Low-tech Process-based Restoration to Treat Structural Starved Riverscapes

What is it and why do we need to do more?

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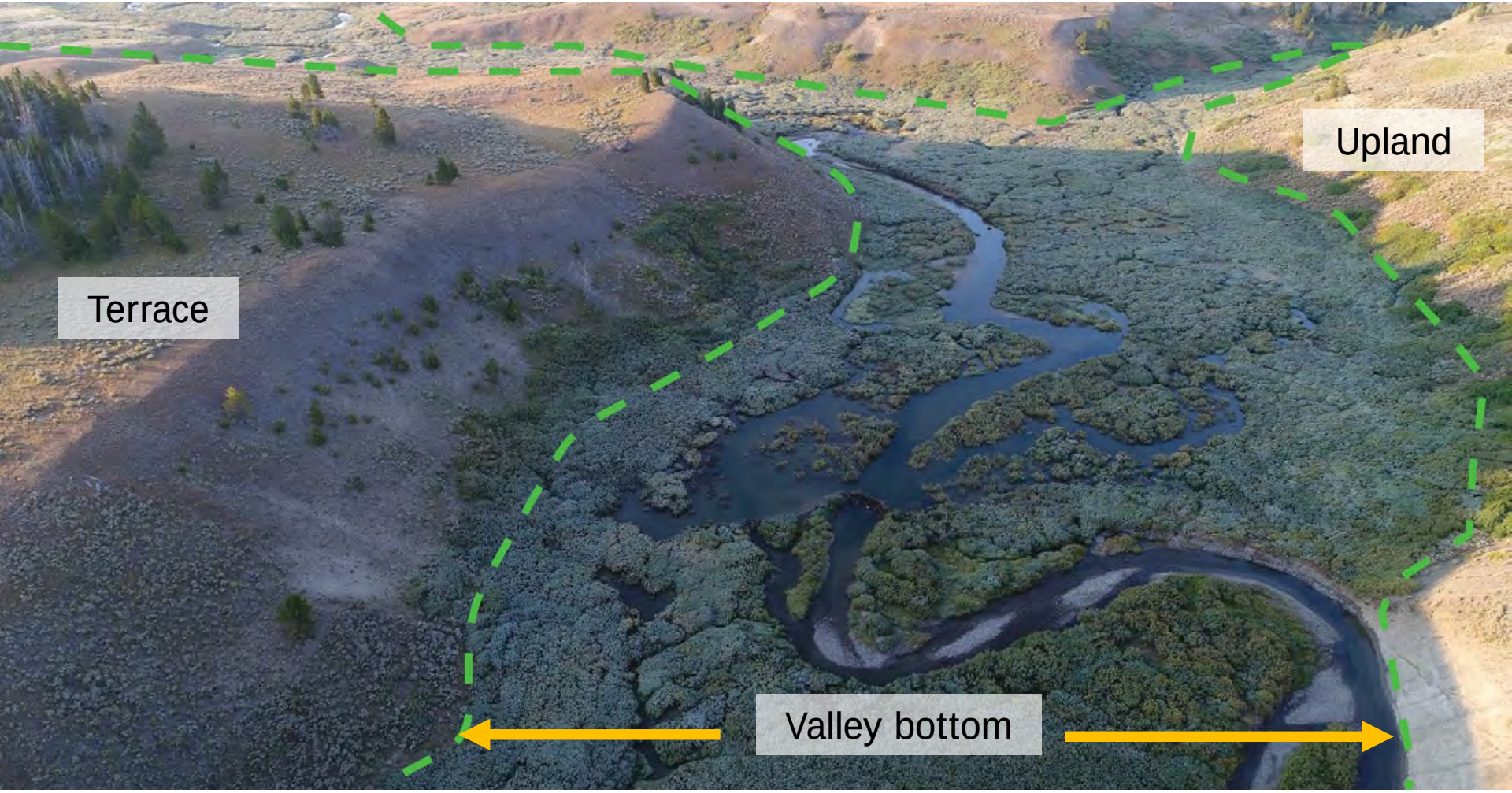
LOW-TECH PROCESS-BASED RESTORATION OF RIVERSCAPES

DESIGN MANUAL

lowtechpbr.restoration.usu.edu

Riverscape & wadeable streams



Low-tech origins

Intensively Monitored Watersheds IMWs; Bennett et al. (2016)

Blockbuster movie pitch

Passionate River Stewards employ a new restoration philosophy and simple methods in a race against time to <u>recover degraded streams</u> and minimize the <u>looming threats</u> of climate change.

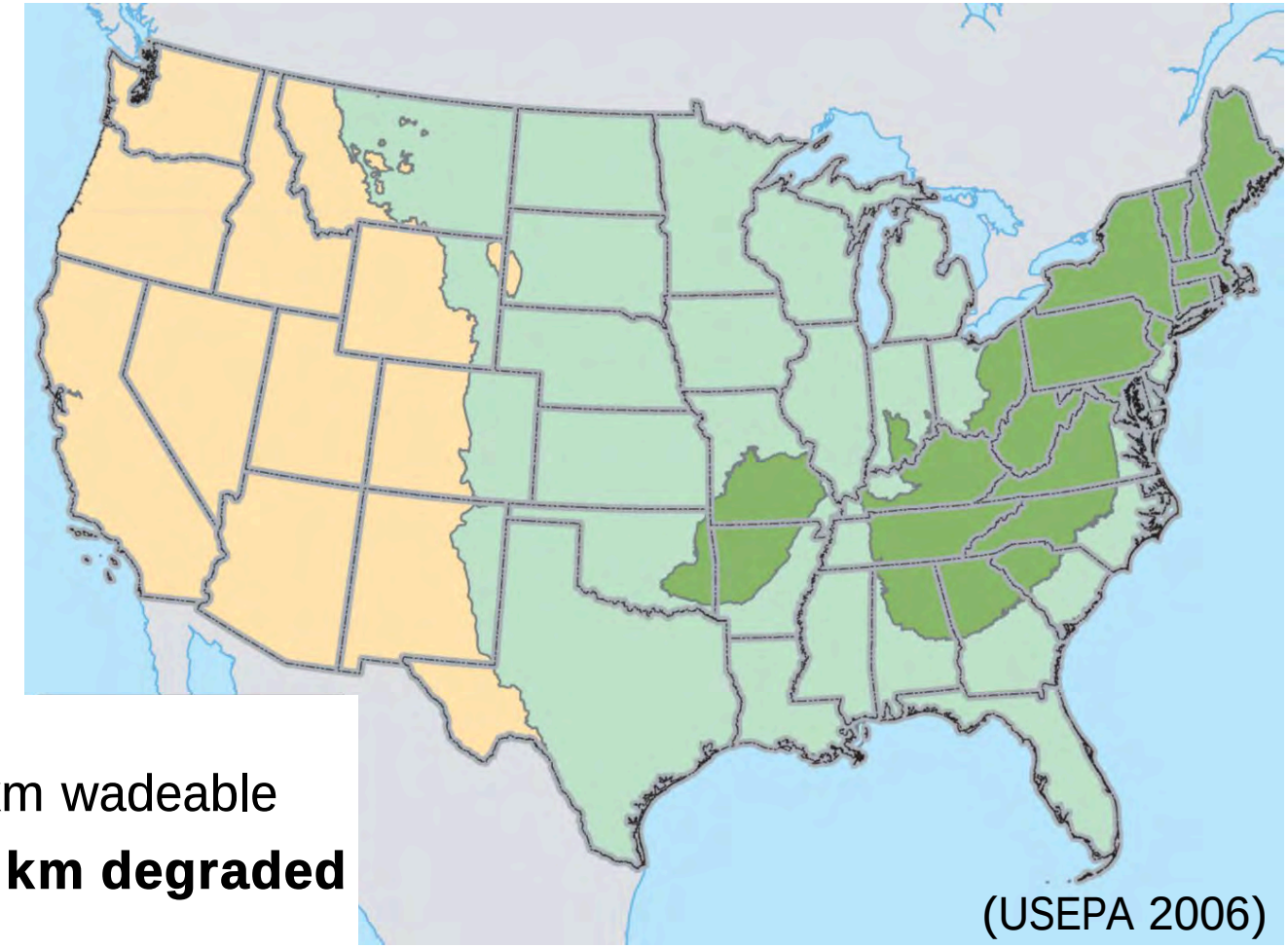
Outline

Scope of problem

Low-tech restoration

- ~~Planning & Assessment~~
- ~~Project Design~~
- **Principles**
- **Structures**
- **Successes**

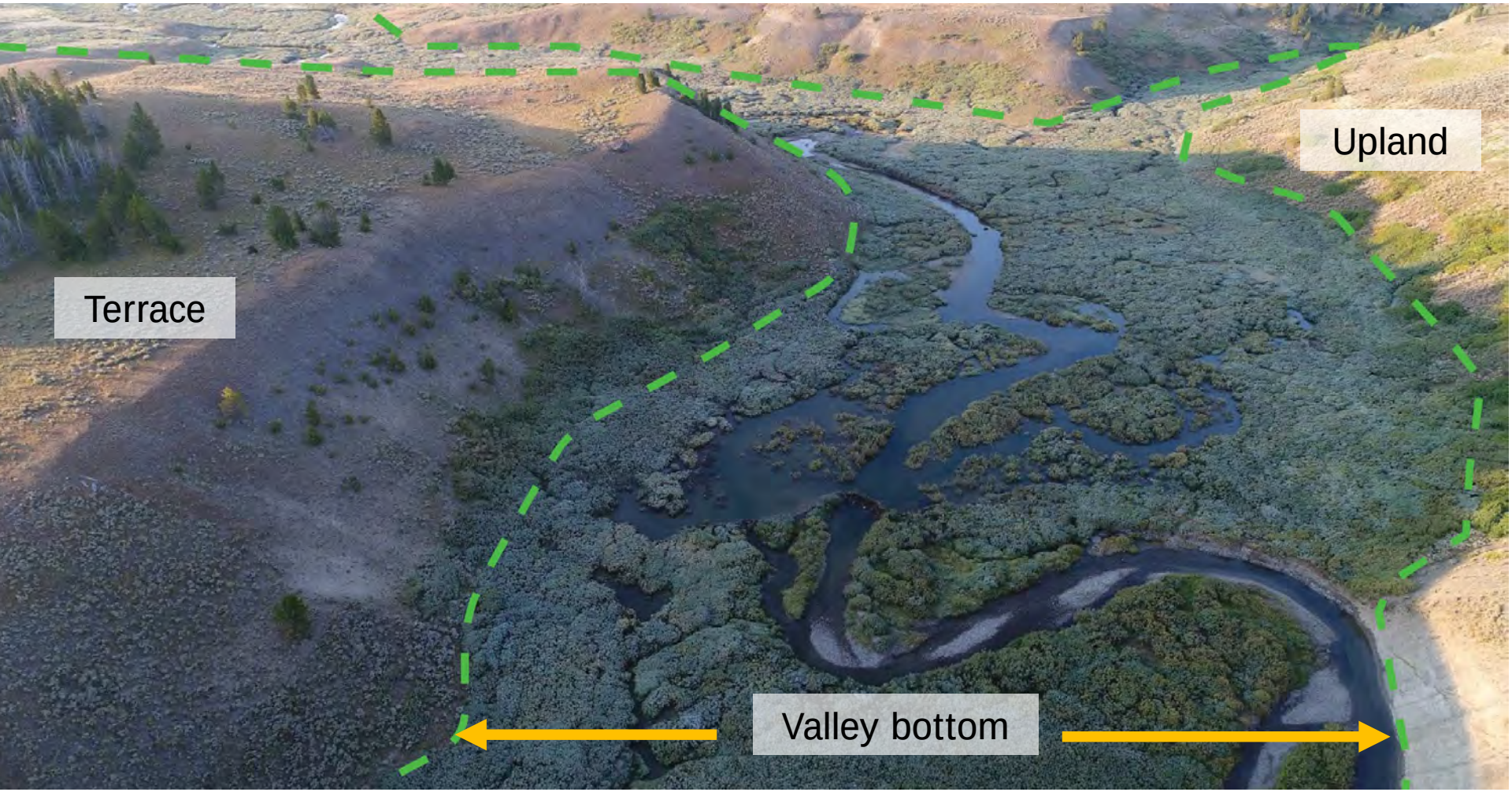
Scope of problem – wadeable streams



West Region

- 240,000 km wadeable
- **130,000 km degraded**

Scope of degradation – what we've lost



Scope of degradation – what we've lost

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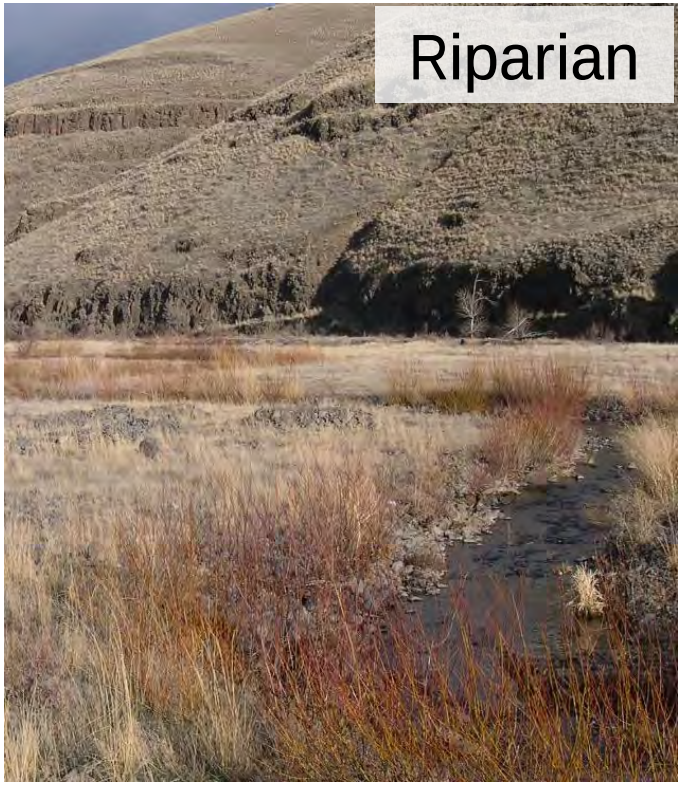
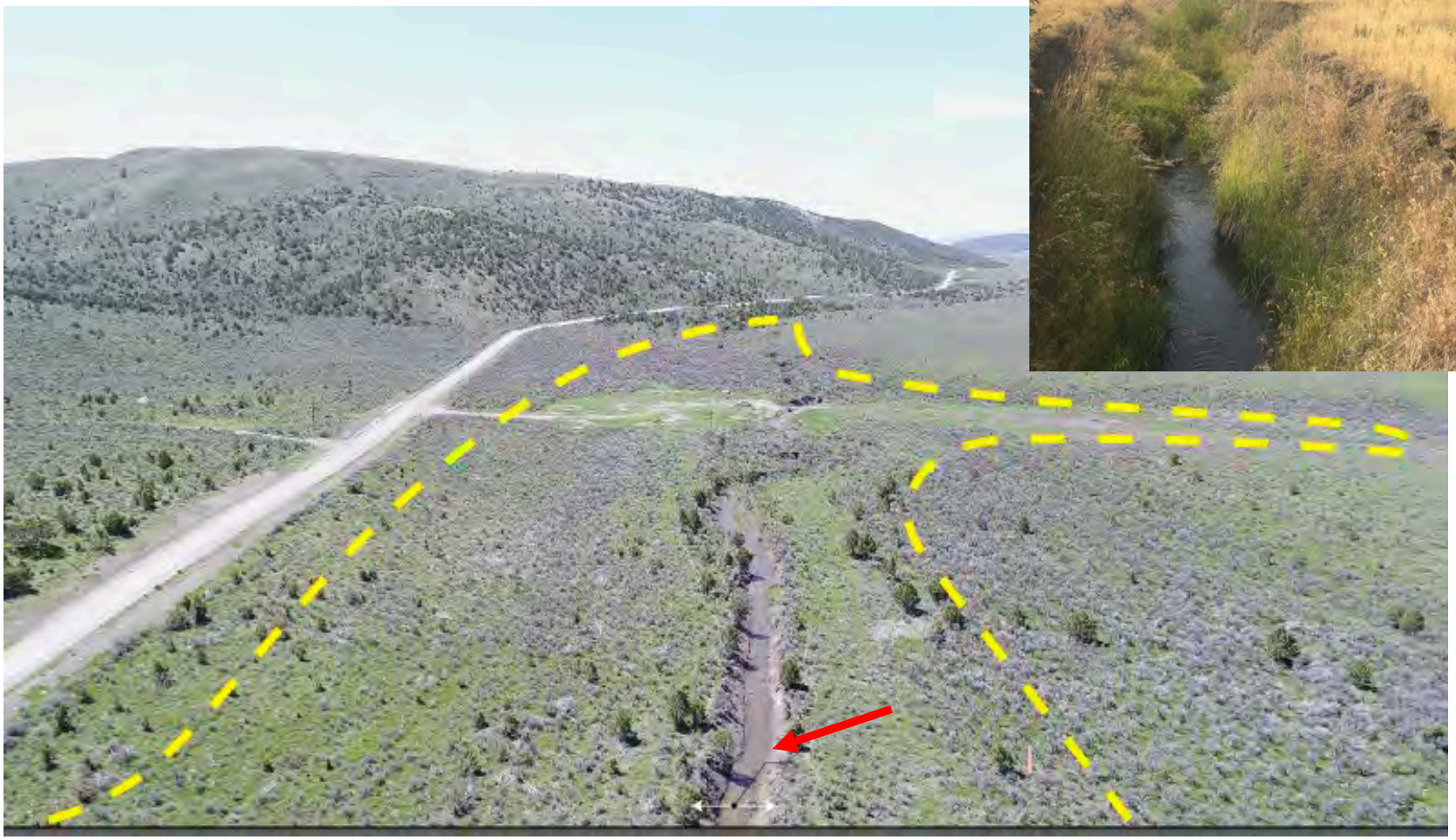
Scope of degradation – why?



Scope of degradation – disconnection



Valley bottom

What’s likely to happen to precipitation?

- Earlier runoff
- Lower baseflows
- Less stable hydrograph

(Klos et al. 2014)

Dominant Restoration Paradigm
Engineering–based

Precisionism (Hiers et al. 2016)

But not out here ...

Low-tech process-based restoration

Imagine "... if restoration was about stream power doing the work, not diesel power?" Jared McKee (USFWS)

Low-tech - nothing new

Figure 26

Kraebel and Pillsbury (1934)

Low-tech principles

Low-tech principles

Let the **system** do the work

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Low-tech principles

Strength in numbers

Low-tech principles

Defer decision making to the riverscape
... anti-precisionism

Low-tech to mimic beaver dams - beaver dam analogs (BDAs)

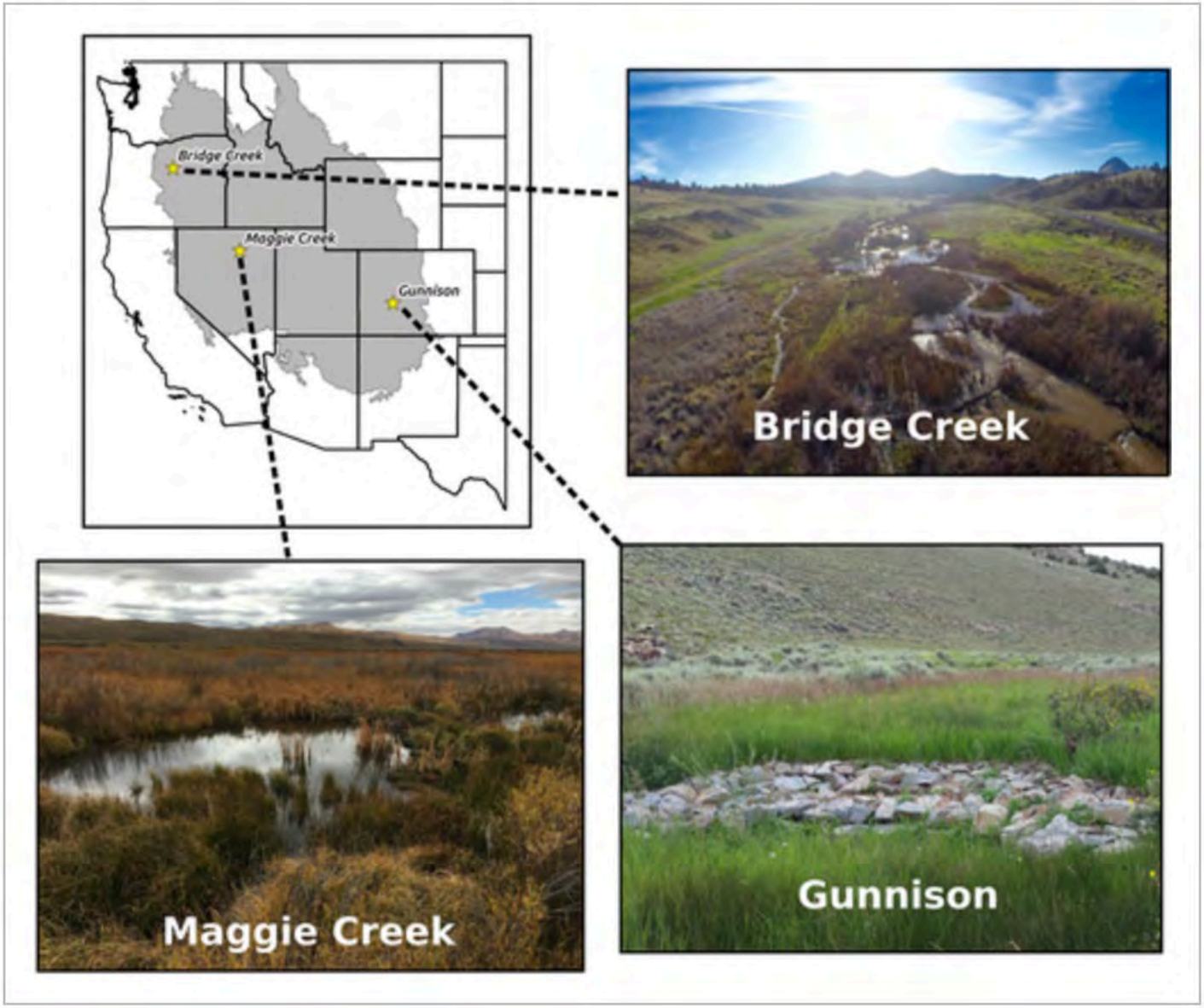
A
Post-Assisted
B
Postless
C
Postless
D
Postless

Mimic wood accumulation –
Post-assisted log structures (PALS)

A
Bank-Attached
B
Mid-Channel
C
Channel-Spanning
D
Channel-Spanning

Low-tech - Successes

Silverman
et al. (2018)



Low-tech – Successes

Relocation of beaver – Birch Creek, ID

Low-tech – Successes

Relocation of beaver – Birch Creek, ID

Health Analogy

Engineering-based

Low-tech restoration

Calls to arms

Acknowledgements

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OREGON Fish & Wildlife

ASOTIN COUNTY CONSERVATION DISTRICT
Assisting, protecting, and restoring Asotin County's natural resources.

Oregon State University Cascades

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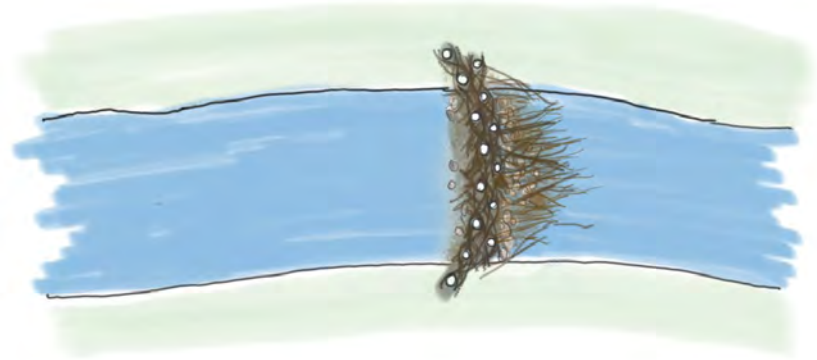
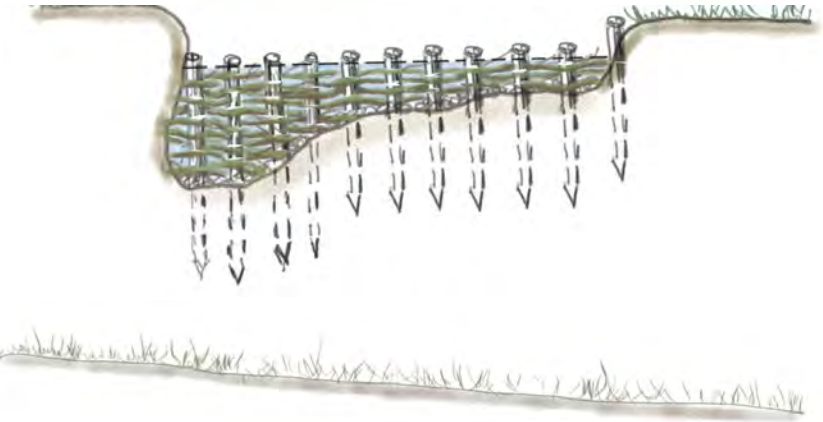
Mimic beaver – Beaver dam analogs (BDAs)

Flow

Planform



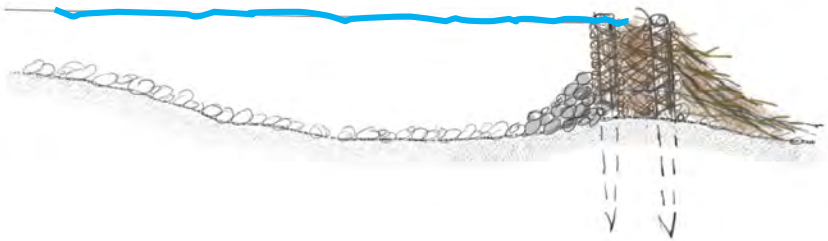
Cross-section



Water surface

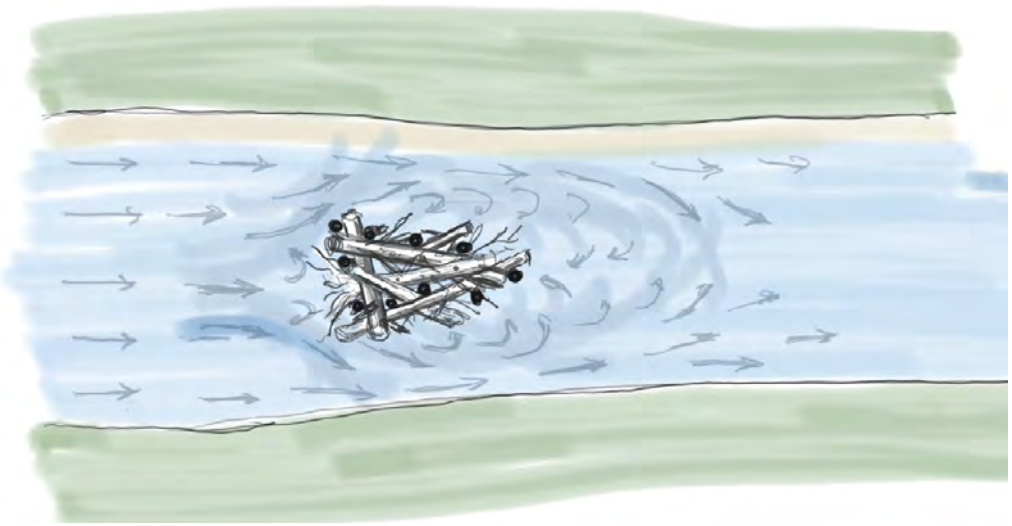
Profile

Flow



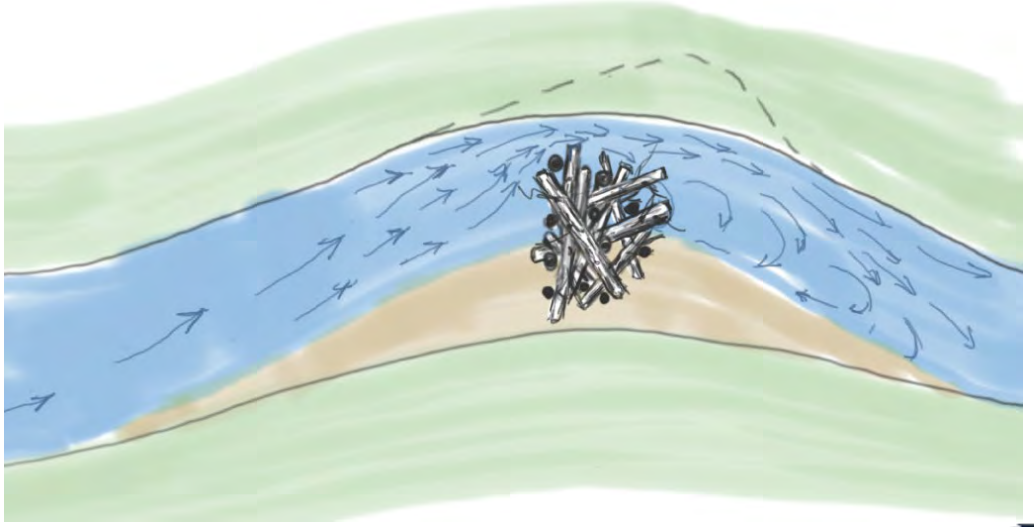
Low-tech structures to mimic wood accumulation

Mid-channel



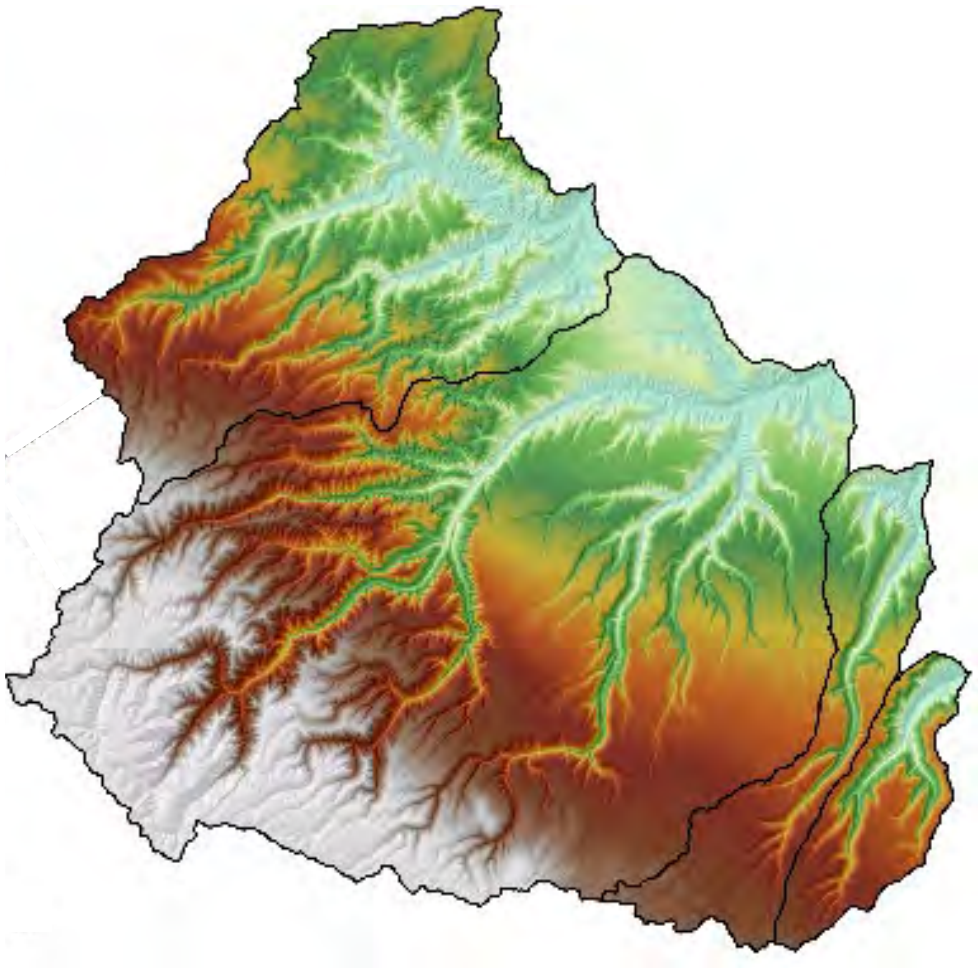
Flow

Bank-attached



Low-tech – assessment and planning

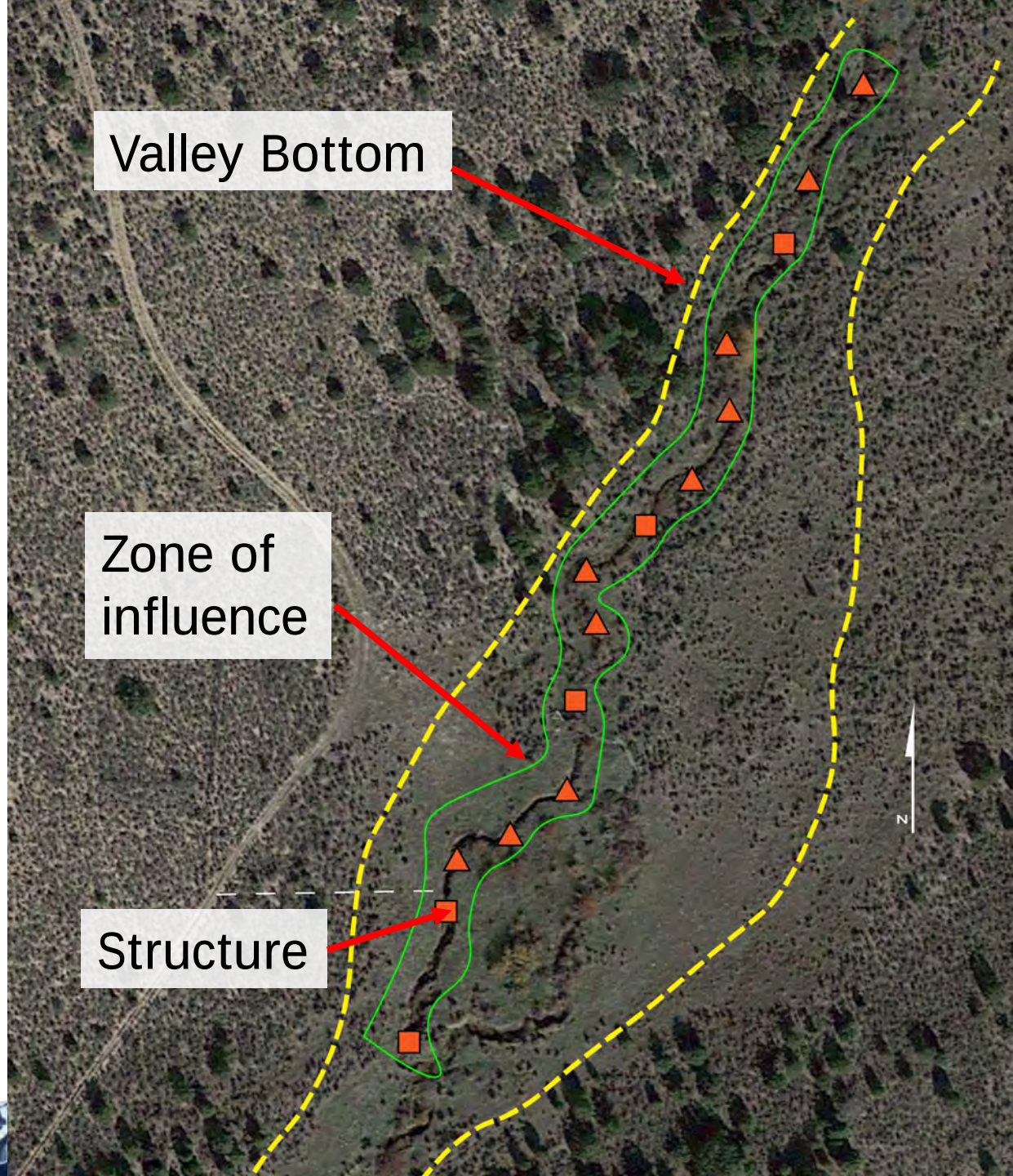
- Root cause
- GIS to scale up



riverscapes.xyz

Low-tech Design

- Rapid
- Field-based
- Complex focused



Low-tech principles – inefficient conveyance