A Methodology for Improving the Management of Controversial Wetlands

Philippe Merot

INRA, Unité Sol, Agronomie Spatialisation

Rennes, France

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The objective of the methodology

- To improve consistency between different approaches for characterizing wetlands
- To propose a method organizing wetland delineation and wetland functions into a hierarchy
- applied to Valley Bottom Wetlands

What is a controversial wetland ?

- A wetland with a highly fluctuating wetness

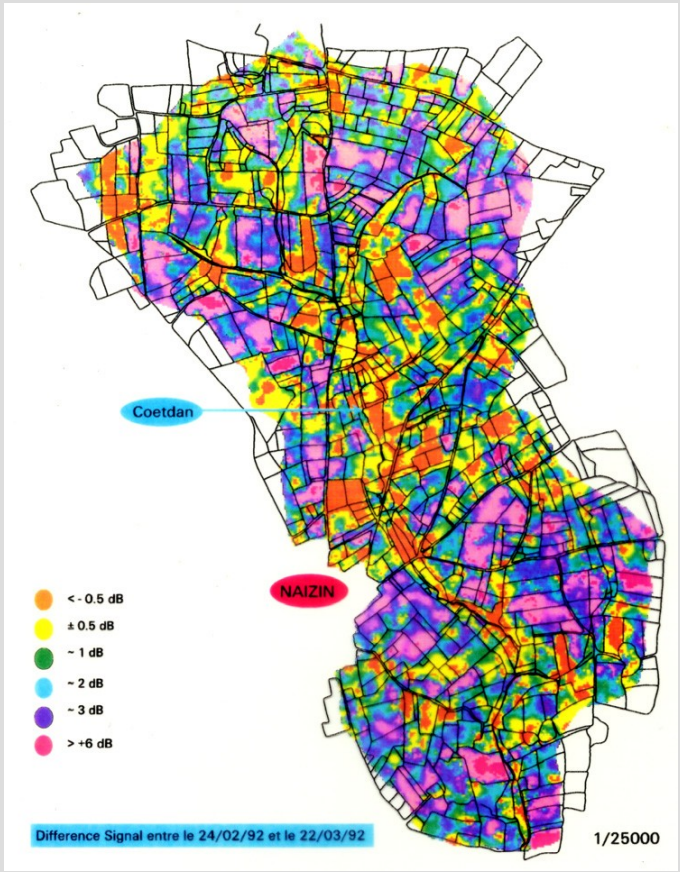
What is a controversial wetland ?

- A wetland difficult to delineate,

What is a controversial wetland ?

- A wetland scattered, as narrow patches in the landscape

Saturated areas (in orange and yellow) located from satellite radar remote sensing



From Gineste Ph, Puech C., Merot Ph., 1998, Hydrol. Proc., 12, 267-284

What is a controversial wetland ?

- A wetland offering opposite stakes

i.e
intensive
farming
versus
conservation

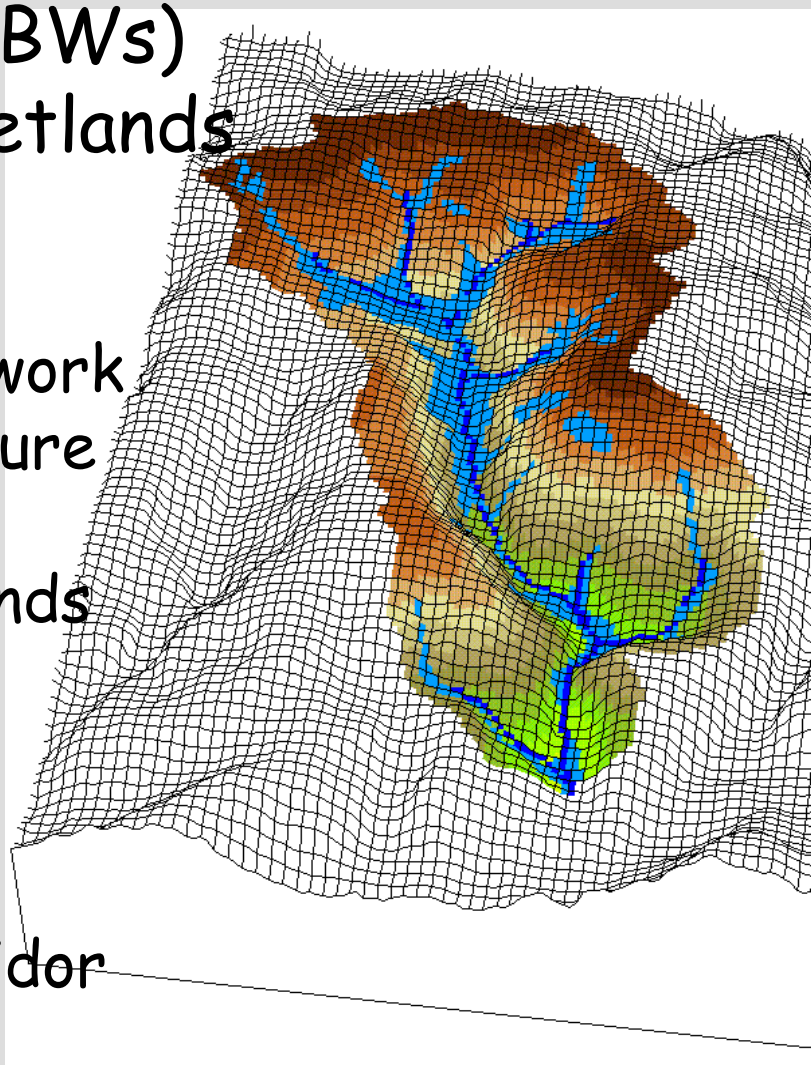
What is a controversial wetland ?

- Valley Bottom Wetlands (VBWs) are typical controversial wetlands

  - Narrow strips of wet soils following the dense river network
  - Threatened by the agriculture expansion
  - Hardly recognised as wetlands

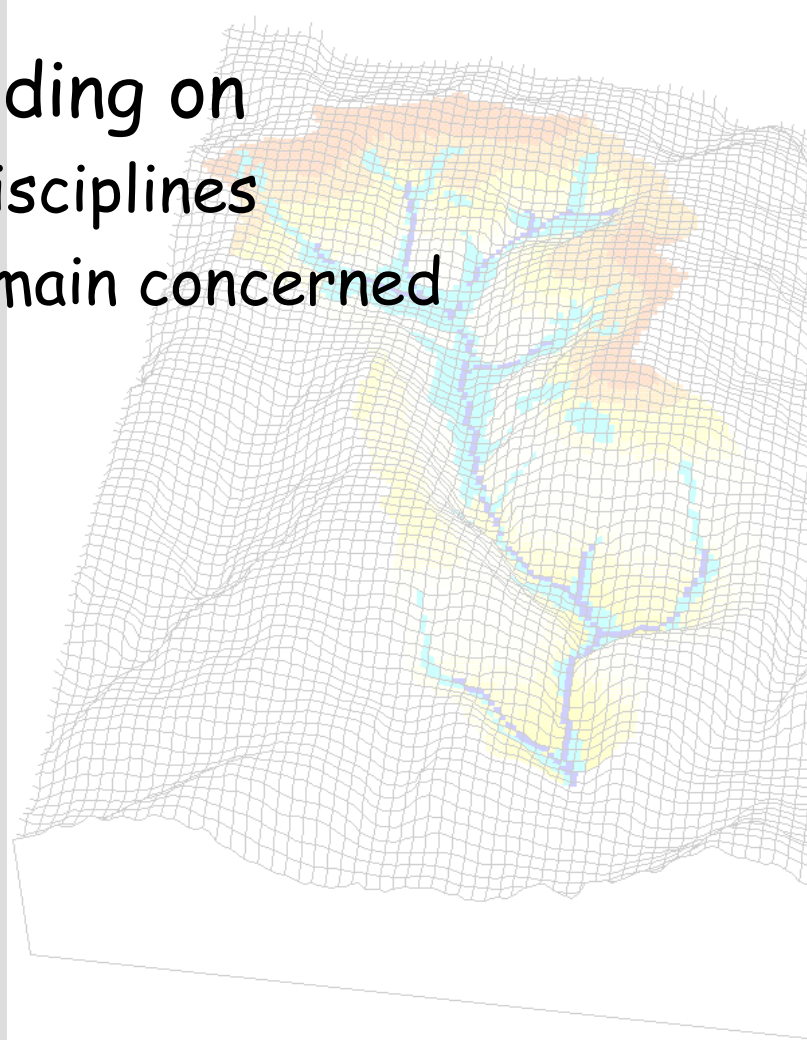
At the opposite

  - Considered as useful to limit diffuse pollution
  - Ecological habitat and corridor



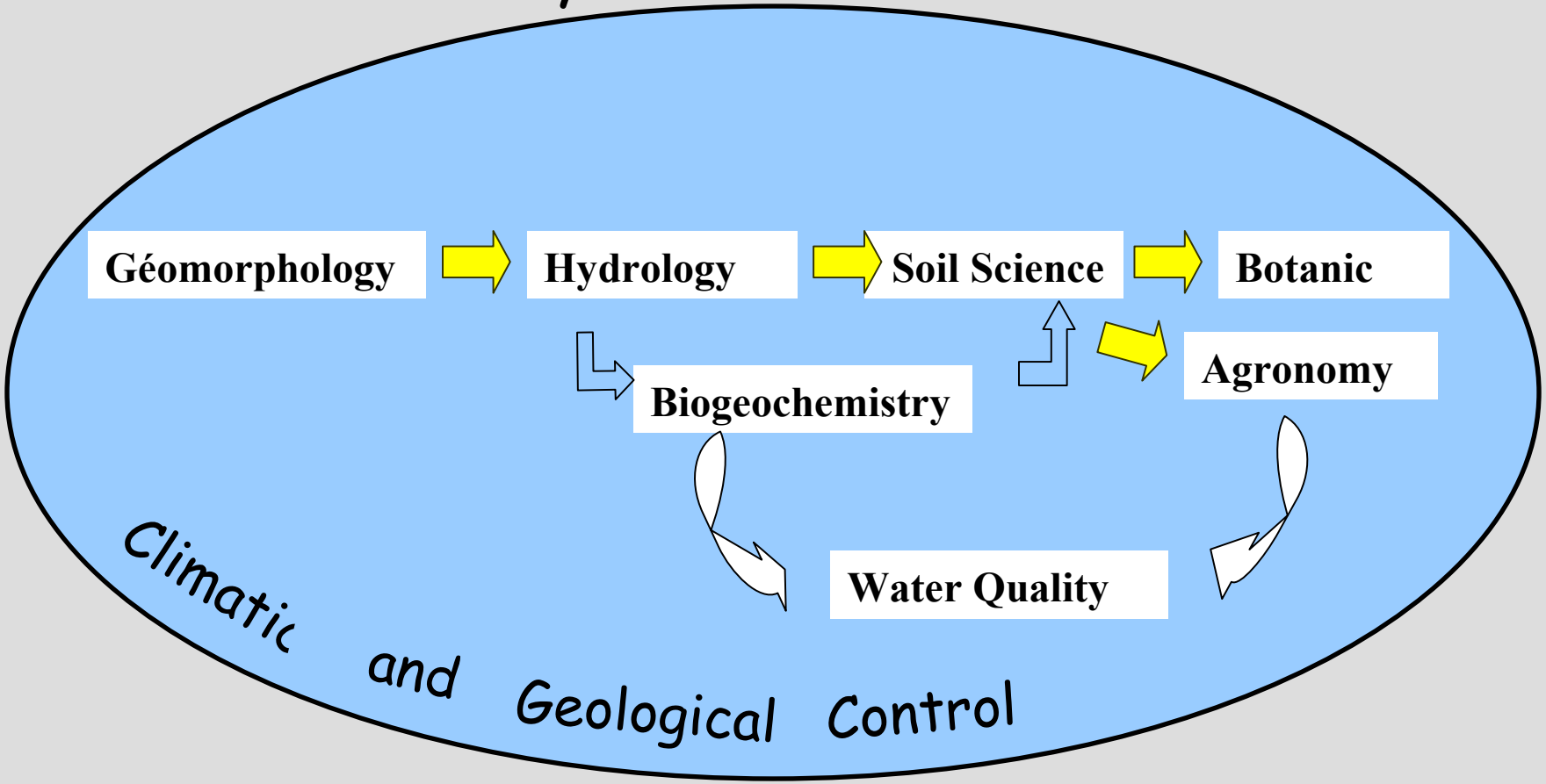
What is a controversial wetland ?

- VBW delineation is depending on
  - the diverse approaches/ disciplines
  - the bio-eco-geographic domain concerned



Relations Between the Different Methods Used to Characterize and Delineate Wetlands

"Genetic" scheme for characterizing Valley Bottom Wetlands

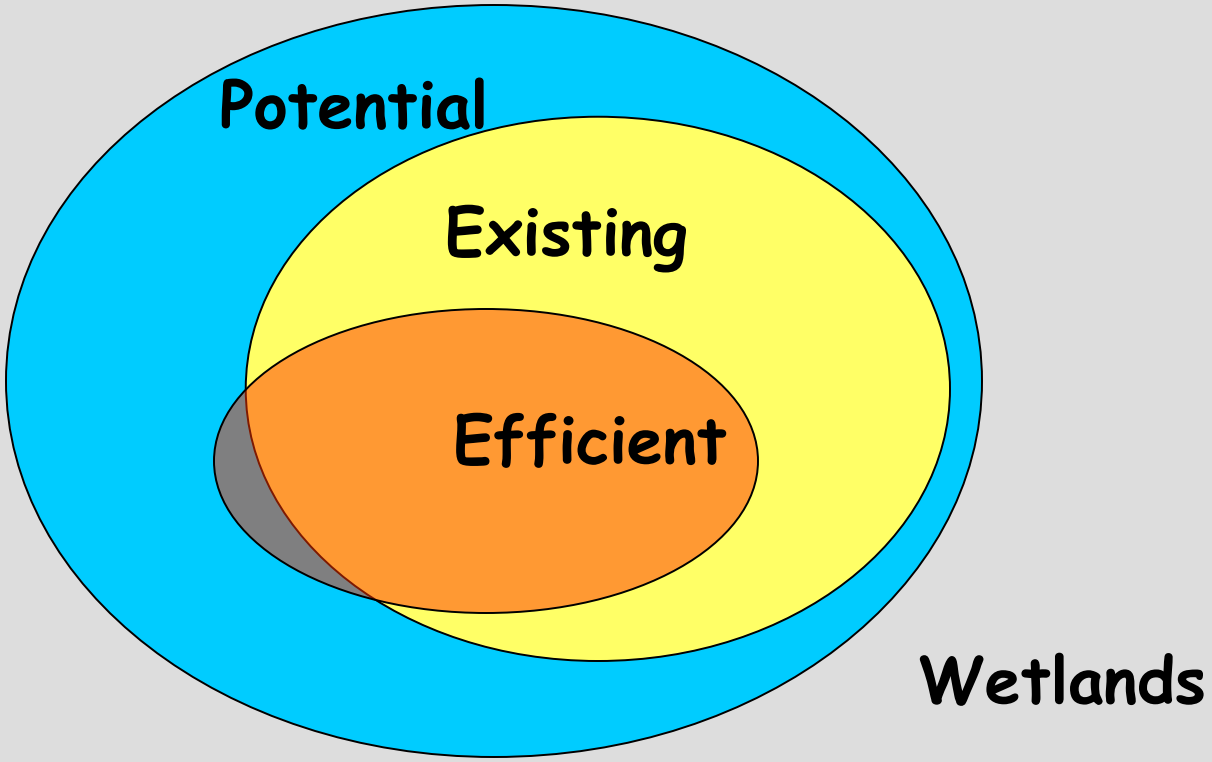


- Scheme defined at the landscape scale

A New Hierarchy for Wetland Delineation :

The PEEW approach

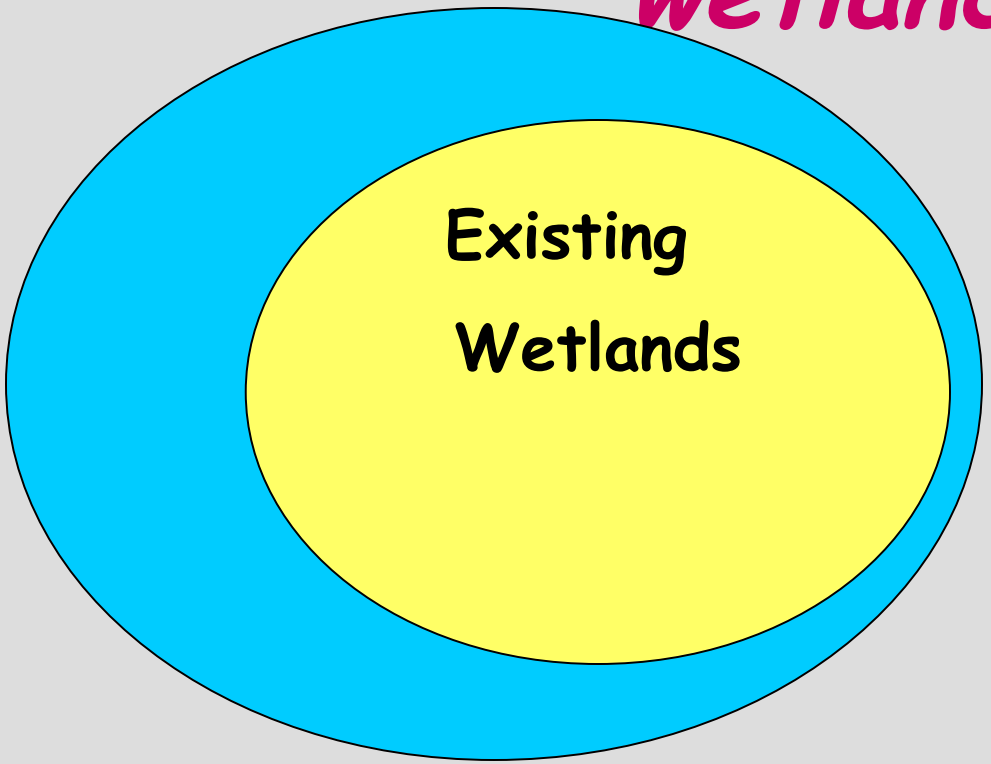
A methodological approach of wetlands…



A methodological approach of wetlands...

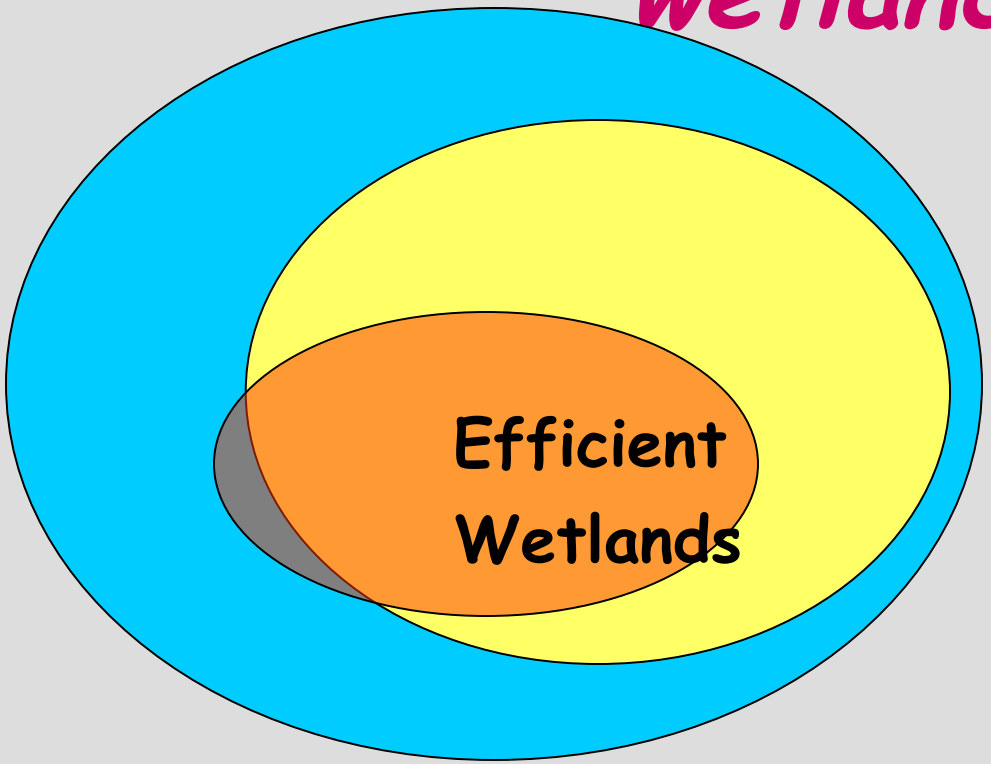
Potential Wetland : the envelope of wetlands with regards to the geomorphological criteria

A methodological approach of wetlands...



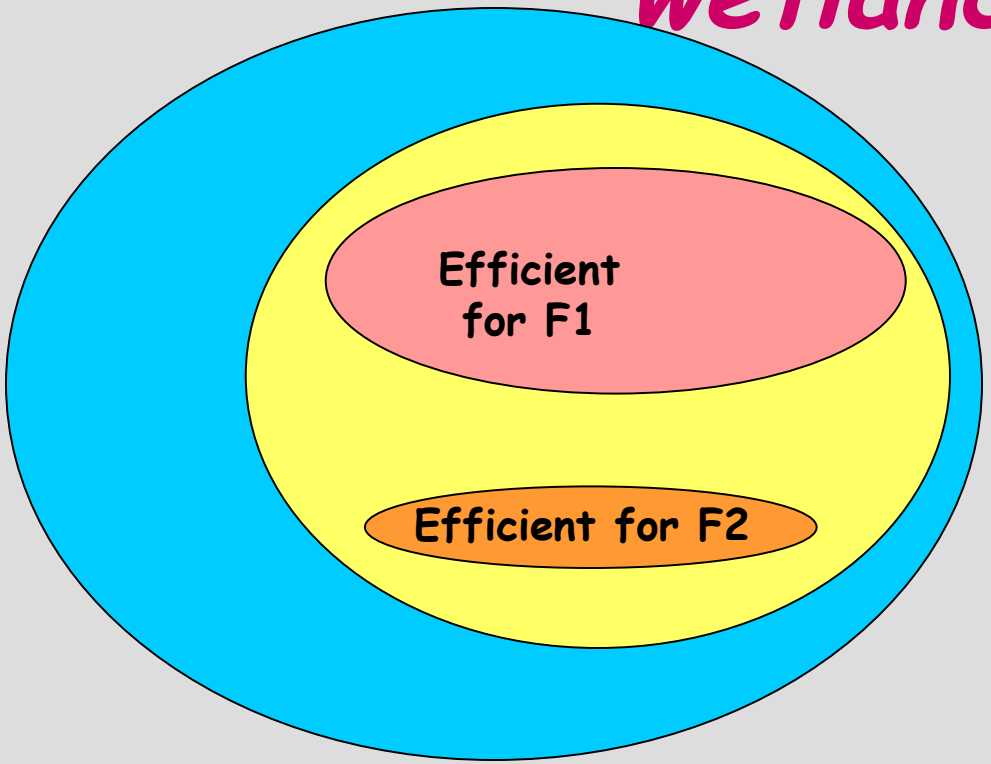
Existing wetland :
the actual wetlands

A methodological approach of wetlands...



Efficient wetland regarding a specific function : Flood storage, Chemical buffer, Ecological corridor, Social amenities ...

A methodological approach of wetlands...



Efficient wetland regarding a specific function :
Flood storage,
Chemical buffer,
Ecological corridor,
Social amenities

The different level of the hierarchy

Wetlands	based on	method
Potential		
Existing		
Efficient		

The PEEW Approach

The different level of the hierarchy

Wetlands	based on	method
Potential	- Geomorphology - Topographic indexes - Hydromorphic soil maps	- Empirical analyse - Based on the drained area and the topographic slope - Soil mapping
Existing		
Efficient		

The different level of the hierarchy

Wetlands	based on	method
Potential	- Geomorphology - Topographic indexes - Hydromorphic soil maps	- Empirical analyse - Based on the drained area and the topographic slope - Soil mapping
Existing	- Soil use (drainage..) - Soil wetness - Vegetation - Synthetic criteria	- Drainage - Piezometers, tensiometers, pond observation - Hydrophylic species, wet meadows -Remote sensing
Efficient		

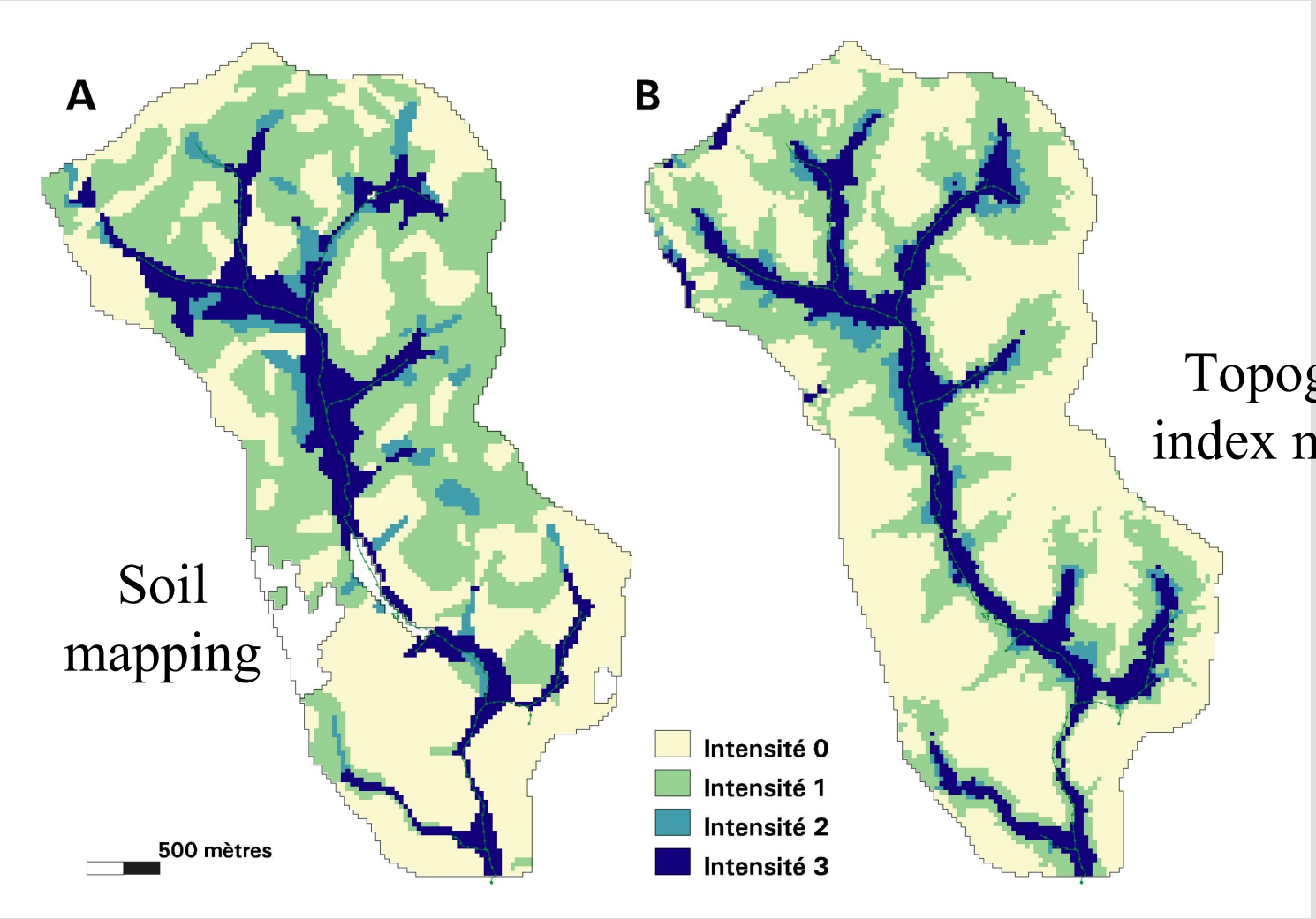
The different level of the hierarchy

Wetlands	based on	method
Potential	- Geomorphology - Topographic indexes - Hydromorphic soil maps	- Empirical analyse - Based on the drained area and the topographic slope - Soil mapping
Existing	- Soil use (drainage..) - Soil wetness - Vegetation - Synthetic criteria	- Drainage - Piezometers, tensiometers, pond observation - Hydrophylic species, wet meadows -Remote sensing
Efficient	- Pollutant fluxes incoming the wetland - Internal geometry of VBW	- Analyse - Field study catchment - Redox measurements…

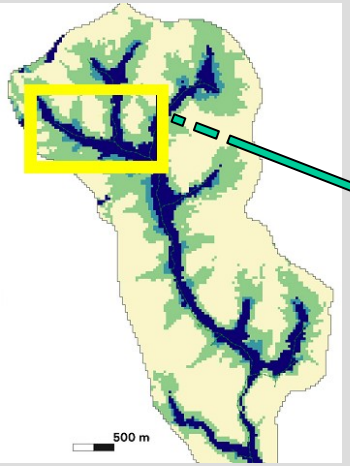
Delineation and assessment of Wetlands Using the PEEW Approach:

An Example

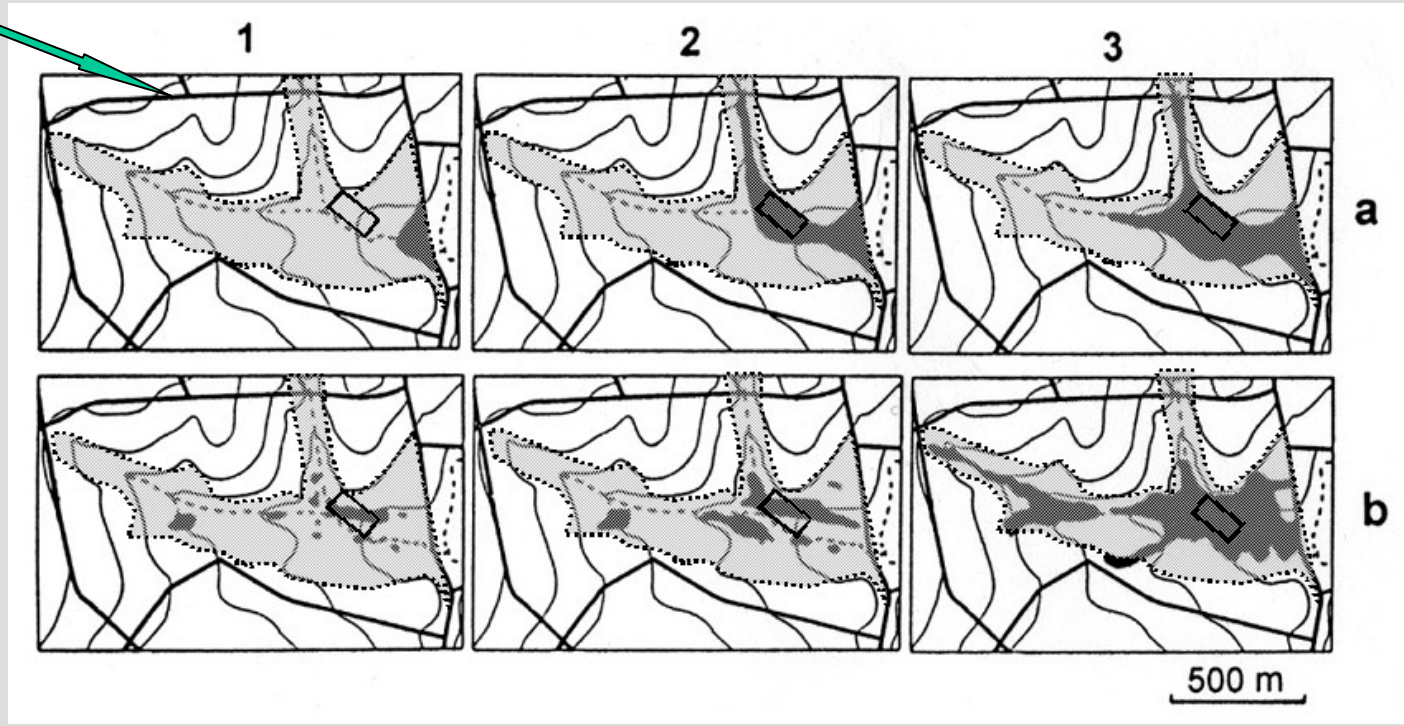
Potential wetland mapping



Comparison of the potential and existing wetland



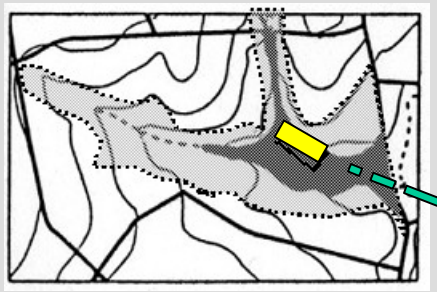
Top Model prediction

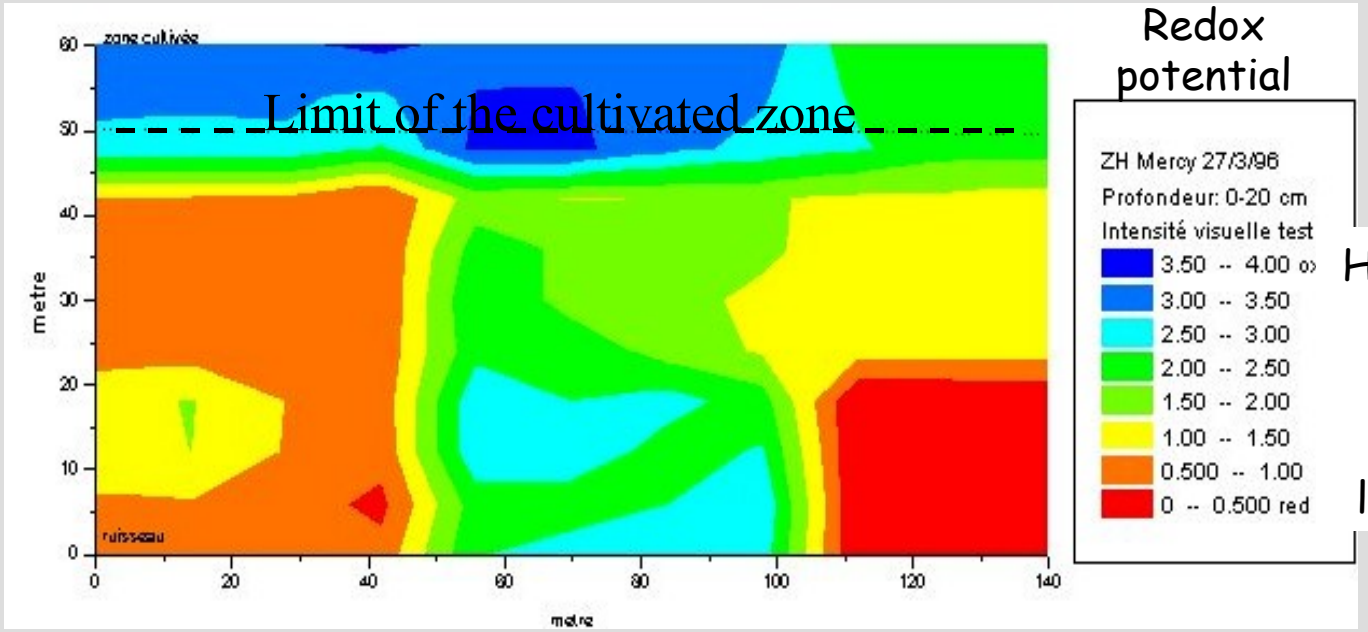


Soil wetness measurements

Legend	
Line : contour	In grey : Potential Wetland
Dotted line : river	In black : Existing wetland

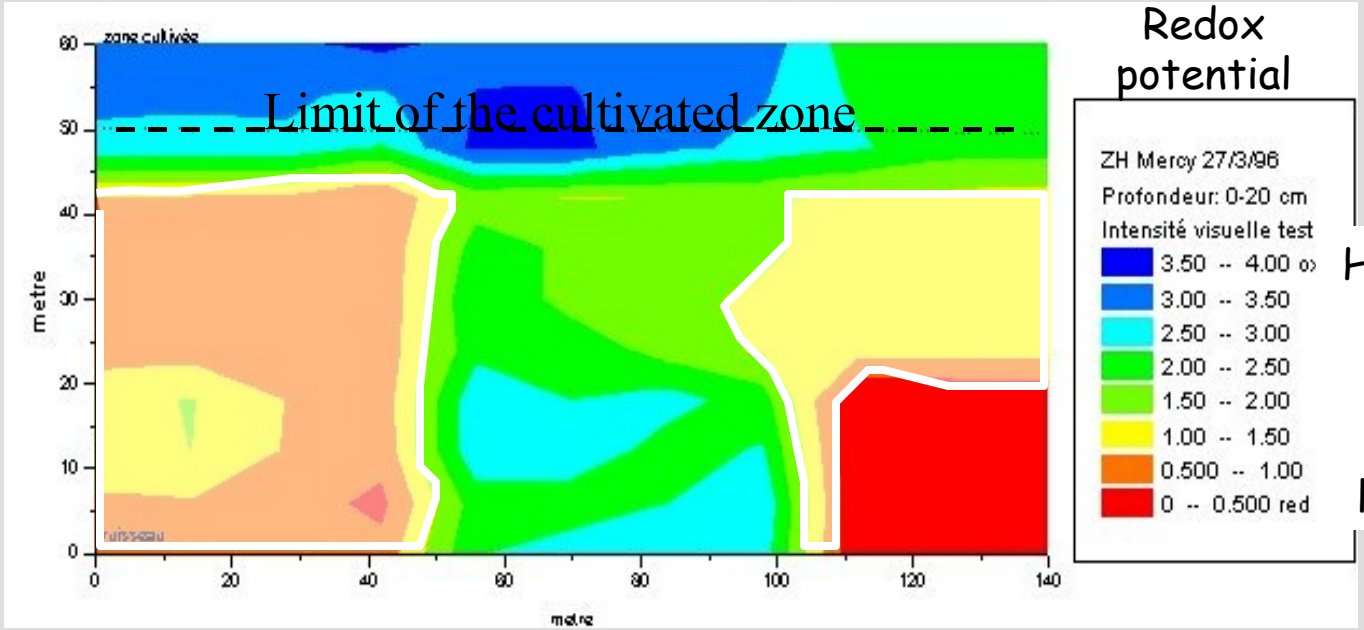
Analyse of the efficient wetland





river

Analyse of the efficient wetland



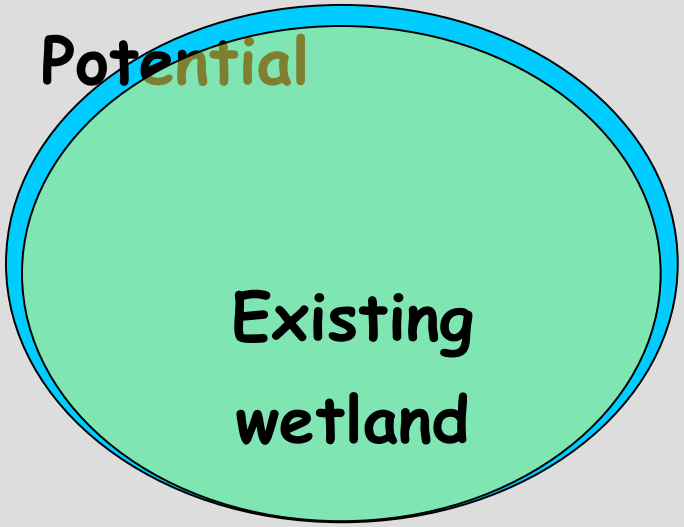
river

Efficient wetland concerning epuration : Shadow colors

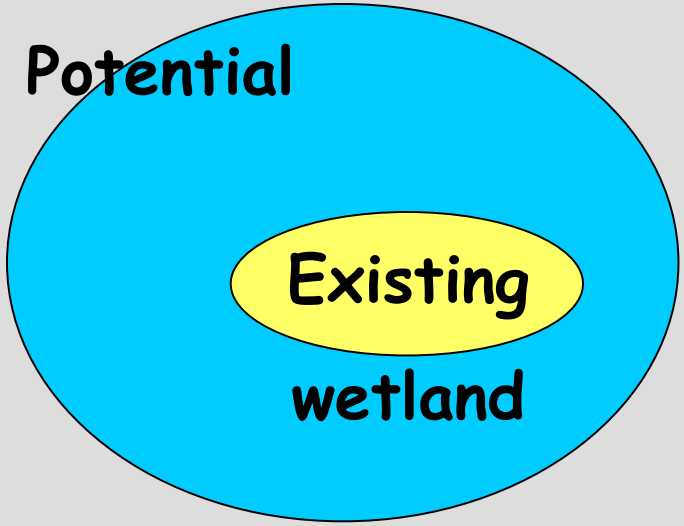
Discussion /conclusion

- What does mean the differences between potential and existing wetland ?

Discussion /conclusion

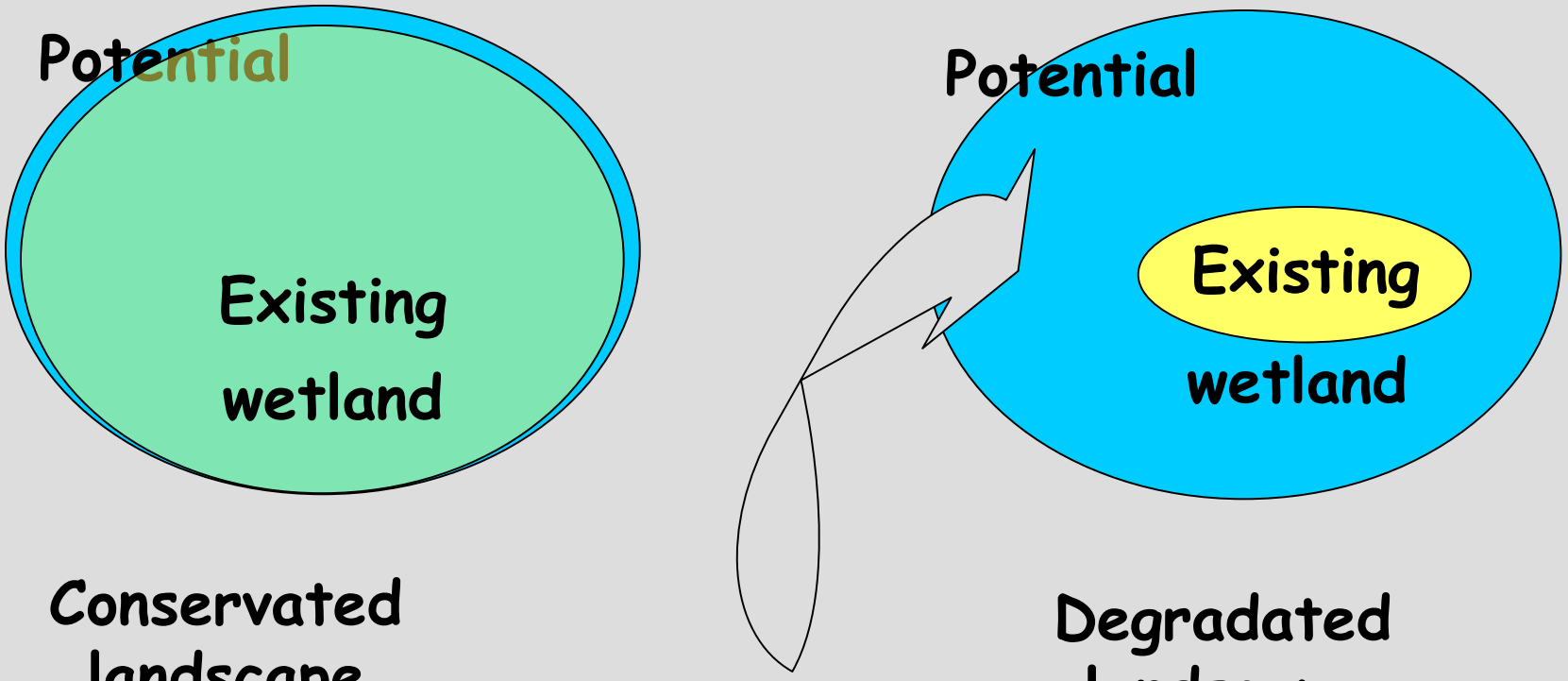


Conservated landscape



Degradated landscape

Discussion /conclusion



Discussion /conclusion

- A protection based on a formal definition of wetlands is not always operational when many stakes are in competition.
- The base of the methodology is a progressive approach :
  - an attempt to classify wetlands through a gradient of knowledge and interest

Conclusion

- The Potential, Existing and Efficient Wetland Approach (PEEW Approach) is an useful tool
  - to clarify the different methods used to study wetlands, depending on different disciplines;
  - to negociate with the users the wetlands that have to be saved, depending on the level of interest, of means and of knowledge.

For more information :

MEROT, PH., HUBERT-MOY,L., GASCUEL-ODOUX C., CLEMENT J.C., DURAND P., BAUDRY J., THENAIL C. A methodology for improving management of controversial wetland. *Env. Manag. (sous presse)*