



**Federal Section 319
Nonpoint Source Grant**
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Pine River Hydrology and Geomorphology Project

February 14, 2003 through June 30, 2006

This project consisted of a hydrologic and geomorphic study focusing on the Pine River Watershed, a watershed of 195 square miles, tributary to the St. Clair River. Like most southeastern Michigan rivers, the main water quality problems in the Pine River include excess sediment, elevated bacteria densities and high nutrient levels. The hydrologic study was comprised of a land use assessment and an investigation into relevant USGS stream gauge flow data. The geomorphic study consisted of an historical stream location analysis, data collection from a seven-square-mile subwatershed (the Holland Drain) and detailed analysis of the data. Using the Bank Erosion Hazard Index (BEHI), Rosgen techniques and Pfankuch methods, conclusions were drawn classifying the stability of the Holland Drain and recommending site-specific Best Management Practices (BMPs). This study, of what is still mostly an agricultural and rural residential watershed, can be compared and contrasted with the findings of the Clinton River Hydrologic Project, which focused on a rapidly-developing urban/suburban watershed.

Grant Amount: \$ 119,921
Match Funds: \$ 40,831
Total Amount: \$ 160,752



Key Findings

- The hydrologic regime (storm water run-off) of the Pine River Watershed was found to be in a relatively stable state. Stream gauge data did not indicate an increasing or decreasing peak flow trend.
- The natural hydrology was probably first altered by lumbering and intensive agriculture. Modest growth in rural residential development has probably been offset by an overall reduction in intensive agriculture since the 1950's.
- The natural portions of the watershed are geomorphically stable, but in tributaries like the Holland Drain where artificial drainage has been constructed, stream morphology was found to be unstable with some severe erosion problems.
- Approximately 58% of the Holland Drain reaches studied are in an incised state (disconnected from the floodplain).
- Using Rosgen Level II Classifications, the existing drain reaches are primarily of "E", "F", and "G" stream types.
- The erosion analysis showed that many of the reaches are rated at fair to poor erosion ratings. The poorest ratings were correlated to "G" stream types.
- Connectivity to floodplains was found to be an important factor driving geomorphic stability

• Many of the recommendations for creating a stable watercourse from the severely eroded Holland Drain will be implemented in a petitioned county drain improvement project.

• A protocol was developed that can be used in similar watersheds to determine stream stability and to select specific BMP's for implementation.

Partners involved:

- Holland Drain Drainage District
- St. Clair County Metro Planning
- Environmental Consulting & Technology, Inc.

Severe Erosion Problems



Fact Sheet Date: 9/26/07