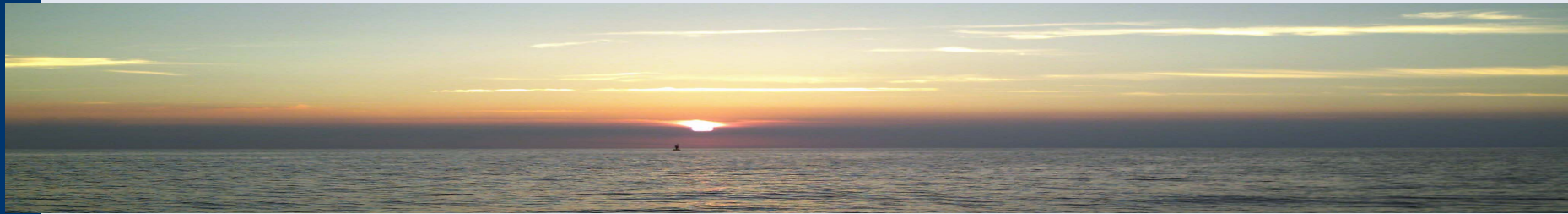




AMBER Annual Meeting 2010

Translation: Science into Policy



AMBER

Assessment and Modelling of Baltic Ecosystem Response

Hannah Brocke



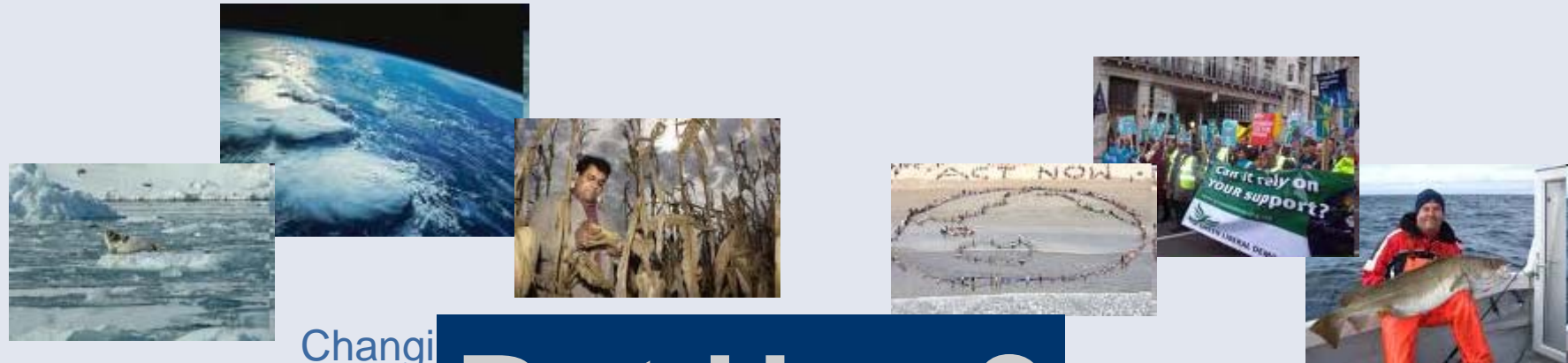


Table of Contents

1. Introduction: Science - Policy
2. DPSIR Model - Driving Force Pressure State Impact
Response Model
3. EcoQO - Ecological Quality Objectives
4. EAM - Ecosystem Approach to Management
5. What can AMBER do?



Why is it necessary to translate science into policy?



Changi
Risk?

But How?

tection needed?



Management on International Level needs policy decisions.



DPSIR Model

- Driving Force Pressure State Impact Response Model

- Simplified model to describe exposure and actions towards environmental problems.
- Used by EEA (European Environmental Agency), UNEP (UN Environment Programme) and BUWAL (Schweizer Bundesamt für Umwelt, Wald und Landschaft)



DPSIR Model

- Driving Force Pressure State Impact Response Model

1 Driving Forces

What cause the problems?

e.g. 85 million people in the catchment area of the Baltic sea

2 Pressure

What are the consequences?

e.g. waste water runoff

3 State

How is the environmental state?

e.g. nutrient enrichment in costal water

5 Response by society

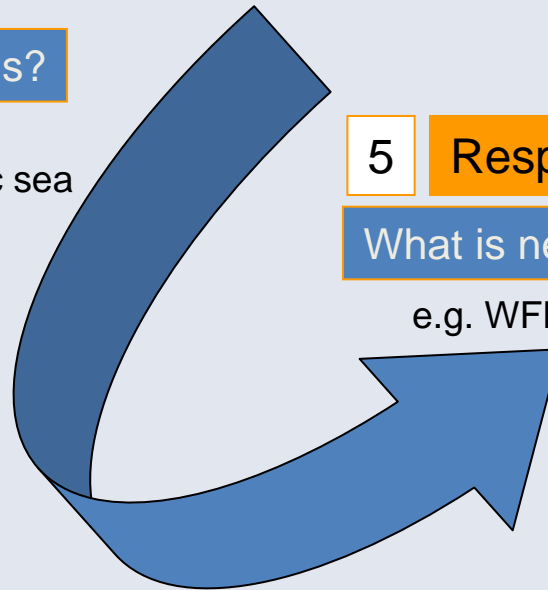
What is necessary to change the impacts?

e.g. WFD guidelines

4 Impact

How does the environment change?

e.g. eutrophication
– marine ecosystem change





EcoQO

- Ecological Quality Objectives

Overview

1

Strategic Goals

What is the overall goal to achieve in terms of environmental, social and economic benefits?

2

Ecological Objectives

What has to be done to change the environmental condition(s)?

3

Operational Objectives

What is influenced by the Ecological Objectives? What are the components of EcoO?

4

Indicators

What shows the state/ change of the environmental conditions?

5

Targets

What needs to be changed/ reached until when?

TARGET LEVEL IN TIME RELATION

EcoQO – Ecological Quality Objectives



EcoQO

- Ecological Quality Objectives

Example

- 1 Strategic Goals
- 2 Ecological Objectives
- 3 Operational Objectives
- 4 Indicators
- 5 Targets

To protect and, where practicable, restore the function and structure of marine biodiversity and ecosystems in order to achieve and maintain good ecological status of these ecosystems

Reduce the impact of eutrophication on the ecosystem

Improve light conditions in the water column

Reduce primary production

Reduce the frequency and areal extent of oxygen deficiencies

Other operational objectives

Depth distribution of eelgrass and other macrophytes

Concentrations of nutrient in seawater and point sources

Primary production

Oxygen concentration in bottom water

Ecological Quality Objectives

>= than as before 1950

< Target levels

< Target levels

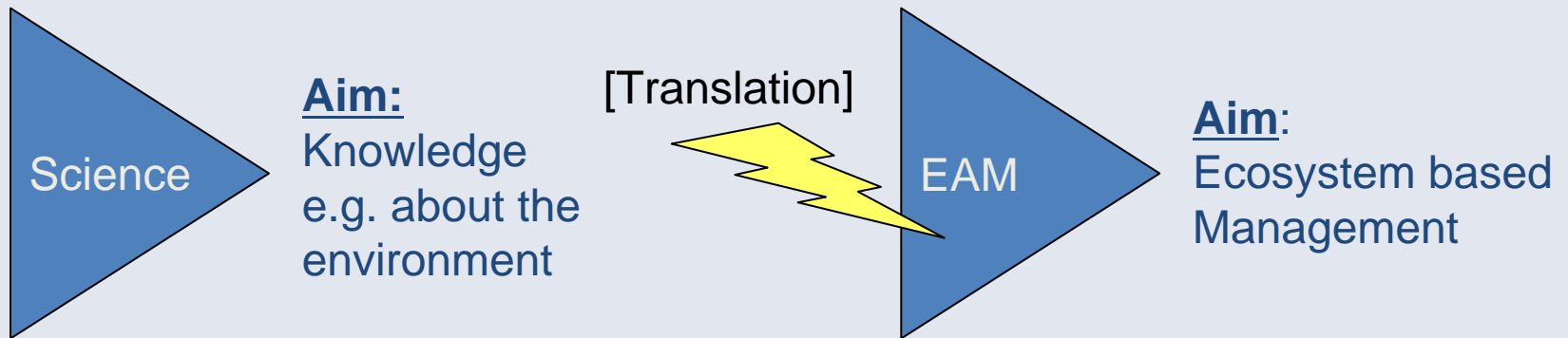
Target: frequency < x %

Target: areal extent < x km²



EAM

- Ecosystem Approach to Management



- Part of European Marine Strategy (EMS)
- Established by ICES (International Council of the Exploration of the Sea) and European Commission



EAM

- Ecosystem Approach to Management

Concept

1. Evaluate the current situation and impacts.
2. Define the vision of the ideal outcome.
3. Identify ecosystem properties of particular importance.
4. Setting Ecological objectives.
5. Deriving Operational Objectives (reduced to the necessary) with indicators and reference points.
6. Ongoing management for moving to targets.
7. Periodic updates for comparing changes (environmental or human activities), revising strategies and gathering new scientific knowledge.

Ecological Quality Objectives

1 Strategic Goals

2 Ecological Objectives

3 Operational Objectives

4 Indicators

5 Targets

Referring to ICES Cooperative
Research Report No. 273

Ecosystem based Management



And what can AMBER do?



Ecosystem Approach to Management of the Baltic Sea?



HELCOM – EcoQO

- Ecological Quality Objectives

Vision

A healthy Baltic Sea environment, with diverse biological components functioning in balance, resulting in a good ecological status and supporting a wide range of sustainable human economic and sustainable activities

Goals

Baltic Sea unaffected by eutrophication

Baltic Sea life undisturbed by hazardous substances

Favourable status of Baltic Sea biodiversity

Maritime activities in the Baltic Sea carried out in an environmentally friendly way

Objectives

Concentrations of nutrients close to natural levels

Clear water

Natural level of algal blooms

Natural distribution and occurrence of plants and animals

Natural oxygen levels

Concentrations of hazardous substances close to natural levels

All fish safe to eat

Healthy wildlife

Radioactivity at pre Chernobyl levels

Natural landscapes and seascapes

Thriving and balanced communities of plants and animals

Viable populations of species

No illegal pollution

Safe maritime traffic without accidental pollution

Efficient response capability

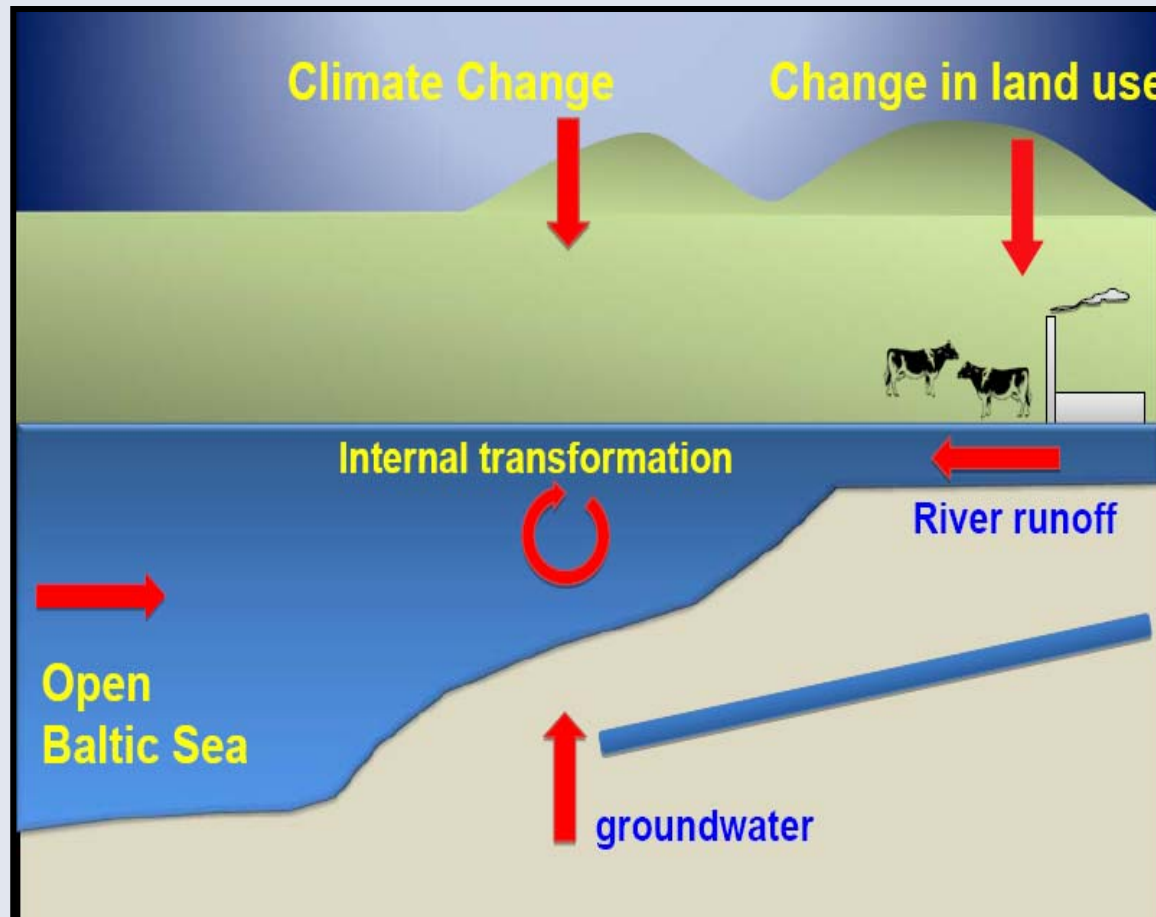
Minimum air pollution from ships

No introductions of alien species from ships

Zero discharges from offshore platforms

HELCOM website

Possible Effects of Climate Change to the Baltic Sea





Climate Change Scenario

Projection of Climate Change (2100)

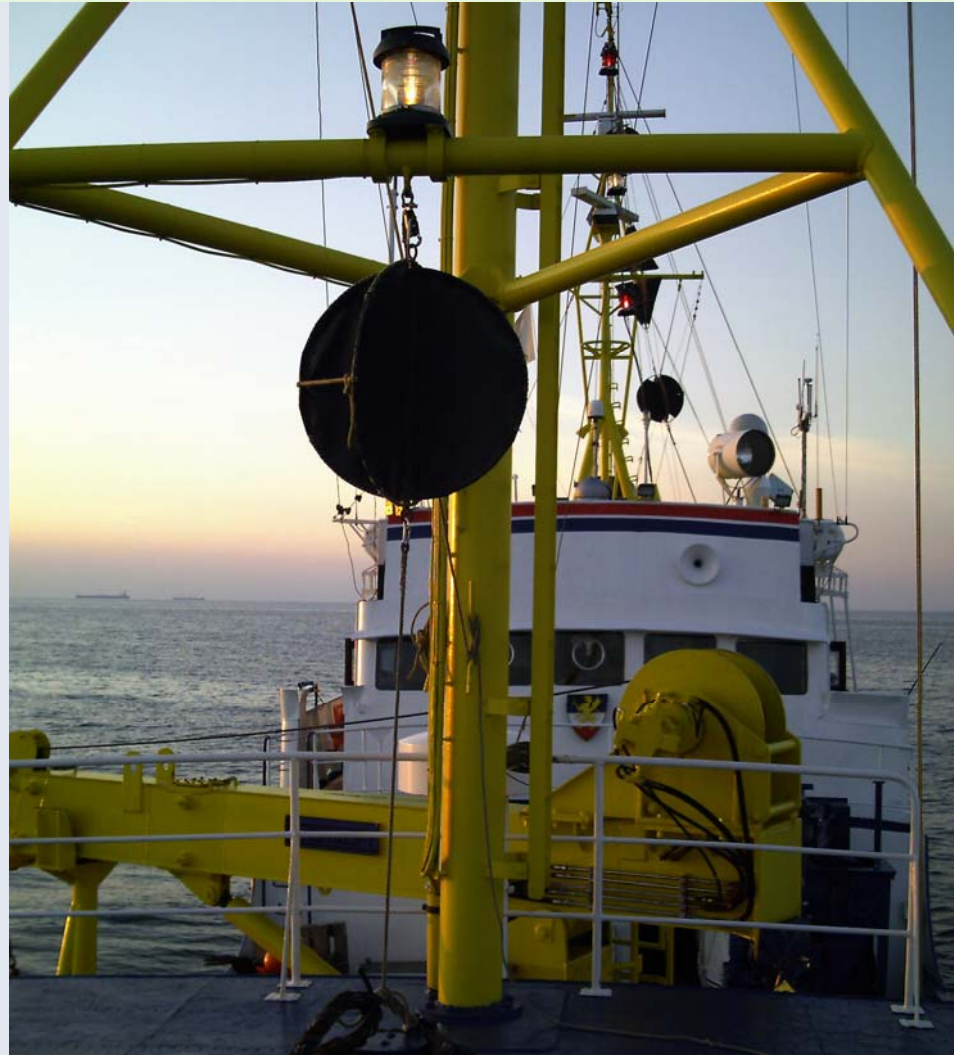


- Increase of air temperature $\sim 3 - 5^{\circ} \text{ C}$
- Increase of sea surface temperature $\sim 2 - 4^{\circ} \text{ C}$
- Decrease of ice extent 50% - 80%
- Decrease of salinity $\sim 8\% - 50\%$
- Risk of floods on south- and east-coasts
- Winter becomes wetter, summer drier
- Increase of river runoff during winter $\sim 50\%$
- Decrease of river runoff during summer $\sim 20\%$
- No robust results for wind and storms

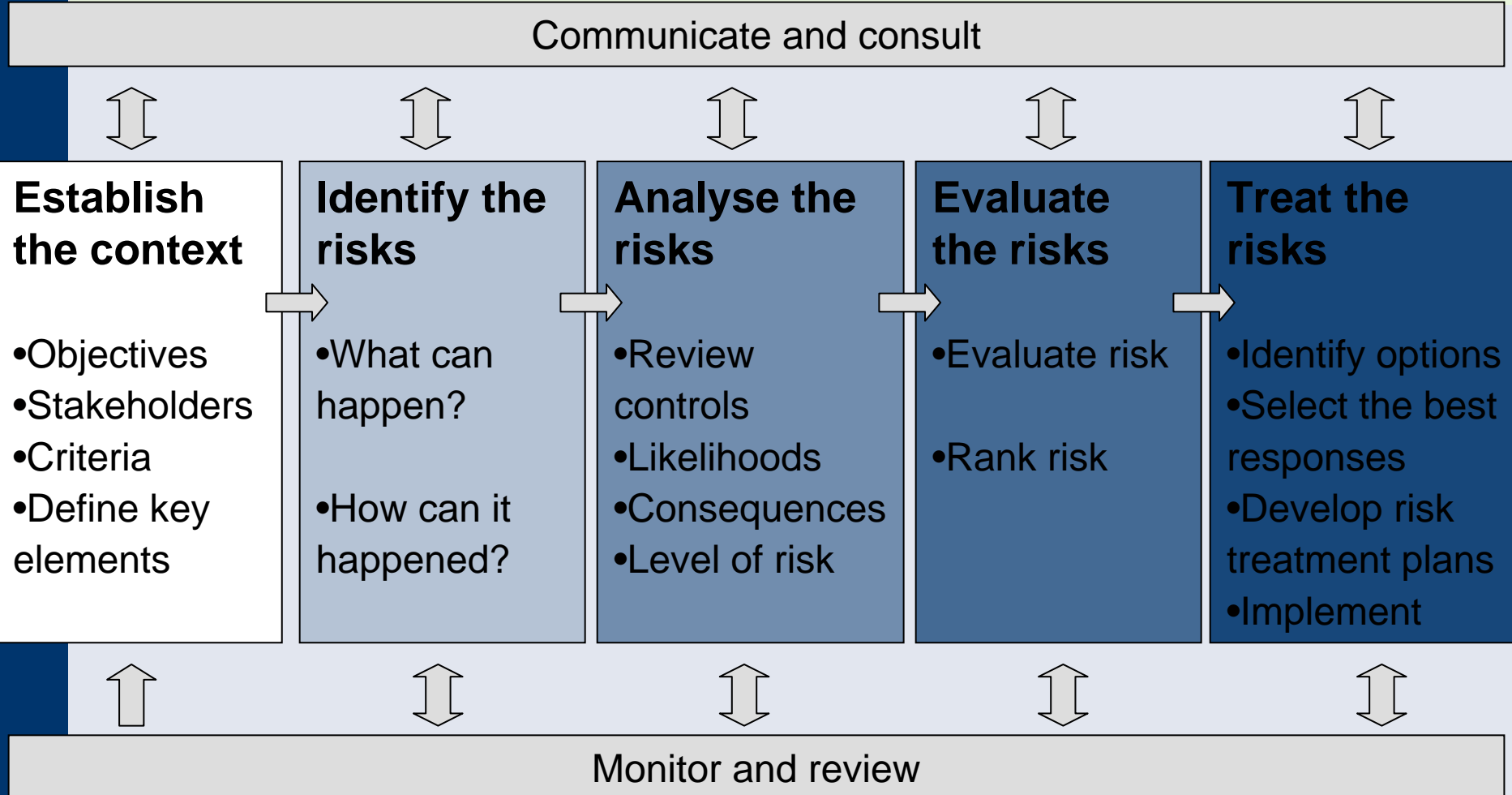
Possible Effects:

- NO_3 eluviation of the soil
- Change of agricultural geography, result: agriculture move northward
- Change of agriculture, e.g. corn
- Change of waste water runoffs
- Watering of crops (groundwater)
- Groundwater: Direction of flow

Thank you for your Attention!



General Risk Assessment Process





Climate Change Scenario

Projection of Climate Change (2100)

- Increase of air temperature $\sim 3 - 5^{\circ} \text{ C}$
- Increase of sea surface temperature $\sim 2 - 4^{\circ} \text{ C}$
- Decrease of ice extent $\sim 50\% - 80\%$
- Decrease of salinity $\sim 8\% - 50\%$
- Risk of floods on south- and east-coasts
- Winter becomes wetter, summer drier
- Increase of river runoff during winter $\sim 50\%$
- Decrease of river runoff during summer $\sim 20\%$
- No robust results for wind and storms



EAM

- Ecosystem Approach to Management

Assessment, monitoring, scientific research will be required to support the Ecosystem Approach

Steps 1-7:

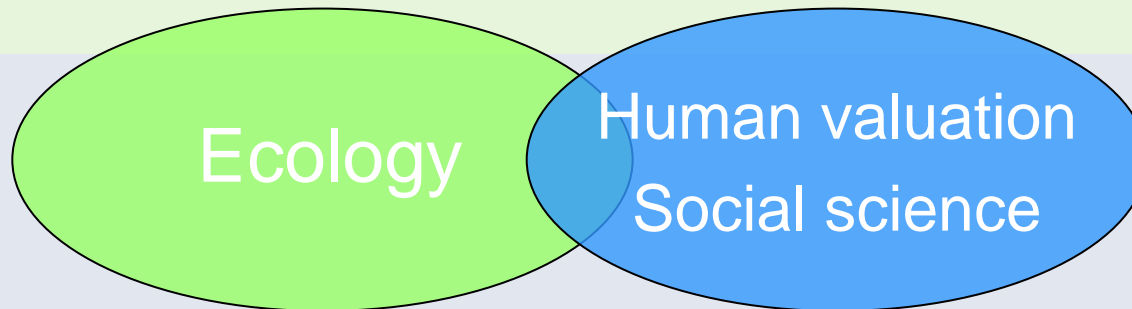
- Evaluate the current situation and impacts.
- Define the vision of the ideal outcome (high-flown).
- Identify ecosystem properties of particular importance.
- Setting Ecological objectives (inter-compatible to each other).
- Deriving Operational Objectives (reduced to the necessary) with indicators and reference points.
- Ongoing management for moving to targets.
- Periodic update for comparing changes (environmental or human activities), revising strategies and gathering new scientific knowledge.



EcoQO

- Ecological Quality Objectives

Problems?



- the “ideal” ecosystem state is dependent on the specific management context (not the same quality standard)
- the definition of quality is sensitive to the identification of societal demands
- not necessarily all societal demands (quantitatively) can be met by an ecosystem