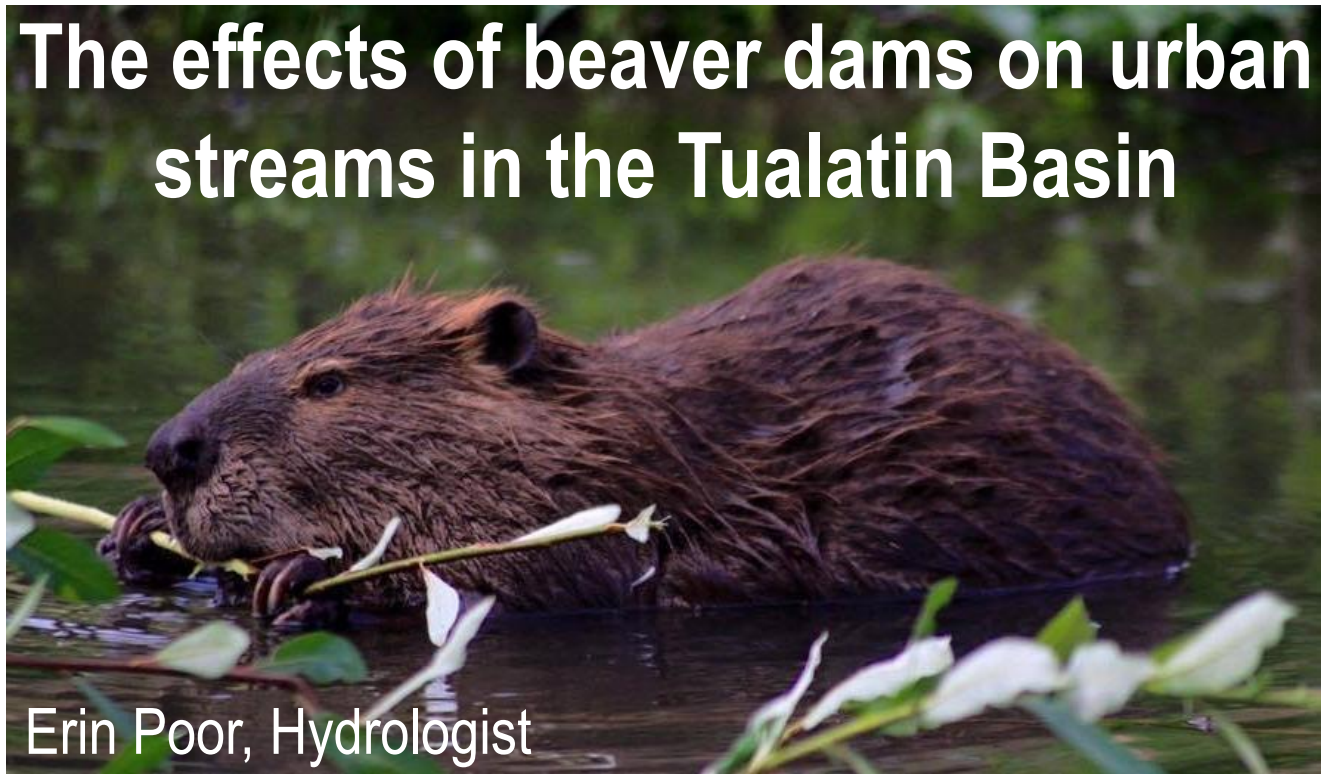
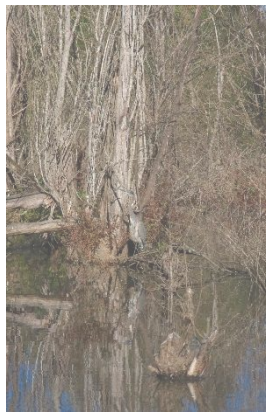
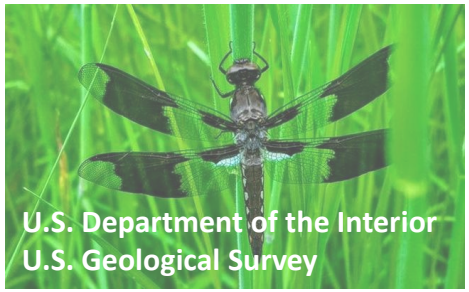
The effects of beaver dams on urban streams in the Tualatin Basin

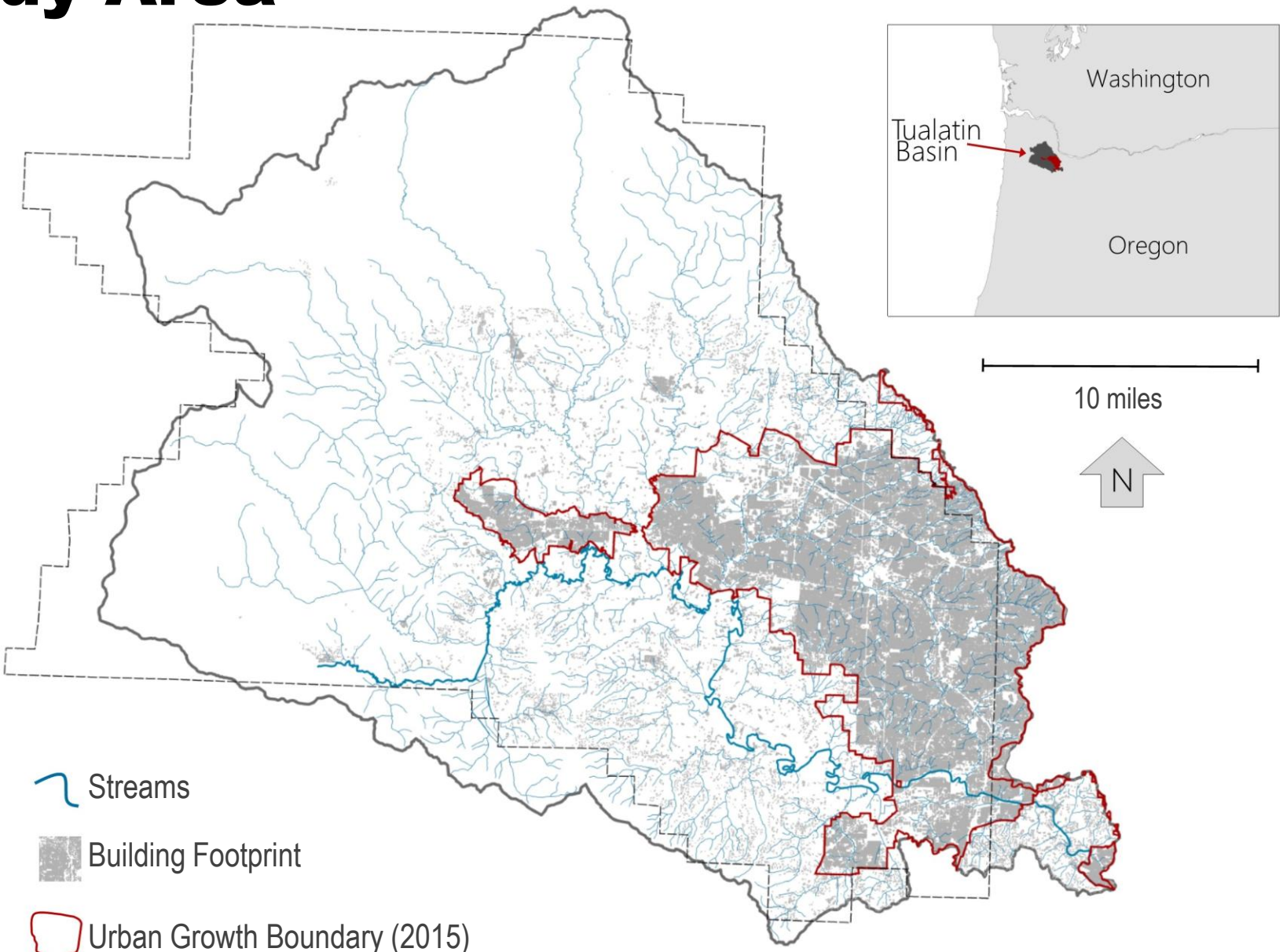


Erin Poor, Hydrologist





Study Area



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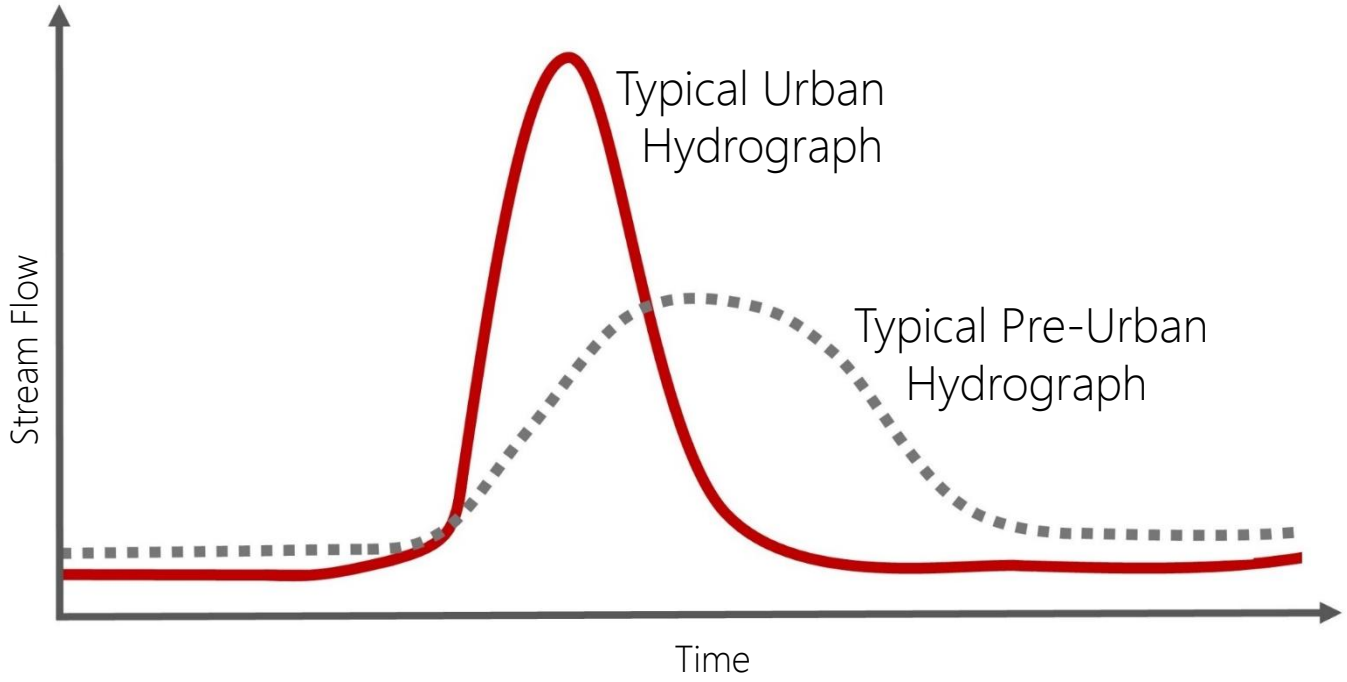
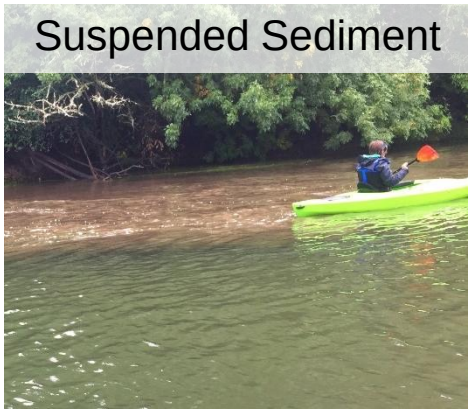
Urban Streams





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Overarching Question

Can beaver dams be used as a tool to manage stormwater and improve water quality and ecosystem health in an urbanized watershed?

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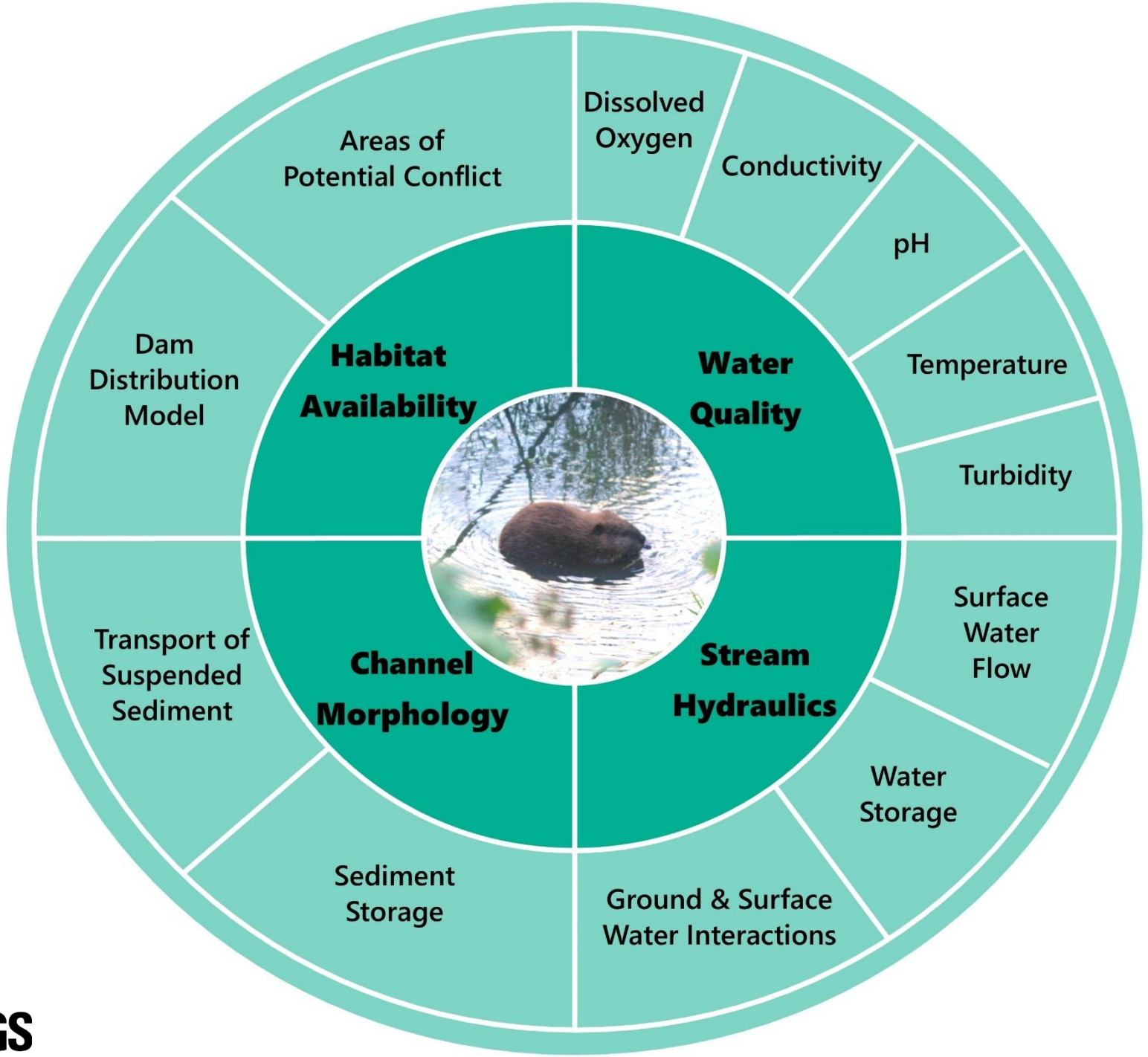
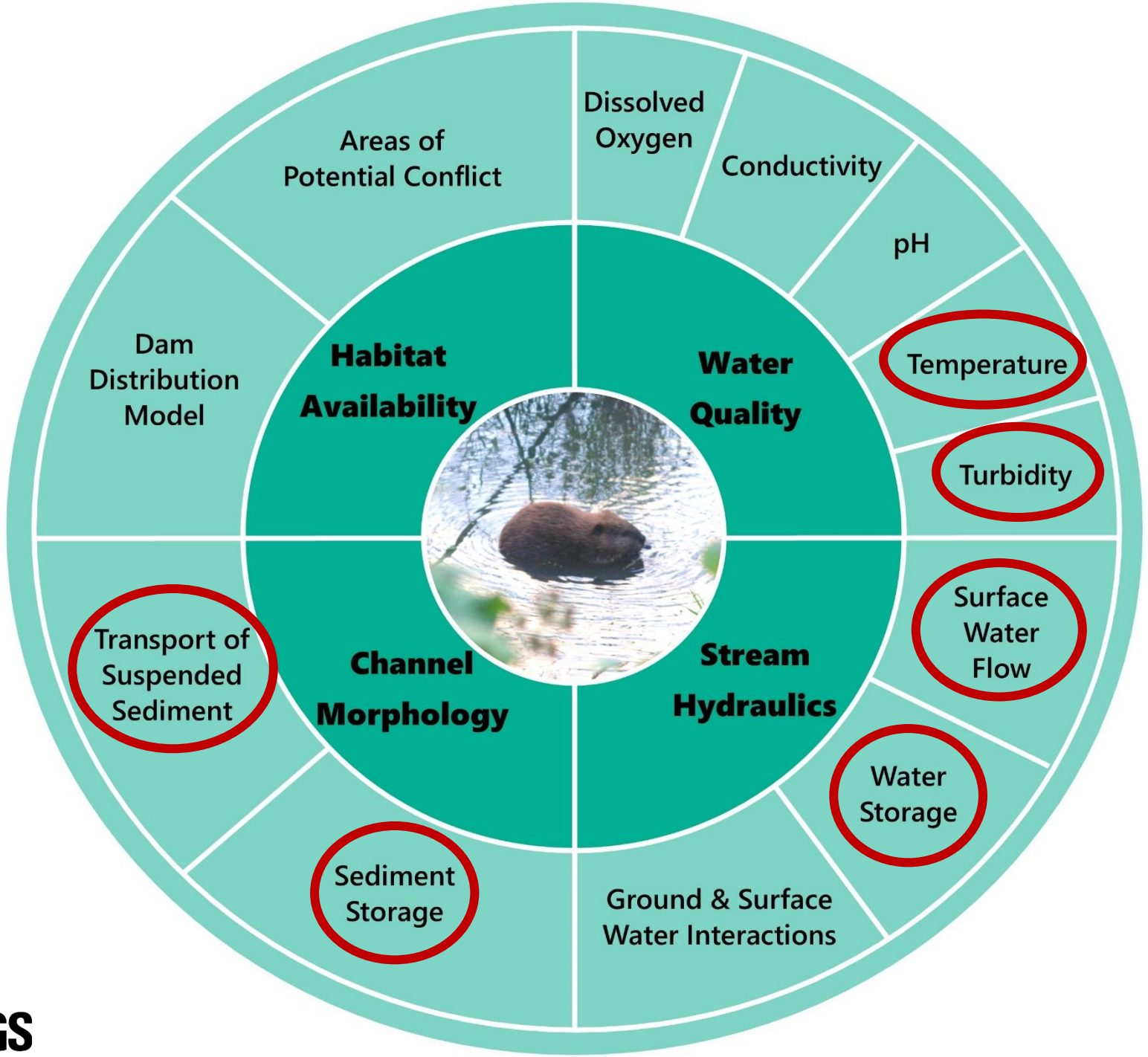

Areas of Potential Conflict
Dissolved Oxygen
Conductivity
pH
Temperature
Turbidity
Dam Distribution Model
Habitat Availability
Water Quality
Transport of Suspended Sediment
Channel Morphology
Stream Hydraulics
Surface Water Flow
Water Storage
Sediment Storage
Ground & Surface Water Interactions

USGS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Stream Hydraulics

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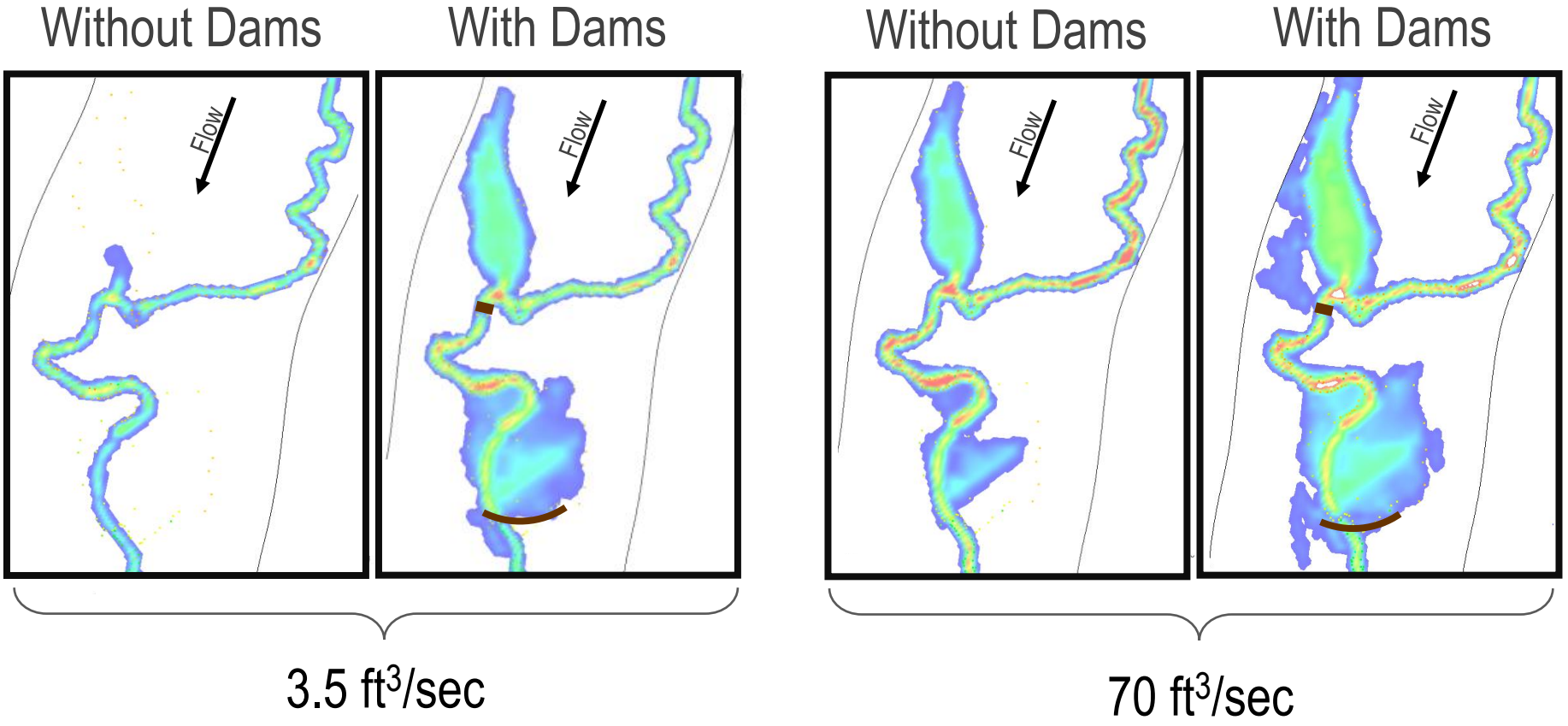
Stream Hydraulics

Hydraulic Model
at Fanno Creek

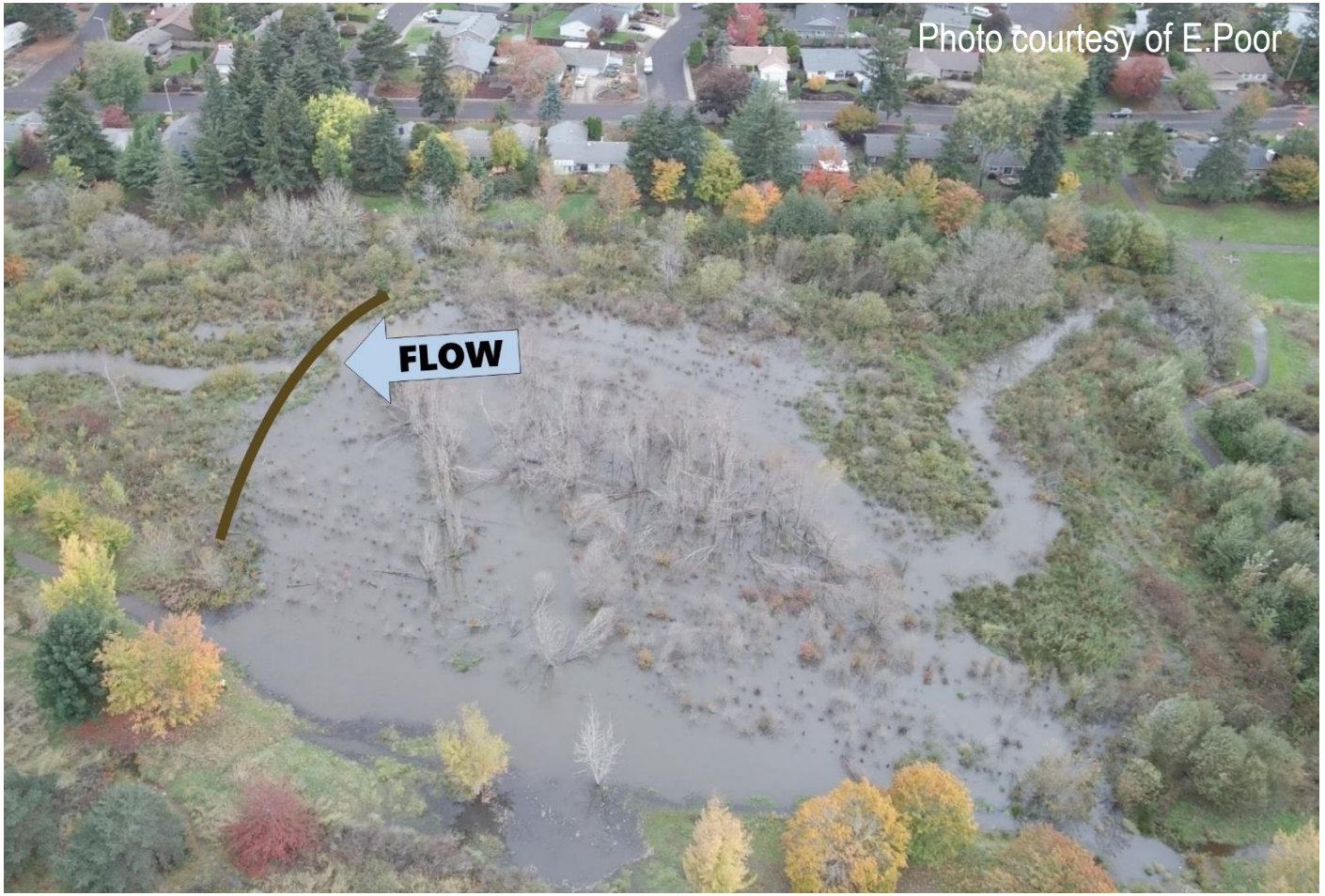


Beaver dams increase wetted area.

USGS

Preliminary results; subject to revision

Stream Hydraulics



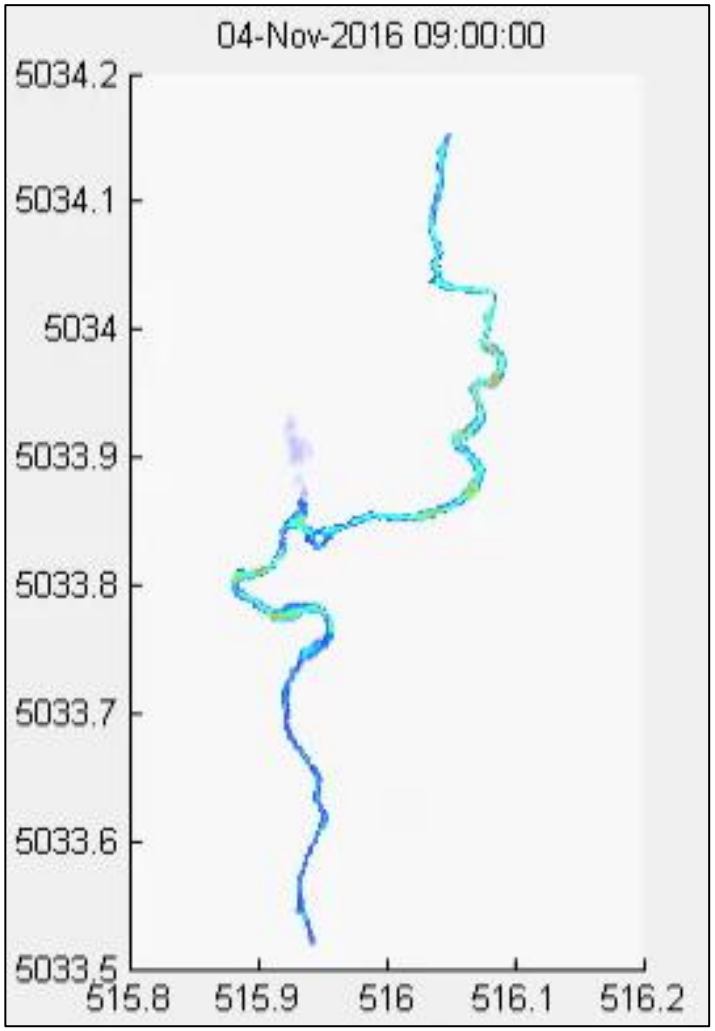
Beaver dams create diverse aquatic habitat conditions.

USGS

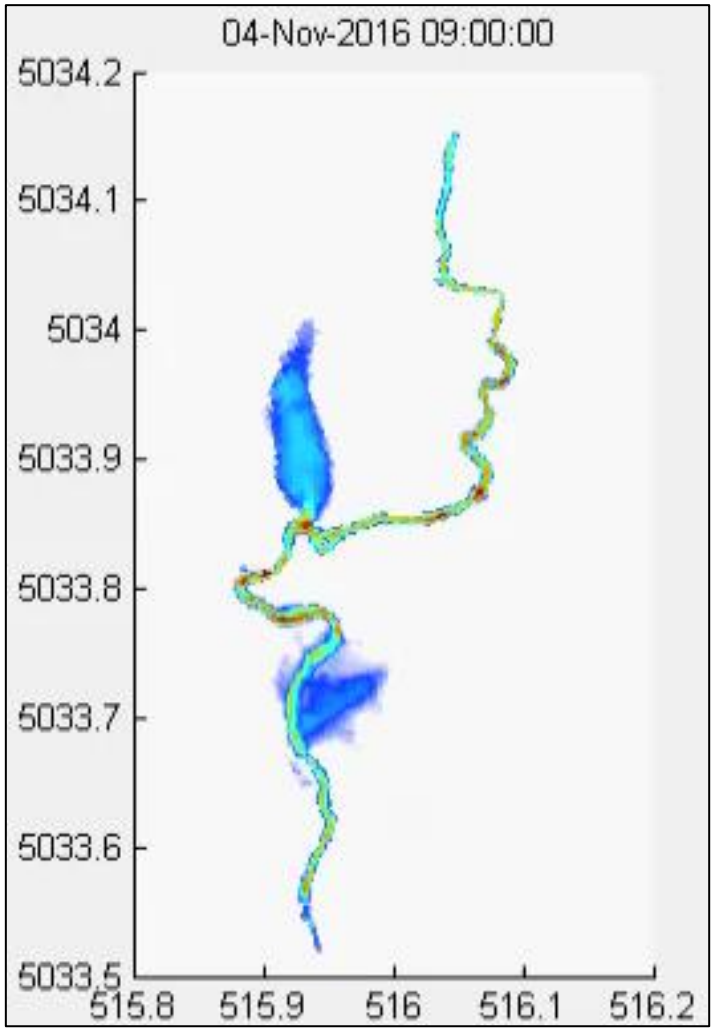
Storm Simulation
at Fanno Creek

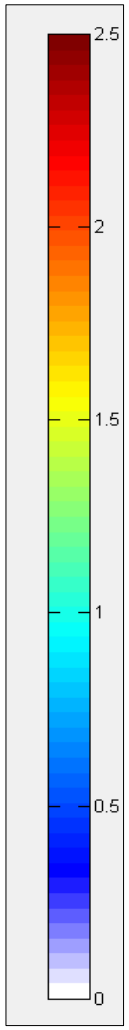
Large Storm (peak flow ~ 210 ft^3/s)

Without Beaver Dams



With Beaver Dams





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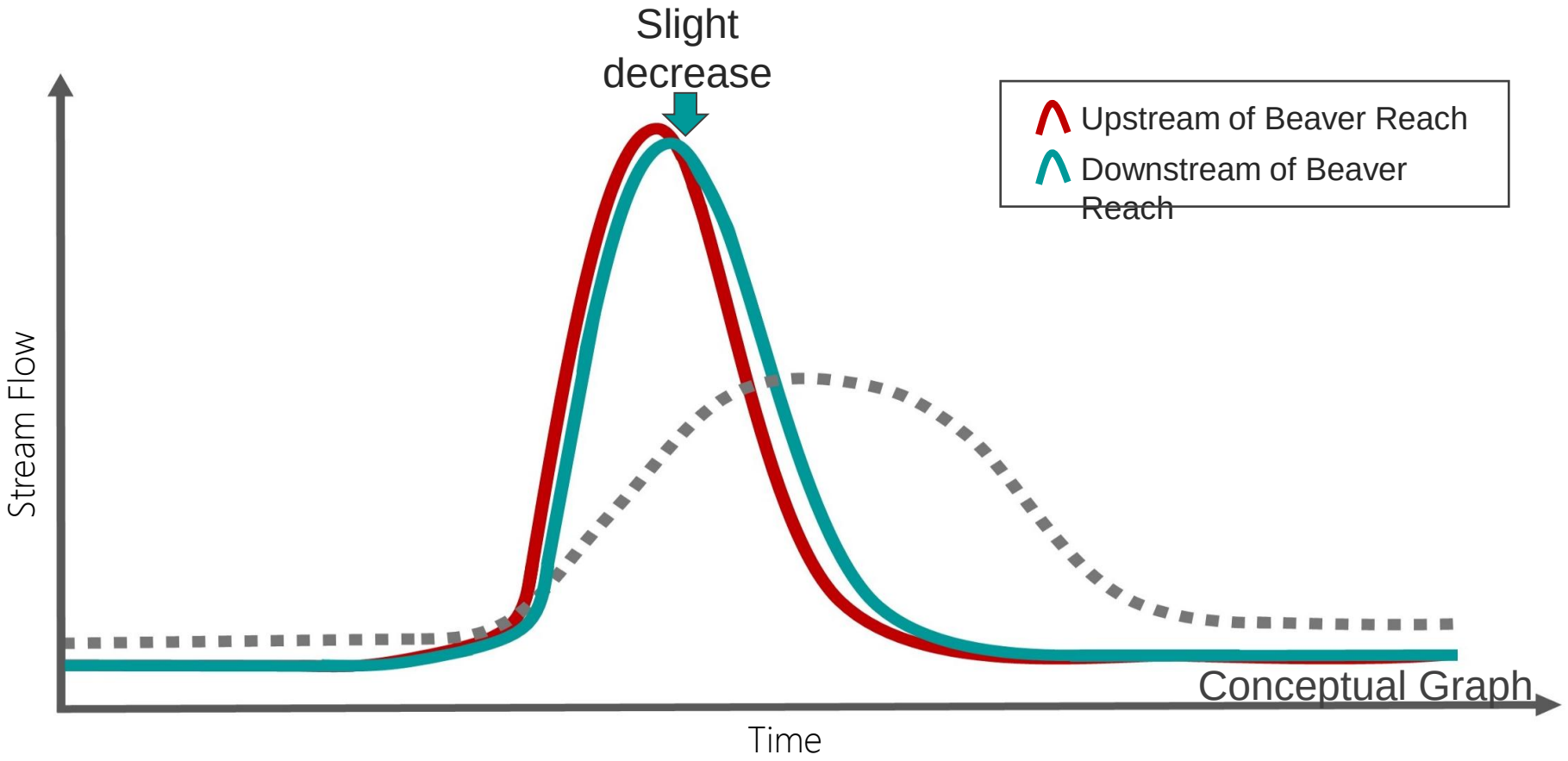
Preliminary results; subject to revision

Hydrograph During Storm Events



Beaver dams can temporarily store water during storms, causing modest reductions in the magnitude of some storm peaks.

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Sediment Dynamics

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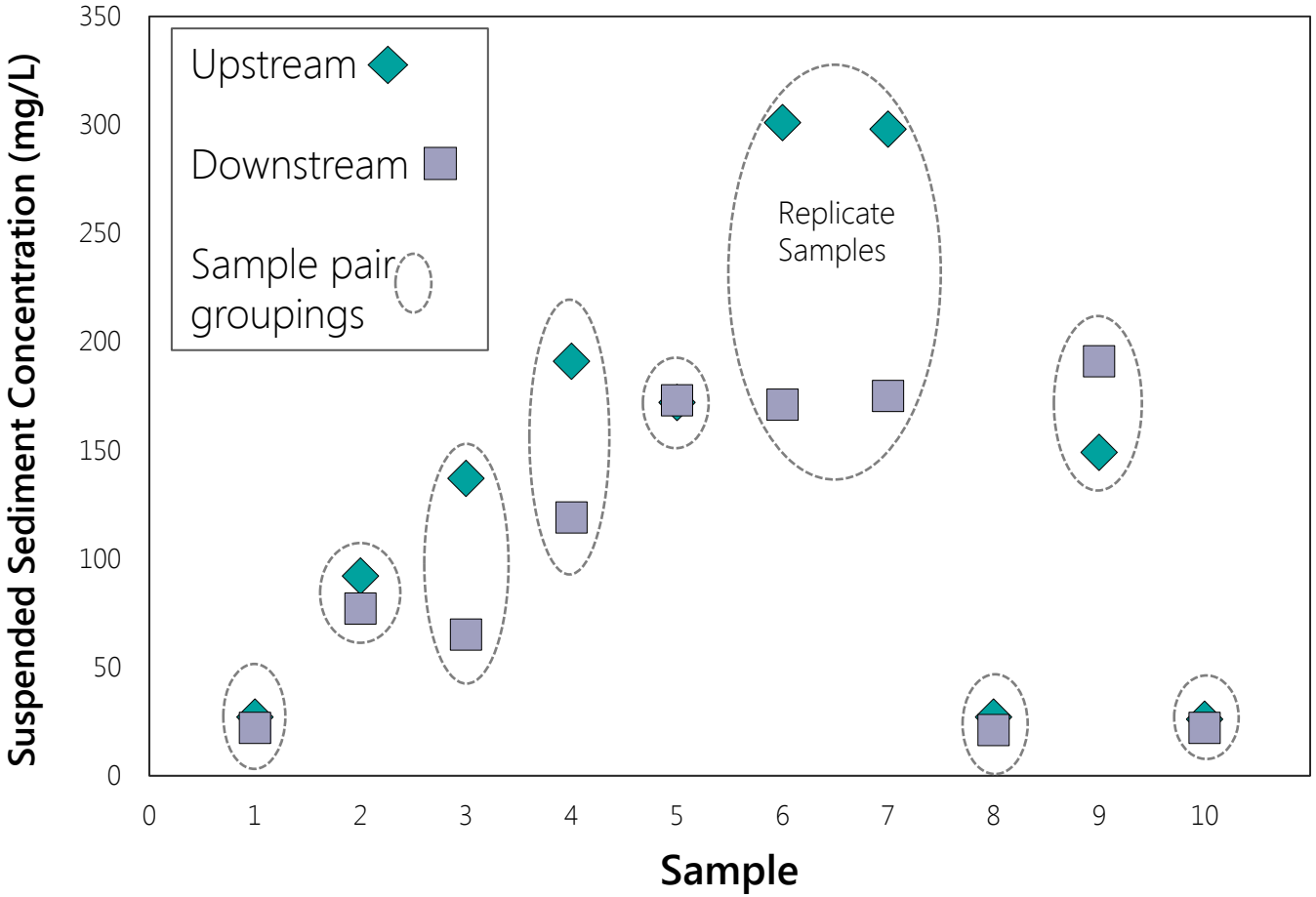
Suspended Sediment Concentrations

at Fanno Creek



Suspended sediment concentrations were generally lower downstream of beaver ponds.

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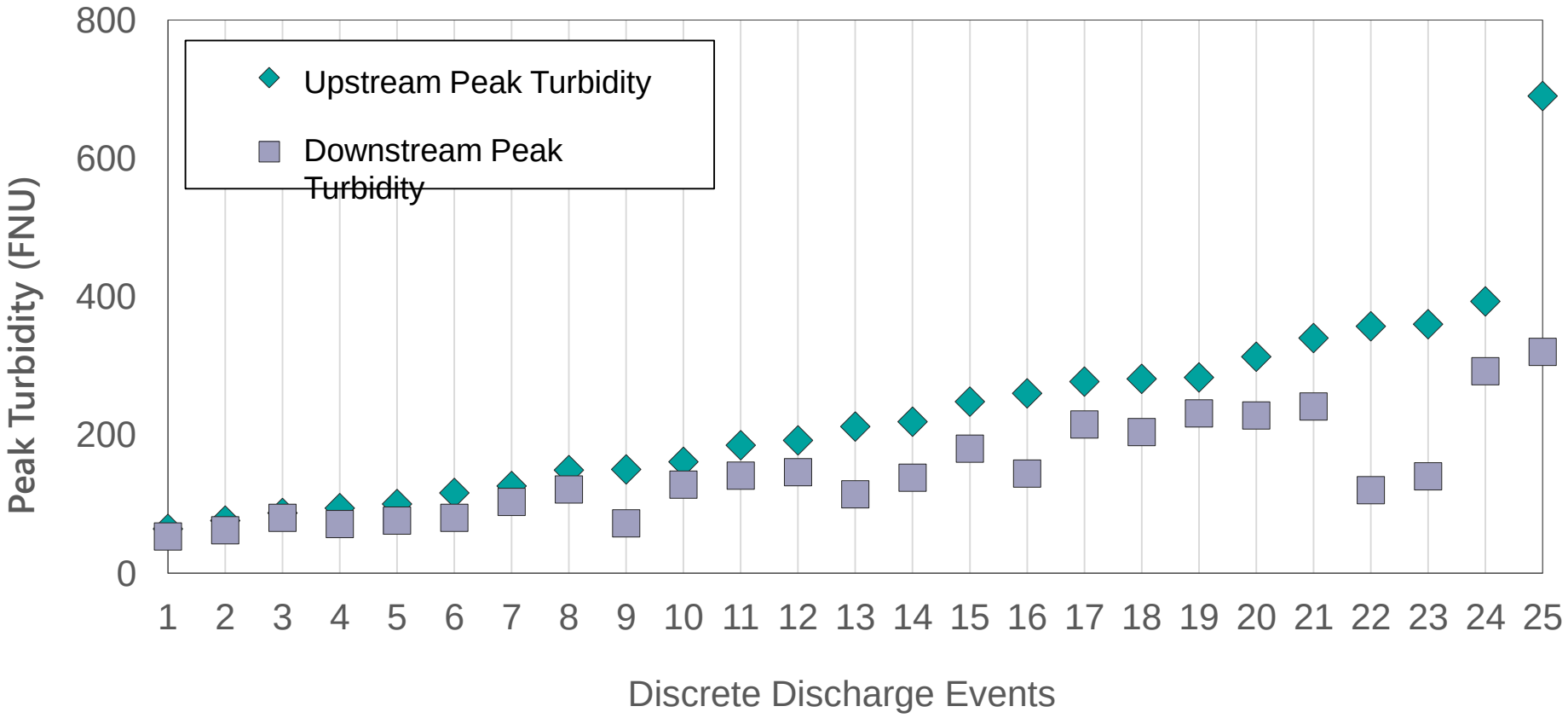
Preliminary results; subject to revision

Peak Turbidity During Storms

at Fanno Creek



Peak turbidity was reduced as water traveled through the beaver pond.

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Preliminary results; subject to revision

Sediment Storage

More than 1,200 m^3 of fine sediment has been deposited in the large beaver pond.

USGS

Preliminary results; subject to revision

Temperature Patterns

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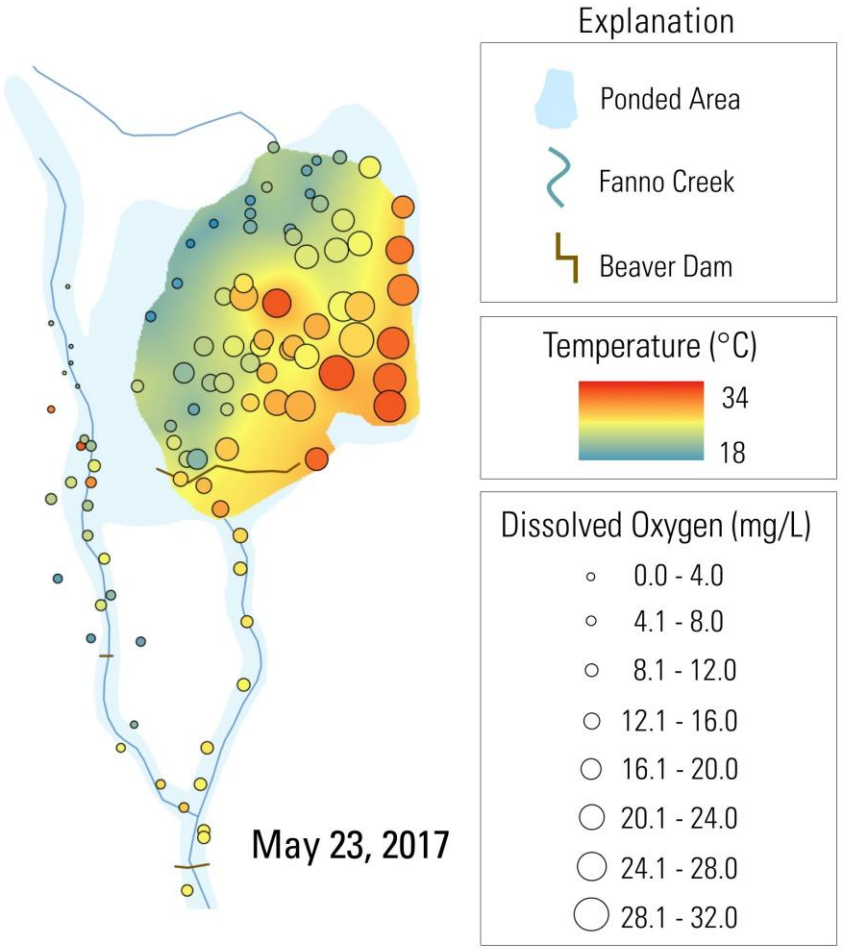
Temperature Patterns

at Fanno Creek



Water temperatures vary spatially and temporally within the ponded area.

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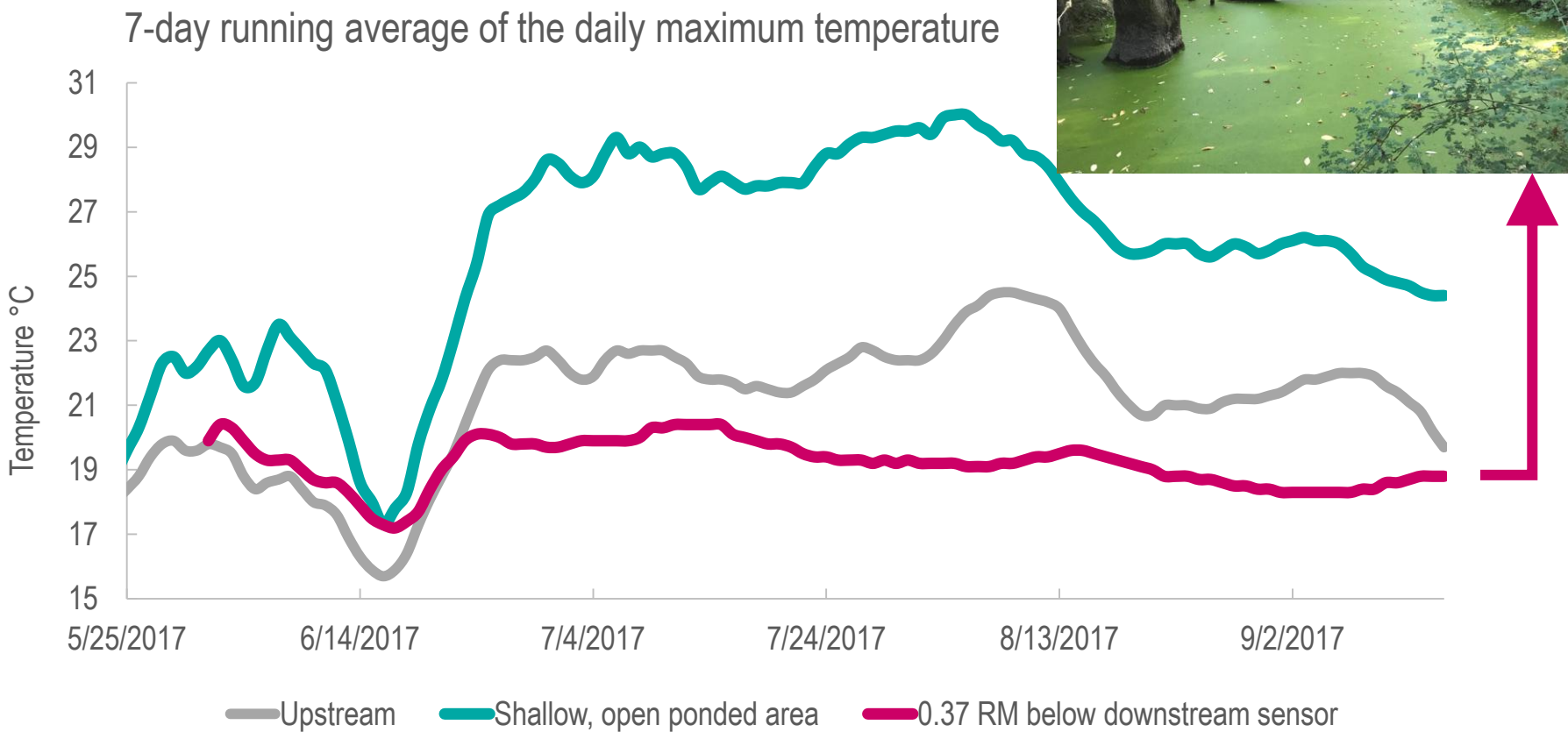
Preliminary results; subject to revision

Temperature Patterns

at Fanno Creek



Water temperature increases in shallow pond, but is cooler 0.4 miles downstream of the beaver reach where the channel is confined and shaded.

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Preliminary results; subject to revision

Biodiversity

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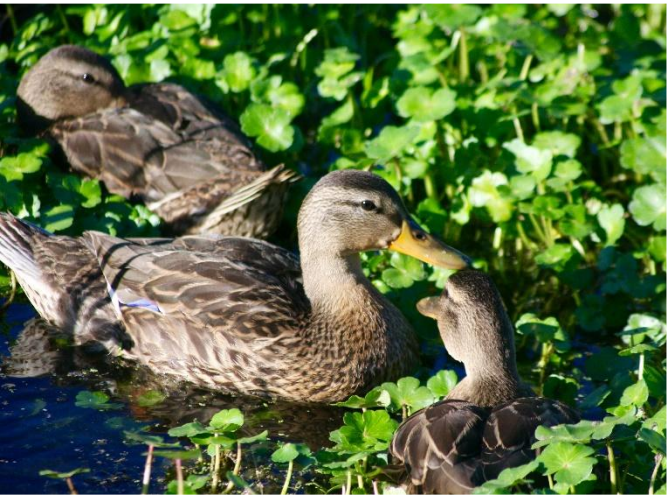
Birds in Beaver Habitats

Clean Water Services
Our commitment is clear.



Since beaver built dams, more species of birds are using Greenway Park for longer periods.

USGS

Results courtesy of Clean Water Services

Amphibians in Fanno Creek

Clean Water Services
Our commitment is clear.

Beaver dams and ponds create new still-water habitat that amphibians are using for breeding and egg-laying.

USGS

Results courtesy of Clean Water Services

Summary

Stream Hydraulics

- Modest peak flow reductions
- Temporarily store stormwater
- Increased wetted area, decreased velocity

Sediment Dynamics

- Store sediment, reducing peak turbidity and suspended sediment concentrations
- Accumulated large volumes of sediment

Temperature Trends

- Increased spatial variation during warm periods
- Warming in shallow, open areas, returns to equilibrium temperature downstream

Biodiversity Surveys

- Increased bird diversity and prolonged site use
- New still-water habitat for amphibians
- *Results courtesy of Clean Water Services*

USGS

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503-251-3240

All photos by E.Poor unless otherwise noted