

Proposal Jpower TKI Ecology

Ideas posted in TKI proposal

2 ideas:

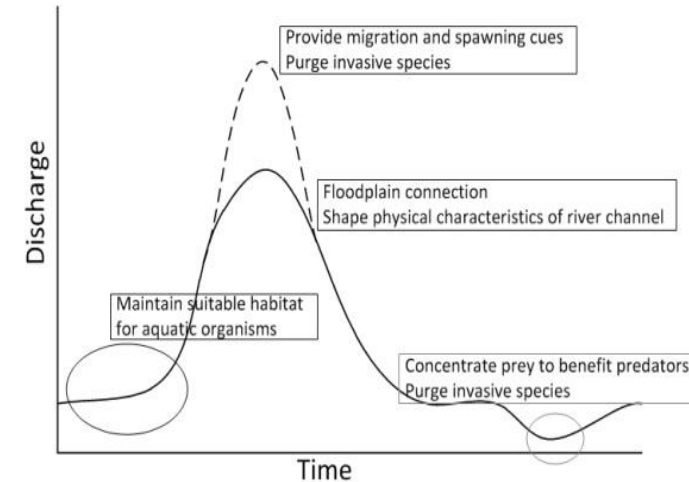
1. Connecting species (fish!) habitat to specific components of the flow requirement, trying to provide mechanistical explanation
2. Not species, but trait based: more generic, but also more mechanistical

- With a more thorough literature scan, those two ideas are closely linked
- In line with environmental flow developments in literature

Environmental flows

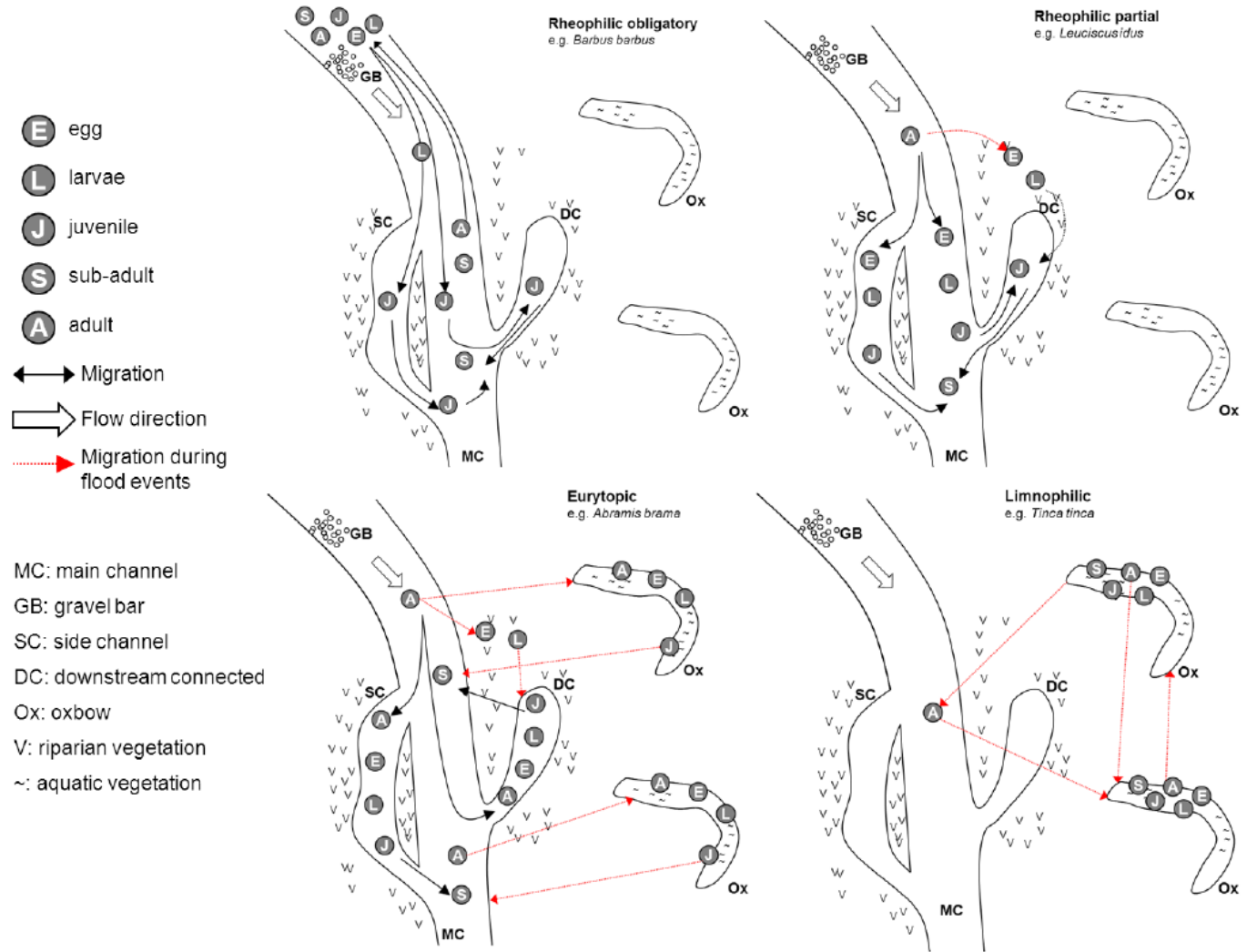
Natural flow regimes have shaped their biotic community

- Aspects of a river's flow regime are meaningful to species
- Artificial changes in a river's flow regime can impact a species success in that river
- 'Normal' e-flow approach used to be to use historical flow regime records to construct/advise a specific e-flow
- In recent literature warnings are posted that climate change can also have impacts on a river's flow regime, which has consequences for e-flow advise: look at how dynamics of flows impact habitats of species in consecutive years



Year to year flows

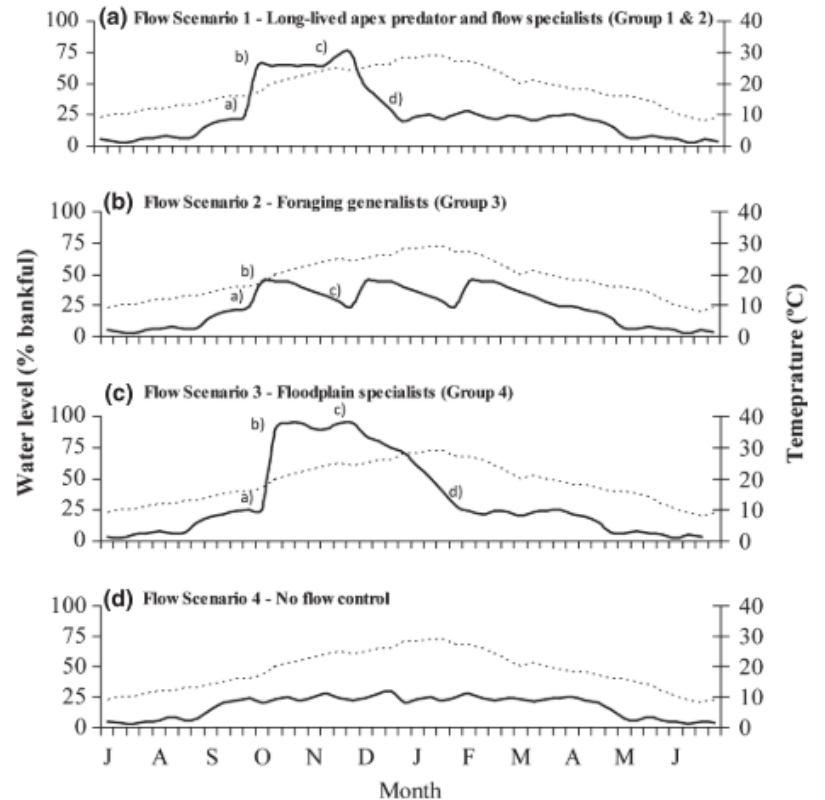
- Changes between years in regard to available habitats
- Changes in connection between available habitats
- Depends on the species



Guilds of fish species

Several different species arrangements possible, for example

- Long-lived apex predators
 - No spawning cue
 - Increased flow could contribute to more spawning habitat
 - Because of longevity, annual spawning and recruiting not required
- Flow dependent specialists
 - Flood pulses are required for a spawning response
 - Migration may be flow dependent
- Foraging generalists
 - Generally resilient to prolonged low flow conditions
 - Relative flexible spawning and recruitment strategies (seems temperature dependent)
 - Spawning more than once each year: small-scale watering events may be beneficial
- Floodplain specialists
 - Mostly short-lived (up to ten years), so regular connection to floodplains required (2 to 3 times per decade)
 - Dispersal between floodplain habitats (and thus along channel habitats) is an essential life history strategy.



How does JPower fit in?

- Applying the 'guild' approach to whole of the lower stretch, for several years
 - Gives insight in the usability of this approach for habitat modelling in general
 - Gives insight how year-to-year changes may facilitate the different guilds
- Translating the Ayu fish knowledge rules into environmental flow aspects: adding time component explicitly
 - Finding out how this works
 - Can we fit Ayu fish into guilds generally described in literature?

Parts of the project

- Identification which species are to be expected in the Tenryuu river (IUCN database)
- What guild approach seems best suitable (literature scan)
- Translation of guilds to knowledge rules
- Run several scenario's within Habitat

- Translate Ayu fish knowledge rules to e-flow aspects
- Run several scenario's and compare with previous work

- Compare guild results and Ayu fish results to come up with findings of suitability of using guilds and e-flow explicitly