

**RIPA-1 : First International Conference on Riparian Ecosystems Science and Management**

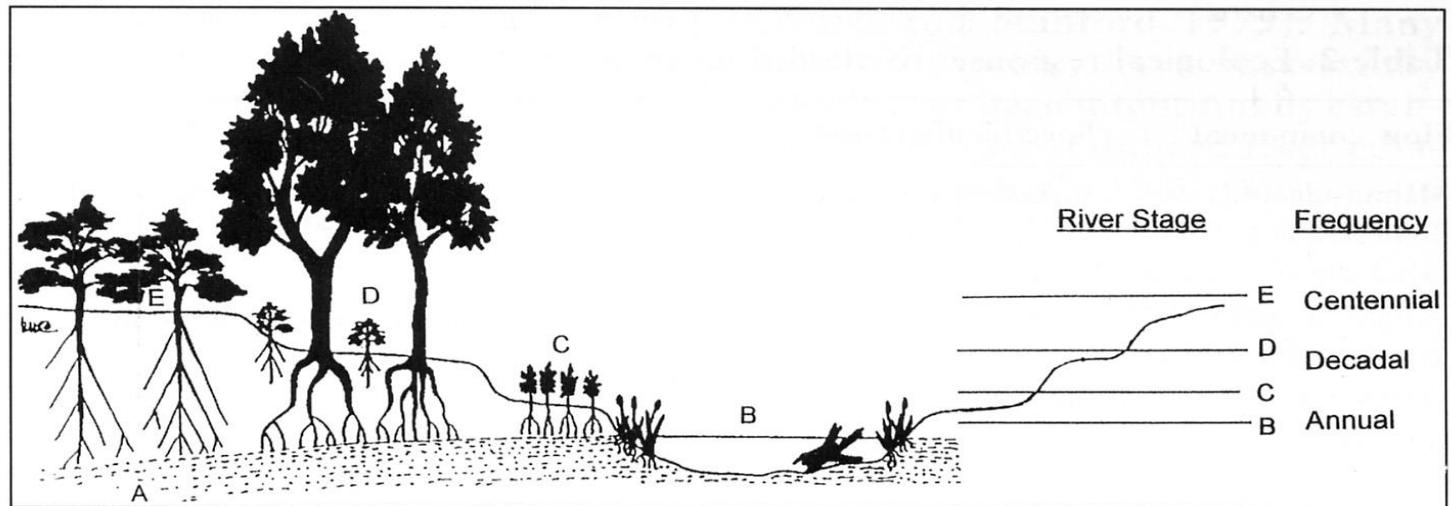
# Hydrology-based spatial planning for riparian revegetation

Rui Rivaes & Francisca C. Aguiar



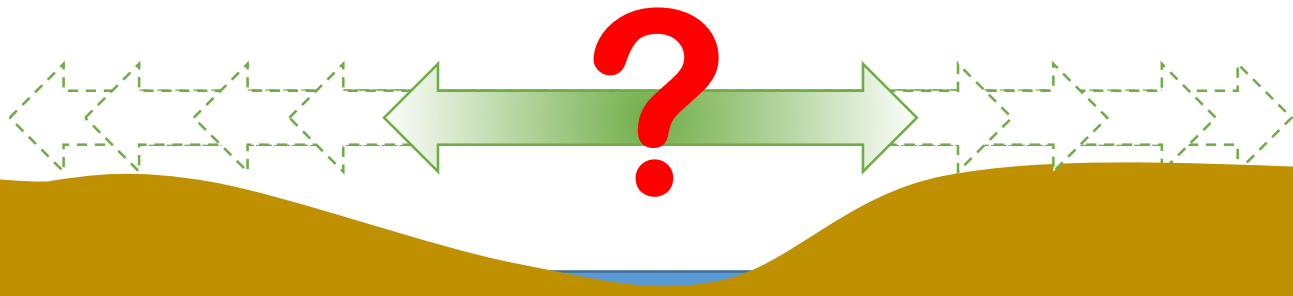
# Fluvial disturbance: main driver

- River stage is a proxy for fluvial disturbance;
- Fluctuates in the form of flood pulses;
- Effects the succession dynamics of riparian vegetation both physically and physiologically.



# Restoration actions

- Creation of riparian buffers;
- Planting; brush mattresses; dormant posts; live stakes and fascines;
- Native riparian species;
- Known provenance;
- Preferably from local individuals.



# Research questions

- Which riverine referential should be used?
- To which distance from the river should riparian vegetation be placed?
- Which vegetation type should be planted and distance range?



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# Methods

*Hydrology-based spatial planning for riparian revegetation*

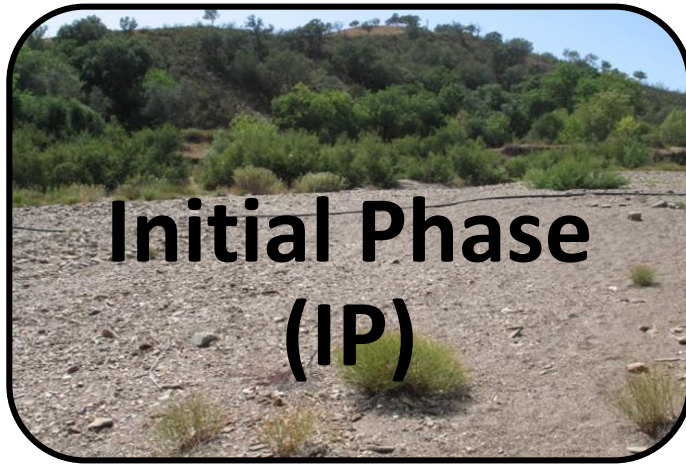


# Riparian patch assessment

- Assess the characteristics of riparian vegetation patches;
- Group patches by vegetation types (succession phases);
- Find appropriate differentiating patch characteristics;
- Determine ranges for vegetation types.



# Riparian succession phases



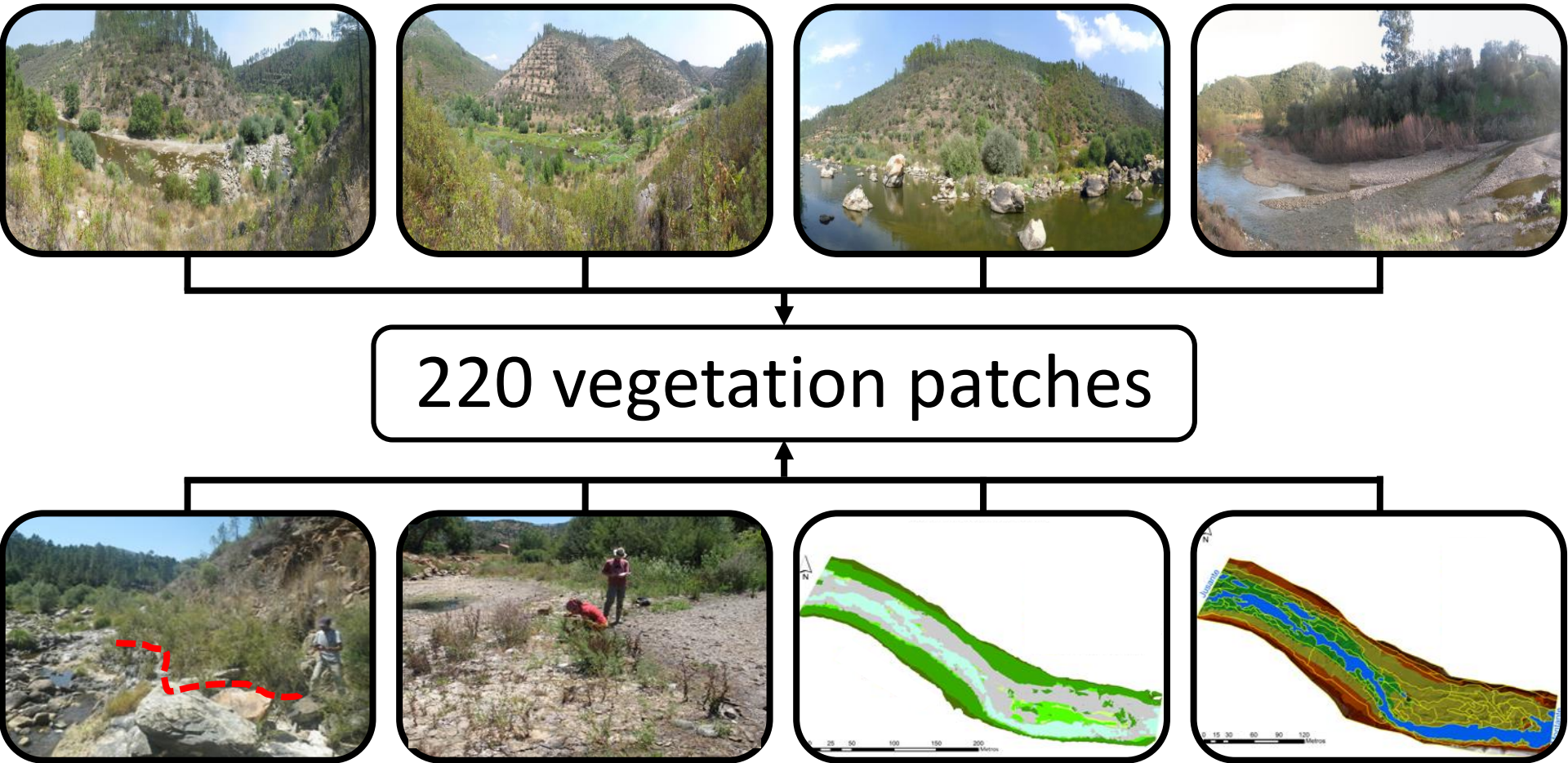
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# Results

*Hydrology-based spatial planning for riparian revegetation*

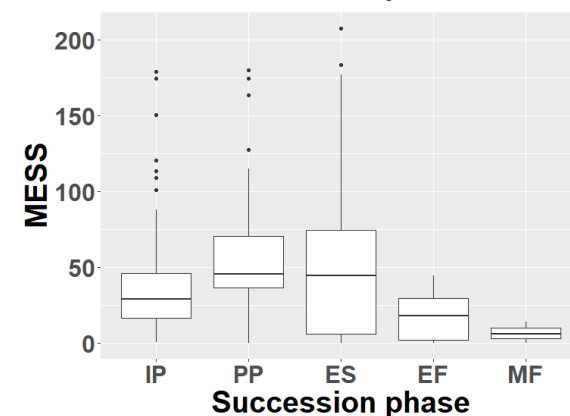
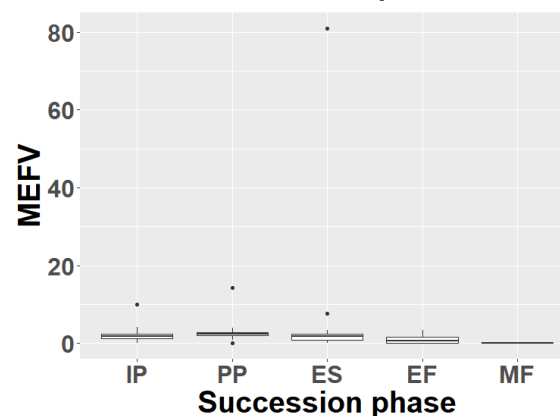
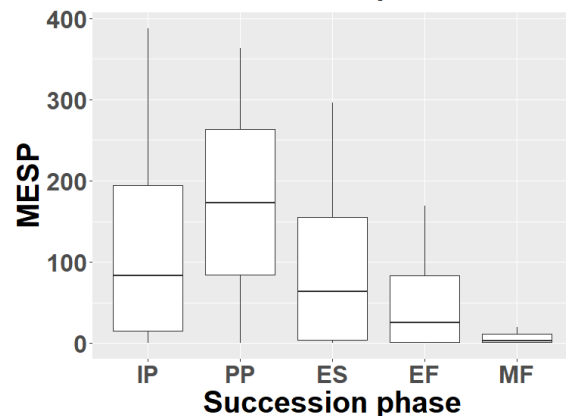
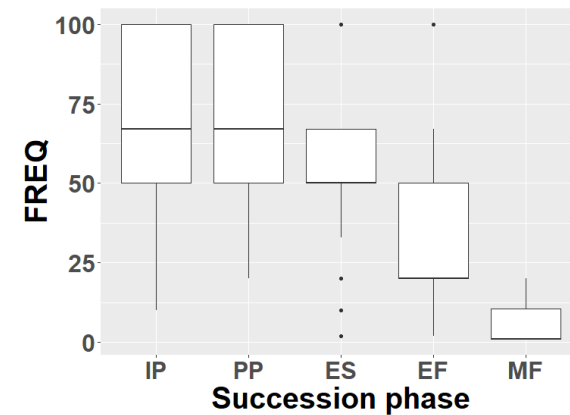
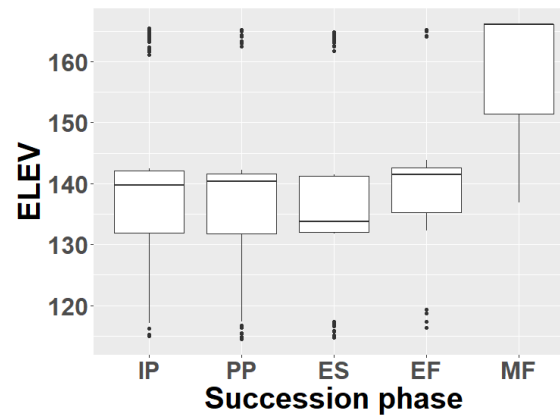
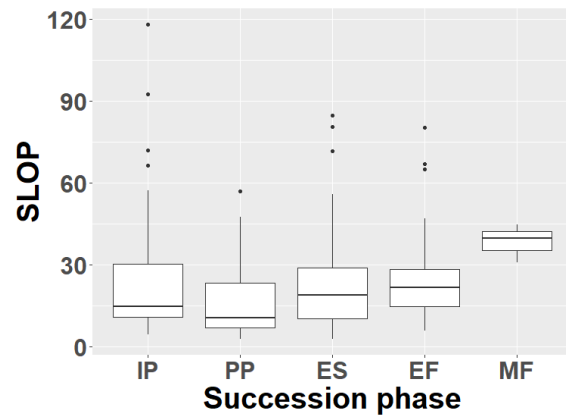


# Riparian patch assessment



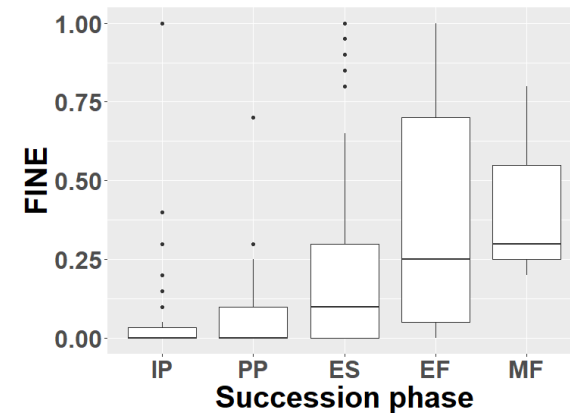
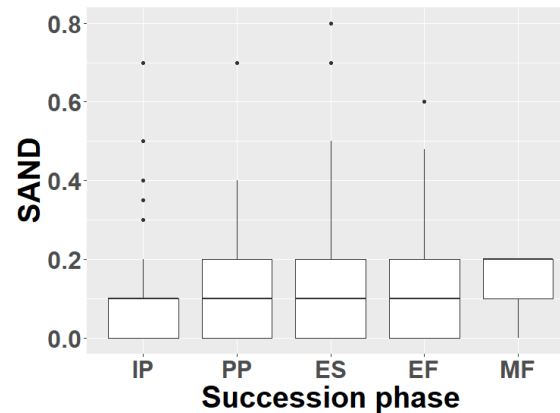
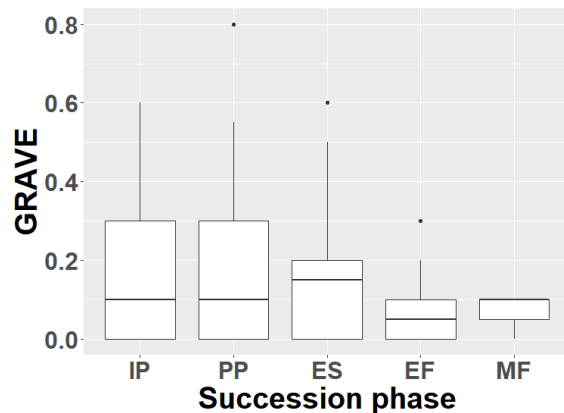
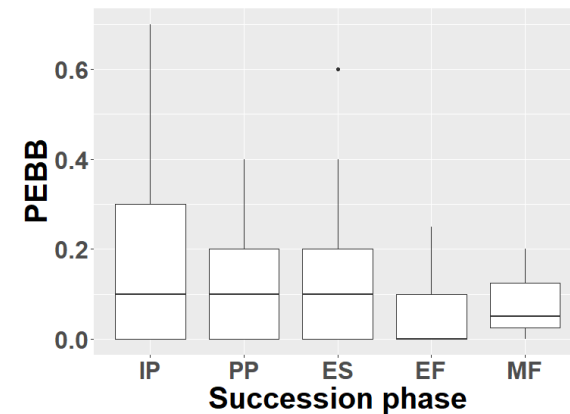
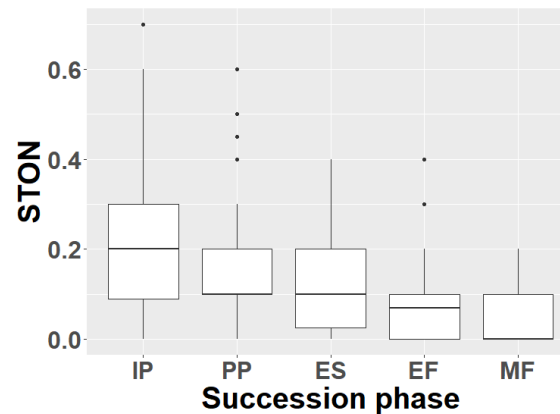
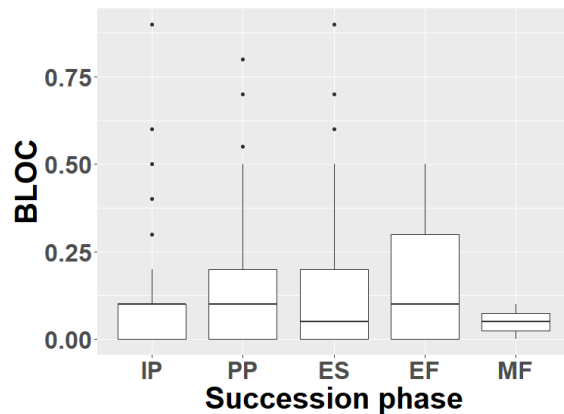
# Characteristics of the patches

- Environmental



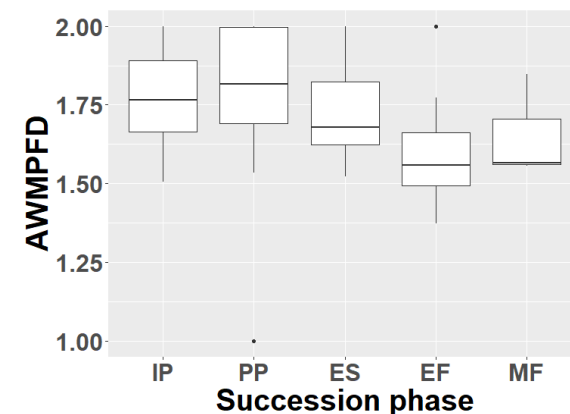
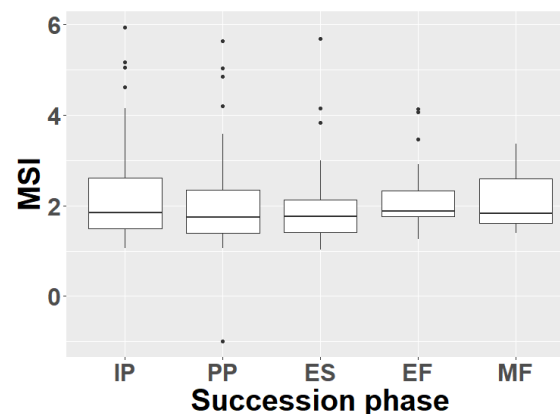
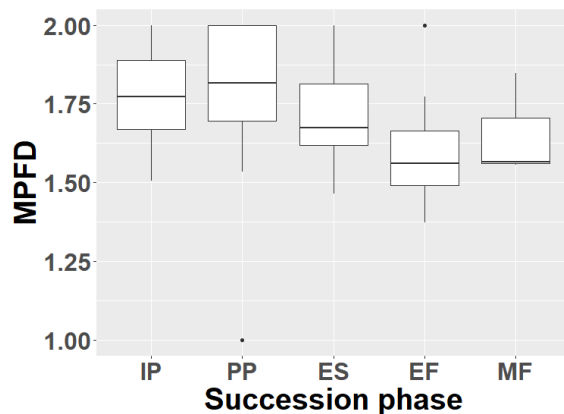
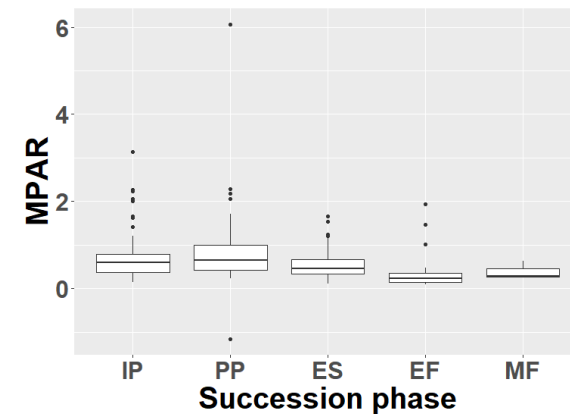
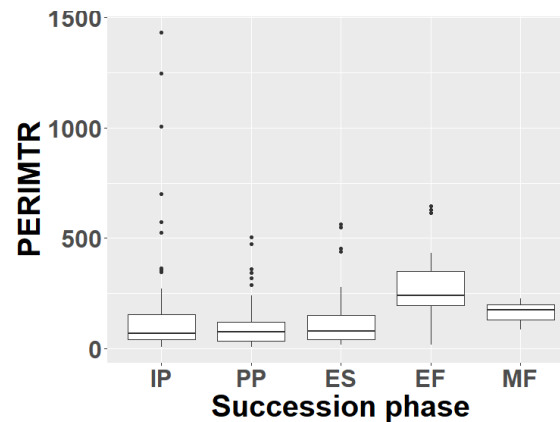
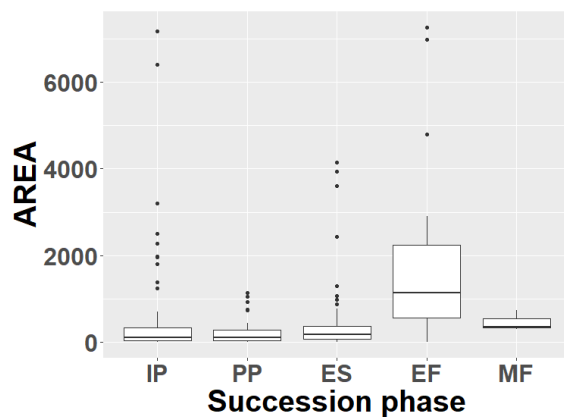
# Characteristics of the patches

- Substrate



# Characteristics of the patches

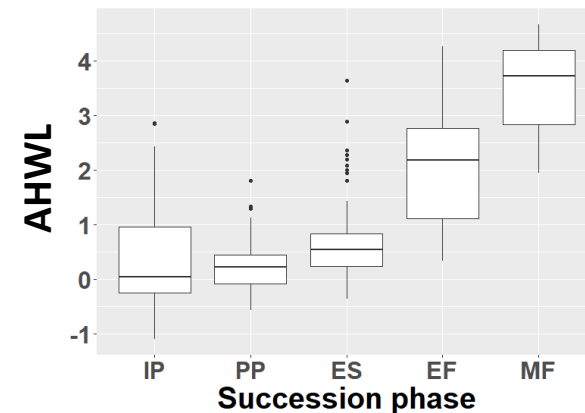
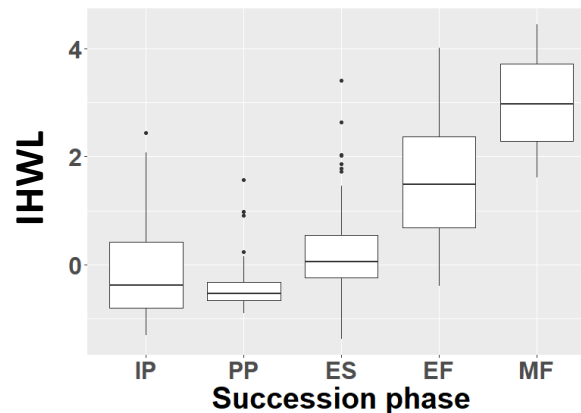
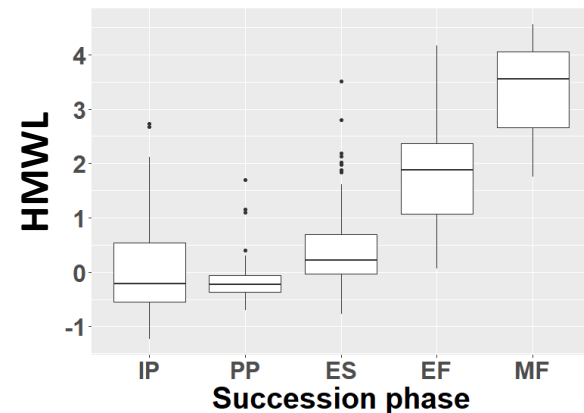
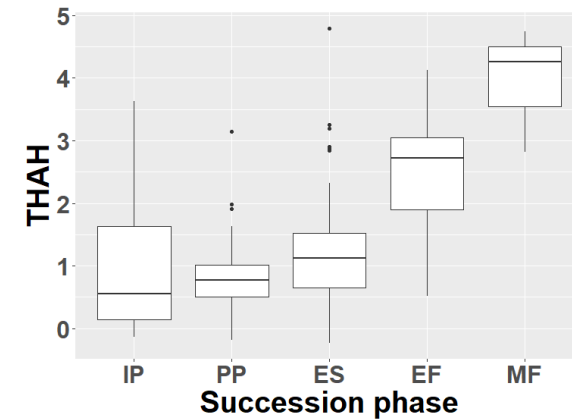
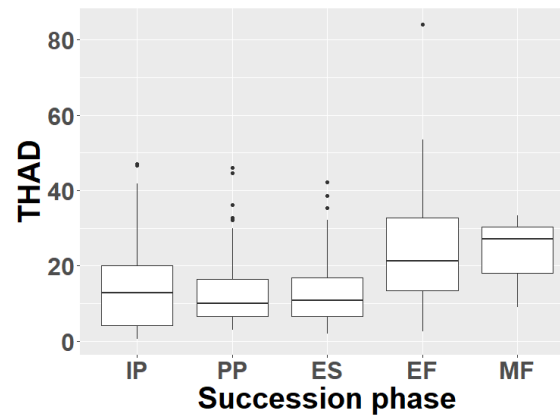
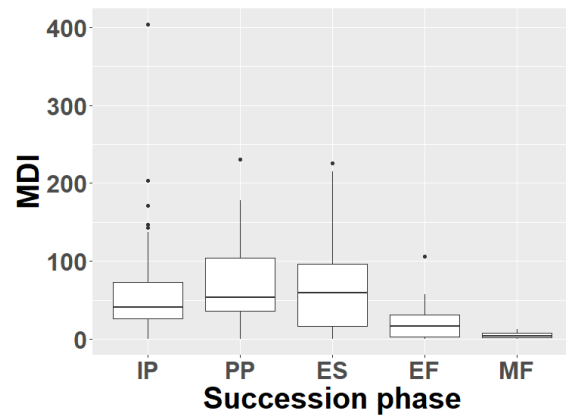
- Shape



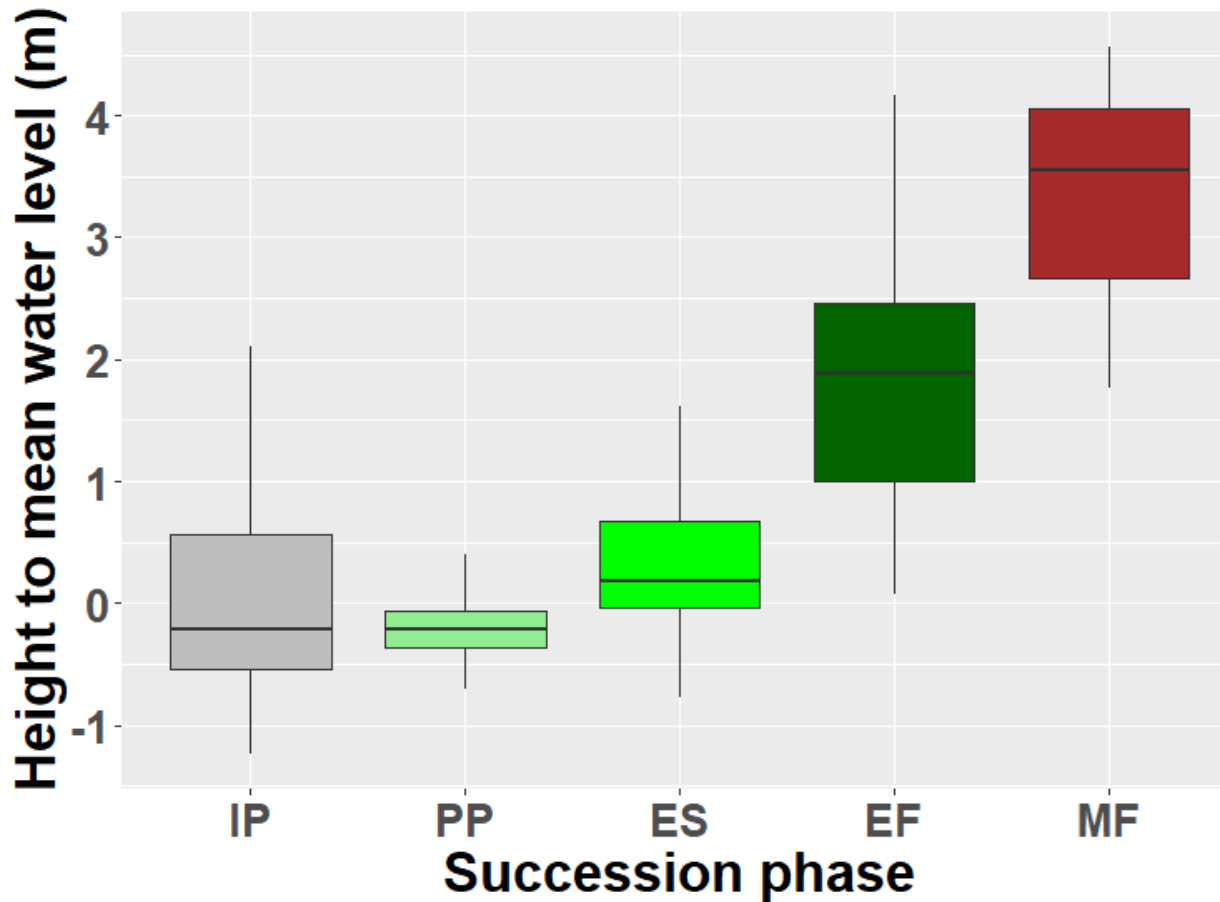


# Characteristics of the patches

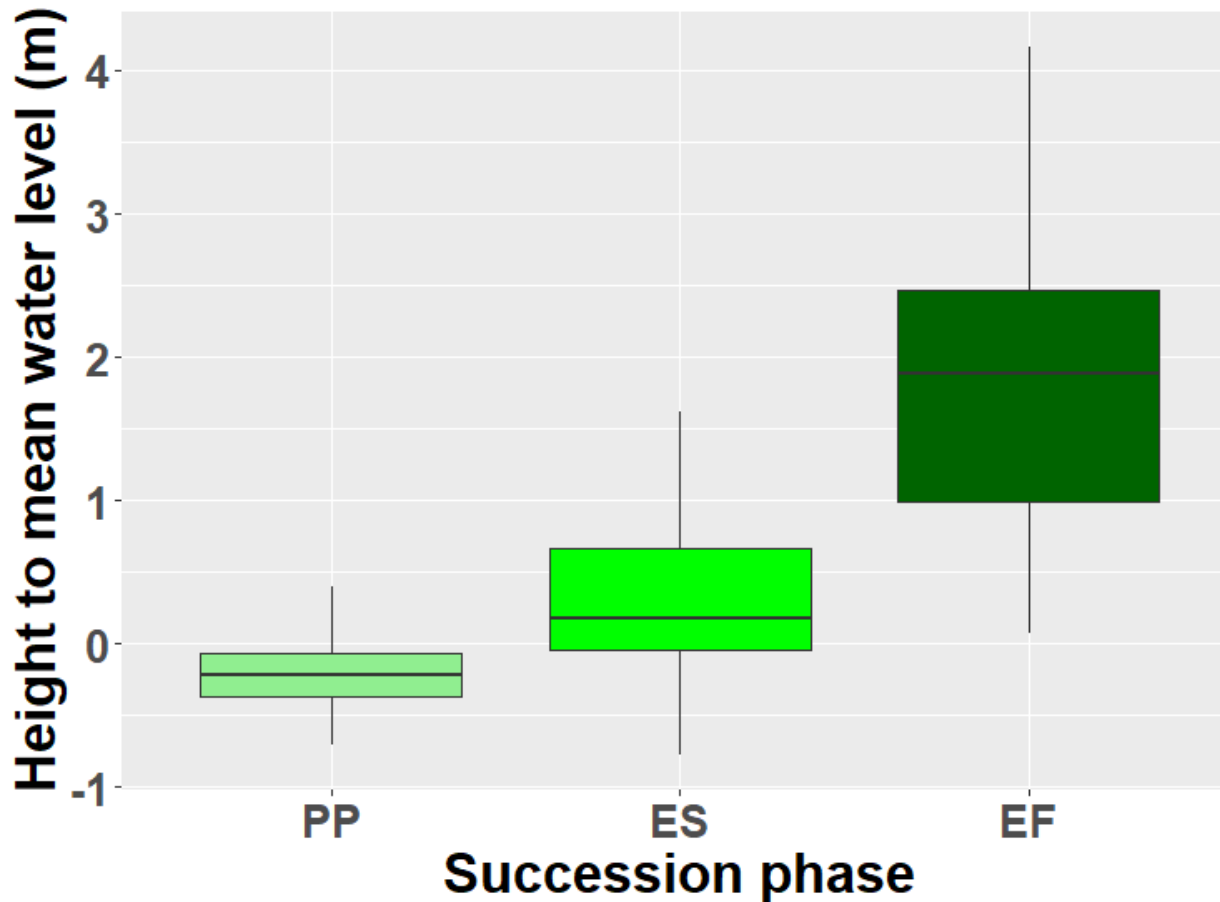
- Hydrologic



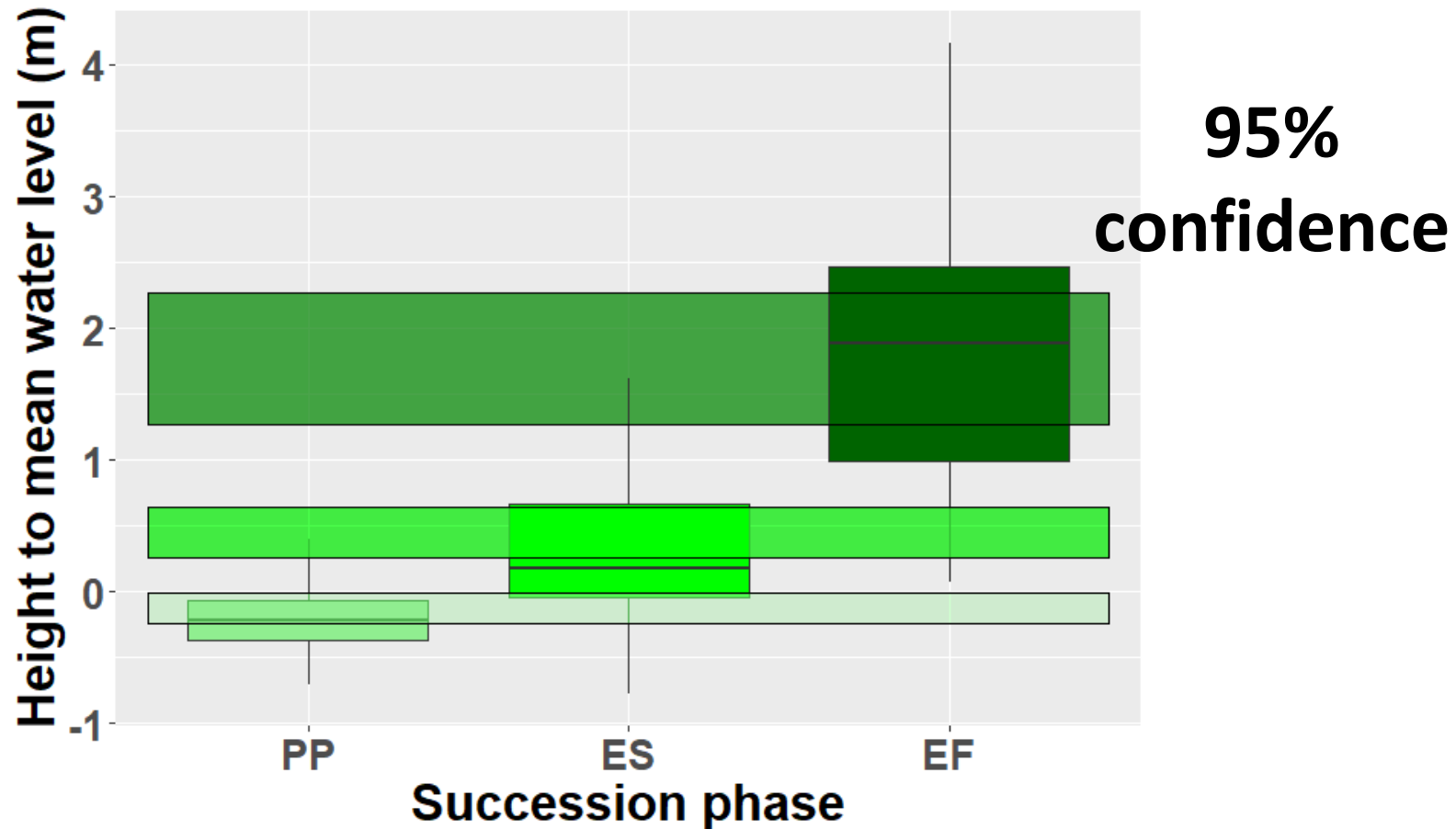
# Flow regime dependency – riparian area



# Flow regime dependency – strictly riparian

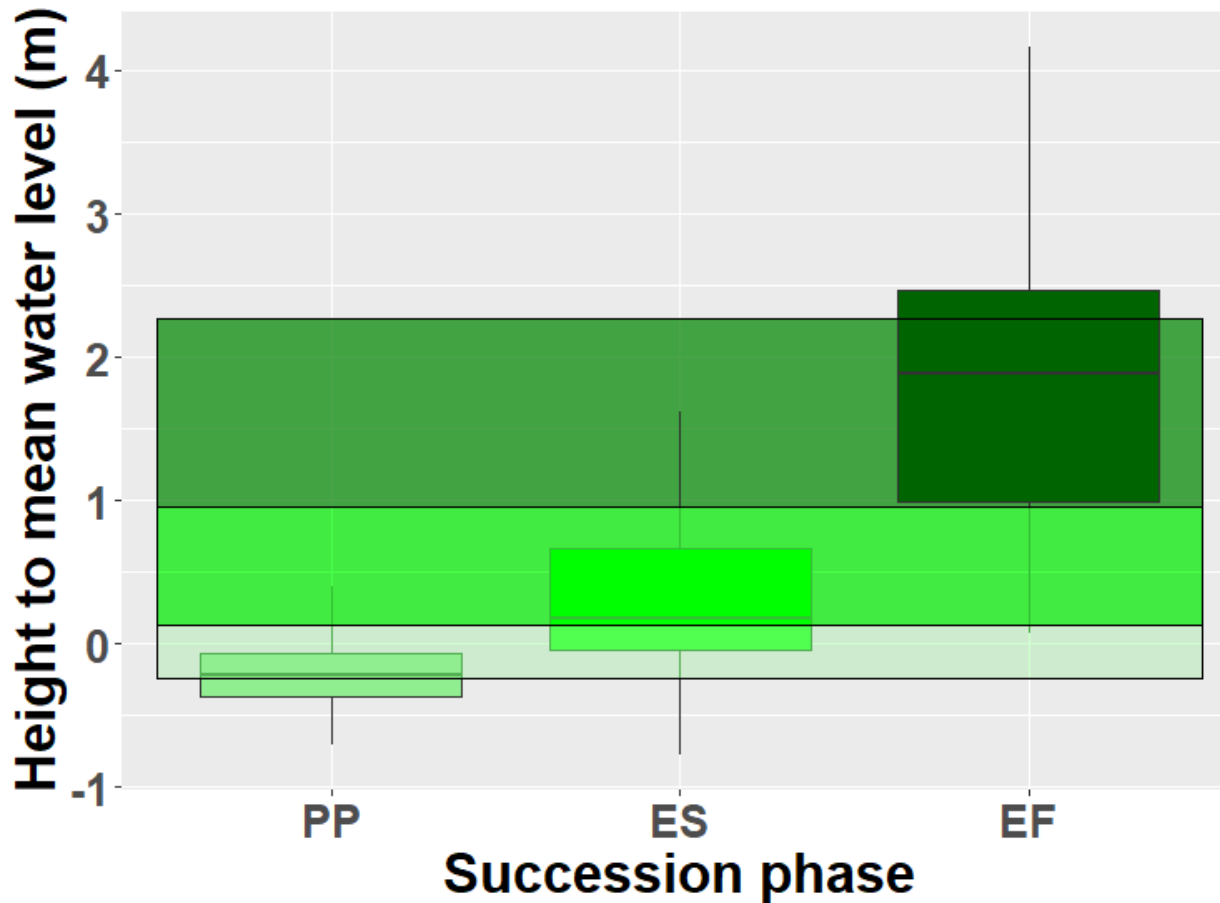


# Flow regime dependency – confidence intervals

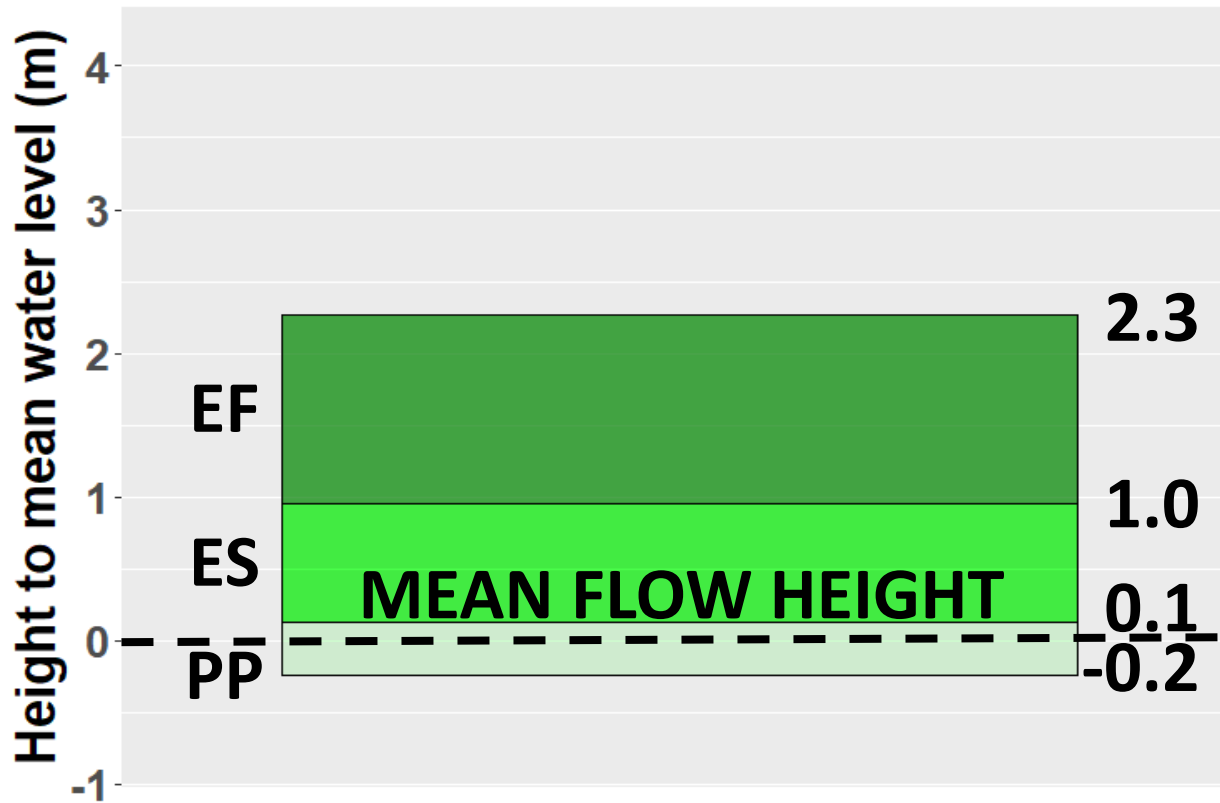




# Riparian bands

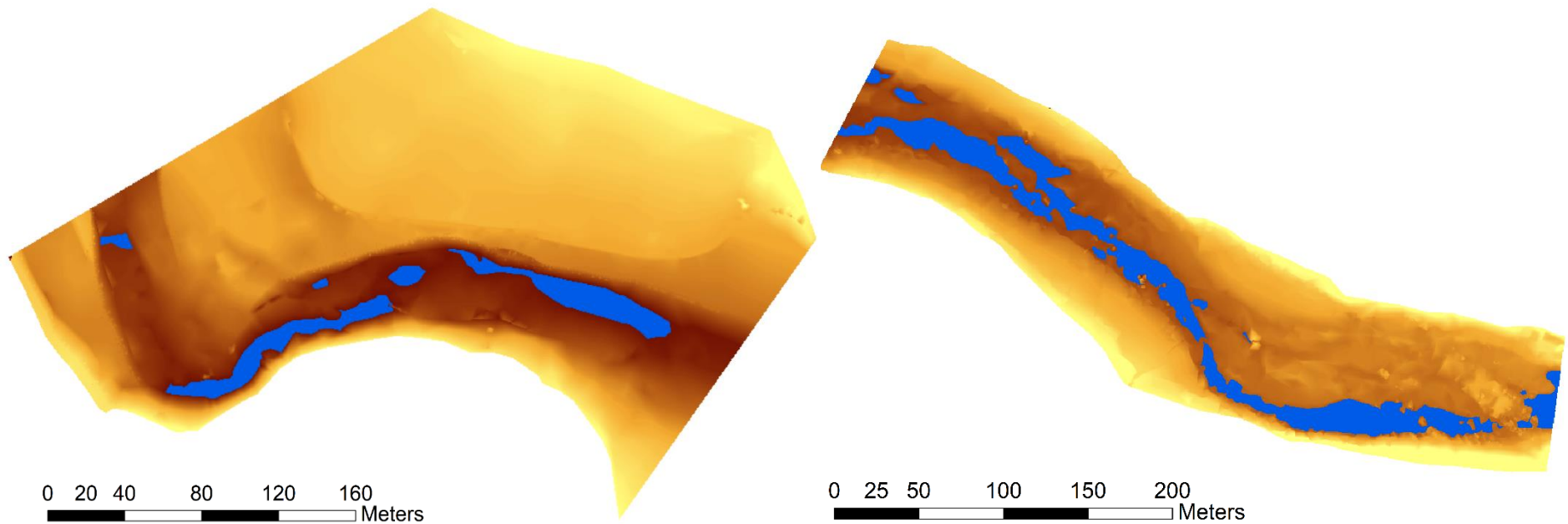


# Riparian bands



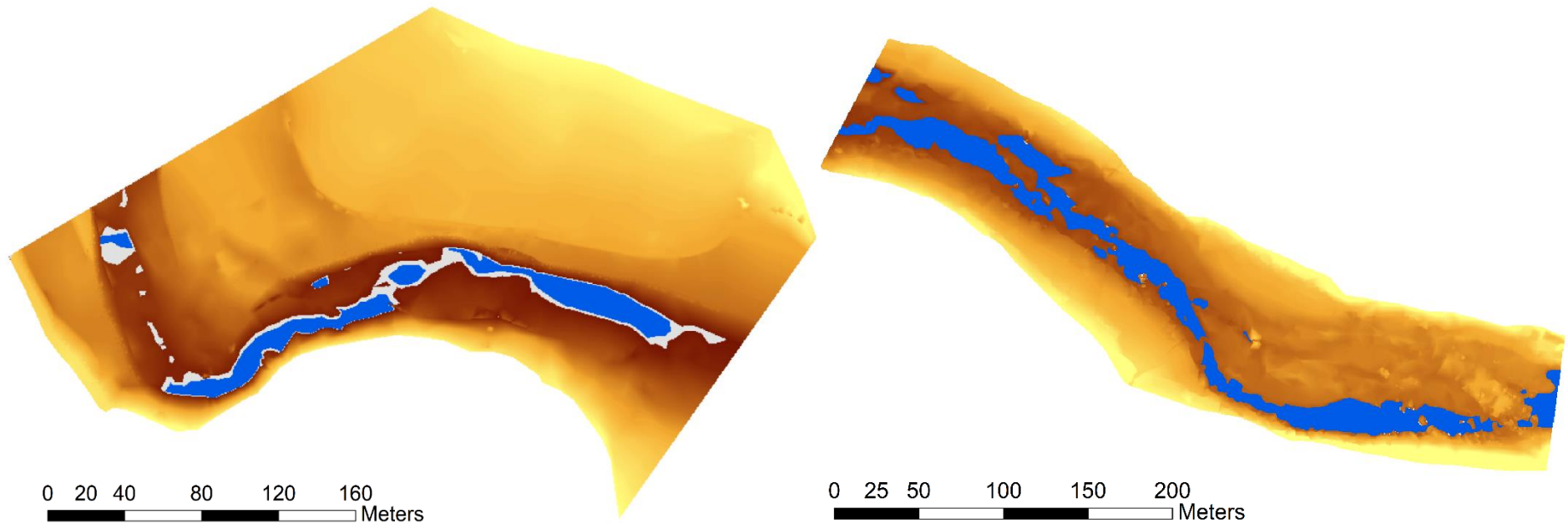
# Revegetation areas – current conditions

- Topography



# Revegetation areas – current conditions

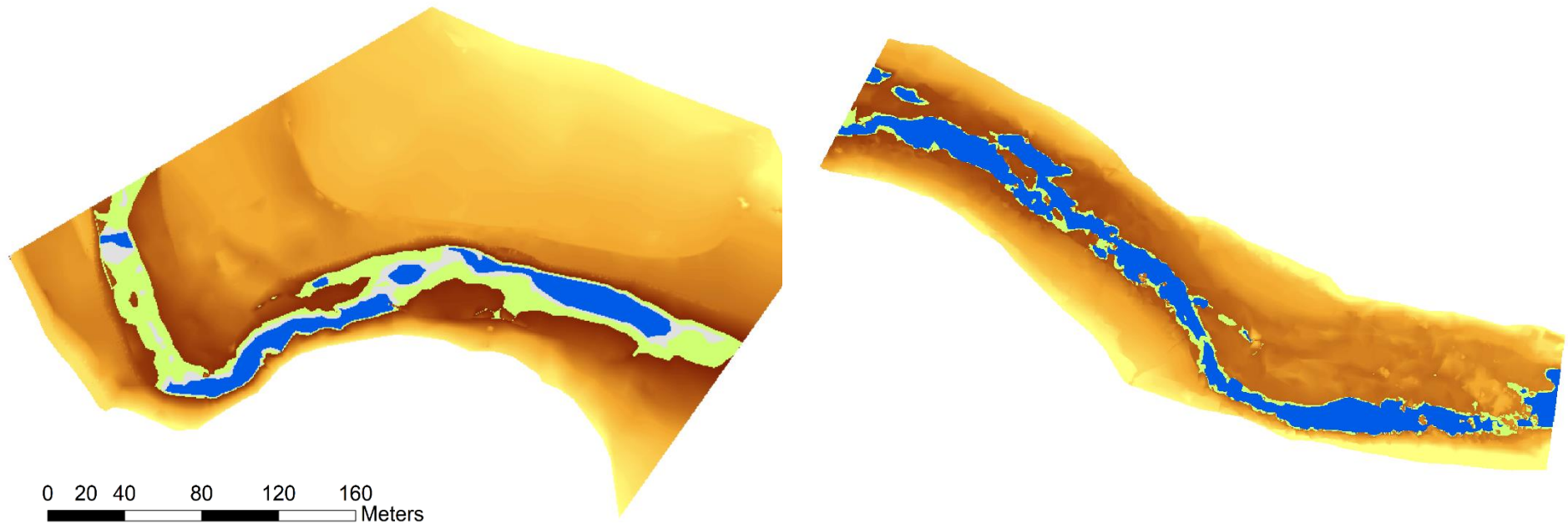
- Initial phase (IP; no suitable conditions)





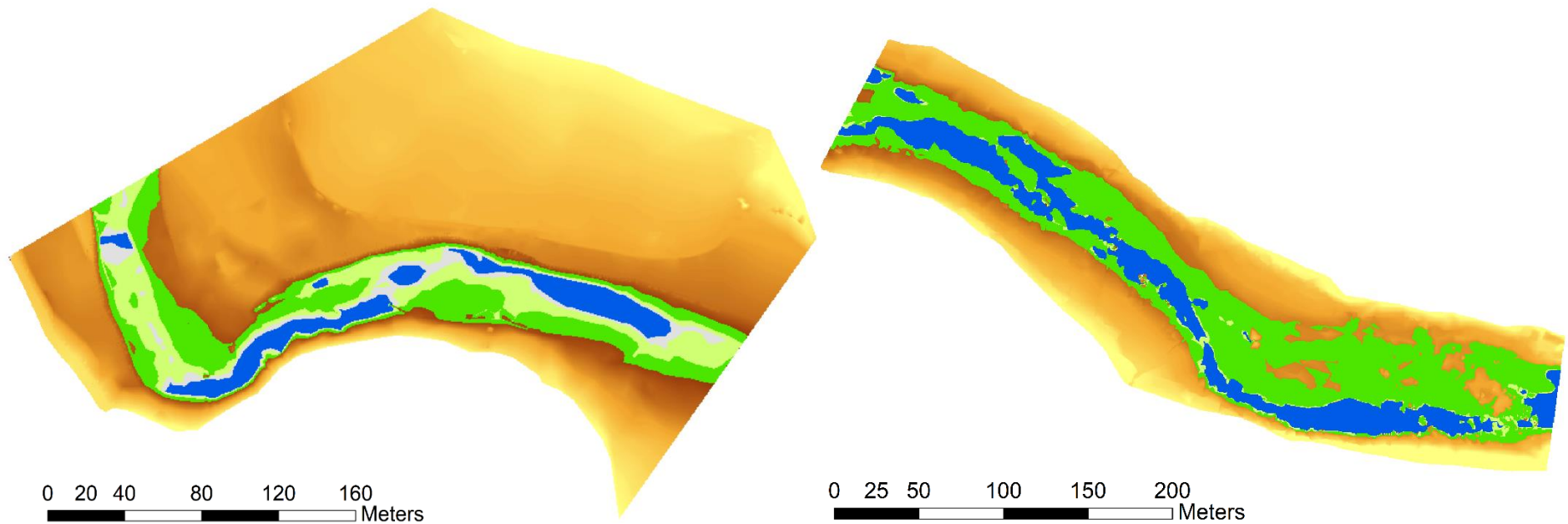
# Revegetation areas – current conditions

- Pioneer phase (PP)



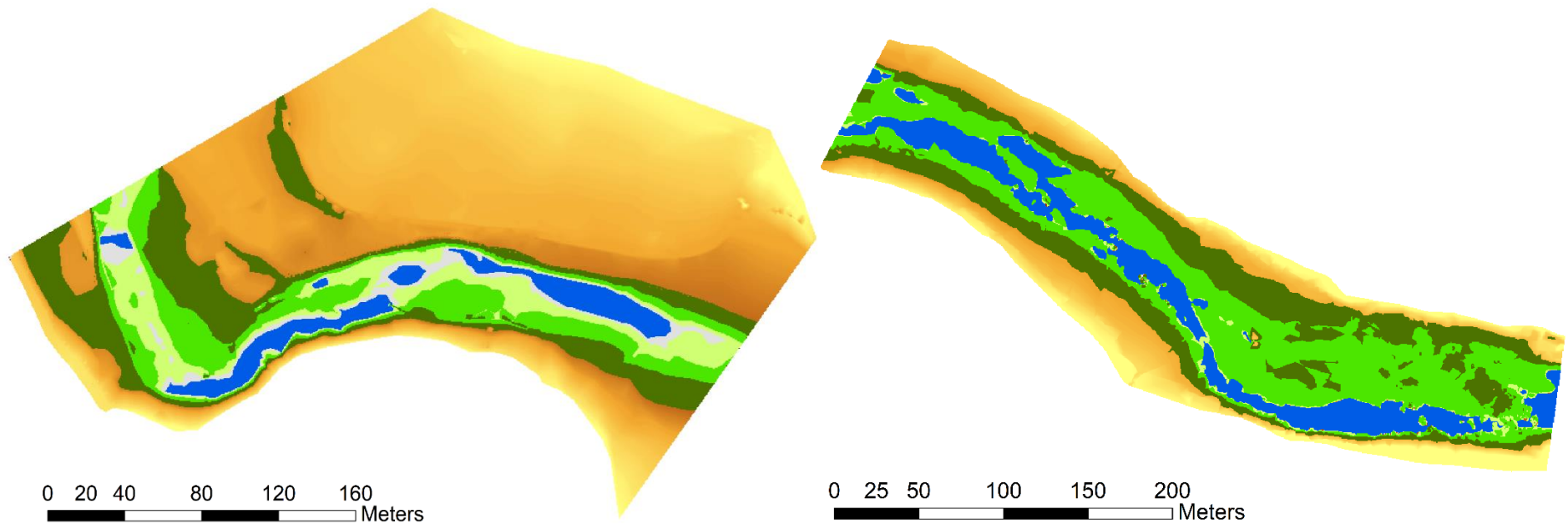
# Revegetation areas – current conditions

- Early Succession phase (ES)



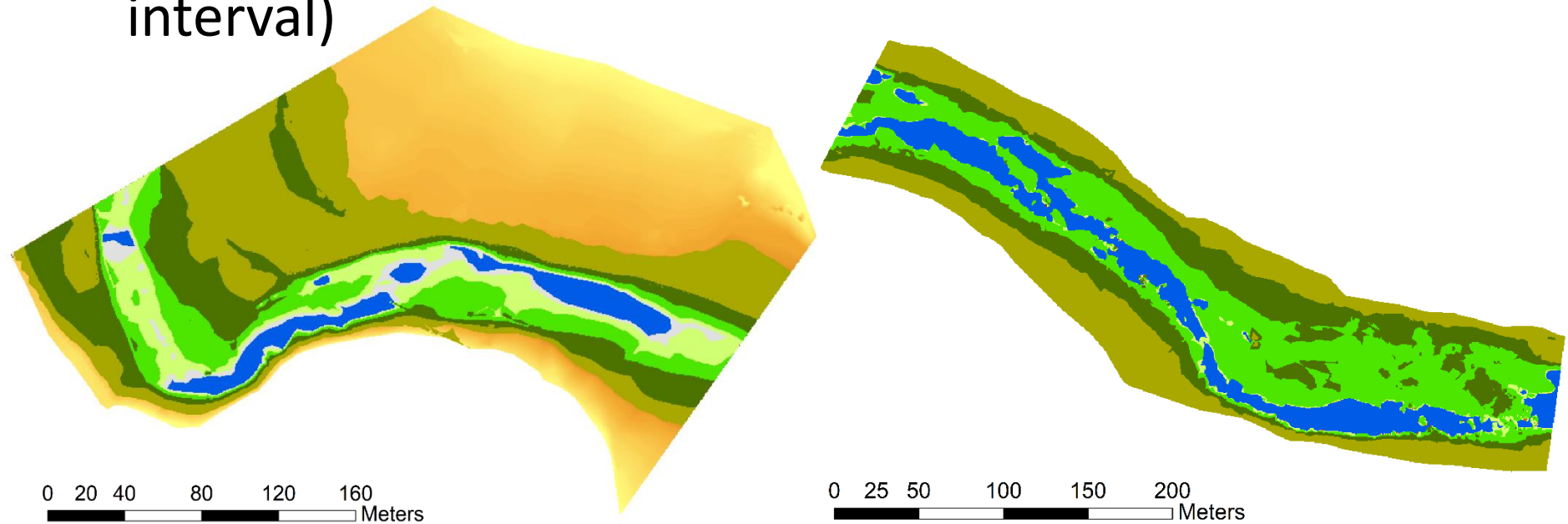
# Revegetation areas – current conditions

- Established Forest phase (EF)



# Revegetation areas – current conditions

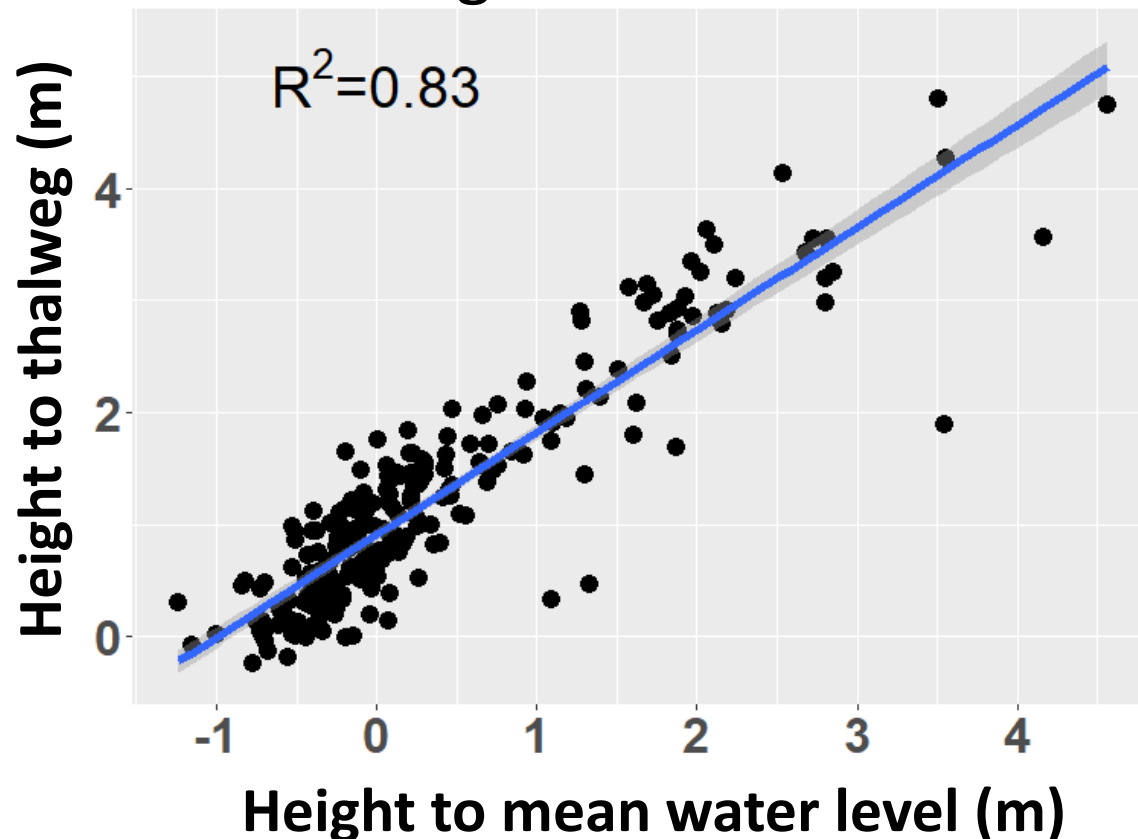
- Mature Forest phase (MF; 100 year recurrence interval)





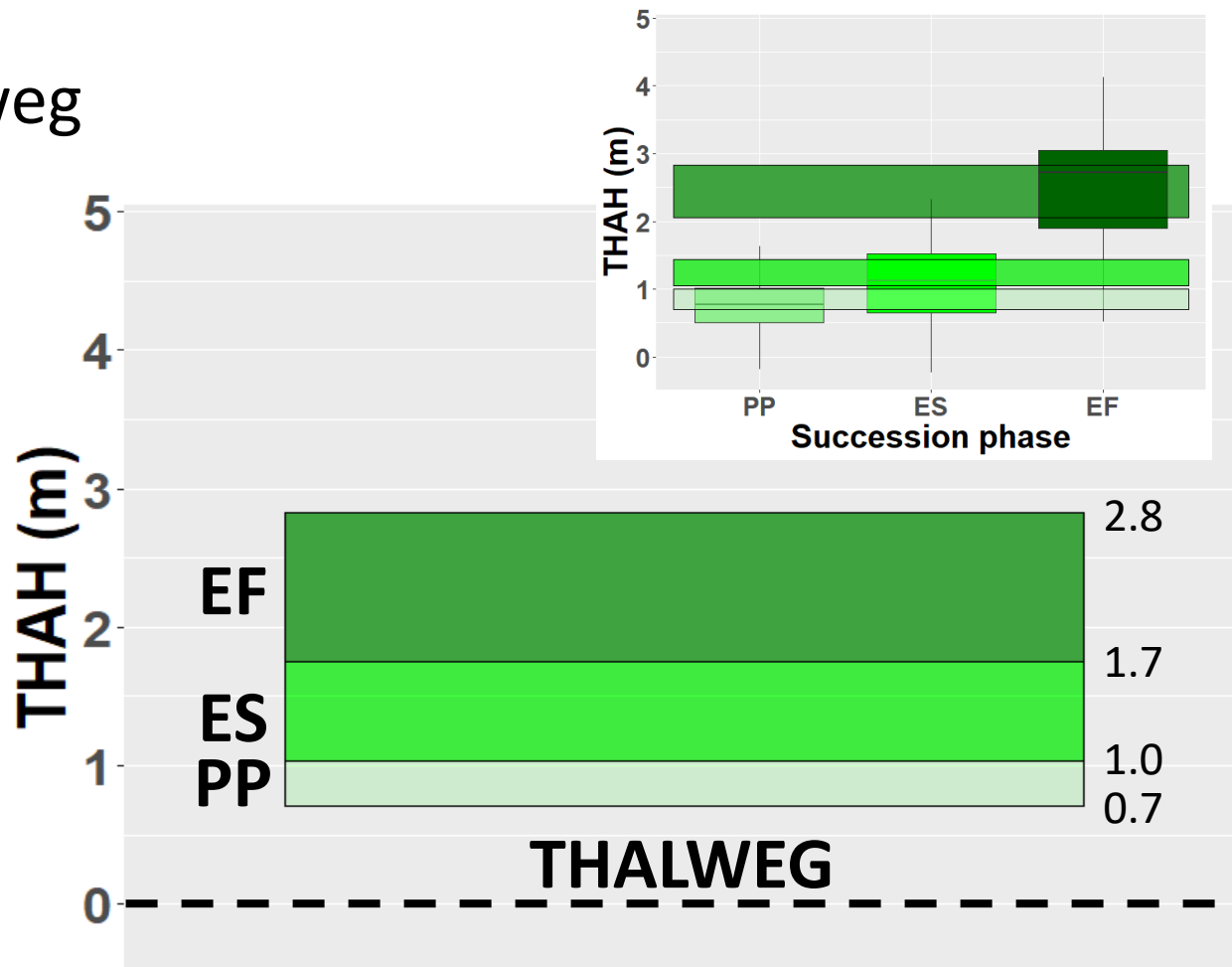
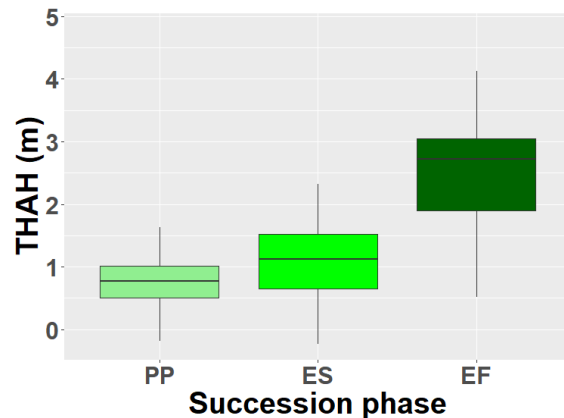
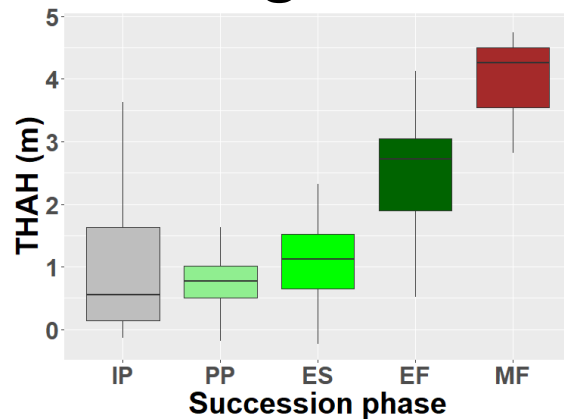
# Expeditious approach

- Height above thalweg



# Riparian bands

- Height to thalweg



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*Riparian forest Values and Ecosystem services in uncertain freshwater futures and Altered Landscapes*

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Thank you!

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