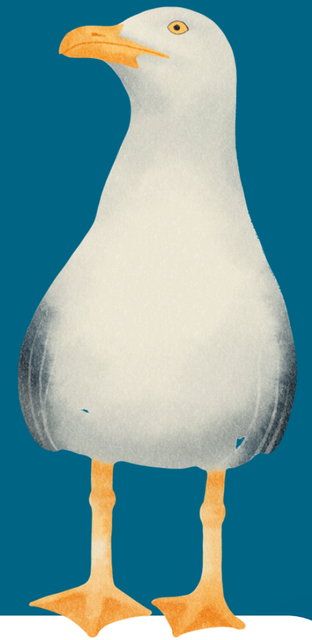
MicroplasticFree Shore

student-driven citizen science project

March-May 2025

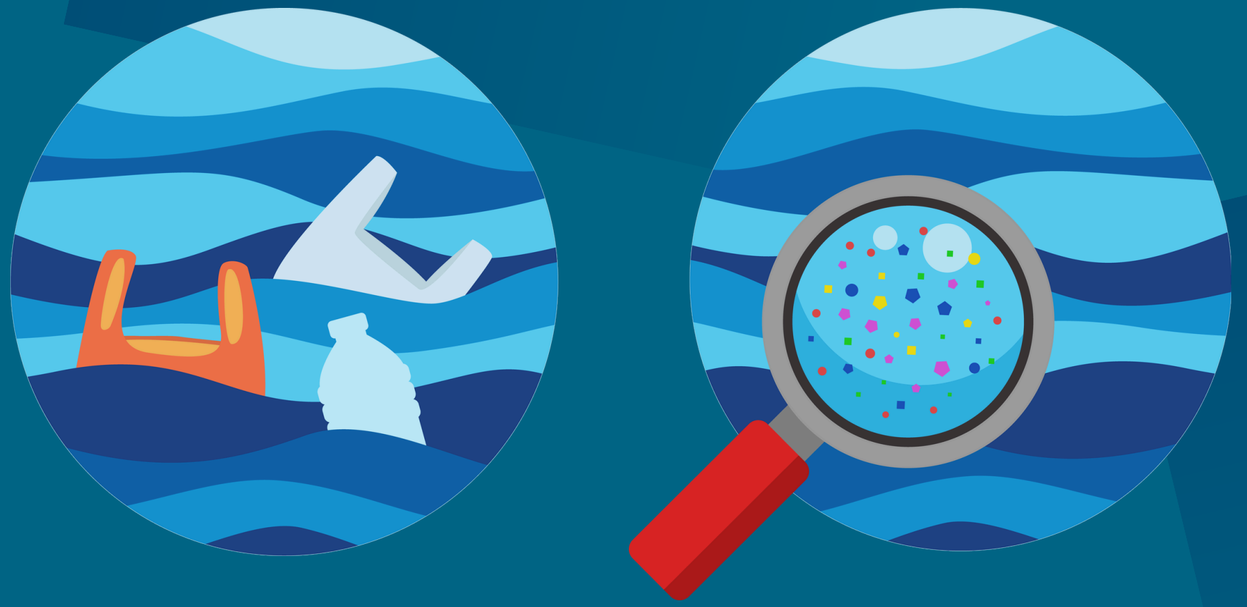


European universities supporting legal and community capacities for Ukraine's environmental recovery

GROMADA ERASMUS+ Project 2023-1-SE01-KA220-HED-000151848

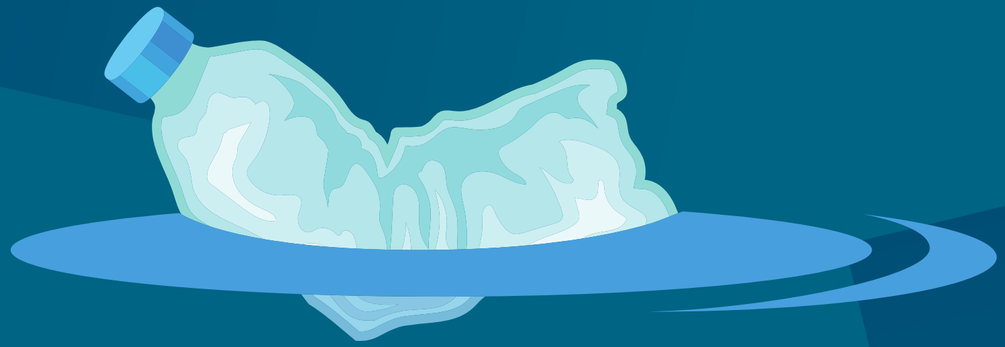
The issue

The number of microplastics in Ukraine's environment is likely increasing due to Russia's war of aggression, primarily as a result of the widespread destruction of infrastructure, military equipment (especially drones), and civilian goods, many of which contain plastics.



This process causes plastic materials to fragment and subsequently degrade into microplastics, thereby contributing to environmental pollution.

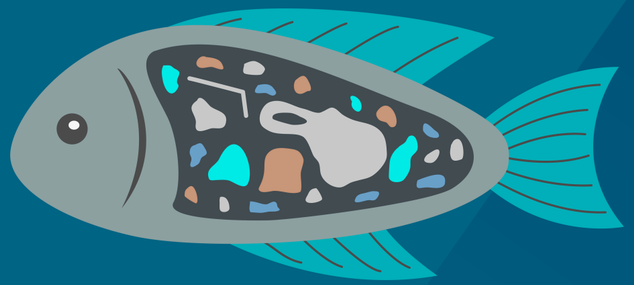
The Black Sea context



In the case of the Black Sea, the destruction of the Kakhovka Dam in June 2023 significantly exacerbated the situation. The dam collapse caused large volumes of plastic waste, industrial debris, and household materials to be washed into the Dnipro River, ultimately reaching the Black Sea and further polluting the ecosystem

What is microplastics?

Microplastics represent a significant and growing global environmental issue due to their pervasive presence in marine ecosystems. These tiny plastic particles are increasingly found in the oceans, where they pose a serious threat to marine life. They enter the marine food chain in multiple ways, with one of the primary routes being their ingestion by plankton. Once consumed by plankton, the microplastics are passed up the food chain when plankton are eaten by fish.



Seafood Health Risks

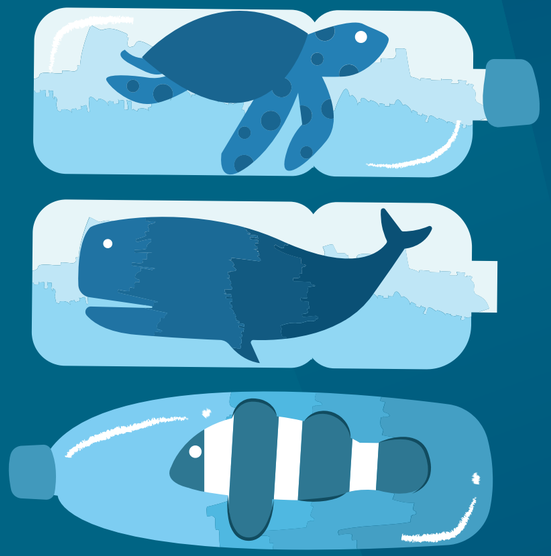
In addition to this, marine organisms such as mussels also ingest microplastics directly from the surrounding water. This widespread contamination of marine organisms can have far-reaching consequences, impacting not only the health of individual species but also the entire marine food web and, ultimately, human health through seafood consumption.

The initiative

This project is designed to assist scientists in monitoring microplastic pollution along the beaches of Odesa.

By collecting consistent and high-quality data, the initiative aims to better understand the sources, concentration, and distribution of microplastics in the Black Sea region.

In addition to supporting local research, the project contributes to the development of a European-wide microplastics database, helping to align Ukraine's efforts with broader international strategies for combating marine pollution.



GROMADA

This project is a citizen science initiative led by **GROMADA**, which engages local communities in collecting data on microplastics along the beaches of Odesa. It not only supports scientific research but also promotes public involvement in environmental monitoring.

GROMADA works to strengthen cooperation between European universities and build legal and civic capacity for environmental recovery in Ukraine. In response to the environmental damage caused by war, the project highlights the legal aspects of citizen science and empowers communities to take part in environmental protection and peacebuilding efforts.

Our Team: “Detectives of plastic”

MicroplasticFree Shore* participants are 2nd year Law students of the Faculty of Economics and Law of ONU Mechnikov:

1. Oleksandra Velshynevska

2.Liliia Diakova

3. Anna Zakhlevska

*MicroplasticFree Shore initiative has been supervised by the ONU coordinator of GROMADA Project, Vice-Rector for International Cooperation Andrii Smitiukh

Detectives of plastic background

We are law students, passionate about international law and deeply concerned about the recent environmental challenges. Our particular focus is on the issue of microplastics — an invisible threat infiltrating the world's oceans, soils, and even the air. The research supervision of our initiative was provided by the Faculty of Hydrometeorology and Environmental Studies, while the organizational support comes from the Economics and Law Faculty.

We are inquisitive, detail-oriented, and open to acquire new knowledge. We are inspired by the idea of creating effective legal frameworks that can help protect the environment on a global scale.

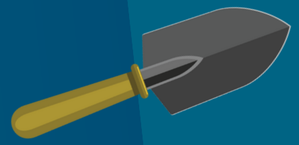
Anna Zakhlevska

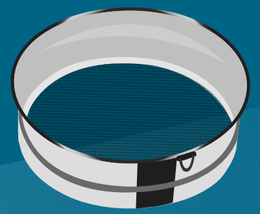
Oleksandra Velshynevska

Liliia Diakova

The methods we used: samples mining

Microplastic sampling on selected beaches of Odesa follows a standardized citizen science method developed by the University of Malta. We used a simple yet effective set of tools use a 0.5 mm sieve, a trowel, a 0.5 x 0.5 m quadrat, and a ruler to collect surface sand samples, which are then stored in a glass jar to prevent contamination.



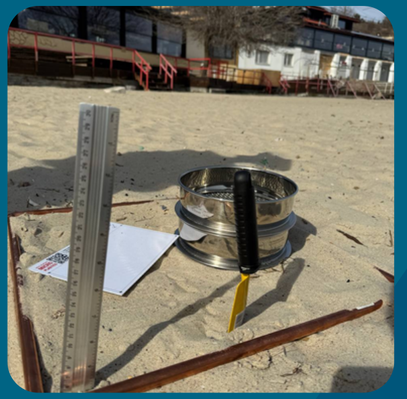


Samples mining guidance

A metal square frame helped us mark out consistent areas of sand for sampling. Within this frame, we collected sand using a small plastic shovel, measuring the depth precisely with a metal ruler. To separate microplastics from natural materials, we used a fine metal sieve.

Finally, we sorted and observed the findings on a white background card, which allowed us to easily identify plastic fragments.

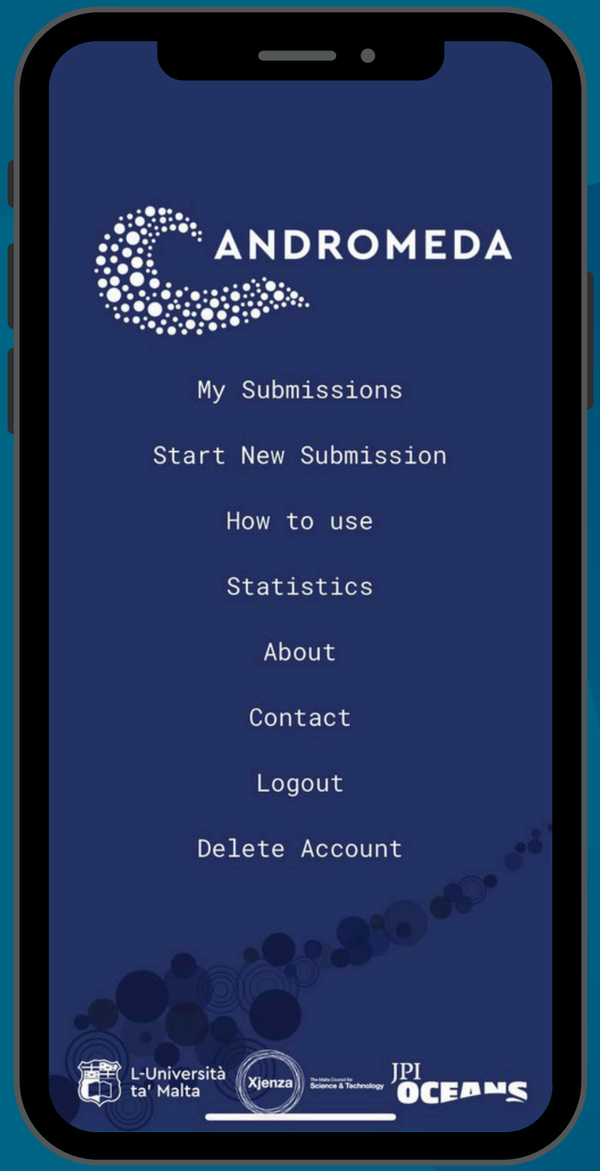
These tools enabled us to gather data on pollution levels and better understand the presence of microplastics in our local coastal environment.



The methods we used: data submission

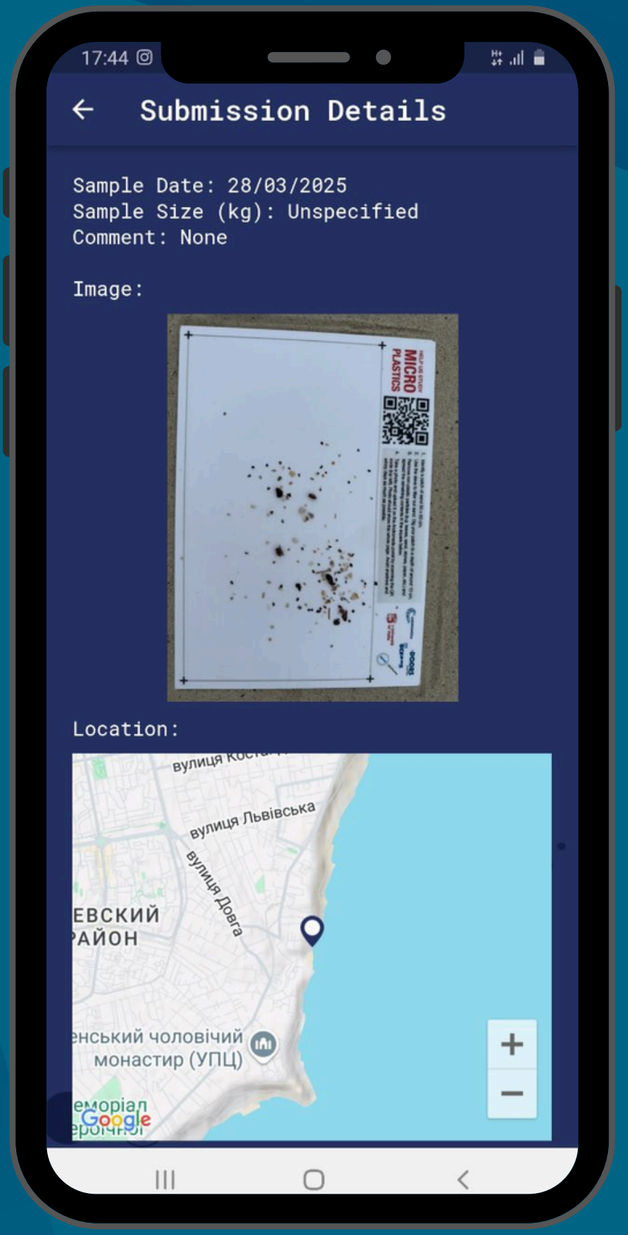
Each sample is photographed with a smartphone using a photo template for accuracy.

Photos are uploaded through the Andromeda Microplastic app, developed by the University of Malta, which also records the GPS location. The app uses AI to analyze the images and extract data on the size, roughness, and colour of microplastic particles, supporting a consistent and comparable dataset across regions.



What is Andromeda?

The ANDROMEDA project is a three-year international research initiative aimed at advancing the study and monitoring of microplastics and nanoplastics in the marine environment. Coordinated by Aix-Marseille University, the project brings together the expertise of 15 research institutions across Europe. Its main objectives include developing cost-effective and optimized in situ sampling methods, refining laboratory techniques for detecting even the smallest and most complex plastic particles, and investigating the processes of plastic degradation and fragmentation, such as those caused by car tyre wear—responsible for an estimated 28% of sea-borne microplastics.



Andromeda's Maltese origin

L-Università ta' Malta

A key contributor to the project is the University of Malta, which has developed a smartphone application called Andromeda Microplastic.

This citizen science tool allows users to collect, photograph, and upload microplastic samples using AI-driven image analysis. The app records GPS data and automatically analyses particle size, colour, and surface roughness.

All collected images and data are stored on University of Malta servers, supporting the creation of a European-wide microplastics database.

Andromeda - Malta - SEA EU - ONU

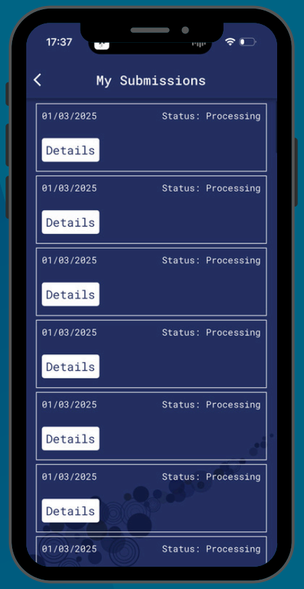
University of Malta in turn is a member of the European University Alliance SEA-EU. This alliance unites nine EU universities focused on marine research.

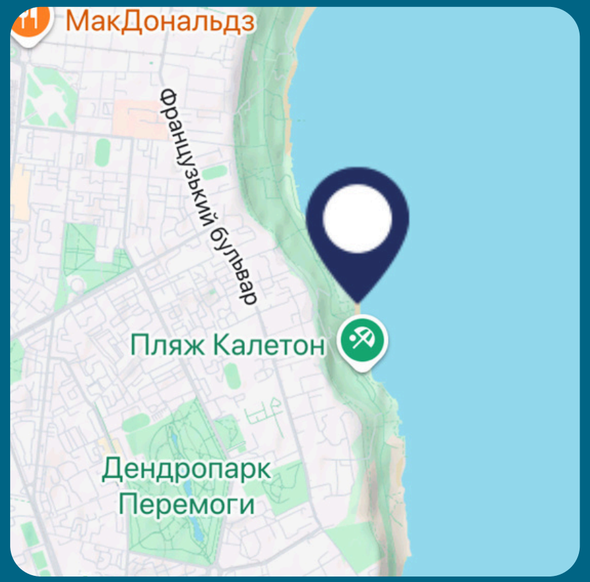
ONU is an associated member of the SEA-EU Alliance, as Ukraine is not a member of the European Union, but it actively participates in SEA EU joint initiatives contributing to international scientific cooperation and environmental protection efforts.

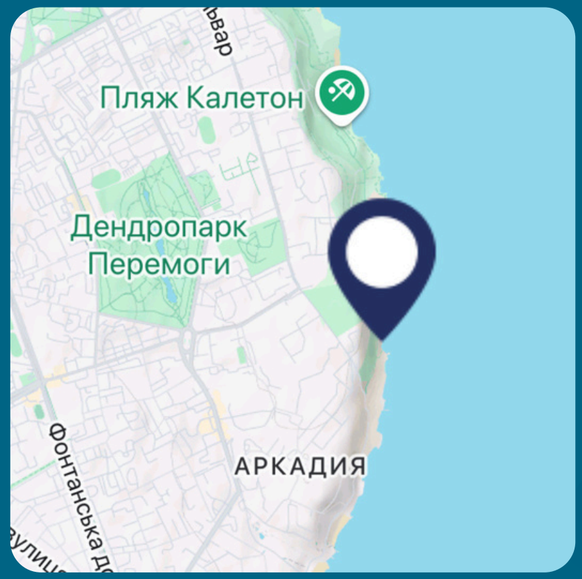
Dolphin and Little Fountain Beaches

The first beach which we visited on March 1, 2025 was Dolphin beach. We made 7 submissions and downloaded pictures to Andromeda app

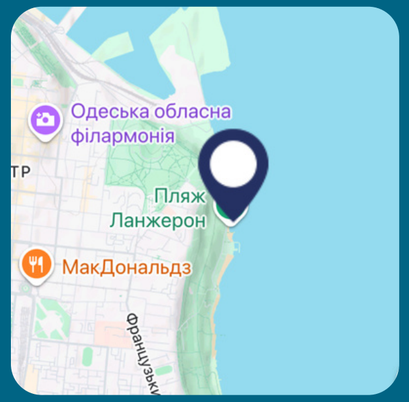
The next one was the Little Fountain Cape beach, which we visited on March 6, 2025. We made 5 submissions and likewise downloaded in the app

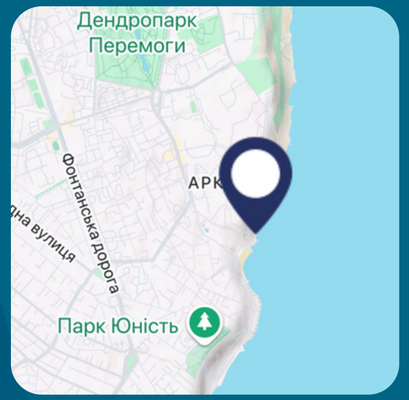






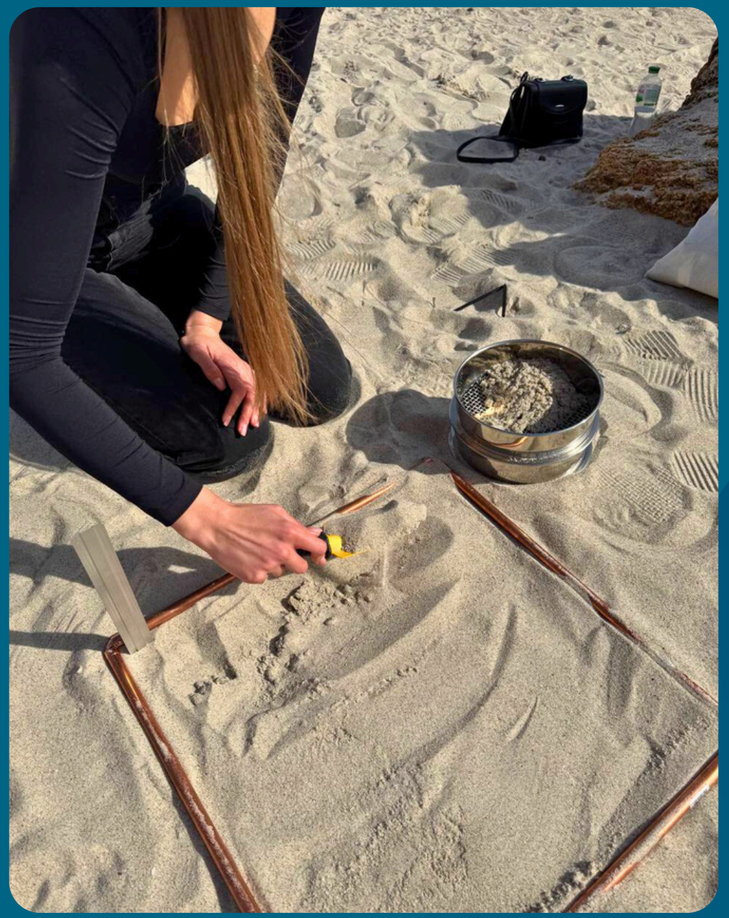
Arcadia and Langeron Beaches



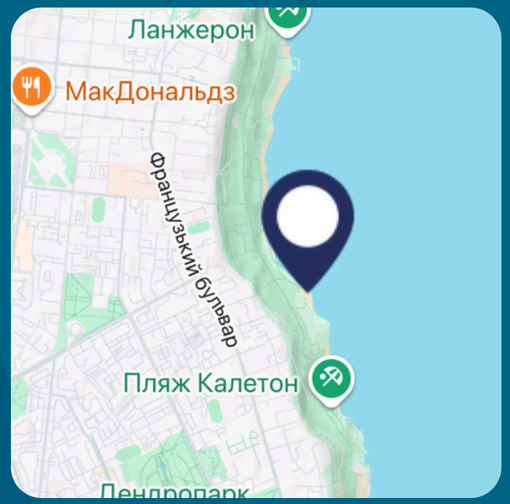


Next 2 beaches are among most popular ones in Odesa:

- Arcadia Central Beach (visited on March 6, 2025 with 8 submissions) has noticeably dirty sand;
- Langeron Beach (visited on March 16, 2025 with 7 submissions), being the closest to the port and city center, is the dirtiest

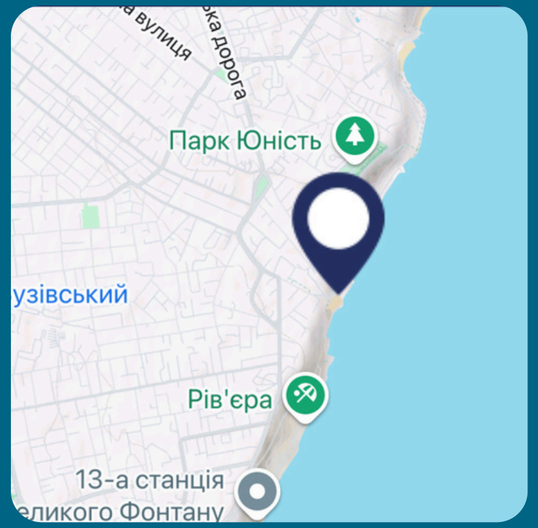


Dogs' Beaches



The Dogs' Beach, known for allowing visitors with dogs, was explored on March 20, 2025. We conducted eleven submissions. It turned out to be much more clean than beahces we attended before. Additionally, the weather was quite nice and windless

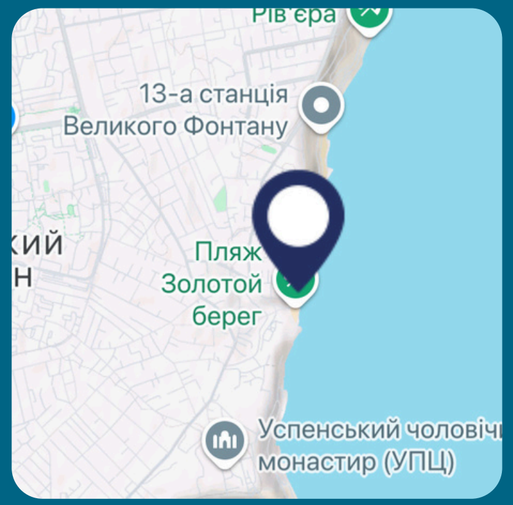
10th Station of the Great Fountain Beach



The next time when we explored Odesa's beaches we visited two beaches at the same day 28 of March, 2025
First was 10th Station of the Great Fountain Beach and we conducted six submissions.

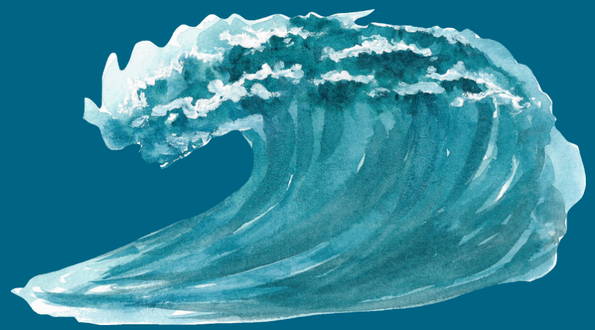
In our opinion, it was the cleanest beach in Odesa

16th Station of the Great Fountain Beach



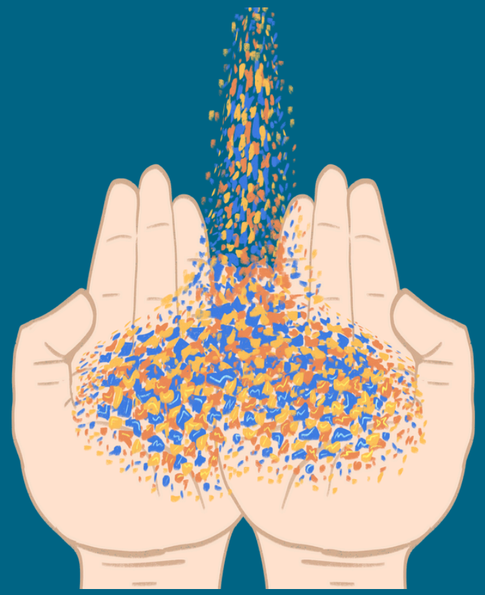
The next beach which we visited on March 28, 2025 was 16th Station of the Great Fountain Beach (5 submissions)

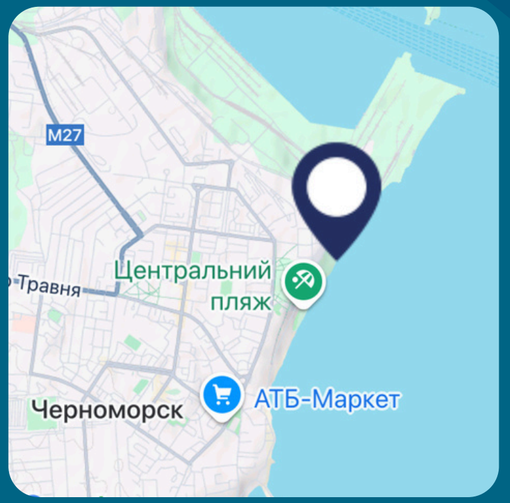
The weather was windy there was also storm.

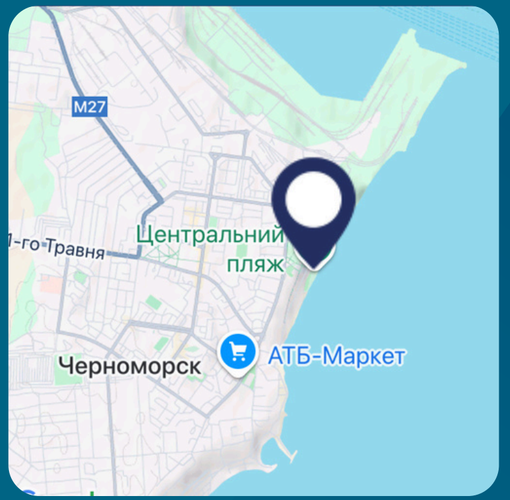


Chornomorsk Beaches

Finally, the last two beaches which we explored were The Central beach and Seagull Beach in Chornomorsk.



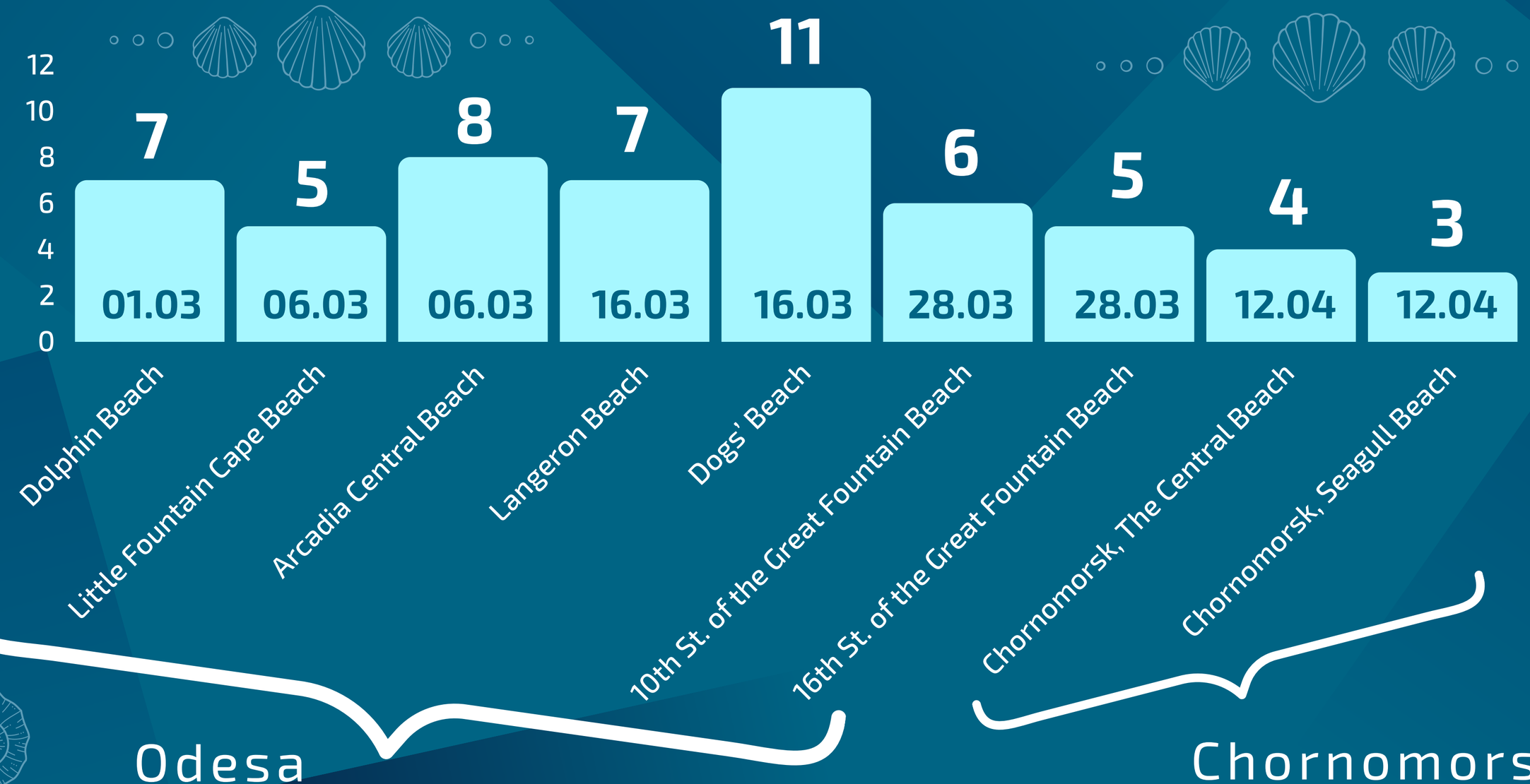




The Map

There were
56 submissions
at 9 beaches in Odesa
and Chornomorsk overall

Number of Submissions per a Beach



The Database

To facilitate a comprehensive understanding of our research, we have compiled a table containing detailed descriptions of the beaches, their locations, and accompanying photos captured during our fieldwork. For ease of reference, we have provided a link where you can access all the collected data:

https://docs.google.com/document/d/1rT-vci040a6qtUpQ3metMqbbIgXtDR46/edit?usp=drivesdk&ouid=117844230821190463997&rtpof=true&sd=true

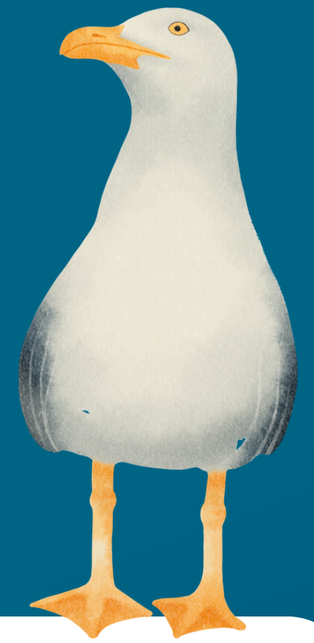
The testimony

We are deeply grateful to our university for giving us the chance to be part of this important initiative. It allowed us to grow both professionally and personally, to work alongside passionate individuals, and to acquire valuable knowledge in the intersection of environmental science and international law. This experience has strengthened our commitment to contributing to sustainable and legally sound solutions for global ecological challenges.

The microplastics project was a truly enriching and eye-opening experience for us. Throughout the process, we had the chance to engage in meaningful research while applying our legal knowledge to a real-world environmental issue.

Visiting numerous beaches in Odesa, where we conducted fieldwork and collected samples, was not only scientifically valuable but also an incredible opportunity to connect with nature, witness the impact of pollution firsthand, and reflect on the importance of environmental protection

Thank you for your attention!



Erasmus+

ANDROMEDA

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