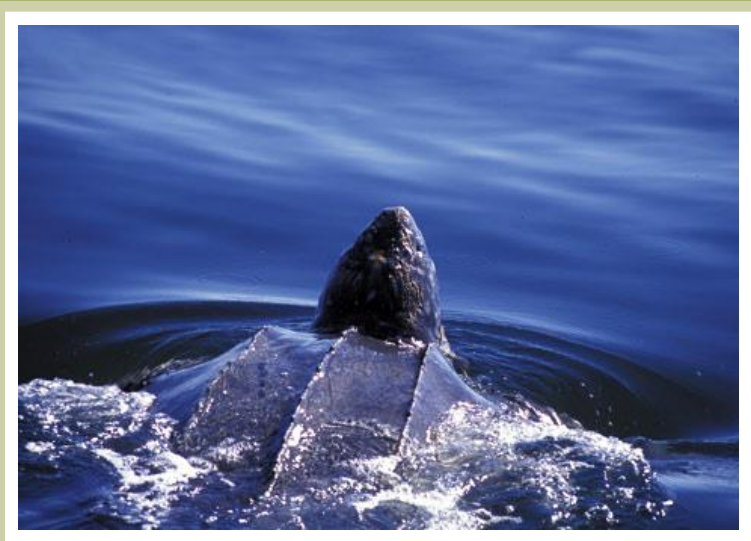


Report on the Progress of Recovery Strategy
Implementation for the Leatherback Sea Turtle
(*Dermochelys coriacea*) in Canadian Pacific Waters
for the Period 2007-2012

Leatherback Sea Turtle



2015

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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

Leatherback Sea Turtles (*Dermochelys coriacea*) occur in the Atlantic and Pacific waters of Canada. In 1981, the species was assessed by the Committee on the Status of Wildlife in Canada (COSEWIC) as endangered, and were listed on Schedule 1 of the Species at Risk Act (SARA) in June 2003. In 2012, it was recognized that a single designation is not sufficient to describe Leatherback Sea Turtles in Canada, as Atlantic and Pacific populations are discrete and evolutionarily significant. Current understanding of population structure, sources, status and threats differ significantly between the Canadian Atlantic and Pacific populations, and the species was re-assessed by COSEWIC as two separate designatable units – the Leatherback Sea Turtle (Pacific population) and the Leatherback Sea Turtle (Atlantic population). Both populations maintain *Endangered* status.

In Canadian Pacific waters, threats to Leatherback recovery include incidental catch and entanglement in fishing gear, ingestion of marine debris, and collisions with boats. Potential threats include diseases and parasites, predation, oil exploration and extraction, environmental contamination, and aquaculture (PLTRT 2006). Internationally, threats to Leatherback recovery in the Pacific Ocean include incidental catch in fisheries, illegal fisheries, harvest of eggs, predation and parasitism of nests, increased human presence on nesting beaches, habitat loss, artificial lighting, exotic vegetation, contamination, and pollution on beach sites. To achieve species recovery, threats to Leatherback Sea Turtles should be mitigated both nationally and internationally.

This report summarizes the progress made towards Pacific Leatherback Sea Turtle recovery for the period 2007-2012. Progress includes:

- Increased public awareness of Leatherback Sea Turtles, and promotion of conservation activities to mitigate threats.
- Consolidation of knowledge on the seasonal distribution and occurrence of Leatherbacks in Canadian Pacific waters, including historical and current sightings.
- Further data that contributes to our knowledge of the migratory routes undertaken by Pacific Leatherback Sea Turtles.
- An improved understanding of the basic biology and the physiological requirements of Leatherback Sea Turtles – including age at sexual maturity, and energy requirements for turtles in various demographic groups.
- Pilot study assessing the caloric content of Leatherback Sea Turtle prey species in Pacific Canada.
- The development and implementation of an ongoing abundance and distribution survey of jellyfish in Canadian Pacific waters.
- Identification of foraging habitat used by Leatherback Sea Turtles in Pacific Canada
- Completion of science advice in support of Critical Habitat identification for Leatherback Sea Turtles in Pacific Canada.

- The development of a draft Action Plan for the Recovery of Leatherback Sea Turtles (*Dermochelys coriacea*) in Canadian Pacific waters.

While there has been measurable progress towards meeting the goals, objectives, and performance measures presented in the Recovery Strategy, further effort is required to ensure the decline in the Pacific Leatherback Sea Turtle population is reversed.

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1. Background

1.1 COSEWIC Assessment Summaries

Common name:	Leatherback Sea Turtle (Pacific population)
Scientific name:	<i>Dermochelys coriacea</i>
Legal listing (SARA):	Endangered
COSEWIC status:	Endangered
Assessment summary:	May 2012 ¹
Reason for designation:	The Pacific population of this species has collapsed by over 90% in the last generation. Continuing threats include fisheries by-catch, marine debris, coastal and offshore resource development, illegal harvest of eggs and turtles, and climate change.
Occurrence in Canada:	Pacific 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 Pacific population was designated Endangered in May 2012.

1.2 Threats

1.2.1 Threats to the Species at Risk

Present threats to Leatherback Sea Turtles (*Dermochelys coriacea*) occur in their foraging habitat in Canadian Pacific waters, migratory corridor in Pacific international waters, and nesting habitats of Indonesia and Southeast Asia. Due to the migratory nature of this species, threats in international areas must be addressed at least in part by Canadians, as outlined in the Recovery Strategy (PLTRT, 2006).

Threats to Leatherbacks in Canadian Pacific waters include: accidental capture and entanglement in fishing gear, ingestion of marine debris, and collisions with boats. Potential threats include diseases and parasites, predation, oil exploration and extraction, environmental contamination, and aquaculture.

Threats to Leatherbacks in Pacific international migratory waters and international nesting habitats include: incidental catch and incidental take in fisheries, illegal fisheries, harvest of eggs, predation and parasitism of nests, increased human presence on nesting beaches, habitat loss, artificial lighting, exotic vegetation, contamination and pollution of beach sites.

¹ Assessment updated from that presented in the 2006 Recovery Strategy. COSEWIC (Committee on the Status of Endangered Wildlife in Canada) Annual report – 2011-2012. (COSEWIC 2012a).

1.2.2 Activities Likely to Destroy Critical Habitat

Critical habitat for Leatherback Sea Turtles was not identified in the Recovery Strategy (PLTRT, 2006). The Recovery Strategy outlined a schedule of studies that would allow for the identification of critical habitat over a 5-year timeframe.

Scientific advice relevant to the identification of critical habitat required by Leatherback Sea Turtles in their Pacific foraging grounds has now been completed (DFO, 2013). Activities likely to destroy this habitat have not yet been identified, but will be developed when critical habitat is identified in a recovery document.

2. Recovery

2.1 Recovery Goals and Objectives

Recovery Goals and Objectives, as stated in the Recovery Strategy (PLTRT, 2006) are as follows:

Recovery Goals

The recovery goal for Leatherback Sea Turtles in Canadian Pacific waters is long-term population viability.

Recovery Objectives

To meet the above recovery goal as set forth in the recovery strategy, the following objectives were determined:

1. Conduct and support research that makes possible the development of measureable recovery criteria, within five years, for Leatherback Sea Turtle population(s) that frequent Canadian Pacific waters.
2. Identify and understand threats to the Leatherback Sea Turtle and its habitat resulting from human activities in Canadian Pacific waters.
3. Mitigate human-caused threats to Leatherback Sea Turtles in Canadian Pacific waters and protect their critical migratory and foraging habitats.
4. Support the efforts of other countries to promote the recovery of the Leatherback Sea Turtle population(s) that frequent Canadian Pacific waters.
5. Raise awareness of Pacific Leatherbacks and engage Canadians in stewardship projects.

2.2 Performance Measures

Specific performance measures were not outlined in the Recovery Strategy (PLTRT, 2006); however, a five-year evaluation plan was identified to evaluate progress towards species recovery. This plan included 11 measures of progress that are reported upon in Section 3.4.

3. Progress towards Recovery

Much of the progress made thus far in achieving the goals identified in the Recovery Strategy has been documented in Spaven *et al.* (2009), Gregr *et al.* (2014), and DFO (2013). This section summarizes the achievements to date.

3.1 Research and Monitoring Activities

The Recovery Strategy for Pacific Leatherback Sea Turtles recommended a schedule of studies to enable the classification of Critical Habitat (PLTRT, 2006). This schedule of studies included four broad objectives: 1) to determine the seasonal occurrence and distribution of Leatherback Sea Turtles, 2) to collaborate on international projects to determine migration routes, 3) to assess the distribution of prey/food resources, and 4) to model the biotic and abiotic factors that influence Leatherback distribution.

The following section documents progress on each of the four major objectives leading to the DFO (2013) report, and highlights the achievements of the DFO (2013) report, including advice on identification of function and features of foraging habitat required for recovery.

Seasonal occurrence and distribution of Leatherback Sea Turtles

A multi-disciplinary approach was undertaken by Spaven *et al.* (2009) to determine the occurrence of Leatherbacks off the Pacific coast of Canada using historical and current turtle observations. Data were compiled from ship-based surveys, aerial surveys, historic sightings reports, and recent opportunistic sightings obtained from commercial trawl, trap, and longline fisheries, as well as incidental catch data from salmon, gillnet, seine and troll fisheries. Leatherback Sea Turtle sightings from Canadian Pacific waters that were collected during the 2002-2008 ship-based cetacean surveys were collated. A questionnaire was deployed to solicit voluntary reports of both historic and current turtle sightings, and opportunistic sightings collected by the BC Cetacean Sightings Network were compiled. Through these combined methods, Spaven *et al.* (2009) determined that Leatherback Sea Turtles are scattered throughout the Canadian Pacific coast, with a general trend of heightened occurrence in neritic waters on the continental shelf. An increase in Leatherback Sea Turtle sightings in Canadian Pacific waters was detected in July, August, and September (Spaven *et al.* 2009).

Multispecies ship-based and aerial survey efforts have continued through 2013. Ship-based surveys from 2002-2010 covered almost 40,000 km of line-transects, and have involved over 2,000 hours of dedicated observations, resulting in two Leatherback sightings.

Multispecies aerial surveys were conducted from 2005-2012 and are ongoing in 2013. Aerial surveys undertaken from 2005-2007 included 4000 km of tracklines and 32 observer hours, and aerial surveys completed from 2012-2013 included 7000 km and about 48 observer hours; aerial surveys were not undertaken from 2008-2010. In addition, DFO Pacific conducted aerial surveys in nearshore waters off Vancouver Island (Hesquiat Peninsula to Barkley Sound and associated inlets) each summer from 2007-2011 to monitor shark distribution, and opportunistic turtle sightings. To date, no turtle sightings

have occurred via aerial survey. When turtles are sighted from the air, location and behavioural data will be collected.

The BC Cetacean Sightings Network (BCCSN) continues to work with DFO to collect and archive Leatherback Sea Turtle sightings submitted by volunteer and opportunistic observers. In collaboration with DFO, the BCCSN has compiled 151 sightings of Leatherback Sea Turtles. The BCCSN recently developed a model to estimate observer effort for their opportunistic sightings network, which allowed for predictions of high and low Leatherback turtle occurrence densities off the BC coast (Smith *et al.* 2006). This work was continued in 2011 and 2012, resulting in seasonal predictions of turtle hot-spots in BC waters (Rechsteiner *et al.* 2013).

Collaboration in international research programs to identify migratory routes

International efforts supporting telemetry studies indicate that the Leatherback Sea Turtles that frequent Canadian Pacific waters are likely part of a population that nest mainly in Papua, Indonesia and migrate to various locations throughout the Pacific (Benson *et al.* 2007; 2011).

The first record of a trans-Pacific migration of a Leatherback Sea Turtle was documented by Benson *et al.* (2007). Of the nine turtles tagged on the nesting beaches in Papua, Indonesia, five individuals traveled northeast across Pacific waters. Further details of trans-Pacific Leatherback Sea Turtle migration were revealed by Benson *et al.* (2011), who reviewed earlier literature and collated satellite data from 126 individual Leatherbacks tagged across different locales and seasons. Turtles migrating to the north Pacific waters spent 10-12 months crossing the Pacific, and commonly spent multiple years migrating north and south along the eastern Pacific after their arrival, and before returning to western Pacific nesting grounds. The implications of this work are important, showing that the time of year recovery initiatives are conducted in Indonesia will affect whether or not those efforts assist in the recovery of turtles foraging in Canadian Pacific waters, and revealing that the waters in the eastern temperate and tropical Pacific provide habitat to turtles for multiple years and foraging seasons. These foraging seasons are a vital part of the life history of Leatherbacks and provide the requisite energy for their return to the nesting beaches.

DFO currently coordinates the Leatherback Turtle Action Plan team, which was initiated in 2011 to facilitate the development of the “Action Plan for the Leatherback Sea Turtle (*Dermochelys coriacea*) in Canadian Pacific waters”. Members of this team include Leatherback Sea Turtle experts from the Canadian Atlantic coast and the US National Oceanic and Atmospheric Administration (NOAA).

Distribution of prey/food sources

Satellite tagging data of Leatherback Sea Turtles from both the Atlantic and Pacific populations indicate that temperate waters serve as foraging grounds, and the primary prey is known to be gelatinous zooplankton (i.e. jellyfish). Due to the low energy density of jellyfish, Leatherbacks must consume large quantities of prey in order to meet their caloric

needs. A greater understanding of prey densities and distribution in BC waters is therefore important to predicting Leatherback foraging success.

The current state of jellyfish populations in Canadian Pacific waters is largely unknown; therefore, a jellyfish survey methodology was developed in 2012 and is now being implemented on DFO ship-based salmon trawl surveys (DFO 2013). The protocol is designed to survey all jellyfish incidental catch, including the following data collection: species identification, total biomass of jellyfish caught in trawl, number of individuals, weight and bell diameter of individuals, photographs of unusual or unidentifiable individuals, and general observations (DFO 2013). Data from these surveys will be used to assess species composition, distribution and seasonal variation of jellyfish concentrations in Canadian Pacific waters.

In addition to assessing populations of jellyfish, a pilot study was undertaken to quantify the energetic density and proportion of water in two species of jellyfish commonly consumed by Leatherback Sea Turtles in Canadian Pacific waters: the lion's mane jellyfish (*Cyanea capillata*) and the sea nettle jellyfish (*Chrysaora fuscescens*). As jellyfish are a relatively low-energy food source, the caloric and nutritional content of the prey are important factors in understanding the quality of foraging habitat in Canada.

Model biotic and abiotic factors that influence the distribution of Leatherbacks

Biotic and abiotic factors that influence the distribution of Leatherbacks in their foraging habitat in Pacific Canada were modeled in order to identify foraging “hot spots”. A predictive model of Leatherback foraging habitat was designed in part by assessing the two major factors likely to influence Leatherback distribution – chlorophyll-a concentration (as a proxy for jellyfish prey concentration, see Gregr *et al.* 2014 and references therein) and areas of low tidal movement/low current speed (which would indicate areas of high concentrations of jellyfish due to entrainment – see Gregr *et al.* 2014 and references therein). Turtle foraging behaviour and preferred water depths were also examined based on foraging observations of Leatherback turtles in Atlantic Canada (see Fossette *et al.* 2010 and Heaslip *et al.* 2012) due to the paucity of behavioural and foraging observations of turtles in Pacific Canada.

3.2 Management Activities

In 2012, COSEWIC re-assessed Leatherback Sea Turtles in Canada, and recommended that the Pacific population and the Atlantic population be considered as two separate designatable units (DUs). Both populations are listed as Endangered. This division and associated listings may influence future management activities (COSEWIC 2012a, 2012b).

Management regulations have not yet been implemented to regulate or mitigate the threats associated with Leatherback Sea Turtle recovery.

3.3 Stewardship Activities

In 2008, the Vancouver Aquarium Marine Sciences Centre, primarily through the BC Cetacean Sightings Network and funding through the Habitat Stewardship Program for Species at Risk (Environment Canada), developed a public awareness campaign on Leatherback Sea Turtles and their recovery. This campaign has been maintained through 2012 and is ongoing in 2013. The awareness campaign covers identification of Leatherbacks in the field, turtle life-cycle and biology, threats to recovery of Leatherbacks, Canadian recovery efforts, and what individuals can do to minimize threats at home and abroad. A toll-free sightings phone number continues to be maintained, and an online reporting form was established and promoted to increase the number of reported sightings of Leatherbacks.

DFO Science, SARA and Conservation and Protection branches have participated in Leatherback Sea Turtle stewardship and conservation activities through informational displays, distribution of educational materials, and attendance at public outreach events.

3.4 Summary of Progress towards Recovery

A summary of the progress made towards the recovery of Pacific Leatherback Sea Turtles was documented using the performance measures identified in Section 2.2 and in the Recovery Strategy (PLTRT, 2006).

1. *Was Critical Habitat and important habitat defined in Pacific Canada?*

In progress. Science advice on the habitat necessary for the survival and recovery of Leatherback Sea Turtles has been developed (Gregr *et al.* 2014).

2. *Were the populations of Leatherback Sea Turtles frequenting Pacific Canada identified?*

In progress. Data are not yet sufficient to identify the populations of Leatherback Sea Turtles frequenting Pacific Canada. No genetic samples of Leatherback Sea Turtles in Pacific Canada have been compiled by DFO due to lack of dead specimens and live turtle encounters during research efforts. Telemetry and modeling work (Bensen *et al.* 2007; 2013) highlighted populations of Leatherbacks nesting in the eastern Pacific that have approached Canadian Pacific waters and that may use these waters as foraging habitat.

3. *Were contributions made to the scientific literature regarding biology, physiology, behaviour and demographics of Leatherback Sea Turtles?*

Yes. Literature contributions were made regarding the occurrence, distribution, and foraging behaviour of Leatherback Sea Turtles, including Spaven *et al.* (2009), DFO (2013), and Gregr *et al.* (2014).

Several contributions to the scientific literature occurred within the larger scientific community. Of note, Fossette *et al.* (2010) assessed foraging patterns and behaviour of Leatherback turtles in the Atlantic, and Heaslip *et al.* (2012) used animal-borne cameras and GPS tags to look at how type, size, and encounter rate of

prey species were effecting foraging behaviour of Leatherbacks. The age of sexual maturity was estimated for Pacific Leatherback turtles by monitoring Leatherbacks that were captured as hatchlings and maintained in captivity for 2 years (Jones *et al.* 2011). Energy requirements were determined for individual turtles of various ages and throughout their developmental stages, and were estimated for populations of Leatherbacks in the Pacific (Jones *et al.* 2012).

4. *Were historic and current sightings records compiled and organized in a maintained database?*

Yes. Historic and current sightings records of Leatherback Sea Turtles were compiled and organized, and a report synthesizing these data is complete (Spaven *et al.* 2009). The report included sightings collected from 1931 to 2009. All sightings collated by Spaven *et al.* 2009 were also included in the BC Cetacean Sightings Network (BCCSN) database of cetacean and sea turtle sightings, a partnership project between the Vancouver Aquarium Marine Science Centre and Fisheries and Oceans Canada, which is currently maintained by the BC Cetacean Sightings Network.

5. *Was a report produced on human activities known to affect Leatherbacks in Pacific Canada?*

Yes. The recent Assessment and Status Report (COSEWIC 2012b) overviews the threats and limiting factors experienced by Leatherback Sea Turtles in the Pacific Ocean, and notes that threats to recovery in Canadian waters are significant. COSEWIC (2012b) identifies the greatest threat to Leatherbacks in Canadian waters occur during their interactions with fisheries, preliminarily as incidental catch.

Threats to Leatherback Sea Turtles were in part assessed in Spaven *et al.* (2009), via an analysis of Leatherback incident and stranding data. Since 2008, all incidents involving sick, injured, entangled, or dead Leatherback Sea Turtles within BC waters are reported through, verified, responded to and tracked by the DFO Pacific Marine Mammal Response Program (MMRP).

Wallace and Saba (2009) reviewed anthropogenic threats to Leatherbacks in both the Pacific and the Atlantic oceans, documenting intra-specific variation in life history traits which may be concurrent with environmental or anthropogenic impacts.

6. *Was a draft plan for the protection of Critical Habitat in Pacific Canada constructed?*

In progress. Science advice recommending areas for critical habitat has been drafted for Pacific Leatherback Sea Turtles (DFO, 2013). This advice will be used in part to identify critical habitat in the Action Plan, and activities likely to result in destruction of critical habitat will be identified. Once critical habitat is identified in a final recovery strategy or action plan, a SARA order for the protection of critical habitat may be developed.

7. *Were recovery and emergency response procedures implemented, along with threat-reduction measures?*

Yes. Emergency response and threat reduction procedures were implemented, as Leatherback Sea Turtles were included as a focal species of the DFO Pacific Marine Mammal Response Program, initiated in 2008.

8. *Did DFO participate in international fora on sea turtles in consultation with Environment Canada (Biodiversity Convention Office) and Foreign Affairs and International Trade?*

No. DFO did not participate in international fora on sea turtles in consultation with Environment Canada and Foreign Affairs and International Trade.

9. *Were Canadian experts seconded to international projects?*

No. Canadian experts were not seconded to international projects.

10. *Was information on Leatherbacks produced and distributed to federal and provincial government departments?*

Yes. The BCCSN designed pamphlets, decals, posters, and brochures providing information about Leatherbacks, along with their Sightings logbooks for reporting sightings of whales, dolphins, porpoises and sea turtles in BC waters. These were distributed to federal and provincial government departments, including DFO Conservation and Protection, Parks Canada, Canadian Coast Guard, Department of National Defense, Ministry of Environment, and to staff at Provincial Parks and Campgrounds. Leatherback Sea Turtle awareness is also included in all BCCSN, DFO Cetacean Research Program, and DFO Marine Mammal Response Program outreach presentations, many of which have been and continue to be presented to government agencies throughout the Pacific Region.

11. *Were public awareness materials produced and distributed, including but not limited to briefing kits, web resources, and brochures?*

Yes. The BC Cetacean Sightings Network (BCCSN) produced and distributed public awareness materials such as pamphlets, posters, and decals, explaining biology of, identification of, and threats to Leatherback Sea Turtles. The BCCSN, DFO Cetacean Research Program and DFO Marine Mammal Response Program also provided numerous presentations soliciting sightings of turtles, promoting awareness of anthropogenic-caused threats to turtles, and engaging Canadians in stewardship projects. Numerous grade-schools were attended by BCCSN staff, and lectures were provided to students to promote awareness of Leatherback Sea Turtles in BC waters. The BCCSN also mounted public displays at the Vancouver Aquarium on Leatherback Sea Turtles. The BCCSN maintains a website and a blog which includes web-stories about Leatherback Sea Turtles and further contributes to public awareness.

4. References

- Benson, S.R., Dutton, P.H., Hitipeuw, C., Samber, B., Bakarbessy, J., and Parker, D. 2007. Post-nesting migrations of Leatherback turtles (*Dermochelys coriacea*) from Jamursba-Medi, Bird's Head Peninsula, Indonesia. *Chelonian Conservation and Biology* 6(1), 150-154.
- Benson, S. R., T. Eguchi, D. G. Foley, K. A. Forney, H. Bailey, C. Hitipeuw, B. P. Samber, R. F. Tapilatu, V. Rei, P. Ramohia, J. Pita, and P. H. Dutton. 2011. Large-scale movements and high-use areas of western Pacific Leatherback turtles, *Dermochelys coriacea*. *Ecosphere* 2(7), 1-27.
- COSEWIC. 2012a. COSEWIC annual report – 2011-2012. Committee on the Status of Endangered Wildlife in Canada. Ottawa. xv + 39 pp.
- COSEWIC. 2012b. COSEWIC assessment and status report on the Leatherback Sea Turtle *Dermochelys coriacea* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. xv + 58 pp. www.registrelep-sararegistry.gc.ca/default_e.cfm
- DFO. 2013. Advice relevant to the identification of critical habitat for Leatherback Sea Turtles (Pacific Population). DFO Can. Sci. Advis. Sec. Sci. Advis. Rep. 2013/075.
- Fossette, Sabrina, Hobson, Victoria J., Girard, Charlotte, Calmettes, Beatriz, Gaspar, Philippe, Georges, Jean-Yves, and Hays, G.C. (2010). Spatio-temporal foraging patterns of a giant zooplanktivore, the Leatherback turtle. *Journal of Marine Systems*, 81(3), 225-234.
- Gregg E.J., Gryba, R., James, M.C., Brotz, L. and Thornton, S.J. 2014. Information relevant to the identification of critical habitat for Leatherback Sea Turtles (*Dermochelys coriacea*) in Pacific Canadian waters. DFO Can. Sci. Advis. Sec. Res. Doc. 2014/in press.
- Heaslip, S.G., Iverson, S.J., Bowen, W.D., and James, M. C. (2012). Jellyfish support high energy intake of Leatherback sea turtles (*Dermochelys coriacea*): video evidence from animal-borne cameras. *PLoS ONE*, 7(3), e33259.
- Jones, T.T., Hastings, M.D., Bostrom, B.L., Pauly, D., Jones, D.R. 2011. Growth of captive Leatherback turtles, *Dermochelys coriacea*, with inferences on growth in the wild: Implications for population decline and recovery. *Journal of Experimental Marine Biology and Ecology*. 399: 84-92
- Jones, T.T., Bostrom, B.L., Hastings, M.D., Van Houtan, K.S., Pauly, D., Jones, D.R. 2012. Resource requirements of the Pacific Leatherback turtle population. *PLoS ONE*, 7(10), e45447.
- Pacific Leatherback Turtle Recovery Team (PLTRT). 2006. Recovery Strategy for Leatherback Turtles (*Dermochelys coriacea*) in Pacific Canadian Waters. In *Species*

at Risk Act Recovery Strategy Series. Vancouver: Fisheries and Oceans Canada. v + 41 pp.

Rechsteiner, E.U., Birdsall, C.F.C., Sandilands, D., Smith, I.U., Phillips, A. V., Barrett-Lennard, L.G., 2013. Quantifying observer effort for opportunistically-collected wildlife sightings. *BC Cetacean Sightings Network: Technical Report*, 43 pp. Vancouver Aquarium, 845 Avison Way, Vancouver B.C., V6G 3E2.

Spaven, L.D., Ford, J.K.B, and Sbrocchi, C. 2009. Occurrence of Leatherback sea turtles (*Dermochelys coriacea*) off the Pacific coast of Canada, 1931-2009. Can. Tech. Rep. Fish. Aquat. Sci. 2858: vi + 32 p.

Smith, I., Phillips, A.V., Sandilands, D., & Barrett-Lennard, L.G. 2006 Quantifying observer effort for opportunistically-collected wildlife sightings records. *BC Cetacean Sightings Network: Technical Report*, 28 pp. Vancouver Aquarium, 845 Avison Way, Vancouver B.C., V6G 3E2.

Wallace, B.P. & Saba, V.S. 2009. Environmental and anthropogenic impacts on intra-specific variation in Leatherback turtles: opportunities for targeted research and conservation. *Endangered Species Research*. 7: 11-21.