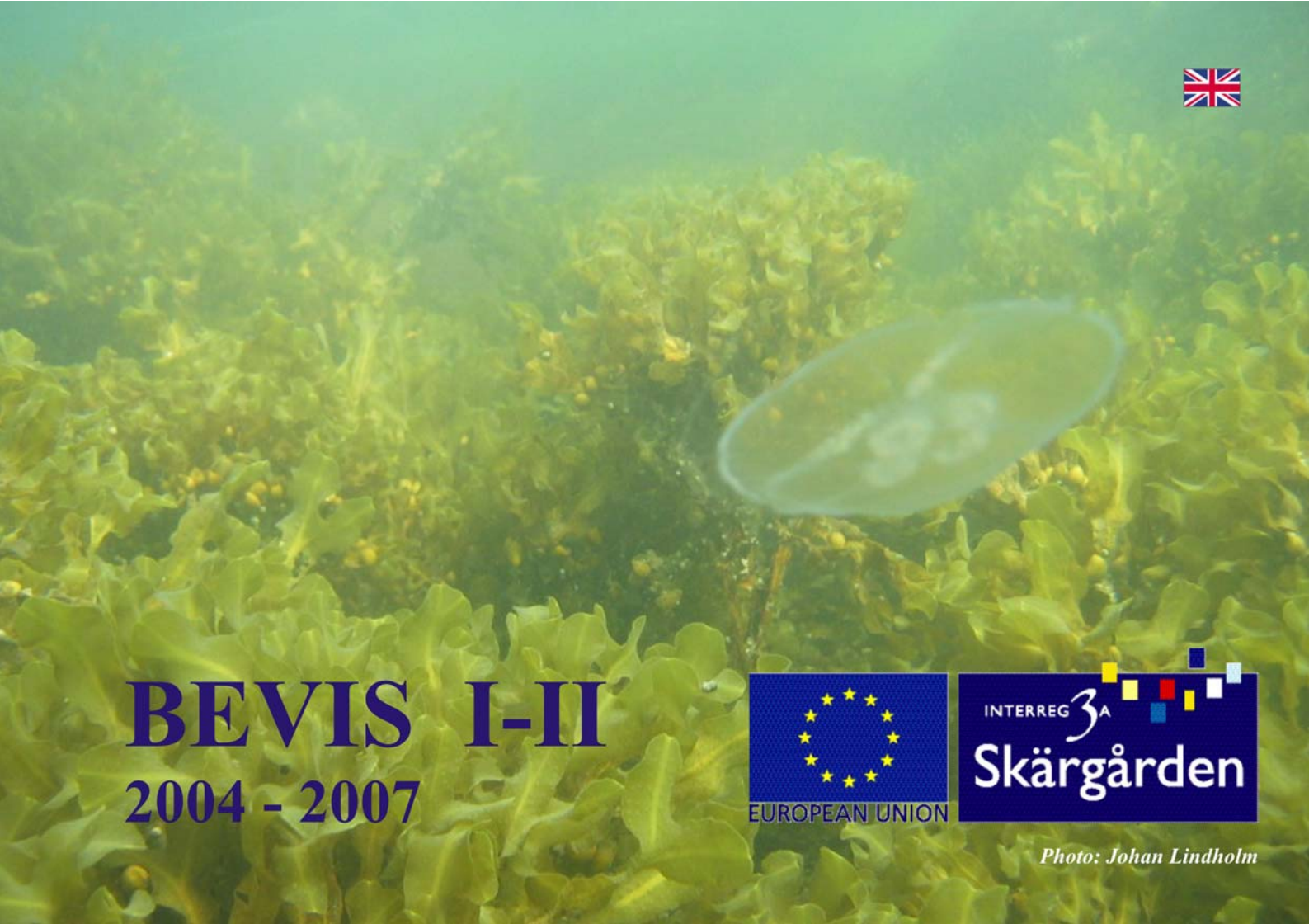


BEVIS I-II

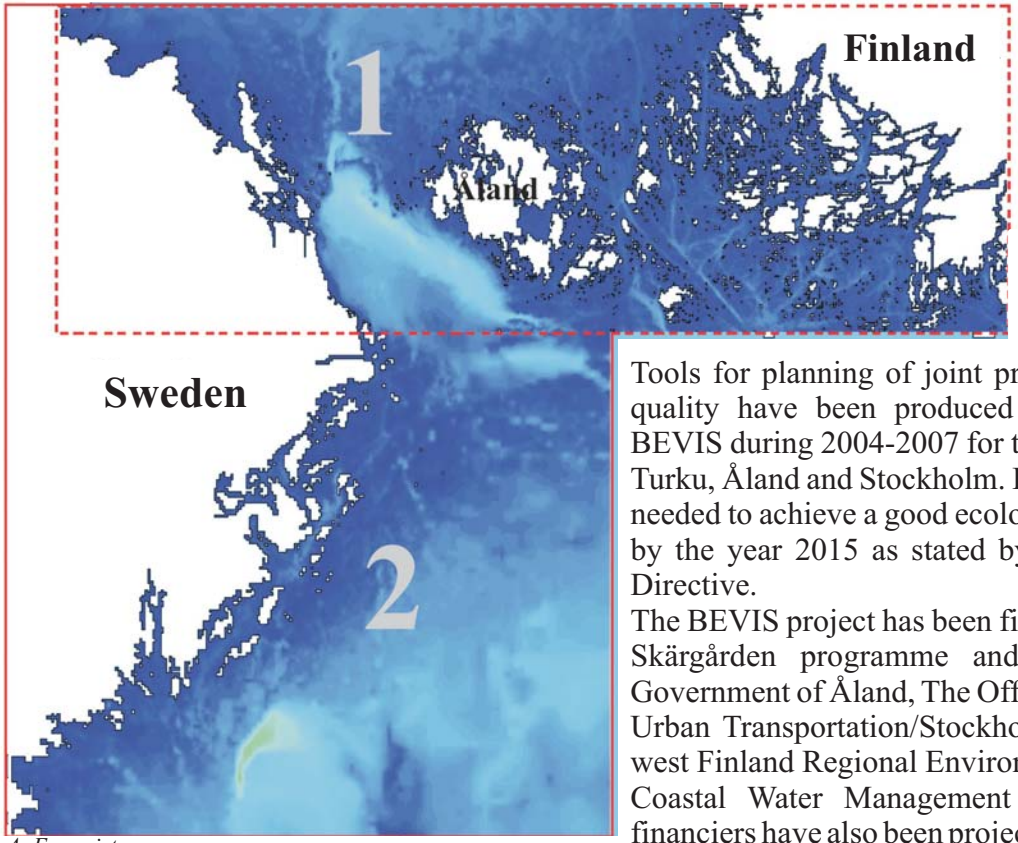
2004 - 2007

EUROPEAN UNION

INTERREG 3A Skärgården

Photo: Johan Lindholm

Turku - Åland - Stockholm archipelagos



A. Engqvist

BEVIS project areas

Tools for planning of joint protective measures for water quality have been produced in a multinational project BEVIS during 2004-2007 for the three archipelago areas of Turku, Åland and Stockholm. Effective protection plans are needed to achieve a good ecological status of coastal waters by the year 2015 as stated by the EC Water Framework Directive.

The BEVIS project has been financed by EU's Interreg IIIA Skärgården programme and four national financiers: Government of Åland, The Office of Regional Planning and Urban Transportation/Stockholm County Council, South-west Finland Regional Environment Centre, and Svealands Coastal Water Management Association. The national financiers have also been project partners, together with Åbo Akademi University and Stockholm University, and will use the project deliverables in the decision making.


T. Kohonen


A. Sydänoja

Project deliverables

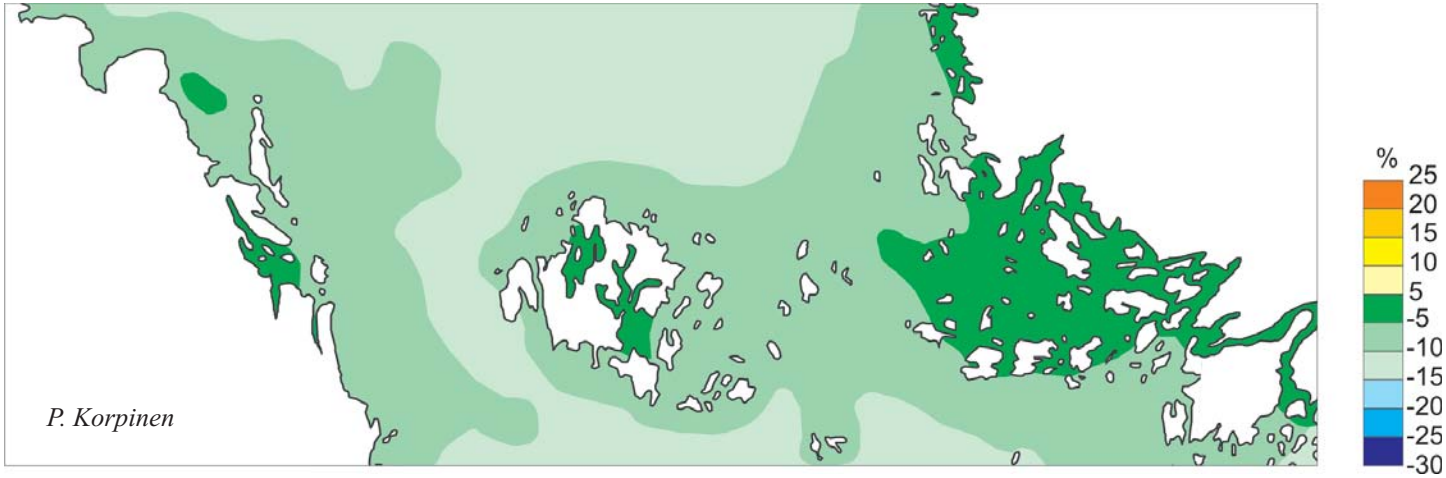
BEVIS phase I (2004-2006)
- a joint database with nutrient loading data from diffuse and point sources, and monitoring data of water quality measurements in the project area 1
- two different high resolution 3-D water quality models that describe nutrient concentration and/or the amount of phytoplankton in the project area 1
- model simulations and environmental economic calculations of seven future scenarios for the project area 1
- conclusions of the project results and recommendations for measures

BEVIS phase II (2007)
- new estimations of the phosphorus release from the sediments to the overlaying waters in the project area 1
- a mesoscale water quality model for the project area 2 (Svealand coast)
- model simulations and environmental economic calculations of three new future scenarios for the project area 1

Main results

The models function well in relation to the complex model area, but they still seem to underestimate the internal loading of phosphorus. As the sediment seems to be a significant loading source for phosphorus, more research is needed on this topic.
In the outer archipelago regions water quality follows mainly the water quality of the surrounding open sea areas (see modeling results on page 4). In order to be able to improve water quality in these areas international collaboration is needed through e.g. HELCOM and EU.
The water quality in the inner archipelago areas is highly dependent on nutrient loading from local sources (see modeling results on pages 5-6). In order to improve water quality in the coastal and inner archipelago areas, the water protection measures must be directed towards local sources.
Regarding fish farming, local improvement in water quality could be achieved by relocating fish farms from enclosed areas further out towards the open sea. However, it should be noted that the total loading will not decrease through this alternative.

More information on project results can be found on BEVIS home page http://web.abo.fi/fak/mnf/biol/huso/bevis/



Scenario 4

In scenario 4 a 10 % reduction of nutrient loading both from the atmosphere (nitrogen) and outside sea areas (phosphorus and nitrogen) was assumed. Nutrient loading from other sources is unchanged, i.e. at the same level as in the year 2004.

Modeling results of scenario 4 show the change in phytoplankton biomass (%) in the project area 1 after one growth period. Comparison year: 2004. The assumed decrease in the loading would result in 5-15 % improvement of water quality in the outer archipelago and the open sea areas. Phytoplankton = cyanobacteria + other phytoplankton.

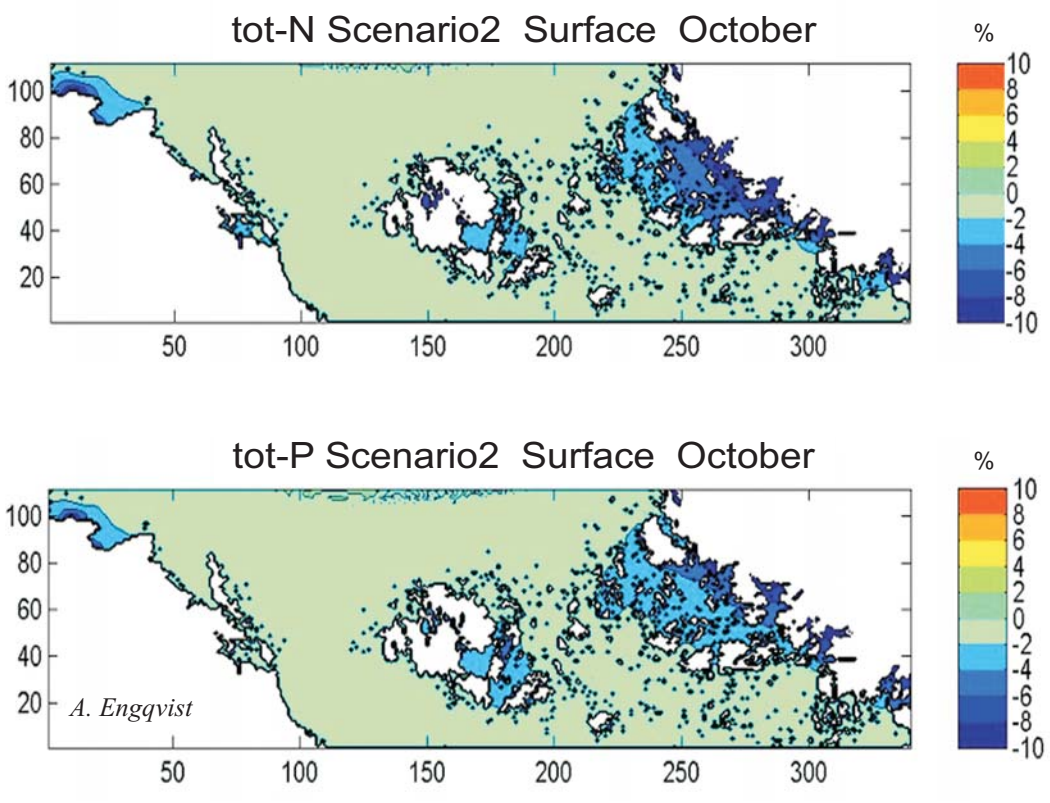
The assessed total costs would be 383-2 081 M€/year; 3 553-19 305 MSEK/year.

Scenario 2

In scenario 2 reduction of nutrient loading from rivers, other diffuse sources, industry, sewage treatment plants, and fish farms was assumed to be done according to current environmental action plans (level 2) in Finland, Sweden and Åland. Nutrient loading from atmosphere and other sea areas is unchanged, i.e. at the same level as in the year 2004.

Modeling results of scenario 2 show the change in phytoplankton biomass (%) in the project area 1 after one growth period. Comparison year: 2004. Accomplishment of current environmental goals would improve water quality in inner and middle archipelago regions by 5-30 % under a year cycle. Phytoplankton = cyanobacteria + other phytoplankton.

The assessed annual costs would be 40-337 M€; 349-3 032 MSEK.



Effects of scenario 2 in nitrogen (tot-N) and phosphorus (tot-P) concentrations (%) in the surface water in October. Comparison year: 2004. Modeling results show improvement of water quality in coastal and inner archipelago areas.

Project partners

Åbo Akademi University	http://web.abo.fi/fak/mnf/biol/huso/
The Office of Regional Planning and Urban Transportation, Stockholm County Council	http://www.rtk.sll.se/
Stockholm University	http://www.ecology.su.se/
Svealands Coastal Water Management Association	http://www.svealandskusten.se/
Southwest Finland Regional Environment Centre	http://www.ymparisto.fi/
Government of Åland	http://www.regeringen.ax/

http://web.abo.fi/fak/mnf/biol/huso/bevis/english.htm

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