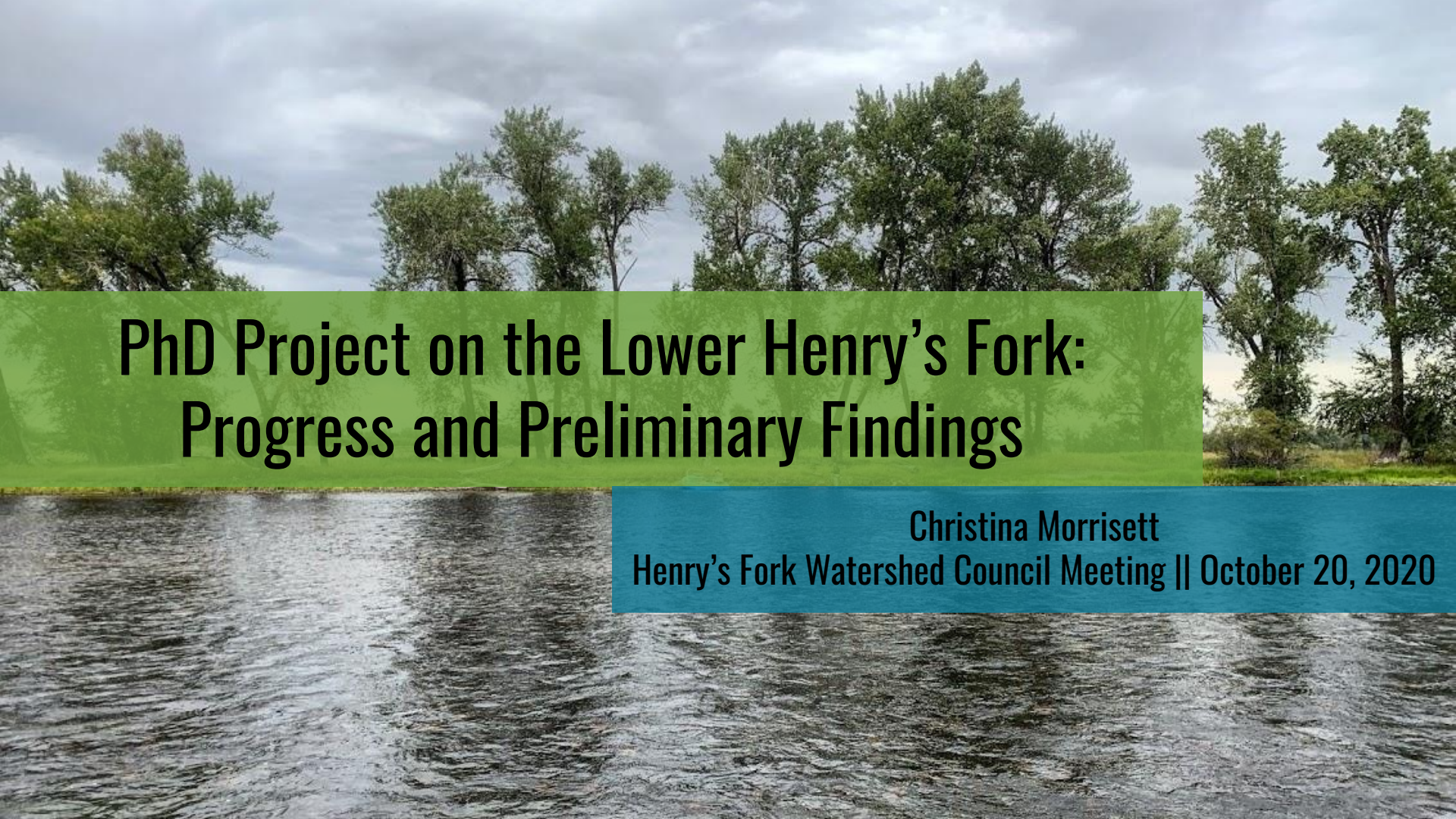
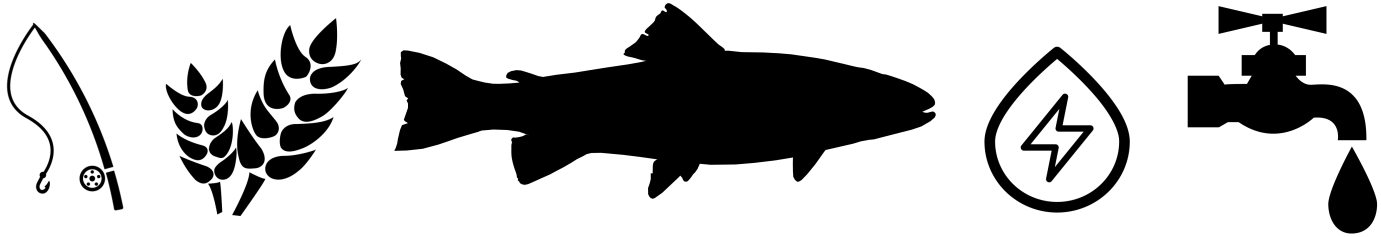


PhD Project on the Lower Henry's Fork: Progress and Preliminary Findings

Christina Morrisett

Henry's Fork Watershed Council Meeting || October 20, 2020

Water availability is less predictable



How can we adapt our water management strategies?


Irrigation


Fishing


Groundwater

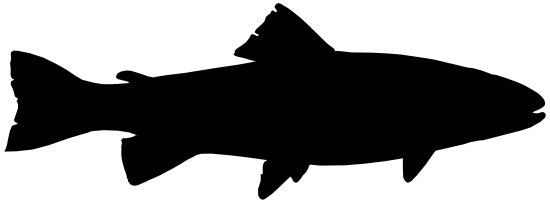

Island Park Reservoir Management


Low flow indicator

2,894 cfs
June 12, 2019

352 cfs
July 16, 2019

Research Questions

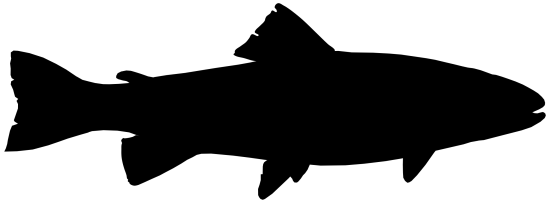


How does aquatic HABITAT change with streamflow?

What role does GROUNDWATER play?

Low flow recommendation

Research Questions



How does aquatic HABITAT change with streamflow?

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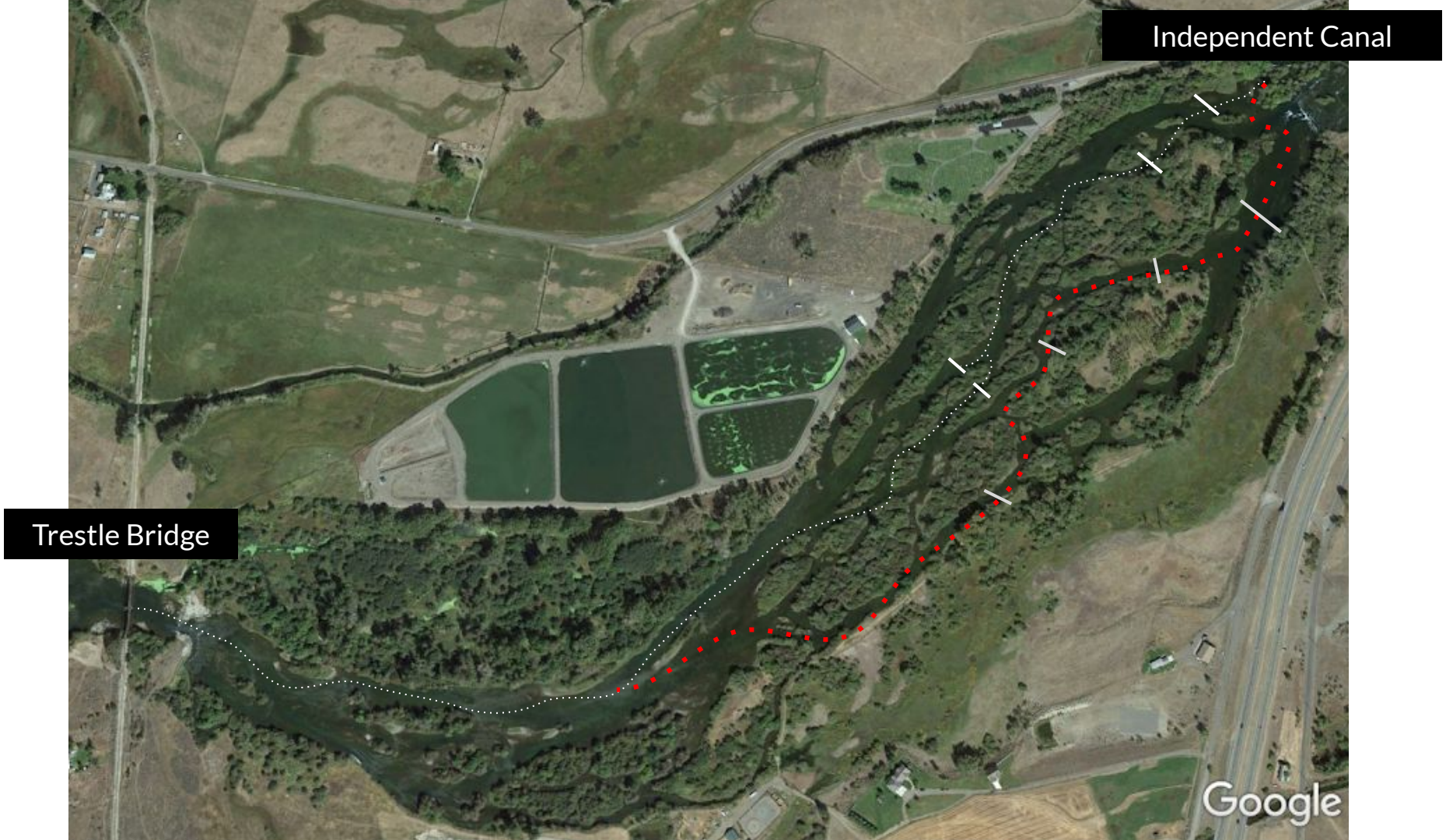
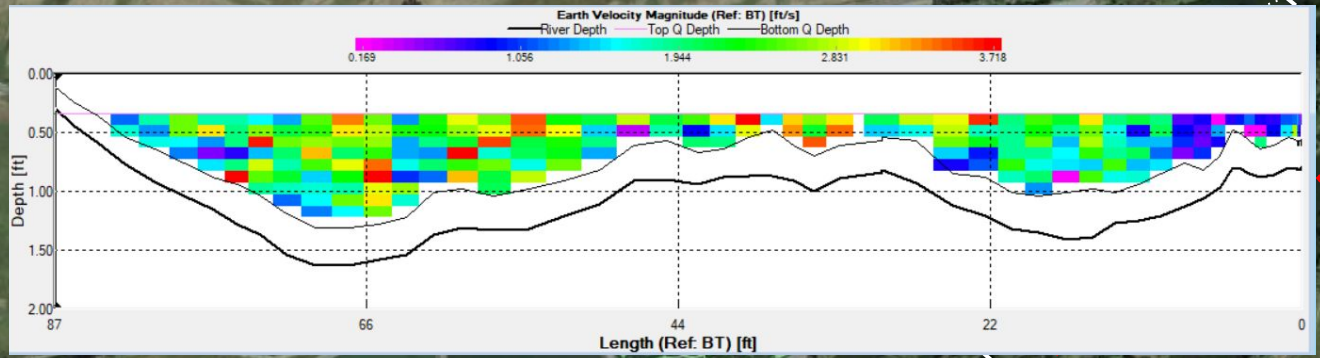
Low flow recommendation


St. Anthony
Trestle
TP1
Parker
TP2


St. Anthony
Trestle
TP1
TP2
Parker


Independent Canal
Trestle Bridge
Google

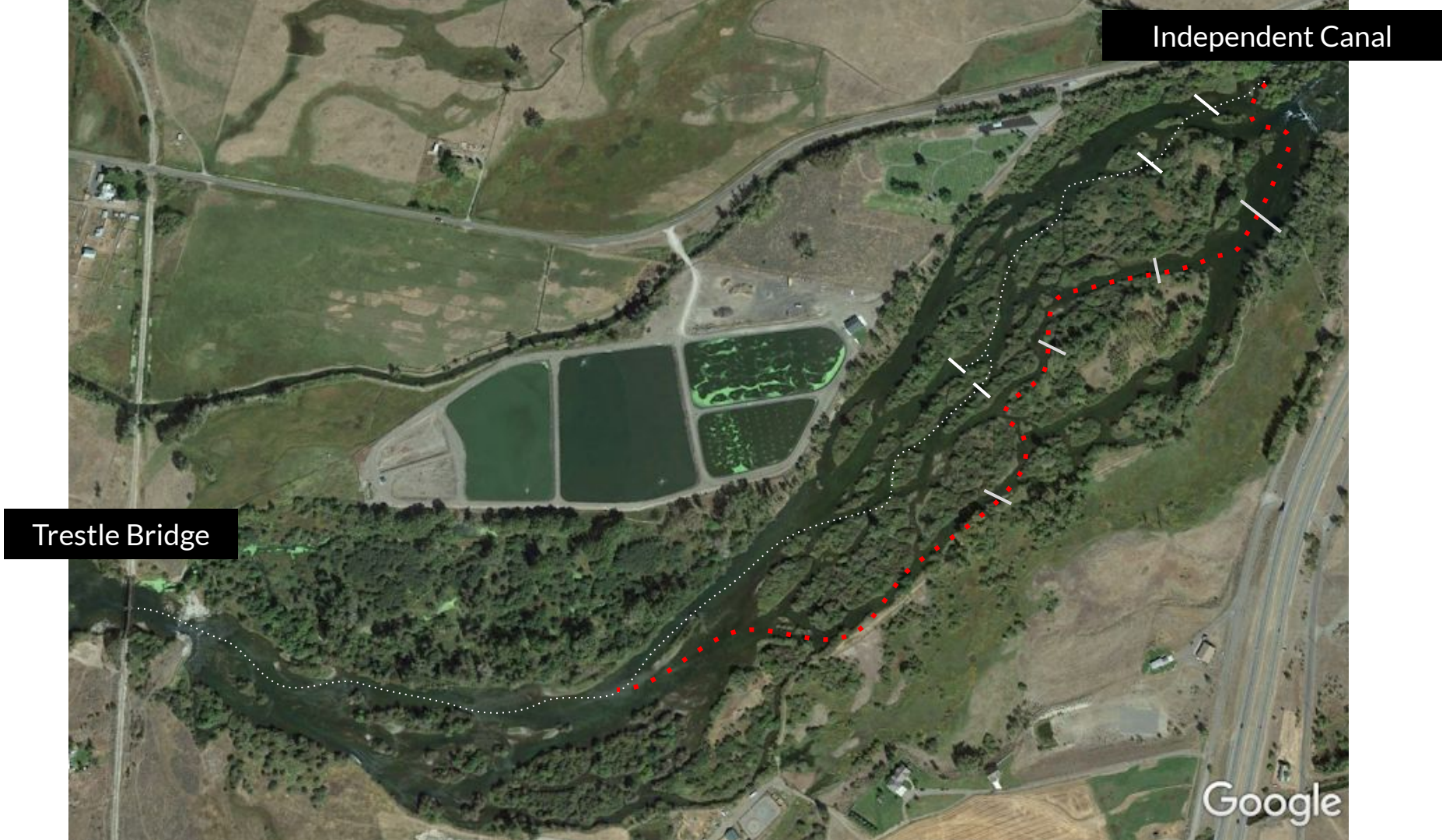
Independent Canal

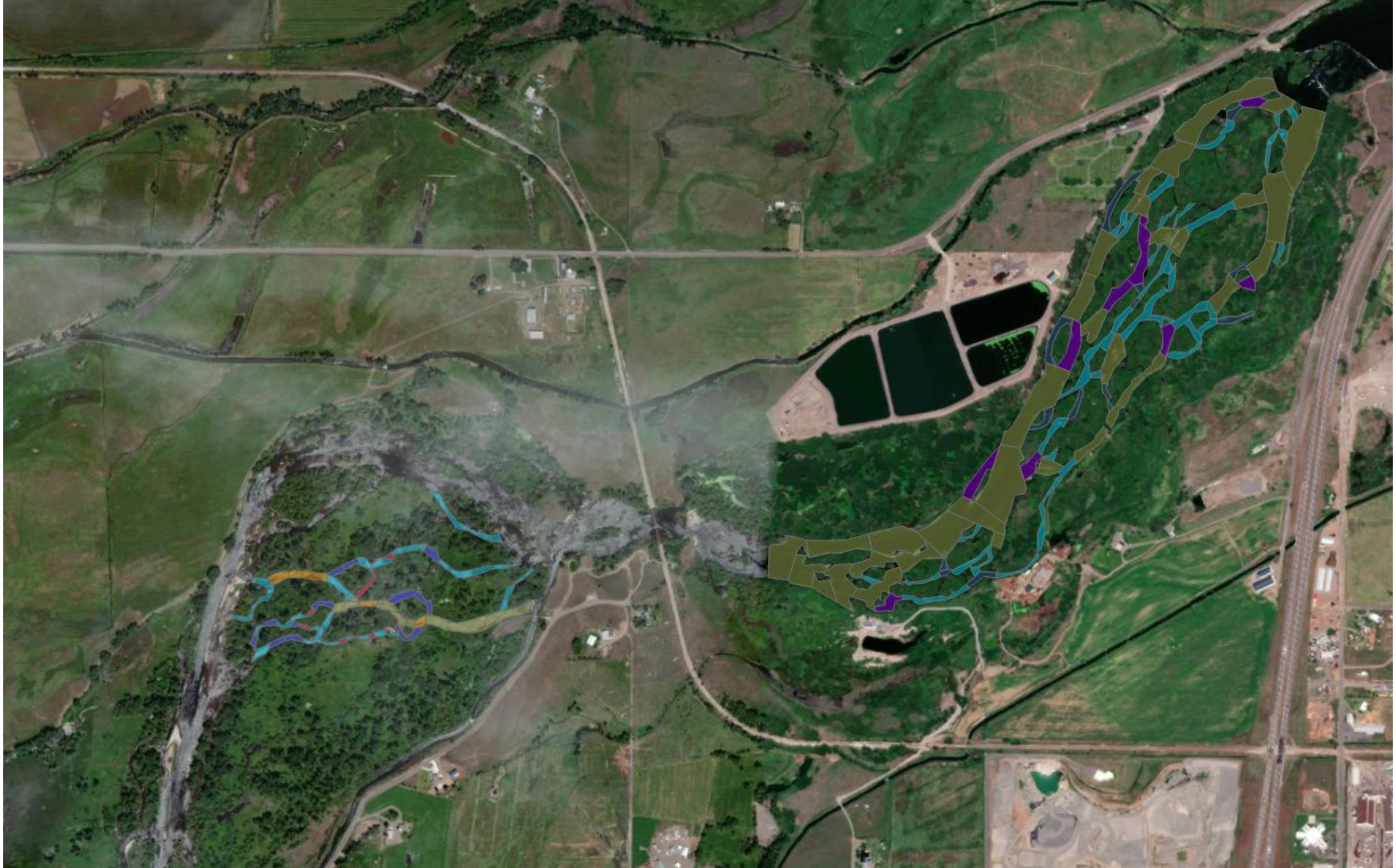


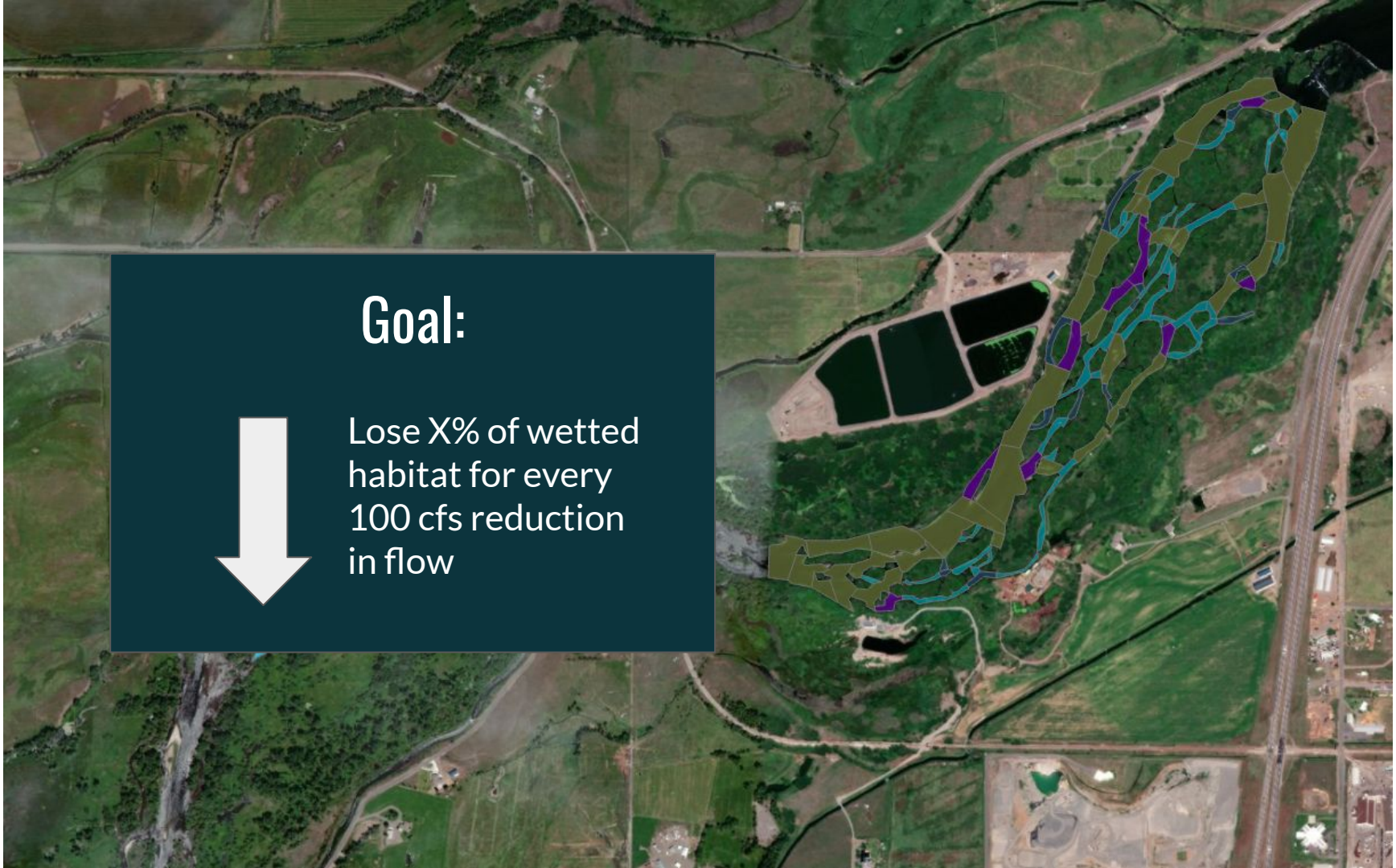
- Flow (cfs)
- Width(ft)
- Area (ft2)
- Velocity (mean, max)
- Depth (mean, max)
- Water temperature

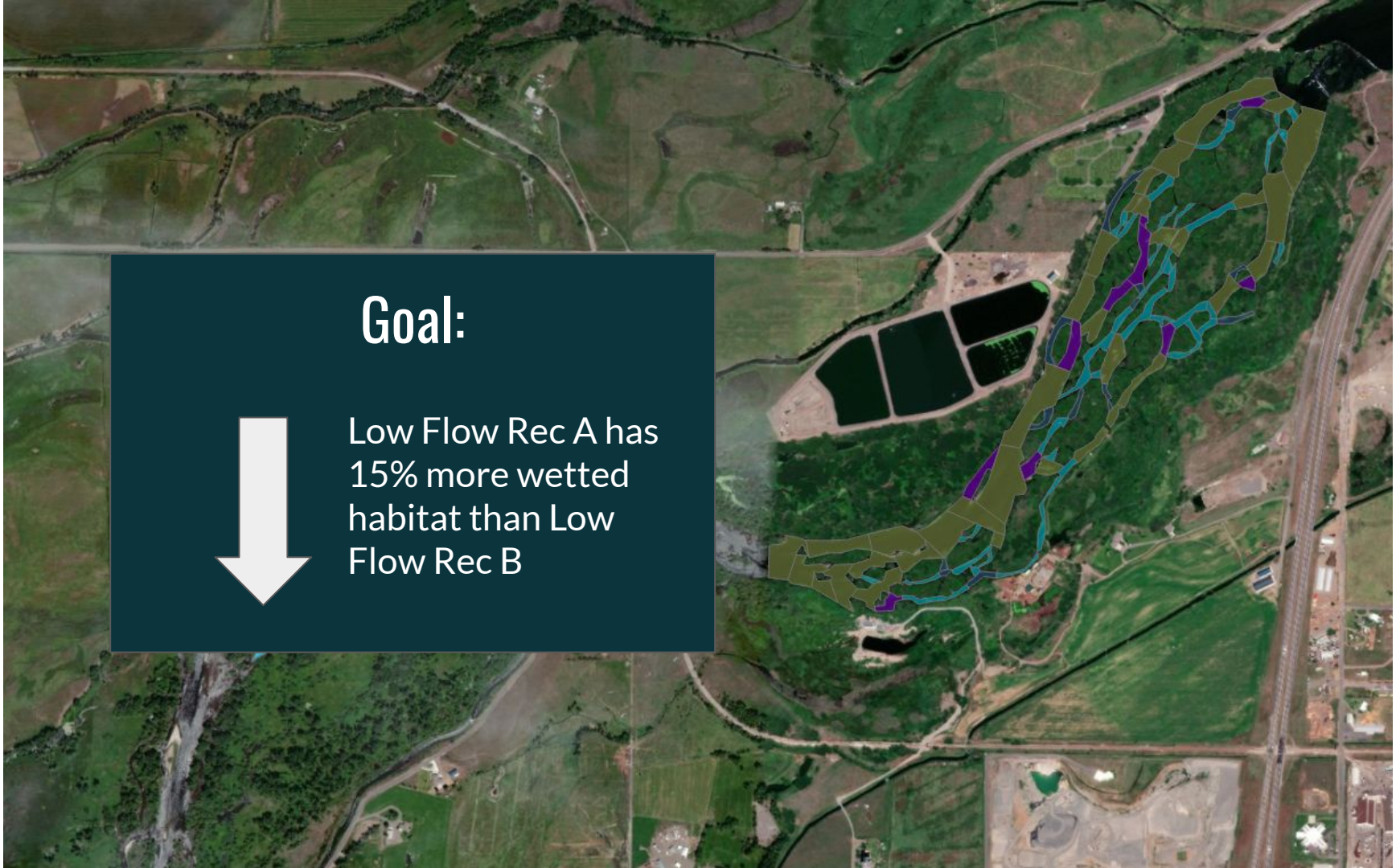
Trestle Bridge

Google


Independent Canal
Trestle Bridge
Google



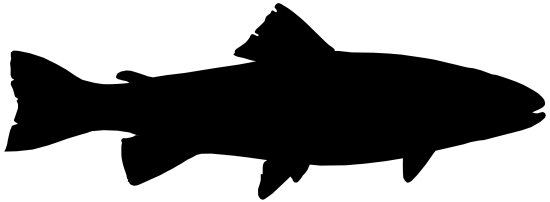

Goal:
Lose X% of wetted habitat for every 100 cfs reduction in flow

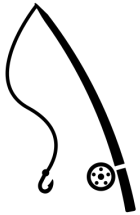


Goal:

Low Flow Rec A has 15% more wetted habitat than Low Flow Rec B

Research Questions



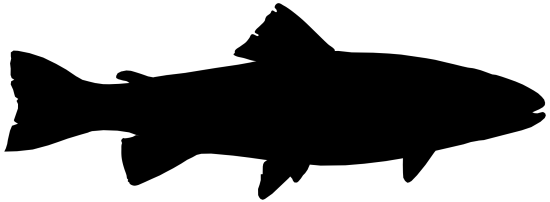


How does aquatic HABITAT change with streamflow?

How does FISHING USE change with streamflow?

Low flow recommendation

Research Questions

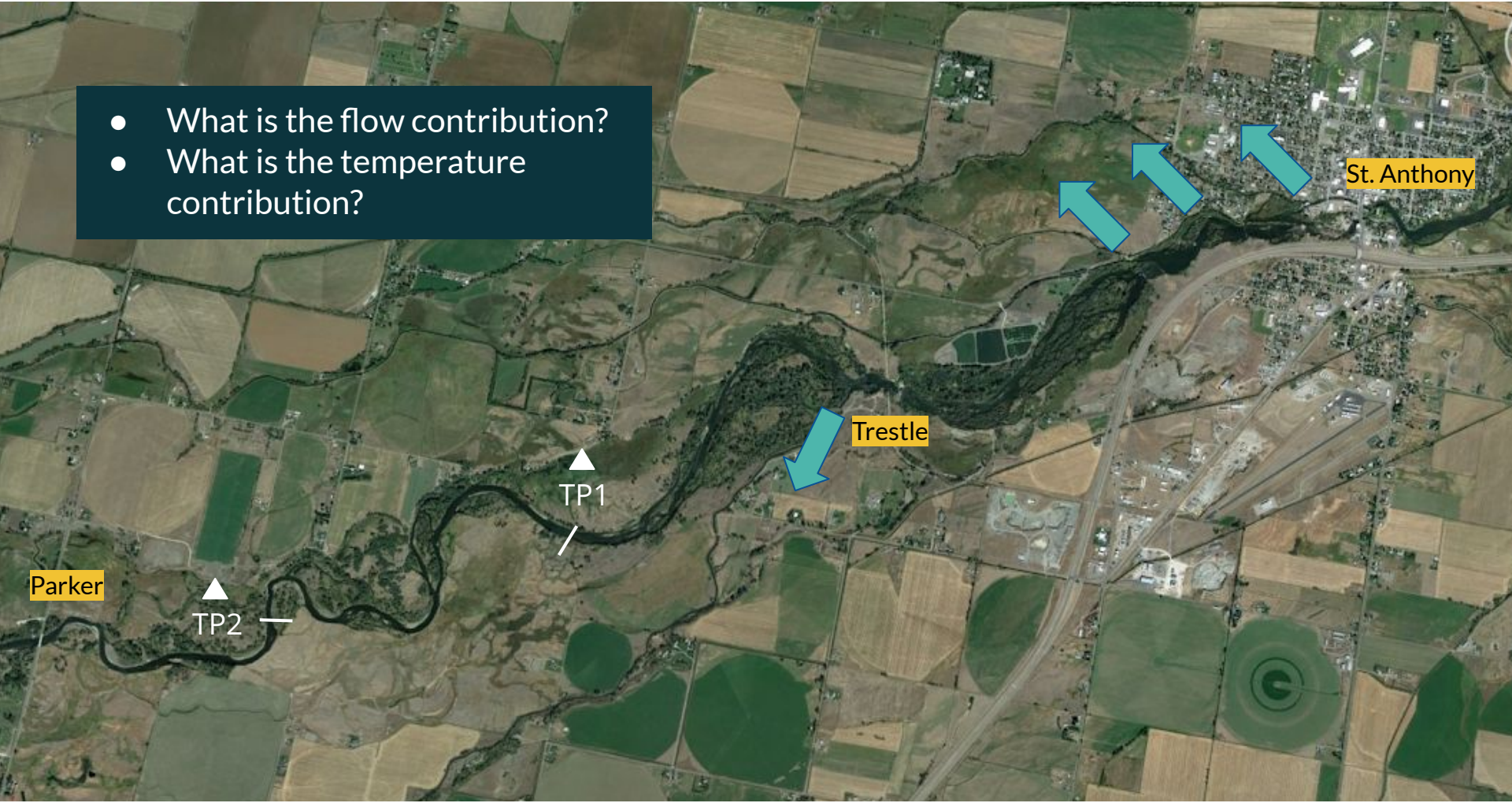


How does aquatic HABITAT change with streamflow?

What role does GROUNDWATER play?

Low flow recommendation


St. Anthony
Trestle
TP1
Parker
TP2


What is the flow contribution?
What is the temperature contribution?
St. Anthony
Trestle
TP1
Parker
TP2

Groundwater flow contribution

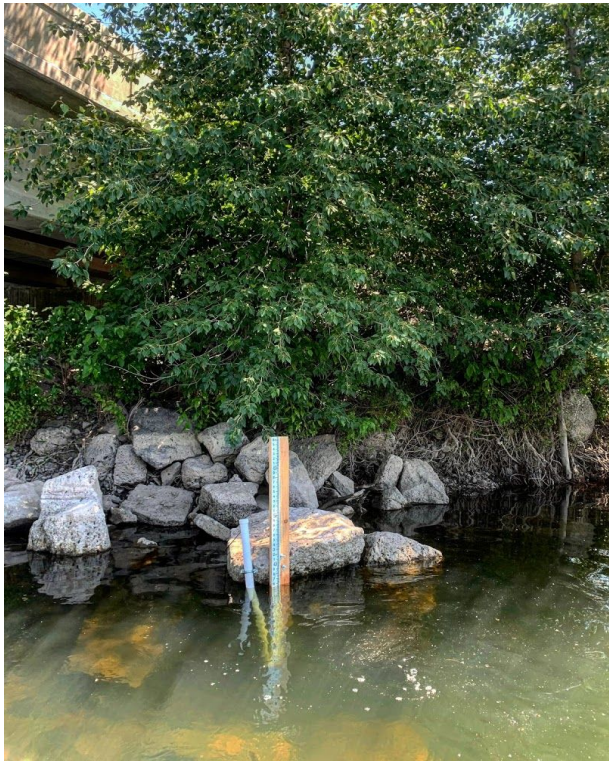
Stream gauge

Flow measurements

Piezometers

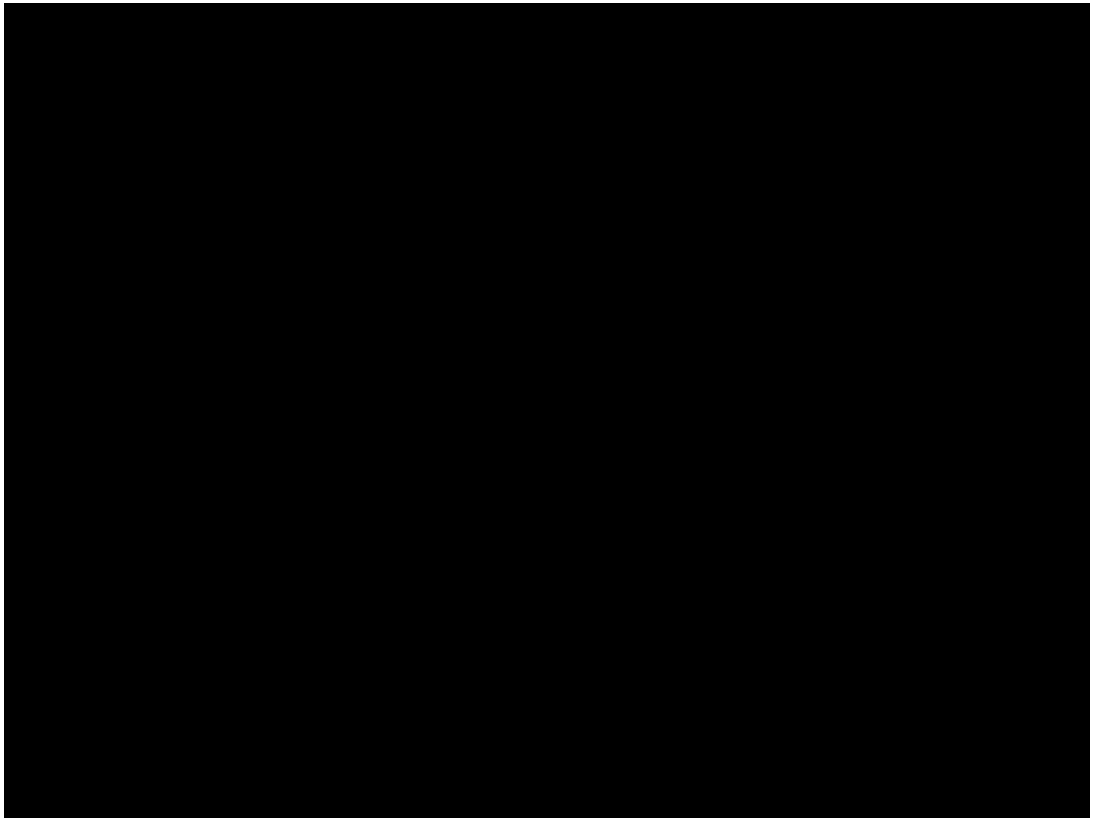
Groundwater flow contribution: stream gauge

- Installed a stream gauge at Parker
- Records every 15-min, remote transmission hourly

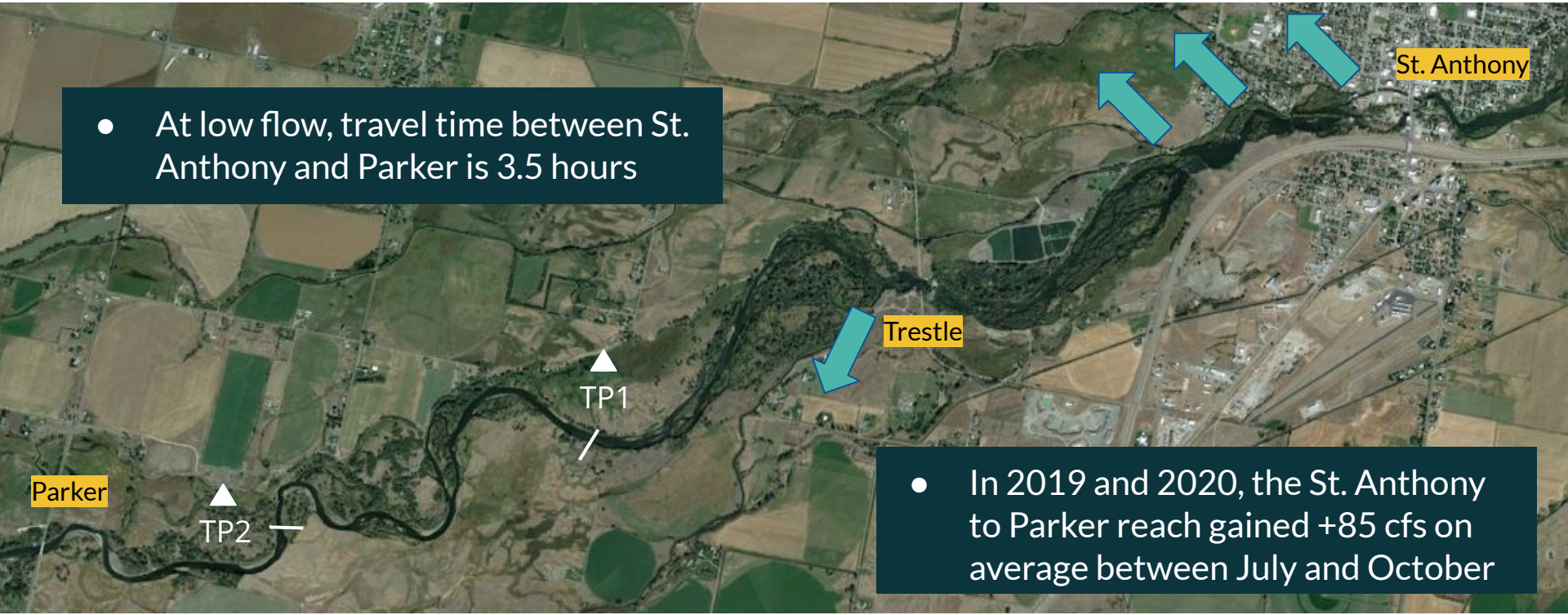


Groundwater flow contribution: flow mmt

- Measure flow at Trestle, TP1, TP2, and Parker
- Paired with stream gauge, we can calculate travel time between St. Anthony and a measurement site

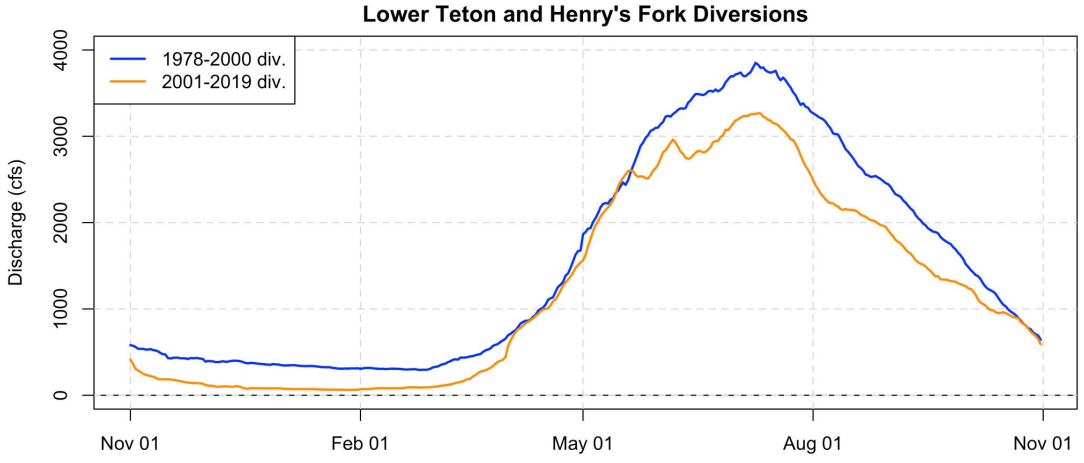


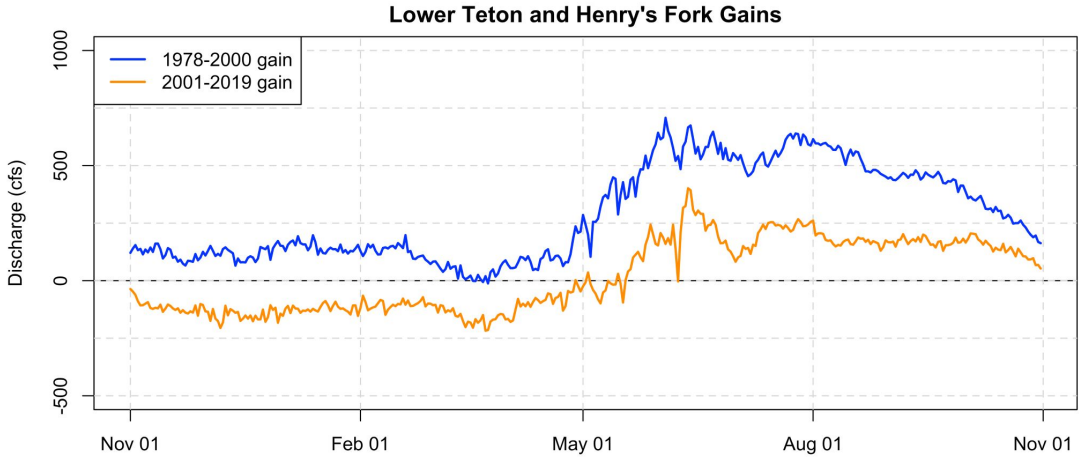
Groundwater flow contribution: early results



- At low flow, travel time between St. Anthony and Parker is 3.5 hours

- In 2019 and 2020, the St. Anthony to Parker reach gained +85 cfs on average between July and October

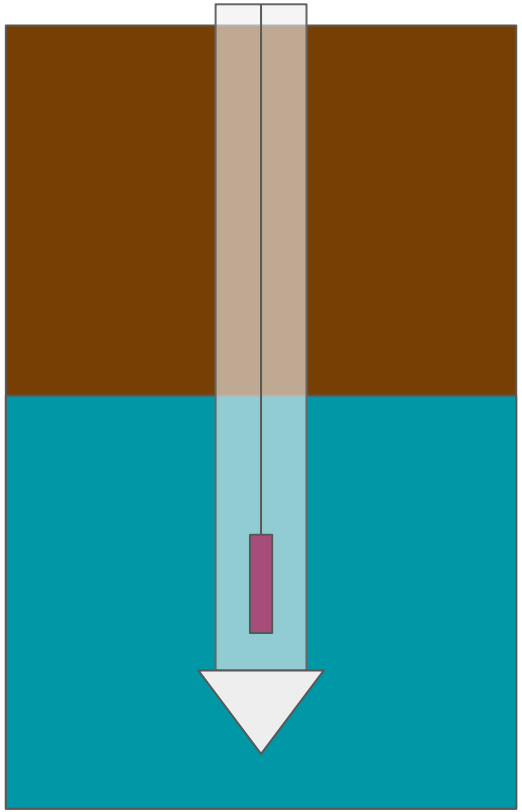




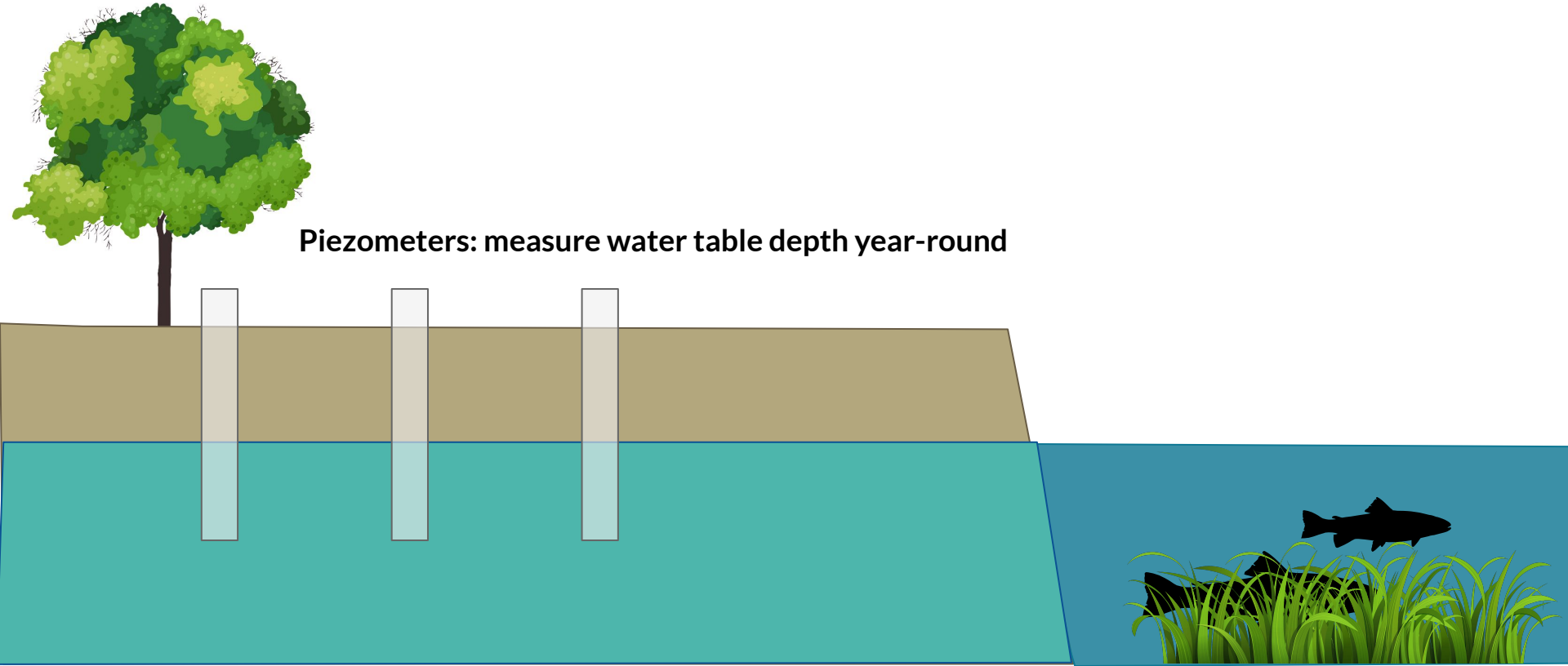
London Bernier
St. Lawrence University '20
HFF Intern 2020

- 200,000 acre-ft drop in diversions
- Reach gains decreased by same amount
- Watershed reach gains predicted by diversions
- We can account for much of the 200k af loss in the lower watershed

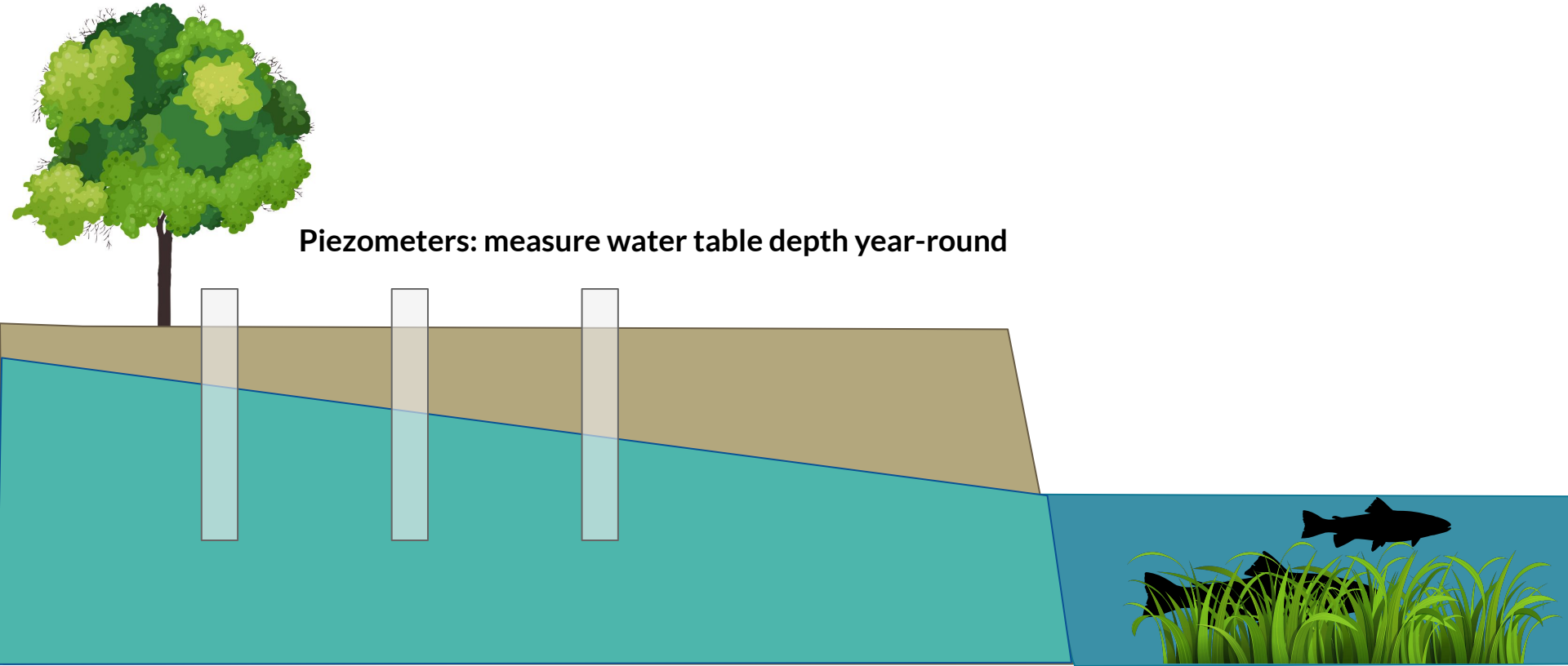
Groundwater flow contribution: piezometers



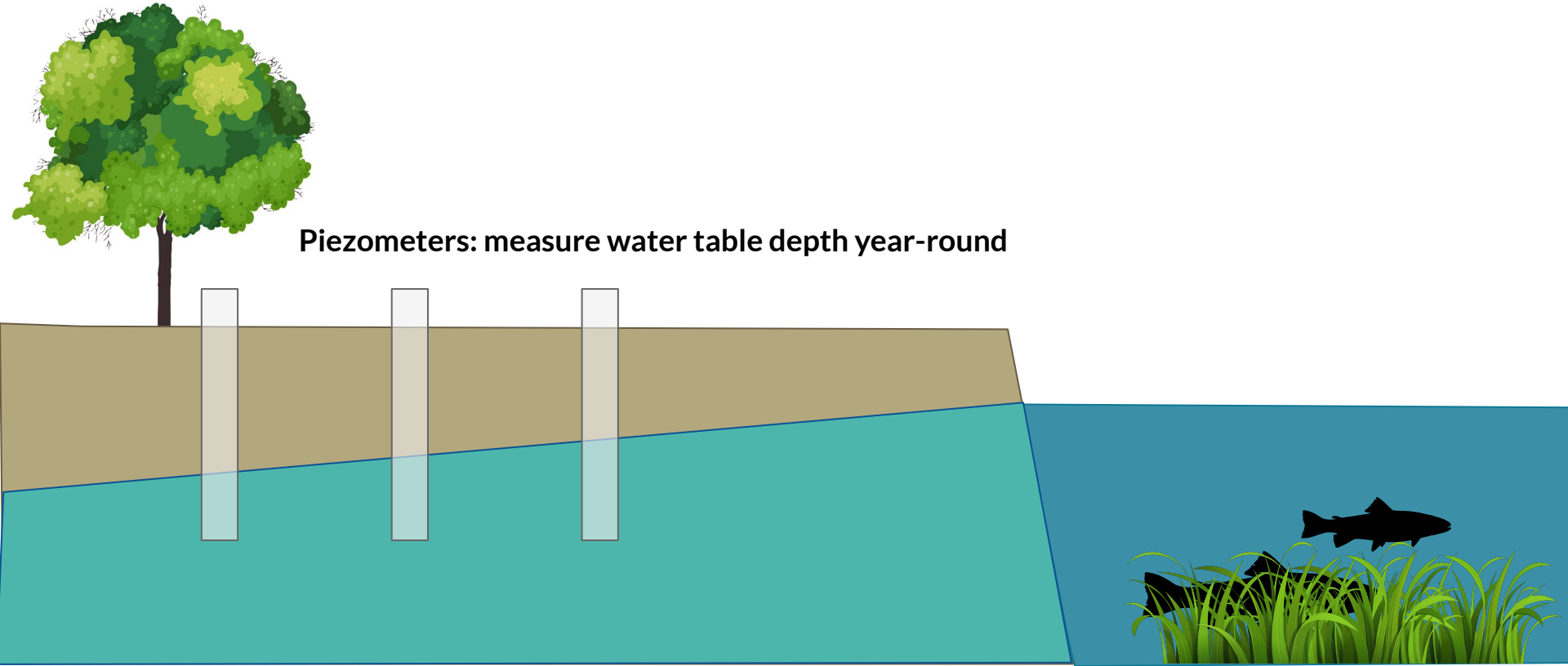
Groundwater flow contribution: piezometers



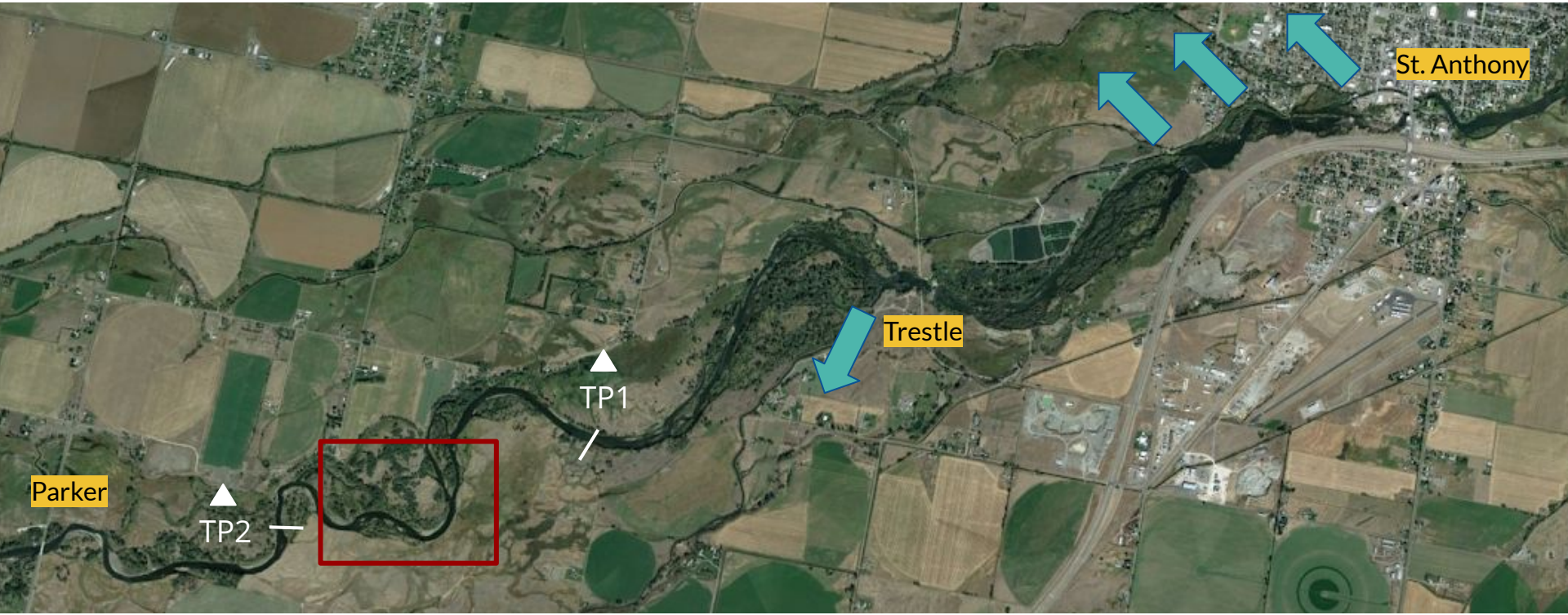
Groundwater flow contribution: piezometers

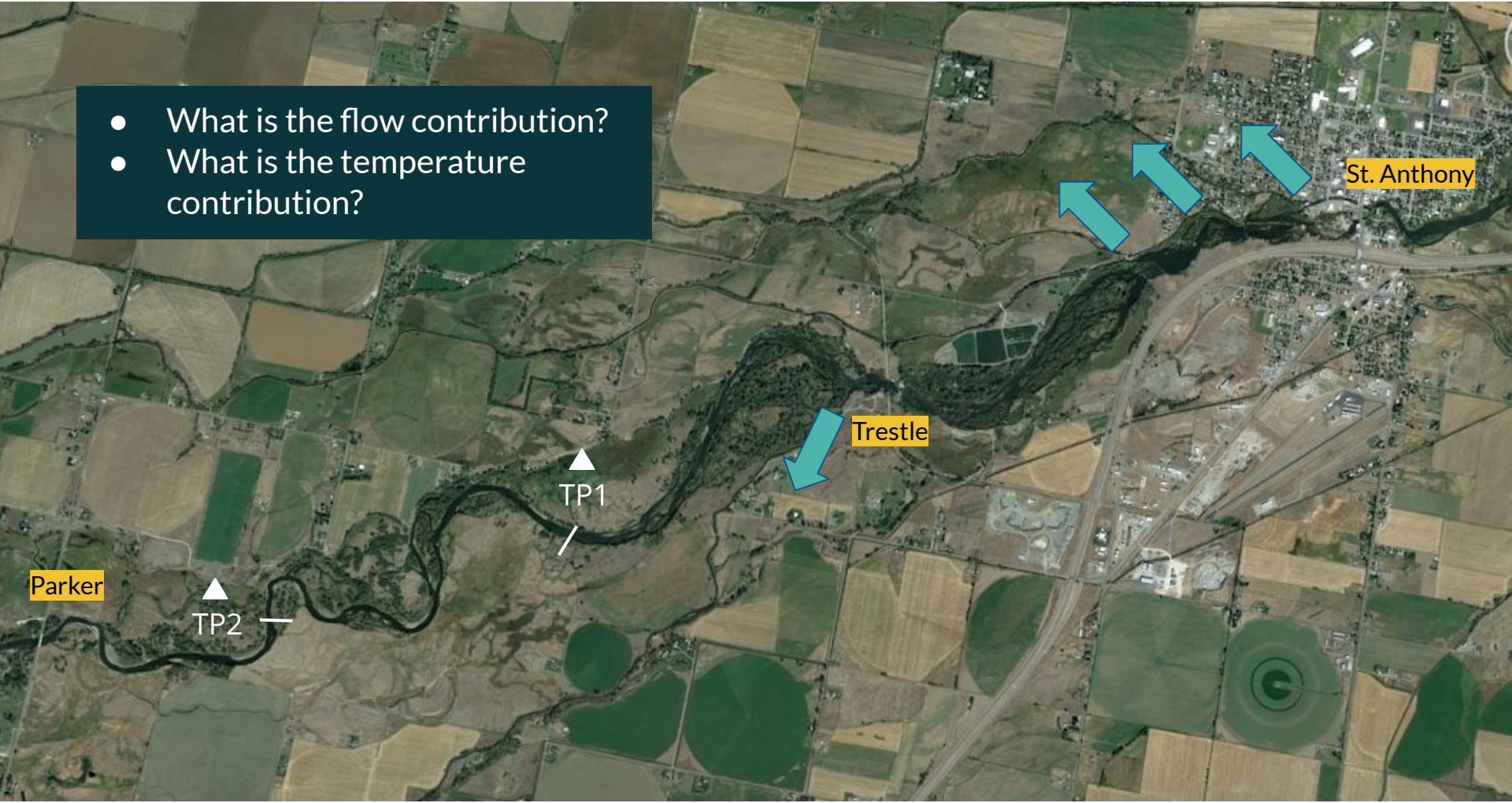


Groundwater flow contribution: piezometers



Groundwater flow contribution: piezometers

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St. Anthony
Trestle
TP1
Parker
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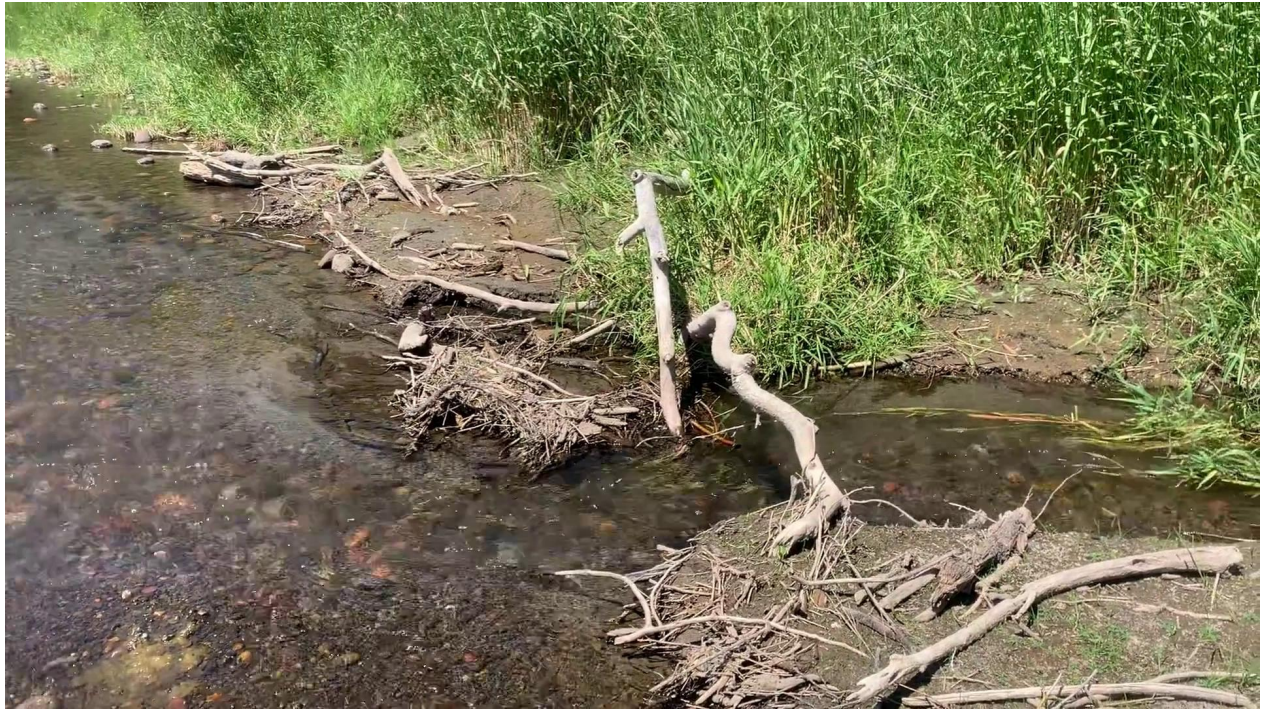
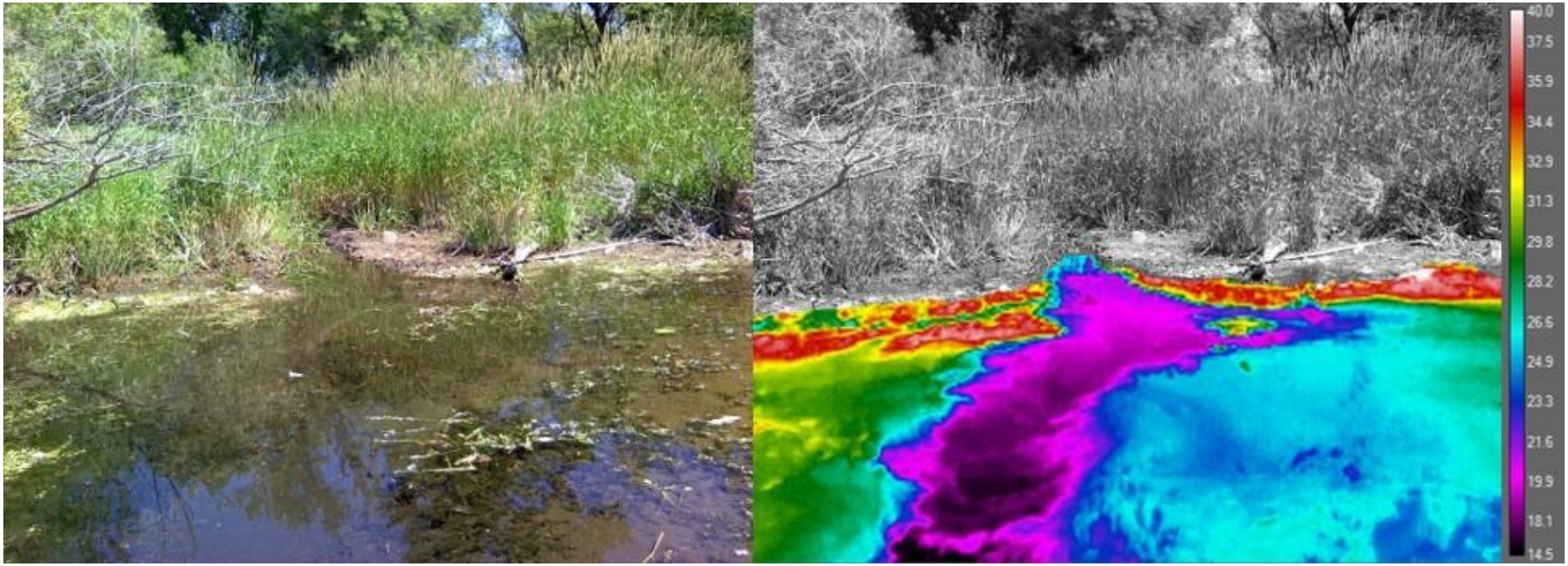
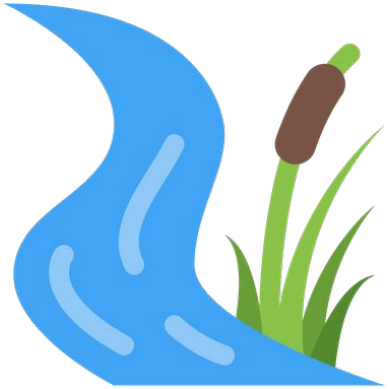
Ashly Loibman
Colgate University ‘20
HFF Intern 2019





Van Kirk et al. 2020

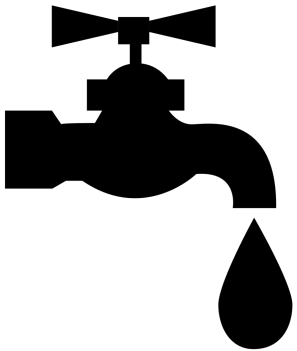
58°F



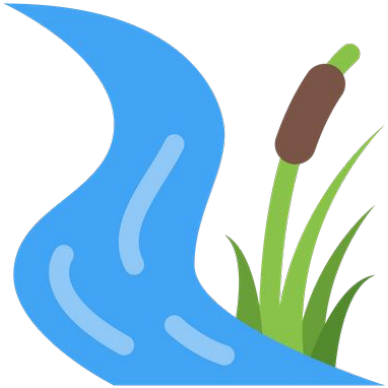
65°F

7°F difference between springs and river

Van Kirk et al. 2020



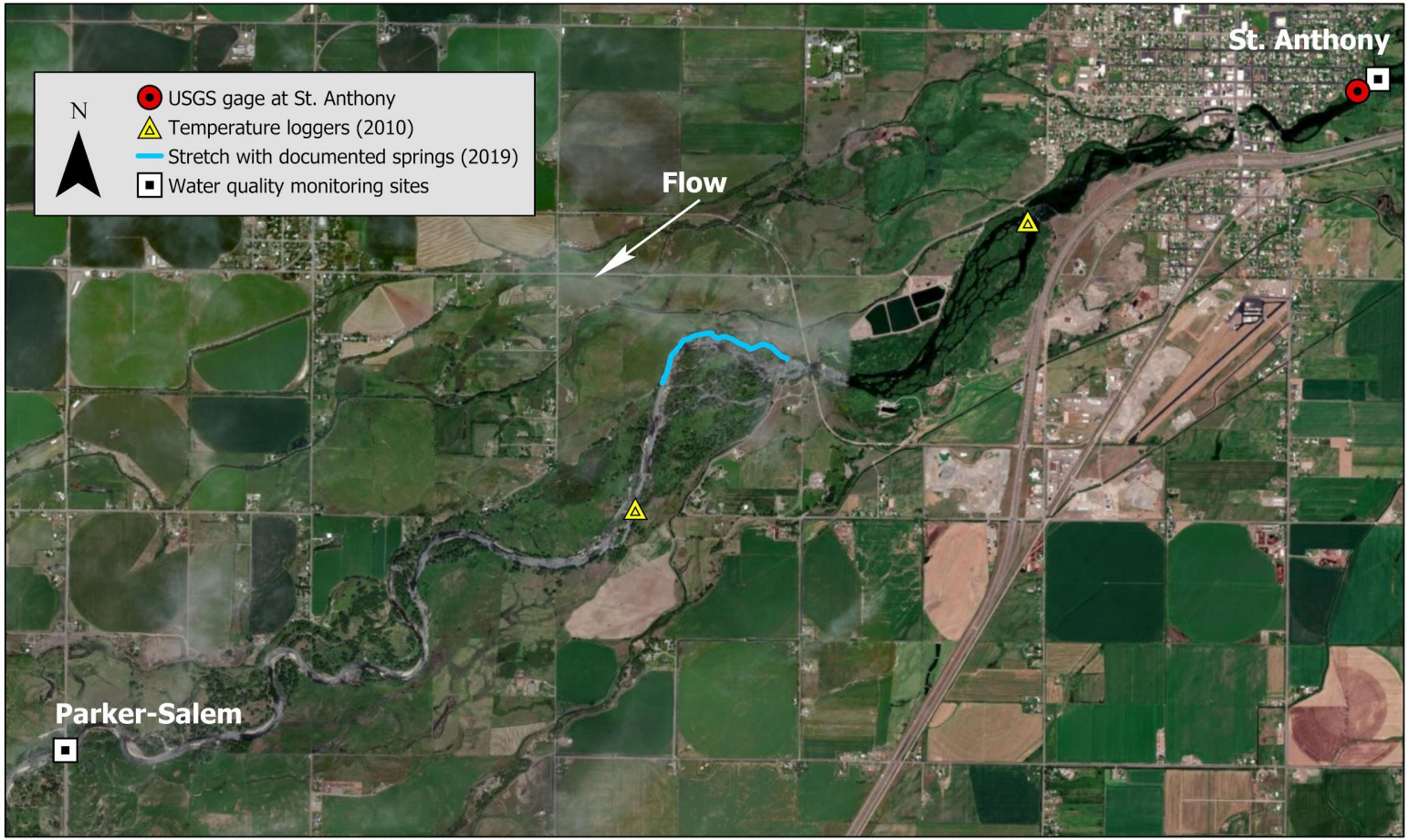
58°F



65°F

7°F difference between springs and river

But how does this translate downriver?



Van Kirk et al. 2020

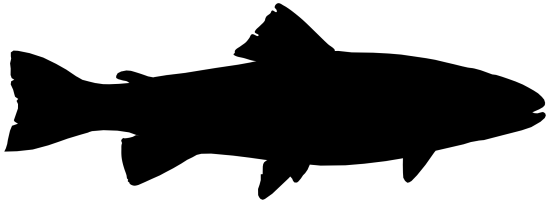
3.1 mi

June - Aug 2010

1.08°F

Van Kirk et al. 2020

Research Questions

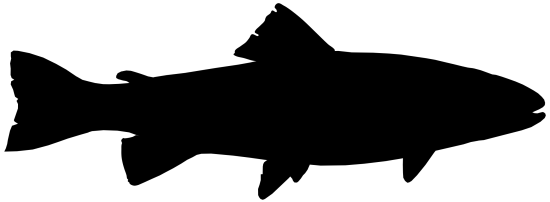


How does aquatic HABITAT change with streamflow?

What role does GROUNDWATER play?

Low flow recommendation

Research Summary + Status

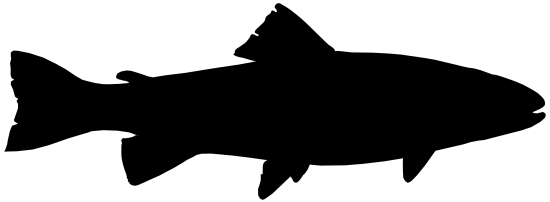


How does aquatic HABITAT change with streamflow?

- In progress
- Also interested in looking at streamflow-fishing use relationship

What role does GROUNDWATER play?

Research Summary + Status



How does aquatic HABITAT change with streamflow?

- In progress
- Also interested in looking at streamflow-fishing use relationship

What role does GROUNDWATER play?

- +85 cfs gain between St. Anthony and Parker in July-September
- Groundwater is 7°F cooler than river at low flows

Thank You!

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CLIMATE ADAPTATION SCIENCE

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Fremont Madison Irrigation District
Fremont County + LHTAC

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Rob Van Kirk
Matt Hively
Randy, Fred, Paul

London Bernier
J. Lansche
J. Heckel
B. High
A. Day


Henry's Fork
Henry's Fork
Henry's Fork
Henry's Fork
Henry's Fork
Cottonwood Dr
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