Species at Risk Act
Management Plan Series

Management Plan for the Black-footed Albatross (*Phoebastria nigripes*) in Canada

Black-footed Albatross

2017

Government of Canada
Gouvernement du Canada
Canada

Recommended citation:

Environment and Climate Change Canada. 2017. Management Plan for the Black-footed Albatross (*Phoebastria nigripes*) in Canada. *Species at Risk Act* Management Plan Series. Environment and Climate Change Canada, Ottawa. iv+ 30 pp.

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Cover illustration: John Ford

Également disponible en français sous le titre
« Plan de gestion pour l'Albatros à pieds noirs (*Phoebastria nigripes*) au Canada »

ISBN 978-0-660-24370-2
Catalogue no. En3-5/91-2017E-PDF

[1] http://sararegistry.gc.ca/default.asp?lang=En&n=24F7211B-1

Preface

The federal, provincial, and territorial government signatories under the Accord for the Protection of Species at Risk (1996)[2] agreed to establish complementary legislation and programs that provide for effective protection of species at risk throughout Canada. Under the *Species at Risk Act* (S.C. 2002, c.29) (SARA), the federal competent ministers are responsible for the preparation of management plans for listed species of special concern and are required to report on progress five years after the publication of the final document on the SAR Public Registry .

The Minister of Environment and Climate Change and Minister responsible for the Parks Canada Agency is the competent minister under SARA for the Black-footed Albatross and has prepared this management plan as per section 65 of SARA. To the extent possible it has been prepared in cooperation with Fisheries and Oceans Canada and the Province of British Columbia, as per section 66(1) of SARA.

Success in the conservation of this species depends on the commitment and cooperation of many different constituencies that will be involved in implementing the directions set out in this plan and will not be achieved by Environment and Climate Change Canada and the Parks Canada Agency, or any other jurisdiction alone. All Canadians are invited to join in supporting and implementing this plan for the benefit of the Black-footed Albatross and Canadian society as a whole.

Implementation of this management plan is subject to appropriations, priorities, and budgetary constraints of the participating jurisdictions and organizations.

[2] http://registrelep-sararegistry.gc.ca/default.asp?lang=En&n=6B319869-1%20

Acknowledgments

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Thanks to John Ford (Fisheries and Oceans Canada) for permission to use his photograph on the cover page.

Executive Summary

The Black-footed Albatross is a long-lived seabird that breeds mainly in the Northwestern Hawaiian Islands and occurs at sea off the Pacific Coast of Canada during the breeding and non-breeding seasons. Significant numbers feed off the coast of British Columbia each year, including adults making long foraging trips to feed their young.

The population seems generally stable, but relatively high numbers are caught as bycatch in longline fisheries in the North Pacific. Additionally, adults and immature birds are affected by the accumulation of toxic chemicals and heavy metals and by the ingestion of waste plastics from the surface of the sea when they are feeding. Because of the unknown effect of these particular threats over the long term, the Black-footed Albatross has been listed as a species of Special Concern in Canada. Emerging threats such as the potential loss of nesting and foraging habitat due to climate change also threaten this species.

The management objective for the Black-footed Albatross is *to "...help to increase global population numbers and maintain the population throughout its documented distribution in Canadian waters, by reducing at-sea mortality and otherwise augmenting international conservation efforts."* The conservation of the Black-footed Albatross cannot succeed by Canadian efforts alone due to the wide-ranging marine nature and distant nesting habitats of this species.

Actions already underway include long-term at-sea surveys that record Black-footed Albatross distribution and abundance in Canada, and assessments of longline bycatch mortality in Canadian Pacific waters, including monitoring of current bycatch levels. Bycatch mitigation measures have been implemented in the target fishing fleet, but monitoring for compliance and effectiveness is limited and should be increased. Strategies and measures to achieve the management objectives are presented in the section entitled Broad Strategies and Conservation Measures.

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1. COSEWIC* Species Assessment Information

Date of Assessment: April 2007

Common Name (population): Black-footed Albatross

Scientific Name: *Phoebastria nigripes*

COSEWIC Status: Special Concern

Reason for Designation: This long-winged, long-lived (up to 40 years) seabird breeds on remote islands primarily in the Hawaiian chain, but significant numbers feed off the coast of British Columbia each year, including adults making long foraging trips to feed their young. Black-footed Albatross numbers declined at one of two major colonies in the 1990s, but the population seems generally stable or possibly slowly increasing. Some population models have predicted serious declines, while others predict stable populations. Many are caught as bycatch in longline fisheries, most suffer from ingestion of plastic and accumulate high levels of pollutants, but the long-term effects of these threats are unclear.

Canadian Occurrence: Pacific Ocean

COSEWIC Status History: Designated Special Concern in April 2007.

*COSEWIC (Committee on the Status of Endangered Wildlife in Canada)

2. Species Status Information

Table 1. List and description of various conservation status ranks for the Black-footed Albatross (Source: NatureServe 2014; WWF México 2012; COSEWIC 2006)

	Global Ranks	National Ranks	Sub-national Ranks	COSEWIC Status
Black-footed Albatross (*Phoebastria nigripes*)	Global Status G3G4 (Vulnerable, Apparently Secure); Rounded Global Status G3 (Vulnerable) International Union for Conservation of Nature (IUCN) – Near Threatened	Canada – N3N (Vulnerable) United States – N4N5B (Apparently Secure, Secure) Mexico – Amenazada (Vulnerable)	British Columbia – S3N (Vulnerable) Alaska – S3S4N (Vulnerable, Apparently Secure) Hawaii – S3S4 (Vulnerable, Apparently Secure) Oregon – SNA (Not Applicable) Hawaii – Threatened (under state legislation)	Special Concern

3. Species Information

3.1. Species Description

The Black-footed Albatross (*Phoebastria nigripes* Audubon 1839) is a relatively small member of the albatross family and one of four albatross species regularly found in the Northern Hemisphere. Adult birds are distinguished from other albatross species in the North Pacific by their dusky brown plumage, whitish area around the base of the bill and under the eye and white plumage over the base of the tail and undertail coverts. Immature birds have darker plumage than adults and lack the white upper and undertail coverts (Hyrenbach et al. 2002). Males have a larger head size than females (Smith et al. 2010). The Black-footed Albatross lives for at least 40 years, with banding records showing the oldest bird as being 45+ years. Like many other seabird species, Black-footed Albatross exhibit a monogamous mating system that lasts a lifetime unless their mate disappears or dies. Birds typically begin breeding at the age of seven or eight (Rice and Kenyon 1962) and produce a single egg per breeding season. Details on natural history and biology of the Black-footed Albatross are provided in the COSEWIC (2006) status report for the species, with many additional references provided therein.

3.2. Population and Distribution

Black-footed Albatross are currently known to nest at 15 sites throughout the tropical/subtropical North Pacific Ocean, with approximately 95% of the population breeding entirely within the Northwestern Hawaiian Islands (NWHI; Agreement on the Conservation of Albatrosses and Petrels [ACAP] 2011; Fig 1) and protected in the Papahānaumokuākea Marine National Monument. COSEWIC (2006) reported a total of 12 nesting sites, but three other intermittent sites are listed by ACAP (2011).

The global population has been estimated at between 278,000 and 300,000 individuals (presumably including non-breeding birds at sea; Cousins & Cooper 2000; BirdLife International 2004a, b). The most recent global estimate of breeding birds is of 66,377 pairs, with approximately 63,273 breeding pairs in the central Pacific (Hawaiian island chain; unpublished data ACAP 2014). Its nesting distribution means the species is vulnerable to localised threats; just four colonies (Midway Atoll, Laysan Island, Pearl and Hermes Reef, and French Frigate Shoals [FFS]) account for approximately 88% of the world's breeding population. Four small colonies (about 5% of the world's breeding pairs) are situated on islands off the coast of Japan (ACAP 2011). In 1998 and 2000 the first reported breeding for this species east of Hawaii was recorded in Mexico (Guadalupe and San Benedicto Island; no breeding documented since; Pitman and Ballance 2002; ACAP 2011). Several large central and western Pacific colonies historically extirpated by the feather trade have not been recolonized

(Arata et al. 2009), though a few pairs recently made unsuccessful attempts to nest at Wake Island (central Pacific; Arata et al. 2009). New analyses based on nest count data from Midway, Laysan, and FFS from 1992–2014, 1998–2012, and 1980–2011 showed linear trends in populations that were positive (1.5% per annum), negative or presumed stable (-0.02% per annum), and presumed stable (0.6% per annum), respectively (ACAP 2011; see COSEWIC (2006) for previous analyses).[3]

At sea, the Black-footed Albatross is widespread throughout the North Pacific, ranging from 20°–58°N (Cousins and Cooper 2000). The population occurs in international waters as well as in the Canadian Exclusive Economic Zone (EEZ) off British Columbia (BC). They are most often found along the continental shelf and shelf break, over seamounts and other areas with steep bathymetry, and quite frequently near shore (Kenyon et al. 2009; Fig. 2). The waters of British Columbia are important for Black-footed Albatross, particularly along the shelf break, where upwelling and high prey populations create reliable sources of food for these birds. Historically, Black-footed Albatross were regular visitors to the BC Coast. This is the only albatross species seen regularly in Canadian waters at present (COSEWIC 2006).

Ship-based observations and studies show that Black-footed Albatross numbers in BC peak from May to September, particularly in August and early September when adult birds and young of the year disperse from their Hawaiian colonies. In late September to early October breeders return to their nesting colonies and are present in lower numbers from December to April (COSEWIC 2006). There is no trend analysis for the species in Canadian waters.

[3] Note: French Frigate Shoals positive 1.8% per annum 1991 – 2011.

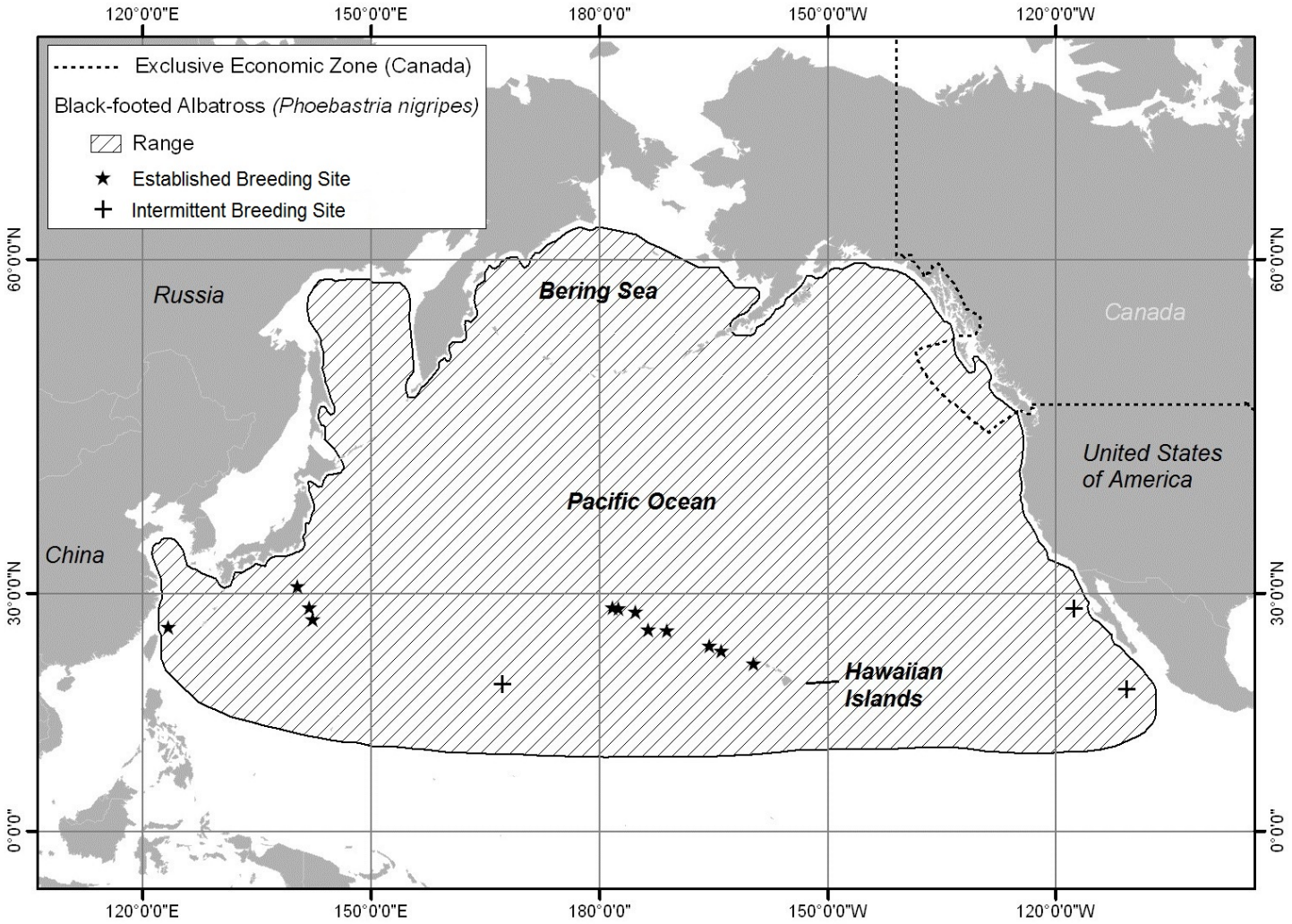

Figure 1: Global at-sea and terrestrial range of Black-footed Albatross, with established and intermittent breeding sites indicated (source: Environment Canada).

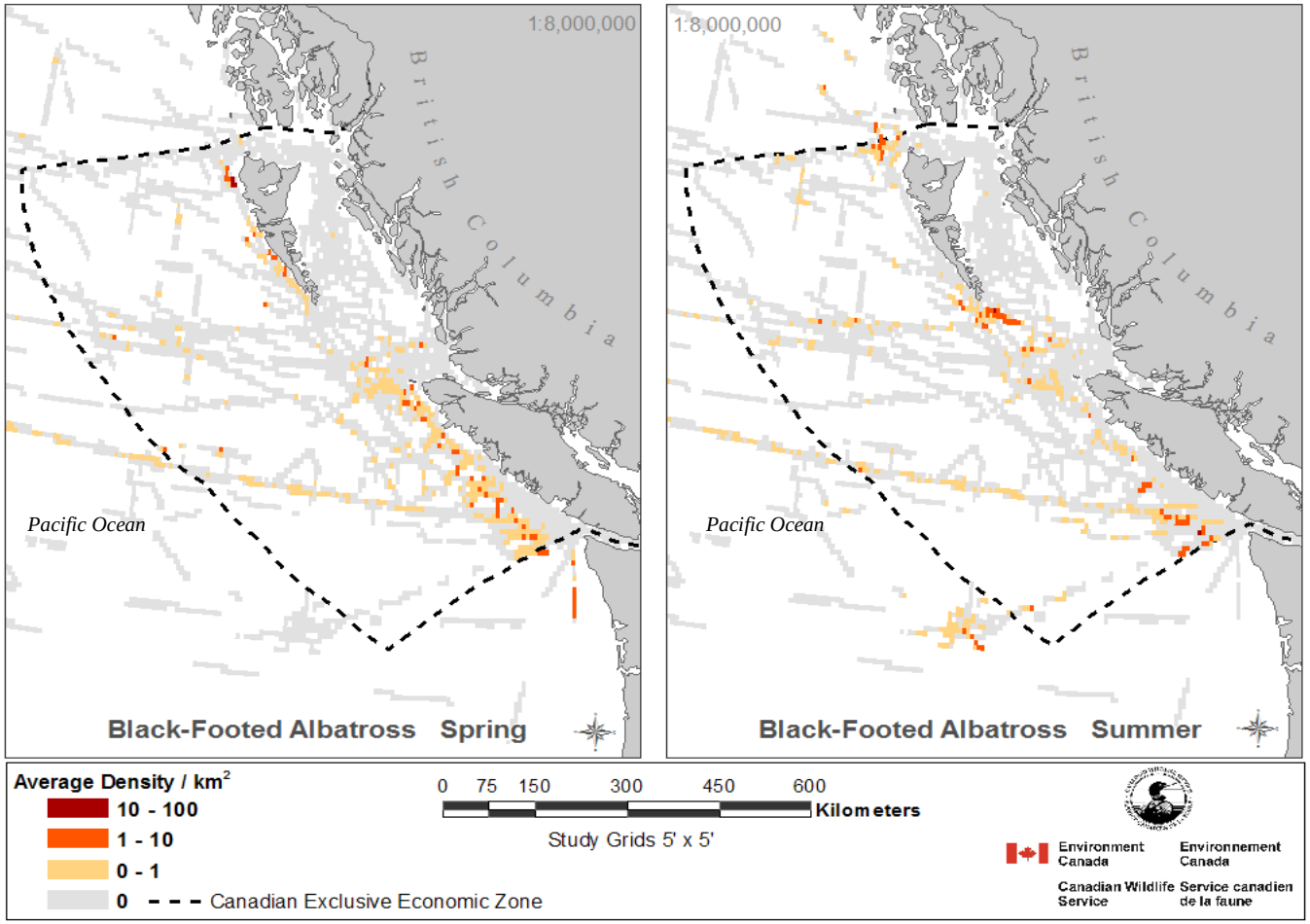

Figure 2: Average grid cell densities of Black-footed Albatross in Canadian waters during seasons of peak abundance ("Spring" = 16 March – 15 June; "Summer" = 16 June – 15 September; Source: Environment Canada, Data: Kenyon et al. 2009).

3.3. Needs of the Black-footed Albatross

The Black-footed Albatross is long-lived, with delayed age of first breeding, low fecundity, and high adult survival rates (Whittow 1993). The species is thus extremely vulnerable to any changes in natural rates of adult mortality, with demographic models showing that population change is most affected by adult survival (Cochrane and Starfield 1999). It is also a highly pelagic, island-nesting species that needs predator-free areas for nesting and for year-round foraging; requires large, productive marine habitats free from human disturbances and disruptions in their prey populations (COSEWIC 2006). The tendency for this species to often forage up to several thousands of kilometres from their breeding sites is most relevant to Canada's Management Plan. Adult Black-footed Albatrosses visit Canada's Pacific EEZ to forage during the breeding and post-breeding season, and immature birds are likely present in Canadian waters year round.

The need for disturbance-free nesting habitat is primarily compromised by introduced predators, particularly at historical colonies that have yet to be reoccupied. On land, Black-footed Albatrosses need predator-free nest sites because they are vulnerable for up to six months while they breed. Once their chick hatches, adults need to remain close to guard the chick and feed it frequent, small meals. During this time both adult and chick are tied to the colony and its vicinity for survival. As chicks age they need larger meals and may be left alone for days or weeks at a time while the parent forages at sea. Once chicks reach 18-20 days of age, a breeding adult will expand its foraging range to access cold, nutrient-rich waters north and east of the colonies, including along North America’s continental shelf, from central California to BC (Hyrenbach et al. 2002; Kappes et al. 2010). Once chicks leave the colony, breeding adults will also depart, dispersing across the North Pacific and remaining at sea until the next breeding season (e.g., Hyrenbach and Dotson 2003).

Albatrosses are surface predators and scavengers, requiring productive marine habitats during all life stages to feed primarily on squid and flying fish eggs and opportunistically on discarded fishing bait. Their selection of marine habitats is mediated by both food distribution and wind patterns (Croxall et al. 2005). Seamounts are important oceanic features for albatrosses, presumably due to oceanic upwelling and increased food concentrations; in Canada, Black-footed Albatrosses appear to concentrate over shallow seamounts such as Bowie (K. Morgan unpublished data). Near the North American continent, the species is most abundant over the outer continental shelf, particularly at the shelf break, another area of high food concentration (Morgan et al. 1991; Whittow 1993; Kenyon et al. 2009). In summary, breeding birds require marine habitats with abundant prey populations, both near and far from their colonies, and in Canada they use seamounts, the continental shelf, and shelf break habitats, so these areas need to be free from human disturbance or threats.

4. Threats

All the Canadian and international threats identified in the species' status report (COSEWIC 2006) are included in the following table and narrative. Two new threats identified since the status report was completed are also included here (collisions with vessels and active fishing gear, and tsunamis during the nesting season).

4.1. Threat Assessment

Table 2. Threat Assessment Table, with Threat Categories listed in order of priority for both Canada and worldwide (information on some threats is inadequate to prioritize all sub-categories fully).

Threat	Level of Concern[1]	Extent	Occurrence	Frequency	Severity[2]	Causal Certainty[3]
Threat Category: Pollution						
Plastic ingestion	High (chicks), Low (adults)	Widespread, Canada and range-wide	Current	Continuous	Unknown	Medium/ Low
Contaminants (toxins)	Medium	Widespread, Canada and range-wide	Current	Continuous	Moderate	Medium
Chronic oil pollution	Medium	Localised and Widespread, Canada and range-wide, wherever there is marine shipping	Current	Recurrent	Unknown	Medium
Catastrophic oil spills	Low	Localised, occasionally Widespread, Canadian and USA coastal waters	Current	Recurrent	Moderate	Medium

Threat Category: Accidental Mortality						
Demersal Longline Fisheries Bycatch	High	Widespread, Canada and range-wide; continental shelf (demersal) and pelagic habitats	Current	Continuous	Moderate to High	High
Collision with active fishing gear and vessel superstructure, including trawl third wire[4]	Low	Localised, Canada (probable; based on US data) and range-wide	Current	Unknown	Unknown	Low
Entanglement with active or derelict (lost) fishing gear	Low (of greater concern historically)	Widespread, Canada (probable) and range-wide (certain); most likely in vicinity of illegal drift gillnet fisheries in NW Pacific	Current, Historical	Unknown	Unknown	Low
Aircraft strikes	Low	Localised, outside of Canada (Midway Atoll)	Current	Continuous	Low	Medium
Collisions with wind farm turbines	Unknown	Localised, on continental shelf habitats in Canada and USA	Anticipated	Unknown	Low	Low
Threat Category: Exotic, Invasive or Introduced Species						
Introduced predators	High, particularly for re-establishing colonies at historical sites	Localised, outside Canada (e.g., cats and rats at Wake Island)	Historical (some colonies), Current (e.g., Wake and Mariana Island, Johnston Atoll)	Historical (some sites), Seasonal (hindering re-colonization of historically occupied sites)	High (at affected sites)	High

Introduced plants	Medium	Localised, outside Canada	Current	Seasonal (nesting season)	Moderate	Moderate
Introduced diseases	Low	Localised, outside Canada (Midway Atoll and main Hawaiian islands, avian pox)	Current (avian pox), Anticipated (West Nile Virus)	Recurrent (avian pox)	Low (avian pox), Unknown (West Nile Virus)	Low
Threat Category: Climate Change and Natural Disasters						
Climate change and inundation of breeding sites	Medium (short-term), High (long-term)	Localised, outside Canada	Anticipated	Unknown	High (potentially)	High (predicted for future)
Tsunamis during nesting season[4]	Medium	Localised, outside Canada	Current, Anticipated	Recurrent	High to Moderate (depending on severity)	High (depending on frequency and severity)
Climate change and changes to foraging areas/food availability	Low	Localised, Canada and range-wide (e.g., California Current system)	Anticipated	Unknown	Unknown	Medium (predicted for future)
Volcanic eruptions	Low	Localised, outside Canada (only where species nests on volcanic islands, e.g., Torishima)	Current	Recurrent	Low	Low
Threat Category: Biological Resource Use						
Competition with fisheries for foods	Medium	Unknown	Anticipated if fisheries expand, Canada and range-wide	Ongoing	Unknown	Low

[1] *Level of Concern: signifies that managing the threat is of (high, medium or low) concern for the conservation of the species, consistent with the management objectives. This criterion considers the assessment of all the information in*

the table). (NB. Here, this descriptor applies to the recovery of the species across its range, nationally and internationally. Whether the threat applies in Canada is described under 'Extent' in Column 3.)

[2] *Severity: reflects the population-level effect (High: very large population-level effect, Moderate, Low, Unknown).*

[3] *Causal certainty: reflects the degree of evidence that is known for the threat (High: available evidence strongly links the threat to stresses on population viability; Medium: there is a correlation between the threat and population viability e.g. expert opinion; Low: the threat is assumed or plausible).*

[4] *This threat was not identified in the species' status report.*

4.2. Description of Threats

Demersal Longline Fisheries Bycatch

Fisheries bycatch, or incidental take, is the most serious threat facing Black-footed Albatrosses in Canada and globally (COSEWIC 2006; Arata et al. 2009). In Canada, the greatest fisheries threat occurs in the demersal longline fishery when baited hooks are set behind a vessel and albatross are able to access and swallow the hooks before they sink, resulting in their drowning as the longline is set along the sea floor. The Black-footed Albatross exhibits a strong degree of spatial and temporal overlap with Canadian commercial groundfish hook and line fisheries; especially those targeting Pacific halibut (*Hippoglossus stenolepis*), sablefish (*Anoplopoma fimbria*), rockfish (*Sebastes* spp.) and spiny dogfish (*Squalus acanthias*), which are concentrated on the continental shelf (Wiese and Smith 2003; Smith and Morgan 2005). This places breeding and post-breeding adults at risk of being caught as bycatch. Smith and Morgan (2005) reported that Black-footed Albatrosses were the most frequently caught seabird in west coast Canadian demersal longline fisheries, with a predicted average of about 90 albatrosses killed each year (data from 1999-2002 halibut and rockfish fisheries). In the late 1990s and early 2000s the highest bycatch in BC occurred at Bowie Seamount during a permitted charter longline fishery for rockfish, indicating high densities at this location (Smith and Morgan 2005). This fishery is now closed and two thirds of Bowie Seamount is a federal Marine Protected Area (MPA). In this Management Plan, fisheries mortality is rated the highest priority because of three pieces of information: (1) a relatively high rate of Black-footed Albatross bycatch in monitored or observed demersal longline fisheries in Canada, and in other fisheries (demersal and pelagic) elsewhere in the North Pacific; (2) the lack of data on bycatch and fisheries effort for several foreign pelagic longline fisheries where bycatch rates are thought to be higher (e.g., US west coast demersal fishery, Russian and Asian fleets; Arata et al. 2009); and (3) the aforementioned life history characteristics of this species that make the overall population extremely vulnerable to increases in adult mortality rates (COSEWIC 2006; Arata et al. 2009).

Plastic Ingestion

As surface feeders, Black-footed Albatross inadvertently consume floating plastic objects and susceptibility to plastic ingestion has been ranked "high" for this species, especially for chicks (Nevins et al. 2005; COSEWIC 2006). Although

population-level impacts of widespread plastic ingestion have been hard to quantify, the known harmful effects to individuals include dehydration, reduction of stomach volume, internal injury from plastic objects, and starvation (Sievert and Sileo1993). The greatest threat posed by plastic ingestion is starvation and dehydration of chicks because parents regurgitate the plastic pieces to them during feeding. Indirectly, ingested plastics may also facilitate the accumulation of organochlorines in all seabirds as these contaminants may adsorb to plastic particles (Naughton et al. 2007).

Introduced Predators

At Black-footed Albatross colonies, historically introduced predators such as rats and cats have caused population declines and extirpations through depredation of eggs, chicks and adults. Introduced predators have all been eradicated from colonies in the NWHI but are still present in Hawaii proper and at islands historically or recently occupied by nesting albatrosses, and may prevent or limit colonization or re-colonization of these sites.

Contaminants (toxins)

Contaminants are a current, recurrent threat to the Black-footed Albatross as both chicks and adult birds are susceptible to the bioaccumulation of environmental pollutants such as organochlorines and heavy metals obtained from their marine diet (Jones et al. 1996; Aguilar et al. 2002; Bjerregaard et al. 2001; Tchounwou et al. 2003). At sufficiently high levels these chemicals, particularly organochlorines, can produce altered immune functions, resulting in altered physiological functions and compromised immunological status. Concentrations of organochlorines in Black-footed Albatross tissues have increased by 100% in the last decade, leading to increased mortality and population level concerns (Finkelstein et al. 2006, 2007; Arata et al. 2009).

Chronic Oil Pollution and Catastrophic Oil Spills

Chronic oil pollution (e.g., via illegal discharge of contaminated bilge water) and large catastrophic oil spills are an on-going, recurrent threat to all seabirds in Canada, including Black-footed Albatross. When birds come into contact with floating oil at sea it accumulates on their feathers, reducing waterproofing, thermoregulation and buoyancy, and leading to reduced fitness or survival. The majority of Black-footed Albatrosses have been observed along the Canadian continental shelf break, an area bisected by commercial shipping traffic, resulting in high potential to encounter either chronic discharges or a catastrophic spill from shipping traffic during the summer and fall. To date (2014), federal and provincial moratoriums for oil and gas exploration off the BC coast are in place, but there have been recent discussions concerning the potential lifting of these moratoriums, and coastal shipping of oil and condensate is projected to dramatically increase in the next decade with export to Asia and liquid natural gas development in northern BC (COSEWIC 2006).

Tsunamis during Nesting Season
Tsunamis are a recurrent and anticipated threat to Black-footed Albatross that were not identified in the COSEWIC (2006) report. In March 2011, a tsunami generated by a 9.0-magnitude earthquake in Japan washed over the Midway Atoll National Wildlife Refuge and other islands in the NWHI, killing over 110,000 Laysan (*P. immutabilis*) and Black-footed Albatross chicks and about 2,000 adults (USFWS 2011; breakdown by species was not available, though Black-footed Albatross nest closer to the shoreline than do Laysan Albatross). Estimates for other affected islands such as Laysan were less accurate, but the USFWS (2011) estimates that many more thousands of albatross chicks were lost. A tsunami is also known to have inundated Midway Atoll in 1952 (D. Duffy in litt.).

Climate Change and Inundation of Breeding Sites
An increase in sea level, as a result of climate change, is of particular concern for Black-footed Albatrosses nesting on low-lying atolls in the tropical North Pacific, where about 95% of the world's population breeds. Some of these sites, just one or two metres above sea level, are among the world's most vulnerable to inundation and consequent loss of beach nesting areas or even the disappearance of entire atolls (Baker et al. 2006).

Competition with Fisheries for Foods
Competition with commercial fisheries for food is a potentially recurrent threat for Black-footed Albatrosses in Canada and range-wide. Squid forms up to 30% of their diet and in locations where there are currently directed squid fisheries, such as Japan and the North Pacific, this threat may cause albatrosses to spend more time foraging if local prey populations are depleted. Surface scavenging is an important foraging strategy for this species, thus the effects of competition may be partially offset by the availability of discards from fishing vessels if they discard at sea (COSEWIC 2006).

Introduced Plants
Invasive plant species, particularly ironwood *(Casuarina equisetifolia),* and golden crown-beard (*Verbesina encelioides*) limit the open sandy nesting areas favoured by Black-footed Albatrosses on some islands (e.g., Midway Atoll; Arata et al. 2009).

Collision with Active Fishing Gear and Vessel Superstructure
Another source of fisheries-related incidental mortality for North Pacific albatrosses is collision with vessels' fishing gear (e.g., a trawler's third wire) or rigging. These collisions have been studied in the US for Short-tailed Albatross (*Phoebastria albatrus*) and were found to be low in part because of the low spatial overlap between albatross and bottom trawlers (Zador et al. 2008a, b); presumably this also occurs rarely in Canada for similar reasons. This low-level threat was not identified as being part of fisheries-related mortality in the species' status report (COSEWIC 2006).

Aircraft Strikes

Aircraft strikes kill a low number of Black-footed Albatrosses each year at Midway Atoll, a colony in the NWHI, but mitigation measures are in place to minimize mortality (COSEWIC 2006; Arata et al. 2009).

Introduced Diseases

Introduced avian pox, spread by introduced mosquitos (*Culex quinquifasciatus*) at Midway Atoll and in the main Hawaiian Islands, is known to cause outbreaks in Black-footed Albatross chicks on rare occasions, though chicks generally survive. Whether the species is also vulnerable to West Nile Virus, avian influenza, and other emerging avian diseases is unknown.

Volcanic Eruptions

Volcanic eruptions are also a recurrent threat where Black-footed Albatross nest on active volcanic islands (e.g., Torishima and San Benedicto Islands; COSEWIC 2006). Though the Black-footed Albatross undoubtedly evolved in the context of such catastrophic events, the combination of threats facing the species may leave them less resilient to periodic disasters.

Entanglement with Active or Derelict (lost) Fishing Gear

Outside of Canada, high seas and coastal driftnet fisheries were historically a significant source of mortality for Black-footed Albatross and other seabirds (Arata et al. 2009). Though high seas driftnet fisheries were banned by a United Nations General Assembly Resolution in 1992, both legal and illegal driftnet fishing effort still occurs, incurring an undocumented level of albatross bycatch (Arata et al. 2009). While there is no documentation of illegal driftnet fisheries occurring in Canada's EEZ, it is possible that Black-footed Albatross gets entangled with derelict (i.e., lost or abandoned) fishing gear (Birdlife International 2008).

Climate Change and Changes to Foraging Areas and Food Availability

In the Northeast Pacific, multi-decadal regime shifts (e.g., Pacific Decadal Oscillation) and shorter-term phenomena (e.g., El Niño Southern Oscillation (ENSO) and La Niña) cause system-wide oceanic changes that alter food supply. This results in reduced foraging success, either because there is less food or it becomes harder to locate. Reduced foraging success affects reproductive output of breeding seabirds, affects juvenile survival rates (Crick 2004; Kitaysky et al. 2006) and/or increases intervals between breeding years (Gilman and Freifeld 2003).

Collisions with Wind Farm Turbines

Wind farms are an anticipated threat to Black-footed Albatrosses in BC as interest in ocean renewable energy increases, with the threat due to potential mortality from collisions and/or displacement of foraging habitat. Future marine

wind farm projects, should they overlap significantly with albatrosses' at-sea distribution, pose a potential risk of collisions and displacement.

5. Management Objective

The management objective for the Black-footed Albatross is:

To help to increase global population numbers and maintain the population throughout its documented distribution in Canadian waters, by reducing at-sea mortality and otherwise augmenting international conservation efforts.

Rationale
Since there are no breeding colonies for Black-footed Albatross within Canada, conservation of the Black-footed Albatross cannot succeed by Canadian management efforts alone; breeding populations and at-sea distributions span the North Pacific Ocean, thus requiring both international and national efforts to maintain and increase breeding populations. Within Canadian waters, reducing at-sea mortality is the primary contribution that can be made to overall population management.

This management objective is derived from the COSEWIC status report (2006) and more recent literature pertaining to this species. The international efforts, which implementation of this management plan will augment, are laid out in the United States Fish and Wildlife Service (USFWS) *Conservation Action Plan for the Black-footed Albatross and Laysan Albatross* (Naughton et al. 2007).

6. Broad Strategies and Conservation Measures

6.1. Actions Already Completed or Currently Underway

(1) Environment and Climate Change Canada – Canadian Wildlife Service has a 20+ year dataset on the distribution and abundance of seabirds in Canadian Pacific waters, collected during pelagic seabird surveys conducted from vessels of opportunity starting in 1982. The results of these surveys are summarised by Morgan et al. (1991) and Kenyon et al. (2009). These survey data are vital for the development of spatially-explicit management plans, thus the surveys should continue.

(2) In the United States, a full scientific assessment of the global population of Black-footed Albatross was recently undertaken (the *Status Assessment of Laysan and Black-footed Albatrosses, North Pacific Ocean*; Arata et al. 2009), and this assessment provides the most up-to-date model projections for the entire population.

(3) In 2006, a national Recovery Team for Short-tailed Albatross and Pink-footed Shearwater (*Puffinus creatopus*) was formed after these species were listed in SARA Schedule 1. Black-footed Albatross uses these same waters and was

added to the Pacific Canada Albatross and Shearwater Recovery Team's remit after it was placed on Schedule 1 in 2009.

(4) The first assessments of the magnitude of fisheries bycatch in Canadian Pacific waters were characterized by Smith (2002) for 1995-2000, and published by Smith and Morgan (2005) for 1998-2002. Wiese and Smith (2003) conducted a spatial and temporally explicit analysis to look at the overlap between Black-footed Albatross and fisheries in Canada from 2000-2002. Mandatory seabird mitigation was introduced in 2002 and new data are available from Fisheries and Oceans Canada. Based on some of these data, an analysis of Canadian west coast commercial groundfish hook and line fishing effort (2006 through 2012) and associated seabird bycatch is currently in progress, with bycatch data derived from vessel logbook entries and audits of Electronic Monitoring (EM) videos (K. Morgan unpublished data; Appendix B).

(5) Canada completed a *National Plan of Action for Reducing Incidental Catch of Seabirds in Longline Fisheries* (hereafter, NPOA - Seabirds; Fisheries and Oceans 2007). This is a key strategy for national and international management of Black-footed Albatross; the NPOA - Seabirds recommends action by adopting ecosystem-based and precautionary approaches to fisheries management, including the reduction and mitigation of seabird bycatch. Of other countries with EEZs in which Black-footed Albatross occur, the United States and Japan have both also completed NPOA - Seabirds. Fisheries and Oceans Canada (2012) published a progress report highlighting their approach, plans to enhancing the observer program, promotion of bycatch mitigation measures, improved understanding of seabird distributions and incidental take and expanded outreach opportunities.

(6) Under the auspices of the Canadian NPOA - Seabirds, some bycatch measures have been implemented in fisheries affecting Black-footed Albatross. Specifically, all commercial groundfish vessels licensed to fish Canada's west coast waters are required to have on board either an independent at-sea observer or an EM system and as a condition of licensing, all vessels must utilize seabird bycatch avoidance devices (e.g., streamer lines with towed buoys). Most vessels now utilize the EM systems rather than carry at-sea observers and after the completion of a fishing trip, a random audit of 10% of the video imagery is conducted to verify the reported bycatch of non-target fish species for those vessels equipped with EM systems. During those audits, any seabird bycatch observed is also recorded (see Appendix B). The effectiveness of recommended bycatch mitigation measures, however, has not been measured within the BC fisheries, and compliance monitoring is limited (K. Morgan pers. comm.). Based on preliminary analysis, Black-footed Albatross bycatch levels may currently be similar to those that occurred during the avoidance devices' phase-in period (Appendix B; Smith and Morgan 2005; K. Morgan pers. comm.). Such compliance and effectiveness monitoring is vital to eliminating or minimizing

Black-footed Albatross bycatch, and should be fully integrated into the groundfish monitoring program as an important means of improving the NPOA's outcomes.

(7) Under the *Oceans Act (2006)*, an ecosystem approach and integrated fisheries management plans require the evaluation of cumulative effects of marine economic activities on species and habitats. To that end, Fisheries and Oceans Canada is undergoing a process to identify ecologically and biologically significant areas (EBSAs) on the west coast of Vancouver Island and Pacific North Coast in Fisheries and Oceans Canada's Centre for Science Advice Pacific (CSAP). CSAP assessments relate to issues of importance including fisheries, habitat, ecosystems and Species at Risk and are currently reviewing several working papers to define and identify EBSAs (e.g., Clarke and Jamieson 2006a and b). Broad strategies to address cumulative effects on marine activities on species and habitats offshore may also be addressed by other marine planning processes on the North Coast including First Nations Marine Use Plans on Haida Gwaii, North Coast and Central Coast and the Marine Planning Partnership for the North Pacific Coast, as well as on the west coast of Vancouver Island by West Coast Aquatic.

(8) Under Bill C-15, amending the *Migratory Birds Convention Act (1994)* and the *Canadian Environmental Protection Act (1999)*, illegal oil discharges by ships travelling within Canada's EEZ are monitored and cases prosecuted. This is undertaken by means of Transport Canada's National Aerial Surveillance Programme (NASP) and Environment and Climate Change Canada's Integrated Satellite Tracking of Pollution (I-STOP) initiative.

(9) In 2009, the Bowie Seamount MPA was created and now protects two thirds of this marine feature. Bowie and other shallow seamounts are important oceanic features for albatrosses.

(10) Seabird identification guides and hands-on courses to identify and enumerate seabird bycatch were developed by the Canadian Wildlife Service (1999) for fisheries observer-providing companies in British Columbia (e.g., Archipelago Marine Research). In addition, laminated albatross guides were produced by the US Fish and Wildlife Service and distributed free of charge to licensed commercial longline fisheries in Pacific Region in 2001 and 2002.

(11) Preliminary research on salvaged Black-footed Albatross from Pacific longline fisheries, collected in the 2002-2003 salvaged bird program, found plastic particles in 61% of birds (or 8 out of 13; Smith et al. 2010). Additional research has been conducted and is underway in Canada's Pacific to quantify and describe the threat of plastics to seabirds (e.g., Avery-Gomm et al. 2013). This research may fill a knowledge gap with respect to the amount of plastic ingested by some groups of marine birds in British Columbia.

(12) A seabird salvage program was introduced and operated by Environment and Climate Change Canada and Fisheries and Oceans Canada from 2000-2003 and was an important mechanism to positively identify birds killed as bycatch. Recovery of the dead birds also provided data to examine demographic trends and other information (e.g., plastic ingestion rates).

13) Environment and Climate Change Canada has developed a proposal for the Scott Islands marine National Wildlife Area (NWA) off the northwest coast of Vancouver Island**,** to protect and conserve the foraging habitat and seabirds of this highly productive marine environment. The proposed marine NWA, which encompasses approximately 11,500 km^2 of ocean habitat, includes areas utilized by Black-footed Albatrosses during their breeding and non-breeding seasons. Reducing bycatch mortality and improving the effectiveness of mitigation measures from longline fishing activities have been identified in the Regulatory Strategy for the marine NWA. Once designated, a management plan for the Scott Islands marine NWA will be an important tool for implementation of conservation measures for seabirds in this area, including the Black-footed Albatross.

All of these management initiatives are an important contribution to the management of Black-footed Albatross and other at-risk seabird species in Canada, and should be continued or implemented.

6.2. Broad Strategies

The broad strategies (cf. Environment Canada 2008) that will be used to support management of Black-footed Albatross in Canada are:

1. Develop and/or Implement Programs and Policy Aimed at Threat Reduction
2. Identify and Conserve Habitat Important to Black-footed Albatross
3. Support Research and Monitoring to Address Knowledge Gaps
4. Increase Education & Awareness
5. Continue International Collaboration

Rationales for the broad strategies

The general rationale for utilizing these particular combined strategies lies in the need to address the interlocking social and environmental elements of the multiple threats that are occurring at both a national and a global level.

1. Develop and/or Implement Programs and Policy Aimed at Threat Reduction

Longline Fisheries Bycatch
The Black-footed Albatross is the seabird most commonly caught by demersal longline fisheries in Pacific waters. The NPOA - Seabirds provides an existing framework for improving existing bycatch mitigation and enforcement of

existing measures, and is built from within a Canadian legislative context (see Fisheries and Oceans 2007 for details). Implementation and monitoring of the recommendations within the NPOA - Seabirds will be an essential component of threat reduction for Black-footed Albatross.

Contaminants
It will be important to ensure that appropriate legislation and planning processes are successful in regulating the release of contaminants into the marine environment and consider the impacts of future marine industrial developments.

Chronic Oil Pollution and Catastrophic Oil Spills
In the context of chronic oil spills it is important that existing oil spill deterrence programs are supported and appropriate legislative mechanisms are considered to reduce chronic oil discharge within areas important to Black-footed Albatross. In the context of catastrophic oil spills it is important that all appropriate legislative mechanisms are considered in order to minimize tanker traffic in areas important to Black-footed Albatross, and the development of coordinated spill response programs is encouraged.

2. *Identify and Conserve Habitat Important to Black-footed Albatross*
Processes in support of the *Oceans Act* may be an important component of identifying and planning for managing and conserving Black-footed Albatross foraging habitats in Canada, including marine mapping or zoning to avoid or reduce spatial and temporal overlap between human activities and marine species such as Black-footed Albatross.

3. *Support Research and Monitoring to Address Knowledge Gaps*
Additional research is required to address knowledge gaps related to the spatial-temporal distribution of Black-footed Albatross, the rate of bycatch mortality in longline fisheries, the effectiveness of bycatch mitigation measures, strategies for reducing overlap of longline fisheries and Black-footed Albatross habitat, the effects of plastic ingestion on Black-footed Albatross, and the evaluation of emerging threats. It is important that this information be used to inform ongoing and future management activities. Monitoring is required to measure changes in the abundance and distribution of Black-footed Albatross in Canadian waters in response to threat reduction measures.

4. Increase Education & Awareness.
Increasing public and industry awareness of actions and responsibilities that can reduce threats to Black-footed Albatross will help further the successful management of the species. Education and awareness should be prioritized for those involved in activities that contribute to any of the Canada-based threats mentioned in this management plan.

5. Continue International Collaboration.
As indicated under the Management Objective (Section 5), Canadian goals and objectives will be supported by participation in ongoing international efforts to conserve and manage this species, e.g., the Agreement on the Conservation of Albatrosses and Petrels, and the Short-tailed Albatross Recovery Team (cf. USFWS 2008, Fisheries and Oceans 2012).

6.3 Conservation Measures

Table 3. Conservation Measures and Implementation Schedule

Conservation Measure	Priority[1]	Threats or Concerns Addressed	Timeline
Broad Strategy – Develop and/or Implement Programs and Policy Aimed at Threat Reduction			
Continue implementation of Canada's NPOA - Seabirds	High	Demersal Longline Fisheries Bycatch Collision with Active Fishing Gear and Vessel Superstructure Chronic Oil Pollution and Catastrophic Oil Spills Contaminants Collisions with wind farm turbines	Ongoing
Assess effectiveness of compliance with mandatory bycatch mitigation measures required in all Pacific Canada longline groundfish hook and line fisheries.	High		2020
Support the development of a coordinated oil spill response program (e.g., BC Marine Oil Spill Response Plan).	Medium		Ongoing
Collaborate with the National Aerial Surveillance Program (NASP) and the Integrated Satellite Tracking of Polluters (ISTOP) to ensure that oiling deterrence measures and oil hotspot mapping are implemented in areas important to BFAL*	Medium		Ongoing
Ensure that existing information related to the BFAL range is considered in the environmental assessments of projects that will elevate the risk of contaminant release and collisions (wind farms)	Medium		Ongoing

Broad Strategy – Identify and Conserve Habitat Important to Black-footed Albatross			
Evaluate and implement tools for BFAL marine habitat identification and conservation. Implement habitat protection measures if warranted.	Medium	Demersal Longline Fisheries Bycatch Chronic Oil Pollution Competition with Fisheries for Foods	2020
Discuss extending the protection of waters around Bowie Seamount to include important foraging areas along the shelf break and identifying these areas as Important Bird Areas (IBAs)	Medium		2020
Support the establishment of the proposed Scott Island marine National Wildlife Area	Medium		2020
Broad Strategy – Support Research and Monitoring to Address Knowledge Gaps			
At regular intervals obtain and evaluate data on Pacific Region groundfish hook and line fisheries effort, bycatch mitigation compliance, and seabird bycatch	High	Knowledge Gaps Demersal Longline Fisheries Bycatch Collision with Active Fishing Gear and Vessel Superstructure Chronic Oil Pollution and Catastrophic Oil Spills Contaminants Plastic Ingestion Collisions with wind farm turbines	Ongoing
Continue the Pacific Region - Seabird Bycatch Working Group	High		Ongoing
Identify and evaluate emerging threats that may pose a threat to BFAL (e.g., offshore oil and gas exploration, alternative energy, oil transport)	High		Ongoing
Investigate options to re-establish a seabird salvage program (whole bird) to collect BFAL caught as bycatch. Ensure accurate species identification, data collection and reporting procedures in order to assess impact of seabird bycatch and plastic ingestion/contaminants	High		Ongoing
Support future research on the effects of ingested plastics and contaminants on BFAL	Medium		Ongoing
Continue and expand pelagic seabird monitoring to gather seasonal data on Canadian BFAL distribution and abundance.	Medium		Ongoing
Using existing and new at-sea and satellite tracked BFAL data with oceanographic data, develop predictive models of	Medium		Ongoing

spatial-temporal abundance and distribution to better assess the degree of overlap with threat sources (e.g., fisheries, shipping lanes)			
Create a comprehensive reference document or database of existing knowledge from BFAL research and monitoring	Low		2020
Broad Strategy – Increase Education & Awareness			
Promote participatory research that engages stakeholders in bycatch reduction	High	Knowledge Gaps Demersal Longline Fisheries Bycatch Collision with Active Fishing Gear and Vessel Superstructure	Ongoing
Update existing or develop new educational and/or informational materials and/or programs directed at commercial fisheries to promote support for seabird conservation (e.g., species identification skills, correct use of mitigation devices, or perceptions about the impact of bycatch).	Medium		Ongoing
Develop educational and/or informational materials and/or programs directed at general public to promote participation in BFAL conservation & management	Low		2020
Broad Strategy – Continue International Collaboration			
Build on existing Canadian participation in and promotion of international agreements and conventions to promote management & conservation of BFAL	High	An international collaborative approach will address primary threats in Canada (e.g., longline bycatch, oil pollution, contaminants) as well as contribute to management of populations at nesting colonies (i.e., of the birds that occur in Canadian waters)	Ongoing
Collaborate internationally, with foreign wildlife and fisheries agencies and international bodies, in developing BFAL-related conservation initiatives, research and policy	High		Ongoing

*BFAL = Black-footed Albatross

[1] Priority" reflects the degree to which the measure contributes directly to the conservation of the species or is an essential precursor to a measure that contributes to the conservation of the species. High priority measures are considered those most likely to have an immediate and/or direct influence on attaining the management objective for species. Medium priority measures may have a less immediate or less direct influence on reaching the management population and distribution objectives, but are still important for management of the population. Low priority recovery measures will likely have an indirect or gradual influence on reaching the management objectives, but are considered important contributions to the knowledge base and/or public involvement and acceptance of species.

7. Measuring Progress

The performance indicators presented below provide a way to define and measure progress toward achieving the management objective. Every five years, success of this management plan implementation will be measured against the following performance indicators:

- At-sea mortality of Black-footed Albatross has been reduced in Canadian waters;
- The distribution of Black-footed Albatross in Canadian waters has been maintained; and
- International conservation efforts have been supported.

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Appendix A: Effects on the Environment and Other Species

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*[4]. 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 and to evaluate whether the outcomes of a recovery planning document could affect any component of the environment or any of the Federal Sustainable Development Strategy's[5] (FSDS) goals and targets.

Conservation planning is intended to benefit species at risk and biodiversity in general. However, it is recognized that implementation of management plans may 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 upon non-target species or habitats. The results of the SEA are incorporated directly into the management plan itself, but are also summarized below in this statement.

This management plan will clearly benefit the environment by promoting the conservation of the Black-footed Albatross. The potential for the plan to inadvertently lead to adverse effects on other species within Canada was considered. The SEA concluded that this plan 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: Needs of Black-footed Albatross; Description of Threats; Actions Already Completed or Underway; Broad Strategies and Conservation Measures.

Actions to reduce at-sea oiling, either chronic or catastrophic, will be beneficial for Cassin's Auklets (*Ptychoramphus aleuticus*), Rhinoceros Auklets (*Cerorhinca monocerata*) and Marbled Murrelets (*Brachyramphus marmoratus*) which are all considered to be especially vulnerable to oil spills. Successful implementation of the NPOA - Seabirds in the Pacific region of Canada would also benefit Northern Fulmar (*Fulmarus glacialis*), Herring Gulls (*Larus smithsonianus*), Glaucous-winged Gulls (*Larus glaucescens*), and any other species prone to bycatch events.

[4] www.ceaa.gc.ca/default.asp?lang=En&n=B3186435-1
[5] www.ec.gc.ca/dd-sd/default.asp?lang=En&n=F93CD795-1

Appendix B: Preliminary Analysis of the Black-Footed Albatross Bycatch, Canadian West Coast Commercial Groundfish Hook and Line Fleet, 2006-2009

Prior to 2006, commercial groundfish fisheries on Canada's West Coast had variable levels of observer coverage. Beginning in 1996, the groundfish trawl fleet was subject to 100% at sea observer coverage. Starting in 1999, groundfish hook and line fisheries were required to have partial coverage of at-sea observers. Target levels of partial coverage varied among the hook and line fisheries but generally covered 10 to 15% of the fishing effort. Since 2006, all commercial groundfish vessels licensed to fish Canada's west coast waters must have on board either an independent at-sea observer or an Electronic Monitoring (EM) system. Most vessels in the groundfish hook and line fisheries now utilize the EM rather than at-sea observers; however, groundfish trawl vessels are still required to have 100% at sea observer coverage. As a condition of licensing, all vessels have to use seabird bycatch avoidance devices. After the completion of a fishing trip, a random audit of 10% of EM video imagery is carried out to verify catch. Seabird bycatch is recorded during those audits. For vessels carrying an at-sea observer, observers record seabird bycatch.

An analysis of Canadian west coast commercial groundfish hook and line fishing effort and associated seabird bycatch, 2006 through 2012, is currently in progress (K. Morgan, unpublished data). Bycatch data were obtained from vessel logbook entries and EM video audits. A small proportion of the seabird bycatch was reported to the species level; most were listed to the 'group' level (e.g., unidentified albatross, unidentified gull) or simply as unidentified bird. Based upon the work of Smith and Morgan (2005), it was assumed that all albatrosses listed in the database were Black-footed Albatrosses. The following summarizes the unpublished analyses conducted by K. Morgan.

The annual total bycatch by fishery, gear type and year (2006 through 2012) in the longline halibut, sablefish, rockfish and spiny dogfish fisheries was estimated by extrapolating, from the percentage of sets audited to 100% of the sets that were fished, the number of birds detected in the EM audits. Over the 6 year period, the extrapolated average bycatch of albatrosses was 120 birds per year (range 0-269) for the above fisheries. As well, the extrapolated average bycatch of unidentified birds was 166 birds annually (range 35-376).

In addition to the bycatch events detected during the EM audits, 92 more albatrosses and 263 more unidentified birds were recorded in the vessel logbooks. The 6-year average annual number of albatrosses reported in the logbooks and not detected during the EM audits, was 13 birds (range 2-33), and that of unidentified birds was 36 birds (range 15-66). Because of the low occurrence of birds being detected in both the EM audits and reported in the vessel's logbooks, and because of the high number of unidentified birds, the

predicted average annual bycatch of albatrosses (120) should be considered a conservative estimate.

To place the results of the above analyses in context, Wiese and Smith (2003) used a spatially and temporally explicit model to estimate that between 67 and 162 Black-footed Albatrosses were killed annually in the rockfish and halibut demersal longline fishery off Canada's west coast. They also noted that the mortality of Black-footed Albatrosses may have been as low as 22 or as high as 253 birds.