

# Vegetation dynamics in floodplains of trained rivers in the Netherlands: observing, understanding and simulating

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## Challenge

To guarantee water safety during high river discharges, floodplains must be able to convey the extra water. Floodplain vegetation is a critical factor. However, as the floodplains serve also as nature areas vegetation may develop within set conditions. Knowing the why, how, where and when of this development, contributes to efficient floodplain management.

## Innovative components

- Using 35 years of satellite data to observe and quantify the rate of change in water, bare substrate, grass, herbs, shrubs and forests cover of floodplains.
- Linking plant characteristics to floodplain processes to rank the processes most dominant in steering vegetation composition.
- Simulating vegetation dynamics of floodplain grasses and herbs on strategy level by means of linear programming.

## For whom and where?

Floodplain managers interested in the why, how, where and/or when vegetation develops within floodplains.

## Application development and findings

- Satellite data showed that on the river and reach scale vegetation dynamics are comparable, but may differ on the floodplain scale.
- Vegetation dynamics in floodplains are not following standard succession rules, possibly due to human interventions
- Floodplain vegetation composition is steered by resource (water and nutrients) gradients and is modulated by disturbances like excavation and summer flooding
- Linear programming shows promising results to describe the observed vegetation dynamics, but this is work in progress.

## Status for day-to-day practice & next steps

- Quantification of the rate of change in vegetation composition is used in the *Vegetatie Voorspeller*, a tool currently being developed by Deltares
- The knowledge on steering processes for vegetation composition is used for developing a linear programming model. The model set-up is a start for further development of simulating plant traits within the Deltares software *Dwaq*.

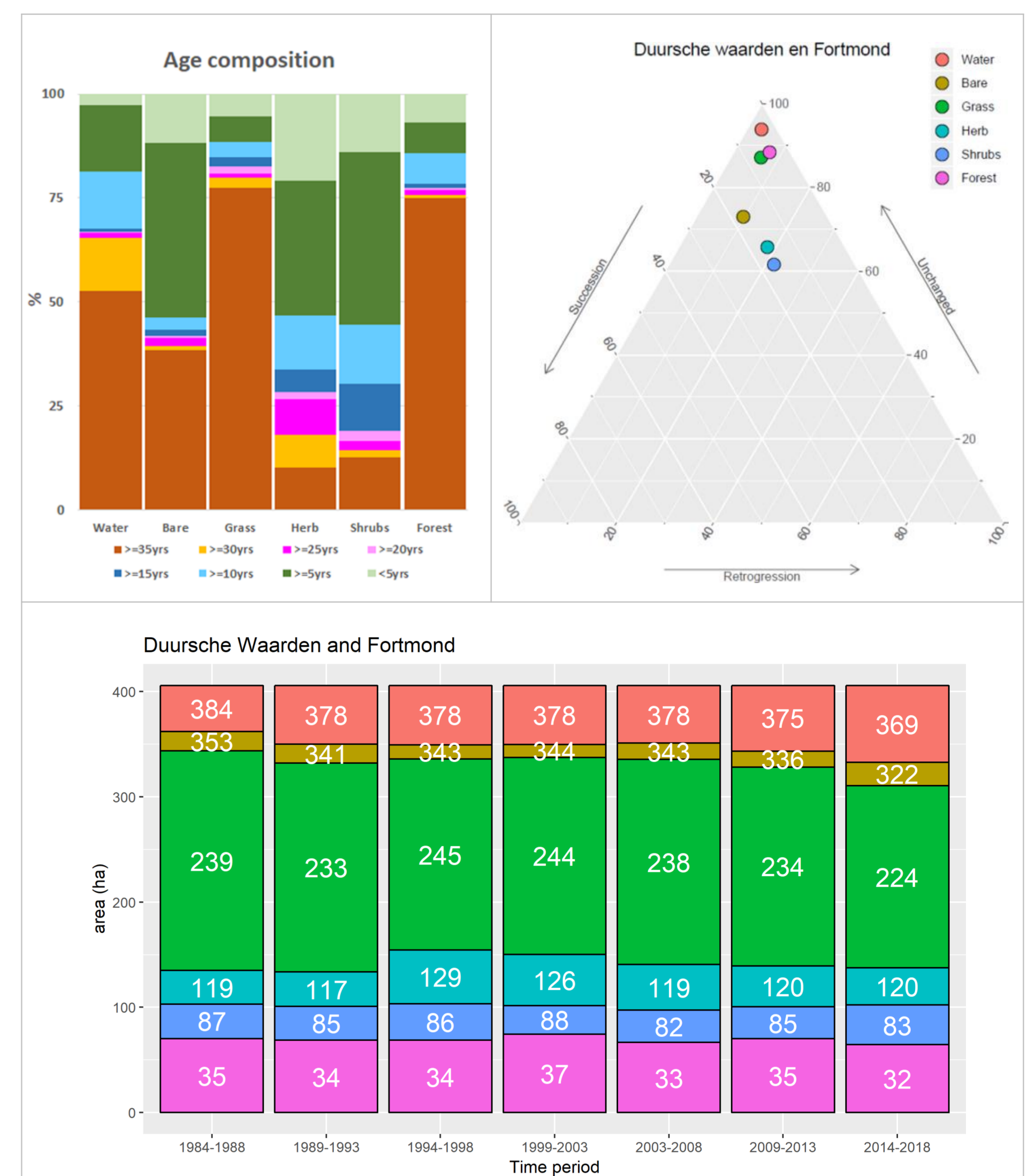


Figure 1: Age composition of the different land cover classes (left), the extent of succession, retrogression and stability of the vegetation (right), and the changes in land cover (bottom) in the Duursche Waarden en Fortmond. Data retrieved from LandSat for the period 1984-2018

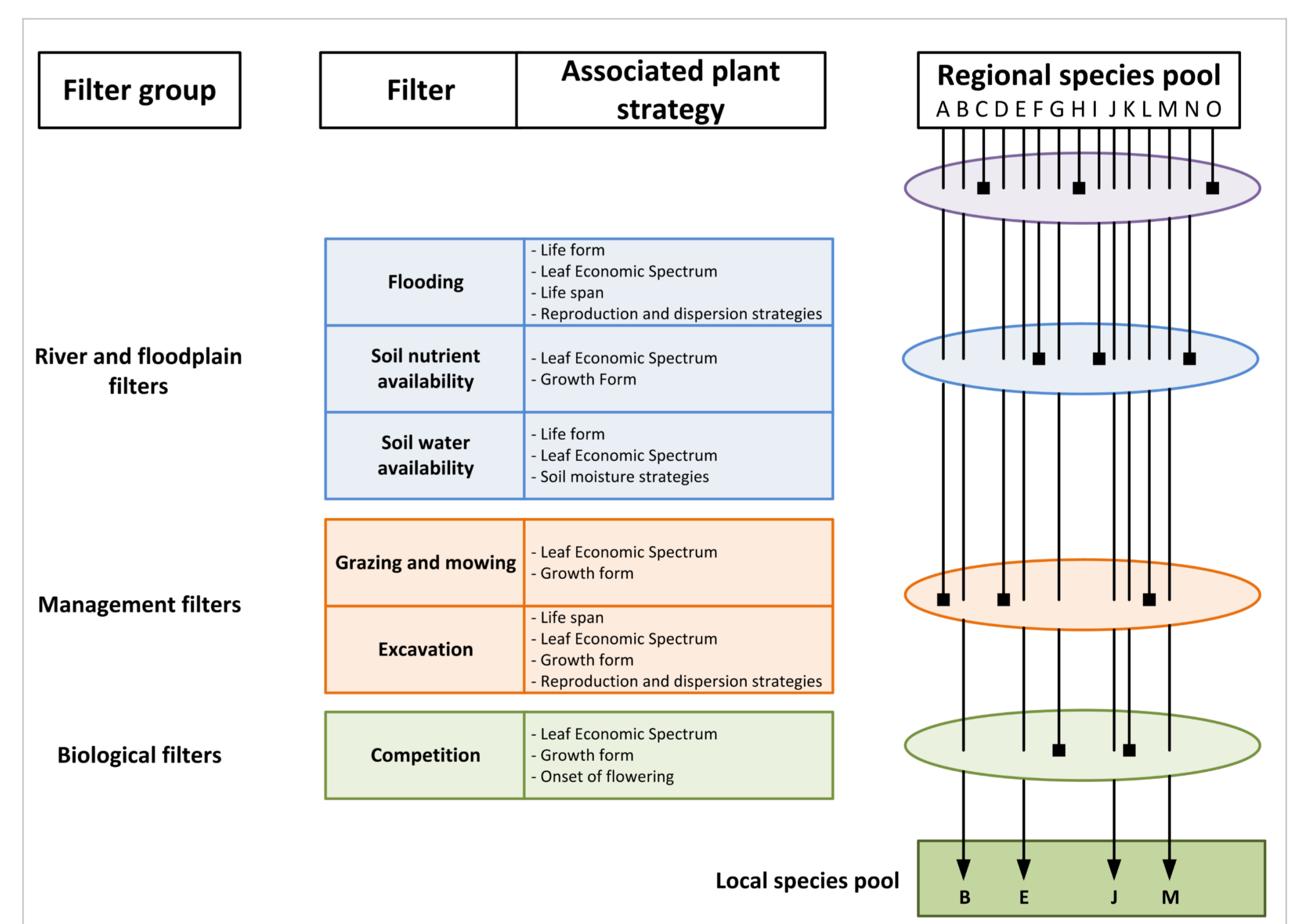


Figure 2: Conceptual framework of the linkage between floodplain processes and plant species strategies

## Interested?

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Explore more in the [project description](#) on the knowledgebase website

