Drivers and functions of instream vegetation in urbanised streams

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Enhancing Life and Liveability

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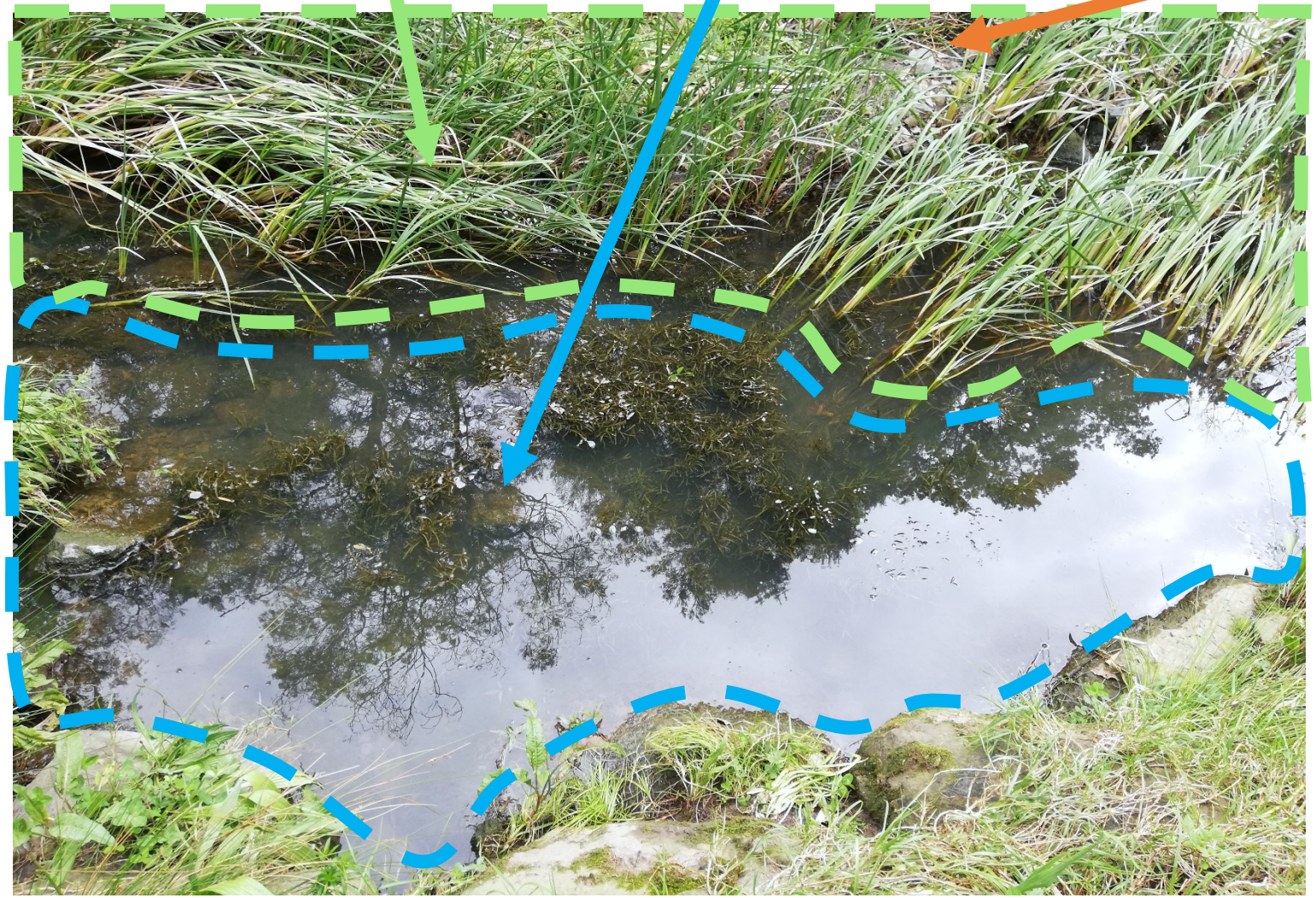
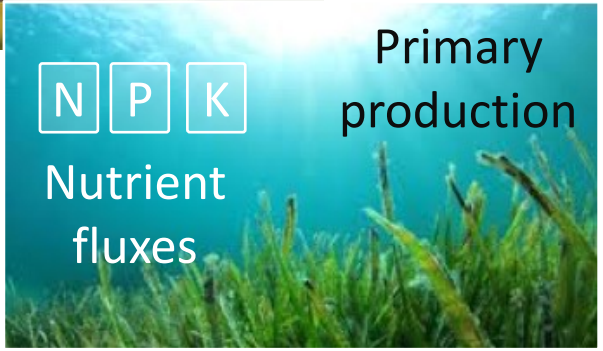
Instream vegetation

Amphibious

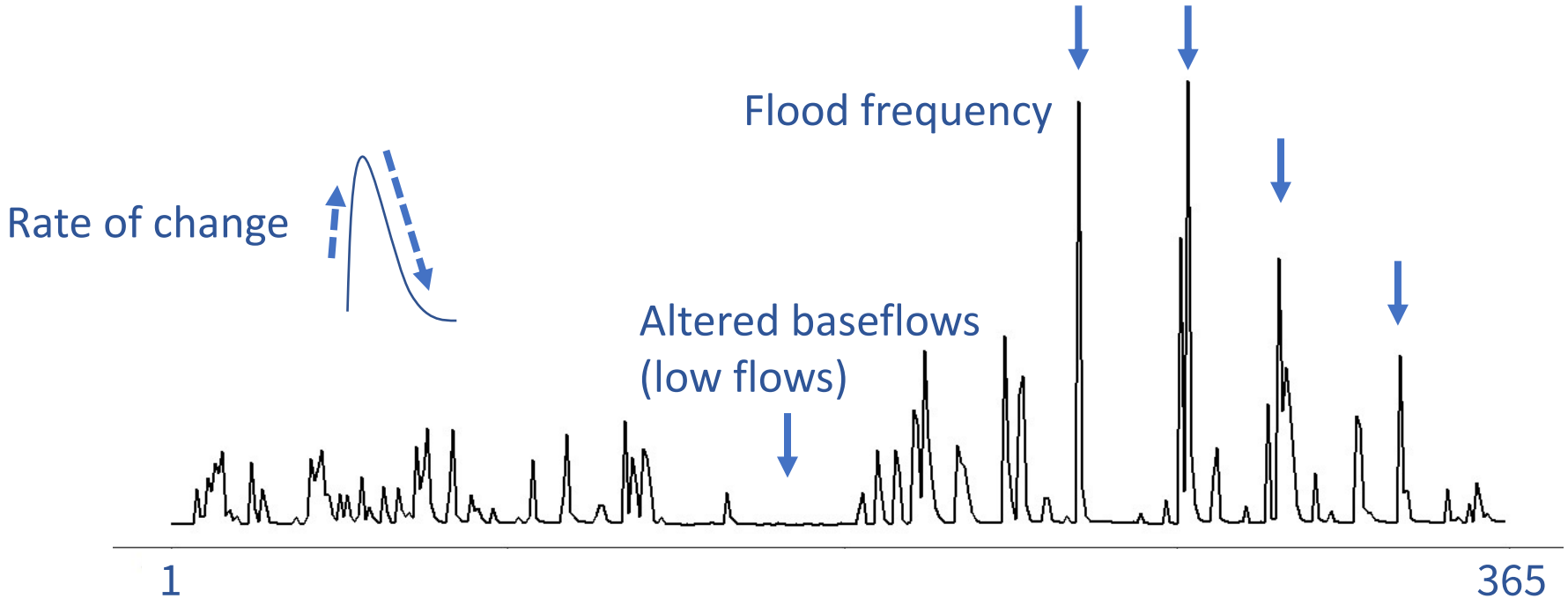
Aquatic

Terrestrial





Urban flow regime



Urban ('flashy') flow regimes

Geomorphic complexity

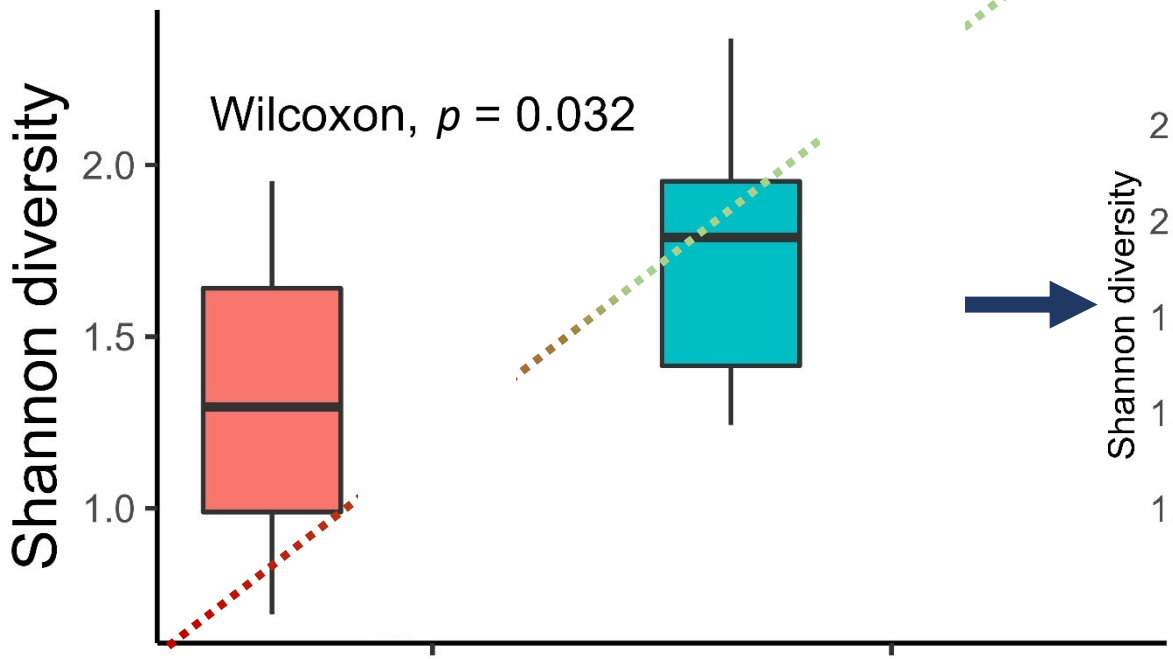
Complex

Simplified

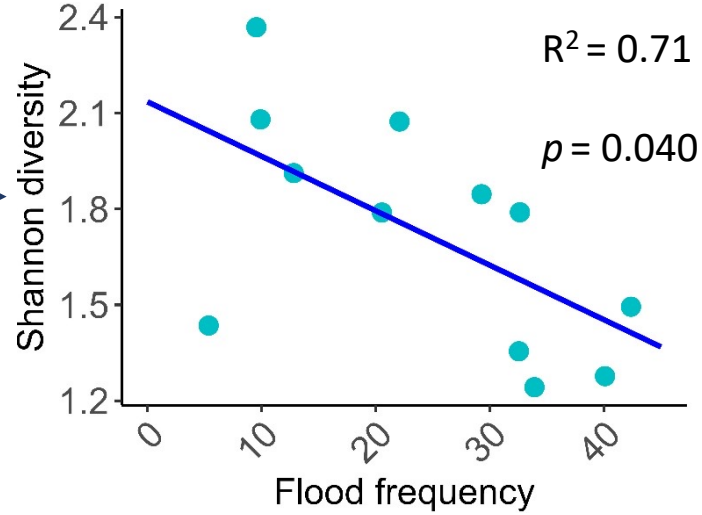
Rural Peri-urban Urban

Flashy flows reduce benefits of complexity

Best outcome



Worst outcome

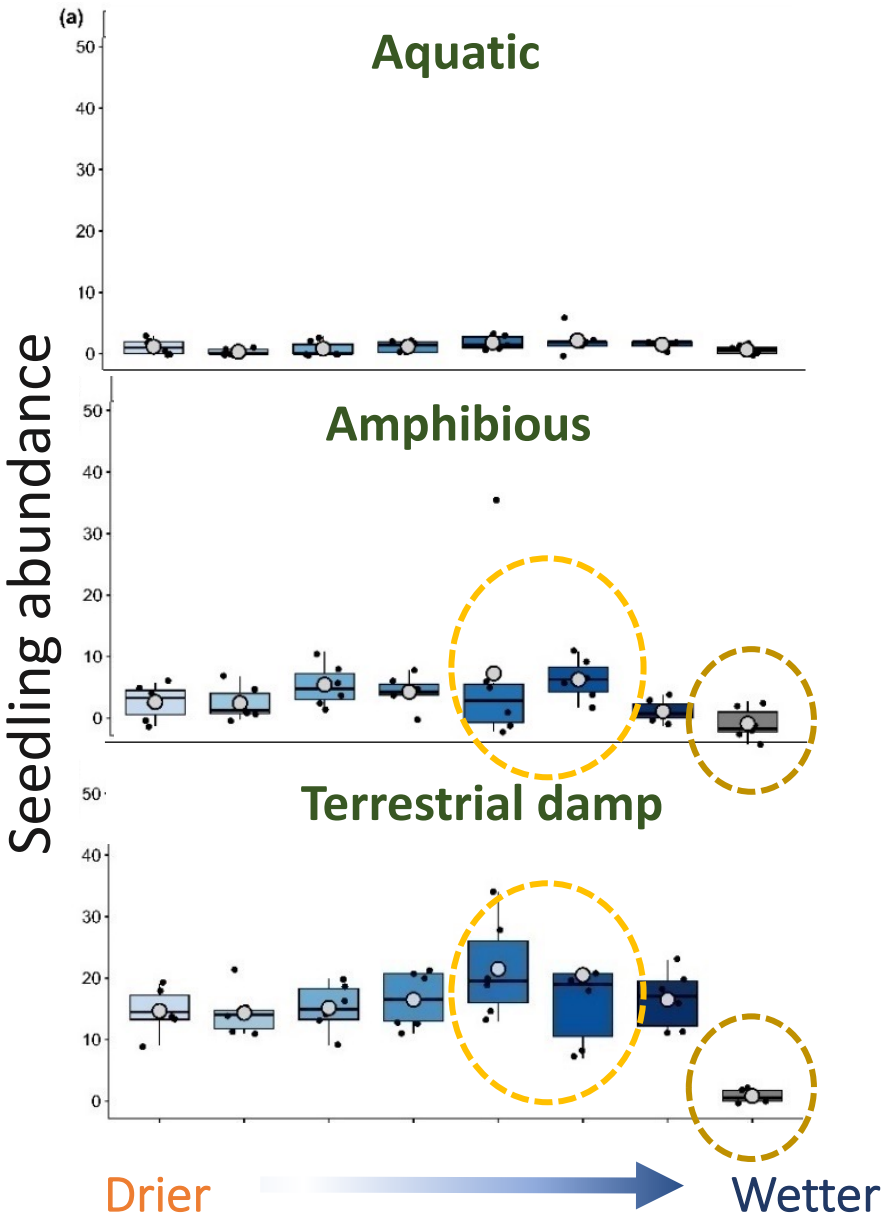


Geomorphology Simplified Complex # of floods 10 20 30 40

Early plant recruitment improves with more natural flows (minimally)

- Propagule banks samples
- 8 flow regimes – 2 flood/3 low flow durations
- + flooded/dry
- Repeated for 3 months

Early plant recruitment improves with more natural flows (minimally)



- Seven day flood + 14 or 21 day low flow (GLMs)
- Permanent flooding = least richness/abundance

Effect sizes minimal

Some low flows required for recruitment

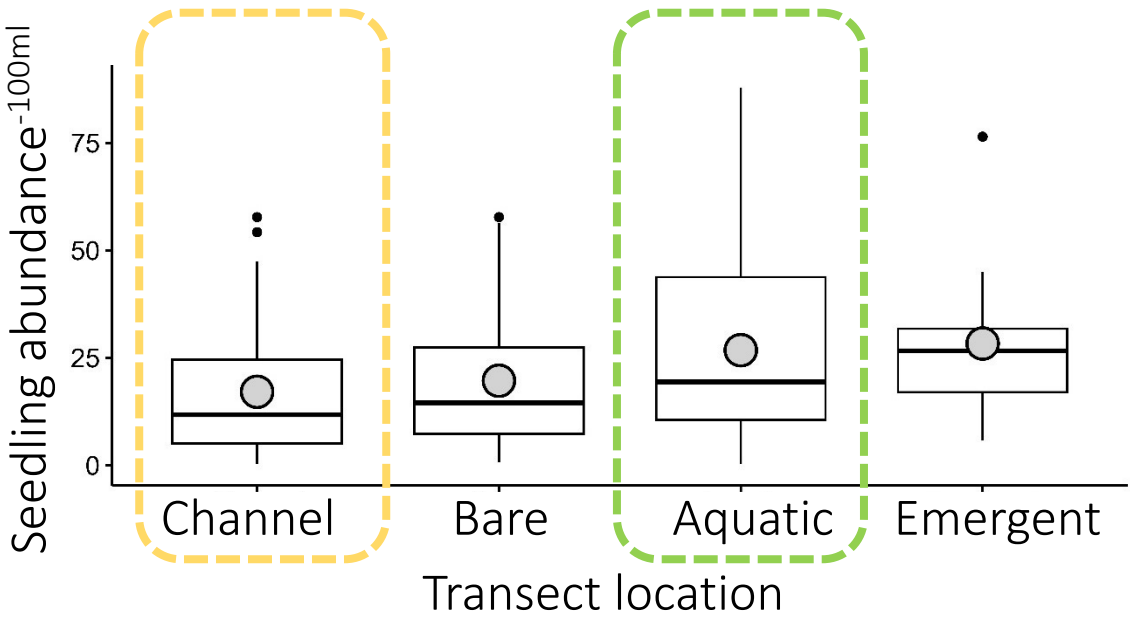
Aquatic species are important ecosystem engineers

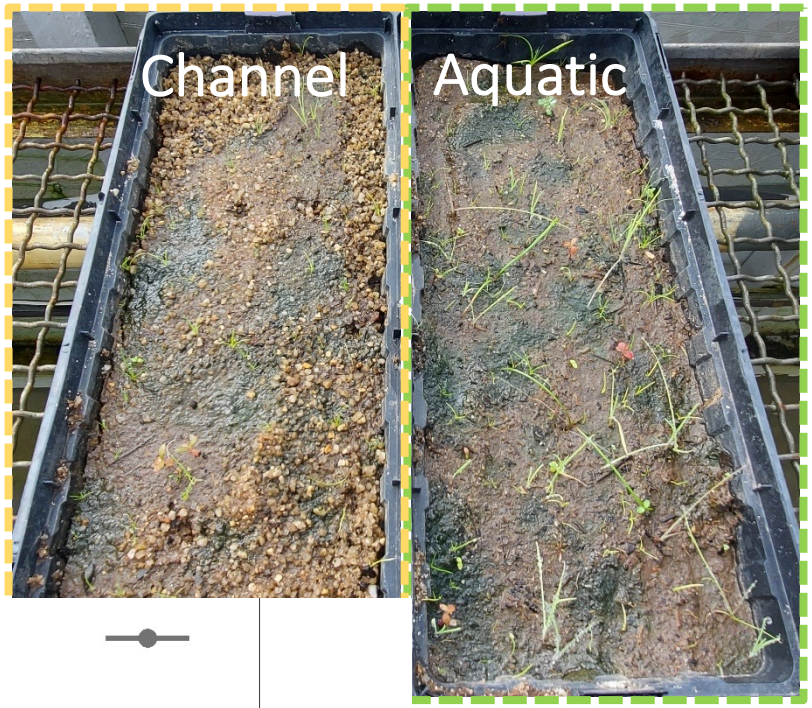
Gurnell et al., 2012

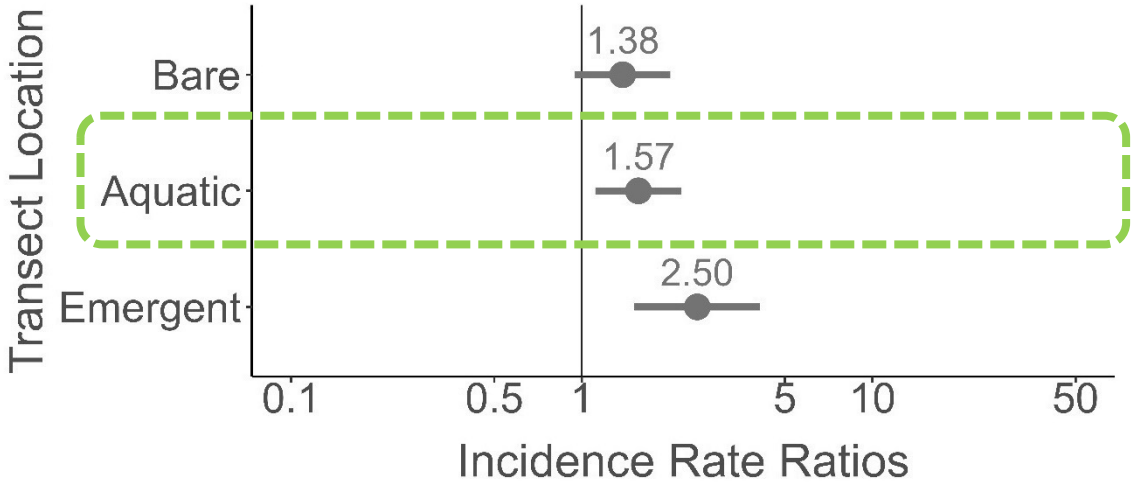

Gurnell et al., 2012

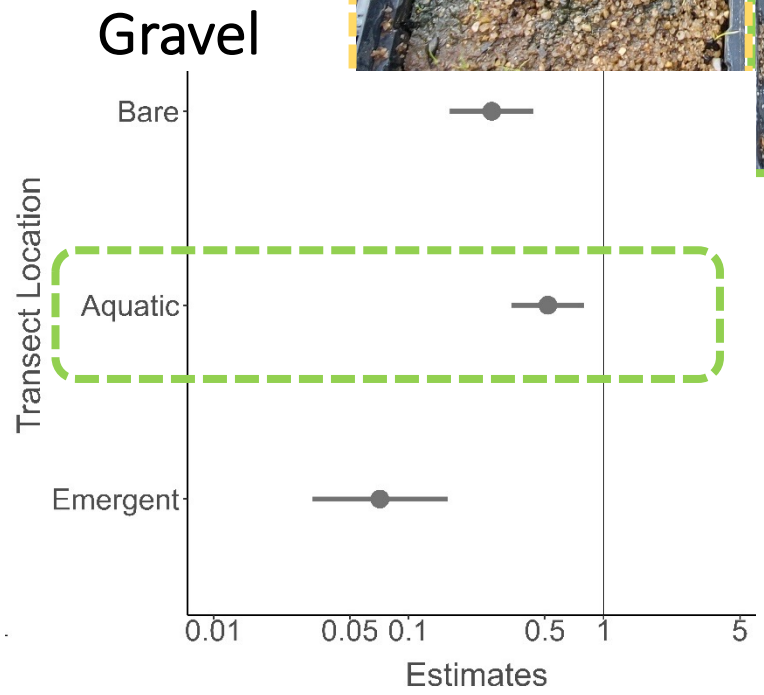
Emergent **Aquatic** **Channel** **Bare**

Aquatic species are important ecosystem engineers



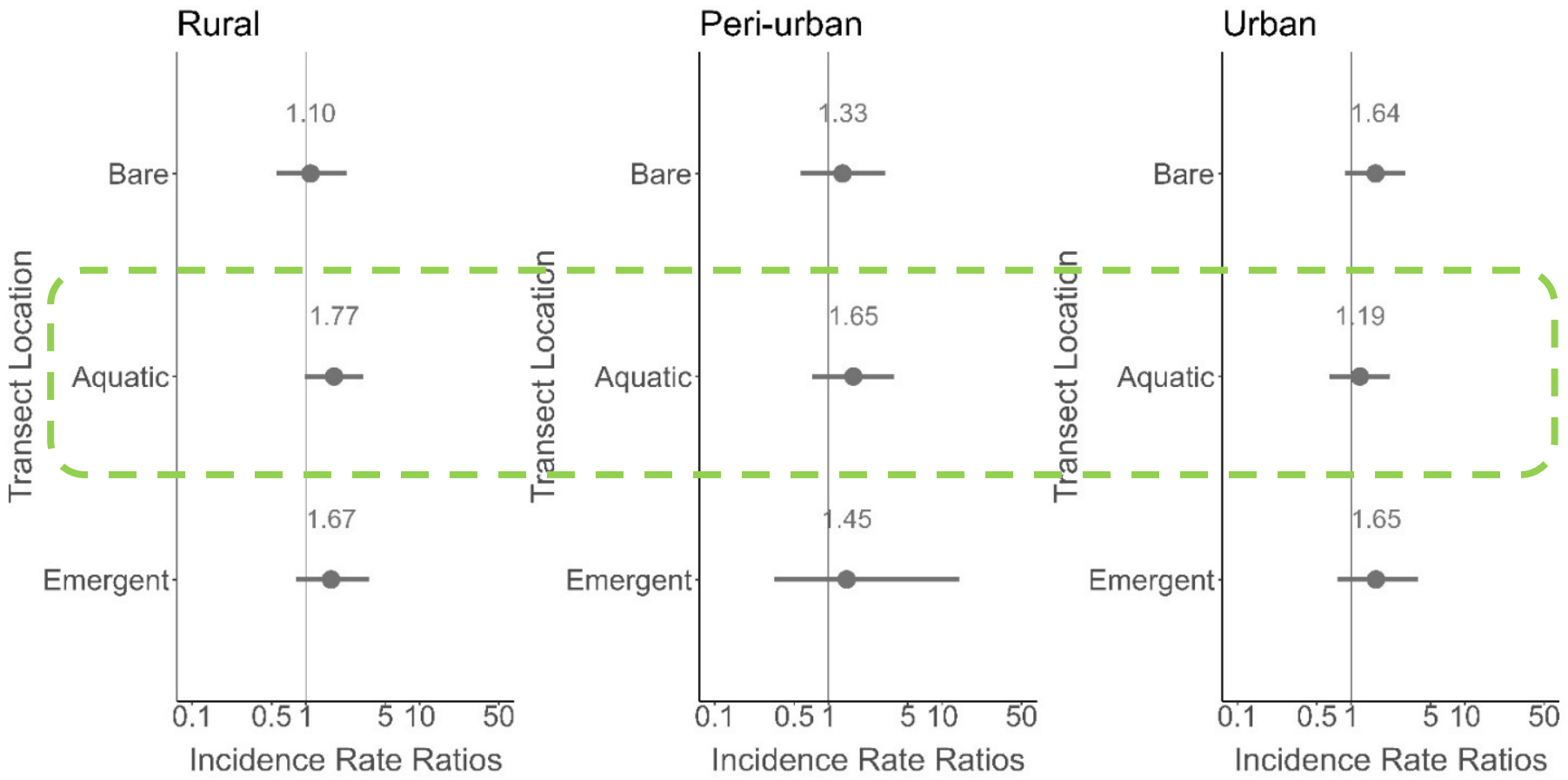






Aquatic species are important ecosystem engineers

Seedling abundance



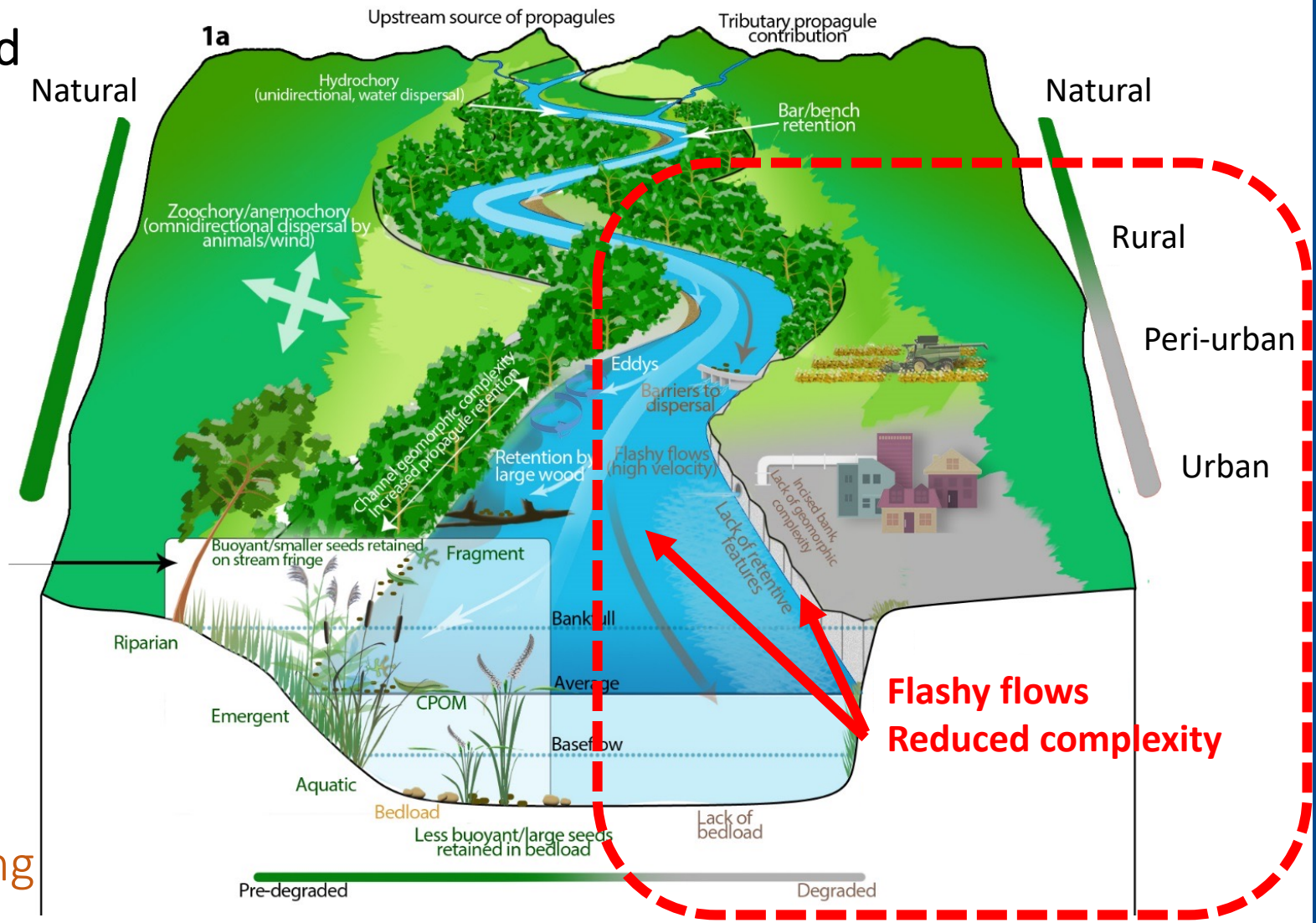
Conclusions

Urban flow regimes heavily influence instream vegetation (and geomorphology)

Geomorphic complexity also influences instream veg.

Urbanising catchments likely to suffer same fate as urban:

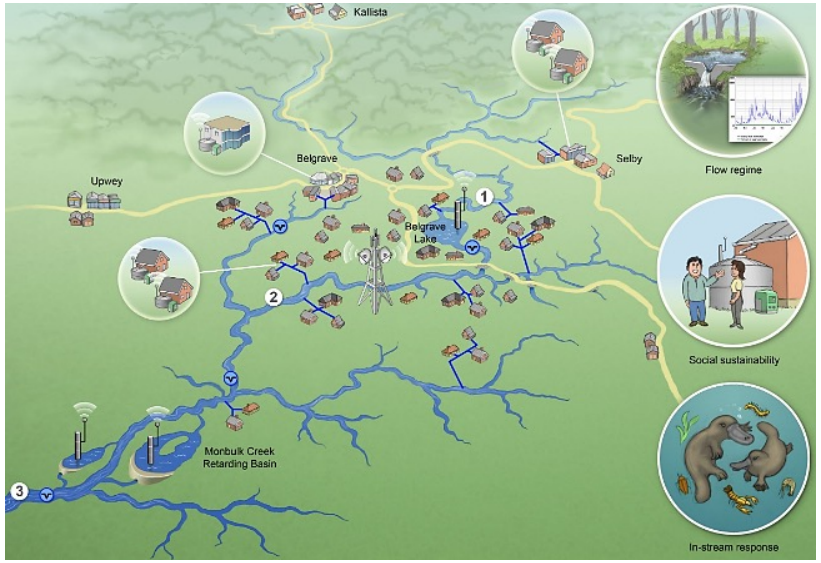
- Lack of recruitment
- Reduced diversity and cover
- Altered biogeomorphic processes and propagule trapping

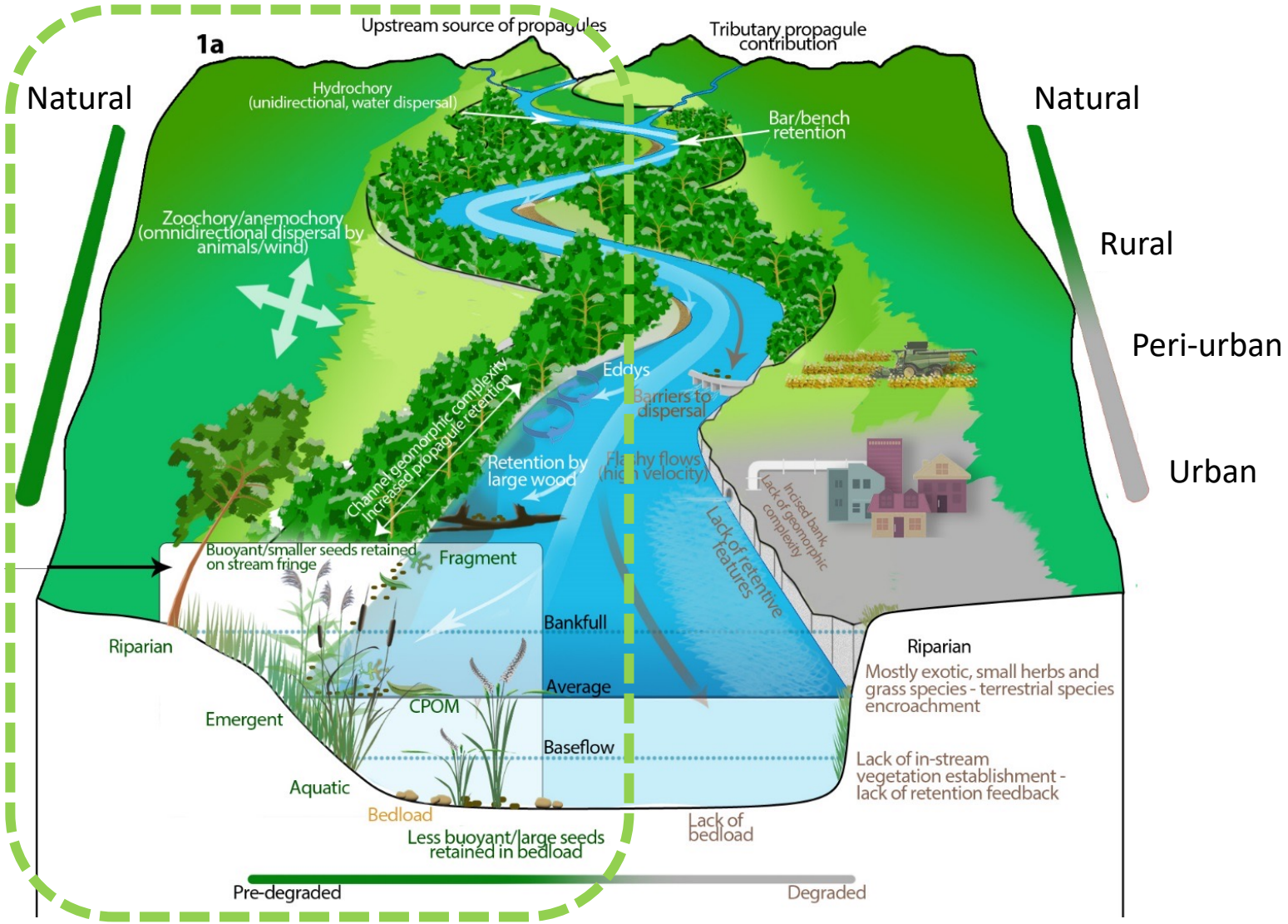


Conclusions: management

Improvements to instream complexity will likely improve instream vegetation

But only if the flow regime is improved/protected – WSUD





Questions?

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