

ESMIC

Estimation, monitoring and reduction of plastic pollutants in Latvian-Lithuanian Coastal area via innovative tools and awareness raising

Framework to improve and integrate plastic litter monitoring and management solutions in natural territories

(T1.1.)

About the Programme

The Interreg V-A Latvia – Lithuania Cross Border Cooperation Programme 2014- 2020 aims to contribute to the sustainable and cohesive socio-economic development of the Programme regions by helping to make them competitive and attractive for living, working and visiting.

The Estimation, monitoring and reduction of plastic pollutants in Latvian-Lithuanian coastal area via innovative tools and awareness raising (ESMIC) project is funded by the European Union. The total project size is 449 574.89 EUR. Out of them co-funding of European Regional Development Fund is 382 138.64 EUR

Introduction

The *Estimation, monitoring and reduction of plastic pollutants in Latvian-Lithuanian coastal area via innovative tools and awareness raising* (ESMIC) project aims to develop a sustainable, cost-effective framework for plastic litter detection, monitoring and management in marine and coastal environments. One of the key activities with in the Project is awareness raising dedicated to key stakeholders (coastal municipalities and agencies responsible for coastal management) and target groups (coastal enterprises working on tourism and hospitality as campsites, restaurants, hotels, event organisers; other enterprises working on coastal management as waste management companies; NGO's and citizen groups active in the field of coastal development and management, educational and awareness raising NGO's and institutions as environmental organisations, schools; regional branches of environmental protection institutions).

Official disclaimer

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The objective of the activities was to develop the framework for assessment and estimation of plastic litter in the LAT-LIT Programme area (coastal and marine environment), link with coastal accumulations (macroalgae and macrophyte wracks and microalgae scum), investigate the associated pathogen, to evaluate the added value, cost-effectiveness and usability for joint monitoring purposes and reduction measures, to prepare the guidelines dedicated for stakeholders. The key steps were taken in order to create the framework for an integrated monitoring and management solutions with in the Programme area:

- Open discussion on the current status of the plastic litter issue and importance of bathing site quality monitoring;
- Development of the unified survey approaches in the coastal and marine environment.

The initial start of the Project was complicated by the ongoing restrictions regarding the Covid-19 Pandemy. Despite the lack of discussions in person Project Consortium met via online meeting platform on 5th of November 2020 and discussed the implementation of the in situ and remote sensing methods for achieving Project goals. Deciding on key techniques for the sampling processes.

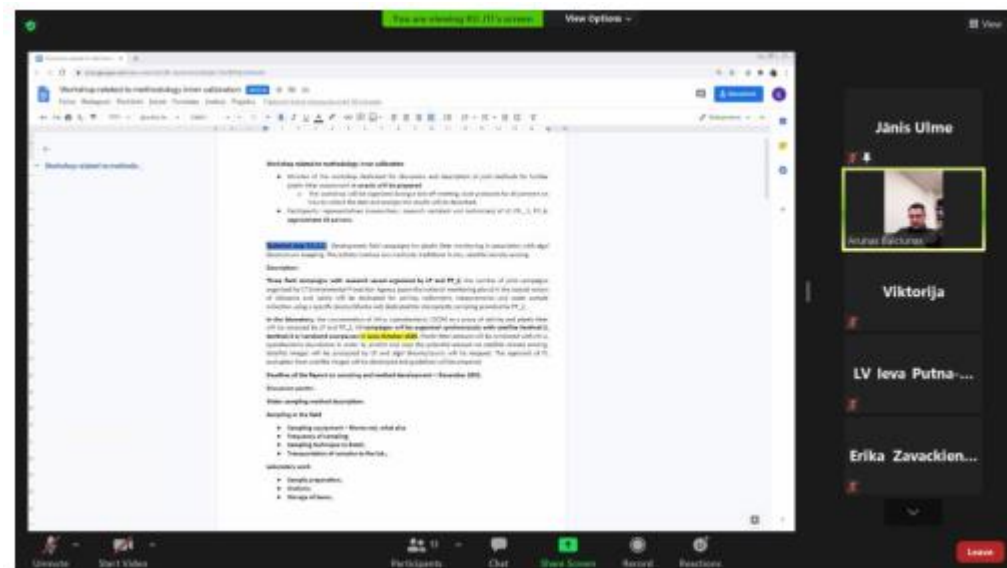


Figure 1. Snapshot of discussion on the the implementation of the in situ and remote sensing methods for achieving Project goals.

The finalisation of the common methodologies took place during the winter time, when in situ monitoring is not possible nor relevant, since it is too cold for a active recreation at the Latvian and Lithianian coast and beach wrack or algal scum is not present. During this time Project Consortium was able to contact and meet with representatives form the local stakeholders in beach management and maintenance in Klaipeda City, Neringa municipality, Palanga City municipality, Liepāja City, Venspils City municipality, Jēkabpils, Riga City, Daugavpils City, who later participated in other ESMIC Project activities and workshops. Additionally authorities which are responsible for the monitoring or the Baltic Sea environment, especially in Lithuania were contacted and followed the development phase of the monitoring techniques.

During the Project's first and second year periods a high emphasis was on the field sampling and testing out the marine litter, especially plastic litter, monitoring techniques. The activities on the coastline varied from gathering the scientific data to exhibitions and environmental awareness raising events.



Figure 2. The pilot beach and bathing site quality monitoring campaign in Klaipeda.



Figure 3. Beach clean up during the Latvian coast monitoring and environmental awareness raising event “My Sea campaign”.

The complicated time period for the development and testing of the common monitoring techniques presented also with a unique experiences. One of such experiences, accrued, when during the July of 2021 Project consortium met at the boarder between the Latvian and Lithuanian Republics. Despite the Covid-19 restrictions this meeting not only was the first in person meeting of the Project Consortium, but also allowed all partners to work together on finalising marine litter, beach wrack/algal scum, remote sensing and microbiological analysis techniques.



Figure 4. A group picture of the ESMIC Project Partners at the Latvian-Lithuanian boarder.

The satellite remote sensing (Sentinel-2, Sentinel-3, Landsat-8) technique was used to identify and map algal bloom patches and scum, beach/coastal wracks. Data gathered by drones will served as a tool to monitor smaller beach wrack accumulations. Number of field campaigns with stakeholders, including representatives from Environmental Protection Agency in Lithuania, and ESMIC partners were organised for the in situ evaluation of the plastic litter proportion in algal scums and macrophyte accumulations, beach/coastal wracks. Simultaneously the presence of with the plastic associated pathogen (*Vibrio*) in water was estimated using developed method considering the molecular methods (Real Time PCR). The results from the first sampling season campaigns were presented during the local workshops with stakeholders and in person meetings. The report on the collected data and achieved results was created. The uncertainties of used methods (sample analysis, remote sensing data processing, automatic detection of scums or wracks) and improvement of methods were described.

The following sampling seasons were focused on increasing the data fields and further developing the monitoring techniques, which resulted in a final reports: on summarising the collected data and achieved results of the methodology for monitoring marine plastic litter in association with accumulated and/or floating material in the coastal areas testing; on the pathogenic organisms associated with plastic pollutants.

Finanlly joint activities were carried out during the Project implementation phase, were representataives from Klaipeda university, Latvian Institute of Aquatic Ecology, Agency of Daugavpils University and Lithuanian Environmental Protection Agency were able to follow and perform open sea monittoring for microplastics techniques unsig *Manta* net and laboratory work.

The project outputs contribute to enhanced institutionalized knowledge and competence outside the partnerships by using developed documents and marine litter pollution prevention and mitigation measures:

- developed Methodology is used/support the research and awareness raising activities by Klaipeda University, furthermore the Lithuanian EPA have included the knowledge and practical information to the National Environment Monitoring Programme, where microplastics in the Lithuanian Maritime waters are being surveyed based on the developed methodology;
- prepared Guidelines are used by the Ministry of Environmental Protection and Regional Development of Latvia, Latvian Institute of Aquatic Ecology and the Ministry of Environmental Protection of Lithuania. Additionally, the gathered information on microbiological, especially pathogenic organisms, contributed to the closer co-operation of Klaipeda University, Klaipeda municipality and National Public health centre of Lithuania;

In addition, the knowledge and written reports are a foundation for the future scientific research in Latvia and Lithuania. The data collected is being used in scientific publications and a necessary citations or acknowledgements to the Project and LAT-LIT Programme are maintained. Additionally, one of the Project activity of awareness raising in public beaches required Posters to be printed and hung on the dressing cabins, therefore, after the Project end these posters are left to the public beach management company to keep using them and for the general public to see.



Figure 5. Snapshots from the field work activities during the Project consortium meeting at the Latvian-Lithuanian boarder



Figure 6. Snapshots from the joint field and laboratory work activities in Latvian Institute of Aquatic Ecology