



**Clean Michigan Initiative
Nonpoint Source Grant**
Tracking Code: 2000-0139



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Lake Charlevoix Watershed Project

December 2001 through December 2004

The Lake Charlevoix Watershed Project (CMI) goal is to protect the diversity of aquatic habitats, including cold water fisheries, and maintain the excellent recreation opportunities of Lake Charlevoix and its tributaries by reducing nutrient and sediment loads from priority road crossings, lakeshore erosion, recreation access to tributaries, agricultural activities, and urban stormwater.

Restoration projects installed for the Lake Charlevoix Watershed Project included three road/stream crossing improvements in Charlevoix County; two road/stream crossing improvements in Antrim County; erosion control and habitat improvement at four sites on the Jordan River; installation of best management practices at three agricultural sites (two in Antrim County and one in Charlevoix County); restoration of three lakeshore erosion sites and one road end all on Lake Charlevoix; the installation of a detention basin in Boyne City. All of the projects reduced nutrient and sediment loads significantly and will serve as excellent demonstrations.

Best Management Practices:

- Vegetated buffer strip/greenbelts
- Whole-tree revetments
- Riprap/Coir bundles
- Brush bundles
- Alternative watering systems
- Erosion control
- Culvert replacement
- Stormwater conveyance channel
- Detention outlets/Detention basin
- Critical area treatment
- Compost system

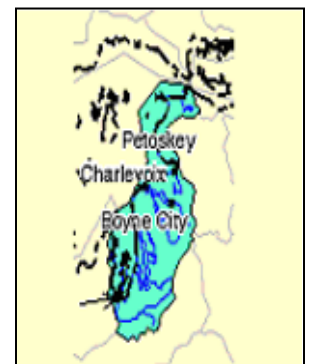
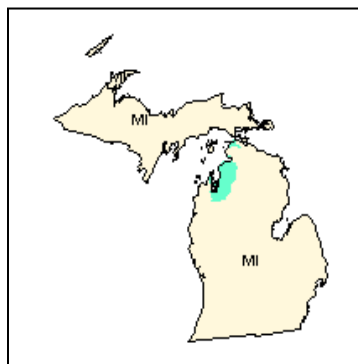
Annual Load Reductions:

- 406 tons Sediment
- 548 lbs Phosphorus
- 693 lbs Nitrogen



Partners Involved:

- Antrim County Road Commission
- Charlevoix County Road Commission
- City of Boyne City
- Conservation Resource Alliance
- Friends of the Boyne River Watershed
- Friends of the Jordan River Watershed
- Russell Hart
- Lake Charlevoix Association
- Frank Leist
- Michigan Department of Natural Resources
- Michigan Department of Environmental Quality
- Natural Resource Conservation Service
- Tip of the Mitt Watershed Council
- Waabo Peace Center



Amount Spent: \$	230,900
Actual Match: \$	110,300
Total Amount: \$	341,200



Lake Charlevoix Watershed Project



Restoration Projects

Lakeshore Erosion - Road End

BEFORE



Description: Photo taken spring 2004. Note severe gullying and rilling, both signs of accelerated erosion.

AFTER



Description: Photo taken November 2004. Note fieldstone-lined stormwater conveyance channel (right), water bars (center), and seeded vegetation buffer temporarily stabilized with coir mulch blanket (left). Gully and sheetflow erosion will both be greatly reduced at this site as a result of these 3 BMPs.

Lakeshore Erosion - Residential

BEFORE



Description: Photo taken fall 2003. Note large areas of exposed filter fabric, and large angular riprap. Almost no buffer exists with maintained turf extending to the edge of the riprap.

AFTER



Description: Photo taken October 2004. Angular riprap has been top dressed with rounded gravel and fieldstone. After one growing season, a substantial 10' wide buffer zone is taking shape behind the riprap.

Agricultural Restoration

BEFORE



Description: Several seeps from a hillside caused this area around the barn to become extremely muddy.

AFTER



Description: Water seeping from hillside is now collected and used in the barn. Material excavated to install the cement pad, was used to stabilize the eroding hillside.

Stormwater Management

BEFORE



Description: Photo taken Spring 2004. Detention basin location at the corner of Lynn Street, Court Street and North Lake Streets in Boyne City.

AFTER



Description: Photo taken Spring 2005. This project was started very late in the year. At the time of this photo it wasn't completely finished, but was still working!

Road/Stream Crossing Improvements

BEFORE



Description: The severely undersized, perched 36" culvert caused ponding upstream.

AFTER



Description: A properly aligned 16' wide steel bottomless arch culvert was installed to better accommodate water capacity and velocity of the Jordan River, provide a natural stream bottom, and improve fish passage.

Recreational Access

BEFORE



Description: Photo taken in the fall of 2003. Note large areas of exposed soil. Vegetation appears to have been mowed or trampled through extensive use. Other features include scattered litter, accelerated erosion, and lack of woody vegetation.

AFTER



Description: Photo taken in August 2004. Whole tree revetments and brush obstacles have been installed in front of and on top of eroding banks. Native woody vegetation installed on banks.