Soap Creek, Jackie Corday

Part 1 - Background

Who is the Colorado Healthy Headwaters Working Group?

What are our goals?

Bringing Stream/wetland partners together in Colorado to scale up headwater restoration

A **workshop at Colorado Parks & Wildlife was held in Dec. 2019** to bring together the many agencies and orgs that work to restore headwater streams and wetlands – goal was to discuss collaborating to increase the pace and scale of headwaters restoration.

The Workshop led to the creation of the Colorado **Healthy Headwaters Working Group (HHWG)** in March 2020

Tagline of HHWG – ***What can we do more effectively as a group than working separately?***

J. Corday – South Park

HHWG was inspired by how new partners came together during the California **drought crisis** of 2012-2016 to focus upon restoring wet meadows in Source watersheds

Traditional Stream/Wetland Restoration Partners

- Federal and state **land mgt** agencies such as USFS, BLM, CPW
- Federal and state **wildlife** agencies such as USFWS, CPW
- Federal and state **water quality** agencies – EPA, WQCD
- Federal **agriculture** – NRCS
- Local government – counties & cities
- Conservation non-profits – local, state, national
- Watershed groups – local, regional

New Partners, Interests, & Funding

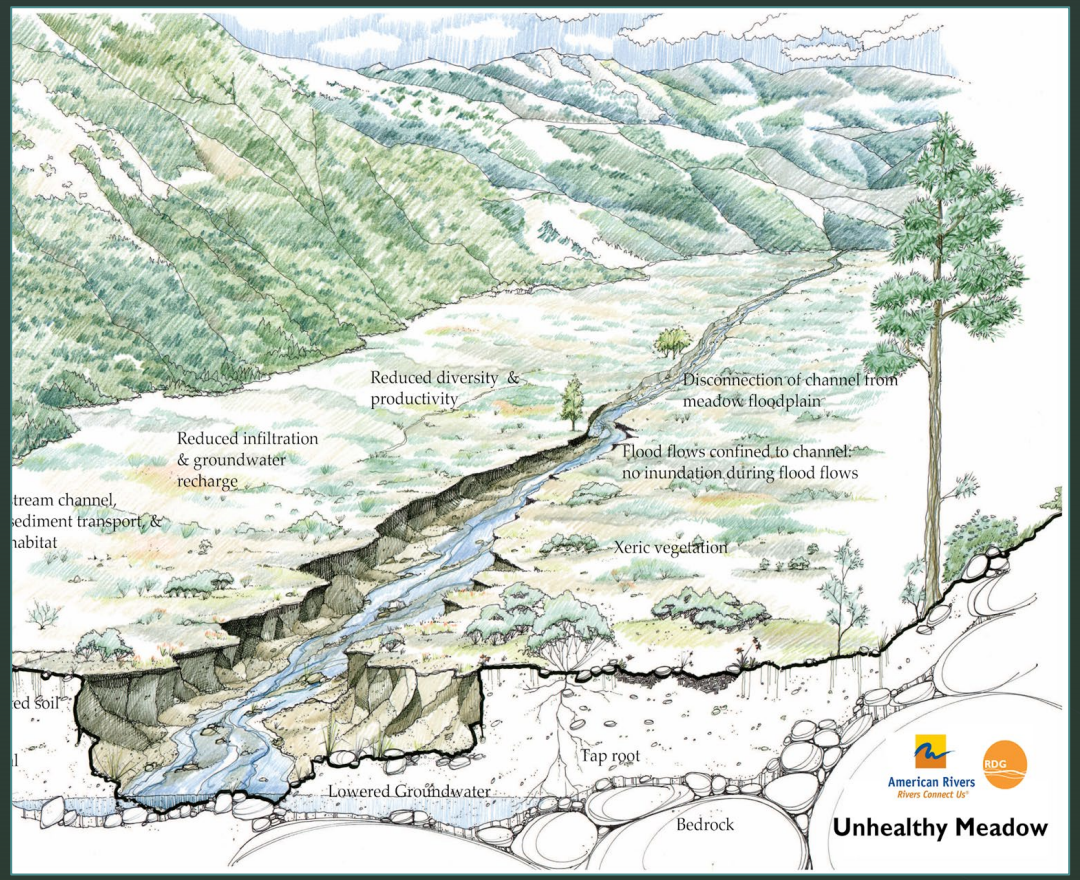
- Water Conservation & Conservancy Districts
- Water providers, utilities
- Federal and state **disaster** agencies – FEMA, DOLA
- Federal and state **water mgt** agencies – BOR, USACE, state water boards
- Agencies & organizations focused on **resiliency to climate change impacts** – drought, fires, floods, less snowpack

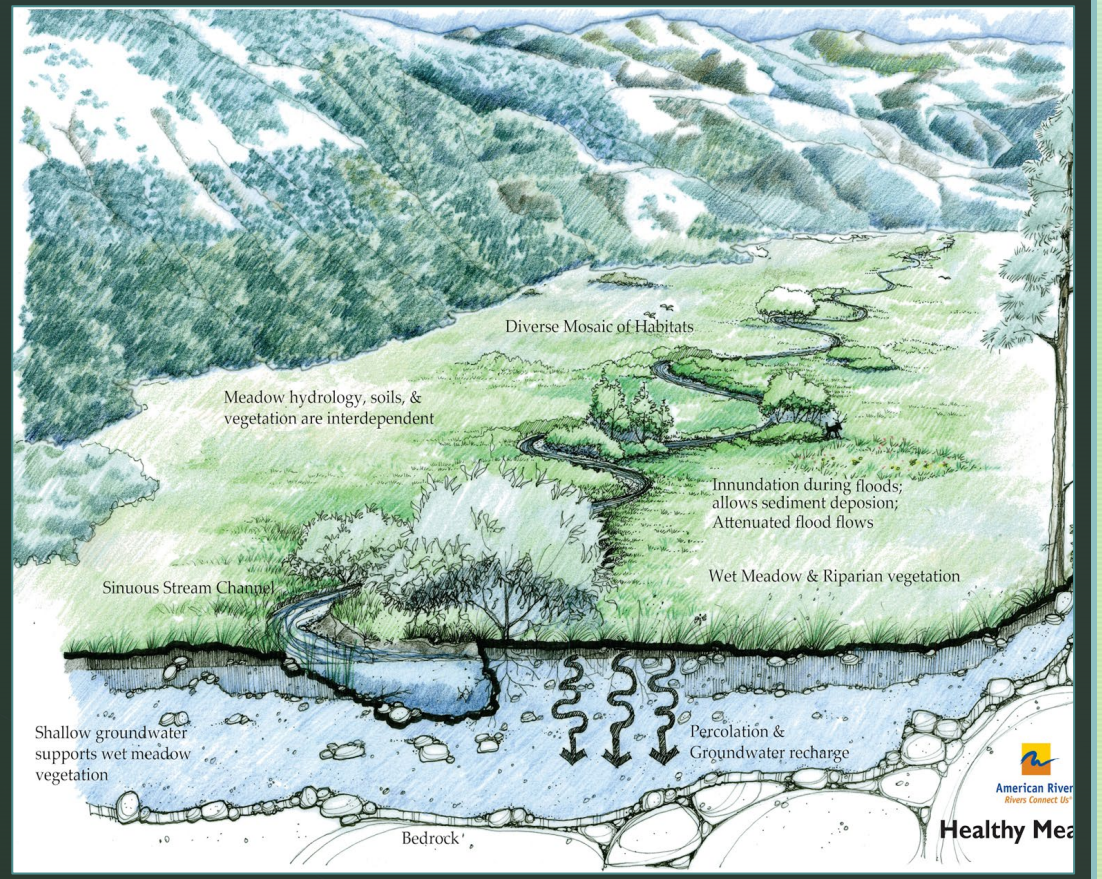
Many of the same agencies and nonprofits that led in California are also in Colorado - became HHWG members

- **HHWG members** – Academic ***researchers*** (CSU, CMU, & MSI), ***state agencies*** (CPW, CDOT, CWCB), ***federal agencies*** (NRCS, USFS, BLM), conservation, land trust, and watershed ***nonprofits***, and river/wetland restoration ***practitioners***

- **HHWG Vision**: *Work together to **increase the pace,** scale, and value of process-based **headwaters riverscape restoration** throughout Colorado to improve watershed health, critical wildlife habitat, and ecosystem services*.

- **HHWG formed two subcommittees**:
  - **Policy/communication** – focused on supporting policy that scales up restoration
  - **Science/projects** – focused on supporting restoration demonstration projects





Healthy riverscapes provide greater water security and biodiversity than degraded systems

Examples of HHWG Policy & Science work

Policy/communication Work

- CO Water Plan comments - focused on the Thriving Watersheds Action Area
- Members make numerous presentations
  - Water Congress 2021 & 2022
  - CWCB Drought Resiliency Workshop
  - Legislator Webinars for water bills
  - BRT E&R Rep meetings
- Support solving barriers to restoration
  - Stream Restoration Bill
  - Education on IIJA & IRA Funding

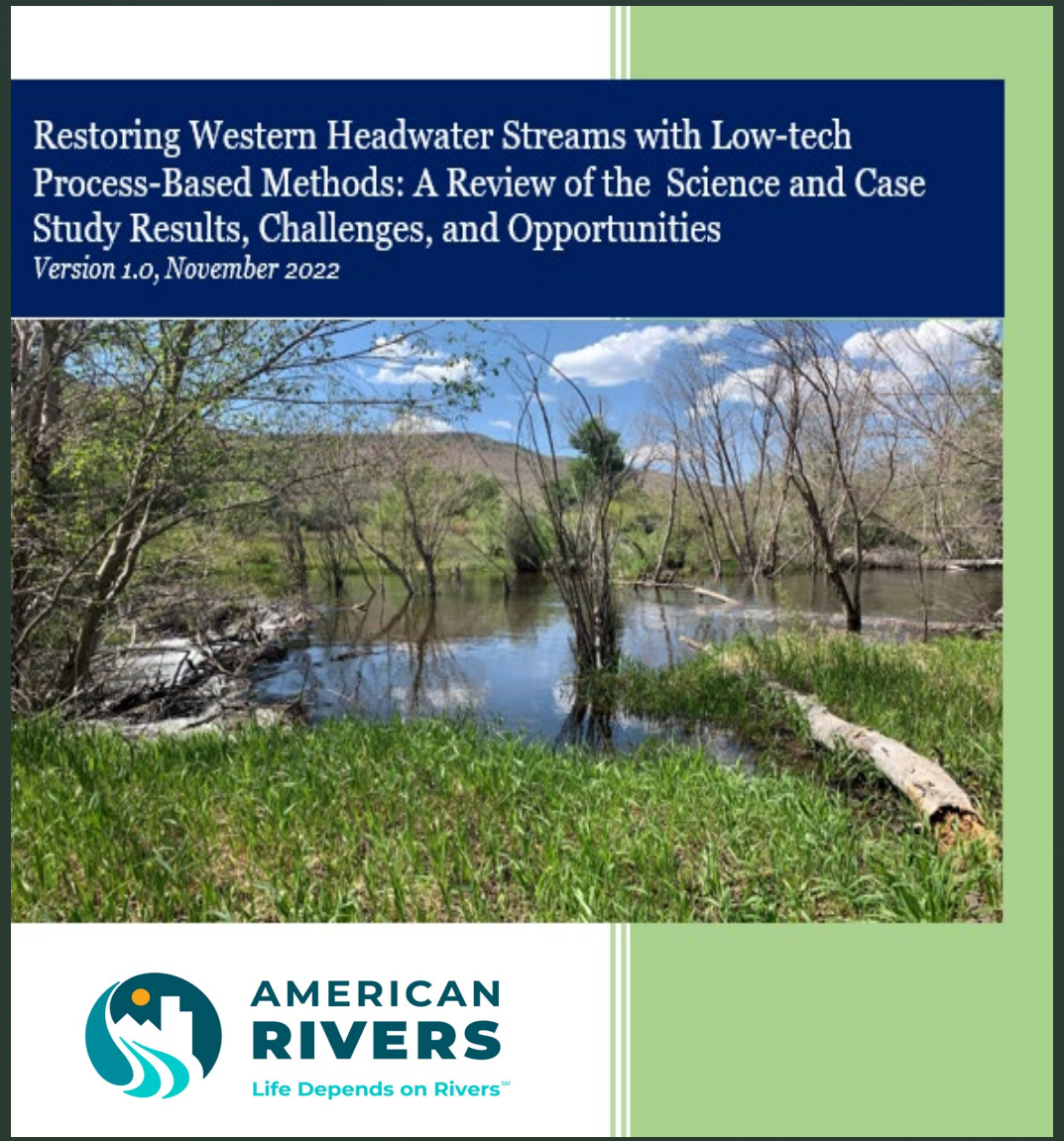
Science/Project Support Work

- Restoration project support
- Restoration research – Comprehensive review & synthesis of published and unpublished case studies

New comprehensive LTPBR research paper to share

State of the science review is a deliverable for an American Rivers grant from CWCB called: ***Engaging West Slope Agriculture in Headwaters Restoration to Improve Water Security - Outreach and Assessment Strategies***"

Link for the Report: [State of the Science on Restoring Western Headwater Mountain Streams (americanrivers.org)]



Trail Creek, Jackie Corday

Part 2 – Why is HHWG focused on scaling up LTPBR?

Three big reasons: First, the scale of the problem

- Colorado has over 105,000 miles of rivers.
- ~61% of smaller streams and ~97% of major rivers have experienced **floodplain alteration**, rendering their floodplains partially or wholly nonfunctional.
- Climate change impacts of drought, less snowpack, & fires are exacerbating/magnifying the problems incised streams cause.

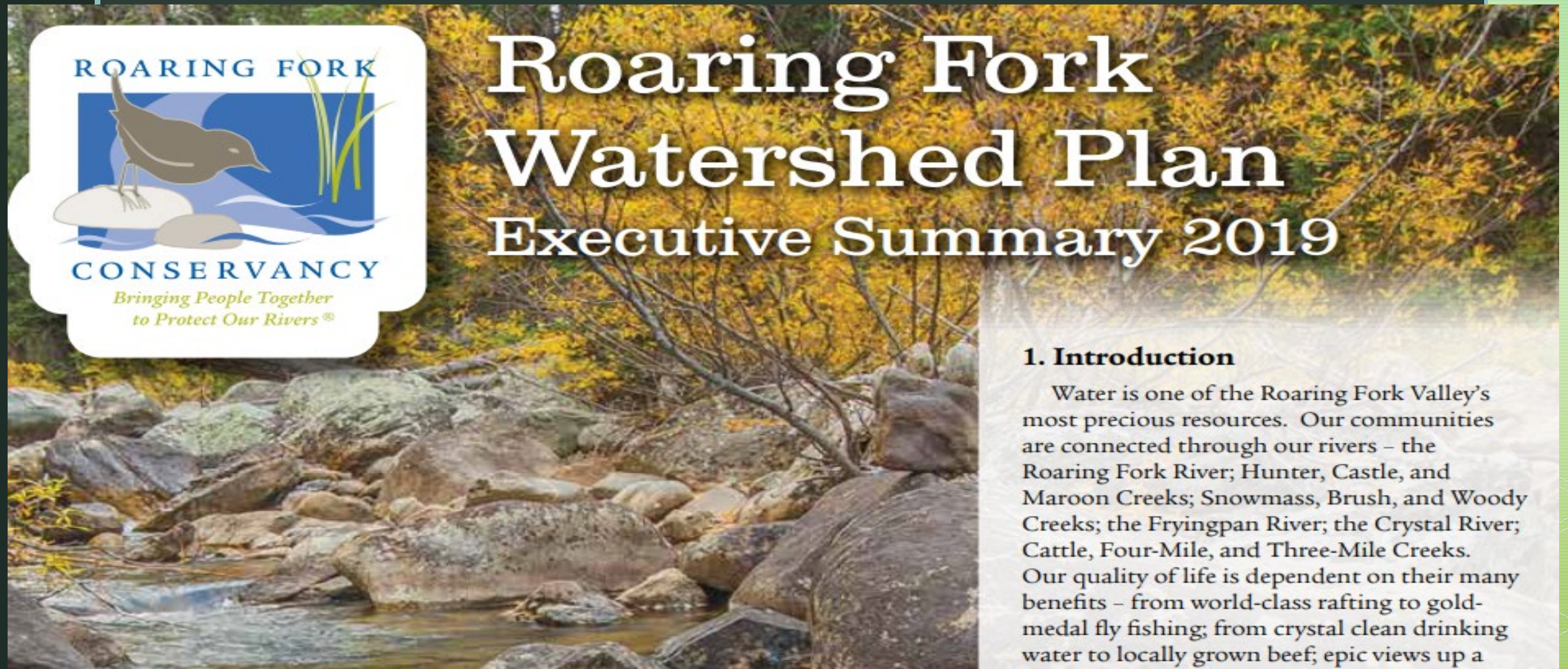
Rivers modified by floodplain alteration

STATE	SHARE OF **HEADWATERS** THAT HAVE BEEN MODIFIED	SHARE OF **SMALLER RIVERS AND STREAMS** THAT HAVE BEEN MODIFIED	SHARE OF **MAJOR RIVERS** THAT HAVE BEEN MODIFIED	**SHARE OF ALL RIVERS THAT HAVE BEEN MODIFIED**
Arizona	32%	56%	96%	**63%**
California	36%	41%	80%	**45%**
Colorado	51%	61%	97%	**63%**

Chart from Disappearing West, Center for American Progress website.

State of the Roaring Fork Watershed

"*More than **two-thirds** of the surveyed streams in the Roaring Fork watershed have moderately to severely **degraded riparian habitat**.*" Roaring Fork Watershed Plan 2019 Executive Summary



Why are incised streams/disconnected floodplains a problem?

- **Physical effects** of disconnected floodplains include:
  - Lowered groundwater tables,
  - Loss of riverine wetlands and riparian vegetation,
  - Lower summer base flows – streams can even transition from perennial to intermittent,
  - Higher sedimentation and warmer water temperatures = **lower water quality**.
- **Biological effects** include a substantial loss of riparian plant biomass and diversity, and population declines in fish and other aquatic organisms.
- **Freshwater biodiversity** of rivers, streams, wetlands, and lakes is rapidly declining in every major river basin on earth at a faster pace than terrestrial and marine systems.

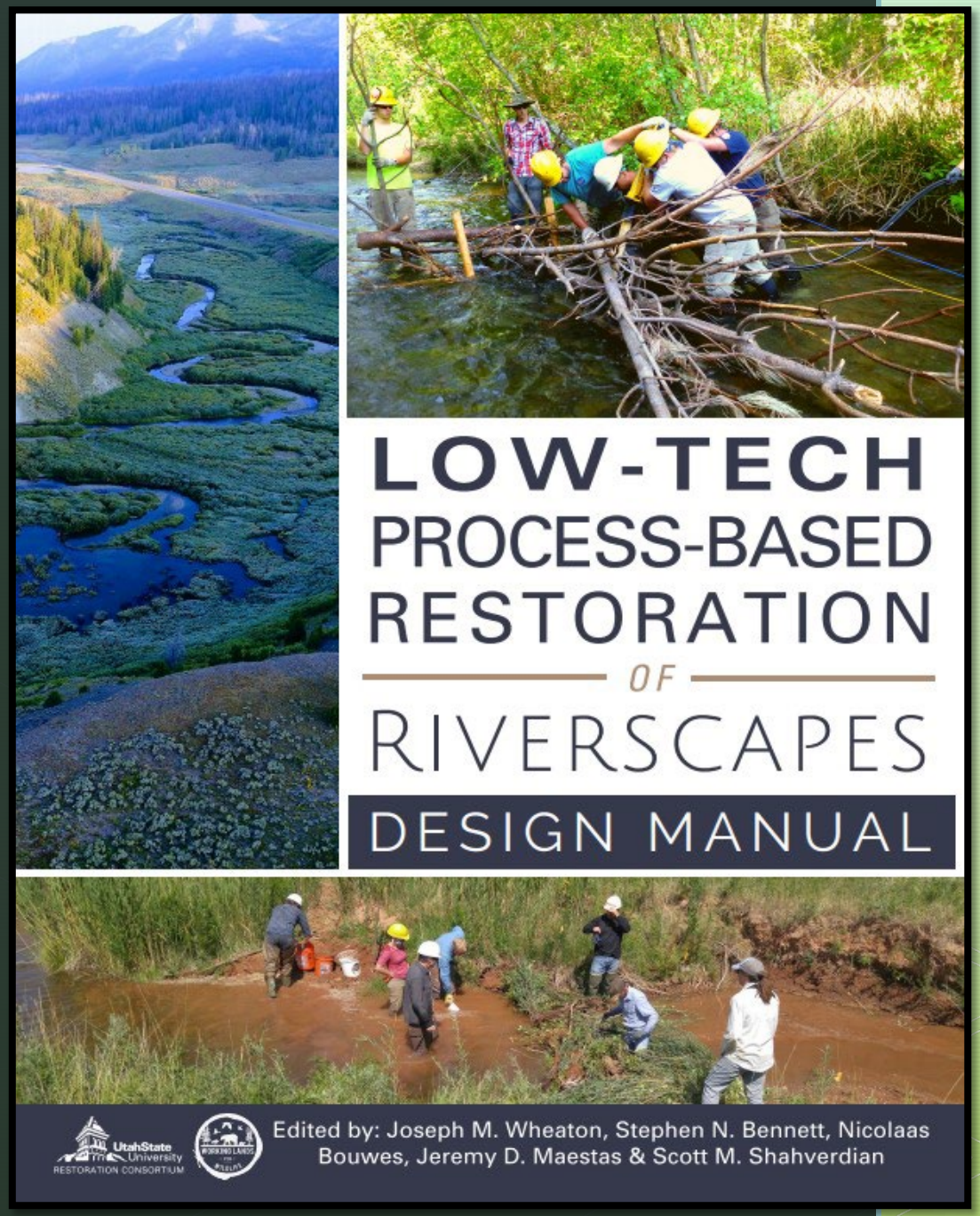
The degree of floodplain alteration differs substantially in CO Streams

All photos by Jackie Corday

2nd & 3rd reasons "Why LTPBR" – *the science & the economics*

The science - case studies show how effective it is to reconnect floodplains and restore ecological and ecosystem services.

The Economics – LTPBR typically costs about **1/10th the cost** of traditional heavy equipment approaches per mile of restoration.



Restored riverscapes = Drought Resiliency

By re-wetting the “sponge”

Soil Moisture

↓

Productivity

↓

Resiliency

SAGE GROUSE INITIATIVE

WORKING LANDS FOR WILDLIFE

This Slide from **Jeremy Maestas, NRCS**

Slides available at: DOI: 10.13140/RG.2.2.20982.55366

Wildfire Resilience

Extensive research on this topic from Dr. Emily Fairfax

Water doesn't burn. Beaver complexes are

Without Beavers

With Beaver

Photos by Dr. Joe Wheaton, Utah State University, of the 2019 **Sharps Fire in Idaho**

Large beaver complex survived Colorado's 2020 Cameron Peak fire

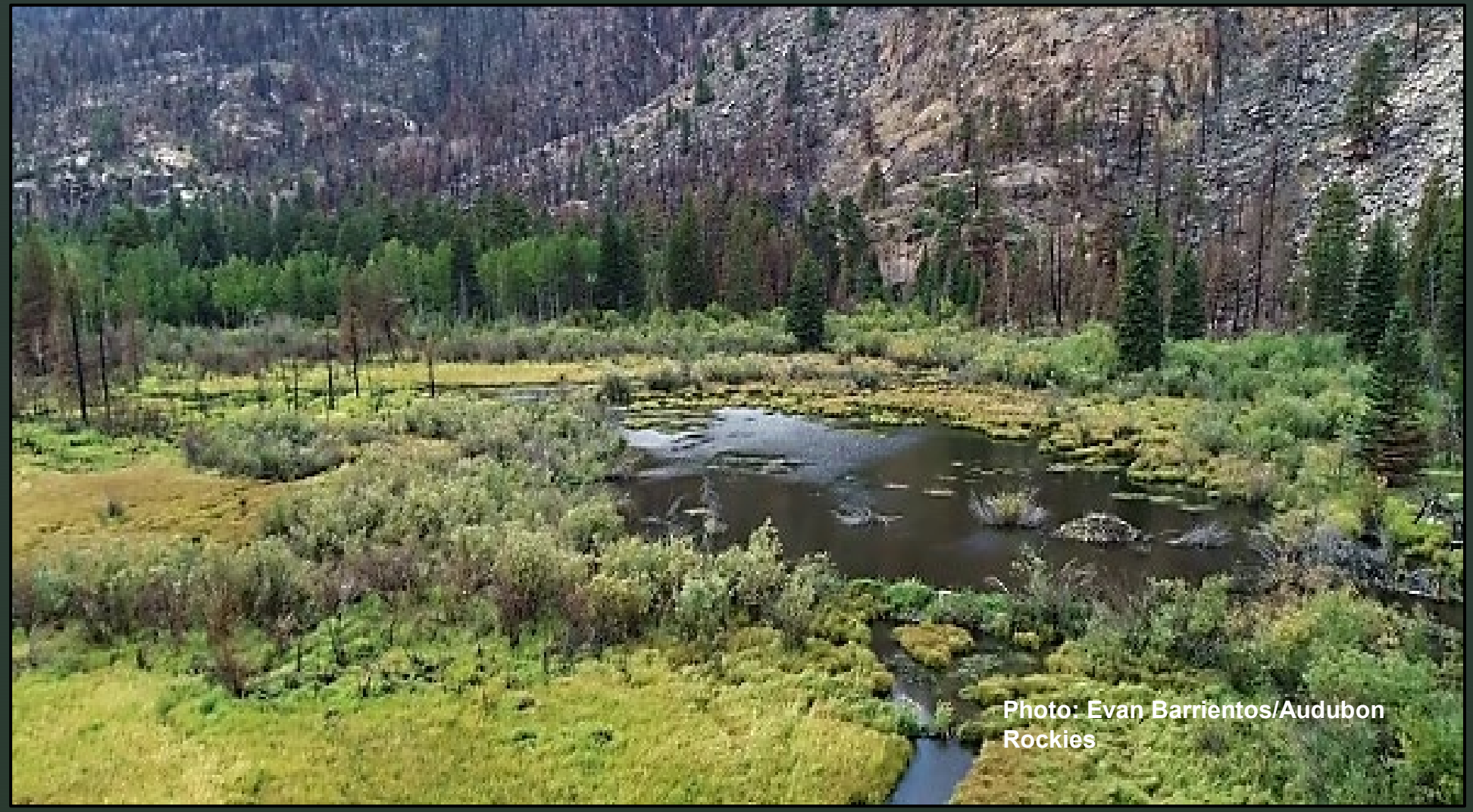


Photo: Evan Barrientos/Audubon Rockies

Benefits of restored streams – allowing beaver to stay or return to their historic habitat

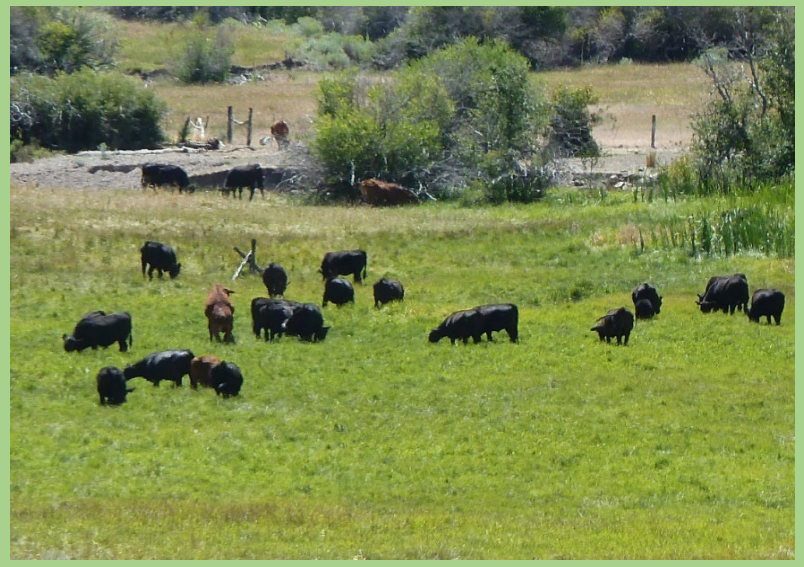
Ranchers' views

Water

- Higher groundwater table
- Improved stream flows
- Increased water ponding

Forage

- Increased riparian pastures & wet meadows
- Better quality & quantity of livestock forage
- Healthier, fatter animals



Slide from Dr. Susan Charney, USDA Pacific Research Station

Part 3

LTPBR Project Examples

Examples of LTPBR approaches – BDAs & PALS

Depending on the location, the goal usually is that beavers will return and take over the project areas where beaver mimicry structures were installed because they are the most beneficial long-term agents of maintaining river health.

Beaver returned within one year of this EcoMetrics South Park BMS restoration project

Photo from Mark Beardsley, EcoMetrics river in South Park area, CO

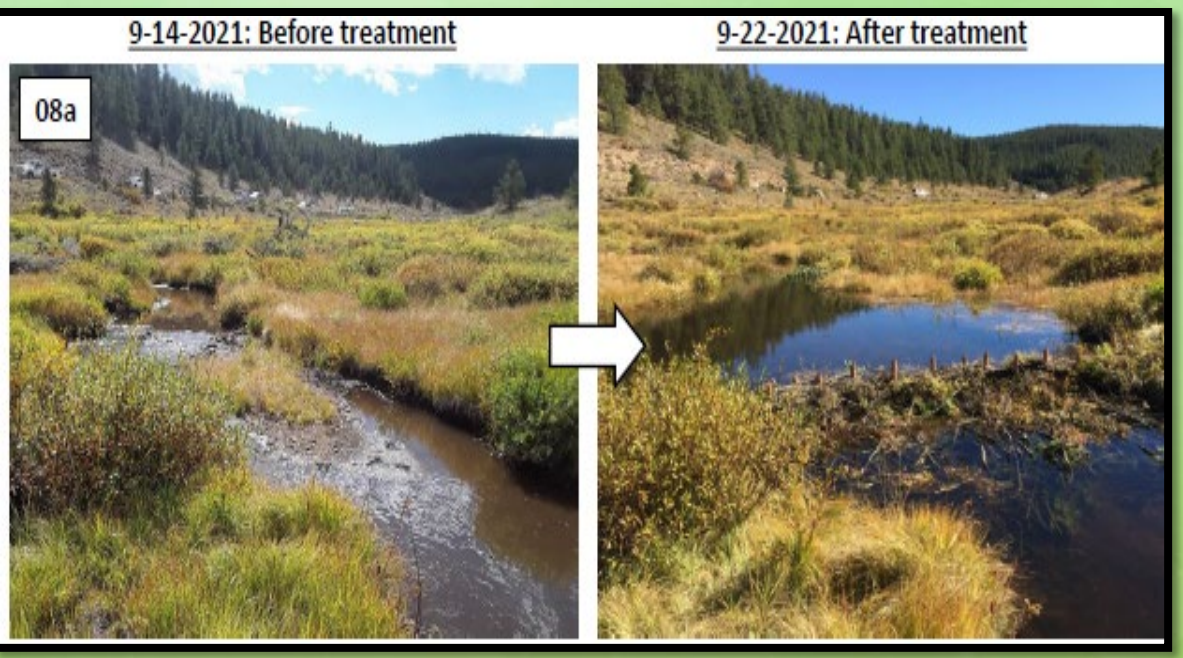
More examples of LTPBR methods – **Zeedyk** rock structures to control gully erosion in the Upper Gunnison

Rock Detention Structures in Arizona that slow runoff, recharge groundwater

Colorado examples of LTPBR projects

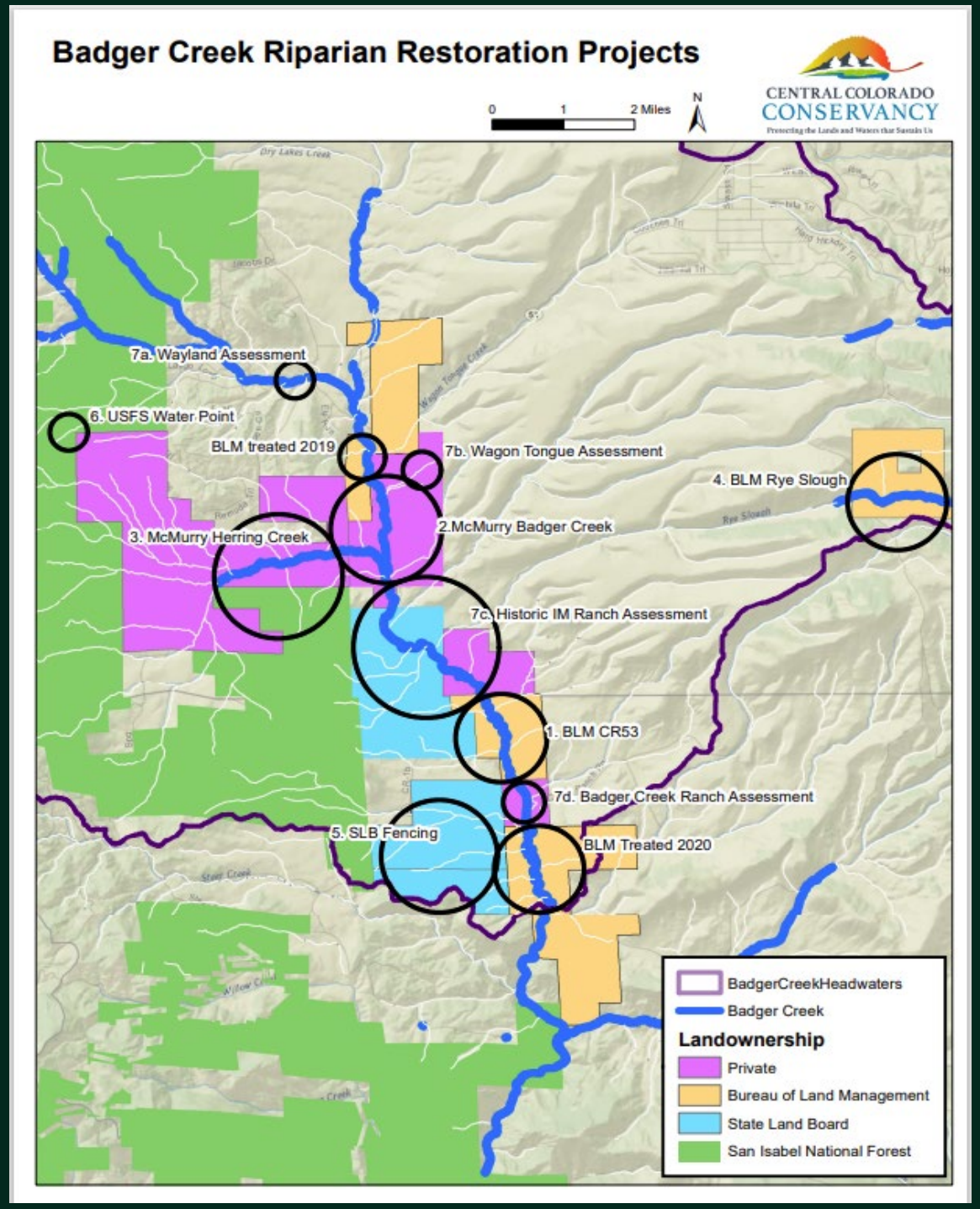
GMUG, Gunnison Ranger District –

Trail Creek – Partners included USFS, CPW, NPS, NFF, TU, HHCA, WCU, and Gunnison County



All photos by EcoMetrics

The Trail Creek LTPBR structures – one season later in June 2022



Badger Creek multi-year project – BLM, CWCB, Park County, CPW, private landowners, CCC

Goal – restore this degraded reach to this reference reach

April 20, 2020 – Before Treatment

June 11, 2020 – After Treatment

LTPBR approach included using native grass sod plugs to provide speed bumps in the incised stream

Also, grazing mgt and riparian plantings are key

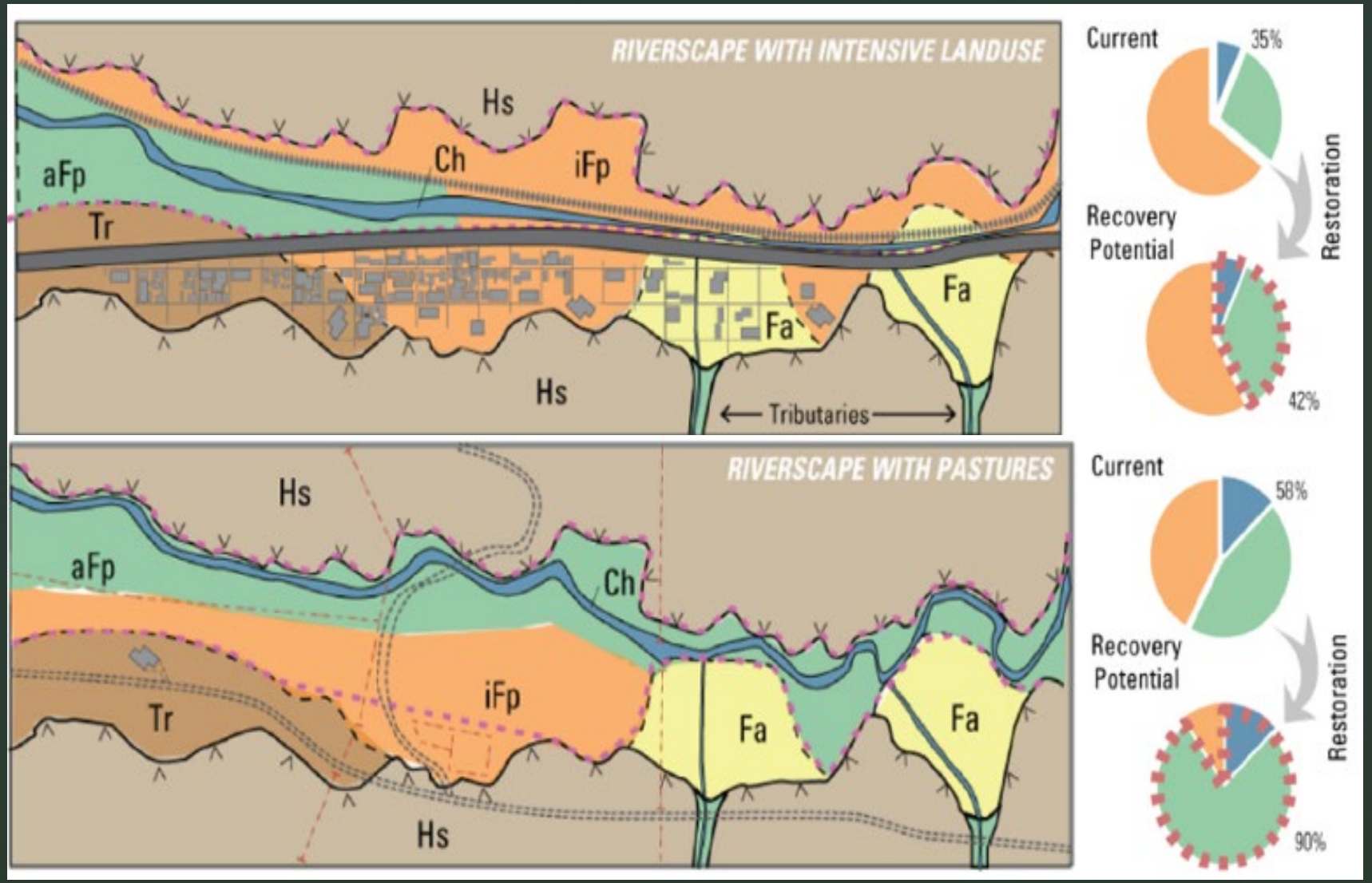
April 23, 2020 – During Treatment

June 11, 2020 – After Treatment, During Planting

Important considerations for LTPBR

- Where are LTPBR approaches to riverscape restoration appropriate? Usually upper watershed headwater streams in valleys with 3% or less slope - where there is room for the stream to utilize its full floodplain without causing conflicts
- Using nature's energy to restore dynamic processes – run-off and erosional events and beaver = dynamic processes & thus need for adaptive management
- Infrastructure management – must plan for beaver returning – culverts/roads
- Grazing management is key to project success!

Recovery potential will depend upon many factors, including existing land uses – graphics from Peter Skidmore & Joe Wheaton 2022 paper



Green = Active Floodplain

Orange = Inactive or historic floodplain

Dashed pink line = potential for FP recovery

[Riverscapes as natural infrastructure: Meeting challenges of climate adaptation and ecosystem restoration - ScienceDirect]