Proposed

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Action Plan Series

Action Plan for the Northern and Southern Resident Killer Whale (*Orcinus orca*) in Canada

Resident Killer Whale

2016

Canada

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For copies of the Action Plan, or for additional information on species at risk, including Committee on the Status of Endangered Wildlife in Canada (COSEWIC) Status Reports, residence descriptions, recovery strategies, and other related recovery documents, please visit the SAR Public Registry.

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Preface

The federal, provincial, and territorial government signatories under the Accord for the Protection of Species at Risk (1996) 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 action plans for species listed as extirpated, endangered, or threatened for which recovery has been deemed feasible. They are also required to report on progress five years after the publication of the final document on the Species at Risk Public Registry.

The Minister of Fisheries and Oceans and the Minister responsible for Parks Canada Agency are the competent ministers under SARA for the Northern and Southern Resident Killer Whale and have prepared this Action Plan to implement the Recovery Strategy, as per Section 47 of SARA. In preparing this Action Plan, the competent ministers have considered, as per Section 38 of SARA, the commitment of the Government of Canada to conserving biological diversity and to the principle that, if there are threats of serious or irreversible damage to the listed species, cost-effective measures to prevent the reduction or loss of the species should not be postponed for a lack of full scientific certainty. To the extent possible, this Action Plan has been prepared in cooperation with Environment Canada, Transport Canada, the Department of National Defence, the Canadian Coast Guard, Natural Resources Canada, the Province of British Columbia, and the U.S. National Oceanographic and Atmospheric Administration (NOAA) as per section 48(1) of SARA.

As stated in the preamble to SARA, success in the recovery of this species depends on the commitment and cooperation of many different constituencies that will be involved in implementing the directions and actions set out in this Action Plan and will not be achieved by Fisheries and Oceans Canada and Environment Canada or any other jurisdiction alone. The cost of conserving species at risk is shared amongst different constituencies. All Canadians are invited to join in supporting and implementing this Action Plan for the benefit of the Northern and Southern Resident Killer Whale and Canadian society as a whole.

Under SARA, an action plan provides the detailed recovery planning that supports the strategic direction set out in the recovery strategy for the species. The plan outlines recovery measures to be taken by Fisheries and Oceans Canada and Environment Canada and other jurisdictions and/or organizations to help achieve the population and distribution objectives identified in the recovery strategy. Implementation of this action plan is subject to appropriations, priorities, and budgetary constraints of the participating jurisdictions and organizations.

Acknowledgments

This Action Plan was prepared by Sheila J. Thornton (Fisheries and Oceans, Pacific Region). The development of the Action Plan was the result of collaborative efforts and contributions from many individuals and organizations. The Northern and Southern Resident Killer Whale Action Plan Team (Appendix C) compiled the contributions from DFO Science, the Northern and Southern Killer Whale Prey and Disturbance workshop (March 8-10th, 2011), preliminary public consultations (February 2, 2012 to February 16th, 2012), the NOAA/DFO bilateral workshop series on The Effects of Salmon Fisheries on Southern Resident Killer Whales (September 21-23rd, 2011, March 13-15th, 2012 and September 18-20th, 2012), and feedback obtained during regional public consultation on the draft document (March 3rd to April 16th, 2014).

Executive Summary

The Northern and Southern Resident Killer Whale (*Orcinus orca*) were listed as Threatened and Endangered, respectively, under the *Species at Risk Act* (SARA) in 2003. This Action Plan is considered one in a series of documents that are linked and should be taken into consideration together, including the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) status report, a recovery potential assessment, and the Recovery Strategy.

Three distinct ecotypes of Killer Whale inhabit the waters off British Columbia, each exhibiting different prey preferences, dialects and social organization. The Resident, Offshore, and Transient (Bigg's) Killer Whale ecotypes are believed to be socially and genetically isolated, despite sharing the same waters. Resident Killer Whales feed exclusively on fish (primarily salmon) and cephalopods, while Transient (Bigg's) Killer Whales feed primarily on marine mammals. Offshore Killer Whales are the least understood of the three ecotypes, but are believed to primarily consume fish, with shark species comprising a significant portion of their diet.

Two distinct populations of Resident Killer Whales occupy the waters off the west coast of British Columbia. The populations are referred to as the Northern Residents and Southern Residents, and although the ranges of these two populations overlap, they are acoustically, genetically and culturally distinct from each other. Killer Whale populations in British Columbia are presently considered to be at risk because of their small population size, low reproductive rate, and the existence of a variety of anthropogenic threats that have the potential to prevent recovery or to cause further declines. Even under the most optimistic scenario (human activities do not increase mortality or decrease reproduction), the species' low intrinsic growth rate means that the time frame for recovery will be more than one generation (25 years).

Principal among the anthropogenic threats to recovery are reductions in the availability or quality of prey, environmental contamination, and both physical and acoustic disturbance. As these threats are common to all three ecotypes, the measures identified in the Resident Killer Whale Action Plan are highly likely to benefit Transient (Bigg's) and Offshore Killer Whale populations that frequent Canadian Pacific waters.

This Action Plan outlines measures that provide the best chance of achieving the population and distribution objectives for the species, including the measures to be taken to address the threats and monitor the recovery of the species. The recovery strategy defined the population and distribution objective for the Northern and Southern Resident Killer Whale as:

> *Ensure the long-term viability of Resident Killer Whale populations by achieving and maintaining demographic conditions that preserve their reproductive potential, genetic variation, and cultural continuity*[1]*.*

Section 1.2 outlines the measures to be taken under the following broad strategies:

- *Monitor and refine knowledge of Resident Killer Whale population and distribution in Canadian Pacific waters*

[1] Culture refers to a body of information and behavioural traits that are transmitted within and between generations by social learning

- *Ensure that Resident Killer Whales have an adequate and accessible food supply to allow recovery*

- *Ensure that disturbance from human activities does not prevent the recovery of Resident Killer Whales*

- *Ensure that chemical and biological pollutants do not prevent the recovery of Resident Killer Whale populations*

- *Protect critical habitat for Resident Killer Whales and identify additional areas for critical habitat designation and protection*

For the Northern and Southern Resident Killer Whale, critical habitat was identified to the extent possible, using the best available information, in the Section 8 of the Recovery Strategy. The species' critical habitat is protected from destruction by a SARA Critical Habitat Order made under subsections 58(4) and (5), which invokes the prohibition in subsection 58(1) against the destruction of the identified critical habitat (Section 2.3).

An evaluation of the socio-economic costs of the Action Plan and the benefits to be derived from its implementation is provided in Section 3.

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1. Recovery Actions

1.1 Context and Scope of the Action Plan

The Northern and Southern Resident Killer Whale (*Orcinus orca*) were listed as Threatened and Endangered respectively under the *Species at Risk Act* (SARA) in 2003. This Action Plan is part of a series of documents regarding the Northern and Southern Resident Killer Whale, including the COSEWIC Status Report (COSEWIC 2009), and the Recovery Strategy that should be taken into consideration together. Under SARA, an action plan provides the detailed recovery planning that supports the strategic direction set out in a recovery strategy for the species. A recovery strategy also provides background information on the species and its threats and critical habitat information.

Two distinct populations of fish-feeding 'resident' Killer Whales (*Orcinus orca*), known as the Northern and Southern Residents, occupy the waters off the west coast of British Columbia. Although the ranges of these two populations overlap, they are acoustically, genetically and culturally distinct from each other. Resident Killer Whale populations in British Columbia are presently considered to be at risk because of their small population size, low reproductive rate, and the existence of a variety of anthropogenic threats that have the potential to prevent recovery or to cause further declines. Principal among these anthropogenic threats are reductions in the availability or quality of prey, environmental contamination, and both physical and acoustic disturbance. Even under the most optimistic scenario (human activities do not increase mortality or decrease reproduction), the species' low intrinsic growth rate means that the time frame for recovery will be more than one generation (25 years).

The Southern Resident Killer Whale population experienced declines of 3% per year between 1995 and 2001, and since then has shown little recovery, having 77 members in 2014. During the summer and fall, Southern Residents are primarily found in the transboundary waters of Haro Strait, Boundary Pass, the eastern portion of the Juan de Fuca Strait, and southern portions of the Strait of Georgia. This area is designated as 'critical habitat' based on consistent and prolonged seasonal occupancy. Some members of the population typically remain in the same general area in winter and spring, but others appear to range over much greater distances, and have been reported as far south as Monterey Bay, California, and as far north as Southeast Alaska. Winter and spring critical habitat has not been identified for the latter group. During the summer and fall, the principal prey of Southern Residents appears to be Chinook and Chum Salmon (*Oncorhynchus tshawytscha* and *O. keta*); little is known of their diet in the winter and spring. The lack of information about winter diet and distribution of the Southern Residents is a major knowledge gap that impedes our understanding of the principal threats facing the population.

The Northern Resident Killer Whale population experienced a decline of 7% between 1997 and 2001. The population has since increased from 219 members in 2004, to 275-280 members in 2014. Northern Residents appear to spend the majority of their time from central Vancouver Island (both west and east coasts) and northwest to Dixon Entrance, but have been sighted as far south as Grays Harbor, Washington, and as far north as Glacier Bay, Alaska. A portion of the population is regularly found in Johnstone Strait and southeastern portions of Queen Charlotte Strait (and adjoining channels) during the summer and fall, and this area is identified as critical habitat based on this consistent seasonal occupancy. Other areas are likely very important to Northern Residents during this time but they have yet to be clearly identified. Similarly, areas that may constitute critical habitat during the winter and spring are not yet

known. Northern Residents also appear to feed primarily on Chinook and Chum Salmon during the summer and fall. However, like Southern Residents, very little is known of their winter distribution and diet, and this knowledge gap must be addressed to fully understand the principal threats affecting the population.

The recovery strategy defined the population and distribution objective for the Northern and Southern Resident Killer Whale as:

> *Ensure the long-term viability of Resident Killer Whale populations by achieving and maintaining demographic conditions that preserve their reproductive potential, genetic variation, and cultural continuity[2].*

Under Section 47 of SARA, the competent minister must prepare one or more action plans based on the recovery strategy. Therefore, action planning for species at risk recovery is an iterative process. The Implementation Schedule in this Action Plan may be modified in the future depending on the progression towards recovery.

[2] Culture refers to a body of information and behavioural traits that are transmitted within and between generations by social learning

1.2 Measures to be Taken and Implementation Schedule

Success in the recovery of this species is dependent on the actions of many different jurisdictions; it requires the commitment and cooperation of the constituencies that will be involved in implementing the directions and measures set out in this Action Plan.

This Action Plan provides a description of the measures that provide the best chance of achieving the population and distribution objectives for the Northern and Southern Resident Killer Whale, including measures to be taken to address threats to the species and monitor its recovery, to guide not only activities to be undertaken by Fisheries and Oceans Canada and Environment Canada, but those for which other jurisdictions, organizations and individuals have a role to play. As new information becomes available, these measures and the priority of these measures may change. Fisheries and Oceans Canada strongly encourages all Canadians to participate in the conservation of the Northern and Southern Resident Killer Whale through undertaking measures outlined in this action plan.

Principal among the anthropogenic threats to recovery are reductions in the availability or quality of prey, environmental contamination, and both physical and acoustic disturbance. As these threats are common to all three ecotypes, of the 94 measures identified to recover Resident Killer Whales, 57 (61%) are likely to benefit Transient (Bigg's) and Offshore Killer Whale populations that frequent Canadian Pacific waters.

Table 1 identifies the measures to be undertaken by Fisheries and Oceans Canada to support the recovery of the Northern and Southern Resident Killer Whale.

Table 2 identifies the measures to be undertaken collaboratively between Fisheries and Oceans Canada and its partners, other agencies, organizations or individuals. Implementation of these measures will be dependent on a collaborative approach, in which Fisheries and Oceans Canada is a partner in recovery efforts, but cannot implement the measures alone.

Table 3 identifies the remaining measures that represent opportunities for other jurisdictions, organizations or individuals to lead for the recovery of the species, as all Canadians are invited to join in supporting and implementing this Action Plan. If your organization is interested in participating in one of these measures, please contact the Species at Risk Pacific Region office at sara@pac.dfo-mpo.gc.ca.

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

Table 1: Measures to be undertaken by Fisheries and Oceans Canada.

Measures noted by an asterisk (*) have been identified as also likely to provide benefits to Transient (Bigg's) and Offshore Killer Whales (3 of 12, or 25% of measures).

#	Recovery Measures	Priority[3]	Threats or Concerns Addressed	Timeline[4]
Broad Strategy 1: ***Monitor the population abundance and demographics of Resident Killer Whales and refine knowledge of their seasonal distribution and foraging ecology in Canadian Pacific waters.***				
1	Undertake an annual census to monitor and assess Resident Killer Whale population dynamics (multi-species ship surveys and dedicated vessel surveys)	High	Prey availability Disturbance Contaminants	Annual; ongoing
2	Estimate the carrying capacity of Resident Killer Whale habitat (population modeling).	High	Prey availability	5 years
Broad Strategy 2: ***Ensure that Resident Killer Whales have an adequate and accessible food supply to allow recovery.***				
Approach 1: Determine the seasonal diet, feeding areas and energetic requirements of Northern and Southern Resident Killer Whales.				
3	Examine the CANFIS/catch per unit effort (CPUE) records to assist in identifying areas of prey aggregation in order to anticipate Resident Killer Whale foraging grounds.	High	Prey availability	Annual; ongoing

[3] "Priority" reflects the degree to which the action contributes directly to the recovery of the species or is an essential precursor to an action that contributes to the recovery of the species.

- "High" priority measures are considered likely to have an immediate and/or direct influence on the recovery of the species.
- "Medium" priority measures are important but considered to have an indirect or less immediate influence on the recovery of the species.
- "Low" priority measures are considered important contributions to the knowledge base about the species and mitigation of threats.

[4] "Timeline" is the timeframe from posting of the final document in which the measure will be accomplished. A timeline listed as "ongoing" indicates the importance that that measure be conducted regularly through the foreseeable future; "unknown" means that the current paucity or complete lack of data for a given species does not allow us to state a certain timeline at this point; "uncertain" indicates that the measure is led by a 3rd party and timelines have not yet been determined.

#	Recovery Measures	Priority[3]	Threats or Concerns Addressed	Timeline[4]
Approach 3: Establish long term monitoring programs capable of detecting changes in abundance, distribution and quality of Resident Killer Whale prey.				
4	Identify features that define "quality" prey for Resident Killer Whales and determine a means of assessment (e.g., length, age, caloric value, lipid content, contaminant load).	Medium	Prey availability	5 years
5	Assess the quality of identified prey species on an annual basis.	Medium	Prey availability	Annual; ongoing
Approach 4. Develop prospective actions to be taken during poor Chinook return years to ensure sufficient prey availability for Resident Killer Whales.				
6	Investigate strategic fishery closures as a possible tool to reduce Resident Killer Whale prey competition in specific feeding areas (e.g., modeling, fishery closure tests).	High	Prey availability	5 years
Broad Strategy 3: *Ensure that disturbance from human activities does not prevent the recovery of Resident Killer Whales.*				
Approach 3: Develop and implement regulations, guidelines, sanctuaries and other measures to reduce or eliminate physical and acoustic disturbance of Resident Killer Whales.				
7	Investigate the use and implementation of protected areas and/or fishery closures as tools to protect important foraging and beach rubbing locations (such as Robson Bight and other identified locations).	High	Disturbance Noise pollution Prey availability	5 years
8*	Assess cumulative effects of potential anthropogenic impacts on Killer Whales using an appropriate impact assessment framework for aquatic species.	High	Disturbance Noise pollution	2 years

#	Recovery Measures	Priority[3]	Threats or Concerns Addressed	Timeline[4]
9*	Dedicate funding for compliance and enforcement of regulations protecting Killer Whales.	Medium	Disturbance Noise pollution	Ongoing
10*	Institute a communications plan around the Marine Mammal Regulations and ensure the message is transboundary.	Medium	Disturbance Noise pollution	2 years
Broad Strategy 5: *Protect critical habitat for Resident Killer Whales and identify additional areas for critical habitat designation and protection.*				
Approach 1: Identify key feeding areas and other critical habitat of Resident Killer Whales intra and inter-annually.				
11	Analyse new acoustic and sightings data to identify additional areas of habitat necessary for the survival and recovery of Resident Killer Whales.	High	Prey availability	1 year
Approach 2: Protect the access of Resident Killer Whales to their critical habitat.				
12	Identify projects that may impact Resident Killer Whale critical habitat and provide advice on mitigation, if appropriate.	High	Disturbance Noise pollution	Ongoing

Table 2: Measures to be undertaken collaboratively between Fisheries and Oceans Canada and its partners.

Measures noted by an asterisk (*) have been identified as also likely to provide benefits to Transient (Bigg's) and Offshore Killer Whales (45 of 69, or 65% of measures).

#	Recovery Measures	Priority	Threats or Concerns Addressed	Timeline	Partner(s)
Broad Strategy 2: *Ensure that Resident Killer Whales have an adequate and accessible food supply to allow recovery.*					
Approach 1: Determine the seasonal diet, feeding areas and energetic requirements of Northern and Southern Resident Killer Whales					
13	Identify year round Resident Killer Whale distribution and diet using acoustic monitoring and dedicated vessel surveys.	High	Prey availability	Annual; ongoing	NOAA Other agencies ENGOs[5]
14	Further identify Resident Killer Whales' prey preferences (species/size/sex/stock).	High	Prey availability	Annual; ongoing	NOAA Other agencies
15	Incorporate aboriginal traditional knowledge (ATK) on the behavior and distribution of Resident Killer Whales and their prey into measures for the recovery of the species.	Medium	Prey availability Disturbance Noise pollution	Annual; ongoing	First Nations
Approach 2: Determine Resident Killer Whale foraging success rates.					
16	Undertake a catch per unit effort (CPUE) assessment of Resident Killer Whale foraging effort and success rate.	High	Prey availability	Ongoing	Other agencies

[5] Environmental Non-Governmental Organizations

#	Recovery Measures	Priority	Threats or Concerns Addressed	Timeline	Partner(s)
17	Continue to monitor the role of Chinook abundance in the population dynamics of the Northern and Southern Resident Killer Whale populations.	High	Prey availability	Ongoing	NOAA Other agencies
18	Assess Resident Killer Whale body condition using the best available technology.	High	Prey availability	Annual; ongoing	NOAA Other agencies ENGOs
19	Assess the potential impact of prey competition between Southern Resident Killer Whales, Northern Resident Killer Whales and other salmonid predators.	High	Prey availability	2 years	NOAA Other agencies
Approach 3: Establish long term monitoring programs capable of detecting changes in abundance, distribution and quality of Resident Killer Whale prey.					
20	Continue to monitor abundance, distribution and age specific composition of Chinook and Chum stocks and runs.	High	Prey availability	Annual; ongoing	NOAA Other agencies
21	Identify and monitor natural and anthropogenic factors affecting Resident Killer Whale prey over the long term (e.g., climate change, Pacific Decadal Oscillation, El Niño)	High	Prey availability	Annual; ongoing	NOAA Other agencies Academia
Approach 4: Develop prospective actions to be taken during poor Chinook return years to ensure sufficient prey availability for Resident Killer Whales.					

#	Recovery Measures	Priority	Threats or Concerns Addressed	Timeline	Partner(s)
22	Take into account both the seasonal (acute) as well as the cumulative (chronic) effects of poor Chinook returns on Resident Killer Whales when managing salmonid fisheries.	High	Prey availability	Annual; ongoing	NOAA Other agencies
23	Form a transboundary working group of representatives from DFO, NOAA, as well as other technical experts to ensure that Resident Killer Whale needs are considered in the management of fisheries (e.g., wild salmon policy, Pacific Salmon Treaty)	High	Prey availability	Ongoing	NOAA Other agencies Academia
Approach 5: Ensure that the populations and habitat of Resident Killer Whale prey species are adequately protected from anthropogenic factors such as exploitation and degradation, including contamination.					
24	Protect and preserve the freshwater habitat of important Resident Killer Whale prey stocks	High	Prey availability	Ongoing	NOAA Other agencies ENGOs
25	Continue to implement and support wild salmon policy and salmon recovery plans.	High	Prey availability	Ongoing	NOAA Other agencies ENGOs
26	Assess the potential impact of salmon enhancement and aquaculture operations on Resident Killer Whales, both directly and through effects on wild salmon populations, and develop actions to mitigate such effects, should impacts be detected.	Medium	Prey availability	5 years	NOAA Academia ENGOs
Broad Strategy 3: *Ensure that disturbance from human activities does not prevent the recovery of Resident Killer Whales.*					

#	Recovery Measures	Priority	Threats or Concerns Addressed	Timeline	Partner(s)
Approach 1: Determine baseline natural and anthropogenic noise profiles and monitor sources and changes in the exposure of Resident Killer Whales to underwater noise.					
27*	Expand transboundary coverage of calibrated hydrophones to quantify ocean noise budget throughout Killer Whale range, giving priority to improving and utilizing existing hydrophone networks.	High	Disturbance Noise pollution	10 years	NOAA ENGOs Stakeholders Other agencies
28*	Standardize protocols and methodologies for data analysis, data presentation, and archiving of acoustic information obtained from hydrophones in the Killer Whale range.	High	Disturbance Noise pollution	2 years	NOAA, ENGOs Stakeholders Other agencies
29*	Increase monitoring of Killer Whale use of marine Navy ranges, geographically and temporally in order to help inform decisions around Naval exercise planning.	High	Disturbance Noise pollution	5 years; ongoing	ENGOs
30*	Link hydrophone-detected noise events with vessel presence using the Automatic Identification System (AIS) for real time detection of acoustic disturbance in critical habitat, and implement a response mechanism to mitigate potential impacts.	High	Disturbance Noise pollution	5 years	Stakeholders ENGOs
31*	Undertake systematic monitoring of ambient noise records for non-vessel related acute acoustic events that may cause harm to Killer Whales.	High	Disturbance Noise pollution	5 years; ongoing	Stakeholders ENGOs
32*	Compile metadata on acoustic recordings from existing archives and current available sources (e.g., Navy, government agencies, individuals, consultants); identify format, calibration, temporal and spatial distribution, data gaps, and data collection protocols.	Medium	Disturbance Noise pollution	2 years	Stakeholders ENGOs

#	Recovery Measures	Priority	Threats or Concerns Addressed	Timeline	Partner(s)
Approach 2: Determine the short and long-term effects of chronic and immediate forms of disturbance, including vessels and noise, on the physiology, foraging and social behaviour of Resident Killer Whales					
33	Undertake behavioural studies of Resident Killer Whales in the winter months.	High	Disturbance Noise pollution Prey availability	Ongoing, long term	NOAA ENGOs Other agencies Academia
34	Utilize D-tag data to create a 3D model of the Resident Killer Whale's immediate (received) acoustic environment.	High	Disturbance Noise pollution	5 years; ongoing	NOAA Academia
35*	Maintain and improve the existing 24 hour hotline (BCMMRN/ORR) for acoustic incidents as a mechanism for timely response.	Medium	Disturbance Noise pollution	Ongoing	ENGOs
36*	Increase transboundary communication of research methods and objectives to address disturbance issues with counterpart agencies in the US.	Medium	Disturbance Noise pollution	Ongoing	NOAA
Approach 3: Develop and implement regulations, guidelines, sanctuaries and other measures to reduce or eliminate physical and acoustic disturbance of Resident Killer Whales.					
37	Improve interagency communication and coordination to ensure that new activities, projects and developments that may impact Resident Killer Whales are identified, and appropriate mitigation measures are developed and implemented (e.g., Canadian Environmental Assessment Agency, Fisheries Protection Program).	High	Disturbance Noise pollution	Ongoing	Other agencies

#	Recovery Measures	Priority	Threats or Concerns Addressed	Timeline	Partner(s)
38	Review operational impacts of existing activities, projects and developments that may have acute or cumulative impact on Resident Killer Whales and work with stakeholders to develop and apply appropriate mitigation measures.	High	Disturbance Noise pollution	Ongoing	Other agencies
39*	Encourage the development and use of methodologies that mitigate acoustic impacts (e.g., bubble curtains, ship quieting technologies).	High	Disturbance Noise pollution	Ongoing	Stakeholders
40*	Review and improve 1) thresholds for disturbance and injury, and 2) measures to mitigate marine mammal impacts from acute noise (e.g., seismic surveys, sonar use, pile driving and at-sea detonation); and include in Standards and Statements of Practice (e.g., Maritime Command Orders, Statement of Canadian Practice with respect to the Mitigation of Seismic Sound in the Marine Environment).	High	Disturbance Noise pollution	5 years; ongoing	NOAA Stakeholders Other agencies
41*	Develop a means to assess individual ship noise and determine response strategies as necessary.	High	Disturbance Noise pollution	5 years	Stakeholders
42*	Work with the Department of National Defence to reduce Killer Whale exposure to high intensity underwater sound from military operations.	High	Disturbance Noise pollution	Ongoing	Other agencies
43*	Develop a communication strategy to inform foreign military authorities of Canadian acoustic mitigation protocols.	High	Disturbance Noise pollution	Ongoing	Other agencies
44	Investigate area-specific shipping and boating guidelines and/or regulations (e.g., speed restrictions, vessel traffic routes and scheduling) that reduce acoustic impact as well as risk of collision in Resident Killer Whale habitat.	Medium	Disturbance Noise pollution Prey availability	5 years	NOAA Stakeholders Other agencies

#	Recovery Measures	Priority	Threats or Concerns Addressed	Timeline	Partner(s)
45*	Improve boater education and tourism programs using the latest marine mammal regulations and guidelines (e.g., boater courses; marine safety courses, fishing licenses, vessel registration and licensing courses).	Medium	Disturbance Noise pollution	2 years	NOAA Stakeholders Other agencies
46*	Promote awareness of, and compliance with, guidelines and regulations to reduce acoustic impacts and vessel interactions (e.g., Be Whale Wise guidelines, stewardship programs, on-the-water education).	Medium	Disturbance Noise pollution	2 years; ongoing	NOAA Stakeholders ENGOs
47*	Investigate new methodologies and technologies to aid in compliance and enforcement of Marine Mammal Regulations and SARA.	Medium	Disturbance Noise pollution	5 years; ongoing	NOAA Other agencies
48*	Ensure that the development and delivery of SARA enforcement training for DFO fishery officers includes content from whale experts.	Medium	Disturbance Noise pollution	Ongoing	Academia ENGOs
49*	Evaluate and revise whale watching guidelines and/or regulations to reflect most recent understanding of effects of chronic physical disturbance.	Medium	Disturbance Noise pollution	Ongoing	NOAA Academia Other agencies
50*	Evaluate the efficacy of a license program and conditions for commercial whale watching as a means of mitigating potential disturbance (e.g., training standards for boat operators and naturalists, number and/or type of vessels, standard of practice).	Medium	Disturbance Noise pollution	2 years	Stakeholders
51*	Promote responsible advertising and documentaries that reflect the Be Whale Wise guidelines and demonstrate appropriate viewing practices.	Medium	Disturbance Noise pollution	2 years	Stakeholders

#	Recovery Measures	Priority	Threats or Concerns Addressed	Timeline	Partner(s)
Broad Strategy 4: *Ensure that chemical and biological pollutants do not prevent the recovery of Resident Killer Whale populations.*					
Approach 1: Investigate the health and reproductive capacity of Resident Killer Whales using scientific studies on free-ranging and stranded individuals, as related to chemical and biological pollution.					
52*	Investigate diseases in stranded Killer Whales and identify those caused by biological pollution (e.g., viruses, bacteria, fungi, parasites).	High	Environmental contaminants	Opportunistic; ongoing	NOAA Other agencies ENGOs
53*	Collate and summarize information on marine mammal necropsy and disease reports.	High	Environmental contaminants	Annual; ongoing	NOAA ENGOs
54*	Evaluate the type and level of risk of biological pollutants from agricultural runoff, sewage effluent, wildlife rehabilitation facilities and other sources.	High	Environmental contaminants	5 year	Other agencies
55*	Investigate and monitor priority pathogens of concern in marine mammals as a means to identify risk to Killer Whales (e.g., *Morbillivirus* spp.).	Medium	Environmental contaminants	Annual; ongoing	NOAA Other agencies
56*	Conduct research in support of evaluating risks associated with disposal at sea operations in coastal waters (e.g., with a focus on emerging concerns such as PBDEs).	Medium	Environmental contaminants	2 years	Other agencies
Approach 2: Monitor the chemical and biological pollutant levels in Resident Killer Whales, their prey, and their habitat.					

#	Recovery Measures	Priority	Threats or Concerns Addressed	Timeline	Partner(s)
57*	Quantify the background levels of natural and anthropogenic hydrocarbons to provide a baseline for assessing spill impacts in Killer Whale habitat.	High	Environmental contaminants	5 years	NOAA Other agencies
58*	Identify and monitor contaminants of concern (e.g., flame retardants, pharmaceuticals and personal care products, PBTs, hydrocarbons), and conduct a risk-based assessment of different chemicals of concern in Killer Whales, their prey, and their habitat.	High	Environmental contaminants	3 years; ongoing	NOAA Other agencies
59*	Evaluate contaminant concentration trends in Killer Whales, based on both published and new measurements of different contaminants.	High	Environmental contaminants	5 years	NOAA Other agencies
60*	Develop a monitoring program for pathogens and biological pollutants to evaluate long-term trends in Killer Whales and their prey.	High	Environmental contaminants	5 years	NOAA Other agencies
Approach 3: Identify and prioritize the sources of key chemical and biological pollutants affecting Resident Killer Whales and their habitat.					
61*	Undertake a workshop to identify source of persistent bioaccumulative contaminants presenting a risk to Killer Whales.	High	Environmental contaminants	5 years	ENGOs
62*	Undertake a workshop to identify source of biological pollutants presenting a risk to Killer Whales.	High	Environmental contaminants	5 years	ENGOs
63*	Collate information on remediation efforts for land-based PCBs.	High	Environmental contaminants	5 years	Other agencies

#	Recovery Measures	Priority	Threats or Concerns Addressed	Timeline	Partner(s)
64*	Work with the Federal Contaminated Sites Action Plan (FCSAP) to evaluate the potential contribution of persistent environmental contaminants to the contamination of Killer Whale habitat.	High	Environmental contaminants	5 years	Other agencies
Approach 4: Reduce the introduction into the environment of pesticides and other chemicals that have the potential to adversely affect the health of Resident Killer Whales and/or their prey, through measures such as municipal, provincial, national and international agreements, education, regulation and enforcement.					
65*	Incorporate knowledge of distribution, foraging behavior and contaminant bioaccumulation in Killer Whales into pesticide and chemical regulation development and implementation overseen by provincial agencies, Health Canada's PMRA (Pest Management Regulatory Agency), and Environment Canada's Chemical Management Plan (CMP).	High	Environmental contaminants	5 years, ongoing	Other agencies
66*	Determine the efficacy of the new regulations for PBDEs under the Canadian Environmental Protection Act (CEPA) by monitoring trends in indicator species in Killer Whale habitat, and develop additional source control strategies if warranted.	High	Environmental contaminants	5 years; possibly ongoing	Other agencies
67*	Identify and support programs that identify and mitigate small scale and/or chronic contaminant spills and leaks.	High	Environmental contaminants	5 years; ongoing	NOAA ENGOs Stakeholders
Approach 5: Mitigate the impacts of currently and historically used "legacy" pollutants in the environment.					

#	Recovery Measures	Priority	Threats or Concerns Addressed	Timeline	Partner(s)
68*	Reduce the risk of lifetime contaminant exposure in Killer Whales by incorporating knowledge of distribution, foraging behavior and their food web into assessment and remediation plans for contaminated sites.	High	Environmental contaminants	5 years	Other agencies Stakeholders
69*	Work with other government departments, non-governmental organizations, and industry to promote best practices, green design, mitigation protocols and outreach efforts for the protection of Killer Whales and their habitat from urban pollution (e.g., sewage treatment, source control, combined sewer overflows, runoff).	High	Environmental contaminants	5 years; ongoing	NOAA Other agencies Stakeholders ENGOs
70*	Work with individuals, industries, agricultural operations, and other sectors in order to reduce the release of agricultural chemicals of concern into the habitat of Killer Whales and their prey.	High	Environmental contaminants	5 years; ongoing	NOAA Other agencies Stakeholders
71*	Ensure that the protection of Killer Whales and their habitat is included as a high priority in spill response and monitoring protocols within the Canadian Coast Guard's Incident Command Structure.	High	Environmental contaminants	1 year; ongoing	Other agencies
72*	Prepare for oil or chemical spills to minimize impacts to Killer Whales through the development of a spill response plan, including deterrence methods, training, drills and equipment.	High	Environmental contaminants	1 year; ongoing	NOAA Other agencies Stakeholders
73*	Review and, if appropriate, recommend refinement of policies and best management practices for ocean dredging and disposal at sea.	Medium	Environmental contaminants	Ongoing	Other agencies

#	Recovery Measures	Priority	Threats or Concerns Addressed	Timeline	Partner(s)
74*	Refine and expand existing monitoring programs of municipal and industrial waste to minimize Killer Whale exposure to legacy and emergent pollutants.	Medium	Environmental contaminants	Ongoing	Other agencies
Approach 6: Reduce the introduction of biological pollutants, including pathogens and exotic species, into the habitats of Resident Killer Whales and their prey.					
75*	Reduce the release of biological pollutants into the habitat of Killer Whales and their prey by working with municipal, provincial and federal agencies tasked with domestic, agricultural and industrial discharges (including ballast water).	Medium	Environmental contaminants	5 years	Other agencies Stakeholders ENGOs
76*	Mitigate the release of biological pollutants into the habitat of Killer Whales and their prey by working with individuals, industries, agricultural operations, and other source sectors to develop or improve protocols and guidance.	Medium	Environmental contaminants	5 years	NOAA Other agencies Stakeholders ENGOs
Broad Strategy 5: *Protect critical habitat for Resident Killer Whales and identify additional areas for critical habitat designation and protection.*					
Approach 1: Identify key feeding areas and other critical habitat of Resident Killer Whales intra and inter-annually.					
77	Continue to undertake research activities to identify areas of habitat necessary for the survival and recovery of Resident Killer Whales.	High	Prey availability Disturbance Noise pollution	Ongoing	NOAA Other agencies ENGOs

#	Recovery Measures	Priority	Threats or Concerns Addressed	Timeline	Partner(s)
78	Identify and account for the likelihood that changes in the relative strength of major salmon stocks may cause corresponding shifts in the geographic location of critical habitat for Resident Killer Whales.	Medium	Prey availability	Ongoing	Other agencies ENGOS Academia
79	Refine understanding of the functions, features and attributes of Resident Killer Whale habitat and identify what may constitute critical habitat destruction.	Medium	Prey availability Disturbance Noise pollution	Ongoing	Other agencies ENGOS Academia
Approach 2: Protect the access of Resident Killer Whales to their critical habitat.					
80	Continue efforts outlined in Broad Strategy 3 to ensure disturbance from human activities does not prevent access of Resident Killer Whales to their critical habitat.	High	Disturbance Noise pollution	Ongoing	Stakeholders Other agencies ENGOs
Approach 3: Encourage trans-boundary cooperation in the identification and protection of critical habitat.					
81	Continue dialogue with the NOAA to encourage transboundary consistency of Southern Resident Killer Whale critical habitat protection.	High	Disturbance Noise pollution	Ongoing	NOAA

Table 3: Measures that represent opportunities for other jurisdictions, organizations or individuals to lead

Measures noted by an asterisk (*) have been identified as also likely to provide benefits to Transient (Bigg's) and Offshore Killer Whales (9 of 13, or 69% of measures).

#	Recovery Measures	Priority	Threats or Concerns Addressed	Timeline	Suggested Other Jurisdictions or Organizations
Broad Strategy 2*: Ensure that Resident Killer Whales have an adequate and accessible food supply to allow recovery.*					
Approach 1: Determine the seasonal diet, feeding areas and energetic requirements of Northern and Southern Resident Killer Whales.					
82	Use historical fishing records to identify potential Resident Killer Whale feeding areas.	Medium	Prey availability	Uncertain	Academia ENGOs
Approach 4: Develop prospective actions to be taken during poor Chinook return years to ensure sufficient prey availability for Resident Killer Whales.					
83	Analyze historical data to identify environmental correlates with Chinook abundance and Resident Killer Whale mortality trends.	Medium	Prey availability	Uncertain	Academia Other agencies
Broad Strategy 3: *Ensure that disturbance from human activities does not prevent the recovery of Resident Killer Whales.*					
Approach 2: Determine the short and long-term effects of chronic and immediate forms of disturbance, including vessels and noise, on the physiology, foraging and social behaviour of Resident Killer Whales.					
84*	Develop an acoustic model that incorporates effects of increasing ambient noise levels on communication signals of Killer Whales.	Medium	Disturbance Noise pollution	Unknown	Stakeholders Academia

#	Recovery Measures	Priority	Threats or Concerns Addressed	Timeline	Suggested Other Jurisdictions or Organizations
85*	Research the effects of other vessel-based impacts (e.g., fish finders, air quality issues related to engine exhaust, disposal of waste and bilge water).	Medium	Disturbance Noise pollution Environmental contaminants	Unknown	Stakeholders Academia
86	Continue and expand existing behavioural monitoring programs involving vessel/whale interactions and increase support for data analysis and publication.	Medium	Disturbance Noise pollution	Unknown	Stakeholders ENGOs
87	Develop a means of differentiating nutritional vs. disturbance-induced stress (via hormone response and other methods).	Medium	Disturbance Noise pollution	Unknown	Academia Other agencies
Approach 3: Develop and implement regulations, guidelines, sanctuaries and other measures to reduce or eliminate physical and acoustic disturbance of Resident Killer Whales.					
88*	Expand the Whale Wise flag program to notify other mariners when whales have been observed in order to reduce risk of collision and acoustic disturbance.	Medium	Disturbance Noise pollution	Ongoing	Stakeholders ENGOs
89*	Improve public awareness of recovery activities for Killer Whales through Parks Canada Agency's educational programs,(e.g., the BC Ferries Coastal Naturalist Program).	Medium	Disturbance Noise pollution Prey availability	5 years	Parks Canada Agency
Broad Strategy 4: *Ensure that chemical and biological pollutants do not prevent the recovery of Resident Killer Whale populations.*					
Approach 1: Investigate the health and reproductive capacity of Resident Killer Whales using scientific studies on free-ranging and stranded individuals, as related to chemical and biological pollution.					

#	Recovery Measures	Priority	Threats or Concerns Addressed	Timeline	Suggested Other Jurisdictions or Organizations
90*	Develop, evaluate, and apply new tools to assess the effects of contamination and pollution on the health of free-ranging Killer Whales.	Medium	Environmental contaminants	Unknown	Other agencies ENGOS Academia
Approach 2: Monitor the chemical and biological pollutant levels in Resident Killer Whales, their prey, and their habitat.					
91*	Quantify the current levels of contaminant concentrations in Killer Whale prey and refine the analysis of contaminant intake by Killer Whales using current information on their feeding ecology.	High	Environmental contaminants	Uncertain	Stakeholders ENGOs
Approach 3: Identify and prioritize the sources of key chemical and biological pollutants affecting Resident Killer Whales and their habitat.					
92*	Evaluate the risks of bioaccumulation related to mercury (Hg) contamination in Killer Whale food webs.	Medium	Environmental contaminants	Uncertain	Stakeholders Other agencies ENGOs
Approach 4: Reduce the introduction into the environment of pesticides and other chemicals that have the potential to adversely affect the health of Resident Killer Whales and/or their prey, through measures such as municipal, provincial, national and international agreements, education, regulation and enforcement.					
93*	Support new, proposed, or existing bans on the use of pesticides for cosmetic purposes and re-establish a comprehensive pesticide sales and use inventory for British Columbia.	High	Environmental contaminants	Uncertain	ENGOs General public

#	Recovery Measures	Priority	Threats or Concerns Addressed	Timeline	Suggested Other Jurisdictions or Organizations
94*	Incorporate knowledge of Killer Whale distribution, foraging behavior and contaminant bioaccumulation into CEPA technical reviews on chemicals of concern.	High	Environmental contaminants	Uncertain	Other agencies

2. Critical Habitat

2.1 Identification of the Species' Critical Habitat

2.1.1 General Description of the Species' Critical Habitat

Critical habitat is defined in SARA as "…*the habitat that is necessary for the survival or recovery of a listed wildlife species and that is identified as the species' critical habitat in a recovery strategy or in an action plan for the species*." [s. 2(1)]

Also, SARA defines habitat for aquatic species as "… *spawning grounds and nursery, rearing, food supply, migration and any other areas on which aquatic species depend directly or indirectly in order to carry out their life processes, or areas where aquatic species formerly occurred and have the potential to be reintroduced*." [s. 2(1)]

Critical habitat for the Northern and Southern Resident Killer Whale is identified to the extent possible in Section 8.1 of the Recovery Strategy (Fisheries and Oceans Canada, 2011). The Recovery Strategy also contains details about the identified critical habitat including geographic location and biophysical functions, features and attributes. The critical habitat identified in the Recovery Strategy is insufficient to achieve the species' population and distribution objectives. There are likely other areas that are necessary for survival or recovery of Killer Whales, and studies are underway to identify further areas of habitat necessary for the survival and recovery of these populations.

2.2 Activities likely to Result in the Destruction of Critical Habitat

Examples of activities likely to result in destruction of critical habitat may be found in Section 8.3 of the Recovery Strategy.

2.3 Proposed Measures to Protect Critical Habitat

Under SARA, critical habitat must be legally protected from destruction within 180 days of being identified in a recovery strategy or action plan. For the Northern and Southern Resident Killer Whale critical habitat, a SARA Critical Habitat Order was made under subsections 58(4) and (5), which invokes the prohibition in subsection 58(1) against the destruction of the identified critical habitat.

3. Evaluation of Socio-Economic Costs and of Benefits

The *Species at Risk Act* requires that an action plan include an evaluation of the socio-economic costs of the action plan and the benefits to be derived from its implementation (SARA 49(1)(e), 2003). This evaluation addresses only the incremental socio-economic costs of implementing this action plan from a national perspective as well as the social and environmental benefits that would occur if the action plan were implemented in its entirety, recognizing that not all aspects of its implementation are under the jurisdiction of the federal government. It does not address cumulative costs of species recovery in general nor does it attempt a cost-benefit analysis. Its intent is to inform the public and to guide decision making on implementation of the action plan by partners.

The protection and recovery of species at risk can result in both benefits and costs. The Act recognizes that "*wildlife, in all its forms, has value in and of itself and is valued by Canadians for aesthetic, cultural, spiritual, recreational, educational, historical, economic, medical, ecological and scientific reasons*" (SARA 2003). Self-sustaining and healthy ecosystems with their various elements in place, including species at risk, contribute positively to the livelihoods and the quality of life of all Canadians. A review of the literature confirms that Canadians value the preservation and conservation of species in and of themselves. Actions taken to preserve a species, such as habitat protection and restoration, are also valued. In addition, the more an action contributes to the recovery of a species, the higher the value the public places on such actions (Loomis and White, 1996; DFO., 2008). Furthermore, the conservation of species at risk is an important component of the Government of Canada's commitment to conserving biological diversity under the *International Convention on Biological Diversity*. The Government of Canada has also made a commitment to protect and recover species at risk through the *Accord for the Protection of Species at Risk*. The specific costs and benefits associated with this action plan are described below.

Efforts for Recovery to date

The Action Plan for this species captures activities from 2016 onwards. However, efforts for Killer Whale recovery have been underway prior to listing under SARA. Since 1973, an annual census has been undertaken to locate, photograph, and identify individual Killer Whales found in Canadian waters. Since 2002, to determine recovery status and further the understanding of distribution, abundance and seasonal occurrence of these whales, DFO's Cetacean Research Program (CRP) has completed over 2,000 hours of dedicated ship-based surveys. In addition, collaborations with other groups, organizations and partners have provided significant advances in acoustic monitoring networks, sightings, identification methods and identification of important habitat (e.g., the BC Parks Warden Program at the Robson Bight (Michael Bigg) Ecological Reserve). First Nations have contributed to recovery efforts through stewardship and guardian programs, and identification efforts. Finally, education, stewardship and enforcement programs have also contributed to recovery efforts.

Benefits

The impacts of the recovery measures in this plan on Resident Killer Whale populations are unknown but likely positive. As indicated above, Canadians value such actions for a number of

reasons, including non-market benefits (i.e., existence, bequest and option values).[6] Activities that positively affect the recovery of these species may result in positive benefits to Canadians.

The recovery measures are also likely to provide broader benefits, as some of the threats to this species are common to other marine mammals and sea turtles. Actions that mitigate those threats may also provide benefits to other species. In addition, ocean research surveys generally collect information on other marine mammals, sea turtles and other species of interest when encountered, if feasible and appropriate. In particular, Transient and Offshore Killer Whales, as well as other species of whales may benefit from the research activities in this plan, specifically research related to acoustic disturbance and contaminants. Consequently, many of the activities identified in this Action Plan will have positive impacts on other SARA listed species and provide overall benefits to the aquatic ecosystem.

Costs

The Implementation Schedule separates recovery measures into three categories in three tables. Table 3 activities have not been assessed; while these activities are identified as important for species recovery, limited information is available in terms of participants, activities and timelines.

Very few of the identified costs are associated with recovery measures that would be completed in the short-term (1-2 years). The majority of the recovery measures will result in some level of annual costs over the anticipated timeframe for the plan (i.e., >25 years) and completion dates are not specified. This long-term level of costs is similar to expenditures in support of these species prior to this plan.

The majority of activities in the plan focus on research. The coast-wide distribution of these populations requires extensive survey effort resulting in higher costs than for more localized populations. Research and monitoring activities to reduce threats are closely linked to cooperation and engagement activities with a number of partners providing in-kind support to meetings and discussions. Education and engagement may include in-kind support from environmental organizations. Compliance promotion and enforcement activities would likely be funded through a re-allocation of existing government funds.

Cost estimates for DFO activities in Tables 1 and 2 are expected to be low[7]. There is a high degree of uncertainty regarding cost estimates for partner contribution towards Table 2 activities. As well, the costs for Table 3 activities were not considered as information on project specifics, participants and/or timelines are not available. Annual DFO costs related to Tables 1 and 2 are low on the national scale. The inclusion of financial and in-kind costs for Canadian partners for Table 2 and 3 activities would increase the total; however, overall costs are unlikely to meet the medium threshold.[6] Costs to international partners have not been included in the assessment.

[6] Non-market benefits include bequest values (the value placed on conservation for future generations), existence values (the value people place on the existence of a species) and option values (the amount someone is willing to pay to keep open the option of future use of the species).
[7] Guidance provides scales in terms of present values, as well as annualized values. The annualized scale is: Low $0-$1 million, Medium $1-$10 million, High >$10 million. Source: Government of Canada. *Guidelines for Completing Action Plan Templates (Federal)*. Draft (2.2.). June 2012.

While DFO is identified as the lead for several recovery measures for Resident Killer Whales, most actions are in Tables 2 and 3 which are to be undertaken collaboratively. A number of partners and collaborators are identified and/or have participated in similar activities in the past. These partners include other federal departments and agencies, environmental organizations, academic institutions and programs, First Nations and other foreign governments who may contribute financial and in-kind support. Potential funding sources for DFO costs include existing federal resources, as well as supplemental funds from annual programs such as the Habitat Stewardship Program (HSP).

4. Measuring Progress

The performance indicators presented in the associated recovery strategy provide a way to define and measure progress toward achieving the population and distribution objectives.

Reporting on *implementation* of the action plan (under s. 55 of SARA) will be done by assessing progress towards implementing the recovery objectives and strategies) identified in the Recovery Strategy (Fisheries and Oceans Canada, 2011).

Reporting on the ecological and socio-economic impacts of the action plan (under s. 55 of SARA) will be done by assessing the results of monitoring the recovery of the species and its long term viability, and by assessing the implementation of the action plan.

5. References

Fisheries and Oceans Canada. 2011. Recovery Strategy for the Northern and Southern Resident Killer Whales (*Orcinus orca*) in Canada. *Species at Risk Act* Recovery Strategy Series, Fisheries & Oceans Canada, Ottawa ix + 80 pp.

Fisheries and Oceans Canada. 2008. Estimation of the Economic Benefits of Marine Mammal Recovery in the St. Lawrence Estuary. Policy and Economics Regional Branch, Quebec 2008.

Loomis, J.B. & White, D.S (1996). Economic Benefits of Rare and Endangered Species: Summary and Meta-analysis. Ecological Economics, 18: 197-206.

Appendix A: Effects on the Environment and Other Species

In accordance with the Cabinet Directive on the Environmental Assessment of Policy, Plan and Program Proposals (2010), SARA recovery planning documents incorporate strategic environmental assessment (SEA) considerations throughout the document. 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 achievement of any of the Federal Sustainable Development Strategy's goals and targets.

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 upon non-target species or habitats. The results of the SEA are incorporated directly into the Action Plan itself, but are also summarized below in this statement.

The recovery measures are also likely to provide broader benefits, as some of the threats to this species are common to other marine mammals and sea turtles. Actions that mitigate threats to the aquatic environment (acoustic disturbance, contaminants) may also provide benefits to other species. In addition, ocean research surveys generally collect information on other marine mammals, sea turtles and other species of interest when encountered, if feasible and appropriate. All cetacean species, and Transient and Offshore Killer Whales in particular, will likely benefit from measures identified in this action plan. Consequently, many of the activities identified in this Action Plan will have positive impacts on other SARA listed species and provide overall benefits to the aquatic ecosystem.

Appendix B: Record of Cooperation and Consultation

Action plans are to be prepared in cooperation and consultation with other jurisdictions, organizations, affected parties and others as outlined in SARA section 48. DFO has utilized a process of technical iterative document development, interagency involvement, and public consultation to seek input to the development of this Action Plan. Information on team participants is included in Appendix C.

Additional stakeholder, Aboriginal, and public input will be sought through the publication of the proposed document on the Species at Risk Public Registry for a 60-day public comment period. Comments received will inform the final document.

Appendix C: Teams and Processes Contributing to the Development of this Action Plan

2011-2014 Northern and Southern Resident Killer Whale Action Plan Team

Lynne Barre	National Oceanographic and Atmospheric Administration
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