

# Report on the Progress of Recovery Strategy Implementation for the Leatherback Sea Turtle (*Dermochelys coriacea*) in Atlantic Canada for the Period 2007-2012

Leatherback Sea Turtle



2013

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Leatherback Sea Turtle (*Dermochelys coriacea*)  
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For copies of the recovery strategy report, or for additional information on species at risk, including COSEWIC Status Reports, residence descriptions, recovery strategies, action plans, and other related recovery documents, please visit the [SAR Public Registry](#).

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## Preface

Section 46 of the *Species at Risk Act* (SARA) requires the competent Minister to report on the implementation of the recovery strategy for a species at risk, and on the progress towards meeting its objectives within five years of the date when the recovery strategy was placed on the Species at Risk Public Registry.

Reporting on the progress of recovery strategy implementation requires reporting on the collective efforts of the competent Minister, provincial organizations and all other parties involved in conducting activities that contribute towards the species recovery.

## Executive summary

The Leatherback Sea Turtle (*Dermochelys coriacea*) is the world's largest and widest-ranging sea turtle. A single species occurs in the Atlantic, Pacific, and Indian Ocean basins. In 1981, it was first designated as Endangered in Canada by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC). Its status was confirmed as Endangered by COSEWIC in 2001 and 2012. The Leatherback Sea Turtle (hereafter referred to as the "Leatherback Turtle") was listed as Endangered under the *Species at Risk Act* (SARA) in June 2003. This document deals with the Atlantic Canada population of this species including individuals occurring off of the coasts of Nova Scotia, New Brunswick, Prince Edward Island, Québec, and Newfoundland and Labrador. Leatherback Turtles that nest on tropical and subtropical beaches in the western Atlantic migrate north annually to forage on gelatinous zooplankton (jellyfish) at high latitudes, including Atlantic Canadian waters (James *et al.* 2005, 2007). Entanglement in fishing gear is considered the primary threat in these northern foraging areas (Atlantic Leatherback Turtle Recovery Team 2006). Other threats in Atlantic Canadian waters include collisions with vessels, marine pollution, and acoustic disturbances. Threats outside Canadian waters include threats to nesting habitat such as: poaching, coastal construction, artificial light, and climate change (Atlantic Leatherback Turtle Recovery Team 2006).

The *Recovery Strategy for the Leatherback Turtle (Dermochelys coriacea) in Atlantic Canada* (hereafter referred to as the "Recovery Strategy") was posted on the Species at Risk Public Registry in 2007. This report fulfills the commitment to report every five years on the progress of Recovery Strategy implementation. It covers the period 2007-2012.

Critical habitat for the Leatherback Turtle in Atlantic Canada was not defined in the 2006 Recovery Strategy. Subsequent research and scientific review (Fisheries and Oceans Canada [DFO] 2012a) have suggested that there are three important habitat areas for Leatherback Turtle foraging in Atlantic Canadian waters. This information is being used to inform the identification of critical habitat in a forthcoming amendment to the 2006 Recovery Strategy.

The following six recovery objectives were identified in the Recovery Strategy: 1) understanding threats; 2) understanding Leatherback Turtle life history characteristics; 3) habitat identification and protection; 4) risk reduction; 5) education; and 6) international initiatives. Performance measures were identified in the Recovery Strategy and are addressed in this report.

Recent research on Leatherback Turtles conducted in Canada and abroad has revealed much about their migratory behaviour, important foraging habitat, and population structure. However, precise information about population size and trends in Atlantic Canadian waters and beyond is still lacking.

Two DFO-led Zonal Advisory Processes (ZAPs) were held in early 2012. Their purpose was to review the use of satellite tracking data to define important habitat for Leatherback Turtles in Atlantic Canada (DFO 2012a) and to review Leatherback Turtle interactions with fisheries and with non-fishery activities in Atlantic Canadian waters during 2006-2010 (DFO 2012b). The science advisory reports (SARs) produced from these meetings contain information demonstrating progress on the Recovery Strategy objectives: 1) understanding threats; 2) understanding Leatherback Turtle life history characteristics; and 3) habitat identification and protection.

Important progress has been made in achieving all objectives and many progress indicators. Measures to achieve all 6 objectives are identified in the *Action Plan for the Leatherback Sea Turtle in Atlantic Canada*, which is in development.

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# 1. Background

## 1.1 COSEWIC assessment summary

### Assessment Summary – May 2012

**Common name**

Leatherback Sea Turtle -Atlantic population

**Scientific name**

*Dermochelys coriacea*

**Status**

Endangered

**Reason for designation**

Globally, this species is estimated to have declined by more than 70%. In the Atlantic, this species continues to be impacted by fisheries bycatch, coastal and offshore resource development, marine pollution, poaching of eggs, changes to nesting beaches and climate change. Canadian waters provide an important foraging area for these turtles. There they are threatened by entanglement in longline and fixed fishing gear.

**Occurrence**

Atlantic Ocean

**Status history**

The species was considered a single unit and designated Endangered in April 1981. Status re-examined and confirmed in May 2001. Split into two populations in May 2012. The Atlantic population was designated Endangered in May 2012.

## 1.2 Threats

### 1.2.1 Threats to the species

Information on threats comes from the Recovery Strategy (Atlantic Leatherback Turtle Recovery Team 2006) unless otherwise indicated.

- **Entanglement in fishing gear:** Incidental entanglement in fishing gear such as pelagic longlines, lines associated with pot gear and gillnets, buoys and anchor lines, and other ropes and cables pose a risk of entanglement to Leatherback Sea Turtles (hereafter referred to as “Leatherback Turtle”). Leatherback Turtles that are entangled in fishing gear are at risk of serious injury, infection, necrosis or death. Entanglement can limit the Leatherback Turtles ability to feed, dive, breathe or perform other essential behaviours.
- **Marine pollution:** Marine debris such as plastic bags, balloons, plastic and polystyrene foam (e.g. Styrofoam), tar balls, plastic sheeting, and fishing gear pose a threat. Leatherback Turtles can ingest these materials resulting in blockages to their digestive tracts which can cause injury, reduced gut functions or death (Mrosovsky *et al.* 2009).
- **Vessel collisions:** Recreational and commercial boating and other marine traffic pose a threat to Leatherback Turtles since most of their activities occur in the

upper 6-12 m of the water column. Approximately 20% of stranded Leatherback Turtles studied off Florida had propeller marks (Eckert *et al.* 2009). Limited information on this threat exists in many parts of the species' range, including within Atlantic Canada.

- **Acoustic disturbances:** In hard-shelled sea turtles, seismic surveys and other acoustic disturbances elicit short-term physical, physiological and behavioural responses with impacts that are likely localized and short-term (McCauley *et al.* 2000; Martin *et al.* 2012). It is not known if similar responses are typical in Leatherback Turtles; however, research is underway to address this question (W. Dow-Piniak, pers. comm. 2012).
- **Nesting environment:** Though Leatherback Turtles do not nest in Atlantic Canada threats to nesting habitat are relevant to the recovery of the species and these include: poaching of eggs, coastal construction which alters preferred nesting habitat or prohibits nesting, artificial light that results in disorientation of nesting females or hatchlings and climate change which results in alterations to beach habitats (e.g. temperature change, loss of nests due to increased inclement weather, and beach erosion).

### 1.2.2 Threats to critical habitat

Critical habitat for the Leatherback Turtle in Atlantic Canada was not identified in the 2006 Recovery Strategy. Subsequent research by Dalhousie University and the Canadian Sea Turtle Network (CSTN, formerly the Nova Scotia Leatherback Turtle Working Group) was reviewed and used by DFO to identify three important habitat areas (DFO 2012a). This information will be used to inform the identification of critical habitat in an amended Recovery Strategy (in prep.).

## 2. Recovery

### 2.1 Recovery goals and objectives

#### *Recovery goal*

The recovery goal presented in the Recovery Strategy (2006) is to: *increase the population such that the long-term viability of the [L]eatherback [T]urtles frequenting Atlantic Canadian waters is achieved<sup>1</sup>.*

#### *Recovery objectives*

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<sup>1</sup> A more quantitative population and distribution goal (recovery goal) cannot be determined at this time. Further research is necessary to obtain information on the population and distribution of Leatherback Turtles in Atlantic Canadian waters. The need for this is reflected in the updated SOS in the amended Recovery Strategy which is currently in preparation.



Creating and maintaining the necessary conditions both within Canadian territory and abroad in efforts to achieve a viable population of Atlantic Leatherback Turtles will be accomplished by implementing the following recovery objectives:

- **Objective 1:** Understanding Threats. *Identify and understand anthropogenic threats to Leatherback Turtles in Atlantic Canadian waters.*
- **Objective 2:** Understanding Leatherback Turtle Life History Characteristics. *Support research and monitoring that will fill knowledge gaps concerning general organismal traits of Leatherback Turtles in Atlantic Canadian waters.*
- **Objective 3:** Habitat Identification and Protection. *Identify and protect habitat of Leatherback Turtles in Atlantic Canadian waters.*
- **Objective 4:** Risk Reduction. *Minimize risk of harm to Leatherback Turtles from anthropogenic activities under Canadian jurisdiction.*
- **Objective 5:** Education. *Develop and implement education activities that support Leatherback Turtle recovery in Canada.*
- **Objective 6:** International Initiatives. *Promote international initiatives contributing to the recovery of Leatherback Turtles.*

## 2.2 Performance measures

Table 1 repeats the performance measures listed in the Recovery Strategy. They have been numbered for clarity in reporting but do not reflect priority. Section 3.4 presents a summary of the progress made towards these indicators from 2007 to 2012.

**Table 1. Indicators of progress towards achieving recovery goals and objectives (Atlantic Leatherback Turtle Recovery Team 2006).**

Recovery objective	Indicators of progress
<b>Understanding Threats</b>	1) Potential/known interactions of Leatherback Turtles and fishing industry activities identified and documented. 2) Post-release survivorship determined. 3) Potential biological removal limit assessed. 4) Potential/known threats of offshore development activities on Leatherback Turtles identified and documented. 5) Report produced on human activities known to, or having the potential to, threaten Leatherback Turtles in Atlantic Canada, with recommendations for actions.
<b>Research</b>	6) Populations frequenting Atlantic Canadian waters identified. 7) Historic and current sightings compiled and organized in a centralized database. 8) Knowledge from research and monitoring activities compiled in a comprehensive, living, reference document that is regularly updated and accessible to a broad range of user groups. 9) Research initiated on foraging ecology, movements and behaviour of

Recovery objective	Indicators of progress
	<p>Leatherback Turtles in Canadian waters.</p> <p>10) Research initiated on the oceanographic correlates that relate to the spatial/temporal distribution of Leatherback Turtles in Canadian waters.</p> <p>11) Survey programme established to develop indices of abundance (e.g., long term in-water population trends in northwest Atlantic waters).</p>
<b>Habitat Identification and Protection</b>	<p>12) Critical and/or important habitat in Atlantic Canada identified to the extent possible.</p> <p>13) Tools for habitat protection assessed and evaluated.</p> <p>14) Draft plan for protection of critical habitat in Atlantic Canada developed.</p>
<b>Threat Mitigation and Risk Reduction</b>	<p>15) Mitigation measures developed to reduce known harm from human activities.</p> <p>16) Recovery and emergency response procedures implemented, along with specific threat reduction measures.</p> <p>17) Programmes developed to engage stakeholders in the implementation of mitigation measures.</p>
<b>Education and Outreach</b>	<p>18) Information on Leatherback Turtles produced and distributed to federal and provincial government departments</p> <p>19) Public awareness materials produced and distributed, including but not limited to briefing kits, web resources, brochures,</p> <p>20) Initiatives developed to educate and train stakeholders about their role in Leatherback Turtle conservation (e.g. continuation of fishers outreach/research via NS Leatherback Turtle Working Group).</p>
<b>International Initiatives</b>	<p>21) Collaboration with other nations on Leatherback Turtle conservation initiatives.</p>

### 3. Progress towards recovery

This section presents the progress towards achieving the recovery goal and the population and distribution objectives for the Leatherback Turtle in Atlantic Canada between 2007-2012.

DFO is drafting an Action Plan and has conducted initial consultations for this plan. An amended Recovery Strategy for Leatherback Turtles is being prepared. It provides updated information on Leatherback Turtles and identifies critical habitat as part of the Government of Canada's ongoing commitment to the conservation of Species at Risk through the implementation of the Species at Risk Act.

Specific activities that have contributed to progress are presented in Table 2 organized according to the following categories: Research and Monitoring (including the schedule of studies [SOS]) (sec. 3.1), Management Activities (sec. 3.2), and Outreach and

Education (sec. 3.3). Section 3.4 presents a summary of all of these activities and of how they have contributed to achieving the progress indicators identified in Table 1.

While this document reports on progress for the period 2007-2012, some research papers that are cited were published prior to 2007 because they were not available at the time the Recovery Strategy (2006) was being prepared. Not including them in this document would leave a gap of information between the Recovery Strategy publication and the five-year reporting period.

These recovery efforts and many of the other activities detailed below would not have been possible without the important collaborations of many partners.

**Table 2. Progress towards recovery.**

Progress towards recovery	Indicators of progress and recovery objective addressed
<b>3.1 Research and monitoring</b>	
<ul style="list-style-type: none"> <li>▪ A DFO Zonal Advisory Process (ZAP) titled <i>Leatherback Sea Turtle Part 2: Assessment of Fisheries and Non-Fisheries Related Interactions in Atlantic Canadian Waters</i> was held (March 1-2, 2012). The products of this meeting include a research document and a science advisory report (SAR) (DFO 2012b; O’Boyle 2012). Fisheries not previously linked to Leatherback Turtle entanglement were identified as potential threats (e.g. whelk pots and hagfish traps). Information in these documents will be used to inform amendments to the Recovery Strategy and future Recovery implementation priorities.</li> <li>▪ Canadian Wildlife Federation (CWF), CSTN, and DFO (Maritimes Region) are combining data on fishing effort and turtle distributions to analyze Leatherback Turtle entanglement hazards.</li> <li>▪ A Canadian (CSTN &amp; DFO [Maritimes Region]) and U.S. (National Oceanic and Atmospheric Administration [NOAA]) collaborative review of Leatherback Turtle entanglement incidents in temperate northwest Atlantic waters is underway.</li> <li>▪ DFO is preparing an <i>Action Plan for the Leatherback Turtle in Atlantic Canada</i>. It outlines the measures required to implement the Recovery Strategy, including those that address threats.</li> </ul>	1 -- Understanding Threats
<ul style="list-style-type: none"> <li>▪ CSTN and its collaborators, including DFO (Maritimes Region), are deploying electronic and identification tags to increase knowledge on post-release survivorship of Leatherback Turtles.</li> <li>▪ DFO SAR and research documents (DFO 2012b; O’Boyle 2012) estimate mortality rates from entanglements based on the best available information and expert opinion. Rough estimates of mortality rates for large pelagic longline interactions are 21-49%, and other fixed-gear fisheries are 20-70%. Further work is needed before mortality rates from other fisheries can be determined.</li> </ul>	2--Understanding Threats
<ul style="list-style-type: none"> <li>▪ The ability to detect and evaluate threats other than those from fisheries remains low. Vessel traffic could be a larger threat than the documented interactions would suggest (DFO 2012b). However, a relatively low level of recreational boating occurs in Leatherback Turtle high-use Canadian habitat. This may indicate a minimal source of anthropogenic injury and/or</li> </ul>	4 – Understanding Threats

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Progress towards recovery	Indicators of progress and recovery objective addressed
<p>mortality (M. James, pers. comm. 2013).</p> <ul style="list-style-type: none"> <li>▪ Further work is required to understand the potential threat that offshore development activities present to Leatherback Turtles. This need has been identified in the Action Plan and the amended Recovery Strategy as part of the SOS (in prep.).</li> </ul>	
<ul style="list-style-type: none"> <li>▪ CSTN collaborative research based on tag-recapture data and genetics (James <i>et al.</i> 2007; Sherrill-Mix <i>et al.</i> 2008; Stewart <i>et al.</i> 2013) have identified source populations for Leatherback Turtles frequenting Atlantic Canadian waters. *</li> <li>▪ The largest rookery for the Atlantic Canadian Leatherback Turtles foraging population has been identified in Trinidad, with other large rookeries in French Guiana and Costa Rica (Stewart <i>et al.</i> 2013). *</li> </ul>	6 -- Research
<ul style="list-style-type: none"> <li>▪ Historic and current sightings have been compiled for Nova Scotia (NS), Prince Edward Island (PEI), the southern Gulf of St. Lawrence (James <i>et al.</i> 2006), Quebec (QC) (Ouellet <i>et al.</i> 2006), and Newfoundland and Labrador (NL) (Goff and Lien 1988; Brock 2006). Sightings from the numerous sources have yet to be compiled and organized in a centralized database. The need for this database is reflected in the Action Plan.</li> <li>▪ Local Ecological Knowledge (LEK) and Traditional Ecological Knowledge (TEK)<sup>2</sup> surveys for QC and Atlantic Canada have been completed and information collected is available as reports or information sheets (Giroux 2008; Quebec-Labrador Foundation 2008; Ikanawtiket 2010).</li> </ul>	7 -- Research
<ul style="list-style-type: none"> <li>▪ Since 2008, CSTN, in partnership with commercial fishermen and DFO (Maritimes Region), have been conducting a long-term, annual at-sea Leatherback Turtle monitoring program. *</li> <li>▪ The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) has compiled knowledge from research and monitoring activities in an Assessment and Status Report (COSEWIC 2012). <a href="#">COSEWIC</a> updates their analysis and assessment documents every 10 years, and reports are accessible via the internet.</li> </ul>	8 -- Research
<ul style="list-style-type: none"> <li>▪ CSTN and DFO (Maritimes Region) initiated research that includes studies of Leatherback Turtle population characteristics, thermoregulation, energetics, foraging ecology, entanglement risk, and movements and dive behaviour in Atlantic Canadian waters (James <i>et al.</i> 2005, 2006, 2007). *</li> <li>▪ Studies of foraging ecology (Heaslip <i>et al.</i> 2012), prey consumption and feeding behaviour (Hamelin <i>et al.</i> submitted; Heaslip <i>et al.</i> 2012), and migration patterns (James <i>et al.</i> 2005, 2007) confirm that Atlantic</li> </ul>	9 -- Research

<sup>2</sup> Local Ecological Knowledge and Traditional Ecological Knowledge here refer to the ecological knowledge of coastal people and Aboriginal people respectively. Knowledge is cumulative and gathered over generations and is regionally and locally specific.

\* Indicates progress made towards the SOS to identify critical habitat in Appendix B of the Recovery Strategy 2006.

<b>Progress towards recovery</b>	<b>Indicators of progress and recovery objective addressed</b>
<p>Canadian waters are important foraging grounds for Leatherback Turtles. This is supported by studies of seasonal changes in Leatherback Turtle body shape (Davenport <i>et al.</i> 2011). * These studies may provide insights into how Leatherback Turtles become entangled in fishing gear.</p> <ul style="list-style-type: none"> <li>▪ DFO (QC Region) is using observation data to model aggregations of jellyfish. *</li> </ul>	
<ul style="list-style-type: none"> <li>▪ DFO (Maritimes Region), CSTN, and Dalhousie University have initiated a study of Canadian habitat used by Leatherback Turtles equipped with electronic tags. DFO (Quebec Region) has also initiated predictive modeling of foraging habitat based on oceanographic variables. *</li> </ul>	10 -- Research
<ul style="list-style-type: none"> <li>▪ CSTN, North Atlantic Marine Mammal Commission (NAMMC), NOAA and DFO conducted vessel-based and aerial survey programs (Trans North Atlantic Sightings Survey [TNASS] and Atlantic Marine Assessment Program of Protected Species [AMAPPS]) in Canadian and U.S. waters. These surveys aid in our ability to develop abundance estimates for Leatherback Turtles. Further surveys are needed to determine effort-corrected abundance indices.</li> </ul>	11 -- Research
<ul style="list-style-type: none"> <li>▪ Information from data on Leatherback Turtles tracked in Atlantic Canadian waters over an 11-year period (1999-2009) is being used to inform the identification of critical habitat in an amendment to the Recovery Strategy. Three primary areas of important habitat were identified: (1) waters east and southeast of Georges Bank, along the southwestern Scotian Shelf near the southwest boundary of the Atlantic Canadian Exclusive Economic Zone (EEZ); (2) the southeastern Gulf of St. Lawrence and waters off western and eastern Cape Breton Island, including Sydney Bight, the Cabot Strait, portions of the Magdalen Shallows and adjacent portions of the Laurentian Channel; and (3) waters south and east of the Burin Peninsula, NL, including parts of Placentia Bay (DFO 2012a). *</li> </ul>	12 – Habitat Identification and Protection
<b>3.2 Management activities</b>	
<ul style="list-style-type: none"> <li>▪ At the 2012 ZAP (DFO 2012b) fishery and non-fishery interactions with Leatherback Turtles in Atlantic Canadian Waters were assessed. Fisheries not previously linked to Leatherback Turtle entanglement (e.g. whelk pots and hagfish traps) were identified as having the potential for interactions with Leatherback Turtles (DFO 2012b).</li> <li>▪ DFO is preparing an <i>Action Plan for the Leatherback Sea Turtle in Atlantic Canada</i>. It outlines the measures that are required to implement the Recovery Strategy, including those that address threats.</li> </ul>	5 – Understanding Threats
<ul style="list-style-type: none"> <li>▪ A DFO ZAP titled: Leatherback Sea Turtle Part 1: Using Satellite Tracking Data to Define Important Habitat was held February 29-March 1, 2012 (DFO 2012a). This information will be used to inform the identification of critical habitat in an amended Recovery Strategy. *</li> </ul>	12 – Habitat Identification and Protection

<b>Progress towards recovery</b>	<b>Indicators of progress and recovery objective addressed</b>
<ul style="list-style-type: none"> <li>▪ Objective 3 of the Action Plan and the SOS in the amended Recovery Strategy (in prep.) identify actions needed to refine our understanding of Leatherback Turtle critical habitat.</li> </ul>	14 – Habitat Identification and Protection
<ul style="list-style-type: none"> <li>▪ DFO developed mandatory mitigation measures for the Canadian pelagic longline fishing fleet which include the use of corrodible circle hooks, as well as training and 3-year certification in sea turtle de-hooking and disentanglement techniques. Other mitigation measures are identified in the Action Plan.</li> <li>▪ DFO (NL Region) has begun promoting gear modification (using sinking lines to reduce floating lines in the water) on a trial basis in selected commercial and Aboriginal fisheries to reduce the risk of entanglement for large marine animals including the Leatherback Turtle. DFO (NL Region) is working with the Fish, Food and Allied Workers (FFAW) and others to better understand the encounter rate and types of interactions Leatherback Turtles have with fishing gear.</li> <li>▪ DFO (NL Region) has created an educational website and distributed printed materials to fishers to promote better gear management for Leatherback Turtle conservation. Leatherback Turtle disentanglement and live-release best practices training are underway for DFO Fisheries Officers (Gulf Region).</li> </ul>	15 – Threat Mitigation and Risk Reduction
<ul style="list-style-type: none"> <li>▪ CSTN, CSTN-affiliated fishers, and DFO (Maritimes Region) have worked in collaboration with researchers and fishers from other nations on Leatherback Turtle conservation initiatives including:               <ul style="list-style-type: none"> <li>▪ preparation of the latest Atlantic Leatherback Turtle stock assessment (Turtle Expert Working Group 2007),</li> <li>▪ identification of natal origins of temperate northwest Atlantic foraging populations (Stewart <i>et al.</i> 2013); and,</li> <li>▪ identification of entanglement hazards in Northeastern US and Eastern Canadian waters (NOAA Northeast Fisheries Science Center, DFO, and CSTN; ongoing).</li> </ul> </li> <li>▪ Collaborations between Canada and France on the identification of population and distribution of Leatherback Turtles in French territory waters of St. Pierre and Miquelon are underway through jointly funded aerial surveys conducted by DFO (NL Region).</li> </ul>	21 – International Initiatives (These activities also support 2, 6, 9, 10 and 11)
<b>3.3 Education and outreach activities</b>	
<ul style="list-style-type: none"> <li>▪ Sightings, strandings and regional entanglement report hotlines are operational in Atlantic Canada and QC, and teams and networks exist in these areas to respond to live stranding or entanglement events. Efforts are made to recover and necropsy reported mortalities.</li> <li>▪ CSTN has provided fishermen in Atlantic Canada with educational materials and training to provide emergency response to entangled Leatherback Turtles.</li> </ul>	16 – Threat Mitigation and Risk Reduction

Progress towards recovery	Indicators of progress and recovery objective addressed
<ul style="list-style-type: none"> <li>▪ Habitat Stewardship Program (HSP) funding provided by the Government of Canada has supported efforts by the CSTN (NS, PEI and NB), Whale Release and Strandings group (NL), the Quebec-Labrador Foundation, and the Group for Research and Education on Marine Mammals (GREMM) (QC) to collaborate with fishermen to implement mitigation measures and to engage them in harm reduction and threat mitigation activities.</li> <li>▪ Organizations such as the Quebec-Labrador Foundation, Agence Mamu Innu Kaikusseht (AMIK), Réseau d'observation de mammifères marins (ROMM), and Amphibia-Nature have gathered TEK and LEK in QC and NL. This information is being used towards risk reduction and threat mitigation in these areas.</li> </ul>	17 – Threat Mitigation and Risk Reduction
<ul style="list-style-type: none"> <li>▪ Information on Leatherback Turtles can be found online on the DFO website for <a href="#">Aquatic Species at Risk</a>. Information here informs federal and provincial government departments and the general public.</li> </ul>	18 – Education and Outreach
<ul style="list-style-type: none"> <li>▪ Various groups, including government and non-governmental organizations, have produced and distributed public awareness materials throughout Atlantic Canada and QC, including, but not limited to, briefing kits, web resources, school curriculum lesson plans, presentations and workshops, educational DVDs, posters, brochures, and hosting information booths at various events. Some of these materials are available from the following organizations: DFO – Species at Risk; CSTN; Maritime Aboriginal Peoples Council; Quebec Labrador Foundation; Whale Release and Strandings (NL); and World Wildlife Fund.</li> <li>▪ In NL, Intervale Associates Inc. has produced and distributed placemats with educational information on Leatherback Turtles (as well as other species at risk) to restaurants. This project was partly funded by the HSP.</li> <li>▪ <a href="#">CSTN</a> has produced marine turtle identification keys and has partnered with other organizations to promote awareness of Leatherback Turtles by posting real-time tracks of satellite-tagged turtles on their website.</li> <li>▪ In Gulf Region, DFO has produced a bilingual one-page summary sheet providing tips for safe handling and release of entangled Leatherback Turtles which they are distributing to fishing license holders whose license conditions include a SARA section 83(4) exemption as specified in the Recovery Strategy. CSTN is using this information to train DFO Fisheries Officers in Gulf Region for Leatherback Turtle disentanglement and live-release best practices beginning in 2013.</li> </ul>	19 – Education and Outreach
<ul style="list-style-type: none"> <li>▪ Intervale Associates with HSP support distributed a short video titled <i>Renewing Hope for Species Recovery</i> that highlights the importance of marine species at risk stewardship and collaboration towards recovery in NL. This video is available on YouTube and through the <a href="#">Intervale Associates</a> website.</li> <li>▪ CSTN produced and distributed a DVD for commercial fishers demonstrating Leatherback Turtle disentanglement techniques.</li> <li>▪ DFO (Gulf and NL Regions) has initiated a campaign promoting reusable bags as an alternative to plastic bags, which, as marine debris, present a</li> </ul>	20 – Education and Outreach

Progress towards recovery	Indicators of progress and recovery objective addressed
<p>threat to Leatherback Turtles.</p> <ul style="list-style-type: none"> <li>▪ Various organizations and groups (government and non-governmental organizations) have developed initiatives to educate and train partners about their role in Leatherback Turtle conservation (e.g. continuation of fishers outreach/research via CSTN) throughout PEI, NL, NS, NB and QC.</li> <li>▪ DFO (Gulf Region) has provided information to fishers regarding Species at Risk programs and regulations, often focusing on Leatherback Turtles, at their Fish Canada/Boat Canada trade show information booth.</li> </ul>	

### 3.4. Summary of Progress towards recovery

This section summarizes progress towards achieving the indicators identified in Table 1. They are listed in order as they appear in the table and following each point the progress indicator addressed is listed (see Table 1 for progress indicators and numbers).

#### *Understanding Threats:*

- A research document and a SAR were produced in 2012 (DFO 2012b; O’Boyle 2012) that refined understanding of the anthropogenic threats to Leatherback Turtles, though further information on fishery and non-fishery related threats is needed.(1, 2, 4)
- A Canadian entanglement hazard analysis is underway. (1)
- DFO is preparing A SARA *Action Plan for Leatherback Sea Turtles in Atlantic Canada*, identifying measures that are to be taken to implement the Recovery Strategy and address threats. (5)

#### *Research:*

- Source populations for Leatherback Turtles in Atlantic Canada have been identified and the largest rookery for the Canadian Leatherback Turtles foraging population has been identified in Trinidad. (6)
- LEK and TEK information has been collected and compiled for Leatherback Turtles within Atlantic Canada and Quebec. (7, 8)
- Historic and current sightings have been compiled throughout Atlantic Canada and Quebec. (7, 8)
- Research efforts have advanced our understanding of Leatherback Turtle foraging, movement and behaviour. Ongoing research activities continue to provide insights on foraging ecology, movements and behaviour, and oceanographic correlates that relate to Leatherback Turtles’ distribution. (9, 10)



*Habitat Identification and Protection:*

- Information from the DFO ZAP held in 2012 is being used to inform the identification of critical habitat in a forthcoming amendment to the 2006 Recovery Strategy. (12)

*Threat Mitigation and Risk Reduction:*

- DFO has undertaken threat mitigation in some fisheries through gear modification and training. (15)
- Emergency reporting hotlines and response networks are in place in Atlantic Canada and Quebec for Leatherback Turtles and other marine animals. (16)
- Through ongoing collaborative efforts, NGOs and fishermen in Atlantic Canada and Quebec have accomplished some threat mitigation and risk reduction to Leatherback Turtles. (17)

*Education and Outreach:*

- Several groups have undertaken numerous education and outreach initiatives, which include briefing kits, brochures, information sheets, websites, school curriculum lesson plans, educational DVDs, Species at Risk placemats, and information booths at events attended by key stakeholders (e.g. fishermen). (19)
- Concerted efforts to involve key partners (e.g. fishermen) in the stewardship of Leatherback Turtles have been undertaken during this reporting period. (20)

*International Initiatives:*

- Researchers and fishers continue to collaborate on international initiatives for the conservation of Leatherback Turtles throughout the Atlantic Ocean. (21)

## **4. Recommendations**

Recovery for Leatherback Turtles is considered feasible and achieving the recovery objectives is considered possible. While some progress on the recovery of this species has been made, more work is needed. Continuing the timely implementation and monitoring of priority recovery measures is crucial for achieving the recovery objectives for Leatherback Turtles as specified in the Recovery Strategy. This will require careful consideration and management of funding requirements and available resources, while ensuring an environment that facilitates the implementation of recovery measures identified in the forthcoming Action Plan. It will be important to maintain existing partnerships and to establish new ones, and to conduct scientific studies required to address uncertainties. Outreach programs aimed at increasing knowledge and compliance should continue.

DFO is currently preparing a SARA Action Plan and an amended Recovery Strategy for Leatherback Turtles as part of the Government of Canada's ongoing commitment to the conservation of Species at Risk through the implementation of the *Species at Risk Act*.

The following measures are considered a ‘high priority’ and should be implemented by the relevant organizations and entities:

- Continue to understand and mitigate anthropogenic threats to Leatherback Turtles within Atlantic Canadian waters. The CSAS document *Assessment of Leatherback Turtle (*Dermochelys coriacea*) fishery and non-fishery Interactions in Atlantic Canadian waters* (DFO 2012b) identifies a number of knowledge gaps in our understanding of threats caused by human activities. Mitigation measures should be implemented as our understanding of threats increases.
- Maintain and increase Canada’s collaborative efforts and partnerships with other nations for the protection and conservation of Leatherback Turtles outside of Canadian waters.
- Continue to monitor and strive to acquire population, distribution and abundance indices for Leatherback Turtles in Atlantic Canadian waters.
- Continue and enhance work to refine an approach to quantify and rank threats to Leatherback Turtles and an approach to estimate total annual mortality.
- Develop a SARA Ministerial Order for the Protection of critical habitat and a compliance plan to guide its protection, following critical habitat identification in the amended Recovery Strategy.
- Complete the amendments currently underway for the Recovery Strategy to include new information relevant to Leatherback Turtle recovery and critical habitat identification. The amendment should also include an updated SOS for future identification or refinement of critical habitat.
- Continue to undertake and support stewardship, education and outreach initiatives in support of Leatherback Turtle recovery.
- Adopt an adaptive management approach to the implementation of all future recovery measures. This will be essential to ensuring the survival of the species within its existing habitat and to addressing any emergent threats.

Recovery success will most readily be achieved by ensuring an enabling environment for the timely and prioritized implementation of recovery measures (as identified in the forthcoming Action Plan), monitoring the effectiveness of those efforts, adopting an adaptive management approach, and by continued collaborative initiatives for the protection and conservation of Leatherback Turtles throughout their range.

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