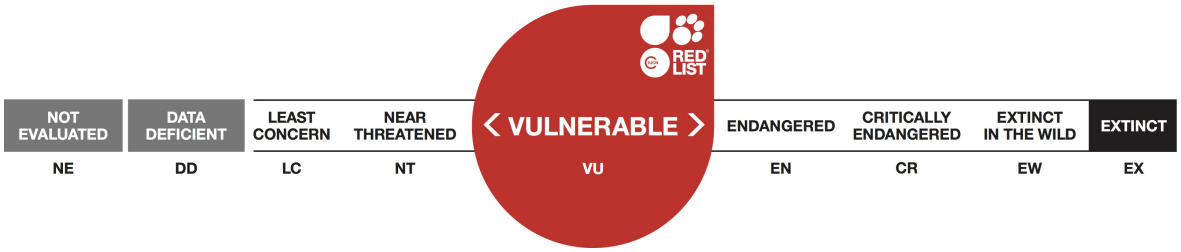
The IUCN Red List of Threatened Species™
ISSN 2307-8235 (online)
IUCN 2008: T3897A83157651

Caretta caretta, Loggerhead Turtle

Assessment by: Casale, P. & Tucker, A.D.



View on www.iucnredlist.org

Citation: Casale, P. & Tucker, A.D. 2015. *Caretta caretta. The IUCN Red List of Threatened Species 2015*: e.T3897A83157651. http://dx.doi.org/10.2305/IUCN.UK.2015-4.RLTS.T3897A83157651.en

Taxonomy

Kingdom	Phylum	Class	Order	Family
Animalia	Chordata	Reptilia	Testudines	Cheloniidae

Taxon Name: *Caretta caretta* (Linnaeus, 1758)

Synonym(s):

- *Testudo caretta* Linnaeus, 1758

Infra-specific Taxa Assessed:

- Caretta caretta (Mediterranean subpopulation)
- Caretta caretta (North East Atlantic subpopulation)
- Caretta caretta (North East Indian Ocean subpopulation)
- Caretta caretta (North Pacific subpopulation)
- Caretta caretta (North West Atlantic subpopulation)
- Caretta caretta (North West Indian Ocean subpopulation)
- Caretta caretta (South East Indian Ocean subpopulation)
- Caretta caretta (South Pacific subpopulation)
- Caretta caretta (South West Atlantic subpopulation)
- Caretta caretta (South West Indian Ocean subpopulation)

Common Name(s):

- English: Loggerhead Turtle
- French: Tortue caouanne
- Spanish: Caguama, Tortuga Boba, Tortuga Cabezona, Tortuga Careta, Tortuga Comun

Assessment Information

Red List Category & Criteria: Vulnerable A2b ver 3.1

Year Published: 2015

Date Assessed: August 23, 2015

Justification:

Rationale

The global population of the Loggerhead Turtle (*Caretta caretta*) comprises 10 subpopulations (see Figure 2 in the Supplementary Material) that vary widely in population size, geographic range, and population trends, and are the appropriate units for assessment of global conservation status for this species (Wallace *et al*. 2010, 2011). As such, assessments have been completed for each of the 10 subpopulations, in addition to the combined global population assessment required by the IUCN (see Table 1 in the Supplementary Material). At the global level, both geographic distribution and population size are much larger than required to qualify for a threatened category. The available long-term series of nest counts (used as an index of population abundance) show an important decrease in the past (47%). Therefore, the Loggerhead Turtle is considered as Vulnerable under current IUCN Red List Criteria (criterion A2b). The previous listing, published in 1996, was Endangered under criterion A1bd (Marine Turtle Specialist Group 1996).

http://dx.doi.org/10.2305/IUCN.UK.2015-4.RLTS.T3897A83157651.en

Results indicate that the Loggerhead Turtle, as a single taxonomic entity, will not go extinct globally in the next generation according to any Red List criteria. However, the global listing is not an appropriate representation of the conservation status of the biologically relevant subpopulations that make up the global Loggerhead Turtle population. Subpopulation assessments demonstrated wide variation not only in status of individual subpopulations (as indicated by IUCN Red List Categories), but also in the criteria under which the individual subpopulations qualified for a threatened category (see Table 1 in the Supplementary Material). For these reasons, the subpopulation-level assessments for the Loggerhead Turtle should be given priority in evaluating the true global conservation status of this species. This conclusion follows the precedent for other long-lived, widely distributed species, including the Leatherback Turtle (Wallace *et al*. 2013).

Justification

The extent of occurrence and area of occupancy exceeds the thresholds for criterion B, and the population size exceeds the thresholds for criteria C and D. Regarding criterion A, trends were estimated on time series datasets with ≥10 years of data of nesting activities (nest counts) at 153 index nesting sites from six subpopulations out of 10 (North West Atlantic, Mediterranean, South West Atlantic, North West Indian, South West Indian, North Pacific). These six subpopulations comprise about 90% of the current annual nests globally (see Table 2 in the Supplementary Material). The analysis revealed different trends for different subpopulations, with an overall -47% population decrease relative to population size three generations ago, which qualifies for the Vulnerable category (under criterion A2). The species trend at a global scale is basically determined by the two most abundant subpopulations, the North West Atlantic and the North West Indian, which altogether comprise about 75% of the current annual nests. They showed positive and negative trends, respectively. The other four subpopulations for which trends could be calculated show positive trends. For the remaining four subpopulations (comprising about 10% of the current annual nests; North East Atlantic, North East Indian, South East Indian, South Pacific), current trends are unclear, however past negative trends are known or suspected at least for the South Pacific and the North East Atlantic subpopulations respectively.

The overall scenario suggests that, on the basis of the current knowledge, the extinction of the species at the global level is highly unlikely to occur in the short and medium term. However, the global status of the species in terms of distribution, number of subpopulations, genetic variability, regional ecological roles, and vulnerability, could change dramatically from the past and current situations. For this reason, the global assessment cannot be considered as an indicator of the true conservation status of the species, and priority should be given to the subpopulation assessments.

Assessment Procedure:

Criterion A

For marine turtles, annual counts of nesting females and their nesting activities (more often the latter) are the most frequently recorded and reported abundance metric across index monitoring sites, species, and geographic regions (National Research Council 2010).

To apply criterion A, three generations (or a minimum of ten years, whichever is longer) of abundance data are required (IUCN Standards and Petitions Subcommittee 2014). In the case of the Loggerhead, we conservatively estimate its generation time as 45 years (see the Habitats and Ecology section below). For criterion A, data from three generations ago (~135 years) are necessary to estimate population declines

beginning three generations ago up to the present (i.e., assessment) year. The challenges of this requirement on long-lived species like turtles—with generation lengths of 30 years or more—are obvious (see Seminoff and Shanker 2008 for a review). Abundance data from ~135 years ago are not available for Loggerheads anywhere in the world. Extrapolating backward using population trends based on current datasets was considered inappropriate because estimates produced would be biologically unrealistic and unsubstantiated, given what is currently known about sea turtle nesting densities on beaches and other factors (Mrosovsky 2003). In the absence of better information, we assumed that population abundance three generations ago (~135 years, one generation estimated 45 years; see Habitats and Ecology section below) was similar to the first observed abundance rather than to assume that the population has always been in a decline (or increase) of the same magnitude as in the current generation. A similar approach was used in the Red List assessment of another sea turtle species, the Leatherback Turtle (*Dermochelys coriacea*) (Wallace *et al*. 2013) and of another long-lived, geographically widespread taxon, the African Elephant (Blanc 2008). Thus, to apply criterion A we assumed that the abundance at the beginning of an available time series dataset had not changed significantly in the preceding three generations, and therefore used the same abundance value in trend calculations. For the Loggerhead global and subpopulation assessments we only considered time series datasets of ≥10 years.

For the global Loggerhead population, we considered time series datasets of 10-50 years, from 153 index nesting sites from six subpopulations (see the individual subpopulation assessments). The index nesting sites included in the analysis are assumed to be representative of their subpopulations, and these six subpopulations comprise about 90% of the current total annual nests (Table 2 in the Supplementary Material).

The assessment under criterion A was conducted in three steps, as follows. Please see the separate subpopulation assessments for further details.

• **Step 1:** We estimated past trends for each of the six individual subpopulations. Specifically, from one past and one recent abundance values (each representing the annual average of five year nest counts) we calculated overall trends (past-present) for each index nesting sites within subpopulations, and then we calculated overall subpopulation past trends for each subpopulation (criteria A1-A2).

• **Step 3:** The past and present total abundance values of the six subpopulations (obtained from Step 2) were summed and from these totals the overall population change (past-present) was calculated (Table 3 in the Supplementary Material).
Five of the above six subpopulations showed positive trends and one showed a negative trend. Altogether, they showed a negative trend (-47%). The overall negative trend depended on the negative trend of one subpopulation (North West Indian) where criterion A2 was appropriate – i.e. the causes of reduction may not have ceased or may not be understood or may not be reversible. Therefore, the overall trend of the six subpopulations was assessed against criterion A2. The past estimated trend was above the threshold for the Vulnerable category under criterion A2 (30% decline) but below the threshold for the Endangered category (50% decline). Therefore, the Loggerhead Turtle qualifies for the Vulnerable category under criterion A2 and the applicable subcriterion is (b), an index of abundance appropriate to the taxon (counts of nests or tracks).

Although these trends consider only 6 of 10 subpopulations, these subpopulations with sufficient available data account for about 90% of the current global population abundance (Table 2 in the Supplementary Material). Therefore, these trends likely reflect the complete global trend and represent the best information available about the global population trend. Similarly, the global Leatherback Turtle assessment used only five of seven subpopulations to estimate global trends due to lack of sufficient data for two subpopulations (Wallace *et al*. 2013).

Criterion B

Since the population area extends over entire oceans around the world, the extent of occurrence (EOO) exceeds the threatened category threshold (20,000 km²). The area of occupancy (AOO) for sea turtles is identified with the nesting beach habitat, which represents the smallest habitat for a critic life stage. Since the appropriate scale for AOO is a grid 2x2 km, the threshold of 2,000 km² corresponds to 1,000 km of linear coastal tract, which is easily exceeded (by orders of magnitude) by the total length of nesting beaches globally. In conclusion, the global population does not trigger any of the thresholds for a threatened category under criterion B.

Criterion C

To apply criterion C, the number of adults is needed and can be derived from the number of nests per year with the following formula: Adults = Nests * Nests per female^{-1} * Remigration interval * Female proportion^{-1}. With a current estimate of annual number of nests of about 200,000, for any reasonable value of the other parameters the population would easily exceed the threshold of 10,000 adults required to qualify for a threatened category under criterion C.

Criterion D

The number of mature individuals (see criterion C) and AOO value (see criterion B) exceeded the respective thresholds. In conclusion, the population does not trigger any of the thresholds for a threatened category under criterion D.

Criterion E

Although population viability analyses (PVA) were attempted at subpopulation level (Conant *et al*. 2009, Van Houtan 2011), in most cases they were not suitable for criterion E under this assessment. No PVA has been attempted at species level and such an approach would also be questionable because the subpopulations are independent units by definition.

Sources of Uncertainty

Although monitoring of nesting activities by adult female sea turtles is the most common metric recorded and reported across sites and species, globally, there are several disadvantages to using it as a proxy for overall population dynamics, some methodological, some interpretive (National Research Council 2010). First, because nesting females are a very small proportion of a sea turtle population, using abundance of nesting females and their activities as proxies for overall population abundance and trends requires knowledge of other key demographic parameters (several mentioned below) to allow proper interpretation of cryptic trends in nesting abundance (National Research Council 2010). However, there remains great uncertainty about most of these fundamental demographic parameters for Loggerheads, including age at maturity, generation length, survivorship across life stages, adult and hatchling sex ratios, and conversion factors among reproductive parameters (e.g., clutch frequency, nesting success, remigration intervals, etc.). These values can vary within and among subpopulations,

further complicating the process of combining subpopulation abundance and trend estimates to obtain global population abundance and trend estimates, and contributing to the uncertainty in these estimates. Second, despite the prevalence of nesting abundance data for marine turtles, monitoring effort and methodologies can vary widely within and across study sites, complicating comparison of nesting count data across years within sites and across different sites as well as robust estimation of population size and trends. However, we have reduced this source of uncertainty by using in the analyses those data sets obtained though standardized monitoring.

For the trend analyses (criterion A) we used data from index rookeries from six populations out of 10. Possible negative past trends associated to high past abundances in the other four subpopulations not included in the analysis could have changed the final result of the assessment (past trends, criterion A2), if such information was available.

For further reading on sources of uncertainty in marine turtle Red List assessments, see Seminoff and Shanker (2008).

For further information about this species, see Supplementary Material.

Previously Published Red List Assessments

1996 – Endangered (EN) – http://dx.doi.org/10.2305/IUCN.UK.1996.RLTS.T3897A10159448.en

1994 – Vulnerable (V)

1990 – Vulnerable (V)

1988 – Vulnerable (V)

1986 – Vulnerable (V)

1982 – Vulnerable (V)

Geographic Range

Range Description:

The Loggerhead Turtle is globally distributed throughout the subtropical and temperate regions of the Mediterranean Sea and Pacific, Indian, and Atlantic Oceans (Wallace *et al*. 2010) (see Figure 1 in the Supplementary Material).

For further information about this species, see Supplementary Material.

Country Occurrence:

Native: Albania; Algeria; Angola (Angola); Anguilla; Argentina; Aruba; Australia; Bahamas; Bahrain; Bangladesh; Barbados; Belize; Bermuda; Bonaire, Sint Eustatius and Saba; Brazil; Cape Verde; Cayman Islands; Chile; China; Colombia; Comoros; Costa Rica; Croatia; Cuba; Curaçao; Cyprus; Djibouti; Dominican Republic; Ecuador; Egypt; Eritrea; Fiji; France; French Guiana; French Polynesia; Greece; Grenada; Guadeloupe; Guatemala; Haiti; Honduras; Indonesia; Iran, Islamic Republic of; Israel; Italy; Jamaica; Japan; Kenya; Korea, Republic of; Kuwait; Lebanon; Libya; Madagascar; Malaysia; Malta; Mauritius; Mexico; Montenegro; Montserrat; Morocco; Mozambique; Myanmar; Namibia; New Caledonia; New Zealand; Nicaragua; Niue; Oman; Pakistan; Panama; Papua New Guinea; Peru;

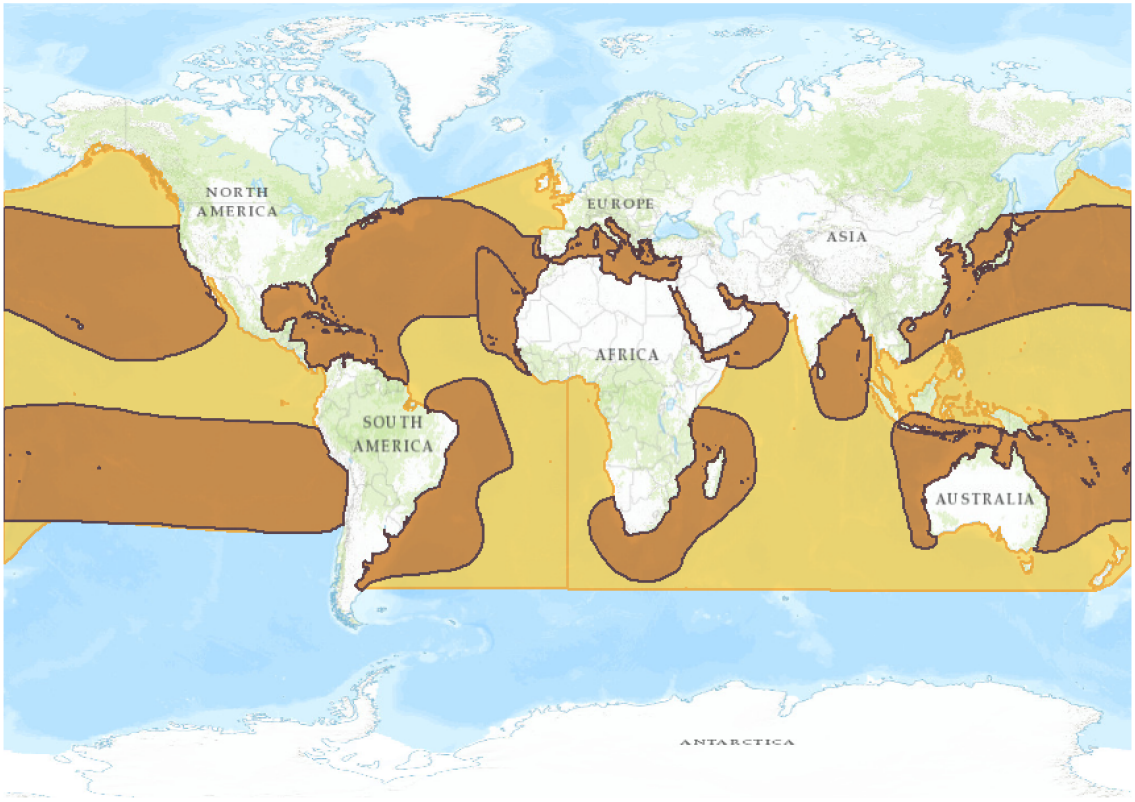
Philippines; Puerto Rico; Qatar; Saint Barthélemy; Saint Kitts and Nevis; Saint Lucia; Saint Vincent and the Grenadines; Senegal; Sierra Leone; Slovenia; Solomon Islands; Somalia; South Africa; Spain (Canary Is.); Sri Lanka; Suriname; Syrian Arab Republic; Tanzania, United Republic of; Tokelau; Tonga; Trinidad and Tobago; Tunisia; Turkey; Turks and Caicos Islands; United Arab Emirates; United States; Uruguay; Venezuela, Bolivarian Republic of; Viet Nam; Virgin Islands, British; Virgin Islands, U.S.; Yemen

FAO Marine Fishing Areas:

Native: Atlantic - western central, Atlantic - southwest, Atlantic - eastern central, Atlantic - northeast, Atlantic - northwest, Atlantic - southeast, Indian Ocean - western, Indian Ocean - eastern, Mediterranean and Black Sea - , Pacific - southwest, Pacific - western central, Pacific - northeast, Pacific - eastern central, Pacific - northwest, Pacific - southeast

http://dx.doi.org/10.2305/IUCN.UK.2015-4.RLTS.T3897A83157651.en

Distribution Map



0 8,000
kilometer

Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

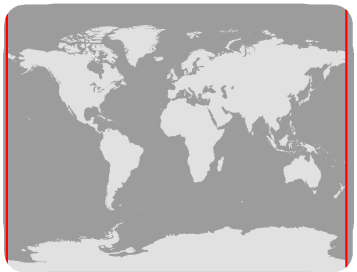
Caretta caretta

Range

- Extant (breeding)
- Extant (resident)

Compiled by:
OBIS-SEAMAP: The World Data Center for Marine Mammal, Sea Bird, and Sea Turtle Distributions

NE DD LC NT VU VULNERABLE EN CR EW EX



The boundaries and names shown and the designations used on this map do not imply any official endorsement, acceptance or opinion by IUCN.

http://dx.doi.org/10.2305/IUCN.UK.2015-4.RLTS.T3897A83157651.en

Population

Loggerheads are a single species globally comprising 10 biologically described regional management units (RMUs; Wallace *et al*. 2010) – hereafter subpopulations - 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. Regional management units are functionally equivalent to IUCN subpopulations, thus providing the appropriate demographic unit for Red List assessments. There are 10 Loggerhead subpopulations: NorthWest Atlantic Ocean, North East Atlantic Ocean, South West Atlantic Ocean, Mediterranean Sea, North East Indian Ocean, North West Indian Ocean, South East Indian Ocean, South West Indian Ocean, North Pacific Ocean, and South Pacific Ocean (see Figure 2 in the Supplementary Material). Multiple genetic stocks have been defined according to geographically disparate nesting areas around the world and are included within RMU delineations (Wallace *et al*. 2010) (shapefiles can be viewed and downloaded at: http://seamap.env.duke.edu/swot).

Total population size is unknown. The most common proxy for population abundance in sea turtles is the annual number of nests. A total of about 200,000 clutches are laid annually by the 10 subpopulations altogether (see Table 2 in the Supplementary Material). Considering a range of 3 to 5.5 clutches per female, the above value would correspond to approximately 36,000-67,000 nesting females annually.

For further information about this species, see Supplementary Material.

Current Population Trend: Decreasing

Habitat and Ecology **(see Appendix for additional information)**

The Loggerhead Turtle nests on insular and mainland sandy beaches throughout the temperate and subtropical regions worldwide. 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 in major current systems (gyres) that serve as open-ocean developmental grounds (Bolten and Witherington 2003, Putman and Mansfield 2015). 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 one 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).

Generation length

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 Standards and Petitions Subcommittee 2014). 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 (IUCN Standards and Petitions Subcommittee 2014).

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, unpubl. 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 unpubl. 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).

Systems: Terrestrial, Marine

Use and Trade

Loggerhead Turtles and their eggs are taken for human use (i.e., consumption and commercial products).

Threats (see Appendix for additional information)

Threats to Loggerheads vary in time and space, and in relative impact to populations. Threat categories affecting marine turtles, including Loggerheads, were described by Wallace *et al*. (2011) as:

• Fisheries bycatch: incidental capture of marine turtles in fishing gear targeting other species;
• Take: direct utilization of turtles or eggs for human use (i.e., consumption, commercial products);
• Coastal Development affecting critical turtle habitat: human-induced alteration of coastal environments due to construction, dredging, beach modification, etc;
• 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;
• 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.).
• The relative impacts of individual threats to all Loggerhead subpopulations were assessed by by Wallace *et al*. (2011). 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.
More detailed information at regional level can found in the specific subpopulation assessments.

Conservation Actions (see Appendix for additional information)

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. In most areas, 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.

More detailed information at regional level can be found in the specific subpopulation assessments.

Credits

Assessor(s): Casale, P. & Tucker, A.D.

Reviewer(s): Wallace, B.P. & Pilcher, N.J.

Bibliography

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.

Başkale, E., Katilmis, Y., Azmaz, M., Yaka, H., Çapar, D. and Kaska, Y. 2013. Monitoring and conservation of sea turtle (*Caretta carreta*, *Chelonia mydas*) populations within the scope of Fethiye Göcek specially protected area monitoring species and habitat project 2013. General Director of the General Directorate of the Protection of Natural Assets Ministry of Environment and Urbanization, Ankara.

Blanc, J. 2008. African Elephant (*Loxodonta africana*). Available at: http://www.iucnredlist.org/details/12392/0. (Accessed: 21/09/2012).

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

Conant, T.A., Dutton, P.H., Eguchi, T., Epperly, S.P., Fahy, C.C., Godfrey, M.H., MacPherson, S.L., Possardt, E.E., Schroeder, B.A., Seminoff, J.A., Snover, M.L., Upite, C.M. and Witherington, B.E. 2009. Loggerhead sea turtle (*Caretta caretta*) 2009 status review under the U.S. Endangered Species Act. Report of the Loggerhead Biological Review Team to the National Marine Fisheries Service, August 2009.

Demetropoulos, A. and Hadjichristophorou, M. 2010. Cyprus - Region B. In: P. Casale, D. Margaritoulis (eds), *Sea Turtles in the Mediterranean: distribution, threats and conservation priorities*, pp. 53-64. IUCN, Gland, Switzerland.

Durmuş, H. and Oruç, A. 2008. Çıralı, Maden Koyu, Beycik Bükü, Küçük Boncuk Koyu ve Tekirova Bükü kumsalları Deniz Kaplumbağası (*Caretta caretta*) ve Yumuşak Kabuklu Nil Kaplumbağası (*Trionyx triunguis*) Populasyonlarının Araştırılması, İzlenmesi ve Korunması Çalışması.

Durmuş, H. and Oruç, A. 2009. Çıralı, Maden Koyu, Beycik Bükü, Küçük Boncuk Koyu ve Tekirova Bükü kumsalları Deniz Kaplumbağası (*Caretta caretta*) ve Yumuşak Kabuklu Nil Kaplumbağası (*Trionyx triunguis*) Populasyonlarının Araştırılması, İzlenmesi ve Korunması Çalışması.

Durmuş, H. and Oruç, A. 2010. Çıralı, Maden Koyu, Beycik Bükü, Küçük Boncuk Koyu ve Tekirova Bükü kumsalları Deniz Kaplumbağası (*Caretta caretta*) ve Yumuşak Kabuklu Nil Kaplumbağası (*Trionyx triunguis*) Populasyonlarının Araştırılması, İzlenmesi ve Korunması Çalışması.

Durmuş, H. and Oruç, A. 2011. Çıralı, Maden Koyu, Beycik Bükü, Küçük Boncuk Koyu ve Tekirova Bükü kumsalları Deniz Kaplumbağası (*Caretta caretta*) ve Yumuşak Kabuklu Nil Kaplumbağası (*Trionyx triunguis*) Populasyonlarının Araştırılması, İzlenmesi ve Korunması Çalışması.

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

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. 2015. The IUCN Red List of Threatened Species. Version 2015-4. Available at: www.iucnredlist.org. (Accessed: 19 November 2015).

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

Kaska, Y., Dusen, S., Sozbilen, D. and Sezgin, C. 2013. Monitoring and conservation of sea turtles (*Caretta caretta*, *Chelonia mydas*) and soft-shelled nile turtle (*Trionyx triunguis*) populations within the scope of

Köyceğiz Dalyan specially protected area monitoring species and habitat project 2013. General Director of The General Directorate of the Protection of Natural Assets - Ministry of Environment and Urbanization, Ankara.

Lombard, P. and Kyle, S. 2014. Marine turtle monitoring and conservation in southern Mozambique.

Margaritoulis, D. 2005. Nesting activity and reproductive output of loggerhead sea turtles, *Caretta caretta*, over 19 seasons (1984-2002) at Laganas Bay, Zakynthos, Greece: the largest rookery in the Mediterranean. *Chelonian Conservation and Biology* 4: 916-929.

Margaritoulis, D. and Rees, A. 2001. The Loggerhead Turtle, *Caretta* caretta, population nesting in Kyparissia Bay, Peloponnesus, Greece: results of beach surveys over seventeen seasons and determination of the core nesting habitat. *Zoology in the Middle East* 24: 75-90.

Margaritoulis, D. and Rees, A.F. 2006. Loggerhead nesting in Koroni, southern Peloponnesus, Greece: nesting data 1995-2002. In: N.J. Pilcher (ed.), Twenty-third Annual Symposium on Sea Turtle Biology and Conservation, pp. 151-154. Miami, FL, USA.

Margaritoulis, D., Panagopoulou, A. and Rees, A.F. 2009. Loggerhead nesting in Rethymno, Island of Crete, Greece: Fifteen-year nesting data (1990-2004) indicate a declining population. In: A. Demetropoulos, O. Turkozan (ed.), Proceedings of the Second Mediterranean Conference on Marine Turtles, pp. 116-119.

Margaritoulis, D., Rees, A.F., Dean, C.J. and Riggall, T. 2011. Reproductive data of loggerhead turtles in Laganas Bay, Zakynthos Island, Greece, 2003-2009. *Marine Turtle Newsletter* 131: 2-6.

Mrosovsky, N. 2003. *Predicting extinction: fundamental flaws in IUCN's Red List system, exemplified by the case of sea turtles*.

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

National Research Council (NRC) of the National Academies, USA. 2010. Assessment of sea turtle status and trends: Integrating demography and abundance. The National Academies Press. Washington, DC.

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.

Oruç, A., Türkecan, O. and Yerli, S. 2007. Çıralı, Maden Koyu, Beycik Bükü, Küçük Boncuk Koyu ve Tekirova Bükü kumsalları Deniz Kaplumbağası (*Caretta caretta*) ve Yumuşak Kabuklu Nil Kaplumbağası (*Trionyx triunguis*) Populasyonlarının Araştırılması, İzlenmesi ve Korunması Çalışması.

Plotkin, P. 2003. Adult migrations and habitat use. In: P.L. Lutz, J.A. Musick & J. Wyneken (ed.), *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.

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.

Sea Turtle Association of Japan. 2002. Current status of Japanese loggerhead turtle nesting and beach environment. In: N. Kamezaki, Y. Toji & Y. Matsuzawa (ed.). Sea Turtle Association of Japan, Osaka, Japan.

Seminoff, J.A. and Shanker, K. 2008. Marine turtles and IUCN Red Listing: A review of the process, the pitfalls, and novel assessment approaches. *Journal of Experimental Marine Biology and Ecology* 356: 52-68.

Tucker, A.D., Baldwin, R., Willson, A., Al-Kiyumi, A., Schroeder, B., Possardt, E. and Witherington, B. 2013. Preliminary estimates for loggerhead clutch frequency from Masirah, Oman derived from satellite tracking. In: T. Tucker, L. Belskis, A. Panagopoulou, A. Rees, M. Frick, K. Williams, R. Leroux & K. Stewart (ed.), Proceedings of the 33rd Annual Symposium on Sea Turtle Biology and Conservation. NOAA Tech. Mem NMFS-SEFSC-645: 243.

Türkozan, O. and Kaska, Y. 2010. Turkey. In: P. Casale & D. Margaritoulis (ed.), *Sea Turtles in the Mediterranean: distribution, threats and conservation priorities*, pp. 257-293. IUCN, Gland, Switzerland.

Van Houtan, K.S. 2011. Assessing the impact of fishery actions to marine turtle populations in the North Pacific using classical and climate-based models, Internal Report IR-11-024. NOAA Fisheries, Pacific Islands Science Center, Honolulu, Hawaii, USA.

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.

Witherington, B., Willson, A., Baldwin, R., Al-Kiyumi, A., Al Harth, S., Al Blooshi, A. and Possardt, E. 2015 (in press). Comparison of recent and historical surveys of nesting by loggerhead turtles on beaches of Masirah island, Sultanate of Oman. Proceedings of the 35th Annual Symposium on Sea Turtle Biology and Conservation.

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.

Yakushima Umigame-Kan. 2011. Report on sea turtle research in Yakuhshima Island (1985-2009). Yakushima Umigame-kan.

Yakushima Umigame-Kan. 2011. Report on sea turtle research in Yakuhshima Island (2010). Yakushima Umigame-kan.

Yakushima Umigame-Kan. 2012. Report on sea turtle research in Yakuhshima Island (2011). Yakushima Umigame-kan.

Yakushima Umigame-Kan. 2013. Report on sea turtle research in Yakuhshima Island (2012). Yakushima Umigame-kan.

Yakushima Umigame-Kan. 2014. Report on sea turtle research in Yakuhshima Island (2013). Yakushima Umigame-kan.

Citation

Casale, P. & Tucker, A.D. 2015. *Caretta caretta. The IUCN Red List of Threatened Species 2015*: e.T3897A83157651. http://dx.doi.org/10.2305/IUCN.UK.2015-4.RLTS.T3897A83157651.en

Disclaimer

To make use of this information, please check the Terms of Use.

External Resources

For Supplementary Material, and for Images and External Links to Additional Information, please see the Red List website.

Appendix

Habitats

(http://www.iucnredlist.org/technical-documents/classification-schemes)

Habitat	Season	Suitability	Major Importance?
9. Marine Neritic -> 9.1. Marine Neritic - Pelagic	Resident	Suitable	Yes
9. Marine Neritic -> 9.2. Marine Neritic - Subtidal Rock and Rocky Reefs	Resident	Suitable	Yes
9. Marine Neritic -> 9.3. Marine Neritic - Subtidal Loose Rock/pebble/gravel	Resident	Suitable	Yes
9. Marine Neritic -> 9.4. Marine Neritic - Subtidal Sandy	Resident	Suitable	Yes
9. Marine Neritic -> 9.5. Marine Neritic - Subtidal Sandy-Mud	Resident	Suitable	Yes
9. Marine Neritic -> 9.6. Marine Neritic - Subtidal Muddy	Resident	Suitable	Yes
9. Marine Neritic -> 9.9. Marine Neritic - Seagrass (Submerged)	Resident	Suitable	Yes
9. Marine Neritic -> 9.10. Marine Neritic - Estuaries	Resident	Suitable	Yes
10. Marine Oceanic -> 10.1. Marine Oceanic - Epipelagic (0-200m)	Resident	Suitable	Yes
12. Marine Intertidal -> 12.2. Marine Intertidal - Sandy Shoreline and/or Beaches, Sand Bars, Spits, Etc	Breeding	Suitable	Yes

Threats

(http://www.iucnredlist.org/technical-documents/classification-schemes)

Threat	Timing	Scope	Severity	Impact Score
1. Residential & commercial development -> 1.1. Housing & urban areas	Ongoing	-	-	-
	Stresses:	1. Ecosystem stresses -> 1.1. Ecosystem conversion 1. Ecosystem stresses -> 1.2. Ecosystem degradation 2. Species Stresses -> 2.1. Species mortality 2. Species Stresses -> 2.2. Species disturbance 2. Species Stresses -> 2.3. Indirect species effects -> 2.3.7. Reduced reproductive success		
1. Residential & commercial development -> 1.2. Commercial & industrial areas	Ongoing	-	-	-
	Stresses:	1. Ecosystem stresses -> 1.1. Ecosystem conversion 1. Ecosystem stresses -> 1.2. Ecosystem degradation 2. Species Stresses -> 2.1. Species mortality 2. Species Stresses -> 2.2. Species disturbance 2. Species Stresses -> 2.3. Indirect species effects -> 2.3.7. Reduced reproductive success		
1. Residential & commercial development -> 1.3. Tourism & recreation areas	Ongoing	-	-	-
	Stresses:	1. Ecosystem stresses -> 1.1. Ecosystem conversion 1. Ecosystem stresses -> 1.2. Ecosystem degradation 2. Species Stresses -> 2.1. Species mortality		

		2. Species Stresses -> 2.2. Species disturbance 2. Species Stresses -> 2.3. Indirect species effects -> 2.3.7. Reduced reproductive success		
5. Biological resource use -> 5.4. Fishing & harvesting aquatic resources -> 5.4.1. Intentional use: (subsistence/small scale)	Ongoing	-	-	-
	Stresses:	2. Species Stresses -> 2.1. Species mortality 2. Species Stresses -> 2.3. Indirect species effects -> 2.3.7. Reduced reproductive success		
5. Biological resource use -> 5.4. Fishing & harvesting aquatic resources -> 5.4.3. Unintentional effects: (subsistence/small scale)	Ongoing	-	-	-
	Stresses:	2. Species Stresses -> 2.1. Species mortality 2. Species Stresses -> 2.2. Species disturbance		
6. Human intrusions & disturbance -> 6.1. Recreational activities	Ongoing	-	-	-
	Stresses:	1. Ecosystem stresses -> 1.2. Ecosystem degradation 2. Species Stresses -> 2.2. Species disturbance 2. Species Stresses -> 2.3. Indirect species effects -> 2.3.7. Reduced reproductive success		
6. Human intrusions & disturbance -> 6.3. Work & other activities	Ongoing	-	-	-
	Stresses:	1. Ecosystem stresses -> 1.2. Ecosystem degradation 2. Species Stresses -> 2.2. Species disturbance 2. Species Stresses -> 2.3. Indirect species effects -> 2.3.7. Reduced reproductive success		
9. Pollution -> 9.4. Garbage & solid waste	Ongoing	-	-	-
	Stresses:	2. Species Stresses -> 2.1. Species mortality		
9. Pollution -> 9.6. Excess energy -> 9.6.1. Light pollution	Ongoing	-	-	-
	Stresses:	2. Species Stresses -> 2.3. Indirect species effects -> 2.3.7. Reduced reproductive success		
11. Climate change & severe weather -> 11.1. Habitat shifting & alteration	Ongoing	-	-	-
	Stresses:	1. Ecosystem stresses -> 1.2. Ecosystem degradation 2. Species Stresses -> 2.3. Indirect species effects -> 2.3.7. Reduced reproductive success		
11. Climate change & severe weather -> 11.3. Temperature extremes	Ongoing	-	-	-
	Stresses:	1. Ecosystem stresses -> 1.2. Ecosystem degradation 2. Species Stresses -> 2.3. Indirect species effects -> 2.3.6. Skewed sex ratios 2. Species Stresses -> 2.3. Indirect species effects -> 2.3.7. Reduced reproductive success		
11. Climate change & severe weather -> 11.4. Storms & flooding	Ongoing	-	-	-
	Stresses:	1. Ecosystem stresses -> 1.2. Ecosystem degradation 2. Species Stresses -> 2.1. Species mortality 2. Species Stresses -> 2.2. Species disturbance 2. Species Stresses -> 2.3. Indirect species effects -> 2.3.7. Reduced reproductive success		

Conservation Actions in Place

(http://www.iucnredlist.org/technical-documents/classification-schemes)

Conservation Actions in Place
In-Place Education
Included in international legislation: Yes
Subject to any international management/trade controls: Yes

Conservation Actions Needed

(http://www.iucnredlist.org/technical-documents/classification-schemes)

Conservation Actions Needed
1. Land/water protection -> 1.1. Site/area protection
1. Land/water protection -> 1.2. Resource & habitat protection
2. Land/water management -> 2.1. Site/area management
2. Land/water management -> 2.2. Invasive/problematic species control
2. Land/water management -> 2.3. Habitat & natural process restoration
3. Species management -> 3.1. Species management -> 3.1.1. Harvest management
3. Species management -> 3.1. Species management -> 3.1.2. Trade management
3. Species management -> 3.1. Species management -> 3.1.3. Limiting population growth
3. Species management -> 3.2. Species recovery
4. Education & awareness -> 4.1. Formal education
4. Education & awareness -> 4.2. Training
4. Education & awareness -> 4.3. Awareness & communications
5. Law & policy -> 5.2. Policies and regulations
5. Law & policy -> 5.3. Private sector standards & codes
5. Law & policy -> 5.4. Compliance and enforcement -> 5.4.1. International level
5. Law & policy -> 5.4. Compliance and enforcement -> 5.4.2. National level
5. Law & policy -> 5.4. Compliance and enforcement -> 5.4.3. Sub-national level
6. Livelihood, economic & other incentives -> 6.1. Linked enterprises & livelihood alternatives
6. Livelihood, economic & other incentives -> 6.4. Conservation payments
6. Livelihood, economic & other incentives -> 6.5. Non-monetary values

Research Needed

(http://www.iucnredlist.org/technical-documents/classification-schemes)

http://dx.doi.org/10.2305/IUCN.UK.2015-4.RLTS.T3897A83157651.en

Research Needed
1. Research -> 1.2. Population size, distribution & trends
1. Research -> 1.3. Life history & ecology
1. Research -> 1.5. Threats
1. Research -> 1.6. Actions
2. Conservation Planning -> 2.1. Species Action/Recovery Plan
2. Conservation Planning -> 2.2. Area-based Management Plan
2. Conservation Planning -> 2.3. Harvest & Trade Management Plan
3. Monitoring -> 3.1. Population trends
3. Monitoring -> 3.2. Harvest level trends
3. Monitoring -> 3.3. Trade trends
3. Monitoring -> 3.4. Habitat trends

Additional Data Fields

Habitats and Ecology
Generation Length (years): 45
Movement patterns: Full Migrant

http://dx.doi.org/10.2305/IUCN.UK.2015-4.RLTS.T3897A83157651.en

The IUCN Red List Partnership

The IUCN Red List of Threatened Species™ is produced and managed by the IUCN Global Species Programme, the IUCN Species Survival Commission (SSC) and The IUCN Red List Partnership.

The IUCN Red List Partners are: BirdLife International; Botanic Gardens Conservation International; Conservation International; Microsoft; NatureServe; Royal Botanic Gardens, Kew; Sapienza University of Rome; Texas A&M University; Wildscreen; and Zoological Society of London.

Loggerhead Turtle (*Caretta caretta*)

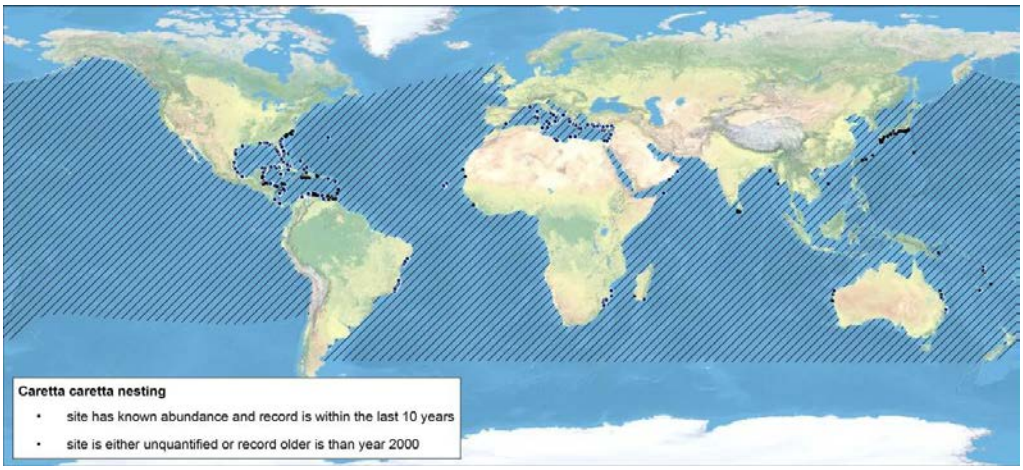


Figure 1. Global distribution and nesting sites for the Loggerhead Turtle *Caretta caretta* (Wallace *et al*. 2010).

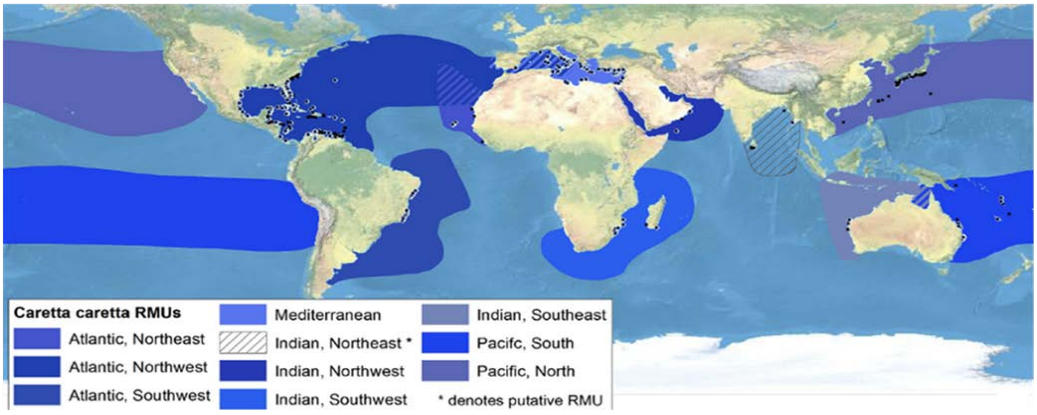


Figure 2. Global map of the 10 IUCN subpopulations (RMUs) of Loggerheads and nesting sites (Wallace *et al*. 2010).

Table 1: Summary results of subpopulation assessments and global assessment of the Loggerhead Turtle (*Caretta caretta*) for all IUCN Red List Criteria, and official Red List categories and criteria. Cells shaded red and yellow indicate "Threatened" and "Near Threatened" category status respectively according to IUCN Red List Criteria.

SUBPOPULATION	Criterion A1-A2 (popn reduction)	Criterion A4 (popn reduction moving window)	Criterion B (geographic range)	Criterion C (small popn size and decline)	Criterion D (very small or restricted popn)	Criterion E (quantitative analysis)	OFFICIAL IUCN CATEGORY AND CRITERION
North West Atlantic	Least Concern	Not assessed	Least Concern	Least Concern	Least Concern	Not assessed	**Least Concern**
North East Atlantic	Data Deficient	Not assessed	Endangered B2ab(iii)	Least Concern	Vulnerable D2	Not assessed	**Endangered B2ab(iii)**
Mediterranean	Least Concern	Not assessed	Least Concern	Least Concern	Least Concern	Not assessed	**Least Concern**
South West Atlantic	Least Concern	Not assessed	Least Concern	Least Concern	Least Concern	Not assessed	**Least Concern**
North West Indian	Endangered A2b	Critically Endangered A4b	Least Concern	Least Concern	Least Concern	Not assessed	**Critically Endangered A4b**
North East Indian	Data Deficient	Not assessed	Endangered B2ab(iii)	Data Deficient	Critically Endangered D	Not assessed	**Critically Endangered D**
South West Indian	Least Concern	Not assessed	Near Threatened B2	Least Concern	Least Concern	Not assessed	**Near Threatened B2**
South East Indian	Data Deficient	Not assessed	Near Threatened B2	Data Deficient	Least Concern	Not assessed	**Near Threatened B2**
North Pacific	Least Concern	Not assessed	Least Concern	Least Concern	Least Concern	Not assessed	**Least Concern**
South Pacific	Critically Endangered A2b	Not assessed	Least Concern	Not assessed	Least Concern	Not assessed	**Critically Endangered A2b**
GLOBAL	**Vulnerable A2b**	**Not assessed**	**Least Concern**	**Least Concern**	**Least Concern**	**Not assessed**	**Vulnerable A2b**

Table 2. Subpopulation and global population abundance (nests yr^{-1}) of the Loggerhead Turtle (see the individual subpopulation assessments for details about estimates and data sources). For convenience, current abundance includes abundance values from the most recent estimates for each subpopulation, which may be several years apart because total abundances are estimated from both index and non-index (i.e. not necessarily constantly monitored) nesting sites.

*The six subpopulations (comprising about 90% of the current annual nests globally) for which long-term data series were available and were included in the trend analyses at subpopulation and global population levels.

[§]The current abundance of the South Pacific subpopulation is one of the lowest, probably about 1% of the total abundance.

Subpopulation (RMU)	**Current abundance** (nests yr^{-1})	**%**
North West Atlantic*	83,717	41.8
North East Atlantic	15,000	7.5
Mediterranean*	7,200	3.6
South West Atlantic*	7,696	3.8
North West Indian*	70,000	35.0
North East Indian	25	0.0
South West Indian*	4,600	2.3
South East Indian	2,955	1.5
North Pacific*	9,053	4.5
South Pacific[§]	n/a	
Total	**200,246**	**100.0**

Table 3. Overall trends of the 6 Loggerhead Turtle subpopulations for which past and present abundance values are available (such data are not available for the other 4 subpopulations: North East Atlantic, North East Indian, South East Indian, South Pacific). Values are nests yr^{-1} except for the North West Indian index sites (*) were values are tracks day^{-1}. Index nesting sites: abundance values and changes for each subpopulation (from a total of 153 index nesting sites; see the specific subpopulation assessments for the complete datasets and data sources; data sources are also listed in section 10). All sites: total abundance values (at index and non-index sites) for each subpopulation calculated from the changes at index sites applied to the present abundance at all sites (here considered as 2013 for convenience).

Total: trends calculated from the total abundance values at all sites (see the Criterion A section in the global assessment's rationale for details).

Subpopluation (RMU)		**Past Abundance** (3 generations ago)	**Current abundance** (2013)	**3-generation change** (past-present)
North West Atlantic	Index sites	52,167	53,038	0.02
	All sites	82,342	83,717	0.02
Mediterranean	Index sites	3,122	3,344	0.07
	All sites	6,723	7,200	0.07
South West Atlantic	Index sites	4,428	7,540	0.70
	All sites	4,519	7,696	0.70
North West Indian	Index sites*	659	190	-0.71
	All sites	243,040	70,000	-0.71
South West Indian	Index sites	599	2,511	3.19
	All sites	1,097	4,600	3.19
North Pacific	Index sites	3,123	8,394	1.69
	All sites	3,368	9,053	1.69
Total	**All sites**	**341,089**	**182,266**	**-0.47**

Data sources for Table 3:

North West Atlantic: North Carolina Wildlife Research Commission (NCWRC), unpublished data; South Carolina Department of Natural Resources (SCDNR), unpublished data; Georgia Department of Natural Resources (GDNR), unpublished data; Florida Fish and Wildlife

Conservation Commission/Fish and Wildlife Research Institute (FWCC/FWRI), unpublished data; U.S. Fish and Wildlife Service (USFWS), unpublished data; Sea Turtle Protection Committee of Quintana Roo, Mexico (CPTMQROO).

***Mediterranean**:* Margaritoulis (2005); Margaritoulis et al. (2011), D. Margaritoulis pers comm.; Margaritoulis and Rees (2001), D. Margaritoulis, A.F. Rees, T. Riggall pers comm.; Margaritoulis *et al*. (2009), D. Margaritoulis, A. Panagopoulou, A.F. Rees, T. Riggall pers comm.; D. Margaritoulis, A.F. Rees, C.J. Dean, A. Panagopoulou, T. Riggall pers comm.; D. Margaritoulis, A. Panagopoulou, A.F. Rees, T. Riggall pers comm.; Margaritoulis and Rees (2006), D. Margaritoulis, T. Riggall pers comm; Kaska *et al*. (2013); Türkozan and Kaska (2010); Y. Kaska, pers. comm.; Başkale *et al*. (2013); Oruç *et al*. (2007); Durmuş and Oruç (2008, 2009, 2010, 2011); Demetropoulos and Hadjichristophorou (2010); Fuller W.J., Glen F., Godley B.J., Rhodes K.A., Snape R.T.E., Stokes K., Broderick A.C., pers. comm.; Y. Levy, pers. comm.

***South West Atlantic**:* N. Marcovaldi, pers. comm.

***North West Indian**:* Tucker *et al*. (2013); Witherington *et al*. (in press).

***South West Indian**:* R. Nel, unpubl. data; Lombard and Kyle (2014).

***North Pacific**:* Sea Turtle Association of Japan, unpubl. data; Sea Turtle Association of Japan (2002); Yakushima Umigame-Kan (2011a, b, 2012, 2013, 2014).

References

Başkale, E., Katilmis, Y., Azmaz, M., Yaka, H., Çapar, D. and Kaska, Y. 2013. Monitoring And Conservation Of Sea Turtles (*Caretta carreta, Chelonia mydas*) Populations Within The Scope Of Fethiye Göcek Specially Protected Area Monitoring Species And Habitat Project 2013. General Director of The General Directorate of the Protection of Natural Assets Ministry of Environment and Urbanization, Ankara.

Demetropoulos, A. and Hadjichristophorou, M. 2010. Cyprus - Region B, In Sea Turtles in the Mediterranean: Distribution, Threats and Conservation Priorities. eds P. Casale, D. Margaritoulis, pp. 53-64. IUCN, Gland, Switzerland.

Durmuş, H. and Oruç, A. 2008. Çıralı, Maden Koyu, Beycik Bükü, Küçük Boncuk Koyu ve Tekirova Bükü kumsalları Deniz Kaplumbağası (Caretta caretta) ve Yumuşak Kabuklu Nil Kaplumbağası (Trionyx triunguis) Populasyonlarının Araştırılması, İzlenmesi ve Korunması Çalışması.

Durmuş, H. and Oruç, A. 2009. Çıralı, Maden Koyu, Beycik Bükü, Küçük Boncuk Koyu ve Tekirova Bükü kumsalları Deniz Kaplumbağası (Caretta caretta) ve Yumuşak Kabuklu Nil Kaplumbağası (Trionyx triunguis) Populasyonlarının Araştırılması, İzlenmesi ve Korunması Çalışması.

Durmuş, H. and Oruç, A. 2010. Çıralı, Maden Koyu, Beycik Bükü, Küçük Boncuk Koyu ve Tekirova Bükü kumsalları Deniz Kaplumbağası (Caretta caretta) ve Yumuşak Kabuklu Nil Kaplumbağası (Trionyx triunguis) Populasyonlarının Araştırılması, İzlenmesi ve Korunması Çalışması.

Durmuş, H. and Oruç, A. 2011. Çıralı, Maden Koyu, Beycik Bükü, Küçük Boncuk Koyu ve Tekirova Bükü kumsalları Deniz Kaplumbağası (Caretta caretta) ve Yumuşak

Kabuklu Nil Kaplumbağası (Trionyx triunguis) Populasyonlarının Araştırılması, İzlenmesi ve Korunması Çalışması.

Kaska, Y., Dusen, S., Sozbilen, D. and Sezgin, C. 2013. Monitoring and Conservation of Sea Turtles (*Caretta caretta, Chelonia mydas*) And Soft -Shelled Nile Turtle (*Trionyx Triunguis*) Populations Within The Scope of Köyceğiz Dalyan Specially Protected Area Monitoring Species And Habitat Project 2013. General Director of The General Directorate of the Protection of Natural Assets - Ministry of Environment and Urbanization, Ankara.

Lombard, P. and Kyle, S. 2014. Marine Turtle Monitoring and Conservation In Southern Mozambique.

Margaritoulis, D. and Rees, A. 2001. The Loggerhead Turtle, Caretta caretta, population nesting in Kyparissia Bay, Peloponnesus, Greece: Results of beach surveys over seventeen seasons and determination of the core nesting habitat. *Zoology in the Middle East 24*: 75-90.

Margaritoulis, D. 2005. Nesting activity and reproductive output of loggerhead sea turtles, *Caretta caretta*, over 19 seasons (1984-2002) at Laganas Bay, Zakynthos, Greece: The largest rookery in the Mediterranean. *Chelonian Conservation and Biology* 4: 916-929.

Margaritoulis, D. and Rees, A.F. 2006. Loggerhead nesting in Koroni, southern Peloponnesus, Greece: nesting data 1995-2002, In Twenty-third Annual Symposium on Sea Turtle Biology and Conservation. ed. N.J. Pilcher, pp. 151-154. NOAA Tech. Memorandum NMFS-SEFSC-536, Miami, FL, USA.

Margaritoulis, D., Panagopoulou, A. and Rees, A.F. 2009. Loggerhead nesting in Rethymno, Island of Crete, Greece: Fifteen-year nesting data (1990-2004) indicate a declining population, In Proceedings of the Second Mediterranean Conference on Marine Turtles. eds A. Demetropoulos, O. Turkozan, pp. 116-119. Barcelona Convention – Bern Convention – Bonn Convention (CMS).

Margaritoulis, D., Rees, A.F., Dean, C.J. and Riggall, T. 2011. Reproductive data of loggerhead turtles in Laganas Bay, Zakynthos Island, Greece, 2003-2009. *Marine Turtle Newsletter* 131: 2-6.

Oruç, A., Türkecan, O. and Yerli, S. 2007. Çıralı, Maden Koyu, Beycik Bükü, Küçük Boncuk Koyu ve Tekirova Bükü kumsalları Deniz Kaplumbağası (*Caretta caretta*) ve Yumuşak Kabuklu Nil Kaplumbağası (*Trionyx triunguis*) Populasyonlarının Araştırılması, İzlenmesi ve Korunması Çalışması.

Sea Turtle Association of Japan 2002. Current Status of Japanese Loggerhead Turtle Nesting and Beach Environment (Eds N.Kamezaki, Y. Toji and Y. Matsuzawa). Sea Turtle Association of Japan, Osaka, Japan.

Türkozan, O. and Kaska, Y. 2010. Turkey, In Sea Turtles in the Mediterranean: Distribution, Threats and Conservation Priorities. eds P. Casale, D. Margaritoulis, pp. 257-293. IUCN, Gland, Switzerland.

Tucker, A.D., Baldwin, R., Willson, A., Al-Kiyumi, A., Schroeder, B., Possardt, E. and Witherington, B. 2013. Preliminary estimates for loggerhead clutch frequency from

Masirah, Oman derived from satellite tracking, In Proceedings of the 33rd Annual Symposium on Sea Turtle Biology and Conservation. eds T. Tucker, L. Belskis, A. Panagopoulou, A. Rees, M. Frick, K. Williams, R. Leroux, K. Stewart. NOAA Tech. Mem NMFS-SEFSC-645: 243.

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., Duenas, R.B., Casale, P., Choudhury, B.C., Costa, A., Dutton, P.H., Fallabrino, A., Girard, A., Girondot, M., Godfrey, M.H., Hamann, M., Lopez-Mendilaharsu, M., Marcovaldi, M.A., Mortimer, J.A., Musick, J.A., Nel, R., Pilcher, N.J., Seminoff, J.A., Troeng, 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: e15465.

Witherington, B., Willson, A., Baldwin, R., Al-Kiyumi, A., Al Harth, S., Al Blooshi, A. and Possardt, E. in press. Comparison of recent and historical surveys of nesting by loggerhead turtles on beaches of Masirah island, Sultanate of Oman, In Proceedings of the 35th Annual Symposium on Sea Turtle Biology and Conservation.

Yakushima Umigame-Kan 2011a. Report on sea turtle research in Yakuhshima Island (2010). Yakushima Umigame-kan.

Yakushima Umigame-Kan 2011b. Report on sea turtle research in Yakuhshima Island (1985-2009). Yakushima Umigame-kan.

Yakushima Umigame-Kan 2012. Report on sea turtle research in Yakuhshima Island (2011). Yakushima Umigame-kan.

Yakushima Umigame-Kan 2013. Report on sea turtle research in Yakuhshima Island (2012). Yakushima Umigame-kan.

Yakushima Umigame-Kan 2014. Report on sea turtle research in Yakuhshima Island (2013). Yakushima Umigame-kan.