

What benefits are associated with NWRMs for the purposes of water management?

Regional workshop

Integration of natural water retention measures (NWRM) into river basin management in the Baltic Sea Region

Monika Centrum Hotels, Elizabetes iela 21, Riga

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In 15 minutes:

- The objective of task 1b
- Costs and benefits of NWRMs - direkt (primary), indirect (ancillary)
- The NWRMs in the WFD
 - Economic analysis in the WFD (CEA, CBA)
 - WFD environmental quality criteria and EQS
 - Useful economic information
- Presentation of Kävlingeån – a water quality project in the south of Sweden
 - Involved NWRM:s
 - Costs and Benefits

Sub-task 1b - Gather information on assessment methods and practices and collect data for assessing measure impact and cost effectiveness and cost efficiency, feeding the catalogue of measures and case studies

- **Bio-physical impacts**, including hydrological, hydromorphological, physiochemical and ecological effects;
 - Associated direct and indirect benefits;
 - Associated direct and indirect costs;
- **Geophysical and biophysical factors** constraining or enhancing the applicability of each type of measure;
- **Potential implementation barriers** and success factors for implementing and sustaining the measures;
- **The financing potential** of measures based on 2014-2020 Common Strategic Framework fund.



Costs and Benefits

- **Direct costs: investment, operation and maintenance costs.**
 - Total investment (costs/ type of measure)
 - Operational & maintenance (costs/year)
- **Indirect costs “external costs” - opportunity costs (cost/yr, cost/capita)**
 - On micro level; foregone benefits, additional costs
 - On macro level; e.g. a loss in sector level (e.g. agriculture production/revenue/value added)



Costs and **Benefits**

Direct (primary) benefits

- Avoided costs from flooding (from e.g. restoring floodplain, afforestation, etc)
- Avoided water purification costs (e.g. buffer strips, wetlands, AGR)
- ...

Indirect (ancillary) benefits

- Biodiversity
- Amenities
- Recreation
- ...

Indirect (ancillary) benefits

- Ecosystem Goods and Services (EGS)

- First approach: identify all relevant EGS connected to NWRMs
- Typology: CICES or TEEB
- Distinguishing between RBMP objectives and ancillary benefits brought about by the NWRM
- Valuation of ancillary benefits (EGS):
 - Biodiversity strengthening other sectors
 - Risk reduction in other sectors

| Type | | Class |
|---------------------------------|---|--|
| Provisioning (biotic / abiotic) | Nutritional (biomass/abiotic) | Rainfed cultivated crops |
| | | Reared animals and their outputs |
| | | Wild plants, algae and their outputs |
| | | Wild animals and their outputs |
| | | Plants and algae from in-situ aquaculture |
| | | Animals from in-situ aquaculture |
| | | Nutritional abiotic substances (mineral and non-mineral: e.g. salt, sunlight) |
| | Materials (biotic/abiotic) | Fibres and other materials from plants, algae and animals for direct use or processing |
| | | Genetic materials from all biota |
| | | Materials from plants, algae and animals for agricultural use |
| | | Abiotic materials (e.g. metal ores, building materials) |
| | Energy (biomass-based / mechanical/abiotic) | Plant-based resources |
| | | Animal-based resources |
| | | Animal-based energy |

NWRM in WFD

- The economic analysis in WFD PoM

CostEfficiencyAnalysis (CEA)

- The cheapest measure, or bundle of measures, to reach a given reduction level necessary to achieve **Good Ecological Status**

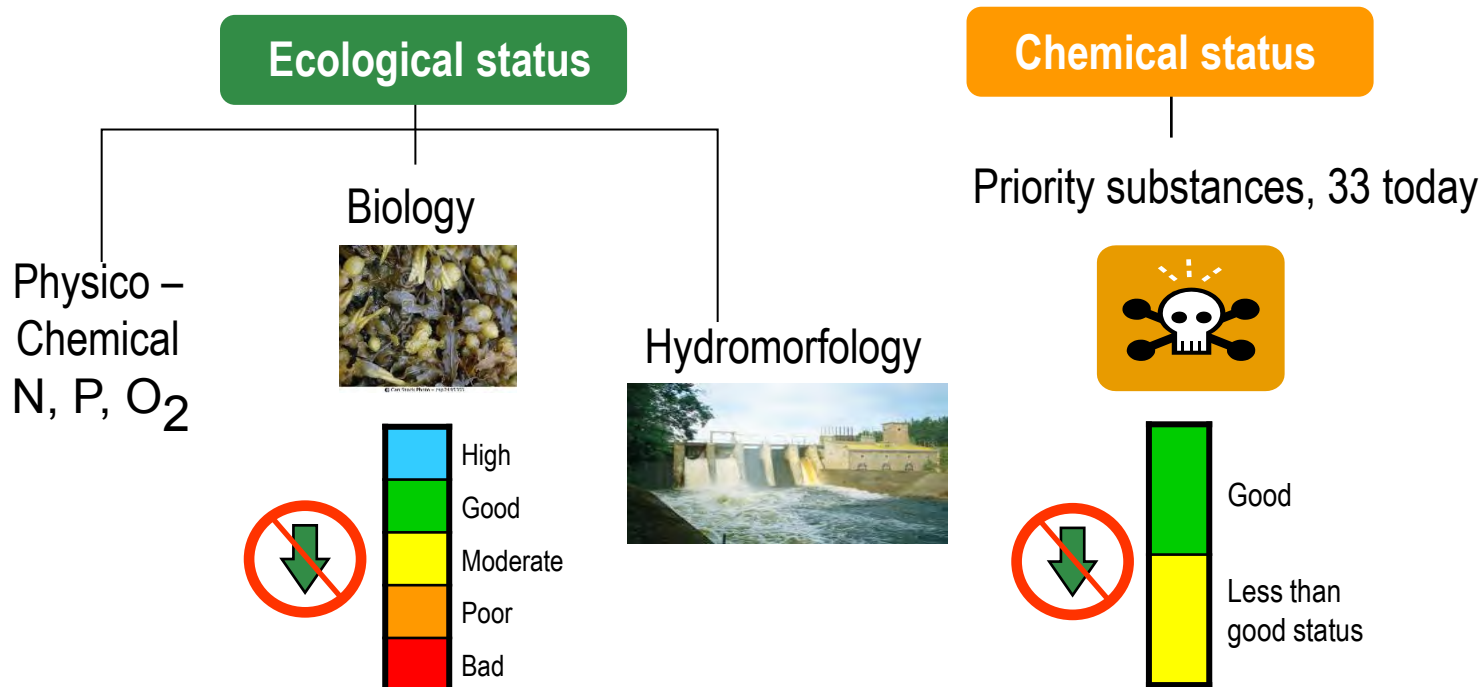
Impact assessment

- CostBenefit Analysis (CBA)
To assess different options/bundles of measures in terms of balance between costs and benefit (including both direct and indirect costs and benefits)
- Distributional effects -> Polluter Pays Principle (PPP)

NWRM in WFD

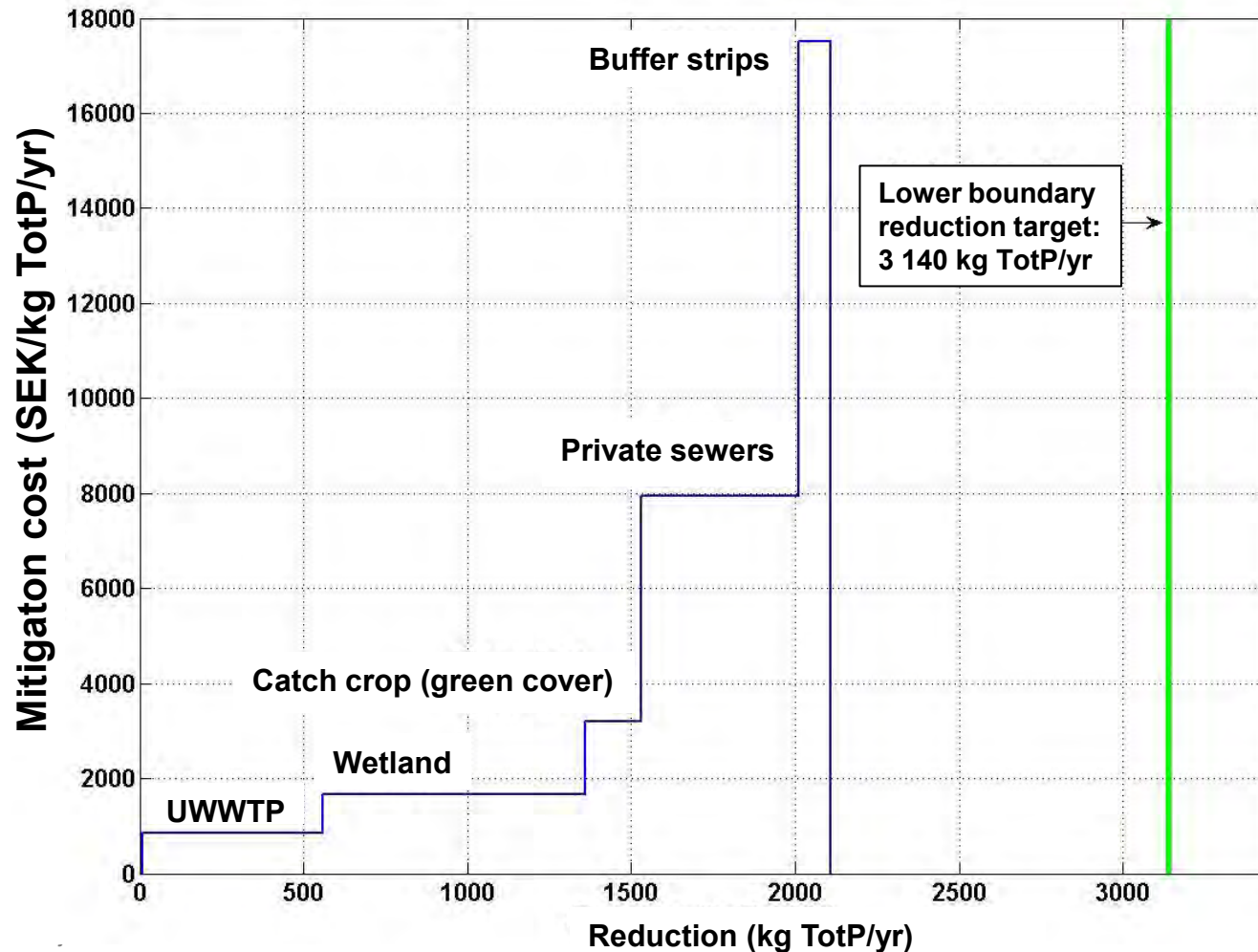
WFD; Environmental quality criteria and EQS

Lakes, streams, coastal waters and ground water (chemical status)



CE analysis of WFD measures

-The Viskan catchment area in the south west of Sweden




What economic NWRM-information would then be useful from a WFD perspective?

For CEA:

- GES - quality criteria affected by the NWRM (physico-chemical, biological, hydromorfological, *chemical*)
- Average unit costs (e.g. SEK/kg TotP/yr) for reduction (intervalls?)

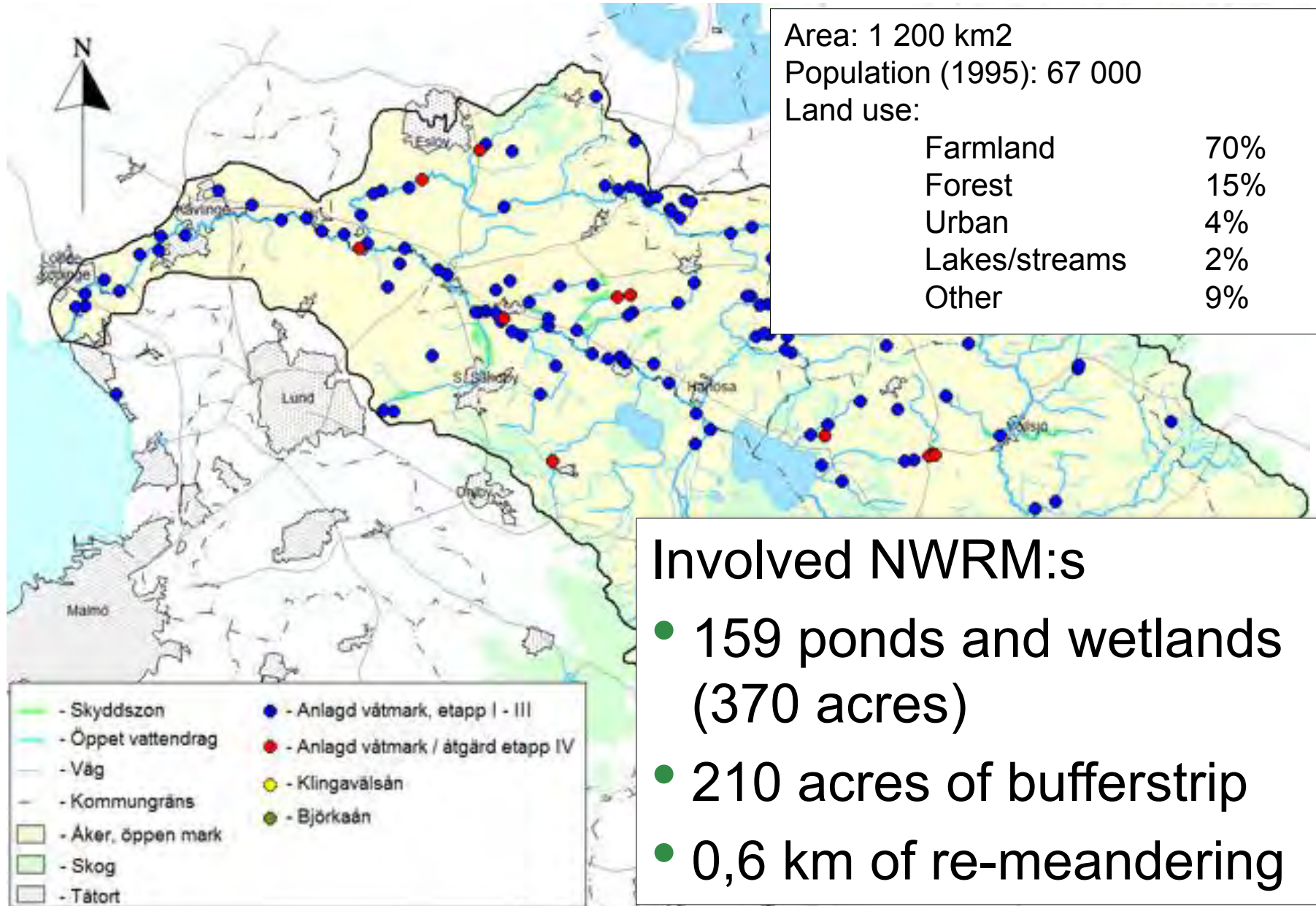
For CBA:

- Direkt and indirect costs (average or marginal costs)
- Direct and indirect benefits (if quantified; average or marginal benefits)



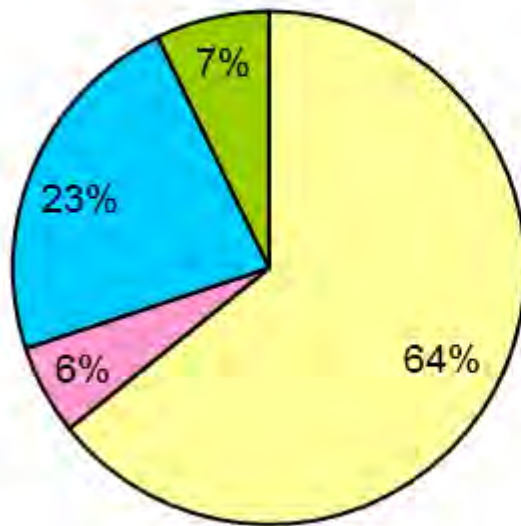
Kävlingeån – a water quality project in the south of Sweden

- Initiated in 1995, finished in 2011/2012
- Objectives;
 - to reduce nutrient leakage to the sea (WFD)
 - to improve water quality in streams and lakes (WFD)
 - to strengthen biodiversity
 - recreational and amenity purposes
- 370 acres of ponds and wetlands created
- Managed and co-financed by 9 municipalities in the catchment area
- Based on stake holder involvement
- EU-funding (Life), Swedish Govt. (Local Investment Programs, Rural development funds)



Costs and Benefits

Total project cost: €13,7 M



Costs and **Benefits**

Ponds and wetlands

- N reduction (denitrification, sedimentation, etc)
- Retention of P and suspended matter (sedimentation)
- Retention/decomposing of pesticides, metals, etc. from farm land, stormwater, point sources etc
- Increased water storage capacity in the landscape (enhanced capacity for irrigation)
- (Re)creation of habitat for birds, wildlife and flora
- Increased recreational opportunities
- Improved residential env. In some cases

Buffer strips

- Decreased supply of P by decreased land runoff,
- Decreased erosion in riparian zones
- Decreased risk for direct exposure of pesticides during spraying close to stream
- Shadowing of the stream decrease the growth rate in the water (less maintenance)
- (Re)creation of habitat for birds, wildlife and flora
- Increased recreational opportunities
- Green infrastructure

Thanks for your attention!



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