

ARCHELON, the Sea Turtle Protection Society of Greece



Conservation efforts during 2015 at the nesting habitat of *Caretta caretta* in Laganas Bay, Zakynthos, Greece

Short report submitted to
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Prologue

This short report, a follow up to the previous reports submitted annually, presents the major events concerning sea turtle conservation on Zakynthos Island, Greece, during the last year. Specifically, this report presents the ARCHELON's field project and the work of the Management Agency (MA) of the National Marine Park of Zakynthos (NMPZ), as well as the actual situation at the nesting beaches and the protected marine area during the nesting season 2015, as recorded through the field project of ARCHELON.

1. Background

1.1. Location and the Park's creation

Laganas Bay, at the southern part of Zakynthos Island, in the Ionian Sea, hosts one of the largest reproductive habitats of the loggerhead sea turtle (*Caretta caretta*) in the Mediterranean Sea. The average number of nests in Laganas Bay accounts for about 17% of the total documented nesting effort of loggerheads in the Mediterranean. The nesting habitat of Laganas Bay consists of a terrestrial part comprised of six distinct nesting beaches (Marathonissi, East Laganas, Kalamaki, Sekania, Daphni, Gerakas), of total length 5.5km, and a marine part comprising of the entire Bay, of total area 51,363sqkm. Map of the region is shown in Illustrations 1 and 2.

Due to the significance of Laganas Bay as a nesting habitat, and the pressures it faces from mass tourism and development, the Greek State has attempted, since 1984, to protect it through various legislative acts. However, these were not endorsed by part of the local community and were generally poorly enforced. Following substantial pressure from domestic and international NGOs, the Council of Europe (Bern Convention) and the European Commission and after several years of deliberations, the NMPZ was eventually established in December 1999 and its MA was set up in July 2000. The relevant Presidential Decree (PD) includes a zonation scheme with varying regulations on land and at sea.

1.2. The long-term field project of ARCHELON

ARCHELON has been systematically monitoring the Bay's nesting beaches since 1984 and records annually nesting levels and associated data. ARCHELON's standardized monitoring project in Laganas Bay is the oldest in the Mediterranean and one of the oldest in the world. As a result, Laganas Bay is used by the Red List Task Force of IUCN's Marine Turtle Specialist Group (MTSG) as an "index" area for the assessment of long-term population trends for the endangered Loggerhead Turtle in the Mediterranean.

The long-term project of ARCHELON, carried out yearly from mid-May through mid-October, involves monitoring of the nesting population, protection of endangered nests against inundation and trampling, protection of hatchlings, as well as recording of turtle strandings and transportation of injured turtles to ARCHELON's Rescue Centre in Glyfada. In addition, it includes an extensive public awareness programme to inform visitors and residents. The project receives substantial labour assistance from a contingent of international volunteers who are organized, trained and supervised by ARCHELON.

ARCHELON collaborates with the MA of the NMPZ since the Agency's formation, and this consists mainly of ARCHELON continuing its monitoring and public awareness work, following mutually agreed upon methodologies, and reporting to the MA violations of regulations on land and at sea. All collected data are given to the Agency for its management needs. It must be noted that ARCHELON, WWF-Greece and MOm (Society for the Study and Protection of Monk Seals) participate with one joint seat on the 11-member Board of the MA.

Due to the financial crisis in Greece the Greek government has reduced the funding of the NMPZ since 2010. Although this created a difficult situation for the operation of the MA, ARCHELON's presence and the ongoing good cooperation between the two bodies could –to some extent– reduce the negative effect of this difficult situation on the nesting beaches.

2. The Work of ARCHELON during 2015

2.1. Monitoring of nesting beaches

In 2015 the project's field station was set up in Kalamaki on 15 May, with fieldwork commencing on 17 May and terminating on 10 October. After this date, the NMPZ wardens continued monitoring the few incubating nests and performed the needed post-hatch excavations. Daily monitoring of the six nesting beaches started on 17 May at East Laganas, Gerakas and Dafni, on 18 May at Sekania, on 22 May at Kalamaki and on 31 May at Marathonissi. As in previous seasons, nests laid in vulnerable sites were protected either *in situ* by placing wooden cages over the nest or by relocating the nest to a safer location. Hatching nests with the potential to be affected by light pollution were shaded in order to reduce or eliminate hatchling disorientation.

On all six monitored nesting beaches of the Bay a total of 4,205 turtle emergences were recorded of which 1,083 were assessed as nests. Although this nest count is close to the annual average of 1,182 nests derived from the period 1984-2014, statistical examination of the annual nest numbers over the last 22 years (1994-2015) shows a significant decline. The noted decline in nesting levels can be considered as caused by a combination of factors, like the long-standing and continuing disturbances and pressures on certain nesting beaches and at the marine area, at both the inter-nesting habitat and/or in the foraging areas.

2.2. Turtle strandings

From the beginning of 2015 and until the ARCHELON field project inception, the MA staff recorded 12 strandings in Zakynthos. Of those, 10 were dead and 2 were injured, which were transported to the ARCHELON Rescue Centre.

During the operation of the ARCHELON field project, 21 strandings were recorded from 15 May until 15 October. 17 turtles were dead while 4 were injured and transported to the ARCHELON Rescue Centre. Of these 4 turtles, 3 were successfully treated and released back to the wild.

2.3. Public awareness

The public awareness (PA) programme of ARCHELON started on 17 May and ended on 13 October. Through this programme residents and visitors are informed about the dangers turtles face and how they can use the beaches and the marine area without disturbing turtles or nests. The PA programme is conducted mainly through seasonal information stations, presentations in hotels and tour boats, live information to beach users and whilst present of Turtle Spotting Boats (see Section 2.5). Specifically, ARCHELON carried out 284 slide show presentations in tourist facilities, 163 presentations on all-day and half-day boat trips and volunteers were present on 72 Turtle-Spotting boat trips. ARCHELON project members were regularly informing beach visitors during beach monitoring duties. Additionally, during 2015 ARCHELON operated four seasonal Information Stations at the central square of Zakynthos town (72 days), at the Crystal Beach Hotel by Kalamaki beach (140 days), at the central road of Kalamaki village (57 days) and at the Zakynthos airport (101 days).

As a result of the PA programme, a total of 46,523 residents and visitors were informed.

2.4. Beach cleaning activities

At the beginning of 2015 nesting season ARCHELON volunteers, together with NMPZ wardens, conducted beach clean ups on every beach (18 May on Gerakas, 19 May on Daphni, 20 of May on Marathonissi, 21 May on Sekania, 22 May on Kalamaki and 23 and 24 May on East Laganas). Thereafter, beach cleanings were continued regularly by NMPZ wardens and ARCHELON volunteers as part of ARCHELON's PA programme.

2.5. Monitoring of the protected marine area

In 2015, ARCHELON carried out systematic monitoring of the NMPZ protected marine area from 6 June until 13 October in order to estimate the situation in the marine area and the possible harassment of sea turtles. This report includes data up to 31 August (see 4.2).

ARCHELON volunteers attended NMPZ-endorsed turtle-spotting boat tours¹, as well as eco-touristic sea tours², as independent on-board observers and also as part of the ARCHELON's PA programme. During these boat trips the ARCHELON personnel recorded: (a) Violations of legislation for the protected marine area (see 4.2.1), (b) non-compliance with the Turtle-Spotting Code of Conduct (see 4.2.2 and Appendix 2), (c) geographic co-ordinates of turtle observations, (d) number and categories of vessels taking part in turtle observations and (e) behaviour of sea turtles during observation.

A GIS analysis was conducted to examine the use of the Turtle-Spotting Zone³ (the location and boundaries of the Turtle-Spotting Zone are shown in Illustration 3, while the results of the analysis are shown in Illustrations 4 and 5). In addition to boat-based observation, land-based surveillance of the protected marine area was carried out from a fixed point on West Laganas beach (N: 37.72798, E: 020.87378) (Illustration 5).

As in previous years, ARCHELON personnel would report to the NMPZ major incidents and problems frequently observed.

ARCHELON also collected information regarding turtle-spotting tour operators. At the sales offices of 10 tour operators in the tourist villages Kalamaki, Laganas, Agios Sostis, Alykes and Tsilivi, ARCHELON enquired about tour booking. The information collected included tour schedules, ticket prices, the boat size (carrying capacity) and details given about sea turtles, the NMPZ and the Turtle-Spotting Code of Conduct. The purpose was to quantify the turtle-spotting operation (see 4.2.2), as well as to assess the level of knowledge and awareness, and the quality of the information given to customers.

3. The Work of the Management Agency during 2015

The financial and political instability in Greece during 2015 exacerbated the inconsistent funding of the MA and hindered the plans of the body for adequate protection of the habitat. The lack of funding led to severe operational problems of the MA and resulted in inadequate

¹ Badge of Special Associate Endorsed by the NMPZ MA: “**Observation of the Sea Turtle in the Area of the NMPZ**” (in this report referred to as “endorsed turtle spotting boats”) – Professionals who bear this badge are considered associates of the MA and are exclusively involved with sea turtle observation in Laganas Bay.

² Badge of Special Associate Endorsed by the NMPZ MA: “**Eco-tourist Sea Tour in the area of the NMPZ**” – Professionals who bear this badge are considered associates of the MA and are exclusively involved with sea tours lasting between 3 and 6 hours. Their main task is to inform/educate visitors about the natural environment and sea turtle biology.

³ In 2006, a “**Turtle-Spotting Zone**” was introduced by the MA. This zone hosting a high density of turtles, as it is an important habitat during their pre- and inter-nesting periods, is exclusive to “endorsed turtle-spotting boats”.

enforcement of the existing restrictions and therefore degradation of the habitat and harassment of sea turtles.

Wardening is crucial for the protection of the nesting beaches as well as of the protected marine area in this mass tourism area. In order to achieve an effective 24-hour wardening of all nesting beaches and the marine area, seasonal wardens (under a 6-month contract) need to be employed in addition to the permanent ones, to cover the needs during the touristic season. Unfortunately in 2015 no seasonal wardens were employed due to funding cutbacks, leaving the task of all wardening to the 19 permanent ones. It must be noted that there are 9 wardening posts on the nesting beaches, which need to be covered 24 hours, while in the peak hours of the day 2 people are needed at most of these posts. As a result, throughout the season there was a very limited amount of wardening carried out during the night. For instance on Kalamaki beach and the eastern side of East Laganas beach no wardens were present day or night throughout the whole season, although these 2 nesting beaches are directly bordering touristic villages and therefore people visiting the beach at night frequently occurs. Where wardens were present there was only one at each station, meaning that patrols of the beach were not possible and so members of the public could enter the beach at a number of locations undetected. This lack of wardening resulted in high number of violations recorded throughout the season. These include vehicles, on the beaches at night, people at the back of the beach, horses and dogs on the beach. The number of the marine area wardens was also very limited (1 warden from Monday to Thursday and 2 wardens from Friday to Sunday) and could not cover protection of the entire marine area (51,363sqkm) with only 1 boat and all the marine transportations needed for the management role of the MA (e.g. assessing violations of marine regulations, safeguarding of turtle spotting activity, transporting beach wardens to and from Marathonissi, setting and checking of buoys, picking up garbage after beach cleaning of Sekania and Marathonissi, collecting floating turtle carcasses).

In order to deal with this problematic situation and as result of the close collaboration between the MA and ARCHELON, the ARCHELON project members made efforts to compensate for the lack of wardening by increased night-patrols as well as at extended hours at information stations near the nesting beaches. However, the work of ARCHELON's volunteers can not in any way replace the presence of NMPZ wardens who are authorized to enforce regulations and to monitor commercial activities, such as rental of beach furniture, turtle spotting or horse-riding.

4. Conservation Status of the Reproductive Habitat during 2015

4.1. The terrestrial habitat

4.1.1. Anthropogenic disturbances on nesting beaches during 2015

This section focuses on the anthropogenic disturbances that resulted in direct and indirect damage to sea turtles (adults and hatchlings), their nests, and the nesting habitat in Laganas Bay during the 2015 nesting season, as these disturbances were experienced through the standard fieldwork of ARCHELON. A brief description of the nesting beaches is given in Appendix 1.

Beach use and beach furniture

Based on the recent Joint Ministerial Decision (FEK 578/09.04.2015 as amended by FEK 828/12.05.2015) prescribing beach use, Municipalities can lease portions of the beach to leisure related businesses. Both the public availability and the protection of the environment must be maintained, with the local Municipalities and the competent Public Land Authority responsible to ensure guidelines are followed. Moreover, in the case of protected areas, the assent of the Minister of Environment is required in order for the special terms of the leasing

to be clarified. This assent is a precondition for the permission from the Municipality. According to it (Decision of the Deputy Minister of Environment of June 2015, Beach Management Measures, Ref. No. 22272/985/29.06.2015), 15 different locations of beach furniture businesses were permitted in Gerakas (1 location), Kalamaki (3 locations) and East Laganas (11 locations), provided that the regulations of the PD (e.g. precise number of beach furniture, removal from the nesting beach at sundown) would be enforced. Moreover the assent foresaw that the NMPZ was competent for the implementation of the management measures regarding beach furniture on the nesting beaches, through a special contract that should be signed between the Municipality of Zakynthos and the MA.

Unfortunately, during the 2015 nesting season, the terms of the PD and the assent were not enforced by the competent authorities and the MA. Specifically, the foreseen maximum numbers and density of beach furniture, as well as the distances from the water front were not implemented (Photos 1, 2) while the removal of beach furniture at sundown was implemented either not at all or incorrectly (Photo 3). Throughout the season, ARCHELON recorded 29,599 violations regarding the removal of sunbeds (either fully left out overnight or folded on their side) in Gerakas, Kalamaki and East Laganas.

It is noteworthy that until 2013 the Municipality of Zakynthos was delegating, albeit unofficially, to the NMPZ the complete management of the beach furniture businesses on the nesting beaches, while this jurisdiction was passed to the Municipality since 2014. This move played a key role in the non implementation of the management measures regarding beach furniture, as also during 2014 almost all rental operators did not remove the beach furniture at night. This move had a negative impact on sea turtle nesting and shows a paramount lack of understanding of the authorities in fulfilling their obligations towards the national environmental legislation and the associated EC guidelines.

Pedalos and boats

As foreseen in the licenses for operation non-motor boats (pedalos and canoes) in zone B, the operators are supposed to moor these in the water or to remove them from the beach during night hours. However, most nights, pedalos were recorded to be stored on the beachfront, blocking the access for turtles. The beach of Kalamaki and the eastern part of East Laganas beach face serious problems with pedalos and canoes, which cover the beach 24 hours a day (Photo 4). This fact makes those part of the beaches non accessible for turtles and can cause them to abandon nesting attempts.

Light pollution

The westernmost part of East Laganas beach, bordering Laganas village, suffers from light pollution from nearby hotels and streetlights. In previous years the lights of Zante Beach Hotel caused hatchling disorientation. Since 2014, however, the light situation is greatly improved with remaining problems only near the bar area of the hotel and in 2015 no hatchling disorientation was recorded in this part of the beach due to the effective nest shading. Nevertheless, hatchling disorientation was consistently noted around the middle of this beach, possibly attributed to the airport of Zakynthos. It is remarkable that although the airport is supposed to be closed during the night, in order to eliminate disturbances to turtle nesting, during 2015 a number of 123 flights was reported after 10 p.m. for the period from 29 May to 2 October. In this area ARCHELON procedures for nest shading are difficult to apply due to the wavy dune system in the back.

Human presence on the nesting beaches at night

According to the PD, human presence is not permitted on the nesting beaches from sundown to 7 a.m. of the next day. Unfortunately, during 2015 the lack of wardening (see Section 3),

combined with the mass tourism, resulted in a high number of violations regarding human presence (Photo 5). A total of 2,694 violations were recorded by ARCHELON, with the majority of those being recorded on the beaches of Kalamaki and East Laganas.

Beach users

A measure applied to protect incubating nests from trampling, accidental shading and damage from umbrellas, is to ask beach visitors to remain close to the shoreline and to avoid the nesting area in the hind part of beach. To ensure this measure can be applied effectively, the enabling PD dictates restrictions regarding the maximum number of visitors in the nesting beaches of Marathonissi, Daphni and Gerakas. Specifically it is stated that people are only allowed to visit Marathonissi through organized tour boats and up to specific numbers, following approval by the MA. The maximum number of visitors in Daphni should not exceed 100 people at any time, while in Gerakas the limit is 350 people at any time. These provisions of the PD were not implemented during 2015 and previous years. The highest number of people visits Marathonissi by privately hired boats without any approval. Both in Gerakas and Daphni the number of visitors are in great excess of the limits. In all cases the high number of beach users may even endanger incubating nests by trampling. During 2015 though, the MA of the NMPZ tried to reduce this problem, which was increased by the lack of wardening, by placing a rope along the beach (Photos 6, 7). In this way the beach users were prevented to go behind the front 5m-zone. This measure was successfully implemented in Gerakas and Marathonissi, as well as in front of Zante Beach Hotel in East Laganas, but not in Daphni.

Vehicles

During the entire 2015 nesting season a large number of 4x4 vehicle tracks and quad bikes were observed on the beach. In total 162 vehicles were recorded mainly on the beaches of East Laganas and Kalamaki. The vibrations of the vehicles can cause damage to turtle eggs since they may detach the embryos and potentially cause hatchlings to emerge prematurely. Emerged hatchlings can be trapped within car ruts for hundreds of meters before they can exit them or die of exhaustion, dehydration or predation. Moreover vehicles moving on the beach cause damage to the sand dune vegetation (Photos 8, 9). In previous seasons wooden pillars were placed by the MA, every 1m, along the back of East Laganas beach to discourage access to the beach by vehicles coming from the sand dune area. Most of these pillars have been either destroyed or removed (Photo 10).

Horses and dogs

The lack of wardening (see Section 3) resulted in high numbers of violations concerning the presence of animals on the nesting beaches. The problem was located mainly on the beaches of East Laganas and Kalamaki, where a total of 633 dog appearances were recorded on the beach. Moreover 94 cases of horse-riding along the beach and in the dunes were recorded in East Laganas. In Kalamaki village it was advertised during the entire season that horse-riding businesses were providing rides on the beach (Photos 11, 12).

Illegal constructions at Daphni beach

As already mentioned, Daphni beach has been subject to many illegal activities such as building and road construction, flattening of dunes, sand removal, planting of non-native vegetation. Following recommendations by the Council of Europe, the removal of illegal buildings at Daphni has been an obligation of the Greek government since 1987, when only two buildings existed (Recommendation No. 9, Bern Convention). Although the illegal buildings have been increased (during the 2015 nesting season there have been operating six illegal businesses), no action for their removal has been taken even though demolition

protocols have been issued by the competent authorities (Photos 13, 14).

It is reminded that landowners in Daphni, supported by the local community, never accepted NMPZ wardens and regulations before 2006. In 2006 the MA came to a compromise with them, which led to several changes on the beach and the area behind. In comparison to previous seasons (before 2006), the overall situation in the period 2006-2010 generally provided better conditions for turtles on the beach by applying some control over the number of visitors and reducing other disturbances (lights, noise, etc.). Nevertheless, the actions of the MA did not stem from an integrated management plan.

Since 2011 the situation at Daphni became again out of control. With wardening greatly reduced most of the illegal buildings and businesses were increased in size, the sand dunes and the areas around the buildings were planted with grass, and showers were added with their water ending in small pools on the beach. Two illegal roads were flattened for easy access to the beach and a wide car-park for the nearby tavernas was constructed by cutting and flattening a hill behind the beach, with the eroded clay being deposited on the beach sand. Further, a transfer of pebbles from the western part of the beach to the sand dunes of the eastern part destroyed substantially a sandy part of the beach that was suitable for nesting. Since 2013 a new line of sunbeds is set in a previously suitable nesting area. During 2014 nesting season a large number of incidents with human footprints over turtle tracks provided clear evidence that people were visiting the beach at night, while in the internet it was advertised that some Daphni businesses were providing turtle watching during the night. Unfortunately the situation indicated little improvement during 2015, as the wardening was very limited (only one warden from 10 a.m. to 6 p.m. and from 8 p.m. to 4 a.m.).

Plans for development in the dunes of East Laganas

Since 2014 a new serious issue has been raised concerning the East Laganas sand dune system. Land owners are requesting the set of beach furniture businesses in the back of the beach claiming a different interpretation of the PD that allows the touristic use of the dune system, thus setting the protection of it in doubt. The implementation of those plans will cause a serious degradation of the extensive sand dunes behind the nesting beach.

Recent illegal actions

In December 2015 the wardens of the MA found that a new illegal road was constructed within the boundaries of the NMPZ and partly within the NATURA 2000 site. The new road, about 3m wide and 1km long, was constructed in the area between Gerakas and Daphni (zone Φ1: protected landscape) and provides access to a small narrow beach next to Gerakas not used by turtles for nesting (Photo 15). 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. Moreover, according to the restrictions of the PD, the construction of new roads is not permitted in the NMPZ, unless this is absolutely necessary for the access to properties and with the prior approval of the MA. In this case neither was any Environmental Impact Assessment submitted or approved, nor the permission of the MA was given.

4.1.2. The landfill site

Within the boundaries of the NMPZ (behind Vrodonero beach, between Kalamaki and Sekania) exists an overused but still active landfill site, which is a permanent toxic pollution threat to both the nesting beaches and the marine area (Photos 16, 17). Its existence constitutes one of the oldest and most serious problems that the habitat faces. Specifically, in 2010 the report of an official investigation, ordered by the Ministry of the Environment, concluded that the landfill site is totally over its capacity, rubbish is over floating, plastic

bags and light items are blown away, liquids from the landfill site reach the sea with eutrophication noted at Vrodonero beach, and heavy metal and toxic pollution threatening Laganas Bay. Further, the investigation report stated that the landfill site is a serious threat for public health and that the supporting wall is not stable anymore. Since January 2012, the European Commission warned Greece of the landfill site⁴ and, after an in situ investigation in July 2012, decided in September 2012 to send Greece to the European Court of Justice⁵. Although the European Court of Justice has fined Greece, the landfill site is still active, causing the opposition of the NGOs and the MA to the delay of the removal of the landfill site and the reaction of the local community⁶. Actions have already been made from the competent authorities (Municipality, Prefecture, Ministry of Environment) to set a new location outside the NMPZ, but it is expected that a long time will pass until such a change will be implemented.

Apart from the fact that the landfill site is a serious toxic threat, it has a negative impact for the sea turtles also in a different way. The landfill site attracts sea gulls, which in turn predate on hatchlings, particularly at Sekania. Due to its remoteness and the high level of hatchling production Sekania beach is particularly susceptible to hatchling predation by sea gulls. After a specific study for marine birds, conducted by the Hellenic Ornithological Society in collaboration with the NMPZ, it was found that Sekania is an important breeding area for yellow-legged gulls (*Larus michahellis*) and Mediterranean shags (*Phalacrocorax aristotelis desmarestii*). Yellow-legged gulls, which predate on hatchlings, seem to feed regularly at the nearby landfill site as well. Since 2012 the number of sea gulls seems to increase mainly due to continuation of the use of the overflowing landfill site, where no burial of the waste is taking place anymore, and the birds have a regular food supply.

4.2. The marine area

4.2.1. Violations of the maritime legislation

The protection status and permitted activities in the protected marine area of Laganas Bay are defined by the PD, Article 4. This area is a Nature Protection Site (Zone Ia) and includes three zones (A, B and Γ) regulating maritime traffic and fishing annually from 1 May to 31 October (Illustration 2).

During 2015 (6 June – 31 August), 1,350 violations of legislation were recorded in the marine area, of which 1,319 incidents were boats breaching the speed limit of 6 knots. 65% of speeding violations were by privately operated (usually hired) boats. In 2015, 184 motorboats were available for rental in the Bay of Laganas. It should be noted that tourists hiring these boats are not required to have a driving license if the boat engine is less than 25 HP, which is usually the case. These tourists are largely unaware of maritime regulations, including knowledge of zone boundaries. Rental operators are not legally obliged to provide this information to their customers. In 2015, a higher rate of speeding violations by tour boats

⁴ http://europa.eu/rapid/press-release_IP-12-66_en.htm

⁵ <http://europa.eu/rapid/pressReleasesAction.do?reference=IP/12/1023&format=HTML&aged=0&language=EN&guiLanguage=en>

⁶ Indicative articles about the reaction within the local community are available in Greek at <http://www.zantepress24.gr/index.php/pages/zante/13843-o-dimarxos-zakynthou-gia-to-kleisimo-tou-xyta-mia-omada-me-epikefalis-ton-anastasio-tzimi-kleidosan-to-portoni-eisodou-ston-skopo> , <http://www.zantepress24.gr/index.php/pages/zante/13863-xristoygenna-me-skoupidia-stous-dromous-ekane-i-zakynthos> & <http://imerazante.gr/2015/12/31/113318>

was recorded compared with previous years (20% in 2013 and 2014; 35% in 2015). In the case of boats entering zone A, 25 incidents were recorded. Of these, seven boats were recorded to have reached Sekania beach. Moreover, 6 incidents of motorized water-sports (jet-skis, banana boats) were recorded in 2015.

Maritime regulations are supposed to be enforced by the combined efforts of the NMPZ and the Coast Guard. According to information from the MA, from middle of July joint patrolling was conducted 2-3 times per week. However, as a result of insufficient funding and staff, one NMPZ marine warden patrolled the marine area between the hours of 10:00 and 18:00. In addition to the supervision of the boating activity, the marine warden is also needed for various other tasks, e.g. patrolling of the far boundaries of the NMPZ Marine Area (Keri Cape and Gerakas Cape), hotspots for illegal spear-gun fishing. Therefore, in many cases, the marine surveillance could not react in time when informed by ARCHELON about violations. The core-zone of turtle-spotting activity as well as hot-spots for speeding violations (Laganas to Marathonissi and Keri to Marathonissi) could only be safeguarded by the authorities for approximately 3-5 hours/day.

4.2.2. Lack of legal framework and uncontrolled growth of the turtle-spotting activity

Currently, management measures for the turtle-spotting activity are not supported by legislation and, therefore, not enforced. As per PD, Article 7, a set of special regulations about operation and management of the NMPZ (commonly referred to as a “Management Plan”) should be issued. Article 7, paragraph 2 refers particularly to activities in the Marine Area that will be specified in a Management Plan (MP). However, a valid MP for the NMPZ does not exist. The delineation as well as regulations regarding the Turtle-Spotting Zone needs to be included in such a MP (NMPZ 2014 Annual Management Measures).

As a result, the Turtle-Spotting Zone is not delineated in any way and any boat can currently enter this zone without consequence. In 60% of turtle observations, that ARCHELON recorded within the Turtle-Spotting Zone, boats larger than the recommended carrying capacity of 25 passengers were present (Photos 18, 19). In addition to these large non-endorsed boats, also small non-endorsed boats are regularly present in this Zone.

The non-endorsed boats seem to have little regard for the Turtle-Spotting Code of Conduct (see Appendix 2). The Code of Conduct has been designed to minimize disturbances of turtles during observation. It was designed as a voluntary set of guidelines and compliance with these was incentivized by endorsement of operators and the exclusive use of the Turtle-Spotting Zone. It regulates (a) approach distance, (b) approach angle, (c) maximum number of boats that can be present in an observation / queuing distance for boats waiting to enter the observation, (d) maximum duration of observation, (e) obligation to terminate the observation when the turtle seems disturbed or tries to escape, and (f) the ban of disturbing or noisy behavior. ARCHELON on-board observers recorded 1,877 violations of the Turtle-Spotting Code of Conduct in the protected Marine Area during 363 turtle observations (Photos 20, 21, 22). In 82% of observations, at least one boat observed breaching the Code of Conduct.

Relevant authorities (e.g. NMPZ MA, Coast Guard), bound by the lack of legislation regarding turtle-spotting, are unable to intervene in this problematic situation. Even though the MA, already in 2010, called attention to “the need to examine alternative solutions that would minimize the consequences of this uncontrolled situation” (NMPZ 2010 Annual Management Measures, p. 60), legislation has not been updated.

Non-enforcement of protection measures, particularly of the Turtle-Spotting Zone and the Code of Conduct, has resulted in rapid and uncontrolled growth of boating in recent years. New vessels (rented boats as well as tour boats) were licensed by the Coast Guard almost

every year -without consultation of the NMPZ MA- to operate in the NMPZ waters. As a result the number of boats for passenger transport increased by 300% within the past 10 years. In addition to the growing competition amongst marine excursion operators, the increasing number of hired boats is fuelling the escalation of turtle-spotting activity. Monitoring efforts indicate that 31% of vessels taking part in turtle observations were privately operated (23% motorboats, 8% non-motorized vessels, i.e. pedalos or canoes). In 2015, 304 vessels were available for rent within the NMPZ area while a total of 364 vessels (Coast Guard of Zakynthos, Ref. No. 2141.6/2900/26-8-2015) were available to take part in turtle-spotting, which concentrates in an area of about 7kmx1.2km (Illustration 3).

No longer is turtle-spotting in Zakynthos a small-scale sustainable operation, but a large-scale industry, carrying out more than 4,500 trips per season and generating an annual revenue of over 1.5 million EUR (result of calculations based on information obtained from operators as well as data collected during 2015).

4.2.3. Lack of support for endorsed operators and inadequate information for visitors

The lack of enforcement of protection measures that were mutually agreed between the endorsed boat drivers and the MA, has led to frustration amongst endorsed operators. Those who agreed to follow the guidelines, are now facing major disadvantages in this competitive market. The endorsement label (“endorsed by the NMPZ for Turtle-Spotting”) is poorly advertised and very few tourists are aware that it exists. Additionally this label was recorded as being used by at least three non-endorsed boats. Many of the endorsed turtle-spotting boat owners are now replacing original smaller vessels with larger models (Photos 18, 19). In 2015, none of the NMPZ' collaborators in the framework of the endorsement of turtle-spotting activity has renewed their annual agreement (as per information by the NMPZ). This is due to the fact that the endorsement scheme is currently not deemed to be lucrative, without the expected strict enforcement and support by the NMPZ MA and the Coast Guard. Raising environmental awareness should be the objective in wildlife-watching operations, which are carried out in a National Park. The NMPZ management framework for marine excursions within the NMPZ contains the obligation for endorsed operators to inform customers about the main characteristics of the NMPZ, the protection status, the protected species as well as the special zones of protection. If possible, the partner has to accept the presence of ARCHELON volunteers on-board to ensure the best public awareness opportunity for their customers. Additionally, boat drivers are obliged to take part in annual workshops organized by the NMPZ. However, awareness and knowledge about regulations and sea turtle conservation amongst the non-endorsed operators are generally low and the information given to customers is often incorrect. Only a few operators demonstrate good knowledge about guidelines, sea turtles and the NMPZ. On the other hand visitors of the island are generally interested in sea turtle conservation efforts and support a sustainable use of the area. Almost every day, visitors express their concern to ARCHELON about the conduct and multitude of boats operating in the NMPZ.

The turtle-spotting operation has reached the critical point at which plans to establish a sustainable turtle-spotting operation within the NMPZ are about to fail.

5. Conclusions and Recommendations

5.1. For the terrestrial habitat

The PD of the NMPZ includes zonation with varying general regulations on land. However, the more specific conservation and management measures were to be included in the - foreseen by the PD Management Plan, which regrettably was never drafted. Consequently the majority of management requirements are not yet legally demarcated and vital conservation

issues remain unresolved for more than 15 years since the Park's establishment. This legal deficiency compounded with inconsistent funding of the MA -recently exacerbated by the financial crisis in Greece- result in inadequate enforcement of the existing restrictions which lead to further degradation of the habitat.

Recommendations:

- The elaboration of a Management Plan, which would include all the specific conservation measures, should be urgently resumed.
- In regard to the beach furniture allocation, the authority should be returned to the MA. It is urgent and vital for the successful management of the area that the government passes this responsibility to the MA because beach furniture numbers, their exact locations and their rental operator's obligation for removal at night are directly impacting nesting and hatching procedures.
- A full 24-hour wardening is absolutely essential to guarantee sufficient protection not only in the nesting beaches but also in the whole area of the NMPZ. The adequate presence of well trained wardens would minimize violations such the human presence on the nesting beaches during night hours, the presence of vehicles, horses and dogs as well as other illegal activities (e.g. road construction) within the boundaries of the NMPZ.
- A permanent and sustainable solution for Daphni beach needs to be found and agreed upon both by the MA and the locals currently residing on the beach. Action should be urgently taken to prevent any further developments and to return the beach as much as possible to its natural state.
- The MA should become strict on the number of visitors foreseen by the PD for the beaches of Marathonissi, Daphni and Gerakas in order to ensure that the carrying capacity is not over passed.
- Further studies should be carried out to minimize light and noise pollution at all nesting beach of the Bay, especially on the East Laganas beach. As stated by the PD, no light sources should be visible directly from the beach and from the sea with a distance of 1 nautical mile from the beach.
- The problematic sanitary landfill should be removed from the NMPZ area as soon as possible. A long term waste management strategy meeting the waste production of this mass tourism destination, needs to be developed, other than just relocating this problem to another part of the island.

5.2. For the marine area

The results of marine area monitoring in 2015 highlight the urgent need to update legislation and to implement a specific management framework for the turtle-spotting activity in the NMPZ. If effectively managed, turtle-spotting in Zakynthos could have the potential to become a best-practice example on how to encompass the conservation of endangered species, alongside environmental awareness, in a mass tourism destination.

However, currently, the turtle-spotting operation does not at all follow sustainable principles and social and ecological matters are dominated by economic interests of a large-scale industry. This is unacceptable within the boundaries of a National Park and within the most important reproduction habitat of an endangered species that, according to European legislation, is in need of strict protection.

Recommendations:

- Legal coverage of the Turtle-Spotting Zone and Code of Conduct. The lack of a specific legal framework (valid Management Plan) for the turtle-spotting activity is the main cause for conservation problems within the NMPZ marine area.

- Adaptation of vessel licensing by the Coast Guard to conservation requirements (the Coast Guard should consult with the MA before issuing new licenses) and determination of a maximum carrying capacity regarding vessel operation (for marine excursions and hire boats) in the NMPZ marine area. In addition to this, technical requirements for boats need to be defined (such as size, noise level of the engine, propeller type).
- Continuous targeted wardening in the core zone of turtle-spotting activity. Targeted daily wardening, supported by the local Coast Guard, should be carried out specifically in the core zone of the turtle-spotting activity and hot-spots of speeding violations.
- An independent survey should be conducted, in order to clarify the expectations and desired experiences of marine park visitors regarding turtle-spotting trips. Knowledge gained from such a survey would act to provide a basis for discussion with tour operators regarding conservation management measures.
- Enhancing information and awareness of visitors regarding sustainable wildlife-watching.
- Enhancing support to the endorsed by the NMPZ Turtle-Spotting operators.

References

- ARCHELON, The Sea Turtle Protection Society of Greece. 2005: Short Report on Sea Turtle Conservation on Zakynthos Island, Greece, during 2005
- National Marine Park of Zakynthos (NMPZ), 2010: Annual Management Measures [in Greek]
- National Marine Park of Zakynthos (NMPZ), 2014: Annual Management Measures [in Greek]

Appendices

Appendix 1: Brief description of the nesting beaches

Marathonissi (zone A2: Nature Protection Site, maritime zone B)

Marathonissi is a small island within the Bay and its nesting beach is characterized by relatively low sand temperatures due to its northern orientation and whitish colour. Low temperatures in Marathonissi produce predominantly male hatchlings and this makes this short beach an extremely important one at regional level, bearing in mind that most other beaches in Zakynthos and elsewhere in the Mediterranean produce mainly female hatchlings. Worldwide, the value of male-producing beaches is enhanced by global warming. The beach is a popular destination for day-visitors who arrive by boat from several locations in the Bay. Over the last years, nest numbers on Marathonissi have been much lower than the decade before (average 68 nests/year in the period 2005-2014 in contrast to 137 nests/year in 1995-2004). As this small island is highly significant for the survival of sea turtles in the Mediterranean level, the reasons for the reduction of the nesting activity have to be urgently studied, taking into account disturbances on the beach as well as in the marine area.

East Laganas (zone II3: Nature Protection Site, maritime zone B)

This beach, partially backed by an extensive sand dune field, stretches for about 2.7 km at the northernmost part of the Bay. A limited number of businesses (hotels and tavernas), which were built before the establishment of the NMPZ, is found along the back of the beach (e.g. taverna Stani at the easternmost part, Kalamaki Beach Hotel taverna at the centre, Zante Beach Hotel at the westernmost part). These businesses and some additional operators rent out the beach furniture, pedalos and canoes located on the beach. Moreover, along the beach there are four NMPZ warden posts (at Stani taverna, Pastra, next to Kalamaki Beach Hotel taverna and at Zante Beach Hotel). At about 2km behind the beach is found the international airport of the island, which is supposed to remain closed at night hours for the period from May to October in order to prevent substantial light and noise pollution (the nesting beach is in the flight path), besides the glow from the airport safety lights seen from the beach. In previous seasons wooden pillars were placed by the MA every 1m along the back of the beach to discourage access to the beach by vehicles and riding horses from the sand dune area. Most of these pillars have been either destroyed or removed. Wooden pillars were placed for the same reason at the western entrance, which separates the protected beach from West Laganas, namely the part of the beach which is in front of Laganas village and is no longer used by turtles for nesting due to intense tourist development and overuse.

Kalamaki (zone II3: Nature Protection Site, maritime zone B)

Kalamaki is a 600m long beach, located east of the East Laganas beach at the northernmost part of the Bay. Access to the beach is gained through a single entrance featuring a barrier preventing vehicle access, where also the warden post of the NMPZ is located. Nevertheless, three more points allow access at its western end and a path coming down the hill at the eastern part of the beach. At the back of this beach is found Crystal Beach Hotel, which was built before the establishment of the NMPZ. This business and one additional operator rent the beach furniture, pedalos and canoes found on the beach.

Sekania (zone A1: Absolute Protection Site, maritime zone A)

Sekania beach is located at the centre of no-boating maritime zone A at the east side of the Bay. This beach hosts one of the highest nesting densities for *Caretta caretta* in the world and as a result is the most strictly protected nesting site of the habitat, where human presence

is permitted only for scientific reasons. It is reminded that WWF-Greece in 1994 acquired the private land behind the beach preventing development. In contrast to previous years when a warden was in charge of this beach, Sekania is left unguarded since 2010. As a result, evidence of some unauthorized human activity is found throughout each nesting season. Although boats are prohibited in maritime zone A, vessels are occasionally observed, some of them even attempting landing on Sekania. In these instances, the Coast Guard is contacted but, in most cases, no action is taken due to the lack of staff and patrol boats.

Daphni (zone II1: Nature Protection Site, maritime zone A)

Daphni beach is located next to Sekania beach at the east side of Laganas Bay and until 2000 hosted the second largest number of nests on Zakynthos. Compared to the decline noted in the entire nesting area, the decline on Daphni is most acute. This beach and especially the area behind the beach, where private properties are found, has been subject to many illegal activities such as building and road construction, flattening of dunes, sand removal, planting of non-native vegetation. It should be noted that Daphni is an unstable beach as sometimes strong southerly winds during winter and spring change its profile revealing a large amount of stones. This probably is aggravated by the human-induced interventions and especially the flattening of the low-lying dunes, which replenish the beach with sand. Further, the repair of rough roads and bush fires (both occurring almost every year) accelerate erosion on the clay hills, with the eroded clay being deposited on the beach and changing the quality of the sand. The PD foresees that the maximum numbers of beach users should not exceed 100 people at any time.

Gerakas (zone II2: Nature Protection Site, maritime zone A)

Gerakas beach is found in the most southeast part of Laganas Bay and is accessed via a single entrance, with a barrier restricting vehicular access. The back of the beach is free from development and light pollution, while one group of operators rent the beach furniture found on the beach. The PD foresees that the maximum numbers of beach users should not exceed 350 people at any time.

Appendix 2: Turtle-Spotting Code of Conduct

National Marine Park of Zakynthos: Code of Conduct – Proper observation procedures

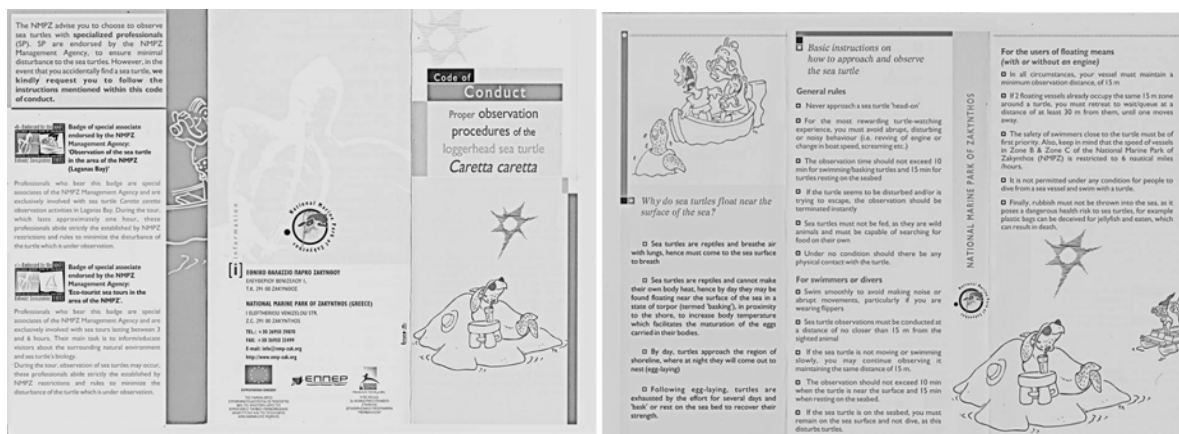




Illustration 4: Map of the Bay of Laganas, showing location of turtle encounters (result of monitoring work at the marine area during 2015).

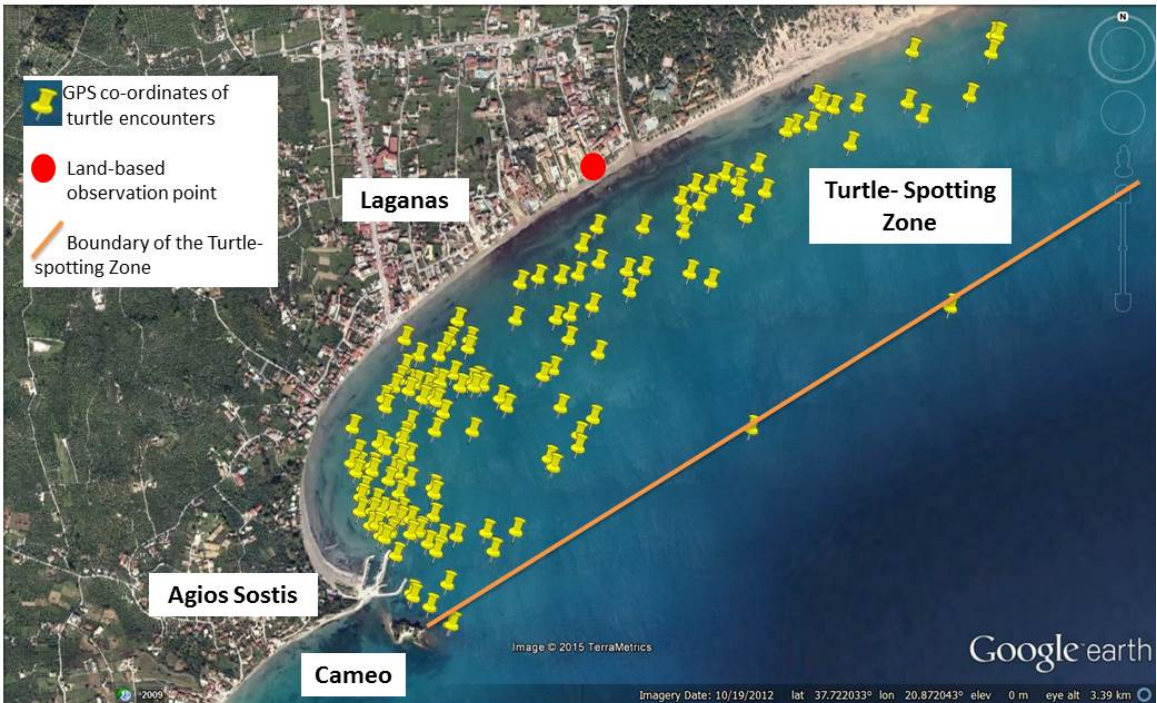


Illustration 5: Map showing area of highest density of turtle encounters (result of monitoring work at the marine area during 2015).

Photos



Photos 1, 2: During 2015 the recorded number of umbrellas in Gerakas (photo 1) was over 90 although the maximum number foreseen by the PD is 60. In East Laganas (photo 2) the umbrellas' density and maximum distance form the water-front were not implemented.



Photo 3: Kalamaki beach, 9 June 2015, 07:08 am: 44 sunbeds were left out overnight, a turtle track was found during Morning Survey hitting the sunbeds and going back to the sea without nesting, as the access to the nesting zone at the back of the beach was blocked by sunbeds.



Photo 4: The eastern part of East Laganas was covered by pedalos and boats 24 hours a day.



Photo 5: Human presence on East Laganas beach after sundown.



Photos 6, 7: The number of Marathonissi visitors (photo 6) is clearly unaffordable for the capacity of the beach. The rope in front of Zante Beach Hotel at the East Laganas beach (photo 7) was a successful measure for keeping beach users away from the nesting zone.



Photos 8, 9, 10: Vehicles on the sand dune zone and vehicle tracks on East Laganas beach. The majority of the wooden pillars on East Laganas have been destroyed or removed.



Photos 11, 12: Horse riding on East Laganas dunes and advertisement of local business providing beach horse-ridings.



Photos 13, 14: Illegal constructions and beach furniture at the back of Daphni beach.



Photo 15: The recent illegal road construction in the area between Daphni and Gerakas.



Photos 16, 17: The overfilled landfill site that exists within the boundaries of the NMPZ was still active during the 2015 nesting season.



Photos 18, 19: Example of Turtle-Spotting Boat with a capacity of max 25 passengers (photo 18). In the majority of observations within the Turtle-Spotting Zone, boats larger than the recommended capacity of 25 passengers were present (photo 19).



Photo 20: Non compliance with the Turtle-Spotting Code of Conduct. Glass-bottom boat passing over a observed turtle.



Photos 21, 22: Non compliance with the Turtle-Spotting Code of Conduct. More than two vessels observing simultaneously a turtle and violation of the minimum observation distance.