Loggerhead Turtle (*Caretta caretta*) and Green Turtle (*Chelonia mydas*) – Cyprus


Photographs: Left: Brocken Inaglory (Wikimedia Commons, 2008); Right: Turtle Excluder Devices (TEDs) (Wikimedia Commons, 2011)

	Loggerhead Turtle	***Green Turtle***
Conservation status	IUCN Global: Vulnerable CY: FV	IUCN Global: Endangered CY: U2 (+)
Protection status	HD: Annex II CMS: Appendix I Bern Convention: Appendix II	HD: Annex II CMS: Appendix I Bern Convention: Appendix II
Population (2007-12)	EU27: > 150,000 – 230,000 individuals CY: 800 – 1,600 individuals	EU27: > 2,120 – 3,360 individuals CY: 120 - 360 individuals
MS with genuine improvement	CY	CY
Other MS	ES, FR, GR, IT, MT, NL, PT, SI, UK	ES, FR, GR, IT, NL, PT, UK

Summary: Massive over-exploitation of turtles for turtle soup and meat, on the Levant coast, from the Gulf of Iskenderun to Palestine/Israel, from the end of the First World War to about 1970 led to a virtual collapse of the turtle populations of the region and especially of the Green Turtle population. More recently both turtle species have been under pressure again, mainly from habitat loss and disturbance as well as from fishing bycatch. After 40 years of implementing conservation measures in Cyprus, steady and recently more rapid improvements have been seen in turtle populations. Time was the key to seeing results, keeping in mind that turtles need 20-30 years to mature, and more in the case of Green Turtles. Knowledge gained through these efforts has resulted in the designation of protected areas, the identification of harmful activities, and the targeted implementation of effective conservation measures. Joint action between dedicated NGOs, the Government, local authorities, supported by volunteers, ensures the continuation of conservation efforts and the spread of public awareness. Key measures to improve turtle breeding and reduce hatchling mortality have included legal protection, prohibiting cars, sunbeds and parasols on beaches, and caging nests to reduce natural predation by Red Foxes.

Background

Status and EU occurrence

The Loggerhead Turtle (*Caretta caretta*)[1] is a widespread marine turtle, occurring in the Atlantic, Indian, and Pacific Oceans. In Europe, it occurs in the north-east Atlantic along the coast of Spain, Portugal, the Netherlands, and the UK, but primarily within the Mediterranean Sea (Casale and Tucker, 2017). Major nesting sites are located in Greece, in Zakynthos and Kyparissia Bay, and to a lesser extent in Turkey (Dalyan) and Cyprus (Chrysochou Bay) (Casale, 2015). The world population for the Loggerhead Turtle is difficult to estimate and is currently unknown. EU Member State reports for 2007-12 provided an estimate for the European

[1] Natura 2000 species code 1224

Mediterranean of 140,800–184,100 individuals (ETC-BD, 2018a). However, the best way of quantifying the species' population is annual nest counts. In 2013, an estimated total of over 200,000 clutches were laid annually, with 7,200 of these located in the Mediterranean (Demetropoulos pers comm, 2018). Overall, during the past three turtle generations (approx. 135 years), there has been a decrease of 47% in the species' abundance, mainly due to losses in the NW Indian Ocean, and as a result the global status of the Loggerhead Turtle is considered to be vulnerable (Casale and Tucker, 2017).

Although Mediterranean population trends have showed a slight positive increase of 7% (Casale and Tucker, 2017) the Article 17 assessments indicate that for 2007-2012 the species had an unfavourable conservation status in the majority of EU Member States, and Atlantic, Macaronesian and Mediterranean biogeographical regions overall (Annex 1). However, the Cyprus population of 800 – 1,000 individuals is considered to have a favourable conservation status, and this is a genuine improvement since the 2001-06 assessment (ETC-BD, 2018a).

The Green Turtle (*Chelonia mydas*)[2] has a similar global geographic presence to the Loggerhead Turtle, inhabiting the Atlantic, Indian, and Pacific Oceans. In Europe, their main nesting ground is considered to be along the coasts of Turkey and Cyprus, with other smaller nesting sites in the Eastern Mediterranean (Kasparek et al., 2001; IUCN, 2010). Global population figures for the Green Turtle are lower than Loggerhead Turtles and show an overall decline of around 48% to 67% compared to 3 generations ago (approx. 1960-1970s). The species is therefore considered to be globally endangered (Seminoff, 2004).

In the EU, Member State reports provide an estimate of over 2,120–3,360 individuals (ETC-BD, 2018b) and indicate that the species has an unfavourable or unknown conservation status in all countries (Annex 1). Its overall status in the Atlantic biogeographical region is unfavourable-bad, with a stable trend, unknown in the Macaronesian region, and unstable-bad with an unknown trend in the Mediterranean region. Although in Cyprus, the species' conservation status for 2007-12 was unfavourable-bad, as it was for 2001-06, the estimated population of 120-160 individuals is believed represent a genuine increase (ETC/BD, 2017b).

Currently, IUCN red list assessments of the conservation status for either turtle species are not available at a European regional scale. Uncertainties around whether or not the Green Turtle's Mediterranean population is distinct from the Atlantic populations have led to a de-listing at a European scale (Seminoff and Shanker, 2008; Euroturtle, undated). Additional research is therefore required to determine whether the Mediterranean population is a distinct subpopulation (MEDASSET pers comm, 2018).

Ecological requirements

The Loggerhead Turtle and Green Turtle require beach areas for nesting sites, mainly on insular and mainland sandy beaches, in temperate and subtropical regions. In Cyprus, Loggerhead Turtles nest mainly on the beaches of Chrysochou Bay, but also on beaches north of Paphos, mainly in the area of the Lara/Toxeftra Turtle Reserve and on several other beaches on the south coast and elsewhere. Green Turtles largely breed on the beaches north of Paphos, in the Lara/Toxeftra Turtle Reserve. However, nesting of both species has ceased in some beaches mainly due to tourism, urban sprawl and recreation or to erosive degradation from sand extraction (including recently at Potima beach and Coral Bay north of Paphos and since 1978 at Ayia Napa) (Demetropoulos pers comm, 2018). Both Green and Loggerhead Turtles have smaller nesting sites on the north coast of the island, close to the Karpas peninsula and at Agia Eirini in Morphou Bay (About Cyprus, 2017).

Both turtles are migratory species, using a wide range of areas and habitats throughout their lifetimes. For about four years, juvenile turtles use gyres as open-ocean developmental grounds and later move to neritic (between coast and continental shelf) developmental areas with benthic or epipelagic prey, seagrass and algae where they grow to maturity (at about 30 years in Loggerhead Turtles and more in Green Turtles). Once sexually mature, both male and female Loggerhead and Green Turtles migrate between foraging grounds and nesting sites at remigration intervals of a few years. Adults reside during non-breeding periods at coastal neritic feeding areas that occasionally coincide with juvenile developmental habitats (Casale and Tucker, 2017; Seminoff, 2004).

Pressures and threats

Pressures and threats to both Loggerhead and Green Turtles, apart from predation from Red Foxes (*Vulpes vulpes*), are mainly human-induced and include fishing (as bycatch) and other boating and sporting activities, driving on beaches, lights near the beaches, sky glow (i.e. distant light pollution), water pollution, and land activities (e.g. coastal constructions for urban areas and sea defences) that disturb breeding beaches (EEA,

[2] Natura 2000 species code 1227

2017b, 2017c; Demetropoulos pers comm, 2018; Casale, 2015; IUCN, 2010). Coastal developments for tourism (including housing) and coastal defence purposes can destroy nesting locations. Both turtles have also been pressured by illegal taking of eggs and juvenile hatchlings for human consumption, though this is not considered to be a current threat to either species in the Mediterranean (EEA, 2017b; Seminoff, 2004; IUCN, 2010).

Some scientific studies in Cyprus have also highlighted predation by Red Foxes, which smell and dig up the eggs (IUCN, 2010). Predation from these sources can impact between 8% and 38% of all clutches per year for both species along the North coast of Cyprus, and up to 80% of all nests in Chrysochou Bay and along the West Coast of Cyprus (Demetropoulos pers comm, 2018). To address this issue, nests are protected by cages and this has significantly reduced turtle mortalities over the years. After hatching, bird predation may also reduce juvenile populations, though this is not considered to be significant in the Mediterranean (IUCN, 2010).

Drivers of improvements: actors, actions and their implementation approaches

Organisers, partners, supporters and other stakeholders

The Department of Fisheries and Marine Research (DFMR) of the Government of Cyprus started the Cyprus Turtle Conservation Project in 1976. The Cyprus Wildlife Society was set up in 1985 to help in the implementation of the project. In 2010, Cyprus Wildlife Society took on overall implementation of the project under a contract agreement with DFMR (Demetropoulos pers comm, 2018). In addition, the Society for the Protection of Turtles (SPOT), University of Exeter's Marine Turtle Research Group (UK), and the North Cyprus Department for Environmental Protection have been working together in the Marine Turtle Conservation Project since 1992 (SPOT, 2017a; MEDASSET, 2018; About Cyprus, 2017; IUCN, 2010).

Contributions / relevance of strategic plans (e.g. species action plans)

A key driver for the conservation of both the Loggerhead and Green Turtles has been the Action Plan for the Conservation of Mediterranean Sea Turtles. Established in 1989 and updated in 1999 and 2008, the action plan aims to support the recovery of both turtles in the Mediterranean through their protection, conservation and management as well as improvements in scientific research and monitoring (UNEP et al., 2008). The plan lays down implementation measures and timelines to achieve these goals, including:

- legislation for their protection and conservation;
- integrated management plans with measures and management rules to protect critical habitats;
- measures to minimise incidental catches and eliminate intentional killings;
- measures to minimise mortality (e.g. rescue centres and first aid stations);
- development of research and monitoring programmes;
- public-awareness and educational programmes;
- capacity building and training programmes; and
- national action plans for the conservation of marine turtles.

Measures taken and their effectiveness

The measures taken by Cyprus for the conservation of the two turtle species are listed below.

Application of conservation measures for Loggerhead Turtle and Green Turtle for 2007-2012 in Cyprus

Measure	Type	Ranking	Inside/outside N2k	Broad Evaluation
Loggerhead Turtle				
Establish protected areas/sites	Legal Administrative	High	Inside	Maintain Enhance Long-term
Legal protection of habitats and species	Legal Administrative	High	Both	Maintain Enhance Long-term
Manage landscape features	Legal Administrative	High	Both	Enhance Long-term
Specific single species or species group management measures	Legal Administrative	High	Both	Enhance Long-term
Green Turtle				
Establish protected areas/sites	Legal Administrative	High	Inside	Maintain Enhance Long-term
Legal protection of habitats and species	Legal Administrative	High	Both	Maintain Enhance Long-term
Manage landscape features	Legal Administrative	High	Both	Enhance Long-term
Specific single species or species group management measures	Legal Administrative	High	Both	Enhance Long-term

Source: Cyprus Article 17 report available at https://bd.eionet.europa.eu/activities/Reporting/Article_17/Reports_2013

In 2007, the United Nations Environment Programme (UNEP) surveyed Mediterranean states to assess their implementation of the Action Plan for the Conservation of Mediterranean Sea Turtles (UNEP, 2007). Cyprus, at that time, stated that it had implemented key actions of the implementation plan, including establishing legal protection for turtles, measures to reduce their bycatch, creating centres to rescue marine turtles and establishing special protected areas for turtle habitats, among other actions (UNEP, 2007). Cyprus was an early adopter of legal protection for turtles, along with dolphins and seals, through regulations under their Fisheries Law in 1971 (Cyprus DoE, 2017; About Cyprus, 2017). Cypriot legislation prohibits the disturbance, harm or capture of both turtle species, their eggs, etc., on land and at sea (Demetropoulos pers comm, 2018).

Currently, there are four protected sites around the north coast of Cyprus, which local authorities designated as Specially Protected Areas under the Barcelona Convention: Alagadi Beach (Alakati beach) (largest loggerhead nesting site), Karpaz Peninsula, South Karpaz and Akdeniz (Ayia Irini). These areas protect the third and fifth most important Green Turtle nesting sites of the entire Mediterranean. A major nesting site at Tatlisu (Akanthou) for Loggerhead Turtles is still under consideration for protection (IUCN, 2010).

In the part of the island under government control, Chrysochou Bay was declared a 'Shore for Ecological Protection' in 2002 on the basis of the Town and Country Planning legislation. Protection measures include providing no permits for the commercial beach use, the prohibition of breakwaters or marinas and restrictions on light pollution from adjacent areas. In 2005, this area was extended to include the Argaka/Yialia area. The whole area was nominated as a Natura 2000 site, and became a Site of Community Importance in 2008, covering 11 km of 65-200m wide coastline and the adjoining sea area to the 50m isobath (IUCN, 2010; Demetropoulos pers comm, 2018). Furthermore, the designation of the Natura 2000 site for the Akamas peninsula, which includes the hinterland behind the Lara/Toxeftra Reserve, was accepted in 2011 (Demetropoulos and Hadjichristophorou, 2017).

In addition to the spatial protection measures and restrictions on human disturbance, Cyprus has also established a small rescue centre at Meneou, where Cyprus's DFMR has its Mariculture Research Station (IUCN, 2010). Since the late 1970s, the Turtle Conservation Project of DFMR has implemented measures aimed at increasing the number of hatchlings that make it to the sea. Early research of the project discovered that Red Foxes dug up roughly 80% of the turtle nests along the Polis/Limni and Lara area beaches. Initial measures aimed to reduce this natural predation through relocation of eggs to a hatchery on the Lara beach. In 1989, the Cyprus Fisheries Law and Regulations protected key nesting habitats on the west coast of the island, establishing the

Lara/Toxeftra Turtle Reserve along 10 km of coastline and adjoining sea to the 20m isobaths (about 1 km from the coast) (Demetropoulos pers comm, 2018). Between the 1st of June to the 30th of September, the reserve protects the five main Green Turtle nesting beaches, where Loggerhead Turtles also nest, by prohibiting the public from:

- staying on beaches or coastal areas at night;
- driving any vehicle on a beach;
- placing umbrellas, caravans, tents, etc., in the reserve;
- using or anchoring a boat in the marine reserve area; or
- fishing, except with a rod and line in the marine reserve area (IUCN, 2010; Demetropoulos and Hadjichristophorou, 2005).

With these changes in area legislation and regulation, conservation work shifted to *in situ* protection through the use of aluminium cages surrounding nests in 1995. These cages are open to allow hatchlings to make their way to the sea, while inhibiting foxes from digging up the eggs (DFMR, 2011; Demetropoulos and Hadjichristophorou, 2005).

Like many programmes, financial and staff resources are limited, and, increased enforcement of current legislation is needed (IUCN, 2010). Furthermore, activities on behalf of local municipalities and authorities have destroyed sand dunes and coastal habitat, either within or adjacent to Natura 2000 sites. Cyprus's environmental authority has admitted a 'lack of sufficient measures to satisfy the basic principles of prevention and protection of the area' (Kikas, 2014a, 2014b). Cases such as these have resulted in the European Commission issuing a letter of formal notice to Cyprus, indicating that in its view there has been an infringement of obligations under the provisions of the Habitats Directive (COE, 2017; Kikas, 2014a, 2014b).

Regarding public-awareness and educational programmes, as well as capacity building and training programmes, the Cyprus Wildlife Society and the DFMR have also been active for many years. Since 1989, Mediterranean scientists, administrators and protected area managers, nominated and sponsored by the Regional Activity Centre for Specially Protected Areas (RAC/SPA) or the Council of Europe can participate in the annual training courses in Turtle Conservation Techniques and Beach Management, run by the Cyprus Wildlife Society in cooperation with the DFMR (About Cyprus, 2017; Demetropoulos pers comm, 2018).

Another project in Cyprus focused on bycatch reduction technology for marine turtle bycatch in eastern Mediterranean small-scale fisheries, which was implemented by the Marine Turtle Research Group and funded by the Peoples Trust for Endangered Species and co-funded by SPOT (Snape, 2014). Previous research found that bottom-set trammel nets are responsible for the death of thousands of sea turtles in North Cyprus. Fishermen in the area lack viable mitigation strategies to reduce turtle bycatch, and North Cyprus has no Marine Protected Areas (MPAs) to protect resident marine turtles and their habitat. The study assessed how the use of LED lights deter turtle bycatch, which had positive qualitative results from the fishermen involved in the experiment (Snape, 2014). Other educational outreach activities to artisan fishers to address fishery bycatch have not produced any concrete conservation results, but has established participatory relationships with fishermen who aid in research (e.g., by informing when they see and catch turtles) (SPOT, 2017a).

In 2016, a LIFE Project called "Euroturtles" was approved and covers six EU countries (LIFE, 2018). In Cyprus, both the University of Cyprus and the DFMR are involved, and activities will focus on the Polis-Gialia Natura 2000 site and to a lesser extent in Lara/Toxeftra, within the Chersonisos Akama Natura 2000 site. Project activities in Cyprus are planned to include an upgrade of existing facilities by purchasing new tanks, installing or replacing plumbing network and pumps, purchasing veterinary equipment, etc. The project will also upgrade the rescue (reporting) network where necessary, allowing turtles to be promptly rescued, with a shorter waiting time and hence a lower mortality (Euroturtle, 2018a). Furthermore, Euroturtle activities in Cyprus will include the introduction of LED lights to reduce sea turtle bycatch in static nets, as well as activities aiming to reduce turtle entanglement in ghost gear (Eurosturtle, 2018b).

Funding sources (current and long-term) and costs (one-off and ongoing)

Total costs for conservation efforts in Cyprus are not known, though funding sources are listed for some projects at least. For example, the Marine Turtle Conservation Project received financial support from both Cyprus and the UK. Cyprus financial support came from The British High Commission, Cyprus Turkish Airlines, and the UNHCR. Financial support from the UK came from various sources, mainly from NGO donations (MTRG, 2017). Other financial support for SPOT activities came from Kuzey Kıbrıs Turkcell, the Erwin Warth Foundation and Pacific Car Rentals. They have received grant support from the British Chelonia Group, Ektam

Kıbrıs, United States Agency for International Development, MEDASSET, and Maureen Hutchinson (a local conservationist) (SPOT, 2017b).

The Cyprus Turtle Conservation Project has been funded (ongoing funding) mostly by the government (the Department of Fisheries and Marine Research) since 1978 and implemented since 2010 by the Cyprus Wildlife Society, which has also been partly funding it in cash and in-kind donations - in earlier decades also (Demetropoulos pers comm, 2018). Furthermore, the Cyprus Turtle Conservation, for the years 2017 and 2018, is co-funded by the European Regional Development Fund under the Operational Program "Competitiveness and Sustainable Development" of the 2014-2020 Programming Period (Marcou pers comm, 2018).

Until 2016, with start of the 'Euroturtles' project (described above), LIFE funding had not contributed to the conservation measures taken for the turtles. This project has a large budget of €5,116,167 (of which €3,793,167 is from the EU), although this is spread across six countries.

Future actions

Conservationists insist on the urgent need for further designations of protected areas as well as increased enforcement of current legislation (MEDASSET, 2018; IUCN, 2010). As a result, greater financial and staff resources need to be allocated to conservation efforts. Proposals for more protected sites in the Karpaz peninsula, west coast beaches and additional north coast beaches are dependent on the agreement of 'ministers' (Boura and Trismpioti, 2016; IUCN, 2010). In addition, there is a need for a conclusive and cohesive coastal zone management project plan, though a CAMP-Cyprus project was finalised in 2007/2008 and a CAMP-Cyprus Biodiversity Concerns Report was included. It was sponsored by UNEP/MAP's Priority Actions Programme/Regional Activity Centre (PAP/RAC) and the Cyprus Government with input from RAC/SPA for the Biodiversity Concerns Report (PAP/RAC, 2018; Demetropoulos pers comm, 2018). Furthermore, the adoption of effective management regulations for the Chrysochou Bay Natura 2000 site is still pending (IUCN, 2010; EEA, 2015). However, a recent case report of the Natura 2000 area found that the Cyprus government believes the current protection scheme to be adequate, stating that a 'Local Development Plan covering the whole of the peninsula is under formulation, to establish distinct development zones and ensure the harmonious coexistence of nature and communities' (Council of Europe, 2018).

Indeed, in 2014, the Audit Office of the Republic of Cyprus found in its audit of the nation's conservation actions a lack of certain activities on the island, including the failure to create a national list of all rare, protected and endangered species of flora and fauna and their important habitats, which is required under the Protocol on Specially Protected Areas and Biological Diversity in the Mediterranean (Barcelona Protocol). Rectifying this omission and those relating to the Habitats Directive are clearly required actions (Kikas, 2014a, 2014b).

Later in 2016, Cyprus was criticised at the 36th Standing Committee Meeting of the Bern Convention at the Council of Europe (Strasbourg, France, 15-18 November 2016). The Council adopted a new Recommendation (No. 191 / 2016) which required Cyprus to 'urgently implement an extensive list of 14 measures, including: declare Akamas peninsula (incl. Limni) as a national park, establish a management entity and implement protection measures, maintain strict protection of Lara and Toxeftra beaches and shut down illegal restaurants, establish a zero-lighting and no-building zone of at least 200m between Limni's protected area and the planned golf resort, and revise the local development plan around Limni to ensure it will not affect nesting' (Boura and Trismpioti, 2016).

Regarding research, there is a need for (1) a thorough assessment of local turtle populations inhabiting Cyprus's waters as well as (2) the completion of an extensive survey and mapping of all major seagrass (*Posidonia oceanica*) beds, which has been partly completed already by the DFMR (Demetropoulos pers comm, 2018). Indeed, seagrass mapping was completed for all marine Natura 2000 sites as well as the Vasilikos – Limassol Bay in Cyprus in 2013. To build on this, further mapping is planned to start in 2018 that will cover all of the coastal areas of Cyprus (under governmental control) (Marcou pers comm, 2018). Continuation of monitoring and nest protection efforts is still necessary (IUCN, 2010).

Achievements

Impacts on the target species

Conservation activities, such as protecting key sites and protecting nests with cages, have contributed to the increase in both Loggerhead and Green Turtle populations in Cyprus (Demetropoulos and Hadjichristophorou, 2017; IUCN, 2010; About Cyprus, 2017; MEDASSET, 2018). Due to the longevity of the species (only reaching maturity after 20-30 years in Loggerhead Turtles, and more in Green Turtles), assessing the effectiveness of conservation measures can be difficult. However, monitoring over time has seen significant increases in the number of nests on Cyprus's coasts since the mid-2000s and large numbers of juvenile Green Turtles and some sub-adults were seen off Cyprus waters, especially in Chrysochou Bay, which were never seen before (Demetropoulos and Hadjichristophorou, 2017, 2005). It is estimated that about 90% of all Green Turtle nests are within the protected area of the Lara/Toxeftra Reserve while over 80% of all Loggerhead Turtle nests are within the Chrysochou Bay Natura 2000 site and the Lara/Toxeftra Reserve (Demetropoulos pers comm, 2018). Cyprus is the only EU Member State in the Mediterranean Sea where population trends for both turtle species have increased since 2001, and is the only country with both species nesting on its shores.

Other impacts (e.g. other habitats and species, ecosystem services, economic and social)

Little information appears to be available on the wider impacts of the conservation measures taken for the turtles in Cyprus. However, one known important benefit from conservation efforts targeting Loggerhead and Green Turtles are its impact on Ghost Crab (*Ocypode cursor*) populations. One study found that along the beaches near Alagadi, limitations on human disturbance at night along the nesting beaches also protected the nocturnally active crabs (Strachan et al., 1999). Ghost crabs are a protected species in the Mediterranean, and are natural predators of sea turtle eggs (Deidun et al., 2017).

Conclusions and lessons learnt

The key targeted conservation measures that led to the improvements

- Legislation protecting the species and banning human activities that disturb key areas of habitat (and its enforcement).
- Improved monitoring of species breeding locations and understanding of threats to egg clutches and hatchlings.
- The implementation of conservation tools to protect nests from predation by Red Foxes.
- Protection of key nesting sites in the Natura 2000 network and other protected areas.
- Education and awareness-raising campaigns to highlight the importance of the species, as well as training programmes to help support ecotourism and conservation efforts.

Factors that supported the conservation measures

- These species were a focus of a great deal of conservation effort, involving Government agencies, national/regional and dedicated NGO conservation organisations, and other important stakeholders; such as dedicated NGO action groups and volunteers that supported conservation efforts on-the-ground and coordinated with national authorities.
- A dedicated national budget through the Department of Fisheries and Marine Research to continue the Cyprus Marine Turtle Conservation Programme.
- The species' threatened status helped to increase awareness and generate widespread support for conservation measures.

Factors that constrained conservation measures

- Increasing urbanisation and infrastructure development for tourism purposes has led to habitat change, fragmentation, and destruction.
- Limitations on available funding for habitat conservation measures and available staff to support monitoring and especially enforcement patrols.
- Lack of effective and implemented management plans for protected areas.

Quick wins that could be applied elsewhere for the species

- Depending on causes of natural predation, the implementation of nest protection through cages could bolster the number of undamaged nests.

- Controls on light pollution and monitoring of coastal areas during nesting and hatching periods.

Examples of good practice, which could be applied to other habitats and species

- The development and implementation of targeted conservation measures affecting the species' population levels at the local scale.
- Passing of legislation protecting key habitats and banning harmful activities in such areas.
- Outreach to, and engagement of, certain key stakeholders in the conservation of the species.

References

About Cyprus (2017) Turtles and conservation in Cyprus. http://www.aboutcyprus.org.cy/index.php/en/turtles-and-conservation-in-cyprus on 18/12/2017

Boura, L and Trismpioti, G (2016) MEDASSET at the Council of Europe: Bern Convention calls for improved protection and adopts decisions for sea turtle habitats in Cyprus, Greece & Turkey. http://www.medasset.org/features/bern-convention-2016/ on 07/11/2018

Casale, P (2015) *Caretta caretta* (Mediterranean subpopulation). The IUCN Red List of Threatened Species 2015: e.T83644804A83646294. http://dx.doi.org/10.2305/IUCN.UK.2015-4.RLTS.T83644804A83646294.en on 18/12/2017

Casale, P and Tucker, A D (2017) *Caretta caretta.* (amended version published in 2015) The IUCN Red List of Threatened Species 2017: e.T3897A119333622. http://dx.doi.org/10.2305/IUCN.UK.2017-2.RLTS.T3897A119333622.en on 18/12/2017

COE (2017) Convention on the Conservation of European Wildlife and Natural Habitats. Standing Committee 37th meeting in Strasbourg, 5-8 December 2017. File Open: Akamas Peninsula. Report by the NGO. Council of Europe (COE). https://rm.coe.int/akamas-peninsula-in-cyprus-ngo-report/168073cb89 on 20/12/2017

Council of Europe (2018) Akamas Peninsula (Cyprus). Convention on the Conservation of European Wildlife and Natural Habitats. Standing Committee 38th meeting Strasbourg, 27-30 November 2018. T-PVS/Files(2018)5. https://rm.coe.int/file-open-akamas-peninsula-in-cyprus-report-by-the-government/16808ea977 on 07/11/2018

Cyprus DOE (2017) Χλωρίδα και Πανίδα (Flora and Fauna), Department of Environment (DOE) http://www.moa.gov.cy/moa/environment/environmentnew.nsf/All/6BE5218AE624D624C2257FB1003EA67B?OpenDocument&highlight=caretta%20caretta on 19/12/2017

Deidun, A, Crocetta, F, Sciberras, A, Sciberras, J, Insacco, G and Zava, B (2017) The protected taxon Ocypode cursor (Linnaeus, 1758) (Crustacea: Decapoda: Ocypodidae) – documenting its well-established presence in the central Mediterranean. The European Zoological Journal 84(1): 96-103 https://www.tandfonline.com/doi/full/10.1080/11250003.2017.1281355 on 07/11/2018

Demetropoulos, A and Hadjichristophorou M (2017) "Turtles and Turtle Conservation in Cyprus". Presentation at part of the Second Mediterranean Natura 2000 Seminar, 14-16 November 2017, Limassol, Cyprus. http://ec.europa.eu/environment/nature/natura2000/platform/documents/second-mediterranean-natura-2000-seminar/06_Turtle_conservation_in_Cyprus_Andreas_Demetropoulos.ppt on 19/12/2017

Demetropoulos, A and Hadjichristophorou, M (2005) The Cyprus Turtle Conservation Project – 29 years on. In: Demetropoulos, A. and O. Turkozan (editors): Proceedings. Second Mediterranean Conference on Marine Turtles (Kemer, Turkey 2005). Barcelona Convention, Bern Convention /Council of Europe, Bonn Convention (CMS). http://www.rac-spa.org/sites/default/files/doc_turtles/p2c.pdf on 07/11/2018

DFMR (2011) Turtles and Turtle Conservation in Cyprus. http://www.moa.gov.cy/moa/dfmr/dfmr.nsf/All/3A83645E42F28B5342257FF5002D02E8/$file/TURTLES.pdf?OpenElement on 07/11/2018

EEA (2015) Natura 2000 Standard Data Form- Periochi Polis- Gialia (CY4000001). http://natura2000.eea.europa.eu/Natura2000/SDF.aspx?site=CY4000001 on 07/11/2018

ETC-BD (2018a) Member State Article 17 reports on *Caretta caretta* as compiled by ETC-BD on EIONET https://bd.eionet.europa.eu/article17/reports2012/species/summary/?period=3&group=Reptiles&subject=Caretta+caretta&region=

ETC-BD (2018b) Member State Article 17 reports on *Chelonia mydas* as compiled by ETC-BD on EIONET https://bd.eionet.europa.eu/article17/reports2012/species/summary/?period=3&group=Reptiles&subject=Chelonia+mydas&region=

Euroturtle (undated) The World Conservation Union (IUCN) Red List Classifications for Sea Turtles http://www.euroturtle.org/37.htm on 02/01/2018

Euroturtle (2018a) Conservation Actions: Rescue Networks and Centers. https://www.euroturtles.eu/#/conservation/rescue-networks on 07/11/2018

Euroturtle (2018b) Conservation Actions: Fisheries Impact Mitigation. https://www.euroturtles.eu/#/conservation/fisheries-impact on 07/11/2018

IUCN (2010) Sea turtles in the Mediterranean: Distribution, threats conservation Priorities. International Union for the Conservation of Nature (IUCN). Gland, Switzerland: IUCN. 296. https://www.cbd.int/doc/meetings/mar/ebsaws-2014-03/other/ebsaws-2014-03-submission-rac-spa-3-en.pdf on 18/12/2017

Kasparek, M, Godley, BJ, and Broderick, AC (2001) Nesting of the Green Turtle, *Chelonia mydas*, in the Mediterranean: a review of status and conservation needs. Zoology in the Middle East 24: 45-74. http://www.cyprusturtles.org/pdf/Nesting%20of%20the%20Green%20Turtle,%20Chelonia%20mydas,%20in%20the%20Mediterranean%20a%20review%20of%20status%20and%20conservation%20needs.pdf on 18/12/2017

Kikas, A (2014a) Coastal management in Cyprus- the environmental perspective. Audit Office of the Republic of Cyprus. https://www.eurosaiwgea.org/meetings/Documents/12%20AM/12AM_Kikas_Cyprus.pdf on 21/12/2017

Kikas, A (2014b) Coastal management in Cyprus. Audit Office of the Republic of Cyprus. http://www.audit.gov.cy/audit/audit.nsf/All/0C06A628C08FC3C0C2257D650038CDD5/$file/Coastal%20management%20report%20summary.pdf?OpenElement on 20/12/2017

LIFE (2017) LIFE Euroturtles: Collective actions for improving the conservation status of the EU sea turtle populations. http://ec.europa.eu/environment/life/project/Projects/index.cfm?fuseaction=search.dspPage&n_proj_id=5867 on 31/01/2018

MEDASSET (2018) Sea turtle research & conservation in north Cyprus. http://www.medasset.org/our-projects/north-cyprus/ on 07/11/2018MTRG (2017) Northern Cyprus: Acknowledgements. Marine Turtle research Group (MTRG) http://www.seaturtle.org/mtrg/projects/cyprus/acknowledgements.shtml on 19/12/2017

PAP/RAC (2018) CAMP Cyprus. http://www.pap-thecoastcentre.org/about.php?blob_id=30 on 31/01/2018

Seminoff, JA (2004) *Chelonia mydas*. The IUCN Red List of Threatened Species 2004: e.T4615A11037468. http://dx.doi.org/10.2305/IUCN.UK.2004.RLTS.T4615A11037468.en on 18/12/2017

Seminoff, JA and Shanker, K (2008) Marine turtles and IUCN Re Listing: A review of the process, the pitfalls, and novel assessment approaches. Journal of Experimental Marine Biology and Ecology 356: 52- 68 http://wgbis.ces.iisc.ernet.in/biodiversity/pubs/ces_pubs/pubs_2008/theme1_17.pdf On 02/01/2018

Snape, RTE (2014). Bycatch reduction technology for sea turtle bycatch in Eastern Mediterranean Small-Scale fisheries. Project report. Marine Turtle Research Group (MTRG). https://ptes.org/wp-content/uploads/2015/09/Cyprus-turtles-final-report.pdf on 07/11/2018

SPOT (2017a) Research and Conservation Efforts. Society for the Protection of Turtles (SPOT) http://cyprusturtles.org/home/research-and-conservation-efforts/ on 19/12/2017

SPOT (2017b) Sponsorship Donation. Society for the Protection of Turtles (SPOT) http://cyprusturtles.org/home/donation/ on 19/12/2017

Strachan, PH, Smith, RC, Hamilton, DAB, Taylor, AC, and Atkinson, RJA (1999) Studies on the ecology and behaviour of the ghost crab, Ocypode cursor (L.) in northern Cyprus. Scientia Marina 63(1): 51–60. http://scimar.icm.csic.es/scimar/pdf/63/sm63n1051.pdf on 07/11/2018

UNEP (2007) Mediterranean Action Plan, Eighth Meeting of Focal Points for SPAs, Palermo, Italy, 6-9 June 2007. United Nations Environment Program (UNEP) http://www.rac-spa.org/sites/default/files/meetings/nfp8/wg.308_inf05_eng.pdf on 19/12/2017

UNEP, MAP, RAC/SPA (2008) Action Plan for the Conservation of Mediterranean Sea Turtles. United Nations Environment Program (UNEP), Mediterranean Action Plan (MAP), Regional Activity Centre for Specially Protected Areas (RAC/SPA) http://www.rac-spa.org/sites/default/files/action_plans/marine_turtles_ap_fr_en.pdf on 19/12/2017

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Annex 1. Status of the Loggerhead Turtle (*Caretta caretta*) and the Green Turtle (*Chelonia mydas*) population trends at Member States and biogeographical levels

Favourable	FV	Unknown	XX	Unfavourable - inadequate	U1	Unfavourable - bad	U2

Caretta caretta

	2001-06	2007-12				
	Overall	Range	Population	Habitat	Future	Overall
ES (ATL)	XX	XX	XX	XX	XX	XX
FR (ATL)	XX	FV	XX	U1	U2	U2 (=)
NL (ATL)	N/A	N/A	N/A	N/A	N/A	N/A
PT (ATL)	XX	N/A	N/A	N/A	N/A	N/A
UK (ATL)	N/A	XX	XX	XX	XX	XX
EU overall (ATL)	XX	FV	XX	U1	U2	U2 (=)
ES (MAC)	XX	XX	XX	XX	XX	XX
PT (MAC)	U1	FV	XX	FV	U1	U1 (x)
EU overall (MAC)	U2	FV	XX	FV	U1	U1 (x)
CY (MED)	U1	FV	FV	FV	FV	FV
GR (MED)	U2	FV	XX	U1	U2	U2
ES (MED)	XX	XX	XX	XX	XX	XX
FR (MED)	U1	FV	XX	U2	U2	U2 (-)
IT (MED)	XX	FV	XX	U1	U1	U1 (-)
MT (MED)	XX	FV	FV	FV	FV	FV
SI (MED)	FV	FV	XX	FV	XX	XX
UK (MED)	U1	XX	XX	FV	U1	U1 (=)
EU overall (MED)	XX	FV	XX	U1	U2	U2 (-)

Source: Member State Article 17 reports as compiled by ETC/BD on EIONET

https://bd.eionet.europa.eu/article17/reports2012/species/summary/?period=3&group=Reptiles&subject=Caretta+caretta&region=

Chelonia mydas

	2001-06	2007-12				
	Overall	Range	Population	Habitat	Future	Overall
ES (ATL)	XX	XX	XX	XX	XX	XX
FR (ATL)	U1	FV	XX	U2	XX	U2 (=)
NL (ATL)	N/A	N/A	N/A	N/A	N/A	N/A
PT (ATL)	U1	N/A	N/A	N/A	N/A	N/A
UK (ATL)	N/A	XX	XX	XX	XX	XX
EU overall (ATL)	XX	FV	XX	U2	XX	U2 (=)
ES (MAC)	U1	XX	XX	XX	XX	XX
PT (MAC)	U1	N/A	N/A	N/A	N/A	N/A
EU overall (MAC)	U1	XX	XX	XX	XX	XX
CY (MED)	U2	FV	U2	FV	U1	U2 (+)
GR (MED)	U2	FV	XX	U1	U2	U2
ES (MED)	XX	XX	XX	XX	XX	XX
FR (MED)	U2	FV	XX	XX	XX	XX
IT (MED)	XX	XX	XX	XX	XX	XX
UK (MED)	U1	XX	XX	FV	U1	U1 (=)
EU overall (MED)	U2	FV	XX	U1	U2	U2 (x)

Source: Member State Article 17 reports as compiled by ETC/BD on EIONET

https://bd.eionet.europa.eu/article17/reports2012/species/summary/?period=3&group=Reptiles&subject=Chelonia+mydas&region=

Annex 2. LIFE Nature Projects in Cyprus that aimed to help conserve the Loggerhead Turtle (*Caretta caretta*) and the Green Turtle (*Chelonia mydas*)

Project Title	Project N°	MS	Type Of Beneficiary	Time period
LIFE Euroturtles - collective actions for improving the conservation status of the EU sea turtle populations	LIFE15 NAT/HR/000997	HR + CY, EL, IT, MT, SL	Research Institute	Sept 2016 – Aug 2021

Source: Life Programme database