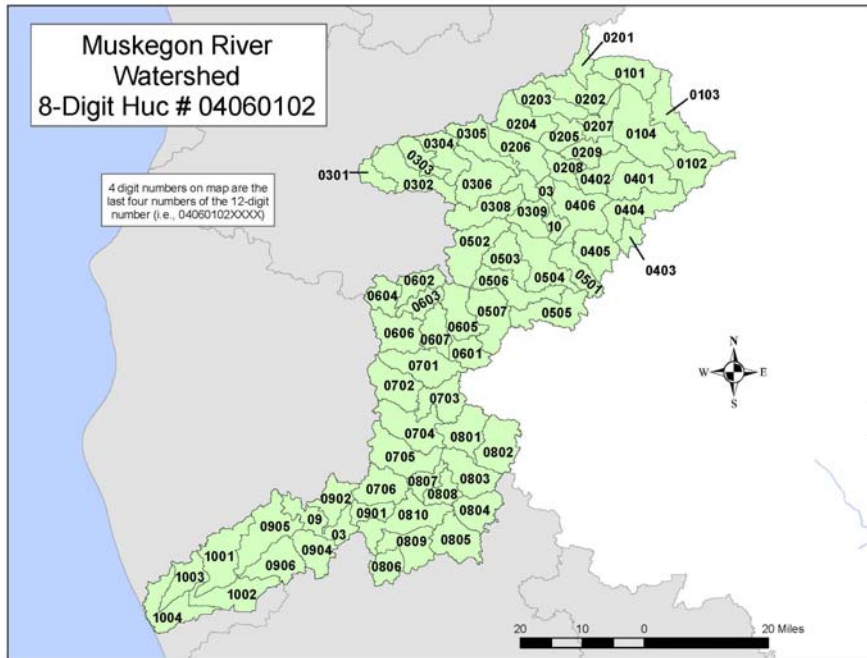


Muskegon River Watershed

Hydrologic Unit Code: 04060102

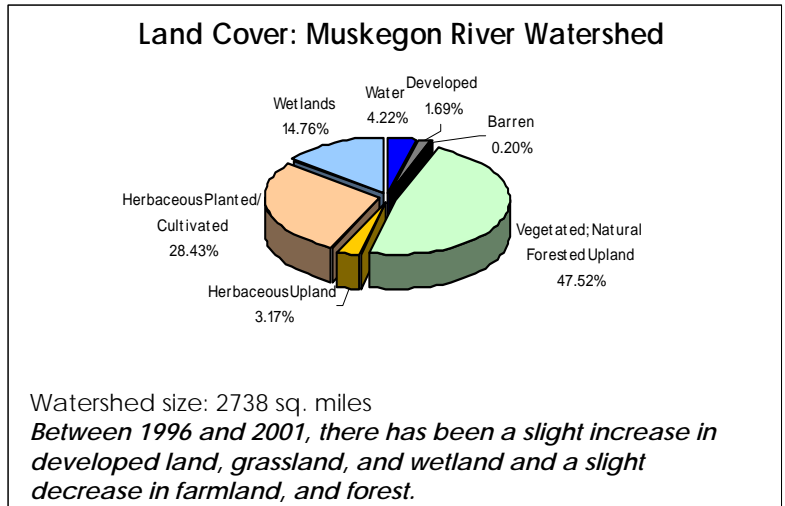
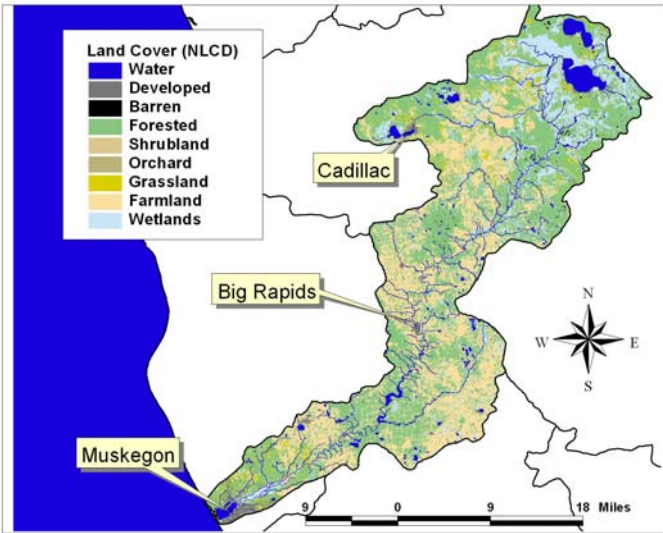
For more information see the USEPA "Surf Your Watershed" website at cipub.epa.gov/surf/huc.cfm?huc_code=04060102 or contact the Michigan Department of Environmental Quality at 517-335-6969 to request a copy of report number MI/DEQ/WB-05/070, "A Biological Survey of the Middle Muskegon River Watershed, Clare, Mecosta, Newaygo, and Osceola Counties, Michigan, 2001" and report number MI/DEQ/WB-05/071, "A Biological Survey of the Upper Muskegon River Watershed, Clare, Missaukee, Osceola, and Roscommon Counties, Michigan, 2001."

Report #05/054 "Biological Survey of the Lower Muskegon River Watershed, Muskegon and Newaygo Counties, Michigan, July 7-11, 2001"



Subwatersheds of the Muskegon River Watershed

- | | |
|--|---|
| 0101 Higgins Lake | 0507 Chippewa Creek-Muskegon River |
| 0102 Denton Creek | 0601 Big Stone Creek |
| 0103 Backus Creek | 0602 East Branch Hersey River |
| 0104 Houghton Lake | 0603 Lincoln Creek |
| 0201 Willow Run | 0604 Burt Creek-Hersey River |
| 0202 Dead Stream | 0605 Twin Creek-Muskegon River |
| 0203 Haymarsh Creek | 0606 Hersey River |
| 0204 Headwaters West Branch Muskegon | 0607 Cat Creek-Muskegon River |
| 0205 West Branch Muskegon | 0701 Buckhorn Creek-Muskegon River |
| 0206 Headwaters Butterfield Creek | 0702 Dalziel Creek-Muskegon River |
| 0207 Dead Stream Flooding-Muskegon River | 0703 Ryan Creek |
| 0208 Butterfield Creek | 0704 Cold Spring Creek-Muskegon River |
| 0209 Nellsville Ditch-Muskegon River | 0705 Bennett Creek-Muskegon River |
| 0301 Mitchell Creek | 0706 Hardy Dam Pond-Muskegon River |
| 0302 Lake Cadillac-Clam River | 0801 West Branch Little Muskegon River |
| 0303 Pleasant Lake-Clam River | 0802 East Branch Little Muskegon River |
| 0304 Cunnerson Creek-Clam River | 0803 Brackway Creek-Little Muskegon River |
| 0305 Mosquito Creek | 0804 Brandy Creek-Tamarack Creek |
| 0306 Taylor Creek-Clam River | 0805 Weatherby Drain-Tamarack Creek |
| 0307 Town of Falmouth-Clam River | 0806 Little Whitefish Lake |
| 0308 North Branch Creek-West Branch Clam River | 0807 Big Creek |
| 0309 West Branch Clam River | 0808 Quigley Creek-Little Muskegon River |
| 0310 Clam River | 0809 Tamarack Creek |
| 0401 Wolf Creek | 0810 Little Muskegon River |
| 0402 Bear Creek-Muskegon River | 0901 Croton Dam Pond-Muskegon River |
| 0403 South Branch Town Line Creek | 0902 Bigelow Creek |
| 0404 Town Line Creek | 0903 Penoyer Creek-Muskegon River |
| 0405 Floodwood Creek | 0904 Fourmile Creek-Muskegon River |
| 0406 Cranberry Creek-Muskegon River | 0905 Brooks Creek |
| 0501 Green Creek | 0906 Minnie Creek-Muskegon River |
| 0502 Crocker Creek-Middle Branch River | 1001 Cedar Creek |
| 0503 Middle Branch River | 1002 Mosquito Creek-Muskegon River |
| 0504 Dishwash Creek-Muskegon River | 1003 Bear Creek |
| 0505 Doc and Tom Creek | 1004 Muskegon River |
| 0506 Whetstone Creek-Muskegon River | |



Watershed Management Plans

- Higgins Lake — Huron Pines RC&D Council
- Muskegon River — Grand Valley State University Annis Water Resources Institute
- Upper Clam River — City of Cadillac
- Bear Creek
- Bear Lake

Watershed Groups

- Muskegon River Watershed Assembly — www.mrwa.org
- Huron Pines RC&D Council — www.huronpines.org
- Muskegon River Watershed Project, Annis Water Resources Institute — www.gvsu.edu/wri/isc/muskegon
- Muskegon River Watershed River Initiative Assessment — www.muskegonriver.org
- Muskegon Watershed Research Partnership — www.mwrp.net
- City of Cadillac — www.cadillac-mi.net
- Muskegon Lake Watershed partnership — www.muskegonlake.org

Watershed Overview

- The Muskegon River Watershed drains approximately 2,738 square miles of land and is located in north-central Michigan.
- The River is approximately 219 miles long from its start at Houghton and Higgins Lakes down to its mouth at Muskegon Lake and, eventually, Lake Michigan.
- The Muskegon River Watershed is one of the of the largest watersheds in the State of Michigan and spans across the better part of nine counties: Wexford, Missaukee, Roscommon,

Impaired (303d) Waters

Waterbody Name	Impairment
Bear Lake	Nuisance Plant Growths, Phosphorous, PCB Fish Consumption Advisory
Bills Lake	Mercury (Fish Tissue)
Croton Pond	Mercury (Fish Tissue)
Hess Lake	PCB Fish Consumption Advisory
Higgins Lake	Chlordane Fish Consumption Advisories PCB Fish Consumption Advisory Mercury (Fish Tissue)
Houghton Lake	PCB Fish Consumption Advisory
Houghton Lake Denton Township Public Beach	Pathogens
Houghton Lake DNR Boat Launch and Park Beach	Pathogens
Houghton Lake Heights Beach	Pathogens
Houghton Lake State Forest Campground Beach	Pathogens
Lake Mitchell	Mercury (Fish Tissue)
Lily Lake	Mercury (Fish Tissue)
Muskegon Lake And Muskegon River#	PCB Fish Consumption Advisory
Muskegon River Watershed	PCBS
Ruddiman Creek	Pathogens, Fish Community Rated Poor, Macroinvertebrate Community Rated Poor
Ruddiman Creek (Wetlands)	PCB Fish Consumption Advisory
Ryerson Creek	Fish Community Rated Poor Macroinvertebrate Community Rated Poor
Todd Lake	Mercury (Fish Tissue)

Data Sources. Land cover map and percentages: National Land Cover database, 1992 (edc.usgs.gov/products/landcover/nlcd.html); Land use change: NOAA Coastal Change Analysis Program, 1996 and 2001 (www.csc.noaa.gov/crs/lca/ccap.html); Total Maximum Daily Load (TMDL) Impaired Waters: Surf Your Watershed (www.epa.gov/surf)

Osceola, Clare, Mecosta, Montcalm, Newaygo, and Muskegon.

- Muskegon Lake is an Area of Concern (AOC). The AOC includes the entire lake with the lake being separated from Lake Michigan by sand dunes. The Muskegon River flows through the lake before emptying into Lake Michigan.
- The Muskegon River and many of its streams and creeks are considered cool water fisheries. They can support both cold-water fish, such as Trout and Salmon, and warm water fish, such as Northern Pike and Smallmouth Bass.
- The sportfishery is worth an estimated \$5 million per year.
- Impairments are excessive nutrient loading, sedimentation, hydrologic flow, invasive species and toxic substances.
- The river faces significant thermal pollution, which raises water temperature, from dams hydroelectric facilities, stormwater runoff, and a lack of streamside canopy. When temperature rises, available oxygen decreases, making it difficult for aquatic life to survive.

Watershed Activities

- The Great Lakes Fishery Trust (GLFT) selected the Muskegon River watershed as the focus of their "River Initiative."
- The Hersey River Restoration Project is working to clean up contaminated sediments and the removal of dilapidated dam structures on the Hersey River.
- The Muskegon Lake & Estuary Emergent Vegetation Restoration Demonstration Project is working to re-establish native wild rice stands, soft stem bulrush and other aquatic vegetation for fish and wildlife habitat in the Muskegon Lake AOC .
- The Sustainable Futures for the Muskegon River Watershed project developed a geographical information system (GIS) outreach tool.
- There are efforts to correct the effects of urban runoff, soil erosion and sedimentation at three highly visible sites within the AOC.
- The Nature conservancy identified the following critical ecological resources in the watershed:
 - ◇ The Muskegon Dunes holds Hemlock - Yellow Birch Wet-Mesic Forest, Great Lakes Beachgrass Dune, and Interdunal Wetlands.
 - ◇ The Muskegon and White Rivers include Great Lakes Hemlock - Beech - Hardwood Forest, Inland Coastal Plain Marsh, Mesic Sand Tallgrass Prairie, and White Pine - White Oak Barrens
 - ◇ Houghton Lake, Higgins Lake, and the Upper Muskegon River include very large, deep, inland lakes, very large, wetland-connected inland lakes, and wetland-connected headwater streams on outwash plain, ice contact and end moraine
 - ◇ The White and Muskegon Rivers have cold, groundwater-fed stream on sandy lake plain
 - ◇ The White and Muskegon Rivers are Waterfowl and Shorebird stopover sites
 - ◇ Houghton Lake, Higgins Lake, and the Upper Muskegon River are home to the Eastern Massasauga, Secretive Locust, and Hill's Thistle
 - ◇ The White and Muskegon Rivers are home to the Black Tern, Kirtland's Snake, Hill-prairie Spittlebug, Karner Blue Butterfly, Sprague's Pygmaic, and the Hill's thistle.

Muskegon River Area of Concern Activities

Location

- The entire 4149 acre lake and several tributaries within the immediate watershed.

Stressors and Primary Contaminants

- PCBs
- Mercury
- Unstable hydrologic flow
- Contaminated Sediments
- Nonpoint pollution
- Coastal wetlands and habitat loss, isolation and fragmentation

Programs

- Shoreline Brownfield Redevelopment Authority
- Navigational dredging
- Great Lakes Legacy Act and Clean Michigan Initiative
- Superfund
- Non-point Source
- USACE
- US Fish and Wildlife Service - Coastal Program

Clean-up Actions

- Wastewater treatment upgraded
- Some tributary remedial actions underway
- Removal of about 90,000 cubic yards of contaminated sediment in Ruddiman Creek

Delisting Targets

- Yes targets are set and approved by the Muskegon Lake Watershed Partnership and MDEQ for six (6) of the nine(9) BUIs: 1) Fish consumption advisories; 2) Beach Closings; 3) Degraded Benthos; 4) Restrictions on Dredging; 5) Degradation of Aesthetics; 6) Eutrophication/Undesireable Algae; ; Working on finalizing targets for Loss of Fish and Wildlife Habitat, Degradation of Populations, and Restrictions on Drinking Water

Key Activities Needed

- Contaminated Sediment Remediation
- Stream buffers for improved habitat and water quality
- More assessment for progress on attaining BUI targets
- TMDL Assessments for Muskegon Lake; Ruddiman Creek; Ryerson Creek; Bear Lake
- Habitat restoration along Muskegon Lake's south shoreline and adjacent mouths of tributaries and lower river mouth
- Coordination with RAP program for AOC delisting purposes

Challenges

- PCB disposal
- Local funding match for federal projects
- Base support for local coordination of AOC/PAC process

Next Steps

- Remediation of brownfields and sediments
- Sediment remediation in Muskegon Lake at the Division Street Outfall.
- Fish and Wildlife Habitat Restoration