



Allowable Harm Assessment for Leatherback Turtle in Atlantic Canadian Waters

Background

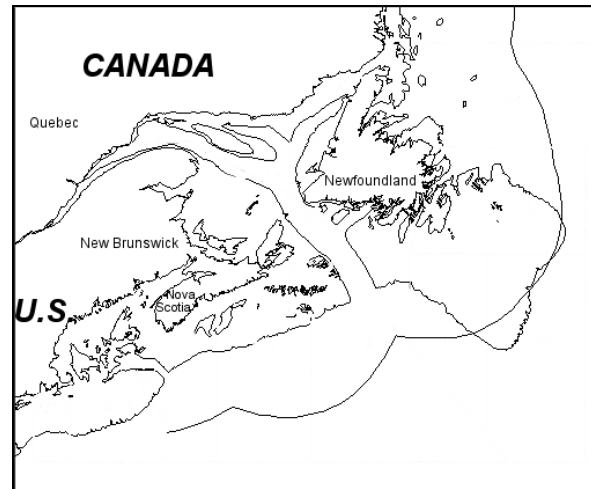
The leatherback turtle (*Dermochelys coriacea*) is designated as “endangered” by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) and is listed on Schedule 1 of the Species at Risk Act (SARA). The prohibitions associated with SARA come into force on June 1 2004 and subsequently SARA will provide legal protection to this species. SARA provides that the Minister of Fisheries and Oceans may issue a permit to allow for incidental harm to a listed species if a number of conditions are met. Under section 73(2), authorizations may only be issued if:

- the activity is scientific research relating to the conservation of the species and conducted by qualified persons;
- the activity benefits the species or is required to enhance its chance of survival in the wild; or
- affecting the species is incidental to the carrying out of the activity

Section 73(3) establishes that authorizations may be issued only if the competent minister is of the opinion that:

- all reasonable alternatives to the activity that would reduce the impact on the species have been considered and the best solution has been adopted;
- all feasible measures will be taken to minimize the impact of the activity on the species or its critical habitat or the residences of its individuals; and
- the activity will not jeopardize the survival or recovery of the species.

The analysis provided herein will allow the Minister of Fisheries and Oceans to determine the basis under which permits are to be issued in Atlantic Canadian waters. It should be noted that in the context of this status report, “harm” refers to all prohibitions as defined in SARA.



Range of Leatherback Turtle in Atlantic Canadian Waters

Summary

- The leatherback turtle is the largest living marine reptile and is the sole member of the family Dermochelyidae
- This species migrates into Canadian waters to feed and has a broad seasonal distribution that includes slope waters east of the Fundian Channel, George’s Bank, south coast of Newfoundland, Sydney Bight, and the southern Gulf of St. Lawrence
- Given current information, it is not possible to determine if the trend in the Atlantic leatherback population index is stable, decreasing or increasing.
- Population size is also poorly known, but likely exceeds several hundred thousand animals.
- Leatherback turtles are long-lived, slow to reach maturity such that they exhibit a low rate of population increase; however it is believed they sustain human-induced mortality rates of up to 1%.

- Incidental captures in Canadian waters appear to account for a small proportion of estimated incidental captures in the Atlantic population.
- Assuming current levels of fishing effort within Canadian jurisdiction, the review committee concluded that there was scope for human-induced mortality without jeopardizing survival or recovery of this species.
- However, the review committee urges that all feasible measures to minimize the impact of human activities on this species be undertaken.

Issue

In support of a SARA permitting evaluation for the Atlantic population of leatherback turtle, the Director of Fisheries Management in the Maritimes requested that Science Branch undertake a scientific evaluation of the impact of commercial fisheries to determine whether or not incidental harm would jeopardize survival or recovery of the leatherback turtle. This would allow Fisheries Management Branch to provide a recommendation to the Minister of Fisheries and Oceans as to whether the SARA pre-conditions are met and incidental harm of this population may be permitted.

A Regional Advisory Process (RAP) meeting was convened 31 March 2004 to address this issue.

Assessment of Issue

Description of the Species

The leatherback turtle is the sole member of the family Dermochelyidae and is the largest living marine reptile. Adult carapace lengths range from 127 to 176 cm and adult mass measurements range from 200 to 900 kg. The leatherback turtle is predominantly pelagic, inhabiting the open ocean from hatchling through adulthood, but may venture into coastal waters to feed and reproduce. Only adult females return to land to nest and

deposit eggs. Adult leatherback turtles forage in temperate and subpolar regions from 71°N to 47 °S in all oceans (Pritchard and Trebbau 1984) and undergo extensive migrations to tropical nesting beaches between 30 °N and 20 °S. Observations from satellite telemetry reveal coastal and offshore movements in Canadian and U.S. waters, with extensive feeding associated with slope waters east of the Fundian Channel, George's Bank, south coast of Newfoundland, Sydney Bight, and the southern Gulf of St. Lawrence (M. James, Dalhousie University; unpublished).

Species Status

The status of the leatherback turtle population in the Atlantic Ocean is difficult to assess because of their widespread distribution and limited accessibility. Because only nesting females are accessible, counts of females or their nests provide the best, and currently the only, index of leatherback turtle population size.

There a number of nesting colonies in the Atlantic basin. Many of these are quite small with fewer than 1,000 females. The largest colonies are located in the French Guiana/Suriname complex, Trinidad and Western Africa. These colonies are thought to represent over 70 % of the nesting females in the population. Trends at these larger colonies will therefore largely determine the overall trend in numbers.

Recent analyses indicate the long-term trend for the Suriname colony seems to show an increase (Hilterman and Goverse 2002, 2003, 2004). However, other researchers believe that the French Guiana nesting colony has declined (Chevalier et al. 1999). Among smaller colonies, those in southeast Florida and St. Croix, for example, data indicate increasing numbers of nests for the past twenty years (NMFS SEFSC 2001). While population data for Trinidad indicates more than 1,000 females nest there annually, trend data are lacking (S. Eckert pers. com.). Similarly nesting in West Africa is likely more than 1000 females nesting annually, but no trend data are available (S. Eckert, pers. com.)

Nesting females may be a poor index of overall population size for several reasons. First, leatherback females exhibit relatively weak fidelity to nesting beaches and thus changes in numbers among colonies could partly be accounted for by movement of females among sites. Second, nesting beaches are continually being remolded by currents such that some beaches are abandoned and new ones establish. It may take some time to discover new nesting colonies resulting in inaccurate interpretation of trends. Third, survey methods differ among the nesting colonies and consistent time series are not available from many colonies making comparisons over the population range difficult. Given these difficulties, at present, it is not possible to determine if the Atlantic population is stable, decreasing or increasing.

There is also considerable uncertainty regarding growth rates, and age-at-maturity for leatherback turtles, whereas, juvenile and adult mortality rates are essentially unknown for this species. Therefore, it is not feasible to construct a quantitative population model to estimate population abundance using data from leatherback turtles. Lewison et al (2004) estimated a global population size assuming an equal sex ratio and that the proportion of the nesting-aged females in the female leatherback population was similar to that observed in Kemp's ridley (*Lepidochelys kempii*) turtles.

Using the best available information on the number of nesting-aged leatherback females in the Atlantic basin (from Spotilla et al. 1996) and the age distribution assumptions of Lewison et al. (2004), an estimate of the Atlantic population would be in the hundreds of thousands (McMillan and Bowen; Fisheries and Oceans Canada; unpublished). This estimate must be treated with great caution as there are a number of important assumptions that cannot be validated without additional research. The population size could be larger or smaller than this rough estimate depending on the actual sex ratio, the proportion of nesting females of the female component of the population, and age-specific reproductive rates of leatherback

turtles. Nevertheless, this estimate does indicate that the size of the Atlantic leatherback population likely exceeds several hundred thousand individuals. There is no estimate of what fraction of the population may migrate into Canadian waters; however, adults and sub-adults of both sexes have been observed.

There is currently no agreed international recovery-target for leatherback turtles. In the absence of a recovery-target for this species or the Atlantic portion thereof, the review committee adopted a pragmatic interim recovery-target as an increasing number of nesting females in the Atlantic Ocean.

It is difficult to provide a precise estimate of the time frame required to achieve this target. However, given the life history traits of leatherback turtles (i.e. suspected late age of maturity and low potential rate of population increase), several decades of monitoring would likely be required to be confident that the interim recovery target was achieved.

Human-Induced Harm

Although leatherback turtles are designated as endangered in Canada based on an assessment of the global population, for the purposes of this assessment, only the Atlantic population was considered.

Simulations, based on a hypothetical life table model (Spotilla et al. 1996), conclude that leatherback turtles could maintain a stable population only if both juvenile and adult survivorship were high. Model simulations indicated that a human-induced adult mortality of more than 1% would result in population decline.

Canadian commercial fisheries operating in Atlantic Canadian waters are known to incidentally capture leatherback turtles.

In Canada, quantitative data on incidental capture exists only for the Atlantic pelagic longline fisheries. Data from this fleet indicate that about 170 incidental captures occur per year. Observers reported no mortalities in this fishery during the period 2001-2003.

However, based on estimated encounter rates from DFO observer data and post-release mortality estimates drawn from studies by the National Marine Fisheries Service (NMFS) in the US, about 30 leatherback turtles mortalities may have occurred each year in this Canadian fleet (McMillan and Bowen, Fisheries and Oceans Canada; unpublished). These estimates are quite uncertain because the estimates of post-encounter mortality rates are taken from studies on another species of sea turtle (the loggerhead), and it is thought they may underestimate leatherback mortalities. Musick (2001) challenged the post-release mortality estimates produced by the US and, after analyzing data collected by US observers, he concluded that post-release mortalities of leatherbacks in this fishery, off the Grand Banks, "may approach nil". However, the contents of the challenge were not peer-reviewed. It is widely acknowledged that there is a high likelihood of some post-release mortality in capture mortality of leatherbacks stemming from their stress response to capture, when hooks are deeply ingested, or when gear is not completely removed at release.

There also is evidence that leatherback turtle mortality in Canadian Atlantic waters is caused by entanglement in ropes and lines associated with fixed gear fisheries (O'Boyle 2001). There are few quantitative data for these gear types in which observations of mortalities are accompanied with measures of survey effort such that encounter rates may be estimated. Nevertheless, observations confirm that leatherback turtles are fatally entangled in these gear sectors.

Estimates of incidental capture of leatherback turtles in the Atlantic Ocean range from 30,000 to 60,000 for one gear sector (offshore pelagic long-line fleet) alone in 2000 (Lewison et al 2004). Although these estimates should be considered tentative, because of the assumptions underlying the calculations, they illustrate that tens of thousands of leatherbacks are incidentally encountered each year in the Atlantic Ocean.

Given that the population likely exceeds several hundred thousand animals, that the geographic extent of the population has not changed (suggesting that suitable habitat is available to permit population growth), and model results suggests that the population can sustain human-induced mortality up to about 1 %, the review committee concluded that there was scope for human-induced mortality without jeopardizing survival or recovery of this species.

Conclusion

The size of Atlantic leatherback turtle population is unknown, but likely exceeds several hundred thousand animals. The geographic extent of the population has not changed suggesting that suitable habitat is available to permit population growth.

The Canadian contribution to incidental captures is largely unknown. Available quantitative data from the offshore pelagic long-line fleet indicate that about 170 incidental captures occur per year. Sightings data indicate that incidental captures occur in Canadian fixed gear fisheries, but estimates of the level of harm are unknown. Nevertheless, only a small fraction of Atlantic-wide incidental captures are likely to occur in Canadian waters. Given that Canadian activities contributing to incidental mortality of the entire Atlantic population are small, Canadian conservation efforts alone will not be sufficient to achieve the interim recovery target.

Assuming current levels of fishing effort within Canadian jurisdiction, the review committee concluded that there was scope for human-induced mortality without jeopardizing survival or recovery of this species.

However, the review committee urges that all feasible measures to minimize the impact of human activities on this species be undertaken.

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