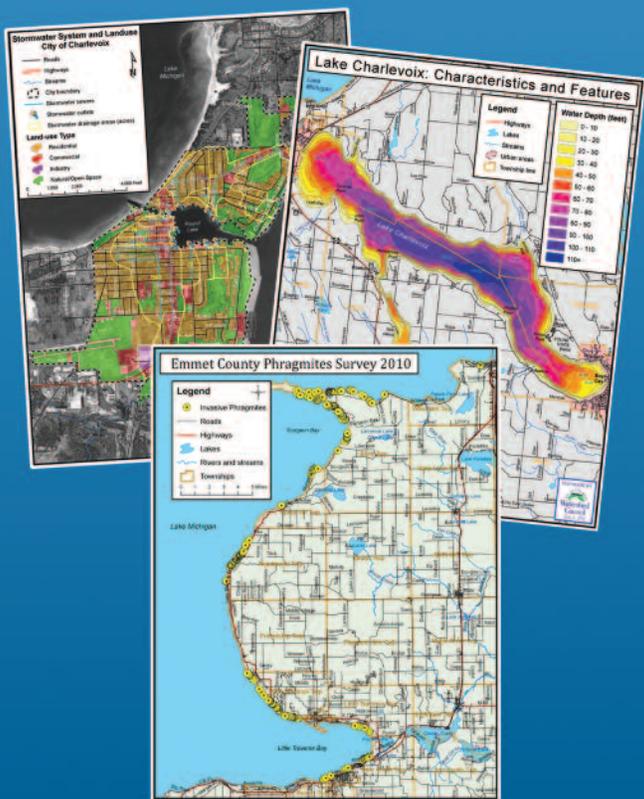


*We can print maps for entire water bodies to individual shorelines. Just tell us what you need.*

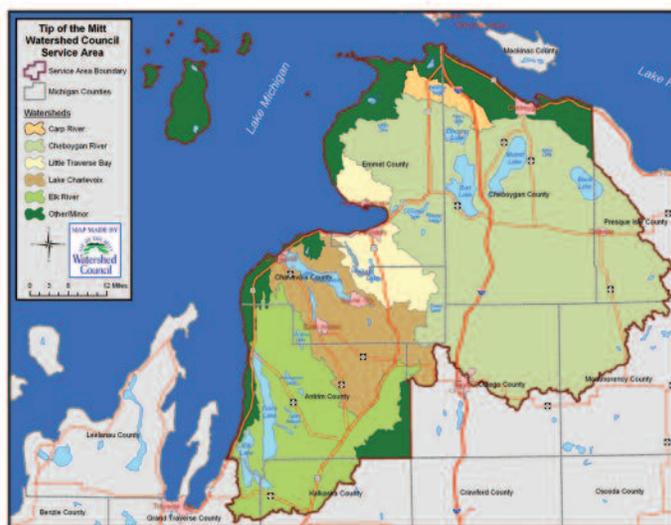


## MAPPING AND NATURAL RESOURCE INVENTORIES

We develop and print maps of lakes, streams, or other water features. Maps can be made for entire water bodies, individual shoreline properties, or specific areas. Any information available can be included on the map, such as lake-bottom contours or survey results.

We perform natural resource inventories at any scale (county to individual property) to assist local units of government, lake associations, and others with planning efforts. Data layers available for inventory maps include wetlands, lakes, streams, landuse, soils, water tables, contours, roads, water quality data, contaminated areas, zoning information, and more.

To address specific water resource problems or questions, we perform spatial analyses using geographical data. Examples of analyses include examining landuse change over time and prioritizing land conservation for water quality protection.



Tip of the Mitt Watershed Council speaks for Northern Michigan's waters. We are dedicated to protecting our lakes, streams, wetlands, and ground water through respected advocacy, innovative education, technically sound water quality monitoring, thorough research and restoration actions. We achieve our mission by empowering others and we believe in the capacity to make a positive difference. We work locally, regionally and throughout the Great Lakes Basin to achieve our goals. Water resources in our service area include:

- More than 2,500 miles of rivers and streams
- Multiple blue-ribbon trout streams
- 14 lakes are larger than 1,000 acres
- 250 lakes that are larger than or equal to 10 acres
- 490 lakes that are larger than or equal to 1 acre and less than 10 acres (1 acre = 209' long by 209' wide)
- 1,050 lakes greater than or equal to 0.1 acres and less than 1 acre (.1 acres = 4356 sq. ft = 66' long x 66' wide)
- 339,000 acres of wetlands

For more information about our technical services program and rates, visit our website.

[www.watershedcouncil.org/services](http://www.watershedcouncil.org/services)

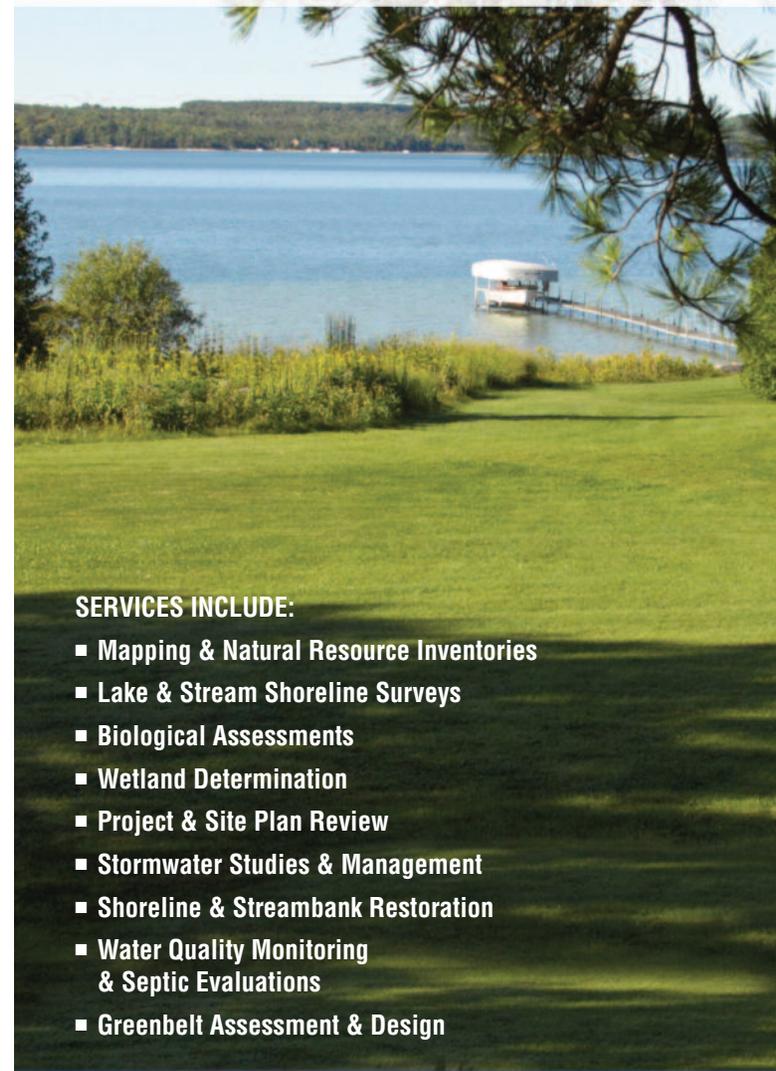


426 Bay Street ~ Petoskey, MI 49770  
phone (231) 347-1181 ~ fax (231) 347-5928

[www.watershedcouncil.org](http://www.watershedcouncil.org)

TIP OF THE MITT WATERSHED COUNCIL

# TECHNICAL SERVICES PROGRAM



## SERVICES INCLUDE:

- Mapping & Natural Resource Inventories
- Lake & Stream Shoreline Surveys
- Biological Assessments
- Wetland Determination
- Project & Site Plan Review
- Stormwater Studies & Management
- Shoreline & Streambank Restoration
- Water Quality Monitoring & Septic Evaluations
- Greenbelt Assessment & Design



Our mission is to protect lakes, streams, wetlands, and groundwater.



### LAKE AND STREAM SHORELINE SURVEYS

Our staff conduct surveys on lakes and streams to document and assess shoreline conditions that have the potential to impact water quality and ecosystem health. These surveys are typically performed for lake associations to provide a lake-wide assessment of the shoreline. Every property is surveyed for nutrient pollution, erosion, greenbelts, altered shorelines, and other relevant factors. Survey information is used to work with individual property owners to address any problems on the shoreline. Information about individual properties is kept confidential.

### BIOLOGICAL ASSESSMENTS

#### Aquatic Plant Surveys

We perform detailed aquatic plant surveys and assist with development of aquatic plant management plans for lake associations and others, using survey results. These surveys are typically done lake-wide and provide information about invasive species, aquatic plant diversity, and fish habitat.

#### Macroinvertebrate Surveys

Our staff assess stream health by conducting aquatic macroinvertebrate surveys. Surveys provide baseline data and can detect changes from suspected pollution sources, such as sewage, stormwater, or hydraulic fracturing operations.

### WETLAND DETERMINATION

We perform wetland determinations to assess if a site includes the hydrology, soils, and vegetation associated with wetlands. A determination does not establish a wetland's legal boundary.

### PROJECT AND SITE PLAN REVIEW

We offer recommendations on site development concepts and plans to better preserve water quality through stormwater management, invasive species control, habitat enhancement, and shoreline, streambank, and wetland protection.

### STORMWATER STUDIES AND MANAGEMENT

We work with municipalities to assess impacts of stormwater runoff on local water resources through inventories and mapping of stormwater drainage areas, inlets, outfalls, and treatment structures in urban areas. We classify landuse types and map impervious surfaces within drainage areas to estimate pollutant loadings to local lakes and streams.

Following surveys and assessments of the stormwater area, we develop comprehensive stormwater management plans. These plans are used to guide municipalities, associations, and others in efforts to reduce or eliminate stormwater impacts to lakes, streams, wetlands, and groundwater.

We provide recommendations on the type and design of residential, commercial, and municipal stormwater best management practices (BMPs) including rain gardens, stormwater wetlands, pervious pavements, filter strips, and other surface runoff treatment methods.

### SHORELINE AND STREAMBANK RESTORATION

We assess shoreline and streambank erosion conditions on residential, commercial, and public sites, and provide recommendations on riparian management and erosion control measures. Staff develop bioengineering plans to restore eroding shorelines and streambanks, and apply for required permits for project implementation. Bioengineering techniques utilize natural materials including plantings, coconut bio-logs, and fieldstone to stabilize erosion and restore function to shorelines and streambanks.

We assist with project implementation by coordinating with contractors before and during installation.



### WATER QUALITY MONITORING AND SEPTIC EVALUATIONS

#### Lake & Stream Monitoring

Our staff monitor lake and stream water quality to assess impacts from development, agriculture, stormwater, discharge pipes, or other pollutant sources. Monitoring can include physical (e.g., oxygen and pH), chemical (e.g., nutrients and metals), or biological parameters (e.g., bacteria).

We assess the impacts of rivers and streams on lake water quality by concurrently monitoring all or select tributaries flowing into a water body. Water quality data is used to determine pollutant loadings from individual streams, and watersheds are assessed to identify pollutant sources.

We monitor stormwater runoff in urban areas to gauge impacts on nearby lakes and streams. Physical and chemical water quality is monitored at stormwater outfalls to detect dangerously high levels of contaminants, determine pollutant loadings, and more.

#### Septic Evaluations

We perform septic evaluations on shoreline properties. Groundwater monitoring along the shoreline and dye tracers are used to determine if septic leachate is contaminating the lake or stream.

### GREENBELT ASSESSMENT AND DESIGN

We assess existing greenbelt conditions and develop greenbelt designs for residential, commercial, and public shoreline properties. Designs include native grasses, perennials, shrubs, trees and ground covers, and accommodate recreational needs such as docks, walkways, seating areas, etc.

We coordinate greenbelt installations with a native plant landscaping company. Planting plans include species name, quantity, size, and other pertinent specifications, as well as recommendations for soil enhancements, invasive species management, and other site improvements.

**Are you a Member?** Tip of the Mitt Watershed Council members receive a 10% discount on select contract services. ~ Contact us today 231.347.1181