Short Communication

Olive ridley turtle *Lepidochelys olivacea* in French Guiana: back from the brink of regional extirpation?

Laurent Kelle, Nicolas Gratiot and Benoît de Thoisy

Abstract The estimated number of olive ridley marine turtles *Lepidochelys olivacea* nesting annually in 2002–2007 in French Guiana was 1,716–3,257, the highest ever recorded in the country and similar to nesting numbers recorded in neighbouring Suriname c. 40 years ago, where the species has now severely declined. A shift of nesting females from Suriname to French Guiana beaches and improvement of nationwide marine turtle monitoring appear to be the most plausible explanations for the current high level of nesting recorded in French Guiana. The species' nesting status in French Guiana therefore appears less critical than previously documented but ongoing threats suggest the need to reinforce regional conservation efforts in the West Atlantic.

Keywords Conservation status, French Guiana, *Lepidochelys olivacea*, olive ridley marine turtle, Suriname.

Ocean ecosystems have been severely damaged by human pressures (Roberts, 2003) and marine turtles are one of the most affected groups (IUCN, 2007). Major rookeries of loggerhead *Caretta caretta* (Turtle Expert Working Group, 2000), green *Chelonia mydas* (Troëng & Rankin, 2005) and leatherback marine turtles *Dermochelys coriacea* (Fossette et al., 2008) are reported on the western shores of the Atlantic Ocean. In comparison, the olive ridley marine turtle *Lepidochelys olivacea* is less abundant, and its phylogeography indicates a recent colonization of the Atlantic (Bowen et al., 1998).

The beaches of Suriname and French Guiana host major marine turtle aggregations (Reichart & Fretey, 1993; Girondot et al., 2007). Suriname was formerly identified as an important olive ridley turtle nesting site (Pritchard, 1973) but the number of nests decreased from 2,875 in 1967 to 1,070 in 1975 (Schulz, 1975), and to 585 in 1989 (Reichart, 1993). Monitoring was interrupted during the early 1990s when the main nesting sites were occupied by rebels (Reichart, 1993). In 1995 only 335 olive ridley turtle nests were recorded (Hoeckert et al., 1996). Because of the difficulty of accessing some nesting sites only fragmentary information on olive ridley turtle nesting has been collected recently in Suriname (Fig. 1). Estimates for the early 2000s, based on limited monitoring efforts, were 150–200 olive ridley turtle nests per year (Hilterman et al., 2008).

Historical data on olive ridley turtles in French Guiana are sporadic. Reports indicated the presence of the species on the coast (Fretey & Lescure, 1979), and nesting appeared to be common on the Cayenne peninsula in the early 1970s (J. Fretey, pers. comm.). A survey in 1987 recorded 582 nests (Fretey, 1989; Fig. 1). Intensive monitoring was implemented in 2000 on the Cayenne peninsula (Talvy & Vié, 2000); this facilitated the development of a model that defines the temporal distribution and numbers of olive ridley nesting, with a correlation of $r \geq 0.97$ (Gratiot et al., 2006). Fragmentary data from other beaches (Amana Nature Reserve and Kourou beaches, monitored since 2002) extrapolated using this model gave estimations for each nest site for the entire nesting season, with errors of 10–15% when the monitoring lasted ≥ 50 days (Gratiot et al., 2006). Based on this extended monitoring coverage we estimated 1,716–3,257 olive ridley turtle nests per year for 2002–2007 in French Guiana. These numbers are the highest reproduction rates recorded for the species in the north-west Atlantic since 1967–1970, when Schulz (1975) estimated 1,665–3,290 nests in Suriname (Fig. 1).

As suggested by Marcovaldi (2001) we consider that three hypotheses could potentially explain the high number of olive ridley turtle nests recorded in French Guiana since 2002. Firstly, the population recovery could be due to long-term conservation efforts (Hays, 2004). Because of overharvesting of eggs (Reichart, 1993) and incidental catch related to shrimp trawling (Reichart & Fretey, 1993) the olive ridley turtle was formerly considered the most threatened marine turtle in the Guianas (Guyana, Suriname and French Guiana; Tambiah, 1994). On beaches, egg poaching is limited to 5% of clutches (ONCFS, pers. comm.) in French Guiana. However, the olive ridley is the marine turtle most vulnerable to offshore shrimp trawling in French Guiana, and informal interviews suggested that c. 1,000 olive ridley turtles are caught annually (Gueguen, 2000). Turtle Excluder Devices are not mandatory in French Guiana, as they have been in Suriname since 1992 (Mohadin, 2000). Thus, it seems unlikely that the resident population of olive ridley turtles in French Guiana has recovered because of long-term conservation.

Laurent Kelle WWF France, Bureau Guyane, Cayenne, French Guiana.

Nicolas Gratiot Laboratoire d'étude des Transferts en Hydrologie et Environnement, Grenoble, France.

Benoît de Thoisy (Corresponding author) Association Kwata, BP 672, F-97335 Cayenne Cedex, French Guiana. E-mail thoisy@nplus.gf

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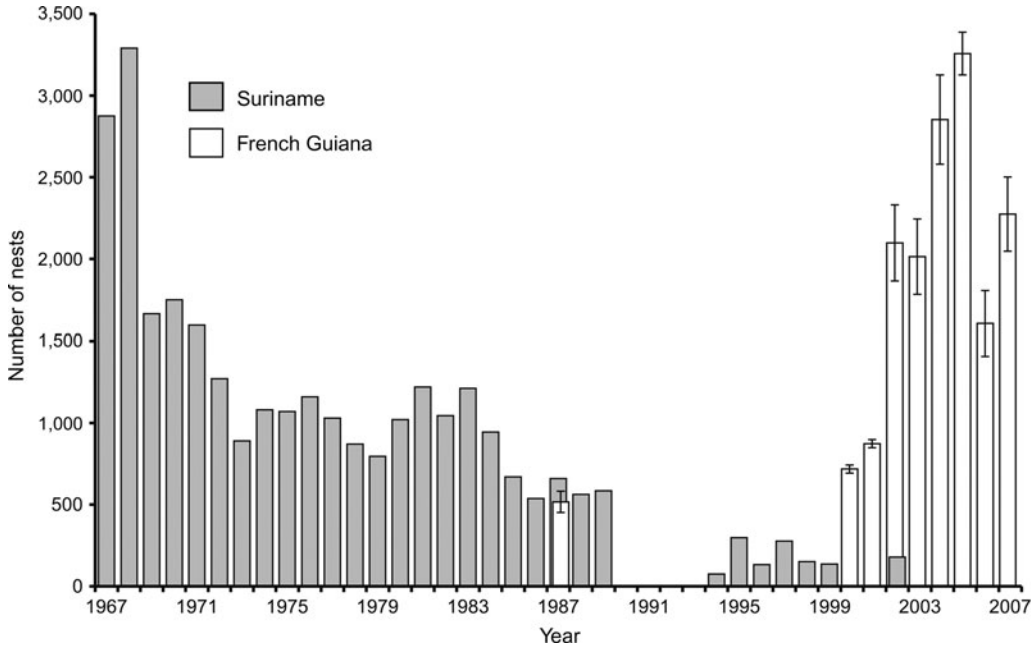

FIG. 1 Olive ridley turtle nest numbers in Suriname and French Guiana, with median error bars (Gratiot et al., 2006), during 1967–2007. Suriname data: 1967–1975 from Schulz (1975), 1976–1989 from Reichart (1993), 1994–1999 from Mohadin (2000), and 2002 from de Djin (2003). Note that monitoring coverage is not detailed in Mohadin (2000), and that de Djin (2003) considered the data to be incomplete. French Guiana data: 1987 from Fretey (1989), when monitoring coverage did not include Cayenne Peninsula. Cayenne Peninsula was the only nesting area monitored in 2000 and 2001. Data for 2002–2007 are the minimum numbers of nests laid, as some minor nesting sites were not continuously monitored.

Secondly, nesting females could have moved south from Suriname to French Guiana beaches. In the Guianas natural modifications of the coastline can cause marine turtles to change their nesting location (Hilterman et al., 2008), as happened with the leatherback turtles now nesting at Awala Yalimapo in French Guiana (Girondot et al., 2007; Kelle et al., 2007).

Thirdly, the species' occurrence in French Guiana could have been underestimated until 2000. Since the late 1970s marine turtle monitoring was mostly focused on leatherback turtle nesting beaches, and current major olive ridley turtle nesting sites (Kourou, Cayenne Peninsula) were rarely visited. Also, the olive ridley turtle sometimes adopts a particular nesting behaviour, coming ashore in large waves known as arribadas (Pritchard, 1967). Between such events few adults come ashore, resulting in underestimation of nesting activity. As monitoring was limited in French Guiana until 2000, the species' occurrence has probably remained underestimated there.

Only long-term monitoring at a large geographical scale is suitable for the assessment of marine turtle nesting trends (Schroeder & Murphy, 1999). In Suriname and French Guiana monitoring of olive ridley turtles has been both temporally and spatially heterogeneous and, therefore, no regional nesting trend can be identified. Based on nest numbers it appears that the population in French Guiana is only c. 2,000 adults, and is nearly extirpated as a breeding species in Guyana and Suriname. Despite a reported increase of the species in Brazil (de Castilhos & Tiwari, 2006) olive ridley turtles in the West Atlantic still face interactions with non-selective trawling gears, both in French Guiana and Brazil (Gueguen, 2000; da Silva et al., 2007). As a consequence the olive ridley turtle continues to be threatened in the West Atlantic, despite a revision of its global IUCN Red List status from Endangered to Vulnerable (IUCN, 2008). Such an apparent discrepancy between local and global Red List assessments reinforces the need for regional assessments for such widely distributed species (Seminoff, 2004; Mast et al., 2006).

The apparent increase in nesting by the olive ridley marine turtle in French Guiana therefore probably reflects the combination of a potential shift in nesting from Suriname to French Guiana and increased monitoring. Further investigation of the olive ridley turtle population structure in the West Atlantic is required. A transnational programme focusing on olive ridley turtles has recently been developed between Suriname and French Guiana, with joint genetic and satellite tracking research. This will produce a better understanding of the genetic signatures of rookeries and elucidate the species' behaviour at sea. Similarly, such a collaborative initiative could be developed with Brazil to clarify gene flow between Brazilian and French Guiana nesting cohorts, the two main olive ridley turtle nesting aggregations in the West Atlantic. This would facilitate the identification of potential conservation units and the development of a comprehensive conservation strategy for the olive ridley marine turtle in the West Atlantic.

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Biographical sketches

Laurent Kelle works on marine conservation in French Guiana for WWF on projects that include monitoring of nesting beaches, capacity building, promotion and testing of selective fishing gears, and development of regional cooperation. Nicolas Gratiot is working at the French Institute of Research for Development on the transport of sediment in watershed, estuarine and coastal zones and its impact on ecosystems. Since 2001 he has been studying the evolution of the coast of the Amazon and its impact on mangroves and turtles. Benoît de Thoisy is the scientific director of the NGO Kwata in French Guiana. His field studies focus on habitat and fauna management and on focal species such as otters, caimans, primates, jaguars and marine turtles.

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