#zeroplastic diving centers

Project Final Report

iSea

www.isea.com.gr

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Environmental Organization for the Preservation of Aquatic Ecosystems
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#zeroplastic diving centers

The #zeroplastic campaign started in 2019 with the aim to inform the public about the impact of plastic waste and microplastics on marine ecosystems and human health, but primarily to promote a zero-waste lifestyle through the re-duce of plastic items and products containing microplastics. The actions of the project during 2019 included a communication campaign, the production and dissemination of informative material, live streaming interviews with experts in the issue of plastic pollution, awareness raising events, a study for exploring the knowledge and perception of the Greek public towards the issue, and zero waste beach clean- ups.

During 2020 the project focuses on the tourism industry through the engagement of diving centers and it includes both raising awareness events and direct actions for the reduce of plastic pollution.

Actions

- Establishment of collaboration with diving centers in Sporades islands, Cyclades islands, Crete, Khalkidhiki and Attica which will actively participate in the project and implement actions to raise awareness among their visitors, remove marine litter from their areas, collect data about marine litter, and reduce their single use plastics and products containing microplastics.
- Assessment of their disposable single use plastics with the aim to find proper solutions in order to minimize the single use plastics and the products containing microplastics that they use in the context of their activities.
- Frequent reporting of the diving centers' disposed single use plastics and products containing microplastics in order to assess their reduction after adopting zero plastic solutions.
- Investigation of zero waste and possible solutions concerning proper actions and appropriate replacements of products for the reduce of plastic pollution due to the activities of the diving centers.
- Participating diving centers will create a "corner" where visitors will be informed about the issue of plastic pollution and microplastics based on the informative materials that were created in the context of the #zeroplastic project.
- Underwater clean ups aiming to both directly remove marine litter and to raise the awareness of the local community, as well as to enhance the data collection and reporting based on the Project Aware guidelines.
- Awareness raising events aiming to inform the tourism industry about the issue of marine plastic pollution.

Participating diving centers

12 diving centers (Figure 1) are committed to collaborate with iSea in the context of the project under a collaboration agreement where the actions of the project are described.

Even though iSea was in constant contact with all the participants during their activities, only 2 of them were totally consistent to our collaboration and fulfilled all of their actions in a monthly basis. Under the pressure of the unprecedented circumstances posed by the pandemic in combination with a significantly low number of visitors, decreased number of implemented actions and few months of operation, taking their waste into consideration proved not to be of the highest priority for the participants.

The participant diving centers are located in different areas though Greece.

Eco Diving Center is located in Crete.

Skopelos Dive Center, Ikion Diving and Gorgonia Diving are located in the Sporades Islands.

Paros Divers, Paros Diving Center, Amorgos Diving Center and Nima Diving Center are located in the Cyclades islands.

Ocean Diving, Athos Scuba, and Blue Diving Center are located in Khalkidhiki Peninsula.

School of Diving is located in Attica.

You can also find their exact location and distribution through Greece here.

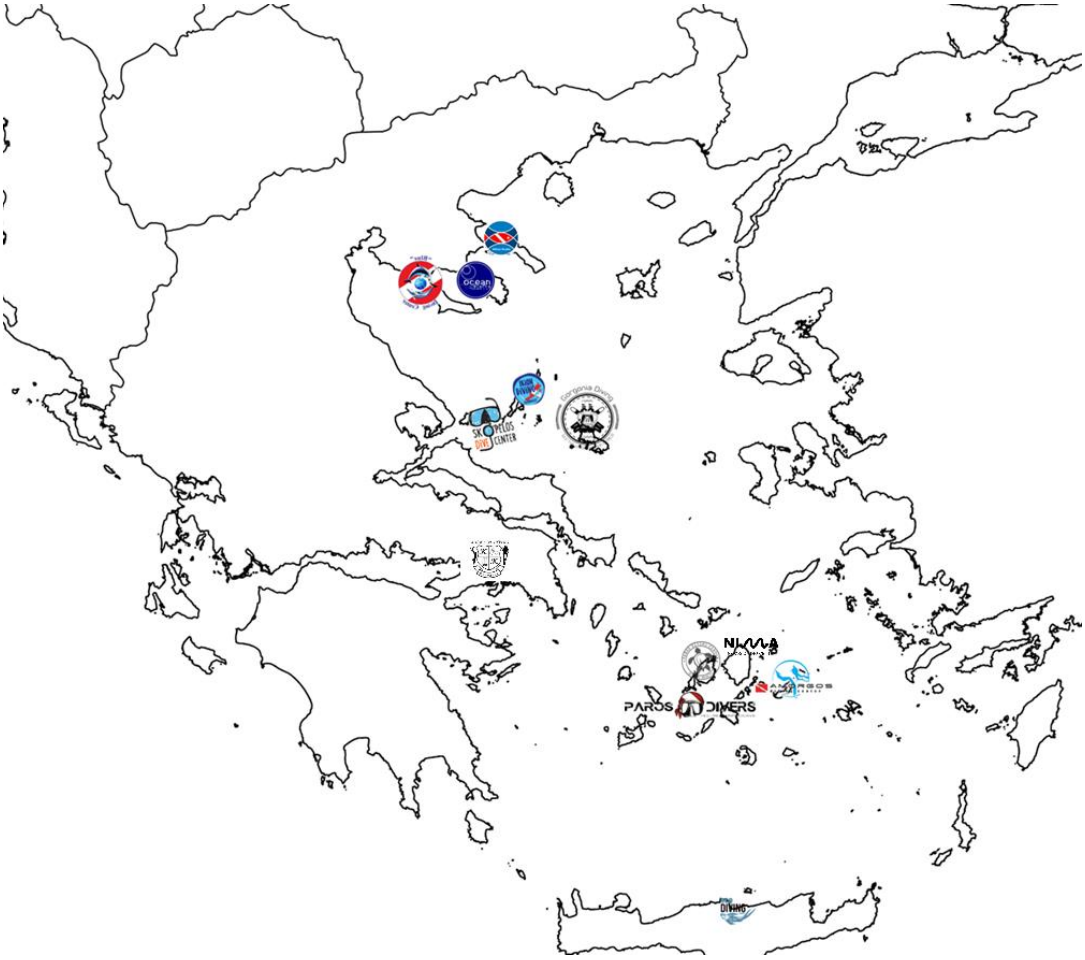

Figure 1: The distribution of the participant diving centers through Greece.

Assessment of the single use plastic and microplastics waste

The assessment of single use plastic products and the products possibly containing microplastics first required the investigation of such products used in the context of their activities.

The diving centers were requested to send a list of all these products that they use. The most common products used by the participants include:

- Refillable plastic bottles 10-19Lt
- Single use plastic water bottles
- Single use plastic straws
- Single use plastic cups
- Sanitizers, containing microbeads and plastic packaging
- Cleaners, containing microbeads and plastic packaging
- Single use plastic gloves and single use surgical masks
- Coffee capsules

Single use plastic and products containing microplastics monthly

The project encountered certain delays, mainly as a result of the Coronavirus pandemic. Every year the diving centers start their activities in April, in parallel with the beginning of the tourism season. This year due to the Coronavirus spread and the total lockdown enforced in Greece from the middle of March to the beginning of May, the tourism period officially started in June. On July the Grand Resorts opened, including the diving centers located in Grand Resorts. They officially remained opened until the end of the tourism period, in the middle of October, but due to second wave of the Coronavirus spread and stricter measures enforced from August, the number of visitors was significantly low.

As a result, the participants were mainly active and busy from June to August, aiming to welcome the highest possible number of visitors. During the previous months the participants were insecure about the possibility of opening, after the official announcement of the tourism period they had to adapt in new standards of operation and during summer they were challenged and dedicated to achieve high numbers of visitors.

The majority of plastic items were used from June to August, when the participants welcomed the highest number of visitors. Plastic cups and coffee capsules were the items used in higher quantities. Plastic gloves were also used in high amounts, but they are a result of the pandemic and do not consist a common item used under regular circumstances. According to the data frequently sent by 5 diving centers, the busiest month for the participants was July with an average of 268 visitors per diving center, June and August follow, with 144 and 120 visitors respectively. The data obtained during June and July are feasible to be compared, taking into consideration the number of visitors and the absence of strict measures at that period of time.

In July, half of the total plastic items' amount/100visitors was used, in comparison with June. This reduction of plastic consumption was possibly achieved due to the awareness raised among the participants and their visitors, in combination with other factors.

The number of single use plastic bottles disposed was reduced, possibly due to the replacement of bottled water with tap and filtered water. The number of plastic cups on the other hand was in accordance with the visitor's number proving that this item was not replaced by the participants. The fact that plastic cups were not increased in

combination with the reduced amount of plastic bottles, indicates that visitors reused their cups while in the diving centers. Single use plastic bags were also reduced, possibly as a result of the participants raised awareness about the issue. The use of wet wipes and gloves as protection measures against COVID-19 were also reduced in July, compared to June, but this is possibly due to the loosen measures existing during July that led people to a more secure feeling as far as COVID-19 is concerned.

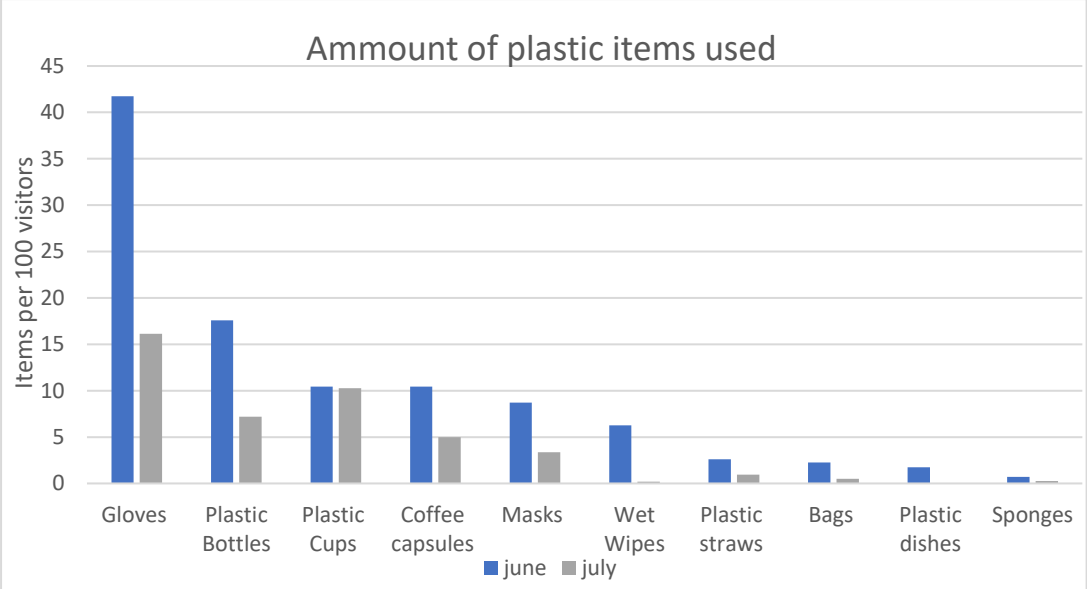

Figure 2: Amount of plastic items used/100 visitors during June and July

The amount of products containing microplastics was also reduced, but this could be attributed to the decontamination of the participants' facilities and equipment that took place in the beginning of their operations during June, in combination with the loosen measures during July and not exclusively to their raised awareness that possibly also contributed to the conscious use of such products.

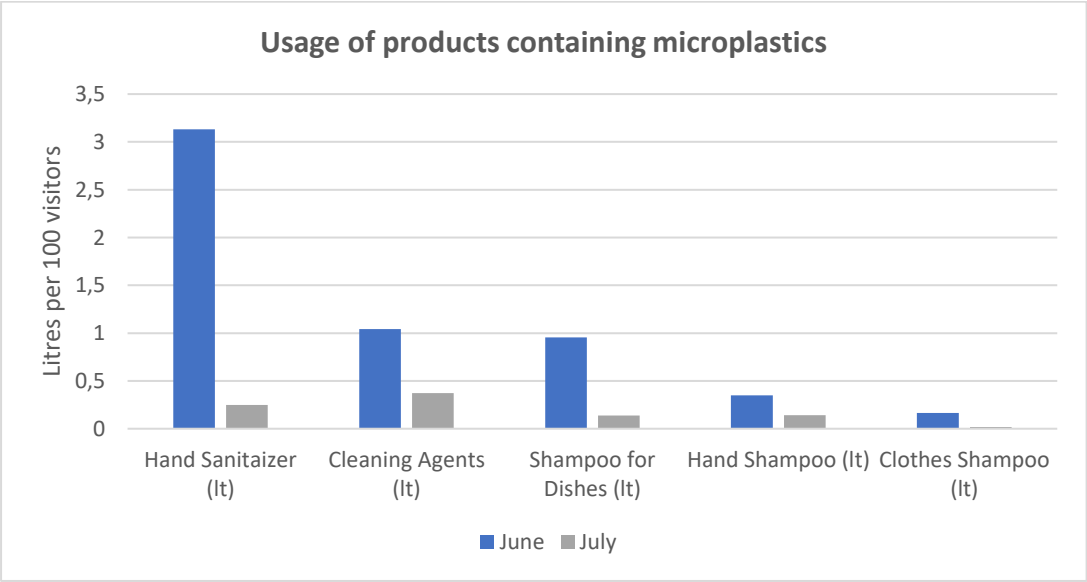

Figure 3: Amount of products containing microplastics used during June and July

According to the data obtained by the diving centers, an average of 5 liters of products containing microplastics were used per month in the context of their activities. The average amount of shampoo gel products corresponds to more than 2 liters/month. According to Raju et. al., 2020, 1g of such products contains 27-30 microbeads. Taking into account the density of the products, it can be stated that an average of more than $6*10^4$ microbeads are released to the environment per month from each diving center.

Zero waste solutions and replacement of products

iSea discussed with the participants on all the possible solutions for the reduction of the plastic waste according to their needs and encouraged them to adopt zero waste solutions.

Skopelos and Ikion diving centers are dedicated to zero waste. As a result, they developed a common action plan including not only waste, but also sustainable solutions for water, energy and fuel saving. They have replaced all the possible printed materials i.e. learning materials, license cards, advertising materials, with online ones, they promote public transportations and cycling among their visitors, carpooling to staff and only dive near their bases in order to avoid extra transportation. They also promote among customers and serve local food products when needed and have installed filters, in order to serve tap water.

Skopelos dive center uses an ecofriendly sunscreen. In order to reduce its visitors' waste, it also collaborates with a café that provides discount to those bringing their reusable cup.

Ocean diving center installed a recycling bin for the separate collection of plastic items.

After investigating the needs and the quantities consumed by every participant, in combination with other factors, like the availability and the cost of products, alternatives were proposed to them in order to replace some of the products, along with other environmentally friendly steps.

The final brands and products were suggested to the participants, after checking their ingredients and cross-checking them through "Beat the Microbead" application.

"Corner" with informative material

All participants received the informative material created in the context of #zeroplastic project and exhibited it in their diving centers. Meetings with them followed in order to train them about the material' s content and enable them to use the materials in order

to raise awareness among their visitors. A total number of more than 2500 people, visitors of the diving centers, were informed about the issue of marine plastic pollution from the representatives of the participant diving centers.

You can find photos from the “corners” in the diving centers here.

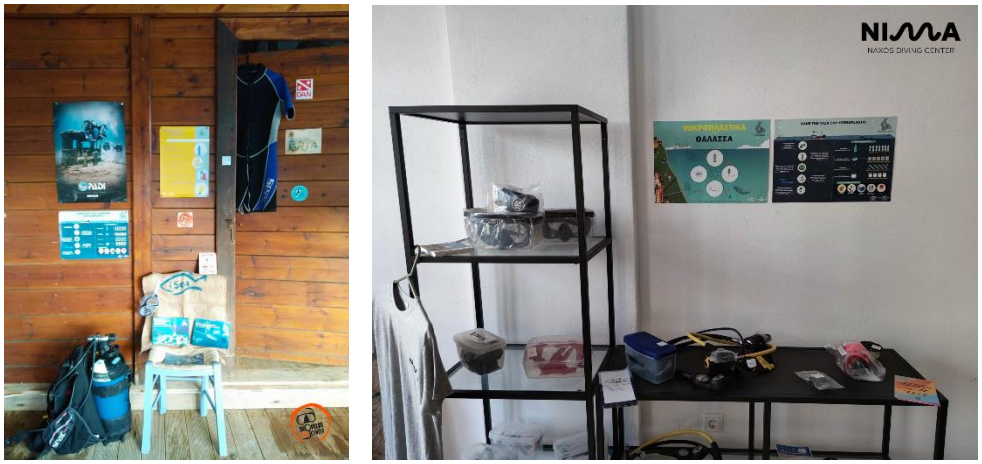

Figure 4: “Corners” of the informative material

Underwater cleanups

Participants were informed about “Project Aware” and all the materials for the data collection according to “My Dive Against Debris Surveys” were presented and provided to them by iSea. A total number of 9 underwater clean ups were implemented from June to October in the context of the project. All data collected were registered to Project Aware. A total amount of 677 kg of waste was collected, registered and removed.

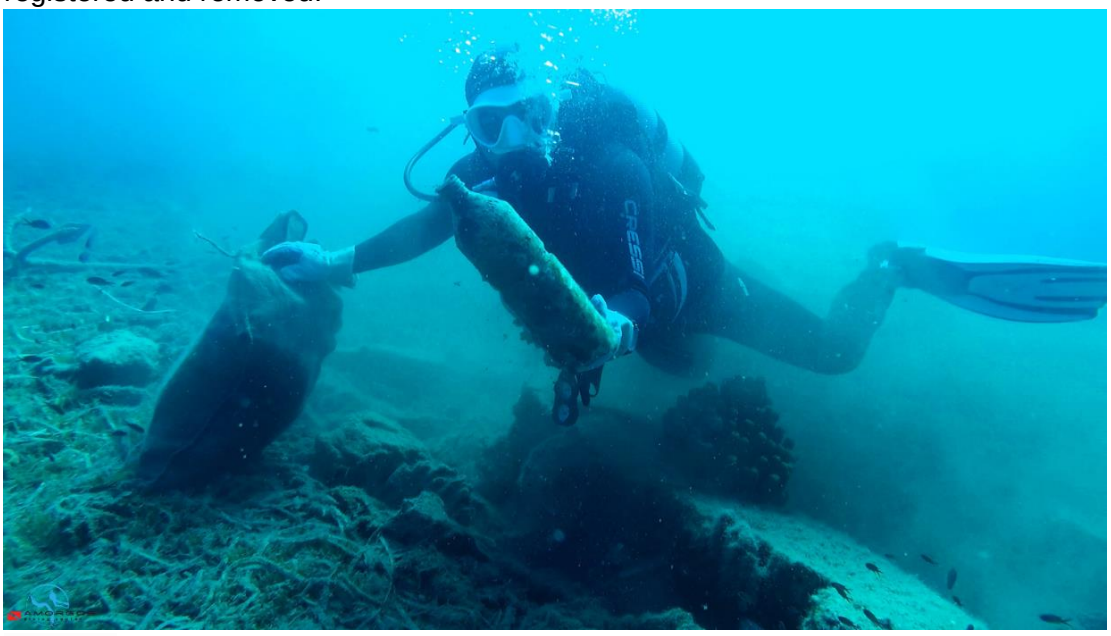

Figure 5: Underwater clean up by Amorgos Diving Center

The details and results of each clean up, as registered by the participants:

Table 1: List of the implemented clean ups

Clean ups	Location	Total kg
Clean up 1	Amorgos island	40
Clean up 2	Skopelos island	350
Clean up 3	Khalkidhiki	20
Clean up 4	Khalkidhiki	100
Clean up 5	Khalkidhiki	15
Clean up 6	Khalkidhiki	2
Clean up 7	Amorgos island	50
Clean up 8	Alonnisos island	60
Clean up 9	Skyros island	40

You can find the photos from all the clean ups here.

Table 2: Clean ups' details

Clean up	N.o participants	Total weight	Cigarette Butts	Plastics (>50cm)	Fishing nets	Plastic bags	Plastic bottles	Glass bottles	Metal bottles
Clean up 1	3	40	0	0	2	2	0	5	0
Clean up 2	2	350	0	0	2	5	10	3	0
Clean up 3	4	20	0	0	0	2	2	0	0
Clean up 4	2	100	17	0	5	11	20	5	0
Clean up 5	7	15	0	0	0	7	8	0	16
Clean up 6	3	2	0	0	0	11	4	0	4
Clean up 7	3	50	0	0	0	0	142	2	13
Clean up 8	8	60	0	0	1	0	96	10	6
Clean up 9	4	40	0	0	0	60	33	15	0
SUM	**36**	**677**	**17**	**0**	**10**	**98**	**315**	**40**	**39**

The majority of litter items collected (41%) were plastics, followed by glass/ceramic items (17%) and processed wood (15%). The most abundant litter item was the beverage plastic bottles, including both categories of bottles, <2L and >2L, accounting for more than 45% of the total litter items collected. Plastic caps and lids follow with a percentage of almost 16% of the total items collected.

Table 3: Total results of #zeroplastic diving center clean ups

#zeroplastic clean ups	
Number of participants	36
Location of clean up	Greece
Duration of clean up	9 hours and 20'

Total weight of debris collected (kg)	677 kilos	
Collected items	Cigarette Butts	17
	Microplastics	0
	Plastics (>50cm)	10
	Fishing Nets	10
	Plastic Bags	98
	Plastic Bottles	315
	Glass Bottles	40
	Metal Bottles	39
	Others	3 car batteries 1 gardening pipe 1 carpet 2 scuba gear 3 ropes 5 tires 2 air conditions

Awareness raising events

An open public event aiming to raise awareness about the issue took place on 29th of August in collaboration with the Europe Direct Central Macedonia and Ocean Diving center in Lagomandra beach. The event also included an underwater cleanup by the representatives of the diving center and volunteers, as well as the distribution of informative material and awareness raising among the public, which were mainly tourists and representatives of other relevant businesses, like restaurants and hotels, located in the area. The event was held strictly according to the required public health protocols.

You can find photos from the event here.

Figure 6: The materials created for the dissemination of the public event.

On the 2nd and 3rd of November, an online event took place in the context of MARLITER project. Almost 40 people attended the event during which #zeroplastic diving centers project was presented. The main goal of the presentation was to raise awareness about the active participation in data collection regarding marine litter through citizen science. The presentation of #zeroplastic diving center project mainly focused on the divers' participation in data collection, the applied processes and methods and their familiarization with the Project Aware citizen science platform.

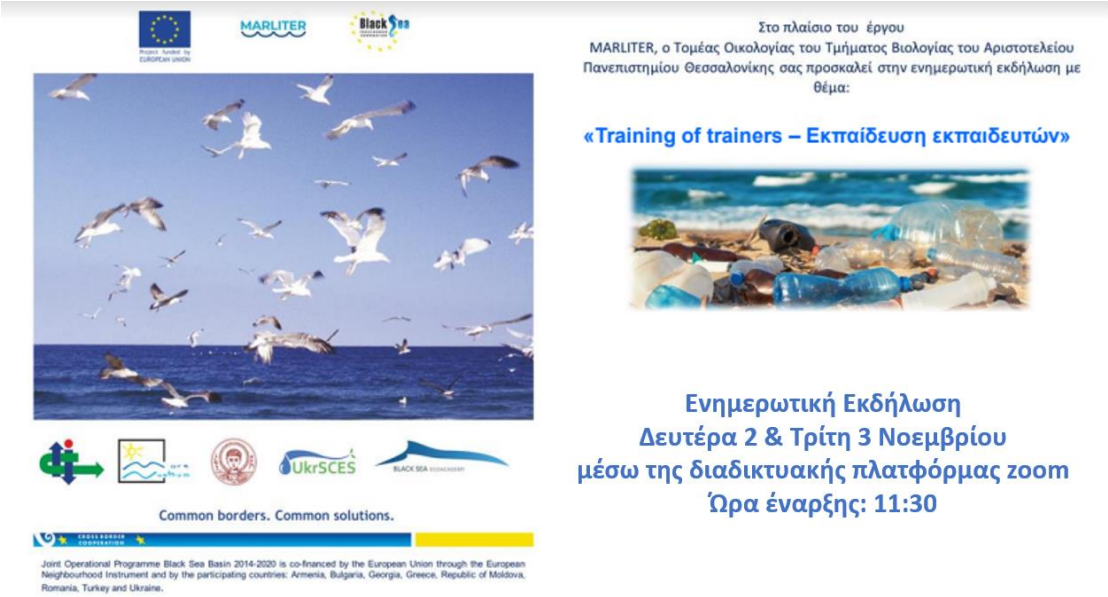

Figure 7: The online MARLITER event.

Social Media

The results of the actions were distributed through iSea's Social Media (Facebook, Instagram, Twitter and LinkedIn) accounts in order to raise awareness among the public about the issue of marine plastic pollution and disseminate the project's results.

The project was launched through Social Media in June. Posts followed in order to present the progress of the project and the actions implemented by the participants. Facebook and Instagram posts reached the highest number of people. Some of the published posts follow.

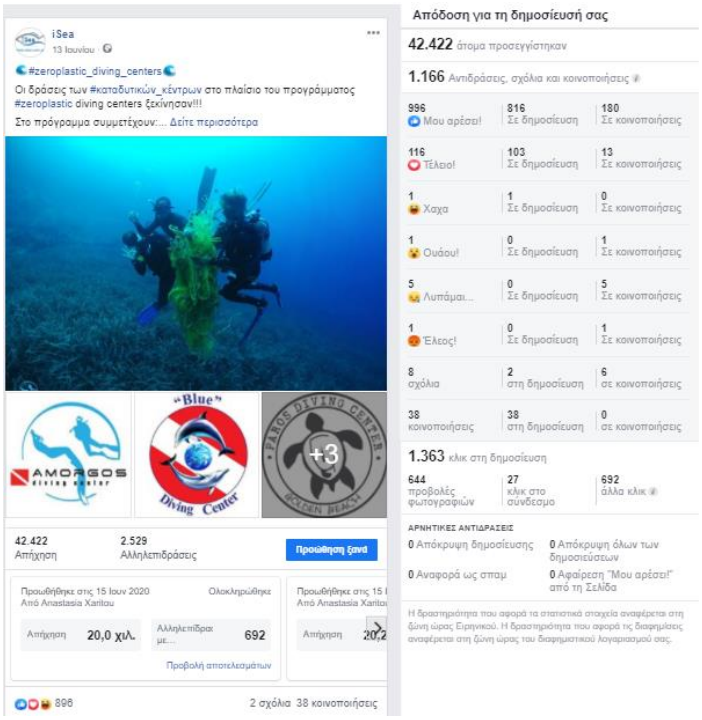

Figure 8: The first post published in the context of #zeroplastic diving centers project with the aim to launch the project and announce its first participants.

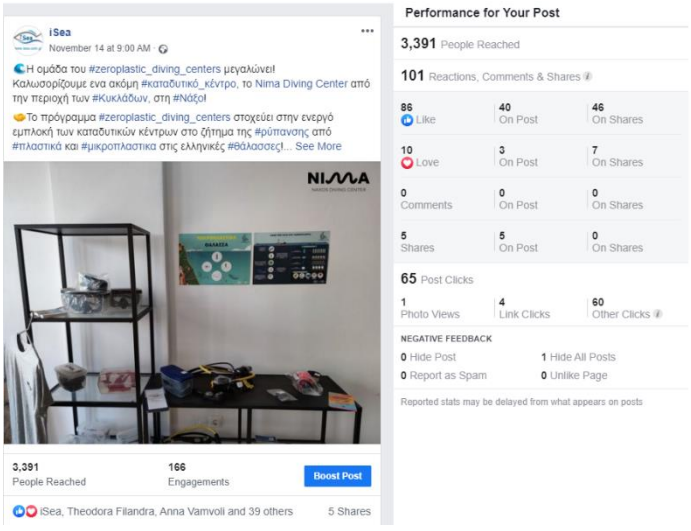

Figure 9: The most recent Facebook post, welcoming the last participant to join the project.

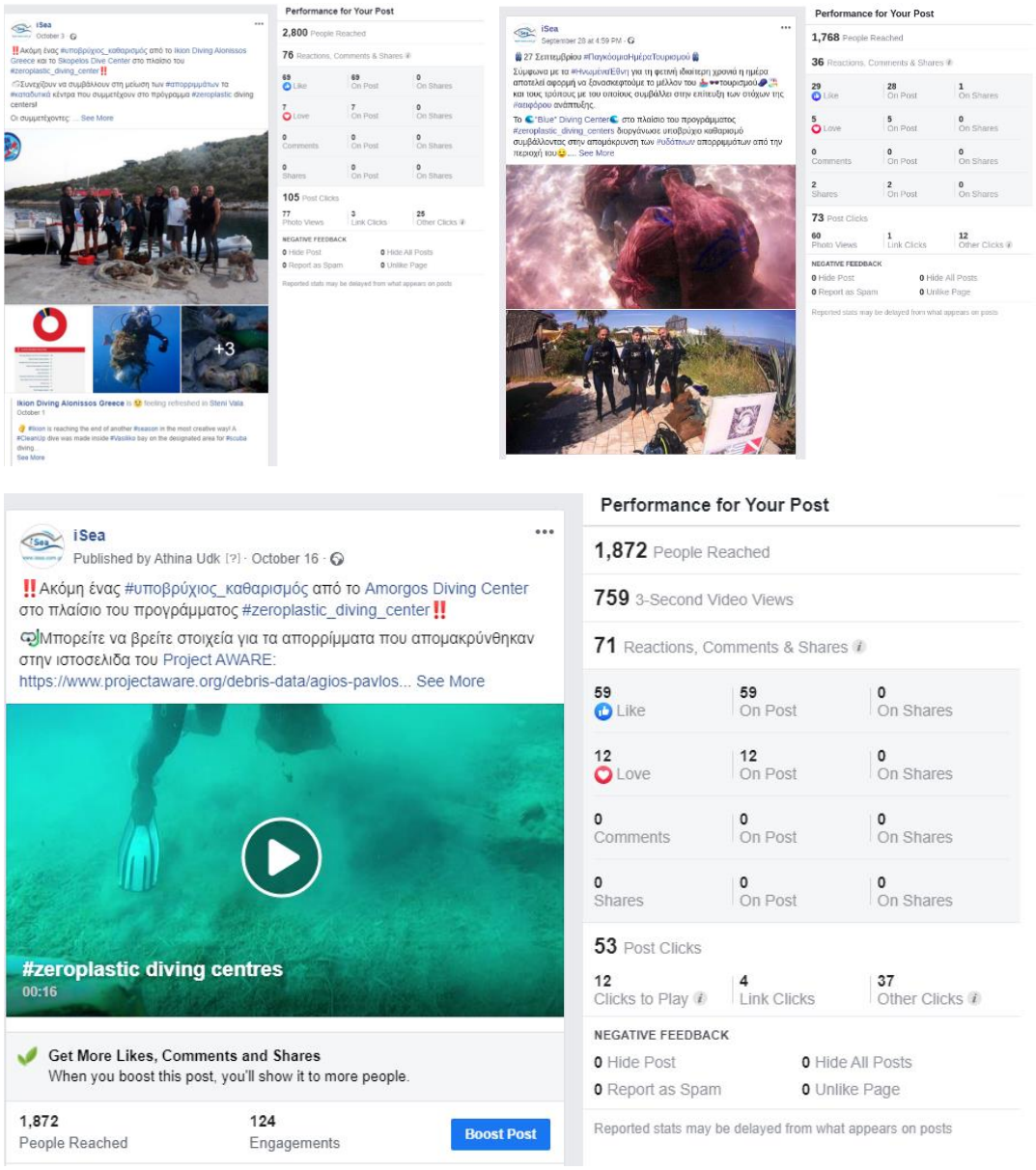

Figure 10: Facebook posts presenting the most recent clean ups implemented by the participants.

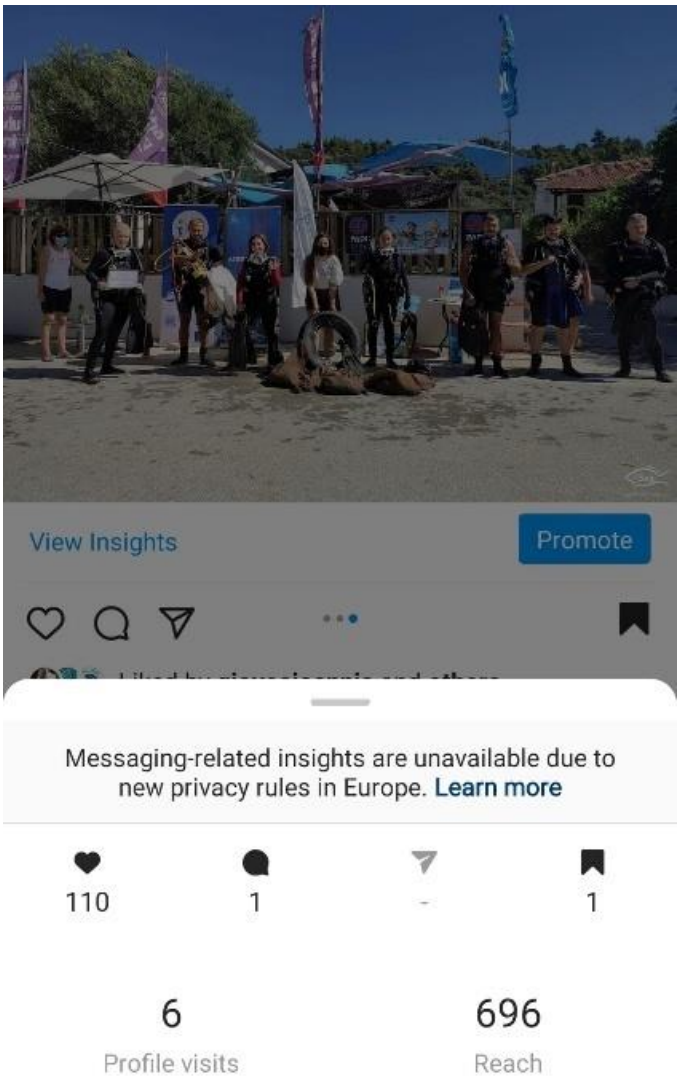

Figure 11: Instagram post presenting the awareness raising event and the results of the underwater clean up implemented in Khalkidhiki.

Posts were also shared on Twitter and LinkedIn.