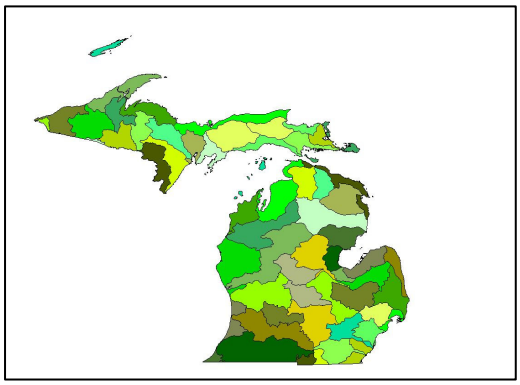
Michigan Reference Curves

(Ongoing)



Michigan Watersheds

Watershed location and features:

- Contains 63 watersheds encompassing over 100,000 square miles and 15 Congressional Districts.
- Watersheds in Michigan deliver sediment to 62 federally maintained harbors and 4 Great Lakes.

Watershed characteristics:

- Highly variable, ranging from sandy glacial outwash features to highly impermeable clay soils to bedrock.

Soil erosion and sedimentation issues:

- Urbanization increases erosion of river banks
- Intense agricultural use increases erosion of river banks and farm-land
- Degraded river systems affect the transport capacity of a river, leading to deposition/scour and loss of ecological function
- Degraded systems cause bridges to become undermined, dramatically increase bank erosion and cause a disconnection between the river and its floodplain
- Aggraded systems increase flood elevations, obstruct bridges and culverts and increase dredging requirements

Other issues:

- Rapid urban expansion and loss of wildlife habitat has affected the water quality

Partners on tributary modeling:

- U. S. Geological Survey (USGS)
- Michigan Department of Environmental Quality (MDEQ)
- Michigan Department of Transportation (MDOT)
- Michigan Department of Natural Resources (MDNR)
- U. S. Department of Agriculture Natural Resource Conservation Service (NRCS)
- U. S. Fish and Wildlife Service (USFWS)
- U. S. Forest Service (USFS)

Modeling approach:

- Collect dimension, pattern and profile data at USGS gages and at ungaged sites
- Analyze data and produce regional curves that relate drainage area to bankfull area, bankfull width and bankfull flow

Status:

- Study to be completed by March 2009

Applications:

- The development of regional curves will promote stream stability by encouraging the design and construction of a wide variety of restoration projects, such as:
    1. The design of culverts and bridges to minimize bed and bank erosion
    2. The design of toe and bank protection projects
    3. River restoration projects using natural channel design

- Regional curves will help create a more-complete understanding of the causes of river degradation and lead to a more-appropriate solution
- Regional curves can be applied in ecosystem restoration projects (such as dam removal, wetland creation, etc.) to produce a project that is compatible with the existing sediment regime

Point of Contact: Jim Selegean
U.S. Army Corps of Engineers, Detroit District