

Marine Turtles in Latin America and the Caribbean: A Regional Perspective of Successes, Failures and Priorities for the Future

Maria Ângela Marcovaldi¹, Joca Thomé² & J. G. Frazier³

¹Fundação Pró- TAMAR, Caixa Postal 2219, Salvador, Bahia, CEP: 40210-970 Brazil (E-mail: neca@tamar.org.br)

²Projeto TAMAR-IBAMA, Av. Paulino Miller 1111, Jucutuquara, Vitória, Espírito Santo, CEP:29042-571, Brasil.

³Conservation and Research Center, National Zoological Park, Smithsonian Institution, 1500 Remount Road, Front Royal, Virginia 22630 USA (E-mail:kurma@shentel.net)

Latin America: One Region with Many Facets and Great Diversity

For historic, political and social reasons a major portion of the Western hemisphere is routinely referred to as 'Latin America'. This region extends from Mexico to Tierra del Fuego; with few exceptions the lands were colonised by either Spain or Portugal, and today the dominant languages are either Spanish or Portuguese. From Mexico to Panama (i.e., Central America except for Mexico) there are 8 nations; in South America there are 12 nations (including two that are landlocked, and one overseas department of France); and the insular Caribbean has 24 nations, 10 of which are dependencies of European countries (France, The Netherlands, the United Kingdom). In addition to Spanish and Portuguese, the official languages of Latin American countries include Dutch, English and French.

With island possessions that extend eastward to Brazil's Trindade Island, 1200 km off the continental coast in the south Atlantic and westward to Chile's Easter Island, 3585 km off the continental coast in the south Pacific, the marine and coastal areas included in Latin America are enormous and diverse, and extend from the tropics to sub-polar regions.

Although there is sometimes a general opinion that Latin American nations and Latin American peoples are much the same, there is in fact a tremendous amount of diversity at multiple levels, both within and between nations. Ethnic groups, for example, include Native Americans; descendants of African slaves, European colonists, and Indonesian and East Indian indentured labours; and mestizos (a mixture of Native Americans with other ethnic groups) and mulattos (a mixture of black Africans with other ethnic groups). The histories, cultures, political structures, societies, and economic development differ tremendously between different Latin American countries. Hence, the perceptions of, and responses to, conservation issues are highly variable.

Marine Turtles and Their Habitats in Latin America

Only one species of marine turtle does not occur in Latin America, the Australian flatback (*Natator*

depressus); and the region is of tremendous importance for the remaining six species. The only significant nesting area for Kemp's ridley (*Lepidochelys kempii*) is in Mexico (TEWG 1998); the only nesting areas for the black or Eastern Pacific green turtle (*Chelonia mydas*, sometimes called '*Chelonia agassizii*') extend along the Pacific coasts from Mexico to Galapagos, Ecuador (Seminoff 2002), and some of the largest nesting concentrations of green turtles (*Chelonia mydas*) are on mainland and island beaches of the Caribbean (Seminoff 2002). One of the world's largest nesting concentrations of leatherbacks (*Dermochelys coriacea*) is in Suriname and French Guiana (Spotila *et al.* 2000); one of the world's largest nesting concentrations of hawksbills (*Eretmochelys imbricata*) is on the shores of the Yucatan Peninsula, Mexico (Meylan & Donnelly 1999); about half of the major massed nesting concentrations for olive ridleys (*Lepidochelys olivacea*) rely upon Pacific beaches from Mexico to Costa Rica (Pritchard & Plotkin 1995); and many of the loggerheads (*Caretta caretta*) that occur in Latin American waters stem from major nesting populations in southeastern USA or Japan, depending on whether they are in the Atlantic or Pacific Oceans (Bolten & Witherington 2003). Hence, in addition to major nesting areas, Latin America provides vast and diverse feeding areas for marine turtles, as well as important developmental habitats and migratory corridors.

The Status of Marine Turtles and Their Habitats in Latin America

Despite this richness in species, large sizes of many populations, and diversity and extent of important environments, Latin America also provides lucid examples of mismanagement of the animals and their habitats. Perhaps the clearest case is that of the Kemp's ridley, which was literally brought back from the brink of extinction, and now, after decades of dedicated and costly work is in the early stages of recovery (TEWG 1998). Many populations of the other five species in the region have experienced dramatic declines, and in some cases they have become ecologically and

economically extinct. The case of the green turtle in the Caribbean, devastated by overexploitation during colonial times, is probably the best understood (Jackson 2001; Jackson *et al.* 2001), but numerous populations of hawksbills (Meylan & Donnelly 1999), olive ridleys (Pritchard & Plotkin 1995), loggerheads (Bolten & Witherington 2003), and leatherbacks (Eckert & Bjorkland in press) are also known to have decreased markedly over the past century.

In certain nesting areas, where conservation programs have been sustained for at least two decades, there are clear indications of recovery. The better known increases include: hawksbills in Yucatan (Garduño *et al.* 1999); olive ridleys in Brazil (Castilhos *et al.* in press); leatherbacks in St. Croix, US Virgin Islands (Boulon *et al.* 1996) and some Caribbean beaches of Costa Rica, such as Playa Negra and Playa Gandoca (Chacón in litt.); green turtles at Tortuguero, Costa Rica and Yucatan, Mexico (Seminoff 2002); and olive ridleys at Escobilla, Mexico (Márquez 2000). In general, however, the documented cases of recovering populations stand out as exceptions against a background of decimated populations.

Direct exploitation, or overkill, is often attributed to these declines, and in a few cases there is archaeozoological evidence that pre-Columbian peoples reduced the abundance of exploited populations (Frazier 2003 in press), a phenomenon that has been established for many New World animals, including scores of examples of evolutionary extinction (e.g., Kay & Simmons 2002). However, without a doubt, European colonization heralded major increases in rates of resource extraction, involving the ecological and economic extermination of various populations (Jackson 2001; Jackson *et al.* 2001). Most of the above examples of increasing population trends have been preceded by a decade or more of sustained and significant reduction in the number of nesting females killed annually on the respective beaches.

In more recent times less conspicuous, but equally insidious negative impacts on marine turtles have been caused by incidental capture, particularly in modern fishing operations; vast habitat destruction, especially on tropical nesting beaches through development of resorts, hotels, and other human enterprises; and marine and coastal pollution, often caused by human activities that are not immediately obvious to the lay public, such as light, nutrient, thermal, and chemical pollutions (Lutcavage *et al.* 1997). A global entrepreneurial trend to turn sandy, tropical shores into tourist destinations with hotels, beach and near shore activities, etc. has

resulted in the destruction of large numbers of nesting beaches throughout Latin America. The development and intensification of fisheries, including increased availability and use of synthetic fibres and internal combustion engines, with amplified market pressures to catch and export more fisheries products, and an ever-escalating spiral of increased fishing effort has created gargantuan problems with incidental capture and mortality throughout most of the region.

Development of Conservation Activities in Latin America

Although marine turtle work was active in Costa Rica as early as 1955 (Carr, 1967), one of the longest running national programmes for marine turtle conservation began in Mexico, nearly 30 years ago (Márquez *et al.* 1976), and the national programme in Suriname began 35 years ago (Reichart & Fretey 1993). The national programmes in Brazil (TAMAR) (Marcovaldi & Marcovaldi 1999) and French Guiana (Girondot & Fretey 1996) also have decades of experience. In the last decade nearly every country in Latin America has developed a marine turtle program, some incipient such as in Argentina and Uruguay, and some highly developed and integrated with various activities including monitoring, investigation, environmental education, community participation, etc. In some countries, such as Costa Rica, Guatemala, Mexico and Peru, there are multiple projects, with varying degrees of coordination. The results of national workshops and meetings in Colombia (Amorocho *et al.* 1999), the Guianas (Kelle *et al.* 2000; Shouten *et al.* 2001) and Mexico have been published (Benabib & Sarti 1992; Frazier *et al.* 1993).

In addition to activities conducted at a national level, there are regional networks. The Wider Caribbean Sea Turtle Conservation Network (WIDECAST) has been active for 22 years, integrating participation from diverse sectors of virtually every Caribbean nation. WIDECAST collaborators have produced sea turtle recovery action plans (STRAPs) for 11 Caribbean nations: Antigua and Barbuda, Aruba, Barbados, Belize, British Virgin Islands, the Netherlands Antilles, St. Lucia, St. Kitts and Nevis, St. Vincent and the Grenadines, Suriname, and Venezuela. WIDECAST has also trained or promoted the training of many hundreds of biologists and managers throughout the region, developed standard procedures for conservation and research, promoted community involvement, and enhanced the level of awareness of sea turtle issues amongst policy-makers. The Central American Sea

Turtle Network (RCA) serves as a forum for the seven Central American countries, from Belize to Panama, to exchange information and expertise, and this has been active since 1996. Another example is the Marine Turtle Conservation Program of the Guianas (for Guyana, Suriname and French Guiana).

In many respects these regional activities follow the lead of the earlier Western Atlantic Turtle Symposia, or 'WATS' (Bacon *et al.* 1984; Ogren *et al.* 1989), and have led to strong range state support for continuing regional dialogues (Eckert & Abreu 2001). Meetings specifically designed to reach the needs of Latin American stakeholders are also convened on a regular basis. Since 1994 there has been a two-day meeting of Latin American specialists immediately before the Annual Symposium on the Biology and Conservation of Sea Turtles. These reunions provide a forum for the exchange of information and contacts at a regional level, and the annual Latin American meeting has attained certain organizational and political importance in the Annual Symposium (Barragán 2002).

Because of the migratory nature of marine turtles, it is widely realized that collaboration and true cooperation between projects (within and among nations) is essential to complement site-restricted activities. Integration and sharing of information and scientific data enables the development of more effective monitoring, which provides the foundation for timely, and more meaningful, more integrated responses to conservation problems.

In this respect the Latin American region plays a unique role in the promotion of international cooperation for the conservation of marine turtles and their habitats. Between September 1994 and September 1996 a total of 27 countries and 4 intergovernmental organisations, as well as numerous other specialists from academic, conservation, NGO, and other organisations, participated in the development of the Inter-American Convention for the Protection and Conservation of Sea Turtles ('IAC'). The objective of this treaty – open to all states in the Americas – is *'to promote the protection, conservation and recovery of sea turtle populations and of the habitats on which they depend, based on the best available scientific evidence, taking into account the environmental, socioeconomic and cultural characteristics of the Parties.'* There is no doubt that the hard work and dedication of scores of marine turtle specialists throughout the region has been instrumental in the advancement of this treaty (Frazier 2000), and this experience has served as an important case study at a global level (Bache 2002). Indeed, the IAC has served as a model for the development of other international

instruments concerned with the development of multilateral accords for the conservation of marine turtles and their habitats.

Priorities for the Future

"Perhaps the most significant need for the region is to build on its networking capacity and to make a genuine commitment to managing and monitoring sea turtles stocks on a population scale. This scale transcends national boundaries and necessitates that governments understand and take into account the effects that management decisions in one country will have on sea turtles in another country. A good level of sharing and coordinated decision-making is the next challenge for a fully integrated and successful conservation strategy." (Karen Eckert In litt). Expanding on these sentiments, Diego Amorocho concluded that *"Public awareness, information dissemination and community involvement need to be strengthened at local and regional levels. Strategies including incentives and alternative livelihood practices must be identified and fostered to encourage community involvement in the decision-making process for policy planning and conservation management. A combination of "top down" and "bottom up" approaches must be considered for improving public participation in sea turtle conservation in Latin America. In addition, national policies and conservation measures need to be harmonized with international law and cooperative regional agreements in order to guarantee the protection of sea turtles and their vital habitats over their entire distributional range in America."* (Amorocho 2002).

Several priority actions include:

- Evaluate and support the mitigation of the root problems of unsustainable development, social and political instability, and inequitable economic growth.
- Strengthen and expand the efforts of local conservation groups, particularly those working in the field, to involve coastal communities.
- Strengthen cooperative efforts at coordination and organization between different sectors: public and private; governmental, academic and non-governmental; local, national and international. The development of the Inter-American Convention for the Protection and Conservation of Sea Turtles is an example of how this policy can be implemented on a regional level.
- Standardise protocols and databases that employ the same methodologies and terms,

including the development of a glossary for technical terminology and concepts, that will facilitate integration between activities and communications in the region, a better understanding of the status of shared populations and enhance effective decision-making for the conservation of marine turtles and their habitats in the region.

- Develop a strategic plan for each country, as well as an overall plan for the region, with clear prioritisation of responses to major threats, the development and maintenance of protected areas, and the identification of conservation objectives/goals, while respecting different social, economic, political, cultural and environmental situations.
- Enhance capacity building, interchanges, and periodic evaluations of data and activities between projects.
- Develop investigations to identify population structure, or management units, particularly through the use of molecular genetics.
- Develop and implement on-board observer programs for identifying and evaluating problems of incidental catch in mechanised fisheries.
- Develop and implement national plans to mitigate incidental capture and mortality in various fishing activities.

Acknowledgements: We would like to thank the many people and organisations who have supported the development of marine turtle programmes through the region over the past decades. Several people made valuable contributions to earlier drafts of this article: Diego Amorocho, Joaquín Buitrago, Didiher Chacón, Karen Eckert, Alejandro Fallabrino, Milagros Lopez, Matthew Godfrey, Hedelvy Guada, Luciano Soares, Laurent Kelle, and Melania Yáñez.

- AMOROCHO, D. 2002. Prioritising research-driven management and public participation in sea turtle conservation in Colombia. Unpublished Master Env. Sci. Thesis. School of Resources, Environment and Society. Canberra, Australian National University. 143 pp.
- AMOROCHO, D., P. SALDAÑA & C.H. PINZÓN. 1999. Memorias: II Seminario Taller Internacional sobre Conservación y Biología de Tortugas Marinas en Colombia. Agosto 25-28 de 1999. Santa Marta, Colombia. 100 pp.
- BACHE, S.J. 2002. A view of the Inter American Convention for the Protection and Conservation of Sea Turtles from Down Under. In: A Moser, A. Foley & B. Brost (compilers). Proceedings of the 20th Annual Symposium on Sea Turtle Biology and Conservation. NOAA Technical Memorandum NMFS-SEFSC-477. pp.

121-125.

- BACON, P., F. BERRY, K. BDAL, H. HIRTH, L. OGREN & M. WEBER (Editors). 1984. Proceedings of the Western Atlantic Turtle Symposium, 17-22 July 1983, San José, Costa Rica. University of Miami Press, Miami.
- BARRAGÁN, A.R., F. SÁNCHEZ, J. ALFARO, & A. BARRIOS, 2002. Report of the IX Meeting of Latin American Sea Turtle Specialists. (Miami, Florida, April 2-3, 2002). Marine Turtle Newsletter. 98: 14.
- BENABIB, M. & L. SARTI (Eds). 1992. Memorias del VI Encuentro Interuniversitario sobre Tortugas Marinas. Publicaciones de la Sociedad Herpetológica Mexicana No. 1. 96 pp.
- BOLTEN, A.B. & B.E. WITHERINGTON (Eds.). 2003. *Loggerhead sea turtles*. Washington, D. C., Smithsonian Institution Press.
- BOULON, R.H., P.H. DUTTON, & D.L. MCDONALD. 1996. Leatherback turtles (*Dermochelys coriacea*) on St. Croix, U. S. Virgin Islands: Fifteen years of conservation. *Chelonian Conservation and Biology* 2: 141-147.
- CARR, A. 1967. *So Excellent a Fish: A Natural History of Sea Turtles*. Charles Scribner's Sons; New York. vii + 280 pp.
- CASTILHOS, J.C., A.C.D.D. da SILVA, D.A.S. ROCHA, F.L.C. OLIVEIRA, M.I. WEBER & P.C.R. BARATA. in press. Nesting Biology and Conservation of The Olive Ridley Sea Turtle (*Lepidochelys olivacea*) in the State of Sergipe, Brazil. 22nd Annual Symposium on Sea Turtle Biology and Conservation. Miami. USA. April 4-7, 2002.
- ECKERT, K.L. & R. KERR BJORKLAND. in press. Distribution and status of the leatherback sea turtle, *Dermochelys coriacea*, in the insular Caribbean Region. Proceedings of the 21st Annual Symposium on Sea Turtle Biology and Conservation.
- ECKERT, K.L. & F.A. ABREU G (Eds.). 2001. Proceedings: Marine Turtle Conservation in the Wider Caribbean Region – A Dialogue for Effective Regional Management. Santo Domingo, 16-18 November 1999.
- FRAZIER, J. 2000. Building Support for Regional Sea Turtle Conservation in Indian Ocean Region: Learning from The Inter-American Convention for the Protection and Conservation of Sea Turtles. In: N. Pilcher and G. Ismail (eds.) Sea Turtles of the Indo-Pacific: Research, Conservation and Management. ASEAN Academic Press; London. pp. 277-306.
- FRAZIER, J. 2003. Prehistoric and Ancient Historic Interactions Between Humans and Marine Turtles. In: P.L. Lutz, J.A. Musick & J. Wyneken (eds.) The Biology of Sea Turtles Vol 2. Baton Rouge, Florida, CRC Press. pp 1-38

- FRAZIER, J. In press. Marine turtles of the past: A vision for the future? In: Proceedings of the Meeting of the International Council for Archaeological Zoology, Durham, England, August 2002. Oxbow Books; Oxford.
- FRAZIER, J., R. VÁZQUEZ, E. GALICIA, R. DURÁN, & L. CAPURRO (eds.). 1993. Memorias del IV Taller Regional sobre Programas de Conservación de Tortugas Marinas en la Península de Yucatán. Universidad Autónoma de Yucatán; Mérida, México. iii + 212 pp.
- GARDUÑO-ANDRADE, M. V. GUZMAN, EM MIRANDA, R. BRISEÑO-DUEÑAS, & F. ALBERTO ABREU-GROBOIS. 1999. Increases in hawksbill turtle (*Eretmochelys imbricata*) nestings in the Yucatan Peninsula, Mexico, 1977-1996: Data in support of successful conservation? *Chelonian Conservation and Biology* 3: 286-295.
- GIRODONT, M. & J. FRETEY. 1996. Leatherback Turtles, *Dermochelys coriacea*, Nesting in French Guiana, 1978-1995. *Chelonian Conservation and Biology* 2: 204-208.
- JACKSON, J.B.C. 2001. What was natural in the coastal oceans? *Proceedings of the National Academy of Sciences* 98: 5411-5418.
- JACKSON, J.B. *et al.* 2001. Historical Overfishing and the Recent Collapse of Coastal Ecosystems. *Science* 293:629-638.
- KAY, C.E. & R.T. SIMMONS. (Eds.) 2002. Wilderness and Political Ecology: Aboriginal Influences and the Original State of Nature. Salt Lake City, University of Utah Press.
- KELLE, L., LOCHON, S., THÉRÈSE, J., & DESBOIS X., (Eds). 2000. 3rd Meeting on the Sea Turtles of the Guianas. *Proceedings. Programme de conservation des tortues marines de Guyane*, publication 1.
- LUTCavage, M.E., P. PLOTKIN, B. WITHERINGTON, & P.L. LUTZ. 1997. Human impacts on sea turtle survival. In: P.L. Lutz & J.A. Musick (Eds.). *The Biology of Sea Turtles*. CRC Press, New York. pp. 387-409.
- MARCOVALDI, M.Â. & MARCOVALDI, G.G., 1999. Marine Turtles of Brazil: the history and structure of Projeto TAMAR-IBAMA. *Biological Conservation* 91,:35-41.
- MÁRQUEZ, R. 1976. Natural Reserves for the Conservation of Marine Turtles in Mexico. *Florida Marine Publications* 33: 56-60.
- MÁRQUEZ, R. 2000. The ridley sea turtle populations of Mexico. In: *Proceedings of the Eighteenth International Sea Turtle Symposium*. U. S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service. NOAA Technical Memorandum NMFS-SEFSC-436. pp. 19.
- MEYLAN, A.B. & M. DONNELLY. 1999. Status justification for listing the hawksbill turtle (*Eretmochelys imbricata*) as Critically Endangered on the 1996 IUCN Red List of Threatened Animals. *Chelonian Conservation and Biology* 3: 200-224.
- MOREIRA, L., C. BAPTISTOTTI, J. SCALFONE, J.C. THOMÉ & A.P.L.S. ALMEIDA. 1995. Occurrence of *Chelonia mydas* on the Island of Trindade, Brazil. *Marine Turtle Newsletter* 70: 2.
- OGREN, L., F. BERRY, K. BJORNDAL, H. KUMPF, R. MAST, G. MEDINA, H. REICHART & R. WITHAM (Eds.). 1989. *Proceedings of the Second Western Atlantic Turtle Symposium*. NOAA Technical Memorandum NMFS-SEFC-226 Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Southeast Fisheries Science Center, Miami. iii + 401 pp.
- PRITCHARD, P.C.H. & P.T. PLOTKIN. 1995. Olive ridley sea turtle, *Lepidochelys olivacea*. In P.T. Plotkin (Ed.). *National Marine Fisheries Service and U. S. Fish and Wildlife Service status reviews for sea turtles listed under the Endangered Species Act of 1973*. Silver Spring, Maryland; National Marine Fisheries Service. vi + 139 pp.
- REICHART, H.A. & J. FRETEY. 1993. WIDECast Sea Turtle Recovery Action Plan for Suriname (K.L. Eckert, Ed.). Caribbean Environment Programme Technical Report No. 24. UNEP Caribbean Environment Programme; Kingston, Jamaica. xiv + 65 pp..
- SEMINOFF, J.A. 2002. Marine Turtle Specialist Group 2002 global green turtle (*Chelonia mydas*) assessment for the IUCN Red List Programme. Report submitted to Species Survival Commission, Gland, Switzerland. 93 pp.
- SHOUTEN, A., MOHADIN, K., ADHIN, S., & MCCLINTOCK, E (Eds.) 2001. *Proceedings of the V Regional Marine Turtle Symposium for the Guianas*, Paramaribo September 2001. WWF Technical Report No. GFCEP#9.
- SPOTILA, J.R., R.D. REINA, A.C. STEYERMARK, P.T. PLOTKIN & F.V. PALADINO. 2000. Pacific leatherback turtles face extinction: Fisheries can help avert the alarming decline in population of these ancient reptiles. *Nature* 405: 529-530.
- TEWG (Turtle Expert Working Group). 1998. An assessment of Kemp's ridley (*Lepidochelys kempii*) and loggerhead (*Caretta caretta*) sea turtle populations in the western North Atlantic. US. Department of Commerce, National Oceanic and Atmospheric Administration, NOAA Technical Memorandum NMFS-SEFSC-409.
- TRIPATHY, B. 2002. Is Gahirmatha the world's largest sea turtle rookery? *Current Science* 83: 1299.