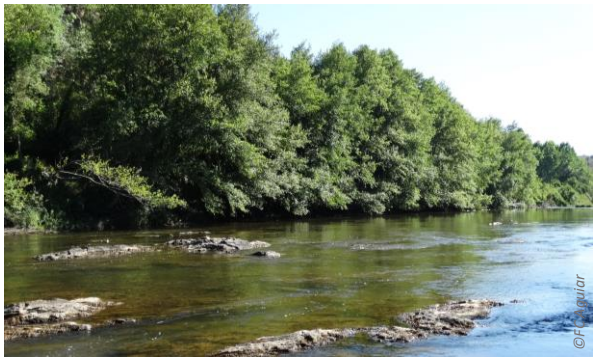
RIVEAL PROJECT

RIPARIAN FOREST VALUES AND ECOSYSTEM SERVICES – RIPARIAN FORESTS

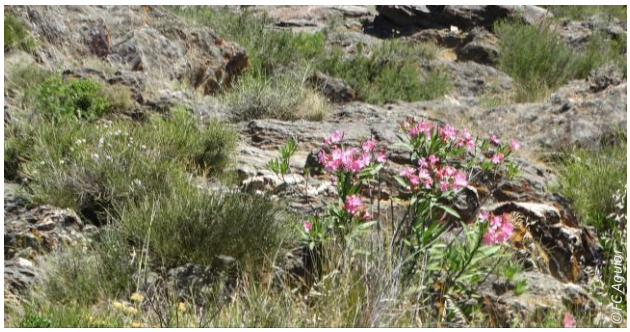
RIPARIAN FORESTS ARE…

… woody plant communities of semi-terrestrial habitats between terrestrial and aquatic ecosystems of rivers and streams and other inland waters, such as wetlands. Under the canopies many herbaceous plants thrive, profiting from the climatic regulation of riparian forests (on wind, light, and temperature) and the flow of nutrients and organic matter.

They are amongst the most diverse, complex and dynamic ecosystems worldwide. They may be naturally dominated by single woody species, e.g. alder woodlands, by shrubby communities on headwaters or by diverse interconnected vegetation units. In perennial rivers they frequently present a clear tranversal zonation from the aquatic ecosystem to the uplands, underlying communities with varying vertical *strata* and diverse requirements of soil humidity.



Alder woodlands in River Rabaçal, Douro catchment, NE Portugal.



Riparian shrublands of Flueggea tinctoria and Nerium oleander, River Guadiana, SE Portugal.

WHAT ARE THEIR FUNCTIONS?

Riparian forests are chief components for the riverine and aquatic environment and their biotic communities (such as riparian and aquatic plants, fish and macroinvertebrates).

They provide climatic regulation, habitat, spawning, and nursery areas, and as primary producers they participate in food webs. They offer refugia and migration corridors for birds, mammals and other animals. It is well-known their buffer capacity for pollutants and nutrients from agricultural runoff and the interaction in erosion and siltation processes.

RIPARIAN INTEGRITY and HUMAN DISTURBANCE

Riparian forests are driven by bioclimatic, geomorphological and hydrological factors, which change over space and time under natural and human disturbances. The integrity of these ecosystems include the species composition and diversity, the structure of vegetation and the lateral and longitudinal patterns across the landscape.

In Mediterranean regions, they are frequently narrow and clearly discernible from the adjacent lands, and for this they have been labelled as *riparian galleries* and *linear oases*.

Regulation of stream flows, water abstraction, pollution, climate change, land-use change, deforestation and fire are amongst the major sources of degradation. A variety of methods are used to assess and monitor the condition of riparian forests. Both field and remote sensing approaches provide information to support indicators of riparian ecological quality.

River Lima, riparian forests and adjacent lands taken during an unmanned aerial vehicle (UAV or drone) overfly in Summer 2020.

ECOSYSTEM SERVICES

Riparian forests provide multiple ecosystem services, that is, the benefits people and society obtain from ecosystems, from the various ecosystem services categories: Provisioning, Regulating and Maintenance, Cultural, and the Intermediate services, which are related to biodiversity (also known as Supporting services).

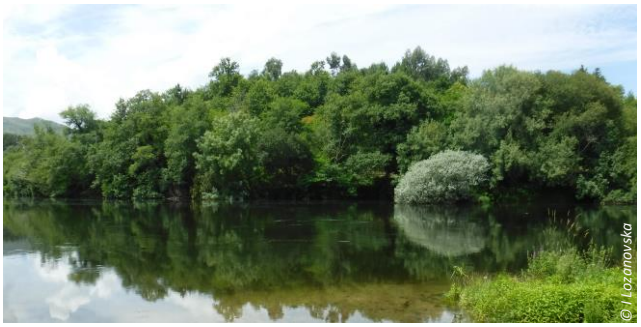
Provisioning services are direct physical products (e.g., timber, seeds), regulating and maintenance services include those that sustain environmental quality (e.g., carbon sequestration, climate regulation). Cultural services include tangible recreational uses (e.g., walking across forests) or less tangible benefits such as contemplation, aesthetic benefits, sense of belonging and educational values.

RIPARIAN FORESTS IN RIVEAL

Riparian woody vegetation was surveyed in the Summer of 2019 on the two case studies: River Lima, and River Alva, impaired by dams with different operation rules: a run-of-river dam (Touvedo) and a reservoir dam (Fronhas). The survey included near-natural river stretches and the regulated river stretches downstream from dams.

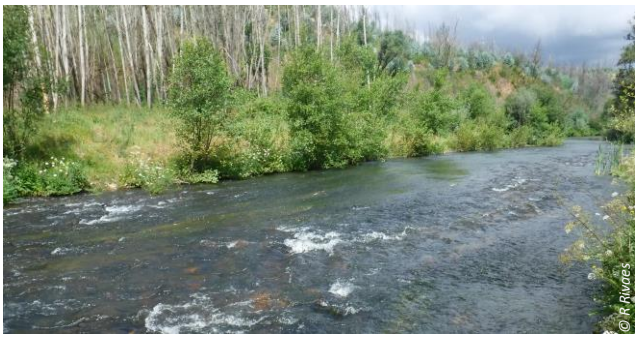
In the surveyed stretches 15 riparian woody species (trees, shrubs and lianas) were observed, and 3 terrestrial species, among which the invasive species *Acacia dealbata* (silver wattle) and *Ailanthus altissima* (tree-of-heaven).

In general, riparian forests of River Lima were continuous, narrow and dominated by alders (*Alnus glutinosa*) and black willows (*Salix atrocinerea*). Other common species were the ash (*Fraxinus angustifolia*), 'borrazeira-branca' (*Salix salviifolia*) and the English ivy (*Hedera hibernica*), the latter with low coverage.



Riparian forest of a RIVEAL project sampling site at River Lima (Summer 2019).

Alders, black willows and shrubby formations of *Salix salviifolia* were the most frequent and abundant woody species in visited river stretches of River Alva. Some stretches were highly invaded by sylver wattle and presented a widespread fragmentation. Riparian trees and shrubs were recovering from the wildfire of 2017.



Riparian forest of a RIVEAL project sampling site at River Alva (Summer 2019).

Funded by:

FCT Fundação para a Ciência e a Tecnologia Lisb@20 20 COMPETE 2020 PORTUGAL 2020 UNIÃO EUROPEIA Fundo Europeu de Desenvolvimento Regional

Factsheet elaborated by FC Aguiar · R Rivaes
February 2021