

The Aquarius approach on mitigation of phosphorus losses

Arne Joelsson, Jonas Svensson,
County Administrative Board of Halland, Sweden

The Interreg IVB
North Sea Region
Programme





Farmers as water managers under changing climatic conditions

With the aim to reach Good Ecological Status
under maintained farming conditions and
production

Aberdeenshire Council
Macaulay Institute

Lantbrukets Rådgivningsservice
Danish Ministry of Environment

Provincie Drenthe
Waterschaap Hunze en Aa's

Hooghemsraadschap van Delfland

County of Östfold
Bioforsk institute

Landwirtschaftskammer, Niedersachsen

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European Union



The European Regional Development Fund

Main conclusions

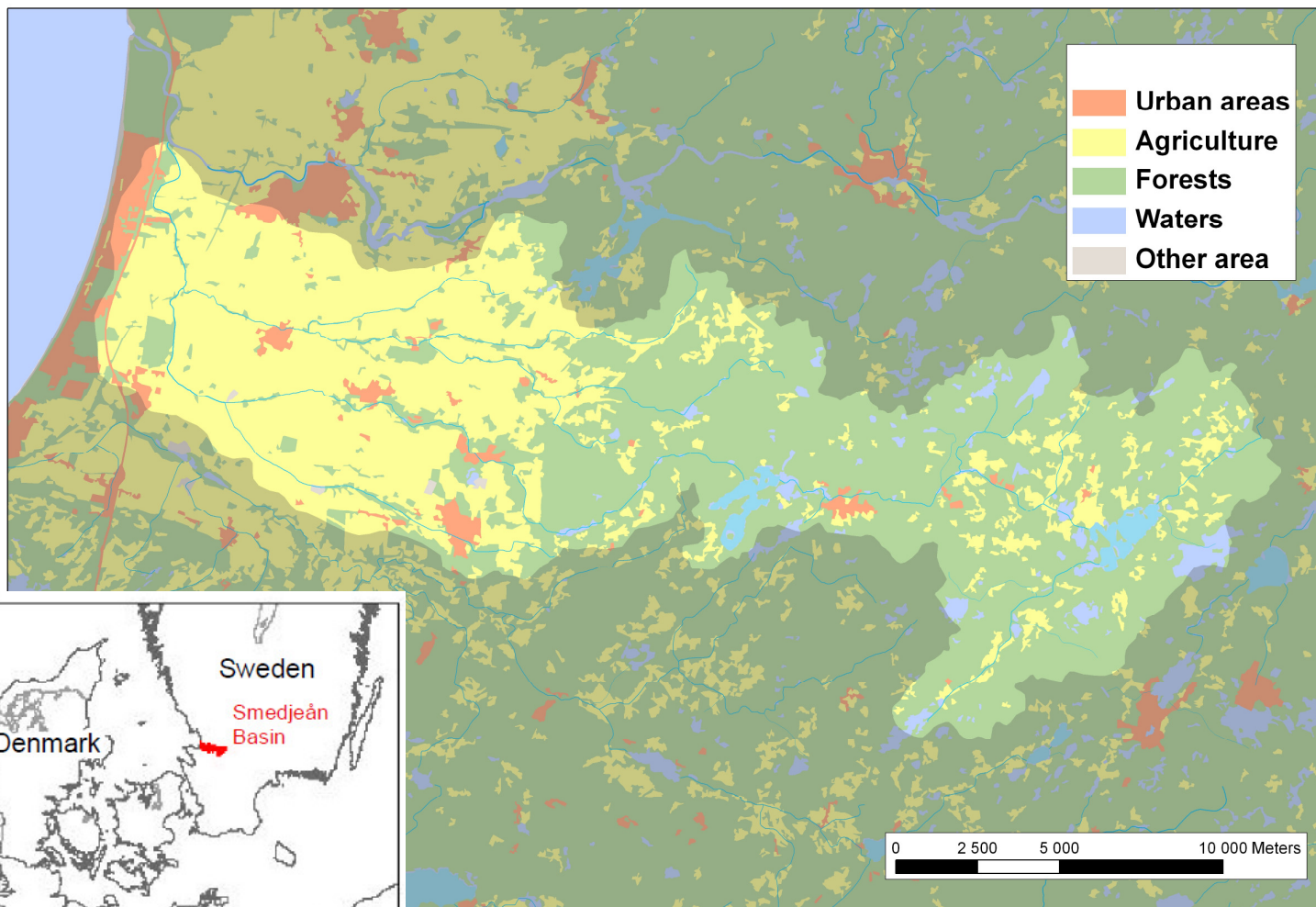
- General regulations and voluntary support schemes are not sufficient to mitigate phosphorus losses

Because: Phosphorus losses from arable land in Sweden can vary from 0,02 -2 kg·ha⁻¹·yr⁻¹

- A measure program must be locally adapted to be cost-effective
- A water management plan on farm level is needed



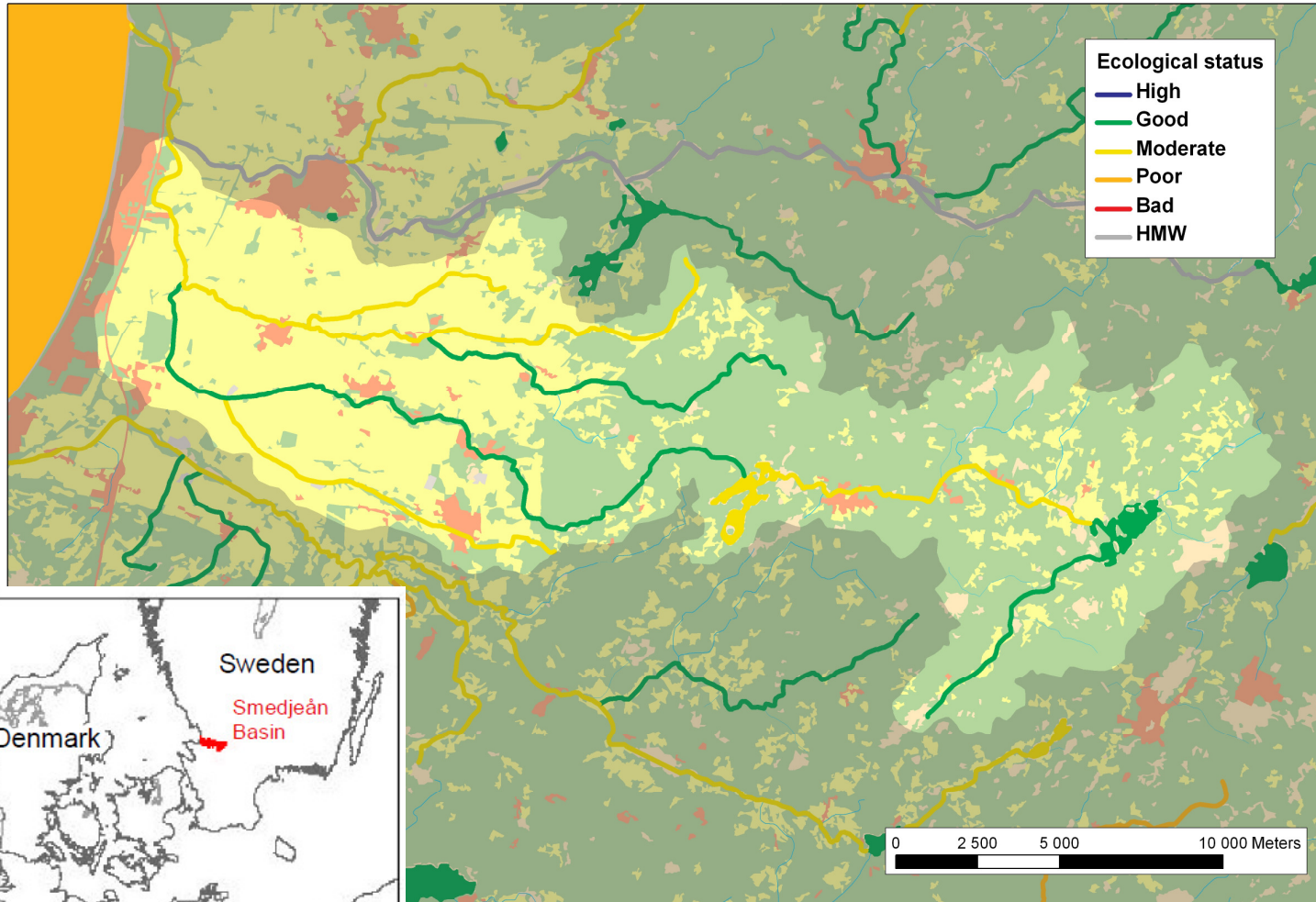
River Smedjeån – pilot catchment



Smedjeån Catchment

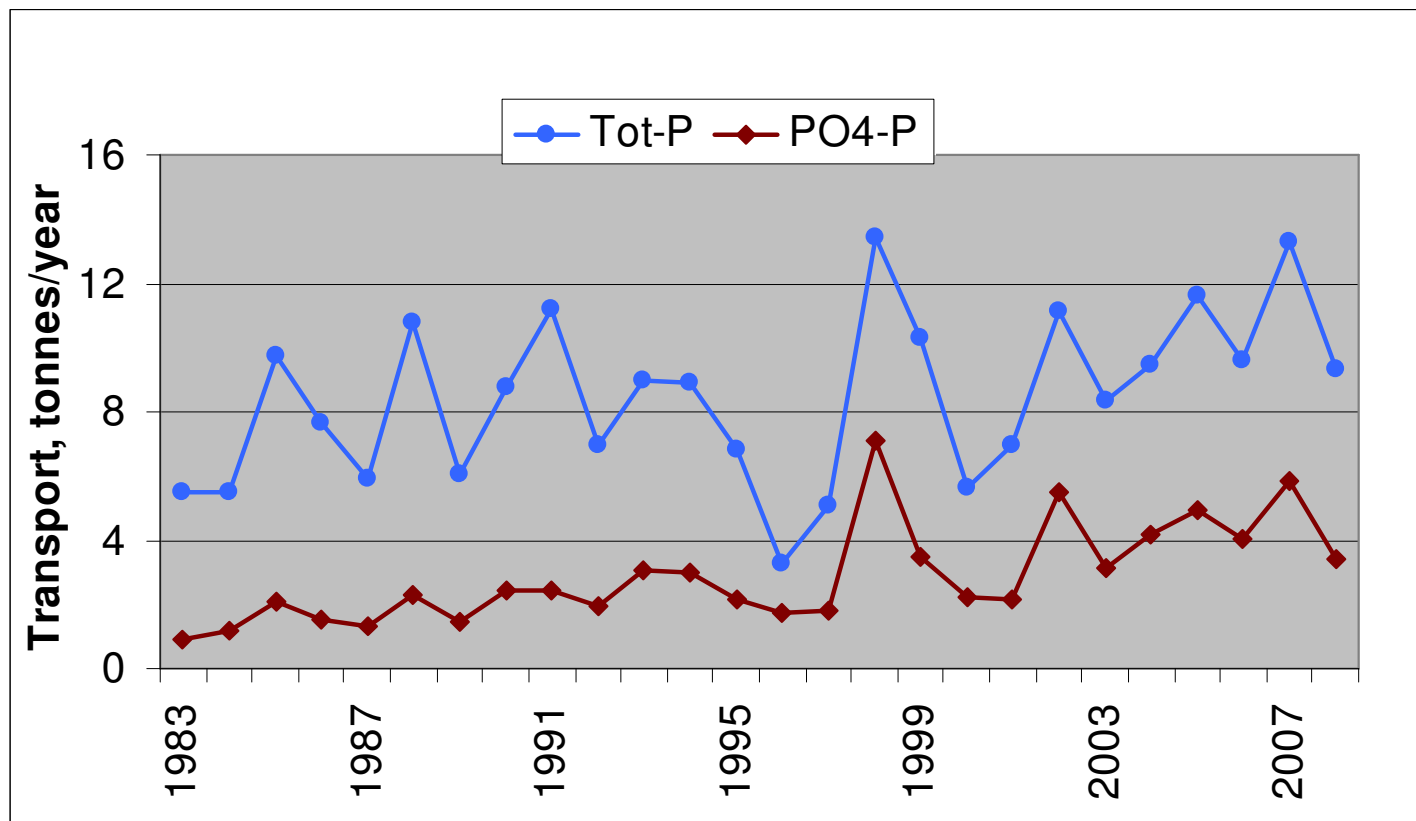
River Smedjeån catchment

Water bodies and present Ecological status



Smedjeån Catchment

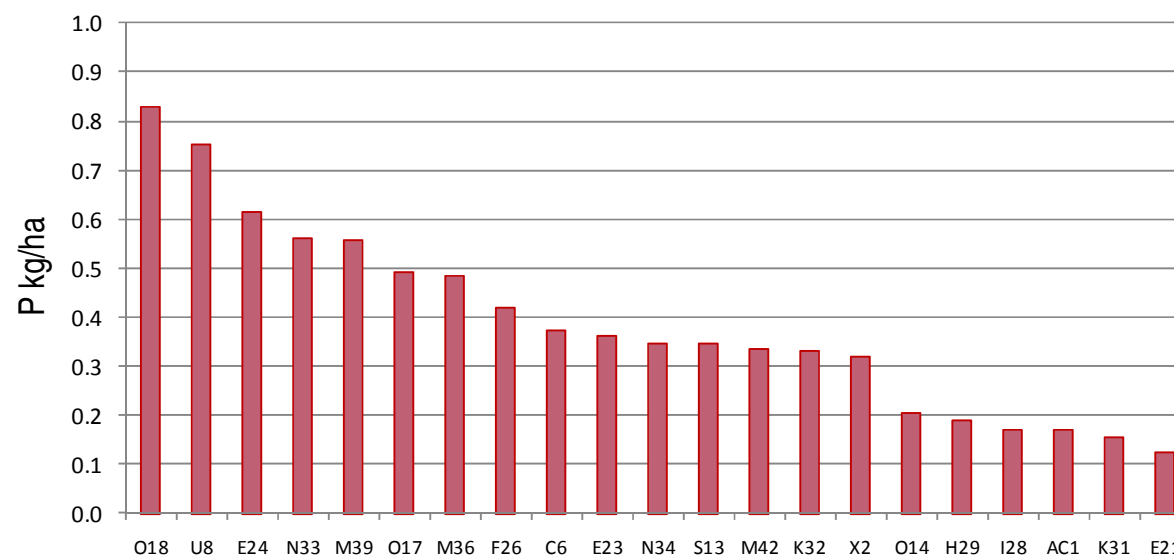
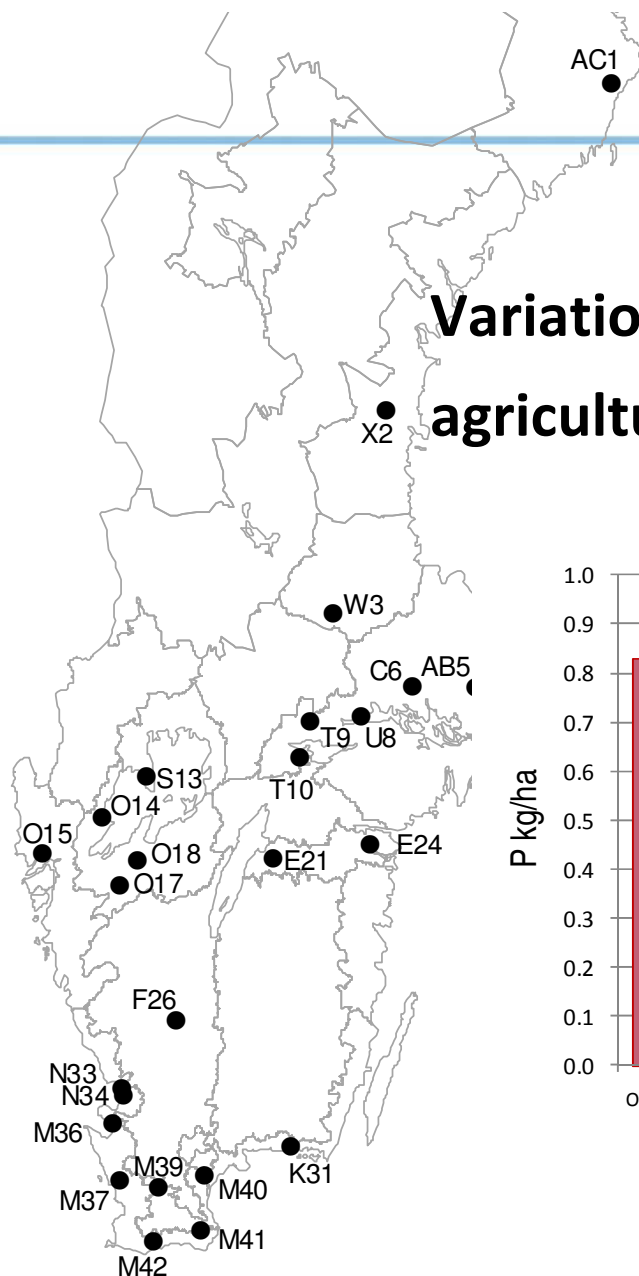
Transport of P in River Smedjeån



**Net-anthropogenic P-load: 2550 kg/year
(60% from agriculture)**

www.smed.se

Variation in transports of P from different agricultural soil types in Sweden (10-year means)



(The Swedish Environmental Monitoring programme)

These natural and man made conditions lead us to the following strategy:

- **Adaptation of agricultural practices in a tight cooperation with the farmers**
- **Focus on P-losses from erosion sensitive areas**
- **Increase of the P-retention capacity in soils and through constructed wetlands**
- **Combat flooding of arable land by increased storage capacity in the upland and by reserving areas for controlled flooding**



Swedish policy instruments



The Ordinance on environmental concern in agriculture and the Swedish Regulation on Environmental Considerations in Agriculture

gives the obligations for all farmers.

Swedish financial support schemes and subsidies to mitigate phosphorus losses

- Perennial ley farming
- Construction of wetlands and ponds
- Catch crops
- Buffer zones

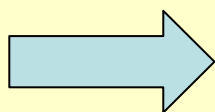
Water management plans on individual farm level



Present conditions:

High animal density has increased the light soluble phosphorus concentration of the soils

As a mean value the phosphorus application exceeds the official recommendations by 11 kg P per ha and year

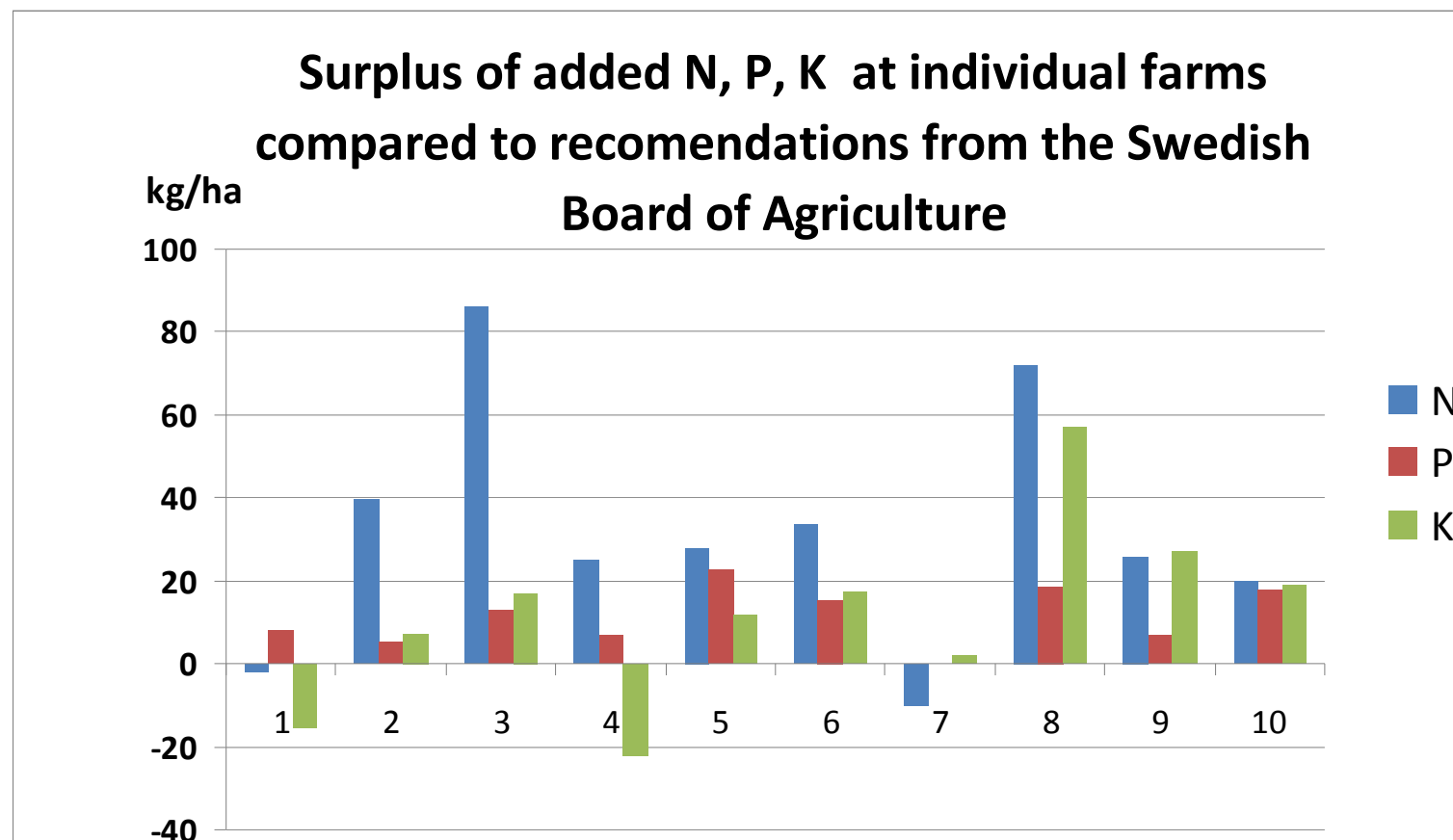


Decrease of P-fertilization is needed

Water management plans on individual farm level



Present conditions:



Constructed wetlands in River Smedjeån catchment

Edenberga wetland

P mean concentrations ($\mu\text{g/l}$) over one year of flow proportional sampling







Edenberga wetland	In	Out	
Tot-P	31.4	14.4	
PO-P	5.7	5.1	

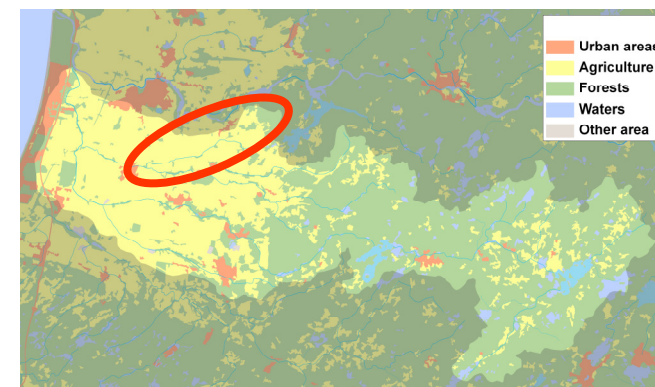
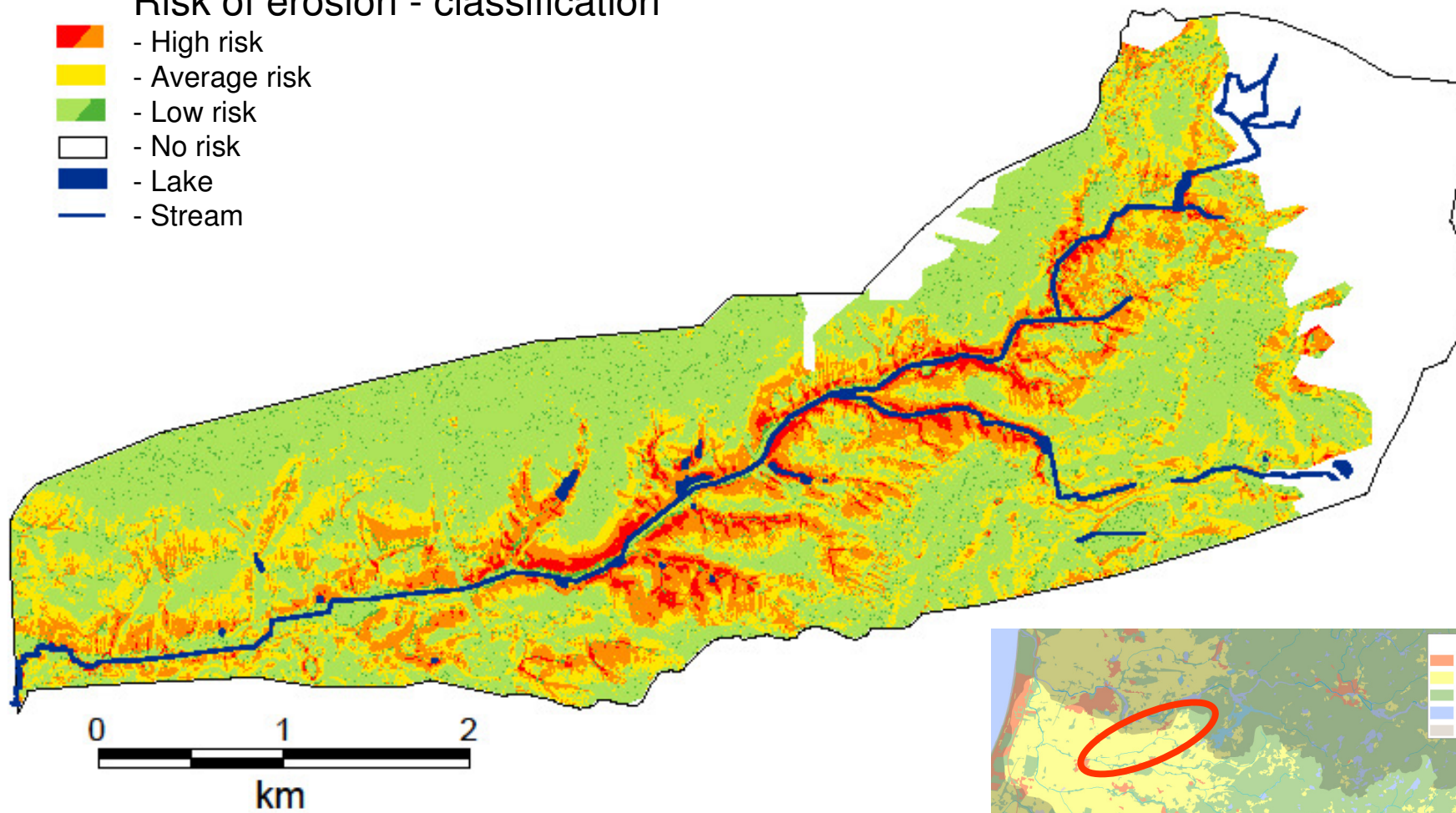


Buffer strips of standardized width is not a cost efficient measure to stop erosion of P to streams and ditches



Risk of erosion - classification

-  - High risk
-  - Average risk
-  - Low risk
-  - No risk
-  - Lake
-  - Stream



Coming up...

Tuning at the individual farm of
agricultural practices,
wetlands
buffer zones

**Water management plan on farm level that improves water quality through
land management and at the same time optimizing production**

**Acknowledgments to: Gert Erlandsson, Peter Feuerbach, Anna Hansson,
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Erika Tollebäck, Katarina Vartia and Stefan Weisner.**

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Next step...

Water management plans on farm level with a cost effective combination of measures including

- tuning of agricultural practices**
- catch/cover crops during winter season**
- construction of wetlands**
- buffer zones**

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Thanks for listening!

Acknowledgments to: Gert Erlandsson, Peter Feuerbach, Anna Hansson, Annika Henriksson, Torsten Kindt, Johan Kling, John Strand, Erika Tollebäck, Katarina Vartia and Stefan Weisner.

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