

RESEARCH SUMMARY



GLOBAL PRIORITIES FOR SEA TURTLE MANAGEMENT AND CONSERVATION

ANDREA D. PHILLOTT#

One Health Research Group, College of Public Health, Medical and Veterinary Sciences, James Cook University, Townsville QLD, Australia

#andrea.phillott@gmail.com

Interest in, and research on, sea turtles has greatly increased over the past few decades, as evidenced by the growing body of literature on sea turtle biology and conservation and hundreds, and sometimes thousands, of participants in the annual sea turtle symposium held by the International Sea Turtle Society (<http://www.internationalseaturtlesociety.org>). To inform sea turtle research, conservation and/or management efforts, Hamann *et al.* (2010) solicited the opinions of 35 multinational, multidisciplinary researchers and compiled a list of 20 priority research metaquestions within 5 categories (reproductive biology, biogeography, population ecology, threats, and conservation strategies). As a follow-up exercise to assess if relevant peer-reviewed research published since Hamann *et al.* (2010) had contributed to answering these key questions, Rees *et al.* (2016) followed the expert-opinion approach and involved 42 researchers in a systematic review of literature using Web of Science.

The papers considered by Rees *et al.* (2016) demonstrated both species (green turtles- 41% of articles; loggerhead turtles- 34%; hawksbill and leatherback turtles- 15% each; olive ridley turtles- 11%; Kemp's ridley turtles- 6%; flatback turtles- 5%) and geographic (North Atlantic populations- 32% of articles; North Pacific populations- 20%; South Atlantic populations- 13%; Indian Ocean populations- 12%; Mediterranean populations- 10%; South Pacific populations- 10%) biases. These likely reflect the more restricted ranges of some species (Kemp's ridley and flatback turtles) and availability of resources to countries bordering well-researched ocean regions. Rees *et al.* (2016) acknowledge that these biases may have been less if the assessment included literature outside of Web of Science (e.g. non-peer-reviewed papers and/or non-English literature sources); however, the relatively low proportion of studies on sea turtles in the Indian Ocean and South East Asia waters indicate a need for greater research activity- or greater sharing of

the outcome of prior and current projects- in the region. Rees *et al.* (2016) identified progress, although it was not uniform, towards answering all 20 of the priority questions described by Hamann *et al.* (2010). Three main areas were identified as being under-researched when compared with others:

Reproductive biology

What are the factors that underpin nest site selection and behaviour of nesting turtles?

What are the primary sex ratios being produced and how do these vary within or among populations and species?

What factors are important for sustained hatchling production?

Threats

What will be the impacts from climate change on sea turtles and how can these be mitigated?

What are the major sources of fisheries bycatch and how can these be mitigated in ways that are ecologically, economically and socially practicable?

How can we evaluate the effects of anthropogenic factors on sea turtle habitats?

What are the impacts of pollution on sea turtles and their habitats?

What are the etiology and epidemiology of fibropapillomatosis (FP), and how can this disease be managed?

Conservation strategies

How can we effectively determine the conservation status of sea turtle populations?

What are the most viable cultural, legal and socioeconomic frameworks for sea turtle conservation?

Which conservation strategies are working (have worked) and which have failed?

Under what conditions (ecological, environmental, social and political) can consumptive use of sea turtles be sustained?

Researchers and NGO's in the Indian Ocean and South East Asia (and elsewhere) can use the progress described by Rees *et al.* (2016) towards addressing the 20 metaquestions developed by Hamann *et al.* (2010) and the relative lack of published literature for the region to their advantage. Using these references to highlight the need for local research, conservation, and management activities may help demonstrate the importance of initiatives to policy makers and enhance the success of funding applications.

As an outcome of the assessment, Rees *et al.* (2016) also identified the bias of sea turtle research towards prioritizing biological questions and the need for greater engagement with social science researchers. There are challenges to interdisciplinary conservation research, especially for social scientists (e.g. Campbell, 2003, 2005), but obvious gains in understanding the human dimensions of sea turtle conservation, including motivations and incentives for individuals and communities to engage with conservation initiatives.

Finally, Rees *et al.* (2016) echoed the suggestion of Hamann *et al.* (2010) that stakeholders from across different professions and/or sectors and geographic regions contribute to a future assessment of priority research questions and conservation actions for sea turtles. Similarly to the biological areas identified as requiring further research, many of the recommendations of Rees *et al.* (2016) can be used to leverage funding or action for sea turtle research and conservation in the Indian Ocean and South East Asia

Literature cited:

Campbell, L.M. 2003. Challenges for interdisciplinary sea turtle research: Perspectives of a social scientist. *Marine Turtle Newsletter* 100: 28-32.

Campbell, L.M. 2005. Overcoming obstacles for interdisciplinary research. *Conservation Biology* 19: 574-577.

Hamann, M., M.H. Godfrey, J.A. Seminoff, K. Arthur, P.C.R. Barata, K.A. Bjorndal, A.B. Bolten, A.C. Broderick, L.M. Campbell, C. Carreras, P. Casale, M. Chaloupka, S.K.F. Chan, M.S. Coyne, L.B. Crowder, C.E. Diez, P.H. Dutton, S.P. Epperly, N.N. FitzSimmons, A. Formia, M. Girondot, G.C. Hays, I.J. Cheng, Y. Kaska, R. Lewison, J.A. Mortimer, W.J. Nichols, R.D. Reina, K. Shanker, J.R. Spotila, J. Tomás, B.P. Wallace, T.M. Work, J. Zbinden & B.J. Godley. 2010. Global research priorities for sea turtles: informing management and conservation in the 21st century. *Endangered Species Research* 11: 245-269.

Rees, A.F., J. Alfaro-Shigueto, P.C.R. Barata, K.A. Bjorndal, A.B. Bolten, J. Bourjea, A.C. Broderick, L.M. Campbell, L. Cardona, C. Carreras, P. Casale, S.A. Ceriani, P.H. Dutton, T. Eguchi, A. Formia, M.M.P.B. Fuentes, W.J. Fuller, M. Girondot, M.H. Godfrey, M. Hamann, K.M. Hart, G.C. Hays, S. Hochscheid, Y. Kaska, M.P. Jensen, J.C. Mangel, J.A. Mortimer, E. Naro-Maciel, C.K.Y. Ng, W.J. Nichols, A.D. Phillott, R.D. Reina, O. Revuelta, G. Schofield, J.A. Seminoff, K. Shanker, J. Tomás, J.P. van de Merwe, K.S. Van Houtan, H.B. Vander Zanden, B.P. Wallace, K.R. Wedemeyer-Strombel, T.M. Work & B.J. Godley. 2016. Are we working towards global research priorities for management and conservation of sea turtles? *Endangered Species Research* 31: 337-382.