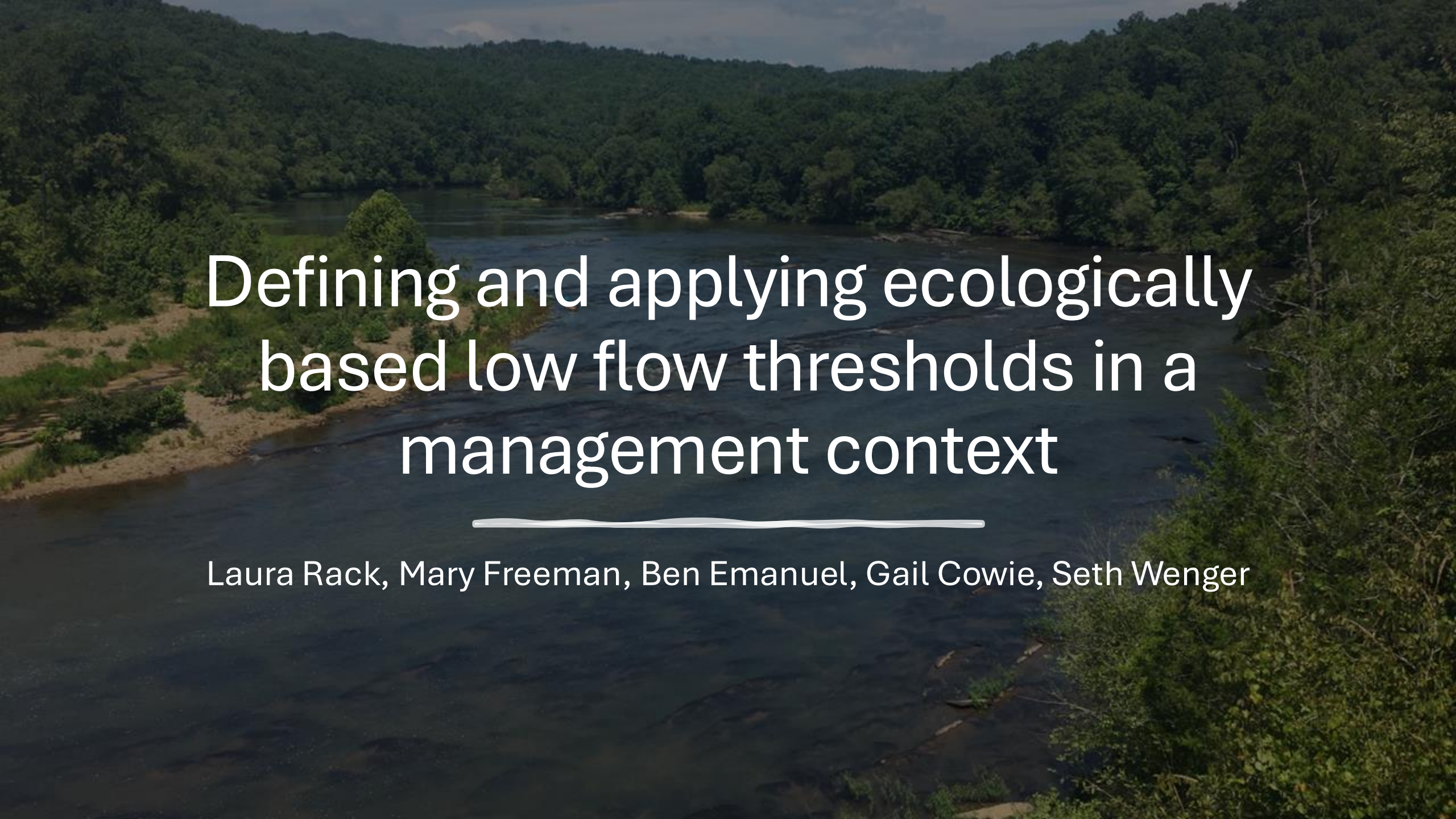

Defining and applying ecologically based low flow thresholds in a management context

Laura Rack, Mary Freeman, Ben Emanuel, Gail Cowie, Seth Wenger

Themes for integrating ecological flow thresholds for water management

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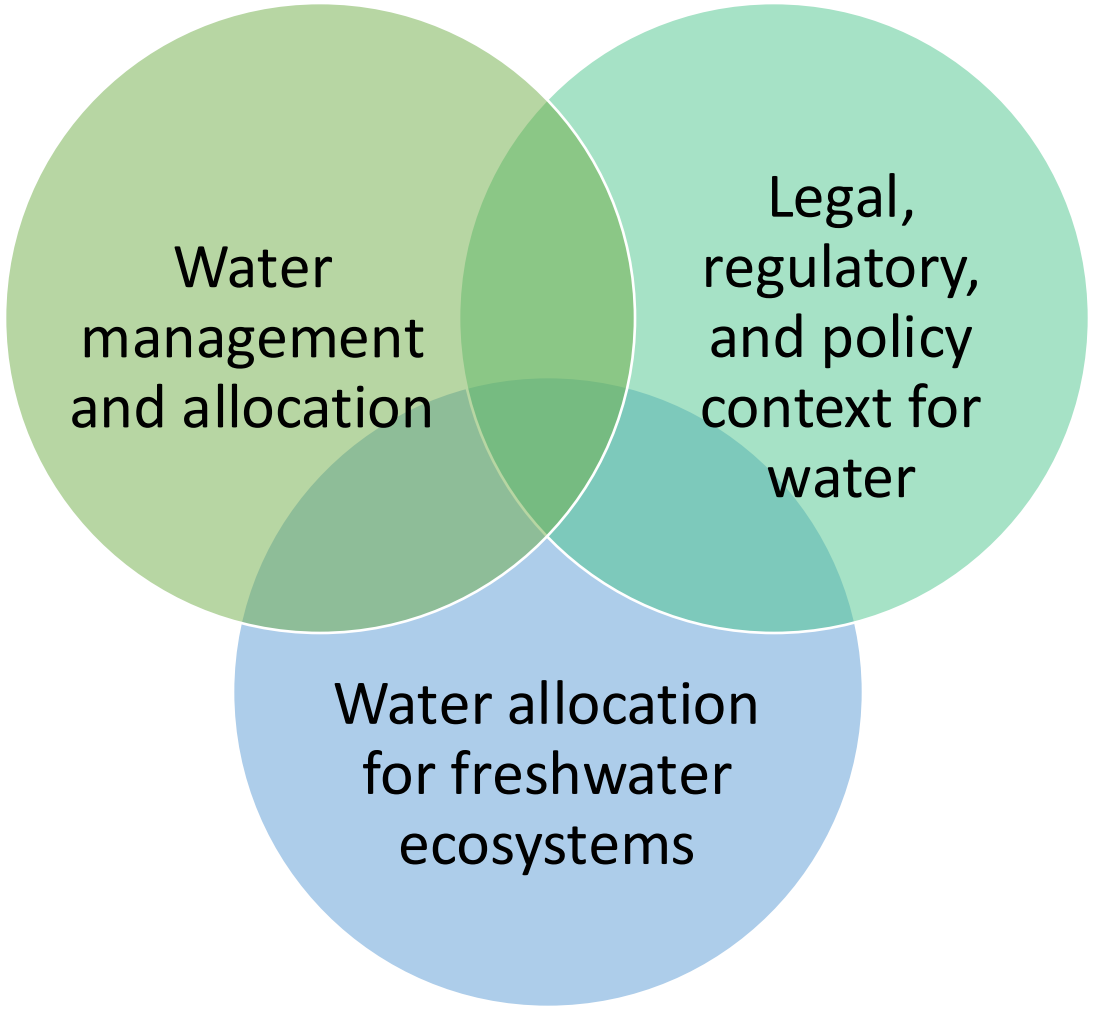
Environmental flows in the water management and regulatory space



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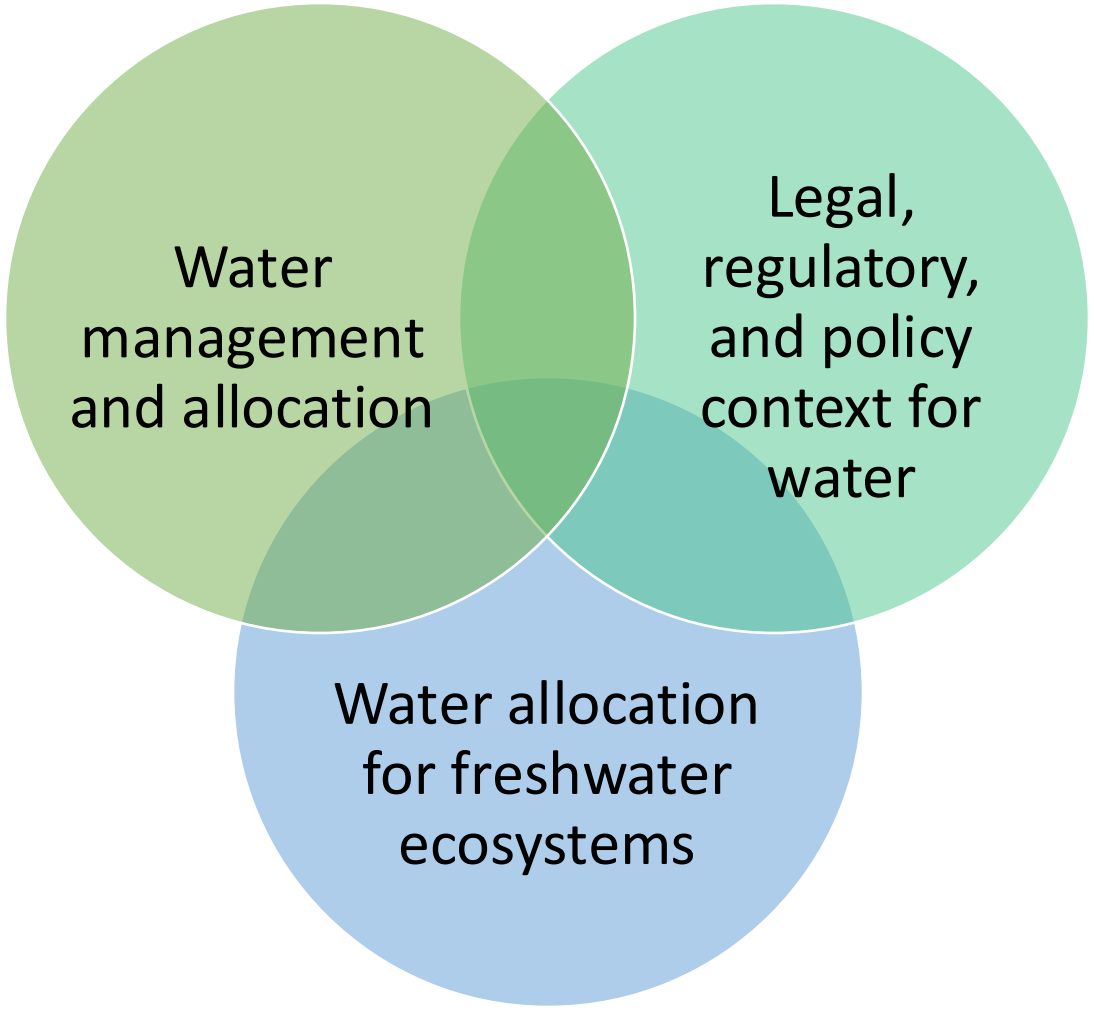
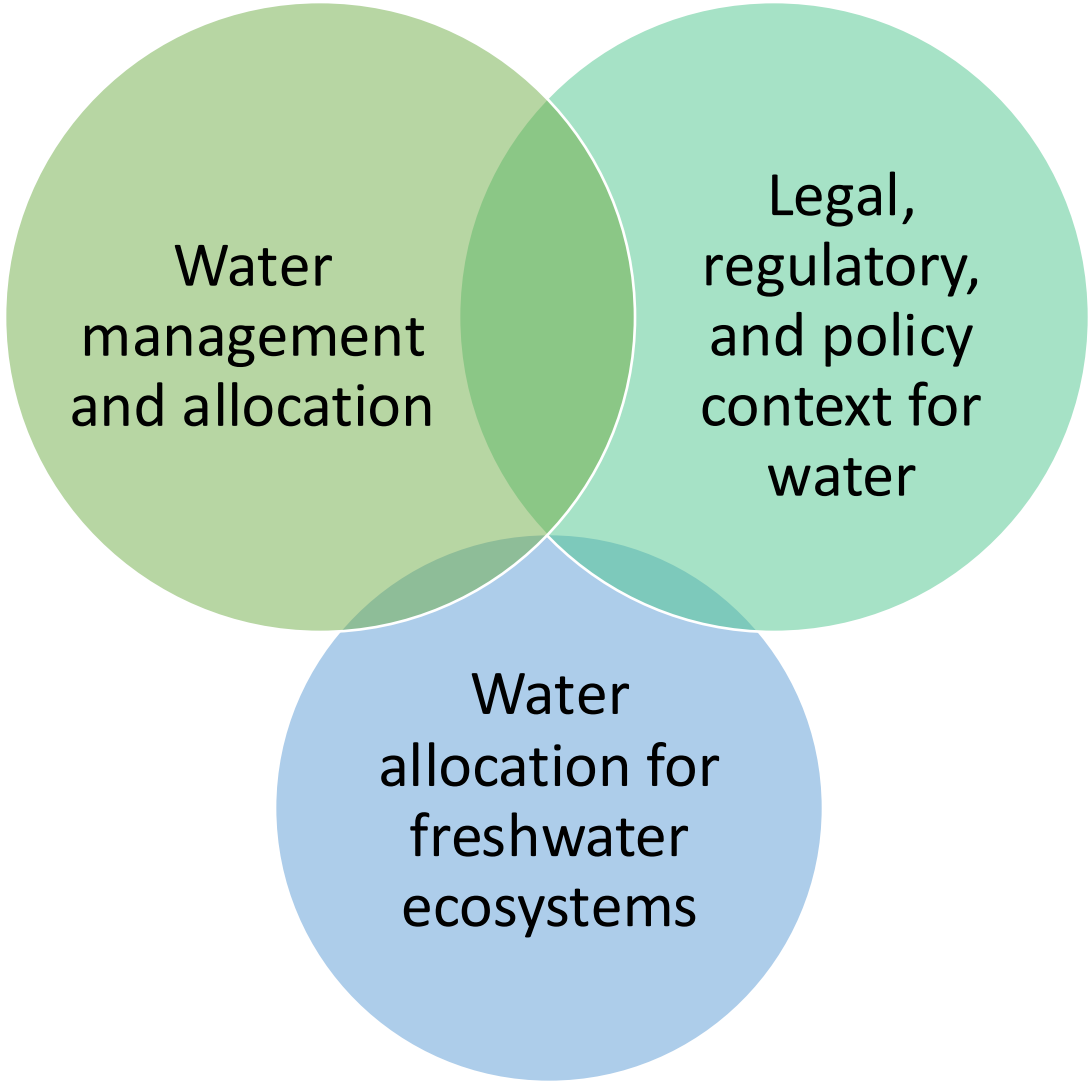
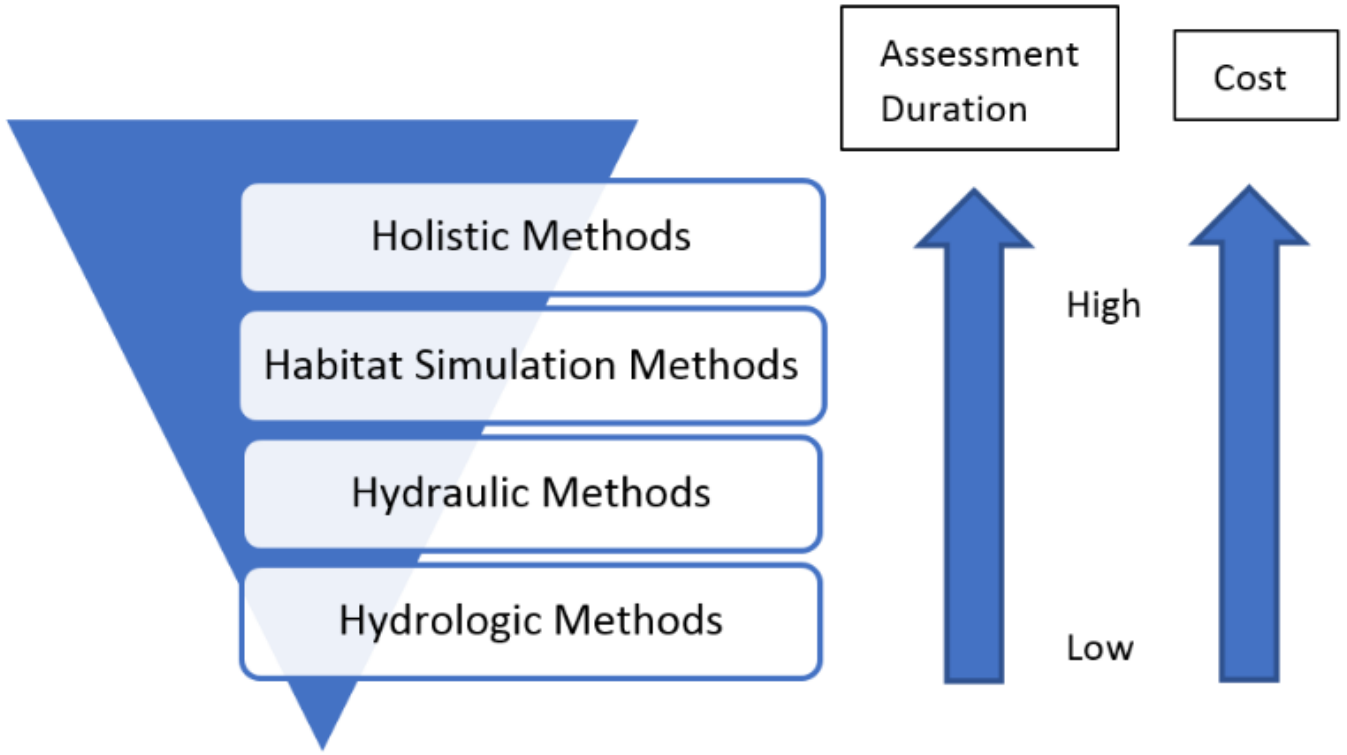




Environmental flow approaches



Arcadis. 2019. Methods for Flow Regime Evaluation Ocmulgee River, Georgia. Arcadis U.S., inc.

Functional Flows Approach

Yarnell et al. (2015)

Developed for highly regulated rivers, where returning to the natural flow regime was not feasible

Identified a few dimensions of the natural flow regime that we can tie to support of riverine ecosystems

Provided a practicable number of metrics for water planning

Functional Flow	Description
Channel maintenance flows	Maintain the dynamic **erosional and depositional forces** that shape channel form and aquatic habitats

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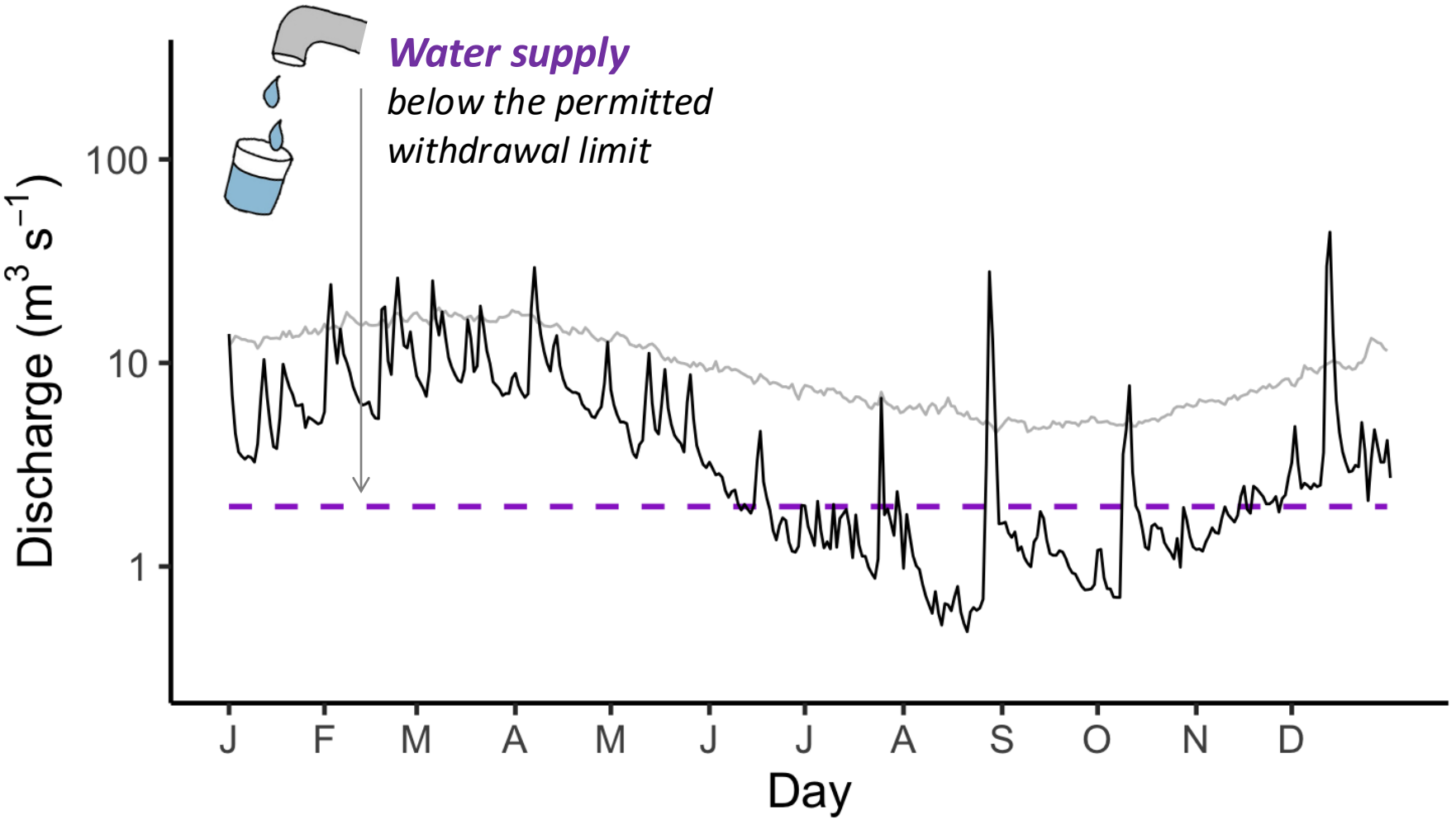
Dry season baseflows	Maintain **habitat connectivity and conditions for the survival** of aquatic organisms during seasonal low-flows

Evaluating river ecosystem needs alongside other water uses



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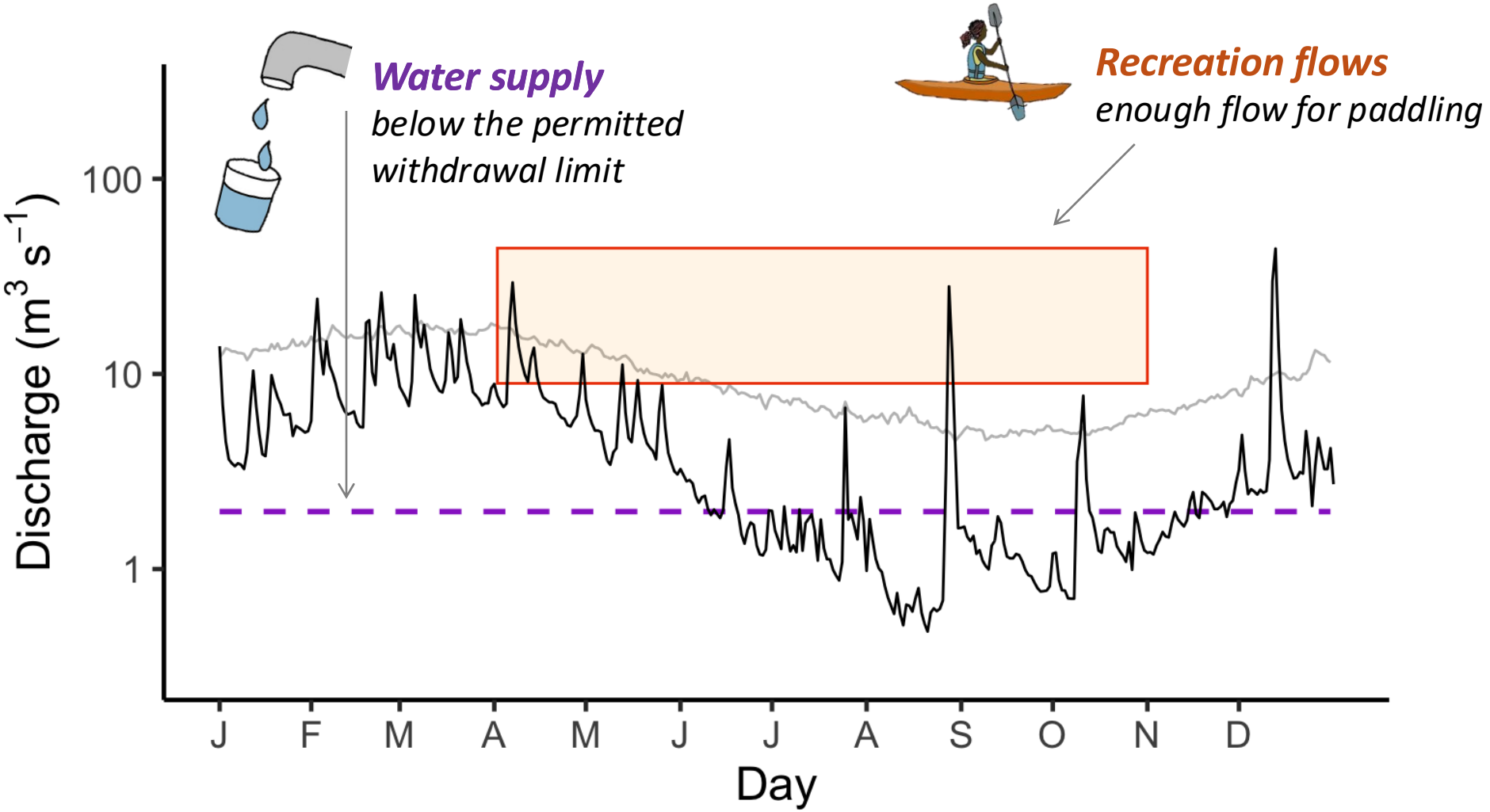

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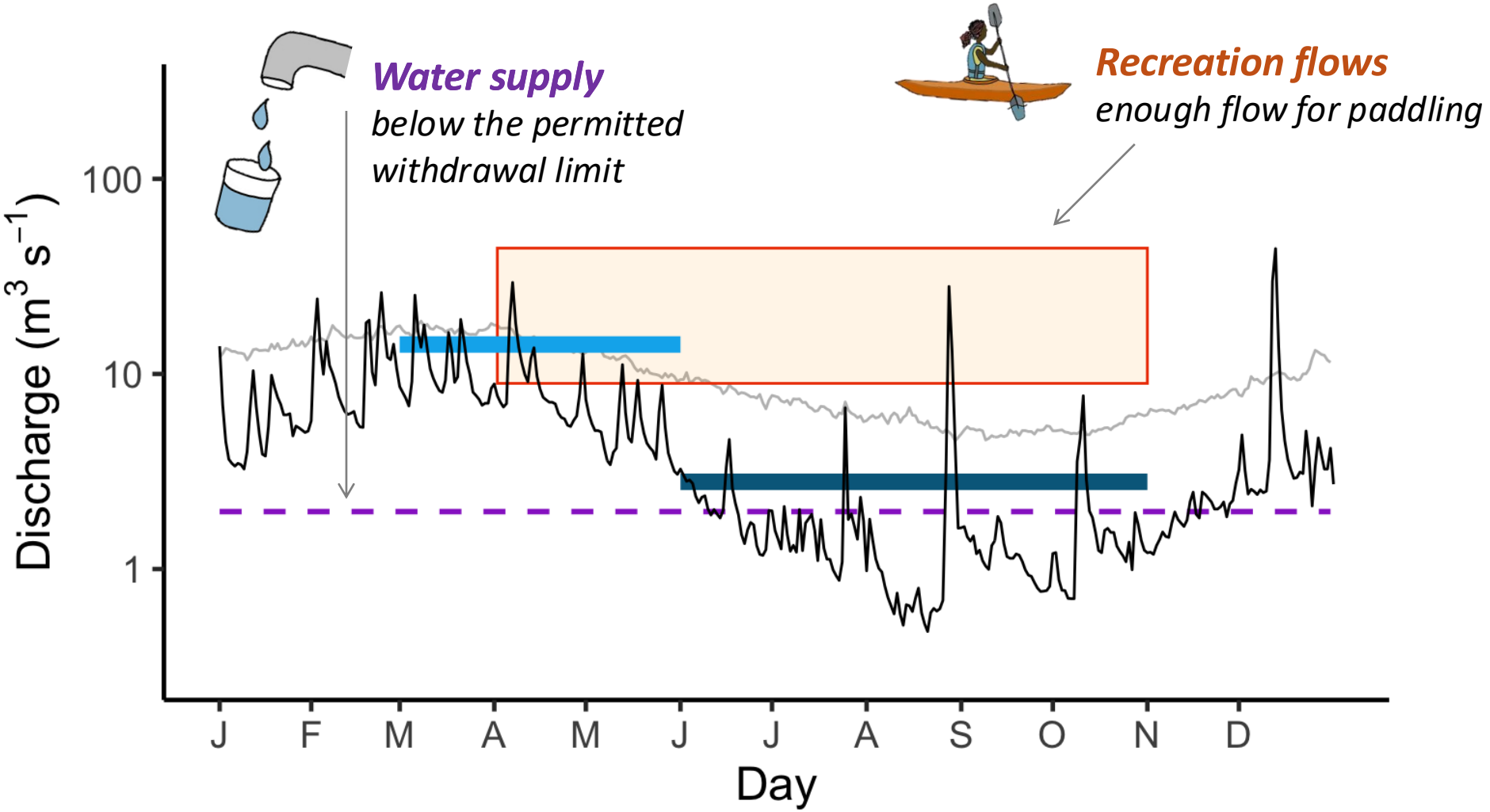

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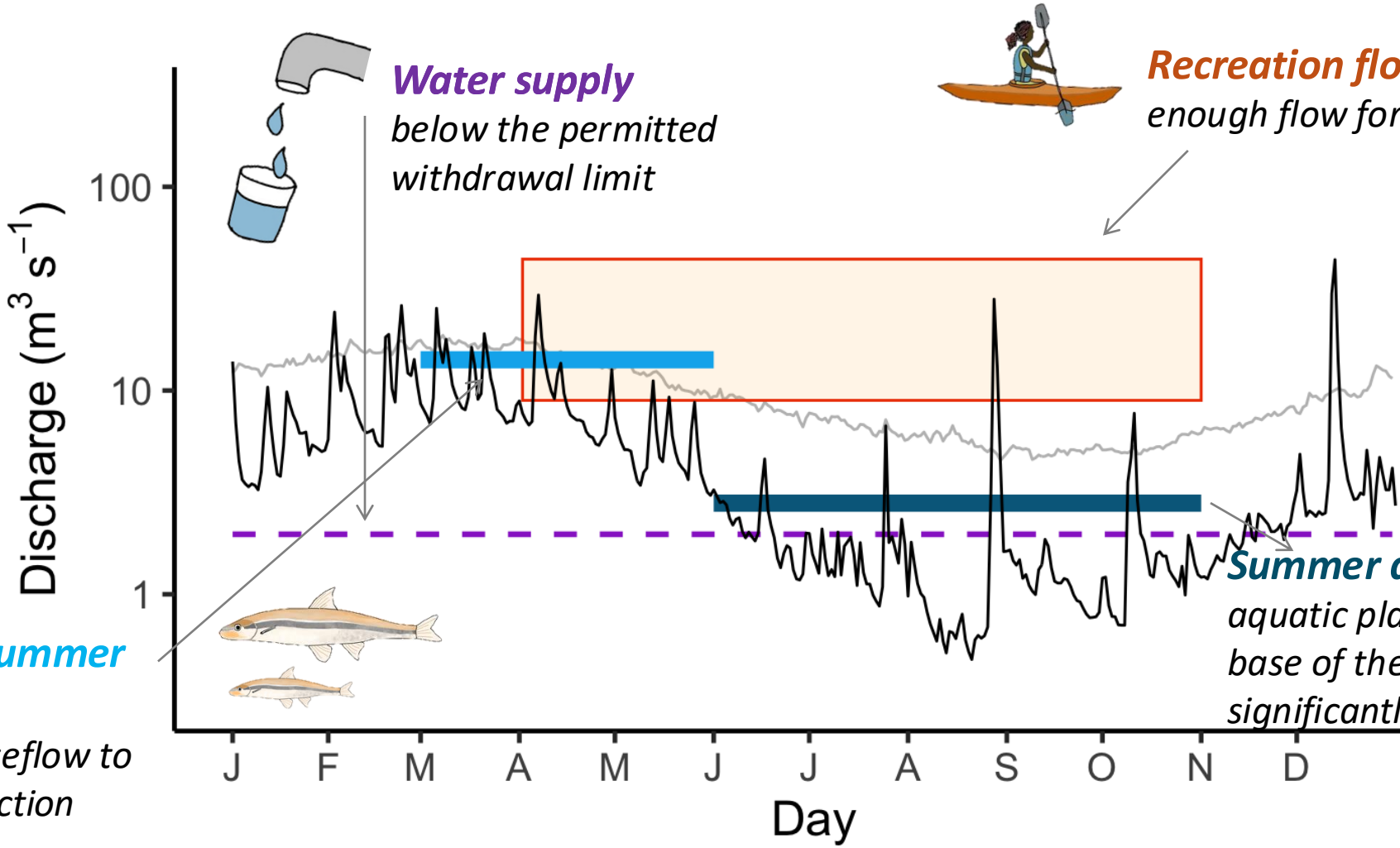

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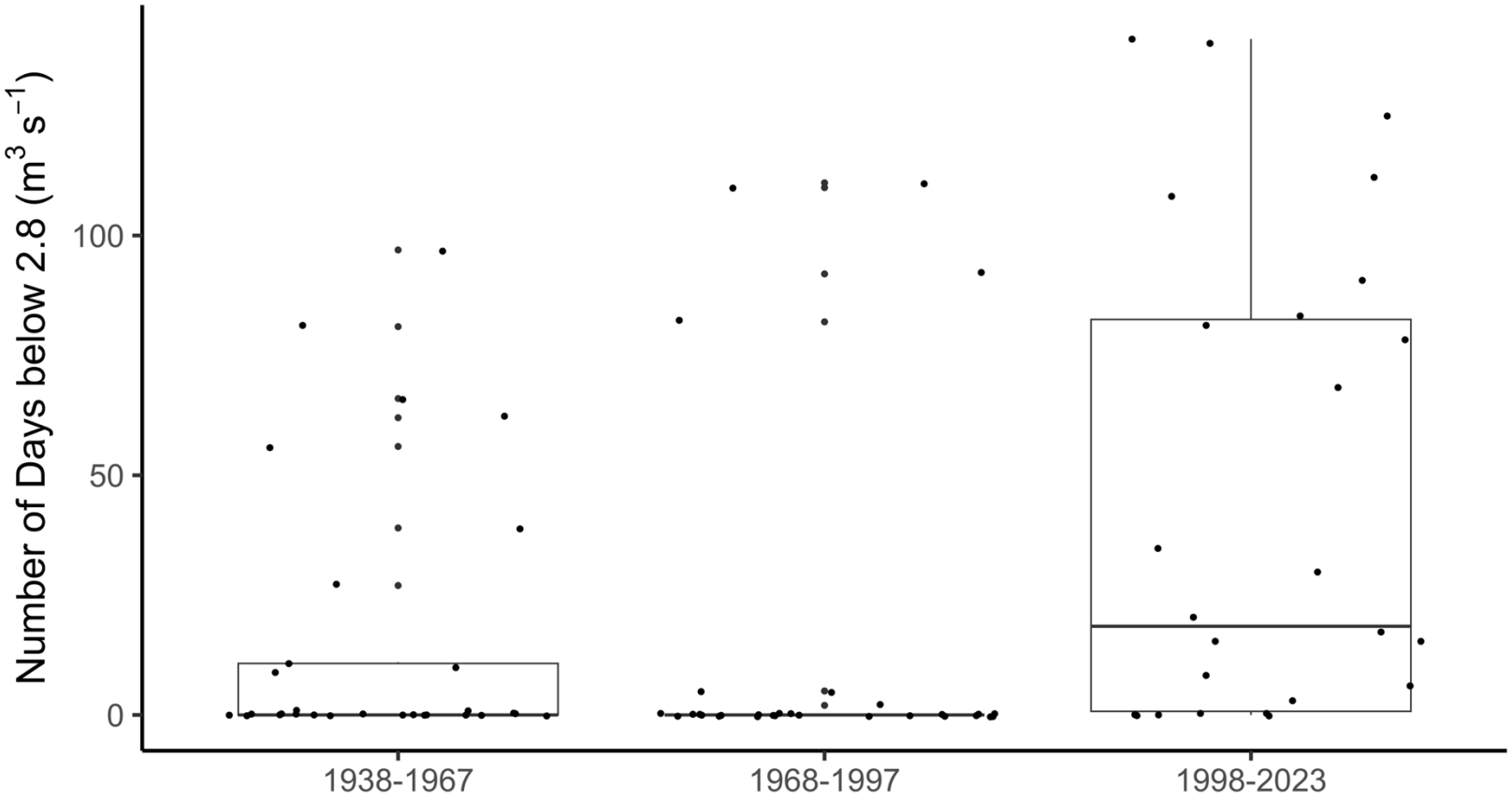
Evaluating and interpreting ecological metrics



Annual duration may be more ecologically relevant than % total period of record for extreme events

Takeaways

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- It’s important to start somewhere…
- We still have a lot of science to do: how low, how long, and how often?
- Perhaps metrics that represent flow related ecosystem functions can help to integrate ecosystem needs with the rest of our needs…

Functional Flow	Metric
1	# years > channel threshold level
2	# days during November-March with flows > floodplain threshold level
3	# years with the maximum 10-day high flow in March-May > spring pulse flow
4	# days during March-May with flow < reproductive season threshold
5	# days during June-October with flow < dry season threshold