

Environmental considerations and blue economy

The Baltic Sea is one of the world's largest bodies of brackish water. Its drainage area is inhabited by around 85 million people, whose activities affect the environmental status of the Baltic Sea. Countries around the Baltic Sea share the challenge to manage the effects of human pressures, activities and usage of marine environment and reducing their impacts to marine ecosystems. **How can we mitigate the risks of increasing human exploitation of sea space and promote a Blue Economy agenda without jeopardizing sustainability?**

The [ADRIENNE project](#) analyses how human activities affect biodiversity, functioning and ecosystem services in the Gulf of Finland (GoF) and seeks to find ways to mitigate damage to and to assure the sustainability of the marine environment. ADRIENNE has produced a publicly accessible geospatial portal [PlanWise4Blue \(PW4B\)](#) that can assess interactive responses of various human-induced stressors on the GoF ecosystem under different nutrient concentrations and climate change scenarios.

The following human activities are included in the PW4B tool: dredging, wind park development, shipping, commercial fishing, harbour development and maintenance, extraction of minerals (mining), military activities, wastewater discharge, coastal protection, fish farming, mussel and algal cultivation, marine plant harvesting, tourism and leisure activities. All these human activities exert different pressures on the biota and habitats and one human activity often causes multiple pressures. Consequences of these pressures can cause severe environmental impacts and challenges.

Challenges for the Gulf of Finland

The marine environment of neither the Baltic Sea nor Gulf of Finland have attained the suitable status by 2021 as stated in HELCOM's [Baltic Sea Action Plan](#). Human uses either alone or combined with other pressures may affect biodiversity, ecosystem functioning and services in the highly utilized and sensitive transboundary waterbody of the GoF. Here are some of the main challenges the GoF is currently facing:

- **Eutrophication:** happens through excessive input of nutrients (nitrogen and phosphorus) to the marine environment and is the most large-scale and severe environmental problem in the GoF. It brings a cascade of ecosystem changes, such as enhanced growth of phytoplankton, blooms of nuisance seaweeds, oxygen depletion at the seafloor and mass mortalities of benthic invertebrates and fishes.
- **Hazardous substances:** pressure from contaminants is great in the entire Baltic Sea. Anthropogenic chemicals (incl. pharmaceuticals) and heavy metals enter the Baltic Sea from numerous sources, such as wastewater treatment plants, leaching from waste deposits or deposition from industrial emissions. Some inputs are regularly monitored; some are not reliably assessed. Most harmful substances are persistent, toxic and accumulate in biota or sediments.
- **Non-indigenous species (NIS):** species that have migrated or have been introduced as a result of human activities, reaching environments where they previously did not naturally inhabit, causing negative disturbances in local ecosystems. Shipping and aquaculture help to spread NIS as they can be easily transported in ballast water tanks or on ship hulls.
- **Seabed loss and disturbance:** caused by human activities such as dredging, extraction of minerals, construction. These alternations might lead to undesirable ecological changes, especially in bottom habitats.
- **Fishing:** is an important source of food and income. The fishing sector must ensure resource utilisation in line with the ecosystem-based approach to avoid depletion of fish resources.

- **Climate change:** intensifies pressures to the Baltic Sea and creates stochastic changes in the ecosystems. [Learn more about the State of the Baltic Sea](#) by [HELCOM](#).

Blue Economy- opportunities for Gulf of Finland

The blue economy is the sustainable use of ocean resources for economic growth, improved livelihoods and jobs, while preserving the health of marine and coastal ecosystem.

A sustainable Blue Economy allows society to benefit sustainably from the oceans and coastal regions, whilst allowing the marine environment to regenerate over time. Human activity must be managed to safeguard ocean health and for economic viability.

The EU maritime economy continues to expand; while some sectors are declining or stagnating, new sectors are emerging and adding pressures to the marine environment. In addition to relevant policy initiatives and actions ([SDGs](#), [EU integrated maritime policy](#), [EU Blue Growth](#) strategy, [EU strategy on offshore renewable energy](#), HELCOM [Baltic Sea Action Plan](#) and others), innovative approaches are needed to maintain the sustainable use of marine resources.

AQUACULTURE

[Aquaculture](#) is currently one of the biggest growth opportunities for the [EU Blue Economy](#). Innovative technology and mitigation measures could be used in order to manage negative effects from aquaculture on the marine environment. Seaweed and shellfish farming, implementing interoperable and nutrient compensating solutions (e.g., multitrophic aquaculture or closed nutrient cycling) should be promoted.

Possible mitigation measures to neutralize the nutrient inputs from fish farming:

- Cultivation of filter feeding invertebrates with removal of biomass from the aquatic environment;
- Cultivation of algae with removal of biomass from the aquatic environment;
- Removal of natural algal biomass from the aquatic environment;
- Collection of beach wrack from the beach;
- Common reed biomass removal from the sea;
- Additional selective fishing (e.g. non-commercial and alien species).



WIND ENERGY

Prompted by the [European Green Deal](#), establishment of offshore wind farms can augment local and regional energy supplies without additional greenhouse gas emissions. [Offshore renewable energy](#), such as wind energy, is an important resource to move towards climate neutrality. The submerged portion of the turbine towers can serve as an artificial landscape for bottom-dwelling species. These species can be supported further by furnishing the bases of the towers with artificial substrate. Combining offshore wind energy and large-scale mussel farming is seen a promising co-use of marine space. Offshore wind parks can be a tourist attraction with organized tours to wind farms and observation platforms. Local fisherman can diversify their income by sharing their labour and vessels for monitoring wind farms or by offering touristic cruises.



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