Central aim of the project:

Investigating different measures for reaching Good Environmental Status

WP2 Impacts on the seabed

Partners: SYKE (lead), DTU Aqua, SLU, SwaM, HELCOM

This part is based on a Swedish report by Kraufvelin et al. (2020) and consider restoration or similar measures relevant for **shallow coastal areas**.

Detailed information is given for **16 measures**:

1. Restoration of eelgrass, *Zostera marina*
2. Restoration of soft bottom macrophytes (other than eelgrass)
3. Restoration of brown macroalgae, mainly *Fucus vesiculosus*
4. Restoration of blue mussel reefs
5. Restoration of stony reefs
6. Restoration of soft bottoms free of vegetation
7. Restoration of coastal wetlands
8. Strengthening piscivorous fish to rehabilitate coastal ecosystem function
9. Reducing nutrient loading by farming and harvesting blue mussels
10. Rehabilitation of hypoxic areas by oxygen pumping
11. Reducing internal phosphorus loads by metal bounding
12. Biomanipulation to remove cyprinids and sticklebacks and rehabilitate coastal ecosystem function
13. Rehabilitation of anoxic, nutrient rich or polluted sediments by removal or coverage
14. Rehabilitation of hard bottoms by establishment of artificial reefs
15. Protection of habitats
16. Follow-up and knowledge sharing

Work finalized

ACTION

Co-funded by the European Union

Restoration measures to support coastal habitats and fish in the Baltic Sea
Just a few examples

Restoration focus	Scientific support for success or effectiveness for habitats	Scientific support for success or effectiveness for fish
Hard bottom macroalgae	No	No
Seagrass meadows	Yes (in Denmark and Sweden)	No
Blue mussel reefs	Yes (but mostly in Denmark)	Some support (from Denmark)
Stony/artificial reefs	Yes (some examples from Sweden and Denmark)	Some support (from Sweden and Denmark)
Wetlands/pike factories	Yes (many examples from Sweden, some from Denmark)	Some support and growing body of evidence

For each measure, a **"score card" for feasibility/effectiveness** based on **a number of aspects** has been provided (using 1–3 or 0–3, the higher, the better):

- The type of measure regarding chances for re-creating historical conditions,
- If the restoration target concerns "threatened species/habitats", "important ecosystem services/human benefits" or "potential risks of no action",
- The focus of the measure, i.e. focus on "causes", "symptoms" or "both"
- Availability of methodology,
- Existence of relevant practical experiences,
- Chances for long-term success of the measure,
- Needs for complementary measures for success,
- Risk of negative side-effects from the measures,
- Size (spatial scale) of the area that may be affected positively,
- Draft evaluation of the cost-effectiveness of the measures.

Expert evaluation I
Ongoing work

WP2.2a: Identification in which coastal areas the restoration measures are of highest significance/need

Based on **available information** such as HOLAS II, SYMPHONY, SWaM-projects, etc. and **local and regional expert knowledge**, we will make a **rough mapping/description** of which **habitats and areas are the most damaged** and where different types of **restoration could be of highest significance/need**.

The aim is to suggest viable and cost-effective restoration measures to these habitats/areas, and provide recommendations for specific measures needed to restore the damaged habitats/systems.

Expert evaluation II
+ map information
Ongoing work

WP2.2a: Identification of cost-effective restoration measures

Some initial general conclusions:

- Most restoration measures are effective mainly at a very small, local scale. Possible exceptions to this are measures targeting fish nursery areas, predatory fish and no-take areas

- Different measures may be advisable in different areas, depending on community composition and key species, local characteristics and what local key impacts that are identified

- A combination of measures is likely to be most efficient in many cases, such as combining eelgrass restoration with restoration of mussel reefs and marine protection, etc.

- Green infrastructure also needs to be taken into consideration – restoration measures improving connectivity needs to be boosted/priorized