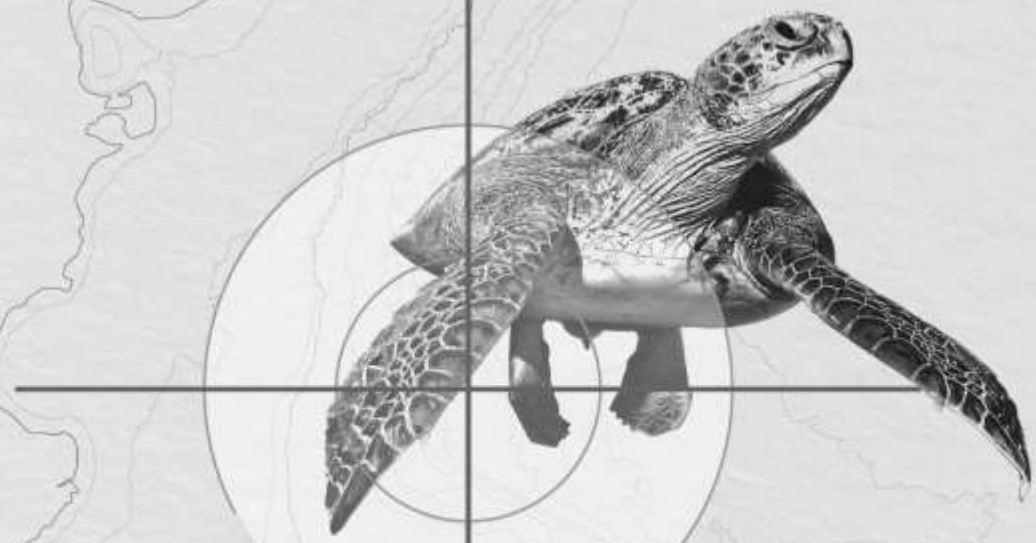
Foro para la Conservación
del Mar Patagónico
y Áreas de Influencia

TORTUGAS MARINAS

RED LIST



Primer Taller Regional de
EVALUACIÓN DEL ESTADO DE CONSERVACIÓN DE ESPECIES
para el MAR PATAGÓNICO según criterios de la Lista Roja de UICN

Primer Taller Regional de Evaluación del Estado de Conservación de Especies para el Mar Patagónico según criterios de la Lista Roja de UICN: TORTUGAS MARINAS. Buenos Aires, ARGENTINA - 2016

Fecha del informe: Enero 2019

Results of the 2016 IUCN Regional Red List Workshop for Species of the Patagonian Sea: MARINE TURTLES. Last version of the report: January 2019

Con el apoyo de:

EXPERTOS:

Diego Albareda	IUCN – Argentina
Alejandro Fallabrino	KARUMBE – Uruguay
Laura Prosdocimi	Dirección Nacional de Planificación Pesquera – Argentina

COLABORADOR EXPERTO: Victoria Gonzalez Carman - CONICET

EXPERTOS IUCN: Beth Polidoro y Gina Ralph

REVISION Y EDICIÓN: M. Shope y V. Falabella

CITA:

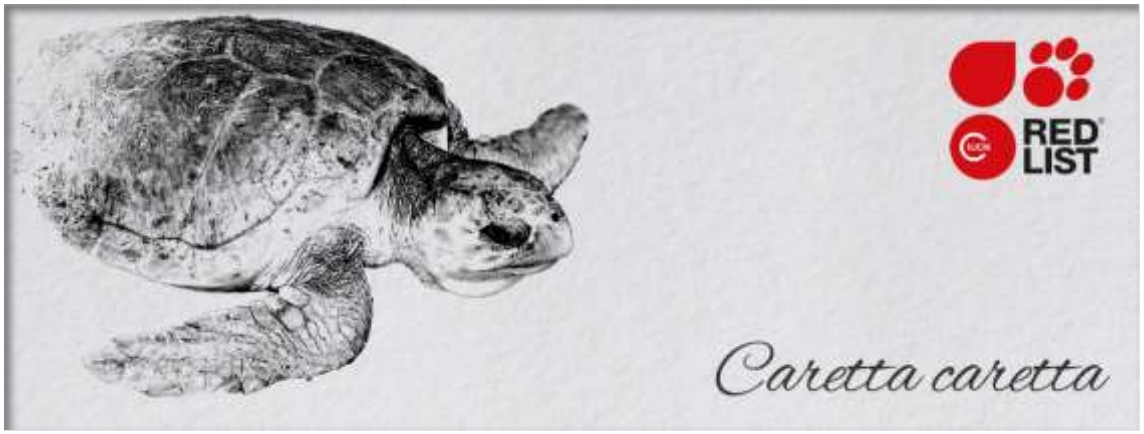
Foro para la Conservación del Mar Patagónico y áreas de influencia, 2019. Informe del Primer Taller Regional de Evaluación del Estado de Conservación de Especies para el Mar Patagónico según criterios de la Lista Roja de UICN: Tortugas Marinas. V. Falabella & C. Campagna (Eds).

Citation:

Forum for the Conservation of the Patagonian Sea, 2019. Report of the IUCN Regional Red List First Workshop for Species of the Patagonian Sea: Marine Turtles. V. Falabella & C. Campagna (Eds).

DISEÑO Y ARTE: Victoria Zavattieri – Wildlife Conservation Society

INDICE:



LC – Least Concern, (IUCN version 3.1)

Assessment Rationale:

This species is present in the Patagonian Sea, throughout Brazil, Uruguay and Argentina, to the latitude of Golfo San Matias (41-42° S; 64-65° W). The vast majority of individuals registered are from the Southwest Atlantic subpopulation (Brazilian breeding sites) which is listed globally as Least Concern. This region is an important feeding area, developmental habitat and migration corridor for juveniles and adults of the species. Main threats in the Patagonian Sea include bycatch in trawl, gillnet and longline fisheries.

Since all Loggerhead turtles in the Patagonian Sea come from the Southwest Atlantic subpopulation, the species is also classified as **Least Concern (LC)** in this regional assessment.

Assessor(s): Prosdocimi, L., Fallabrino, A. & Albareda, D.

Reviewer(s): Gonzalez Carman, V. & Falabella, V.

Contributor(s): Lopez-Mendilaharsu, M., Monteiro, D., Vélez-Rubio, G., Casale, P. & Marcovaldi, M.A.

Facilitators/Compilers: Polidoro, B. & Falabella, V.

Taxonomic information

ANIMALIA - CHORDATA - REPTILIA - TESTUDINES - CHELONIIDAE - Caretta - caretta - South West Atlantic subpopulation – (Linnaeus, 1758)

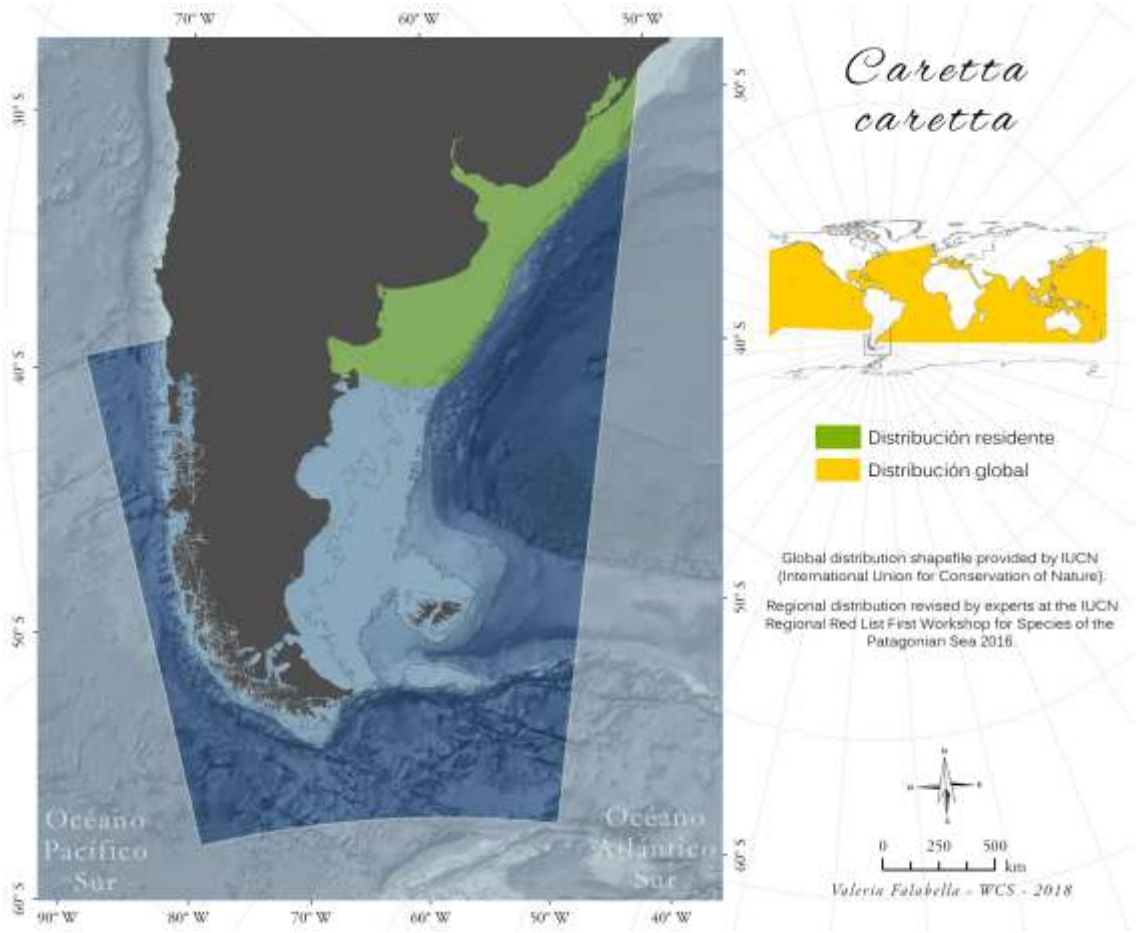
Common Names: Loggerhead Turtle (English), Caguama (Spanish; Castilian), Careba Amarela (Portuguese), Tartaruga Cabeçuda (Portuguese), Tartaruga Comum (Portuguese), Tartaruga Vermelha (Portuguese), Tortue caouanne (French), Tortuga Boba (Spanish; Castilian), Tortuga Cabezona (Spanish; Castilian), Tortuga Careta (Spanish; Castilian), Tortuga Comun (Spanish; Castilian)

Geographic Range

The Loggerhead Turtle has a worldwide distribution in subtropical to temperate regions of the Mediterranean Sea and Pacific, Indian, and Atlantic Oceans (Wallace *et al*. 2010).

The South West Atlantic subpopulation breeds along the coast of Brazil (Marcovaldi and Chaloupka 2007, Marcovaldi and Laurent 1996. Lima *et al.* 2012) and its marine habitats extend throughout most of the South West Atlantic ocean (Barceló *et al*. 2013, González Carman *et al*. 2011, 2016a, Marcovaldi *et al*. 2010, Prosdocimi *et al*. 2015, Vélez-Rubio *et al*. 2013,).

Loggerhead turtle is present in the Patagonian Sea (Álvarez-Varas *et al.* 2016; Barceló *et al.* 2013; González Carman *et al.* 2011, 2016; Vélez-Rubio *et al.* 2013, Marcovaldi and Marcovaldi 1999, Monteiro et al. 2016) where the southernmost report is in Golfo San Matias (41-42° S; 64-65° W, González Carman *et al.* 2011). The region is an important feeding area, developmental habitat and migration corridor for juveniles and adults (Barros 2010; González Carman *et al.* 2016a, Barceló *et al.* 2013, Martinez-Souza *et al.* 2013, Monteiro *et al.* 2016, Vélez-Rubio *et al.* 2013). The origin of the individuals and the importance of the Patagonian Sea for the species have been confirmed by mark-recapture studies, satellite tracking and genetic analysis (Barceló *et al*. 2013, Caraccio *et al.* 2008, González Carman *et al.* 2011, González Carman *et al.* 2016a-b, Laporta and López 2003, Marcovaldi *et al.* 2010, Padua Almeida *et al.* 2000, Prosdocimi *et al.* 2015, Reis 2014, Reis *et al.* 2010, Vélez-Rubio *et al*. 2013).



Population

Loggerheads are a single species globally comprising 10 biologically described Regional Management Units (RMUs, Wallace *et al.*, 2010), which describe biologically and geographically explicit population segments by integrating information from nesting sites, mitochondrial and nuclear DNA studies, movements and habitat use by all life stages. RMUs are functionally equivalent to IUCN subpopulations, thus providing the appropriate demographic unit for Red List assessments.

The Loggerhead turtle does not breed in the Patagonian region. The vast majority (all) of Loggerhead turtles in the Patagonian Sea belong to the Southwest Atlantic subpopulation (Araújo 2012, Caraccio *et al.* 2008, Cardozo *et al.* 2016, Prosdocimi *et al.* 2015, Reis *et al.* 2010, Wallace *et al*. 2010)). This subpopulation breeds on at least 15 nesting sites situated in eastern and northeastern Brazil (Marcovaldi and Chaloupka 2007), with a total number of nests estimated at ca. 7,700 per year (Casale *et al.* 2015).

Habitats and Ecology

The Loggerhead Turtle nests on insular and mainland sandy beaches throughout the temperate and subtropical regions. Like most sea turtles, Loggerhead Turtles are highly migratory and use a wide range

of broadly separated localities and habitats during their lifetimes (Bolten and Witherington 2003). Upon leaving the nesting beach, hatchlings begin an oceanic phase, perhaps floating passively in major current systems (gyres) that serve as open-ocean developmental grounds (Bolten and Witherington 2003). After 4-19 years in the oceanic zone, Loggerheads recruit to neritic developmental areas rich in benthic prey or epipelagic prey where they forage and grow until maturity at 10-39 years (Avens and Snover 2013). Upon attaining sexual maturity Loggerhead Turtles undertake breeding migrations between foraging grounds and nesting areas at remigration intervals of 1 to several years with a mean of 2.5-3 years for females (Schroeder *et al*. 2003) while males would have a shorter remigration interval (e.g., Hays *et al*. 2010, Wibbels *et al*. 1990). Migrations are carried out by both males and females and may traverse oceanic zones spanning hundreds to thousands of kilometres (Plotkin 2003). During non-breeding periods, adults reside at coastal neritic feeding areas that sometimes coincide with juvenile developmental habitats (Bolten and Witherington 2003). It is widely accepted that this species is carnivorous throughout its life, with the main difference between populations coming from the proportion of benthic or pelagic fauna in the diet (Bjorndal 1997, Jones and Seminoff 2013).

In the Patagonian Sea, juvenile and adult Loggerheads occur along the coast, inhabiting neritic and oceanic waters (Barceló *et al*. 2013, González Carman *et al.* 2016 a,b, Marcolvaldi *et al*. 2010). Particularly in this region, juvenile Loggerheads appear to recruit to neritic waters at about 12 years of age (Lenz *et al*. 2016), much later than the estimated average for the global population. Regarding its feeding, in Patagonia, Loggerheads prey on a wide variety of animals including salps, crabs (Malacostraca), whelks (Gastropoda), among others (Martinez-Souza *et al.* 2013).

The IUCN Red List Criteria define generation length to be the average age of parents in a population (i.e., older than the age at maturity and younger than the oldest mature individual) and care should be taken to avoid underestimation (IUCN 2016). Although different subpopulations may have different generation length, since this information is limited we adopted the same value for all the subpopulations, taking care to avoid underestimation as recommended by IUCN (2016). Loggerheads attain maturity at 10-39 years (Avens and Snover 2013), and we considered here 30 years to be equal or greater than the average age at maturity. Data on reproductive longevity in Loggerheads are limited, but are becoming available with increasing numbers of intensively monitored, long-term projects on protected beaches. Tagging studies have documented reproductive histories up to 28 years in the North Western Atlantic Ocean (Mote Marine Laboratory, unpublished data), up to 18 years in the South Western Indian Ocean (Nel *et al*. 2013), up to 32 years in the South Western Atlantic Ocean (Projeto Tamar unpublished data), and up to 37 years in the South Western Pacific Ocean, where females nesting for 20-25 years are common (C. Limpus, pers. comm). We considered 15 years to be equal or greater than the average reproductive longevity. Therefore, we considered here 45 years to be equal or greater than the average generation length, therefore avoiding underestimation as recommended by IUCN (IUCN Standards and Petitions Subcommittee 2014).

General Use and Trade Information

The South West Atlantic Loggerhead subpopulation was harvested for human consumption in the past, however this has now stopped.

Threats

Threat categories affecting marine turtles, including Loggerheads, were described by Wallace *et al*. (2011) as:

1. Fisheries bycatch: incidental capture of marine turtles in fishing gear targeting other species;
2. Take: direct utilization of turtles or eggs for human use (i.e., consumption, commercial products);
3. Coastal Development affecting critical turtle habitat: human-induced alteration of coastal environments due to construction, dredging, beach modification, etc.;

4. Pollution and Pathogens: marine pollution and debris that affect marine turtles (i.e., through ingestion or entanglement, disorientation caused by artificial lights), as well as impacts of pervasive pathogens (for example fibropapilloma virus) on turtle health;
5. Climate change: current and future impacts from climate change on marine turtles and their habitats (increasing sand temperatures on nesting beaches affecting hatchling sex ratios, sea level rise, storm frequency and intensity affecting nesting habitats, etc.).

Wallace *et al*. (2011) assessed the relative impacts of individual threats to all Loggerhead subpopulations. Fisheries bycatch was classified as the highest threat to Loggerheads globally, followed by coastal development and human consumption of eggs, meat, or other products. Due to lack of information, pollution and pathogens was only scored as affecting three subpopulations and climate change was only scored for two subpopulations. Enhanced efforts to assess and reduce the impacts of these threats on Loggerheads—and other marine turtle species—should be a high priority for future conservation efforts.

In the Patagonian Sea, the main threat of Loggerhead turtles is bycatch in trawl, driftnets, bottom gillnets and longlines fisheries (Domingo *et al.* 2006a, Domingo *et al.* 2006b, Pinedo and Polacheck 2004, Kotas et al. 2004, Giffoni *et al.* 2008, González Carman *et al.* 2011, Gallo *et al*. 2006, Fiedler et al. 2012, Laporta and Lopez 2003, Laporta *et al.* 2013, , Sales *et al.* 2008, Vélez-Rubio *et al.* 2013). Entanglement and marine debris ingestion have also been described as threats affecting individuals captured by the longline oceanic fishery fleet (Bugoni et al. 2001, Martinez Souza 2009, Martinez Souza *et al.* 2013). Egg harvest for consumption and nesting beach destruction have been successfully addressed by decades of conservation programs at nesting beaches (Marcovaldi and Chaloupka 2007, Marcovaldi *et al*. 2005).

Conservation

In the Patagonian Sea Loggerhead turtles have been afforded legislative protection under a number of treaties and laws (González Carman *et al.* 2012, 2015). Argentina, Brazil and Uruguay signed, approved and ratified by their national laws the following International Conventions: Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), Convention on Migratory Species (CMS), Convention on Wetlands of International Importance (RAMSAR), Convention on Biological Diversity (CBD), United Nations Convention on the Law of the Sea (CONVEMAR) and Inter-American Sea Turtle Convention (CIT).

The three countries have also national legislation and regulations that directly and indirectly protect sea turtles. In 2014, the Federal Environment Council (COFEMA) of Argentina approved the National Action Plan for the Conservation of Sea Turtles, together with the National Programme of Action to Reduce the Interaction of Marine Turtles with marine debris. In 2011, the Chico Mendes Institute for Conservation da Biodiversidade and Projeto Tamar published the National Action Plan for the Conservation of Sea Turtles in Brazil.

For the South West Atlantic subpopulation, intensive conservation actions have been implemented by several projects in the last decades at nesting beaches and foraging areas through promoting adequate legislation, social inclusion and environmental education in order to stop or reduce direct use, and destruction of nesting habitats (Marcovaldi *et al*. 2005, Marcovaldi and Chaloupka 2007). Initiatives to reduce incidental capture in fisheries are also performed intensively across the region (Domingo *et al*. 2006, González Carman *et al*. 2012). This species is listed Nationally in Uruguay, Argentina and Brazil as Endangered.

Global Conservation

Loggerhead Turtles are afforded legislative protection under a number of treaties and laws (Wold 2002). Annex II of the SPAW Protocol to the Cartagena Convention (a protocol

concerning specially protected areas and wildlife); Appendix I of CITES (Convention on International Trade in Endangered Species of Wild Fauna and Flora); and Appendices I and II of the Convention on Migratory Species (CMS). A partial list of the International Instruments that benefit Loggerhead Turtles includes the Inter-American Convention for the Protection and Conservation of Sea Turtles, the Memorandum of Understanding on the Conservation and Management of Marine Turtles and their Habitats of the Indian Ocean and South-East Asia (IOSEA), the Memorandum of Understanding on ASEAN Sea Turtle Conservation and Protection, the Memorandum of Agreement on the Turtle Islands Heritage Protected Area (TIHPA), and the Memorandum of Understanding Concerning Conservation Measures for Marine Turtles of the Atlantic Coast of Africa.

As a result of these designations and agreements, many of the intentional impacts directed at sea turtles have been lessened: harvest of eggs and adults has been slowed at several nesting areas through nesting beach conservation efforts and an increasing number of community-based initiatives are in place to slow the take of turtles in foraging areas. In regard to incidental take, the implementation of Turtle Excluder Devices has proved to be beneficial in some areas, primarily in the United States and South and Central America (National Research Council 1990). Guidelines are available to reduce sea turtle mortality in fishing operations in coastal and high seas fisheries (FAO 2009). However, despite these advances, human impacts continue throughout the world. The lack of effective monitoring in pelagic and near-shore fisheries operations still allows substantial direct and indirect mortality, and the uncontrolled development of coastal and marine habitats threatens to destroy the supporting ecosystems of long-lived Loggerhead Turtles.

Bibliography

Araújo, P.R.B.L. 2012. Variação temporal da composição genética de tartarugas cabeçudas (*Caretta caretta*, Linnaeus 1758) encalhadas no litoral sul do Brasil. Dissertation, Universidade do Estado do Rio de Janeiro, Rio de Janeiro.

Avens, L. and Snover, M.L. 2013. Age and age estimation in sea turtles. In: J. Wyneken, K.J. Lohmann & J.A. Musick (ed.), *The biology of sea turtles. Volume III*, pp. 97-133. CRC Press, Boca Raton, FL, USA.

Barceló, C., Domingo, A., Miller, P., Ortega, L., Giffoni, B., Sales, G., McNaughton, L., Marcovaldi, M., Heppell, S.S. and Swimmer, Y. 2013. High-use areas, seasonal movements and dive patterns of juvenile loggerhead sea turtles in the Southwestern Atlantic Ocean. *Marine Ecology Progress Series* 479: 235-250.

Barros, J.A. 2010. Alimentação da tartaruga-cabeçuda (*Caretta caretta*) em habitat oceânico e nerítico no sul do Brasil: composição, aspectos nutricionais e resíduos sólidos antropogênicos. Universidade Federal do Rio Grande-FURG.

Bjorndal, K.A. 1997. Foraging ecology and nutrition of sea turtles. In: P.L. Lutz and J.A. Musick (eds), *The Biology of Sea Turtles*, pp. 83-106. CRC Press, Boca Raton, Florida.

Bolten, A.B. and Witherington, B.E. 2003. *Loggerhead Sea Turtles*. Smithsonian Books, Washington, D.C., USA.

Bugoni, L., Krause, L., Petry, M. 2001. Marine debris and human impacts on sea turtles in southern Brazil. *Marine Pollution Bulletin* 42: 1330-1334.

Caraccio, M.N., Domingo, A., Márquez, A., Naro-Maciel, E., Miller, P. & Pereira, A. 2008. Las aguas del Atlántico Sudoccidental y su importancia en el ciclo de vida de la Tortuga cabezona (*Caretta caretta*): evidencias a través del análisis del ADNmt. *Collective Volume of Scientific Papers* 62: 1831-1837.

Cardozo, J.M., Caraccio, M.N., Márquez, A., González, S. 2016. Genetic diversity of Loggerhead turtles (*Caretta caretta*) stranded on the Uruguayan coast; contributions towards the conservation of the species in the Southwestern Atlantic Ocean. *36th Annual Symposium on sea turtle biology and conservation*: Lima, Perú. 67pp.

Casale, P. and Marcovaldi, M. 2015. *Caretta caretta* (South West Atlantic subpopulation). The IUCN Red List of Threatened Species 2015: e.T84191235A84191397. Available at: http://dx.doi.org/10.2305/IUCN.UK.2015-4.RLTS.T84191235A84191397.en.

Domingo, A., Bugoni, L., Prosdocimi, L., Miller, P., Laporta, M., Monteiro, D.S., Estrades, A. and Albareda, D. 2006. El impacto generado por las pesquerias en las tortugas marinas en el Océano Atlántico sud occidental. In: WWF Programa Marino para Latinoamérica y el Caribe (ed.). San Jose, Costa Rica.

Domingo, A., Sales, G., Giffoni, B., Miller, Ph., Laporta, M. and Maurutto, G. 2006. Captura Incidental de Tortugas Marinas con Palangre Pelágico en el Atlántico Sur por las Flotas Atuneras de Brasil y Uruguay. *Collective Volume of Scientific Papers ICCAT* 59(3): 992-1002.

FAO. 2009. Guidelines to reduce sea turtle mortality in fishing operations. FAO, Rome.

Fiedler, F.N., Sales, G., Giffoni, B., Monterio-Filho, E.L.A., Secchi, E.R. and Bugoni, L. 2012. Driftnet fishery threats to sea turtles in the Atlantic Ocean. *Biodiversity and Conservation* 21: 915-931.

Gallo, B.M.G., Macedo S., Giffoni, B.D.B., Becker, J.H., Barata, P.C.R. 2006. Sea turtle conservation in Ubatuba, Southeastern Brazil, a feeding area with incidental capture in coastal Fisheries. *Chelonian Conservation and Biology* 5: 93-101.

Giffoni, B., Domingo, A., Sales, G., Fiedler, F.N. and Miller, P. 2008. Interacción de tortugas marinas (Caretta caretta y Dermochelys coriacea) com la pesca de palangre pelágico em el Atlántico Sudoccidental: uma perspectiva regional para la conservación. *Collective Volume of Scientific Papers* 62: 1861-1870.

González Carman, V., Bruno, I.M., Maxwell, S., Álvarez, K., Albareda, D., Acha E.M. and Campagna C. 2016. Habitat use, site fidelity and conservation opportunities for juvenile loggerhead sea turtles in the Río de la Plata, Argentina. *Marine Biology* 163: 20.

González Carman, V., Machain, N., Albareda, D., Mianzan, H. and Campagna, C. 2012. Legal and institutional tools to mitigate marine turtle bycatch: Argentina as a case study. *Marine Policy* 36: 1265-1274.

González Carman, V., Machain, N., Campagna, C. 2015. Legal and institutional tools to mitigate plastic pollution affecting marine species: Argentina as a case study. *Marine Pollution Bulletin* 92: 125-133.

González Carman, V., Mandiola, A., Alemany, D., Dassis, M., Seco Pon, J.P., Prosdocimi, L., Ponce de León, A., Mianzan, H., Acha, E.M., Rodríguez, D., Favero, M., and Copello, S. 2016.

Distribution of megafaunal species in the Southwestern Atlantic: key ecological areas and opportunities for marine conservation. *ICES Journal of Marine Science* 73(6): 1579-1588.

González Carman, V., Mianzan, H., Bruno, I., Prosdocimi, L., Albareda, D. y Campagna, C. 2012. Tortugas marinas en aguas argentinas. *Revista Ciencia hoy* 22(127): 13-19.

González Carman, V., Álvarez, K., Prosdocimi, L., Inchaurraga, M.C., Dellacasa, R., Faiella, A., Echenique, C., González, R., Andrejuk, J., Mianzan, H., Campagna, C., Albareda, D. 2011. Temperate SW Atlantic: a feeding and developmental habitat for endangered sea turtles. *Marine Biology Research* 7: 500-508.

González Carman, V., Álvarez, K.C., Prosdocimi, L., Inchaurraga, M.C., Dellacasa, R.F., Faiella, A., Echenique, C., González, R., Andrejuk, J., Mianzan, H.W., Campagna, C. and Albareda, D.A. 2011. Argentinian coastal waters: A temperate habitat for three species of threatened sea turtles. *Marine Biology Research* 7: 500-508.

Hays, G.C., Fossette, S., Katselidis, K.A., Schofield, G. and Gravenor, M.B. 2010. Breeding periodicity for male sea turtles, operational sex ratios, and implications in the face of climate change. *Conservation Biology* 24: 1636-1643.

IUCN Standards and Petitions Subcommittee. 2014. Guidelines for Using the IUCN Red List Categories and Criteria. Version 11. Available at: http://jr.iucnredlist.org/documents/RedListGuidelines.pdf.

IUCN Standards and Petitions Subcommittee. 2016. Guidelines for Using the IUCN Red List Categories and Criteria. Version 12. Prepared by the Standards and Petitions Subcommittee. Available at: http://www.iucnredlist.org/documents/RedListGuidelines.pdf.

Jones, T. and Seminoff, J. 2013. Feeding biology: advances from field-based observations, physiological studies, and molecular techniques. In: Wyneken, J., Lohmann, K.J., Musick, J.A. (ed.), *The biology of sea turtles*, pp. 211-247. CRC Press, Boca Raton, USA.

Kotas, J.E., Santos, Sd., Azevedo, V.Gd., Gallo, B.M.G., Barata, P.C.R. 2004. Incidental capture of loggerhead (*Caretta caretta*) and leatherback (*Dermochelys coriacea*) sea turtles by the pelagic longline fishery off southern Brazil. *Fishery Bulletin* 102: 393-399.

Laporta, M. and Lopez, G. 2003. Loggerhead sea turtle tagged in Brazil caught by a trawler in waters of the common Argentinean-Uruguayan fishing area. *Marine Turtle Newsletter* 102: 14.

Laporta, M., Miller, P. and Domingo, A. 2013. Captura incidental de tortugas marinas en la pesquería de arrastre Uruguaya. In: Zaldua-Mendizabal, N., Egaña-Callejo, A. (ed.), Marine turtles of the North East Atlantic. Contributions for the First Regional Conference, pp. 43-50. San Sebastian.

Lenz, A.J., Avens, L., Campos Trigo, C., Borges-Martins, M. 2016. Skeletochronological estimation of age and growth of loggerhead sea turtles (*Caretta caretta*) in the western South Atlantic Ocean. *Austral Ecology* 41: 580-590.

Lima, E.P., Wanderlinde, J., de Almeida, D.T., Lopez, G., Goldberg, D.W. 2012. Nesting Ecology and Conservation of the Loggerhead Sea Turtle (*Caretta caretta*) in Rio de Janeiro, Brazil. *Chelonian Conservation and Biology* 11: 249-254.

Marcovaldi, M.A. and Chaloupka, M. 2007. Conservation status of the loggerhead sea turtle in Brazil: an encouraging outlook. *Endangered Species Research* 3: 132–143.

Marcovaldi, M.A. and Laurent, A. 1996. A six season study of marine turtle nesting at Praia do Forte, Bahia, Brazil, with implications for conservation and management. *Chelonian Conservation and Biology* 2: 55-59.

Marcovaldi, M.A. and Marcovaldi, G.Gd. 1999. Marine turtles of Brazil: the history and structure of Projeto TAMAR-IBAMA. *Biological Conservation* 91: 35-41.

Marcovaldi, M.A., Lopez, G., Soares, L., Lima, E., Thomé, J. and Almeida, A. 2010. Satellite-tracking of female loggerhead turtles highlights fidelity behavior in northeastern Brazil. *Endangered Species Research* 12: 263-272.

Marcovaldi, M.A., Patiri, V. and Thome, J.C. 2005. Projeto TAMAR-IBAMA: twenty-five years protecting Brazilian sea turtles through a community-based conservation program. In: J. Frazier (ed.), *Marine Turtles As Flagships*, pp. 39-62. MAST/Maritime Studies (Special Issue) 3/4.

Marcovaldi, M.A., Thome, J.C., Sales, G., Coelho, A.C., Gallo, B. and Bellini, C. 2002. Brazilian plan for reduction of incidental sea turtle capture in fisheries. *Marine Turtle Newsletter* 96: 24-25.

Martinez Souza, G. 2009. Ecologia Alimentar Da Tartaruga Marinha Cabeçuda (*Caretta caretta*) No Oceano Atlântico Sul Ocidental, Uruguai. Programa de Pós-graduação em Oceanografia Biológica , Universidade Federal do Rio Grande.

Martinez Souza, G., Estrades, A. Scarabino, F. and Kinas, P.G. 2013. Diet of Loggerhead Sea Turtles (*Caretta caretta*) on the Continental Shelf of Uruguay. In: Blumenthal, J., Panagopoulou, A., and Rees, A.F. (eds), Proceedings of the Thirtieth Annual Symposium on Sea Turtle Biology and Conservation. NOAA Technical Memorandum NMFS-SEFSC 640: 96-97.

Monteiro D.S., Estima S.C., Gandra T.B.R., Silva A.P., Bugoni L., Swimmer Y., Seminoff J.A. and Secchi E.R. 2016. Long-term spatial and temporal patterns of sea turtle strandings in southern Brazil. *Marine Biology* 163: 247.

National Research Council. 1990. *Decline of the Sea Turtles: Causes and Prevention*. National Research Council, Washington, DC, USA.

Nel, R., Punt, A.E. and Hughes, G.R. 2013. Are coastal protected areas always effective in achieving population recovery for nesting sea turtles? . *PLoS ONE* 8(5): e63525. doi:10.1371/journal.pone.0063525.

Padua Almeida, A., Baptistotte, C. and Schineider, J.A. 2000. Loggerhead Turtle Tagged in Brazil found in Uruguay. *Marine Turtle Newsletter* 87: 10.

Pinedo, M.C., Polacheck, T. 2004. Sea turtle by-catch in pelagic longline sets off southern Brazil. *Biological Conservation* 119: 335-339.

Plotkin, P. 2003. Adult migrations and habitat use. In: P.L. Lutz, J.A. Musick and J. Wyneken (eds), *The Biology of Sea Turtles. Volume II*, pp. 225-241. CRC Marine Biology Series, CRC Press, Inc., Boca Raton, London, New York, Washington D.C.

Pons, M., Miller, P., Giffoni, B., Domingo, A. and Sales, G. 2012. Estimating total bycatch of loggerhead sea turtles, Caretta caretta, in the Southwestern Atlantic Ocean. SCRS/2012/087.

Prado, W. S., Waller, T., Albareda, D.A., Cabrera, M.R., Etchepare, E.G., Giraudo, A.R., González Carman, V., Prosdocimi, L. and Richard, E. 2012. Categorización del estado de conservación de las tortugas y caimanes de la República Argentina. *Cuadernos de Herpetología* 26(1): 375-387.

Prosdocimi, L., Bugoni, L., Albareda, D. and Remis, M.I. 2015. Are stocks of immature loggerhead sea turtles always mixed? *Journal of Experimental Marine Biology and Ecology* 466: 85-91.

Reis, E.C. 2014. Panorama sobre a pesquisa e conservação de tartarugas marinhas no Brasil: contribuições do monitoramento de encalhes e das análises genéticas. Universidade do Estado do Rio de Janeiro.

Reis, E.C., Soares, L.S., Vargas, S.M., Santos, F.R., Young, R.J., Bjorndal, K.A., Bolten, A.B. and Lobo-Hajdu, G. 2010. Genetic composition, population structure and phylogeography of the loggerhead sea turtle: colonization hypothesis for the Brazilian rookeries. *Conservation Genetics* 11: 1467-1477.

Sales, G., Giffoni, B.B. and Barata, P.C.R. 2008. Incidental catch of sea turtles by the Brazilian pelagic longline fishery. *Journal of the Marine Biological Association of the United Kingdom* 88: 853-864.

Schroeder, B.A., Foley, A.M. and Bagley, D.A. 2003. Nesting patterns, reproductive migrations, and adult foraging areas of Loggerhead Turtles. In: A.B. Bolten & B.E. Witherington (ed.), *Loggerhead Sea Turtles*, pp. 114-124. Smithsonian Books, Washington, D.C.

Vélez-Rubio, G.M., Estrades, A., Fallabrino, A. and Tomás, J. 2013. Marine turtle threats in Uruguayan waters: insights from 12 years of stranding data. *Marine Biology* 2013: DOI: 10.1007/s00227-013-2272-y.

Wallace, B.P., DiMatteo, A.D., Bolten, A.B., Chaloupka, M.Y., Hutchinson, B.J., Abreu-Grobois, F.A., Mortimer, J.A., Seminoff, J.A., Amorocho, D., Bjorndal, K.A., Bourjea, J., Bowen, B.W., Briseño-Dueñas, R., Casale, P., Choudhury, B.C., Costa, A., Dutton, P.H., Fallabrino, A., Finkbeiner, E.M., Girard, A., Girondot, M., Hamann, .M, Hurley, B.J., López-Mendilaharsu, M., Marcovaldi, M.A., Musick, J.A., Nel, R., Pilcher, N.J., Troëng, S., Witherington, B. and Mast, RB. 2011. Global conservation priorities for marine turtles. *PLoS ONE* 6(9): e24510. doi:10.1371/journal.pone.0024510.

Wallace, B.P., DiMatteo, A.D., Hurley, B.J., Finkbeiner, E.M., Bolten, A.B., Chaloupka, M.Y., Hutchinson, B.J., Abreu-Grobois, F.A., Amorocho, D., Bjorndal, K.A., Bourjea, J., Bowen, B.W., Briseño-Dueñas, R., Casale, P., Choudhury, B.C., Costa, A., Dutton, P.H., Fallabrino, A., Girard, A., Girondot, M., Godfrey, M.H., Hamann, M., López-Mendilaharsu, M., Marcovaldi, M.A., Mortimer, J.A., Musick, J.A., Nel, R., Pilcher, N.J., Seminoff, J.A., Troëng, S., Witherington, B. and Mast, R.B. 2010. Regional Management Units for marine turtles: A novel framework for prioritizing conservation and research across multiple scales. *PLoS ONE* 5(12): e15465. doi/10.1371/journal.pone.0015465.

Wibbels, T., Owens, D.W., Limpus, C.J., Reed, P.C. and Amoss, M.S. 1990. Seasonal changes in serum gonadal steroids associated with migration, mating, and nesting in the loggerhead sea turtle (*Caretta caretta*). *General and Comparative Endocrinology* 79: 154-164.

Wold, C. 2002. The status of sea turtles under international environmental law and international environmental agreements. *Journal of International Wildlife Law and Policy* 5: 11-48.

Álvarez-Varas, R., Berzins, R., Bilo, K., Chevalier, J., Chevallier, D., De Thoisy, B., Fallabrino, A., García Cruz, M., Kelez, S., Lopez-Mendilaharsu, M., Marcovaldi, M.A., Mast, R.B., Medrano, C., Miranda, C., Nalovic, M.A., Prosdocimi, L., Rguez-Barón, J.M, Santos, A., Soares, L., Thome, J., Vallejo, F., Vélez-Rubio, G. 2016. Sea Turtles of South America. *SWOT Report* 11: 17-27.

VU - Vulnerable, (IUCN version 3.1)

Assessment Rationale:

This species is present in the Patagonian Sea, throughout Brazil, Uruguay and Argentina, to the latitude of Valdés Peninsula (42°35'S, 64°17'W). This region is an important feeding area, developmental habitat and migration corridor for juveniles. Main threats affecting this species in the area is bycatch in fisheries and ingestion of marine debris, especially plastics.

Genetic analysis shows that green turtles present in the Patagonian Sea belong to different nesting sites: Ascension Island - UK (61%), Suriname (13%), Isla de Aves - Venezuela (10%) and Ilha Trindade - Brazil (7%). Using a weighted average, based on the proportion of individuals from different nesting sites in the Patagonian Sea combined with changes in nesting females recorded at sites over the past three generation lengths (100-150 years), a 33% decline has been estimated for this species in the Patagonian Sea (from 3023 to 1998 individuals in 2001). **Therefore, this species is listed as Vulnerable A2bd.**

Current data is from the 2004 *Chelonia mydas* Global Account Analysis of Subpopulation Changes, meda at 32 Index Sites distributed globally. The information on population size was extracted from Seminoff, J.A. 2004.

Assessor(s): Prosdocimi, L., Fallabrino, A. & Albareda, D.

Reviewer(s): Gonzalez Carman, V. & Falabella, V.

Contributor(s): Lopez-Mendilaharsu, M., Monteiro, D. & Vélez-Rubio, G.

Facilitators/Compilers: Polidoro, B. & Falabella, V.

Taxonomic information

ANIMALIA - CHORDATA - REPTILIA - TESTUDINES - CHELONIIDAE - Chelonia – mydas – (Linnaeus, 1758)

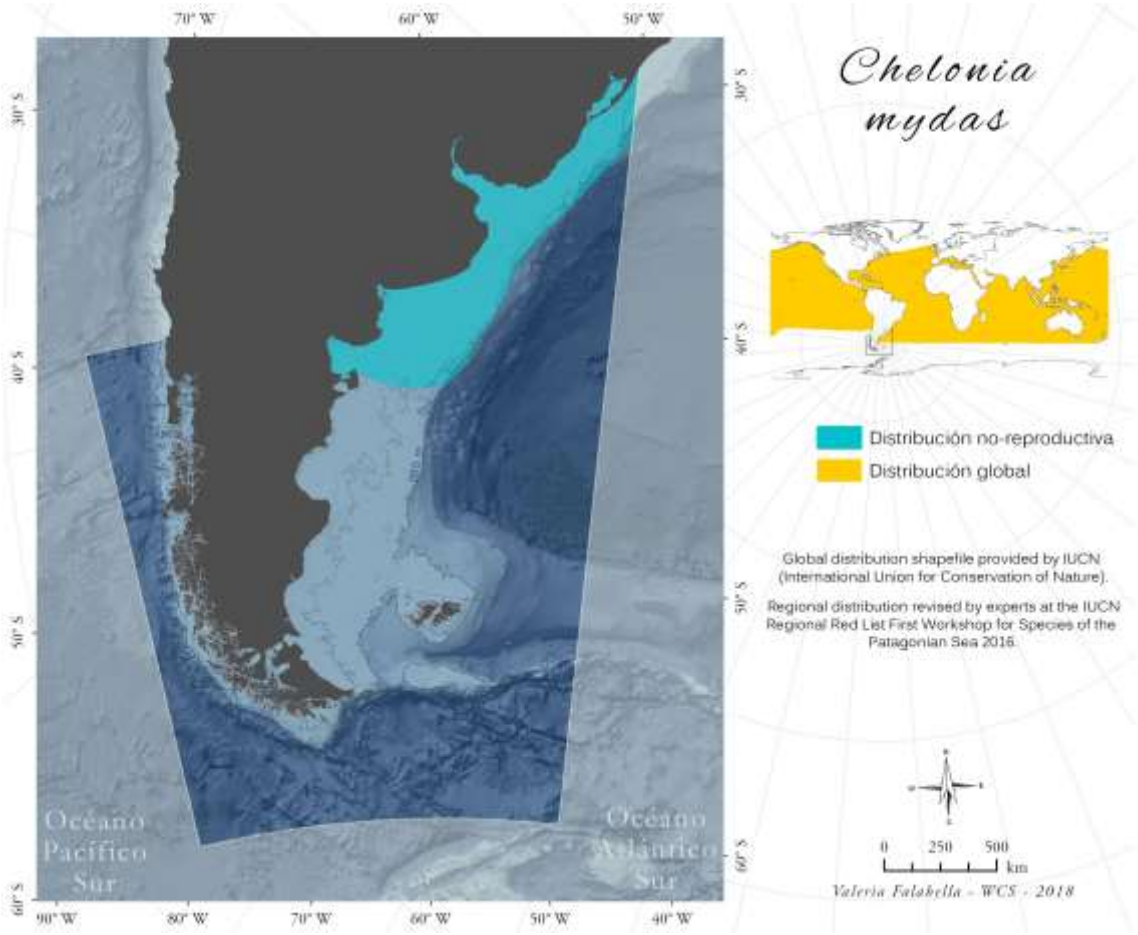
Common Names: Green Turtle (English), Aruanã (Portuguese), Tartaruga Verde (Portuguese), Tortue comestible (French), Tortue franche (French), Tortue verte (French), Tortuga Blanca (Spanish; Castilian), Tortuga Verde (Spanish; Castilian), الخضراء السلحفاة (Arabic)

Synonyms: Testudo mydas Linnaeus, 1758

Geographic Range

The Green Turtle has a circumglobal distribution, occurring throughout tropical and subtropical waters, and also temperate waters to a lesser extent (Atlantic Ocean – eastern central, northeast, northwest, southeast, southwest, western central; Indian Ocean – eastern, western; Mediterranean Sea; Pacific Ocean – eastern central, northwest, southwest, western central). Green turtles are highly migratory and they undertake complex movements and migrations through geographically disparate habitats. Nesting occurs in more than 80 countries worldwide (Hirth 1997). Their movements within the marine environment are less understood but it is believed that green turtles inhabit coastal waters of over 140 countries (Groombridge and Luxmoore 1989).

The species is present in the **Patagonian Sea** throughout Brazil, Uruguay, and Argentina, where the southernmost report is in Golfo Nuevo, Península Valdés (42°35'S, 64°17'W, González Carman *et al*. 2011, Scolaro 1990). This region is an important feeding area, as well as a migration corridor for juveniles (Barata *et al.* 2016, González Carman *et al.* 2011, González Carman *et al.* 2012, Godley *et al*. 2003, López-Mendilaharsu *et al.* 2006, Marcovaldi and Marcovaldi 1999, Monteiro *et al.* 2016, Vélez-Rubio *et al*. 2013, Vélez-Rubio *et al*. 2016, Santos *et al.* 2015).



Population

Green turtles are a single species globally comprising 17 Regional Management Units (RMUs, Wallace *et al*. 2010), which describe biologically and geographically explicit population segments by integrating information from nesting sites, mitochondrial and nuclear DNA studies, movements and habitat use by all life stages. RMUs are functionally equivalent to IUCN subpopulations, thus providing the appropriate demographic unit for Red List assessments. The majority of nesting of global population occurs at Poilão Island, Guinea Bissau (Catry *et al.* 2002), Ascension Island, UK (Weber *et al.* 2014) and Galibi and Matapica in Suriname (Turny pers. comm.). These three countries represent >90% of the nesting populations included in this assessment. In the southern Caribbean other important nesting sites include Aves Island, Venezuela (García-Cruz *et al.* 2015), Guyana and the French Guiana (Seminoff *et al.* 2015). Significant nesting is also documented in Brazil, along its mainland coast and on its offshore islands, with the major rookeries located on the remote islands of Trindade, Atol das Rocas and Fernando de Noronha (Bellini *et al.* 2013, Moreira *et al.* 1995).

The Green turtle does not breed in the Patagonian region. Individuals in the **Patagonian Sea** region belong to both Southwest and South Central Atlantic subpopulations. Genetic analysis shows that green turtles present at the Patagonia Sea belong to different nesting sites in Ascension Islands, UK (61%), Suriname (13%), Isla de Aves, Venezuela (10%) and Ilha

Trindade, Brasil (7%) (Caraccio 2008, Costa Jordao *et al.* 2015, Proietti *et al.* 2009, Proietti *et al.* 2012, Prosdocimi *et al.* 2012).

Mixed-stock of foraging aggregations of juvenile and subadult green turtles are found throughout the Caribbean and along the coastlines and offshore islands of South America and West Africa. A small proportion of these aggregations have been monitored for over a decade (Bellini *et al.* 2013, Marcovaldi and Marcovaldi 1999, Vélez-Rubio *et al.* 2013,), however very limited information is available on vital population parameters (e.g. survival, residency, abundance) and threats for most of these aggregations.

Habitats and Ecology

Like most sea turtles, green turtles are highly migratory and use a wide range of broadly separated localities and habitats during their lifetimes (for review see Hirth 1997). Upon leaving the nesting beach, it has been hypothesized that hatchlings begin an oceanic phase (Carr 1987), perhaps floating passively in major current systems (gyres) that serve as open-ocean developmental grounds (Carr and Meylan 1980, Witham 1991). After a number of years in the oceanic zone, these turtles recruit to neritic developmental areas rich in seagrass and/or marine algae where they forage and grow until maturity (Bolten 2003, Musick and Limpus 1997). Upon attaining sexual maturity green turtles commence breeding migrations between foraging grounds and nesting areas that are undertaken every few years (Hirth 1997). Migrations are carried out by both males and females and may traverse oceanic zones, often spanning thousands of kilometers (Carr 1986, Mortimer and Portier 1989). During non-breeding periods adults reside at coastal neritic feeding areas that sometimes coincide with juvenile developmental habitats (e.g., Limpus *et al*. 1994, Meylan *et al.* 2011, Seminoff *et al*. 2003).

In the Patagonian Sea, immature green turtles occur along the coast, inhabiting shallow and sheltered habitats (Barata *et al*. 2016, Duarte *et al.* 2011, Gonzalez Carman *et al*. 2011, Gonzalez Carman *et al*. 2012, López-Mendilaharsu *et al.* 2006, Monteiro *et al.* 2016, Vélez-Rubio *et al.* 2013, Vernetti 2009). Here, juvenile Green turtles recruit to the neritic waters at an age of 2 to 3 years, remaining in this region until reaching about 7 years (Lenz *et al.* 2017). Although it is widely accepted that this species is herbivorous (Bjorndal 1997, Jones and Seminoff 2013) consuming macroalgae and seagrass (Guebert-Bartholo *et al.* 2011, López-Mendilaharsu *et al.* 2006, Santos *et al*. 2011), in some areas of the Patagonian Sea its diet includes a high proportion of animal preys (Bugoni *et al.* 2003, Vélez-Rubio *et al*. 2015, Nagaoka *et al*. 2012, Santos *et al.* 2015), mainly gelatinous macrozooplanckton (Gonzalez Carman *et al*. 2014a, Vélez-Rubio *et al*. 2016).

General Use and Trade Information

Without information for the Patagonian Sea

Threats

Turtles Subpopulations inhabiting the Patagonian Sea, has been particularly threatened by high bycatch (Wallace *et al.* 2011). While past threats that affected these subpopulations (such as the capture eggs or adult individuals for consumption), have been successfully addressed by decades due the work of conservation programs at nesting beaches (Broderick *et al.* 2006, Weber *et al*. 2014, Marcovaldi *et al*. 2005, Bellini *et al.* 2013), now the current and probably increasing threat is represented by fishery bycatch (Sales *et al*. 2008, Monteiro *et al.*

2016, Vélez-Rubio *et al*. 2013, González Carman *et al.* 2012). The responsible fishing method and technique include gillnetting, drift netting, shrimp trawling, and longlining (Domingo *et al.* 2006 a,b, Fiedler *et al.* 2012, Gallo *et al.* 2006, González Carman *et al.* 2011, Laporta *et al.* 2006, Laporta *et al.* 2013, Lezama *et al.* 2013, López-Barrera *et al.* 2012, Marcovaldi *et al.* 2006, Monteiro *et al.* 2005, Monteiro *et al.* 2006, Pinedo and Polacheck 2004, Ramos and Vasconcellos 2013, Rivas 2012, Sales *et al.* 2008, Silva 2006, Vélez-Rubio 2011, Viera 2012).

Also in the region, ingestion of anthropogenic debris represents an important threat to Green turtle populations, causing them direct lethal effects as impaction or perforation of the digestive tract, or indirect effects as the reduce of its energetic reserves, causing a decrease in the growth and survival rates or a retard in the sexual maturity age (Bugoni *et al.* 2001, De Franco 2011, González Carman *et al.* 2014b, Lozoya *et al.* 2015, Murman 2011, Santos *et al.* 2015, da Silva Mendes *et al.* 2015, Teryda 2015, Tourinho *et al.* 2010). Other new threats recorded in the area are the biofouling with *Rapana venosa* (Lezama *et al.* 2012), the ports dredging (Martinez-Souza 2014), the genetic damage associated with effluents (Borrat *et al.* 2013) and the impacts of pervasive pathogens on turtles health, like fibropapilloma virus (Santos *et al.* 2010, Torezani *et al.* 2010). Uruguay has the southernmost record of a turtle infected by this virus (Ferrando *et al.* 2015, Pastorino *et al.* 2007).

Conservation

Argentina, Brazil and Uruguay have signed, approved and ratified by their national laws the following International Conventions: Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), Convention on Migratory Species (CMS), Convention on Wetlands of International Importance (RAMSAR), Convention on Biological Diversity (CBD), United Nations Convention on the Law of the Sea (CONVEMAR) and Inter-American Sea Turtle Convention (CIT).

The three countries have also national legislations and regulations that directly and indirectly protect sea turtles (González Carman *et al.* 2012, González Carman *et al.* 2015). In 2014, the Federal Environment Council (COFEMA) of Argentina approved the National Action Plan for the Conservation of Sea Turtles, together with the National Programme of Action to Reduce the Interaction of Marine Turtles with marine debris. In 2011, the Chico Mendes Institute for Conservation da Biodiversidade and Projeto Tamar published the National Action Plan for the Conservation of Sea Turtles in Brazil.

It is important to highlight the value that represents, at local and regional levels, contributions made by different actors that make the ASO-Turtles Network. The role of this network has to be strengthened, as a tool for experience exchanging with other regions, as well as further qualifying protection policies to sea turtles in the respective countries (Tonelli 2005).

Global Conservation

Green turtles have been afforded legislative protection under a number of treaties and laws (e.g., Fleming 2001, Fretey 2001, Humphrey and Salm 1996, Navid 1982). Among the more globally relevant designations are those of Endangered by the World Conservation Union (IUCN; Baillie and Groombridge 1996, Hilton-Taylor 2000); Annex II of the SPAW Protocol to the Cartagena Convention (a protocol concerning specially protected areas and wildlife); Appendix I of CITES (Convention on International Trade in Endangered Speciesof Wild Fauna and Flora); and Appendices I and II of the Convention on Migratory Species (CMS). A partial list of the International Instruments that benefit green turtles includes the Inter-American Convention for the Protection and Conservation of Sea Turtles, the Memorandum of Understanding on the Conservation and Management of Marine Turtles and their Habitats of

the Indian Ocean and South-East Asia (IOSEA), the Memorandum of Understanding on ASEAN Sea Turtle Conservation and Protection, the Memorandum of Agreement on the Turtle Islands Heritage Protected Area (TIHPA), and the Memorandum of Understanding Concerning Conservation Measures for Marine Turtles of the Atlantic Coast of Africa.

As a result of these designations and agreements, many of the intentional impacts directed at sea turtles have been lessened: harvest of eggs and adults has been slowed at several nesting areas through nesting beach conservation efforts and an increasing number of community-based initiatives are in place to slow the take of turtles in foraging areas. Concerning incidental take, the implementation of Turtle Excluder Devices has proved to be beneficial in some areas, primarily in the United States and South and Central America (National Research Council 1990). However, despite these advances, human impacts continue throughout the world. The lack of effective monitoring in pelagic and near-shore fisheries operations still allows substantial direct and indirect mortality, and the uncontrolled development of coastal and marine habitats threatens to destroy the supporting ecosystems of long-lived green turtles.

Bibliography

Ackerman, R.A. 1997. The nest environment and the embryonic development of sea turtles. In: P.L. Lutz and J.A. Musick (eds), *The Biology of Sea Turtles*, pp. 83-106. CRC Press, Boca Raton, Florida.

Baillie, J. and Groombridge, B. (eds). 1996. *1996 IUCN Red List of Threatened Animals*. pp. 378. International Union for Conservation of Nature, Gland, Switzerland and Cambridge, UK.

Barata, P., […], Estrades, A., Fallabrino, A., Vélez-Rubio, G.M. 2016. Geographical, temporal and sex-ratio patterns of green turtles in the coastal region of the Western South Atlantic. *36th Annual Symposium on sea turtle biology and conservation.* Lima, Perú.

Barros, J.A. 2007. Ecologia alimentar da tartarugas-verde (Chelonia mydas) no extremo sul do Brasil. Universidade Federal do Rio Grande.

Bellini C., Santos A.J.B, Grossman A., Marcovaldi M.A and Barata P. 2013. Green turtle (*Chelonia mydas*) nesting on Atol das Rocas, north-eastern Brazil, 1990–2008. *Journal of the Marine Biological Association of the United Kingdom* 93(4): 1117-1132.

Bjorndal, K.A. 1997. Foraging ecology and nutrition of sea turtles. In: P.L. Lutz and J.A. Musick (eds), *The Biology of Sea Turtles*, pp. 83-106. CRC Press, Boca Raton, Florida.

Bolten, A.B. 2003. Variation in sea turtle life history patterns: neritic versus oceanic developmental stages. In: Lutz, P.L., Musick, J.A., Wyneken, J. (ed.), *The biology of sea turtles*, pp. 243-257. CRC Press, Boca Raton, FL.

Borrat, V., Villar, S., Martinez Souza, G. and Fallabrino, A. 2013. The Micronucleus Test: A Reliable Toolfor Health Screening of Green Turtles. In: Tucker, T., Belskis, L., Panagopoulou, A., Rees, A., Frick, M., Williams, K., LeRoux, R., and Stewart, K. (eds), Proceedings of the Thirty-Third Annual Symposium on Sea Turtle Biology and Conservation. NOAA NMFS-SEFSC-645: 3-4.

Broderick, A.C., Frauenstein, R., Glen, F., Hays, G.C., Jackson, A.L., Pelembe, T., Ruxton, G.D., Godley, B.J. 2006. Are green turtles globally endangered? . *Global Ecology and Biogeography* 15: 21-26.

Bugoni, L., Krause, L. and Petry, M. 2001. Marine debris and human impacts on sea turtles in southern Brazil. *Marine Pollution Bulletin* 42: 1330-1334.

Bugoni, L., Krause, L. and Petry, V. 2003. Diet of sea turtles in southern Brazil. *Chelonian Conservation Biology* 4: 685-688.

Caraccio, M.N., Domingo, A., Márquez, A., Naro-Maciel, E., Miller, P. & Pereira, A. 2008. Las aguas del Atlántico Sudoccidental y su importancia en el ciclo de vida de la Tortuga cabezona (*Caretta caretta*): evidencias a través del análisis del ADNmt. *Collective Volume of Scientific Papers* 62: 1831-1837.

Carr, A. 1986. *The Sea Turtle: So Excellent a Fishe*. University of Texas Press, Austin. 280 pp.

Carr, A. 1987. New perspectives on the pelagic stage of sea turtle development. *Conservation Biology* 1: 103.

Carr, A. and Meylan, A.B. 1980. Evidence of passive migration of green turtle hatchlings in Sargassum. *Copeia* 1980: 366-368.

Catry, P., Barbosa, C., Indjai, B., Almeida, A., Godley, B.J. and Vié, J.C. 2002. First census of the green turtle at Poilao, Bijagos Archipelago, Guinea-Bissau: the most important nesting colony on the Atlantic coast of Africa. *Oryx* 36: 400-403.

Costa Jordao, J., Vigliar Bondioli, A.C., Foresti de Almeida-Toledo, L., Bilo, K., Berzins, R., Le Maho, Y., Chevallier, D., and de Thoisy, B. 2015. Mixed-stock analysis in green turtles *Chelonia mydas*: mtDNA decipher current connections among west Atlantic populations. *Mitochondrial DNA* part A: 197-207.

De Franco, L. 2011. Análise de resíduos sólidos presentes no conteúdo fecal de juvenis de tartaruga-verde (*Chelonia mydas*) in situ na região de Cerro Verde – Uruguai. Pós graduação em Conservação e Manejo da Fauna Silvestre, Ipessp – Instituto de Pesquisa e Educação em Saúde de São Paulo.

Domingo, A., Bugoni, L., Prosdocimi, L., Miller, P., Laporta, M., Monteiro, D.S., Estrades, A. and Albareda, D. 2006. El impacto generado por las pesquerias en las tortugas marinas en el Océano Atlántico sud occidental. In: WWF Programa Marino para Latinoamérica y el Caribe (ed.). San Jose, Costa Rica.

Domingo, A., Sales, G., Giffoni, B., Miller, Ph., Laporta, M. and Maurutto, G. 2006. Captura Incidental de Tortugas Marinas con Palangre Pelágico en el Atlántico Sur por las Flotas Atuneras de Brasil y Uruguay. *Collective Volume of Scientific Papers ICCAT* 59(3): 992-1002.

Duarte, D.L.V., Monteiro, D.S., Estima, S.C., Barros, J.A., Jardim, R.D., Soares, J.C. & Varela, A.S. 2011. Determinação sexual e maturação gonadal de fêmeas de tartaruga-verde (*Chelonia mydas*) e tartaruga-cabeçuda (*Caretta caretta*) no extremo sul do Brasil. V Jornada de Pesquisa e Conservação de Tartarugas Marinhas no Atlântico Sul Ocidental (ASO). Florianópolis.

Ferrando, V., Fallabrino, A., Estrades, A., Massimino, V., Curbelo, T., González Paredes, D. 2015. Revision of fibropapilomatosis in Green turtles (*Chelonia mydas*) in Uruguayan waters. In: Kaska, Y., Sonmez, B., Turkecan, O., Sezgin, C. (ed.), Book of abstracts of 35th Annual Symposium on Sea Turtle Biology and Conservation. Turkey.

Fiedler, F.N., Sales, G., Giffoni, B., Monterio-Filho, E.L.A., Secchi, E.R. and Bugoni, L. 2012. Driftnet fishery threats to sea turtles in the Atlantic Ocean. *Biodiversity and Conservation* 21: 915-931.

Fleming, E.H. 2001. *Swimming Against the Tide: Recent surveys of Exploitation, Trade, and Management of Marine Turtles in the Northern Caribbean*. Traffic North America, Washington D.C. 161 pp.

Fretey, J. 2001. *Biogeography and conservation of marine turtles of the Atlantic Coast of Africa. CMS Technical Series Publication No 6*. UNEP/CMS Secretariat, Bonn, Germany.

Gallo, B.M.G., Macedo, S., Giffoni, B.D.B., Becker, J.H. and Barata, P.C.R. 2006. Sea turtle conservation in Ubatuba, southeastern Brazil, a feeding area with incidental capture in coastal fisheries. *Chelonian Conservation and Biology* 6: 126-129.

García-Cruz, M.A., Lampo, M., Peñaloza, C.L., Kendall, W.L., Solé, G., Rodriguez-Clark, K.M. 2015. Population trends and survival of nesting green sea turtles *Chelonia mydas* on Aves Island, Venezuela. *Endangered Species Research* 29: 103-116.

George, R.H. 1997. Health problems and diseases of sea turtles. In: P.L. Lutz and J.A. Musick (eds) *The Biology of Sea Turtles*, pp. 363-409. CRC Press, Boca Raton, Florida.

Godley, B.J., Lima, E.H.S.M., Åkesson, S., Broderick, A.C., Glen, F., Godfrey, M.H., Luschi, P., Hays, G.C. 2003. Movement patterns of green turtles in Brazilian coastal waters described by satellite tracking and flipper tagging. *Endangered Species Research* 253: 279-288.

González Carman, V., Acha, E.M., Maxwell, S.M., Albareda, D., Campagna, C. y Mianzan, H. 2014. Young green turtles, *Chelonia mydas*, exposed to plastic in a frontal area of the SW Atlantic. *Marine Pollution Bulletin* 78: 56-65.

González Carman, V., Botto, F., Gaitán, E., Albareda, D., Campagna, C. y Mianzan, H. 2014. A jellyfish diet for the herbivorous green turtle *Chelonia mydas* in the temperate SW Atlantic. *Marine Biology* 161339-349.

González Carman, V., Falabella, V., Maxwell, S., Albareda, D., Campagna, C., Mianzan, H. 2012. Revisiting the ontogenetic shift paradigm: The case of juvenile green turtles in the SW Atlantic. *Journal of Experimental Marine Biology and Ecology* 429: 64-72.

González Carman, V., Machain, N., Albareda, D., Mianzan, H. and Campagna, C. 2012. Legal and institutional tools to mitigate marine turtle bycatch: Argentina as a case study. *Marine Policy* 36: 1265-1274.

González Carman, V., Machain, N., Campagna, C. 2015. Legal and institutional tools to mitigate plastic pollution affecting marine species: Argentina as a case study. *Marine Pollution Bulletin* 92: 125-133.

González Carman, V., Álvarez, K., Prosdocimi, L., Inchaurraga, M.C., Dellacasa, R., Faiella, A., Echenique, C., González, R., Andrejuk, J., Mianzan, H., Campagna, C., Albareda, D. 2011.

Temperate SW Atlantic: a feeding and developmental habitat for endangered sea turtles. *Marine Biology Research* 7: 500-508.

Groombridge, B. and Luxmoore, R. 1989. *The Green Turtle and Hawksbill (Reptilia: Cheloniidae): World Status, Exploitation and Trade*. Secretariat of the Convention on International Trade in Endangered Species of Wild Fauna and Flora, Lausanne, Switzerland, 601 pp.

Guebert-Bartholo, F.M., Barletta, M., Costa, M.F. & Monteiro-Filho, E.L.A. 2011. Using gut contents to assess foraging patterns of juvenile green turtles *Chelonia mydas* in the Paranaguá Estuary, Brazil. *Endangered Species Research* 13: 131-143.

Hilton-Taylor, C. 2000. *2000 IUCN Red List of Threatened Species*. IUCN, Gland, Switzerland and Cambridge, UK.

Hirth, H.F. 1997. Synopsis of the biological data on the green turtle, *Chelonia mydas* (Linnaeus 1758). United States Fish and Wildlife Service Biological Report 97-1. 120 pp.

Humphrey, S.L. and Salm, R.V. (eds). 1996. Status of Sea Turtle Conservation in the Western Indian Ocean. *UNEP Regional Seas Reports and Studies* No. 165. IUCN/UNEP, Nairobi, Kenya. 162 pp.

Jones, T. and Seminoff, J. 2013. Feeding biology: advances from field-based observations, physiological studies, and molecular techniques. In: Wyneken, J., Lohmann, K.J., Musick, J.A. (ed.), *The biology of sea turtles*, pp. 211-247. CRC Press, Boca Raton, USA.

Laporta, M., Miller, P. and Domingo, A. 2013. Captura incidental de tortugas marinas en la pesquería de arrastre Uruguaya. In: Zaldua-Mendizabal, N., Egaña-Callejo, A. (ed.), Marine turtles of the North East Atlantic. Contributions for the First Regional Conference, pp. 43-50. San Sebastian.

Laporta, M., Miller, P., Ríos, M., Lezama, C., Bauzá, A., Aisenberg, A., Pastorino, Ma.V. and Fallabrino, A. 2006. Conservación y Manejo de Tortugas Marinas en la Zona Costera Uruguaya. In: Menafra, R., Rodríguez-Gallego, L., Scarabino, F. and Conde, D. (eds), *Bases para la Conservación y Manejo de la Costa Uruguaya*, pp. 668. VIDA SILVESTRE URUGUAY, Montevideo.

Lenz, A.J., Avens, L., Borges-Martins, M. 2017. Age and growth of juvenile green turtles *Chelonia mydas* in the western South Atlantic Ocean. *Marine Ecology Progress Series* 568: 191-201.

Lezama, C., Carranza, A., Fallabrino, A., Estrades, A., Scarabino, F. and López-Mendilaharsu, M. 2012. Unintended backpackers: bio-fouling of the invasive gastropod *Rapana venosa* on the green turtle *Chelonia mydas* in the Río de la Plata Estuary, Uruguay. *Biological Invasions* 15: 485.

Lezama, C., Rivas, F., Viera, N., Fallabrino, A. and Estrades, A. 2013. Green turtle interactions with coastal gillnet fishery of the Rio de la Plata estuary, Uruguay. In: Tucker, T., Belskis, L., Panagopoulou, A., Rees, A., Frick, M., Williams, K., LeRoux, R., and Stewart, K. (eds), Proceedings of the Thirty-Third Annual Symposium on Sea Turtle Biology and Conservation. NOAA NMFS-SEFSC-645: 104 Pp.

Limpus, C.J., Couper, P.J. and Read, M.A. 1994. The green turtle, *Chelonia mydas*, in Queensland: population structure in a warm temperate feeding area. *Memoirs of the Queensland Museum* 35: 139-154.

Lozoya, J.P., Carranza, A., Lenzi, J. *et al*. 2015. Management and research on plastic debris in Uruguayan Aquatic Systems: update and perspectives. *Journal of Integrated Coastal Zone Management / Revista de Gestão Costeira Integrada* 15(3): 377-393.

Lutcavage, M.E., Plotkin, P., Witherington, B. and Lutz, P.L. 1997. Human impacts on sea turtle survival. In: P.L. Lutz and J.A. Musick (eds) *The Biology of Sea Turtles*, pp. 107-136. CRC Press, Boca Raton, Florida.

López-Barrera, E.A., Longo, G.O., Monteiro-Filho, E.L.A. 2012. Incidental capture of green turtle (*Chelonia mydas*) in gillnets of small-scale fisheries in the Paranaguá Bay, Southern Brazil. *Ocean & Coastal Management* 60: 11-18.

López-Mendilaharsu, M., Estrades, A., Caraccio, M.N., Calvo, V., Hernández, M. & Quirici, V. 2006. Biología, Ecología y Ecología de las Tortugas Marinas en la Zona Costera Uruguaya. In: Menafra, R., Rodríguez-Gallego, L., Scarabino, F. & D. Conde (ed.), *Bases para la Conservación y Manejo de la Costa Uruguaya*, pp. 247-258. VIDA SILVESTRE URUGUAY, Montevideo.

Marcovaldi, M., Sales, G., Thomé, J.C., da Silva, A., Gallo, B.M., Lima, E., Lima, E.P., Bellini, C. 2006. Sea turtles and fishery interactions in Brazil: identifying and mitigating potential conflicts. *Marine Turtle Newsletter* 112: 4-8.

Marcovaldi, M.A. and Marcovaldi, G.Gd. 1999. Marine turtles of Brazil: the history and structure of Projeto TAMAR-IBAMA. *Biological Conservation* 91: 35-41.

Marcovaldi, M.A., Patiri, V. and Thome, J.C. 2005. Projeto TAMAR-IBAMA: twenty-five years protecting Brazilian sea turtles through a community-based conservation program. In: J. Frazier (ed.), *Marine Turtles As Flagships*, pp. 39-62. MAST/Maritime Studies (Special Issue) 3/4.

Martinez Souza, G. 2014. Caracterizaçao populacional de juvenis de tartaruga-verde (*Chelonia mydas*) em duas áreas do Atlântico Sul Ocidental. Programa de Pós-graduaçao em Oceanografia Biológica, Universidad Federal do Rio Grande.

Meylan, P.A., Meylan, A.B., Gray, J.A. 2011. The ecology and migrations of sea turtles, 8: Test of the developmental habitat hypothesis. *Bulletin of the American Museum of Natural History* 357: 1-70.

Monteiro D.S., Estima S.C., Gandra T.B.R., Silva A.P., Bugoni L., Swimmer Y., Seminoff J.A. and Secchi E.R. 2016. Long-term spatial and temporal patterns of sea turtle strandings in southern Brazil. *Marine Biology* 163: 247.

Monteiro, D.S., Bugoni, L., Estima, S.C. 2006. Strandings and sea turtles fisheries interactions along the coast of Rio Grande do Sul state, Brazil. Book of Abstracts of 26th Annual Symposium on sea turtle biology and conservation: 257. Athenes.

Monteiro, D.S., Estima, S.C., Junqueira, S.P., Bugoni, L., Gandra, T.B.R. 2005. Ocorrência de Chelonia mydas e interação com a pesca artesanal no interior do estuário da Lagoa dos Patos

– RS. Livro de Resumos da II Jornada de Conservação e Pesquisa de Tartarugas Marinhas no Atlântico Sul Ocidental NEMA/FURG: 68-71.

Moreira, L., Baptistotti, C., Scalfone, J., Thomé, J.C. and de Almeida, A.P.L.S. 1995. Occurrence of *Chelonia mydas* on the Island of Trindade, Brazil. *Marine Turtle Newsletter* 70: 2.

Mortimer, J.A. and Portier, K.M. 1989. Reproductive homing and internesting behaviour of the green turtle (*Chelonia mydas*) at Ascension Island, South Atlantic Ocean. *Copeia* 1989: 962.

Murman, I. 2011. El impacto de los desechos antrópicos en individuos juveniles de *Chelonia mydas* (tortuga verde), Cerro Verde, Uruguay. Departamento de Ciencias Biológicas, Universidad CAECE.

Musick, J.A. and Limpus, C.J. 1997. Habitat utilization and migration in juvenile sea turtles. In: P.L. Lutz and J.A. Musick (eds), *The Biology of Sea Turtles*, pp. 137-164. CRC Press, Boca Raton, Florida, Book.

Nagaoka, S.M., Martins, A.S., Santos, R.G., Tognella, M.M.P., Filho, E.C.O., Seminoff, J.A. 2012. Diet of juvenile green turtles (*Chelonia mydas*) associating with artisanal fishing traps in a subtropical estuary in Brazil. *Marine Biology* 159(3): 573-589.

National Research Council. 1990. *Decline of the Sea Turtles: Causes and Prevention*. National Research Council, Washington, DC, USA.

Navid, D. 1982. Conservation and management of sea turtles. In: K.A. Bjorndal (ed.) *Biology and Conservation of Sea Turtles*, pp. 523-536. Smithsonian Institution Press, Washington, D.C.

Pastorino, V., Aguirre, A., Caraccio, N., Hernández, M., Fallabrino, A. & Moraña, J.A. 2007. First histopathological confirmation of fibropapilomatosis in juvenile green turtles in Uruguay. Proceedings of the 24th Annual Symposium on Sea Turtle Biology and Conservation. NOAA Tech. Memo. NMFS-SEFSC 567: 145.

Pinedo, M.C. and Polachek, T. 2004. Sea turtle by-catch in pelagic longline sets off southern Brazil. *Biological Conservation* 119: 335-339.

Proietti, M.C., Lara-Ruiz, P., Reisser, J.W., Pinto, Ld.S., Dellagostin, O.A., Marins, L.F. 2009. Green turtles (*Chelonia mydas*) foraging at Arvoredo Island in Southern Brazil: Genetic characterization and mixed stock analysis through mtDNA control region haplotypes. *Genetics and Molecular Biology* 32: 613-618.

Proietti, M.C., Reisser, J.W., Kinas, P.G., Kerr, R., Monteiro, D.S., Marins, L.F. & Secchi, E.R. 2012. Green turtle *Chelonia mydas* mixed stocks in the western South Atlantic, as revealed by mtDNA haplotypes and drifter trajectories. *Marine Ecology Progress Series* 447: 195-209.

Prosdocimi, L., González Carman, V., Albareda, D. & Remis, M.I. 2012. Genetic composition of Green turtle feeding grounds in coastal waters of Argentina based on mitochondrial DNA. . *Journal of Experimental Marine Biology* 412: 37-45.

Ramos, K.L, Vasconcellos, M.C. 2013. Characterization of the interactions between sea turtles and bottom gillnets in southern Brazil through interviews with fishers. *Marine Turtle Newsletter* 139: 6-12.

Rivas, F. 2012. Captura incidental de tortugas marinas en Bajos del Solís, Uruguay. Facultad de Ciencias, Universidad de la República.

Sales, G., Giffoni, B.B. and Barata, P.C.R. 2008. Incidental catch of sea turtles by the Brazilian pelagic longline fishery. *Journal of the Marine Biological Association of the United Kingdom* 88: 853-864.

Santos, R.G., Andrades, R., Boldrini, M.A., Martins, A.S. 2015. Debris ingestion by juvenile marine turtles: An underestimated problem. *Marine Pollution Bulletin* 93: 37-43.

Santos, R.G., Martins, A.S., Batista, M.B., Horta, P.A. 2015. Regional and local factors determining green turtle *Chelonia mydas* foraging relationships with the environment. *Marine Ecology Progress Series* 52: 265-277.

Santos, R.G., Martins, A.S., Farias, J.N., Horta, P.A., Pinheiro, H.T., Torezani, E., Baptistotte, C., Seminoff, J.A., Balazs, G.H. & Work, T.M. 2011. Coastal habitat degradation and green sea turtle diets in southeastern Brazil. *Marine Pollution Bulletin* 62(6): 1297-1302.

Santos, R.G., Martins, A.S., Torezani, E., Baptistotte, C., Farias, Jd.N., Horta, P.A., Work, T.M., Balazs, G.H. 2010. Relationship between fibropapillomatosis and environmental quality: a case study with *Chelonia mydas* off Brazil. *Diseases of Aquatic Organisms* 89: 87-95.

Scolaro, J.A. 1990. *Chelonia mydas* (Green Sea Turtle). *Herpetological Review* 21: 24.

Seminoff, J.A. 2004. *Chelonia mydas*. *The IUCN Red List of Threatened Species* 2004: http://dx.doi.org/10.2305/IUCN.UK.2004.RLTS.T4615A11037468.en.

Seminoff, J.A., Allen, C.D., Balazs, G.H., Dutton, P.H., Eguchi, T., Haas, H.L., Hargrove, S.A., Jensen, M.P., Klemm, D.L., Lauritsen, A.M., MacPherson, S.L., Opay, P., Possardt, E.E., Pultz, S.L., Seney, E.E., Van Houtan, K.S., Waples, R.S. 2015. Status Review of the Green Turtle (*Chelonia mydas*) Under the U.S. Endangered Species Act. NOAA Technical Memorandum, NOAANMFS- SWFSC-539.

Seminoff, J.A., Jones, T.T., Resendiz, A., Nichols, W.J. and Chaloupka, M.Y. 2003. Monitoring green turtles (*Chelonia mydas*) at a coastal foraging area in Baja California, Mexico: multiple indices describe population status. *Journal of the Marine Biological Association of the United Kingdom* 83: 1355-1362.

Silva, L.M. 2006. Captura incidental de tartarugas marinhas no estuário da Lagoa dos Patos e região costeira adjacente - RS - Brasil. Ecologia, Universidade Católica de Pelotas-UCPel.

Teryda, N. 2015. Evaluación de la ingestión de residuos antrópicos de la tortuga verde (*Chelonia mydas*) en Uruguay. Facultad de Ciencias Exactas y Naturales, Universidad Nacional de Mar del Plata.

Tonelli, M. 2005. *Acciones a ser implementadas para el establecimiento de una buena cooperación internacional entre Argentina, Uruguay y Brasil para la protección y conservación de tortugas marinas. IV Master en Gestión, Acceso y Conservación de Especies en Comercio: El Marco Internacional*. Sede Antonio Machado de Baeza, Universidad Internacional de Andalucía, España.

Torezani, E., Baptistotte, C., Mendes, S.L., Barata, P.C.R. 2010. Juvenile green turtles (*Chelonia mydas*) in the effluent discharge channel of a steel plant, Espírito Santo, Brazil, 2000–2006. *Journal of the Marine Biological Association of the United Kingdom* 90: 233-246.

Tourinho, P.S., Ivar do Sul, J., Fillman, G. 2010. Is marine debris ingestion still a problem for the coastal marine biota of southern Brazil? . *Marine Pollution Bulletin* 60: 396-401.

Vernetti, D.L.D. 2009. Determinação sexual e maturação gonadal de fêmeas da tartaruga-verde (*Chelonia mydas*) e da tartaruga-cabeçuda (*Caretta caretta*) no extremo sul do Brasil. Universidade Federal do Rio Grande.

Viera, N. 2012. Captura incidental de tortugas marinas por la pesquería artesanal que opera en la región estuarina interna del Río de la Plata. Facultad de Ciencias, Universidad de la República.

Vélez-Rubio, G.M. 2011. Estudio de los varamientos de tortugas marinas en Uruguay, un área critica de alimentación y desarrollo en el Atlántico Sur Occidental. Máster en Biodiversidad: Conservacion y Evolucion, Facultat de Ciències Biològiques, Universitat de València.

Vélez-Rubio, G.M., Cardona, L., López-Mendilaharsu, M., Martinez Souza, G., Carranza, A., González-Paredes, D. & Tomás, J. 2016. Ontogenetic dietary changes of green turtles (*Chelonia mydas*) in the temperate southwestern Atlantic. *Marine Biology* 163: 57.

Vélez-Rubio, G.M., Estrades, A., Fallabrino, A. and Tomás, J. 2013. Marine turtle threats in Uruguayan waters: insights from 12 years of stranding data. *Marine Biology* 2013: DOI: 10.1007/s00227-013-2272-y.

Vélez-Rubio, G.M., Tomás, J., Míguez-Lozano, R., Xavier, J., Martinez Souza, G. & Carranza, A. 2015. New insights in Southwestern Atlantic Ocean Oegopsid squid distribution based on juvenile green turtle (*Chelonia mydas*) diet analysis. *Marine Biodiversity* 45(4): 701–709.

Wallace, B.P., DiMatteo, A.D., Bolten, A.B., Chaloupka, M.Y., Hutchinson, B.J., Abreu-Grobois, F.A., Mortimer, J.A., Seminoff, J.A., Amorocho, D., Bjorndal, K.A., Bourjea, J., Bowen, B.W., Briseño-Dueñas, R., Casale, P., Choudhury, B.C., Costa, A., Dutton, P.H., Fallabrino, A., Finkbeiner, E.M., Girard, A., Girondot, M., Hamann, .M, Hurley, B.J., López-Mendilaharsu, M., Marcovaldi, M.A., Musick, J.A., Nel, R., Pilcher, N.J., Troëng, S., Witherington, B. and Mast, RB. 2011. Global conservation priorities for marine turtles. *PLoS ONE* 6(9): e24510. doi:10.1371/journal.pone.0024510.

Wallace, B.P., DiMatteo, A.D., Hurley, B.J., Finkbeiner, E.M., Bolten, A.B., Chaloupka, M.Y., Hutchinson, B.J., Abreu-Grobois, F.A., Amorocho, D., Bjorndal, K.A., Bourjea, J., Bowen, B.W., Briseño-Dueñas, R., Casale, P., Choudhury, B.C., Costa, A., Dutton, P.H., Fallabrino, A., Girard, A., Girondot, M., Godfrey, M.H., Hamann, M., López-Mendilaharsu, M., Marcovaldi, M.A., Mortimer, J.A., Musick, J.A., Nel, R., Pilcher, N.J., Seminoff, J.A., Troëng, S., Witherington, B. and Mast, R.B. 2010. Regional Management Units for marine turtles: A novel framework for prioritizing conservation and research across multiple scales. *PLoS ONE* 5(12): e15465. doi/10.1371/journal.pone.0015465.

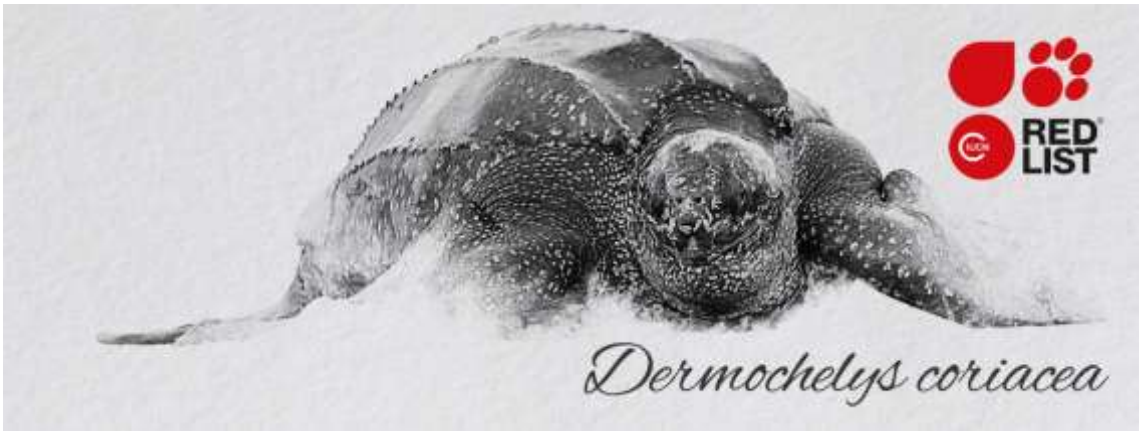
Weber S.B., Weber, N., Ellick, J., Avery, A., Frauenstein, R., Godley, B.J., Sim, J., Williams, N., Broderick, A.C. 2014. Recovery of the South Atlantic's largest green turtle nesting population. *Biodiversity and Conservation* 23: 3005-3018.

Witham, R. 1991. On the ecology of young sea turtles. *Florida Science* 54: 179.

Witherington, B.E. 1992. Behavioral responses of nesting sea turtles to artificial lighting. *Herpetologica* 48: 31-39.

Witherington, B.E. and Bjorndal, K A. 1990. Influences of artificial lighting on the seaward orientation of hatchling loggerhead turtles, *Caretta caretta*. *Biological Conservation* 53: 139-149.

da Silva Mendes, S., de Carvalho, R.H., de Faria, A.F., de Sousa, B.M. 2015. Marine debris ingestion by Chelonia mydas (Testudines: Cheloniidae) on the Brazilian coast. *Marine Pollution Bulletin* 92: 8-10.



NT – Near Threatened, (IUCN version 3.1)

Assessment Rationale:

Patagonian Sea is the most important feeding ground for Leatherback turtles in the Southwest Atlantic Ocean. Population genetics studies reveled that turtles in this region belong to Southwest or Southeast Atlantic subpopulation (84% breed in West Africa, and approximately 10% in Brazil). The geographical distribution of the Southeast and the Southwest Atlantic subpopulations are identical, but both subpopulations are genetically distinct and do not exchange breeding individuals.

The total breeding area (based on nesting females in both Brazil and West Africa) is approximately 500 km^2 or less, across approximately 20 nesting (beach) sites (Thomé *et al.* 2007; Tiwari *et al.* 2013). There is a continuing decline in habitat quality from pollution, and decreasing numbers of mature individuals due to capture as bycatch and hunting. The combined population (Brazil and West Africa) can therefore be listed as Near Threatened under B2ab (iii,v). As the individuals observed in the Patagonian Sea are from these combined populations, the species is also listed as **Near Threatened** in this regional assessment.

Assessor(s): Prosdocimi, L., Fallabrino, A. & Albareda, D.

Reviewer(s): Gonzalez Carman, V. & Falabella, V.

Contributor(s): Lopez-Mendilaharsu, M., Monteiro, D., Girondot, M., Tiwari, M., Vélez-Rubio, G., Wallace, B.P., Thome, J., Marcovaldi, M.A. & de Padua Almeida, A.

Facilitators/Compilers: Polidoro, B. & Falabella, V.

Taxonomic information

ANIMALIA - CHORDATA - REPTILIA - TESTUDINES - DERMOCHELYIDAE - Dermochelys – coriácea – (Vandelli, 1761)

Common Names: Leatherback (English), Baula (Spanish; Castilian), Canal (Spanish; Castilian), Cardon (Spanish; Castilian), Coffin-back (English), Dorso de Cuero (Spanish; Castilian), Galapagos (Spanish; Castilian), Leatherback Sea Turtle (English), Leathery Turtle (English), Lederschildkröte (German), Luth (English), Siete Lomos (Spanish; Castilian), Siete Quillas (Spanish; Castilian), Tartaruga-de-casco-mole (Portuguese), Tartaruga-de-couro (Portuguese), Tartaruga-gigante (Portuguese), Tinglada (Spanish; Castilian), Tinglar (Spanish; Castilian), Tora (Spanish; Castilian), Tortue luth (French), Tortuga Caná (Spanish; Castilian), Tortuga Laud (Spanish; Castilian), Trunk Turtle (English), Trunkback Turtle (English), سلحفاة المحيط الظهر جلدية (Arabic)

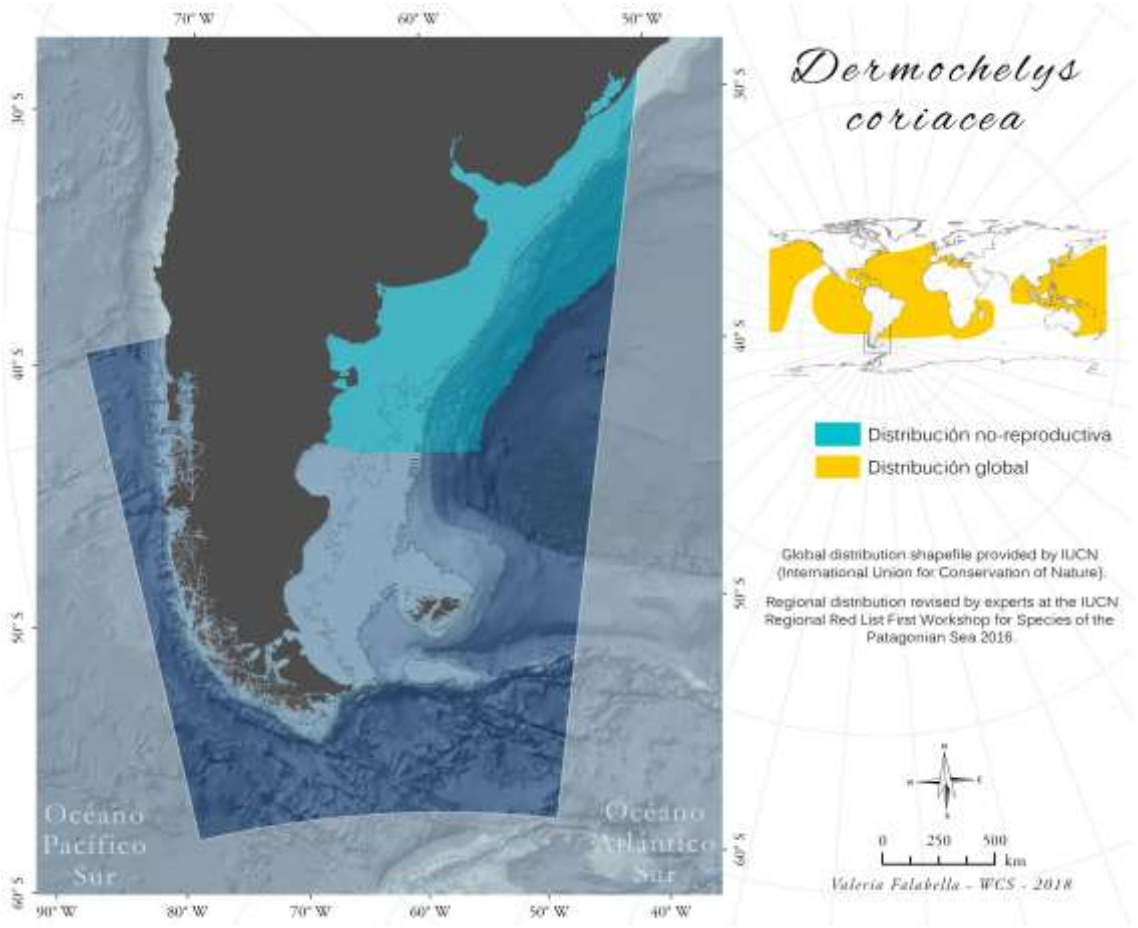
Synonyms: *Testudo coriacea* Vandelli, 1761

Geographic Range

Leatherbacks are circumglobally distributed, using tropical sandy beaches as nesting sites, and foraging ranges that extend into temperate and sub-polar latitudes. See Eckert *et al*. (2012) for more information about Leatherback's global geographic range.

In the Patagonian Sea, leatherbacks range of distribution extends throughout all the South Atlantic Ocean, inhabiting the neritic and oceanic zone. In the particular case of the South Atlantic Leatherback subpopulation, turtles nests in Espiritu Santo-Brazil (Barata *et al.* 2004, Thomé *et al.* 2007) and in East Africa (Formia *et al.* 2000, Fretey 2007, Witt *et al.* 2009).

According to investigations done with satellite telemetry, mark-recapture and strandings case studies, the **Patagonian Sea** is the most important feeding ground for Leatherback turtles in the Southwest Atlantic Ocean (Álvarez-Varas *et al.* 2016, Almeida *et al.* 2011, Billes *et al.* 2006, López-Mendilaharsu *et al.* 2009, Fossette *et al.* 2010, González Carman *et al.* 2011, González Carman *et al.* 2016, González- Paredes *et al.* 2013, Monteiro *et al.* 2016, Vélez-Rubio *et al.* 2013). For this region, the southernmost record, for Leatherback, is registered in oceanic waters at latitude 45°S – 53°W (López-Mendilaharsu *et al.* 2009).



Population

The global population of Leatherback turtles comprises seven subpopulations, described as Regional Management Units (RMUs), that vary widely in population size, geographic range, and population trends (Wallace *et al*. 2010, Wallace *et al*. 2011). RMUs are functionally equivalent to IUCN subpopulations, thus providing the appropriate demographic unit for Red List assessments. Leatherback RMUs (hereafter subpopulations) are: Northwest Atlantic Ocean, Southeast Atlantic Ocean, Southwest Atlantic Ocean, Northeast Indian Ocean, Southwest Indian Ocean, East Pacific Ocean, and West Pacific Ocean.

The leatherback turtle does not breed in the **Patagonian region**. Individuals found in the Patagonian Sea region belong to both Southeast and Southwest Atlantic subpopulations (Wallace *et al.* 2010). Population genetics studies estimated that 84% of the Patagonian sea Patagonian Sea individuals breed in West Africa and approximately 10% breed in Brazil (Prosdocimi *et al.* 2014, Vargas *et al.* 2008).

The geographical distributions of the Southeast and Southwest Atlantic subpopulations are identical (Wallace *et al*. 2010), nevertheless the two subpopulations are genetically distinct and do not exchange breeding individuals (Dutton *et al*. 2013). The Southeast Atlantic subpopulation breeds in West Africa and is the largest in the world, with a total estimated of 15,730 to 41,373 breeding females (Witt *et al*. 2009). The biggest nesting site is located in Gabón (Fretey *et al.* 2007, Witt *et al.* 2009, Witt *et al.* 2011). The Southwest Atlantic

Leatherback subpopulation nests only in Espiritu Santo, southern Brazil, with a total estimated of 35 mature individuals. Annual number of nets increased at about 20.4% per year between 1995-1996 and 2003-2004 (Thomé *et al*. 2007).

Habitats and Ecology

D. coriacea is an oceanic, deep-diving marine turtle that inhabits tropical, subtropical, and subpolar seas. Leatherbacks make extensive seasonal migrations between different feeding and nesting areas. Leatherbacks feed predominantly on jellyfishes, salps and siphonophores (Bjorndal 1997, Jones and Seminoff 2013).

Females are characterized by migrating during the reproductive seasons, which occur with an interval of several years (2+), producing several clutches (3-10) of 60-90 eggs per reproductive season,. For a thorough review of Leatherback biology, please see Eckert *et al*. (2012).

Satellite tracking studies showed that coastal waters of Brazil, Uruguay and Argentina are important feeding grounds for this species at different stages of its life cycle, being the estuary of Rio de la Plata one of the most important feeding areas for large juveniles and adults (Fossette *et al.* 2010, López-Mendilaharsu *et al.* 2007, López-Mendilaharsu *et al.* 2009). South of this area, the species occurred seasonally during austral summer, from November to May (González Carman *et al.* 2011, Prosdocimi *et al.* 2016a).

Leatherback age at maturity is uncertain, and estimates, based on skeletochronology (Zug and Parham, 1996), and inferences from mark-recapture studies (Dutton et al., 2005), are imprecise (see Jones *et al.* 2011), varying widely between 9 and 15 years. Even, these become more imprecise when we consider updated skeletochronological analyses, which estimated the age at maturity between 26-32 years (mean 29 years, Avens *et al*. 2009). Extrapolations of growth curves of individuals in captivity under controlled thermal and trophic conditions suggested that size at maturity could be reached in 7-16 years (Jones *et al*. 2011). Thus, wild leatherback age at maturity remains uncertain with a high degree of variance. Likewise, leatherback lifespan is unknown. Long-term monitoring studies of leatherback nesting populations have tracked individual adult females over multiple decades (e.g. Santidrián Tomillo, *et al*. unpublished data; Nel and Hughes, unpublished data), but precise estimates of reproductive lifespan and longevity for leatherbacks are currently unavailable. The IUCN Red List Criteria define generation length as the average age of parents in a population; older than the age at maturity and younger than the oldest mature individual (IUCN, 2011). Thus, based on this definition, we estimated generation length is e 30 years, or equal to the age at maturity (estimated in 20 years), plus a conservative estimate of an average reproductive life of 10 years, as assumed by Spotila *et al*. (1996).

General Use and Trade Information

Leatherback eggs and animals are taken for human use (i.e. consumption and commercial products), eggs are also eaten by domestic animals (e.g. dogs).

Threats

Threats vary in time and space, and in relative impact to populations. Fisheries bycatch was classified as the highest global threat for all Leatherback subpopulations, followed by human

consumption of its eggs, meat, or other subproduct, and by coastal development (Wallace *et al*. 2011).

Main threat at the **Patagonian Sea** is fisheries bycatch in trawlers, longliners, driftnets, bottom gillnets, as well as ghost fishing via derelict fishing gear (Domingo *et al.* 2006a, Domingo *et al.* 2006b, Fallabrino *et al.* 2006, Fiedler *et al.* 2012, Fossette *et al.* 2014, Giffoni *et al.* 2008, Kotas *et al.* 2004, Laporta *et al.* 2006a, Laporta *et al.* 2006b, Laporta *et al.* 2013, Monteiro *et al.* 2007, Monteiro 2008, Pinedo and Polachek 2004, Prosdocimi *et al.* 2016b, Rizzi 2014, Sales *et al.* 2008, Vélez-Rubio 2011).

There is a continuing habitat quality decline due pollution, and a decreasing number of mature individuals due bycatch capture and hunt Tiwari *et al.* 2013). Mortality due to bycatch is difficult to estimate, but is inferred to be at least 100 individuals annually, based on records of stranded turtles, which are supposedly killed by fishing gear (Albareda, Prosdoscimi and Fallabrino, pers. comm 2016.). Using as a basis a threat analysis, it is estimated that between 100 and 1660 animals are killed in the Southwest Atlantic, particularly due to fisheries (Prosdocimi *et al*. 2016b).

Conservation

In the **Patagonian Sea** Leatherback turtles have been afforded legislative protection under a number of treaties and laws (González Carman *et al.* 2012, González Carman *et al.* 2015). Argentina, Brazil and Uruguay signed, approved and ratified by their national laws the following International Conventions: Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), Convention on Migratory Species (CMS), Convention on Wetlands of International Importance (RAMSAR), Convention on Biological Diversity (CBD), United Nations Convention on the Law of the Sea (CONVEMAR) and Inter-American Sea Turtle Convention (CIT).

The three countries have also national legislation and regulations that directly and indirectly protects sea turtles. In 2014, the Federal Environment Council (COFEMA) of Argentina approved the National Action Plan for the Conservation of Sea Turtles, together with the National Program of Action to Reduce the Interaction of Marine Turtles with marine debris. In 2011, the Chico Mendes Institute for Conservation da Biodiversidade and Projeto Tamar published the National Action Plan for the Conservation of Sea Turtles in Brazil.

It is important to highlight the value that represents, at local and regional levels, the contributions made by the different actors that make the ASO-Turtles Network. The role of this network has to be strengthened, as a tool for experience exchanging with other regions, as well as further qualifying protection policies to sea turtles in the respective countries (Tonelli 2005).

Global Conservation

Leatherbacks are protected under various national and international Conventions, laws, treaties, agreements, and memorandum of understanding. Some of international conservation instruments that provide legislative protection for Leatherbacks are: Annex II of the SPAW Protocol, from the Cartagena Convention (a protocol concerning specially protected areas and wildlife); the Leatherback's inclusion in Appendix I of CITES (Convention on International Trade in Endangered Species of Wild Fauna and Flora); and Appendices I and II of the Convention on Migratory Species (CMS); the Inter-American Convention for the Protection and Conservation of Sea Turtles (IAC); the Memorandum of Understanding on the Conservation and Management of Marine Turtles and their Habitats in the Indian Ocean and South-East Asia

(IOSEA); the Memorandum of Understanding on ASEAN Sea Turtle Conservation and Protection; and the Memorandum of Understanding Concerning Conservation Measures for Marine Turtles of the Atlantic Coast of Africa.

Long-term efforts to reduce or eliminate threats to Leatherbacks on nesting beaches have been successful in many places, (e.g. Chacón-Chaverri and Eckert 2007, Dutton *et al*. 2005, Santidrián Tomillo *et al*. 2007, Sarti Martínez *et al.* 2007) but not in all of them (e.g. Chan and Liew 1996). Reducing Leatherback bycatch has become a primary focus for many conservation projects around the world, and some mitigation efforts are showing promising results (Gilman *et al*. 2006, Gilman *et al*. 2011, Watson *et al*. 2005). However, threats to Leatherbacks—bycatch mortality and egg consumption, in particular—persist, and in some places, continue to hinder population recovery (Alfaro-Shigueto *et al*. 2011, Alfaro-Shigueto *et al*. 2012; Tapilatu *et al*. 2013; Wallace *et al.* 2013). To recover Leatherback depleted, the most prevalent and impactful threats must be reduced wherever they occur, whether on nesting beaches or in feeding, migratory, or other habitats (Bellagio Report 2007; Wallace *et al*. 2011, Wallace *et al*. 2013); a holistic approach that addresses threats at all life history stages needs to be implemented (Dutton and Squires 2011). Therefore, current conservation efforts, legal protections, and resources supporting those mechanisms must be maintained—and augmented, wherever possible—to reverse population declines and sustain stable and increasing population trends among Leatherback subpopulations. Regional and local efforts to protect Leatherbacks, their offspring, and their habitats, should be designed to address threats at appropriate scales, and implemented them with participation of appropriate stakeholders.

Bibliography

Alfaro-Shigueto, J., Mangel, J.C., Bernedo, F., Dutton, P.H., Seminoff, J.A. and Godley, B.J. 2011. Small-scale fisheries of Peru: a major sink for marine turtles in the Pacific. *Journal of Applied Ecology* 48: 1432-1440.

Alfaro-Shigueto, J., Mangel, J.C., Dutton, P.H., Seminoff, J.A. and Godley, B.J. 2012. Trading information for conservation: a novel use of ret aadio broadcasting to reduce turtle bycatch. *Oryx* 46: 332-339.

Almeida, A.P, Eckert, S.A., Bruno, S.C., and Scalfoni, J.T. 2011. Satellite-tracked movements of female Dermochelys coriacea from southeastern Brazil. *Endangered Species Research* 15: 77-86.

Avens, L., Taylor, J.C., Goshe, L.R., Jones T.T. and Hastings, M. 2009. Use of skeletochronological analys to estimate the age of leatherback sea turtles *Dermochelys coriacea* in the western North Atlantic. *Endangered Species Research* 8: 165-177.

Barata, P.C.R., Lima, E.H.S.M., Borges-Martins, M., Scalfoni, J.T., Bellini C. and Siciliano, S. 2004. Records of the leatherback sea turtle (Dermochelys coriacea) on the Brazilian coast, 1969-2001. *Journal of the Marine Biological Association of the United Kingdom* 84: 1233-1240.

Bellagio Report. 2007. Bellagio Sea Turtle Conservation Initiative: strategic planning for long-term financing of Pacific Leatherback conservation and recovery. Terengganu, Malaysia.

Billes, A., Fretey, J., Verhage, B., Huijbregts, B., Giffoni, B., Prosdocimi, L., Albareda, D.A., Georges, J.Y. & and Tiwari M. 2006. First Evidence of Leatherback Movement from Africa to South America. *Marine Turtle Newsletter* 111: 13-14.

Bjorndal, K.A. 1997. Foraging ecology and nutrition of sea turtles. In: P.L. Lutz and J.A. Musick (eds), *The Biology of Sea Turtles*, pp. 83-106. CRC Press, Boca Raton, Florida.

Bugoni, L., Neves, T.S., Leite, N.O., Carvalho, D., Sales, G., Furness, R.W., Stein, C.E., Peppes, F.V., Giffoni, B.B. and Monteiro, D.S. 2008. Potential bycatch of seabirds and turtles in hook-and-line fisheries of the Itaipava Fleet, Brazil. *Fisheries Research* 90: 217-224.

Chacón-Chaverri, D. and Eckert, K.L. 2007. Leatherback sea turtle nesting at Gandoca Beach in Caribbean Costa Rica: management recommendations from fifteen years of conservation. *Chelonian Conservation and Biology* 6: 101-110.

Chan, E.H. and Liew, H.C. 1996. Decline of the leatherback population in Terengganu, Malaysia, 1956-1995. *Chelonian Conservation and Biology* 2: 196-203.

Domingo, A., Bugoni, L., Prosdocimi, L., Miller, P., Laporta, M., Monteiro, D.S., Estrades, A. and Albareda, D. 2006. El impacto generado por las pesquerias en las tortugas marinas en el Océano Atlántico sud occidental. In: WWF Programa Marino para Latinoamérica y el Caribe (ed.). San Jose, Costa Rica.

Domingo, A., Sales, G., Giffoni, B., Miller, Ph., Laporta, M. and Maurutto, G. 2006. Captura Incidental de Tortugas Marinas con Palangre Pelágico en el Atlántico Sur por las Flotas Atuneras de Brasil y Uruguay. *Collective Volume of Scientific Papers ICCAT* 59(3): 992-1002.

Dutton, D.L., Dutton, P.H., Chaloupka, M. and Boulon, R.H. 2005. Increase of a Caribbean leatherback turtle *Dermochelys coriacea* nesting population linked to long-term nest protection. *Biological Conservation* 126: 186-204.

Dutton, P., Bowen, B., Owens, D., Barragán, A. and Davis, S. 1999. Global phylogeography of the leatherback turtle (*Dermochelys coriacea*). *Journal of Zoology (London)* 248: 397-409.

Dutton, P.H. and Squires, D. 2011. A holistic strategy for Pacific sea turtle conservation. In: P.H. Dutton, D. Squires and A. Mahfuzuddin (eds), *Conservation and sustainable management of sea turtles in the Pacific Ocean*, pp. 37-59. University of Hawaii Press, Honolulu, Hawaii.

Dutton, P.H., Roden, S.E., Stewart, K.R., LaCasella, E., Tiwari M., Formia A., Thomé J.C., Livingstone, S.R., Eckert, S., Chacón-Chaverri, D., Rivalan, P. and Allman, P. 2013. Population stock structure of leatherback turtles (*Dermochelys coriacea*) in the Atlantic revealed using mtDNA and microsatellite markers. *Conservation Genetics* 14(3): 625-636. DOI: 10.1007/s10592-013-0456-0.

Eckert, K.L., Wallace, B.P., Frazier, J.G., Eckert, S.A. and Pritchard, P.C.H. 2012. Synopsis of the biological data on the leatherback sea turtle (*Dermochelys coriacea*). U.S. Department of Interior, Fish and Wildlife Service, Biological Technical Publication BTP-R4015-2012. Washington, DC.

Fallabrino, A., Lezama, C. and Miller, P. 2006. Incidental capture of a Leatherback Turtle (Dermochelys coriacea) by artisanal fishermen off Valizas, Uruguay. In: Pilcher N.J. (ed.), Twenty-Third Annual Symposium on Sea Turtle Biology and Conservation. NOAA Technical Memorandum NMFS-SEFSC-536.: 212-214.

Fiedler, F.N., Sales, G., Giffoni, B., Monterio-Filho, E.L.A., Secchi, E.R. and Bugoni, L. 2012. Driftnet fishery threats to sea turtles in the Atlantic Ocean. *Biodiversity and Conservation* 21: 915-931.

Formia, A., Tomas, J. and Alvarez, R.C. 2000. Nidification des tortues marines au sud de Bioko. *Canopeé* 18: I-IV.

Fossette, S., Girard, C., López-Mendilaharsu, M., Miller, P., Domingo, A., Evans, D., Kelle, L., Plot, V., Prosdocimi, L., Verhage, S., Gaspar, P., Georges, J.Y. 2010. Atlantic Leatherback Migratory Paths and Temporary Residence Areas. *PLoS ONE* 5(11): e13908.

Fossette, S., Witt, M.J., Miller, P., Nalovic, M.A., Albareda, D., Almeida, A.P., Broderick, A.C., Chacón-Chaverri, D., Coyne, M.S., Domingo, A., Eckert, S., Evans, D., Fallabrino, A., Ferraroli, S, Formia, A., Giffoni, B., Hays, G.C., Hughes, G., Kelle, L., Leslie, A., López-Mendilaharsu, M., Luschi, P., Prosdocimi, L., Rodriguez-Heredia, S., Turny, A., Verhage, S., Godley, B.J. 2014. Pan-Atlantic analysis of the overlap of a highly migratory species, the leatherback turtle, with pelagic longline fisheries. . *Proceedings of the Royal Society B* 281: 20133065.

Fretey, J., Billes A. and Tiwari, M. 2007. Leatherback, *Dermochelys coriacea*, nesting along the Atlantic coast of Africa. *Chelonian Conservation and Biology* 6: 126-129.

Giffoni, B., Domingo, A., Sales, G., Fiedler, F.N. and Miller, P. 2008. Interacción de tortugas marinas (Caretta caretta y Dermochelys coriacea) com la pesca de palangre pelágico em el Atlántico Sudoccidental: uma perspectiva regional para la conservación. *Collective Volume of Scientific Papers* 62: 1861-1870.

Gilman, E., Gearhart, J., Price, B., Eckert, S., Milliken, H., Wang, J., Swimmer, Y., Shiode, D., Abe, O., Peckham, S.H., Chaloupka, M., Hall, M., Mangel, J., Alfaro-Shigueto. J., Dalzell, P. and Ishizaki, A. 2011. Mitigating sea turtle by-catch in coastal passive net fisheries. *Fish and Fisheries* 11(1): 57-88.

Gilman, E., Zollet, E., Beverley, S., Nkano, H., Davis, K., Shiode, D., Dalzell, P. and Kinan, I. 2006. Reducing sea turtle by-catch in pelagic longline fisheries. *Fish and Fisheries* 7: 2-23.

Gonzalez-Paredes, D., Lezama, C., Estrades, A., Lopez-Mendilaharsu, M., Veléz-Rubio, G. and Fallabrino, A. 2013. Spatial and Temporal Distribution Of Leatherback Sea Turtles In The Rio De La Plata: Insights From Stranding And Fisheries Data. In: Tucker, T., Belskis, L., Panagopoulou, A., Rees, A., Frick, M., Williams, K., LeRoux, R., and Stewart, K. (eds), Proceedings of the Thirty-Third Annual Symposium on Sea Turtle Biology and Conservation NMFS-SEFSC-645: 100.

González Carman, V., Machain, N., Albareda, D., Mianzan, H. and Campagna, C. 2012. Legal and institutional tools to mitigate marine turtle bycatch: Argentina as a case study. *Marine Policy* 36: 1265-1274.

González Carman, V., Machain, N., Campagna, C. 2015. Legal and institutional tools to mitigate plastic pollution affecting marine species: Argentina as a case study. *Marine Pollution Bulletin* 92: 125-133.

González Carman, V., Mandiola, A., Alemany, D., Dassis, M., Seco Pon, J.P., Prosdocimi, L., Ponce de León, A., Mianzan, H., Acha, E.M., Rodríguez, D., Favero, M., and Copello, S. 2016. Distribution of megafaunal species in the Southwestern Atlantic: key ecological areas and opportunities for marine conservation. *ICES Journal of Marine Science* 73(6): 1579-1588.

González Carman, V., Mianzan, H., Bruno, I., Prosdocimi, L., Albareda, D. y Campagna, C. 2012. Tortugas marinas en aguas argentinas. *Revista Ciencia hoy* 22(127): 13-19.

González Carman, V., Álvarez, K., Prosdocimi, L., Inchaurraga, M.C., Dellacasa, R., Faiella, A., Echenique, C., González, R., Andrejuk, J., Mianzan, H., Campagna, C., Albareda, D. 2011. Temperate SW Atlantic: a feeding and developmental habitat for endangered sea turtles. *Marine Biology Research* 7: 500-508.

IUCN. 2011. IUCN Red List of Threatened Species (ver. 2011.1). Available at: http://www.iucnredlist.org. (Accessed: 16 June 2011).

Jones, T. and Seminoff, J. 2013. Feeding biology: advances from field-based observations, physiological studies, and molecular techniques. In: Wyneken, J., Lohmann, K.J., Musick, J.A. (ed.), *The biology of sea turtles*, pp. 211-247. CRC Press, Boca Raton, USA.

Jones, T.T., Hastings, M.D., Bostrom, B.L., Pauly, D.P. and 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.

Kotas, J.E., Santos, Sd., Azevedo, V.Gd., Gallo, B.M.G., Barata, P.C.R. 2004. Incidental capture of loggerhead (*Caretta caretta*) and leatherback (*Dermochelys coriacea*) sea turtles by the pelagic longline fishery off southern Brazil. *Fishery Bulletin* 102: 393-399.

Laporta, M., Miller, P. and Domingo, A. 2013. Captura incidental de tortugas marinas en la pesquería de arrastre Uruguaya. In: Zaldua-Mendizabal, N., Egaña-Callejo, A. (ed.), Marine turtles of the North East Atlantic. Contributions for the First Regional Conference, pp. 43-50. San Sebastian.

Laporta, M., Miller, P., Ríos, M., Lezama, C., Bauzá, A., Aisenberg, A., Pastorino, Ma.V. and Fallabrino, A. 2006. Conservación y Manejo de Tortugas Marinas en la Zona Costera Uruguaya. In: Menafra, R., Rodríguez-Gallego, L., Scarabino, F. and Conde, D. (eds), *Bases para la Conservación y Manejo de la Costa Uruguaya*, pp. 668. VIDA SILVESTRE URUGUAY, Montevideo.

Laporta, M., Miller, Ph., Horta, S. and Riestra, G. 2006. First Report of Leatherback Turtle Entanglement in Trap Lines in the Uruguayan Continental Shelf. *Marine Turtle Newsletter* 112: 9-11.

López-Mendilaharsu, M. 2011. Rotas migratórias, áreas de uso intenso e padrões de mergulho de tartarugas de couro (*Dermochelys coriacea*) no Atlântico Sul Ocidental. Centro Biomédico Instituto de Biologia Roberto Alcantara Gomes, Universidade do Estado do Rio de Janeiro.

López-Mendilaharsu, M., Rocha, C.F.D., Miller, P., Domingo, A. and Prosdocimi, L. 2009. Insights on leatherback turtle movements and high use areas in the Southwest Atlantic Ocean. *Journal of Experimental Marine Biology and Ecology* 378: 31-39.

López-Mendilaharsu, M., Sales, G., Giffoni, B., Miller, P., Fiedler, F.N. and Domingo, A. 2007. Distribución y composición de tallas de las tortugas marinas (*Caretta caretta* y *Dermochelys coriacea*) que interactuan con el palangre pelagico en el Atlántico Sur. *Collective Volume of Scientific Papers ICCAT* 60(6): 2094-2109.

Monteiro D.S., Estima S.C., Gandra T.B.R., Silva A.P., Bugoni L., Swimmer Y., Seminoff J.A. and Secchi E.R. 2016. Long-term spatial and temporal patterns of sea turtle strandings in southern Brazil. *Marine Biology* 163: 247.

Monteiro, D.S. 2008. Fatores determinantes da captura incidental de aves e tartarugas marinhas e da interação com orcas/falsas-orcas na pescaria com espinhel pelágico no sudeste-sul do Brasil. Universidade Federal do Rio Grande-FURG.

Monteiro, D.S., Estima, S.C., Bugoni, L. 2007. Sea turtle bycatch in pelagic longline fishery off southern Brazil: 2004 - 2006. Proceedings of the Twenty-Seventh annual symposium on sea turtle biology and conservation Migrate NOAA Technical Memorandum: NMFS-SEFSC-569. Miami.

Pinedo, M.C. and Polachek, T. 2004. Sea turtle by-catch in pelagic longline sets off southern Brazil. *Biological Conservation* 119: 335-339.

Prosdocimi, L., Albareda, D.A., Bruno, I., Rodriguez-Heredia, S., Navarro, G. 2016. Movimientos estacionales de la tortuga Laúd (*Dermochelys coriácea*) y su posible interacción con las pesquerías en el Rió de la Plata. *Frente Marítimo* 24: 147-154.

Prosdocimi, L., Dutton, P.H., Albareda, D.A., Remis, M. I. 2014. Origin and Genetic Diversity of Leatherbacks (*Dermochelys coriacea*) at Argentine Foraging Grounds. *Journal of Experimental Marine Biology* 458: 13-19.

Prosdocimi, L., López Mendilaharsu, M., Fallabrino, A., Giffoni, B., Marcovaldi, M.A., Estrades A., Dos Santos, A., López, G., Tiwari, M. y Bolten, A. 2016. *Multiple Threats Analysis for Leatherback Turtles in the Southwest Atlantic*. 36th Annual Symposium on Sea Turtle Biology and Conservation. 29 Febrero - 5 de Marzo de 2016, Lima - Perú.

Rizzi, M. 2014. Captura incidental de tartarugas marinhas na pescaria com espinhel pelágico no sul do Brasil. Oceanologia, Universidade Federal do Rio Grande-FURG.

Sales, G., Giffoni, B.B. and Barata, P.C.R. 2008. Incidental catch of sea turtles by the Brazilian pelagic longline fishery. *Journal of the Marine Biological Association of the United Kingdom* 88: 853-864.

Santidrián Tomillo, M.P., Veléz, E., Reina, R.D., Piedra, R., Paladino, F.V. and Spotila, J.R. 2007. Reassessment of the leatherback turtle (*Dermochelys coriacea*) nesting population at Parque Nacional Marino Las Baulas, Costa Rica: Effects of conservation efforts. *Chelonian Conservation and Biology* 6: 54-62.

Sarti Martínez, L., Barragán, A.R., Muñoz, D.G., García, N., Huerta, P. and Vargas F. 2007. Conservation and biology of the leatherback turtle in the Mexican Pacific. *Chelonian Conservation and Biology* 6: 70-78.

Spotila, J., Dunham, A., Leslie, A., Steyermark, A., Plotkin, P. and Paladino, F. 1996. Worldwide population decline of *Dermochelys coriacea*: are leatherback turtles going extinct? *Chelonian Conservation Biology* 2(2): 209-222.

Tapilatu, R.F., Dutton, P.H., Tiwari, M., Wibbels, T., Ferdinandus, H.V., Iwanggin, W.G. and Nugroho, B.G. 2013. Long-term decline of the western Pacific leatherback, *Dermochelys coriacea*: a globally important sea turtle population. *Ecosphere* 4: 1-15. doi:10.1890/ES12-00348.1.

Thome, J.C.A., Baptistotte, C., de P. Moreira, L.M., Scalfoni, J.T., Almeida, A.P., Rieth, D.B. and Barata, P.C.R. 2007. Nesting biology and conservation of the leatherback sea turtle (*Dermochelys coriacea*) in the state of Espirito Santo, Brazil, 1988-1989 to 2003-2004. *Chelonian Conservation and Biology* 6: 15-27.

Tiwari, M., Wallace, B.P. and Girondot, M. 2013. *Dermochelys coriacea* (Southeast Atlantic Ocean subpopulation). The IUCN Red List of Threatened Species 2013: e.T46967848A46967852.http://dx.doi.org/10.2305/IUCN.UK.2013-2.RLTS.T46967848A46967852.en.

Tonelli, M. 2005. *Acciones a ser implementadas para el establecimiento de una buena cooperación internacional entre Argentina, Uruguay y Brasil para la protección y conservación de tortugas marinas. IV Master en Gestión, Acceso y Conservación de Especies en Comercio: El Marco Internacional*. Sede Antonio Machado de Baeza, Universidad Internacional de Andalucía, España.

Vargas, S.M., Araújo, F.C.F., Monteiro, D.S., Estima, S.C., Almeida, A.P., Soares, L.S. and Santos, F.R. 2008. Genetic diversity and origin of Leatherback turtles (*Dermochelys coriacea*) from the Brazilian coast. *Journal of Heredity* 99: 215-220.

Vélez-Rubio, G.M. 2011. Estudio de los varamientos de tortugas marinas en Uruguay, un área critica de alimentación y desarrollo en el Atlántico Sur Occidental. Máster en Biodiversidad: Conservacion y Evolucion, Facultat de Ciències Biològiques, Universitat de València.

Vélez-Rubio, G.M., Estrades, A., Fallabrino, A. and Tomás, J. 2013. Marine turtle threats in Uruguayan waters: insights from 12 years of stranding data. *Marine Biology* 2013: DOI: 10.1007/s00227-013-2272-y.

Wallace, B.P., DiMatteo, A.D., Bolten, A.B., Chaloupka, M.Y., Hutchinson, B.J., Abreu-Grobois, F.A., Mortimer, J.A., Seminoff, J.A., Amorocho, D., Bjorndal, K.A., Bourjea, J., Bowen, B.W., Briseño-Dueñas, R., Casale, P., Choudhury, B.C., Costa, A., Dutton, P.H., Fallabrino, A., Finkbeiner, E.M., Girard, A., Girondot, M., Hamann, .M, Hurley, B.J., López-Mendilaharsu, M., Marcovaldi, M.A., Musick, J.A., Nel, R., Pilcher, N.J., Troëng, S., Witherington, B. and Mast, RB. 2011. Global conservation priorities for marine turtles. *PLoS ONE* 6(9): e24510. doi:10.1371/journal.pone.0024510.

Wallace, B.P., DiMatteo, A.D., Hurley, B.J., Finkbeiner, E.M., Bolten, A.B., Chaloupka, M.Y., Hutchinson, B.J., Abreu-Grobois, F.A., Amorocho, D., Bjorndal, K.A., Bourjea, J., Bowen, B.W., Briseño-Dueñas, R., Casale, P., Choudhury, B.C., Costa, A., Dutton, P.H., Fallabrino, A., Girard, A., Girondot, M., Godfrey, M.H., Hamann, M., López-Mendilaharsu, M., Marcovaldi, M.A., Mortimer, J.A., Musick, J.A., Nel, R., Pilcher, N.J., Seminoff, J.A., Troëng, S., Witherington, B. and Mast, R.B. 2010. Regional Management Units for marine turtles: A novel framework for prioritizing conservation and research across multiple scales. *PLoS ONE* 5(12): e15465. doi/10.1371/journal.pone.0015465.

Wallace, B.P., Kot, C.Y., DiMatteo, A.D., Lee, T., Crowder, L.B. and Lewison, R.L. 2013. Impacts of fisheries bycatch on marine turtle populations worldwide: toward conservation and research priorities. *Ecosphere* 4: 1-19. doi:10.1890/ES12-00388.1.

Watson, J.W., Epperly S.P., Shah A.K. and Foster D.G. 2005. Fishing methods to reduce sea turtle mortality associated with pelagic longlines. *Canadian Journal of Fisheries and Aquatic Sciencies* 62: 965-981.

Witt, M.J., Baert, B., Broderick, A.C., Formia, A., Fretey, J., Gibudi, A., Mounguengui, G.A.M., Moussounda, C., Ngouessono, S., Parnell, R.J., Roumet, D., Sounguet, G.-P., Verhage, B., Zogo, A. and Godley, B.J. 2009. Aerial survey of the world's largest leatherback turtle rookery: a more effective methodology for large-scale monitoring. *Biological Conservation* 142: 1719-1727.

Witt, M.J., Bonguno, E.A., Broderick, A.C., Coyne, M.S., Formia, A., Gibudi, A., Mounguengui, G.A.M., Moussounda, C., Nsafou, M., Nougessono, S., Parnell, R.J., Sounguet, G.-P., Verhage, S. and Godley, B.J. 2011. Tracking leatherback turtles from the world's largest rookery: assessing threats across the South Atlantic. *Proceedings of the Royal Society Series B* 278(1716): 2338-2347. doi: 10.1098/rspb.2010.2467.

Zug, G.R. and Parham, J.F. 1996. Age and growth in leatherback turtles, *Dermochelys coriacea* (Testudines: Dermochelyidae): A skeletochronological analysis. *Chelonian Conservation and Biology* 2(2): 244-249.

Álvarez-Varas, R., Berzins, R., Bilo, K., Chevalier, J., Chevallier, D., De Thoisy, B., Fallabrino, A., García Cruz, M., Kelez, S., Lopez-Mendilaharsu, M., Marcovaldi, M.A., Mast, R.B., Medrano, C., Miranda, C., Nalovic, M.A., Prosdocimi, L., Rguez-Barón, J.M, Santos, A., Soares, L., Thome, J., Vallejo, F., Vélez-Rubio, G. 2016. Sea Turtles of South America. *SWOT Report* 11: 17-27.