

By Elasmocatch

Project

FINAL REPORT



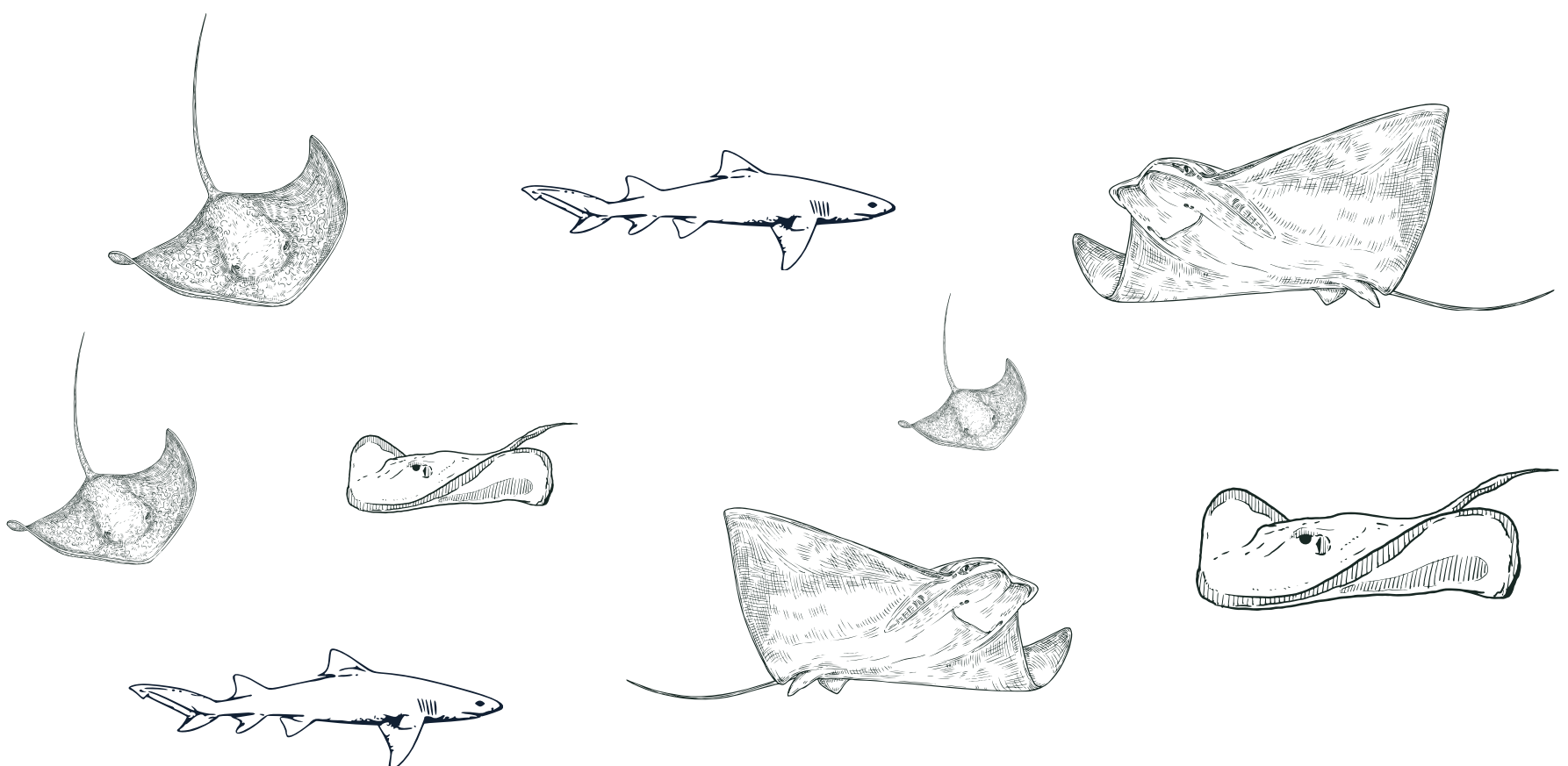
Menidi, December 2024

Citation of this report:

Ciprian M., Athinaiou I., Chouliaras T., Kajtna U., Katsaouni, Manzoni M., Giovos I. (2024). By Elasmocatch Final Report. iSea, Environmental Organisation for the preservation of the Aquatic Ecosystems, Menidi, December 2024.

Photos:

iSea



Contact person:

Martina Ciprian

iSea, Environmental Organisation for the
Preservation of the Aquatic Ecosystems
Menidi - Aitoloakarnanias, 30016, Greece

martina.ciprian@isea.com.gr

+39 3442456270

Table of contents

1

Amvrakikos Gulf

2

By Elasmocatch Project

3

Results - BRUVs

7

**Internships and
educational activities**

8

Conferences

10

Overview

11

References

Amvrakikos Gulf

The **Amvrakikos Gulf** is one of the largest semi-enclosed embayment (405 km²) in the Mediterranean Sea, located in north-western Greece. The Gulf is connected to the Ionian Sea by a narrow, shallow channel (~600 m wide), called Preveza Channel. At the northern border of the gulf, there are complex lagoon systems and an extensive delta formed by two main rivers (Arachthos and Louros) (Kountoura and Zacharias 2011). Amvrakikos Gulf is designated as a **Ramsar Site**, a **National Park**, and includes two **Natura 2000 sites**. The eastern mainland part of the gulf is also designated as a **Key Biodiversity Area** (Gonzalvo et al. 2015), **Important Bird Area** (IBA) and **Important Marine Mammal Area** (IMMA) (Giovos et al. 2023).

Eleven elasmobranch species have been recorded in the area during the By Elasmocatch Project and MECO Project, in particular 2 shark species (*Mustelus mustelus*, *Carcharhinus plumbeus*) and 9 ray species (*Aetomylaeus bovinus*, *Bathytoshia lata*, *Dasyatis marmorata*, *Dasyatis pastinaca*, *Dasyatis tortonesei*, *Gymnura altavela*, *Myliobatis aquila*, *Torpedo marmorata* and *Torpedo torpedo*). The area seems to be used all year around by the species, and it has been confirmed to be of extreme importance during critical life-stages (e.g., parturition and nursery area) (iSea, unpublished data).

This evidence recently led to the delineation of Amvrakikos Gulf as a **Shark and Ray Important Area** (ISRA) by the IUCN Shark Specialist Group for three species (*A. bovinus*, *G. altavela* and *M. mustelus*) (IUCN SSC, Shark Specialist Group, 2023. Amvrakikos Gulf ISRA Factsheet).

By Elasmocatch Project

The By Elasmocatch Project focuses on studying the biodiversity of elasmobranchs in Greece and its interactions with fisheries.

The project started in Amvrakikos Gulf (western Greece) in 2022 collecting bycatch data including observations, measurements, and samples. All samplings regarding bycatch are done according to an adjusted protocol based on “*Monitoring the Incidental catch of Vulnerable Species*” produced by FAO. In addition to the bycatch data, biological information such as morphometrics, maturity, stomach contents, vertebrae, and genetic samples are collected. Protocols also include the evaluation of short-term Post Release Mortality, which is achieved with survival tanks onboard and in landing sites, as well as a health-behavioural scoring system and is the first study of its kind implemented in Greece. In 2024, iSea started to conduct fishery-independent data in regards to abundance of the different species, using Baited Remote Underwater Video systems (BRUVs) (n = 27), drone surveys (n = 7) and visual census (n = 16). During the trials with BRUVs the species *A. bovinus*, *D. marmorata*, *D. pastinaca*, *D. tortonesei*, *G.a altavela* and *M. aquila* have been identified repeatedly.

During drone surveys only the Duckbill Eagle Ray (*A. bovinus*) has been identified, given its presence on surface waters.

In the next year, we aim to conduct more surveys using BRUVs since this methodology has been demonstrated to be efficient to obtain fishery-independent data in the area.

RESULTS

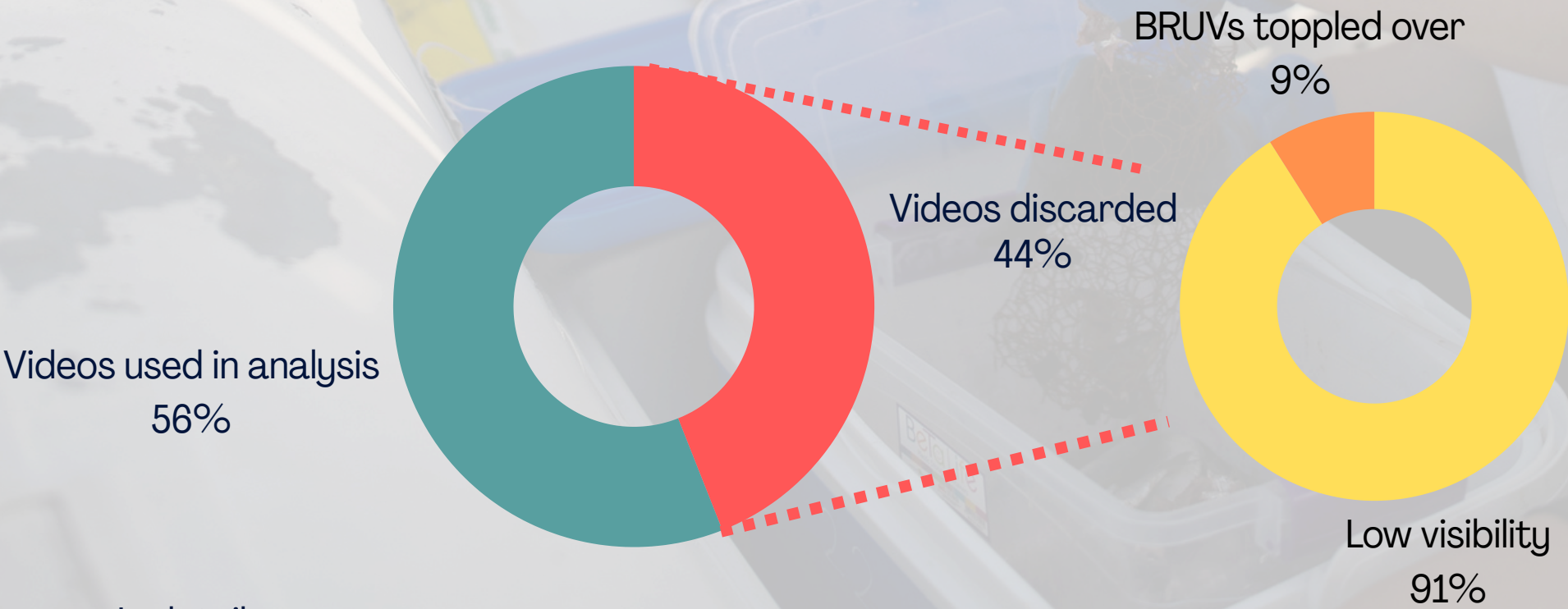
BRUVs

During summer 2024, BRUV surveys were carried out trying to cover different locations within the gulf.

Type of deployment	Number of deployments
Shallow water (2 - 4 m)	8
Medium depth (5 - 7 m)	9
Deep water (12 - 16 m)	10
TOTAL	27

➡ **12 out of 15 deployments used in analysis with recordings of elasmobranchs (80%)**

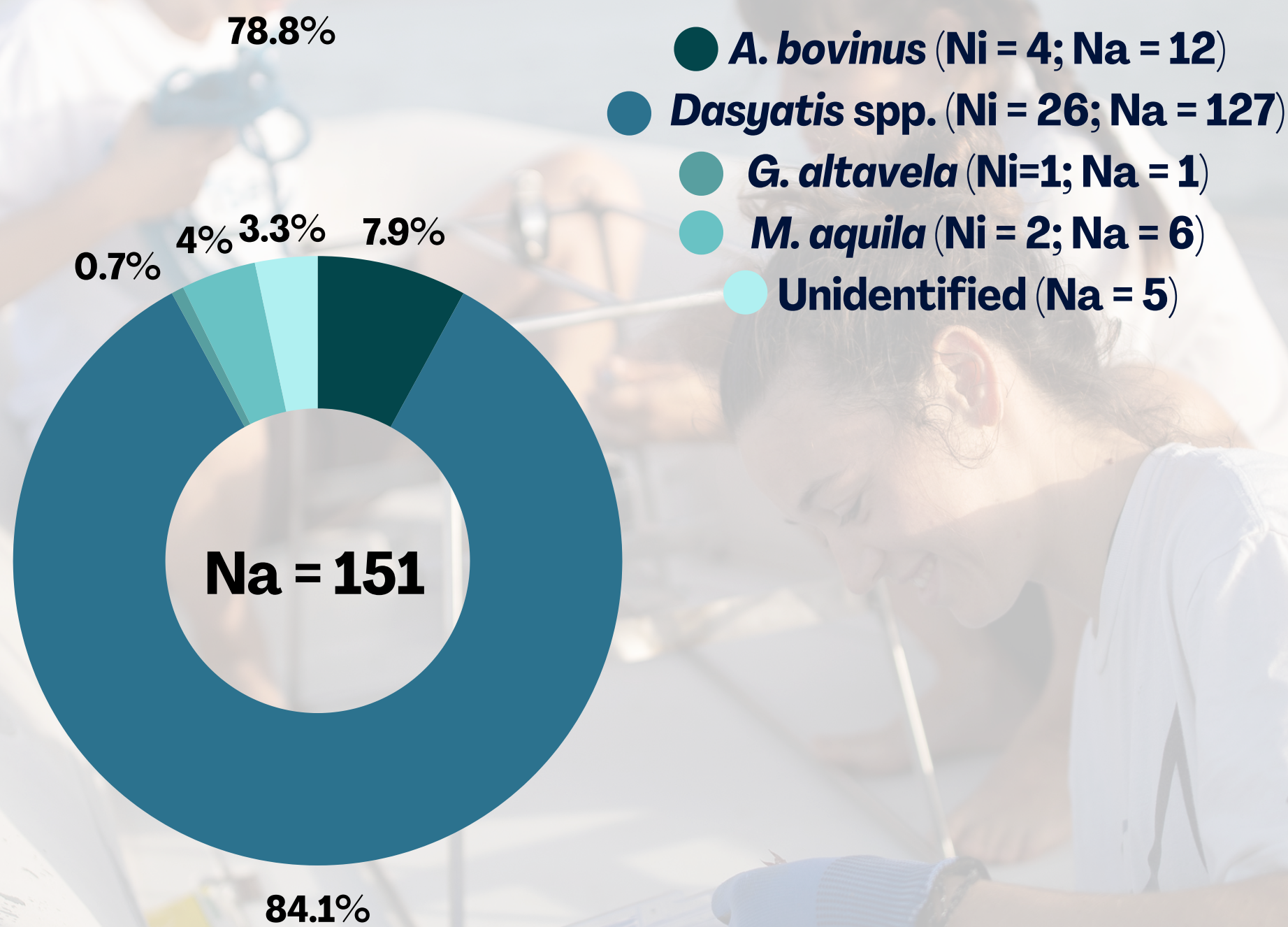
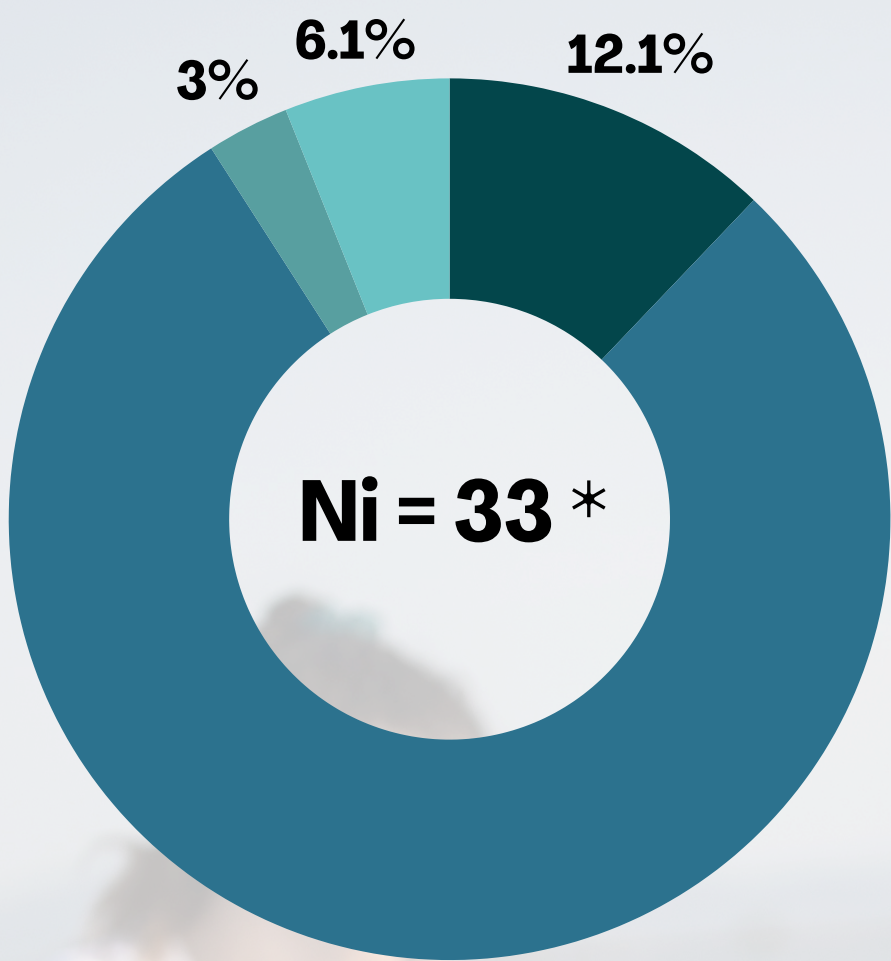
	Time (hh:mm)	Nº of deployments
Video footage used in analysis	19:01	15
Video footage discarded	15:03	12
Total video footage (bottom time)	34:04	27



In details:

- A total of 13 h 36 min (40%) discarded due to low visibilty (<1 m) = 11 out of 27 deployments;
- A total of 1 h 27 min (4%) of video footage discarded due to BRUVS toppled over = 1 out of 27 deployments

Piecharts showing the *Number of individual (Ni)* identified and the *Number of appearances (Na)*, divided by species.



- *A. bovinus* (Ni = 4; Na = 12)
- *Dasyatis* spp. (Ni = 26; Na = 127)
- *G. altavela* (Ni=1; Na = 1)
- *M. aquila* (Ni = 2; Na = 6)
- Unidentified (Na = 5)

*The number of individuals identified is 33. It was not possible to identify some of the individuals, here labelled as **Unidentified**, and recorded for a total of 5 different appearances.



The individuals identified belong to **3 families** (Myliobatidae, Dasyatidae, Gymnuridae). In particular **6 species** (*A. bovinus*, *D. mormorata*, *D. pastinaca*, *D. tortonesei*, *G. altavela* and *M. aquila*) were identified.

In the genus *Dasyatis* are included *D. mormorata*, *D. pastinaca*, *D. tortonesei* recognisable only in some video footage due to their morphological similarity.

Screen time: calculated for all elasmobranchs and per species = sum of appearance durations

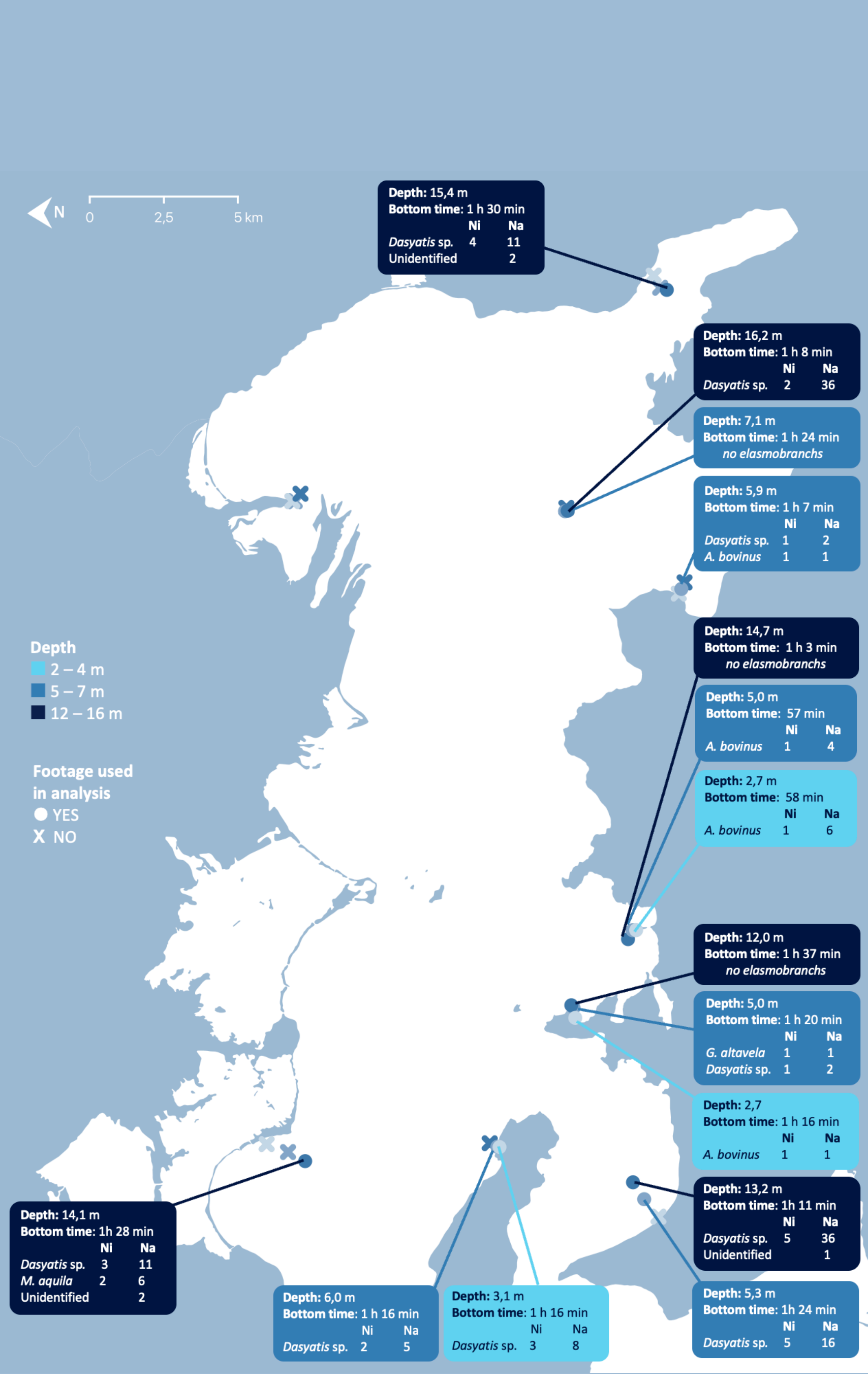
Species	Screen time (mm:ss)	% of screen time
<i>Aetomylaeus bovinus</i>	01:56	3.72 %
<i>Dasyatis</i> spp.	45:04	87.78 %
<i>Gymnura altavela</i>	00:14	0.45 %
<i>Myliobatis aquila</i>	04:03	7.80 %
Unidentified	00:39	1.25 %
TOTAL	51:56	100 %

CPUE: calculated for all elasmobranchs and per species. This was calculated by dividing the number of elasmobranch individuals divided by total hours of footage used in analysis.

Species	CPUE (n/h)
<i>Aetomylaeus bovinus</i>	0.21/h
<i>Dasyatis</i> spp.	1.37/h
<i>Gymnura altavela</i>	0.05/h
<i>Myliobatis aquila</i>	0.11/h
Unidentified	0.26/h
Elasmobranch	0.89/h

Other relevant information recorded

Maximum numbers of species recorded in single deployment: **2**
Maximum numbers of individuals recorded in single deployment: **5** (***Dasyatis*** spp.)
Other notable species: ***Caretta caretta***: **5 sightings in 2 deployments**



Ni = number of individuals, Na = number of appearances.

Internships and educational activities

Graduate and undergraduate students coming from universities of different European countries joined the program for their internships, in particular, from University of the Basque Country (Spain); Maastricht University, Maastricht (Netherlands); Université Côte d'Azur, Nice (France); Imperial College of London (United Kingdom); University of Patras (Greece); University of Primorska (Slovenia); Nantes Université (France).

Reports and thesis produced at the end of the period were related to stomach content analysis; identification of nursery areas within the gulf; recreational fishers monitoring; fishery-independent data collection and analysis; illegal captures of *Gymnura altavela*; insights into management strategies through analysis of short-term and tagging data.

During July, two events were also organised with the local community in order to share the work we are doing in Amvrakikos. Specifically, one event took place in Menidi (where the fieldbase of iSea is located) during Shark Awareness day (July 14), and the other event took place in Koronisia (July 26) during the event “Save Amvrakikos”, in which iSea team was invited to present the projects and its related activities in the gulf.

Collaborators

- Department of Fishery and Aquaculture, University of Patras (Greece), professor Dimitrios K. Moutopoulos
- Department of Biology, University of Padova (Italy), Professor Carlotta Mazzoldi
- Department of Earth and Sea Science, University of Palermo (Italy), Professor Marco Milazzo.
- Anton Dohrn Zoological Station, Naples (Italy), Doctor Carlo Cattano.

Conferences

The iSea team had the pleasure to host the European Elasmobranch Association Conference at the end of October 2024, in Thessaloniki. During the conference, the “By Elasmocatch project” team presented 3 posters and 2 talks. Moreover the work carried out in Amvrakikos Gulf within the By Elasmocatch project was presented during the GFCM Subregional Committee for the central Mediterranean within the Vulnerable Species Working Group Session

Talks

By Elasmocatch Project:
a multidisciplinary approach to improve knowledge and conservation of elasmobranchs

Ciprian M., Giovos I., Minasidis V., Ballis G., Naasan Aga Spyridopoulou R., Mazzoldi C., Moutopoulos D. K.

Funded by: Shark Foundation, ocean care, Food and Agriculture Organization of the United Nations, General Fisheries Commission for the Mediterranean

Thessaloniki, 21-24th of October 2024

TRANSCENDING 2024
EUROPEAN ELASMOBRANCH ASSOCIATION CONFERENCE

BYCATCH OF THREATENED SHARKS AND RAYS IN AMVRAKIKOS WETLANDS NATIONAL PARK, GREECE

Ciprian M., Giovos I., Naasan Aga Spyridopoulou R., Mazzoldi C., Moutopoulos D. K.

Partners: iSea, Shark Foundation, Ocean Care, FAO, GFCM

Funders: iSea, Shark Foundation, Ocean Care, FAO, GFCM

Posters

Thessaloniki, 21-24th of October 2024

EUROPEAN ELASMOBRANCH ASSOCIATION CONFERENCE

Feeding ecology and trophic levels of sharks and rays from Amvrakikos Gulf, Ionian Sea, Greece

Sánchez-Rea A.^{1,2*}, Armendariz-Zuasti I.^{1,3}, Giovos I.^{1,3,4}, Pennetta G.⁵, Ciprian M.^{1,3,4}

¹ iSea, Environmental Organisation for the Preservation of the Aquatic Ecosystems, Thessaloniki;
² Plentzia Marine Station, University of the Basque Country, Plentzia, Spain;
³ Department of Fisheries & Aquaculture, University of Patras, Mesolongi, Greece;
⁴ Department of Biology, University of Padova, Padova, Italy;
⁵ Department of Life and Environmental Sciences, Polytechnic University of Marche, Ancona, Italy.

Introduction

The role of elasmobranchs as mesopredators has received less focus in comparison with studies realized in high predators like sharks. This study aims to describe dietary habits of sharks and rays inhabiting Amvrakikos Gulf, as well as determine their trophic position.

Materials and Methods

Amvrakikos Gulf, Feb 2022 - Jan 2024. Bycatch of local small-scale fishery. Weight and counting of prey items, identification to the lowest taxonomic level possible.

Results

537 stomachs analyzed. 10 known resident elasmobranch species. 180 active small-scale fishing vessels. High bycatch of endangered species. Confirmed Nursery Area for four species.

Discussion

Diet of sharks and rays from Amvrakikos Gulf similar to diet analyses in other parts of the Mediterranean, except for *M. aquila*. Overlapping in species of genus *Dasypatis* could be explained by their display of generalist diet and similar food items composition. *A. bovinus* has the lowest feeding overlap with other species. Elasmobranchs from Amvrakikos Gulf are mesopredators. As some species have specialist diets, alteration on prey population structure could impact on their dietary habits.

Bibliography

Cortés, E. (1999). Standardized diet compositions and trophic levels of sharks. ICES Journal of Marine Science, 56: 707-717.

Acknowledgements

We would like to thank Prof. Cristina Michopoulos for the information provided on the trophic levels of prey items, which was used for the calculation of the trophic levels of elasmobranchs in the present study.

Thessaloniki, 21-24th of October 2024

EUROPEAN ELASMOBRANCH ASSOCIATION CONFERENCE

The Importance of Amvrakikos Gulf (Greece) as a Nursery Area for Sharks and Rays

Torrescasana Amador C.^{1,2}, Giovos I.^{2,3,4}, Naasan Aga-Spyridopoulou R.², Ciprian M.^{2,3,4}

¹ Maastricht Science Programme, Maastricht University, Maastricht, Netherlands
² iSea, Environmental Organization for the Preservation of the Aquatic Ecosystems, Thessaloniki, Greece
³ Department of Fisheries & Aquaculture, University of Patras, 30200, Mesolongi, Greece
⁴ Department of Biology, University of Padova, Padova, Italy

INTRODUCTION

- 10 known resident elasmobranch species
- Interviews to local fishers and aboard surveys
- Biological measurements of bycaught individuals
- Disc Width, Disc Length, Total Length
- Sex and Maturity
- QGIS and R

MATERIALS & METHODS

STUDY AREA: Amvrakikos Gulf (Greece)

RESULTS

Amomyelus brevirostris, Gymnura altavela, Mustelus mustelus, Torpedo torpedo

DISCUSSION

All life stages of *A. bovinus*, *G. altavela*, *M. mustelus* and *T. torpedo* are found in Amvrakikos. Newborns and immature individuals are interacting more with fishing activities than mature individuals. Fishery-independent research is needed to better delineate nursery hotspots in areas where fishing activities are not carried out, and possible isolation of populations inside Amvrakikos Gulf.

Bibliography

1. Gonzalez, J., Giovos, I., & Moutopoulos, D. K. (2018). Fishermen's perception on the sustainability of small-scale fisheries and dolphin-fisheries interactions in two increasingly fragile coastal ecosystems in western Greece. Aquatic Conservation: Marine and Freshwater Ecosystems, 28(1), 91-106.

2. Beck, M. W., Heck, K. L., Able, K. W., Childers, D. L., Eggleston, D. B., Gilanders, B. M., Halpern, B., Hays, C. C., Hoshino, K., & Minello, T. J. (2005). The identification, conservation, and management of estuarine and marine nurseries for fish and invertebrates: a better understanding of the habitats that serve as nurseries for marine species and the factors that create site-specific variability in nursery quality will improve conservation and management of these areas. Bioscience, 55(8), 633-641.

3. Heupel, M. R., Carlson, J. K., & Simpfendorfer, C. A. (2007). Shark nursery areas: concepts, definition, characterization and assumptions. Marine ecology progress series, 337, 287-297.

Acknowledgements

Fellow interns in Meridi (Katerina, Angia, and Ildi)

Thessaloniki, 21-24th of October 2024

EUROPEAN ELASMOBRANCH ASSOCIATION CONFERENCE

Evaluating Gear - Specific Bycatch Rates and Short-Term Post Release Mortality of the Spiny Butterfly Ray, *Gymnura altavela*, in Amvrakikos Gulf

Roussou A.^{1,2*}, Naasan Aga-Spyridopoulou R.³, Giovos I.^{1,3,4}, Ciprian M.^{1,3,4}

¹ iSea, Environmental Organization for the Preservation of the Aquatic Ecosystems, Thessaloniki, Greece;
² Université Côte d'Azur, Nice, France;
³ University of Patras, Department of Fisheries & Aquaculture, Mesolongi, Greece;
⁴ University of Padova, Department of Biology, Padova, Italy

Introduction

The Spiny Butterfly Ray (*Gymnura altavela*) is Critically Endangered in the Mediterranean, with an 80% decline over 20 years. Despite its protected status under Annex II of the Barcelona Convention, which mandates its release if accidentally captured, there are significant interactions with fishing activities that threaten its recovery. This study investigates the compliance with existing legislation, bycatch rates, and their survival after capture.

Materials & Methods

A total of 1130 small-scale fishing trips were recorded from 02/2022 to 09/2024. Live specimens were placed in tanks and health status was assessed at three intervals to evaluate short-term post-release mortality rates.

Study area

Amvrakikos Gulf (Greece)

Result

CPUE* of *G. altavela*

Trammel net (target: fishes & molluscs)	CPUE*
Trammel net (target: fishes)	0.0944
Trammel net (target: shrimps)	0.0802
Set gillnets (target: fishes)	0.0736
Set gillnets (target: elasmobranchs)	0.0333

*CPUE = individuals x km of net⁻¹ x h⁻¹

Short-term post-release mortality rates

0'	10'	40'	
Good	Fair	Moribund	Dead

22% released alive by fishers, 78% kept on board

mean disc width of captured individuals: 48.5cm

Discussion

- CPUE was lowest for set gillnets targeting elasmobranchs, suggesting specific dynamics in the Amvrakikos Gulf. More research is needed to fully understand the interaction between the different variables affecting the CPUE.
- Immediate measures to mitigate stress induced by capture can have a positive effect on their survival chances.
- Release is an affecting conservation measure, and educational programs for fishers are essential to ensure compliance.
- Long-term post release mortality needs to be assessed to determine whether individuals are truly surviving after capture.

Acknowledgements

I sincerely thank iSea and my supervisor, the interns who contributed to data collection, and the collaborating fishers for their support and cooperation.

Bibliography

- RAC/SPA. (2019). Working Document: Status of Elasmobranchs in the Mediterranean and Related Trends. Retrieved from https://www.rac-spa.org/hfp34/documents/01_working_documents/wg_461_07_en.pdf
- Walls, R.H.L., Vacchi, M., Notarbartolo di Scia, G., Serena, F., & Dulvy, N.K. (2018). *Gymnura altavela* (Mediterranean assessment). The IUCN Red List of Threatened Species 2016: e.T63153A16527909. Accessed on 29 May 2024.



Overview

iSea considers this project as a priority project and has strategically chosen to invest in the region for its ecological value, the species that have been recorded (that are understudied in Greece). Three iSea employees are living all year round in Amvrakikos, and a new office has been rented in order to host them, as well as interns and volunteers during their whole practice.

During each fieldwork that took place in the context of By Elasmocatch, iSea invested time and energy to engage with the local community and the management body aiming at sensitising them towards their role in elasmobranch conservation.

The possibility to couple fishery dependent data together with fishery independent data will allow us to have a comprehensive understanding of the species of sharks and rays present in Amvrakikos Gulf, and identify key areas, such as nursery areas and feeding ground. Fishery-independent surveys also allow us to collect stunning footage that will help in raising awareness and uplift the profile of these species through social media and local events.

More surveys will take place in 2025, exploring different areas and depths within Amvrakikos Gulf, also at different time of the day.

From October 2024, a new project has started in Amvrakikos Gulf, the LIFE PROMETHEUS, and for this reason, iSea staff will remain in the area for the next 3 years at least. The By Elasmocatch project will continue in 2025, and more funding requests are made to other funding bodies in order to cover the expenses of the staff and the costs of purchasing new and different equipment related also to fishery-independent surveys, as well as to ensure the presence of the team in the following 5 years.

References

- Giovos, I., Gonzalvo, J., Ciprian, M., Gaentlich, M., Gavriel, E., Konstas, S., Kordopatis, P., Koutsikopoulos, C., Mavrogiorgos, D., Moutopoulos, D.K., Panagopoulou, A., Papatheodorou, Ramfos, A. Amvrakikos Gulf: Biodiversity and threats. Project “Contributing to the effective management of the Amvrakikos Gulf National Park”, Greece 2023.
- Gonzalvo, J., Giovos, I., & Moutopoulos, D. K. (2015 a). Fishermen's perception on the sustainability of small-scale fisheries and dolphin fisheries interactions in two increasingly fragile coastal ecosystems in western Greece. Aquatic Conservation: Marine and Freshwater Ecosystems, 25(1), 91-106.
- <https://isea.com.gr/by-elasmocatch/?lang=en>
- IUCN SSC Shark Specialist Group. 2023. Amvrakikos Gulf ISRA Factsheet. Dubai: IUCN SSC Shark Specialist Group.
- Kountoura, K., & Zacharias, I. (2011). Temporal and spatial distribution of hypoxic/seasonal anoxic zone in Amvrakikos Gulf, Western Greece. Estuarine, Coastal and Shelf Science, 94(2), 123-128.



