

Strasbourg, 31 October 2012
[files46e_2012.doc]

T-PVS/Files (2012) 46

CONVENTION ON THE CONSERVATION OF EUROPEAN WILDLIFE
AND NATURAL HABITATS

Standing Committee

32nd meeting
Strasbourg, 27-30 November 2012

Possible file

**THREATS TO MARINE TURTLES
IN THINES KIPARISSIAS BAY
(GREECE)**

REPORT BY ARCHELON

*Document prepared by
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**ANTHROPOGENIC DISTURBANCES AT THE NESTING AREA OF *CARETTA CARETTA*
IN SOUTHERN KYPARISSIA BAY
(NATURA 2000 - GR2550005)**

**Short report submitted to
the European Commission and the Standing Committee of the Bern Convention
Athens, October 2012**

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1. BACKGROUND

Location

The Bay of Kyparissia, at the western coast of central Peloponnese, contains the second most important loggerhead sea turtle nesting habitat in the Mediterranean Sea (Margaritoulis et al., 2003). Its long sandy beaches constitute one of the largest remaining sand dune systems in Greece. The sandy coastline consists of a 44km continuous beach from river Alfios in the north to river Arcadikos in the south, with a small number of additional beaches separated by rocky coast further south. Maps of the region are shown in Illustrations 1 and 2.

The Core Nesting Area

Although turtles nest along the entire 44km beach, the majority of nesting (about 85%) occurs within the southernmost 9.5km of beach, i.e. between the rivers Neda and Arcadikos (Margaritoulis & Rees, 2001). This part of beach is considered the core nesting area and it is entirely included in the Natura 2000 site GR2550005 “Thines Kyparissias”. The core beach is divided in four sectors (A, B, C, O) of which the first three (A - C, totalling 7.3km) are backed by stretches of coastal pinewood forest, low dunes and cultivated fields, and the fourth sector (O: 2.2km) contains the expanding coastal village of Kalo Nero. The village of Elaia and the small settlement of Agiannakis are found at a short distance to the beach behind the Sectors B and C (Illustrations 3 and 4).

At the marine area of Kyparissia Bay there is also another Natura 2000 site (GR 2330008 “Marine area of Kyparissia Bay: Katakolo Cape – Kyparissia”) a part of which is found in front of the nesting beach (Illustration 2).

Local Government

The local government structure has changed twice over the time of ARCHELON's presence in southern Kyparissia Bay. The core beach was administered before 1999 by two local communities; from 1999 to 2010 by the Municipality of Avlona, and since January 2011 by the newly expanded Municipality of Trifylia, based in the town of Kyparissia. Some local responsibility is still delegated to the sub-municipality of Avlona.

ARCHELON Field Project

Since the beginning of 80s, ARCHELON has operated a seasonal conservation project in Kyparissia Bay. Tagging of turtles started in 1982 (before the founding of ARCHELON) and systematic beach surveys commenced in 1984. In the period 1984-1989 the entire long beach was surveyed and since 1990 the project was restricted to the core area (Margaritoulis & Rees, 2001).

All nests at the core area are located and protected against predation by foxes, against inundation by the sea and against disorientation of hatchlings because of bright lights. Human-induced effects are also monitored. In addition, ARCHELON carries out an extensive public awareness programme to inform visitors and locals, especially children, about sea turtles, the natural environment, and the threats they face (Rees et al., 2002).

The LIFE-Nature project and the Specific Environmental Study

In the context of a LIFE-Nature project (LIFE98NAT/GR/5262), ARCHELON prepared a Specific Environmental Study for southern Kyparissia Bay. This was submitted to the Ministry of Environment in 2003, with a Management Plan and a draft Presidential Decree. These were a precondition for the Ministry to issue the Presidential Decree and establish a Management Agency that would oversee the effective conservation of southern Kyparissia Bay (Efthymiou et al., 2002).

Regrettably, the Ministry of Environment has yet to take any of the necessary steps to establish a Management Agency for this area. As a result, sea turtles and the natural environment in southern Kyparissia Bay remain unprotected. In the absence of a Management Agency, illegal construction and development continue without any Environmental Impact Assessment and often without any license whatsoever. Roads, houses, beach bars and strong lights now stand in areas that were until recently relatively undisturbed; the habitat is degrading, becoming increasingly unsuitable for sea turtles and their nests (Vallianos & Margaritoulis, 2011).

2. ANTHROPOGENIC ISSUES

Anthropogenic conservation issues are human activities that cause damage to the natural environment. This report is focused on conservation issues that result in direct and indirect damage to sea turtles, their nests, and the nesting habitat in southern Kyparissia Bay.

When these issues are identified, ARCHELON engages in a discussion with individuals involved and the relevant authorities. A solution is often found early and the problems are managed. When this is not possible, the relevant authorities are informed and provided with information that helps them understand the situation and take appropriate action. We monitor those issues until they are resolved.

In this chapter, the main conservation issues that remain unresolved are listed and explained. They are separated in three different sections:

2.1. Sector O: The Beach Front of Kalo Nero

2.2. Sectors A, B, and C

2.3. The Marine Area.

2.1. Sector O: The Beach Front of Kalo Nero

The distinction of Kalo Nero from the rest of the nesting beach is important. This area is already severely affected by tourism development. It needs to be closely managed under principles of sustainable development, so that the natural environment is not irrevocably damaged and the beach returns to a conservation status suitable for sea turtle nesting.

When ARCHELON began monitoring the nesting activity in this region, Kalo Nero was a small village with most families occupied with agricultural activities. Agriculture is still a significant source of income in the area, but Kalo Nero is a quickly developing tourism resort.

Coastal Road

A rough road on the back of the beach has been paved over and asphalted gradually since the 90s to become what is now known as the beach front of Kalo Nero. Of the 2.2km of this beach sector, 1.7km are now paved, with street lights installed. The gradual pavement of the road was following the beach front expansion of houses and hotels. The appropriate planning and permissions were never acquired. As a result, the beach front road remains an illegal structure, often damaged by storms during the winter. At some locations, the road also serves as a parking area. Where other disturbance is not present, sea turtles attempting to nest are often disturbed by vehicles driven or people walking along the road.

Platforms on the Beach

In addition to the road, elevated platforms used as beach bars and restaurants started appearing on the back of the beach since 1994 (Photo 1). These were constructed and used as extensions by restaurants and bars that opened on the landward side of the road. In recent years, these platforms were leased out by the Municipality under the guise of “simple beach use.”

In 2003, the Municipality of Avlona submitted a project proposal to the relevant authorities for a development project on the beach front of Kalo Nero. The proposal included plans to stone-pave part of the beach road, to construct a fortified extension on the beach where more platforms could be based, and to install appropriate lighting. The proposal was eventually rejected.

On 28 December 2006, the Coast Guard of Kyparissia arrested eight workers who were constructing a concrete wall on the back of the beach. The wall was intended to protect the platforms from wave action during the winter but also created space for new platforms (Photo 2). The former Mayor of Avlona, whose term ran out at the end of 2006, was taken to court for authorizing unlicensed construction. On 3 January 2007 the new Mayor continued the construction and was also taken to court. By the summer of 2007, a significant part of the wall had been constructed.

The regional public land authority (Ktimatiki Ypiresia) examined the beach front of Kalo Nero, declared that the platforms and the constructed wall were illegal, and issued orders for their demolition. The authority responsible to perform these orders was the Municipality of Avlona.

Both Mayors were judged non guilty by local courts, on the basis that their actions were not malicious because they acted according to existing plans -albeit unapproved- and towards the well being of the local community. This was perceived as an indirect approval of the constructions and further action from local authorities ceased.

Light Pollution

Street lights are installed on electricity poles along the road on the beach front of Kalo Nero. The lights hang from a height of five to seven metres and most are uncovered from all sides. The bulbs are commonly fluorescent white, with lighting power equivalent to roughly 200 watts. Most street lights are very close to the beach, i.e. within 10m from the back of the beach. Additional light pollution is caused by hotels, restaurants and bars on beach platforms, spot lights shining right on the beach, and lights from parked camper vans (Photo 3).

It is not uncommon for hatchlings to be found on this coastal road during the night by ARCHELON volunteers, visitors or locals. Very few are rescued and returned to the beach. Some hatchlings are found squashed by cars or dead by exhaustion and dehydration (Photo 4). Most hatchlings are never found; only their tracks heading towards the back of the beach are discovered during the morning survey.

A common method, used routinely by ARCHELON, to prevent hatchling disorientation is to “shade” a nest, in the vicinity of intense lights, so that artificial light does not reach it directly (Photo 5). However, the problem of light pollution is so intense in Kalo Nero that the simple shading of nests is not effective. This is so because light comes from above and it is very bright because of the proximity and the height of street lights which produce severe light pollution in such a way that some hatchlings although have managed to enter the sea they come out again and move towards the lights.

In order to overcome this severe problem, ARCHELON found necessary to monitor the nests in this section throughout the night in an attempt to reduce the loss of hatchlings due to light pollution. Nests which are expected to or are known to be hatching are covered with a box during the night so that emerging hatchlings are unable to move away (Photo 6). The boxes are checked at regular intervals and all hatchlings found are released on the back of the beach at a dark location, so that they can make it to the sea. In the last years more than 50% of all nests in Kalo Nero have had to be boxed. Thousands of hatchlings are rescued through “boxing” each year, but this is nevertheless an unorthodox method. The problem of light pollution can and needs to be solved at its root.

Beach Use and Beach Furniture

Based on legislation and the recent Joint Ministerial Decision (FEK 792/29-4-2009) prescribing beach use, Municipalities can lease portions of the beach to tourism and leisure related businesses. Under specific guidelines, both the public availability and the protection of the environment must be maintained, with the local Municipalities responsible to ensure guidelines are followed.

Further, according to guidelines for sea turtle nesting beaches issued by the Ministry of Environment, umbrellas must be closed but they can remain on the sand during the night, as their daily removal would result in beach erosion. Sunbeds, however, must be removed and stacked up outside the beach in the evening to avoid disturbing turtles that come out to nest during the night.

In the area of Kalo Nero, much of the beach in front of beach platforms is leased for simple beach use, but sunbeds are not removed during the night (Photo 7a). In many occasions, the beach structure is manipulated and wooden paths, showers, and other structures are added on the sand. This makes a significant part of the beach inaccessible to sea turtles, while the few nests that are successfully laid are in danger of direct or indirect damage (Photo 7b).

Besides the above businesses along the waterfront of Kalo Nero, there is one more beach bar at the southern part of O sector, outside the village limits.

Vehicles and Machinery

Due to its tourism development, the beach of Kalo Nero has been cleaned by use of heavy vehicles in recent years; this was mostly done after the start of the nesting season in spite of the fact that, according to the guidelines of Ministry of Environment, the entry of heavy vehicles on nesting

beaches is prohibited from 1 May until 31 October. Although nests were marked, heavy machinery on the beach cause vibrations in the sand and damage nearby nests, potentially causing hatchlings to emerge early. They also alter the beach structure by compacting the sand, and removing pebbles to make the beach more pleasant for beach users (Photo 8).

2.2. Sectors A, B, and C

If sea turtles are to be effectively protected in Kyparissia Bay, these three Sectors (A, B, C) concentrating about 75% of all nests in the core area, must be maintained at a pristine condition or as close to that as possible. This area is characterized by a wide beach and sand dunes with sensitive vegetation which are increasingly damaged by vehicles, humans, and beach bars. The slightest light pollution can disturb turtles and disorient hatchlings from hundreds of metres away. Newly constructed roads and building activity, in combination with the lack of appropriate management and public awareness, accelerate the effects of the conservation issues listed here.

Road Construction

Since the Specific Environmental Study for Southern Kyparissia Bay was submitted to the Ministry of Environment in 2003, the Municipality of Avlona has proceeded to the construction of roads within the Natura 2000 site's core area. Road construction falls under a category of public works that requires the prior approval of an Environmental Impact Assessment. Within Natura 2000 sites, these must be approved by the Ministry of Environment. In Southern Kyparissia Bay, no Environmental Impact Assessment has been submitted or approved for road construction.

At the beaches of Agiannakis and Elaia, two existing rough roads arriving perpendicular to the beach were paved with compacted soil in 2006 and asphalted in 2009. Although these access roads pre-existed, their paving destroyed sand dunes and associated vegetation where the roads meet the beach. Particularly in Elaia, part of the sand dunes is used as a car parking area (Photos 9 and 10).

A third road providing access to the beach bar of Vounaki (see below "Beach bars") was compacted in 2007 but it is not yet paved with asphalt. In this location, the sand dunes are also used as a car parking area (Photo 11).

The Municipality of Trifylia is slowly constructing a road that aims to join the beach of Kalo Nero with Elaia alongside the train line. This road goes through the core of the Natura 2000 site. Although it is not immediately behind the sand dunes, its construction makes access to a large portion of the beach easier without any measures to mitigate the impact of an increased number of vehicles and visitors.

Finally, a rough road passing through the coastal forest and connecting Elaia with Agiannakis settlement was paved with pebbles twice in recent years.

House Construction

In 2006 a new house was constructed behind the beach at the seaward end of the access road in Agiannakis (Photo 12). Another house construction began in 2010, few metres south of the existing one. Details on the construction license were requested from the Planning Authority and the Municipality of Avlona. It is still not clear how a construction license was acquired outside city planning area and without a legal adjacent road. The construction was stopped, but the building remains on site (Photo 13).

Light Pollution

In comparison to Kalo Nero, light pollution in this area is low. A small number of lights frequently attract hatchlings from distances of 400 metres or more. Hatchling tracks are found in the morning leading behind the sand dunes, and hatchlings are either found dead or predated, or their tracks are lost in the vegetation. In the last few years the beach-bars (see below "Beach bars") shine bright lights on the beach.

Vehicles and Machinery

When hatchlings moving towards the sea crawl into a car track in the sand, the lowest part of the horizon is no longer towards the sea, but to the right or left of it. In these sectors, 4x4 vehicles enter the beach daily. These are either driven by farmers moving between fields or people visiting the beach for swimming or angling. Some vehicles are driven on the beach as a recreational activity. Hatchlings can crawl inside car tracks for hundreds of metres before they get out of them or die of exhaustion or predation (Photo 14).

Vehicles moving on the beach also cause damage to the sand structure and dune vegetation. On all entrances to the beach, sand dune vegetation is absent and the dunes are lower than surrounding dunes (Photo 15). In addition, regular movement of vehicles has created a permanent track on the sand dunes along the entire beach (Photo 16).

Since 2007, the Municipality of Avlona has often employed heavy machinery to clean large portions of the beach from debris that has washed up during the previous winter. The machines used filter the sand and remove large and small debris as well as a large number of stones. This changes the sand structure and can add to beach erosion. The vibrations of these heavy machines can cause damage to sea turtle nests and potentially cause hatchlings to emerge early (Photo 17).

Beach Bars

Beach bars are licensed by the Municipality of Trifylia under the “simple beach use” Joint Ministerial Decision. The Decision requires that any snack bars on the beach operate only during the day and do not have any permanent objects placed on the beach.

In sectors A, B, and C, three isolated beach bars operate during the summer. One is found at Elaia, one at Agiannakis and the newest one (since 2007) at Vounaki. Their exact locations are shown in Illustrations 3 and 4.

Beach bars operate in violation of the Joint Ministerial Decision under which they are licensed. Additional restrictions applying to sea turtle nesting beaches (Guidelines from the Ministry of Environment), are not included in the license issued by the Municipality.

All beach bars are constructed on sand dunes. Soil and stones are often mixed into the sand and are then compacted to make the ground firm. In all of the above cases, a wooden floor has been installed. Dune vegetation in the vicinity of beach bars is completely destroyed due to the construction and the high number of visitors. Sand dunes are in some cases flattened to be used as car parking area (Photo 11). Beach bars add significantly to the problem of light pollution, as they regularly operate into late night (Photo 18), sometimes even organizing beach parties with live music.

Free Camping

The forest of Elaia, close to the sand dunes between Agiannakis and Elaia, attracts a large number of free campers every year. Free camping is against the law in Greece and the local Police regularly receive calls to patrol the area. Since free campers are a source of income for the local community, law enforcement is not strict with regard to free camping.

At high season, in July and August, the beach in this area is regularly disturbed by large groups of people on the beach, lights from camper vans that are parked on the sand dunes and the roads that have been created on them, and even vehicles moving on the beach during the night.

2.3. The Marine Area

A number of adult and subadult sea turtles are found dead on the beaches of southern Kyparissia Bay each year. Specifically, along the core area (Sectors A-C, O) the number of dead turtles over the years ranged from 2 to 10 per season, without any definite trend. The majority of them carry no external injuries, but some of them bear intentional injuries, apparently inflicted by fishermen after capture.

Monitoring human activity that affects sea turtles at sea has been difficult in the past but is an essential element of sea turtle conservation. In the course of a study, in the period 1999-2001, which monitored 75 fishing vessels (trawlers, gill netters, long-liners) based in the ports of Patras, Kyllini,

Katakolo and Kyparissia, and fishing in the wider Kyparissia Bay, 168 turtles were captured alive & released; the great majority of them (76%) were caught in small-scale gill netters. During the same period (1999-2001) on the shores of the entire Kyparissia Bay 39 turtles were found dead, and 13 injured which were transported to ARCHELON Rescue Centre for treatment (Teneketzis et al., 2003).

Trawlers

Trawlers in Greece operate from 1 October to 31 May. The minimum distance from the coast allowed within the EU is 3 nautical miles and the minimum depth is 50m (Council Regulation No 1967/2006). In Greece, however, exceptions were allowed on several areas. In the Bay of Kyparissia (from Katakolon to Kounelos), the minimum distance from the coast was 1 nautical mile since May 2011 (Ministerial Decision 9131/4-1-2011, FEK B' 776/6-5-2011). Since August of the same year though the minimum distance is 1.5 nautical miles under the condition that the depth is no less than 50m (Ministerial Decision 9131/4-5-2011, FEK B' 1884/25-8-2011).

Trawling vessels are recorded almost daily in the Bay of Kyparissia, especially in May. The fishing activity in May coincides with the arrival of sea turtles for the nesting season. These vessels move at a close distance to the coast, often at a south to north direction (Photo 19).

All trawling vessels are monitored by the Coast Guard through a satellite telemetry system. When trawlers move closer to the coast than allowed, the monitoring authority informs the local Coast Guard office, which then fines the vessel operator. According to Coast Guard officers, "trawlers make a call of judgement; if the value of the expected fish catch is higher than the fine, they violate the relevant regulation."

In October 2010, one trawler was fined for fishing at a distance of 1 kilometre from the coast of southern Kyparissia Bay. Similar activity was witnessed daily in May and October 2011, but no action is known to have been taken. Recent requests for information when such activity was reported were refused, on grounds of privacy of the vessel operators.

Artisanal Fisheries

Small fishing boats based in the harbour of Kyparissia regularly deploy gill nets close to the nesting beaches of southern Kyparissia Bay. The nets are placed in late evening and collected in early morning. Most nets are used within 1km from the beach (Photo 20).

In some occasions, nets are anchored within five metres to the beach and laid perpendicularly out to a distance of 200 to 300 metres. According to the Coast Guard, only an existing Regulation for the safety of swimmers can be applied against this type of fishing, despite the fact that it is a known nesting area and a marine Natura 2000 site.

Artisanal fishing with gill nets near the beach is a danger to sea turtles moving in the area and attempting to nest, as well as to hatchlings entering the sea. Fishermen report that turtles are indeed trapped in these nets and are causing damage, but "only one out of ten or so are injured." Requests to fishermen to avoid fishing by the coast are often respected, but tend to be forgotten within a couple of weeks.

Marine Debris

Southern Bay of Kyparissia is littered with a large number of items of marine debris. Most of them are washed out of the sea during high wave activity and gradually buried in the sand or return to the sea (Photo 21). Plastic sheet discarded after use in local agriculture are also found. A similar pattern of uniform debris density is witnessed in the shallow waters of the Bay.

Marine debris is a worldwide threat to sea turtles. They are known to swallow plastics that they believe to be food. The contribution of marine debris to the number of dead sea turtles found in the area with no apparent injuries requires further investigation.

3. CONSERVATION ISSUES IN 2011 AND 2012

A New Platform on the Beach of Kalo Nero

In May 2011, a new platform was built on the beach front of Kalo Nero by the “Messina Mare” hotel. The Coast Guard were informed of this and replied that legal action had been taken. The construction was quickly completed without delay (Photos 22 and 23).

The bureaucratic procedure that followed the platform appearance is briefly explained:

1. The Coast Guard performed an inspection on 18 May 2011. Shortly after, they wrote to the Municipality of Trifylia to request information.
2. On the same day, the Police of Kyparissia also performed an inspection and wrote to the Planning Authority of the Municipality of Trifylia, the District Attorney of Kyparissia, the Public Land authority, the Coast Guard, and the Municipality of Trifylia.
3. On 20 May 2011, the sub-municipality of Avlona replied to the Coast Guard, the District Attorney, and the Police, that no license had been issued for beach use on that location.
4. The Planning Authority wrote to the Public Land Authority to request their action on 3 June 2011. Copies were sent to the Police, the District Attorney, the Municipality of Trifylia, and the Coast Guard.
5. The Public Land Authority performed an inspection two months later, on 21 July 2011. It concluded that there was a platform constructed on the beach. They forwarded a technical description of the platform to the District Attorney of Kyparissia and the other authorities involved, and requested for their actions.
6. On 12 August 2011, the Coast Guard issued a written order to the hotel's management to submit a written explanation within five days.
7. The hotel's management replied on 16 August 2011 and requested a postponement of the deadline to the first week of September.
8. On 14 September 2011, the hotel operators submitted to the Coast Guard:
 - a) A written explanation which stated that the aforementioned structure “can be easily removed at any time” and that “its construction was necessary due to the ground's unevenness,” among other things.
 - b) A copy of a diagram of the construction on a map, signed by the Mayor of Trifylia,
 - c) A license for “simple beach use” issued by the Municipality of Trifylia on 28 July 2011.

It must be noted that the platform is based on the wall built illegally on the beach in 2006/2007 and that the platform and objects placed on the beach by the same hotel violate several clauses of the Joint Ministerial Agreement that prescribes “simple beach use”.

As the beach is within the Natura 2000 land area, the Municipality of Trifylia and previously the Municipality of Avlona were required to request the approval of the Ministry of Environment before issuing simple beach use licenses.

The Municipality of Trifylia has recently requested the approval of the Ministry of Environment to issue simple beach use licenses. In the absence of a Management Agency for Southern Kyparissia Bay, the Municipality is the appropriate authority to issue those licenses. Its current track record on environmental protection, however, suggests that independent controls are necessary.

In June 2012 the Public Land Authority performed a new inspection on the beach of Kalo Nero in order to give for one more time fines to the owners of the beach bars and the ‘Messina Mare’ hotel and to publish orders of sating the platforms down.

Five New Illegal Roads

On 2 April 2011 a number of heavy vehicles were observed to construct a new road that connected the forest road to the beach in Sector C near Agiannakis. The construction material was thin-grained gravel compacted over a layer of stones. This was layered on the sandy ground by a bulldozer and then paved by a cylinder-drum vehicle. In some occasions, sand removed from the beach sand dunes was used, with dune vegetation destroyed during removal.

A further inspection of the area revealed that four roads (each about 10m wide and from 93m to 157m long) had been constructed within a distance of about two kilometres, and one more location had been marked for the construction of a fifth road. In this last area, trees were cut even after the illegal construction was revealed and stopped.

The construction operators reported that the land owner had donated the stripes of land to the Municipality of Trifylia and was covering the expenses for the construction of the roads. This is a typical procedure followed when land owners divide a larger plot of land into small segments to build individual houses on each of them.

Photographs and videos of the construction can be seen at:

<https://picasaweb.google.com/lh/albumMap?uname=118080412252489285601&aid=5592073170150001617&authkey=Gv1sRgCMnO7u3UmYfMGQ#map>

ARCHELON reported this directly to the Environmental Inspectors of the Ministry of Environment, who issued immediate requests for information to local authorities. The Municipality of Trifylia quickly declared that it was not involved in the construction and ordered the postponement of all construction until further investigation. The exchange of documents that followed between several public services revealed that:

1. The road construction was illegal. No licence whatsoever had been acquired, including the required Environmental Impact Assessment. A document fining the land owner and ordering the destruction of the roads was issued by the Planning Authority of Trifylia. The task of the removal of the roads has not been allocated.
2. The land owners had applied for license to build up to fifty houses along the back of the beach covering almost the entire length between Agiannakis and the football field of Elaia (Sector C). The licenses could not be legally approved at their current form.

The construction of the roads and the access they provided to the beach resulted in the deterioration of the sand dunes and destruction of dune vegetation where the roads met the beach. All inspecting authorities stated that they did not know whether the sand dunes were actually a protected element of the environment. No action has been taken so far towards the restoration of the sand dunes, and some public servants predict that the construction will eventually continue, despite the fact that these roads are within the core area of a Natura 2000 site.

Despite the above interventions, the fifth road was eventually constructed on 30 March 2012 completing the connection of the Elaia-Agiannakis forest road to the sea. Again the Environmental Inspectors of the Ministry of Environment were notified, who made an on-the-spot visit and issued a fine to the owner of the land. Currently these five roads are open, despite orders of the Ministry of Environment to be closed, and attract cars and camper vans right on the high beach (Photo 24).

Plans for Total Construction of Sector C

The five roads constructed behind the beach and between Agiannakis and Elaia is a necessary precondition for the construction of up to fifty residences along the back of the beach. The housing construction, with license applications dating from 2009, covers almost the entire beach length between Agiannakis and Elaia.

This strip of land between the beach and the coastal forest was donated (parahoritirio) by the state to one individual in 1953. According to older locals, this area was still forested at that time, but pine trees were burned down in the late 1950s and early 1960s. The land, consisting of sandy soil, was cultivated until early 1990s. It is characterized as land of high agricultural productivity and has a high

availability of groundwater. Through a series of court cases, the donation has been confirmed and the initial land area of 180,000sq.m donated was later corrected to about 500,000sq.m (document 1549/303/24-5-2011 of Ktimatiki Ypiresia).

Heavy Machinery on the Beach

Near the end of May 2011, the Municipality of Trifylia informed ARCHELON of their intention to employ heavy machinery to clean the nesting beach of Southern Kyparissia at several locations. This was initially not objected, despite official guidelines requiring all beach cleaning ends on 1 May, as it was still early in the nesting season and any damage would be minimal. Several weeks later we were informed that the beach cleaning would take place in about the middle of July. The Environmental Inspectors of the Ministry of Environment were immediately informed, and warned the Municipality of Trifylia to follow the existing guidelines.

The Municipality did not proceed with the beach cleaning operations, due to the guidelines and budget limitations. Members of the local Councils instead organized voluntary beach cleaning operations, in which school children, scout groups, and ARCHELON volunteers participated.

Heavy machinery was used in the area in front of the beach platforms of Kalo Nero by one bar to flatten the sand after heavy storms. When the Police was informed, it reported that the operation is done with license from the Municipality of Trifylia. Such incidents are difficult to prevent or follow to their source, as they are seldom authorized with a formal Council decision. Verbal agreement is the norm and, unfortunately, often accepted as adequate license by some authorities.

At the end of May 2012 heavy machinery was used for one more time on the beach of Kalo Nero in order to flatter the sand, with verbal permission by the Municipality of Trifylia.

Beach Bars and Beach Parties

During 2012 nesting season the beach bars at Agiannakis and Elaia were in operation from about 15 June until 15 September, while the one at Vounaki was in operation in August. The beach bar owners at Agiannakis and Elaia organized regularly in the weekends beach parties with loud music and hundreds of people on the beach. Moreover the beach bar at Agiannakis deployed beach chairs and umbrellas along the nesting beach. Although the beach bars at Agiannakis and Elaia were dismantled in October 2012, since the licenses under which they operated were expired, there are plans for their re-erection in May 2013, when new licenses are expected to be issued by the Municipality of Trifylia.

On Saturday 13 August 2011 a beach party was organized on the beach front of Kalo Nero. One of the bars that operate on a beach platform had installed a DJ booth and a number of man-sized speakers. The party was advertised on local radio, newspapers, and through the distribution of flyers.

The Police and Coast Guard were informed and arrived on the scene. They both reported that they could not stop the party because "the equipment was on the platform and not on the beach," neglecting the fact that the platform itself has no legal standing. The party proceeded into late night. The Police did, however, file a case when a formal complaint was made by ARCHELON, and the bar manager was fined for "operation of speakers on open space without a license."

Planned Construction of Wave Breakers

The beach of Kalo Nero suffers from erosion, probably because of the long-time destruction of the dune system and its vegetation. To mitigate beach erosion, initially the Municipality of Avlona and now the Municipality of Trifylia, are planning to construct a series of wave breakers, parallel to the coast line in front of Kalo Nero. It should be noted that this area is entirely included in the Natura 2000 site GR 2330008 "Marine area Kyparissiakos Bay: Katakolo cape – Kyparissia".

Specifically they are planned eight (8) concrete wave breakers (4 under and 4 above the surface of the sea) each with a length of about 100m at a distance of about 100m from the coast. The 4 -above the surface of the sea- wave breakers are shown in Illustration 5.

There is no need to stress that the construction of these wave breakers will cut off the approach of nesting turtles toward the beach and will hamper the dispersion of hatchlings offshore. The future

impact on turtle nesting can be understood if it is taken into consideration that the beach of Kalo Nero (sector O) concentrates 25% of the total nesting activity of the core area (annual average of the period 1994-2011).

For the time being, the authorities proceed with the examination of a preliminary Environmental Impact Assessment.

Artificial Reef

In 2010 the regional government of Peloponnese planned the construction of an artificial reef in the marine area of southern Kyparissia Bay. The purpose of the construction is to increase marine biodiversity and to enrich local fish stocks. ARCHELON followed the relevant procedures, examined the proposed plans and came to the conclusion that the planned artificial reef will not hinder sea turtle nesting and hatchling dispersion. However, it seems that the Municipality of Trifylia is not willing to proceed with this construction any more in order to save funds for the construction of the wave-breakers which, if implemented, is expected to disrupt greatly the nesting process.

4. DISTURBANCES AFFECTING NESTING (EXAMPLES FROM SECTOR O)

4.1. Turtles tend to avoid Sector O

Nest-protection measures have been gradually introduced since 1987, as nests were subject to high rates of mammal predation (about 50%) and inundation by the sea (about 30%). However, since 1992 the great majority of nests were protected in most of the core area, and thus many thousand hatchlings were saved.

In the 12-year period (1994-2005) nesting effort in the core area (sectors A-C, O) averaged 552 nests per year. However, in the last 6 years (2006-2011) there has been a considerable increase in nest numbers. This fact combined with a simultaneous increase in the number of neophyte turtles (evidenced through tagging) indicate an increase in the number of turtles recruiting to the nesting population (Margaritoulis et al., 2011). Indeed, this can be explained by the massive nest-protection measures taken unflinchingly since 1992, which is 15 years before 2006, i.e. the onset of the observed population increase, and corresponds to the minimum age at maturity of *Caretta caretta* in the Mediterranean (Casale et al., 2011).

Nevertheless, the observed increase of nests observed in the three sectors (A-C) does not appear in Sector O which exhibits a great increase of anthropogenic disturbances over these years (Graphs 1 and 2).

4.2. Beach bars discourage nesting

Since 1999, when accurate locations of nests were first recorded, the spread of nests on the beach at Kalo Nero (Sector O) has changed significantly. This change corresponds with the huge increase in development of beach bars/hotels over the same period. Turtles avoid the beach-bar area and now concentrate to a 400m less noisy area (Graph 3).

5. EPILOGUE

In the absence of a Management Agency for the Natura 2000 sites of southern Kyparissia Bay, too many issues have evolved and remain unresolved. Different controlling authorities deal with different issues. This fragmented distribution of authority is additionally complicated by a lack of efficient communication, additive delays in response, and a gap of knowledge in environmental protection and the existing legal framework.

The unwillingness of the Ministry of Environment to make the right steps in 2003 by forwarding the Specific Environmental Study and the associated Presidential Decree, elaborated in the context of the LIFE-Nature project, has now created a more complicated situation.

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7. ILLUSTRATIONS



Illustration 2: Map of western Peloponnese.



Illustration 1: Map of the Natura 2000 sites.



Illustration 3: North part of Southern Kyparissia Bay



Illustration 4: Continued from Illustration 3. The southern half of the monitored area of Southern Kyparissia Bay includes sector O, largely backed by the beach front of Kalo Nero

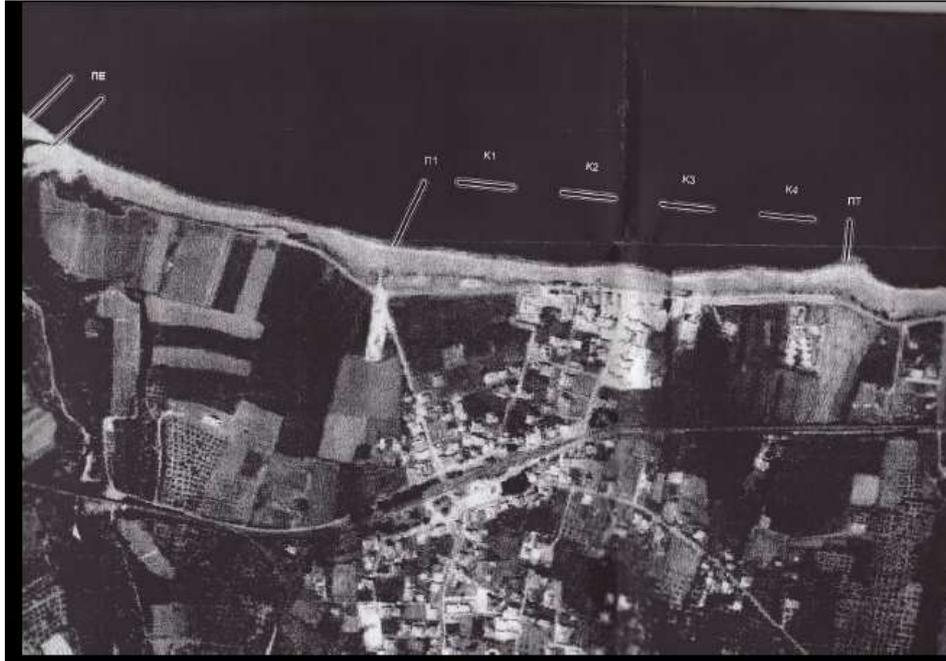
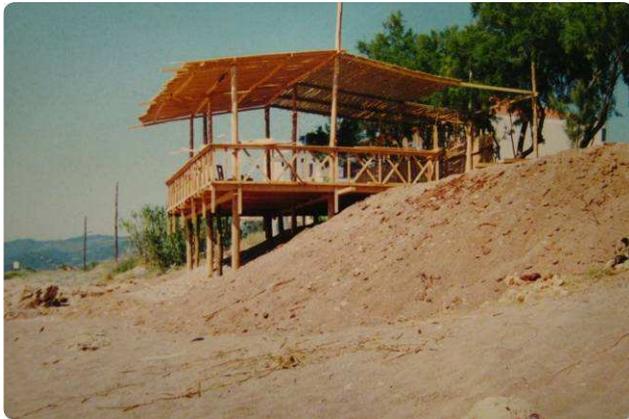


Illustration 5: The 4 -above the surface of the sea- wave breakers.

8. PHOTOS



Picture 1: The first beach platform to appear in Kalo Nero, in 1994. (DM)



Picture 2: A new wall was constructed on the back of the beach



Picture 3: Light pollution in Kalo Nero is severe. Lights from a restaurant on the right, street lamps, platforms and spot lights on the beach turn night into day. It is nearly impossible for hatchlings to find the sea in this area.



Picture 4: This hatchling followed the brightest light to make it to the sea, but made it to the road instead.



Picture 5: Volunteers install shading on a nest.



Picture 6: A box is placed over the nest during the night to trap emerging hatchlings.



Picture 7a: Beach furniture is not removed during the night (photo by Panagiota Theodorou).



Picture 7b: Simple beach use in Kalo Nero excludes the area used from sea turtle nesting. The few nests that are laid here risk being damaged.



Picture 8: Heavy machinery on the beach (photo by Daisy Parsons).



Picture 9: The road leading to the beach of Elea in 2007. All sand dune vegetation has been removed and the sand has been mixed with soil to be used as a car parking area.



Picture 10: The road access to the beach of Agiannakis was asphalted in 2009. It serves as a parking area. Street lamps installed here affect hatchlings from hundreds of metres away.



Picture 11: The road leading to the beach bar of Vounaki. Dune vegetation was removed, and the sand was layered over with stones and soil for easier access.



Picture 12: A new house was built within the core area.



Picture 13: A new house construction began behind the beach in 2010 but has now ceased.



Picture 14: Hatchlings can crawl inside car tracks for hundreds of metres.



Picture 15: Dune vegetation is absent from entrances to the beach, making it susceptible to erosion.



Picture 16: Regular movement of vehicles has created a permanent track on the sand dunes.



Picture 17: Heavy machinery is used for beach cleaning



Picture 18: This nest near the beach bar of Vounaki had to be boxed to save the hatchlings from certain disorientation (photo by Jeffrey Ho).



Picture 19: A trawler is fishing at a short distance to the beach of Southern Kyparissia Bay, October 2011 (photo by Hannah O'Mahoney).



Picture 20: Artisanal fishing with gill nets near the beach is a danger to sea turtles moving in the area and attempting to nest, as well as to hatchlings entering the sea (photo by Aris Gkintidis).



Picture 21: Marine debris, commonly plastic waste, is widespread on the beaches of Southern Kyparissia Bay.



Picture 22: A new platform on the beach of Kalo Nero appeared in May 2011.

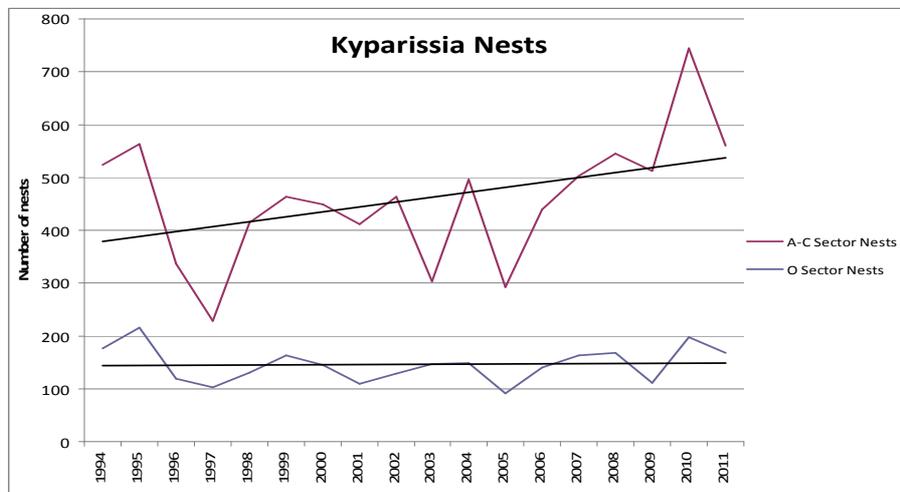


Picture 23: Legal action by the Coast Guard, the Police, the Public Land authority, and the Planning authority had no effect. Despite having no legal basis, the platform was complete and operational by July 2011.

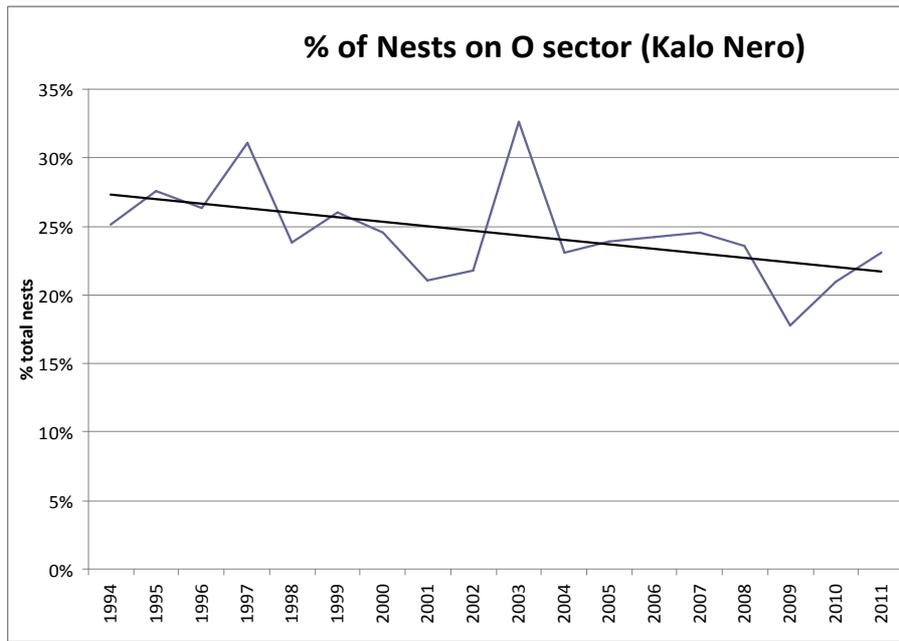


Picture 24: The end of all illegal roads is used as parking areas which causes further flattening of the dunes.

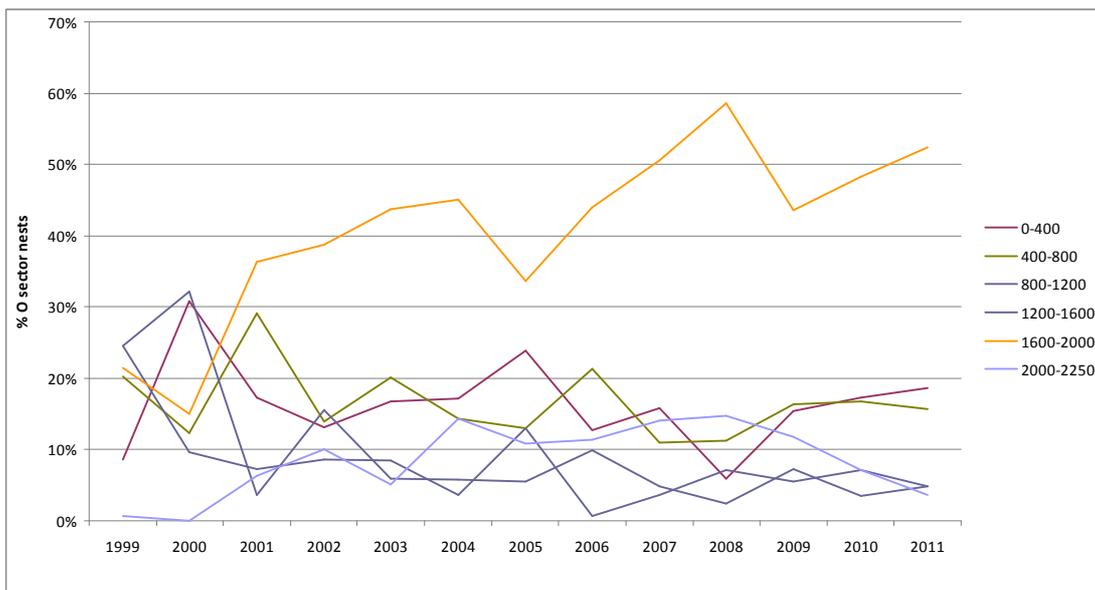
9. GRAPHS



Graph 1. Evolution of nesting in sectors A-C and O showing trend lines over the years 1994-2011.



Graph 2. Percentage of nests in O Sector in comparison to total nests in core area, showing a declining trend over the years 1994-2011.



Graph 3. Percentage of nests over specific locations in O Sector (Kalo Nero). The orange line shows that a 400m beach section (between 1600 & 2000m from the start of the beach) without beach-bars now has a significantly increased proportion of nests. Prior to the existence of these bars, nest locations were fairly uniformly spread, whereas now almost half of the nests at Kalo Nero beach are in this quiet area - one of the few quiet areas remaining in the village.