

## Michigan's 319 Success Stories – 2005

Title: Improved Macroinvertebrates in Furlong Creek

Opening paragraph: Unrestricted cattle access to Furlong Creek caused an impaired aquatic macroinvertebrate community. When cattle were excluded from the creek, the macroinvertebrate community (aquatic insects, snails, clams, crayfish, etc.) improved to the point that the stream reach was removed from the 303(d) list.

Problem: Furlong Creek, a tributary to Millecoquins Lake, is located in Mackinac County in Michigan's Upper Peninsula. Surveys conducted in 1989, prior to unrestricted cattle grazing on the Krause Road property, found diverse fish and macroinvertebrate communities in the creek. In 1999 cattle were grazing the property and had unrestricted access to the creek, and the fish and macroinvertebrate populations were found to be degraded by excessive instream habitat disturbance and sedimentation caused by cattle trampling the riparian vegetation and walking in the stream. Fish and macroinvertebrate diversity was low, and sensitive fish like rainbow trout and sensitive insect families like caddisflies, stoneflies, and mayflies were absent or very rare. This biotic impairment resulted in 4 miles of the stream appearing on the 303(d) list.

Project Highlights: Cattle were excluded from the stream during the early 2000s via a cooperative effort by the landowner, DEQ staff, and Michigan Department of Agriculture Right-to-Farm staff.

Results: By 2004, the stream had recovered to the point that fish and macroinvertebrate populations were essentially identical to those found before cattle had unrestricted access to the stream (see table, below), and the stream reach will be removed from the 303(d) list.

Partners and Funding: In 1990 and 1991 DEQ provided \$214,000 in Section 319 funds to the Luce-West Mackinaw Conservation District for stream bank fencing and other grazing land protections in the Furlong Creek and Doe Creek watersheds. The property changed hands sometime in the 1990s and apparently the fencing was removed. A subsequent biological survey in 1999 found that cattle again had access to the stream, after which the Krause Road property owner and Michigan Department of Agriculture Right-to-Farm staff collaborated on a farm management plan that would prevent unrestricted cattle access. Section 319 funded the pre- and post-BMP biological surveys.

Photos: Furlong Creek site in 2004, after cattle exclusion. (Note herbaceous vegetation at the stream waterline, a sign of stable stream banks.)



Table:

<b>Biological Measurement</b>	<b>1989 (limited cattle access)</b>	<b>1999 (unrestricted cattle access)</b>	<b>2004 (limited cattle access)</b>
Number of fish species	12	7	13
Rainbow trout present?	Yes	No	Yes
Kinds of macroinvertebrates	24	18	26
Kinds of mayflies	2	1	3
Kinds of caddisflies	6	0	5
Mussels present?	Yes	No	Yes
Macroinvertebrate community rating	Attainment	Nonattainment	Attainment

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Title: Channel restoration of Big Creek

Opening paragraph: Excessive sedimentation altered the stream channel and damaged instream habitat in Big Creek. Volunteers removed excess woody debris and blocked braided side channels to divert flow and recreate a single main channel, which transported fine sediment out of the reach and re-exposed gravel riffles suitable for fish reproduction. These improvements have persisted for 10 years and counting.

Problem: Historic timber harvest practices and eroding road/stream crossings deposited large amounts of sediment in the channel of Big Creek, a tributary to the Chocoday River in Marquette County in Michigan's Upper Peninsula. This excessive sedimentation raised the streambed, buried the natural gravel bottom, widened and braided the channel, degraded macroinvertebrate populations, and destroyed fish habitat necessary for trout and salmon reproduction.

Project Highlights: In 1994 and 1995, volunteers organized by the Marquette Conservation District restored a 1.5 mile reach of Big Creek by removing instream debris and blocking braided side channels to divert flow and recreate a single main channel (a "thalweg"). Normal stream flows through the new main channel were expected to mobilize fine sediments and re-expose gravel riffles.

Results: By late 1995, just months after completion of the restoration, stream channel width had narrowed by over 50%, which removed sand from the channel and re-exposed the gravel substrate preferred by young trout and salmon (Table 1). The habitat improvements have persisted through 2005, with no additional interventions. Fish numbers also increased in a short time (Table 2).

Partners and Funding: In 1994 and 1995 the Marquette Conservation District received a total of \$59,500 of Section 319 funds to hire a volunteer coordinator and execute a volunteer-based restoration of Big Creek. Michigan Department of Natural Resources staff conducted the fish population and stream habitat quality surveys in the 1990s, and Michigan Department of Environmental Quality staff repeated the stream habitat survey in 1999 and also qualitatively inspected the site in 2005.

Photos:

**Figure 1. Before and After Thalweg Restoration**

**1994**



**2005**



Table/graph/chart:

**Table 1. Physical Channel Measurements**

<b>Measurement</b>	<b>1992 (Before restoration)</b>	<b>Late 1995 (Immediately after restoration)</b>	<b>1999 (4 years after restoration)</b>
Average channel width (ft)	34.0	15.7	17.1
Gravel substrate (%)	2.7	47.5	41.0
Sand substrate (%)	85.5	31.7	47.5

**Table 2. Fish Inventory**

<b>Species</b>	<b>1992 (Before restoration)</b>	<b>1995 (Immediately after restoration)</b>
Coho salmon smolts	10	25
Brown trout juveniles	5	26
Brook trout juveniles	3	7

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