





EUROPEAN UNION European Regional Development Fund

# SEABASED Sediment removal

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## Pilot site selection

-61°N

-60°N

Preconditions defined

40 Km

22°F

61°N

60°N

Exploration of potential pilot sites
 across the Archipelago Sea

#### Hålax vik selected as a pilot site for sediment removal

- Restricted water exchange due to a threshold in the mouth of the bay
- Sediment accumulation and oxygen depletion in the bottom
- Phosphorus release from the sediment
- High phosphorus concentration in the water
- High primary production
- No zoobenthos in the deepest parts
- Previous water quality data available
- Excellent co-operation with the local inhabitants



# Planning of sediment removal

- Exploration and finding solutions for
  - removal
  - deposition
  - recycling of the sediment
- Challenges:
  - Marine scale
  - High water content of sediment
  - Logistical issues
  - Infrastructure construction
  - Lack of competition, new technical solutions needed

### **Pilot implementation**

#### Cost of sediment removal too high

#### Replaced by a sediment incubation test in a laboratory

Will sediment removal change

- Biological oxygen demand in the sediment?
- Nutrient fluxes (particularly phosphorus) to and from the sediment?

#### Results of the sediment incubation test



Sediment \*BOD<sub>7</sub> declined with sediment depth \* indicates how much oxygen micro-organisms need for breakdown of organic matter in seven days

Sediment removal moderated oxygen demand

25 cm sediment removal lowered phosphate concentrations in the water

Change in supernatant P concentration depended on initial concentration in the test

Nitrogen concentrations in the water did not show detectable trend

### Theoretical removal of nutrients

• Removing 10 cm thick sediment layer per hectare in Hålax vik:

# 150kg Phosphorus 1150 kg Nitrogen 7900 Carbon/7700 kg OC

- Based on average data on sediment and water chemistry in Hålax vik
- Amount of nutrient removal is site-specific

## Sustainability

# Careful planning

- Risk assessment
- Environmental monitoring
- ➢Permit procedure
- Transparent public procurement (in our case)
- Communication and informing
  - Local people, authorities, entrepreneurs

### Summary

#### Expensive, many challenges

Marine scale	<ul><li>Depth and extent of bays</li><li>Logistics</li><li>Constructing infrastructure</li></ul>	
Sediment removal	<ul> <li>10 cm insufficient</li> <li>Costly with available solutions, lack of competition</li> <li>New, affordable technical solutions needed for the whole process</li> </ul>	
Sediment deposition	<ul> <li>Steep, rocky coast</li> <li>Recycling</li> <li>Geotube applications</li> <li>Possible sediment pollution</li> </ul>	









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