Deer Creek Floodplain Restoration Project:

A Stage 0 Restoration Case Study in Western Oregon

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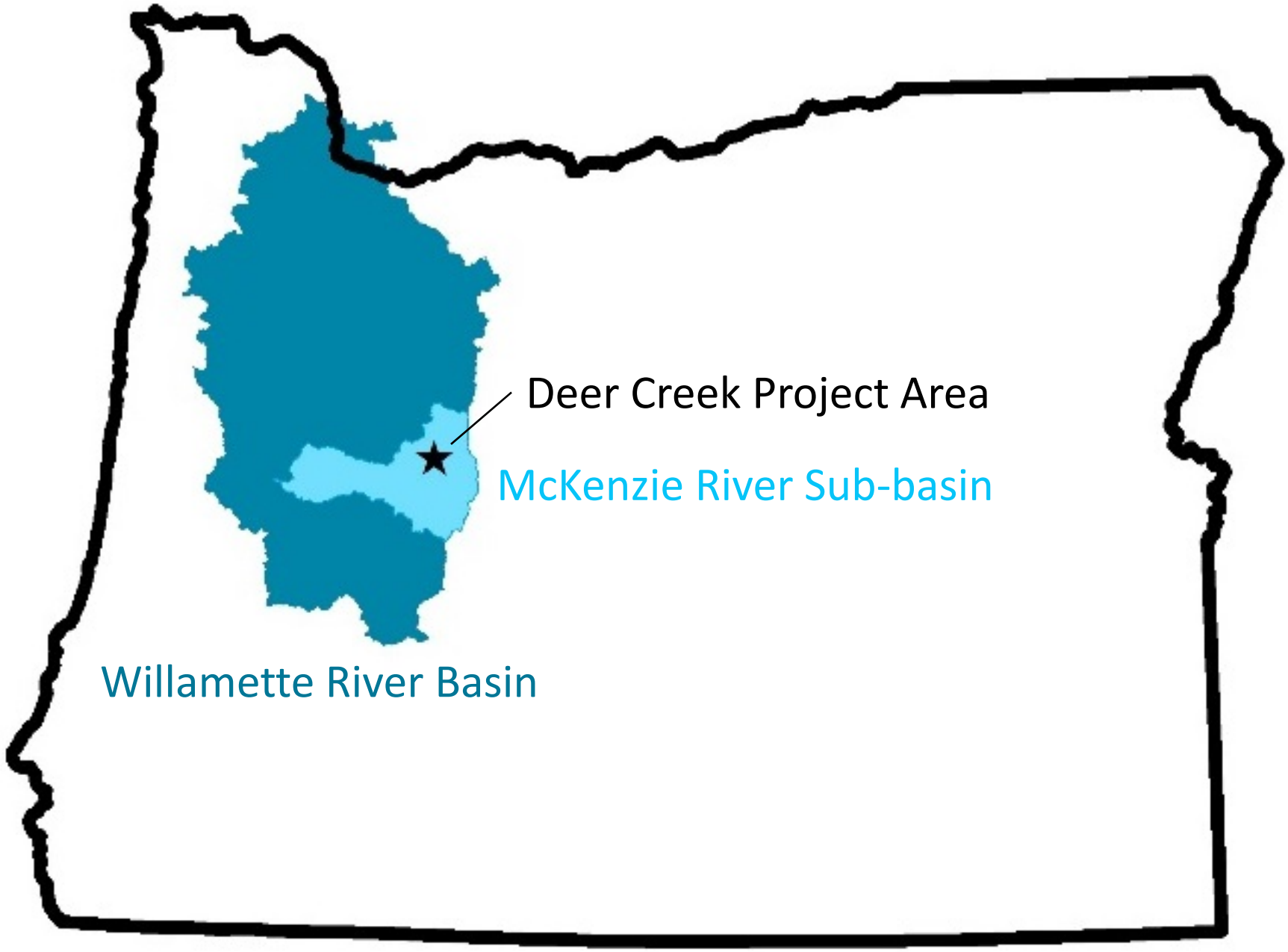

Deer Creek Project Area
McKenzie River Sub-basin
Willamette River Basin

Historically….

- Depositional alluvial valley (high wood loading/sediment storage)
- Spawning and rearing habitat for ESA-Threatened spring Chinook salmon and foraging habitat for ESA-Threatened bull trout
- Productive habitat for cutthroat and rainbow trout, sculpin, etc.

Land Management History

- Historic riparian logging and stream clean-out reduced channel and floodplain roughness
- 1964 flood scoured entire valley bottom

Land Management History

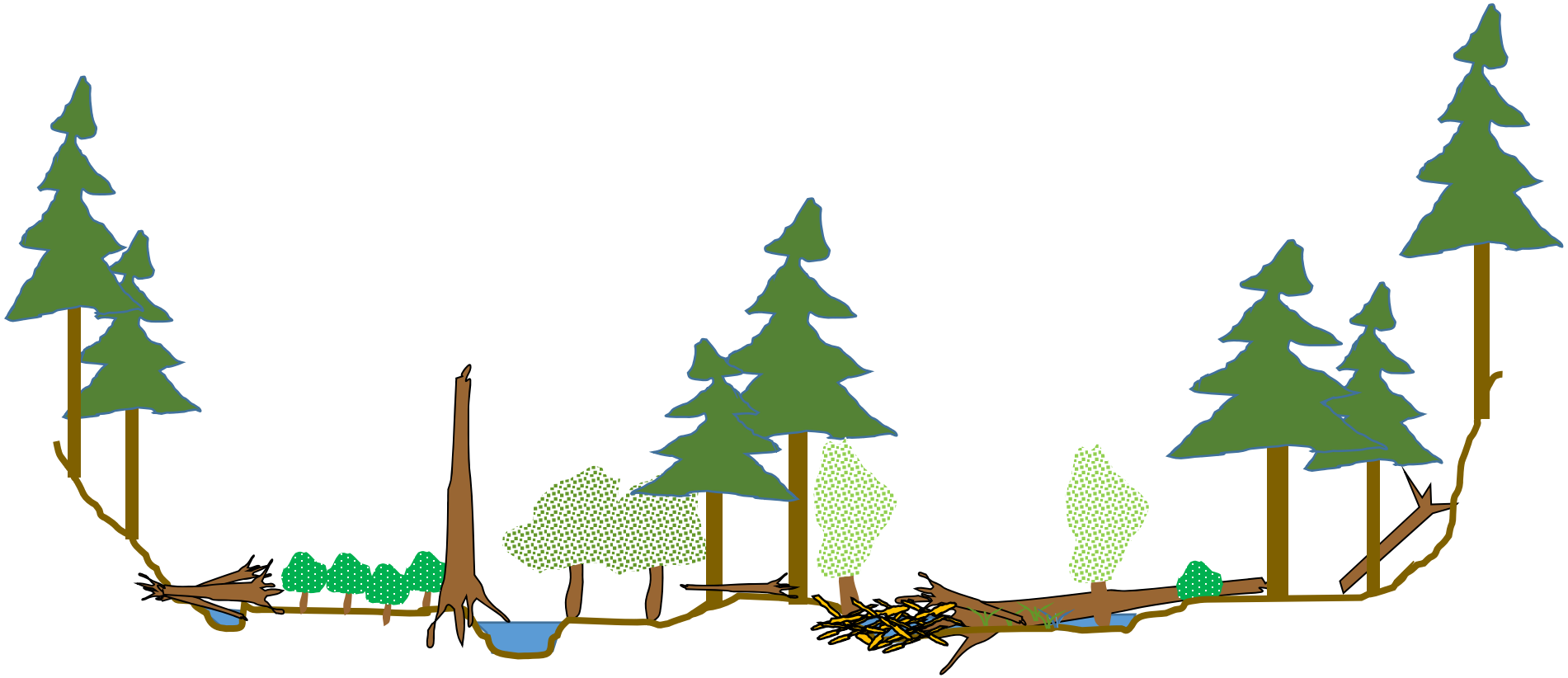
- Constructed berms channelized the stream…

Land Management History

- … and created a single-thread, transport channel with minimal floodplain connectivity

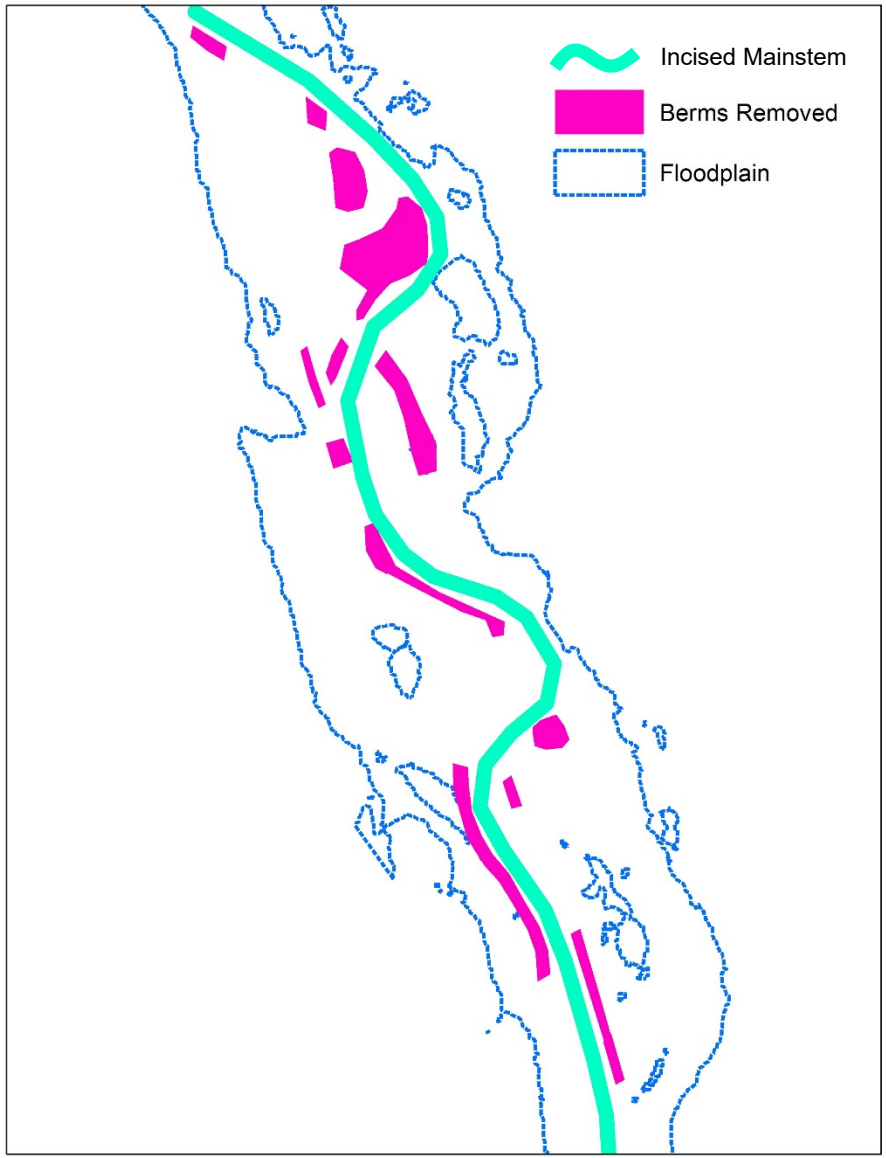
Project Goal

Restore lower Deer Creek to a complex, dynamic, depositional alluvial valley



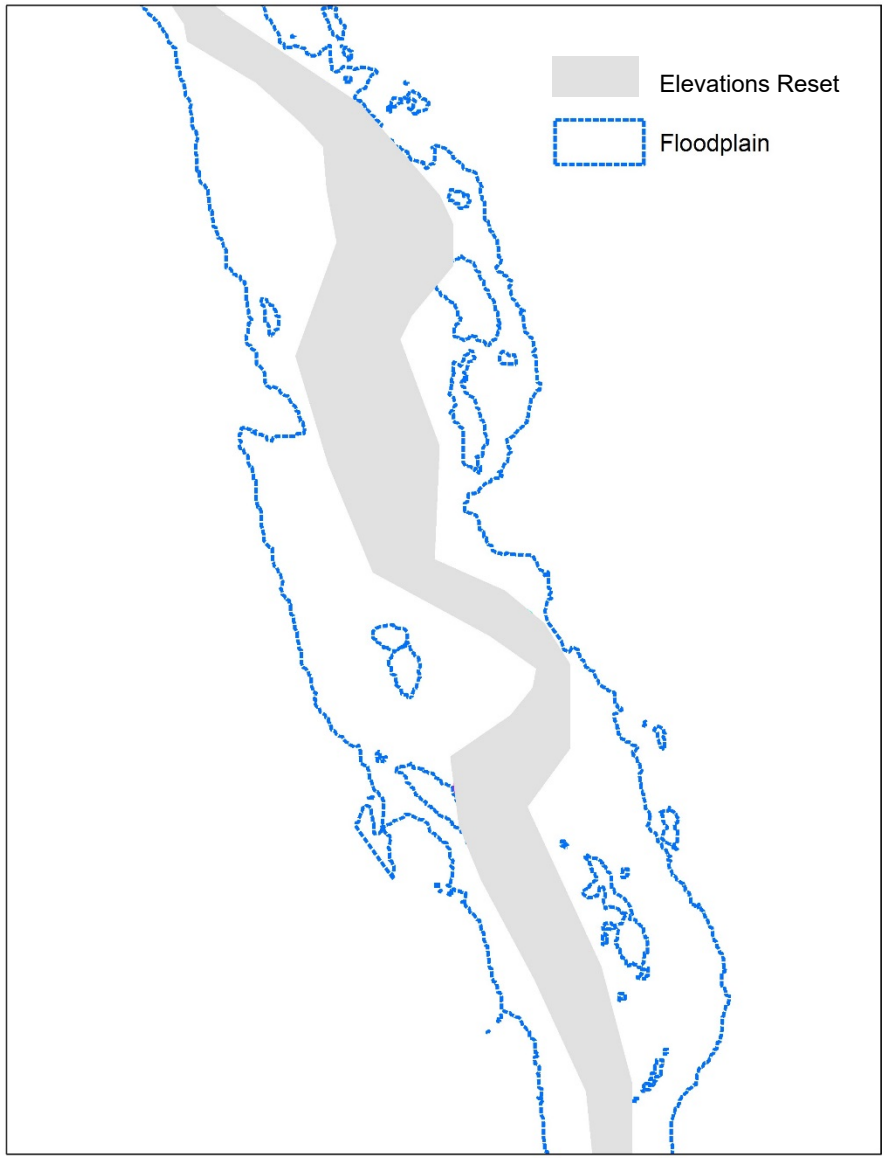
Design Concept

- Identify all berms and artificial features (pink)



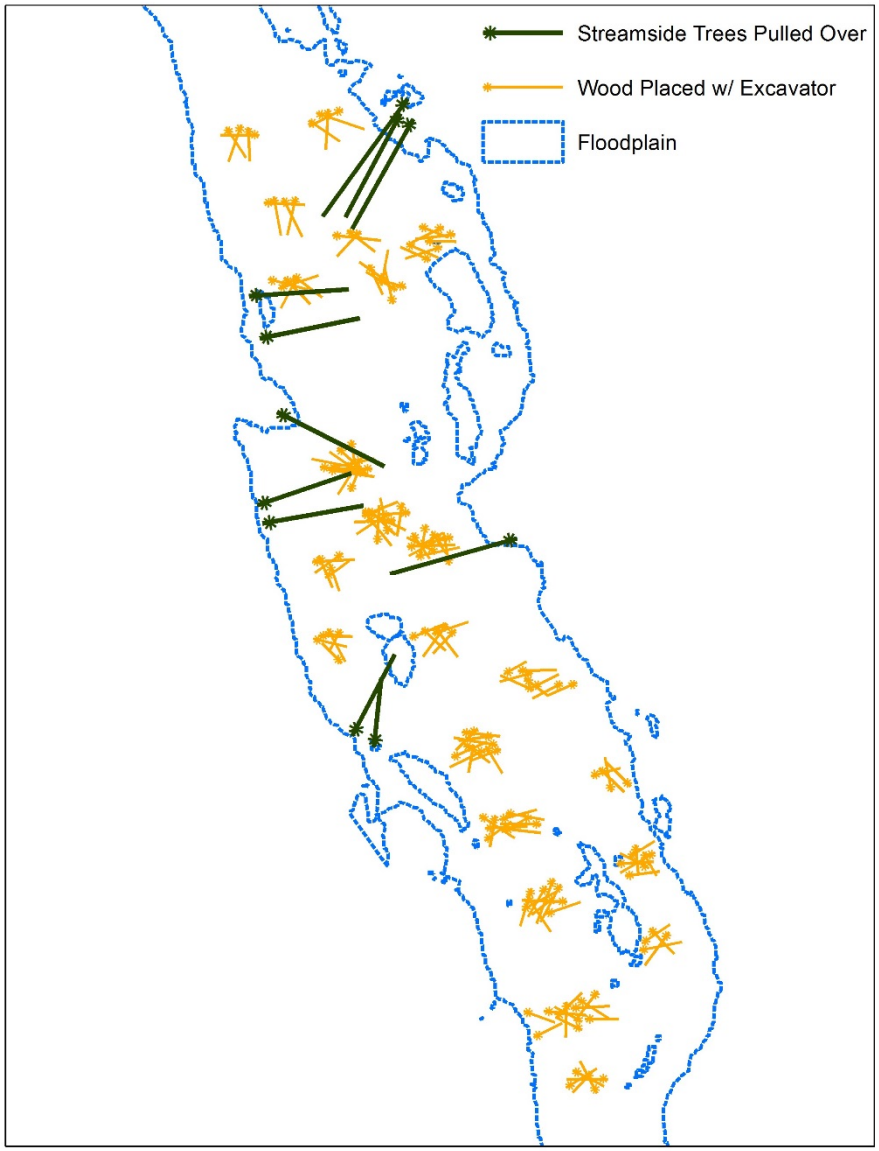
Design Concept

- “Reset” valley bottom elevations for full connectivity by redistributing berm material into incised channel (grey)



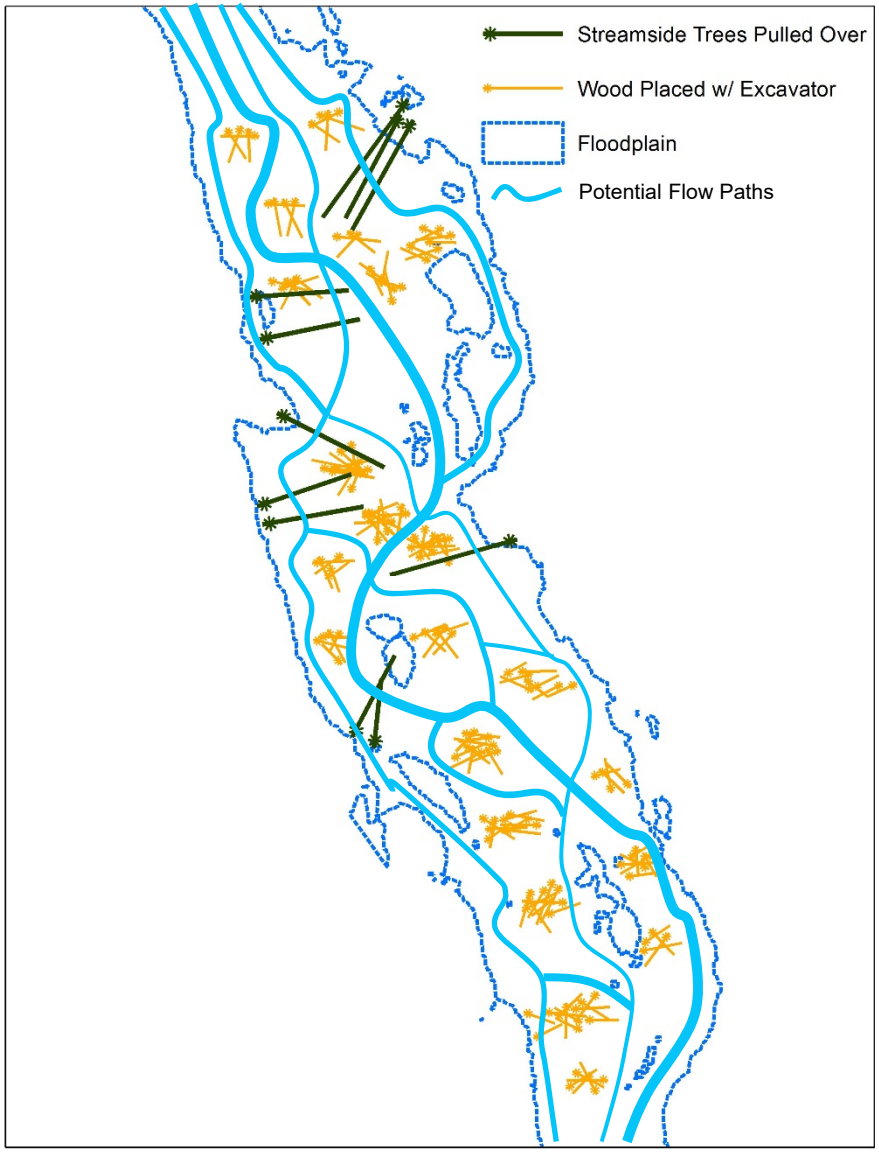
Design Concept

- Add large wood (green and yellow) throughout the valley bottom to create hydraulic complexity and dissipate energy wherever channels may migrate



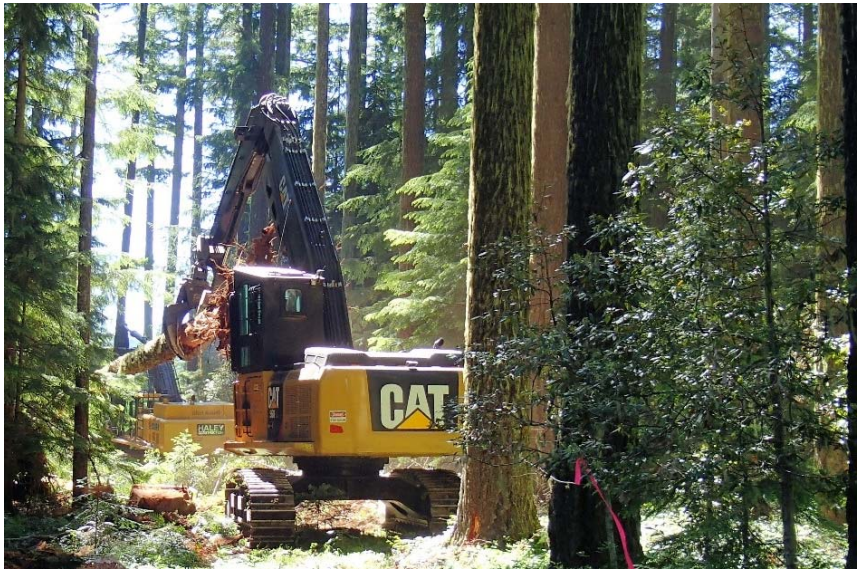
Design Concept

- Allow natural processes to create dynamic channels, islands, bars, and complex habitat
- No constructed channels



Implementation

- 200 trees (24-36” dbh) in upland units were pushed over, broken in half, and hauled down to placement sites



Implementation

- Berms were pushed into incised channel with a dozer and excavator

Implementation

- 450 pieces of large wood were placed in jams and single pieces throughout the valley bottom

Implementation

- 25 streamside trees (38-63” dbh) were pulled over using a truck-mounted yarder to serve as large, stable key pieces

Monitoring Results: Before and After (1yr)

METRIC	BEFORE	AFTER	% INCREASE
LWM Density	20 pieces/mile (12 pieces/km)	317 pieces/mile (197 pieces/km)	1500%

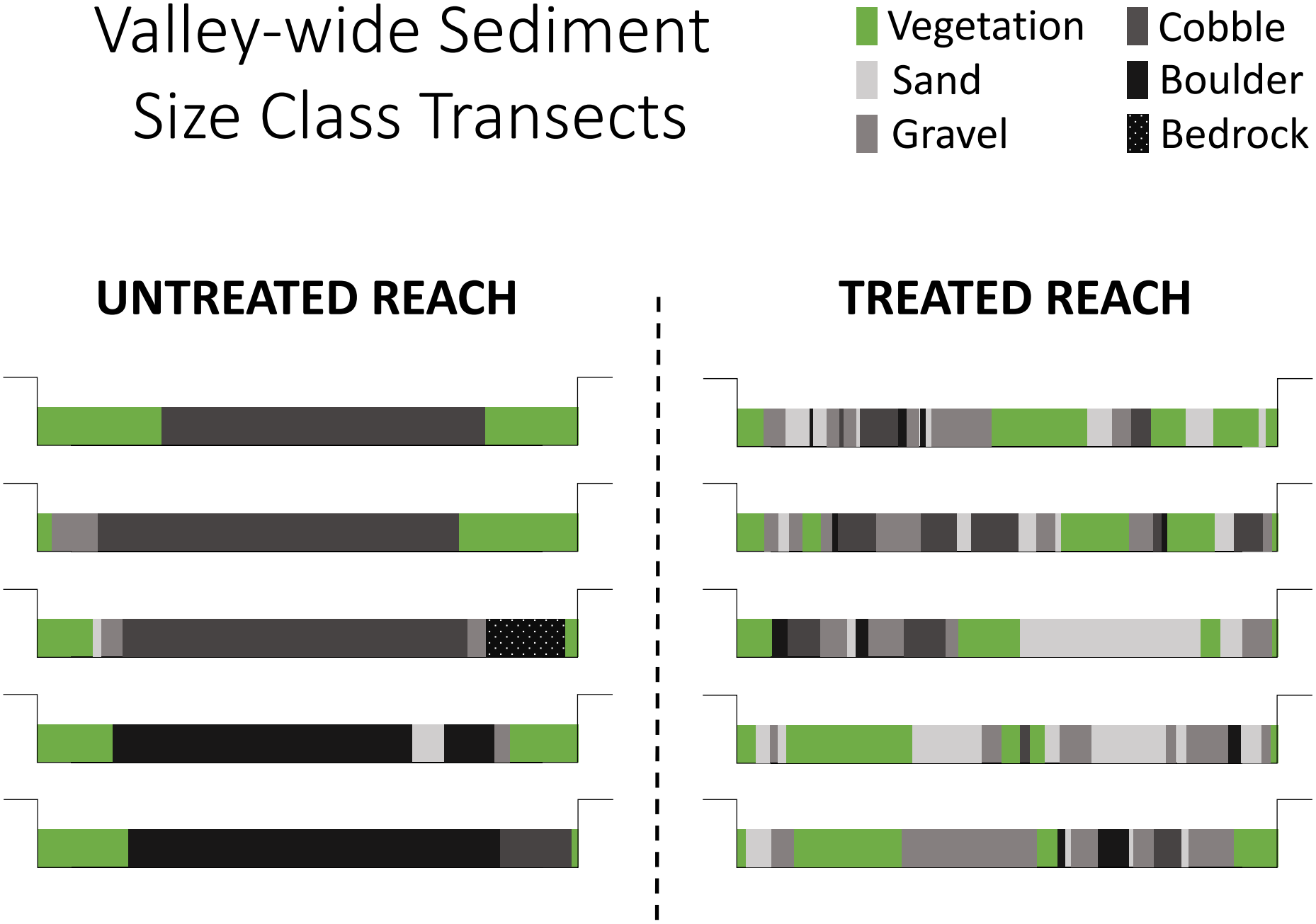
Monitoring Results: Before and After (1yr)

METRIC	BEFORE	AFTER
Median Particle Size of Pool Tailouts	64-90 mm Cobbles	45-64 mm Gravels

Monitoring Results: Before and After (1yr)

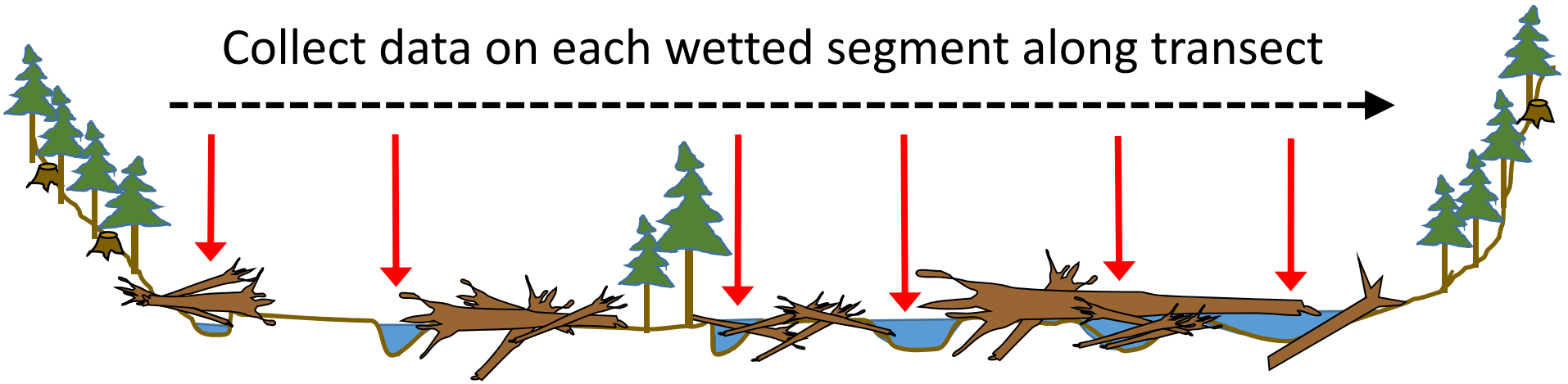
METRIC	BEFORE	AFTER
Spring Chinook Salmon Spawning	No redds documented since 1993	3 redds in 2017

Valley-wide Sediment Size Class Transects

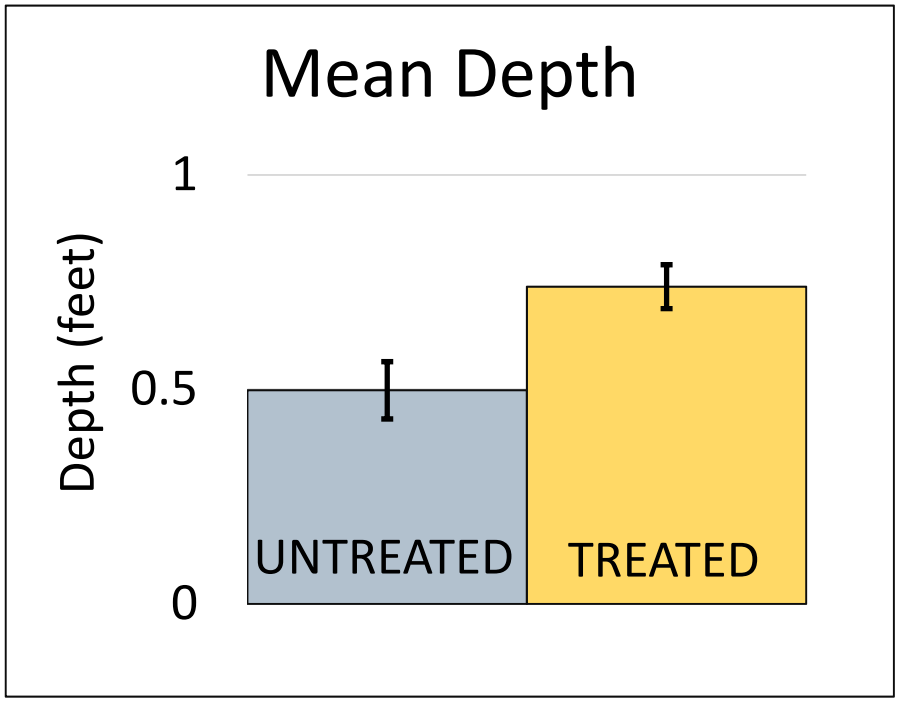


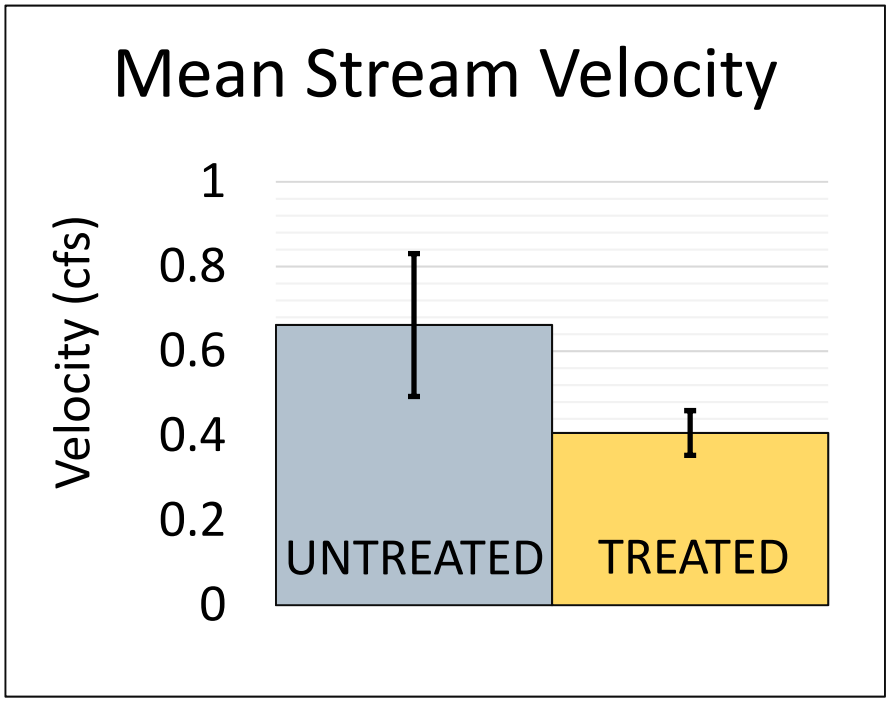
Wetted Segment Data

- *Depth*
- *Velocity*
- *Temperature*
- *Substrate Size*
- *Geomorphic Feature*
- *LWM*
- *Riparian Vegetation*



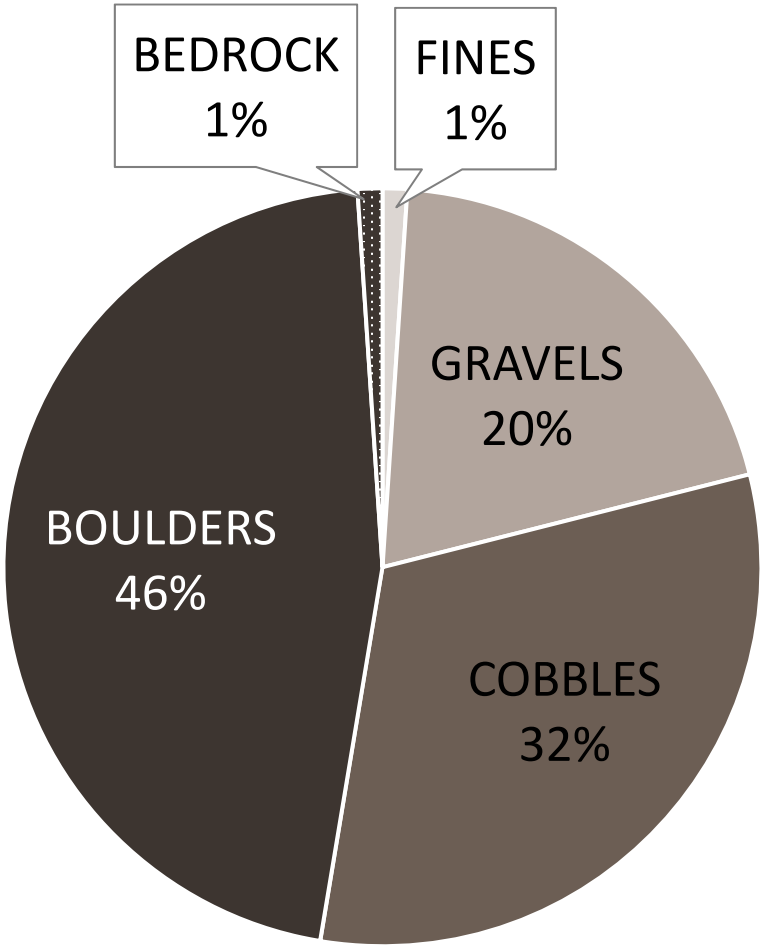
Wetted Segment Data – Depth & Velocity



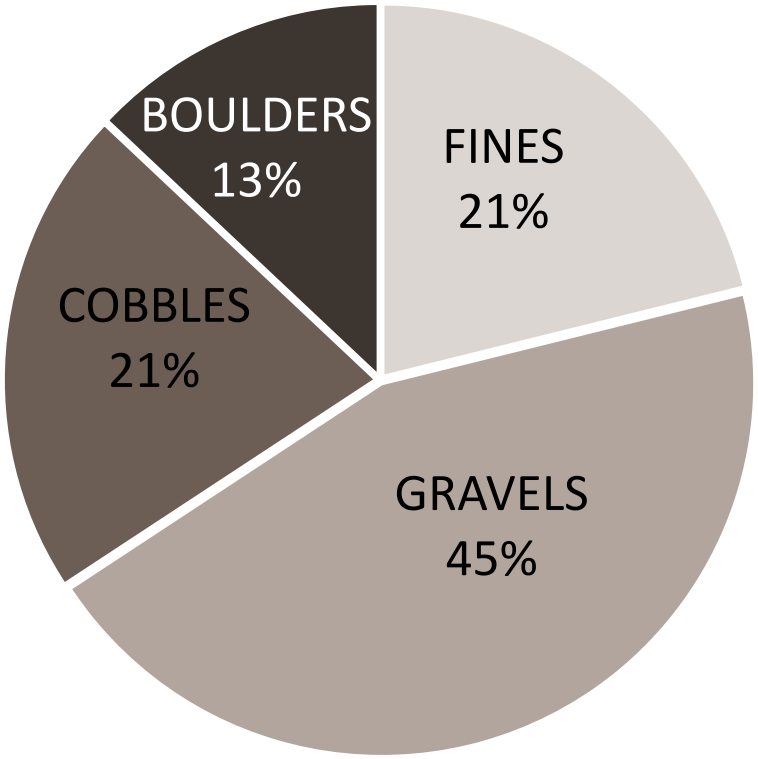


Wetted Segment Data – Substrate Size

UNTREATED REACH

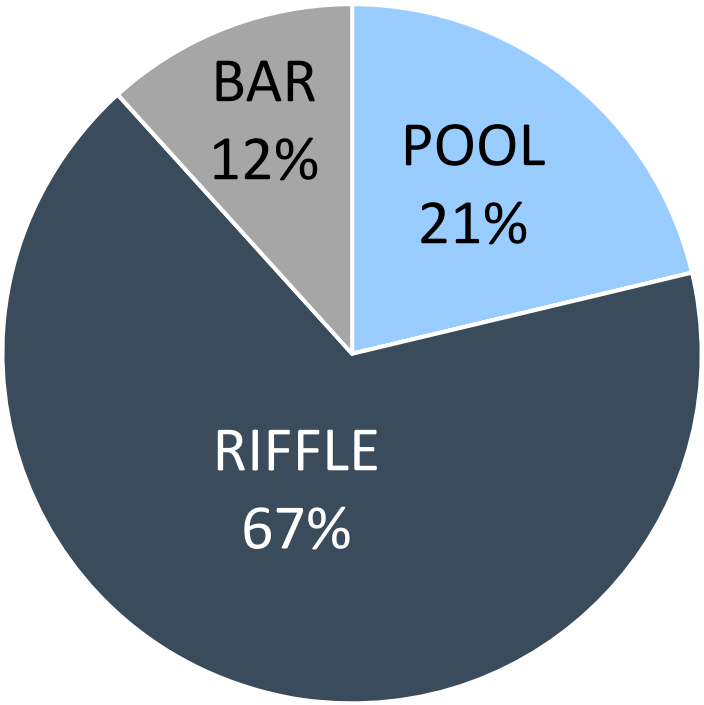


TREATED REACH

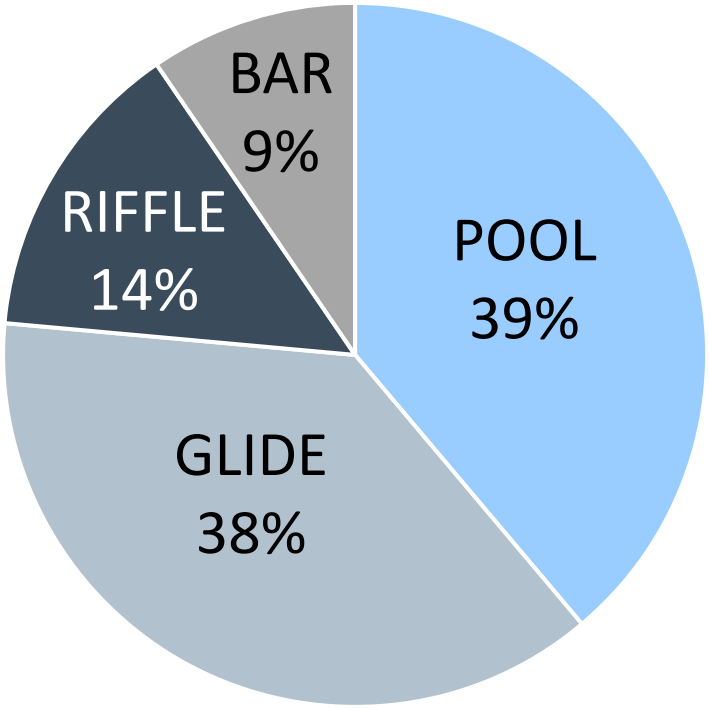


Wetted Segment Data – Geomorphic Feature

UNTREATED REACH



TREATED REACH



April 2016
BEFORE

September 2016
IMMEDIATELY AFTER


BEFORE


1 YR AFTER

Berm Removed

Pre-project Channel

April 2016
BEFORE

September 2016
IMMEDIATELY AFTER

September 2017
ONE YEAR AFTER


BEFORE


3 MONTHS AFTER

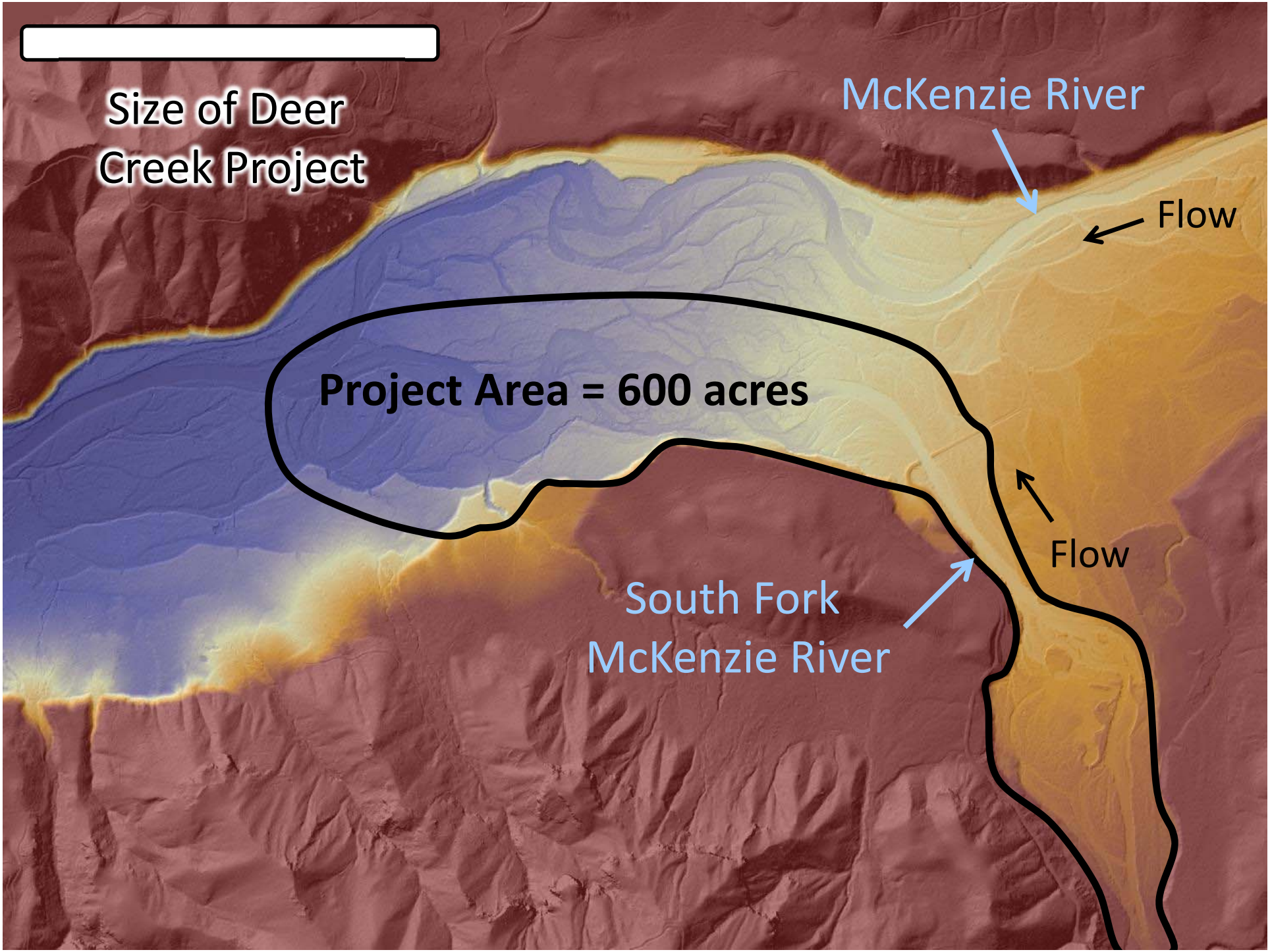

UNTREATED REACH


TREATED REACH


4 ft.

Lessons Learned and Applied to Next Project

1. Project objectives and monitoring plan need to be related to indicators of restored processes, such as:
   - *sediment storage*
   - *channel migration/avulsion*
   - *diversity of geomorphic features*
   - *water table height*
   - *wetted area*
   - *diversity of substrate and velocity*
   - *amount of cold water refugia*
2. Need to have more biological monitoring metrics like abundance, composition and distribution of species (fish, macros, amphibians, birds)
3. TRUST IN THE FORCE AND BE FEARLESS


Size of Deer Creek Project
McKenzie River
Flow
Project Area = 600 acres
Flow
South Fork McKenzie River

Acknowledgements

Project Core Team

- Jared Weybright, Executive Director, McKenzie Watershed Council (Project Co-manager)
- Johan Hogervorst, Hydrologist, Willamette National Forest
- Paul Powers, Fisheries Biologist, Deschutes National Forest
- Mickey Means-Brous, Fisheries Trainee, Willamette National Forest
- Jennifer Weber, Projects Coordinator, McKenzie Watershed Council
- Nick Grant, Hydrologist, Willamette National Forest
- Stephanie Bianco, OSU Graduate Student

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- Payments to Counties/Title II Funding (US Forest Service)
- Western Native Trout Initiative/US Fish and Wildlife Service

Contractors

- Haley Construction Company, Inc.
- Blue Ridge Timber Cutting