Riparian communities as ecological indicators of headwater streams in an intensive agricultural catchment

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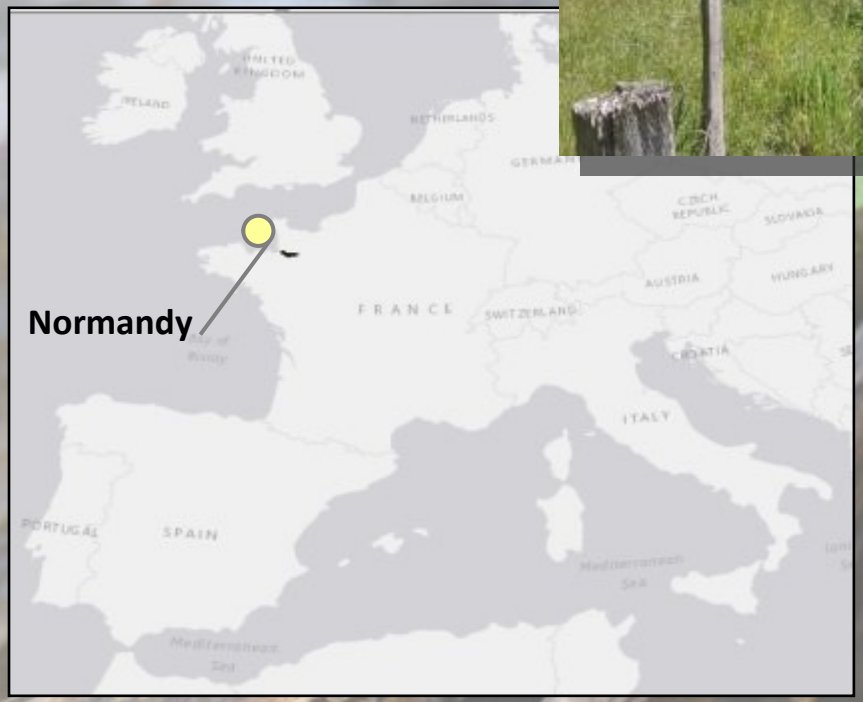
UMR 0985 ESE Ecology and Ecosystem Health Research

Conservation and Restoration of Aquatic Ecosystems

Local context

Sélune river watershed



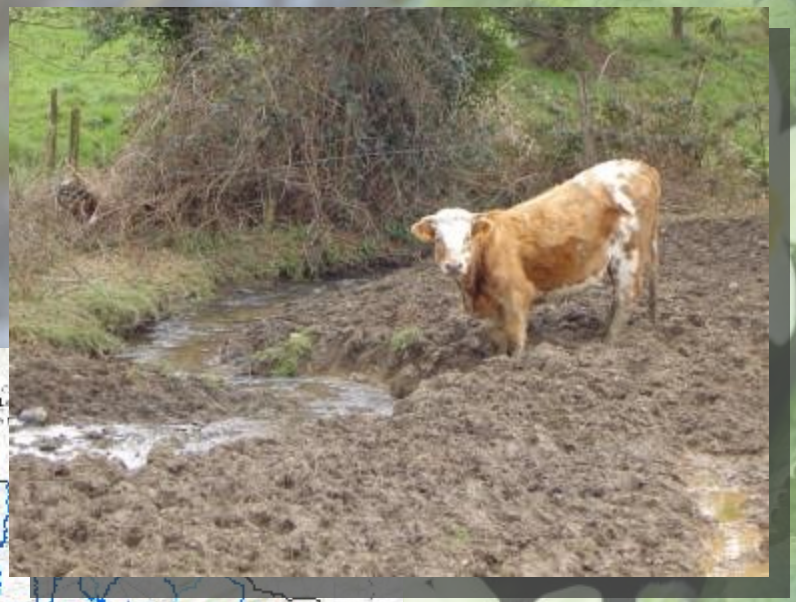
Local context

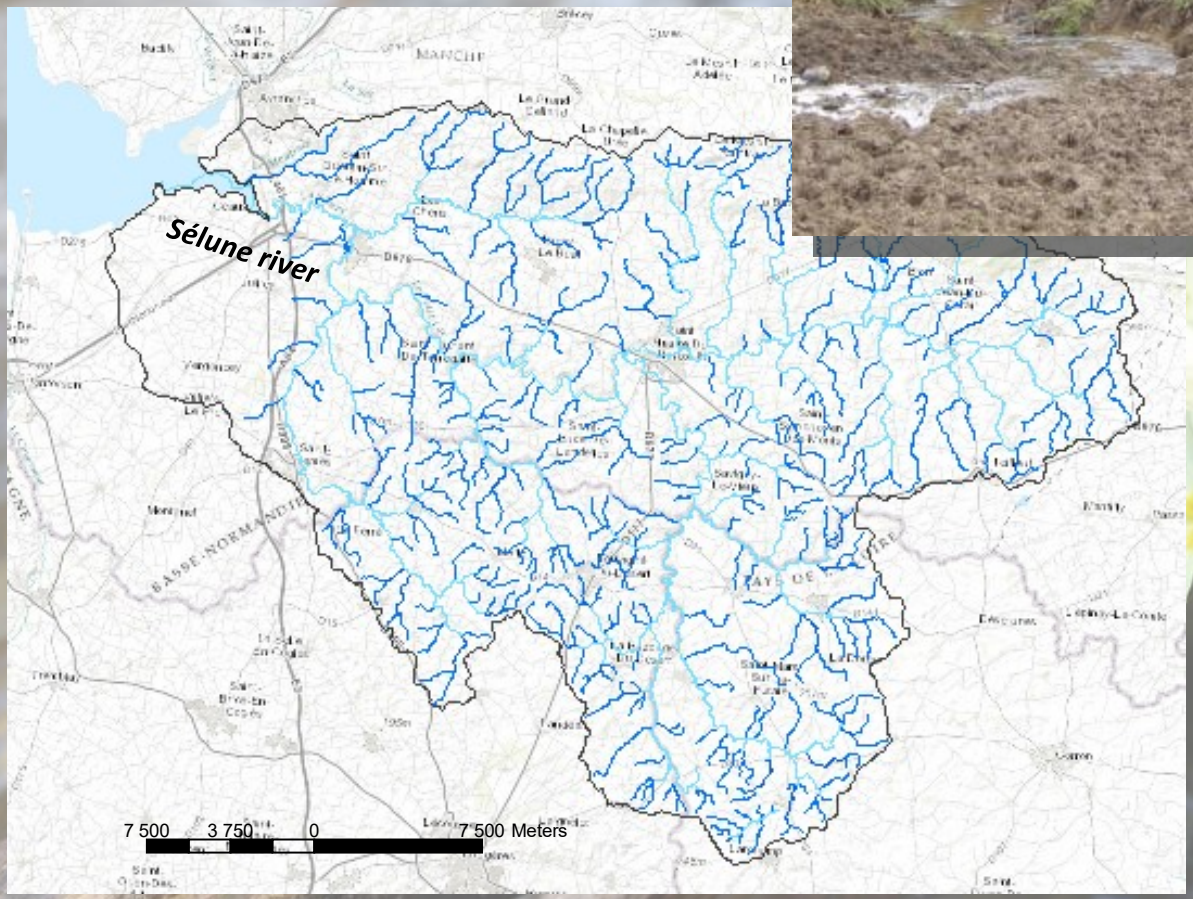
Sélune river watershed

Big dam removal project

Local context

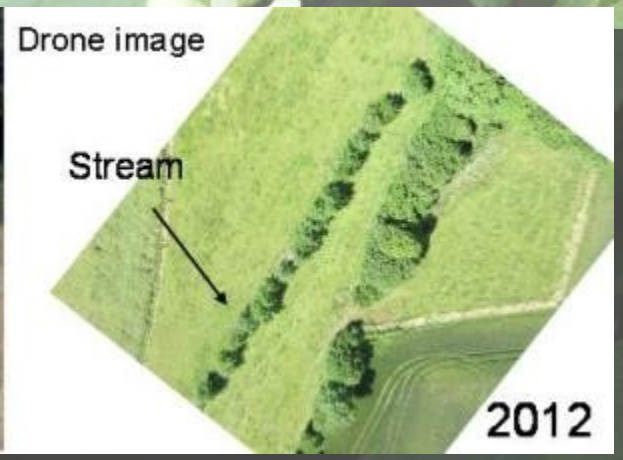
Headwaters degradation





Local context

Banks Ecological restoration



Problematic

Is bank afforestment garrantee of health and functions ?

Focus on trees

Weisberg et al., 2013

Riparian diversity — *Naiman et al, 1993*

Riparian functions — *Palmer et al., 2014*

Herbaceous vegetation

Lyons et al 2000

Biodiversity — **Species richness**
Habitat preferences

Nutrients filter — **Ellenberg index/Nutriotolerance**

Hypotheses

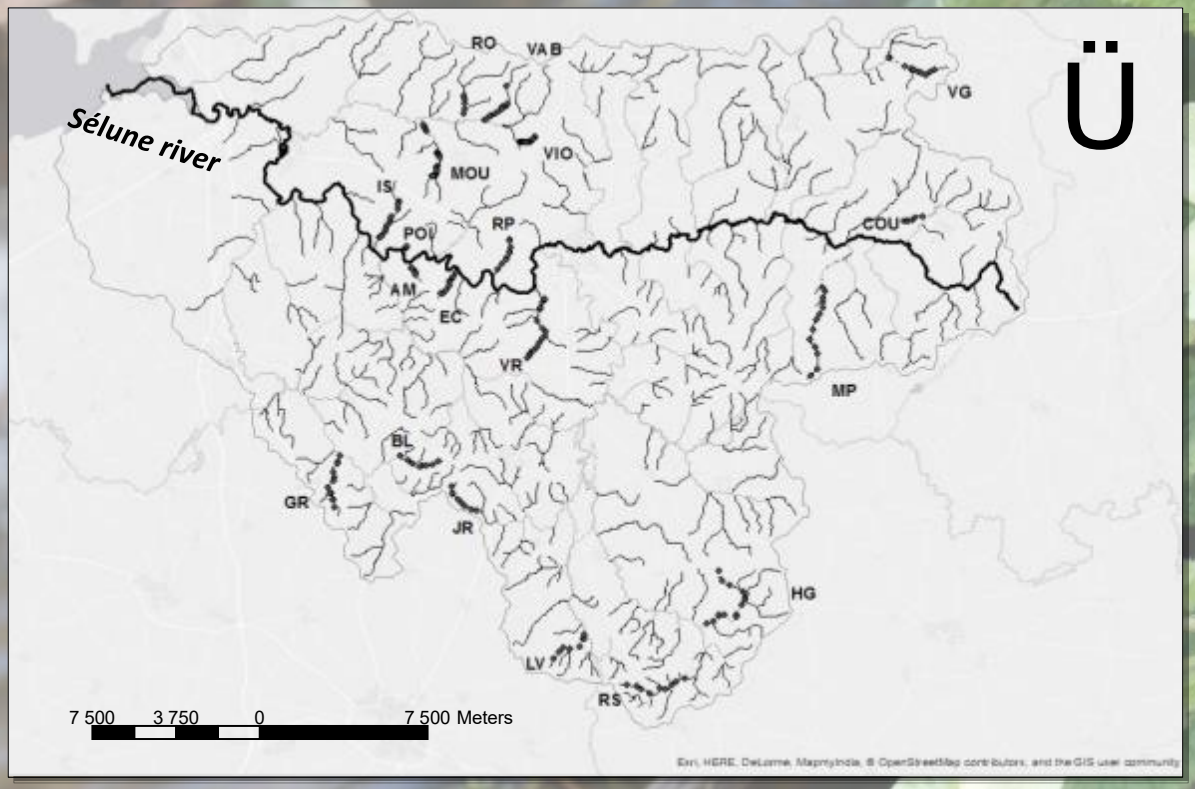
1. Woody riparia are better nutrient filter than open riparia

2. Herbaceous participate to riparian habitat diversity and functioning hence, improvement of riparian health

➔ better evaluation and adaption of current riparian ecological restoration program at the watershed scale

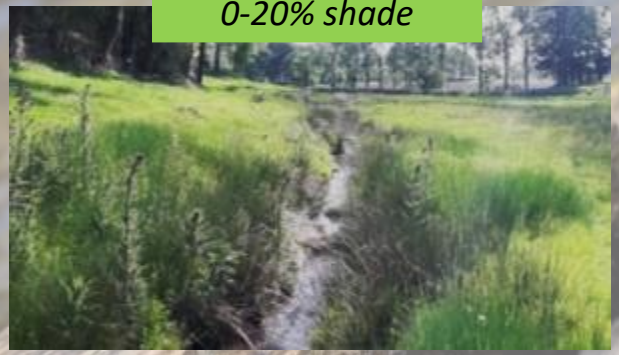
Methods

diversified Headwaters



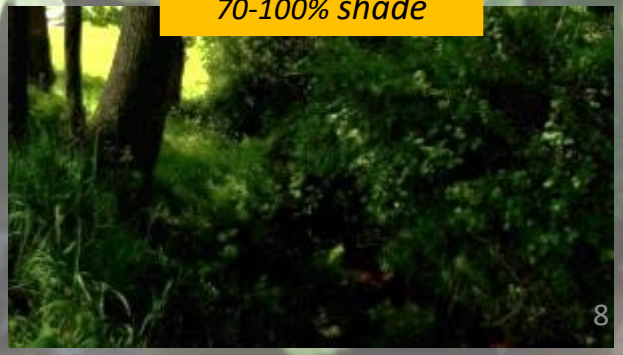
19 headwaters
148 plots

Open
0-20% shade



Intermediate
20-70% shade

Woody
70-100% shade

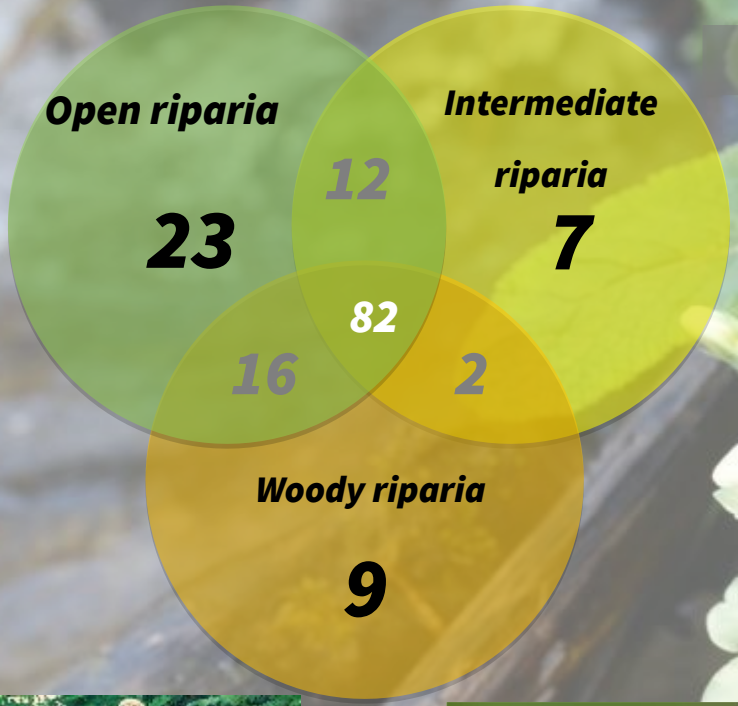


Results : communities composition

Common species

Holcus mollis L.
Holcus lanatus L.

14 species on more thans 60% of plots



Rubus fruticosus

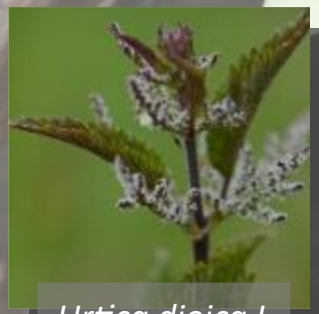
Galium aparine

Agrostis capillaris L.
Agrostis stolonifera L.

Dactylis glomerata

Ranunculus repens

Angelica sylvestris



Urtica dioica L

Athyrium filix-femina

Results : communities composition

Specific species

Convolvulus arvensis

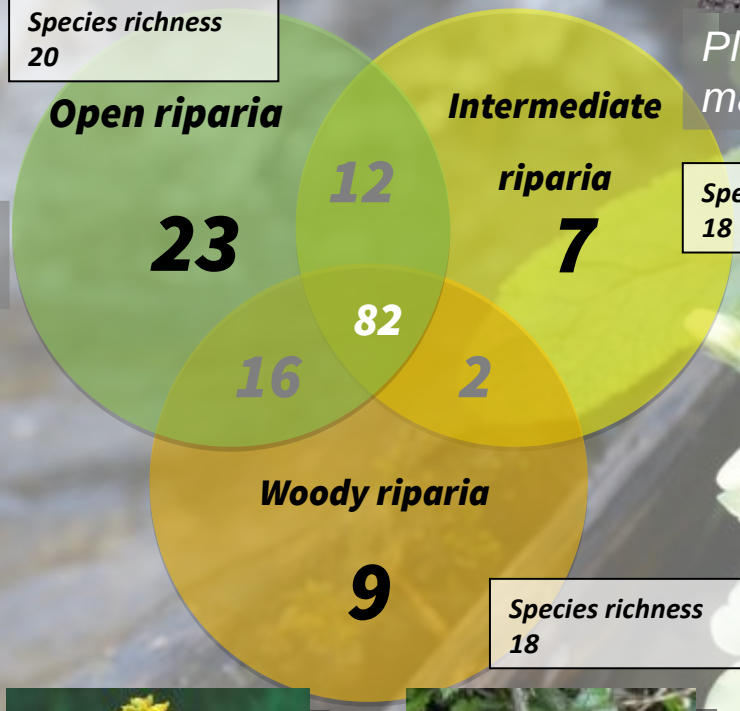
Plantago major

Alopecurus geniculatus

Walhenbergia hederacea

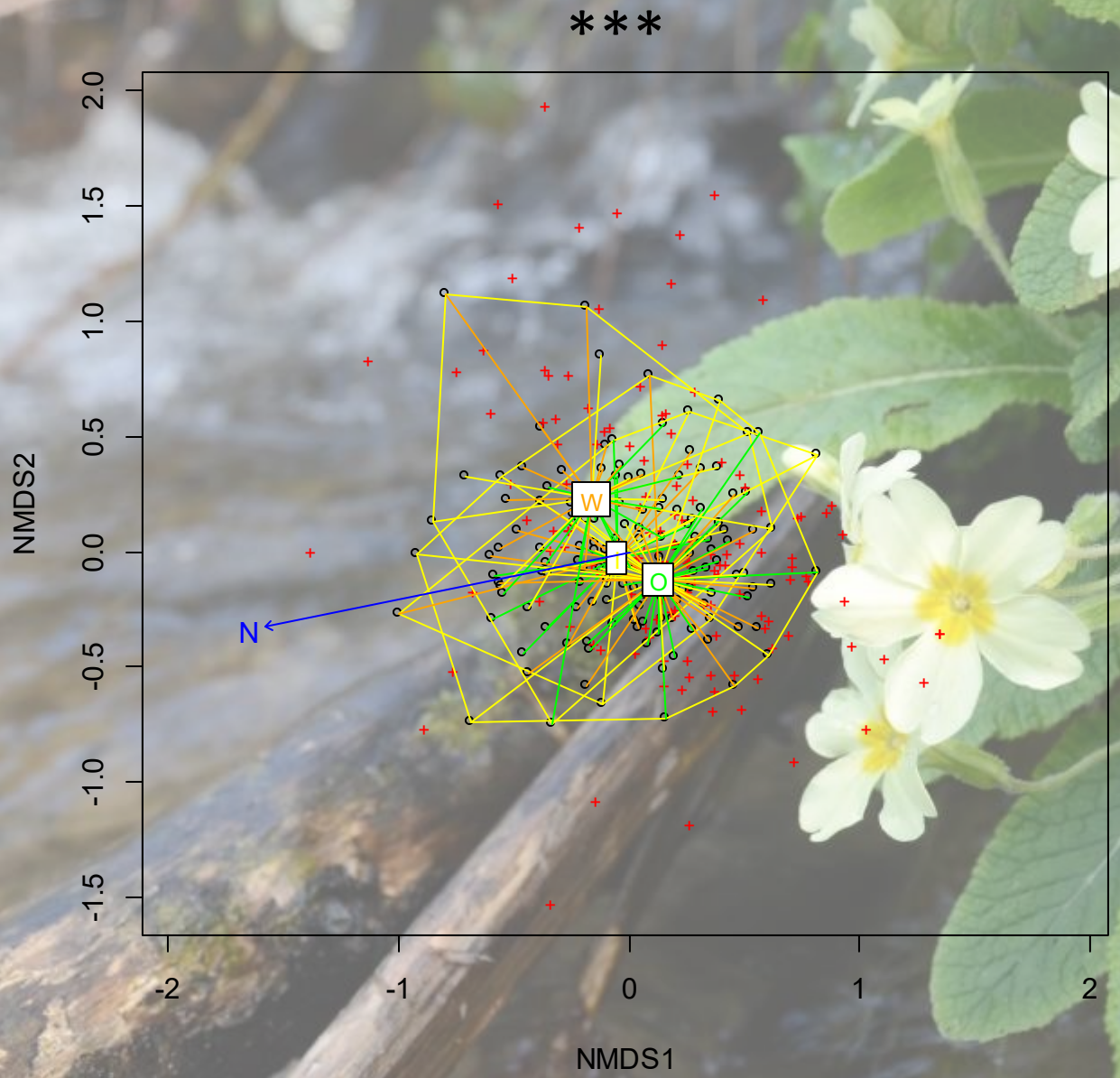
Lysimachia vulgaris

Potentilla sterilis



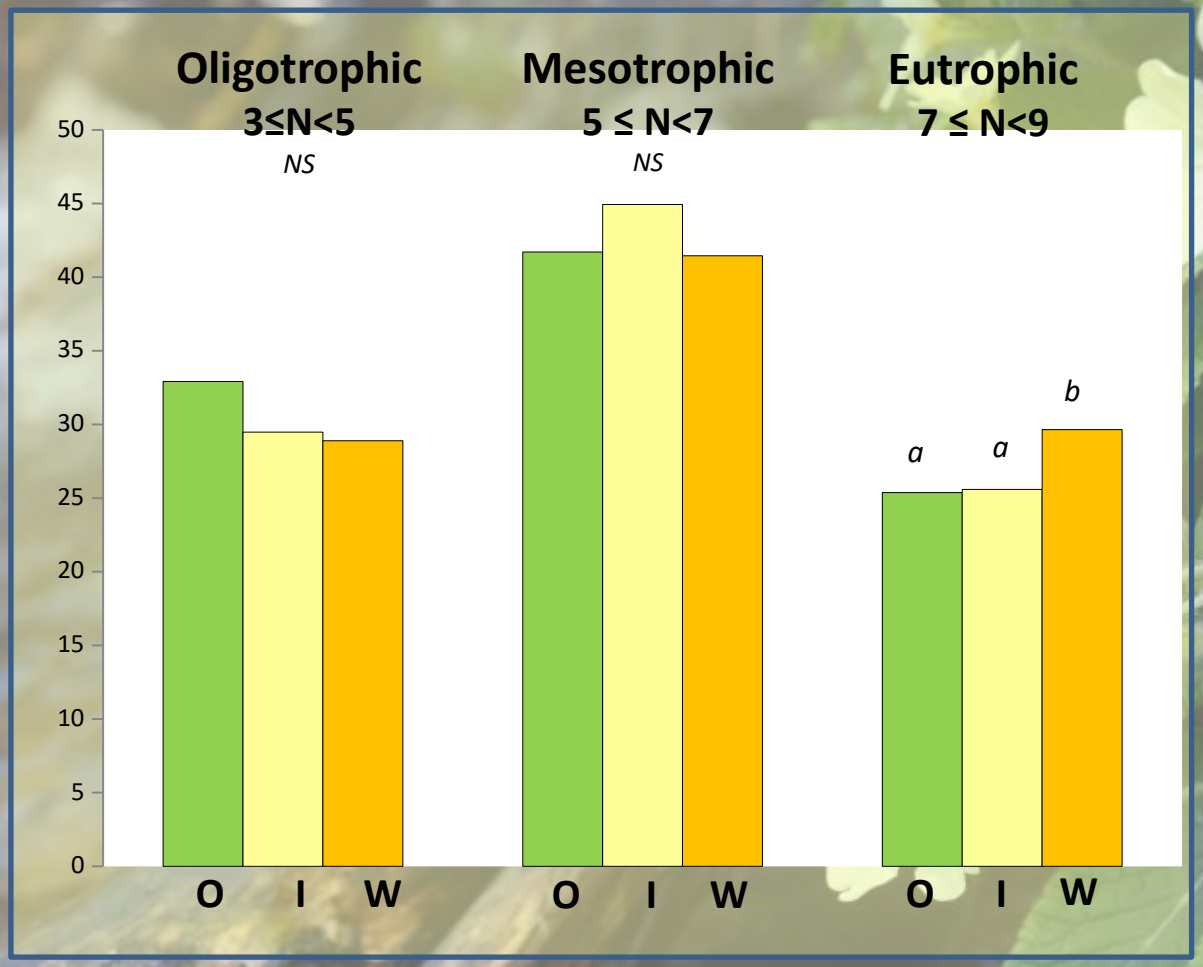
Results : Species ecology

Ellenberg N index



Results : Species ecology

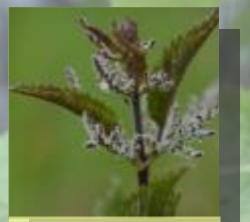
Ellenberg N index

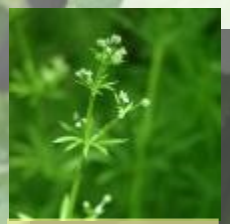


More Eutrophic species in woody riparia

Discussion

- ***Herbaceous are good indicators of riparian conditions***
  - ***general conditions of the watershed***


Eutrophic

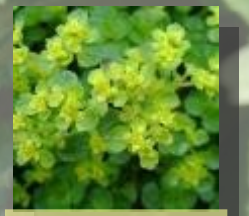

Weed


Grassland

  - ***interface between aquatic and terrestri[illegible]ter***

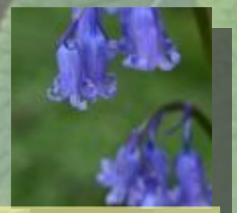

Grassland


Hygrophilous


Aquatic

  - ***source of biodiversity at the landscape***

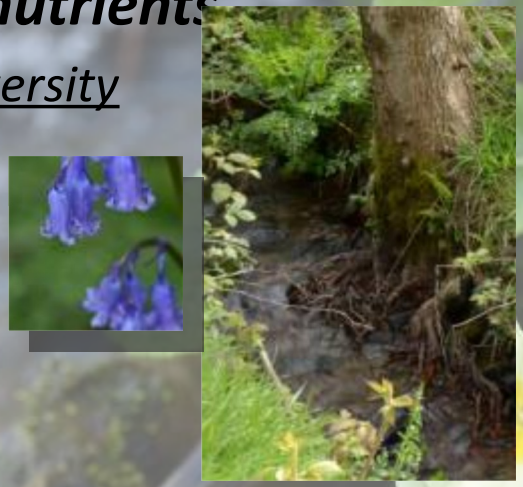

Edge


Forest

Conclusions

Woody & open riparia

- ***Woody riparias are not systematically healthier than open riparias : role in filtering nutrients***
  - *Biodiversity and habitat diversity*




  - *Functionnality*
    - Nutrient retention *Wenger, 1999*
    - Erosion *Trim*

Conclusion

Ecological restoration

- ***Management and Ecological Restoration should promote habitat diversity and adapt to local context***

Hypotheses

Woody riparia are better nutrient filter than open riparia

Herbaceous participate to riparian habitat diversity and functioning hence, improvement of riparian health

➔ better evaluation and adaption of current riparian ecological restoration program to a complete watershed context

Perspectives

- Built a methodology qualify riparian diversity for headwaters streams at watershed scale

- Identify **indicator species** of good riparian functionning to help managers focus, evaluation, priorisation


Merci