REST-COAST

LARGE SCALE RESTORATION OF COASTAL ECOSYSTEMS THROUGH RIVERS TO SEA CONNECTIVITY

VISTULA LAGOON

RESULTS & ACHIEVEMENTS REPORT

SUMMARY

The Vistula Lagoon pilot site centres on the construction of an independent navigational channel connecting the Lagoon to the Baltic Sea, circumventing the previously obligatory passage through the Russian-controlled Strait of Baltiysk. This Government-led infrastructure project has physically opened the Lagoon to maritime trade, laying the groundwork for the economic recovery of the long-isolated southern banks around Elbląg.

A 180-hectare artificial island, created from dredge spoil, serves simultaneously as a sediment repository and a bird sanctuary subject to a strict public-access ban enforced by the Maritime Office. Two monitoring campaigns have recorded significant populations of terns, plovers and shelducks. Implementation progress ranges from 25% to 100% across the seven challenge domains, with governance and environmental-disturbance measures fully delivered. Financial sustainability is expected to evolve from central-government subsidy toward a user-fee model as local economic activity recovers.

Funded by the European Union

This project receives funding from the European Union's Horizon 2020 Innovation Action under grant agreement No 101037097.

THREATS AND PRESSURES ADDRESSED

- Environmental disturbance risk in a protected area arising from large-scale dredging and channel construction works.
- Loss of ground-nesting bird habitat on mainland meadows due to spontaneous reforestation following the decline of sheep and cattle grazing.
- Extensive earthworks and dredging operations require long-term sediment management.
- Competing species conservation objectives require trade-offs between habitat creation and carbon sequestration.
- Disposal and stabilisation of large volumes of fine-grained dredge spoil (silts, muds and clay) with low strength parameters, high organic matter content and slow consolidation rates.
- Risk of unregulated access and governance failure undermining sanctuary and sediment management functions.

BASELINE CONDITION

Prior to the project, the Vistula Lagoon was economically isolated: all maritime access required passage through the Strait of Baltiysk, controlled by Russia, which effectively barred commercial shipping and suppressed economic activity on the southern Lagoon banks around Elbląg for decades. Local businesses were too weak economically to drive recovery independently.

Simultaneously, grassland habitats in the region had undergone sustained decline due to the reduction of livestock numbers (sheep and cattle), leading to spontaneous reforestation of former grazing lands and the disappearance of nesting habitat for ground-nesting birds.

No dedicated bird sanctuary existed in or around the Lagoon. The combination of geopolitical constraint, economic stagnation, and habitat loss created a self-reinforcing cycle of decline that could not be reversed without significant external intervention.

RESTORATION STRATEGY SELECTED AND WHY

The project selected a dual-purpose approach, justified by the national infrastructure strategy: construct a new navigational channel to the Baltic Sea, and embed a nature-based compensation element — a large artificial island — within that infrastructure programme at comparatively low marginal cost (approximately 5% of total project costs).

This approach was selected because the scale of geopolitical and economic challenge required an active governmental stimulus; no local or regional actor could have mobilised an equivalent intervention. By co-locating sediment disposal with habitat creation, the project converted an unavoidable engineering by-product (dredge spoil) into a conservation asset. Maintaining the island as grassland – rather than allowing spontaneous colonisation by shrubs and trees – was identified as the simplest and most cost-effective means of replacing lost mainland nesting habitat.

Strict control on access through a single competent authority (the Maritime Office) was embedded from the outset, both to protect nesting birds and to coordinate all dredging work schedules around ecological sensitivities such as fish spawning seasons.

HOW THE CHALLENGES WERE ADDRESSED AND KEY RESULTS ACHIEVED

100% Implemented

Environmental Disturbance in a Protected Area

Environmental disturbance, particularly hydrodynamic changes, was minimised through the correct placement of the artificial island inside the Lagoon, informed by IBW PAN hydrodynamic simulations. The island now stores 4.6 million cubic metres of dredged sediment and functions as a bird sanctuary. Formal grassland management will commence once sufficient sediment volumes have been deposited.

25% Implemented

Extensive Earthworks and Dredging Operations

4.6 million cubic metres of sediment have been delivered to date. The island has the capacity to receive material for at least several additional decades, ensuring the navigational channel remains operational without impairing sanctuary functions.

25% Implemented

Large-Scale Land Filling and Sediment Management

Island infilling is ongoing and directly linked to channel maintenance dredging. The slow consolidation of fine-grained lagoon sediments is a characteristic constraint that delays grassland establishment but does not impair ongoing bird sanctuary functions.

25% Implemented

Active Habitat Management

Active habitat management has not yet commenced because free infilling areas remain available. Nevertheless, the island already functions ecologically as a bird sanctuary. In 2025, monitoring recorded 280 pairs of common tern, 82 pairs of little tern, 8 pairs of ringed plover, 10 pairs of little ringed plover, and 1 pair of shelduck — with only a small fraction of the island currently available as habitat. A recognised trade-off is the carbon sequestration penalty of maintaining grassland (preventing spontaneous shrub and tree colonisation), estimated at 2,360 kg C per hectare per year, compounded by carbon release from exposed sediment of up to 700 kg C per hectare.

25% Implemented

Balancing Species Conservation Objectives

Two monitoring campaigns confirm a very positive sanctuary role, yet the carrying capacity of the island for nesting and hatching birds is not yet established. Current observations are considered promising; full performance as a bird sanctuary has not yet been reached as the island continues to expand.

100% Implemented

Access Control and Governance

A strict restriction on letting visitors to the island is in place and enforced by the Maritime Office. The island's physical isolation from the mainland is an additional positive factor. This governance regime is expected to be retained indefinitely.

Area of future island ready for filling

PERCENTAGE OF TARGET ACHIEVED

100% Governance and access control in place; environmental disturbance minimised through island placement and Maritime Office jurisdiction.

50% Geopolitical infrastructure intervention – new navigational channel operational; Elbląg harbour overhaul outstanding.

25% Earthworks, sediment management, habitat management, and species conservation – all ongoing with long planning horizons; island ecology already functional.

SPECIFIC SOLUTIONS IMPLEMENTED

180-hectare artificial island

Created from dredge spoil deposited during channel construction and maintenance; serves simultaneously as a long-term sediment repository and a bird sanctuary.

Hydrodynamic modelling

BW PAN executed simulations to determine the optimum location of the island within the Lagoon, minimising environmental disturbance and supporting the national infrastructure decision.

Sediment characterisationn

IBW PAN sampled and analysed deposited materials to determine strength parameters and consolidation times, directly informing the timeline for habitat management activities.

Carbon-balance evaluation

IBW PAN applied the TESSA[1] methodology to evaluate the island's unexploited carbon sequestration potential and the carbon release associated with exposed sediment oxidation.

Strict access ban

Public access to the island is prohibited and enforced by the Maritime Office; dredging and other work schedules are coordinated to respect fish spawning seasons.

Bird monitoring campaigns

Ongoing dialogue with park managers, and authorities to co-design operations and build governance foundations for scaling.

[1] https://doi.org/10.1016/j.ecoser.2013.06.00the the the 3

Ongoing restoration actions

KEY STAKEHOLDERS INVOLVED AND HOW

The Maritime Office holds full legal jurisdiction over the Vistula Lagoon under Poland's hierarchical coastal legal framework. It managed and contracted the entire project — including dredging and sediment operations — and continues to manage the island, enforce access restrictions, and coordinate work schedules. Its central role reflects both the legal structure and the economic weakness of local actors.

IBW PAN (Institute of Hydro-Engineering, Polish Academy of Sciences) is the CORE-PLAT project partner at this pilot site. It contributed scientific advisory and analytical support, including hydrodynamic modelling for island placement, sediment characterisation, and carbon-balance evaluation using the TESSA methodology.
Dredging contractors were engaged by the Maritime Office and played a key operational role, with their schedules coordinated around ecological sensitivities.

Local businesses and communities on the southern Lagoon banks are indirect beneficiaries. Their capacity to influence local policy is currently limited but is expected to grow as the harbour overhaul in Elbląg proceeds. Future governance is envisaged as a gradual shift toward greater local participation under Maritime Office supervision.

INFLUENCE ON DECISION-MAKING

An independent maritime connection between the Vistula Lagoon and the Baltic Sea is now operational, ending dependence on the Russian-controlled Strait of Baltiysk.

A comprehensive overhaul of Elbląg harbour — necessary to fully unlock economic recovery of the southern Lagoon banks — remains outstanding.

The decision to construct the navigational channel and associated island was taken at national government level. IBW PAN directly influenced its technical implementation through hydrodynamic simulations used to select the optimum island location — a concrete scientific input into a nationally significant infrastructure decision.

At project level, IBW PAN's sediment characterisation results directly inform the timeline for transitioning to active grassland management. The carbon-balance findings (TESSA methodology) constitute an evidence base available to support future policy decisions on land management and climate accounting for coastal infrastructure.

No specific local, regional or EU-level policy decisions directly attributable to CORE-PLAT activities have been reported to date. Governance remains centralised in the Maritime Office. As Elbląg port is overhauled and economic activity grows, a transfer of policy leverage to local institutions is anticipated. Future collaboration under the HELCOM framework has been identified as potentially necessary for cross-border water-quality coordination.

After the restoration actions/current

RECOMMENDATIONS FOR FUTURE DEVELOPMENT

Execute the comprehensive overhaul of Elbląg harbour to unlock the economic recovery of the Vistula Lagoon area.

Consider the construction of a 'fleet' of floating islands to extract nutrients from the water column – identified as potentially the only viable pathway to restoring water quality to Water Framework Directive standards, requiring collaboration with Russia under the HELCOM framework.

Initiate active grassland management as soon as practicable once the island reaches adequate dimensions, to maximise nesting habitat and prevent spontaneous reforestation.

Continue and expand bird monitoring programmes to establish carrying-capacity benchmarks for key species.

Factor the long consolidation timescale of fine-grained sediments into planning horizons for habitat development.

Retain the Maritime Office as the key governance authority to prevent unregulated commercial growth from aggravating the ecological status of the Lagoon.

FINANCIAL MECHANISMS USED AND PROPOSED

The project was financed through direct Government intervention, reflecting its national strategic importance and the economic weakness of the local economy. Central government funding enabled a scale of intervention that no local or regional actor could have mobilised independently. The 180-hectare artificial island was embedded within the broader navigational channel project, meaning its biodiversity and sediment-management functions were financed as an integral component of national infrastructure spending.

User fees — in particular lock fees charged to vessels using the new navigational channel — are identified as a significant potential mechanism for recovering overall project costs as maritime traffic grows. As economic recovery progresses, a gradual withdrawal of direct government subsidy is foreseen, with local economic revenues providing a more self-sustaining financial base under the continuing supervisory framework of the Maritime Office. Environmental oversight will remain essential to ensure that commercial expansion does not aggravate the ecological status of the Lagoon.