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.

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NEW VERSION OF RIVE APP

Questions to identified the sampling site

- It is requested to enter the sampling area in m² 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

Approx betwee	imate maximum height of vegetation (proxy to identified young riparian wood, mature or something in	
	< 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 s	ection	
0	Natural /pristine Slight artificialization Heavily modified: both banks with vertical erosion Heavily modified: strong presence of artificial structure Not visible	

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.

Regarding this point, we should send an email to all Converges colleagues to have their requests sent. Together with the name they should also send a simple card with 1 or 2 photos / drawings and two paragraphs of explanation.

Do I send the email directly or you?

Layers

Instead of three layers there will be two, the layer from 0 to 1 meter will be eliminated and analyzed with a separate question. It was considered sufficient to have the layer between 1 and 3 m to estimate the future regeneration.

Ground cover (instead of layer from 0 to 1m)

☐ Not visible

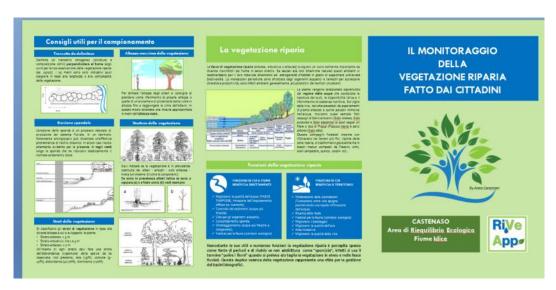
■ Mixed

□ almost exclusively bramble

■ almost exclusively ivy

□ other (for example many oak seedlings)

I remind you that this APP, even if it can be downloaded for the moment without any registration, is expected to carry out an initial training which will be essential not only to answer the questions correctly but also a moment of dissemination and knowledge of riparian vegetation, one of the objectives of Converges. It should also be accompanied by a short guide to take to the field, such as the one prepared by us for the case study in Francesco's thesis.





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.