

# Monitoring riparian vegetation: toward a citizen science approach

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## Abstract :

Despite the remarkable efforts of EU countries at implementing the WFD, recent data demonstrate that only 40 % of European rivers have a good ecological status. Though riparian conditions significantly impact geomorphological processes and ecosystem functioning, their analysis is still poorly defined and inconsistent across a variety of protocols assessing rivers' ecological status. The present study explores the feasibility and the reliability of a new citizen science methodology and related App called RiVe, to monitor riparian vegetation. Riparian vegetation was analyzed at three layers, describing both mature and regeneration forest stages. For the demo/test version of the App an initial set of 12 target woody species was used to identify functional groups of ecological importance, namely native (hygrophilic and mesophilic) and invasive. The app includes questions dealing with both the general condition of the riparian area and pressures that commonly affect it. Each citizen followed consistent training to gain basic knowledge both on the functions of riparian species and their identification. To elicit potential weaknesses in the methodology and detect needs to adapt the App to cover regional specificities, questionnaires were submitted to the volunteers from different geographical contexts. Thus, training events were organized in Italy, Spain, Portugal and France. Results underlined the need to create regional projects containing species representative for different areas. Encouraging citizens to use Apps like Plantnet and to pick up more photos to be checked by the experts in the database can significantly enhance data quality and reduce bias. This method could also be used as a quick survey integrated with remote sensing analysis. Moreover, citizen science activities have educational and social benefits and, enhancing volunteers' perception of the pressures acting on rivers and the related environmental and social issues, they contribute to shaping more informed and resilient societies.

## NEW VERSION OF RiVe APP

### Questions to identified the sampling site

- It is requested to enter the sampling area in m<sup>2</sup> directly
- We also add the mountain area (In addition to hills and plains)
- We ask whether right or left of the river
- How far is it from the river

### Information that estimates the characteristics of the riparian forest by simple proxies

Approximate maximum height of vegetation (proxy to identified young riparian wood, mature or something in between)

- ☐ < 7m
- ☐ 7-15m
- ☐ >15

How many dead or decaying trees are there in the observed area? (Proxy for high, medium or low management activities)

- ☐ 0
- ☐ 1 or 2
- ☐ More than 2

Define the structure of the riparian wood (proxy for naturalness)

- ☐ Natural/ pristine
- ☐ Management evidence (es. coppicing, cuts, passage of heavy vehicles)
- ☐ Artificial: es. Poplar Plantation

River section

- ☐ Natural /pristine
  - ☐ Slight artificialization
  - ☐ Heavily modified: both banks with vertical erosion
  - ☐ Heavily modified: strong presence of artificial structure
  - ☐ Not visible
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### Section of target species

We can enter up to 30 species in all. Therefore we ask to indicate the target species for your region that are not included in the list. There should be about a dozen, for each region, with a fair balance between species exclusive to riparian forest (hygrophilous) species that are often found in riparian forests but are less demanding for soil moisture and invasive species.

[illegible]



I also remember that the final goal will also be to integrate it with remote sensing methods and therefore some answers can be controlled, such as the maximum height etc., however most of the answers will be useful to implement, from the ground, information on remote sensing techniques.