Riparian vegetation, a key asset for Europe

On the behalf of the COST Action CONVERGES,

Simon Dufour (Chair) and Patricia María Rodríguez-González (Vice Chair)


26 - 27 May 2021
EUROPEAN RIVER
SYMPOSIUM

CONVERGES
European Riparian Ecosystems

cost
EUROPEAN COOPERATION
IN SCIENCE & TECHNOLOGY

Riparian vegetation

- socio-ecological complex of vegetation units along the river network

- functionally related to the other components of the fluvial system and surrounding area

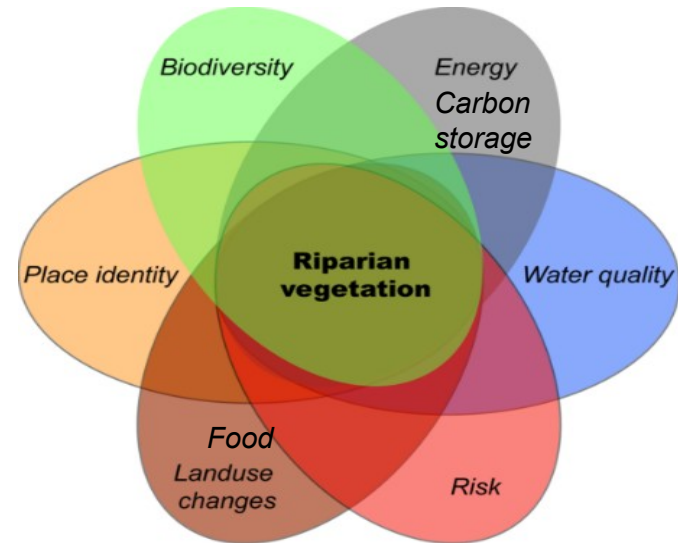=> transitional socio-ecosystems or turquoise (blue/green) infrastructures

WFD, Green Deal, CAP ?
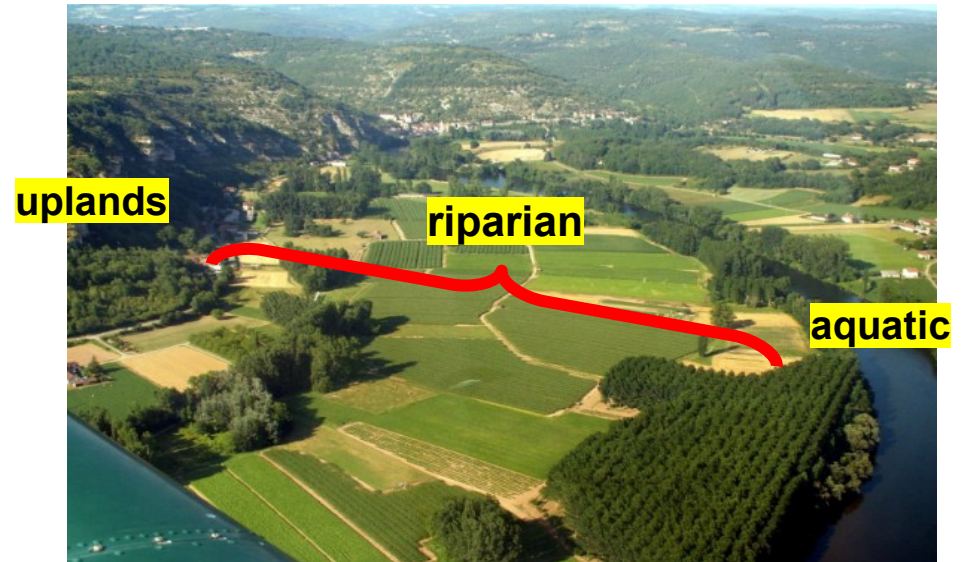
Riparian vegetation contribution : a systemic solution

riparian socio-ecosystems

=> an asset to develop systemic
solutions to maximize synergies
between environmental issues and EU
priorities

1) Green Deal

- **mitigation/adaptation to climate change**

- **renewable sources of energy**

- **toxic-free environment, prevent pollution**

- **increasing the coverage of protected biodiversity-rich land**

=> restoring 25,000 km of rivers, planting 3 billion trees, biodiversity rich landscape on at least 10 % of farmland

Riparian vegetation contribution - Why

1. multifunctional systems (Riis et al. 2020)

- Biodiversity (e.g. Naiman et al., 1993 ; Van Looy et al., 2013)
- climate mitigation and adaptation
  - store a larger amount of C per area compared to surrounding uplands (Sutfin et al., 2016)
  - cooling of water temperature (Broadmeadow et al., 2011, Wondzell et al., 2019)
- raw material production (wood, fruits, genetic materials),
- pollution regulation (buffer effect on sediments, nutrients, pesticides, etc) (Ghermandi et al., 2009 ; Rasmussen et al., 2011)
- ...

=> Many synergies (e.g. between carbon storage and biodiversity, Dybala et al., 2018)

cost
EUROPEAN COOPERATION
IN SCIENCE & TECHNOLOGY

2. heavily degraded (mainly by landuses changes)

Throughout European history, riparian areas have been heavily managed and modified

- ~ 95 % of forested floodplain has disappeared
- EU scale : Urban and cultivated areas = 70% of riparian zone for large medium size rivers (Weissteiner et al., 2016)

=> the marginal increase in services provision deriving from a restoration is potentially higher compared to other systems
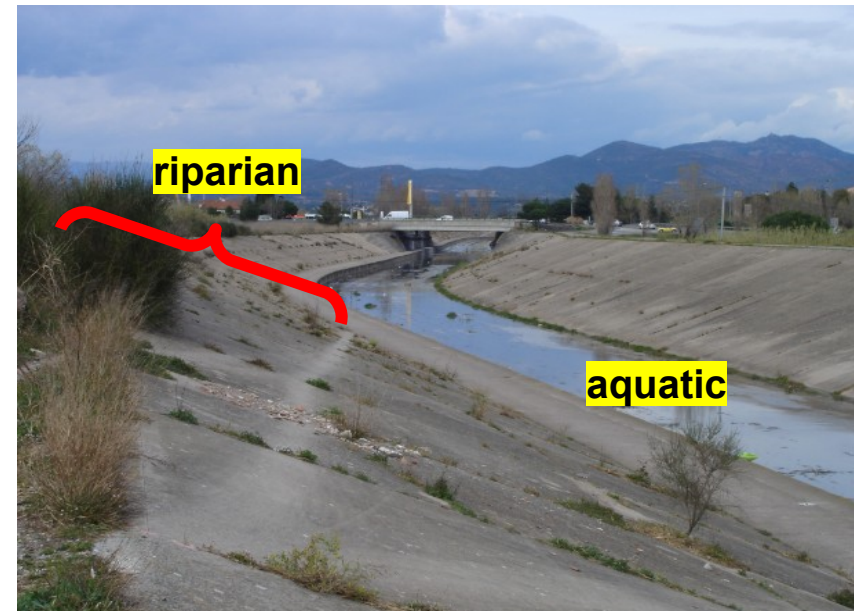
3. small but powerful

great proportion ecosystem services despite being rather limited in their spatial extent ("backbones of the landscape")

Fluvial corridor = capacity to deliver a disproportionately high amount of ecosystem services for a modest investment

- 0.5%–3 % of the global land surface but
- a potential carbon storage of 2.9%–6.7% carbon currently stored in vegetation worldwide
- provide habitats for over 25% of all vertebrates

Riparian vegetation => e.g. Riparian zone of Adour River (France) : 15 % of French flora for 0.03 % of the territory (Tabacchi, 1992)

Synergies with other policies: example of the common agricultural policy (CAP)

- **An underused tool**

  - **buffer strips 1.2% of Ecological Focus Areas (EFAs)** (Zinngrebe et al., 2017)

- **Riparian zone = not necessarily the most efficient location for buffer strip in the landscape**

- **but due to their location, forested riparian buffers represent a cost effective and one of the best opportunity to conciliate production and biodiversity** (Zaime et al., 2012 ; Borin et al., 2010).

2) EU Water Framework Directive

- **Assess water bodies status**

- **Reach a better ecological status**

Riparian vegetation : current role (WFD)

- **Need : improvement of current assessment methods for a better integration of pressures** (eg Friberg, 2014; Carvalho et al., 2019; Giakoumis and Voulvoulis, 2019).

- **Assessment based on biological, hydromorphological and physico-chemical quality elements : riparian vegetation is not a mandatory one and it has been nearly neglected in most hydromorphological assessment protocols** (Gonzalez Del Tánago et al., 2021)

- **Whereas riparian vegetation plays a crucial role in river hydromorphological conditions** (eg Corenblit et al., 2007) **and improve biological status** (eg Van Looy et al., 2013)

=> there is a gap between scientific knowledge and policies/tools

Riparian vegetation : potential contribution

A set of reliable indicators ?

Review

Improving river hydromorphological assessment through better integration of riparian vegetation: Scientific evidence and guidelines

Marta González del Tánago [a,*], Vanesa Martínez-Fernández [b], Francisca C. Aguiar [c], Walter Bertoldi [d], Simon Dufour [e], Diego García de Jalón [a], Virginia Garófano-Gómez [f,g], Dejan Mandzukovski [h], Patricia María Rodríguez-González [c]
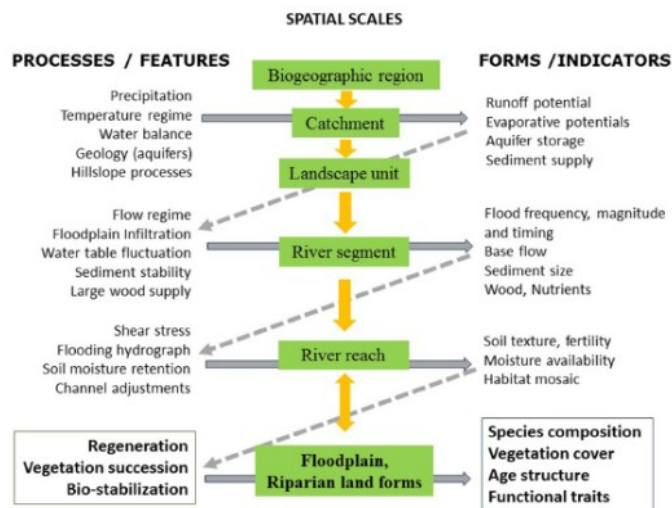
Table 1. Potential indicators used to characterize riparian vegetation at different spatial scales, under different analysis approach.

ANALYSIS APPROACH (MAIN DATA SOURCE)	PLANT / PATCHES RIVER REACH (0.1-1 km)	RIPARIAN CORRIDOR RIVER SEGMENT (1-10 km)	CORRIDOR / FOREST TYPES LANDSCAPE UNIT / CATCHMENT (10-100 km²)
Taxonomy based (field work)	Species composition, Abundance, Diversity	Plant formations, Plant communities	Phytosociological classes, Habitat types, Dominant species
Landscape-mosaic approach (GIS analysis)	Size, Shape, Coverage, Relative location to channel, Spatial distribution	Riparian corridor width, overage, Connectivity, Fragmentation	Corridor types, Spatial assemblage of patches, Landscape diversity
Functional approach (process-based) (field work + GIS analysis)	Pioneer recruitment areas (size, location), Plant functional traits, Genetic diversity	Functional zones based on dominant fluvial processes, Vegetation guilds	Broad Longitudinal / Transversal zonation of Plant communities, Broad location of Pioneer / Late-seral species

cost
EUROPEAN COOPERATION
IN SCIENCE & TECHNOLOGY

11

Conclusion

Key message :
riparian socio-ecosystems => an asset to develop systemic solutions to maximize synergies between environmental issues and EU priorities

Recognize riparian vegetation as an asset to integrate in management plans, in monitoring scheme, teaching programs, etc.
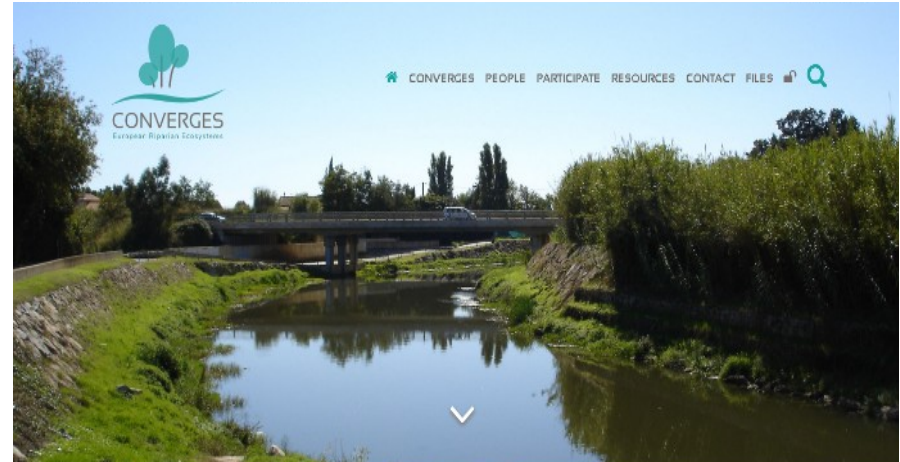
cost
EUROPEAN COOPERATION
IN SCIENCE & TECHNOLOGY

Conclusion

COST Action CONVERGES

A international network launched in 2017 to bring together the diverse body of knowledge that exists across Europe for all aspects of riparian vegetation

=> Status and pressures, restoration, remote sensing, genetic, indicators, policies and management, etc.

=> 39 countries, 200 participants

www.converges.eu

- Mailing list : simon.dufour@univ-rennes2.fr
- https://twitter.com/ca16208
- https://www.researchgate.net/project/COST-Action-CA16208-for-enhancing-management-of-European-riparian-ecosystems-and-services

13

Thank you for your attention

26 - 27 May 2021
EUROPEAN RIVER SYMPOSIUM

RIPA-1 : First International Conference on Riparian Ecosystems Science and Management (*April 2022, Bratislava*)

Questions and stay in touch ?
ripa-1@sciencesconf.org

ORGANIZATION : COST Action CONVERGES
Plant Science & Biodiversity Center, Slovak Academy of Sciences