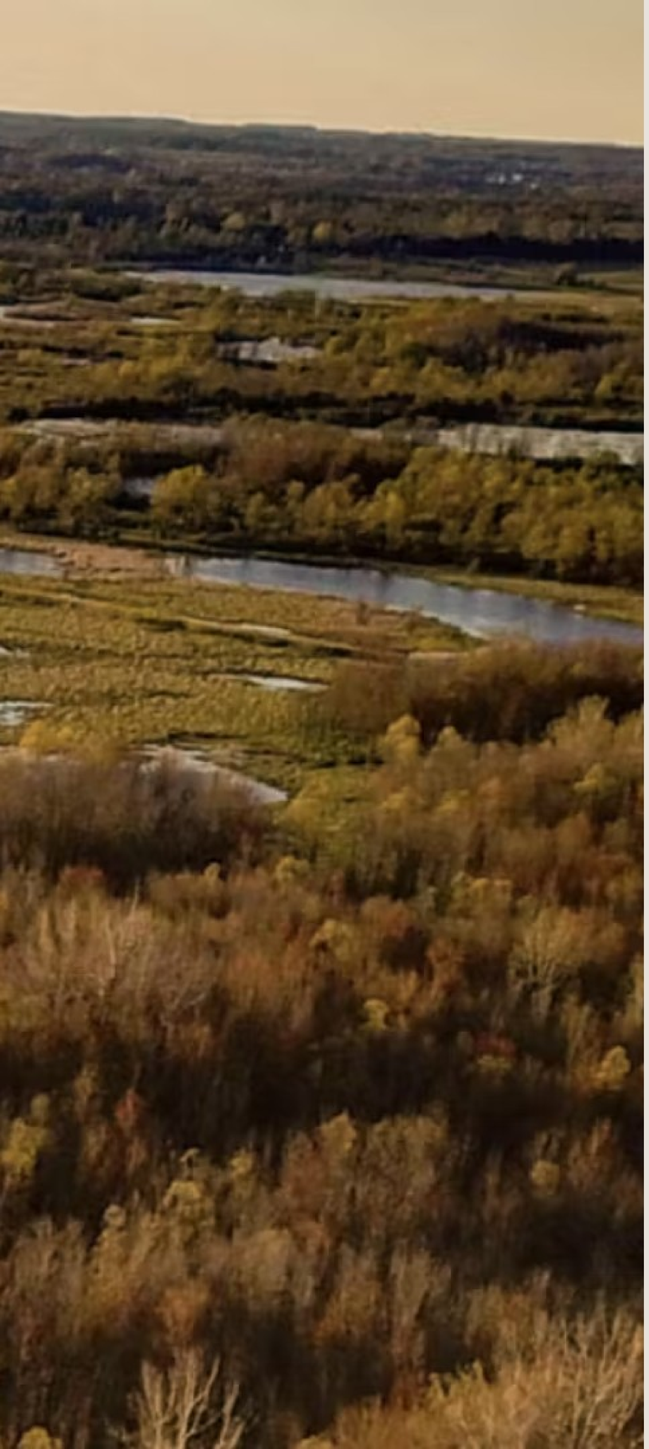
Welcome

Riparian Book Club: The Natural Wood Regime with Ellen Wohl

Host: Colin Barry, PG, CFM | Geomorphologist | Ayres Associates
Tech: Maria Brandt | Outreach & Development Director | Coalitions & Collaboratives (COCO)



Riparian Book Club

Bridging the gap between academic research on stream/wetland systems and applied restoration design. These book club discussions are targeted toward those tasked with stream-wetland restoration design and project planning, to seminal/pivotal scientific papers that can help them in daily work tasks.

Previous: The Natural Flow Regime & The Natural Sediment Regime
Today: The Natural Wood Regime

CO-CO.org > Resilient Communities > Riparian Book Club

Colorado Riparian Association

Formed in 1989 by a small group of dreamers who believed that our riparian zones should not become sacrifice areas.

Promoting the conservation, restoration, and preservation of Colorado's riparian areas and wetlands.

COLORADO
RIPARIAN
ASSOCIATION

Coalitions & Collaboratives

We believe in working together. No single individual, business, organization, or government can fix the difficulties facing our planet and its people, but by working together, we can drive positive change for people and the planet. This includes as much open access to resources and information sharing as possible.

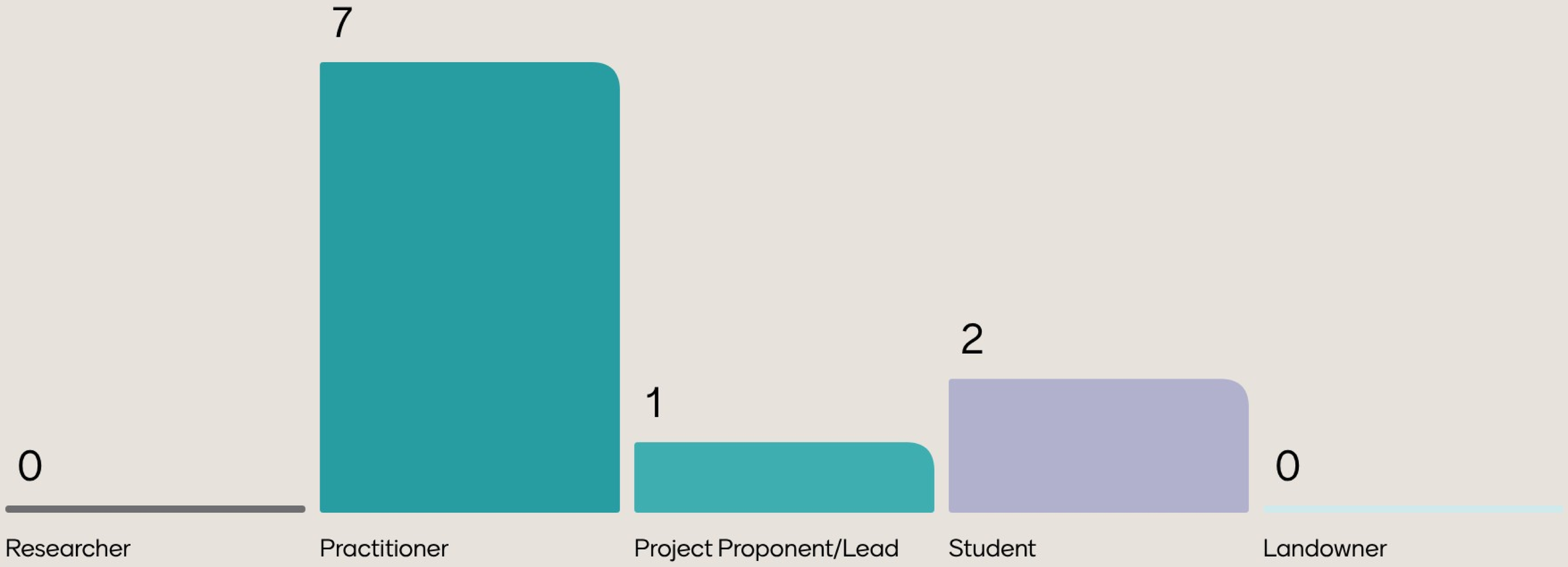
To advance healthy and resilient communities through collaborative conservation and restoration.

COCO

Using Mentimeter

- Scan the QR code or enter menti.com into your computer's web browser
- Enter the code given in the QR box or info bar above
- Follow along and participate in the webinar
- Polling is anonymous. Please be respectful and professional.
- Using Menti and Zoom to engage
- Welcome to add questions to Menti during presentation

I'm a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Researcher
Practitioner
Project Proponent/Lead
Student
Landowner

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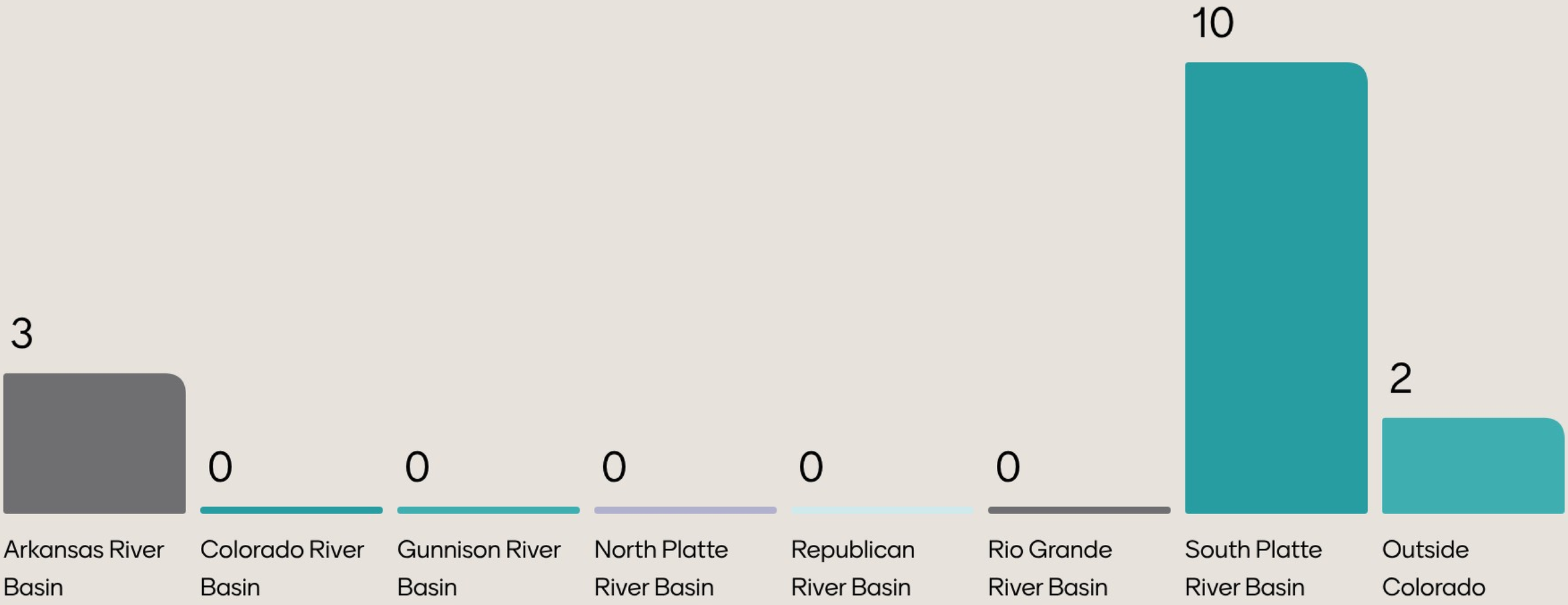
10

What geographic location are you joining us from?



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What do you hope to get from this online workshop?

I always learn something when Ellen is presenting!

Reasons for better land management and conservation of riparian corridors/ecosystems.

More insights into the wood regime and how we can use those concepts in our implementation!

A heady break from the workday and some Ellen Wohl time!

New ideas on how to apply concepts from The Natural Wood Regime paper in my work and also just to keep learning from Ellen!

An update/overview of recent research and application in restoration of natural wood regime concepts.

Im not sure. I'm here with an open mind

Learn the basics. Get access to information and resources.

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What do you hope to get from this online workshop?

I'm interested in the current research occurring on this topic.

Better understanding of the wood regime and how we could potentially incorporate that into assessments of aquatic habitat for water quality assessments.

Learn more about developing target wood regimes!

Getting after the nuance/guidance and constructive ways to encourage restoring wood into systems given that we need to contend with that most nuisance of species - humans.

ideas on how to quantify/assess wood regime in river systems

Better understanding of the wood regime and how fisheries researchers can better understand its impacts on populations

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Ellen Wohl

Ellen Wohl received a BS in geology from Arizona State University and a PhD in geosciences from the University of Arizona. She is a professor in the Department of Geosciences at Colorado State University and a University Distinguished Professor. Her research focuses on physical processes and forms in river channels and floodplains, and how these interact with biogeochemistry and ecological and human communities. She has conducted field research in diverse environments around the world.

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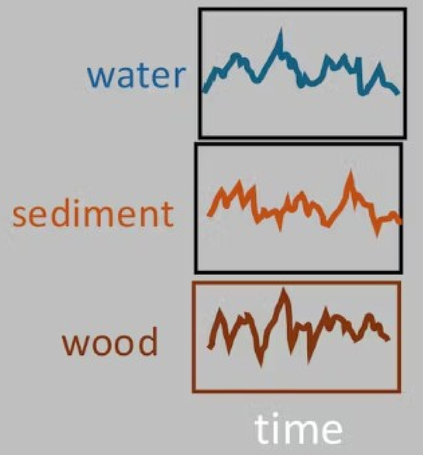
The Natural Wood Regime in Rivers

ELLEN WOHL, NATALIE KRAMER, VIRGINIA RUIZ-VILLANUEVA, DANIEL N. SCOTT, FRANCESCO COMITI, ANGELA M. GURNELL, HERVE PIEGAY, KATHERINE B. LININGER, KRISTIN L. JAEGER, DAVID M. WALTERS, AND KURT D. FAUSCH

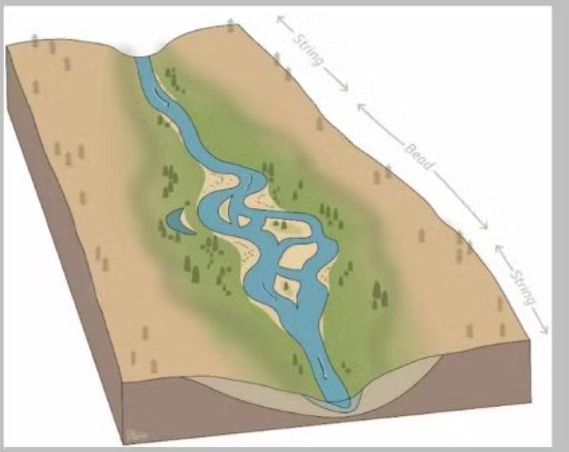
Configuration & (in)stability of river corridor

fluxes



flow, sediment, & large wood regimes

context



valley floor lateral confinement & gradient

biota

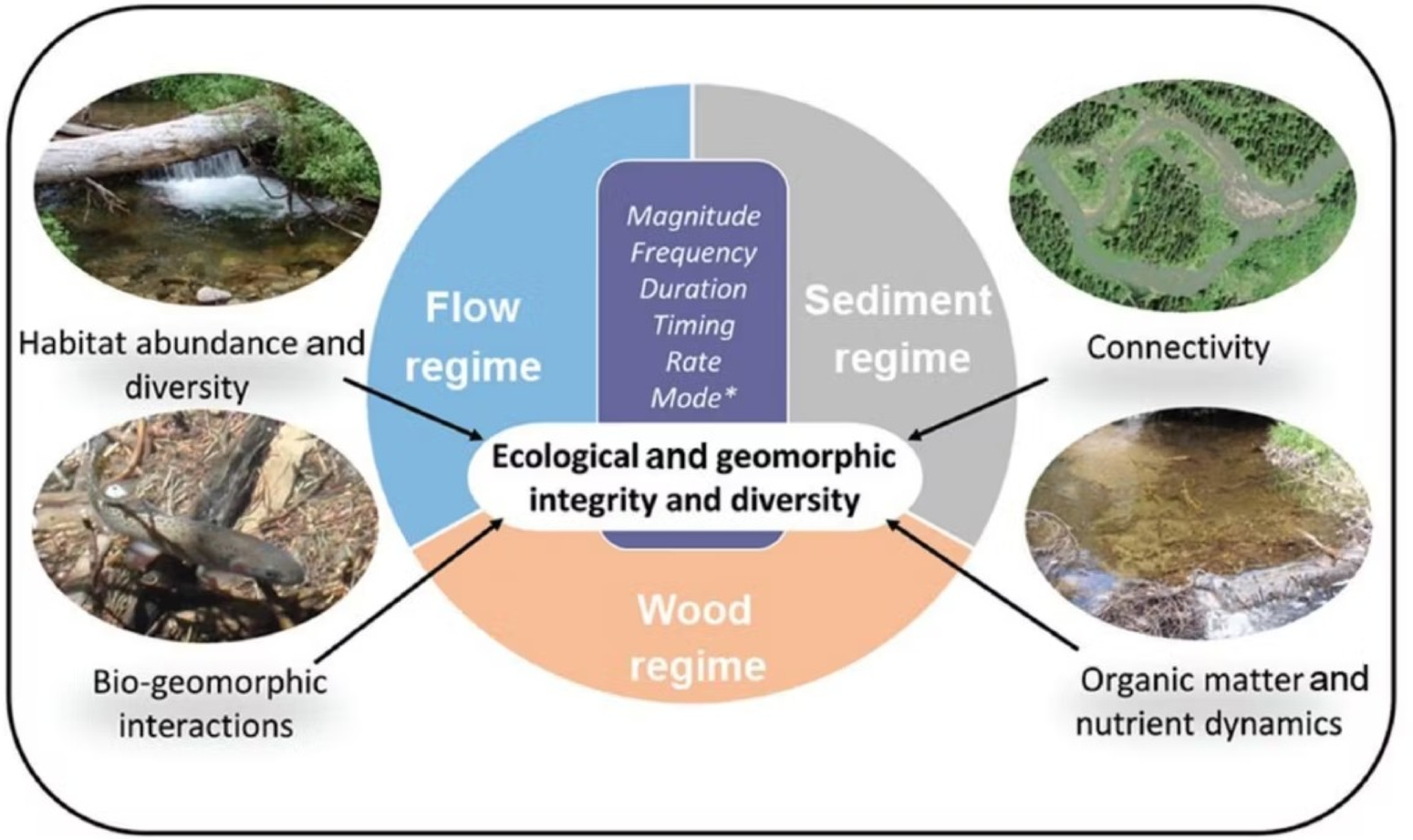


Figure 1. Characteristics of the river corridor influenced by interactions among water, sediment, and wood. Characteristics listed around the margins (e.g., physical habitat template) are influenced by the presence of mobile and stored wood. In the central box, Mode* *refers only to the wood regime.*

Regime vs budget vs process domain

mass balance accounting
storage = inputs - outputs
temporal focus
fluxes & storage of wood
5 components
spatially discrete areas with distinctly different wood regimes (in terms of any of the 5 primary components)
Regime vs budget vs process domain

Table 1. Components of wood regimes with respect to recruitment, transport, and storage.

	Recruitment	Transport	Storage
Magnitude	Mass	Hypercongested/congested/semicongested/uncongested	Abundant
	Individual		Minimal
Frequency	Frequent	Frequent	Frequent
	Infrequent	Infrequent	Infrequent
Duration	Short recruitment time (episodic)	Short transport time	Short residence time (mobile or quick to decay)
	Long recruitment time (continuous)	Long transport time	Long residence time (immobile or slow to decay)
Timing	Predictable	Predictable	Predictable
	Unpredictable	Unpredictable	Unpredictable
Rate	Rapid delivery	Rapid transport	Rapid change
	Slow delivery	Slow transport	Slow change
Mode	En masse	Floating (limited influence from obstructions)	Dispersed (ramp, bridge, parallel, oblique)
	Sliding/rolling	Deflecting (influenced by obstructions)	Concentrated (channel-spanning, partial, floodplain, raft)
	Falling (snapping, leaning)	Dragging (sliding, rolling)	Buried
	Biotic addition (beaver, human)		

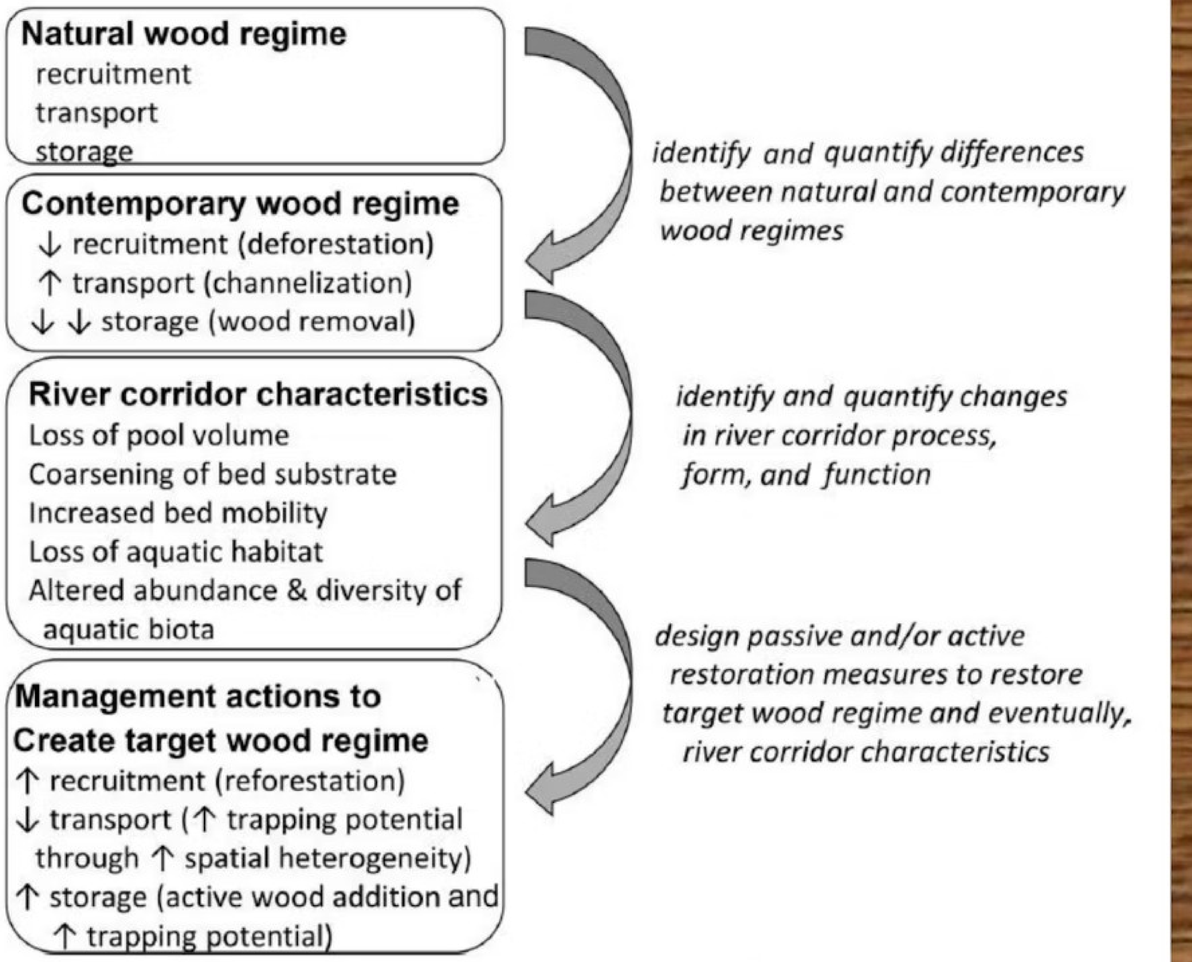
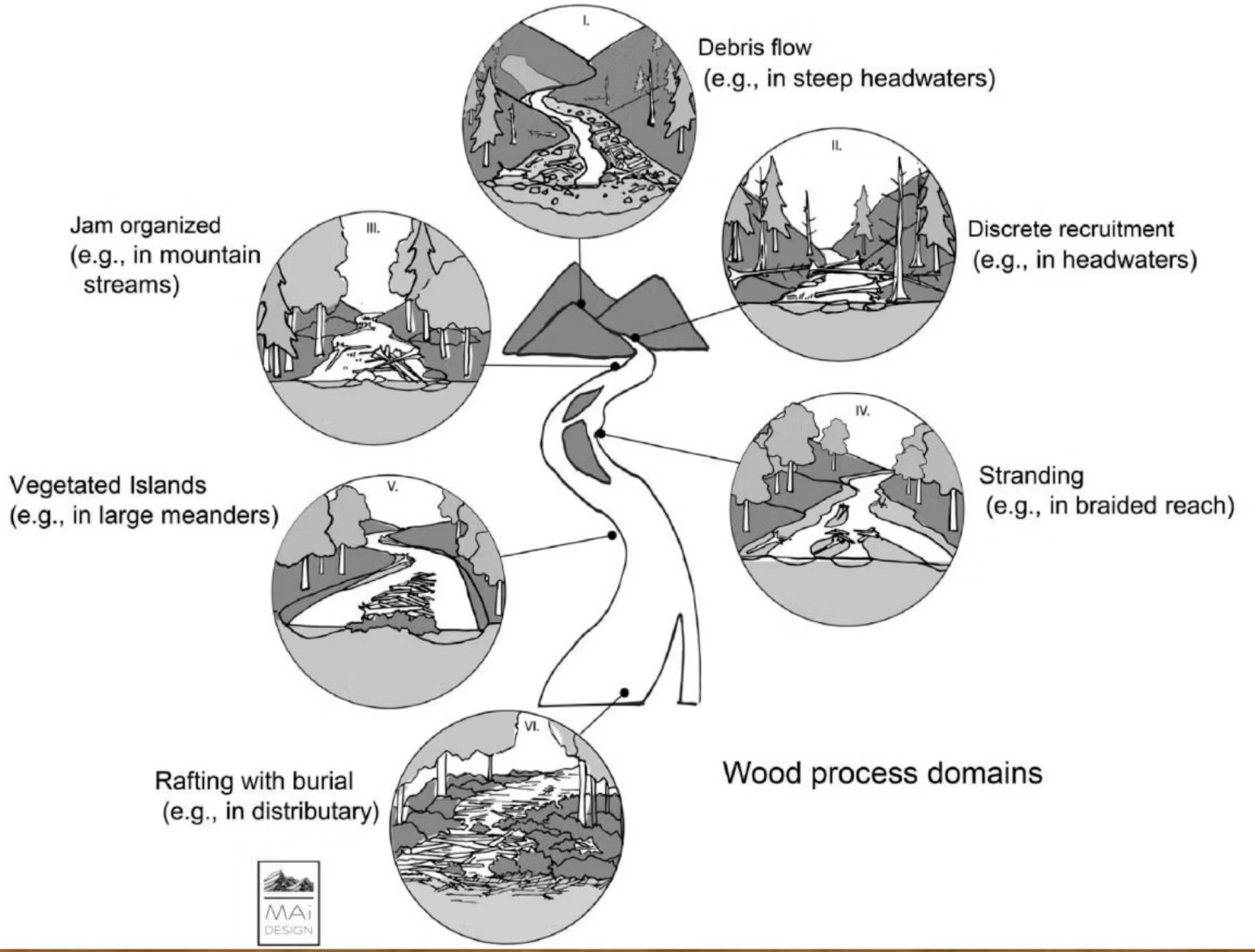


Figure 5. Flow chart outlining suggested procedure for developing a target wood regime. In this hypothetical example, the contemporary wood regime differs


I.
Debris flow
(e.g., in steep headwaters)
II.
Discrete recruitment
(e.g., in headwaters)
III.
Jam organized
(e.g., in mountain streams)
IV.
Stranding
(e.g., in braided reach)
V.
Vegetated Islands
(e.g., in large meanders)
VI.
Rafting with burial
(e.g., in distributary)
Wood process domains
MAi
DESIGN

Box 1. Example management strategies for attaining a target wood regime.

Passive restoration

- Cessation or limits on
  - deforestation (wood recruitment)
  - removal of downed wood in the river corridor (transport, storage)
  - river engineering (recruitment, transport, storage)
  - flow regulation (recruitment, transport, storage)
- Riparian forest management (e.g., planting, selective thinning or felling) to alter recruitment rate and piece characteristics
- Removal of bank erosion mitigation measures to promote wood recruitment
- Channel and floodplain design to control roughness and potential wood-trapping features such as bars and side channels
- Modified design for infrastructure such as bridges or dams that influence wood regime
- Altered regulatory framework that recognizes importance of presence of wood in river corridor

Active restoration

- Reintroduction of either potentially mobile or fixed wood within river corridor
- Beaver habitat enhancement or reintroduction.

Riparian Book Club Discussion

In the managed and unmanaged forest study, did they have the same natural flow regime and history of flow modification? How do you see changes to these two regimes interacting with one another?

Can you talk a little more about deforestation versus thinning treatments as it relates to the amount of wood we should see in streams?

What's the best way or tools to "unskew" stakeholder expectations of a natural wood regime?

Is wood important in wetlands and fresh water bays?

Are there any places that you have seen attempts to improve the wood regime in areas that were done wrong? If not in practice could you think about it theoretically where it could be done incorrectly?

Do you think the apparent natural wood regime in wilderness areas is artificially high due to fire suppression?

Do you have recommendations on methods to quantify appropriate amounts of wood for a given stream system? How can the estimate inform design to avoid a contrived result, get natural look and function?

Have there been advancements in scaling the identification and quantification of natural vs contemporary wood regimes since the paper was published? Or is it still largely river-specific?

Riparian Book Club Discussion

Should non-native species (example Crack willow) be replaced by native species (cottonwoods) when the large, old crack willows are providing habitat, wood, shade, mostly positive affects?

Do you have any thoughts on about how bridges and culverts could be designed to accommodate large wood?

Can you talk a bit about how likely reference conditions/restoration targets typically vary with stream gradient, confinement, and valley typology (low gradient alluvial vs steeper transport reaches)

pt. 1: Amazon is a good example of a more natural wood regime in a riverine sstem. At times of the year, and in differing tributaries the PH can go as low as 4 due to wood and decompostion of organic.

pt 2: Does Ph have an effect on nutirent transfer or availability?

Thank You

A recording of this webinar will be available at CO-CO.ORG -> Resilient Communities ->Riparian Book Club