Spatial distribution of green filters with different nitrate retention potential in the Tordera river basin

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Máster en Ingeniería de Montes

Introduction

· Industrial nitrogen production has altered its biogeochemical cycle.

· It is an essential nutrient, used as an intensive agricultural fertiliser

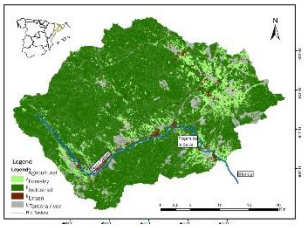
· Non-point source pollution has become the largest source of inputs into aquatic ecosystems

· Problems: Loss of water quality and degradation of ecosystems

· There are ecosystems with the capacity to act as N sinks: riparian forests and wetlands.

The Tordera river basin

An ideal natural laboratory to explore the work of green filters.



· Typically mediterranean watershed (Spanish NE)

· High forestry character, low urbanized, high tourist pressure.

· Presence of chemical and pharmaceutic industry.

· Intensive logging and farming.

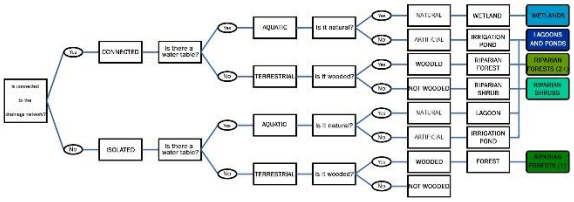
Objectives

1) Identify and classify habitats with potential to act as green nitrate filters.
2) Determine the abundance of these green filters and describe their distribution at a landscape scale.
3) Infer the nitrate retention potential of each type of green filter and determine how it is distributed.

Methodology

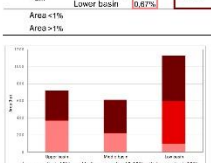
1. Obtain geographic information from national and autonomic sources.

2. Identify and classify green filters from this geographic information.



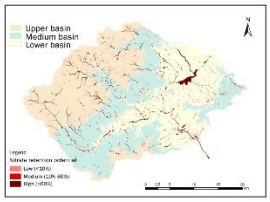
3. Determine nitrate retention potential of green filters from the literature

Nitrate retention potential		Riparian forests(1)	Riparian forests(2+)	Riparian Shrubs	Wetlands, Lagoons and ponds
Medium width <5m	Upper basin	0,25%	10%	27%	
	Medium basin	0,22%			
	Lower basin	0,08%			
Medium width >5m	Upper basin	2,04%	81,80%	69,80%	
	Medium basin	1,77%			
	Lower basin	0,87%			
Area <1%					20,33%
Area >1%					36,23%



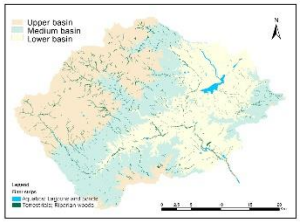
Medium nitrate retention potential:
Upper basin - 31.6%
Medium basin - 44.6%
Lower basin: 57.2%

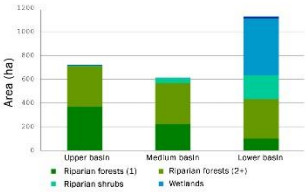
Average: 47.5% of total nitrate in green filters runon



Nitrate retention potential is greater in areas with higher anthropogenic pressure, such as lower basin and middle reach or Tordera river

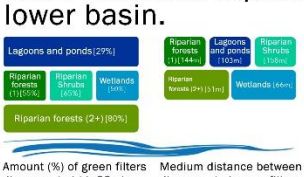
Results





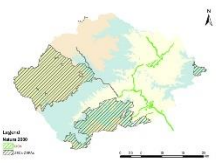
2,464 ha covered by green filters (2,84% of watershed).

Riparian forests is the most abundant green filter. Almost of aquatic green filters are in lower basin.



Amount (%) of green filters disconnected (d>23m) from river network.

Medium distance between disconnected green filter items and river network.



The environmental characteristics and land uses of each area of the watershed condition its potential to retain nitrate. Green filters can contribute more directly to mitigating human impacts and improving water quality, even taking into account their limitations. Protection and enhancement of these ecosystems is needed.