Road- Stream Crossing (RSX) Assessment
North Branch White River

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Overall goals

- Characterize and prioritize RSXs in headwaters stream reaches
- Assess pre- and post-improvement
- Analyze & interpret data to support fund-raising for ongoing efforts by road commissions (culvert replacements are costly)

Status

A work in progress to acquire the necessary skills and apply them as widely as volunteer resources permit

Steps in the process

- Assess, using standard protocol
- Enter into Roadsoft database
- Upload to statewide inventory
- Conduct hydro- and geomorphological characterization
- Evaluate habitat quality
  - Fluvial
  - Terrestrial
- Estimate erosion and sediment transport parameters

Assessment data

Paper forms or remote hand-held device

Hypsometer is a handy tool (thanks, Patrick!)

Roadsoft

Free download

Comprehensive user's manual

Help Desk readily available

Info stored on your computer

Input form matches assessment form

Statewide Inventory

Only accepts data in Roadsoft format

Before improvement: "A dam with a hole in it"

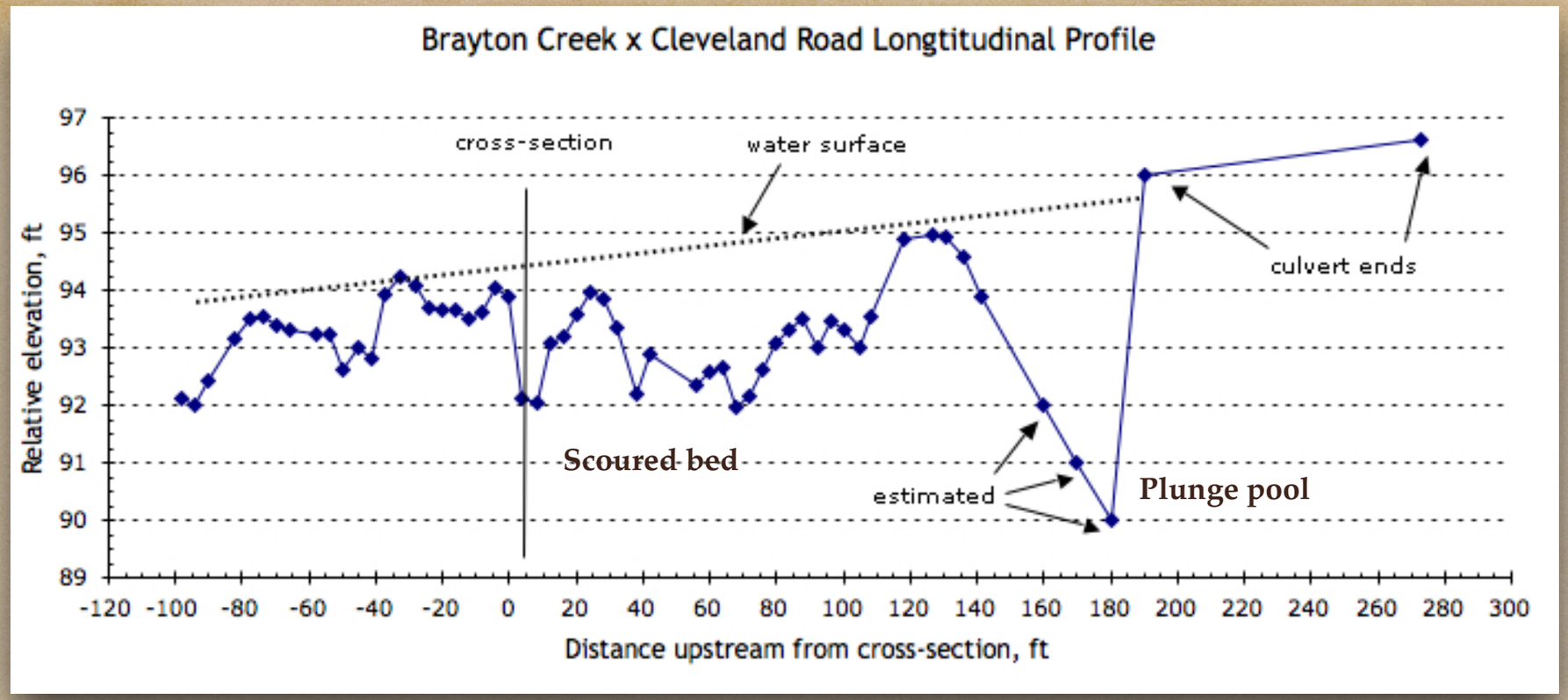
Inlet

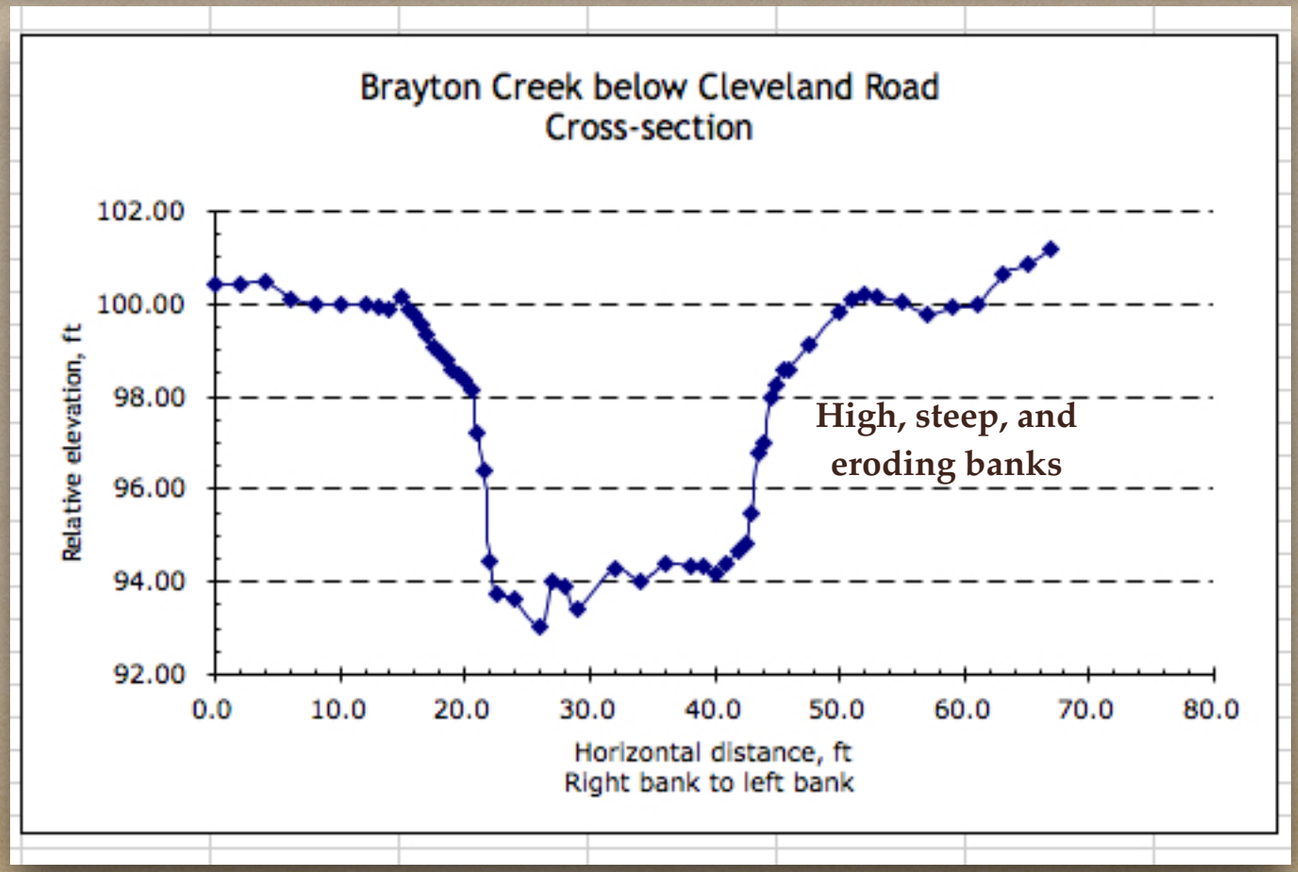
Outlet

Upstream

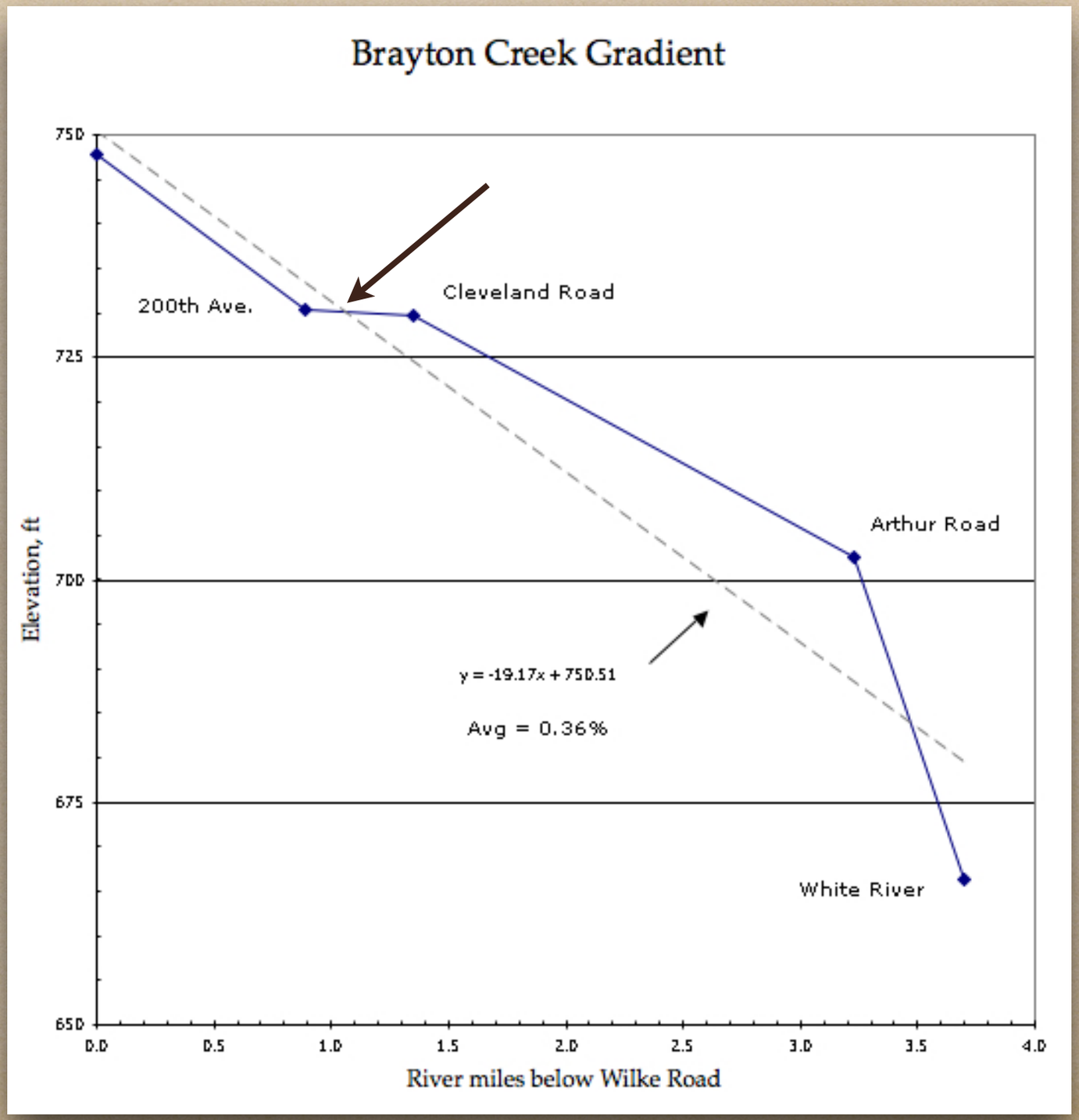
Downstream

Perched, misaligned, partly blocked, too small, erosion, sediment retention, etc.
May have been the worst RSX in the county.


Brayton Creek x Cleveland Road Longtitudinal Profile
Relative elevation, ft
97
96
95
94
93
92
91
90
89
cross-section
water surface
culvert ends
Scoured bed
estimated
Plunge pool
-120 -100 -80 -60 -40 -20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Distance upstream from cross-section, ft


Brayton Creek below Cleveland Road
Cross-section
Relative elevation, ft
102.00
100.00
98.00
96.00
94.00
92.00
High, steep, and
eroding banks
0.0 10.0 20.0 30.0 40.0 50.0 60.0 70.0 80.0
Horizontal distance, ft
Right bank to left bank

Dam-ing evidence?



What you need next, if you want to fix it...

Lisa Dutcher waves her magic wand, and...

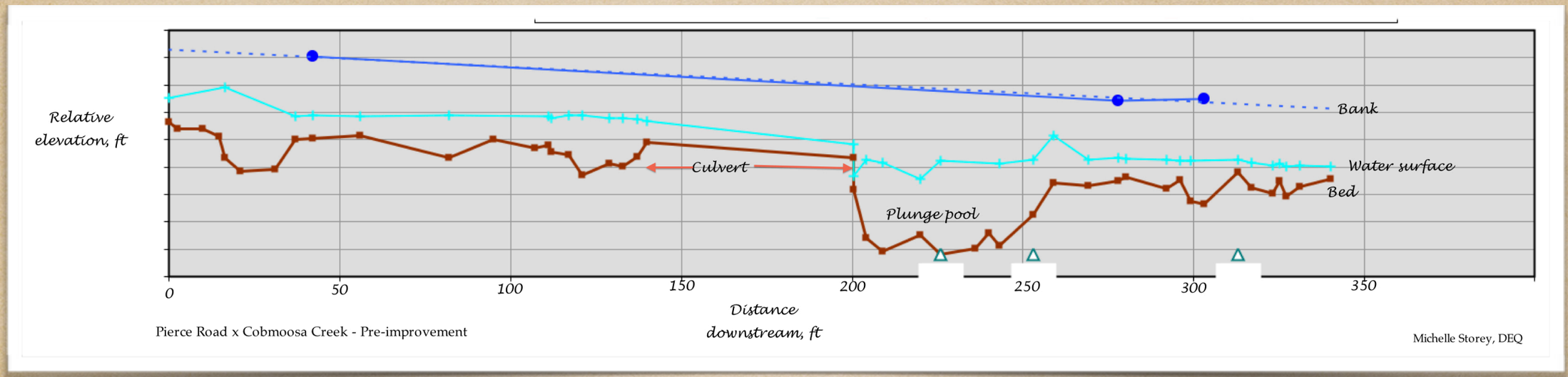
Presto!

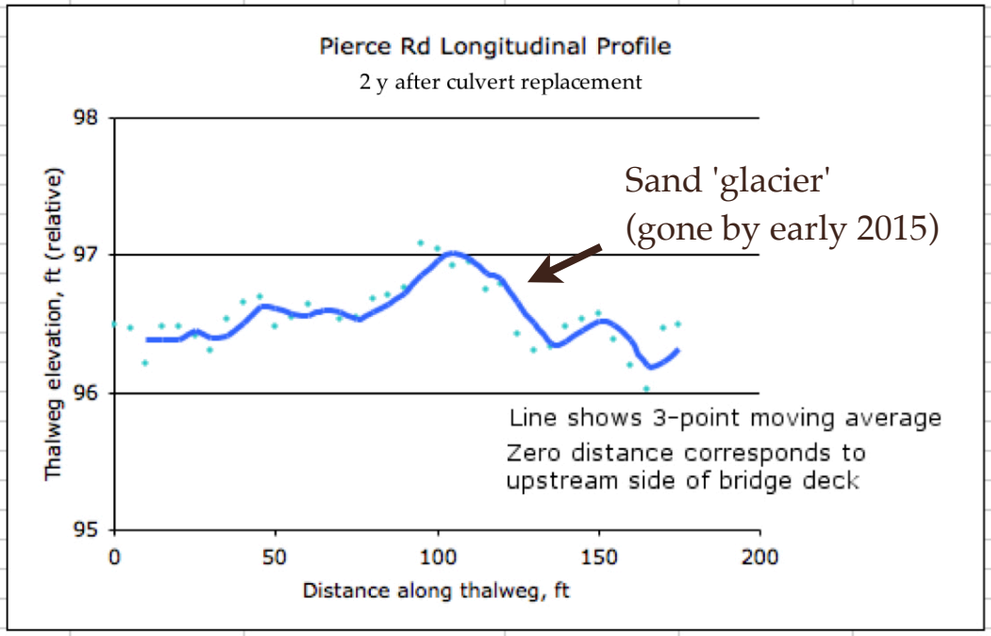
Summer 2014

Fall 2015

- Project cost: $335 K
- Management: Oceana County Road Commission/Lisa Dutcher
- Competitive bids, local contractor
- Donors
    - Great Lakes Fisheries Trust
    - National Forest Foundation
    - Coca-Cola Company
    - DoI -U. S. Fish & Wildlife Service
    - USDA - Forest Service

Before and after stream profiles (different site)





Note: a sandy, flat area extends from about 50 ft, reaching its maximum breadth at about 100 ft. This feature seems to result from sand washing off Pierce Rd. south of the bridge, as evidenced by extensive sandy deposits on the upper stream banks in this area.

Sand retained upstream moves quickly to fill plunge pool

Channel narrows, current speed increases

Gravel gradually covers sandy or scoured bed

Sand 'glacier' gradually disperses downstream

Indicator organisms

Using standard MiCorps protocols for benthic invertebrates

Will monitor recovery over several years after improvements

Encouraging preliminary results from a couple of earlier replacement sites

Caddis fly larva

Importance of erosion along approaches, which in our rural upper watersheds are frequently unpaved and in glacial terrain where coarse, easily erodible soils predominate

Left approach, 176th Ave. x N. Branch White River

Quantification

Soil loss from RUSLE model
as implemented at
http://www.iwr.msu.edu/rusle/

Calculated Soil Loss

The following are calculated soil loss for the construction site.

Site Information:

County:	Oceana
Site:	176 x N Branch
Site ID:	001
Soil:	BENONA (56C)
Slope:	6%
Slope Length:	1000 ft.
Mulch Type:	None
Mulch Rate:	0 (tons/acre)
Acreage:	1.0 acre(s)

Calculated Soil Loss:

Erosion Factors:	R = 90 K = 0.15 LS = 3.3 C = 1.0 P = 1
Tolerable Soil Loss:	T = 5 (tons/acre/year)
Calculated Soil Loss:	A = 44.55 (tons/acre/year)
Potential soil loss (total):	44.55 (tons/year)

*** Note: Erosion from this site appears higher than the tolerable soil loss.**

3 - 4% of the total annual erosion
in the entire N. Branch sub-watershed (!),
much of which is in the Natl. Forest

Soil type from NRCS map application at
http://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm

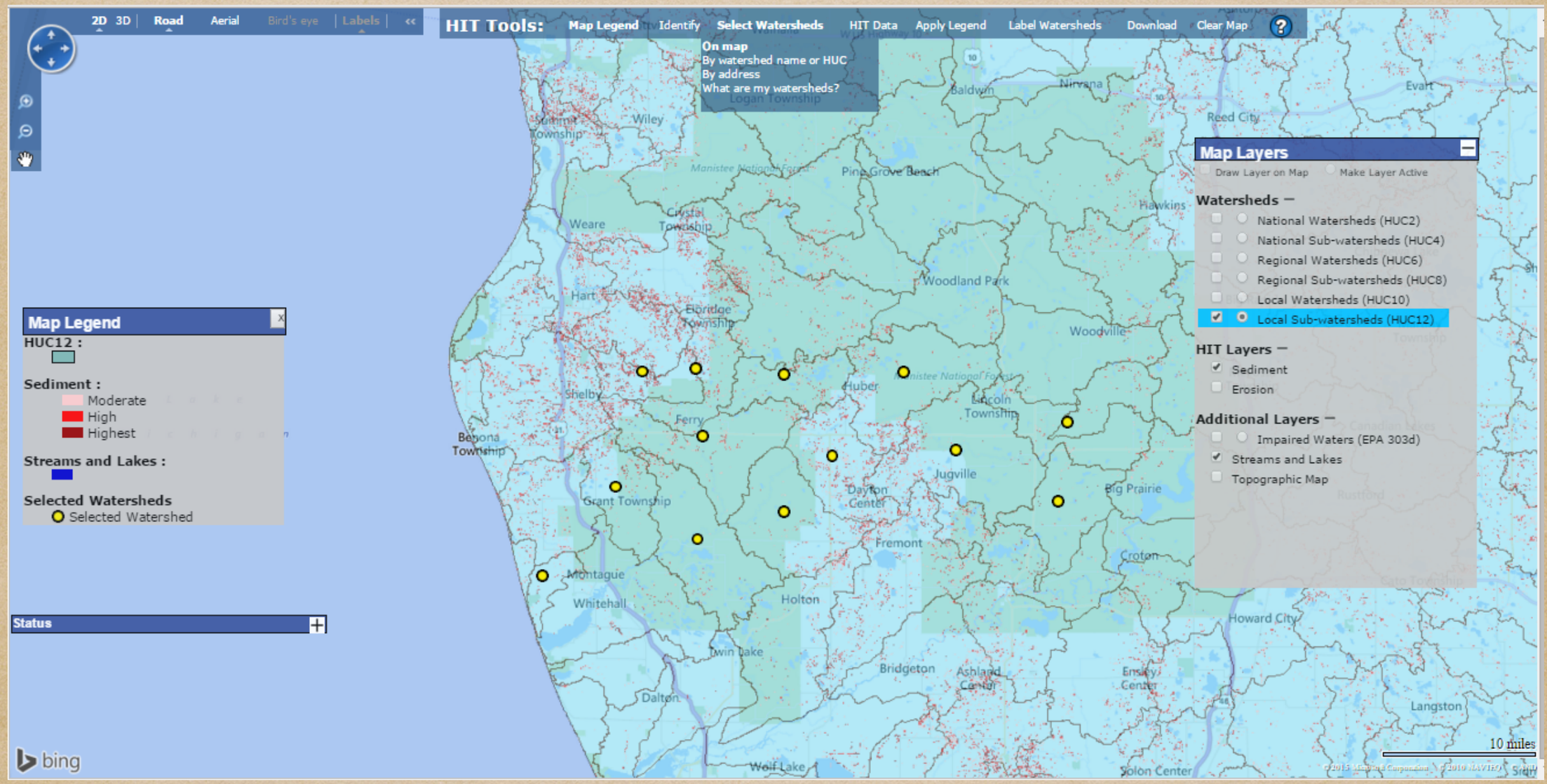
Targeting erosion and sedimentation hot spots

By watershed

Name	HUC	Acres	Rate(tons/ac/yr)
Mullen Creek-South Branch White River	040601010701	29,760	0.013
Sand Creek-White River	040601010901	30,939	0.016
Flinton Creek-South Branch White River	040601010703	18,806	0.017
White River	040601010904	39,039	0.019
Fivemile Creek	040601010702	11,956	0.028
South Branch White River	040601010707	27,900	0.031
Black Creek-South Branch White River	040601010704	39,401	0.039
Martin Creek-South Branch White River	040601010705	31,706	0.039
McLaren Lake-North Branch White River	040601010801	14,811	0.041
North Branch White River	040601010804	29,265	0.041
Carlton Creek	040601010902	17,856	0.042
McDuffee Creek	040601010301	25,798	0.044
Osborn Creek-North Branch White River	040601010803	14,524	0.066
Brayton Drain-South Branch White River	040601010706	21,793	0.090
Robinson Creek	040601010802	11,008	0.142
TABLE TOTALS		364,563	0.039

HIT2 erosion model results for White River subwatersheds

by stream segment, using HIT2 model from MSU



note impact of National Forest land management

Acknowledgements

- Dr. Jim Selegean, USACE - Detroit/Wayne State
- Drs. Jo Latimore and Paul Steen
- Patrick Ertel, MI-DNR
- MiCorps VSMP Grant support
- Volunteers from the White River Watershed Partnership