

## Exploring riparian vegetation interactions with flow regime and fluvial processes for an improved river management and conservation

### Summary

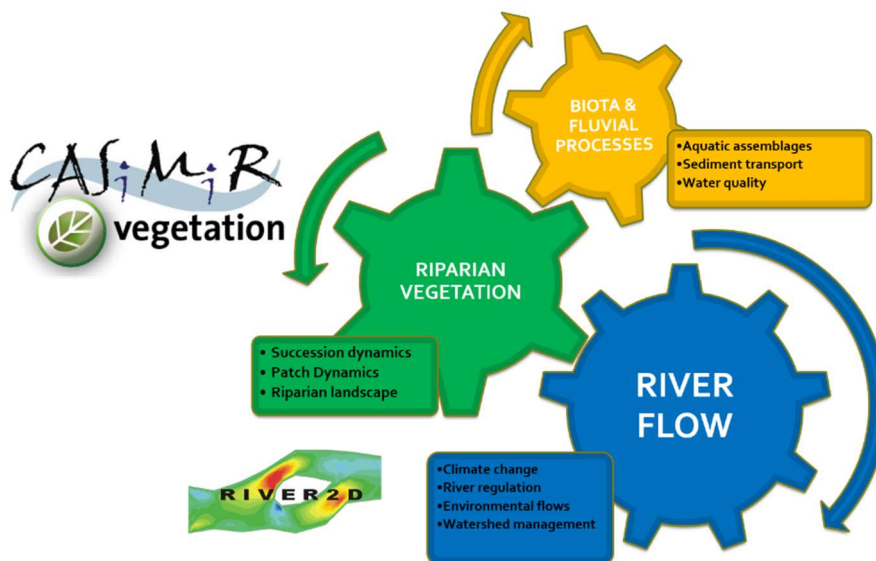
This thesis composes an assessment of the flow regime effects on the structure and functioning of riparian vegetation, as well as, the influence of the respective vegetation changes back on the aquatic communities and fluvial processes. The expected flow regimes driven by climate change originate amendments in riparian vegetation, characterized mainly by a general area reduction and a greater menace to the younger and water dependent succession phases. In the European context, the Mediterranean rivers are the ones most threatened.

The fluvial disturbance has different effects on the location and shape of the vegetation patches, being groundwater hydrology the main driver of patch location, which exposes a predominant zonation of succession phases over the natural ecologic succession. It was determined the potential natural riparian patch mosaic in regulated rivers, allowing for the establishment of reference conditions for environmental flows. The riparian maintenance flows are able to restore the dynamics of riparian vegetation and reduce the effects of regulation in these communities. The maintenance of a minimum discharge during the summer period allows for the prevention of channel invasion and encroachment by vegetation. The changes in the riparian patch mosaic have influence in the hydraulic characteristics of the river, changing the habitat availability of the local fish species according to the magnitude of the changes.

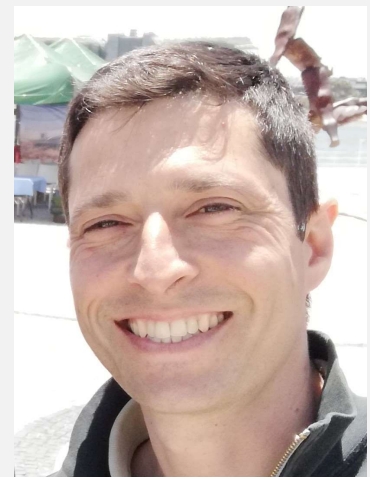
Environmental flows that disregard riparian vegetation requirements become obsolete in few years due to the modification of the habitat premises for which they were based, revealing therefore to be unsustainable in the long term and failing to achieve the desired effects on aquatic communities to which those were proposed in the first place. Accounting for the requirements of riparian vegetation into environmental flows poses an essential measure to assure the effectiveness of environmental flow regimes in the long-term perspective of the fluvial ecosystem.

### Keywords

Riparian ecosystems, riparian flow requirements, riparian maintenance flows, fish fauna, environment flows.



*Thesis focus – Knowledge development concerning the ecological connections between flow regime, riparian vegetation, and aquatic biota and fluvial processes.*



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