

Lower Boise River Aquatox Model segments 8 – 12

Pool/Run/Riffle Ratio
Periphyton Visual Assessment
With notes on turbidity, canopy cover, and wetted width

June 20 – 21, 2013

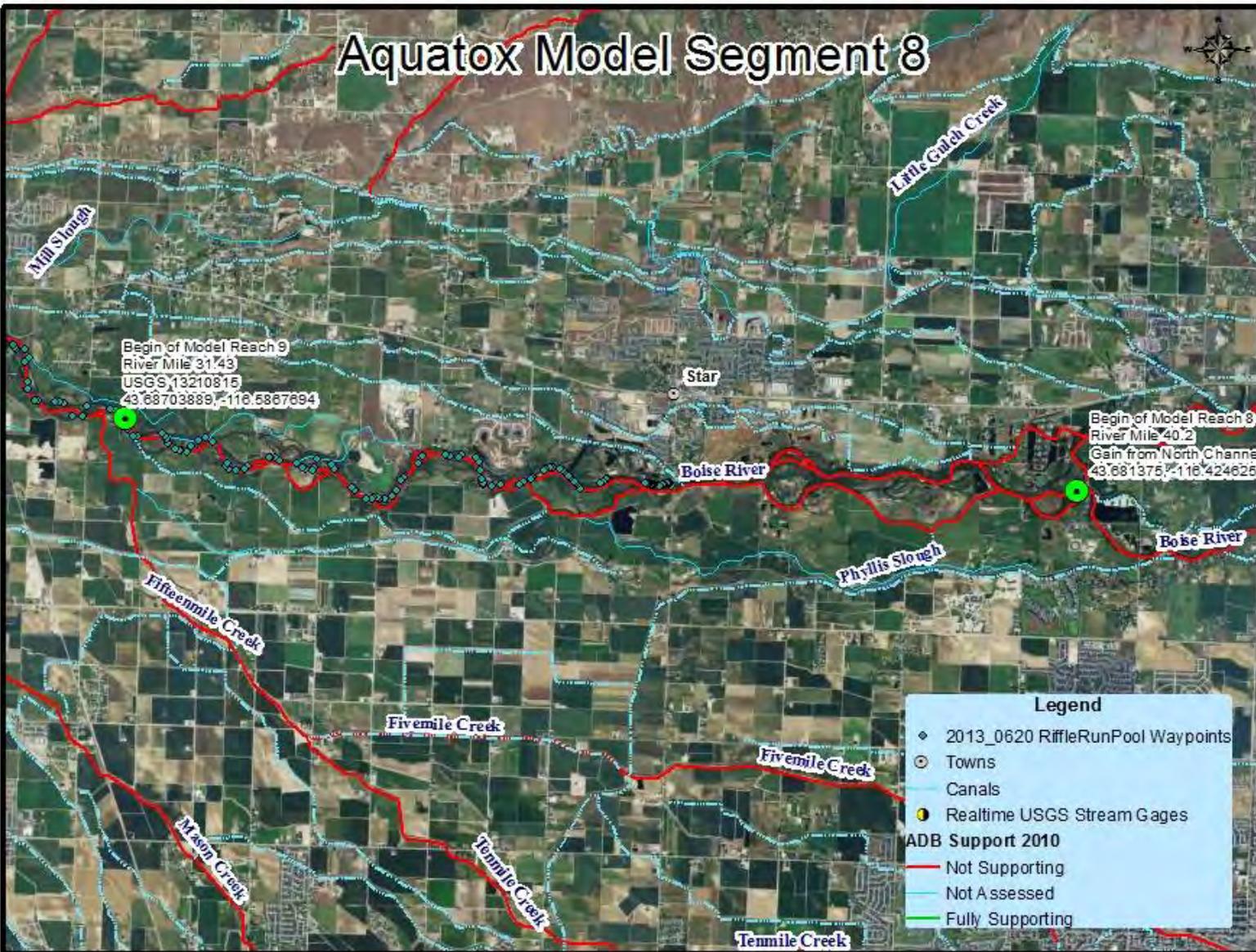
Troy Smith and Josh Schultz, Boise Regional Office

Darcy Sharp, Technical Services, State Office

Kate Harris, City of Boise



Aquatox Model Segment 8



Begin of Model Reach 9
 River Mile 31.43
 USGS 13210815
 43.68703889, -116.5867694

Begin of Model Reach 8
 River Mile 40.2
 Gain from North Channel
 43.681375, -116.424626

Legend

- ◆ 2013_0620 RiffleRunPool Waypoints
- Towns
- Canals
- Realtime USGS Stream Gages

ADB Support 2010

- Not Supporting
- Not Assessed
- Fully Supporting



Star Bridge; Riffles 1 - 7

- Depth 0.2 - 0.5 meters
- 82% periphyton
- 1.1 meter visibility



Riffle 5 and Representative Shade

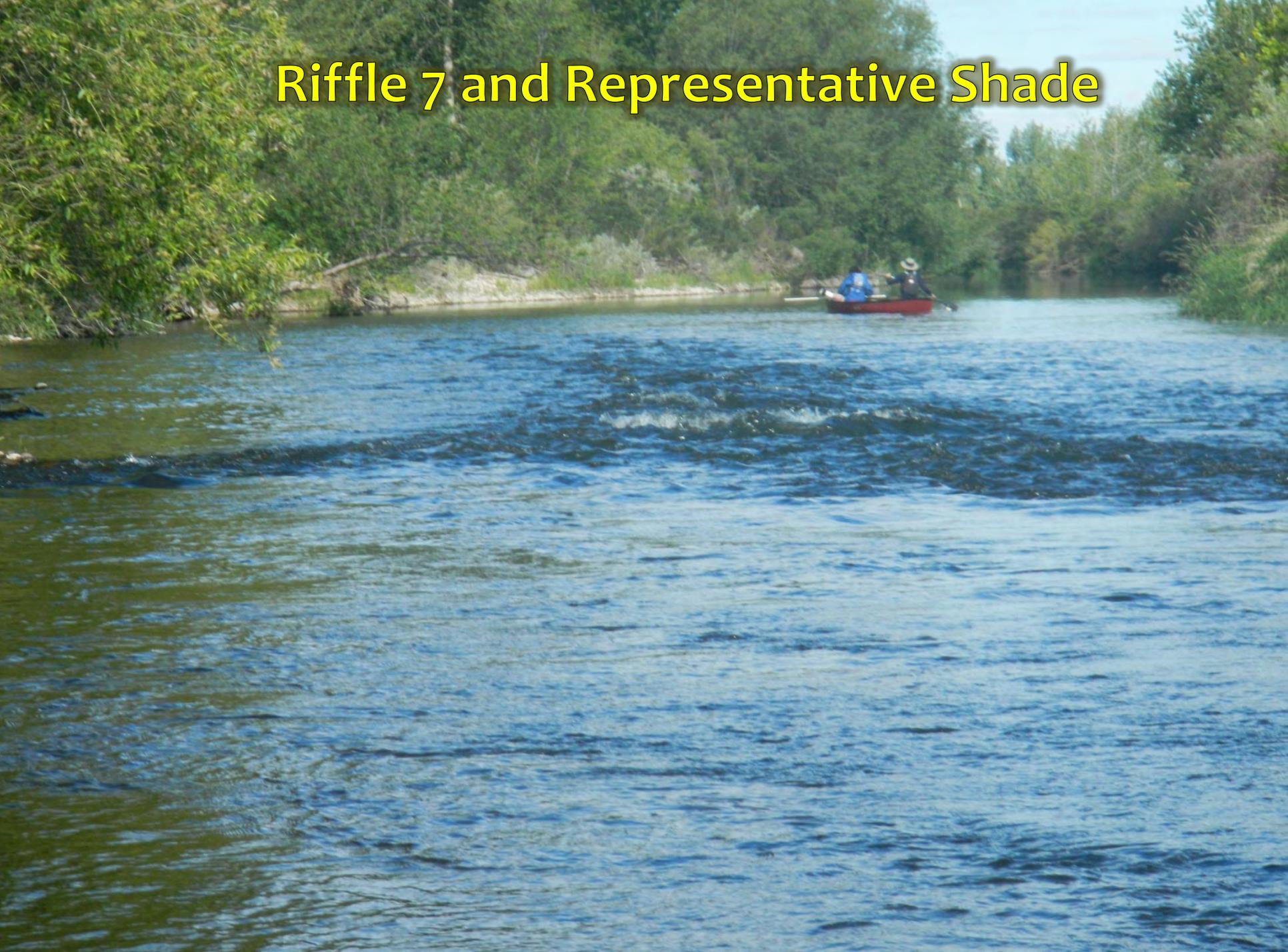


Macrophytes in reach

Apparently ribbon-leaved pondweed



Riffle 7 and Representative Shade



Riffles 8 - 15

- Depth 0.2 to 1.5 meters
- 76% periphyton
- 0.5 to 1.1 meter visibility



Substrate

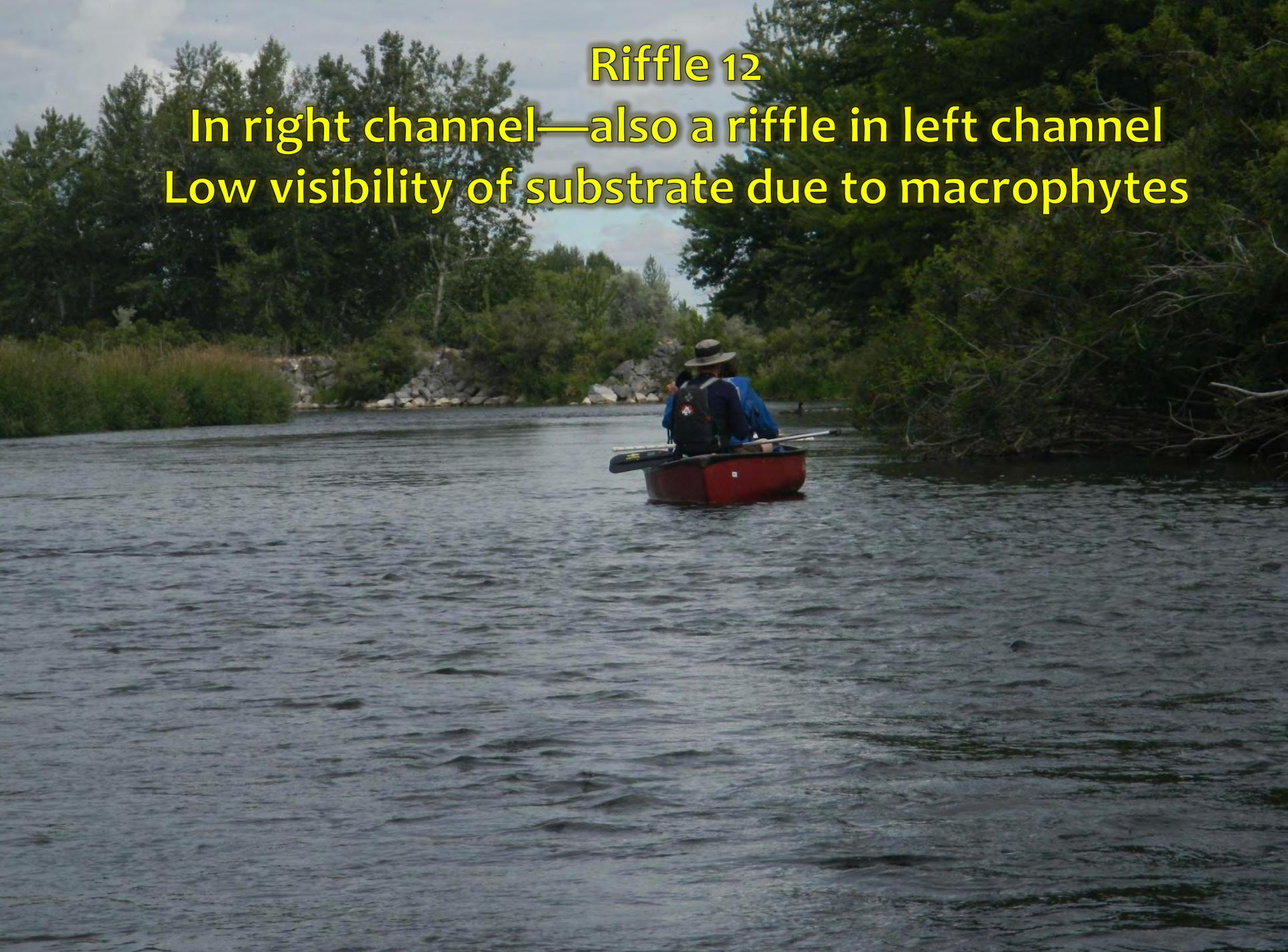


Riffle 9



Riffle 12

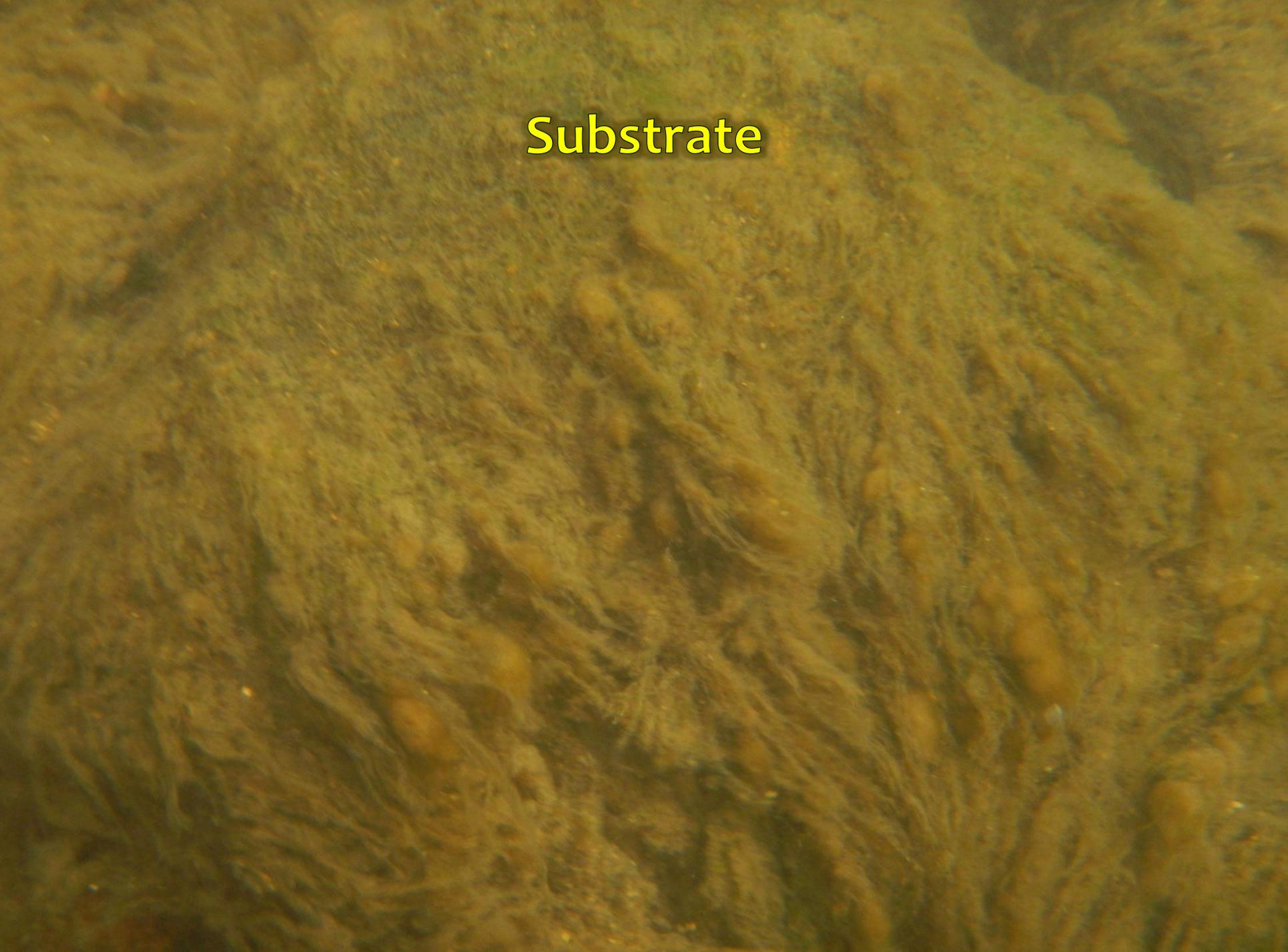
In right channel—also a riffle in left channel
Low visibility of substrate due to macrophytes



Riffle 14
Run downstream had rip-rapped right bank



Substrate

The image shows a highly textured, fibrous surface with a yellowish-brown color. The texture consists of numerous fine, overlapping fibers or strands that create a complex, woven appearance. The lighting is somewhat uneven, with darker areas in the lower-left and upper-right corners, and a brighter, more uniform area in the center. The word "Substrate" is printed in a bold, yellow, sans-serif font at the top center of the image.

Riffle 15



Riffles 16 - 22

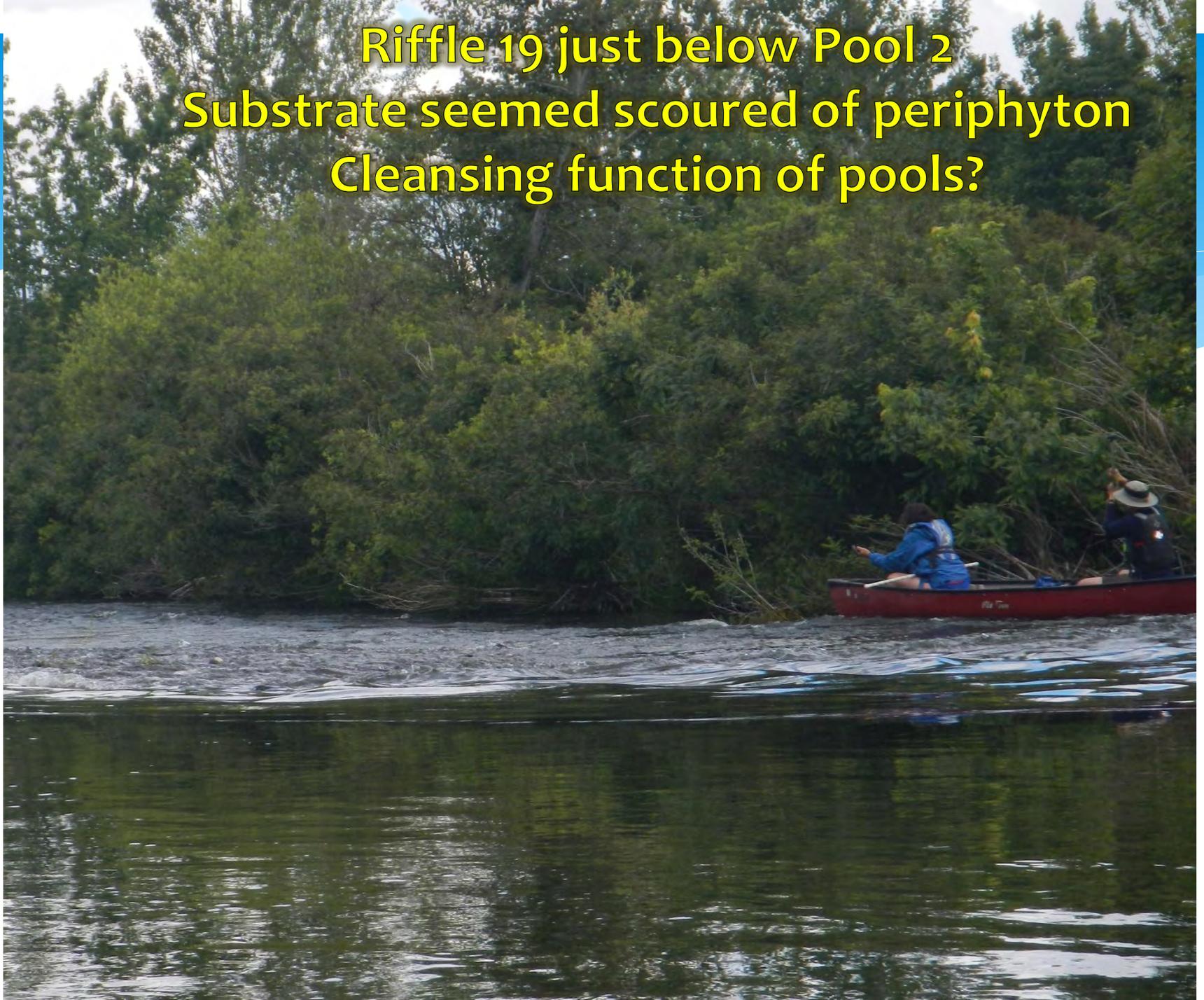
- Depth .3 to >2 meters
- 66% periphyton
- 0.4 to 0.8 meter visibility
- Development west of Can-Ada road



Riffle 16



Riffle 19 just below Pool 2
Substrate seemed scoured of periphyton
Cleansing function of pools?



Riffle 20

After this reach with more pools and velocities,
diatoms predominated



Pool 3



Riffles 23 - 28

- Depth .2 to 1.5 meters
- 76% periphyton
- 0.6 meter visibility
- Ponds at end of Goldie Lane South of Highway 44



Riffle 23



Riffle 25
Some eroding banks



Riffles 29 - 33

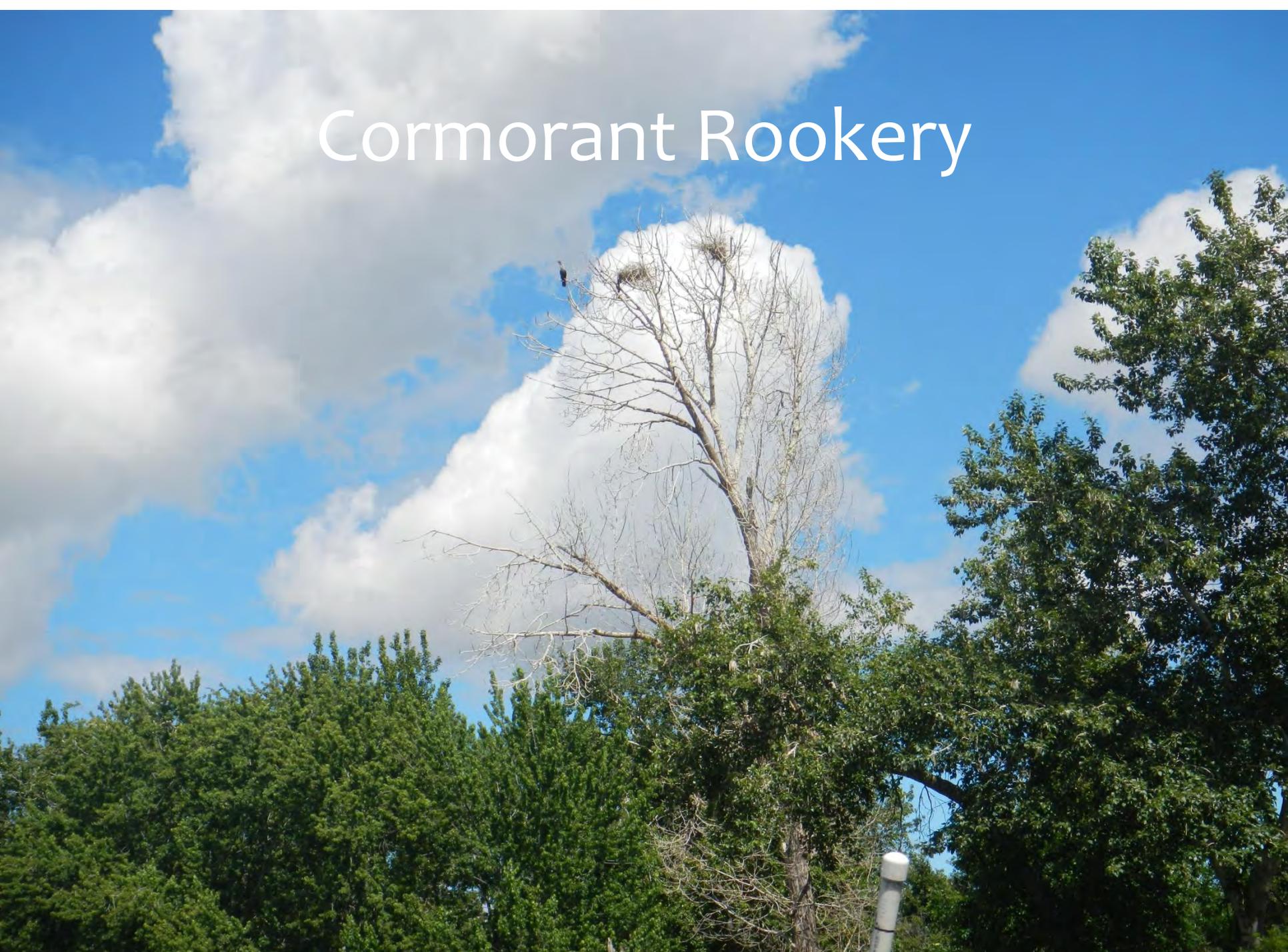
- Depth .4 to 1.1 meters
- 77% periphyton
- 0.8 meter visibility



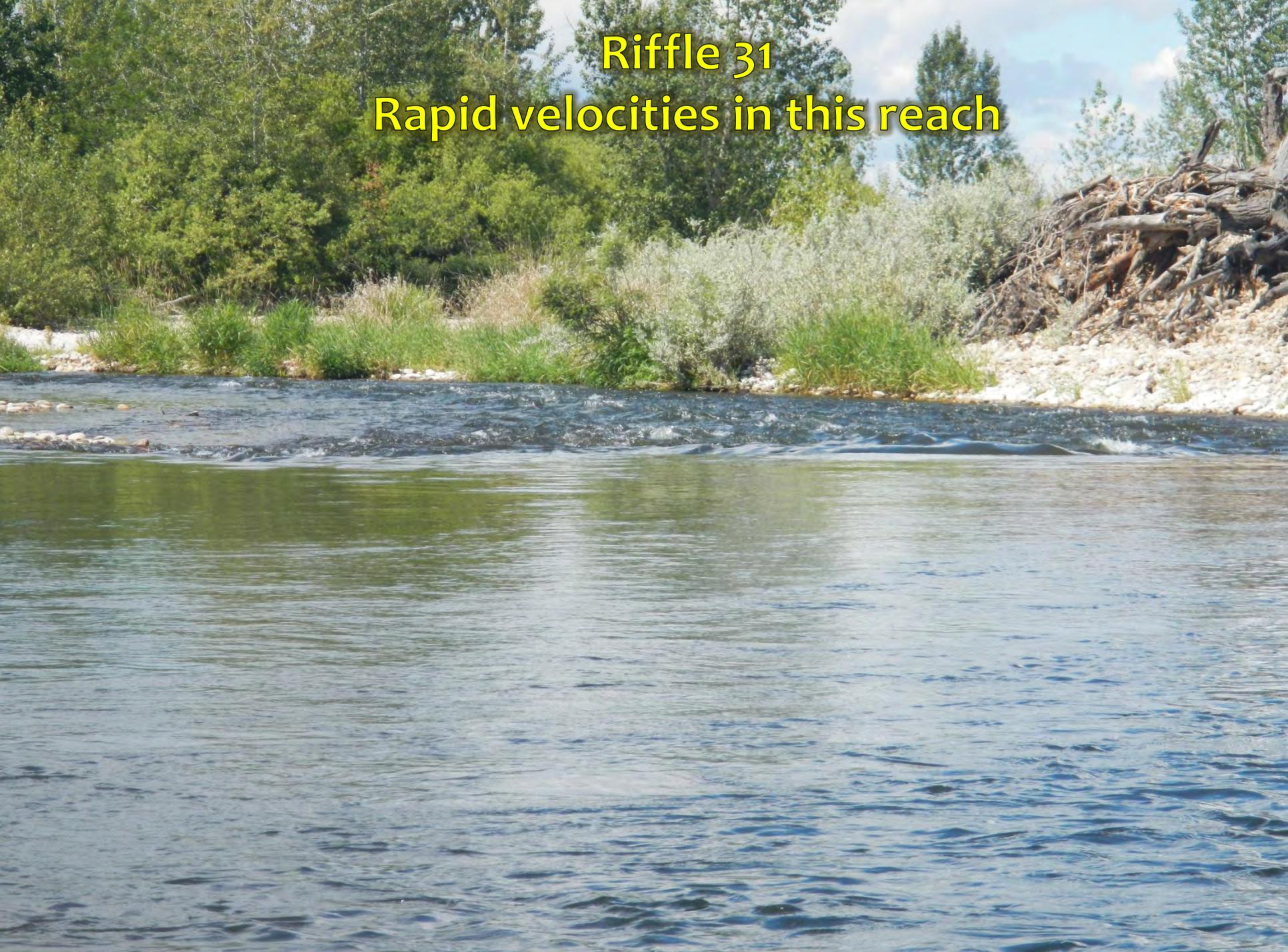
Riffle 30



Cormorant Rookery

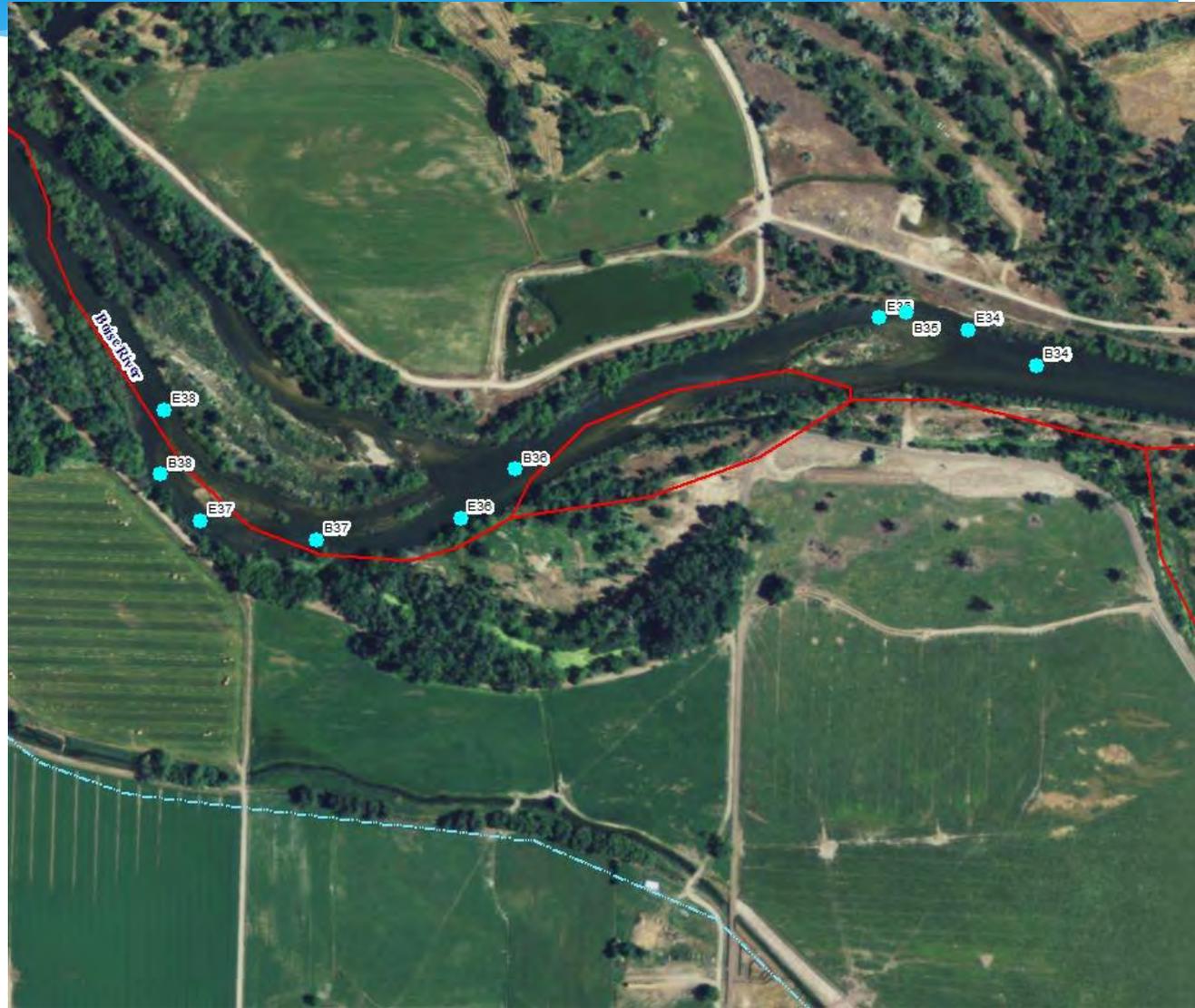


Riffle 31
Rapid velocities in this reach



Riffles 34 - 38

- Depth .4 to 1.5 meters
- 81% periphyton
- 0.5 meter visibility



Long, slow run after south channel return



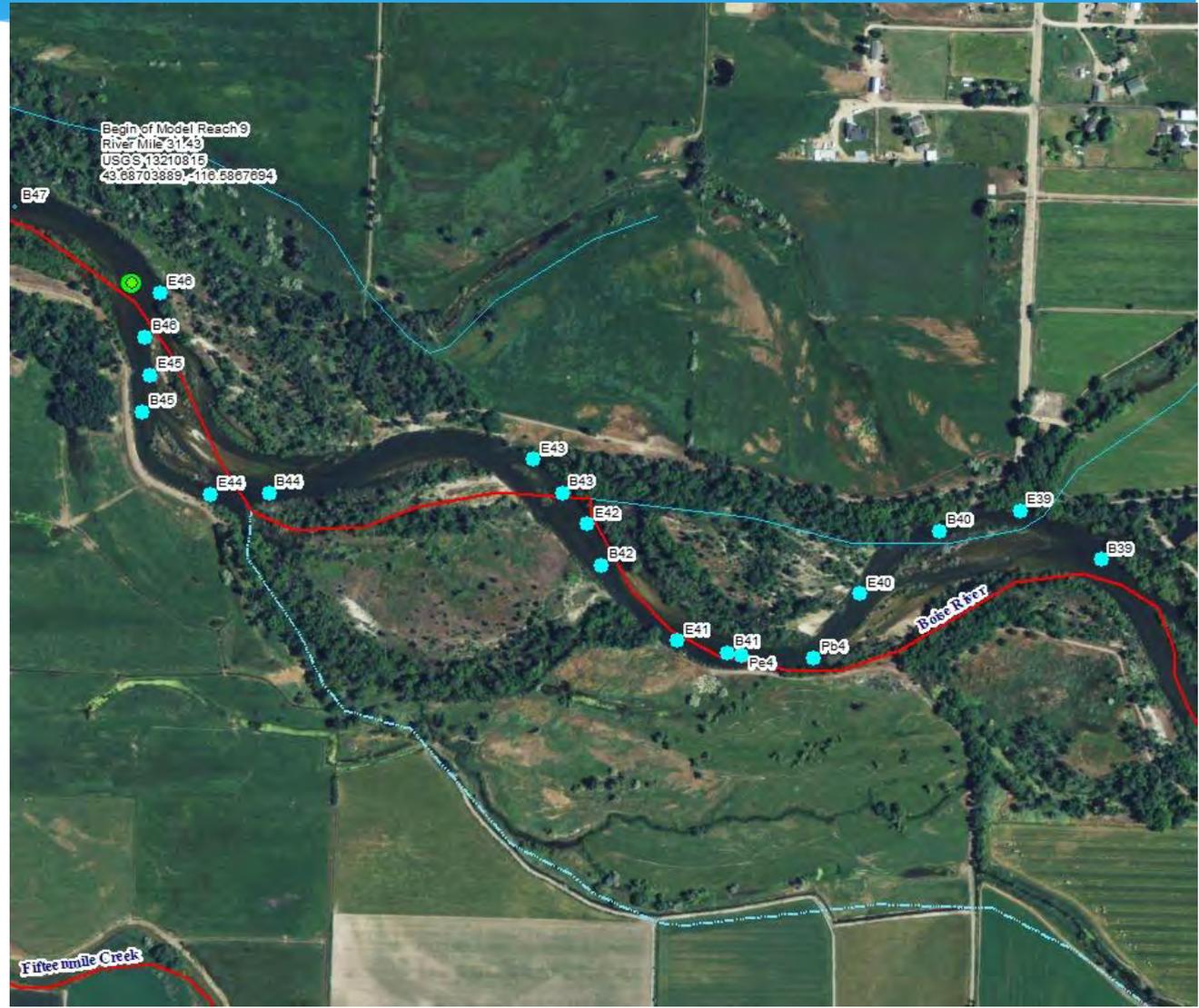
Riffle 38



Riffles 39-46

- Depth .4 to 1.3 meters (>2 m for pool)
- 83% periphyton
- 0.6 meter visibility

NHD indicates unnamed confluence on rb and unnamed canal on lb



Riffle 39 at Idaho Power Gage



Side channel right bank entering from concrete bridge and culvert



Small drain, apparently Mill Slough, right bank



Hat = substrate with periphyton growth



Riffle 43
100% habitat available * 75% periphyton coverage



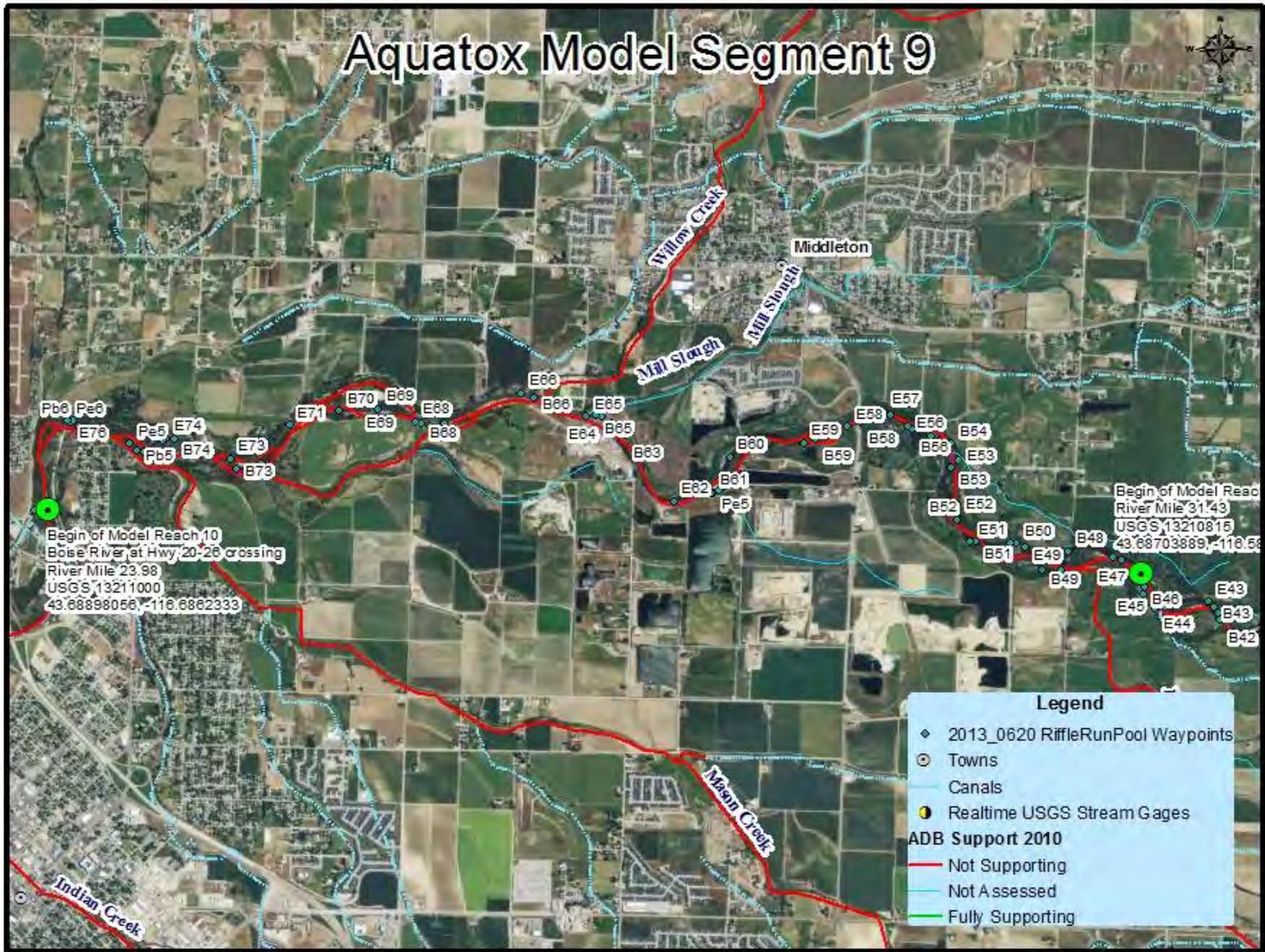
Riffle 43
100% habitat available * 75% periphyton coverage



Aquatox Model Segment 8 Summary

- * Pool/Riffle/Run = 3%/30%/67%
- * 78% periphyton coverage, mostly diatoms
- * 0.5 to 1.1 meter visibility

Aquatox Model Segment 9



Begin of Model Reach 10
 Boise River at Hwy 20-26 crossing
 River Mile 23.98
 USGS 13211000
 43.68898066, -116.6862333

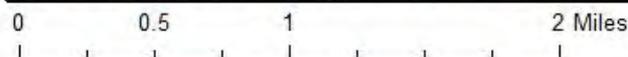
Begin of Model Reach
 River Mile 31.49
 USGS 13210815
 43.68703889, -116.56

Legend

- ◆ 2013_0620 RiffleRunPool Waypoints
- Towns
- Canals
- Realtime USGS Stream Gages

ADB Support 2010

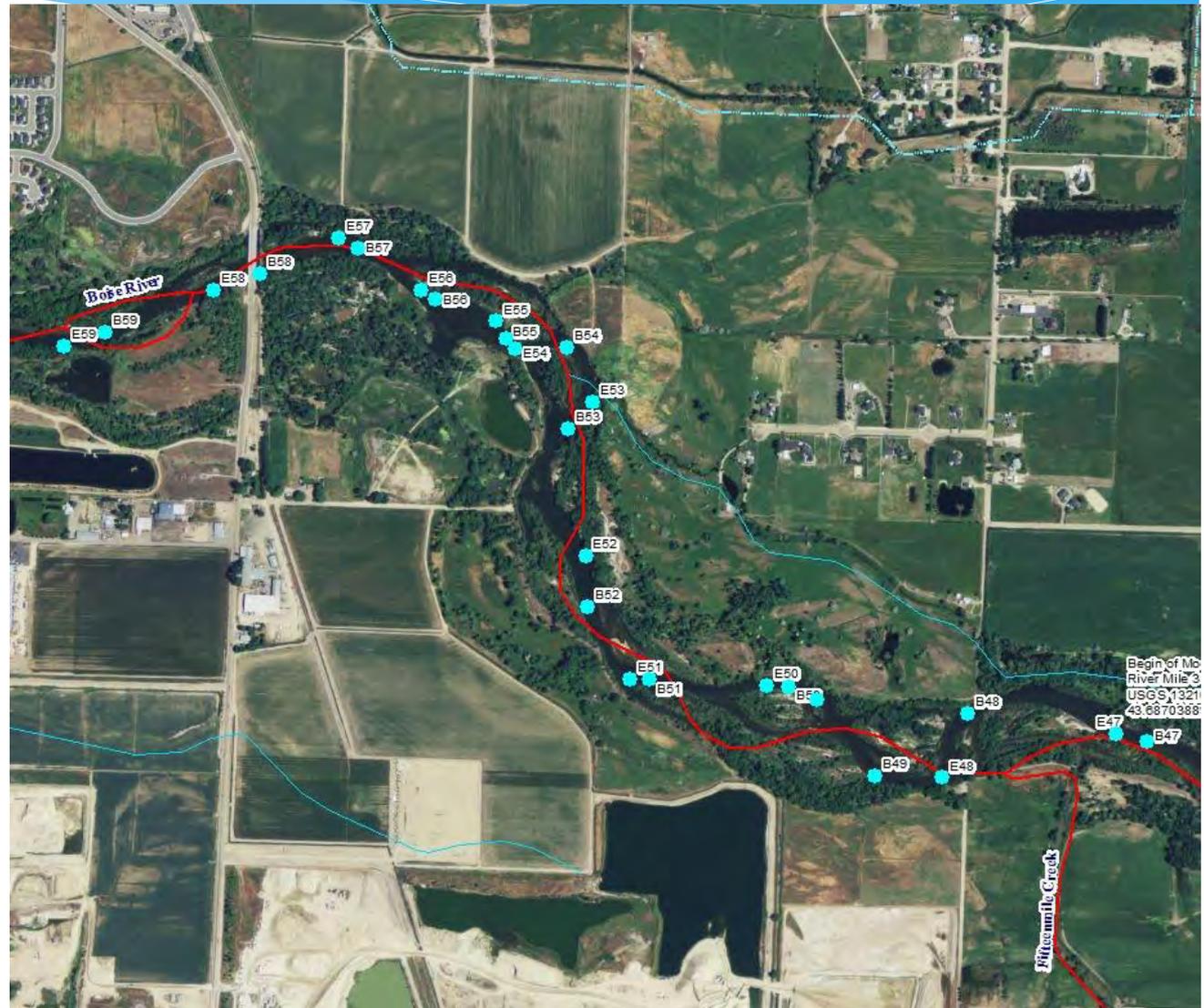
- Not Supporting
- Not Assessed
- Fully Supporting



Riffles 47-59

- Depth 0.3 to 1.9 meters
- 74% periphyton
- 0.6 meter visibility

Includes Fifteenmile
Creek confluence



Confluence with Fifteenmile Creek Increase in turbidity



Riffle 50

Next three riffles after Fifteenmile confluence
no visibility due to turbidity



Riffle 55
Runs in this reach had patchy macrophytes



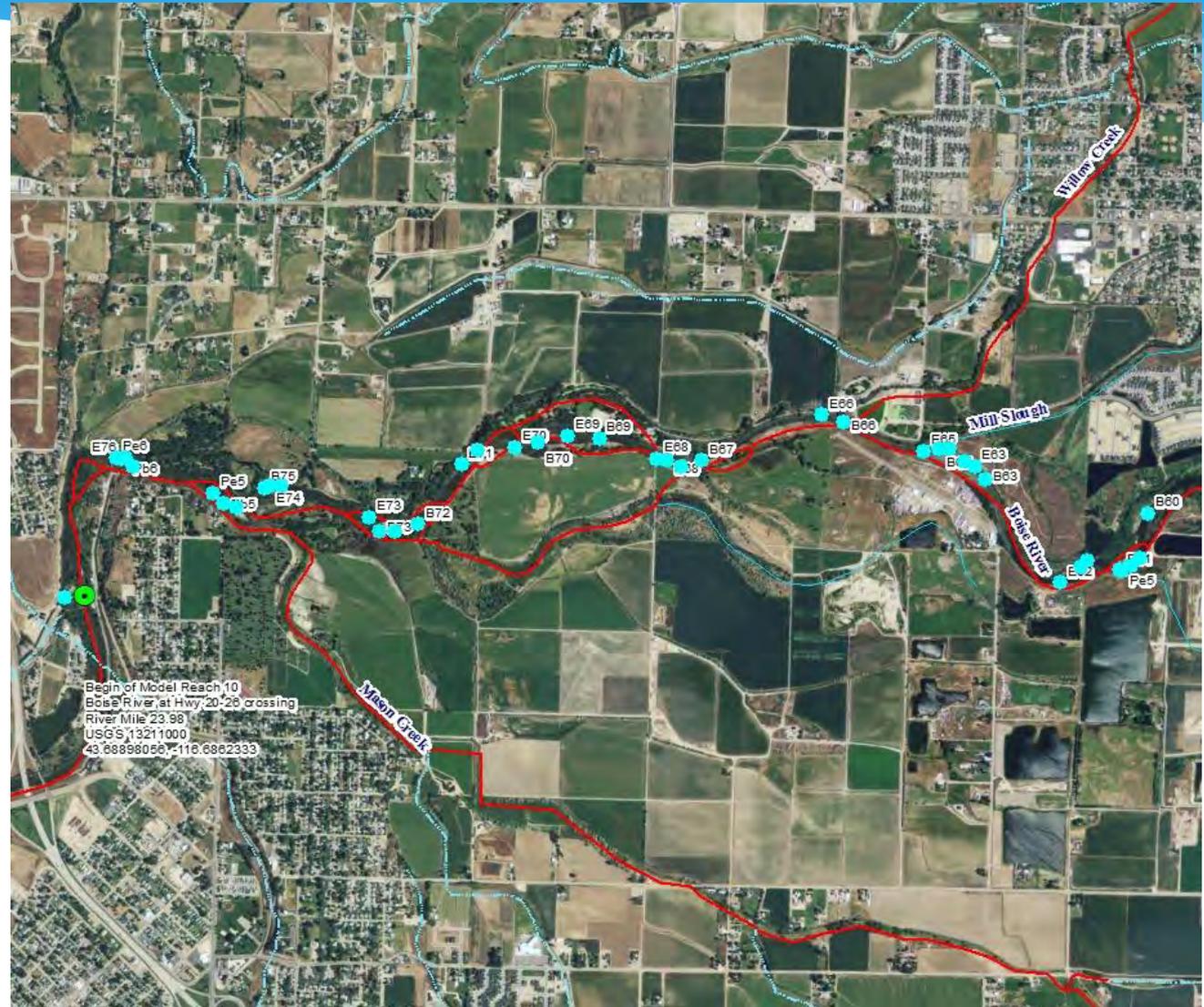
Riffle 57
Middleton Road Bridge



Riffles 60-76

- Depth 0.4 to 2.0 meters
- 64% periphyton
- 0.5 meter visibility

Includes Willow and Mason confluences



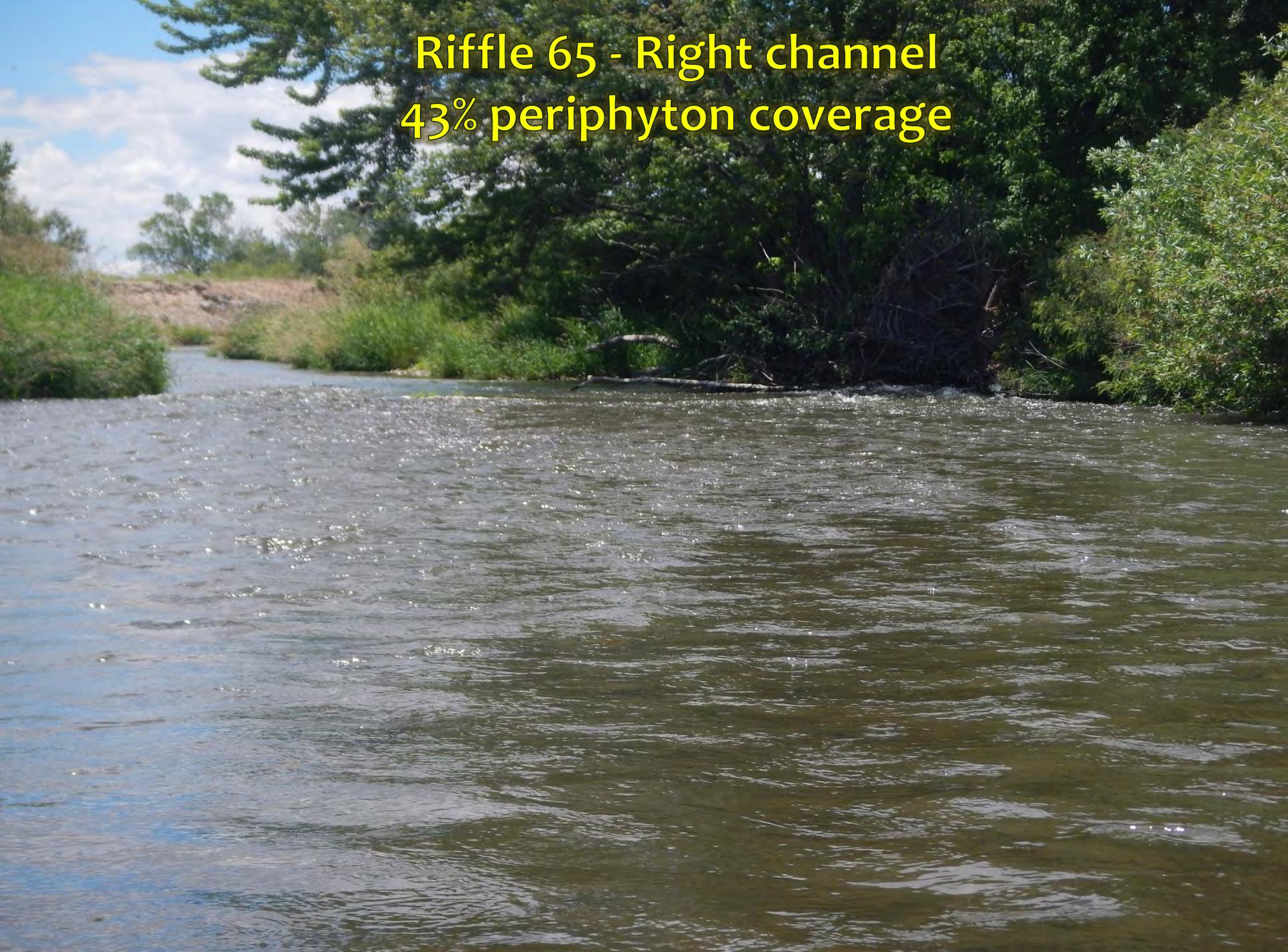
Riffle 60



Pool 5



Riffle 65 - Right channel
43% periphyton coverage



Riffle 69
83% periphyton coverage

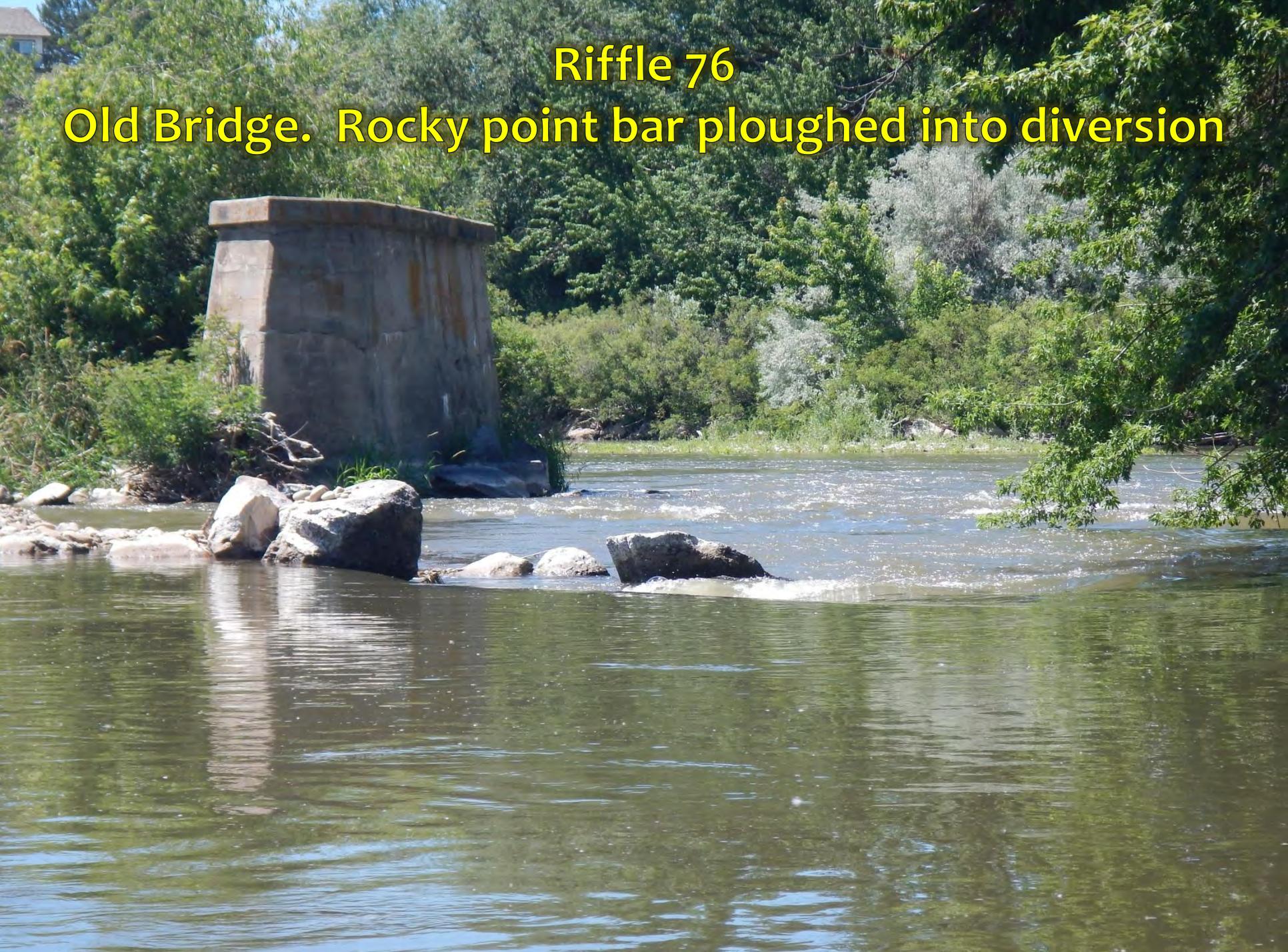


Turbidity after Mason confluence



Riffle 76

Old Bridge. Rocky point bar ploughed into diversion



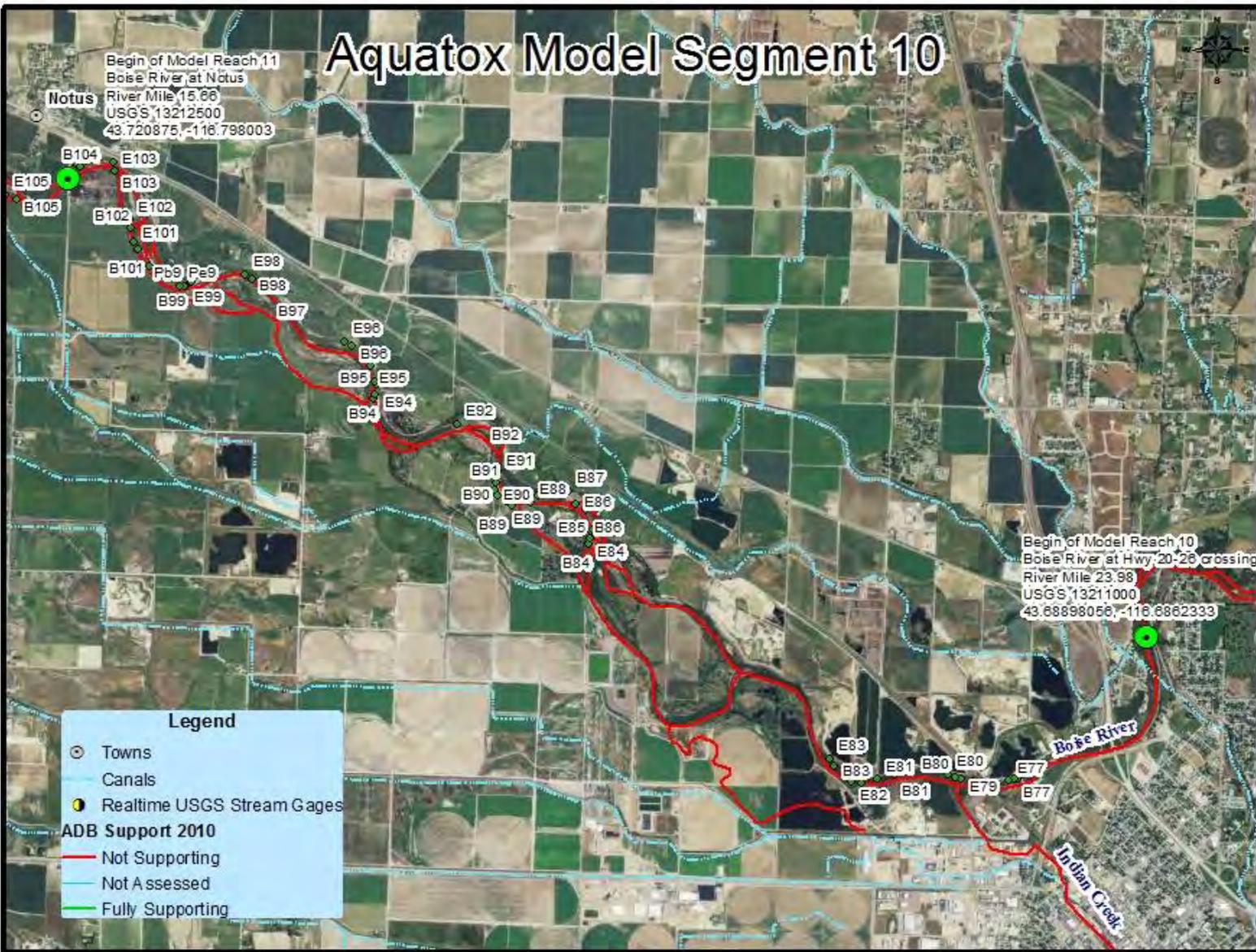
Hartley Drain
Boise River channel takes a 90° turn to the south



Aquatox Model Segment 9 Summary

- * Pool/Riffle/Run = 2%/29%/70%
- * 69% periphyton coverage, mostly diatoms
- * 0.5 meter visibility

Aquatox Model Segment 10

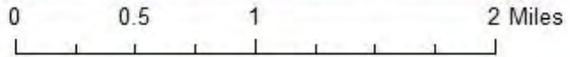


Begin of Model Reach 11
Boise River at Notus
River Mile 15.88
USGS 13212500
43.720875, -116.798003

Begin of Model Reach 10
Boise River at Hwy 20-26 crossing
River Mile 23.98
USGS 13211000
43.88898056, -116.8862333

Legend

- ⊙ Towns
- Canals
- Realtime USGS Stream Gages
- ADB Support 2010**
- Not Supporting
- Not Assessed
- Fully Supporting

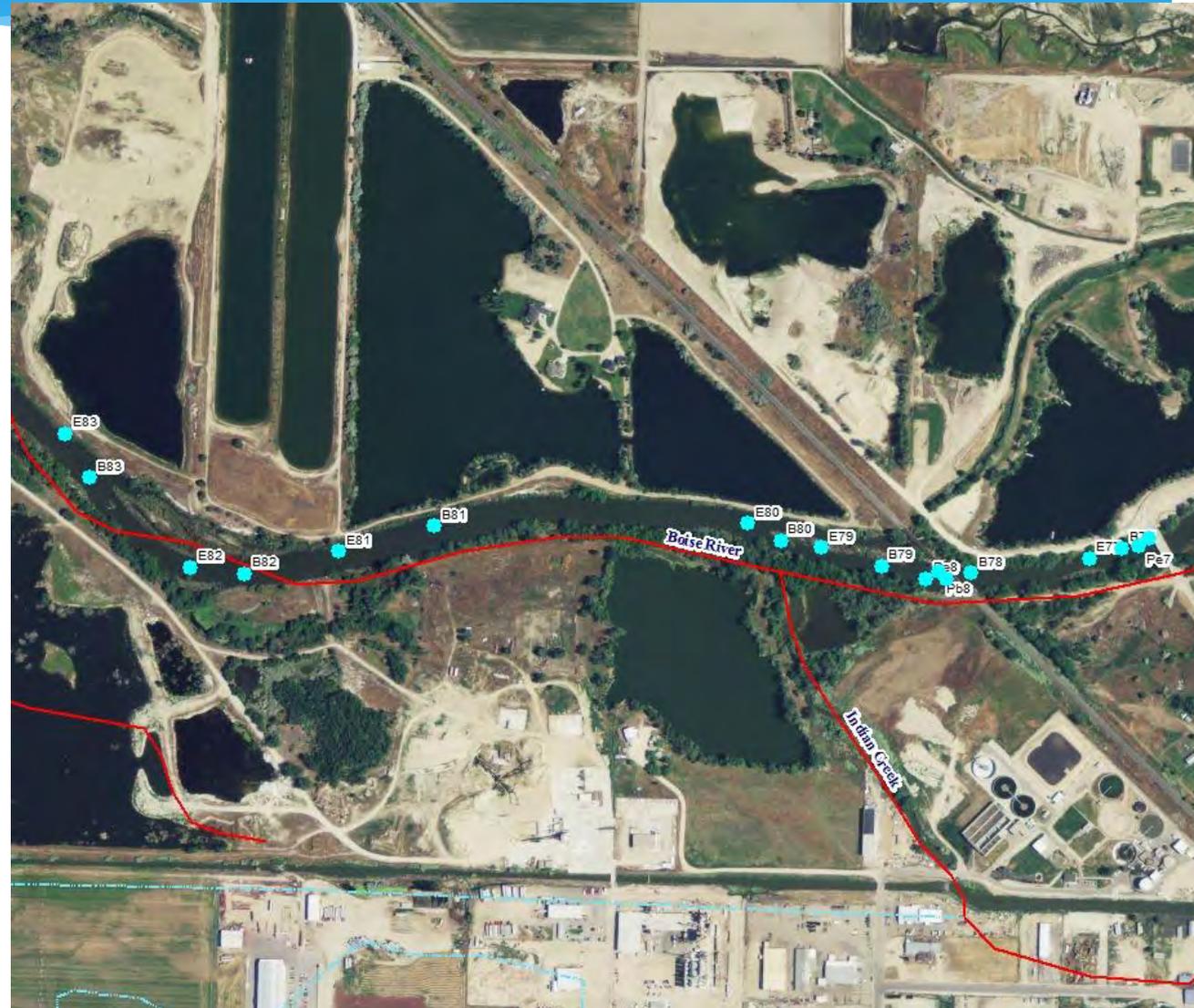


Riffles 77- 83

- Depth 0.2 to 2.0 meters
- 52% periphyton
- 0.4 meter visibility

June 21st—began survey at Chicago Street bridge in Caldwell

Reach includes Indian Creek confluence



Riffle 78

Railroad bridge downstream of Chicago Street bridge



Culvert



Riffle 79 upstream of Indian Creek confluence



Indian Creek confluence

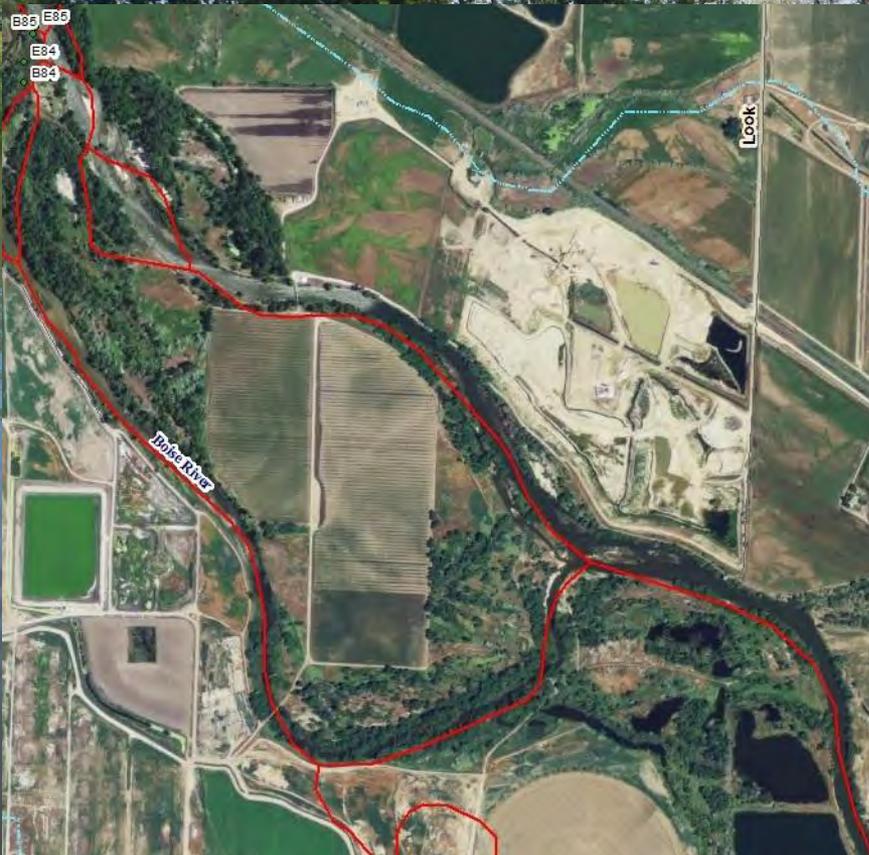


Large earthen diversion

North channel was entirely diverted—2 to 8-inch cobbles typical of substrate

South channel all run—2.3 miles long—full of strainers and portages

Artificial diversion created increased velocity—withdrawal at end of south channel



Riffles 84- 92

- Depth 0.2 to 1.7 meters
- 31% periphyton
- 0.4 meter visibility



Riffle 86—note eroding bank

Notes of 60% embeddedness directly downstream

Overland runoff—suspended sediment

Instream erosion—fine sediment in substrate



Riffle 90



Riffles 93-104

- Depth 0.2 to 1.7 meters
- 31% periphyton
- 0.25 meter visibility



Unnamed Drain
Turbidity—0.25 meter visibility

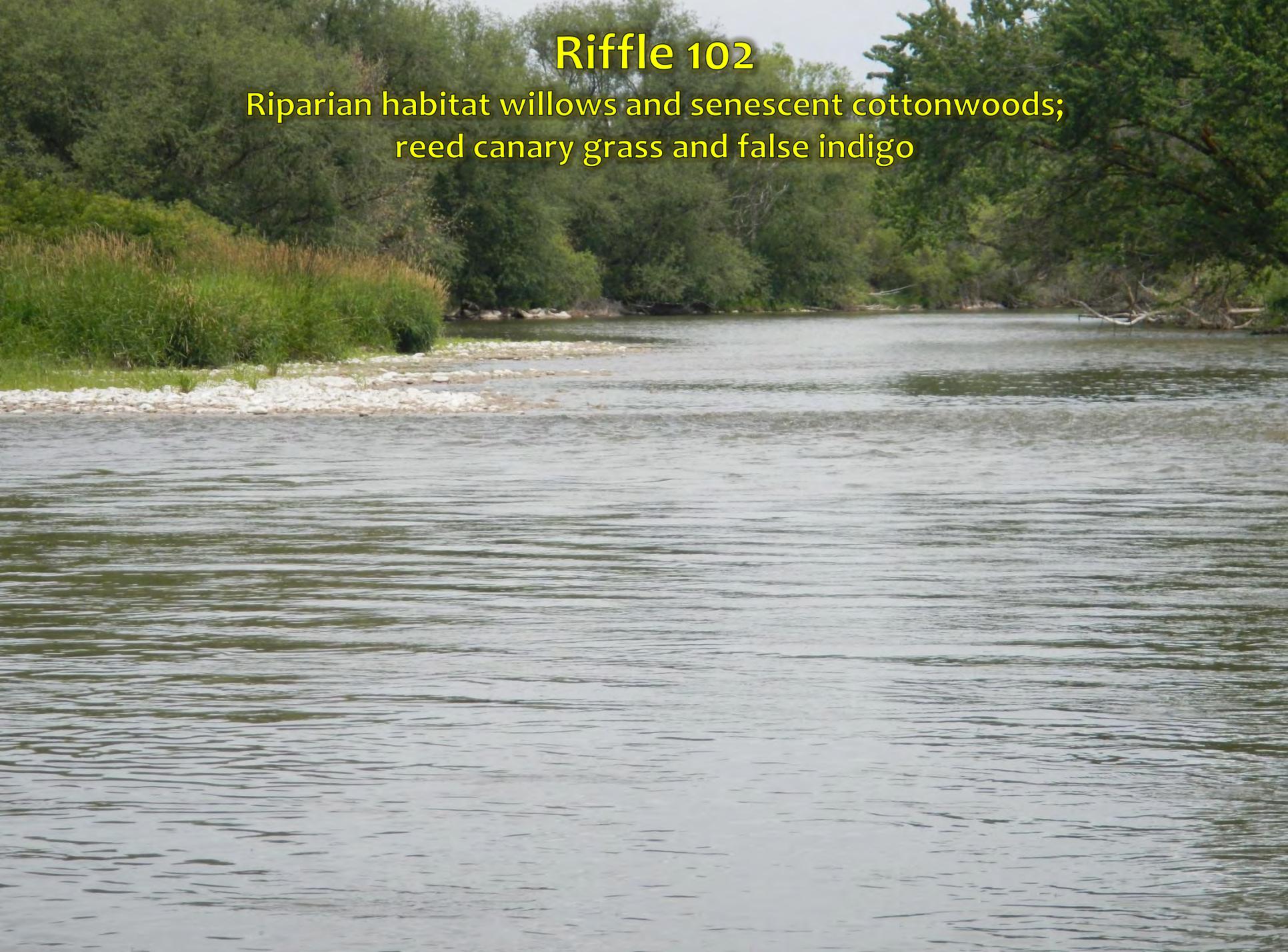


Two outfalls between Riffles 96 and 97



Riffle 102

Riparian habitat willows and senescent cottonwoods;
reed canary grass and false indigo



Aquatox Model Segment 10 Summary

- * Pool/Riffle/Run = 0.5%/19%/80%
- * 41% periphyton coverage, mostly diatoms
- * 0.4 meter visibility

Aquatox Model Segment 11



Sand Hollow Creek

Begin of Model Reach 12
Upstream of Dixie Drain confluence
River Mile 10.6
43.732245, -116.889004



Notus

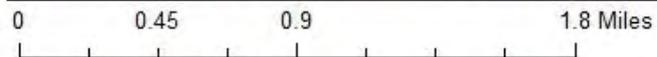
Begin of Model Reach 11
Boise River at Notus
River Mile 15.68
USGS 13212500
43.720875, -116.798003

Legend

- ⊙ Towns
- Canals
- Realtime USGS Stream Gages

ADB Support 2010

- Not Supporting
- Not Assessed
- Fully Supporting



Riffles 105-112

- Depth 0.3 to 1.3 meters
- 42% periphyton
- 0.3 meter visibility



Riffle 105

Downstream of Notus Road Bridge



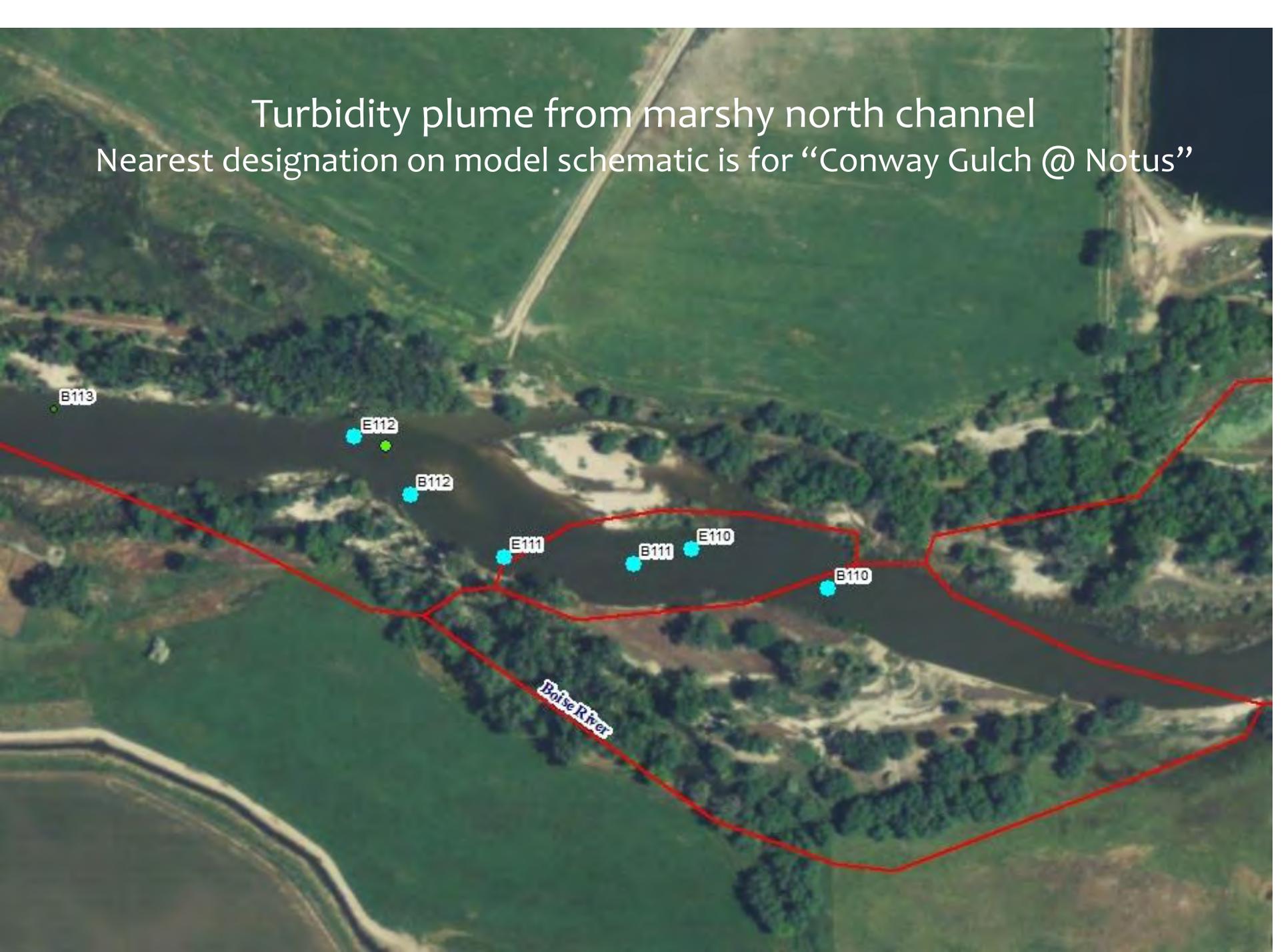
Three drains in this reach



Consistently increased turbidity after this confluence

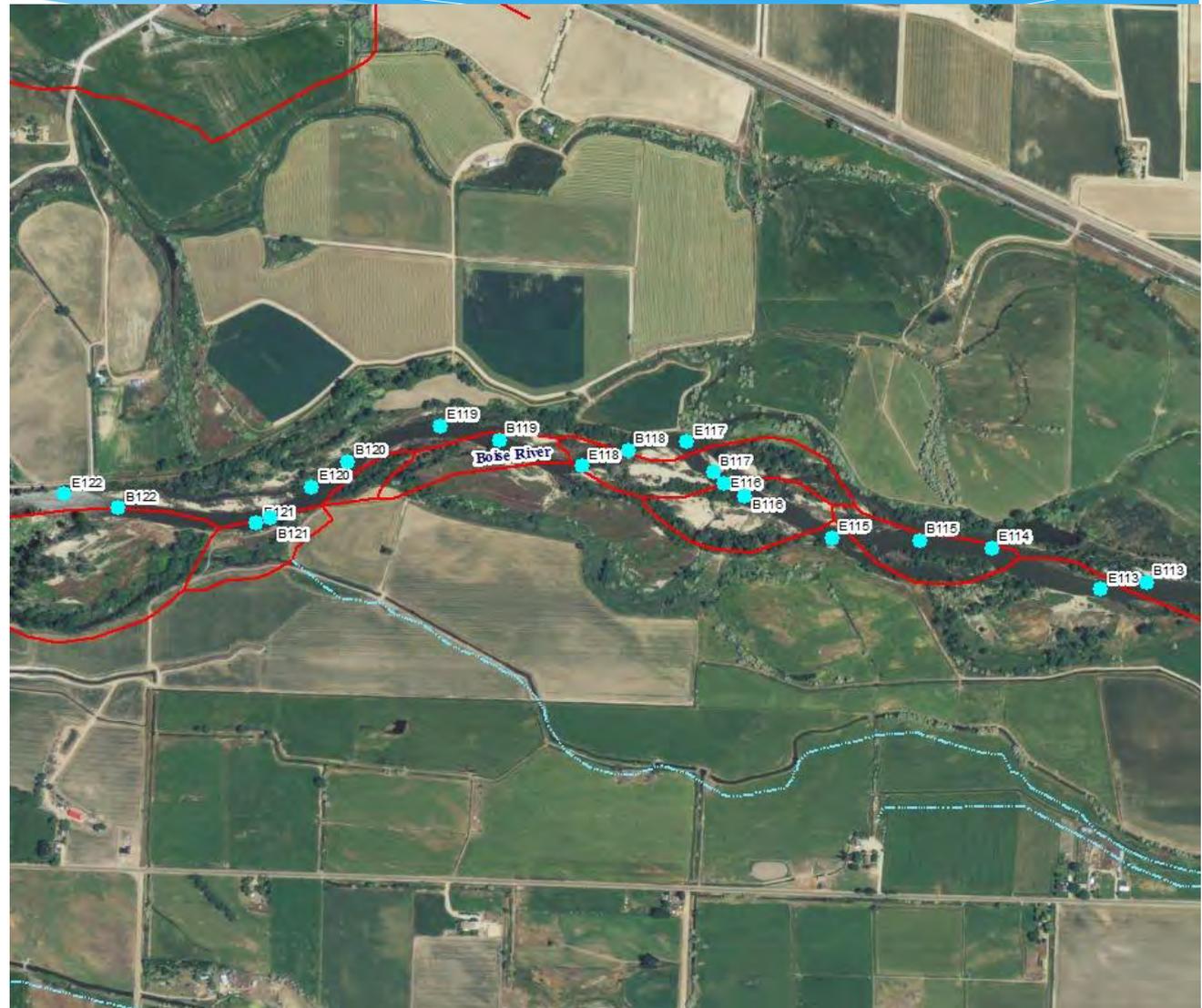


Turbidity plume from marshy north channel
Nearest designation on model schematic is for “Conway Gulch @ Notus”



Riffles 113-122

- Depth 0.4 to 1.1 meters
- 57% periphyton
- 0.15 meter visibility



Riffle 113

Turbidity so high—low visibility—I got out to sample substrate for estimates of habitat and coverage

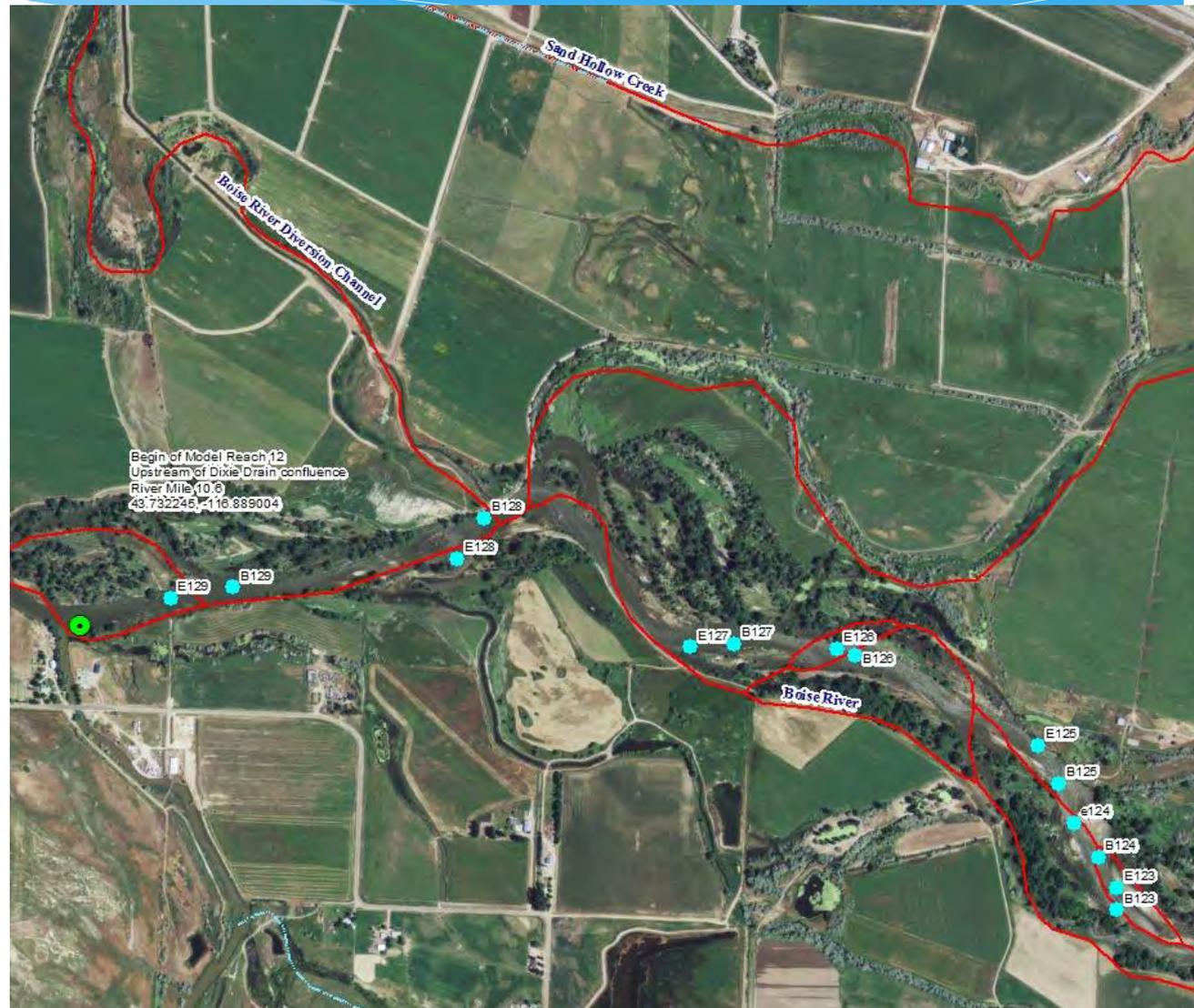


Four side channels and/or drains in this reach



Riffles 123-129

- Depth 0.3 to 1.2 meters
- 45% periphyton
- 0.1 meter visibility



Riffle 128

Four drains or side channels in this reach



Aquatox Model Segment 11 Summary

- * Pool/Riffle/Run = 0%/27%/73%
- * 48% periphyton coverage, mostly diatoms
- * 0.1 meter visibility

Aquatox Segment 12

Riffles 130-135

- Depth 0.3 to 1.7 meters
- 30% periphyton
- 0.1 meter visibility



Dixie Drain confluence
Dixie Bridge



Riffle 135
End Survey at Highway 95

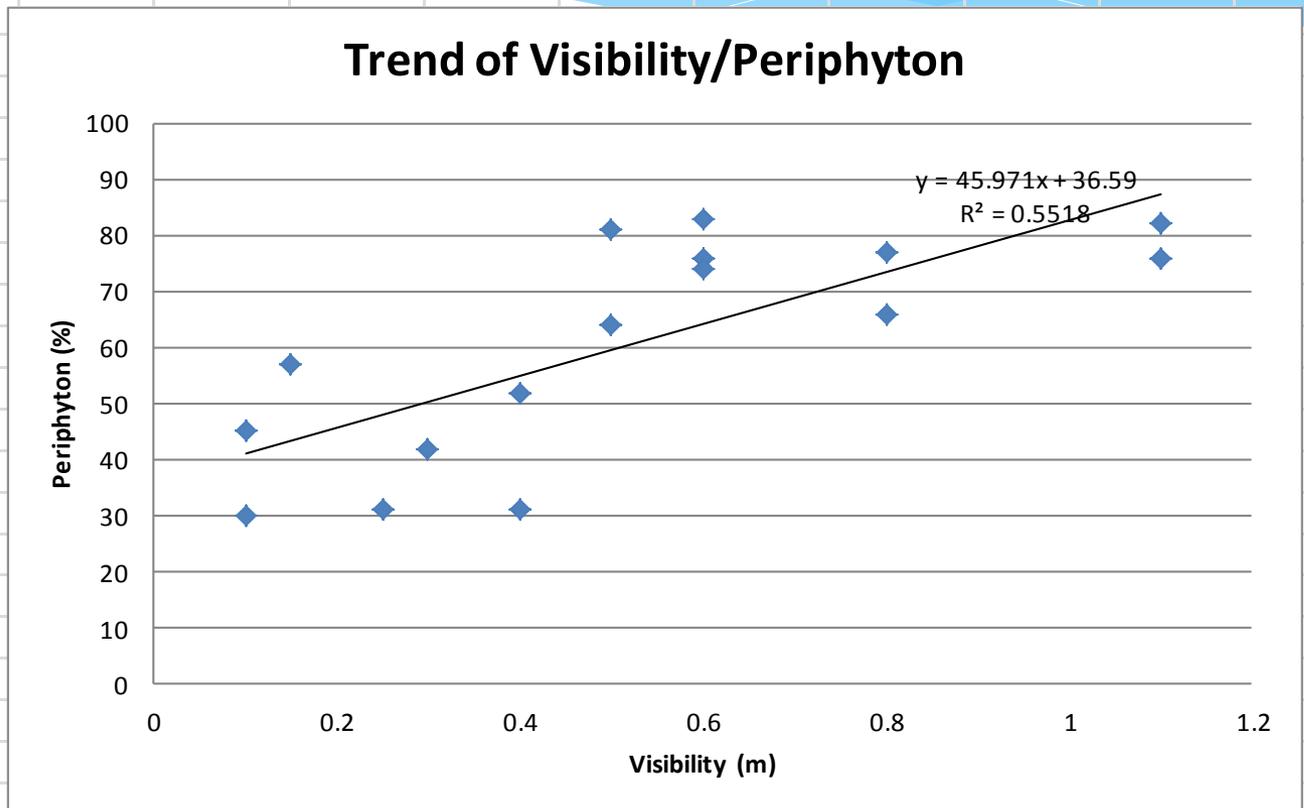


Aquatox Model Segment 12 Summary

- * Pool/Riffle/Run = 0%/25%/75%
- * 30% periphyton coverage, mostly diatoms
- * 0.1 meter visibility

Trends

Visibility (m)	Periphyton (%)
1.1	82
1.1	76
0.8	66
0.6	76
0.8	77
0.5	81
0.6	83
0.6	74
0.5	64
0.4	52
0.4	31
0.25	31
0.3	42
0.15	57
0.1	45
0.1	30



Aquatox Model Segment Summaries

* Segment 8

- * Pool/Riffle/Run = 3%/30%/67%
- * 78% periphyton coverage
- * 0.5 to 1.1 meter visibility

* Segment 9

- * Pool/Riffle/Run = 2%/29%/70%
- * 69% periphyton coverage
- * 0.5 meter visibility

* Segment 10

- * Pool/Riffle/Run = 0.5%/19%/80%
- * 41% periphyton coverage
- * 0.4 meter visibility

* Segment 11

- * Pool/Riffle/Run = 0%/27%/73%
- * 48% periphyton coverage
- * 0.1 meter visibility

* Segment 12

- * Pool/Riffle/Run = 0%/25%/75%
- * 30% periphyton coverage
- * 0.1 meter visibility

Conclusions

- * Comfortable with:
 - * Synoptic sampling results for species composition
 - * Periphyton visual assessment for biomass
- * Extrapolation of turbidity/periphyton ratio to segments 1-7?
 - * My vote is no—need a survey
 - * Unless Mullins (1999) and synoptic sampling provide a comfort level for extrapolation
- * Currently working on:
 - * Conversion of %periphyton coverage to biomass per unit area
 - * Dick Park memo 4/26/2013