FINAL PROJECT REPORT

Road-Stream Crossing Assessments in the Upper White River Watershed

by the

White River Watershed Partnership, Grantee
Dr. Thomas Tisue, P.I.

in collaboration with

Muskegon Community College
and
The Muskegon Conservation District

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The **project's overall purpose** was twofold: 1) to compile information regarding the conditions of road-stream crossings (RSXs) in upper portions of the White River watershed using standard protocols, and 2) to enter that information into a database supplied by the Michigan DNR.

To achieve the project's purpose and meet the terms of the grant award, the following **objectives** had to be achieved:

- project planning and preparation, including site selection and equipment acquisition
- volunteer training
- completion of 50 RSX assessments
- entry of the assessment results into a M-DNR database
- presentation of the results at a MiCorps Annual Conference
- preparation of quarterly status and financial reports

We are pleased to be able to report that **all project objectives were met** in full.

The major **obstacles** we encountered were:

- difficulties with entering data into the RoadSoft database, which proved unwieldy and excessively time-consuming
- delays associated with illness of a key volunteer

We dealt with these obstacles by:

- abandoning the RoadSoft database in favor of an Access database supplied by DNR program manager Patrick Ertel
- recruiting and training a replacement for the volunteer who became incapacitated

The major effect of these challenges was a three-month delay in completion of the project.

The P.I. received **training** in implementing the standard RSX assessment protocols from the M-DNR program manager. In turn, the P.I. trained the two WRWP volunteers who assisted with the assessments and data entry. This three-person team was responsible for completing all field work and data entry.

The P.I. was responsible for quarterly and final report preparation and for **education/ outreach presentations** at public and professional meetings. Presentations took place at the MiCorps Annual Conference (Nov. 2016), at the Stewardship Network Annual Conference (Jan. 2017), at the River Network's annual River Rally (Aug. 2016), and at the WRWP's Annual Meetings (Sept. 2016 and 2017).

One of the WRWP volunteers was a **student** at Muskegon Community College. His participation in the project was part of a three-credit independent study project, and was supported by a stipend through a WRWP **internship**. The student subsequently transferred to Michigan State University, where he is pursuing a degree in Environmental Engineering.

The project's **products (deliverables)** consisted of, in addition to this report:

- completed and scanned-to-files data sheets for 50 RSXs
- 300 digital photographs from the 50 sites
- database entries for 3000+ assessment characteristics from the 50 sites
- abstracts for conference proceedings
- digital versions of conference slides and posters
- student intern's final report

Electronic versions of these products are being submitted along with this Report.

The **environmental benefits** of the project included the identification of substandard RSX that are priorities for remediation because they pose barriers to organism passage and/or because they conduce to excessive sediment input. Of the 50 RSX assessed, eight (16%) pose severe barriers to organism passage because the outlets are perched and/or discharge onto shallow cascades formed by rip-rap or aprons (see Photo WRWP#29B). Organism passage is blocked at one site by a curtain-wall weir (see Photo WRWP#9C). At six sites (12%), some combination of shallow water, lack of substrate in the structure, or excessive current velocity leads to varying degrees of interference with organism passage (see Photo #24A).

Our assessments also turned up a few sites where the RSX contributes to sediment transport into the stream, mostly because of erosion from unpaved approaches. See Photo XXXXXX.

Refer to the attached Tables for an analysis of the data that prioritizes the RSXs we assessed with the aim of identifying both those most in need of remediation as well as the environmental benefits that would flow from improvements to them.

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To summarize, 15 of the 50 sites (30%) we assessed exhibited either total or partial interference with the passage of organisms. Our sample of 50 sites probably represents 20% or less of the total number of RSXs in the Upper White River Watershed. This result suggests that at least 75 additional RSX are in need of remediation.

More generally, our assessments showed that, with some exceptions, RSXs in the Manistee National Forest are in good to excellent condition. This **lesson learned** means that future assessment work can safely emphasize parts of the watershed that lie outside the National Forest, greatly reducing the number of sites that must be assessed.

Besides identifying RSX in need of remediation, the WRWP is **monitoring** sites where substandard RSX already have been remediated, with the goal of documenting improvements in stream profiles, substrate characteristics, and stream quality indices. Data from these sites will provide evidence in support of **grant applications** for future improvements at other priority locations.

Volunteer groups like the WRWP can accomplish a great deal at very low cost, as was the case with the current project. Nonetheless, the **sustainability** of the WRWP's RSX assessment and remediation efforts will of course depend in part on our ability to develop **funding sources**. In this regard, we are pleased to report that the WRWP has entered into discussions with USDA officials to explore collaboration under the EQUIP program. We hope to use the assessment data the current project generated to select sites that fit the USDA's criteria for remediation funding, such as expansion and improvement of brook trout habitat and reduction of sedimentation.

Table I. Priority Sites – Organism Passage

WRWP ID#	RSX Location	Principal Deficiency	Erosion	Miles reconnected	Fish Species (1)	Priority ranking (2)
1	Coonskin Creek x S. Centerline Rd.	Perched outlet	Moderate	1.9	Mostly warmwater	7.6
48	Five Mile Creek x E. Monroe Rd.	No substrate in structure	"	3.7	Mixed	14.8
10	Evans (Swinton) Creek x E. Pierce Rd.	" "	Minor	0.6	Coldwater	
11	Evans (Swinton) Creek x E. Buchanan Rd.	Shallow water in structure	"	2.0	"	16 (aggregate for Evans)
46	Evans (Swinton) Creek x E. Baseline Rd.	Shallow water in structure; undersized	"	0.6	"	
22	Flinton Creek x N. Spruce St.	Perched outlet	"	5.0	Presumed coldwater	30
29	Cushman Creek x Roosevelt Rd.	Shallow cascade onto apron	"	1.9	Coldwater	11.4
11	Bear Creek x S. 128th Ave.	Perched outlet	"	2.0	Mixed	10
17	Wrights Creek x N. Comstock Ave.	Shallow cascade onto riprap	Moderate	2.8	Mixed	11.2
15	2nd Cole Creek x N. Ferris Ave.	" " " "	Minor	1.3	Coldwater	6.5
9	Robinson Creek x Echo Dr.	Curtain wall weir	"	3.3	Mixed	16.5
13	Rattlesnake Creek x W. Baseline Rd.	No substrate in structure	"	0.4	"	1.6

1. O'Neal, R. **White River Watershed Status of the Fishery Resource Report:** Muskegon, Oceana and Newaygo Counties. Michigan Department of Natural Resources, January 2012.
2. Calculated as follows. Passage rating: no organism passage = 3; limited organism passage = 2; little restriction = 1. Habitat rating: coldwater = 3; mixed warm and cold = 2; warmwater only = 1. Miles reconnected = distance along stream from Google Earth. Priority rating = (passage rating + habitat rating) x miles reconnected.

"A large portion of the White River is classified Designated Trout Stream under the Michigan Natural Resources and Environmental Code, Public Act 451, Part 487, 1994. Designated Trout Streams generally provide cold water fish habitat and have different fishing regulations and more restrictive water quality regulations than streams supporting cool or warm water fish. All of the mainstem from the mouth at White Lake to the headwaters (84.3 miles) is Designated Trout Stream. All of the North Branch upstream to 192nd Avenue (24.3 miles) in Oceana County is a Designated Trout Stream. The 1.9 mile river segment upstream from 192nd Avenue to McLaren Lake is not Designated Trout Stream due to the warm water discharged from the lake during summer. Most of the tributaries in the watershed are also Designated Trout Streams."

"Some tributaries provide primarily warmwater habitat due to natural lake drainages and include Coonskin Creek, Robinson Creek, and Rattlesnake Creek (Table 10). Other tributaries have degraded coldwater habitat in all or part of the stream from man-made impoundments and include Silver Creek, Sand Creek, Cleveland Creek, and Mena Creek. Several tributaries also have degraded coldwater habitat due to agricultural land use and include Black (DeLong) Creek, Brayton Creek, and Skeel Creek (De Mol 2009; Schultz 1953; Table 10). " (Excerpt from ref. 1)

Table II. Priority Sites – Erosion

WRWP ID#	RSX Location	Description	Severity
2	Martin Creek x Monroe St.	Material from upper unpaved approaches is being transported across paved portions into stream; diversions needed	Moderate
17	Wrights Creek x N. Comstock Ave.	Right approach eroding into stream; paving or diversions needed	“
20	Flinton Creek x River View Dr.	Local residents report structures are prone to wash-out during Spring floods	“
27	Cushman Creek x 184th Ave.	Upper unpaved portions of both approaches are eroding onto road surface; material is being transported into stream	“
33	Brayton Creek x 200th Ave.	Gullies on both approaches have been partially filled with added gravel but material eroding from roadway is still reaching stream	“
34	Brayton Creek x Cleveland Rd.	Severe and persistent gully on right approach, downstream side; eroding fill on stream banks both up- and down-stream from structure	Severe
35	N. Branch White River x 176th Ave.	Both> 800 ft approaches subject to heavy erosion due soil type and steep slope; diversions not well designed or maintained and only partially effective; approaches need to be paved	Moderate/ severe
49	Five Mile Creek x N. Pine Rd.	Left approach (~700 ft) is eroding and needs to be paved, but not all eroded material reaches stream	Moderat

Photo WRWP#24A

Photo WRWP#9C

Photo WRWP#29B

Photo WRWP#35 erosion