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**Follow up to Recommendation No. 9 (1987) on the protection of  
Caretta Caretta in Laganas bay, Zakynthos (Greece)**

**- NGO REPORT -**

*Document prepared by  
ARCHELON*

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# **ARCHELON, The Sea Turtle Protection Society of Greece**



## **Conservation efforts during 2023 at the nesting habitat of *Caretta caretta* in Laganas Bay, Zakynthos, Greece**

Short report submitted to  
the European Commission and  
the Standing Committee of the Bern Convention

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## **Acronyms:**

MP: Management Plan  
MU: Management Unit  
NECCA: Natural Environment and Climate Change Agency  
NMPZ: National Marine Park of Zakynthos  
PD: Presidential Decree  
SAC: Special Area for Conservation  
SCI: Site of Community Importance  
SES: Specific Environmental Study

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## Summary

This report outlines the outcome and presents the issues related to the protection of the loggerhead sea turtles (*Caretta caretta*) and their habitats in Laganas Bay on Zakynthos Island, Greece, during the 2023 reproductive period. The site, which is a Natura 2000 site (GR2210002), hosts one of the largest reproductive populations of the loggerhead sea turtle in the Mediterranean. The NMPZ was established in 1999 by PD and the Management Agency (MA) of NMPZ was established in 2000. A change in the governance of protected areas was introduced in 2020, with the establishment of the Natural Environment and Climate Change Agency (NECCA), of which the Management Unit (MU) of Zakynthos and Ainos National Parks and Protected Areas of the Ionian Islands is now a part.

During the nesting season of 2023, more than 1870 nests were recorded by ARCHELON in Laganas Bay and protected in collaboration with the MU. Out of 29 sea turtle stranding incidents recorded so far in 2023 (25 dead and 4 injured/sick), 9 were located within the marine protected area of Laganas Bay. Guards/patrols and cordoning-off of the nesting zone were implemented by the MU. WWF-Greece operated the fire prevention observatory in the land behind Sekania beach. Moreover, ARCHELON carried out public awareness activities on the beach, in tourist facilities and ARCHELON's information kiosk in Zakynthos town.

ARCHELON has been carrying out systematic monitoring and conservation work in Laganas Bay every year since 1984. Analyses of previous nesting data from the site indicate the effects of global warming on this regionally important sea turtle population; however, it does not appear that a lethal threshold in sand temperatures has yet been reached. Analysis of previous data has also shown that since the establishment of the NMPZ, the contribution of the individual beaches to the overall nesting numbers for the site has shifted. In particular, in recent years, the average contribution of Sekania beach decreased with an equivalent increase of nesting contribution on the beaches of East Laganas, Kalamaki and Gerakas. This long-term shift is likely attributed to better protection measures (wardening, cordoning-off of the nesting zone, management of beach equipment) implemented gradually by the MU as well as by the local businesses on these beaches. However, a significant decrease in nest numbers has been observed on the beaches of Marathonissi and Daphni during the last years, which is related to disturbances of sea turtles by boats in the marine area of the Bay and uncontrolled human pressure respectively. Considering the long-term trend (40 years, 1984-2023) of the nesting population, as it appears from the annual nest counts, it can be deduced that the sea turtle population nesting in Laganas Bay is rather stable with intense annual fluctuations.

Several incidents of non-compliance to the existing protection measures were recorded during the 2023 nesting season both on land and at sea. There were daily incidents of breaking the speed limit of 6 knots and disrespect of non-anchoring zones in the protected marine area, during July and August. The number of licensed vessels in the Bay has not been regulated yet and, more often than not, the Turtle Spotting Guidelines were not followed. Apart from Sekania, which is an Absolute Protection Site with no human visitation, incidents of human presence at nighttime on the beach, of human trampling of nests, of driving vehicles and horse riding in the sand dune zone were recorded on all other beaches. Cases of non-compliance related to the maximum numbers of beach furniture and the requirement for them to be removed at night were also recorded on all other beaches.

Additionally, long-term threats due to illegal activities, which were identified in previous years, continued to exist. These include the old sanitary landfill site, the road between the beaches of Daphni and Gerakas, buildings at Gerakas, and buildings/ businesses at Daphni. Local authorities have not implemented existing administrative decisions for the demolition of these illegal constructions.

Zakynthos Island has become a top international tourism destination in recent years. However, there is

a noted disrespect and disregard to environmental legislation in the area on the part of local authorities and local operators, especially in relation to nature conservation regulations at sea and on the nesting beaches. The continued presence of the MU and ARCHELON on the site has ensured sea turtle monitoring and nest protection. However, the interest of local businesses, landowners, and local authorities to collaborate for better law enforcement in the NMPZ seems to be quite low. The scale of visitation to the beaches and the marine area in Laganas Bay in previous years along with the reluctance to observe environmental legislation displayed by local authorities and local operators calls for (a) a much bigger communication/ information/ awareness effort towards local operators, the authorities and visitors, (b) a collaborative approach in improving law enforcement and the implementation of management practices, and (c) a more effective surveillance of the beaches and the marine area.

This problematic situation is not expected to improve through the SESs and MPs for all Natura 2000 sites, which are currently being drafted and which are part of a project coordinated by the Ministry of Environment at a national scale. In January 2023 the proposed SES for the protected areas of the Ionian Islands, including Zakynthos, accompanied by a draft of a new PD and a MP, was released for public consultation. Despite the immense pressures on the island's protected areas, the current draft of the SES seems to be focused on maintaining the status quo, thus intensifying the main issues instead of trying to resolve them. ARCHELON and other environmental NGOs submitted detailed comments during the consultation period.

A set of recommendations appears at the end of the report as guidance for the near future.

## Foreword

The present short report is a follow up to previous reports submitted annually, outlining the main events and presenting the issues related to the protection of the loggerhead sea turtles and their habitats in Laganas Bay (Natura 2000 site GR2210002 “Kolpos Lagana Zakynthou kai nisides Marathonissi & Pelouzo”) during the 2023 reproductive period. It contains information on the monitoring and conservation work and the threats in the terrestrial and marine habitat, as recorded through the fieldwork conducted by ARCHELON, in collaboration with the competent MU of Zakynthos and Ainos National Parks and Protected Areas of the Ionian Islands.

## 1. Background

Laganas Bay, at the southern part of Zakynthos Island, in the Ionian Sea, hosts one of the largest reproductive populations of the loggerhead sea turtle (*Caretta caretta*) in the Mediterranean and is therefore designated as a SCI and a SAC (NATURA 2000 site GR2210002).

The significance of the site as a sea turtle nesting habitat was recognized by legislation in 1980, and since 1984 a number of legislative acts regulated the increasing touristic development pressure in the area. These acts contributed to safeguarding a big part of the coastal area of Laganas Bay, but they did not eliminate the disturbance on sea turtle nesting beaches and in the marine waters of the Bay. The consistent pressure from NGOs, the Council of Europe (Bern Convention) and the European Commission, led to the establishment of the NMPZ following several years of deliberations. The NMPZ was established in December 1999 and its respective Management Agency (MA) was set up in July 2000. The relevant PD (Government Gazette D906/22-12-1999) includes a zonation system with varying regulations on land and at sea (see Annex 1). In 2020, the responsibility for the management of protected areas was transferred to a newly established central agency, the Natural Environment and Climate Change Agency (NECCA), while all MAs of protected areas were incorporated as Management Units (MU) under the jurisdiction of NECCA. The transition to the scheme of MUs under NECCA took place in 2022.

ARCHELON, founded in 1983, has been carrying out systematic monitoring and conservation work in Laganas Bay every year since 1984 and has been collaborating with the MA/ MU of the NMPZ since its establishment in 2000. ARCHELON’s long-term project, carried out annually from early-May through mid-October, involves monitoring of the nesting activity, protection of nests and hatchlings, and recording of turtle strandings. During the same period, ARCHELON’s field teams monitor the threats that may persist on site and carry out public awareness activities to inform visitors and residents of the area. Volunteers trained on-site and supervised by ARCHELON personnel carry out the above-mentioned field work.

## 2. The under elaboration Specific Environmental Study for Zakynthos’ protected areas

In January 2023 the proposed SES for the protected areas of the Ionian Islands including Zakynthos, accompanied by a draft of a new PD and a MP, was released for public consultation. ARCHELON and other environmental NGOs submitted detailed comments during the consultation period. The main issues of concern that ARCHELON and others raised were:

- The proposed SES divides the NMPZ into 42 different zones, with no clear boundaries as the maps are not accompanied by relevant coordinates.

- In the majority of the suggested zones there is a multitude of permitted land uses, for which an appropriate impact assessment is absent regarding their cumulative impact on the protected species and habitats.
- The proposed SES does not seem to address the existing illegal construction projects in the existing Protected Zones, but appears to attempt to legitimize these projects, particularly involving threats with long-term impact, such as the illegal infrastructure on Daphni beach. This legitimization seems to focus on maintaining the current situation instead of aiming towards effective protection according to the needs of the protected species and habitats.
- The carrying capacity of tourism at the nesting beaches and the marine area of Laganas Bay is not accounted for anywhere in the proposed SES, despite the intensive pressure because of mass tourism. In addition, the SES proposals suggest the removal of the existing capacity limit of 150 rooms for hotels, thus allowing the extensive building of coastal areas.
- Much needed measures for the implementation and enforcement of the existing protection framework are missing from the SES proposals. Taking into account the current situation from the existing PD, as well as the poor implementation of environmental legislation in the area, attention must be drawn to the need for enabling the appropriate conditions for effective law enforcement.

### **3. The 2023 nesting season**

#### **I. Monitoring and Conservation work**

In 2023, ARCHELON commenced fieldwork on the six nesting beaches of Laganas Bay on 10 May and terminated on 10 October. The project implemented the protocols of nest monitoring as agreed with the MU, in good collaboration with the MU's staff.

Preliminary data indicate that more than 1870 nests were recorded along the six nesting beaches during the 2023 nesting season. This figure is well above the average annual number since 1984 (approx. 1200 nests). The overall long-term outlook for the turtle population nesting in Zakynthos is considered to be stable, with intense annual fluctuations in nesting activity.

Public awareness efforts carried out by ARCHELON reached approx. 43,000 people. The public awareness activities were conducted on the nesting beaches, in various touristic facilities, on touristic boats operating in the marine protected area of Laganas Bay, as well as through the operation of ARCHELON's information kiosk located in Zakynthos town.

Regarding turtle strandings, 29 incidents were recorded from the beginning of 2023 until 15 October, involving 25 dead and 4 injured/sick individuals. Of the total number of strandings, 9 were located within the marine protected area of Laganas Bay. Examination of the stranded animals in the protected area showed interaction with fisheries (incidental capture in fishing gear, 2 cases) as well as signs of injuries caused by boat collision (2 cases) (Photo 1). In all other cases, the cause of death or injury was not apparent.

It should be noted that WWF-Greece operated an observatory against wildfires on its acquired land behind Sekania beach.

For yet another year, the MU did not employ seasonal staff due to limited resources. As a result, some warden huts remained unstaffed on a daily basis, even during night hours.

#### **II. Threats**

This section presents a description of threats observed in the terrestrial and marine areas. Whenever possible, a quantitative description is provided.



## **A. Marine area**

The large growth in the number of boat licenses issued in Zakynthos has led to an uncontrolled increase of boating activity in the marine area of the NMPZ. ARCHELON has requested official data on the number of motorized and non-motorized boats operating in Laganas Bay during 2023, but until today has not received a response from the competent Coast Guard. However, an extremely high number of boats offered for rent and Turtle Spotting activities was observed and has resulted in higher disturbance to sea turtles. Inadequate patrolling of the marine area by the competent authorities has encouraged an overall attitude and mentality of disregard towards maritime regulations.

In the early years of the operation of the NMPZ, the MA awarded boat owners with a “Turtle Spotting License” on a voluntary basis but the scheme was later abandoned. In 2018, the Turtle Spotting Guidelines were included in a legislative act issued by the Coast Guard of Zakynthos, and thus they were rendered compulsory. However, in recent years and in 2023 in particular, Turtle Spotting has been observed to be evolving into a “turtle hunt”. In total, 2688 occasions of non-compliance with the Turtle Spotting Guidelines were recorded during 153 days of observation (Photo 2a).

Regarding the maritime traffic regulations as foreseen by the PD, during 2023, in a total of 153 days of observation, ARCHELON recorded 1007 instances of breaking the 6 knots speed limit of Zones B and C, 1266 occasions where boats were anchored in Zone B, and 50 cases of anchored/passing boats in Zone A. (Photos 2b, 2c).

The MU repeatedly sent requests for joint patrols to the local Coast Guard, but these joint patrols were eventually conducted only 4-5 times per week from early July until early September. Even though the MU’s staff patrolled the area daily and were themselves authorized to issue fines in cases of non-compliance (due to a legislative change in 2023), no such fines were issued.

Please refer to Annex I, for the maritime traffic regulations of the PD and the Turtle Spotting guidelines.

## **B. Terrestrial habitat loss/degradation:**

### **Long-term impacts**

*Natural deposition of pebbles and clay on the north-west part of Gerakas beach:* In recent years huge amounts of pebbles have been deposited because of wave action during the winter months (Photo 3). Furthermore, clay runoff from the cliffs behind the beach due to rainfall has caused further hardening of this beach part. Consequently, this part of the beach has been rendered unsuitable for nesting.

*Illegal constructions and infrastructure:* For almost 37 years now the degradation of the area behind Daphni beach and parts of the beach itself has been taking place, resulting in direct disturbance of sea turtle nesting and incubating nests. The site has been completely transformed by unauthorized activities such as building and road construction, flattening of dunes, and sand removal. Following Recommendation No. 9 by Bern Convention (1987), the removal of illegal buildings at Daphni was ordered by demolition protocols and impending fines. Only 2 businesses existed at the time, while presently the operating illegal businesses are 7 (Photo 4). No action has been taken for their removal and as a result, illegal activities continue year after year. It must be noted that in the proposed SES, Daphni beach is proposed as a Nature Protection Zone (NPZ-14), allowing however beach bars of up to 50m<sup>2</sup> to operate. This SES provision is not only inconsistent with sea turtle protection and nesting beach preservation, but instead attempts to legitimize a de facto (illegal) situation that has remained stagnant for decades on Daphni beach.

In addition, in December 2015 and March/April 2018, road construction works were undertaken within the boundaries of the NMPZ, specifically on the hills between the nesting beaches of Gerakas and

Daphni (zone Φ1: protected landscape). Further unauthorized road construction work was reported to have been carried out in January 2021, despite the relevant imposed fines (Photos 5a, 5b, 5c). In 2022 the Prefecture of Ionian Islands issued a decision according to which the imposed fine was dramatically reduced (from 200,000 EUR to 10,000 EUR) (Ref. No.: 38702/7817/16-5-22, Administrative Post Number: 6YI87AE-IIYΨ). Unfortunately, the proposed SES allows the existence of roads, despite assigning this zone as Nature Protection Zone (NPZ-20). Again, this proposed SES provision attempts to legitimize the illegal situation in the area.

Furthermore, in the area behind Gerakas beach (zone Π2: Nature Protection Zone) where building is prohibited, one new stone house and one stable were constructed in 2017. Although fines were imposed, to this day neither demolition nor restoration works have occurred (Photos 6a, 6b). Unfortunately, the proposed SES neither refers to those interventions nor foresees their demolition.

Lastly, within the boundaries of the NMPZ (behind Vrodonero beach, between Kalamaki and Sekania) is an over-filled landfill site. This landfill site has not operated since 2018 but it has not yet been restored by the Municipality, despite the imposition of fines by the Prefecture. It therefore continues to constitute a permanent toxic pollution threat to both the nesting beaches and the marine area (Photo 7).

### **Short-term impacts**

*Beach use and beach furniture:* It has long been observed that the businesses operating beach furniture on the beaches of Laganas Bay do not implement the regulations designated by the PD. As a result, the foreseen maximum numbers and density of beach furniture, as well as the distances from the back of the beach have not been kept, while the removal of beach furniture at sunset has been either completely ignored or implemented incorrectly (Photo 8).

During the nesting season of 2023, ARCHELON recorded 47,825 incidents of non-compliance<sup>1</sup> regarding the removal of sunbeds at sunset on the beaches of Gerakas, Kalamaki and East Laganas, in a total of 153 days of observation. In some instances, beach furniture made whole sections of the beaches inaccessible to turtles and caused them to abandon nesting attempts (Photo 9). Furthermore, the overall number of sunbeds exceeded the number allowed by the PD. During the high touristic season ARCHELON recorded 180 sunbeds in Gerakas (instead of the permitted 120, see Annex 1) and 457 sunbeds in Kalamaki and East Laganas (instead of the permitted 300, see Annex 1).

Throughout the nesting and hatching season of 2023, the permitted number of beach users on Gerakas (350), Daphni (100), and Marathonissi (200) as stated by the PD was greatly exceeded.

As mentioned under section 2, the proposed SES and MP do not make any reference or provision on the carrying capacity of the nesting beaches of Laganas Bay regarding the beach furniture or the beach users.

*Human presence on the nesting beaches at night (sundown to 7 a.m.):* According to the relevant Plan of the MU, there is a total of 9 posts for guards on the 6 nesting beaches, which, if staffed on a 24-hour basis, would require 27 guards.

In 2023 the MU employed 14 guards (permanent staff), but this number proved to be insufficient as incidents of human presence during night hours were frequently observed. This was quite notable on East Laganas and Kalamaki beaches where 1450 incidents of non-compliance were recorded over a total

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<sup>1</sup> This number indicates the total number of sunbeds that remained on the beaches after sunset in a total of 153 days of observation.

of 153 days of observation. In an attempt to support the MU, ARCHELON's project team introduced some extra volunteer shifts on the aforementioned beaches in late July.

Human trampling of nests: Beach visitors are required by the PD to remain close to the shoreline and to avoid the nesting zone at the back of the beach, to protect incubating nests from trampling, as well as shading and damage from umbrellas.

During 2023, as in previous years, the MU implemented the use of roped areas to restrict access to the nesting zone along the beaches of Marathonisi, Gerakas and along a section of Laganas and Kalamaki (Photo 10). However, in areas where the rope was absent, ARCHELON members recorded a total of 416 people at the back of the beach over 153 days of observation (Photo 11).

Vehicles: Sand compaction caused by vehicles can damage turtle eggs and potentially trigger premature emergence of hatchlings from the nest. Emerging hatchlings can be trapped within car ruts and if they cannot scramble out of them, they die of exhaustion, dehydration, or predation. Moreover, vehicles moving along the beach damage the sand dune vegetation. During 2023 the MU placed wooden poles along the back of the beach of East Laganas resulting in a big reduction in the numbers of vehicles observed, as only two cases of vehicles on the beach were recorded over 153 days of observation (Photo 12). Unfortunately, the placement of the wooden poles proved to be effective only for the nesting beach and not the sand dune zone behind it, where the presence of vehicles, mainly quad bikes, was a frequent phenomenon.

Horses: There is a significant growth of commercial horse-riding activity on the sand dunes behind East Laganas, which has significant negative impacts not only on incubating nests but also on the sand dunes. During the 2023 nesting and hatching season, the wooden poles placed by the MU proved to be effective also in relation to this threat, as the horses did not enter the beach. However, the presence of horses on sand dune zone was recorded on a frequent basis. As a result, the nests laid behind the poles (i.e. in the sand dune zone) were disturbed by this activity (Photo 13).

### **C. Light and noise pollution**

Light pollution is a serious threat for sea turtles, as it causes hatchling disorientation and disturbs the nesting females resulting in the abandonment of nesting attempts.

During the 2023 nesting season, ARCHELON conducted provisional recording of the existing light sources causing pollution during the low and the high touristic season. In particular, 33 permanent light sources were recorded on East Laganas, belonging to the airport of Zakynthos, private businesses (i.e. hotels, beach bars) and public streetlights at the back of the beach. Additionally, Daphni beach faced serious light pollution problems due to the operation of 7 illegal businesses behind the beach, some of which had lights on during late hours. In addition, the severe light pollution from West Laganas affected almost all the 6 nesting beaches of the habitat (Photo 14). More than 40% of nests were impacted by light pollution on East Laganas, approximately 19% of nests on Kalamaki and Daphni, and 35% of nests on Marathonissi.

It is important to note that the reduction of light and noise pollution is not taken into account at all in the proposed SES. As a result, the drafted MP does not include specific management measures for the reduction of those threats.

## **4. Discussion and Recommendations**

### **The long-term monitoring**

ARCHELON has been monitoring the nesting site of Laganas Bay since 1984 and has been collecting data on important reproductive parameters. Analyses of previous nesting data from Laganas Bay indicate the effects of global warming on this regionally important sea turtle population. The rising temperatures at sea and on land, as a result of climate change, affect the nesting population and its reproductive behaviour in various ways. In recent years, nesting and hatching have been observed to start earlier in the season as compared to earlier years. Furthermore, the incubation duration, which strongly depends on sand temperature, is decreasing over the seasons and this further augments the already female bias of hatchling sex ratios. However, hatching success and emergence success are increasing and this shows that a lethal threshold in sand temperatures has not been reached yet. ARCHELON follows the recent scientific literature on this subject and convenes with leading experts in this field to submit relevant proposals to the MU for taking appropriate measures if needed.

Analysis of previous data has also shown that after the operation of the NMPZ, the nesting contribution of the individual beaches has changed. Previously, more than 53% of nests were deposited on the remote beach of Sekania, rendering an atypical nest density (reaching 1600 nests/km/season) on this beach. In recent years, the average contribution of Sekania has been decreased (to about 47%), with an equivalent increase of nesting on the beaches of East Laganas, Kalamaki and Gerakas. This long-term change of nesting contribution of the individual beaches is likely caused by the more effectively implemented protection measures (wardening, cordoning-off of the nesting zone, management of beach equipment) by the MU as well as by businesses on these beaches. On the contrary, over the last years, nest numbers on Marathonissi show a significant decrease [average 63 nests/year in the period 2005-2022 in contrast to 121 nests/year in previous years (1984-2004)]. Between 1984 and 2002, Daphni beach hosted the second highest number of nests on Zakynthos (average 150 nests/year). Since then, however, nest numbers show a significant decrease (average 93 nests/year; 2003-2022).

Considering the long-term trend (40 years) of the nesting population, as it appears from the annual nest counts, it can be deduced that the sea turtle population nesting in Laganas Bay is rather stable with intense annual fluctuations.

### **Law enforcement in a major tourist destination**

As presented in detail in part 3 of this report, a significant number of non-compliance with the existing legislation, which is based on the PD and other national environmental laws, was consistently recorded in the area of the NMPZ during the 2023 nesting season. ARCHELON has not received a response about the fines imposed by the Coast Guard in the marine area and no fines have been imposed on businesses or individuals for not following the regulations on the nesting beaches. The fact that the newly bestowed authority to MU staff to conduct investigations and issue fines had no effect in the field (in 2023 no fines were imposed in the terrestrial or the marine area) reveals the lack of internal training and organization regarding this positive change.

Since the establishment of the NMPZ, Zakynthos has become a top tourist destination, reaching about 1,500,000 visitors per year. The number of tourist accommodation units, along with restaurants, bars,

and other entertainment facilities in the Buffer Zone of the NMPZ has increased exponentially. A number of business owners and managers operating in this area have continuously exhibited disrespect and disregard for nature conservation regulations on the beaches and the marine area. The same attitude has been expressed by some landowners within the Nature Protection Zones and the Protected Landscape Zones of the NMPZ itself. The main positive exception to this situation is the land behind Sekania beach, which was acquired by WWF-Greece a few decades ago and is declared as an Absolute Protection Site.

Information campaigns and educational activities about sea turtles and the rest of the very important ecological features within the NMPZ have not been developed in proportion to the number of visitors on the island. Hotel owners, tour operators and beach related businesses in the area do not seem to be interested in developing a common attitude to actively support conservation measures and law enforcement.

Although the elaboration of SESs and MPs for all Natura 2000 sites on a national scale could be a window of opportunity for positive developments, unfortunately as described under section 2, the proposed SES for the protected areas of the Ionian Islands, including Zakynthos, not only does not manage to address the existing problems, but it also appears to lead to additional degradation of the NMPZ.

## **Recommendations**

- Threats to sea turtles in the marine area must be dealt with efficiently. This includes the regulation of the numbers of boats licensed to operate in the Bay, and the enforcement of the speed limit of 6 knots, non-anchoring zones, and the Turtle Spotting Guidelines.
- All illegal constructions and infrastructure (old sanitary landfill, road between beaches of Daphni and Gerakas, buildings at Gerakas and buildings/ businesses at Daphni), which have a long-term impact on the naturalness and integrity of the site must be demolished, and the respective habitats must be restored.
- All short-term impact threats on land (i.e. violations regarding beach furniture, human presence at nighttime on the beach, human trampling, vehicles on the beach, horse riding) must be taken into account and addressed.
- Measures for minimizing light and noise pollution must be implemented and enforced for all nesting beaches of Laganas Bay.
- Law enforcement in both the terrestrial and the marine part of the NMPZ must become a priority, and adequate surveillance by the competent authorities must be ensured.
- A large-scale targeted communication/ information /awareness effort must be deployed in the area towards local businesses, landowners, and local authorities in order to build a platform of collaboration, inform visitors and support law enforcement.
- The proposed SES and the drafted PD and MP for the NMPZ must take into serious account the comments submitted by the environmental NGOs, including ARCHELON, in order to address the existing threats towards the site and achieve effective protection of the habitats.

## **ANNEX 1: Description of the (marine & terrestrial) habitat and existing regulations**

The nesting habitat of Laganas Bay consists of a terrestrial part comprised of six distinct nesting beaches (Marathonissi, East Laganas, Kalamaki<sup>2</sup>, Sekania, Daphni, Gerakas), of a total length of 5.5km, and a marine part including the entire Bay, of a total area of 51,363sqkm. A map of the region is shown in Illustrations 1 and 2.

**Marathonissi (zone A2: Nature Protection Site, maritime zone B/ in the SES it is proposed as Nature Protection Zone 11):** Marathonissi is a small island within the Bay and its nesting beach is characterized by low sand temperatures, due to its northern orientation and whitish sand color. Low temperatures in Marathonissi produce predominantly male hatchlings. This makes this short beach an extremely important one at a regional level, as most beaches around Mediterranean produce mainly female hatchlings. The beach is a popular destination for day-visitors who arrive by boat, however, only up to 200 people are allowed at any time, according to the management measures of the NMPZ MU. According to the PD the construction of buildings is prohibited.

**East Laganas (zone II3: Nature Protection Site, maritime zone B/ in the SES it is proposed as Nature Protection Zone 16):** This long beach (2.7km) is partially backed by an extensive sand dune zone. A limited number of hotels and taverns, which were built before the NMPZ's establishment, is found along the back of the beach. These businesses and some additional operators rent beach furniture and pedaloos/canoes along the beach. In a small distance behind the beach (2km) is the international airport of the island, which is supposed to remain closed during night hours from May to October, to prevent light and noise pollution. At the western end of East Laganas, extends the known as "West Laganas" beach, namely the part of the beach which is in front of Laganas village and is no longer used by turtles for nesting due to strong touristic development and overuse.

**Kalamaki (zone II3: Nature Protection Site, maritime zone B/ in the SES it is proposed as Nature Protection Zone 16):** Kalamaki is a 600m beach, which is located east of East Laganas at the northernmost part of the Bay. Access to the beach is gained through a single official entrance, but four more illegal entrances exist. At the back of this beach a hotel is found, which was built before NMPZ's establishment. This business and one additional operator rent beach furniture, while one more business with pedaloos/canoes operate on the beach.

According to the PD the maximum permitted number of beach furniture on both East Laganas and Kalamaki is 150 umbrellas/ 300 sunbeds.

**Sekania (zone A1: Absolute Protection Site, maritime zone A/ in the SES it is proposed as Absolute Protection Zone 01):** Sekania beach (650m) is located at the center 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. It is the most strictly protected nesting site of the habitat, where human presence is permitted only for scientific reasons. It is noted that in 1994 WWF-Greece acquired the private land behind Sekania preventing development.

**Daphni (zone III: Nature Protection Site, maritime zone A/ in the SES it is proposed as Nature Protection Zone 14):** Daphni beach is located next to Sekania beach at the east side of Laganas Bay. This beach and especially the area behind the beach, where private properties are found and 7 illegal businesses operate, has been subject to many illegal activities (e.g. building and road constructions,

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<sup>2</sup> The NMPZ MA refers to the beaches of East Laganas and Kalamaki as Kalamaki and Crystal respectively.

flattening of dunes, sand removal, planting of non-native vegetation, placement of numerous beach furniture). On the contrary, the PD foresees no operation of businesses at the back of the beach, no beach furniture, while the maximum number of beach users should not exceed 100 people at any time.

**Gerakas (zone II2: Nature Protection Site, maritime zone A/ in the SES it is proposed as Nature Protection Zone 15):** Gerakas beach is found in the most southeast part of Laganas Bay and is accessed via a single entrance. The back of the beach is free of development and light pollution, while a group of operators rent beach furniture on the beach. The PD foresees that the maximum numbers of beach users should not exceed 350 people at any time, while the maximum number of beach furniture is 60 umbrellas/120 sunbeds.

**Marine area of Laganas Bay (zone Ia, Nature Protection Site):** The protection status and permitted activities in the protected marine area of Laganas Bay are defined by the PD, Article 4. This area includes three zones (A, B and Γ) regulating maritime traffic and fishing annually from 1 May to 31 October. In particular, in zone A, no boating and fishing is allowed. In zone B, there is a speed limit of 6 knots to avoid lethal collisions with sea turtles, while anchoring and mooring is also not permitted. In zone Γ, the only restriction is the speed limit for boats which is 6 knots.

Within Zone Ia, several businesses operate wildlife-watching boat trips focusing on sea turtles. In order to minimize the negative impact of the observation of sea turtles, the NMPZ MU, in cooperation with ARCHELON, has issued guidelines for proper observation procedures of sea turtles. These guidelines for Turtle Spotting regulate: (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, (f) the ban of disturbing or noisy behavior, (g) the ban of physical contact with sea turtles, (h) the ban to feed sea turtles and (i) the ban to dive off vessels to swim with sea turtles. Until May 2018 the aforementioned guidelines were voluntary, i.e. not endorsed by legislation. Due to poor implementation in May 2018 the competent Coast Guard issued a special decision (i.e. legislative act), which included the proper observation guidelines (Ref. No. 2131.13/2063/29-05-2018). Moreover in 2006 the “Turtle Spotting Zone”<sup>3</sup> was introduced by the MA, but it is still not supported by legislation.

In the SES zone A is proposed as Absolute Protection Zone 02, zone B is proposed as Nature Protection Zone 09, while zone Γ is proposed as Nature Protection Zone 10.

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<sup>3</sup> A zone which hosts a high density of turtles and was supposed to be exclusive for “endorsed Turtle-Spotting Boats” with carrying capacity <25 passengers.

## ANNEX 2: Illustrations and photos



Illustration 1: Map of the six nesting beaches in Laganas Bay.

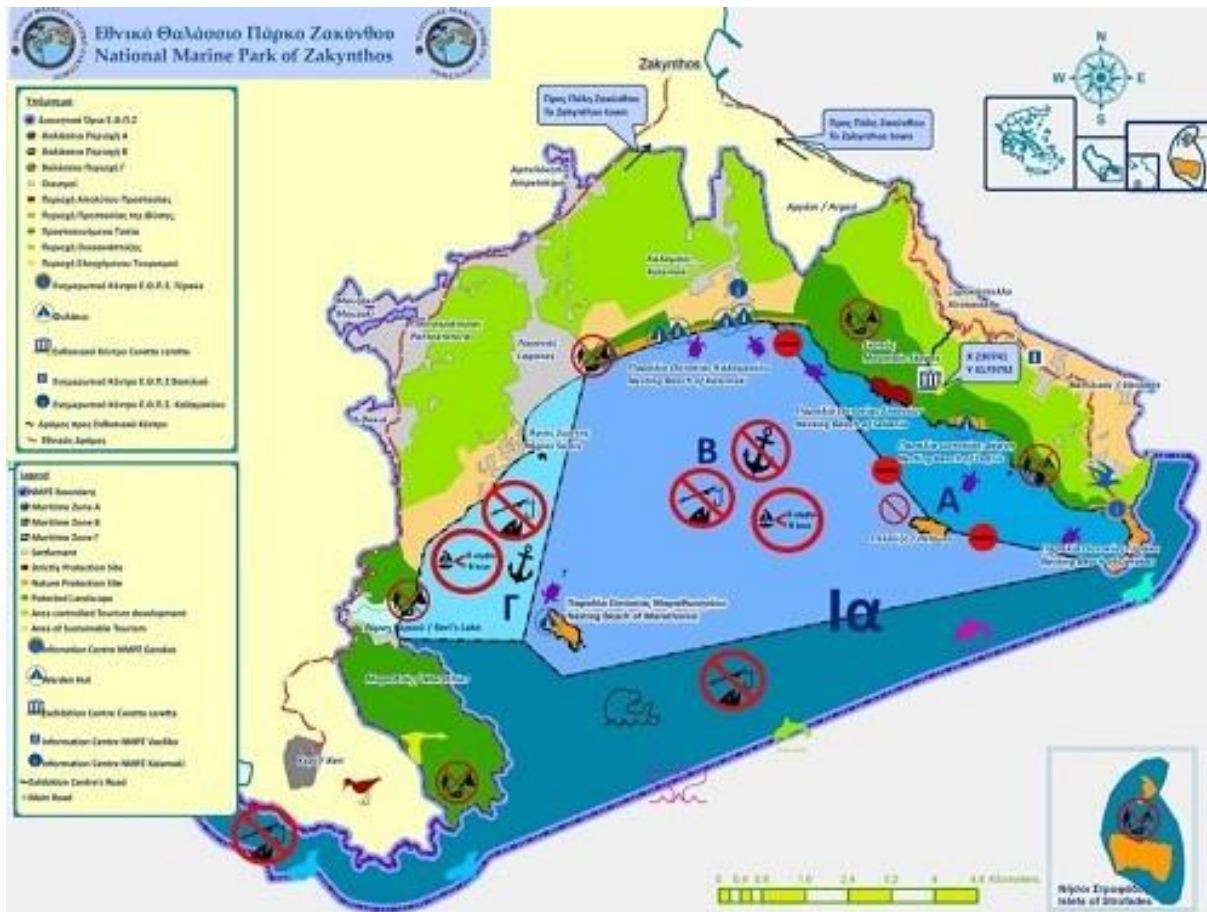


Illustration 2: Zonation scheme of the protected marine area of the NMPZ.





Photo 1: Sea turtle stranding caused by boat collision (Laganas Bay, July 2023).



Photo 2a: Turtle-Spotting guidelines were poorly implemented (Laganas Bay, August 2023).



Photo 2b: The speed limit of 6 knots was daily violated (Laganas Bay, August 2023)



Photo 2c: Anchored boat in Zone A (Daphni, August 2023).



Photo 3: The north-west part of Gerakas beach is not suitable for turtle nesting due to natural deposition of pebbles and clay. Beach furniture operators avoided this part. As a result, their equipment caused extra pressure to the suitable for nesting part of the beach.



Photo 4: Illegal constructions and businesses on Daphni beach.



Photos 5 a, b, c: Illegal roads (providing access to the sea between Daphni and Gerakas beaches) were constructed in 2015 and 2018, were further continued in 2021, and were never demolished nor restored.



Photos 6 a, b: Illegal buildings (1 house & 1 stable) behind Gerakas nesting beach.



Photo 7: The illegal landfill is located within the boundaries of the NMPZ. The site remains unrestored (October 2023).



Photo 8: Beach furniture removal was implemented either incorrectly or not at all (East Laganas, July 2023).



Photo 9: Abandoned sea turtle nesting attempt as the nesting zone was blocked by sunbeds (East Laganas, July 2023).

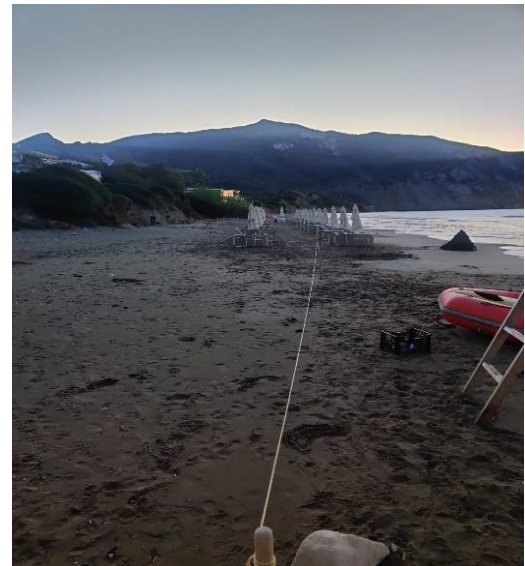


Photo 10: Use of ropes by the NMPZ MU to block access of visitors towards the nesting zone at the back of the beach (Kalamaki, September 2023).



Photo 11: The minimum distances from the back of the beach were not respected especially during the high touristic season (East Laganas, August 2023).



Photo 12: The wooden poles did not allow for vehicles to enter the beach (East Laganas, September 2023).



Photo 13: Horse riding on the sand dunes was observed regularly. Behind the horses the wooden poles are visible, while a nest laid in the sand dune zone is visible in the front (East Laganas, August 2023).

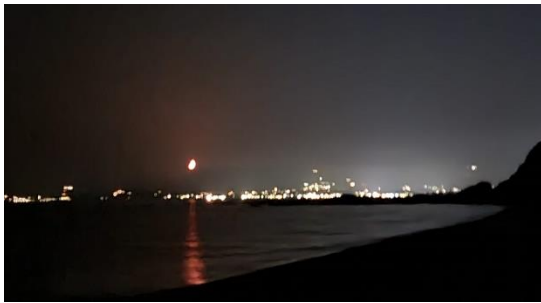


Photo 14: Light pollution originating from West Laganas was visible from almost all nesting beaches of Laganas Bay, even Sekania, which is declared as Absolute Protection Site (Sekania, July 2023).