

# ROADMAP

STEPS FOR THE EFFECTIVE  
ACHIEVEMENT OF THE MISSION  
OCEAN & WATERS OBJECTIVES  
IN THE DANUBE AND BLACK  
SEA LIGHTHOUSE



# Upper Danube Living Lab Innovation Ecosystems

Brainwriting

Achieving consistent innovation

Promote competitiveness

Training on digital



Identifying shared goals

Governance + Policy

Engagement /Education



# Middle Danube Living Lab Climate Change

Field Trip (transect walk)

Quiz

Adaptation of Agriculture

Development of climate change mitigation measures

Smart irrigation

Protection of local communities and ecosystems from extreme events

Wastewater treatment



Water

Holistic approach and integrated territorial investments as an effective tool of the cohesion policy

Programs and AI skills

Visual mind mapping

Economic policies should link livelihoods and well-being, biodiversity and climate change with resource management

Increase adaptation capacity, improve resilience and reduce vulnerability to climate change

# Danube Delta Living Lab Biodiversity

Protected Areas

Sustainable Catch

# Lower Danube Living Lab Water Systems

Funding programs

reuse

Participatory mapping

Promoting businesses with ecosystem services

Common curriculum in schools regarding water systems for awareness raising

Incorporate innovation in monitoring and assessment

Citizen science to better engage in passing information to policymakers



# ABOUT THE LIVING LABS



The projects of the Danube and Black Sea Lighthouse of the Mission “Restore our Oceans and Water” are working on restoring and protecting the biodiversity and ecosystems in this diverse Basin. From the source of the Danube, the second longest river in the world and its most international river basin, all the way to its Delta, one of Europe's greatest marshlands, where the river opens into the Black Sea, the Lighthouse projects are advocating for innovation, collaboration and sustainability.

The EcoDaLLi project (ECOsystem-based governance with DANube lighthouse Living Lab for sustainable Innovation processes) is contributing to this Mission by building a framework designed to accelerate the development and implementation of Nature-Based Solutions (NBS), ecosystem restoration strategies, and sustainable economic models. EcoDaLLi has invited researchers, policymakers, businesses, and citizens to come engage with the Lighthouse and contribute their expertise to co-creating a roadmap for the successful implementation of the Mission in its Living Lab network. These Living Labs, based in the four Danube units, facilitate transnational cooperation, ensuring that policies and strategies for environmental protection, climate resilience, and sustainable innovation are effectively applied across borders. They have addressed different thematic fields such as climate change resilience and the restoration of biodiversity.

The Roadmap consolidates the insights and priorities identified during the events and outlines practical steps for fostering ecological transformation and innovation-driven regional development. Through collaborative governance, scientific expertise, and stakeholder-driven innovation, the Danube & Black Sea Lighthouse, together with EcoDaLLi, is shaping a sustainable future—one that bridges local action with regional impact for a thriving Danube and Black Sea ecosystem.





**INNOVATION ECOSYSTEMS**



**CLIMATE CHANGE**



**WATER SYSTEMS**



**BIODIVERSITY**



**SOURCE TO SINK - BLACK SEA**





inwriting

comp

## Upper Danube Living Lab

Innovation  
Ecosystems



Identifying  
shared goals



Gov





## ACTION POINTS

1

Enhance Cross-Border Collaboration & Governance Integration

2

Strengthen Knowledge Transfer & Digital Infrastructure

3

Support SMEs & Innovation Clusters

4

Implement Nature-Based Solutions (NBS)

5

Increase Stakeholder Engagement & Citizen Involvement

6

Develop a Sustainable Funding & Investment Strategy

7

Bridge the Upper and Lower Danube Innovation Divide

8

Foster Policy Alignment with EU Green & Digital Strategies



# MIDDLE DANUBE



## Middle Danube Living Lab Climate Change

Development of climate  
change mitigation measures

Smart





## ACTION POINTS

1

Restore Wetlands & Floodplains for Natural Water Retention

2

Implement Integrated Water Resource Management (IWRM)

3

Strengthen Agricultural Resilience to Climate Change

4

Enhance Climate Monitoring & Early Warning Systems

5

Increase Community Engagement & Education

6

Promote Sustainable Urban Planning & Green Infrastructure

7

Improve River Connectivity & Biodiversity Protection

8

Support Climate-Resilient Economic Development



# LOWER DANUBE



## Lower Danube Living Lab Water Systems





## ACTION POINTS

- 1 Advocate for increased financial resources
- 2 Enable local communities to identify issues and develop tailored solutions
- 3 Promote sustainable business models like eco-tourism and renewable energy
- 4 Enhance investment in ecosystem services and sustainable practices
- 5 Establish local water committees and involve community members
- 6 Involve communities in monitoring, restoration, and sustainable management
- 7 Scale up local solutions
- 8 Implement educational programs to foster a culture of sustainability



# DANUBE DELTA



## Danube Delta Living Lab Biodiversity

Pro

Sustainab





## ACTION POINTS

1

Connect the 2030 targets with long term goals

2

Advocate for collaboration and joint platforms

3

Standardize monitoring and evaluation

4

Enhance stakeholder/public engagement

5

Develop affordable monitoring techniques

6

Promote the economic benefits of restoration

7

Establish clear roles, responsibilities and measurable goals

8

Consider a more holistic approach stressing the impact of biodiversity



# BLACK SEA



## Black Sea Living Lab Source to Sink





## CHALLENGES

1

**Hydrogen Sulfide (H<sub>2</sub>S) Accumulation** - Over 90% of the Black Sea is anaerobic due to high levels of hydrogen sulfide, creating a dead zone.

2

**Water Pollution from Rivers** – Major rivers, including the Danube, transport pollutants such as industrial waste, sewage, and agricultural runoff.

3

**Coastal Erosion and Habitat Loss** – Uncontrolled urbanization and tourism-related activities contribute to coastal degradation.

4

**Oil and Chemical Spills** – Industrial activities and shipping contribute to persistent pollution and environmental degradation.

5

**Climate Change Impact** – Rising sea temperatures, acidification, and extreme weather events affect marine and coastal ecosystems.

6

**Invasive Species** – The introduction of non-native species disrupts local ecosystems and fish populations.

7

**Overfishing and Unsustainable Fisheries** – Poorly regulated fishing practices deplete fish stocks and disrupt marine food chains.

8

**Lack of Coordinated Regional Governance** – The absence of unified policies and enforcement mechanisms across Black Sea countries hinders effective action.





## ACTION POINTS

1

**Hydrogen Sulfide Removal and Energy Use** - Develop and implement technologies to extract H<sub>2</sub>S as a renewable H<sub>2</sub> source while simultaneously reducing toxicity in the sea.

2

**Strengthening River Pollution Management** - Enhance wastewater treatment in upstream areas, implement buffer zones, and promote NBS like wetlands to filter pollutants.

3

**Coastal Habitat Protection and Restoration** - Introduce strict laws to control urbanization, establish marine protected areas (MPAs), and implement beach nourishment programs.

4

**Oil Spill Prevention and Rapid Response** - Establish an early warning system for spills, mandate double-hull ships, and deploy microbial remediation technologies for cleanup.

5

**Climate Adaptation Strategies** - Promote coastal resilience projects, expand marine carbon sequestration, and implement ecosystem-based climate adaptation.

6

**Invasive Species Control** - Strengthen biosecurity measures in ports, improve ballast water treatment, and conduct regular ecosystem monitoring.

7

**Sustainable Fisheries and Aquaculture Development** - Enforce scientific fishing limits, develop sustainable aquaculture, and support eco-certifications for seafood.

8

**Regional Policy and Governance Integration** - Establish a Black Sea Environmental Council, align national policies with EU regulations, and promote transnational cooperation with the Danube countries through the EcoDaLLi Living Labs.



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## Lighthouse Innovation Action Projects

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## Prep4Blue project

A special thank you to the Prep4Blue project for initiating and organizing the “Pilot Stakeholder Assembly for the Black Sea” allowing us to share our roadmap with the Black Sea community and co-creating an Action Plan for addressing the challenges facing the region.

## EcoDaLLi partners



# JOIN US!

We invite you to join the Danube and Black Sea Lighthouse and contribute to the protection and restoration of its ecosystems and biodiversity through our EcoDaLLi Portal.

Subscribe to our newsletter to stay up-to-date on all activities and learn how you can contribute!



EcoDaLLi Portal



Lighthouse  
Newsletter

