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**On-the-spot appraisal**

**Threats to Marine Turtles  
in Thines Kiparissias Bay  
(Greece)**

**DRAFT REPORT BY THE EXPERT**

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## **On-the-spot appraisal**

# **Thines Kyparissias (Greece)**

*(14-15 July 2014)*

*Document prepared by:*  
*Mr Paolo Casale*

### **TERMS OF REFERENCE**

In keeping with the terms of reference appended to the assignment letter, the purpose of the expertise was to:

- Examine the biological situation of the Loggerhead sea turtle (*Caretta caretta*) in the Natura 2000 site THINES KYPARISSIAS - GR2550005, taking into account recent development plans and their pressure on the turtles nesting activity;
- Assess the possible impacts of the developments plans and infrastructures on the long-term survival of the species at the population level;
- Examine the impact of the restoration measures or the protection measures eventually put in place, in light of other relevant Standing Committee Recommendations;
- Discuss with relevant competent authorities at the national, regional and local level, and concerned NGOs and examine with concerned stakeholders possible solutions that may ensure the survival and nesting of marine turtles in the area;
- Make appropriate recommendations to the Standing Committee to the Bern Convention.

## INTRODUCTION

### THE BAY OF KYPARISSIA IN THE CONTEXT OF LOGGERHEAD SEA TURTLES IN THE MEDITERRANEAN

The Mediterranean loggerhead (*Caretta caretta*) sea turtle population is considered as a distinct Regional Management Unit (Wallace et al. 2010). This population shows a subpopulation substructure (Clusa et al. 2013), with major nesting areas in Greece, Turkey, Libya and Cyprus. The average documented number of nests is over 7200 per year in the entire Mediterranean and over 4100 per year in the EU (Casale et al. 2010). The number of nests in the Kyparissia nesting site increased in recent years (2006-2012) to an average of 730 nests per year (Margaritoulis et al. 2011; ARCHELON 2013). Therefore, the Kyparissia nesting site hosts over 10% of the documented nests in the Mediterranean and over 17% in the EU. It is also the second most important loggerhead nesting site in the Mediterranean after Zakynthos and may become the first if the current trends continue. On this basis, the Kyparissia nesting site represents a very important component of the Mediterranean population and its proper management is crucial for the conservation of the Mediterranean population of loggerhead sea turtles.

### REASONS OF CONCERN

Although the Kyparissia nesting site is still in a relatively pristine condition, it has been recently threatened by development, either already in place or planned. The main existing or potential threats reported by NGOs (ARCHELON 2012; MEDASSET 2012; ARCHELON 2013) may be summarised as follows:

- construction of houses
- construction of roads
- construction of canteens and the like
- construction of wave barriers/artificial reefs
- occurrence of vehicles and people at beach by night during the nesting and hatching season
- fishing

Specifically, these threats can significantly increase disturbance and/or mortality of nesting females (presence of humans on the beach, wave barriers/reefs, fishing) and mortality of hatchlings (light pollution, fishing). Moreover, some of them can alter the nesting habitat in the long term, potentially affecting the incubation habitat of the eggs.

### KEY BACKGROUND CONCEPTS/INFORMATION FOR THE KYPARISSIA CASE

Absolute values or trends of the annual number of nests observed in recent years have no relation with the recent management and cannot be considered as an index of the current anthropogenic pressure. Only very high intensive and constant impacting activities on the entire nesting beach might theoretically kill the females approaching the beach or induce them to move elsewhere to lay their clutches. However, a shifting due to avoidance may be observed among subsectors of the same nesting site. Changes in the overall number of nests in an entire nesting site are the result of a combination of several factors, the main ones being the following:

- change of the number of clutches laid by a female in one nesting season. This may depend on the amount of resources accumulated during the previous foraging period, which depends on food availability, temperature, etc. In other words, a stable adult female population may produce different number of nests in different years if some general conditions at foraging habitats change among years.
- change of breeding frequency. Sea turtle females do not usually breed every year. Migration from foraging to breeding areas and egg production require a high amount of energy, and females may need 2-3 years to accumulate enough resources at foraging grounds before undertaking reproduction. As above, this depends on food availability, temperature, etc. In other words, a stable adult female population may produce different number of nests in different years if some general conditions at foraging habitats change among years.

- change of the number of adult females. This is the most intuitive factor. It should be taken into account that a change on nest abundance due to a change of female abundance means that a different number of females are recruiting at the nesting grounds, i.e. the number of first-breeders is changing. By definition first-breeders have not had any contact with the nesting site since their birth (if they were born at the same nesting site as it is likely to be) and they have probably spent all their immature life (15-20 yrs or longer) (Casale et al. 2009; Casale et al. 2011a; Casale et al. 2011b) at distant foraging grounds, like the Adriatic and the Tunisian shelf, for the Greek loggerhead population (Margaritoulis and Panagopoulou 2010). Therefore, the number of nesting females recruiting at a nesting site depends on the number of females that entered the sea 15-20 years before and the mortality rate that occurred at the foraging grounds in this period. Only the number of females entering the sea 15-20 years before may be affected by management at the nesting site (e.g. nest protection).

In summary, the increased number of nests observed in recent years at the Kyparissia loggerhead nesting site (Margaritoulis et al. 2011; ARCHELON 2013) may reflect (i) a real increase of population abundance due to an increased hatchling production at the nesting site 15-20 years ago or a reduced mortality at foraging grounds in the past 15-20 years, or (ii) an increased individual reproductive output (clutches per females, breeding frequency) due to higher trophic resource availability at foraging grounds, different temperature regimes etc., or (iii) a combination of the two. The observed increase of the proportion of first-breeders (neophytes) associated to the increase of the number of nests (Margaritoulis et al. 2011) supports the hypothesis of a real increase of population abundance. The time span between the beginning of intensive nest protection (1989) and the beginning of the observed increase of number of nests (2006) (Margaritoulis et al. 2011) coincides with the minimum maturation age (15 years) and this suggests that nest protection 15-20 years ago was the main factor inducing the increased female population abundance observed nowadays.

***What light pollution is and how it can be minimized.***

For more about light pollution and sea turtles, see Witherington and Martin (2000).

- The main impact of light pollution is on hatchlings, which crawl towards the brightest portion of the horizon that in natural condition is the sea but in the presence of artificial lights is the land. Obviously, crawling towards the land instead of the sea is eventually lethal for the hatchlings.
- Light pollution can be categorized into 2 classes: direct lights (the light source is directly visible from the beach) and indirect lights (the light source is not directly visible from the beach, but it illuminates objects – or even mist - that become brighter than the sea). This can easily be assessed by a person standing on the beach.
- Light pollution can be minimized through several synergic approaches:
  - Reducing the number of light sources to the minimum possible
  - Reducing the light power to the minimum needed
  - Reducing the time lights are on to the minimum time really needed
  - Reducing direct lights by orienting the lights towards the land or apply to them screens that impede the light to reach directly the beach
  - Using lights of wavelengths less visible to turtles, i.e. red (best), orange, yellow.
  - Reducing indirect lights by orienting the lights in a way that objects that became brighter and visible from the beach are reduced to the minimum possible

## **ON-THE-SPOT APPRAISAL TO THINES KYPARISSIAS**

### **SUMMARY OF THE MEETINGS AND VISITS**

The delegation was composed by Mr Paolo Casale and Mr Eladio Fernández-Galiano

#### ***14 July 2014***

- Athens. Meeting at the Ministry of Environment, Energy & Climate Change (MEECC) with:
  - Mrs. Rebecca Batmanoglou (Acting Director, Environmental Planning, MEECC)
  - Mr. Petros Varelidis (from the Permanent Representation of the Ministry of Environment, Energy and Climate Change at the EU)
  - Mr. Mikos Chlykas and colleague, representatives of the company “NERCO-N. CLYKAS and Accosiates S.A.”
- Kyparissia. Dinner meeting with representatives of NGOs:
  - Ms Panagiota Theodorou (ARCHELON’s Project Leader in the Peloponnese)
  - Mr Kostis Grimanis (Director of MEDASSET)
- Kyparissia coast. Night-time visit to the core nesting area, with the above NGO representatives.

#### ***15 July 2014***

- Kyparissia coast. Daylight visit to the core nesting area, with the above NGO representatives.
- Kyparissia. Meeting with the Mayor (Mr Konstantinos Kolias) and several other officers of the Municipality of Trifylia, and Mrs. Rebecca Batmanoglou (Acting Director, Environmental Planning, MEECC).

### **OBSERVATIONS MADE DURING THE ON-THE-SPOT APPRAISAL TO THINES KYPARISSIAS**

#### ***Major potential problems***

- On the basis of the observations made on the site, regarding its current status, the nesting beach and the location of the planned constructions, the most concerning problem is the possible development plan, including the building of ca. 50 houses along the coast in the dune area (sources: urban certificate from the Municipality of Trifylia to MEDASSET, 05/09/2011; ARCHELON (2012)). This would directly and indirectly induce a high increase of disturbance to nesting females and hatchlings at the nesting beach.

#### ***Major current problems identified***

- Light pollution in the southernmost part of the area (Kalonero) due to tourism infrastructures (hotels, restaurants, public illumination) (Figs 1-6).
- Light pollution from private (a few houses) and public lights (a few roads perpendicular to the seashore) in the rest of the area (Figs 7-9). In some cases, houses have powerful lights oriented towards the beach with the apparent aim to illuminate a as much area around the house as possible.
- Six roads perpendicular to the seashore and over the dunes (that have been removed and flattened). These roads allow vehicles to reach the dune area and therefore to illuminate the beach during the night. They also facilitate persons who want to access the beach by night (Figs 7, 10).
- Camping on the beach. This can potentially represent a disturbance factor at night, depending on the behaviour of the camping people (Fig. 11).
- Feral dogs attacking nesting females. A few cases have been reported by ARCHELON during the visit.

### ***Improvement from a previous situation***

In comparison to what reported by the NGOs in recent years, the current situation has improved in several aspects, thanks to actions undertaken by the municipality of Trifylia and by the Ministry of Environment:

- Construction licenses have been suspended by decree in the area Ministerial Decision of Suspension/Prohibition of all construction and agricultural activities in the broader coastal area (Ministry for the Environment, Energy and Climate Change of Greece, OJGG 180, 24.5.13)
- Three canteens on the beach have been removed
- The roads perpendicular to the seashore were blocked (by removable structures) at the end closest to the sea, impeding vehicles from accessing the beach (Figs. 7, 10, 12)
- On some of the roads perpendicular to the seashore, the public light closest to the sea was not working (although it is unclear if this was intentional and permanent) (Fig. 13)
- In the southernmost part of the area (Kalonero), the most developed one, the beach furniture (e.g. chairs) was packed at night in a way to occupy the minimum space on the beach, thus minimizing the impact of such obstacles for turtles

### **CONCLUSIONS**

- Kyparissia Bay is a key breeding area (one of the two most important sites) for the loggerhead turtle in the EU and in the Mediterranean.
- The current importance of this area relative to others is the result of the hatchling production occurred in the same area 15-20 years ago. While other Mediterranean breeding areas were impacted by various factors (directly or indirectly due to human activities) and experienced a decline of number of clutches laid, in Kyparissia hatchling production was kept high in the past, thanks to the efforts of specific conservation projects and to the pristine conditions of the area.
- The current good level of nesting (and of population abundance) can be maintained in the future only if the past conditions of 15-20 years ago (i.e. the pristine conditions and low anthropogenic impact that caused the current status) will be maintained also in the future.
- The Natura 2000 site THINES KYPARISSIAS - GR2550005 includes the core nesting area and its adequate protection and management is required in order to maintain the local loggerhead population at its current levels.
- Any change that may cause an increase of light pollution and human presence on the beach by night should be avoided. For instance, roads reaching the dune favour approaching the beach by cars, increasing the illumination and the night-time frequentation of the beach; houses on the dunes increase light pollution and human frequentation of the beach at night;
- The construction of roads and houses should be avoided, because they change the dune profile (actually they partially or totally remove the dunes) with possible adverse consequences on the nesting habitat suitable for egg development.
- The recent construction of houses and roads and the current plans of building many new houses should be considered as a significant change from the past conditions and represent the main potential threat for the negative effects they have on the reproduction of sea turtles in the area.
- The sustainable use of the area for tourism development is possible, since tourists are basically interested in frequenting the beaches during daylight when they do not represent a threat for hatchlings or nesting females. Therefore, with the simple identification and protection of nests, in order to avoid the unintentionally damage by people, and by avoiding leaving obstacles at night and avoiding human presence and lights during the night, tourism development will be compatible with sea turtle conservation. Construction in the Natura 2000 area should be considered as not in line with a sustainable development.
- The recent approaches by the municipality and the Ministry (see above) are in the good direction for the protection of the sea turtle nesting area. However, the plans of building many new houses are still pending evaluation and represent the most critical issue.

## RECOMMENDATIONS

On the basis of what reported above, I recommend:

- 1) Consider giving the key areas for marine nesting a protection status (such as National Park) that may ensure the long-time conservation of its high natural values, including marine turtle nesting beaches, dunes systems, coastal forests, marine habitats and other;
- 2) in the key areas where construction licenses have been suspended by decree, prohibit permanently the construction of any villas or other buildings, new roads or other infrastructure, thus keeping those areas in a natural state;
- 3) restore the original dune and forest habitat in the above mentioned area by demolishing the roads perpendicular to the shoreline and other existing artificial infrastructure; before those demolition works are carried out, block as a matter of urgency the roads perpendicular to the shoreline with non mobile barriers at the entry of the road, so to avoid further damage to the neighbouring dunes and forest and so as to avoid that cars and caravans reach the proximity of the nesting beaches and produce nuisance to marine turtle nesting and hatching;
- 4) for the houses that have already been built in sensitive areas in the vicinity of the nesting beaches, avoid that owners change the profile of the dune and make sure that the dune ecosystem is not substituted by planted trees and shrubs so it can maintain its natural communities and geomorphological dynamics; ensure that the existing houses change or shade the lights illuminating the beach and causing photo-pollution affecting negatively marine turtle nesting and hatching; remove invasive alien plants already planted in some of those areas (for instance *Carpobrotus*) as they may spread into dune and beach nesting areas altering the marine turtle nesting habitat;
- 5) avoid any agriculture in the public domain and restore dunes to their original natural state;
- 6) address in the whole Nature 2000 area the problem of photo-pollution, particularly in Kalonero; lights should be (i) removed, or (ii) shaded (in a way that avoids illuminating the beach), and/or (iii) substituted by lights of less power and/or of different spectrum (preferably red, or orange-yellow). Moreover, lights should be switched off when not really needed.
- 7) make sure that the beach equipment used now in the Natura 2000 area is removed at night or stored in a way that reduces the area occupied in the beach; do to authorise any new beach equipment so that most beaches remain free of obstacles for nesting turtles;
- 8) prohibit any sand and gravel extraction or any new structures in the sea (breakwaters, etc.);
- 9) if new habitations are to be built to accommodate growing tourism, favour building in areas already urbanized (such as Kyparissias town) avoiding delivering building licenses (any kind of buildings) in pristine natural areas in the Natural 2000 site;
- 10) establish a prohibition of circulation of vessels in the marine area off the nesting area (included in the Natura 2000 site GR2330008 during the reproductive season (April to October) so as to avoid the killing of turtles by boats; identify existing fishing practices and prohibit those that may incidentally capture adults and hatchlings;
- 11) enforce measures aimed at avoiding people and cars visiting the marine turtle nesting beaches at night, including those from the camping sites;
- 12) control feral dogs as they have proved to attack adult females while nesting.

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*Fig. 1. Kalo Nero. Private (restaurant) and public lights as seen from the nesting beach.*



*Fig. 2. Kalo Nero. Direct and indirect (wall) illumination as seen from a sea turtle nest.*



*Fig. 3 Kalo Nero. Hotel lamps in front of the nesting beach.*



*Fig. 4. Kalo Nero. Hotel lamps (in the back, same hotel of Fig. 3) as seen from a sea turtle nest (in the front).*





*Fig. 5. Lights along the road, in front of the nesting beach.*



*Fig. 6. Light along the road, in front of the nesting beach.*



*Fig. 7. Houses (completed on the left and uncompleted on the right) in front to the nesting beach (on the right). One of the roads perpendicular to the nesting beach, which allow vehicles to reach the dune zone.*



*Fig. 8. House in front to the nesting beach.*





*Fig. 9. House in front to the nesting beach.*



*Fig. 10. Road perpendicular to the nesting beach, allowing vehicles to reach the dune zone.*



*Fig. 11. Camping on the beach.*



*Fig. 12. One of the roads perpendicular to the seashore, which was blocked (by removable structures) at the end closest to the sea, impeding vehicles from accessing the beach.*





*Fig. 13. The light (out of work) closest to the sea in one of the roads perpendicular to the beach.*

## Appendix



### Convention on the Conservation of European Wildlife and Natural Habitats

#### **Draft Recommendation No. ... (2014) of the Standing Committee, adopted on ... December 2014, on the conservation of *Caretta caretta* and of sand dunes and other coastal habitats in Kyparissia (Peloponnesos, Greece)**

*(To be examined by the Standing Committee on 5 December 2014)*

The Standing Committee to the Convention on the Conservation of European Wildlife and Natural Habitats, acting under Article 14 of the Convention,

Having regard to the objectives of this Convention, which aims to conserve wild fauna and flora and their natural habitats, by giving particular attention to vulnerable species, including migratory species threatened by extinction;

Noting that Kyparissia beach and coastal areas contain natural habitats protected by the Convention and the EU Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora (Habitats Directive);

Noting that most of the important habitats for sea turtle nesting in EU Member States are protected as Natura 2000 sites;

Noting that the beach of Kyparissia is a nesting beach of great importance for the sea turtle *Caretta caretta*, a species listed in Appendix II to the Convention, under threat in the whole Mediterranean Sea;

Noting that, thanks to conservation efforts during the last 25 years concerning nest protection, Kyparissia beach was in 2013 the most important known nesting beach for sea turtles in the whole Mediterranean basin, having registered up to 1450 nests;

Recalling the provisions of Article 4, paragraphs 1 to 3, and Article 6 of the Convention;

Recalling that, for Natura 2000 sites, European Union Member States are under the obligation to take appropriate steps to avoid the deterioration of natural habitats and of the habitats of species as well as disturbance of the species for which the areas have been designated, in so far as such disturbance could be significant in relation to the objectives of the Habitats Directive;

Noting with concern that, roads have already been built on the dune systems in the core area of one of the Natura 2000 sites in Kyparissia Bay, and that the building of further holiday villas is planned in no less than 3 Km of the dune system adjacent to the key nesting beaches for sea turtles,

Recommends that Greece:

1. Considers giving the key nesting areas for sea turtle a protection status ( National Park or equivalent) that may ensure the long-time conservation of their high natural values, including sea turtle nesting beaches, dunes systems, coastal forests, marine habitats and others;
2. Permanently prohibits the construction of any villas or other buildings, new roads or other infrastructure, in the key areas where construction licenses have been suspended by decree thus preserving the present natural state of those areas;



3. Restores the original sand dune and forest habitat in the above mentioned area by demolishing the roads built perpendicularly to the shoreline, as well as other existing artificial infrastructure; blocks as a matter of urgency, until the demolition works are carried out, the roads perpendicular to the shoreline with non-mobile barriers at the entry of the road, so to avoid further damage to the neighbouring dunes and forest, thus avoiding that cars and caravans reach the proximity of the nesting beaches and produce nuisance to sea turtle nesting and hatching;
4. Ensures that the owners of the houses that have already been built in sensitive areas in the vicinity of the nesting beaches, avoid changing the profile of the dune, and controls that the dune ecosystem is not substituted by planted trees and shrubs so it can maintain its natural communities and geomorphological dynamics; further ensures that the existing houses change or shade the lights illuminating the beach causing photo-pollution affecting negatively sea turtle nesting and hatching; remove invasive alien plants already planted in some of those areas (for instance *Carpobrotus*) as they may spread into dune and beach nesting areas making them inappropriate for sea turtle nesting;
5. Avoids any agriculture in the public domain and restore dunes to their original natural state;
6. Addresses in the whole Nature 2000 site the problem of photo-pollution, particularly in Kalonero; all lights should be shaded in a way to avoid illuminating the beach and dune areas;
7. Ensures that the beach's equipment used now in the Natura 2000 site is removed at night or stored in a way that reduces the area occupied on the beach; prohibits does not give any licences to any new beach equipment so that most beaches remain free of obstacles for nesting turtles;
8. Prohibits any sand and gravel extraction or any new structures in the sea (breakwaters, etc.);
9. If new housing is to be built to accommodate growing tourism, favours building in areas already urbanised (such as Kyparissias town) avoiding delivering building licenses in pristine natural areas within the Natural 2000 site, independently from the ecologically friendly characteristics of the new buildings;
10. Establishes a prohibition of circulation of vessels in the marine part of the Natura 2000 site GR 2550005 during the nesting and hatching season (April to October) so as to avoid the killing of turtles by boats; assesses existing fishing practices and prohibits those that may negatively affect nesting and mating turtles, as some are likely to be drowned in fishing nets;
11. Enforces measures aimed at avoiding people and cars visiting the sea turtle nesting beaches at night, particularly from the camping sites; controls feral dogs as they have proved to attack and hurt many nesting sea turtles;
12. Keeps the Standing Committee regularly informed about the progress in the implementation of this Recommendation.