

**Title: Cass River and Saginaw Bay Watershed Livestock Exclusion**

Michigan 303(d) Number: Carrow Creek is not on Michigan's 303(d) list.

GRTS Number: Not applicable; this project was funded with Clean Michigan Initiative (CMI) funds.

Opening Paragraph: The Cass River and Saginaw Bay Watershed Livestock Exclusion Program addressed livestock access problems throughout the Saginaw Bay Watershed. This program was intended to reduce sediment and nutrient inputs to Saginaw Bay by implementing Best Management Practices with 28 landowners. The specific project described in this success story was on Carrow Creek, where installation of fencing, cattle crossings and alternate watering sources improved riparian vegetation, aquatic habitat, and fish and macroinvertebrate communities.

Problem: Carrow Creek is a tributary to the Cass River, in Sanilac County. Much of the Cass River watershed is rural, and in 1996 MDEQ surveys identified 44 eroding livestock access sites throughout the watershed, including 29 sites that were considered to be severely degraded. Excessive sedimentation negatively impacted instream habitat and the resident fish and macroinvertebrate populations.

Project Highlights: A cooperative effort between the MDEQ Nonpoint Source Program and the USDA's Conservation Reserve Enhancement Program (CREP) improved water quality by reducing nutrient and sediment input into the Cass River by excluding livestock from streams and ditches, providing stable stream crossings, restoring critical areas and providing alternate watering facilities away from water bodies. Specifically, the MDEQ/CREP cooperative project used a \$462,926 CMI-NPS grant to address all 29 of the severely degraded sites mentioned above, by installing 75,668 linear feet of fencing, 20 livestock crossings and 4 alternate watering sources.

One of the 29 severely degraded sites was on the Schunk dairy farm, on Carrow Creek. The CMI-NPS grant spent \$26,870 to install one alternate water source for cattle and three livestock crossings on the farm. This work was completed in June of 2002. Pre-BMP monitoring was performed in September 2001, and post-BMP monitoring was performed in September 2004. All monitoring was supported by Section 319 funds.

Results: Pre- and post-BMP photographs suggested that the BMPs described above improved riparian and instream habitat conditions in this reach of Carrow Creek (photographs, below), and biological monitoring conducted before and after the BMPs were installed confirmed their effectiveness (Tables 1, 2 and 3). Aquatic and riparian habitat features related to bank erosion and sedimentation improved substantially after BMP installation, and this improved habitat was

reflected in the biological data. While the total number of fish and the number of fish species in the sampled reach of this very small stream did not increase substantially, the dominant fish changed from a species tolerant of turbid water, silty sediments and low dissolved oxygen concentrations (central mudminnow) to two species that prefer clear water, stable stream bottoms and higher dissolved oxygen concentrations (creek chub and brook stickleback). Similarly, the total number of macroinvertebrate taxa did not change with BMP installation, but the composition shifted from taxa tolerant of poor water quality to more sensitive taxa (mayflies, caddisflies, and stoneflies).

For the entire Cass River watershed, pollutant control models estimated annual reductions of 11,367 tons of sediment, 22,212 pounds of phosphorus, and 68,471 pounds of nitrogen from the BMPs described above.

Partners and Funding: In 2001 MDEQ provided \$472,000.00 in CMI funds to the Sanilac Conservation District for the livestock exclusion project in the Cass River watershed, including \$26,870 for installation of one alternate water source and 3 livestock crossings on the farm owned by Mr. John Schunk on Carrow Creek.

Photographs:

**Before BMP installation**

**After BMP installation**



Data:



**Table 1. Instream Habitat Quality Scores Downstream of the Schunk Farm, Before and After BMP Installation. (Higher score = better habitat)**

Metric	2001 (Pre-BMP)	2004 (Post-BMP)
<b><i>Bottom Substrate</i></b>		
Available Cover	3	8
Embeddedness	2	11
Velocity/Depth	7	11
<b><i>Channel Morphology</i></b>		
Bottom Deposition	2	8
Flow Stability	7	8
Pools-Riffle-Run-Bends	5	9
<b><i>Riparian and Bank Structure</i></b>		
Bank Stability	5	8
Bank Vegetative Stability	6	10
Stream Cover	4	5
<b>Total Score</b>	<b>41</b>	<b>78</b>
<b>Aquatic Habitat Ranking</b>	<b>Fair</b>	<b>Good</b>

**Table 2. Fish Community Data Downstream of the Schunk Farm, Before and After BMP Installation.**

Species	2001 (Pre-BMP)	2004 (Post-BMP)
Central mudminnow	20	0
Creek chub	0	10
Brook stickleback	1	15
Total fish taxa	2	2
Total number of fish	21	25

**Table 3. Macroinvertebrate Community Data Downstream of the Schunk Farm, Before and After BMP Installation.**

Metric	2001 (Pre-BMP)	2004 (Post- BMP)
EPT taxa*	1	3
Percent surface air breathers	18	10
Total taxa	20	20
<b>Overall rating</b>	<b>Poor</b>	<b>Acceptable</b>

\*EPT = mayfly, caddisfly and stonefly taxa = sensitive macroinvertebrates

Contact Information: Joe Rathbun, MDEQ-Water Bureau; 517-373-8868; rathbunj@michigan.gov