K. Dayton. 2000. Marine Protected Areas and ocean basin management. Aquatic Conservation: Marine and Freshwater Ecosystems 10:437-458.

Kenyon, J.K., K.H. Morgan, M.D. Bentley, L.A. McFarlane Tranquilla and K.E. Moore. In prep. Atlas of pelagic seabirds off the west coast of Canada and adjacent areas. CWS Technical Report Series XXX, Environment Canada, Delta, BC.

Kitaysky, A.S., E.V. Kitaiskaia, J.F. Piatt, and J.C. Wingfield. 2006. A mechanistic link between chick diet and decline in seabirds? Proceedings of the Royal Society of London [B] 273(1585): 445-450.

Martin, P.W., and M.T. Myres. 1969. Observations on the distribution and migration of some seabirds off the outer coasts of British Columbia and Washington state, 1946-1949. Syesis 2: 241-256.

Mawani, T. pers. comm. 2007. Fisheries and Oceans Canada, Vancouver, British Columbia, Canada.

McDermond, D.K., and K.H. Morgan. 1993. Status and conservation of North Pacific albatrosses. Pp. 70-81 *in* Vermeer, K., K.T. Briggs, K.H. Morgan and D. Siegel-Causey, (eds.). The status, ecology, and conservation of marine birds of the North Pacific. Canadian Wildlife Service Special Publication, Ottawa.

Melvin, E.F., M.D. Wainstein, K.S. Dietrich, K.L. Ames, T.O. Geernaert, and L.L. Conquest. 2006. The distribution of seabirds on the Alaskan longline fishing grounds: implications for seabird avoidance regulations. Washington Sea Grant Program. Project A/FP-7. 20pp.

Morgan, K.H., K. Vermeer, and R.W. McKelvey. 1991. Atlas of pelagic birds of western Canada. Canadian Wildlife Service, Occasional Paper Number 72, Ottawa.

Morgan, K. pers. comm. 2006, 2007. Environment Canada, Sidney, British Columbia, Canada.

NPPSD. 2005. North Pacific Pelagic Seabird Database, Short-tailed Albatross, Ver. 2005.06.07 USGS Alaska Science Center & U.S. Fish and Wildlife Service, Anchorage, Alaska. Available: http://www.absc.usgs.gov/research/NPPSD (accessed 31 May 2006)

O'Hara, P., pers. comm. 2006. Birds Oiled at Sea program, Department of Biology, University of Victoria, British Columbia.

Ojeda, P., H. Gonzalez and G. Araya. 2003. Erradicación del conejo europeo *Oryctolagus cuniculus* Linnaeus, 1758 desde la Isla Santa Clara Archipiélago Juan Fernández. Informe Técnico No. 48. Corporación Nacional Forestal, Chile.

Onley, D. and P. Scofield. 2007. Field Guide to the Albatrosses, Petrels and Shearwaters of the World. Christopher Helm, London, U.K.

Palmer, R.S. 1962. Handbook of North American Birds, Vol 1. Yale University Press. Newhaven, Conn.

Penhallurick, J. and M. Wink. 2004. Analysis of the taxonomy and nomenclature of the Procellariiformes based on complete nucleotide sequences of the mitochondrial cytochrome *b* gene. Emu 104:125-147.

Piatt, J.F., J. Wetzel, K. Bell, A. DeGange, G. Balogh, G. Drew, T. Geernaert, C. Ladd, and G.V. Byrd. 2006. Predictable hotspots and foraging habitat of the endangered short-tailed albatross (*Phoebastria albatrus*) in the North Pacific: Implications for conservation. Deep-Sea Research II 53: 387-398.

Prince, P.A., and R.A. Morgan. 1987. Diet and feeding ecology of Procellariiformes. Pp. 135-171 *in* Croxall, J.P., (ed.). Seabirds: feeding ecology and role in marine ecosystems. Cambridge University Press, Cambridge, U.K.

Ramsay, L. pers. comm. 2006. BC Ministry of Environment, Victoria, British Columbia, Canada.

Rheindt, F.E., and J.J. Austin. 2005. Major analytical and conceptual shortcomings in a recent taxonomic revision of the Procellariiformes – a reply to Penhallurick and Wink (2004). Emu 105:181-186.

Robinson, R.A., J.A. Learmonth, A.M. Hutson, C.D. Macleod, T.H. Sparks, D.I. Leech, G.J. Pierce, M.M. Rehfisch, and H.Q.P. Crick. 2005. Climate change and migratory species. British Trust for Ornithology Research Report 414, British Trust for Ornithology, Thetford, Norfolk.

Ribic, C.A., and D.G. Ainley 1988/89. Constancy of seabird species assemblages: an exploratory look. Biological Oceanography. 6:175–202.

Rottmann, J., and M.V. López-Callejas. 1992. Estrategia Nacional de Conservación de Aves. Serie Tecnica, año 1(1). Servicio Agrícola y Ganadero. Ministerio de Agricultura. Chile. 16 pp.

Sanger, G.A. 1972. The recent pelagic status of the Short-tailed Albatross (*Diomedea albatrus*). Biological Conservation 4(3):189-193.

Schlatter, R.P. 1984. The status and conservation of seabirds in Chile Pp. 8-15 *in* Croxall, J.P., P.G.H. Evans and R.W. Schreiber, (eds.). Status and Conservation of the World's Seabirds. International Council for Bird Preservation Technical Publication No. 2.

Sherburne, J. 1993. Status report on the Short-tailed Albatross *Diomedea albatrus*. U.S. Fish and Wildlife Service, Anchorage, Alaska. 32 pp.

Sibley, D.A. 2000. National Audubon Society The Sibley Guide to Birds. Chanticleer Press, Inc., New York.

Sievert, P.R., and L. Sileo. 1993. The effects of ingested plastic on growth and survival of albatross chicks. Pp. 212-217 *in* K. Vermeer, K.T. Briggs, K.H. Morgan, and D. Siegel-Causey (eds.). The Status, Ecology, and Conservation of Marine Birds of the North Pacific, Canadian Wildlife Service Special Publication, Ottawa.

Smith, J.L., and K.H. Morgan. 2005. An Assessment of Seabird Bycatch in Longline and Net Fisheries in British Columbia. Technical Report Series Number 401. Canadian Wildlife Service, Pacific and Yukon Region, Sidney, British Columbia. xiii + 51 pp.

Suryan, R.M., F. Sato, G.R. Balogh, K.D. Hyrenbach, P.R. Sievert, and K. Ozaki. 2006. Foraging destinations and marine habitat use of short-tailed albatrosses: a multi-scale approach using first-passage time analysis. Deep-Sea Research II 53: 370-386.

Suryan, R.M., K.S. Dietrich, E.F. Melvin, G.R. Balogh, F. Sato, K. Ozaki. 2007. Migratory routes of short-tailed albatrosses: Use of exclusive economic zones of North Pacific Rim countries and spatial overlap with commercial fisheries in Alaska. Biological Conservation 137:450-460.

Tanabe, S., M. Watanabe, T.B. Minh, T. Kunisue, S. Nakanishi, H. Ono, and H. Tanaka. 2004. PCDDs, PCDFs, and Coplanar PCBs. in albatross from the North Pacific and Southern Oceans: Levels, patterns, and toxicological implications. Environmental Science and Technology 38(2):403-413.

U.S. Fish and Wildlife Service (USFWS). 2005. Short-tailed Albatross Draft Recovery Plan.

Anchorage AK, 62 pp.

M. Wainstein, pers. comm. 2006. Washington Sea Grant, University of Washington, Seattle, WA, USA.

Warham, J. 1990. The Petrels: their ecology and breeding systems. Academic Press Ltd., London, U.K.

Wiese, F.K. and J.L. Smith. 2003. Mortality estimates and population effects of Canadian Pacific longline fisheries on Black-footed Albatross (*Phoebastria nigripes*): national and international implications. *In* DFO-EC National Working Group on Seabird Bycatch in Longline Fisheries. 2003. Status Report and Future Directions Towards the Development of a National Plan of Action for the Reduction of Incidental Catch of Seabirds in Domestic and Foreign Longline Fisheries in Canadian Waters. Canadian Technical Report of Fisheries and Aquatic Sciences 2471: 23-50.

Wiese, F.K. and G.J. Robertson. 2004. Assessing seabird mortality from chronic oil spill discharges at sea. Journal of Wildlife Management 68:627-638.

Yamanaka, L. pers. comm. 2005. Fisheries and Oceans Canada, Nanaimo, British Columbia, Canada.

4. RECOVERY TEAM MEMBERS

Ken Morgan (Chair)
Pelagic Seabird Biologist
Environment Canada, c/o Institute of Ocean Sciences
9860 West Saanich Road, Sidney, BC, Canada, V8L 4B2
(250) 363-6537, morgank@dfo-mpo.gc.ca

Louise K. Blight
PhD Student, University of British Columbia
Centre for Applied Conservation Research
Vancouver, BC Canada, V6T 1Z4
(604) 222-3348, lkblight@interchange.ubc.ca

Myke Chutter
Provincial Bird Specialist
BC Ministry of Environment
P.O Box 9338 Stn Prov Govt, Victoria, BC, Canada, V8W 9M1
(250) 387-9797, Myke.Chutter@gov.bc.ca

Peter Hodum
Seabird Ecologist
Oikonos-Ecosystem Knowledge
PO Box 1932, Benicia, CA USA, 94510
(253) 879-2789, peter@oikonos.org

Tamee Mawani
Hook and Line Coordinator
Fisheries and Oceans Canada
401 Burrard St, Vancouver, BC, Canada, V6C 3S4
(604) 666-0912, mawanit@pac.dfo-mpo.gc.ca

Nadine Parker
Environmental Officer
Transport Canada
620 - 800 Burrard St, Vancouver, BC, Canada, V6Z 2J8
(604) 666-5382, parkern@tc.gc.ca

Jo Smith
PhD student, University of Washington
School of Aquatic and Fishery Sciences
Box 355020, Seattle WA, USA, 98195
(206) 221-5294, josmith@u.washington.edu

Ross Vennesland
Species at Risk Recovery Specialist
Parks Canada Agency
300 -300 West Georgia St,
Vancouver, BC, Canada, V6B 6B4
(604) 666-4648, ross.vennesland@pc.gc.ca