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CONVENTION ON THE CONSERVATION OF EUROPEAN WILDLIFE
AND NATURAL HABITATS

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Habitat destruction in Mersin Anamur Beach (Türkiye)

REPORT OF THE ON-THE-SPOT APPRAISAL
2-4 JULY 2024

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Introduction

Turtle nesting at Anamur in the context of Mediterranean populations of loggerhead and green sea turtles and the Nile soft shelled turtle

The Mediterranean loggerhead sea turtle (*Caretta caretta*) and green sea turtle (*Chelonia mydas*) have established distinct Regional Management Units (RMUs) that are functionally separate from other global RMUs (Wallace et al. 2023). Recent regional IUCN Red Listings for sea turtle species describe the loggerhead as Least Concern and the green as Near Threatened, but sustained favourable status of both populations are indicated as conservation dependent (iucnredlist.org). Both species are also protected under the Bern Convention. Loggerhead turtles mainly nest in Greece, Türkiye, Cyprus and Libya, whilst green turtles mainly nest in Türkiye, Cyprus and Syria (Casale et al. 2018). Loggerhead nesting at Anamur is considered one of the most important in the Mediterranean in terms of numbers of nests (Casale et al. 2018) whilst it receives only sporadic nesting by green turtles. Hence where this report discusses issues relating to sea turtles the loggerhead turtle is primary subject matter.

The Mediterranean population of the Nile soft shelled turtle (*Trionyx triunguis*) was classified on the IUCN Red List in 1996 as Critically Endangered (iucnredlist.org) with breeding populations present from Türkiye round to Israel. This listing obviously requires updating. The species is relatively understudied, and sizes of individual breeding populations are unknown. Whilst the Nile soft shelled turtle is regarded a freshwater species, it often inhabits rivers near to the mouth to the sea and are reported to nest on sandy coastal beaches (e.g. Uçar and Ergene 2022), bringing them into the same habitats and facing the same impacts as sea turtles.

Scientific monitoring and conservation actions of turtle populations and management and restoration habitats can be used to ensure the nationally and regionally important population of loggerhead turtles is sustained into the future and that the current status of the Nile soft shelled turtle can be determined and improved at Anamur's river sites. Resources sufficient to generate suitable biological datasets and securely enforce conservation-related legislation, especially in terms of controlling development and light pollution, need to be provided in the long-term to ensure favourable status for turtle populations that may only become evident over decades, as yearly cohorts of hatchlings mature and return to breed (Casale et al. 2011).

Reasons of Concern

Complaints about poor management and lack of enforcement concerning sea turtles and their habitats at Anamur have been raised by local and international NGOs. Hence the status of turtle populations are unknown and potentially worsening. The complaints can be summarised as:

- Insufficient action against and inappropriate development on and near the turtle nesting beaches, together with associated pollution impacts.
- Weak management and control of access to the beach by vehicles at any time and by people at night.
- Lack of public reporting on the results of beach surveys that have been carried out by the local authorities covering a period of a decade or longer.

On the spot appraisal

Summary of meetings and visits

The Mission team was composed of Dr ALan Rees (independent expert) and Ms Marta Medlinska (Bern Convention Secretariat; on-line). Other key participants were Burak Tatar (General Directorate of

Nature Conservation and National Parks and National focal point for the Bern Convention), who chaired meetings and translated discussions, Prof. Yakup Kaska (Pamukkale University; member of the national Sea Turtle Scientific Committee) who has an in-depth understanding of the situation at Anamur and Ayca Ardiç from local NGO MERÇED Anamur.

The on-the-spot appraisal visit took place on 2-4 July 2024. The agenda of the visit, along with the participating groups is presented in Annex 1.

Evaluation of current and potential conservation status based on the on-the-spot appraisal

Background information on Anamur and its turtles

Sea turtle nesting has been recorded at Anamur since the late 1980s, when tourist activities and sand extraction were identified as the main threats to the turtles (Baran & Kasperek 1989). Anamur is listed as one of the top five nesting areas, in terms of nest numbers, in the Mediterranean for loggerhead sea turtles: second in Türkiye after Belek (Casale et al. 2018). The most recent published data comes from 2006 and 2007 (Uçar et al. 2012), however unpublished data from more recent years suggest that loggerhead turtles nest in higher numbers than these historic records. Green turtles also nest there in very low numbers (Uçar 2008). Data from 2006 & 2007 also indicate that the Nile soft shelled turtles nested in the area in the past (Uçar and Ergene 2022).

The turtle nesting beach is reported as 12.7 km long and is segmented by the presence of several small rivers some which are habitats used by the Nile soft shelled turtle (Uçar et al. 2012; Uçar and Ergene 2022). The beach is least developed at either end and has considerable urban and touristic infrastructure more centrally located (Fig. 1).

Current status of turtle populations and habitats

Turtle population status can only be determined through multi-year collection of accurate scientific data of parameters that can indicate stable, improving or worsening conditions. Such parameters have been set out in the Bern Convention Conservation of sea turtle nesting sites Guidance Tool (Standing Committee of the Bern Convention (2023); Guidance Tool). The number of nests naturally varies from year to year even in a stable turtle population, and hence short-term status assessments based on nest count data are not suitable. The key biological indicators to determine population status are: Hatching success (percentage of eggs that produce hatchlings), Hatchling Emergence success (percentage of eggs that produce hatchlings that emerge from the nest), Clutch predation (number of clutches and proportion of each clutch predated), Hatchling orientation index, Approximate hatchling predation rate, Incubation period (to infer hatchling sex ratio) and Nesting success (proportion of female emergences resulting in egg deposition) (Guidance Tool).

Nest data have been provided for this report and derived data are presented in Tables 1 and 2. Nest number per beach section were supplied, no other data that can be used as indicators was supplied and are likely not collected. Beach surveying in the last decade has been carried out by one or two people over the season who are employed by the local branch of the Ministry of Agriculture and Forestry. GPS locations of each turtle emergence are not being recorded. Emergence tracks are not being scrubbed (to avoid duplicate recording in subsequent surveys) after being recorded. Non nesting emergences are not recorded. Observations made on the site visit suggest that nests were being missed by the beach surveying personnel and it was not clear that the surveyor was able to distinguish between loggerhead and green turtle nesting emergences (see Fig. 2). It is apparent that no specific survey effort is aimed at monitoring the presence of Nile soft shelled turtles in the local rivers nor its nesting on riverbanks or

coastal beaches. Based on direct field observations of beach surveying, it is expected that sea turtle nest numbers supplied for this report may differ dramatically from the actual number of nests made per beach sector per year over the last decade.

The status of the turtles nesting habitats can and should also be determined through collection of a set of key indicators based around the themes of Anthropogenic threats, Beach features and Mitigating measures (Guidance Tool). Anthropogenic threats include hard constructions and their distance from the landward boundary of the sandy beach and light pollution visible on the beach at night. Beach features include beach width and profile, and Mitigation measures include various forms of clutch protection and hatchling management. All parties should refer to these guidelines (Guidance Tool) to best support the conservation of turtles at Anamur.

From the on-the-spot appraisal (OSA), it was determined that several habitat/management measures are considered, such as removing cantinas away from the shore in certain locations, whilst other protection measures and monitoring are lacking. The thirteen requirements of this on-the-spot appraisal, as listed in the terms of reference (ToR), are covered in the following sections.

1 Collect information on the initial state of the nesting beach to be able to compare with the current state, in particular the number of nests registered before the work started and in 2023

Changes to the state of the nesting beach, in particular the stretches subject to remodelling (sections 3 and 4) and infrastructure encroachment (section 2) were examined remotely using Google Earth Pro (Figs 3 and 4). Nest data per beach section was supplied by the local authorities covering the period from 2014 to 2023, with derived data presented in Tables 1 and 2. The local authorities were cooperative in all matters relating to data sharing, and open to discuss the situation prevailing at the different sites of Anamur beach under complaint. Unfortunately, turtle monitoring data are lacking in detail and breadth (see above) which limits their use to support or refute insinuations of anthropogenic impacts on the population.

2 Assess the actions taken to stop sand extraction from the nesting beach, vehicles access on the beach, light and noise pollution, removal of beach furniture at night, collect of littering and treatment of wastewater, small business expansion and any other illegal activities

This is a broad point, covering many aspects of anthropogenic impacts over the entire beach. Each topic is covered in turn, with most having both positive and negative components. Locations with specific issues raised in the ToR are dealt with in more detail in their respective sections.

A) Sand extraction

No recent evidence of sand extraction was witnessed during the site visits. However, evidence of movement of sand, through piling of sand, was observed near to Dragon River where the area had been cleared and partially covered in stones, which according to MERÇED Anamur were to “to establish a caravan camping area” (Fig. 5).

B) Vehicle access on the beach

Intermittent vehicular access to the beach was observed to be possible for dedicated drivers where access prevention measures had been modified (e.g., Fig. 6). However, there was very little evidence of cars, 4WD vehicles or heavy machinery observed on the beach during the OSA. A small quad bike, used to sell maize, was observed on one stretch of the beach and tracks from the surveying officer's

quad bike were observed in other locations. Though their use is not to be encouraged, small quad bikes, used intermittently during the day, do not cause significant damage to the beach or incubating nests. Ruts from the passage of vehicles were observed in the 'picnic area' of beach section 3 and were assumed to be residual tracks from the remediation work undertaken earlier in the year (Fig. 7). The situation of the picnic area is dealt more fully under point 8.

C) Light and noise pollution

There is a lack of studies that confirm noise in the vicinity of turtle nesting beaches impacts the turtles nesting or hatching activity. However, light pollution is a well-established and major concern at many turtle nesting areas globally and Anamur is no exception.

The OSA incorporated nighttime visits to beach sections 4 and 3 where local development stages 1 and 2 had been carried out (see Fig. 3). Prof Kaska indicated that following a previous visit to the area by himself and other members of the National Sea Turtle Scientific Committee, they offered guidance on what should be done to improve the beach conditions to support turtle nesting. The guidance included moving all tourist infrastructure back from the shore, out of the coastal Zone 1 (water's edge to 65 m inland), and to modify lighting to be 'turtle friendly' (red or amber coloured luminaires). Conditions on these sections of beach are dealt with in detail under point 9 of this evaluation.

Bright lights were observed on the piers at beach section 6 (Fig. 8) which were confirmed to be causing hatchling misorientation (Fig. 9). Other sections of beach remain undeveloped with little to no light pollution, so focussed attention to the areas illuminated at nighttime are warranted.

There is no methodology in place to monitor or combat hatchling misorientation caused by artificial lighting more than reactively collecting mis-orientated hatchlings in buckets to be released elsewhere on the beach.

D) Removal of beach furniture at night

During the OSA locations that had potential to be overrun with beach furniture generally had very little beach furniture present, even during the day, with a notable exception in section 7 (Fig. 10). Consequently, the presence of furniture on the beach at night was not observed to be an important issue for turtle nesting during the OSA. However, the situation has the potential to change from one day to the next, given the presence of umbrella bases in the beach and numerous sun loungers placed along the top of the beach and monitoring and enforcement of regulations is warranted.

E) Collect of littering [sic] and treatment of wastewater

No problems of excessive littering, or litter removal were observed during the OSA. Neither were any problems with wastewater observed. Several showering stations with water that flowed into the sand were observed at the back of beach section 3 (Fig. 11). They were assessed to not be impacting the turtles due to the width of the beach and the distance of the shower effluent from the nesting zone.

F) Small business expansion

Development of touristic facilities on beach section 2 (see Fig. 4) was the most obvious example of small business expansion. According to discussion during the OSA, this area involves the potential private ownership of normally state land behind the beach, which complicates issues. However, the development: bungalows, cantina, irrigated lawn and trees, beach furniture etc. and storing of large amounts of soil on the beach and dune area (Fig. 12) are reducing the physical area available to the

turtles for nesting and degrading the natural habitat which should be under protection under national legislation. This is especially concerning as the development occurs away from the main developed area and, if left unchecked, may act as a catalyst for other such developments.

G) Other illegal activities

People on the beach at night (restricted under national legislation on turtle nesting areas) is a general problem with several seen during the OSA field visit. There was no evidence of organised groups or individuals on the beach at night specifically to look for turtles nor were there any parties or groups occupying the beach at night.

Impacts on Nile soft shelled turtle habitats. The presence of buildings along the river banks at Sultan River (boundary between beach sections 1 and 2; Fig. 13), that had been moved from Dragon River (boundary between beach sections 7 and 8) were reported as illegal, dumping raw sewage into the river. These buildings mainly impact Nile soft shelled turtle habitat. The Nile soft shelled turtle was reported as present at Sultan River (where the riverbanks have been covered in stone), the river next to the picnic area and Dragon River. The latter two location are dealt with under specific report points (8 and 11), but it should be noted there is a general lack of scientific data on the distribution and breeding of Nile soft shelled turtles in the area. Published data come from surveys in 2006 and 2007. It was reported that a biodiversity study carried out between 2016 and 2018 identified no nests from this species in the area and no information is available from a study undertaken in 2019. The surveyor employed to protect turtle nests on the beaches gave no indication that they had seen any Nile soft shelled turtle nests, nor that they made any specific efforts to identify them near river mouths.

3 Assess the feasibility of a restoration of the nesting beach

The main area of beach requiring restoration, that is not considered under specific report points was the area of touristic facilities on beach section 2. This area should physically be relatively simple to restore however legal complications of the process based on alleged private ownership of the land could hinder restorative actions. The local authorities indicated they were enthusiastic to do what they could under the established legal framework. Indeed, Anamur had recently undergone elections where a new party had been voted into power and during the OSA meetings they were keen to suggest they want to do all they can to protect the turtles and their habitats and correct any mistakes made by the previous administration. Details of such interventions are listed in the relevant report points.

The main concern here is for strong regulation, management and enforcement to ensure the conditions of the Anamur Beach, which in some areas is still relatively pristine, does not worsen and the developed area expand.

4 Assess whether there are sufficient information and warning signs about turtles in the beach entrance areas

One large information sign including information about sea turtles was observed during the OSA field visit on the highly touristic beach section 6 (Fig. 14). A similar sign was reported as being in place at another point along the beach but was not observed. Considering the general open access to the beach in the area backed by Anamur town, this is a rather paltry amount of signage. Additional signs were present at different parts of the beach often placed next to nest protection cages. However, many such cages bore no information signs (Fig. 14).

5 Collect information on the possible consequences of the changes in the conservation status of the area between Dragon Rivulet, Mamure Castle, and the Pullu Forest Camp as reorganised by a new Circular of 29 July 2023 (Government Official Gazette number 32263)

This was briefly discussed during the OSA with the outcome indicating that the new conservation status for the area had improved regulations in place to protect sea turtles and their habitats over the previous system.

The following information was supplied by the authorities in response to a request for additional information on this point: The Ministry of Environment, Urbanization, and Climate Change has made a change across Türkiye in the designation of areas that were previously declared as 1st, 2nd, and 3rd degree natural protected areas. In this context, conservation and usage conditions have been determined for natural protected areas, which are now registered as strictly protected sensitive areas, qualified natural protection areas, and sustainable conservation and controlled usage areas, according to the Principal Decision on Conservation and Usage Conditions of Natural Protected Areas by the Central Commission for the Protection of Natural Assets, published in the Official Gazette.

Strictly protected sensitive areas are defined as land, water, and marine areas declared by a Presidential Decree that contain species, habitats, and ecosystems of national and international importance, contribute to ecosystem services due to their biological, geological, and geomorphological characteristics, have a high risk of degradation or destruction due to human activities, and require the preservation of vegetation, topography, and landscape for future generations.

In these areas, necessary emergency interventions can be made in the event of a natural disaster, but mining activities cannot be carried out, and stone, soil, or sand cannot be extracted. Additionally, materials such as soil, slag, garbage, or industrial waste cannot be dumped. The change in status is limited to this, and a zoning arrangement has been made for areas that were previously designated as 1st degree natural protected areas. This change has resulted in stricter and more protective usage conditions, particularly for the beach areas.

6 Collect information on the state of play of current internal court proceedings and their possible outcomes

It was briefly reported that the internal court proceedings had been completed, including the final decision on appeal, and the case was found in favour of the complainant, and the matter is now up to the authorities to enforce.

7 Assess the state of collaboration and communication between the authorities and civil society

There was obviously a historical lack of communication between authorities and civil society, following complaints by the local NGO that they did not receive responses to their information requests. The presence of a new incumbent administration raises hope that this situation may change. The OSA and its integral meetings with authorities and civil society provided an excellent avenue to initiate direct dialogue between the two parties, which was enthusiastically capitalised on. During a meeting with both parties Prof Kaska suggested to set up stakeholder group for all to work together. This proposal was warmly agreed upon by all, but no actions were taken during the meeting to share contacts between key stakeholders.

8 Assess the state of rehabilitation of the *Karaağaç Picnic Area*

The portion of beach section 2, identified as the picnic area, was reported to be heavily impacted during its landscaping and development. However, following complaints the area was cleared and rehabilitated. The beach area, as observed during the OSA now looks to be in good, natural condition (Figs 4 and 15) except for some evidence of the extensive vehicular use of the beach that must have been required during the rehabilitation process (Fig. 7). The drainage channel to the rear of the beach retains stone walling that was said to be put in place during the creation of the picnic area (Fig. 15), which is suggested to affect the behaviour of Nile soft shelled turtles that may be present in the drainage channel. However, there is no solid recent evidence of that species being present in the channel.

9 Assess whether the Coastal Arrangement Project is sufficiently protecting the nesting beach (in particular, as concerns the 1st Protection Zone, is the limit of 65 meters from the coastline forbidding any structures so that the turtles can lay their eggs sufficient and respected? Is the 2nd protection zone sufficient and respected?)

The coastal arrangement project that has been undertaken included ‘Stage 1’ at beach section 4 and ‘Stage 2’ at beach section 3 (see Figs 1 and 3). Stage 2 is reported as not completed with a further 400 m stretch of beach to be subject to coastal arrangement and this is covered in point 10. Development of the beach under the coastal arrangement project was subject to advice and guidelines from the national Sea Turtle Scientific Committee (Kaska Y, pers. comm. 2024). The coastal arrangement project has resulted in major changes to the beach and hind-beach/dune area along the developed stretches. These include concreted walkways, extensive lighting infrastructure, irrigated grass areas, new road, shower and changing facilities (Figs 3, 11, 16 and 17). Most tourist enterprises such as bars and restaurants have been relocated back away from the beach (conservation zone 1), though lighting issues remain. Both development stages are discussed individually next.

The alterations of Stage 1, the first completed on the coast, notably included the addition of a paved road behind the beach (Fig. 3), installation of multiple green and white walkway lights and other infrastructure (Fig. 16) and moving bars and restaurants back away from the turtle nesting zone. Clearing the turtle nesting zone of tourist structures is a positive result of this development, however walkway lighting design and light management are poor and did not follow the national Sea Turtle Scientific Committee advice.

The alterations of Stage 2, so far completed, are similar to Stage 1 although no new road was constructed behind the beach. The new lighting arrangement (Fig. 17) is better than for Stage 1 but can be further improved through changing the colour and brightness of the luminaires used.

For both stages, the clearing of the beach from furniture and bars etc. from 1st Protection Zone is an improvement on the past situation, but the new lighting schemes and lights from the relocated bars need varying degrees of improvement to be ‘turtle friendly’. The whole design scheme of the development on the 2nd Protection Zone is questionable as it encourages use of the area behind the beach at night, and without any barriers to accessing the beach it can only encourage more use of the beach itself at night and that may have consequences for successful nesting by turtles in the area.

During the OSA the people responsible for municipal lighting showed a keen interest in revising the lighting scheme to be turtle friendly and correcting the mistakes of the installed systems. They were given PDF files of international guidelines for lighting management for turtle nesting areas so they would have full understanding of the issues and solutions.

10 Collect information on any further projects and assess whether they are compatible with the protection of the nesting sites

Further Staged development of the Anamur coast was indicated during the OSA. Completion of Stage 2 with development of a further 400 m of shore to the west together with a planned Stage 3 to develop some of beach section 7 in a similar manner.

There is currently no touristic infrastructure behind the final section of Stage 2 (Figs 3 and 18) and hence developing this stretch of beach in a similar manner to what is already completed will only encourage more people, and development, along a less disturbed beach area increasing pressure on the turtle nesting habitat.

The section of beach designated as Stage 3 of the Coastal Arrangement Project needs improvement as tourist facilities cover large parts of the beach (Fig. 19). The current condition of beach shown in the middle image of Fig. 19 represents an interesting status of being artificially created but probably having little to no impact on turtle nesting. It includes a vegetation barrier reducing lighting from the built-up area behind reaching the beach and low-key infrastructure that encourages daytime and not night-time visits through provision of shade and no excessive illumination. Removal of restaurants and other paraphernalia from the beach (1st Zone of Protection) will greatly improve the conditions for turtles nesting in this area with little to no further development required.

11 Collect data concerning the presence of Soft-Shelled Nile Turtles (*Trionyx triunguis*) nests on the banks of the Dragon rivulet and assess a potential destruction of the habitat due to the construction of the stone wall on the banks of the Dragon rivulet.

Topics regarding the Nile soft shelled turtle were most difficult to assess due to lack of up-to-date data on its presence at the various rivers and canals along Anamur beach, see point 2G for available information. However, during the OSA one Nile soft shelled turtle was observed swimming near the mouth of Dragon River (Fig. 20). The steep stone walls created along the banks of the Dragon River (Fig. 21) have no doubt covered any *potential* nesting habitat for the Nile soft shelled turtle for the 1.4 km that they extend. The walls' steepness probably also prevents the turtles from leaving the water to bask, as they are known to do. The ecology of this species is poorly known; therefore, it is difficult to judge if they might leave the river, via the mouth, and crawl up the beach to nest in the same habitat as the sea turtles. Lack of information on this species, presence, distribution and ecology is a major impediment to its management and protection.

12 Assess the feasibility of a restoration of the banks of the Dragon rivulet

Restoration of the banks of Dragon River, and other Nile soft shelled turtle habitats, should be as feasible as the process used to create the walled areas. During the OSA, control of river channel location and river flow to avoid flooding were given as reasons that stone walls had been built and the steepness of the walls was defined by the potential river conditions and the need to manage water flow. Accepting these reasons as valid two options for partial remediation are evident. Firstly, additional stones can be placed along the riverbanks in such a way as to provide basking spots for the turtles and secondly the riverbank stone walls can be removed from the river mouth (at minimum from one side) back to the area behind the coastal beach, thus giving the Nile soft shelled turtle potential to nest without venturing into the sea.

13 Assess whether geothermal exploration activities could have an impact on the nesting beach, and whether an Environmental Impact Assessment of these activities have been duly carried out

During OSA the local authorities categorically stated that the geothermal exploration zone that covered the nesting beach had been blocked and no exploration would take place there. The remaining two locations for exploration were inland and activities there would not impact the turtles or their habitats. Further investigation as to an Environmental Impact Assessment having been carried out was not undertaken on hearing that the coastal zone would not be subject to exploration activities.

14 Assess to what extent the zoning plan change affects the nesting beach [Sections 8 and 9] and, if necessary, the measures to be taken so that there are no negative consequences for the beach

This point relates to the information given in points 5 and 13. Brief discussion during the OSA indicated that the new zoning plan for the area had improved regulations in place to protect sea turtles and their habitats over the previous system and that no activities negative to turtle conservation are to be permitted. Additional information on this point was requested from the complainants and authorities twice during the report drafting and none were supplied in time for submission of the report.

Conclusions

Anamur beaches represent a nationally and regionally important nesting area for loggerhead sea turtles. Nesting levels, acquired through basic monitoring, appear to be higher in recent years than from historic data collected in 2006 and 2007. The local authorities should treasure the presence of this natural wonder along its coast and promote the mutualistic use of the beach to the benefit of turtles and humans.

Nest protection measures carried out, i.e. caging of nests, appear to be respected by beach users with no indications the cages were being moved or damaged, suggesting a more compliant than antagonistic local population, which is a good sign.

Much of the Anamur sea turtle nesting area, sections 1, 2, 8, 9 and 10, remains in relatively natural condition, suitable for nesting activity with limited to no anthropogenic pressure.

Recent development changes brought about through municipal works (Stages 1 & 2 of the coastal arrangement project – beach sections 3 and 4 – are not all beneficial for turtles. Whilst positives such as removal of infrastructure from the beach have been achieved, lighting conditions and the encouragement of people to the beachside at night is detrimental.

With a newly elected local authority there is hope that future municipal activities will be better designed and implemented, and that recent changes (namely Stage 1 and 2) can be revised to more compatible with turtle protection and that enforcement of regulations on private enterprises will be swift and effective. Any changes to the coastal area should improve circumstances for the turtles, by removing anthropogenic pressures, which may mean revision of existing plans for continuation of the coastal arrangement project.

Current monitoring of sea turtle nesting activity is not sufficient to provide accurate data on nesting distribution or levels and omits key parameters required to robustly defend population status as indicated in the Guidance Tool and needs additional resources.

Ecology and status of the Nile soft shelled turtle is unknown at its previously registered locations along Anamur beach, and the results of previous studies are not all published in the public domain. There is no dedicated monitoring currently afforded to this species, which is likely to hinder its conservation.

Communication between authorities and local NGOs has been weak. Adherence to national nature protection measures relating to preservation of coastal habitats for sea turtles has been patchy. There however is optimism that the recent change in the municipal authority will signify a great improvement with both these points. This was typified by the local authority indicating they would construct a sea turtle information centre as part of the 400 m stretch of coast due to be developed under Stage 2 of the Coastal Arrangement Project. We recommend investigating the DEKAMER sea turtle visitors' centre at Dalyan to develop the most impactful information centre at Anamur; i.e. one that will best deliver the message of turtle conservation and correct behaviour on and around the beach.

The improvement and restoration of impacted turtle habitats is very achievable given their geographically limited extent, and more effective scientific monitoring of turtle nesting activity can be realised with moderate financial investment and collaboration between authorities and civil society/local NGOs (Table 3).

Recommendations

Remedy Stage 1 and 2 design issues, which mainly relate to poor lighting choices and light control. Consider erecting a fence along the beach edge to deter people from entering the beach at night.

Review the remaining Stage 2 and Stage 3 development plans to ensure they are necessary and are compatible with preservation of successful, undisturbed turtle nesting.

Enforce existing legislation by removal of illegal development, structures and impactful lighting from all areas of beach but especially the area of bungalows and restaurant on beach section 2 that may act as a catalyst for similar such developments away from the urban centre.

Increase number of signs that have information on sea turtles and the dos and don'ts for behaviour on the nesting beach at beach entrances. Create new signs to attach to each protective nest cage so that each nest has key information associated with it.

Improve turtle monitoring and protection capacity through training and increasing the number of people involved in daily surveys. Collect all relevant data indicated in Guidance Tool, starting as soon as possible by recording the location of each turtle nest using GPS to support scientific analyses and interpretation of the status of turtles and their habitats.

Design a hatchling management plan to be prepared for occurrences of hatchling disorientation caused by artificial lighting and respond promptly and strongly to adjust, revise or eliminate problematic lighting.

Undertake surveys for presence of Nile soft shelled turtles at all historically known sites along Anamur beach and commission ecological study for feasibility of restoring sites where presence remains, and nesting was previously reported.

Create a turtle protection network composed of authorities, NGOs, local stakeholders and concerned individuals that regularly meet to discuss issues and their solutions.

Create a turtle monitoring group composed of authorities, NGOs, local stakeholders and concerned individuals to better monitor the turtle nesting activity. Investigate the potential for bringing in academic and voluntary teams to contribute to the monitoring. Given that Anamur beach potentially hosts one of the top five loggerhead turtle nesting areas in the Mediterranean accurate assessment of activity is strongly warranted.

A summary of issues, recommended actions and monitoring schedule are presented in Table 3 (Appendix 3).

Appendix 1:

Programme of the visit and participant organisations

2 July 2024

- Anamur – (am) meeting with authorities
 - Anamur Municipality
 - Anamur Police Department
 - General Directorate of Nature Conservation and National Parks
 - Mersin Provincial Directorate of the Ministry of Agriculture and Forestry
 - Mersin Coast Guard Commandery
 - Mersin Provincial Directorate of Ministry of Environment, Urbanization and Climate Change
 - Provincial Directorate of Ministry of Culture and Tourism
 - 7th Regional Directorate of the Ministry of Agriculture and Forestry
 - National Sea Turtle Scientific Committee / DEKAMER
- Anamur – (pm) meeting with NGOs and local stakeholders
 - MERÇED Anamur
 - Underwater Research Society
 - Concerned individual citizens
 - National Sea Turtle Scientific Committee / DEKAMER
- Anamur – (evening) Visit to two sections of nesting beach
 - MERÇED Anamur
 - Concerned individual citizens
 - General Directorate of Nature Conservation and National Parks
 - Mersin Provincial Directorate of the Ministry of Agriculture and Forestry
 - 7th Regional Directorate of the Ministry of Agriculture and Forestry
 - National Sea Turtle Scientific Committee / DEKAMER

3 July 2024

- Anamur – (am) Visit to eastern sections of the nesting beach
 - MERÇED Anamur
 - Concerned individual citizens
 - General Directorate of Nature Conservation and National Parks
 - Mersin Provincial Directorate of the Ministry of Agriculture and Forestry
 - 7th Regional Directorate of the Ministry of Agriculture and Forestry
 - Anamur Municipality
 - National Sea Turtle Scientific Committee / DEKAMER
- Anamur – (pm) Visit to the western sections (and the most easterly section) of the nesting beach
 - MERÇED Anamur
 - Concerned individual citizens
 - General Directorate of Nature Conservation and National Parks
 - Anamur Municipality
 - 7th Regional Directorate of the Ministry of Agriculture and Forestry
 - Mersin Provincial Directorate of the Ministry of Agriculture and Forestry
 - State Hydraulic Works
 - Underwater Research Society
 - National Sea Turtle Scientific Committee / DEKAMER

4 July 2024

- Anamur – (am) combined meeting with authorities, NGOs and local stakeholders
 - Anamur Municipality
 - Mersin Provincial Directorate of the Ministry of Agriculture and Forestry
 - State Hydraulic Works
 - 7th Regional Directorate of the Ministry of Agriculture and Forestry
 - General Directorate of Nature Conservation and National Parks
 - MERÇED Anamur
 - Underwater Research Society
 - Concerned individual citizens
 - National Sea Turtle Scientific Committee / DEKAMER

Appendix 2:

Literature cited

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Appendix 3:

Figures and Tables



Figure 1. Anamur coast and assumed beach subdivisions used in nest monitoring. 1) ÖREN-S. SUYU / Anemurium – Sultan River. 2) S. SUYU-KARAAĞAÇ / Sultan River – Karaağaç. 3) KARAAĞAÇ-CERENLER / Karaağaç - Cerenler (Stage 2+). 4) CERENLER-TAŞLIK / Cerenler – Stony Area (Stage1). 5) TAŞLIK-ASKERİYE / Stony Area – Military. 6) ASKERİYE-İSKELE / Military – Port side. 7) İSKELE-DRAGON / Port Side – Dragon River. 8) DRAGON-DERE / Dragon River – Nameless River. 9) DERE-KALE / Nameless River – Mamure Castle. 10) KALE-PULLU / Mamure Castle – Pullu National Park



Figure 2. A fresh green turtle nest observed near Dragon River during the 3 July 2024 OSA. It was not clear that the person responsible for surveying the beach understood that it was not a nest made by the more common loggerhead turtle. This was the only green turtle nest observed and recorded so far in the 2024 nesting season.



Figure 3. Status changes over time for beach section 3 (left of the river [Stage 2]) and part of 4 (right of the river [Stage 1]) as shown using Google Earth Pro. Note the removal of most of the tourist infrastructure close to the shore and substantial landscaping of the foredune area between 2021 and 2024. For details of beach divisions see Fig. 1.



Figure 4. Northern part of beach section 2 with development of touristic infrastructure on and near the beach (left oval) and a landscaped and remediated 'picnic area' (right oval). Both locations have been topics within the specific complaints raised against the insufficient governance of the turtle nesting beach. Note also the reduction of sand immediately to the left of the river between 2021 and 2024. For details of beach divisions see Fig. 1.



Figure 5. Evidence of movement (piling) of sand on the beach (A) and landscaping the dune area “to establish a caravan camping area” that includes laying of stones to stabilise the ground (B; yellow oval).



Figure 6. The beach near Dragon River is made accessible by the smoothing of a dirt slope that was in place to prevent access.



Figure 7. Most extensive evidence of vehicular use of the beach was observed at the rehabilitated 'picnic area' on beach section 3. These ruts were believed to be old and made by vehicles sanctioned to restore the condition of this area of beach.



Figure 8. Bright lights on the piers at beach section 6.



Figure 9. Evidence of hatchling misorientation (hatchling tracks running along the beach from the nest towards the pier, rather than towards the sea) from beach section 6.



Figure 10. Touristic areas of beach and the presence of beach furniture and constructions.

A & B) Beach cafes etc. on beach section 7 displaying absence of furniture over the beach during the day. Bases for umbrella poles are evident on the beach and there were many sun loungers placed along the top of the beach, *suggesting that the absence of furniture may not be coincidental with the dates of the OSA.*

C) Upended sun loungers and umbrella poles on a narrow stretch of beach at the northern part of section 7. Note also the wastewater flooding onto the beach, at more than one point, from the stage floor of the construction behind the beach that was being hosed down beach.

D) The empty beach of the northern part of section 4.



Figure 11. One of several showering and changing stations along the rear of beach section 3. Note the grass growing where the shower water is running onto the beach/dune area, but due to the distance from the sea, the importance of this spillage and growth is negligible.



Figure 12. Anthropogenic impacts on beach section 2 (Karaağaç beach).

A) Large amounts of soil dumped on the beach and dune area together with recently planted and irrigated trees.

B - D) grass lawn, buildings, bungalows and miscellaneous tourist infrastructure established on and behind the beach.

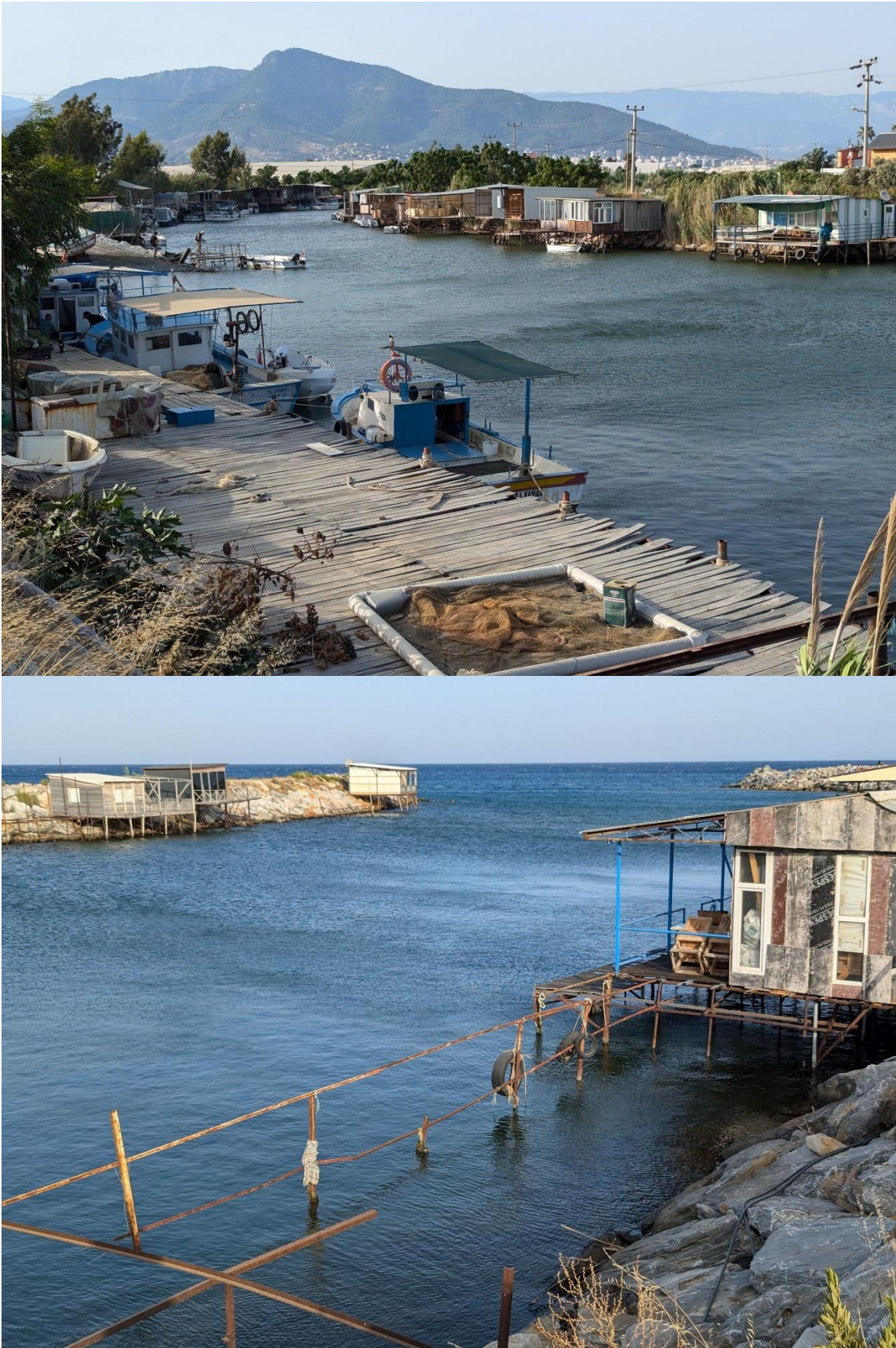


Figure 13. Reportedly illegal buildings located along the walled banks of Sultan River.



Figure 14. Beach signage relating to sea turtle protection on Anamur Beach.

A) Large sign on beach section 7 in the developed area of Anamur Beach.

B) Sign on beach section 9. Note the numerous protective cages over the sea turtle nests in the background. Many such cages across the beach lack any signage to explain what their purpose is.



Figure 15. The rehabilitated 'picnic area' of beach section 2.

A) Section of rehabilitated beach and foredune that appears to be in near natural condition.

B) Evidence that a stone wall remains in place along the seaward side of the drainage channel.

Potentially impacting behaviour of the Nile soft shelled turtle that has been reported to inhabit the waters in the past.



Figure 16. Condition of the beach along section 4, altered by the coastal arrangement project Stage 1, as observed during the 2024 OSA.

A) Looking along Stage 1 from the eastern end. Green walkway lighting very visible. Beach is mainly clear of development in zone 1 – water's edge to 65 m inland.

B) A protected nest on the beach, again with very visible bright green and white lighting.

C) Bar/Restaurant set back from the coast but with excessive white lighting.

D) Bar set back from the coast with less disruptive lighting but extensive, possible beach cleaning, activity on the beach in front of it affecting at least the surface layer of the beach.

E) Detail of the illuminated, paved walkway with bar, rest huts, exercise equipment and planted vegetation. See also Fig. 3.



Figure 17. Condition of the beach along section 3, altered by the coastal arrangement project Stage 2, as observed during the 2024 OSA.

A) View from water's edge inland to the illuminated walkway.

B) View towards the western end of Stage 2 as currently completed. The left part of the image (lacking green lighting) is the remaining 400 m of Stage 2 that is yet to be developed. Note the mix of red and green and white lighting that predominates along the developed beach. See also Figs 3 and 11.



Figure 18. View of coastal area due to be developed as completion of Stage 2 of the coastal arrangement project. Note its undeveloped condition, barring several artificially planted palm trees.



Figure 19. Views of the coastal area planned to be revamped under Stage 3 of the coastal arrangement project.

A) Google Earth view (from 2021) of the beach section. Note the heavy exploitation of the beach to the left.

B) Example of current, modest, development; paved path, picnic shelters on lawns backed by numerous trees.

C) Large restaurant encroaching on the 1st Protection Zone and turtle nesting area.



Figure 20. Large sized Nile soft shelled turtle observed near the mouth of Dragon River during the 3 July 2024 field visit of the OSA.



Figure 21. Example of the steep stone walled banks of Dragon River.

Table 1. Percentage of total loggerhead nests made per beach section per year. Darker colours indicate higher percentages. Values based on unpublished nest numbers supplied by the local authorities.

Section n	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
1	3%	2%	5%	4%	4%	4%	4%	4%	5%	3%
2	13%	15%	7%	7%	7%	6%	8%	10%	11%	7%
3	5%	6%	5%	6%	4%	6%	5%	2%	2%	3%
4	9%	12%	12%	13%	17%	16%	15%	12%	12%	14%
5	8%	7%	7%	5%	6%	4%	5%	3%	3%	4%
6	7%	3%	5%	6%	3%	6%	7%	6%	6%	3%
7	11%	10%	10%	6%	8%	11%	9%	13%	12%	11%
8	15%	20%	19%	20%	17%	11%	17%	20%	21%	18%
9	25%	22%	25%	27%	29%	29%	25%	26%	24%	33%
10	3%	2%	4%	5%	3%	5%	4%	4%	4%	4%

Table 2. Density (nests/km) of loggerhead nests per beach section per year. Darker colours indicate higher densities. Values based on unpublished nest numbers supplied by the local authorities. Beach section lengths were determined by the author using Google Earth Pro and official section boundaries.

Section n	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
1	17.4	9.1	39.6	16.5	23.9	19.6	28.3	30.4	28.7	17.8
2	67.5	63.3	47.5	32.1	35.8	25.8	56.3	72.9	65.8	42.1
3	51.8	60.0	76.4	59.1	49.1	59.1	72.7	36.4	25.5	45.5
4	167.1	171.4	295.7	192.9	302.9	240.0	350.0	310.0	242.9	292.9
5	255.0	187.5	305.0	140.0	195.0	107.5	187.5	150.0	107.5	140.0
6	102.2	38.9	102.2	66.7	44.4	72.2	122.2	110.0	86.7	53.3
7	118.3	89.2	134.2	54.2	81.7	95.8	120.8	191.7	141.7	143.3
8	334.5	372.7	572.7	369.1	370.9	203.6	509.1	645.5	527.3	490.9
9	445.7	314.3	602.9	400.0	508.6	430.0	584.3	642.9	490.0	711.4
10	16.2	9.0	34.3	25.7	20.0	23.3	31.0	31.0	28.6	30.0



Table 3. Issues raised for assessment in the OSA, their status, outlook and advised actions. Feedback/reporting to Bern convention given at the start of April, June, August, including actions carried out until the end of the month preceding the report. The monitoring plan starts in January 2025 and unless indicated by an * should be repeated yearly.

Issue	Status	Difficulty to address	Outlook	Action	Monitoring plan
1 assess the actions taken to stop sand extraction from the nesting beach / vehicles access on the beach	Good	Low	Few signs of vehicles on the beach. No signs of recent sand extraction. Barriers to prevent access relatively simple to install.	Barriers put in place to prevent access to the beach at 'hotspots', e.g. south of Dragon River.	Bi-monthly checks; January, March, May, July, September, November.
2 light and noise pollution	Medium	Moderate	Light pollution is localised but problematic in those areas. Multiple light sources require changing to turtle friendly design (red coloured and not directly shining onto the beach) or shutting off.	(a) Multiple light sources changed to turtle friendly design (e.g. red coloured and not directly shining onto the beach) or shut off. (b) Management and mitigation plan prepared for incidences of hatchling misorientation.	(a) Bi-monthly checks; January, March, May, July, September, November. (b) *Development period check March (plan under development?), June (plan completed?).
3 removal of beach furniture at night	Good	Low	Only a few small areas where beach furniture in place and potentially removed at night, except for the development on Karaağaç beach. Furniture removal requires regular monitoring and enforcement.	Furniture removed from beaches at night to free up turtle nesting zone.	Monthly check (random dates); May to September.
4 collect of littering [sic]	Good	Low	The beaches observed were all relatively litter free.	Beaches regularly cleared of litter without using heavy machinery.	Monthly check (random dates); May to September.
5 treatment of wastewater	n/a	n/a	Wastewater from beach showers along 'Stage 2' of beach section 4 were assessed to not be impacting the nesting area. But recommended to not be increased in number.	No additional water-sources placed that drain directly onto beach.	Bi-monthly checks; January, March, May, July, September, November.

6 small business expansion	Medium	Moderate	Businesses encroaching on the beach were generally concentrated to one stretch, plus the development on Karaağaç beach. Most in the areas of Stage 1 and 2 had already been reinstated away from the nesting area. Some individual establishments still require relocation.	Business premises encroaching the 1 st Protection zone of beach removed or relocated inland.	Bi-monthly checks; January, March, May, July, September, November.
Issue	Status	Difficulty to address	Outlook	Action	Monitoring plan
7 any other illegal activities	n/a	n/a	No specific other illegal activities were noted during the OSA.	Any observed illegal activities stopped.	Monthly check (random dates); May to September. Combined with Issue 4.
8 Restoration of the nesting beach	Good	Moderate	Certain areas in Karaağaç beach and 'Stage 1' and 'Stage 2' require some restoration that involves enforcement measures by authorities.	Identified areas are restored and enforcement measures authorised by authorities.	Bi-monthly checks; January, March, May, July, September, November.
9 Information and warning signs about turtles in the beach entrance areas	Poor	Low	Only two signs reported present (one seen). Relatively simple to add more. Adding signage to each nest protection cage is recommended as priority and establishing at least one visitor information centre would be beneficial.	(a) Construct turtle visitor exhibit. (b) Prepare and place individual signs with/on all nest cages.	(a) *Check for progress; January, April, July, October. (b) Intermittent checks; *April (signs prepared?), June & August (signs in place?)
10 Assess the state of collaboration and communication between the authorities and civil society	Medium	Moderate	Communication prior to the OSA was poor, but the OSA acted as a catalyst. With new local government in place matters could improve, but this will require willingness from all sides.	Establish multi-stakeholder teams for beach status assessments and turtle monitoring.	Quarterly check for progress; January, April, July, October.
11 Assess the state of rehabilitation of the Karaağaç picnic area	Good	Low	The picnic area beach was cleared up well and needs little to no further work.	Check for changes to the beach.	Bi-monthly checks; *January, March, May, etc. until the beach is rehabilitated.
12 Assess whether the Coastal Arrangement Project (CAP) is sufficiently protecting the nesting beach (in particular, as concerns the 1 st Protection Zone, is the limit of 65 meters from the coastline forbidding any structures so that the turtles	Medium	High	CAP has resulted in a generally cleared beach, hence positive changes to the 1 st Protection Zone. However, the 2 nd Protection Zone has been developed to encourage people near the beach at night and is not lit in a turtle friendly manner, which requires modification. Lights need to be modified to be 'turtle friendly' and possibly the addition of a fence along the CAP to deter accessing the beach at night. The necessity for continuing the development to complete	Action points are covered under Issues: 2, 3, 4, 5, 6, 7, 8 & 9.	As per individual Issue.

can lay their eggs sufficient and respected? Is the 2 nd protection zone sufficient and respected?)			Stage 2 and for Stage 3 should be assessed. If deemed necessary, the development needs to consider the issues raised herein.		
Issue	Status	Difficulty to address	Outlook	Action	Monitoring plan
13 Assess the feasibility of a restoration of the banks of the Dragon rivulet	Poor	High	The stone banks of the river are not suitable for Nile soft shelled river turtle basking nor access to the banks and beach to nest. Removal of stones would be difficult and may compromise flood defences but should be investigated.	Commission study to determine feasibility of at least partial removal of stones along riverbank to facilitate Nile soft shelled turtle nesting.	*May (study commissioned?).
14 Assess whether geothermal exploration activities could have an impact on the nesting beach, and whether an Environmental Impact Assessment of these activities have been duly carried out	Good	n/a	Drilling for geothermal exploration on and near the nesting beach has been blocked by the authorities and no longer poses a potential threat to the turtles or their habitat.	Confirm no change to the blocking of drilling on and near the nesting beach.	*May.
Sea turtle and beach monitoring	Poor	Moderate	Turtle nest monitoring is not scientifically robust and does not collect sufficient data to support status assessments. Developing a skilled workforce to undertake this work requires finding suitable personnel and adequate financial support.	Robust turtle monitoring program put in place recording data deemed necessary in the Guidelines.	February (plan in place?), April (personnel allocated?), July (monitoring operational?).
Availability of sea turtle monitoring data	Poor	Low	Sea turtle nesting data that have been collected from the past decade are not publicly available. This can be simply rectified through distribution of a report or publication in a scientific outlet.	Sea turtle nesting data are made available. Through distribution of a report or publication in a scientific outlet such as the MedTurtle Bulletin.	*May 2025 for existing data. December for annual reports.
Nile soft shelled turtle population	Poor	High	River and canal habitats have been altered with stone banks and up-to-date scientific records of the presence of this species are lacking. Monitoring habitats for this species is difficult and requires skilled, dedicated surveyors that may be hard to recruit, but efforts should be made	River and canal habitats surveyed for presence of this species to inform a species-specific conservation plan.	*May (survey plan in place?), *July (survey underway?).

