



Exploring the ecological importance of Erimitis

Final Report

iSea, December 2023



ENVIRONMENTAL ORGANISATION FOR THE PRESERVATION OF THE AQUATIC ECOSYSTEMS

Suggested citation:

Athinaiou, I., Pyloridou, K., Poursanidis D., Naasan Aga Spyridopoulou, R. Exploring the ecological importance of Erimitis, NE Corfu, Final Project Report. iSea 2023, Greece, 21pp.

Declaration of conflict of interest:

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this report.

Funded by:



In collaboration with:



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Baseline information

Erimitis peninsula is located in the Northeast of Corfu between the villages of St. Stefanos and Kassiopi. It borders with the western coast of Albania through a narrow body of water, the Straits of Corfu. The channel is a passage from the Adriatic Sea on the North to the Ionian Sea on the South.

The region of Erimitis includes seven beaches that are mainly intact from human disturbances as they can only be approached by trails or from the sea with considerably low tourism in comparison with other places in Corfu and the Ionian in general. Albeit there is an undergoing development plan for the whole peninsula, which includes the construction of a marina in the bay of Bromolimni and several bungalows on the hill of Erimitis along with other associated constructions (i.e., roads, sewage treatment, water distribution, etc.), the area is still largely undisturbed and mostly enjoyed by locals and nature lovers (e.g., hikers, swimmers, recreational fishers).

In 2021, iSea mapped the *Posidonia oceanica* meadows in three bays of Erimitis peninsula (Bromolimni, Korfovounia and Kaminakia). The mapping resulted in 0.157 km² of cohesive *Posidonia* meadows which extend well beyond the northern and southern borders of the study area. During the same year a biodiversity survey was also conducted, resulting in the observation of 82 different species, compiling a total of 107 marine species in combination with previous studies. In 2022, iSea revisited to conduct preliminary research on the conservation status of the mapped meadow and the total Blue Carbon stored in its rhizomes (Giovos et al., 2023). To estimate the conservation status of the meadows, two approaches were utilised, from the first approach the meadows were classified with a "good ecological status", while from the other approach, values ranged from "severe regression" to "very good status". Other ecological indicators (shallow border, deep border) seemed to align with the results of the first approach, indicating no disturbance and an overall good health status. The causes for the low values were likely due to natural environmental factors. For the estimation of the total Blue Carbon stored in the substrate of Erimitis' meadows an elemental methodology was followed resulting in 563.85 tC for the top 60cm of the substrate, which is equivalent to 3,581 tC/km².





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Other research efforts have been conducted on the terrestrial environment of Erimitis regarding the fauna and flora of Erimitis' hills and the three autonomous wetland ecosystems of Erimitis peninsula namely: Akoli, Bromolimni and the 'Marsh of Erimitis'. The three lakes are considered "small island wetlands" and host a variety of species. Within the marine area of Erimitis there is a small islet "Kapareli" which is important to wild doves as a nesting site. Finally, Erimitis is neighboring across the sea with the Butrint National Park, a UNESCO World Heritage Site in Albania. According to the Butrint National Park report in 2010, the *P. oceanica* meadows cover 3.75 km², comprising 3.98% of the area and hosting a variety of fish species and marine megafauna (Zotaj et al., 2010).

In efforts to preserve the environment of Erimitis, local researchers support the initiative proposed during the public consultation concerning the Natura 2000 sites of the Ionian and West Greece ([Special Environmental Study \(5a\)](#)), the designation of the marine area of Erimitis to the shores of Albania as an "Ecological Corridor", to allow the continuous connectivity between the two sites. However, more research is required both regarding the marine and terrestrial sites to determine whether Erimitis meets the criteria for such designation and/or recognitions (i.e. Site of Community Interest (SCI) or Special Area of Conservation (SPA)).

Aim of the project

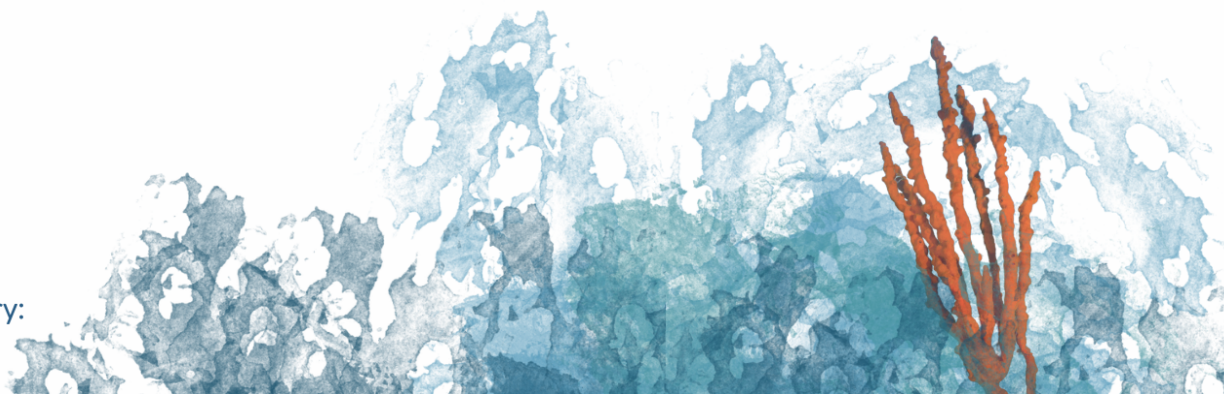
This project aims to explore the ecological value of the marine area of Erimitis focusing on protected and threatened species and habitats, by conducting research and combining existing knowledge.

PROJECT ACTIONS

Posidonia meadows related research

A.1 Mapping *Posidonia oceanica* meadows

iSea visited Corfu in July from 10-20 July to conduct the fieldwork needed to collect the ground truthing points and define the deep limit of the *Posidonia* meadows. For the ground-truthing points, the field team circumnavigated all the small bays and the area surrounding Kapareli (Peristeres) islet. To obtain the ground truthing points, a boat GPS (Garmin Echomap) was used for geolocation and, due to poor bathymetric data along the habitat type, depth





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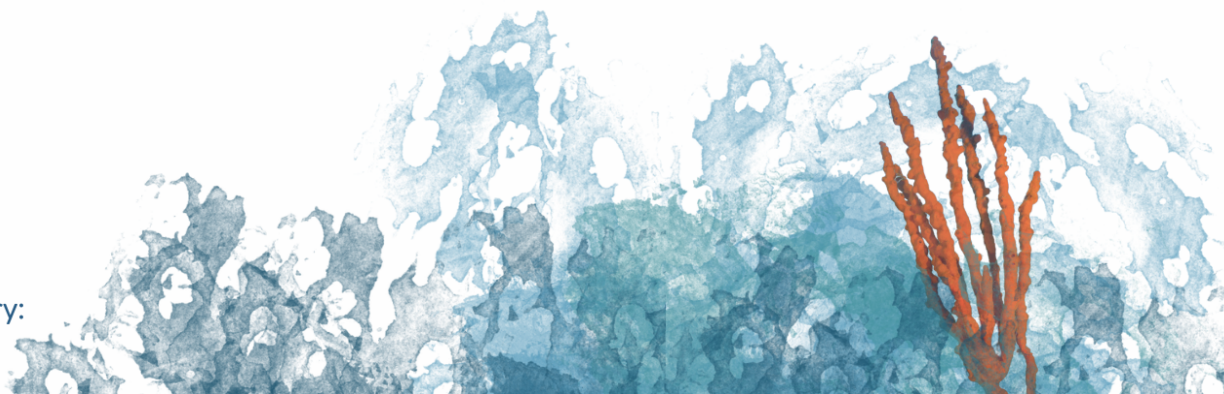
was also recorded. The team made sure to record each point in habitats covering about 10m² to avoid a decrease in the accuracy of the classification of habitats due to the accuracy of the GPS (~3m). The habitat was observed visually through snorkeling, apnea, and for the deeper parts using a remotely operated underwater vehicle (ROV)(PowerRay) and scuba diving. All points were transferred from the GPS device to ArcGIS (Version 10.4) in which the habitat and depth was attributed to each of them. A total of 408 ground truthing points were collected, with 7 habitats/substrate types recorded (Table 1).

Table 1: Ground truthing points collected during the fieldwork, July 2023.

Habitat/Substrate	No of Points
Dead leaves	5
Matte Morte	9
Mud	1
Posidonia meadows	235
Rocky reef/Brown Algae	77
Rocky reef/Sand mix	7
Sand/Gravel	74
Total	408

The team made an effort to have an equal representation of points in all depths up to 30m, especially for *Posidonia oceanica*, to increase the accuracy of the analysis. The deep limit was obtained for all bays and islets.

The habitat classification and accuracy analysis was undertaken by terraSolutions.mer and was performed using WVIII (Maxar WorldView III 8-bands) at 2m pixel size. The selection of the imagery was conducted using the public available Maxar Discover tool (<https://discover.maxar.com/>). Through the available imagery from the archive, the selection was based on the 8-band data (<https://worldview3.digitalglobe.com/>) with a cloud cover less than 20%. Further, the filtered imagery was visually inspected prior to order for further analysis. WVIII has previously been used successfully for coastal bathymetry and habitat mapping at various water types (Mederos-Barrera et al., 2022; Poursanidis et al., 2018; Coffey et al., 2023). The selected image was sensed on the 26/07/2023. Imagery was ordered in Top of Atmosphere Reflectance (TOAR) and ACOLITE (Vanhellemont et al., 2018) was used for the atmospheric





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correction. For the image classification towards seagrass mapping, a Random Forests Regression-based analysis workflow was employed (adapted from Poursanidis et al., 2021) using the open source EnMAP toolbox (Van der Linden et al., 2015, Poursanidis et al., 2019). For the analysis, a series of image-based training data was created that was evenly distributed in the study area. The product validation was based on the 233 validation points for Posidonia meadows (Table 1). A radius of 3m was used to compensate for the GPS accuracy. Figure 1 provides an overview of the developed methodology for the analysis of commercial satellite imagery.

According to the current work, the meadows cover an area of **0.62km²** (Figure 2). The meadows have a continuous distribution along the coast of Erimitis peninsula starting from less than 1m depth up to 42m in a specific site.

The overall accuracy of the final product was estimated at **93.56%**. Although the deep limit was noted in several stations (i.e. table 2), during fieldwork using Scuba dive or ROV, due to oceanographic conditions of the area the accuracy of the analysis of the satellite imagery regarding the lower limit of the meadows is less compared to the upper limit, due to methodology limitations. For a more detailed mapping on the lower limit an investigation using hydroacoustics (side scan sonar) is recommended.

The most extended area covered by meadows is Avlaki beach, in the southwest of the study area being the largest bay (Figure 2). While the least extended meadows appear in and around Agios Stefanos Harbour (Figure 2). Furthermore, sand "corridors" can be observed off the three wetlands suggesting freshwater influxes influence the meadows' distribution.





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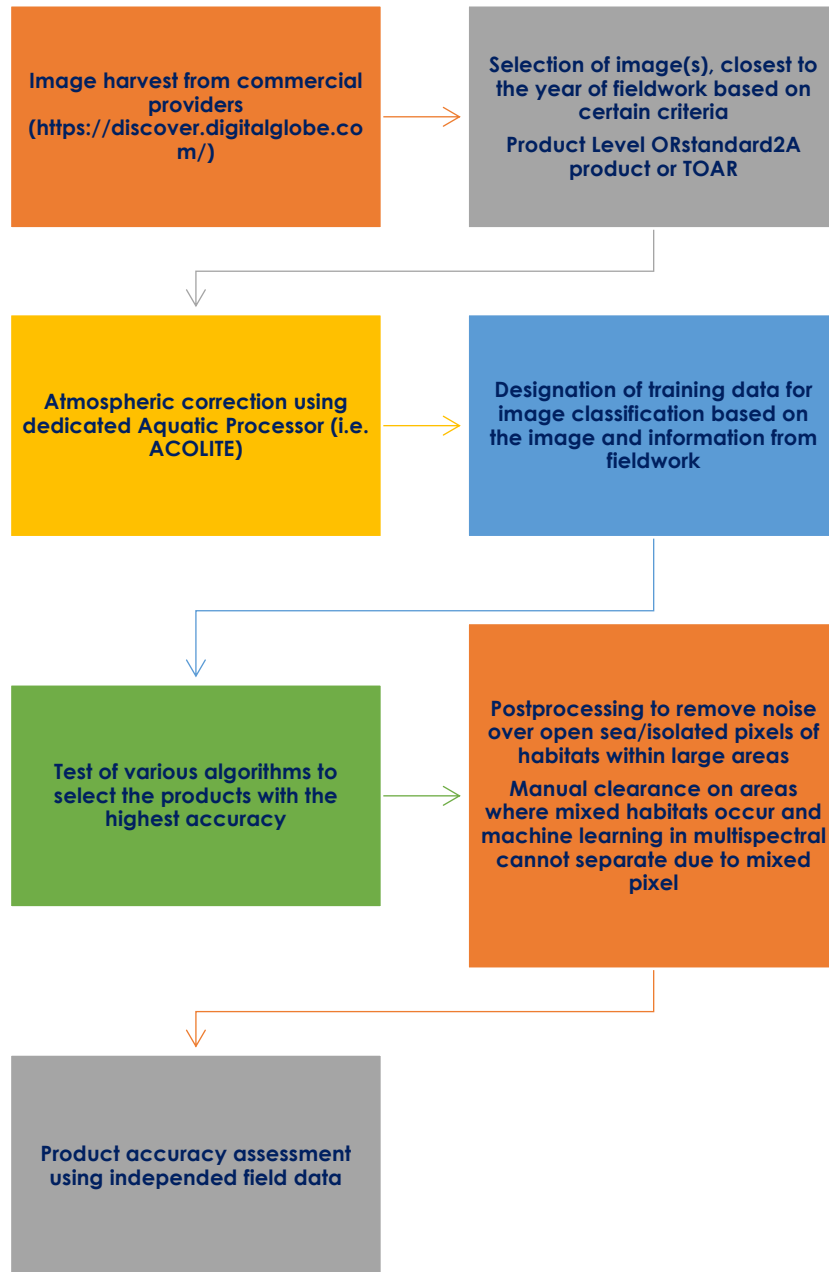
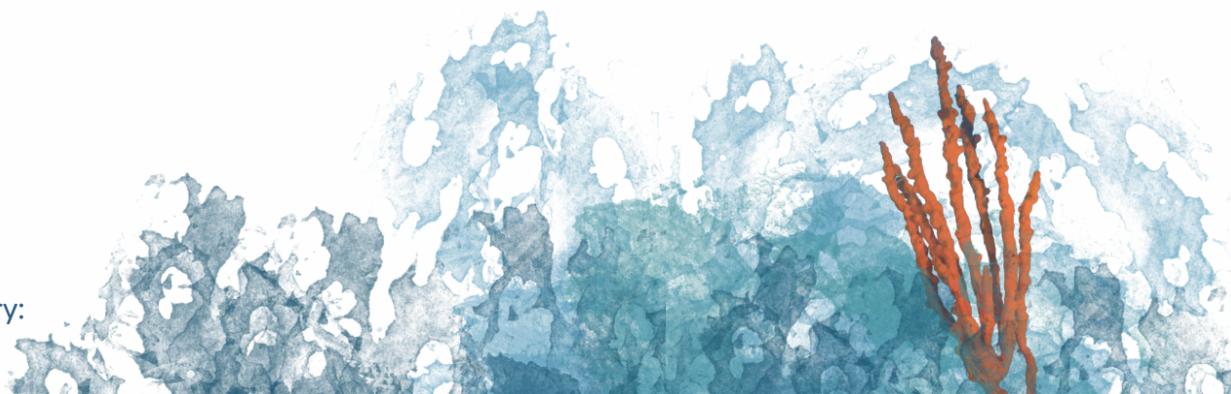


Figure 1: The logical workflow towards seagrass mapping using Maxar WVIII imagery.





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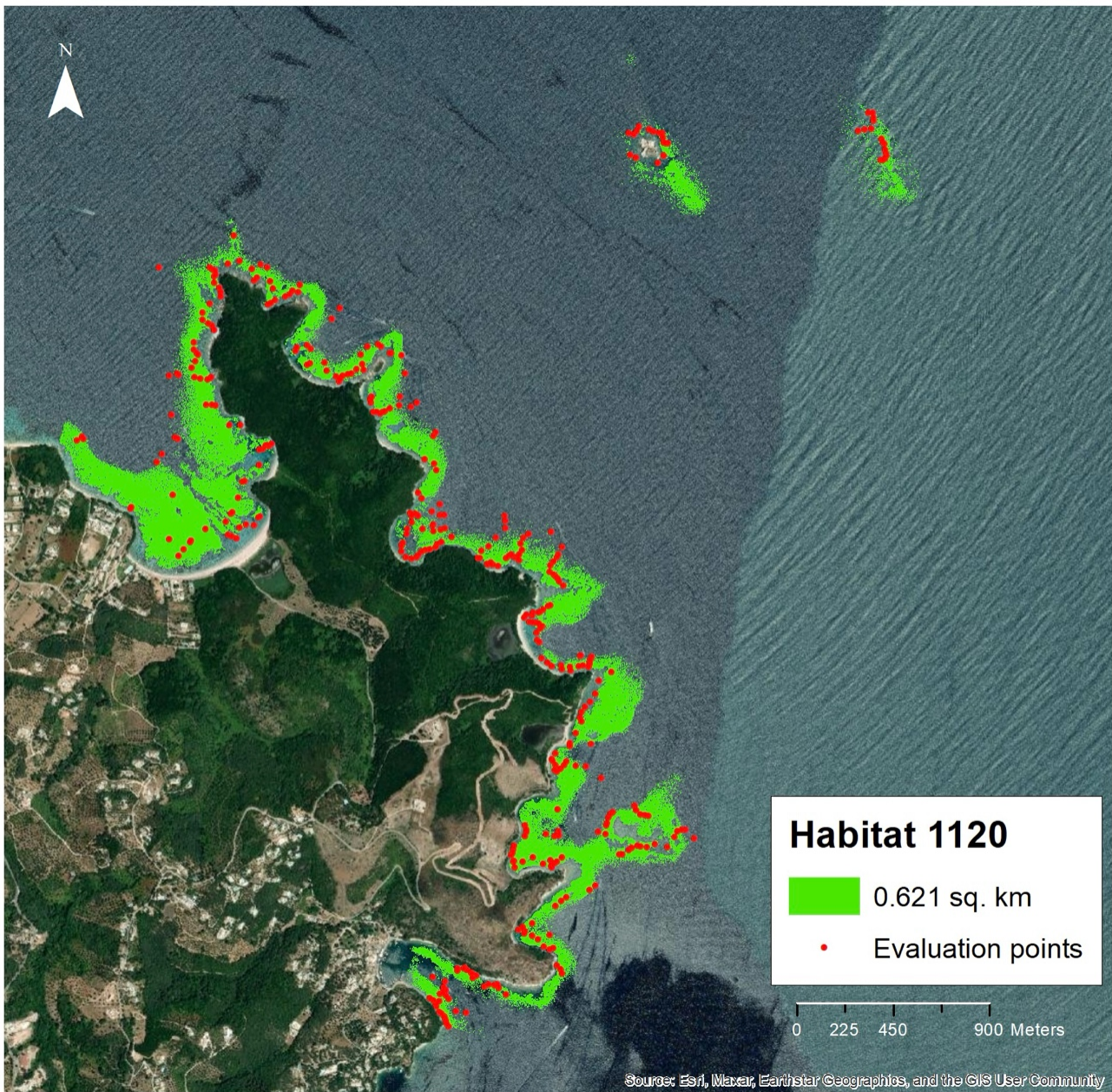
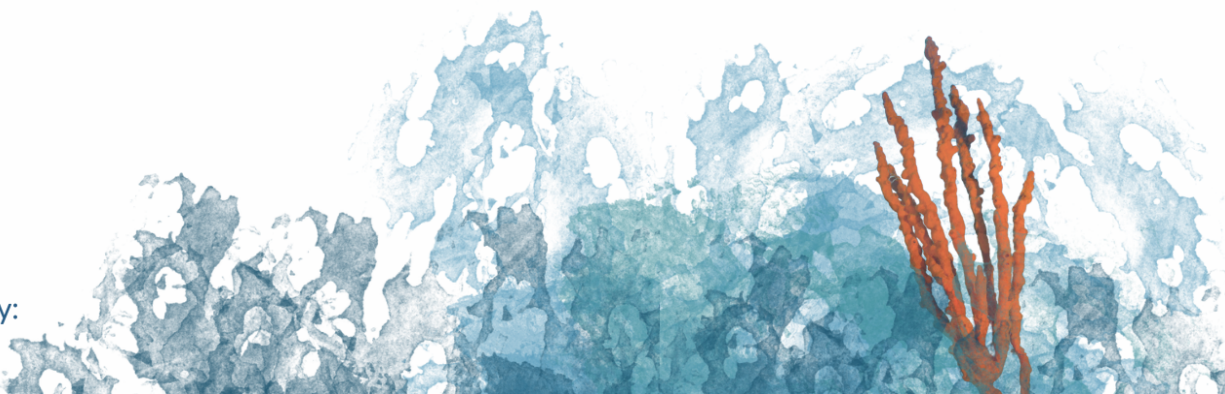


Figure 2: The spatial distribution of *Posidonia oceanica* in Erimitis area.





A.2 Defining the conservation status of *Posidonia oceanica* meadows

Posidonia oceanica meadows being the most prevalent habitat in the area and a priority habitat, information on its conservation and ecological status had been gathered to be used as a baseline. For the collection of data, 9 sampling stations were considered, distributed throughout the study area at an average depth of 15m (Figure 3), while another sampling station was considered near the Aquaculture of Kassiope (Figure 3; Station 9) to be used for comparison.

In each sampling station 4 transects of 25m were performed where the coverage of *Posidonia oceanica* to the nearest cm was noted. From each station a total of 5, 40x40cm quadrats (divided in 4 equal subquadrats; 20x20cm) were used to count the shoot density, plagiotropic rhizomes, leaf length, shoot burial, while other notes were also taken (i.e. presence of other fauna, flora, uprooted rhizomes, litter etc). Finally, 4 orthotropic shoots were collected from each quadrat (N=177), to further examine the phenological features of the leaves, epiphytes, grazing signs and photosynthetic area. While in the nearest lower limit of each station the depth and typology were recorded.

Regarding station 9, this was located ~200m from the aquaculture facility and while no *Posidonia* meadow was found in the site, the seabed appeared to be impacted by the aquaculture's outflow, with little biodiversity (i.e. presence of the bearded fireworm (*Hermodice carunculata*) in large numbers, bryozoa and anoxic sediments. Old sealths of *Posidonia* were found buried in the sediment during the extraction of corers for Blue Carbon. To further explore the past presence of *P. oceanica* in the site, the National Cadastre archive was examined for clear aerial photographs however it was unclear whether there was a meadow present. According to the locals, that was the case and therefore further search should be performed in other archives.



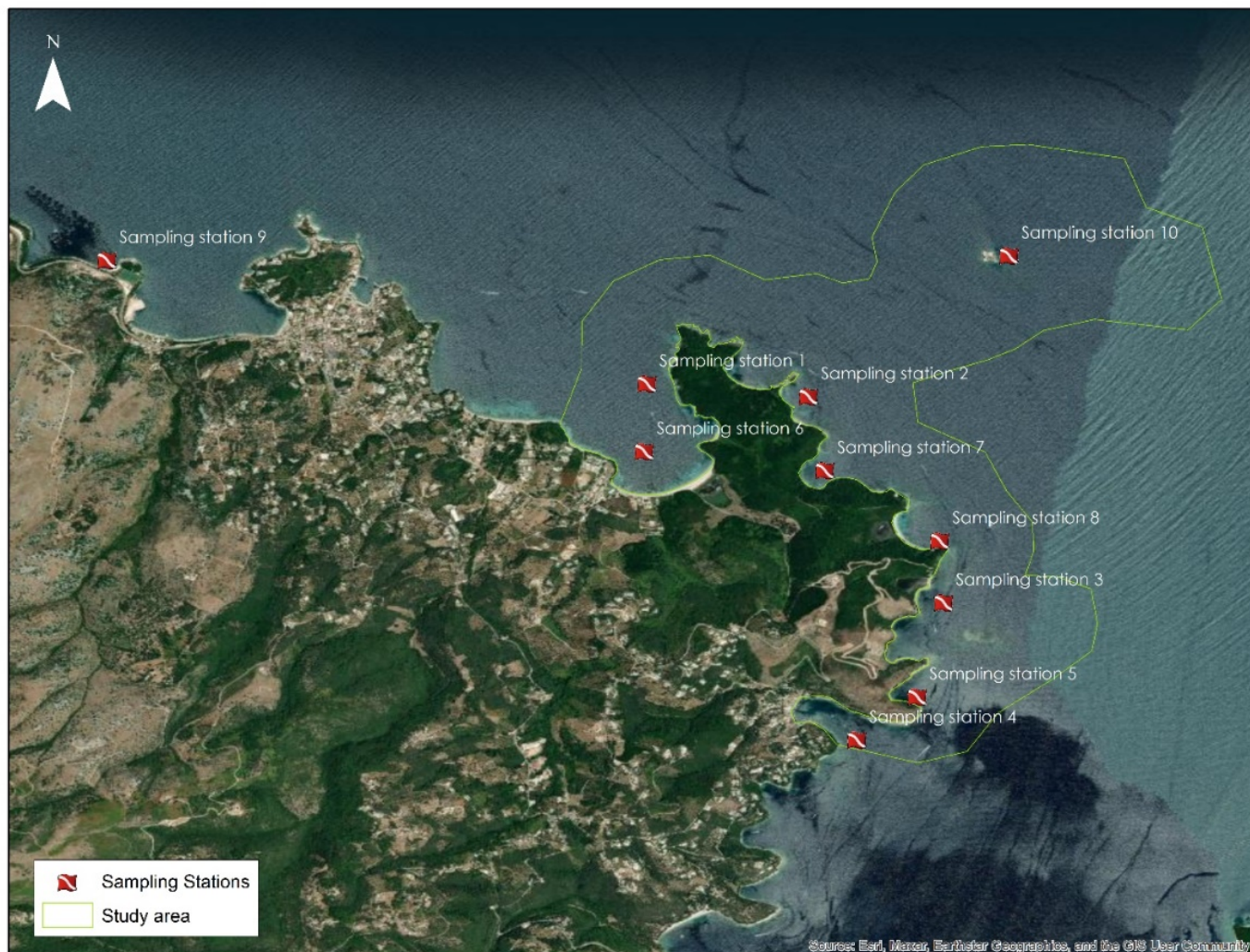
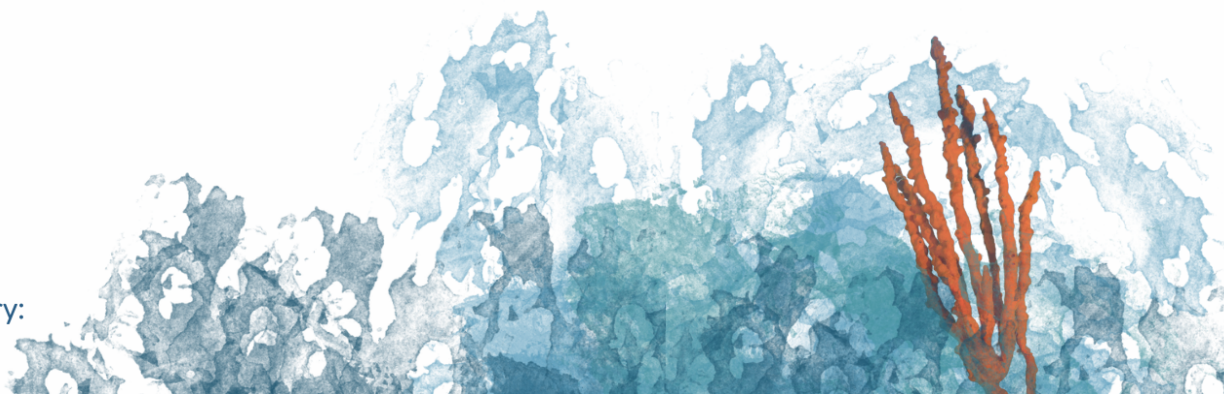


Figure 2: Erimitis sampling stations.

Table 2 provides the deep limit of the meadows in each station, along with its typology, according to the methodology of Lopez et al. (2010). The deep limit ranged from 11m in the station off St. Stefanos port (Station 4), to 43m in the station located at the off Vrwmolimni (Station 3). However, in the majority of



the stations the deep limit was at 19-20m characterised by a progressive typology (Table 2).

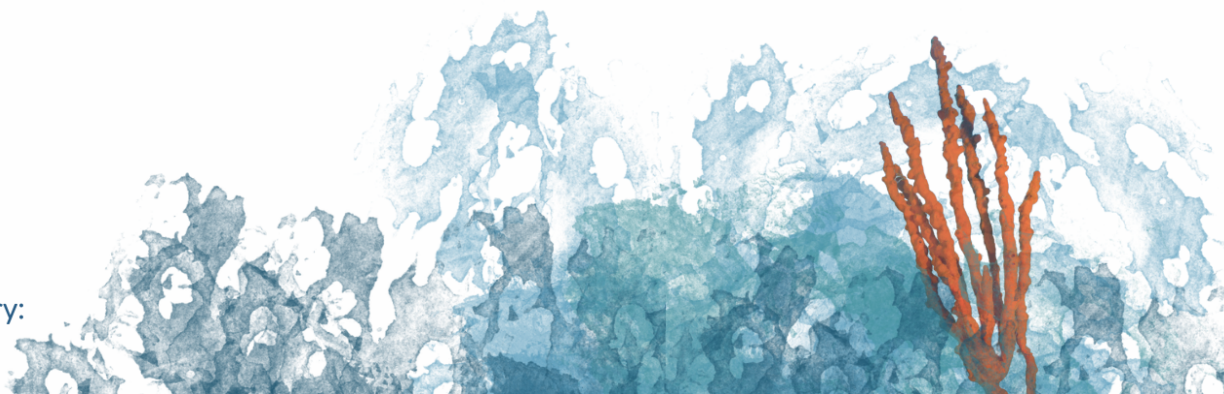
Table 2: Stations' deep limit and typology according to Lopez et al. (2010).

Station	Deep limit (m)	Deep limit typology
1	19	Progressive limit
2	19.8	Progressive limit
3	42	Progressive limit
4	11	Regressive limit
5	31	Progressive limit
6	19.4	Sharp limit low cover
7	19.5	Progressive limit
8	20	Progressive limit
10	20	Progressive limit

The CI and BiPo indexes that were estimated for the 9 stations with Posidonia are presented in Table 3, using the metrics obtained during fieldwork. The values of CI ranged from 0.79 to 1.00 indicating between a "Good conservation status" and a "High conservation status" of the meadows at the study locations. On the contrary, the ecological status of the meadows ranked lower according to the BiPo index, with an average of 0.53, showcasing a "Moderate ecological status" and "Good ecological status". Unsurprisingly, the bay of St. Stefanos (Station 4) which contains a port, was the location with the lowest Ecological Quality Ratio (EQR)', and Avlaki bay (Station 6) located in an area with coastal development, both ranked as having a "Moderate conservation status". The highest rank for BiPo (0.88) was from the area off Station 3 located at Vrwmolimni, which is the area in which the government has recently issued a permit for the construction of a Marina. The lowest BiPo value (0.41) that concluded to a "Moderate ecological status", was observed in sampling station 4 which is the area near Agios Stefanos Harbour.

Table 3: CI and BiPo indexes in Erimitis' stations.

Station	CI	EQR Class	BiPo	EQR Class
1	1.00	High conservation status	0.62	Good ecological status
2	1.00	High conservation status	0.57	Good ecological status
3	1.00	High conservation status	0.88	High ecological status
4	1.00	High conservation status	0.41	Moderate ecological status
5	1.00	High conservation status	0.70	Good ecological status





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6	0.95	High conservation status	0.51	Moderate ecological status
7	0.79	Good conservation status	0.57	Good ecological status
8	0.97	High conservation status	0.63	Good ecological status
10	1.00	High conservation status	0.68	Good ecological status

Other parameters were computed such as the foliar surface (total leaf surface area), photosynthetic leaf surface (leaf surface excluding brown areas and base), and rhizome stripping (length of exposed roots) for each sampling station, along with the percentage of the surveyed leaves that were grazed, plagiotropic (lateral growth) or had lost their apex (coefficient A) (Table 4). The percentage of matte morte (dead Posidonia) was also calculated for each station. Regarding foliar surface area, the mean value for all stations was 386.4 cm², with the largest mean observed in station 6 (448.8 cm²) and the lowest in station 2 (310.8 cm²). The mean photosynthetic leaf surface for all stations combined was calculated as 352.5 cm², while again the highest mean of this value was observed in station 6 (414.2 cm²) and the lowest in station 2 (269.4 cm²). Grazing signs were low throughout the sampled sites (average of 4.9%) however, in the 3rd station 10.42% of the surveyed leaves had grazing signs (highest value). On average, 18.3% of the leaves surveyed in all stations were missing their apex (coefficient A), while the highest percentage of this value was observed in station 4 and 10, with 30.5% and 43.3% respectively. Matte morte was only observed in three sampling stations (6,7 and 8) with the highest percentage observed in station 7 (21%). Finally, regarding rhizome stripping, the mean value for the whole study area was calculated as 5.4cm.

Table 4: Mean values for phenological parameters computed in each sampling station.

Sampling station	Mean Foliar surface (cm ²)	SD of Mean Foliar surface (cm ²)	Mean Photosynthetic leaf surface (cm ²)	SD of Mean Photosynthetic leaf surface (cm ²)	Grazing signs (%)	Mean Coefficient A (%) (cut leaves)	Plagiotropic (%)	Matte morte (%)	Mean Rhizome Stripping/ Burial (cm)
1	359.1	131.32	325.1	113.76	2.15	15.1	12.9	0	4.4
2	310.8	148.35	269.4	134.74	7.69	16.5	9.8	0	5.5
3	435.3	205.98	408.4	197.15	10.42	20.8	18.0	0	4.1
4	346.7	146.39	312.9	128.17	7.32	30.5	8.7	0	4.2
5	427.7	184.49	399.7	177.53	1.53	2.3	15.9	0	6.5





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6	448.8	167.27	414.2	158.12	4.88	10.6	11.0	5	6.1
7	333.2	140.65	299.4	134.30	4.04	13.1	16.1	21	4.0
8	437.6	170.10	407.0	158.54	4.00	13.0	15.1	3	5.5
10	378.4	181.47	335.8	173.98	2.06	43.3	21.9	0	7.9

Epiphytes were observed in all collected rhizomes however their biomass was not considered for comparison and thus are not mentioned here.

From field observations, in various stations the effects of anchoring and pollution were evident, with the ecological status of Bipo index concurring. Specifically, station 7 (Arias bay) had the most evident impacts from anchoring with the highest percentage of matte morte (21%), with scars being very recent and many uprooted rhizomes. In accordance with the previous observations, station 7 was assessed as "Good" with the value of 0.57 according to the EQR range of values (Lopez et al., 2010), though being very close to the upper limit value of the "Moderate" status of 0.549. This indicates that we cannot conclude with certainty whether the conditions of the area are actually in a "Good" or "Moderate" state due to the minor deviation. Similarly, station 2 displays the same outcome in the EQR status but with no evident anchoring scars in the area. Avlaki bay (Station 6) exhibits a "Moderate ecological status" with the value of 0,51, which is also very close to the lower limit value of "Good" status (0,55). While pollution was mostly evident in sampling station 4 (St. Stefanos harbour); with litter items being observed, while mucous aggregates were covering the meadows from 10-14m of depth. We suspect that this mucous blanket was caused by a brown algae *Acinetospora crinite*, however microscopic observation is needed for species identification. The mucous structure appeared anchored to the upper portion of the leaves, whereas the lower shoot portions and shoots were not impacted similar to the reports of Sartoni and Sonni, (1992) and Lorenti et al., (2005). Such phenomena are related to higher nutrient concentrations in combination with low hydrodynamic conditions and typically occur during spring and summer months for short periods up to two months (Lorenti et al., 2005). The ecological and conservation status of Posidonia meadows is characterised as "Good" to "High" apart from Avlaki bay (Station 6) and St. Stefanos (Station 4) which are more urbanised stressing the need to preserve them as they are, avoiding infrastructures that will pose a threat to the meadows.

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Considering that the ecological and conservation status is characterised by a range of values, the status of a station very close to limit values does not indicate a precise representation of the ecological conditions of its classified status, and so displaying an unreliable outcome. Therefore, further parameters such as pollution, anchoring and hydrodynamic conditions but also parameters as its the photosynthetic foliar surface, are being used to characterise the conditions present in the area, in addition to the ecological status, concluding to a more comprehensive perspective.

Presence and abundance of other priority habitats and species

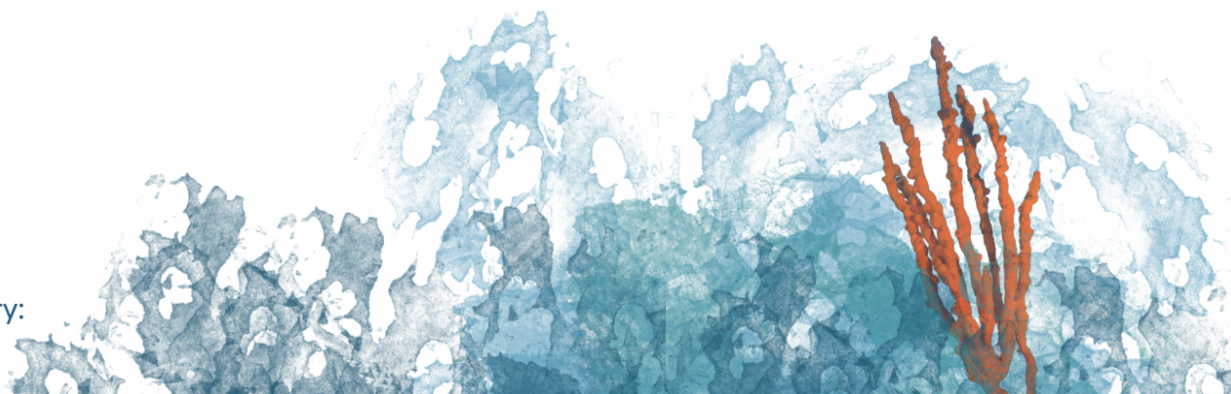
B.1 Exploratory dives to identify presence of priority species and habitats

Two exploratory dives were performed in the rocky reefs surrounding the small islets within the study area. Observed species were recorded, photographed, and identified to species level. The identified records were uploaded on the [iNaturalist](#) platform to be accessible to anyone in the project [SaveErimitis](#).

To create a checklist for all species recorded in the area, a bibliographic search was performed, to account for species that were not present during the exploratory dives and to provide a better representation of the existing fauna and flora in the area (present study; Papadopoulou, 2020; Naasan Aga Spyridopoulou et al., 2021; Frantzis et al., 2002; iNaturalist, 2023; Casale and Margaritoulis, 2010; Jančič et al., 2022). Finally, records of occurrence for other species in Erimitis region were downloaded from iNaturalist. As this was a checklist focusing on the marine extent of Erimitis, only the records of marine species were extracted and used for the checklist.

The species and habitats checklist for the area (Annex 1) was formulated using the mentioned sources and includes the legal status of each species/habitat on a national, regional/European, and international level as well as the Mediterranean IUCN status (for species).

In total 167 marine species, of which 152 fauna and 15 flora species, were identified as being present in Erimitis study area (Annex I). The fauna species included fishes (76 spp. 50% of fauna), mollusks (33 spp. 21% of fauna), echinoderms (8 spp.), marine mammals and reptiles (5 spp.), and others (27 spp. 17% of fauna). Regarding the IUCN status of the species for the Mediterranean, 3 species are in a threatened category (VU. EN. CR), 1 'Near





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Threatened', 64 'Least Concerned' and 6 'Data Deficient' while more than 50% (91 spp.) are not evaluated. Fifteen species of fauna and two species of flora present are protected on a national and/or European level. These are as follows.

Fauna: Common Dolphin (*Delphinus delphis*), Bottlenose dolphin (*Tursiops truncatus*), Cuvier's Beaked Whale (*Ziphius cavirostris*), Loggerhead Turtle (*Caretta caretta*), Green Turtle (*Chelonia mydas*), Dusky Grouper (*Epinephelus marginatus*), Parrotfish (*Sparisoma cretense*), Cleaver wrasse (*Xyrichtys novacula*), Fan Mussel (*Pinna nobilis*), Spiny Fan Mussel (*Pinna rudis*), Giant Tun Snail (*Tonna galea*), *Ophidiaster ophidianus*, *Paracentrotus lividus*, *Aplysina Aerophoba*, and *Balanophyllia europaea*.

Flora: *Posidonia oceanica* and Little Neptune Grass (*Cymodocea nodosa*)

Regarding the marine habitats present in the studied area, we found the existence of five habitat types. Out of these, two are listed in Annex I of the Bern Convention while three are listed in Annex I of the Habitats Directive (92/43/EEC), of which *Posidonia* beds and Coastal lagoons are considered priority habitats.

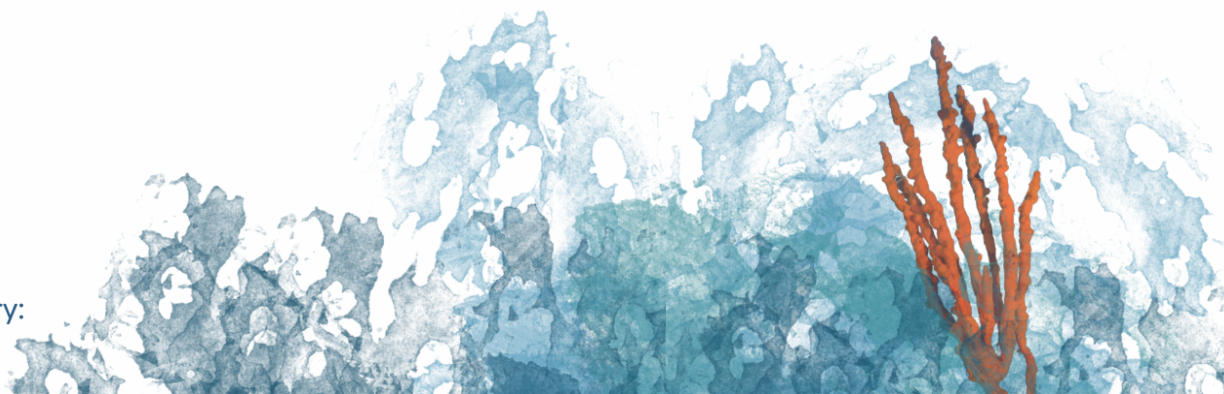
Construction of an inventory of the knowledge

C.1 Creation of an inventory of the knowledge regarding the priority habitat of *Posidonia* meadows (mapping, conservation status)

The data collected during the fieldwork concerning *Posidonia oceanica* and presented in this report were compiled in an inventory of knowledge dedicated to this priority habitat. The inventory of knowledge will constitute a report with information on a) the extent, b) distribution and c) conservation/ecological status of the meadows using the metrics obtained during the fieldwork. The report has been drafted and currently is undergoing graphic design and will be ready by the end of January 2024. There will be two versions one in Greek and one in English to be shared with local stakeholders and serve as a baseline for the Natura2000 site future proposal.

Blue Carbon samplings

During 2022, iSea started preliminary work on Blue Carbon in Erimitis. During this year's field trip a total of 7 corers were obtained from *Posidonia* meadows, 2





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samples of sand (Station 10), and 2 samples in Station 8 (aquaculture sample). As iSea aims to continue working in the area, we aim to obtain more samples next year and analyse them in collaboration and with guidance from the BMF Blue Carbon team.

D.1 Communication of the project in Social Media, iSea's website, etc.

For the communication of the project, a dedicated page was created on iSea's website (both in [English](#) and [Greek](#)) aiming to present the project's objectives and main outcomes. The page will be updated with this year's results and will be communicated in social media from iSea's accounts. The Layman's report on the Inventory of Knowledge will be also published and communicated in collaboration with Blue Marine Foundation and Ionian Environment Foundation perhaps with a press release. So far one [press release](#) with the title 'Prioritising the underwater beauty of Erimitis, NE Corfu' was published in July in both languages, announcing the beginning of the project leading to the publication of 7 articles in mass media.

Coordination of the project

D.2 Monitoring the project actions, ensuring high-quality deliverables, and reporting

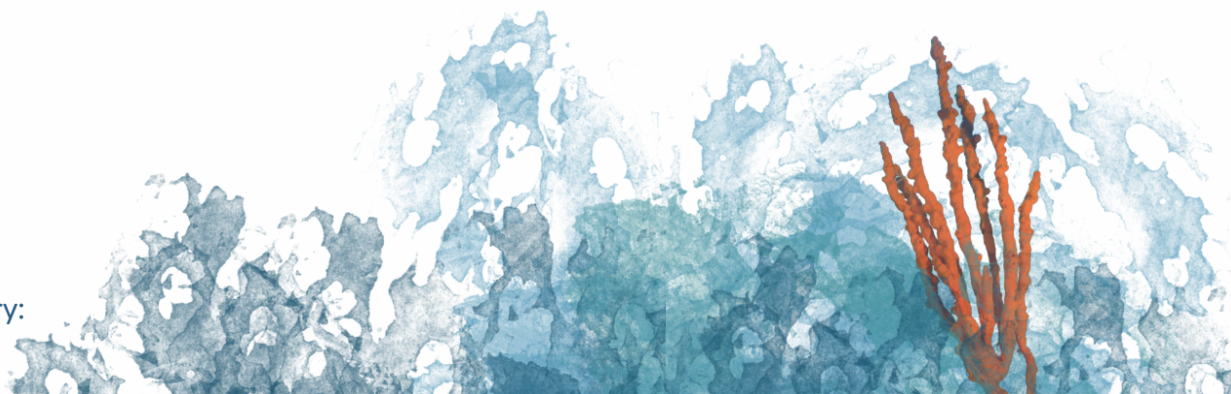
The project manager assigned to this project is responsible for closely monitoring its actions and ensuring their timely implementation by the project's team. No declinations from the original timeline of the project have occurred.

D.3 Financial monitoring

The project manager, the director, and the accountant of iSea closely followed the finances of the project to ensure that the expenses correspond to the agreed budget. All original receipts are kept in iSea's headquarters and copies can be given to the funder upon request.

References

Buia, M.C., Di Martino, V., & Modigh, M. (2005). Occurrence of mucous aggregates and their impact on *Posidonia oceanica* beds. *Science of the total environment*, 353(1-3), 369-379.





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Bego., F., Malltezi, J., Kola, R., Zotaj, A. & Bino, T. (2010). Biodiversity of Butrint National Park. UNESCO and RAMSAR sites: Its status. threats and priority needs for conservation. Report. Available at:

https://www.academia.edu/28471213/Biodiversity_of_Butrint_National_Park_UNESCO_and_Ramsar_site_its_status_threats_and_priority_needs_for_conservation

Camiñas, J.A., Kaska, Y., Hochscheid, S., Casale P., Panagopoulou, A., Báez, J.C., Otero, M. M., Numa, C., Alcázar, E. 2020. Conservation of marine turtles in the Mediterranean sea [brochure]. IUCN, Malaga, Spain.

Casale, P. and Margaritoulis, D. (Eds.) (2010). Sea turtles in the Mediterranean: Distribution, threats and conservation priorities. Gland, Switzerland: IUCN. 294 pp

Coffer, M., Graybill, D, Whitman, O., Schaeffer, B., Salls, W., Zimmerman, R., Hill, V., Lebrasse, M., Li, J., Keith, D., Kaldy, J., Colarusso, P., Raulerson, G., Ward, D., & Kenworthy, W. 2023. Providing a framework for seagrass mapping in United States coastal ecosystems using high spatial resolution satellite imagery. Journal of environmental management. 337. 117669.

<https://doi.org/10.1016/j.jenvman.2023.117669>

European Environment Agency. (2023). EUNIS: European Nature Information System. Available at: <https://eunis.eea.europa.eu>. [Accessed on 06/12/2023]

Frantzis, A., Alexiadou, P., Paximadis, G., Politi, E., Gannier, A. & Corsini-Foka, M. (2002). Current knowledge of the cetacean fauna of the Greek Seas. J Cetacean Res Manage. 5. 10.47536/jcrm.v5i3.801.

Jančić, M., Salvemini, P., Holcer, D., Piroli, V., Haxhiu, I., Lazar, B., Jančić, M., Lazar, I., & Kao, J. (2022). Apparent increasing importance of Adriatic Sea as a developmental habitat for Mediterranean green sea turtles (*Chelonia mydas*). Natura Croatica. 31. 225 - 240. 10.20302/NC.2022.31.16.

IUCN. (2023). The IUCN Red List of Threatened Species. Available at: <https://www.iucnredlist.org>. [Accessed on 06/12/2023].

iNaturalist. (2023). Database of iNaturalist GR. Available at: <https://greece.inaturalist.org> [Downloaded on 06/12/2023].

Lopez y Royo, C., Casazza, G., Pergent-Martini, C., & Pergent, G. (2010). A biotic index using the seagrass *Posidonia oceanica* (BiPo). to evaluate ecological status of coastal waters. Ecological Indicators. 10(2). pp.380–389. doi: <https://doi.org/10.1016/j.ecolind.2009.07.005>.



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Mederos-Barrera, A., Marcello, J., Eugenio, F., Hernández, E. (2022). Seagrass mapping using high resolution multispectral satellite imagery: A comparison of water column correction models. *Int. J. Appl. Earth Obs. Geoinf.* 2022. 113. 102990. <https://doi.org/10.1016/j.jag.2022.102990>

Mediterranean alliance for wetlands. (2020). Letter to the Prime Minister. *Urgent action needed to protect the wetlands of the Erimitis peninsula.* Date 9th October 2020. France

Montefalcone, M. (2009). Ecosystem health assessment using the Mediterranean seagrass *Posidonia oceanica*: A review. *Ecological Indicators.* 9(4). pp.595–604. doi: <https://doi.org/10.1016/j.ecolind.2008.09.013>.

Moreno, D., Aguilera, P.A., and Castro, H. (2001). Assessment of the conservation status of seagrass (*Posidonia oceanica*) meadows: implications for monitoring strategy and the decision-making process. *Biological Conservation.* 102(3). pp.325–332. doi: [https://doi.org/10.1016/s0006-3207\(01\)00080-5](https://doi.org/10.1016/s0006-3207(01)00080-5).

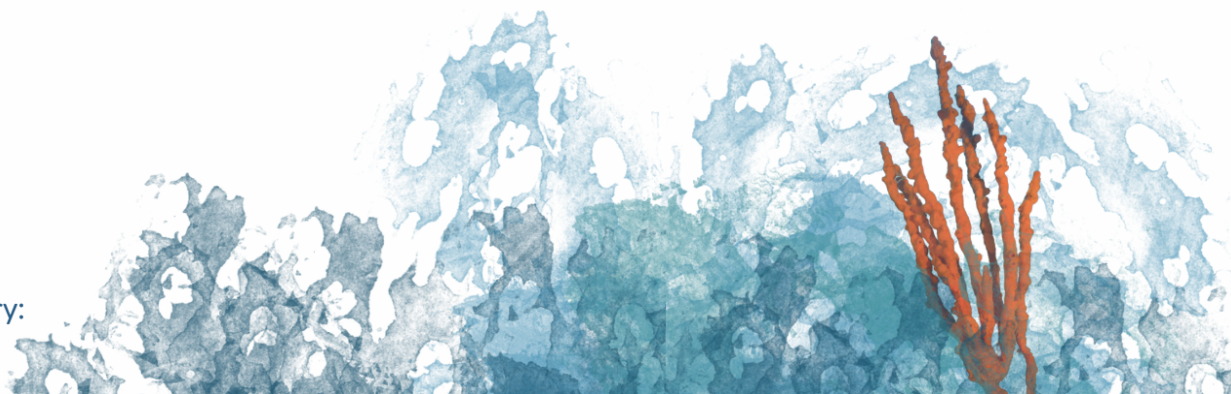
Naasan Aga Spyridopoulou, R., Gkikas, R., Giovos, I. (2021). *Posidonia oceanica* (Linnaeus) Delile. 1813 meadows of northeast Corfu.. iSea 2021. Greece. 14pp.

Papadopouou, E. (2020). The marine environment of Erimitis and a destructive port development project. (in Greek)

Pergent, G., Pergent-Martini, C., Bein, A., Dedeken, M., Oberti, P., Orsini, A., Santucci, J.F., & Short, F. (2015). Dynamic of *Posidonia oceanica* seagrass meadows in the northwestern Mediterranean: Could climate change be to blame? *Comptes Rendus Biologies.* 338(7). pp.484–493. doi:<https://doi.org/10.1016/j.crv.2015.04.011>. Zotaj, A., Bego, F., Memaj, F., Sulejman, S., Vangjeli, J., Peja, N. (2010). Butrint MP_English version_September_2010.

Poursanidis, D., & Topouzelis, K., & Chrysoulakis, N. (2018). Mapping coastal marine habitats and delineating the deep limits of the Neptune's seagrass meadows using Very High-Resolution Earth Observation data. *International Journal of Remote Sensing.* 39. <https://doi.org/10.1080/01431161.2018.1490974>.

Sartoni, G., Sonni, C. (1991). *Tribonema marinum* J Feldmann e *Acinetospora crinita* (Carmichael) Sauvageau nelle formazioni mucillaginose bentoniche osservate sulle coste toscane nell'estate 1991. *Quaderni dell'Accademia Internazionale di Scienze e Tecniche Subacquee Ustica;* 1992. p. 37– 46.





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APPENDICES

Appendix 1.1: Marine species checklist of Erimitis area

Scientific name	Common name	IUCN status Mediterranean	Legal Status	
Animalia				
Chordata				
Mammalia				
3	<i>Delphinus delphis</i>	Common Dolphin	DD	Directive 92/43/EEC Annex IV, Bern Convention Annex II, Bonn Convention Annex I & II, ACCOBAMS, ASCOBANS, CITES Annex II, Regulation No 1320/2014 Annex A, Barcelona Convention Annex II, Greek Presidential Degree 67/81
3	<i>Tursiops truncatus</i>	Bottlenose dolphin	DD	Directive 92/43/EEC Annex IV, Bern Convention Annex I (Resolution 6) & II, Bonn Convention Annex I & II, ACCOBAMS, ASCOBANS, CITES Annex II, Regulation No 1320/2014 Annex A, Barcelona Convention Annex II, Greek Presidential Degree 67/81
3	<i>Ziphius cavirostris</i>	Cuvier's Beaked Whale	DD	Directive 92/43/EEC Annex IV, Bern Convention Annex II, ACCOBAMS, ASCOBANS, CITES Annex II, Regulation No 1320/2014 Annex A, Barcelona Convention Annex II
Reptilia				
4	<i>Caretta caretta</i>	Loggerhead Turtle	NE	CITES Annex I, Directive 92/43/EEC Annex II & IV, Bern Convention Annex I (Resolution 6) & II, Bonn Convention Annex I & II, EU Regulation No 1320/2014 Annex A, Barcelona Convention Annex II, OSPAR Convention, Greek Presidential Degree 67/81
7,8	<i>Chelonia mydas</i>	Green Turtle	NE	CITES Annex I, Directive 92/43/EEC Annex II & IV, Bern Convention Annex I (Resolution 6) & II, Bonn Convention Annex I & II, EU Regulation No 1320/2014 Annex A, Barcelona Convention Annex II, Greek Presidential Degree 67/81
Actinopterygii				
2,5	<i>Aidablennius sphyinx</i>	Blenny Sphinx	LC	
1	<i>Anthias anthias</i>	Sea perch	LC	
2,5	<i>Apogon imberbis</i>	Cardinal Fish	LC	
2,5	<i>Argyrosomus regius</i>	Meagre	LC	
2,5	<i>Atherina boyeri</i>	Big-scale Sand Smelt	LC	
2,5	<i>Balistes carolinensis</i>	Grey Triggerfish	NE	
2,5	<i>Belone belone</i>	Garpike	LC	
2,5	<i>Boops boops</i>	Bogue	LC	
2,5	<i>Bothus podas</i>	Wide-eyed Flounder	LC	
2,5	<i>Chelon labrosus</i>	Thicklip Grey Mullet	LC	
2,5	<i>Chromis chromis</i>	Damselfish	LC	
1	<i>Conger conger</i>	Conger	LC	
2,5	<i>Coris julis</i>	Mediterranean Rainbow Wrasse	LC	
2,5	<i>Coryphaena hippurus</i>	Common Dolphinfish	LC	
2,5	<i>Coryphoblennius galerita</i>	Montagu's Blenny	LC	
2,5	<i>Dactylopterus volitans</i>	Flying Gurnard	LC	
1	<i>Dicentrarchus labrax</i>	Capemouth	LC	
2,5	<i>Diplodus annularis</i>	Annular bream	LC	
2,5	<i>Diplodus puntazzo</i>	Sharpnout Seabream	LC	
2,5	<i>Diplodus sargus</i>	White seabream	NE	
2,5	<i>Diplodus vulgaris</i>	Common Two-banded Seabream	LC	
1	<i>Epinephelus costae</i>	Goldblotch grouper	DD	
2,5	<i>Epinephelus marginatus</i>	Dusky Grouper	EN	Bern Convention Annex III, Barcelona Convention (SPA/BD Protocol) Annex I
2,5	<i>Gobius cobitis</i>	Giant Goby	LC	
2,5	<i>Gobius geniporus</i>	Slender Goby	LC	
2,5	<i>Gobius incognitus</i>	Incognito Goby	NE	
1	<i>Gobius luteus</i>	Golden goby	LC	
1	<i>Labrus bimaculatus</i>	Cuckoo wrasse	LC	
1	<i>Labrus merula</i>		LC	
1	<i>Labrus viridis</i>		VU	
2,5	<i>Lagocephalus scleratus</i>	Silver Puffer (invasive species)	NE	
2,5	<i>Lepadogaster lepadogaster purpurea</i>	Shore Clingfish	NE	
6	<i>Lithognathus mormyrus</i>	Striped Seabream	LC	
1	<i>Mugil cephalus</i>	Black true mullet	LC	
2,5	<i>Mullus barbatus</i>	Red Mullet	LC	

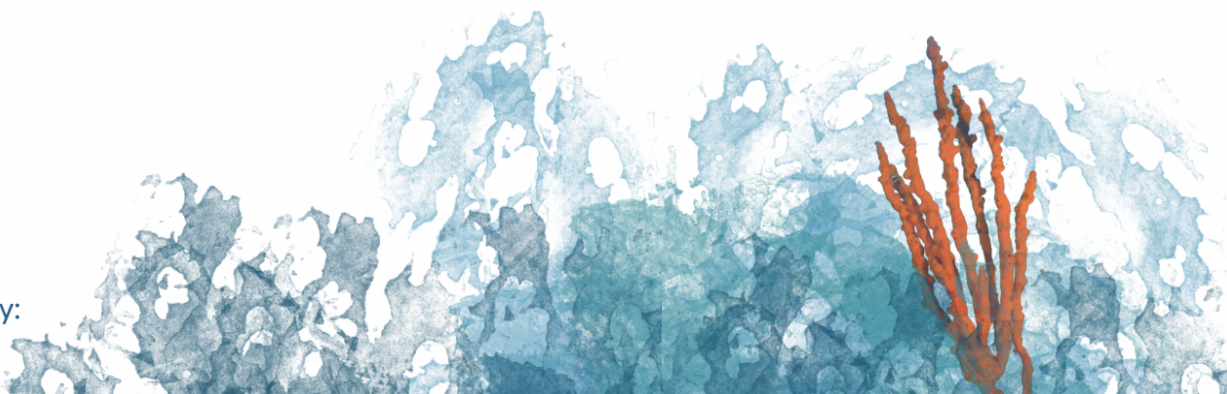
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2,5	<i>Mullus surmuletus</i>	Striped Red Mullet	LC	
2,5	<i>Muraena helena</i>	Black Moray	LC	
2,5	<i>Mycteroperca rubra</i>	Mottled Grouper	LC	
2,5	<i>Oblada melanurus</i>	Saddled Seabream	LC	
2,5	<i>Oedalechilus labeo</i>	Boxlip Mullet	LC	
2,5	<i>Pagellus acarne</i>	Axillary Seabream	LC	
2,5	<i>Pagellus erythrinus</i>	Becker	LC	
2,5	<i>Parablennius gattorugine</i>	Tompot Blenny	LC	
2,5	<i>Parablennius sanguinolentus</i>	Rusty Blenny	LC	
2,5	<i>Parablennius zvonimiri</i>	Zvonimir's blenny	NE	
2,5	<i>Pomatomus saltatrix</i>	Bluefish	LC	
2,5	<i>Pseudocaranx dentex</i>	White Trevally	DD	
2,5	<i>Salaria pavo</i>	Peacock Blenny	LC	
2,5	<i>Sarpa salpa</i>	Karanteen	LC	
6	<i>Sciaena umbra</i>	Brown meagre	NT	
2,5	<i>Scorpaena maderensis</i>	Madeira Rockfish	LC	
6	<i>Scorpaena notata</i>	Small red scorpionfish	LC	
1	<i>Scorpaena scrofa</i>	Large-scaled scorpion fish	LC	
1	<i>Seriola dumerili</i>	Greater amberjack	LC	
1	<i>Serranus cabrilla</i>	Comber	LC	
2,5	<i>Serranus scriba</i>	Painted Comber	LC	
2,5	<i>Siganus luridus</i>	Dusky Spinefoot	NE	
2,5	<i>Sparisoma cretense</i>	Parrotfish	NE	Greek Presidential Degree 67/81
2,5	<i>Sparus aurata</i>	Gilt-head Seabream	LC	
2,5	<i>Sphyrna viridensis</i>	Yellowmouth Barracuda	LC	
2,5	<i>Symphodus mediterraneus</i>	Axillary Wrasse	LC	
6	<i>Symphodus melanocercus</i>	Blacktailed Wrasse	LC	
2,5	<i>Symphodus ocellatus</i>	Ocellated Wrasse	LC	
2,5	<i>Symphodus roissali</i>	Five-spotted Wrasse	LC	
2,5	<i>Symphodus rostratus</i>	Pointed-snout Wrasse	LC	
2,5	<i>Symphodus tinca</i>	East Atlantic Peacock Wrasse	LC	
1	<i>Synodus saurus</i>	Atlantic lizardfish	LC	
2,5	<i>Thalassoma pavo</i>	Ornate Wrasse	LC	
2,5	<i>Trachinotus ovatus</i>	Pompano	LC	
2,5	<i>Trachinus araneus</i>	Spotted Weever	LC	
2,5	<i>Trachipterus trachipterus</i>	Mediterranean Dealfish	DD	
2,5	<i>Trachurus trachurus</i>	Atlantic Horse Mackerel	LC	
6	<i>Tripterygion melanurus</i>	Small Triplefin Blenny	LC	
1	<i>Tripterygion tripteronotum</i>		LC	
1	<i>Uranoscopus scaber</i>	Atlantic stargazer	LC	
2,5	<i>Xyrichtys novacula</i>	Cleaver wrasse	LC	Greek Presidential Degree 67/81
Mollusca				
2,5	<i>Arca noae</i>	Noah's Ark shell	NE	
1	<i>Callochiton spp.</i>		NE	
2,5	<i>Cerithium nodulosum</i>		NE	
2,5	<i>Cerithium vulgatum</i>	Horn Shell	NE	
2,5	<i>Chama gryphoides</i>	Jewel boxes	NE	
2,5	<i>Columbella rustica</i>	Rustic Dove-shell	NE	
2,5	<i>Conus mediterraneus</i>	Mediterranean Cone Snail	NE	
1	<i>Diadora spp.</i>			
2,5	<i>Donacilla cornea</i>		NE	
2,5	<i>Episcomitra cornicula</i>		NE	
2,5	<i>Felimare picta</i>	Regal Sea Goddess	NE	
2,5	<i>Glycymeris glycymeris</i>	European Bittersweet Clam	NE	
2,5	<i>Haliotis tuberculata</i>	Green Ormer	NE	
6	<i>Hexaplex trunculus</i>		NE	



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1	<i>Lepidochitona cinerea</i>		NE	
2,5	<i>Lithophaga lithophaga</i>	Date Shell	NE	
2,5	<i>Muricidae spp.</i>	Murex Snails		
6	<i>Octopus vulgaris</i>	Common Octopus	NE	
1	<i>Osillinus turbinatus</i>		NE	
2,5	<i>Ostrea stentina</i>	True Oysters	NE	
2,5	<i>Patella caerulea</i>		NE	
2,5	<i>Patella caerulea</i>	Mediterranean Limpet	NE	
2,5	<i>Patella rustica</i>		NE	
1	<i>Patella vulgata</i>		NE	
2,5	<i>Phorcus spp.</i>			
2,5	<i>Phorcus turbinatus</i>	Turbinate Monodont	NE	
2	<i>Pinna nobilis</i>	Fan Mussel	CR	Directive 92/43/EEC (EU Habitats Directive) Annex IV, Barcelona Convention (SPA/BD Protocol) Annex II, Greek Presidential Degree 67/81
2	<i>Pinna rudis</i>	Spiny Fan Mussel	NE	Bern Convention Annex II, Barcelona Convention (SPA/BD Protocol) Annex II
2	<i>Semicassis undulata</i>	Mediterranean bonnet snail	NE	
2	<i>Sepia officinalis</i>	European Common Cuttlefish	NE	
6	<i>Spondylus gaederopus</i>	European Thorny Oyster	NE	
2	<i>Steromphala spp.</i>			
2	<i>Tonna galea</i>	Giant Tun Snail	NE	Bern Convention Annex II, Barcelona Convention (SPA/BD Protocol) Annex II
1	Echinodermata			
6	<i>Arbacia lixula</i>		NE	
1	<i>Coscinasterias tenuispina</i>		NE	
1	<i>Echinaster sepositus</i>		NE	
1	<i>Holothuria forskali</i>	Sea Cucumber	NE	
1	<i>Ophiaster ophidianus</i>		NE	Bern Convention Annex II, Barcelona Convention Annex II
1	<i>Ophioderma longicauda</i>	Brittle Star	NE	
1	<i>Paracentrotus lividus</i>		NE	Bern Convention Annex II
1	<i>Sphaerechinus granularis</i>		NE	
	Tunicata			
1	<i>Halocynthia papillosa</i>		NE	
	Bryozoa			
6	<i>Electra posidoniae</i>		NE	
6	<i>Reptadeonella violacea</i>		NE	
	Porifera			
1	<i>Aplysina Aerophoba</i>		NE	Barcelona Convention Annex II
6	<i>Chondrilla nucula</i>		NE	
1	<i>Chondrosia reniformis</i>		NE	
6	<i>Cliona schmidtii</i>		NE	
6	<i>Cliona rickardus</i>		NE	
6	<i>Cliona viridis</i>		NE	
1	<i>Crambe crambe</i>		NE	
1	<i>Hemimycale columella</i>		NE	
1	<i>Ircinia spp.</i>		NE	
6	<i>Ircinia variabilis</i>		NE	
1	<i>Oscarella lobularis</i>		NE	
1	<i>Petrosia ficiformis</i>		NE	
6	<i>Sarcotragus spinosulus</i>	Black Leather Sponge	NE	
6	<i>Spirastrella cunctatrix</i>		NE	
	Cnidaria			
1	<i>Actinia equina</i>	Beadlet anemone	NE	
1	<i>Anemonia viridis</i>		LC	
6	<i>Balanophyllia europaea</i>		NE	CITES Annex II
1	<i>Thecocalus sp.</i>		NE	
	Annelida			
1	<i>Hermodice carunculata</i>	Bearded Fireworm	NE	
1	<i>Protula intestinum</i>	Blood Red Tubeworm	NE	



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6	<i>Protula tubularia</i>	Smooth Tubeworm	NE	
6	<i>Sabella spallanzanii</i>	Mediterranean Fanworm	NE	
6	<i>Serpula vermicularis</i>	Serpulid Worm	NE	
1	<i>Spirorbis spirorbis</i>	Sinistral Spiral Tubeworm	NE	
	Arthropoda		NE	
6	<i>Balanus perforatus</i>	Barnacle	NE	
6	<i>Maja crispata</i>	Lesser Spider Crab	NE	
6	<i>Pachygrapsus marmoratus</i>	Marbled Crab	NE	
	Plantae			
	Tracheophyta			
2,5	<i>Posidonia oceanica</i>	Neptune Grass	LC	Directive 92/43/EEC (EU Habitats Directive) Annex I
1	<i>Cymodocea nodosa</i>	Little Neptune Grass	NE	Bern Convention Annex I, Barcelona Convention Annex II
	Rhodophyta			
2	<i>Corallina officinalis</i>	Common Coral Weed	NE	
1	<i>Dasya corymbifera</i>		NE	
2	<i>Florideophyceae spp.</i>	Florideophycean Algae		
2	<i>Galaxaura rugosa</i>		NE	
1	<i>Jania rubens</i>		NE	
2	<i>Liagora ceranoides</i>		NE	
2	<i>Liagora viscida</i>		NE	
1	<i>Lithophyllum incrustans</i>		NE	
2	<i>Peyssonnelia spp.</i>			
2	<i>Tricleocarpa fragilis</i>		NE	
	Chlorophyta			
2	<i>Acetabularia acetabulum</i>	Mermaid's wine glass	NE	
1	<i>Codium bursa</i>		NE	
1	<i>Codium fragile</i>		NE	
	Chromista			
	Ochrophyta			
1	<i>Colpomenia sinuosa</i>		NE	
1	<i>Cystocleira spp.</i>		NE	

Appendix 1.2: Habitat types identified in Erimitis area surveyed

Habitat Name	Habitat Code	Extent	Legislation
5 Posidonia beds (<i>Posidonia oceanica</i>)	1120	0.62 sq.km	EU Habitats Directive- Annex I habitat type (code 1120), Habitat type - Priority
1,5 Coastal lagoons	1150	NA	EU Habitats Directive- Annex I habitat type (code 1150) Habitat type- Priority
1,5 Reefs	1170	NA	EU Habitats Directive - Annex I habitat type (code 1170) Habitat type Not priority Natura 2000 sites 1157 are designated for this habitat type
5 Sublittoral mixed sediments	A5.4	NA	Bern convention (included in a Resolution 4 habitat type at a higher level - A5), Relation to Annex I habitat types (EU Habitats Directive)
5 Littoral sand and muddy sand	A2.2	NA	Bern convention Annex I, Relation to Habitats Directive 92/43/EEC Annex I

References

- Naasan Aga Spyridopoulou, R., Gkikas, R., Giovos, I. *Posidonia oceanica* (Linnaeus) Delile, 1813 meadows of northeast Corfu., iSea 2021, Greece, 14pp.
- iNaturalist. (2023). Database of iNaturalist GR. Available at: <https://greece.inaturalist.org> [Downloaded on 06/12/2023].
- Frantzis, A., Alexiadou, P., Paximadis, G., Politi, E., Gannier, A. & Corsini-Foka, M. (2002). Current knowledge of the cetacean fauna of the Greek Seas. *J Cetacean Res Manage*, 5. 10.47536/jcrm.v5i3.801.
- Casale, P. and Margaritoulis, D. (Eds.) (2010). *Sea turtles in the Mediterranean: Distribution, threats and conservation priorities*. Gland, Switzerland: IUCN. 294 pp
- iSea 2023 Repositioning Project Mapping
- Papadopoulou, E.. 2020. The marine environment of Erimitis and a destructive port development project. (in Greek)
- Jančić, Matic & Salvemini, Pasquale & Holcer, Draško & Piroli, Vilma & Haxhiu, Idriz & Lazar, Bojan & Jančić, M & Lazar, I & Kao, Jadranskog. (2022). Apparent increasing importance of Adriatic Sea as a developmental habitat for Mediterranean green sea turtles (*Chelonia mydas*). *Natura Croatica*. 31. 225 - 240. 10.20302/NC.2022.31.16.



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8 Camiñas, J.A.; Kaska, Y.; Hochscheid, S.; Casale P.; Panagopoulou, A.; Báez, J.C.; Otero, M. M.; Numa, C., Alcázar, E. 2020. Conservation of marine turtles in the Mediterranean sea [brochure]. IUCN, Malaga, Spain.

Other references

European Environment Agency. (2023). EUNIS: European Nature Information System. Available at: <https://eunis.eea.europa.eu>. [Accessed on 06/12/2023]

IUCN. (2023). The IUCN Red List of Threatened Species. Available at: <https://www.iucnredlist.org>. [Accessed on 06/12/2023]

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