

Flow Discontinuities and their Effects on Ecosystem Stability

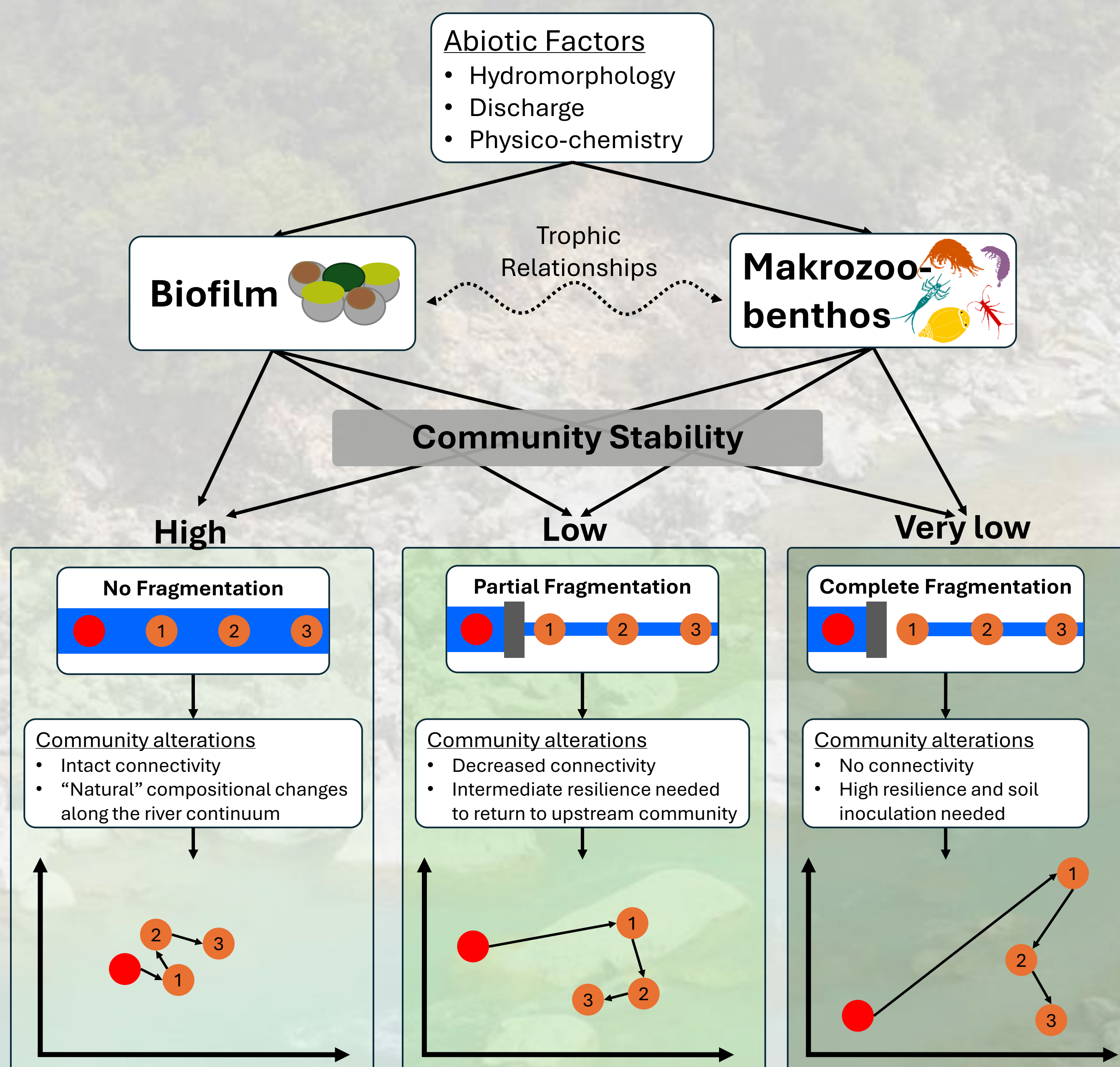
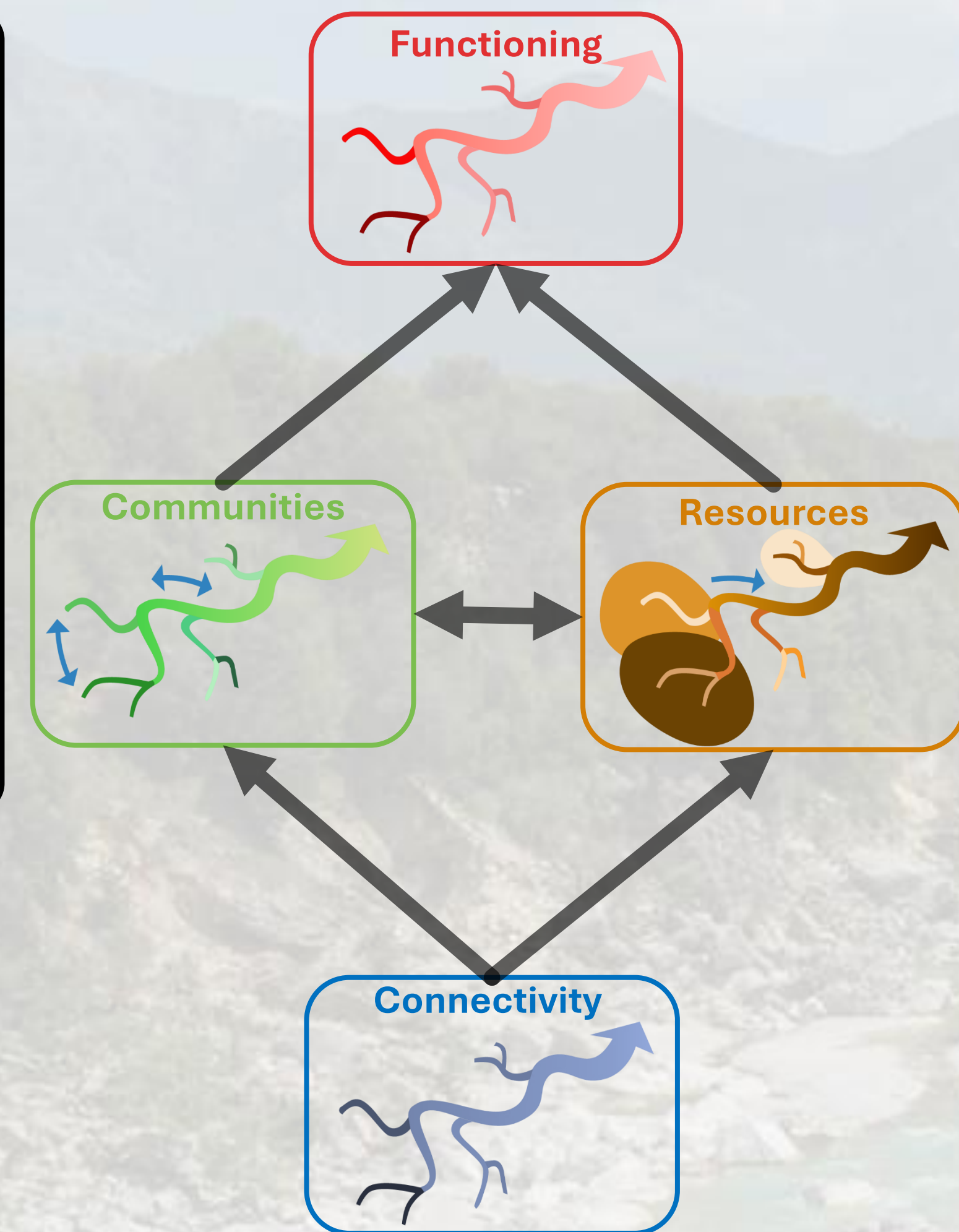
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Why investigate flow discontinuities?

Unaltered river networks are characterized by intact hydromorphology and unhindered directional water flow. These conditions sustain dynamic ecosystems that support high biodiversity, which maintains stable ecosystem functioning.

However, this vital connectivity is increasingly disrupted by human interventions interrupting the downstream flow of water, organisms, and resources. Such engineered discontinuities can alter communities and interfere with the biogeochemical processes that sustain river ecosystem functioning.

Understanding how fragmented river systems affect structure–function relationships is therefore essential to maintain the high biodiversity in river networks, and to predict the future functioning of freshwater ecosystems.

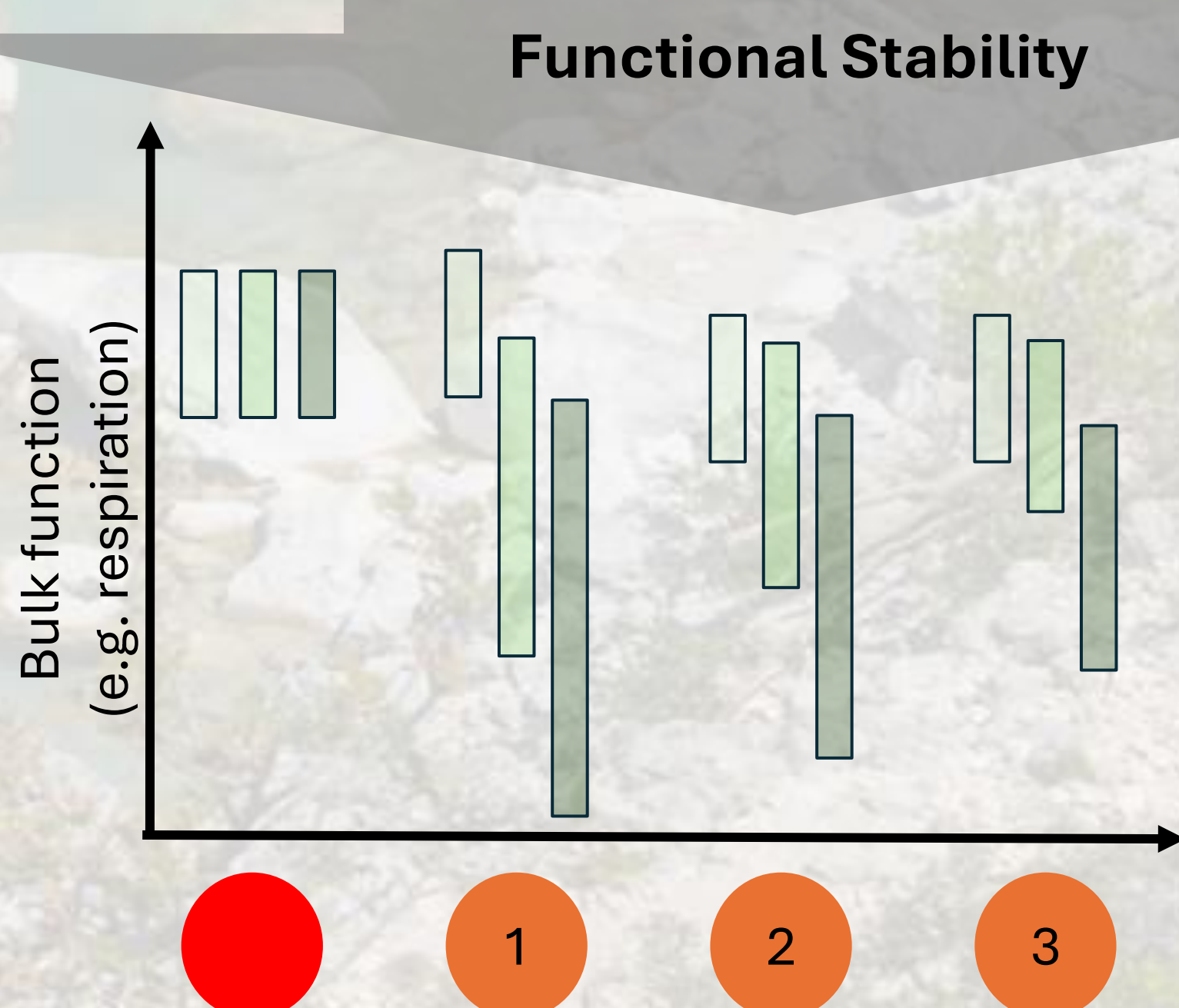


Hypothesis and expectations

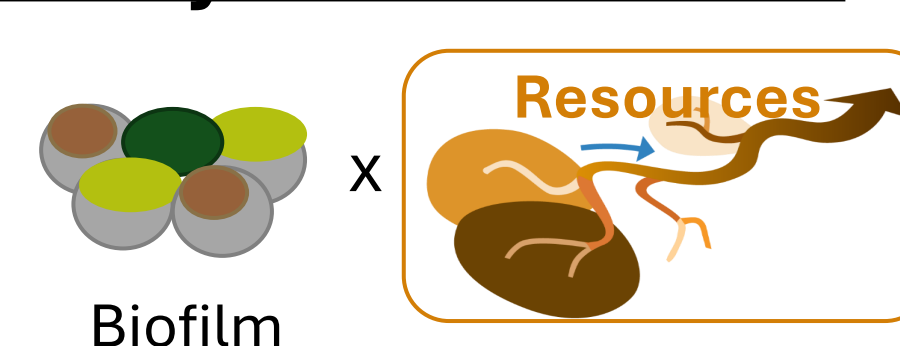
- Community stability relates to the degree of fragmentation.
- Functional stability depends non-linearly on community stability:
 - Reduced community stability cannot increase functional stability, but may maintain it through functional redundancy.
 - Higher community stability can result in either unchanged or enhanced functional stability.

Large scale consequences

- Disruptions of river connectivity may scale from local alterations in communities to cascading meta-community effects and widespread changes in ecosystem functioning.
- Reduced functional stability could impair key biogeochemical processes ultimately reducing the resilience of freshwater ecosystems.
- The cumulative impact of many small flow discontinuities may be as consequential as large dams.



Ecosystem Functions =



Functional Groups

- Passive filter feeders; Univoltine
- Shredders; Hololimnic
- Grazers/scrapers; Bivoltine
- Gatherers/collectors; Semivoltine
- Predators; Merolimnic