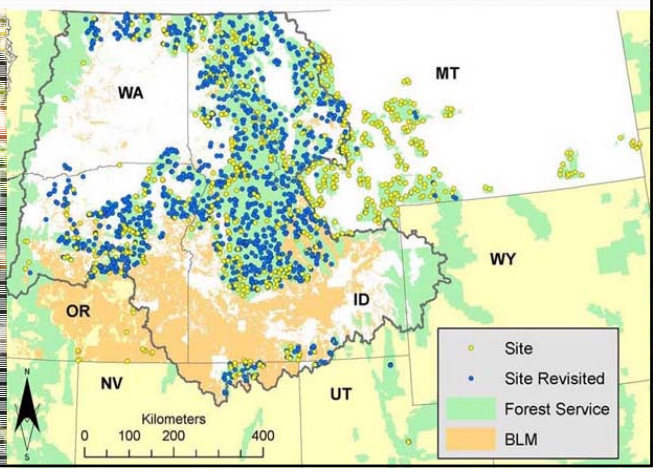
TRUTTA ENVIRONMENTAL SOLUTIONS

Applications and Benefits of the High Definition Stream Survey

(Pacfish/Infish Biological Opinion)

- Day 1: Biological Assessment, Crews of 4
- Day 2: Habitat Assessment, Crews of 4
- 80 hrs. labor/site
- 200 m.
- 1 site/2 days

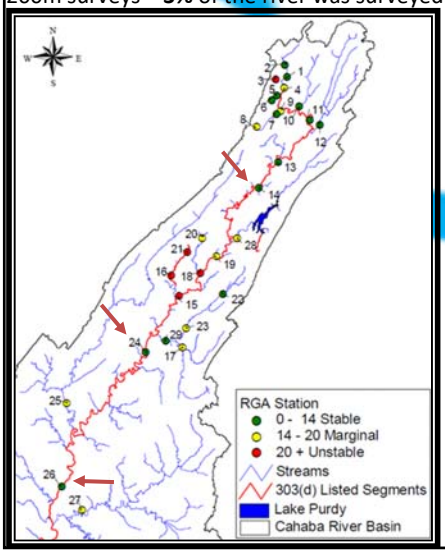


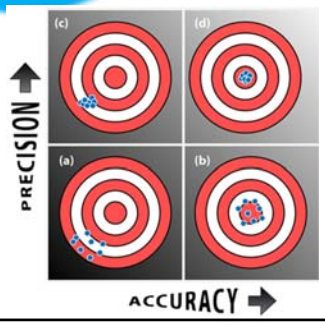
Problems with Traditional methods

- Limited access
- Time consuming
- Limited area/distance
- River size/depth limits
- How much do you sample?
  - Distance
  - Frequency?
- End product is a piece of paper and a dot on a map

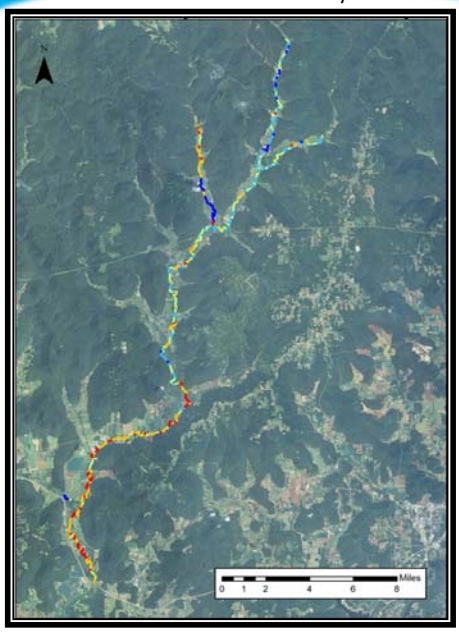
Point vs Continuous Sampling

Cahaba River TMDL Sample Sites
100 km of river, 16 sample locations.
200m surveys = **3%** of the river was surveyed.

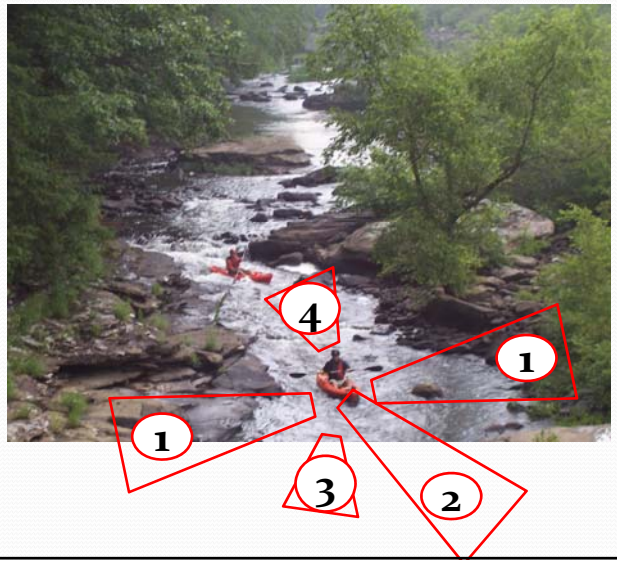




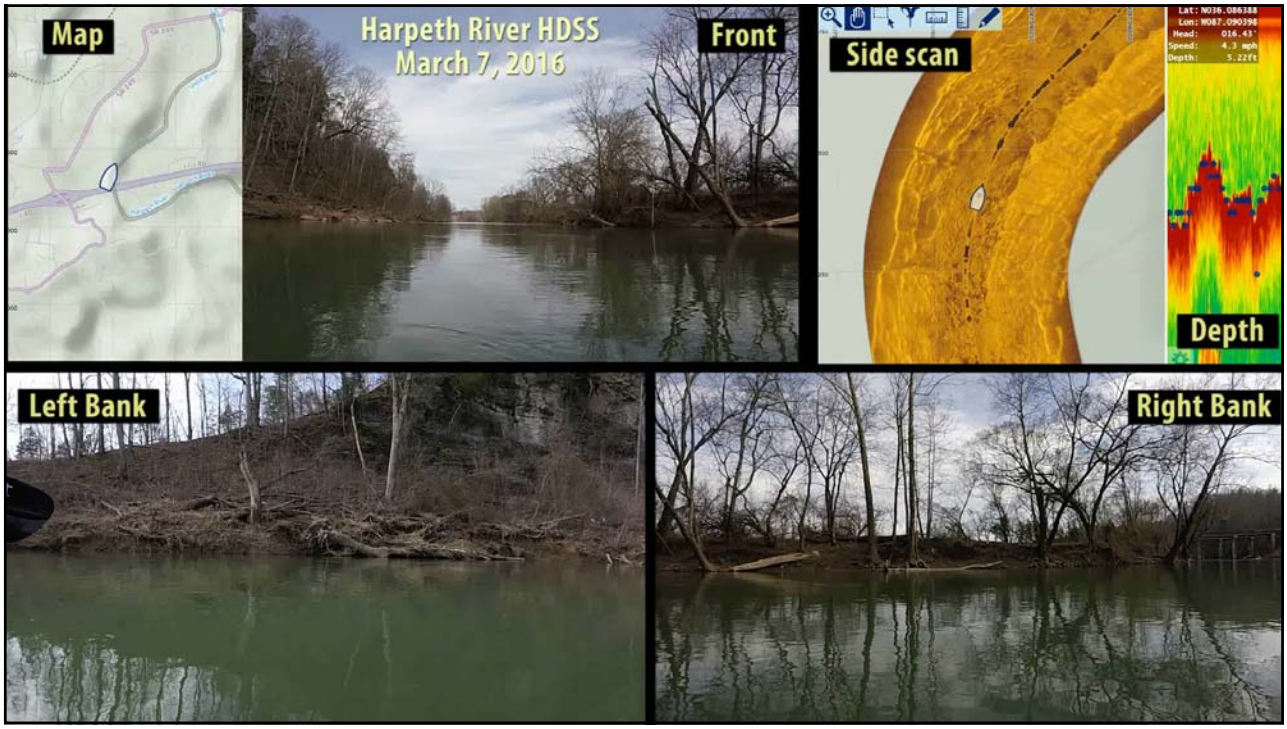
Paint Rock River HDSS
61,382 continuous data points in 3 day, 53 mile field survey.
100% of the river was surveyed.



High Definition Stream Survey



1. Sides
   - River width
   - Bank protection
   - Bank condition
   - Bank angle
   - Bank height
2. Front
   - Habitat type
   - Canopy cover
3. Down
   - Depth
   - Substrate
   - Side-scan sonar
   - Hardness
4. As you pass
   - GPS track
   - Water quality

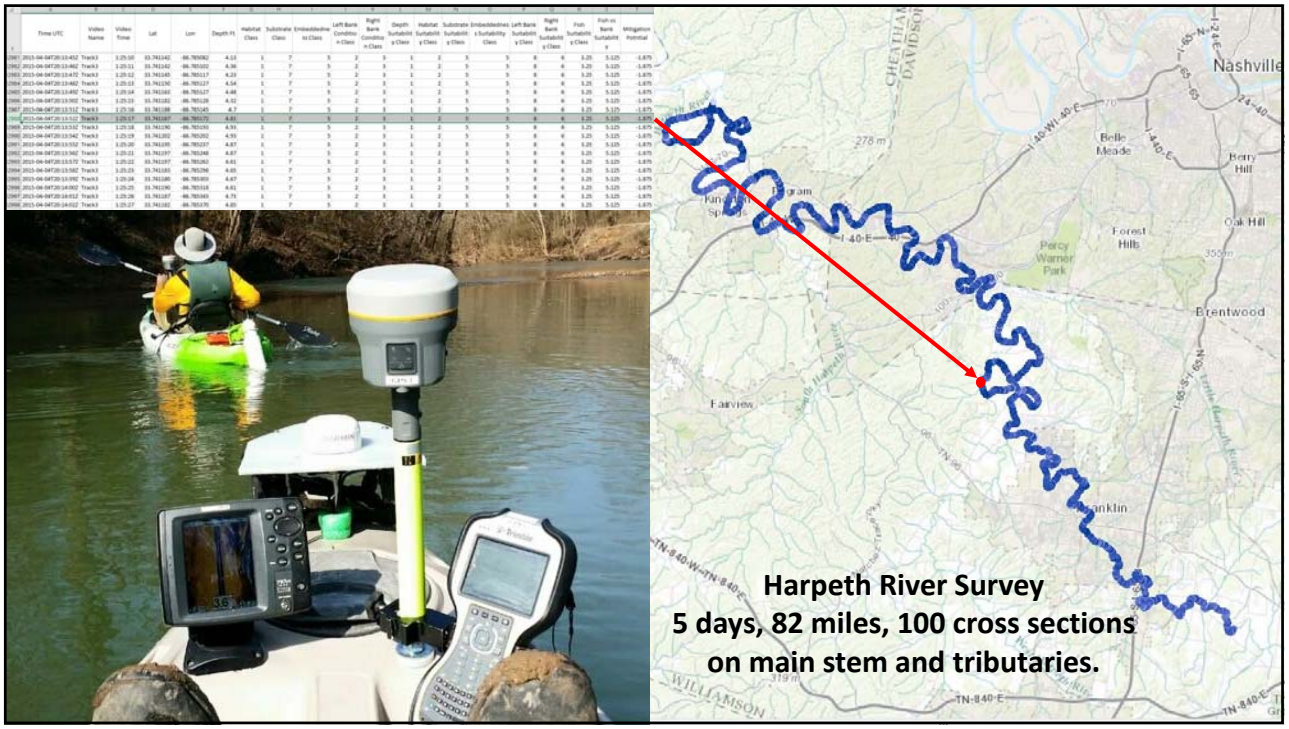


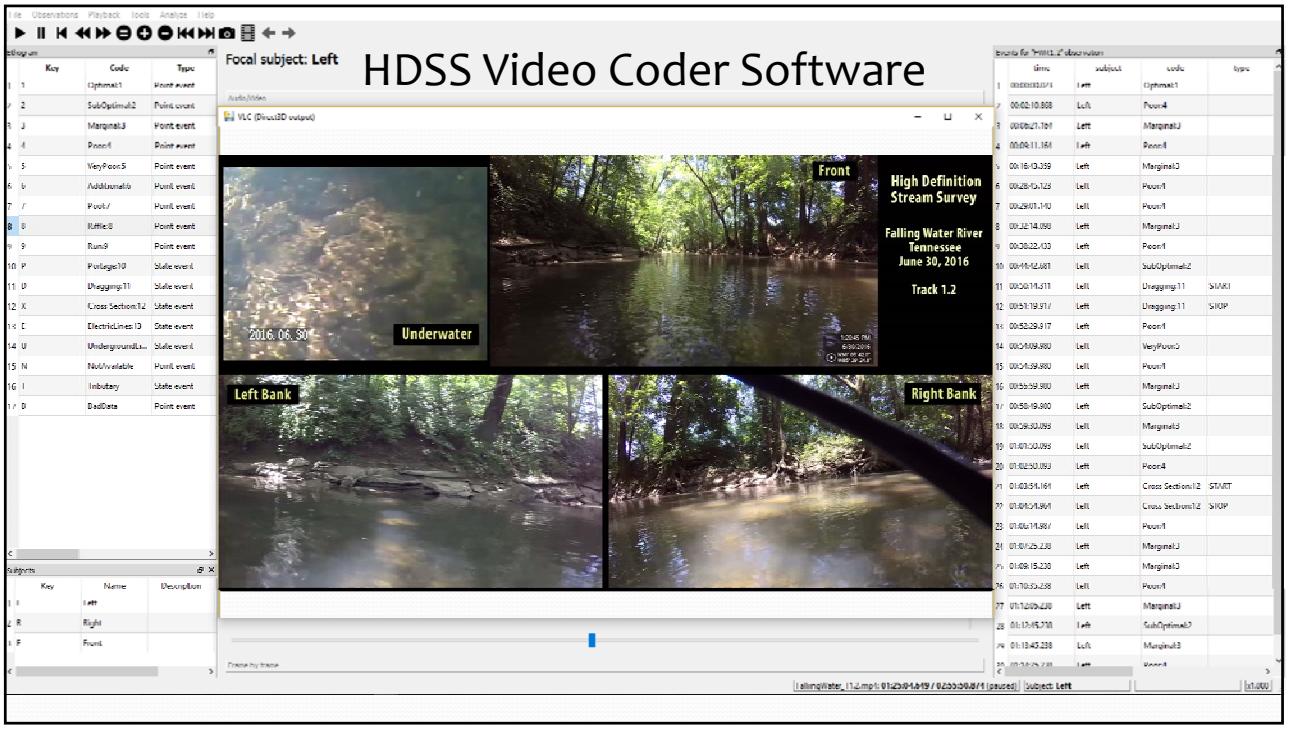
More than just Video.

Instant data output combined during post processing.

Time UTC	Video Name	Video Time	Lat	Lon	Depth Ft	Habitat Class	Substrate Class	Embeddedness Class	Left Bank Condition Class	Right Bank Condition Class	Depth Suitability Class	Habitat Suitability Class	Substrate Suitability Class	Embeddedness Suitability Class	Left Bank Suitability Class	Right Bank Suitability Class	Fish Suitability Class	Fish vs Bank Suitability	Mitigation Potntial
2015-04-04T16:00:57Z	Track1	0:00:01	33.703525	-86.69020833	0.66	3	2	1	2	2	9	8	7	10	8	8	8.5	8.25	0.25
2015-04-04T16:00:58Z	Track1	0:00:02	33.70352833	-86.69021	0.63	3	2	1	2	2	9	8	7	10	8	8	8.5	8.25	0.25
2015-04-04T16:00:59Z	Track1	0:00:03	33.70352667	-86.69021	0.63	3	2	1	2	2	9	8	7	10	8	8	8.5	8.25	0.25
2015-04-04T16:01:00Z	Track1	0:00:04	33.70352667	-86.69020833	0.78	3	2	1	2	2	9	8	7	10	8	8	8.5	8.25	0.25
2015-04-04T16:01:01Z	Track1	0:00:05	33.703525	-86.69020667	0.73	3	2	1	2	2	9	8	7	10	8	8	8.5	8.25	0.25
2015-04-04T16:01:02Z	Track1	0:00:06	33.70352833	-86.69020167	0.8	3	2	1	2	2	9	8	7	10	8	8	8.5	8.25	0.25
2015-04-04T16:01:03Z	Track1	0:00:07	33.70352667	-86.69019833	0.9	3	2	1	2	2	9	8	7	10	8	8	8.5	8.25	0.25
2015-04-04T16:01:04Z	Track1	0:00:08	33.70352333	-86.69019833	0.74	3	2	1	2	2	9	8	7	10	8	8	8.5	8.25	0.25
2015-04-04T16:01:05Z	Track1	0:00:09	33.70351833	-86.69020167	0.86	3	2	1	2	2	9	8	7	10	8	8	8.5	8.25	0.25
2015-04-04T16:01:06Z	Track1	0:00:10	33.70351167	-86.69020167	0.85	3	2	1	2	2	9	8	7	10	8	8	8.5	8.25	0.25
2015-04-04T16:01:07Z	Track1	0:00:11	33.70350667	-86.69020167	0.83	3	2	1	2	2	9	8	7	10	8	8	8.5	8.25	0.25
2015-04-04T16:01:08Z	Track1	0:00:12	33.70350333	-86.690205	0.77	3	2	1	2	2	9	8	7	10	8	8	8.5	8.25	0.25
2015-04-04T16:01:09Z	Track1	0:00:13	33.70349833	-86.69020833	0.92	3	2	1	2	2	9	8	7	10	8	8	8.5	8.25	0.25
2015-04-04T16:01:10Z	Track1	0:00:14	33.703495	-86.69021	0.85	3	2	1	2	2	9	8	7	10	8	8	8.5	8.25	0.25
2015-04-04T16:01:11Z	Track1	0:00:15	33.70348833	-86.69021333	0.97	3	2	1	2	2	9	8	7	10	8	8	8.5	8.25	0.25

Water quality, tile locations, algae, temperature, specific conductivity, salinity, pH, dissolved oxygen, turbidity, pool riffle run, large woody debris, bridges, powerlines, outfalls, plant species, wildlife species, bank height, bank angle, riparian diversity, surface protection, active erosion, cattle access, irrigation pump, armored banks, attempted restoration, trash, land slides, mile marker, prioritized section, cross section, sand, gravel, cobble, boulder, bedrock, vegetation, log jams…





Substrate Types

Sand

Small Gravel

Cobble

Small Boulder

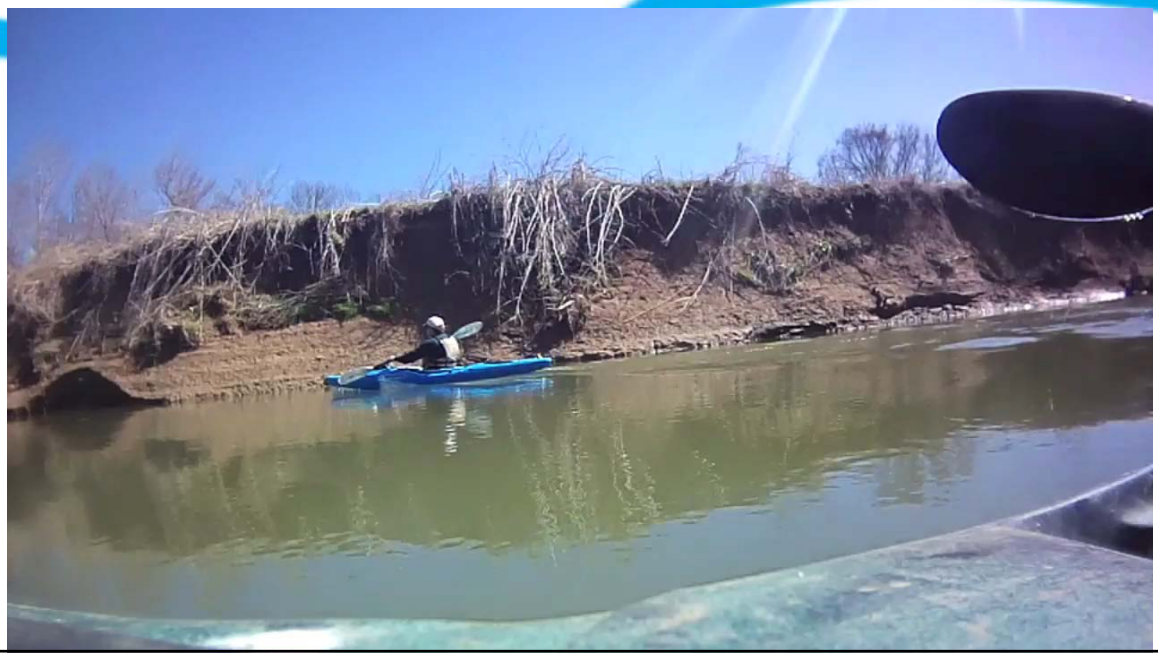
Large Boulder

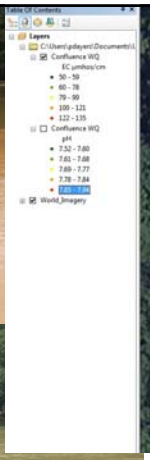
Bedrock

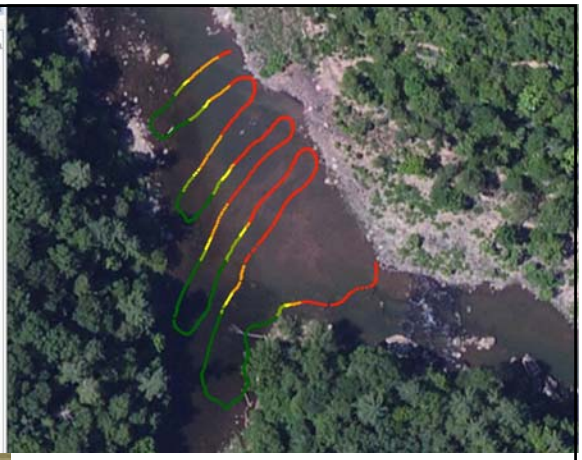
Embeddedness

EPA RBP 3	EPA RBP 1
50-75% surrounded by fine sediment.	< 25% surrounded by fine sediment.

Bank Condition Score: Very Poor

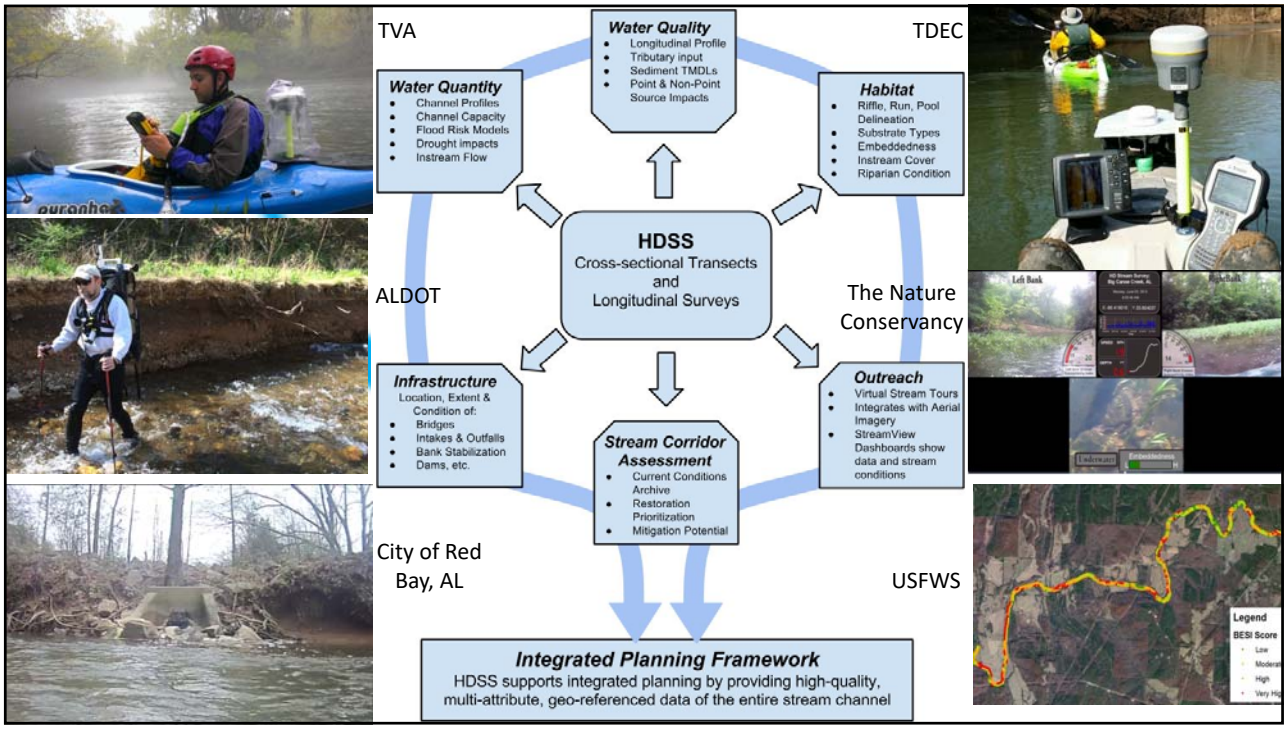






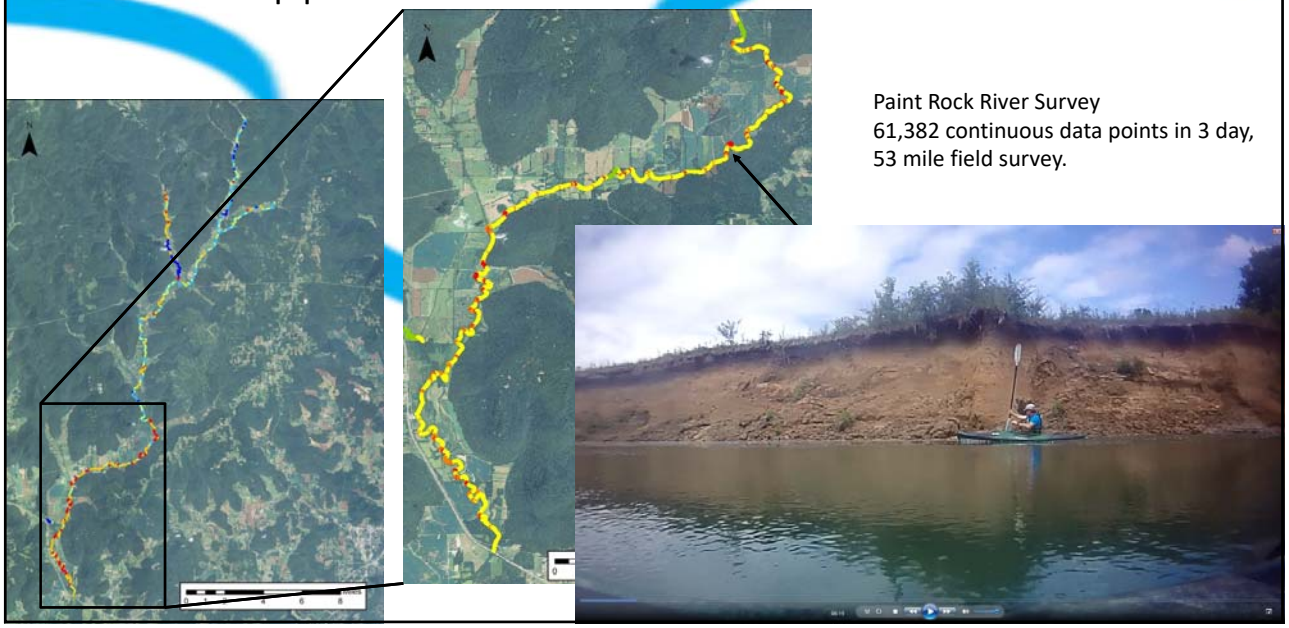
Continuous water quality sampling

New River & Clear Creek Confluence



Prioritization and custom classification

to help prioritize future restoration efforts and action areas.

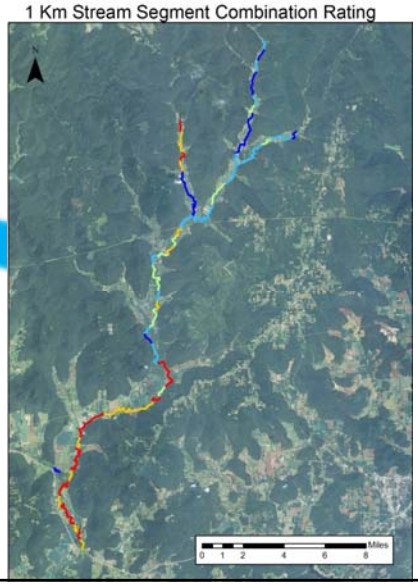


Paint Rock River Survey
61,382 continuous data points in 3 day,
53 mile field survey.

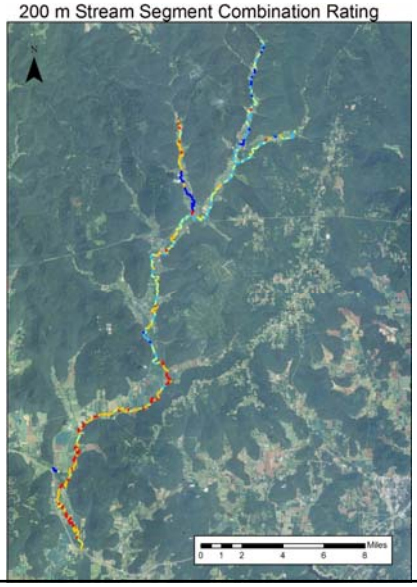
Breaking down the data

Stream Segment Combination Rating

1 Km Stream Segment Combination Rating



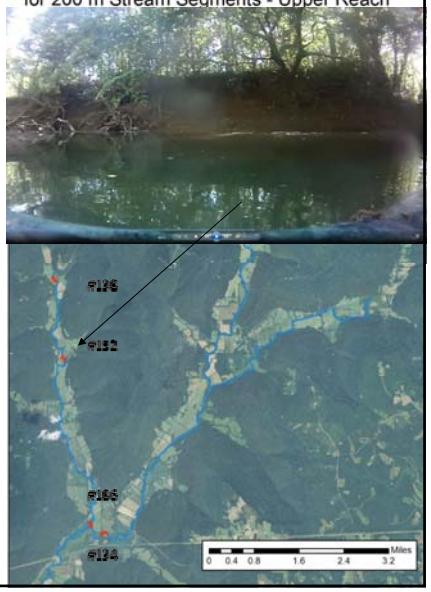
200 m Stream Segment Combination Rating

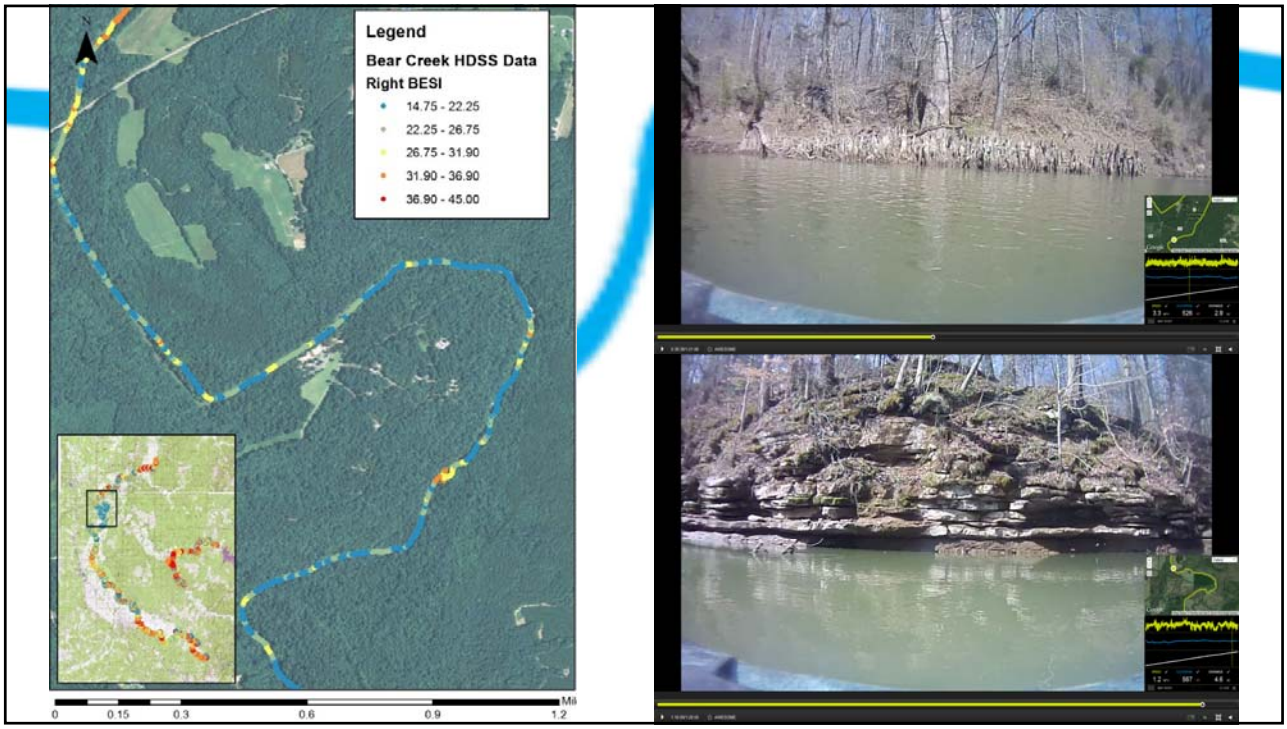


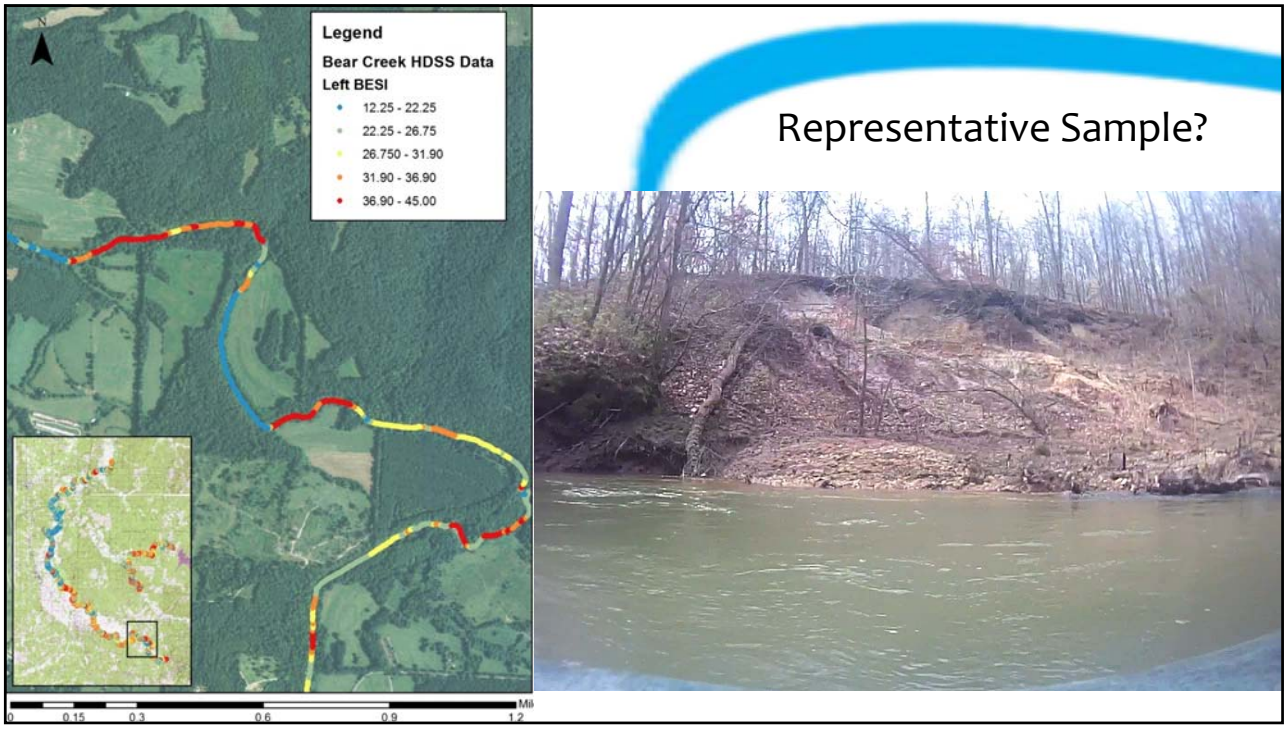
Top 10 Worst Right Bank Score Ratings for 200 m Stream Segments - Lower Reach

Top 10 Worst Right Bank Score Ratings for 200 m Stream Segments - Middle Reach

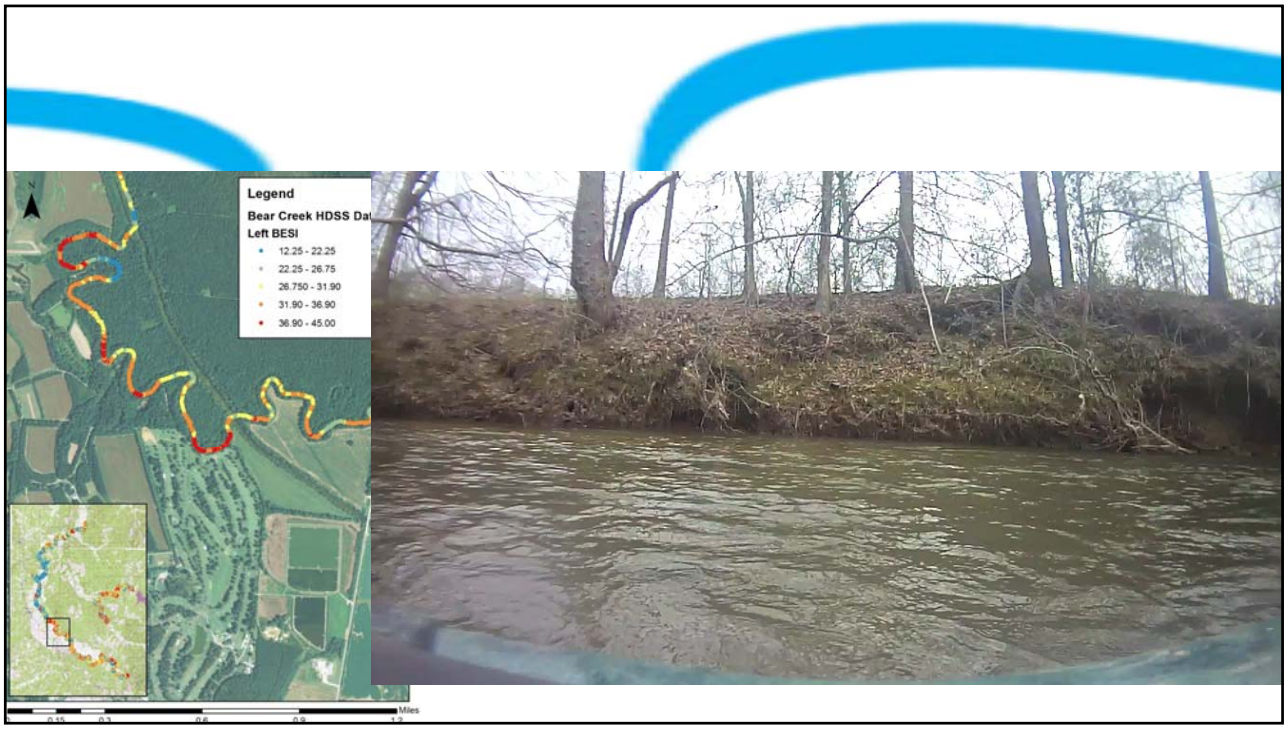
Top 10 Worst Right Bank Score Ratings for 200 m Stream Segments - Upper Reach

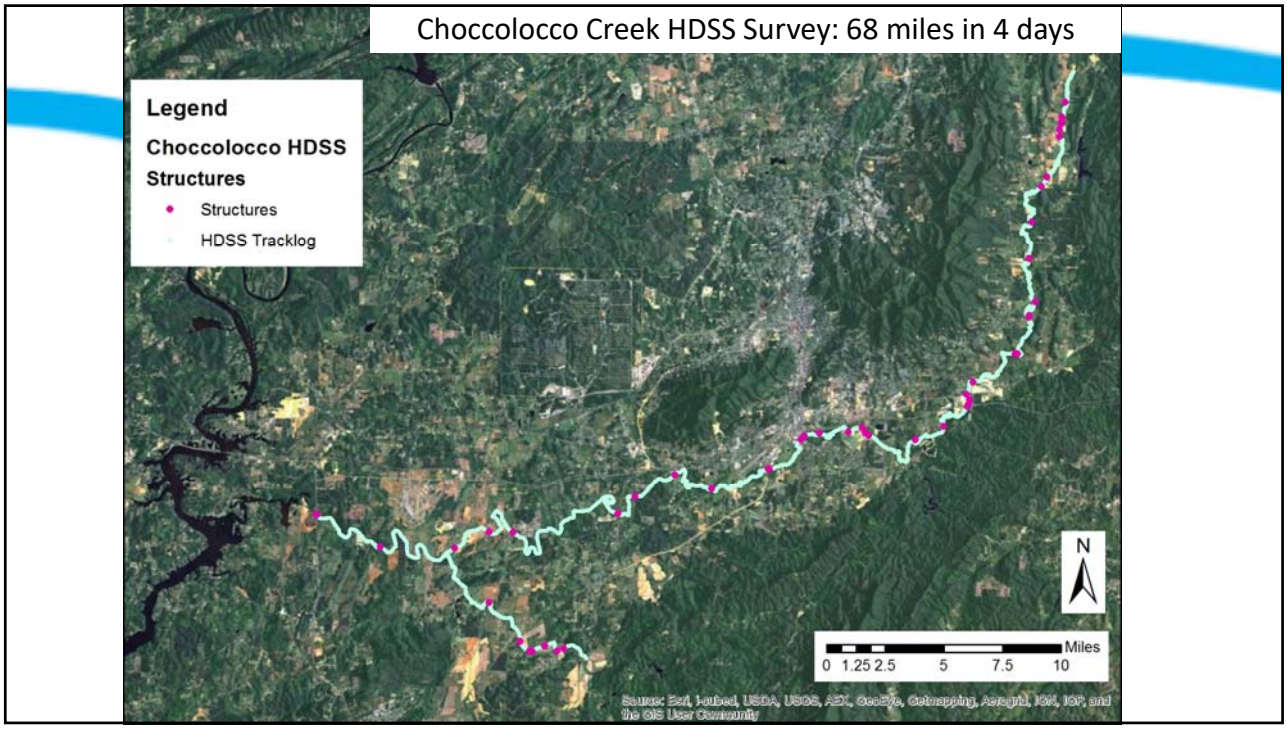


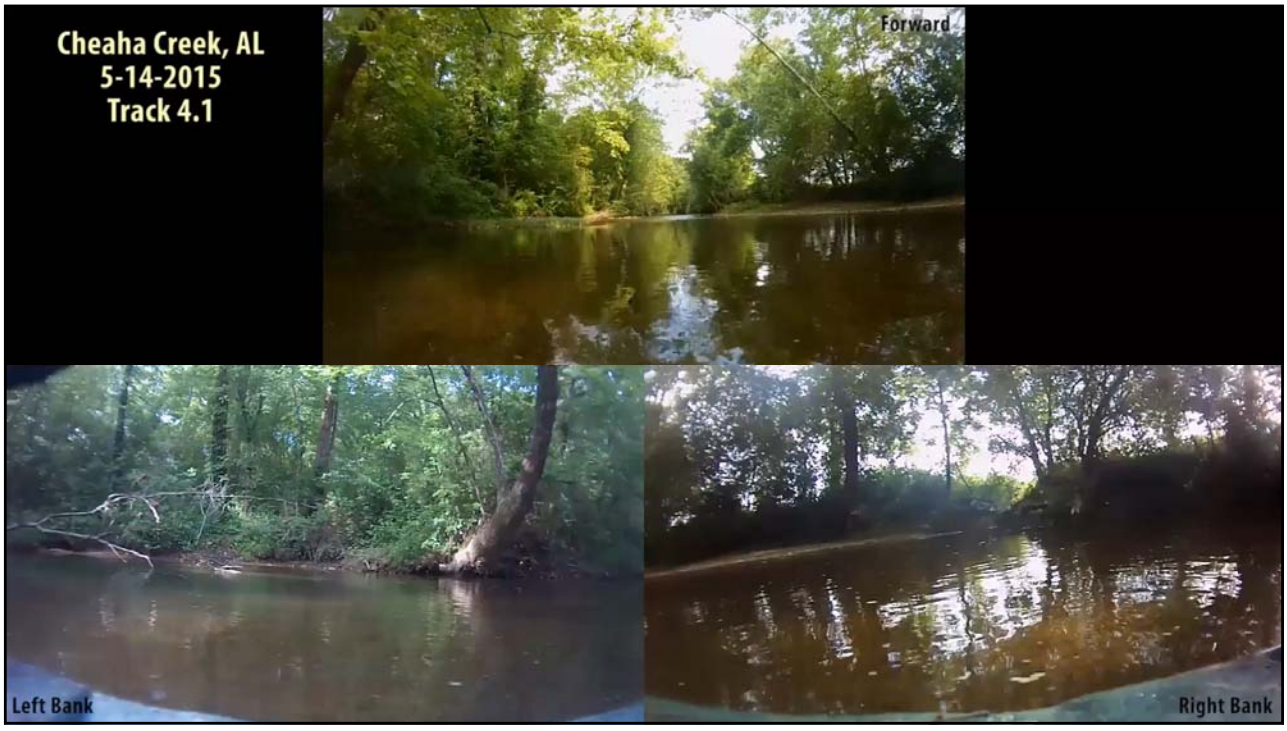


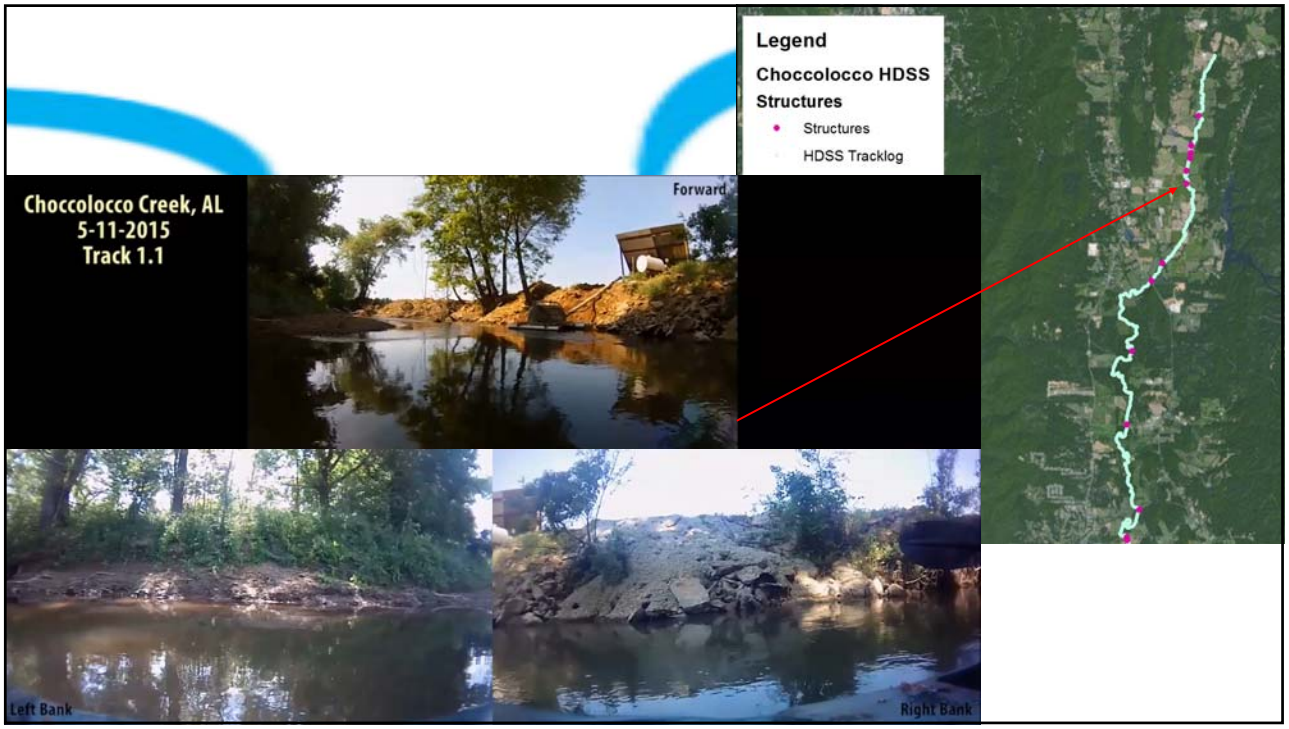


Representative Sample?

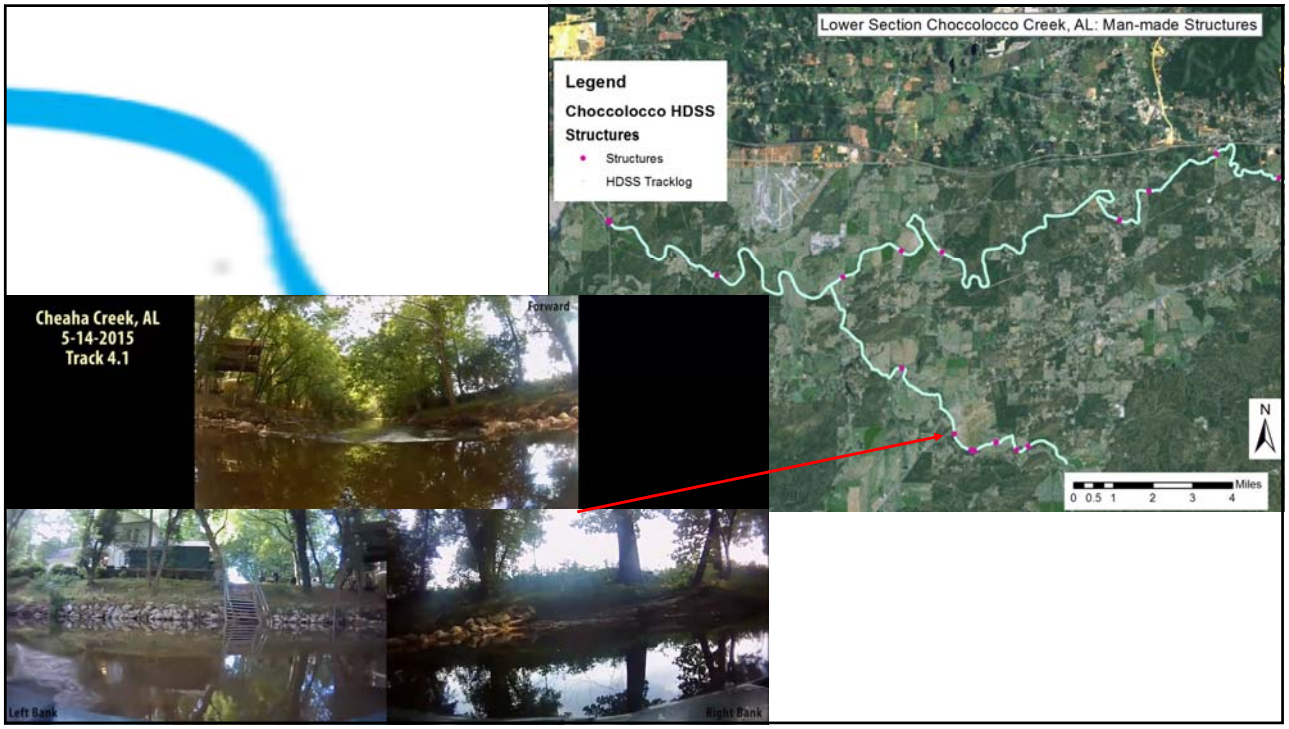

Legend
Left BESI
12.25 - 22.25
22.25 - 26.75
26.750 - 31.90
31.90 - 36.90
36.90 - 45.00
Miles


Choccolocco Creek HDSS Survey: 68 miles in 4 days
Legend
Choccolocco HDSS Structures
Structures
HDSS Tracklog
N
Miles
0 1.25 2.5 5 7.5 10

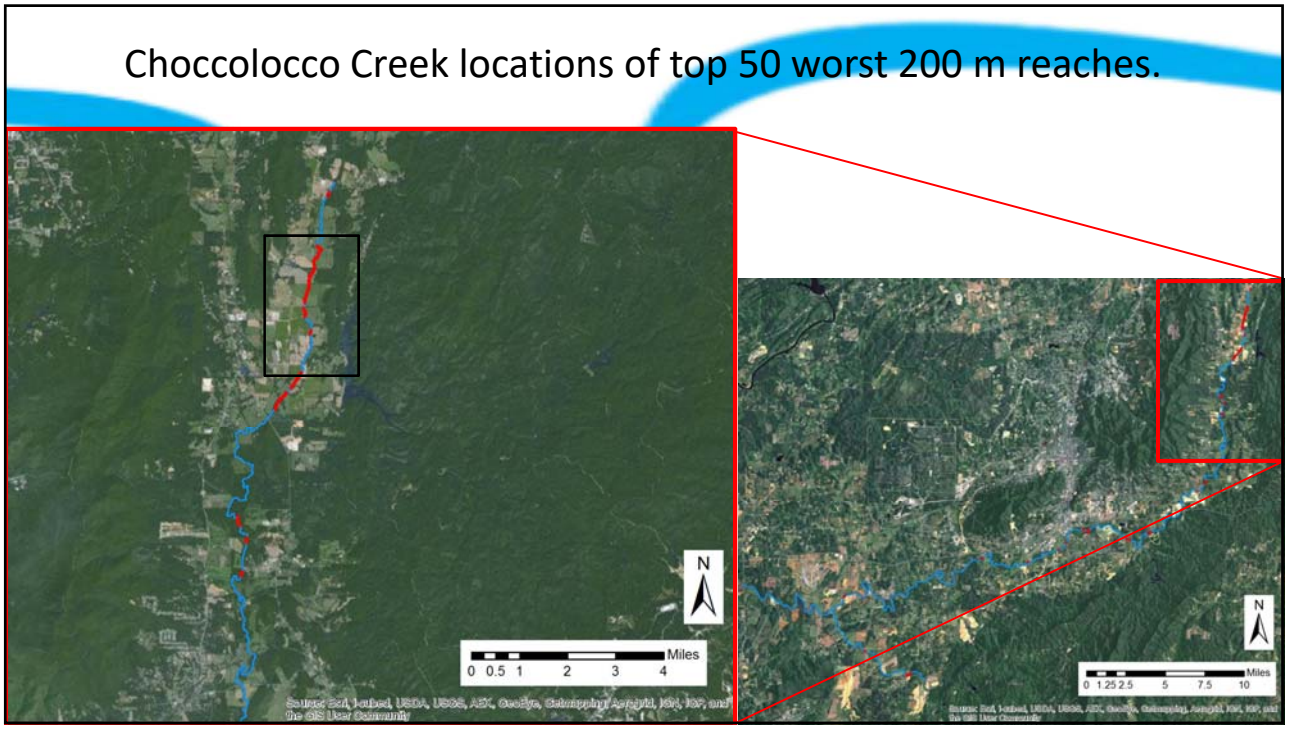

Cheaha Creek, AL
5-14-2015
Track 4.1
Forward
Left Bank
Right Bank

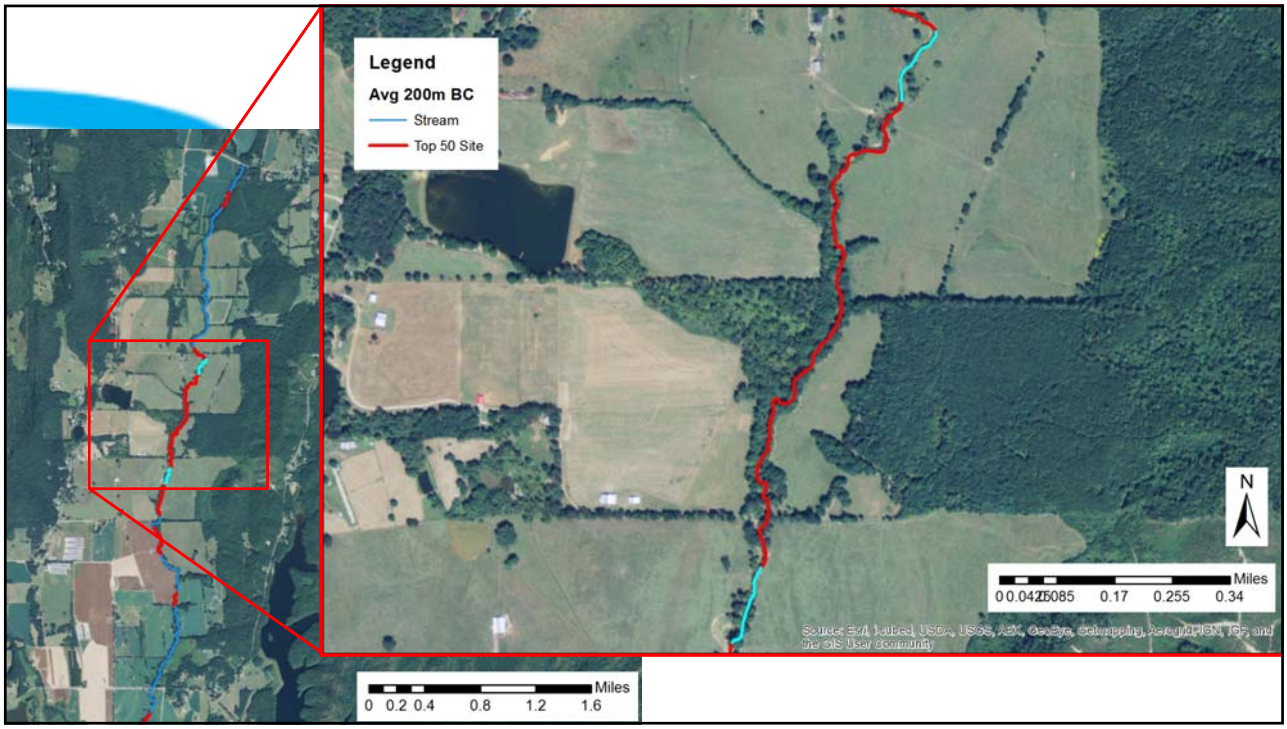

Legend
Choccolocco HDSS Structures
Structures
HDSS Tracklog
Choccolocco Creek, AL
5-11-2015
Track 1.1
Forward
Left Bank
Right Bank

Choccolocco Creek, AL
5-12-2015
Track 2.3
Forward
Left Bank
Right Bank
Mid Section Choccolocco Creek, AL: Man-made Structures
N
0 0.5 1 2 3 4
Miles


Lower Section Choccolocco Creek, AL: Man-made Structures
Legend
Choccolocco HDSS Structures
Structures
HDSS Tracklog
Cheaha Creek, AL
5-14-2015
Track 4.1
Forward
Left Bank
Right Bank
N
0 0.5 1 2 3 4
Miles

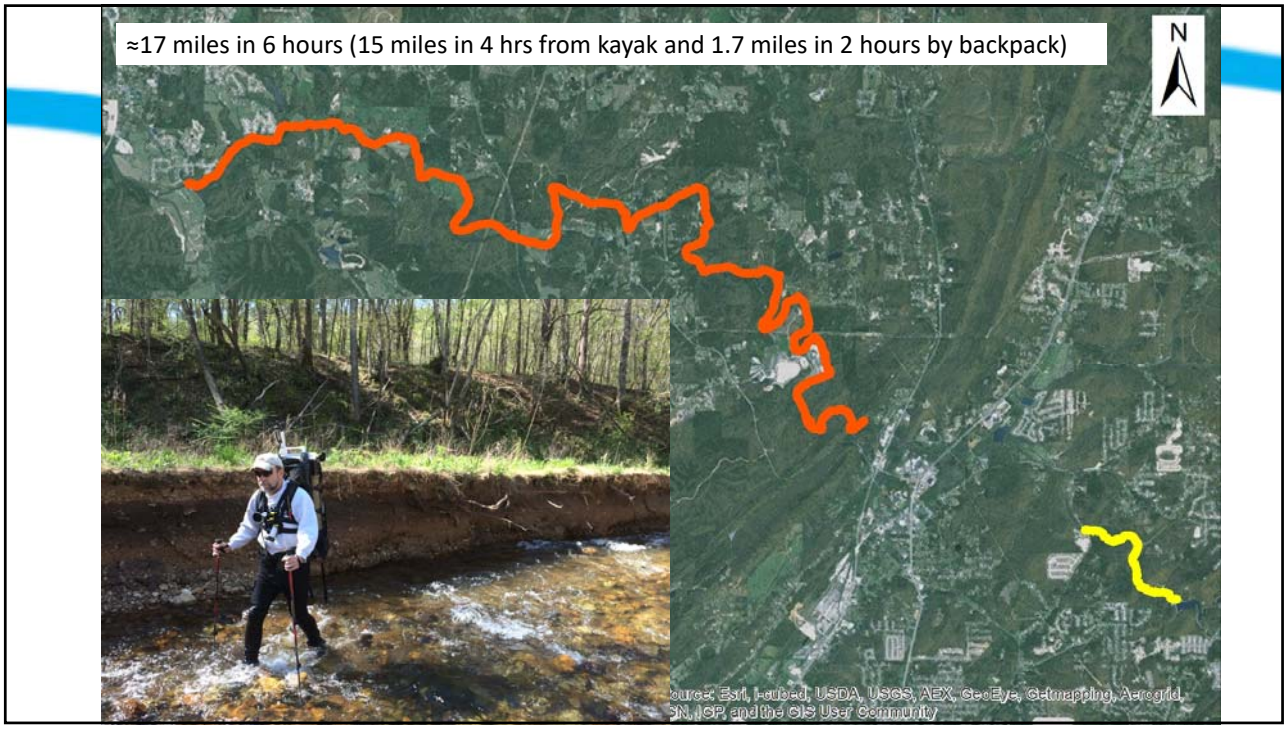
Choccolocco Creek locations of top 50 worst 200 m reaches.




Legend
Avg 200m BC
Stream
Top 50 Site
N
Miles
0 0.2 0.4 0.8 1.2 1.6
Miles
0 0.042.085 0.17 0.255 0.34

Upper Section Choccolocco Creek, AL: Worst Bank Condition 200m Segments
Legend
Avg 200m BC
Stream
Top 50 Site
N
Choccolocco Creek, AL
5-11-2015
Track 1.1
Left Bank
Right Bank

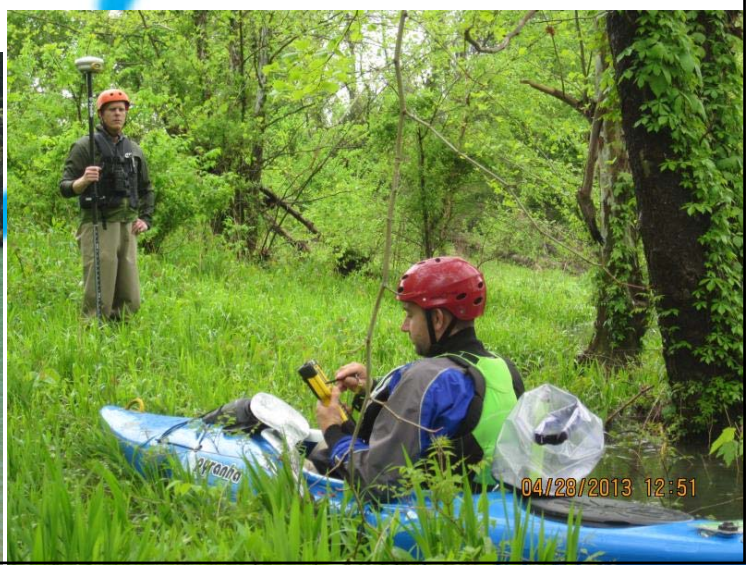
Choccolocco Creek, AL
5-11-2015
Track 1.1
Upper Section Choccolocco Creek, AL: Worst Bank Condition 200m Segments
Legend
Avg 200m BC
Stream
Top 50 Site
N
Miles
Right Bank


≈17 miles in 6 hours (15 miles in 4 hrs from kayak and 1.7 miles in 2 hours by backpack)
N

Contour Generation to Support Calculation of Exposed Snail Habitat in the Coosa River, Alabama

- Dams operated by Alabama Power
- Lay Lake standard summer pool ~120.6 m (395.6 ft AMSL)
- Six mile reach
- Reservoir drawdowns can expose threatened snail habitat
- Concerns for amount of habitat impacted

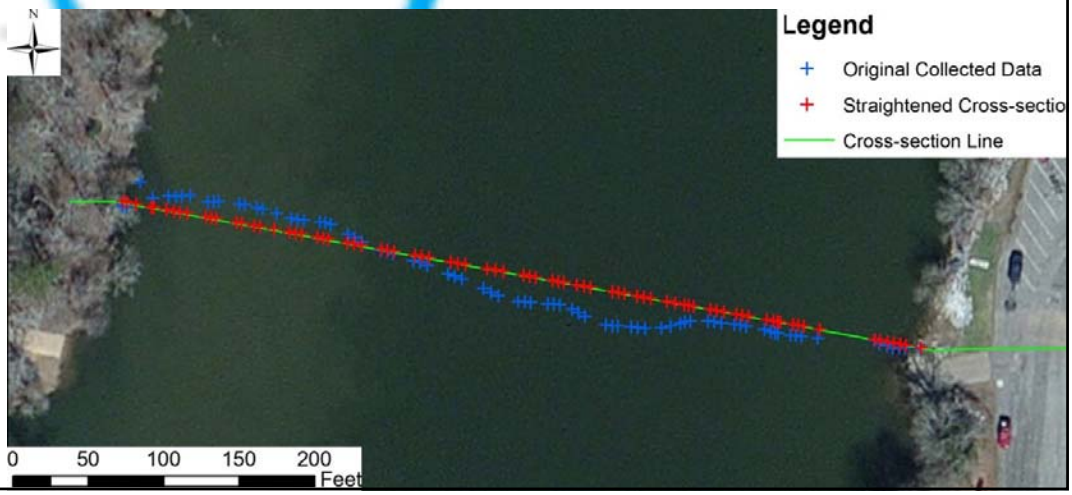
Bathymetric data collection



Data Collected

Straightened Cross-Sections

- ET Geowizards (GIS add-in)
- Representative straight line
- Move collected data to line



HEC-GeoRAS Project

HEC-GeoRAS ArcGIS add-in (USACE)

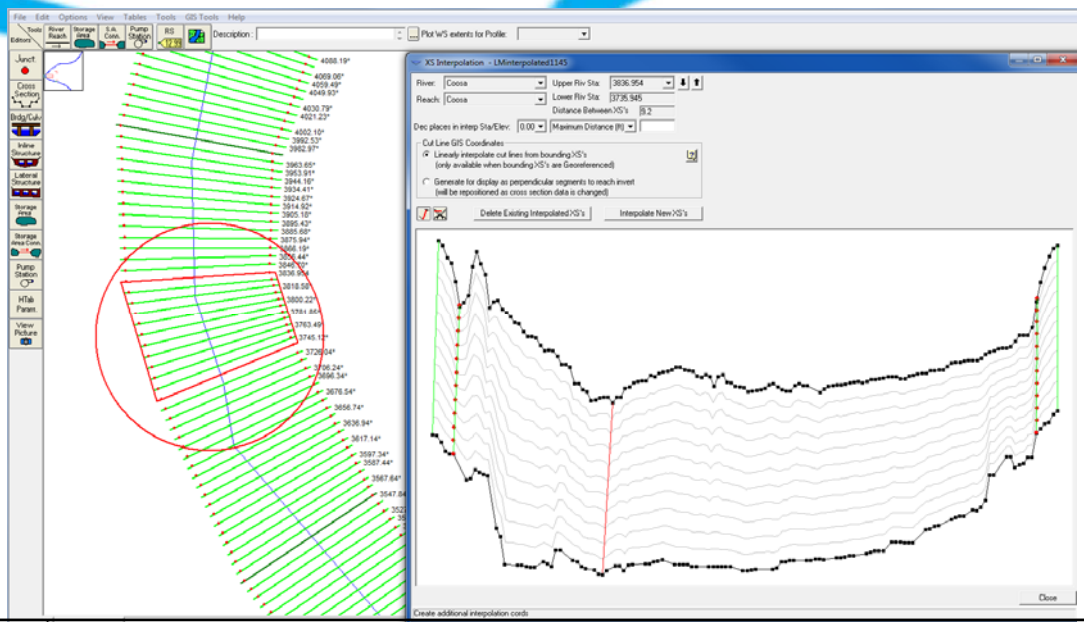
Create project for reach

- Stream centerline (NHD)
- Banks
- Flowpaths
- Cross-section cutlines

Calculate 3D geometry

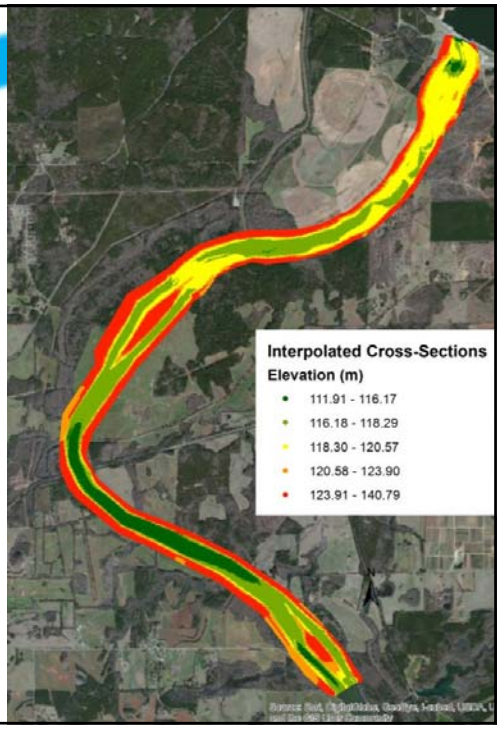
Export project

Cross-section Interpolation



- Export from HEC-RAS
- Interpolated Cross-sections imported into ArcGIS
- Successfully calculated habitat areas exposed

Elevation (ft)	Acreage Exposed
396	0.00
395.9	0.52
395.8	1.05
395.7	1.63
395.6	2.28
395.5	2.92
395.4	3.60
395.3	4.24
395.2	4.93
395.1	5.61
395	6.35
394	18.77
393	39.30
392.5	48.63



Questions?

www.TruttaSolutions.com

TRUTTA ENVIRONMENTAL SOLUTIONS

info@TruttaSolutions.com

Factors of Cost

- Length of survey: 2, 10, and 100 will have a different Cost/mile
- Kayak and/or on foot
- Substrate mapping
  - # of parameters
- Shoreline mapping
  - # of parameters
- Water Quality,
  - keeping samples?
- Cross sections
- Travel
- Providing assistance for the survey?
- Do your own analysis with our data