



UNESCO Biosphere Reserves as testbeds for Nature Based Solutions

11th Nordic WFD Conference, September 25th, 2024

Understanding UNESCO's MAB Programme



“since wars begin in the minds of men, it is in the minds of men that the defense of peace must be constructed.” (Preamble UNESCO Constitution, 1945)

Model regions for sustainable development – predecessors to others

759



Biosphere
Reserves

Present in
136

countries



23



Transboundary
Biosphere Reserves
2 transcontinental biosphere reserves



275 million
people call

biosphere reserves their home



5%

of the world's surface

Altogether 7,120,000 km²,
approximately the size of
Australia



Projet de loi relatif à la loi de programmation relative à l'égalité de territoires et à la République numérique
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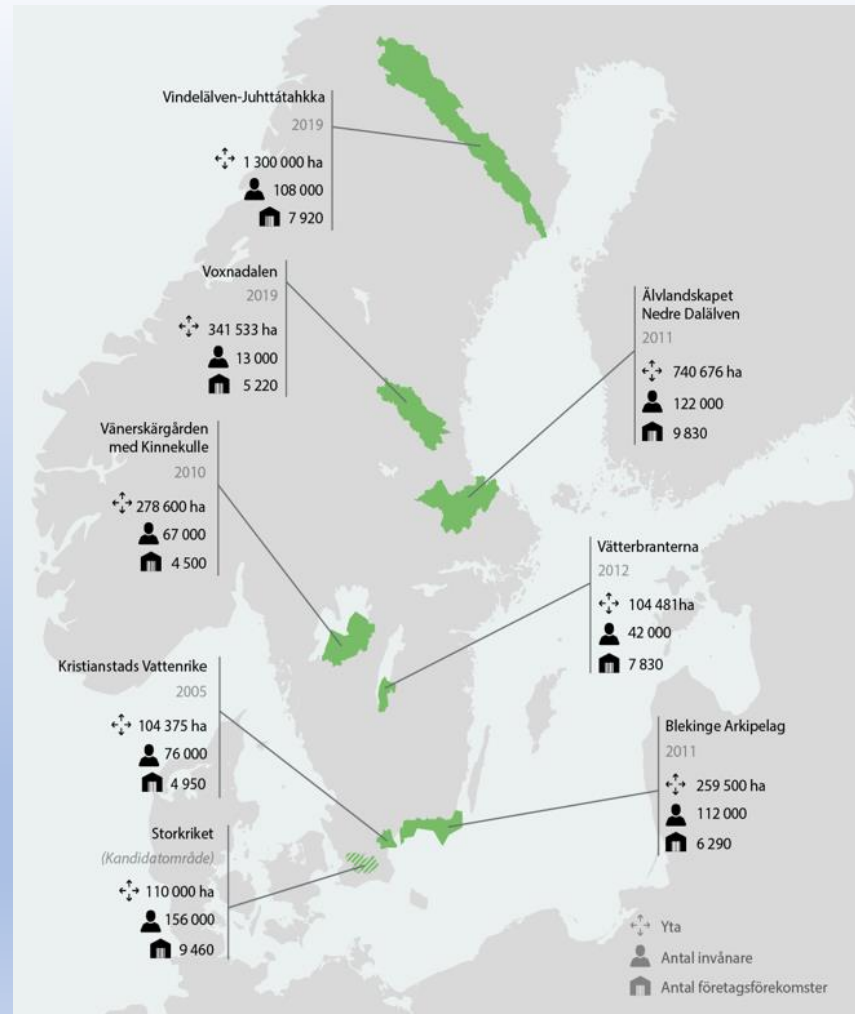


Swedish MAB

7 Biosphere areas
1 biosphere candidate

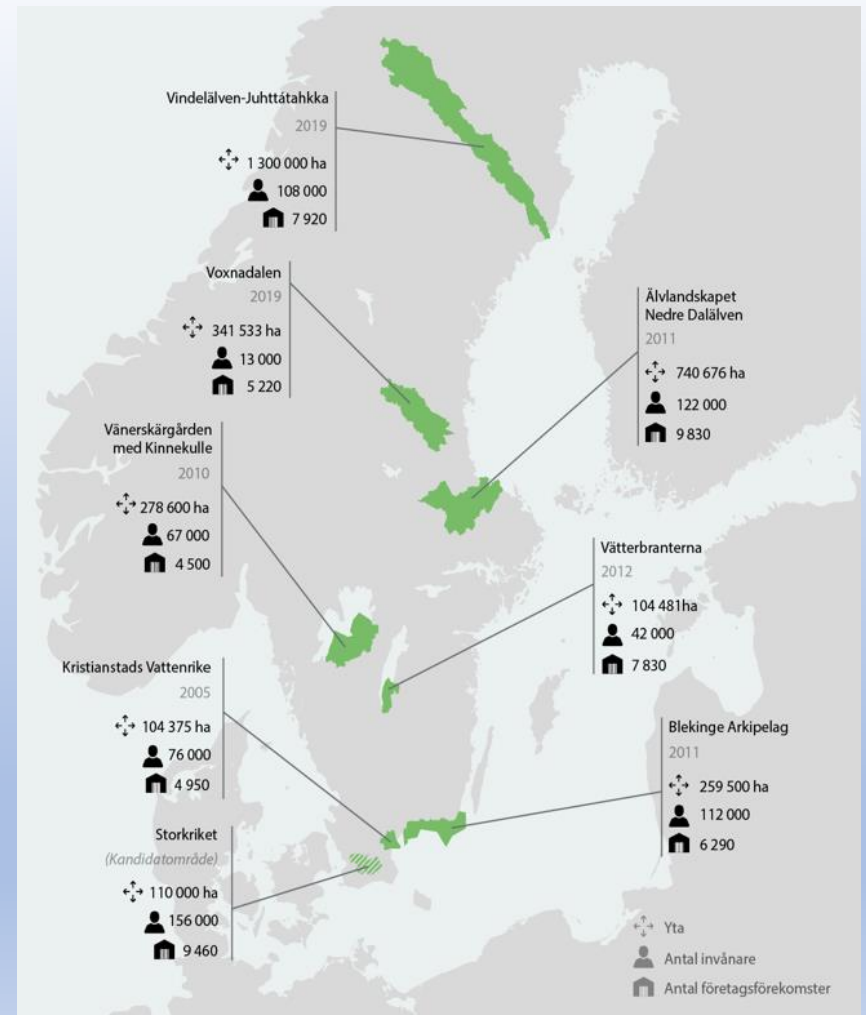
2 preparatory studies
5-6 showing interest

ca 8% of surface area
ca 4% of inhabitants



Swedish MAB cont..

- BRs designed with bottom up approach
- BRs are based on local contexts
- Non-legal basis
- Neutral arenas for collaboration



Supported by Nature

- Nature Based Solutions Learning Sites
for a sustainable Baltic Sea

- 17 Learning Sites in 9 +1 BR
- Multistakeholder approaches
- 4,7 MEuro

Pilots & Target Groups

1) Learning by doing

Establish 17 NBS Learning Sites through collaborative multi-stakeholder approaches.

2) Learning by experiencing

Increase understanding of NBS through activities at Learning Sites.

a) Local public authorities

b) Higher ed. Research inst.

c) Interest groups



Interreg
Baltic Sea Region



Co-funded by
the European Union



SUSTAINABLE WATERS

Supported by Nature

CONCLUSIONS

BRs provide a unifying role and through learning processes link different actors in a strategic way.

BRs are areas that show good examples of how land use goes hand in hand with healthy ecosystems.

BRs gives focus to sustainability issues and engage communities in building their own future, which has been proven profitable for corporations, ecosystems and social capital.

Bridgebuilders that increase governance and local identity.

Kristianstads Vattenrike Biosphere reserve

Testbed for Nature Based Solutions

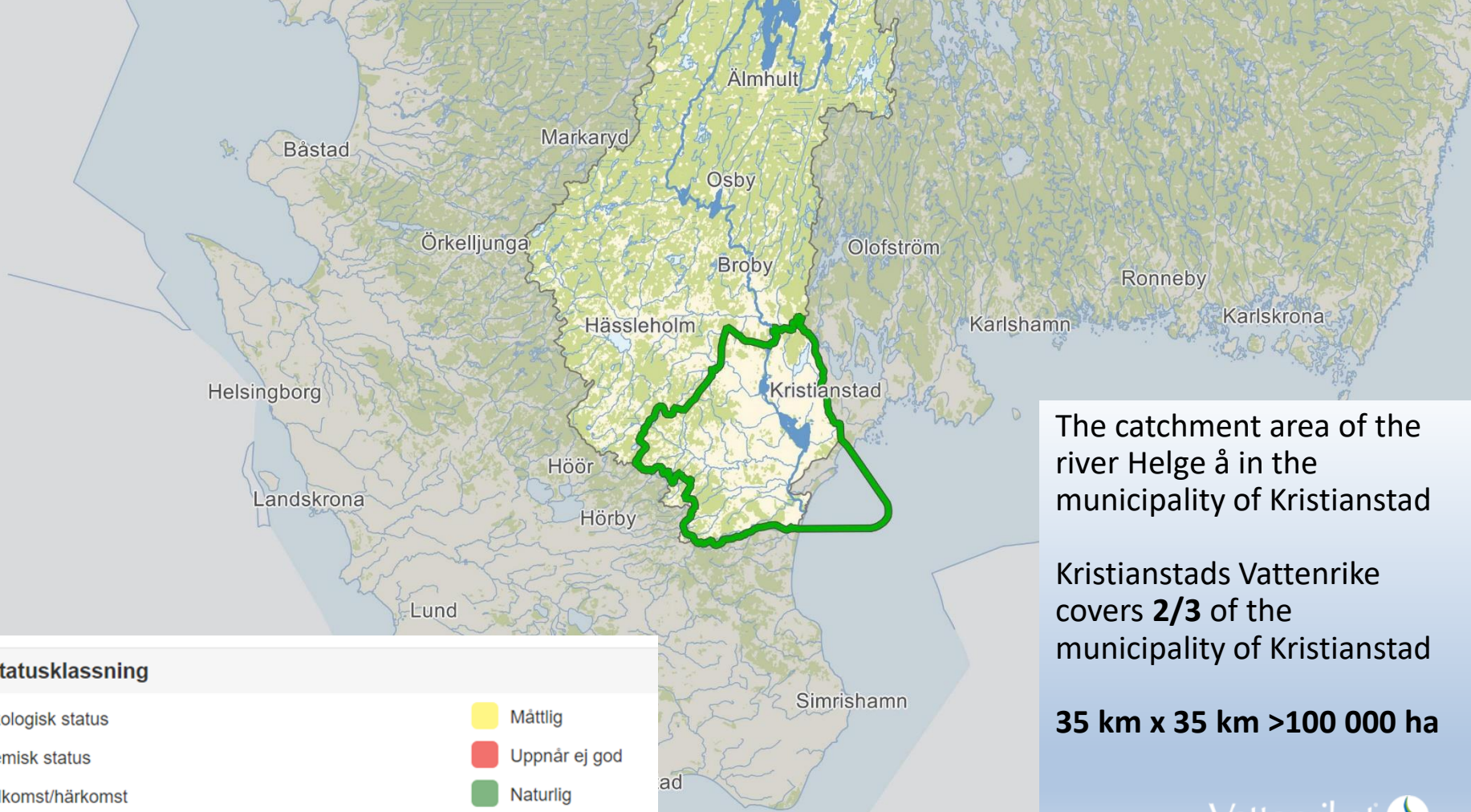
-Multifunctional wetlands



Vattenriket®



Kristianstads
kommun



The catchment area of the river Helge å in the municipality of Kristianstad

Kristianstads Vattenrike covers **2/3** of the municipality of Kristianstad

35 km x 35 km >100 000 ha

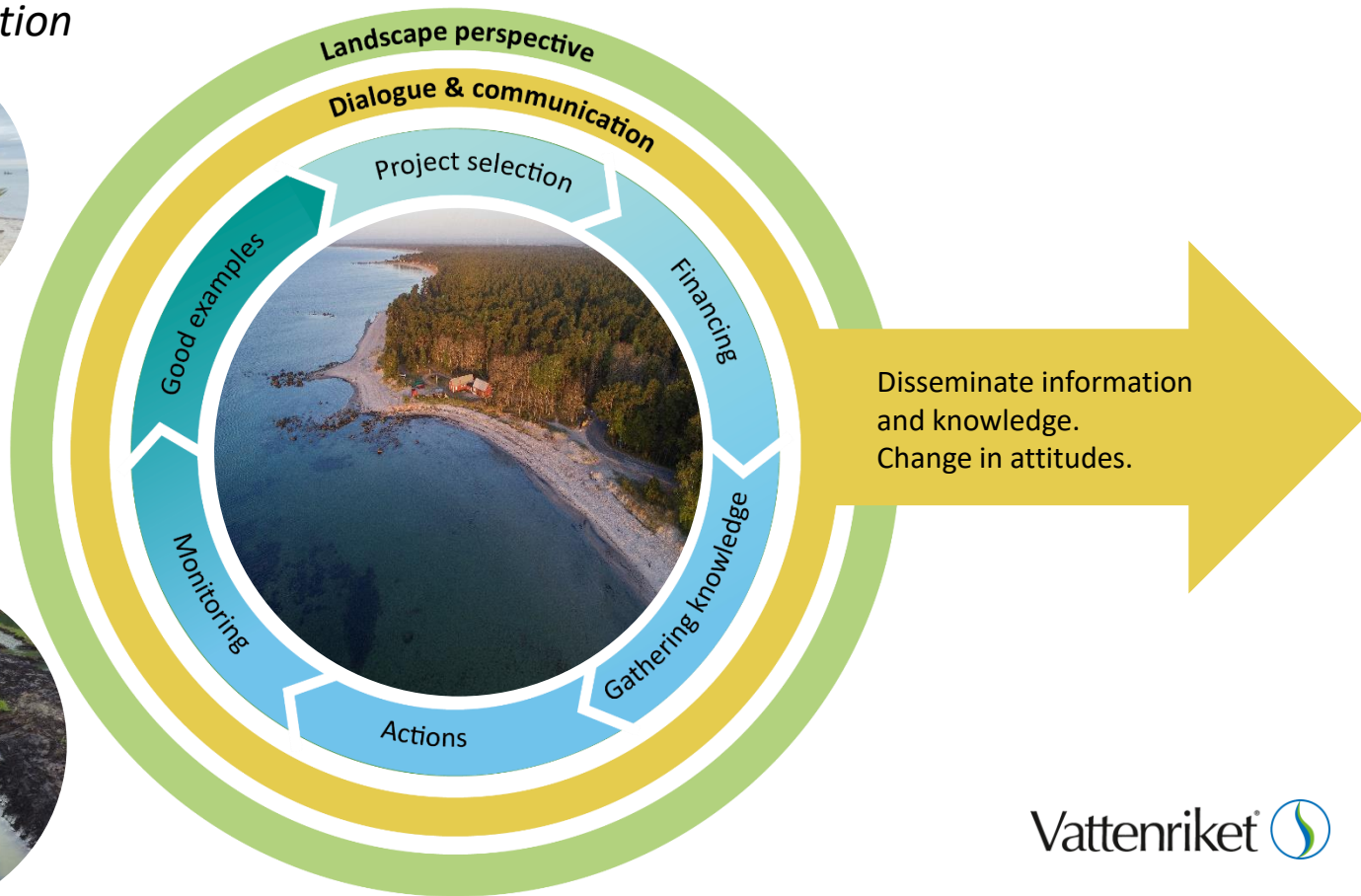
Kristianstads Vattenrike Biosphere Reserve

- The work started in 1989, Biosphere reserve since 2005
- Varied landscape, extraordinarily rich in species
- Actions from source to sea
- Adm. responsible for the water council of the river Helge å since 2020
- *“Good for both people and nature”*



Local solutions to global challenges

Adaptive collaboration



Multifunctional wetlands as examples of work with NBS in Vattenriket

-Two different examples from Vattenriket



Create new wetlands

66 new wetlands, more than 300 ha

Many ecosystem services

- Nutrient retention
- Carbon sinks
- Biodiversity
- Resilience, delay water
- Climate adaptation and mitigation
- Groundwater formation
- Irrigation etc
- Collaboration with research
- The Biosphere office searches for project funding, signs contracts with the landowners, 25 years, mostly 90 % financing
- Easy to get funding, but no money for monitoring





- 10 ha large wetland, completed in 2019
- One part for irrigation and one part for nutrient retention and biodiversity
- “light” sandy soils, ex. root crops are cultivated
- drainage area of 300 ha
- Instead of drilling a new well for irrigation, the farmer contacted us, and we found a solution using surface water, a NBS solution
- The water comes from drainage pipes and a couple of smaller embankments
- 100 ha are irrigated with water from the wetland
- A more resilient solution!

Monitoring and evaluation are important!

- Lessons to be learned:
- [Lärdomar från våtmarksarbete \(youtube.com\)](#)
- [Rubrik \(kristianstad.se\)](#)



YouTube

Sök



Vattenriket



Biosfärområde Kristianstads Vattenrike



Vattenriket i fokus 2024:02

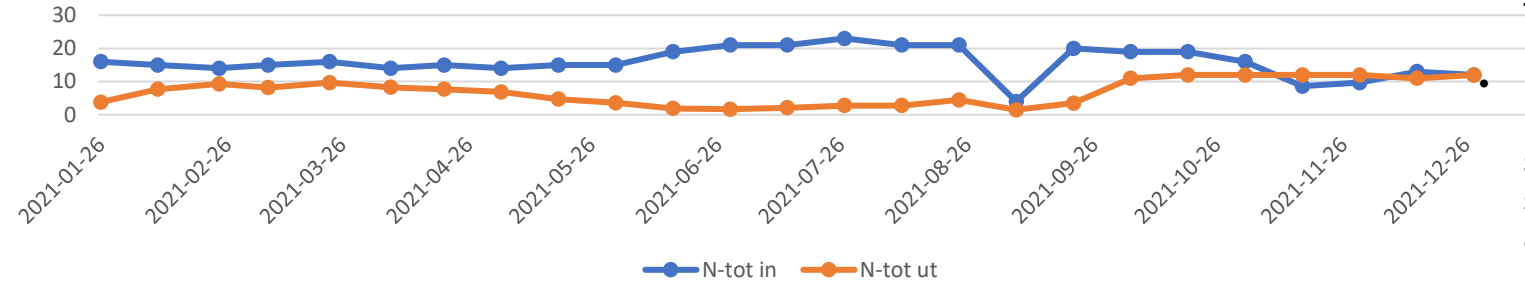
Lärdomar från våtmarksarbete

Uppföljning av 66 våtmarksprojekt

Per Torstensson, Mattis Vindelman



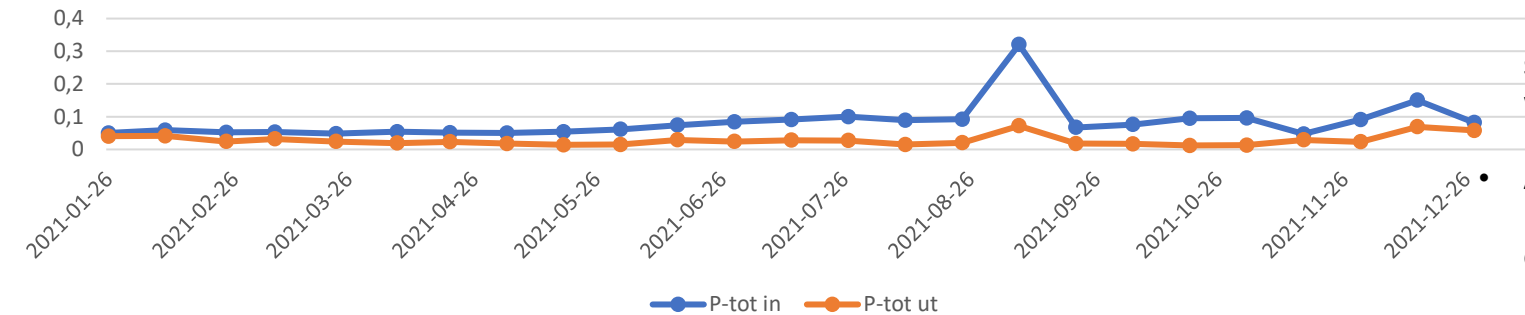
N-tot mg/l Köpinge



- **The wetland functions as a nitrogen and phosphorus trap**

- Both nitrogen (N) and phosphorus (P) increase slightly when the farmer starts the irrigation pump around May 26.

P-tot mg/l Köpinge



- At the same time, the difference between the incoming and outgoing water increases during the growing season, which shows that it works.

- Around September 15, a heavy rainstorm of 40 mm occurs:

- dilution effect on nitrogen (N)
- leaching of phosphorus (P) bound to silt in the drainage pipes

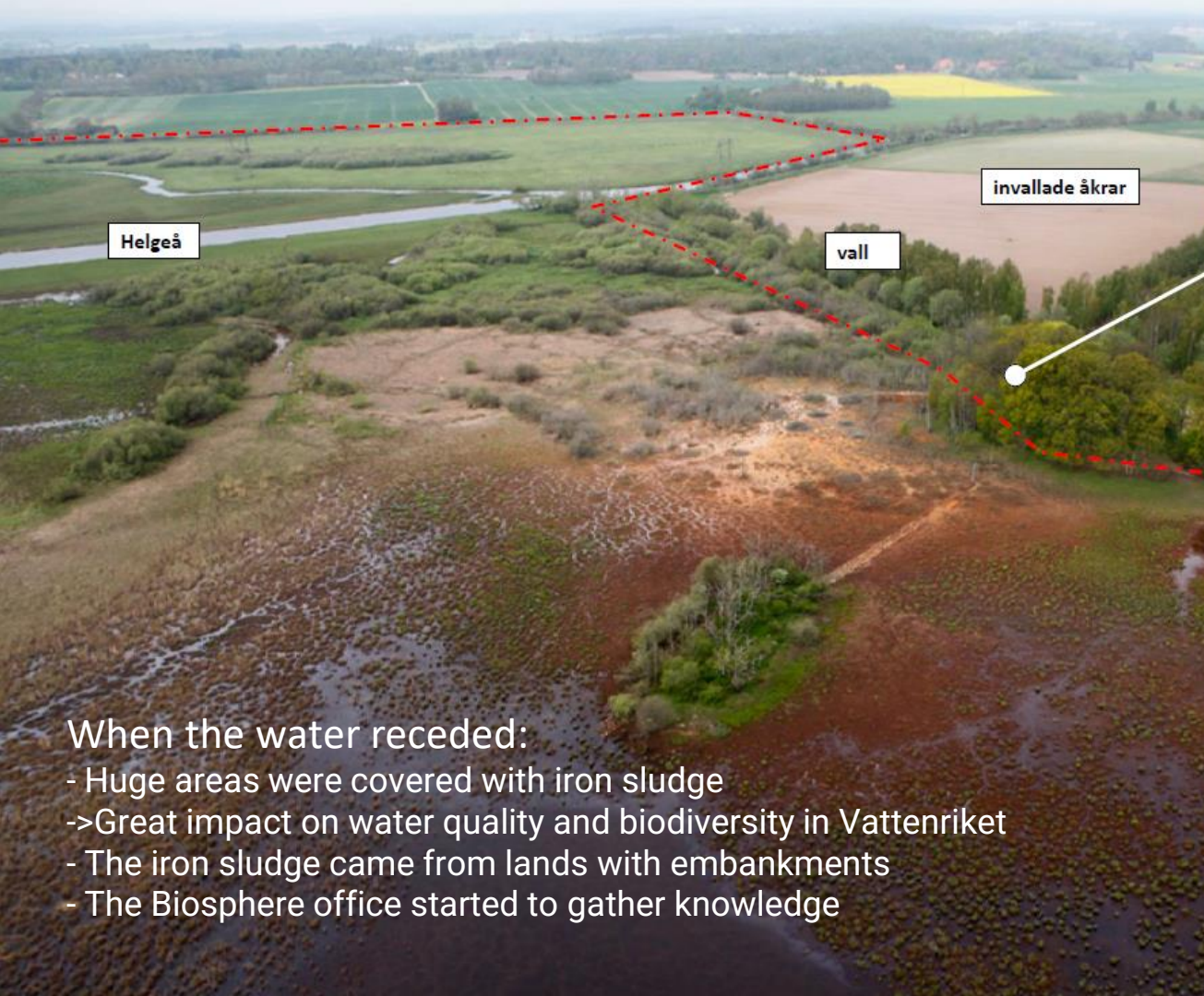


Monitoring and evaluation are important!

- knowledge of the actions provides the desired effect, and if not, how we can improve them
- to maintain the landowners' continued trust and engagement and inspire others to create wetlands
- efficient use of resources and achieving the goal of the Water Framework Directive
- We, the practitioners working in the field, need your help to elevate this important issue so that we can succeed in our ongoing efforts!



High water table July 2007...



Pumpstation Fredriksdalsviken (vatten i dike)

datum	Järn (tot) mg/l	Aluminium (tot) mg/l	Kväve (tot) mg/l	Fosfor (tot) mg/l
2013-11-13	25	34	11	<0,005
2014-02-26	15	21	19	0,023



When the water receded:

- Huge areas were covered with iron sludge
- >Great impact on water quality and biodiversity in Vattenriket
- The iron sludge came from lands with embankments
- The Biosphere office started to gather knowledge

Where does the iron come from?

Sulfide soils transform to acidic sulfate soils



Sulfide soil: It is a type of soil that contains sulfides, particularly iron sulfides, and is often formed in marine or wetland environments.


If sulfide soils come into contact with oxygen, such as through drainage, acidic sulfate soils form.

The sulfate soil releases acid and metals into ditches and waterways, causing issues on land and in water, the “iron sludge”

Embanking waterlogged areas to create farmland has the same effect, as these areas are also drained to lower the groundwater

- Long experience with acidic sulfate soils in Denmark
- Okkerlov since 1985
You are not allowed to release water from sulfate soils into the recipient without first reducing the iron content
- More than 100 wetland facilities in Denmark to reduce iron
- Started a project group: The Biosphere office, an interest association and the landowner Råbelövs Estate and a reference group (CAB, the University of Kristianstad and Hushållningssällskapet (a farming association))
- Study visit in Denmark September 2022



- 
- Old wetland/meadow, the embankment was build in the 1950's, sulfide sediments
 - The embankment dewateres 300 ha
 - Grows potatoes, sugar beet, wheat – wellpaid crops
 - Cultivation safe (both wet and dry years)
 - Pump 30 kbm/min , the soil become oxygenated and acidic sulfate soils are formed, leaching metals...
 - Rewetting of the farmland? – not an option... 1,5 milj euro...

Pilot wetland facility, designed to reduce iron and aluminum from embanked farmland



Nature based solution

- Pilot wetland facility; residence time for the water 8-10 h
- Deep cavities where the iron is sedimented.
- Removes the toxic levels of iron
- The water is then released into the nature reserve and its recipient
- Remove iron sediment from the ponds as needed
- Of course – monitoring and evaluation!



A photograph of two people, a man and a woman, standing in a grassy field. The man on the left is wearing a red beanie, glasses, a dark jacket with yellow accents, and dark pants. He is holding a small white object in his hand. The woman on the right is wearing a blue beanie, a dark jacket with grey accents, and blue pants. They are both looking at each other and appear to be in conversation. In the background, there is a small pond, some trees, and a few buildings under a cloudy sky.

Two examples of biosphere work:
- Good for both nature and people!

17 PARTNERSHIPS
FOR THE GOALS



Vattenriket 

Thank you for listening!

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 NaturumVattenriket

 vattenriket

