Floodplain Focused

Insight into Achieving Great Restoration, without the “River”

Sydney Salzwedel

Biohabitats
SOUTHERN ROCKY MOUNTAIN BIOREGION

the Watershed Center


Old St. Vrain Road
Restoration Project
Lyons, CO

The Team

the Watershed Center

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LEFT HAND EXCAVATING

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WRIGHT WATER ENGINEERS, INC.

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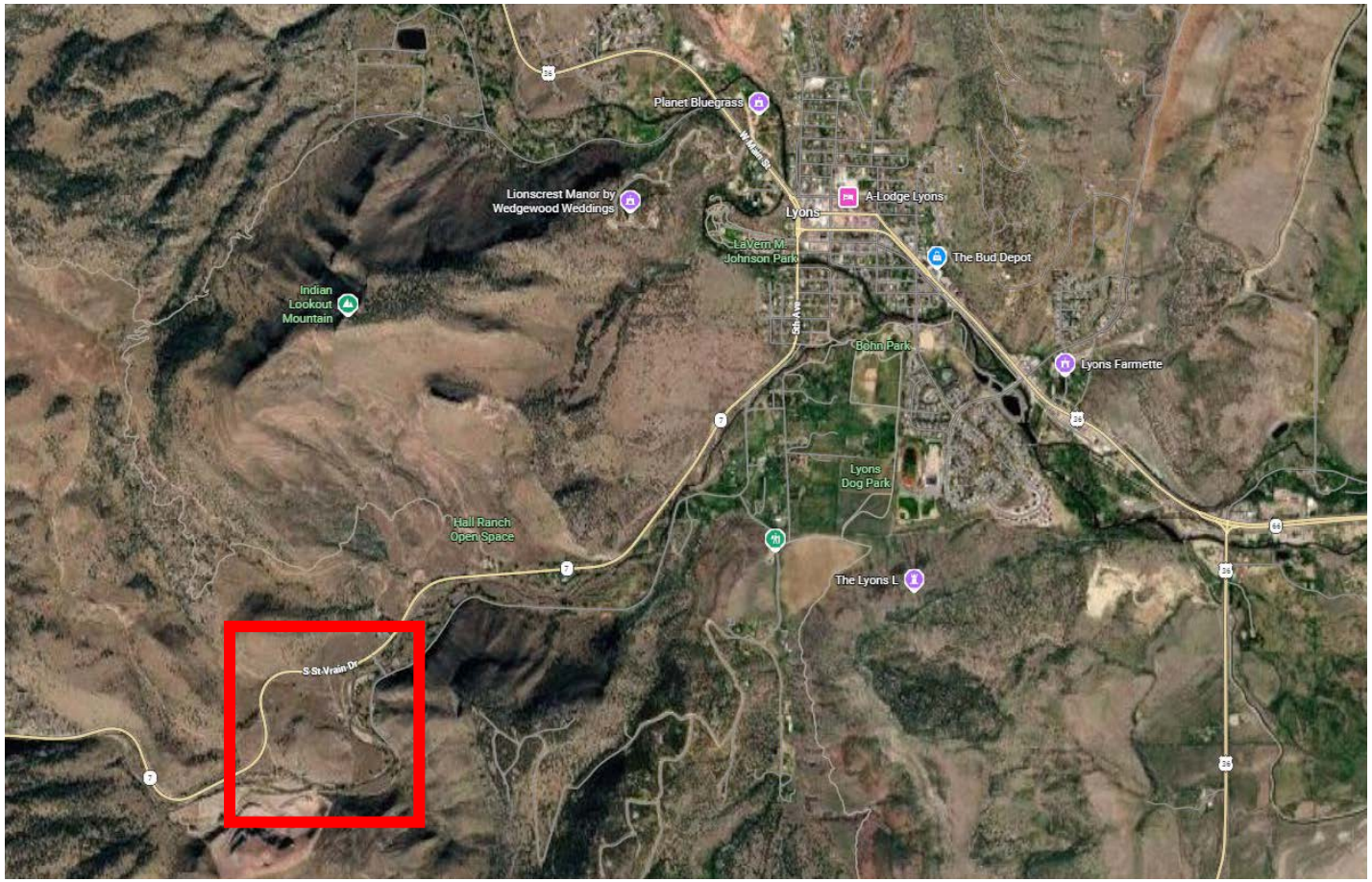
South St. Vrain Creek

The Town of Lyons immediately downstream. Creek approaches from the Southwest, confluences with North St. Vrain Creek

Downstream in a watershed impacted by the Calwood Fire of 2020



South St. Vrain Creek Restoration

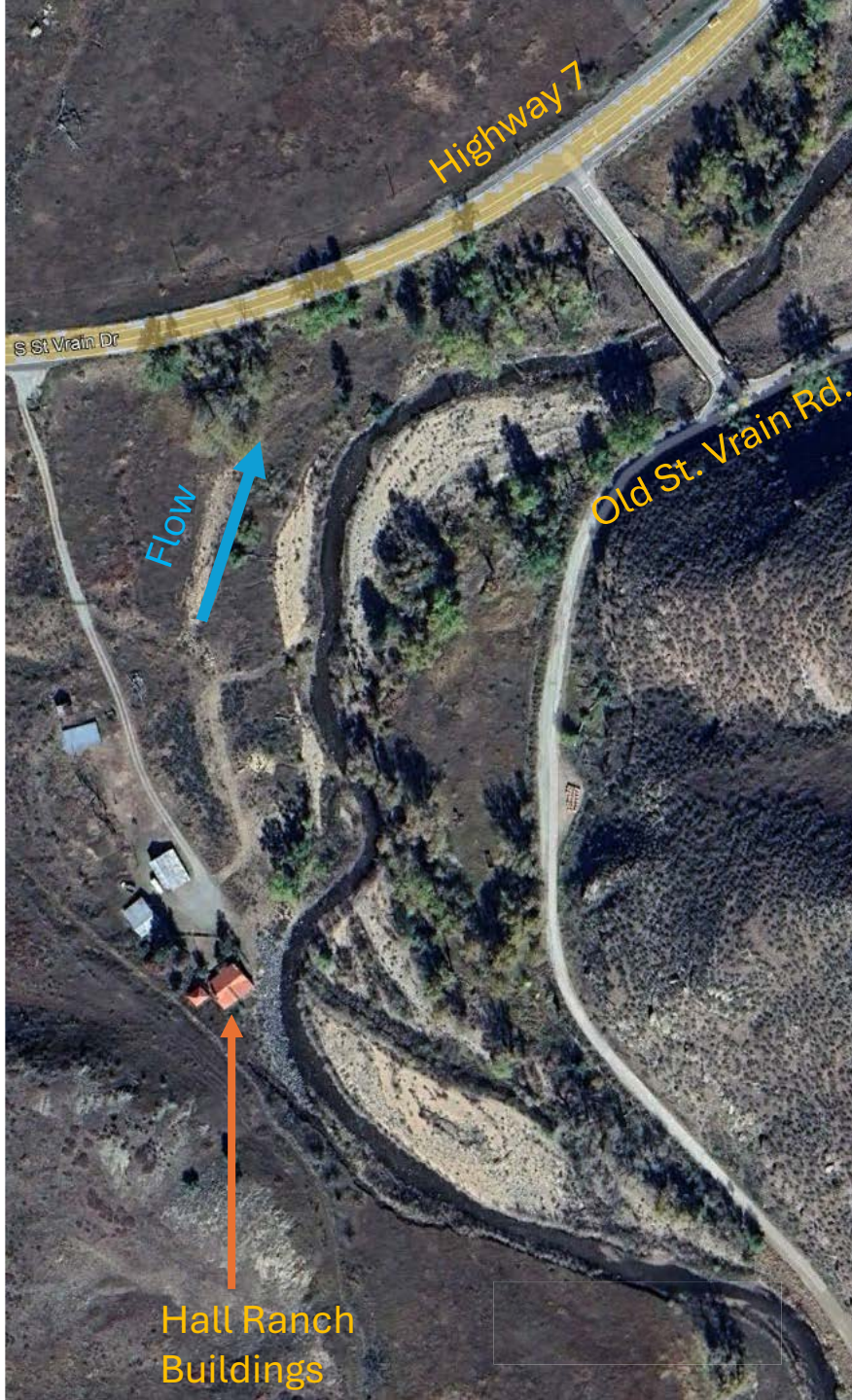
The Project

Design/build ecological restoration project for The Watershed Center.

Hall Ranch and Boulder County property.

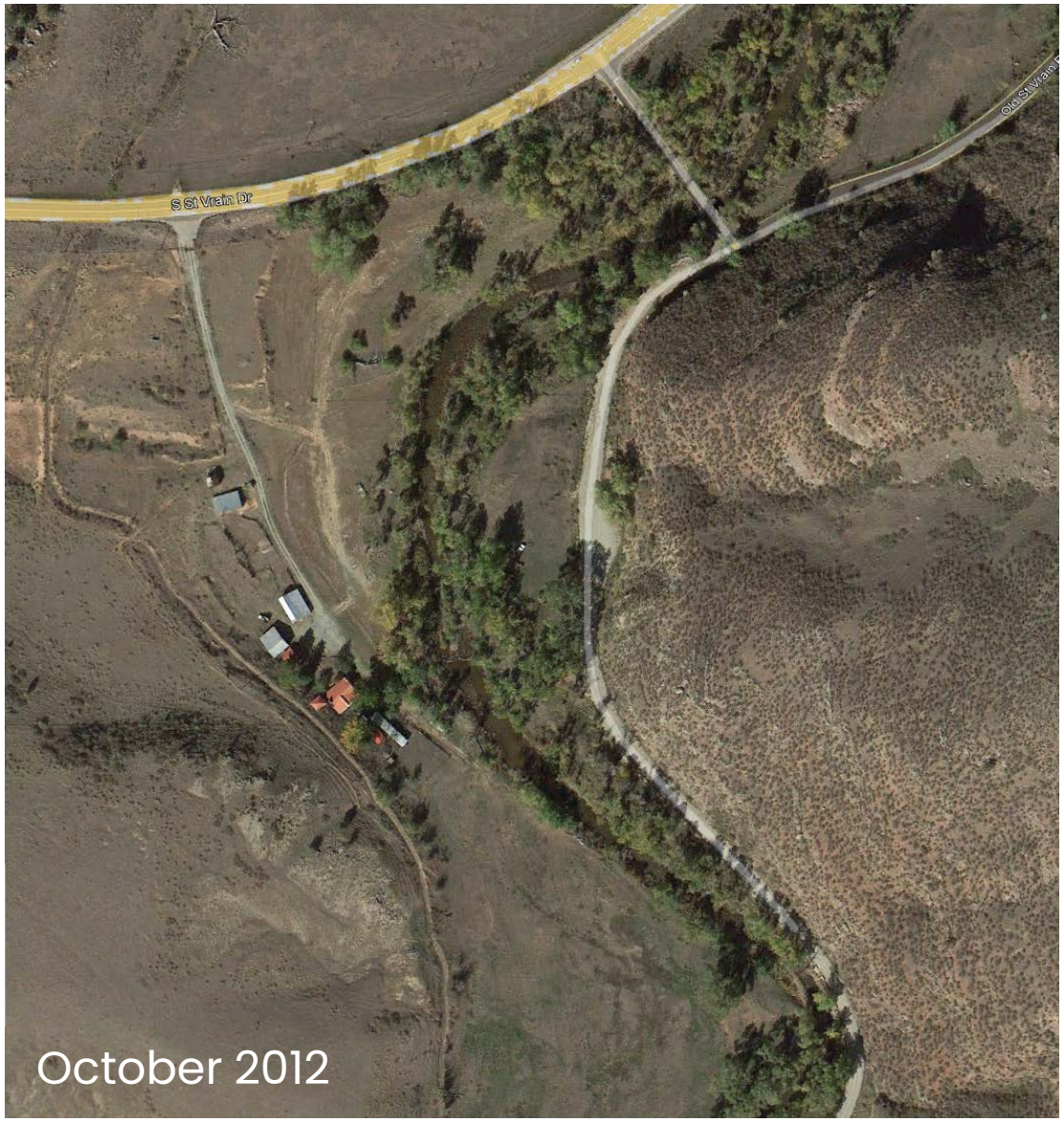
Focusing on the floodplain along 2,200 linear feet of South St. Vrain Creek.

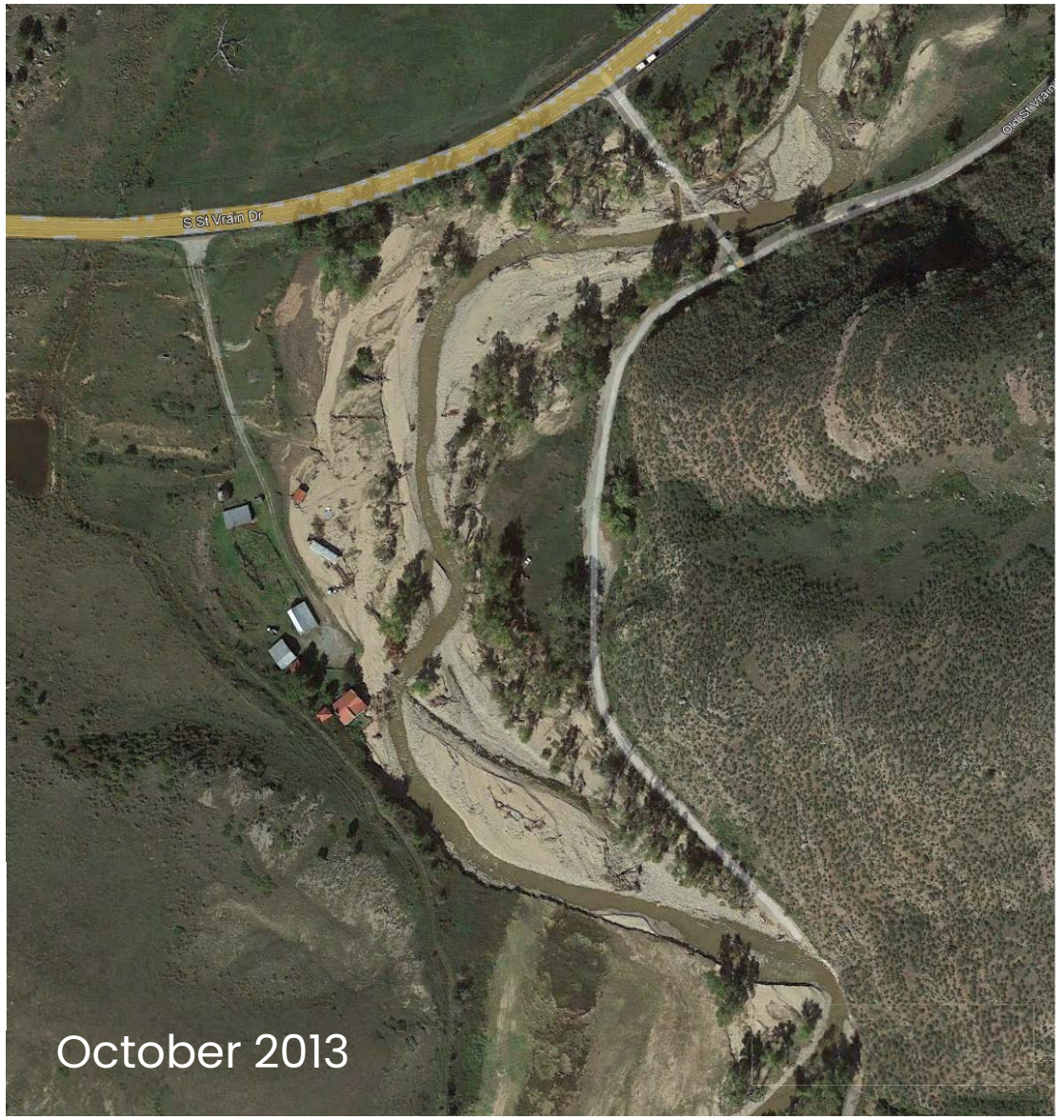
Heavily impacted by the flood in 2013.



South St. Vrain Creek Restoration

Pre- and Post-Flood



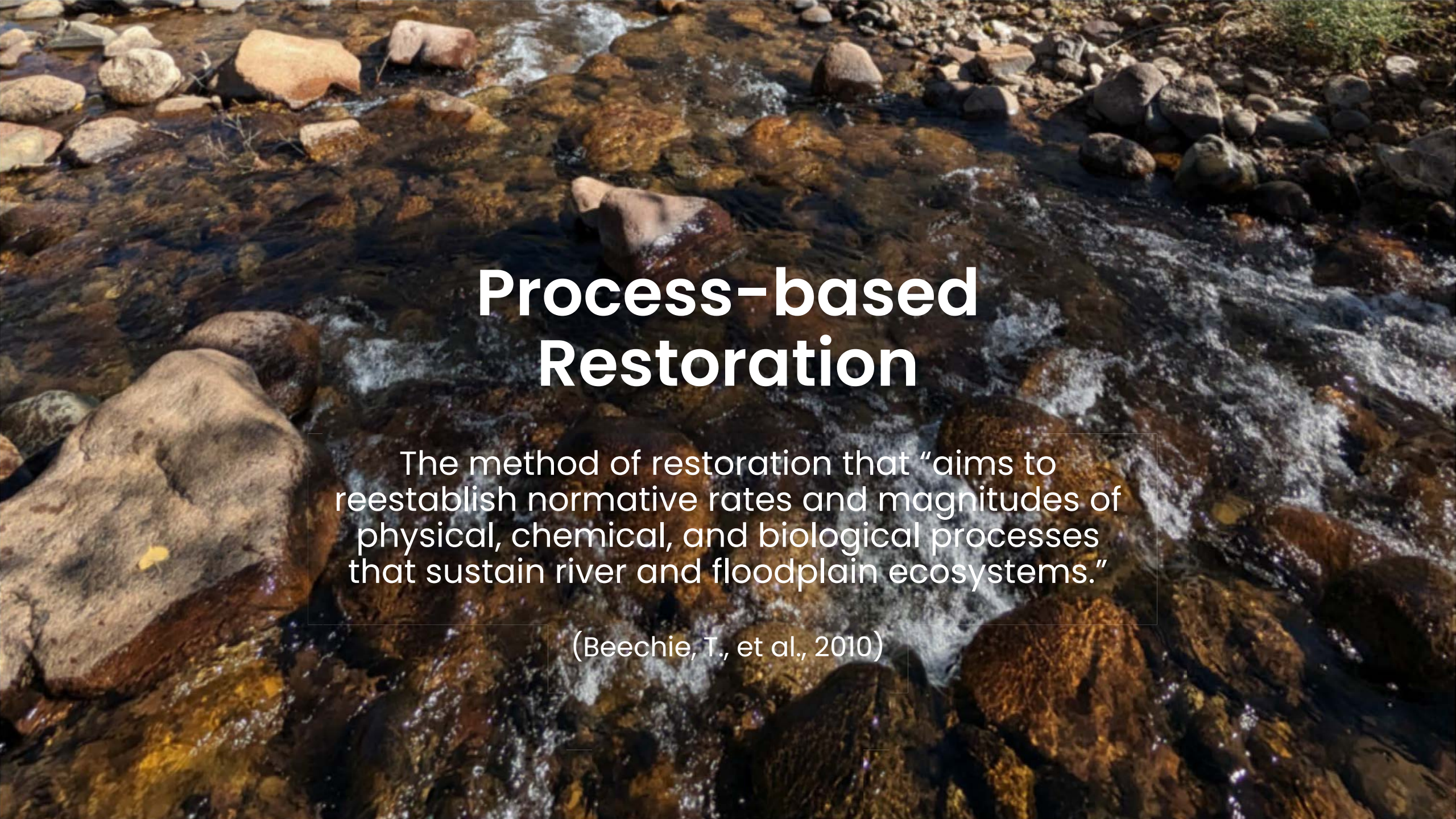


South St. Vrain Creek Restoration

Goals

Using a process-based approach:

- Reduce hazards and increase flood safety
- Control non-point source pollution, mainly post-fire sedimentation
- Improve ecological conditions for wildlife, aquatic habitat, and water quality
- Preserve and protect



Process-based Restoration

The method of restoration that “aims to reestablish normative rates and magnitudes of physical, chemical, and biological processes that sustain river and floodplain ecosystems.”

(Beechie, T., et al., 2010)

Guiding Principles

1) Target root causes of habitat and ecosystem change

2) Tailor restoration actions to local potential

3) Match the scale of restoration to the scale of the problem

4) Be explicit about expected outcomes

(Beechie, T., et al., 2010)

Process-based Restoration

Root Causes

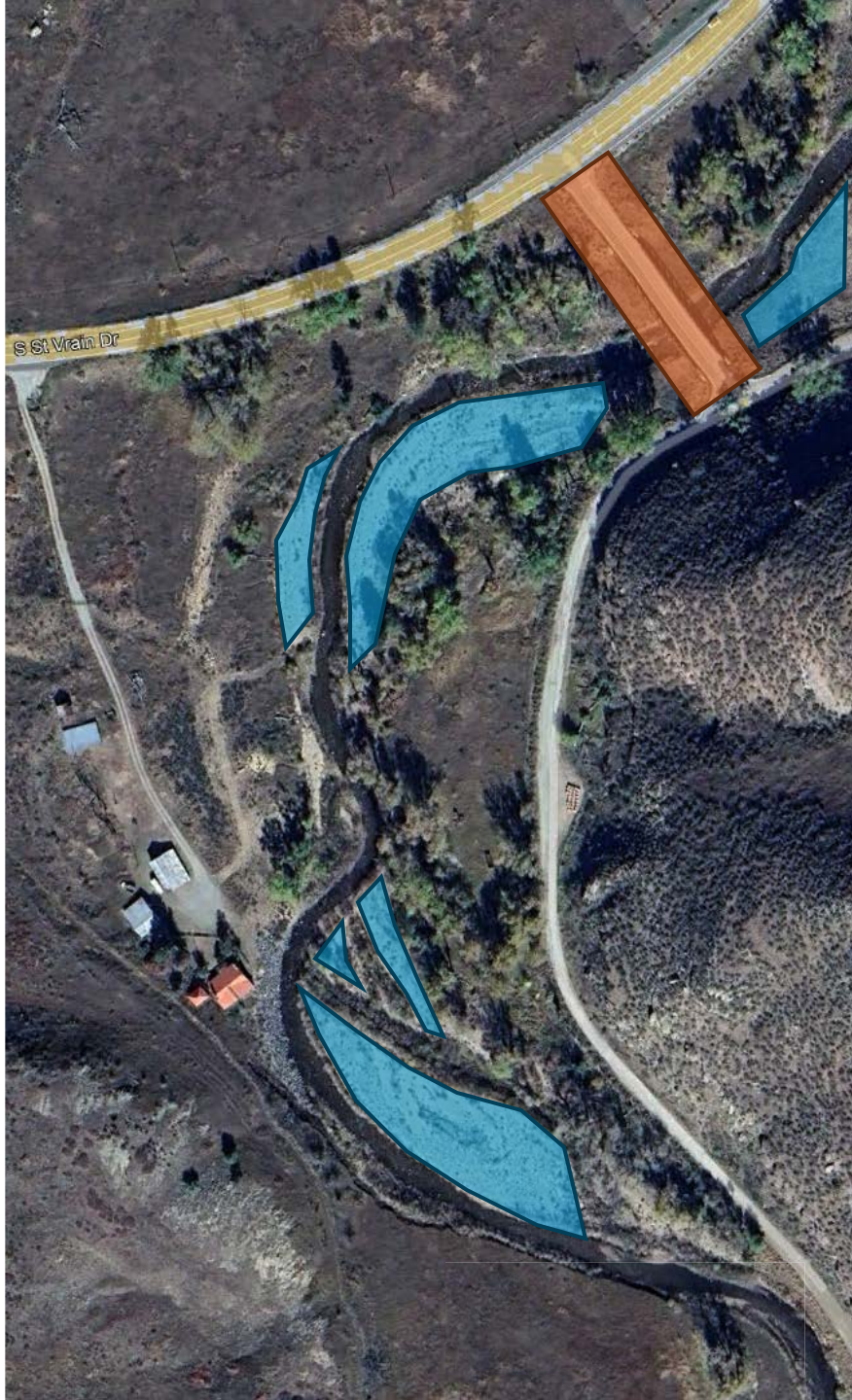
Climate Change? Resiliency!

Undersized infrastructure

Bridge replaced with one that spans the entire floodplain

Disconnected floodplain

?

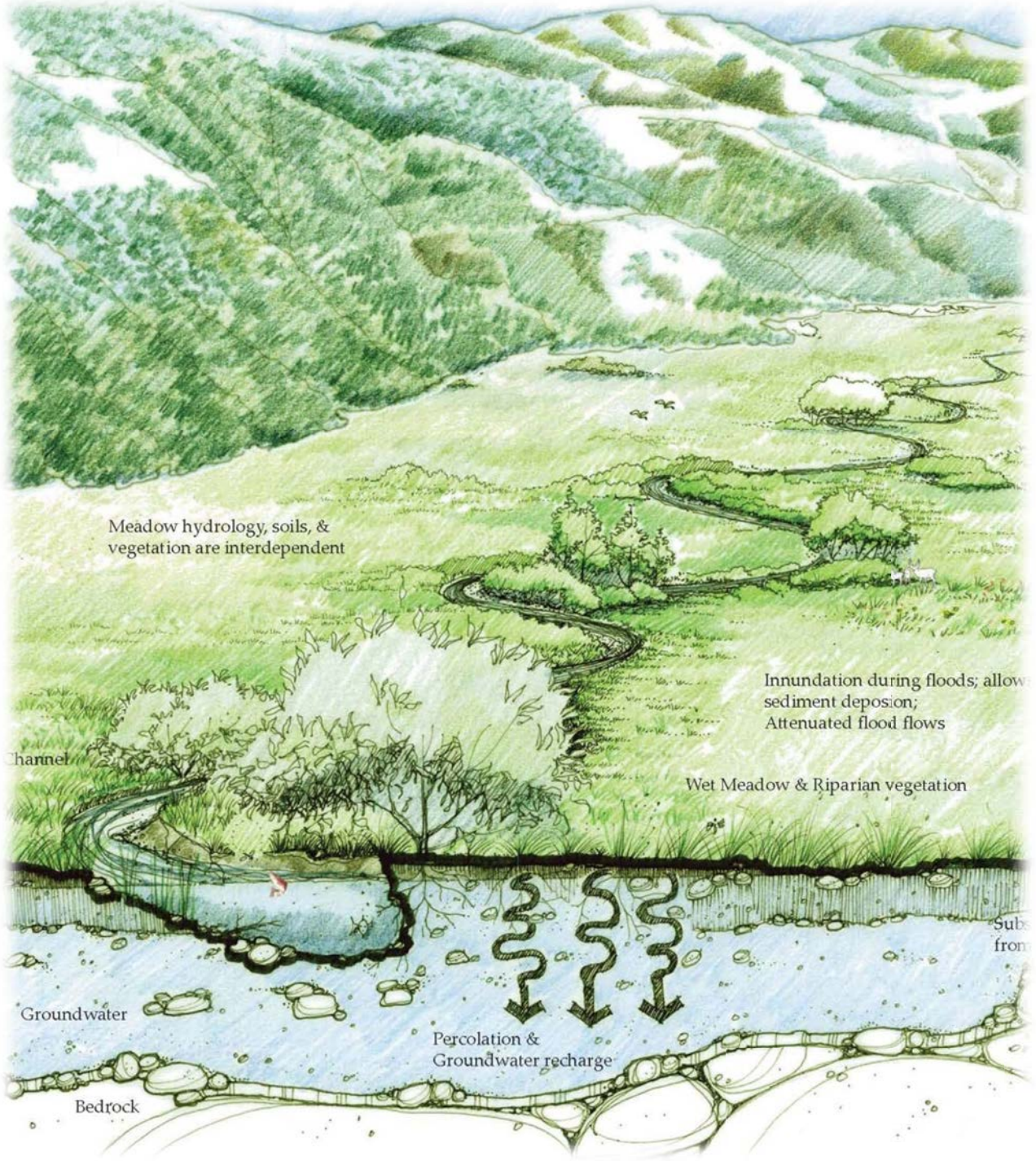


Root Causes

What is interrupting the processes on our site?

Floodplain Disconnection/Channelization

- Frequent inundation
- Infiltration
- Sediment deposition
- Establishment and expansion of riparian soils & vegetation



American Rivers, 2023, Mountain Meadow Restoration

Local Potential

Restoration approach should match physiographic and climatic setting

Scale of Restoration

Connecting large areas of the floodplain, in a high energy system.

We had to scale up:

- Moving large quantities of dirt
- Using very large trees and boulders for structures
- Town of Lyons downstream

“Low-tech” hand-built structures weren’t going to cut it

Process-based Restoration

Expected Outcomes

Processes restored:

- Frequent inundation
- Infiltration
- Sediment deposition
- Establishment and expansion of riparian soils & vegetation

Accepting small variances from design

Design Approach

- Remove excess floodplain deposition from the 2013 flood
- Provide multiple elevational zones that support various riparian communities and activate during various flood events
  - Grading access points and side channels to encourage floodplain overflow
- Create additional complexity for improved habitat
  - Wood and boulder structures

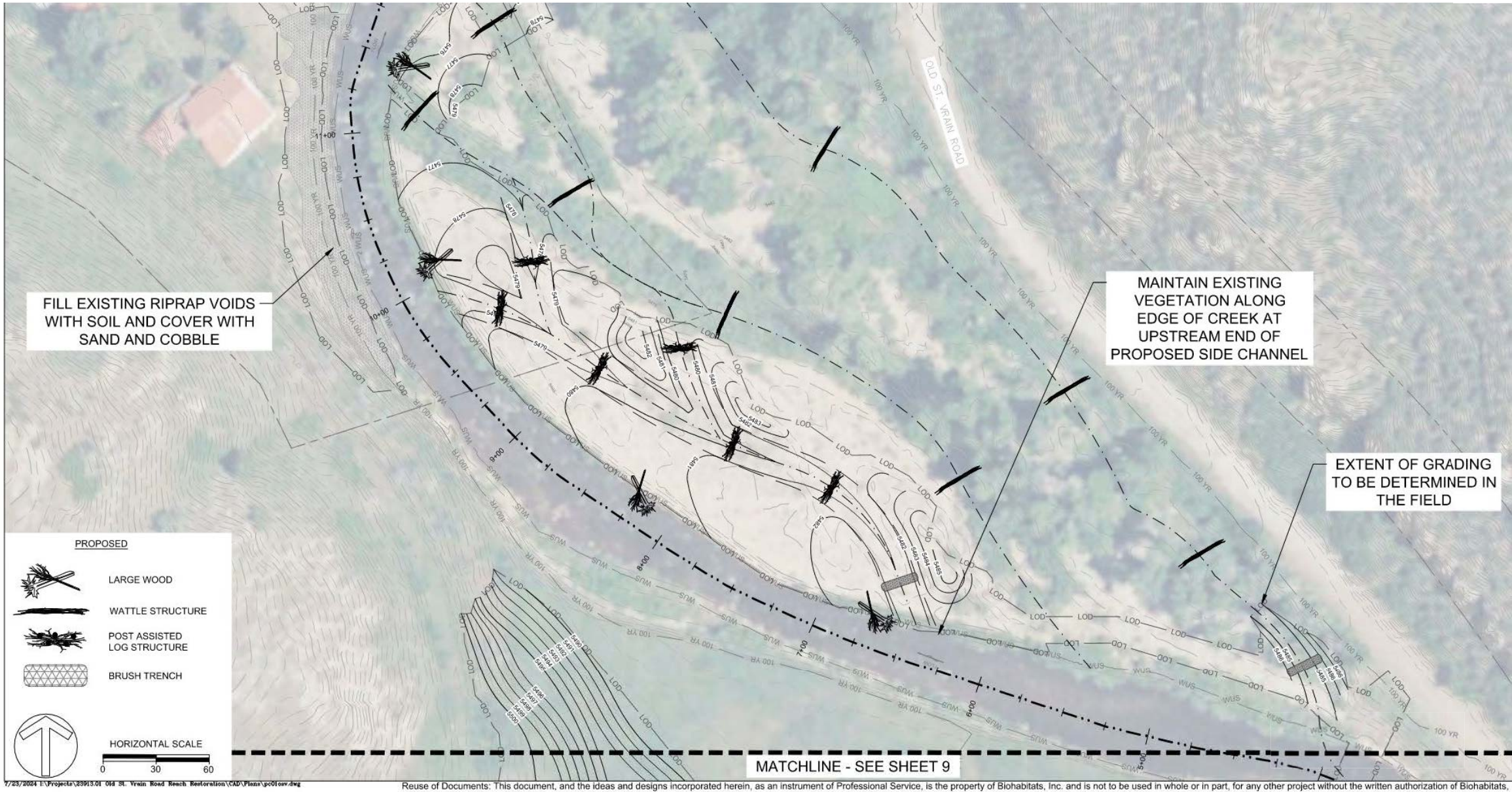
The Main Channel

A riverscape is a whole system, functioning in tandem

Protect & preserve was a big goal for the project

Design

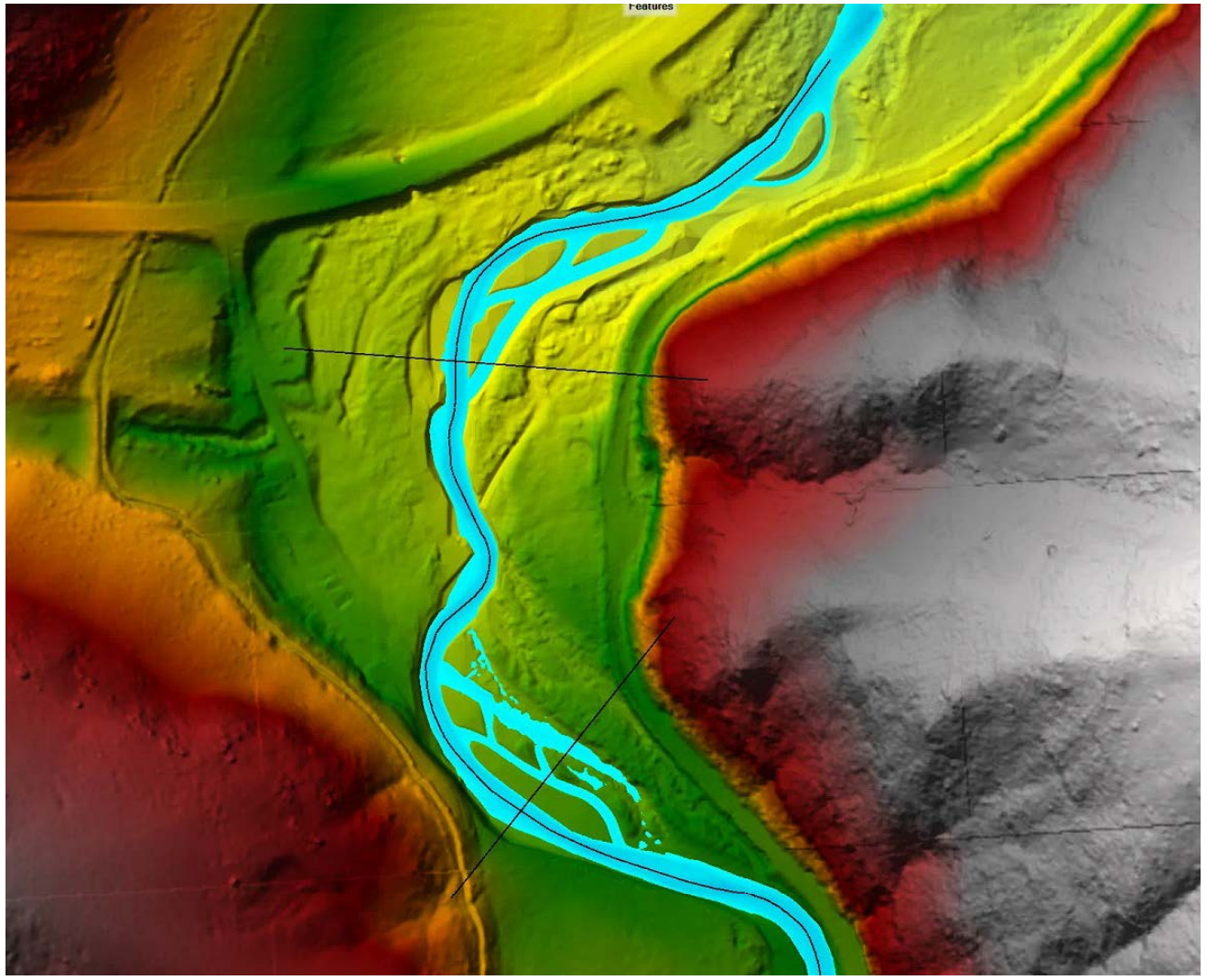
Design Approach



Design


OLD ST. VRAIN ROAD
100 YR
LOD
WUS
SDM
5470
5471
5472
5469
5468
5467
5466
5465
5464
5463
5462
16+00
17+00
19+00
20+00

Side Channels & Floodplain Grading



2D HEC-RAS Model

Proposed Design

Max Depth @ 450 cfs

Design

Side Channels & Floodplain Grading

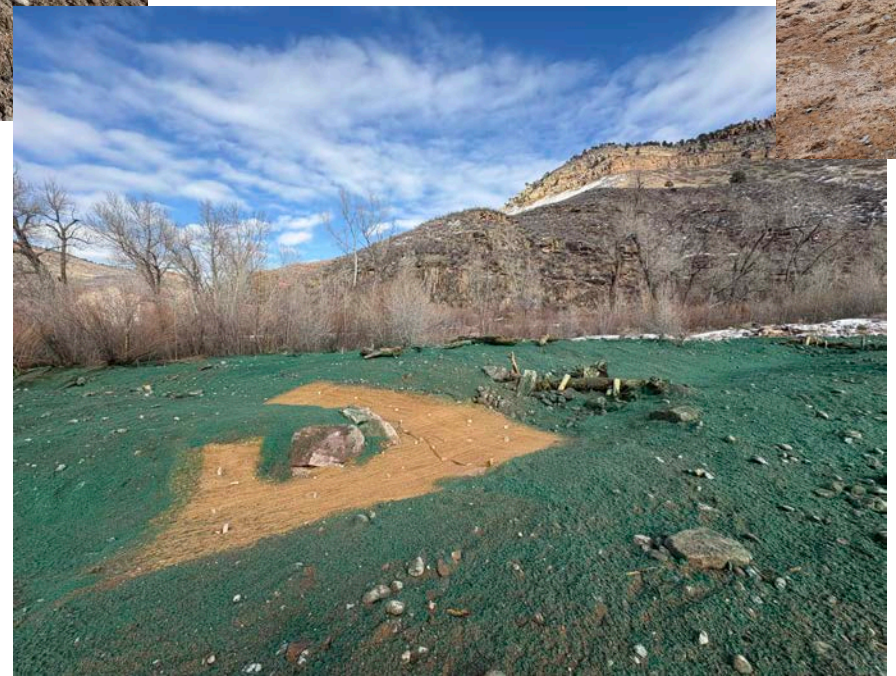
Design

Large Wood

Design

Ephemeral Floodplain Features

PALS



Design

Ephemeral Floodplain Features

Before and After Spring Runoff 8/6/2025

Design

Ephemeral Floodplain Features

Before and After Spring Runoff 8/6/2025

Design

A process-based approach to a floodplain restoration project, while preserving our main channel.

Design

Thank you!

River Stories

https://www.youtube.com/watch?v=GpHaZFPx0Jo