



East Twin River Watershed (TK02)

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A Watershed Report created by the Bureau of Water Quality in support of the Clean Water Act.

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# East Twin River WatershedWatershed Details

## About the Watershed

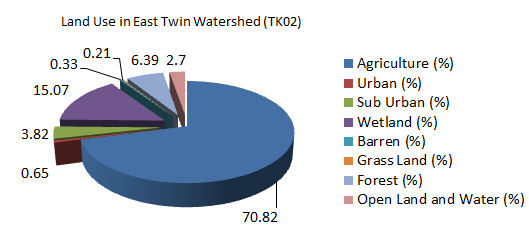
The East Twin River Watershed is bordered on the east by Lake Michigan in Kewaunee and Manitowoccounties and is 117,493 acres in size. The watershed contains 314 miles of streams and river, 12,446 acres of lakes and 14,181 acres of wetlands. The watershed is dominated by agriculture (75%) and wetlands (12%) and is ranked high for nonpoint source issues affecting streams, lakes and groundwater.

Streams in the East Twin Watershed flow south-eastward through southern Kewaunee County and northern Manitowoc County to the City of Two Rivers were it enters Lake Michigan. The 101,196 acre watershed is split nearly evenly between Kewaunee and Manitowoc Counties with 42,932 acres (42.5%) in Kewaunee County and 58,264 acres (57.5%) in Manitowoc County (WCD 1966 and 1968).

## Population and Land Use

East Twin River is located in the East Twin River watershed which is 183.58 mi². Land use in the watershed is primarily agricultural (70.82%), wetland (15.07%) and a mix of forest (6.39%) and other uses (7.71%). This watershed has 314.70 stream miles, 12,446.75 lake acres and 14,181.41 wetland acres (2011 data).

Figure 1 Watershed Location

Table 1 East Twin Watershed (TK02)

|  |  |
| --- | --- |
| Land Use Type | Percent |
| Agriculture (%) | 70.82 |
| Urban (%) | 0.65 |
| Sub Urban (%) | 3.82 |
| Wetland (%) | 15.07 |
| Barren (%) | 0.33 |
| Grass Land (%) | 0.21 |
| Forest (%) | 6.39 |
| Open Land and Water (%) | 2.7 |

## Hydrology

Figure 2 Watershed Location

Lake Michigan is a key ecological and socioeconomic feature. It influences the climate, created unique landforms, and is responsible in part for the presence and distribution of rare species. The shoreline constitutes a major flyway for migratory birds. Most of the major cities in this Ecological Landscape are located at the mouths of rivers entering Lake Michigan or Green Bay. Inland lakes are scarce, and all are small. The Fox River drains Lake Winnebago and runs into Green Bay. The other major rivers here run

|  |  |
| --- | --- |
| Watershed Code | TK02 |
| Watershed Name | East Twin River |
| Watershed Size (Acres) | 117493.03 |
| Watershed Size (SQ Miles) | 183.58 |
| 24K Hydro Stream Miles | 314.7 |
| 24K Hydro Lake Acres | 12446.75 |
| WI Wetland Inventory Acres | 14181.41 |

directly into Lake Michigan, and include the Ahnapee, Kewaunee, East Twin, West Twin, Manitowoc, Sheboygan, and Milwaukee.

## Ecological Landscapes

The East Twin River Watershed lies within the Central Lake Michigan Coastal Ecological Landscape which stretches from southern Door County west across Green Bay to the Wolf River drainage, then southward in a narrowing strip along the Lake Michigan shore to central Milwaukee County. Owing to the influence of Lake Michigan in the eastern part of this landscape, summers there are cooler, winters warmer, and precipitation levels greater than at locations farther inland. Dolomites and shales underlie the glacial deposits that blanket virtually all of the Central Lake Michigan Coastal Ecological Landscape. The dolomite Niagara Escarpment is the major bedrock feature, running across the entire landscape from northeast to southwest. Series of dolomite cliffs provide critical habitat for rare terrestrial snails, bats, and specialized plants. The primary glacial landforms are ground moraine, outwash, and lakeplain. The topography is generally rolling where the surface is underlain by ground moraine, variable over areas of outwash, and nearly level where lacustrine deposits are present. Important soils include clays, loams, sands, and gravels. Certain landforms, such as sand spits, clay bluffs, beach and dune complexes, and ridge and swale systems, are associated only with the shorelines of Lake Michigan and Green Bay.

Figure 3 Ecological Landscapes

Historically, most of this landscape was vegetated with mesic hardwood forest composed primarily of sugar maple, basswood, and beech. Hemlock and white pine were locally important, but hemlock was generally restricted to cool moist sites near Lake Michigan. Areas of poorly drained glacial lakeplain supported wet forests of tamarack, white cedar, black ash, red maple, and elm, while the Wolf and Embarrass Rivers flowed through extensive floodplain forests of silver maple, green ash, and swamp white oak. Emergent marshes and wet meadows were common in and adjacent to lower Green Bay, while Lake Michigan shoreline areas featured beaches, dunes, interdunal wetlands, marshes, and highly diverse ridge and swale vegetation. Small patches of prairie and oak savanna were present in the southwestern portion of this landscape

## Historical Note

In 1795, French-Canadian Jacques Vieux, the first European to settle in the area, established a fur trading post northwest of present day Mishicot, in the current East Twin River watershed. The early settlers of Mishicot came from many countries, including Germany, Bohemia, Switzerland and Canada. A sawmill was erected in 1844 by Daniel Smith and Mishicot, Wisconsin was born. Daniel Smith named the village after his friend, Chief Mishicott, as a sign of his respect for the leader of the area Potawatomi community. The major component of the local economy has always been agriculture. While many dairy farms dot the countryside surrounding the village, the area's farmers produce much more, including grains, vegetables, meats, and wool. Also of note is that many of the farms in the Mishicot area have been run by the same families for more than a century.

# Watershed Condition

## Overall Condition

Twenty-six of one hundred seventy three streams in the watershed have been monitored in the last ten years. Of these waters, the mouth of the East Twin River is considered in “good” condition for Fish and Aquatic Life, while the upstream portions are documented as “poor”. Overall only a fraction of the waters are actually assessed, nearly 75% of stream miles “not assessed”. For lakes, approximately 40% are not assessed with the remainder assessed though a mixture of satellite data and water quality sampling. This these condition evaluations are based on assessment data updated in the integrated reporting process.

## River and Stream Condition

The chart at right shows that of rivers assessed, 11% are not supporting fish and aquatic life, while 15% are supporting and the remaining 74% are not assessed. With DNR’s proclivity to monitor impaired waters or waters known to have problems, this distribution of data is skewed toward identifying the problem waters.

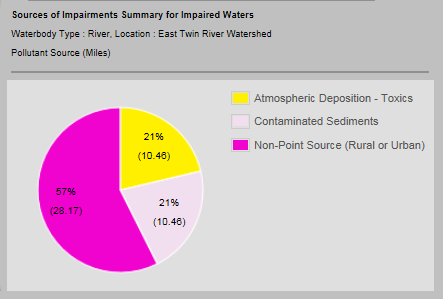
The problems encountered with the assessed waters stem from nonpoint source pollution and atmospheric deposition of toxins as well as in stream deposits of contaminated sediments. Figure at right indicates runoff problems nonpoint source pollutants are the source of 57% of the impairment problems for streams.

Figure 4 River Assessment Results

Streams in the East Twin Watershed flow southeastward through southern Kewaunee County and northern Manitowoc County to the City of Two Rivers were it enters Lake Michigan. The 101,196 acre watershed is split nearly evenly between Kewaunee and Manitowoc Counties with 42,932 acres (42.5%) in Kewaunee County and 58,264 acres (57.5%) in Manitowoc County.  
  
Streams within the watershed range from those that are intermittent to perennial named streams. Classifications of these streams are also widely variable with multiple classifications found on some streams. Of the 98.9 stream miles in the basin, 67.9 miles have had their biological use classified. In this watershed 12.5 miles of stream are classified as trout waters, 26.9 miles are classed as warm water sport fisheries, 13.6 miles as warm water forage fisheries, 9.9 miles as limited forage fisheries and 5 miles of limited aquatic life.   
  
Fisheries in the East Twin River Watershed (TK02)

Figure 5 River Impairment Sources

Fish surveys have been conducted infrequently on the East Twin River, but those studies have found a wide variety of gamefish which range from trout in upper reaches, to smallmouth bass and northern pike in middle reaches to Lake Michigan species in the areas nearest to the lake.  
  
Results from surveys indicate that although Hilsenhoff (HBI) and fish IBI ratings have changed little since earlier surveys, it appears *that native warm water gamefish species are nearly absent or low in abundance in many surveyed sections*. The absence of gamefish from upper sections of the watershed may be due *to low flow conditions or habitat loss, in middle sections due to deep pool loss and in lower sections due to low dissolved oxygen.*  
Brook trout populations in Tisch Mills Creek have dramatically increased since earlier surveys while those in the East Twin River remain stable and those in Krok Creek have declined. Increases are mostly likely due to improved water quality, while declines most likely are due to changes in flow patterns.   
  
Water temperatures within the watershed are generally good as indicated by dissolved oxygen levels greater than 5 PPM and cool temperatures. However, water quality in the East Twin River below the dam in Mishicot appears to be impaired with high stream temperatures and dissolved oxygen levels below 5 PPM.   
  
Streams within this system are well buffered and feature a variety of large-scale and small-scale habitats for aquatic organisms. Large gamefish habitat however is limited. It is recommended that resource managers use the results from fish surveys to design protection or enhancement strategies for each stream and then enact these strategies with the assistance of local partners. These strategies should use stream bank protection programs (CRP, CREP) to maximize stream bank protection.

## Lake Health

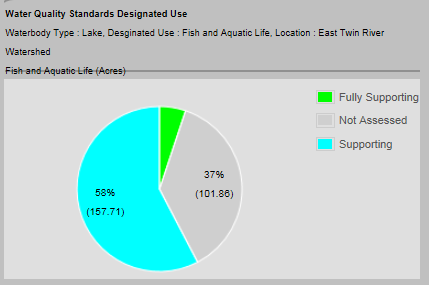
Over 12,446.75 lake acres are documented in the Watershed; of these lakes 37 percent are not yet assessed. However, many of these lakes are considered oligotrophic or mesotrophic, with good water clarity and few sources of runoff or pollutants. These waters do not count the bays, harbors or Lake Michigan, all of which are located downstream and are considered degraded or polluted. The largest portion of waters, 63% are supporting aquatic life use. Within the East Twin River watershed, there are three lakes that have 108 surface acres of water and twenty-two streams with a total of 98.9 miles of water. The three lakes, Engledinger, Heidmann and Shea are impacted by surrounding use. Elevated phosphorus levels in the lakes have resulted in the classification of mesotrophic for Heidmann Lake, with the other two lakes classified as eutrophic (WDNR 1995). Historical records indicate each lake has had winterkill problems, but none recently. The exact status of the fish community in each lake is unknown, but records indicate they are lakes with a largemouth bass-northern pike-bluegill mixture.

Figure 6 Lake Assessment Results

## Beach Health

In this watershed, over 56% of the 3.3 miles of beach are fully supporting recreational uses; 34% of Great Lakes Beach miles listed as impaired.

## Wetland Health

Based on Wisconsin’s wetlands inventory, 14,181.41 acres are located in the watershed.

## Groundwater

**Potential Sources of Contamination**Agricultural activities in the watershed combined with the groundwater/ surface water vulnerability associated with the karst topography is presents tremendous risk for surface and groundwater contamination.

Figure 7 Great Lakes Beach Assessments

## Point and Nonpoint Pollution

A runoff event in 2006 where a pump failed on a manure storage facility 1500 - 2000 gallons discharged to ground. This event occurred in Kewaunee County, T. of Montpelier. In 2005 winter applied manure from two separate fields ran off into unnamed tributaries to Lake Michigan. In addition to these discrete events, the overall vulnerability of groundwater and surface water to the predominantly agricultural land use is of concern.

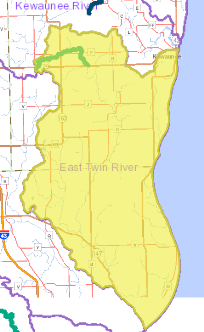
Figure 8 Fish Kill Events

# Waters of Note

## Trout Waters

Class I trout streams are high quality trout waters that have sufficient natural reproduction to sustain populations of wild trout, at or near carry capacity. Consequently, streams in this category require no stocking of hatchery trout. These streams or stream sections are often small and may contain small or slow-growing trout, especially in the headwaters. Class II trout streams may have some natural reproduction, but not enough to utilize available food and space. Therefore, stocking is required to maintain a desirable sport fishery. These streams have good survival and carryover of adult trout, often producing some fish larger than average size. Class III trout streams are marginal trout habitat with no natural reproduction occurring. They require annual stocking of trout to provide trout fishing. Generally, there is no carryover of trout from one year to the next. Four segments of streams/rivers are either class I or II trout waters.

Figure 9 Trout Waters



|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Official Name** | **Trout Class** | **Segment Start and End Mile** | | **Trout Segment Length (miles)** |
| Jambo Creek | CLASS II | 0 | 3.91 | 3.91 |
| *Tisch Mills Creek* | *CLASS II* | *0.01* | *2.26* | *2.25* |
| *East Twin River* | *CLASS II* | *26.4* | *34.18* | *7.78* |
| East Twin River | CLASS I | 34.18 | 40.91 | 6.73 |

## <http://dnr.wi.gov/fish/species/trout/streamclassification.html>

## Outstanding and Exceptional Resource Waters

The East Twin River is listed as exceptional resource water from mile 34.18 to 49.90 for 6.73 miles.

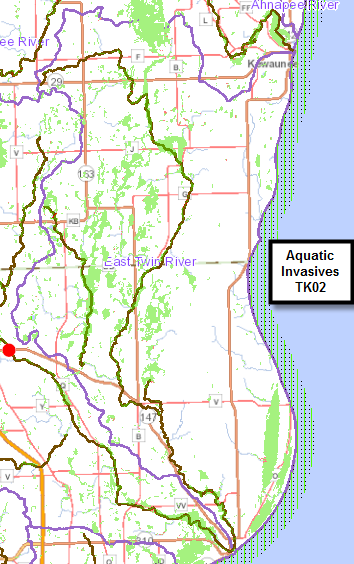
## Impaired Waters

* *Krock Creek* is listed as impaired due to a degraded biological community from excess total phosphorus.
* **East Twin River** is listed for Contaminated Fish Tissue from PCBs, Mercury.
* **Molash Creek** is listed for Total Phosphorus from nonpoint source pollution (runoff analysis).
* **Lake Michigan Shoreline** listed for PCBs, Mercury affecting Contaminated Fish Tissue and contaminated fish tissue.

Figure 10 Outstanding & Exceptional Waters

## Fish Consumption

Wisconsin’s fish consumption advisory is based on the work of public health, water quality, and fisheries experts from eight Great Lakes states. Based on the best available scientific evidence, these scientists determined how much fish is safe to eat over a lifetime based on the amount of contaminants found in the fish and how those contaminants affect human health. Advisories are based on concentrations of the following contaminants along with angler habits, fishing regulations, and other factors.

Studies indicate the people exposed to PCBs are at greater risk for a variety of health problems. Infants and children of women who have eaten a lot of contaminated fish may have lower birth weights and be delayed in physical development and learning. PCBs may affect reproductive function and the immune system and are also associated with cancer risk. Once eaten, PCBs are stored in body fat for many years. Each time you ingest PCBs the total amount of PCB in your body increases (Lowndes & Helmuth. Proposed Guidance for the Classification, Assessment, & Management of Wisconsin Surface Waters, March 12, 2007).

## Aquatic Invasive Species

Aquatic invasive species in the watershed include:

* Rusty Crayfish
* Reed Canary Grass

## Species of Special Concern

State’s Natural Heritage Inventory (NHI) at <http://dnr.wi.gov/topic/nhi/>.

The following animals and natural communities are located in the vicinity of the East Twin River Watershed (TK02).

Figure 11 Aquatic Invasives

| [**Scientific Name**](http://dnr.wi.gov/topic/NHI/Data.asp?tool=county&mode=detail&county=31&sort=scientific&order=asc) | **Common Name** | [**WI Status**](http://dnr.wi.gov/topic/NHI/Data.asp?tool=county&mode=detail&county=31&sort=state&order=asc) | | [**Group**](http://dnr.wi.gov/topic/NHI/Data.asp?tool=county&mode=detail&county=31&sort=category&order=desc) |
| --- | --- | --- | --- | --- |
| [Hendersonia occulta](http://dnr.wi.gov/topic/EndangeredResources/Animals.asp?mode=detail&SpecCode=IMGAS03010) | Cherrystone Drop | THR | | Rare Aquatic and Terrestrial Snails |
| [Vertigo elatior](http://dnr.wi.gov/topic/EndangeredResources/Animals.asp?mode=detail&SpecCode=IMGAS20140) | Tapered Vertigo | SC/N | |
| [Vertigo nylanderi](http://dnr.wi.gov/topic/EndangeredResources/Animals.asp?mode=detail&SpecCode=IMGAS20230) | Deep-throated Vertigo | SC/N | |
| [Strobilops affinis](http://dnr.wi.gov/topic/EndangeredResources/Animals.asp?mode=detail&SpecCode=IMGAS24020) | Eightfold Pinecone | SC/N | |
| [Paravitrea multidentata](http://dnr.wi.gov/topic/EndangeredResources/Animals.asp?mode=detail&SpecCode=IMGAS78210) | Dentate Supercoil | SC/N | |
| [Striatura exigua](http://dnr.wi.gov/topic/EndangeredResources/Animals.asp?mode=detail&SpecCode=IMGAS81010) | Ribbed Striate | SC/N | |
| [Vitrina angelicae](http://dnr.wi.gov/topic/EndangeredResources/Animals.asp?mode=detail&SpecCode=IMGAS86040) | Transparent Vitrine Snail | SC/N | |
| [Heterosternuta wickhami](http://dnr.wi.gov/topic/EndangeredResources/Animals.asp?mode=detail&SpecCode=IICOL55170) | A Predaceous Diving Beetle | SC/N | | Rare Beetles |
| [Ixobrychus exilis](http://dnr.wi.gov/topic/EndangeredResources/Animals.asp?mode=detail&SpecCode=ABNGA02010) | Least Bittern | SC/M | | Rare Birds |
| [Nycticorax nycticorax](http://dnr.wi.gov/topic/EndangeredResources/Animals.asp?mode=detail&SpecCode=ABNGA11010) | Black-crowned Night-Heron | SC/M | |
| [Falco peregrinus](http://dnr.wi.gov/topic/EndangeredResources/Animals.asp?mode=detail&SpecCode=ABNKD06070) | Peregrine Falcon | END | |
| [Bartramia longicauda](http://dnr.wi.gov/topic/EndangeredResources/Animals.asp?mode=detail&SpecCode=ABNNF06010) | Upland Sandpiper | THR | |
| [Phalaropus tricolor](http://dnr.wi.gov/topic/EndangeredResources/Animals.asp?mode=detail&SpecCode=ABNNF20010) | Wilson's Phalarope | SC/M | |
| [Hydroprogne caspia](http://dnr.wi.gov/topic/EndangeredResources/Animals.asp?mode=detail&SpecCode=ABNNM08020) | Caspian Tern | END | |
| [Chlidonias niger](http://dnr.wi.gov/topic/EndangeredResources/Animals.asp?mode=detail&SpecCode=ABNNM10020) | Black Tern | END | |
| [Tyto alba](http://dnr.wi.gov/topic/EndangeredResources/Animals.asp?mode=detail&SpecCode=ABNSA01010) | Barn Owl | SC/M | |
| [Sturnella neglecta](http://dnr.wi.gov/topic/EndangeredResources/Animals.asp?mode=detail&SpecCode=ABPBXB2030) | Western Meadowlark | SC/M | |
| [Xanthocephalus xanthocephalus](http://dnr.wi.gov/topic/EndangeredResources/Animals.asp?mode=detail&SpecCode=ABPBXB3010) | Yellow-headed Blackbird | SC/M | |
| [Somatochlora hineana](http://dnr.wi.gov/topic/EndangeredResources/Animals.asp?mode=detail&SpecCode=IIODO32110) | Hine's Emerald | END | | Rare Dragonflies and Damselflies |
| [Acipenser fulvescens](http://dnr.wi.gov/topic/EndangeredResources/Animals.asp?mode=detail&SpecCode=AFCAA01020) | Lake Sturgeon | SC/H | | Rare Fishes |
| [Notropis anogenus](http://dnr.wi.gov/topic/EndangeredResources/Animals.asp?mode=detail&SpecCode=AFCJB28080) | Pugnose Shiner | THR | |
| [Lepomis megalotis](http://dnr.wi.gov/topic/EndangeredResources/Animals.asp?mode=detail&SpecCode=AFCQB11080) | Longear Sunfish | THR | |
| [Erigenia bulbosa](http://dnr.wi.gov/topic/EndangeredResources/Plants.asp?mode=detail&SpecCode=PDAPI0Y010) | Harbinger-of-spring | END | | Rare Plants |
| [Jeffersonia diphylla](http://dnr.wi.gov/topic/EndangeredResources/Plants.asp?mode=detail&SpecCode=PDBER05010) | Twinleaf | SC | |
| [Cakile lacustris](http://dnr.wi.gov/topic/EndangeredResources/Plants.asp?mode=detail&SpecCode=PDBRA0F025) | American Sea-rocket | SC | |
| [Chamaesyce polygonifolia](http://dnr.wi.gov/topic/EndangeredResources/Plants.asp?mode=detail&SpecCode=PDEUP0D1Z0) | Seaside Spurge | SC | |
| [Viola rostrata](http://dnr.wi.gov/topic/EndangeredResources/Plants.asp?mode=detail&SpecCode=PDVIO041X0) | Long-spurred Violet | SC | |
| [Calamagrostis stricta](http://dnr.wi.gov/topic/EndangeredResources/Plants.asp?mode=detail&SpecCode=PMPOA17170) | Slim-stem Small Reed Grass | SC | |
| [Calamovilfa longifolia var. magna](http://dnr.wi.gov/topic/EndangeredResources/Plants.asp?mode=detail&SpecCode=PMPOA18052) | Sand Reedgrass | THR | |
| [Polystichum acrostichoides](http://dnr.wi.gov/topic/EndangeredResources/Plants.asp?mode=detail&SpecCode=PPDRY0R010) | Christmas Fern | SC | |
| [Lake--deep, hard, seepage](http://dnr.wi.gov/topic/EndangeredResources/Communities.asp?mode=detail&Code=CLSEE342WI) | Lake--Deep, Hard, Seepage | NA | | Lakes |
| [Migratory Bird Concentration Site](http://dnr.wi.gov/topic/EndangeredResources/OtherElements.asp?mode=detail&SpecCode=OMIGLANDC1) | Migratory Bird Concentration Site | SC | | Miscellaneous Elements |
| [Shrub-carr](http://dnr.wi.gov/topic/EndangeredResources/Communities.asp?mode=detail&Code=CPSHR050WI) | Shrub-carr | NA | | Shrub Communities |
| [Alder thicket](http://dnr.wi.gov/topic/EndangeredResources/Communities.asp?mode=detail&Code=CPSHR052WI) | Alder Thicket | NA | |
| [Open bog](http://dnr.wi.gov/topic/EndangeredResources/Communities.asp?mode=detail&Code=CPSHR054WI) | Open Bog | NA | |
| [Northern mesic forest](http://dnr.wi.gov/topic/EndangeredResources/Communities.asp?mode=detail&Code=CTFOR034WI) | Northern Mesic Forest | NA | | Upland Forests |
| [Floodplain forest](http://dnr.wi.gov/topic/EndangeredResources/Communities.asp?mode=detail&Code=CPFOR024WI) | Floodplain Forest | NA | | Wetland Forests |
| [Northern wet-mesic forest](http://dnr.wi.gov/topic/EndangeredResources/Communities.asp?mode=detail&Code=CPFOR036WI) | Northern Wet-mesic Forest | NA | |
| [Northern wet forest](http://dnr.wi.gov/topic/EndangeredResources/Communities.asp?mode=detail&Code=CPFOR038WI) | Northern Wet Forest | NA | |
| [Hardwood swamp](http://dnr.wi.gov/topic/EndangeredResources/Communities.asp?mode=detail&Code=CPFOR039WI) | Hardwood Swamp | NA | |
| [Emergent marsh](http://dnr.wi.gov/topic/EndangeredResources/Communities.asp?mode=detail&Code=CPHER056WI) | Emergent Marsh | NA | | Wetland Herbaceous Communities |
| [Northern sedge meadow](http://dnr.wi.gov/topic/EndangeredResources/Communities.asp?mode=detail&Code=CPHER060WI) | Northern Sedge Meadow | | NA |

## 

## State Natural and Wildlife Areas

* [Point Beach Ridges](https://www.google.com/search?q=point+beach+ridges+state+natural+area&biw=1099&bih=739&tbm=isch&imgil=hOYbtlOLFJjZQM%253A%253BylAylGletS8ltM%253Bhttp%25253A%25252F%25252Fdnr.wi.gov%25252Ftopic%25252FLands%25252Fnaturalareas%25252Findex.asp%25253FSNA%2525253D87&source=iu&pf=m&fir=hOYbtlOLFJjZQM%253A%252CylAylGletS8ltM%252C_&usg=__LO6jo2-Rps3RCBTj5A3l7V-L7kY%3D&ved=0CEMQyjc&ei=vh0SVYjMN4iGyQT11YFY#imgdii=hOYbtlOLFJjZQM%3A%3Bw32_w6o_jyZYpM%3BhOYbtlOLFJjZQM%3A&imgrc=hOYbtlOLFJjZQM%253A%3BylAylGletS8ltM%3Bhttp%253A%252F%252Fdnr.wi.gov%252Ftopic%252Flands%252Fnaturalareas%252Fimages%252F087_pointbeachridges.jpg%3Bhttp%253A%252F%252Fdnr.wi.gov%252Ftopic)
* [Nippissing Swamp](https://www.google.com/search?q=Nippissing+Swamp+Wisconsin&biw=1099&bih=739&source=lnms&sa=X&ei=eCcSVdPVIISqyQT_rYDoAQ&ved=0CAUQ_AUoAA&dpr=1)
  + [Flicker Site](https://www.flickr.com/groups/1153996@N22/discuss/72157634890477128/)
* Two Creeks Buried Forest

**Point Beach Ridges**

Point Beach Ridges is a 558-acre (226 ha) topography of alternating [ridges](https://en.wikipedia.org/wiki/Ridges) and [swales](https://en.wikipedia.org/wiki/Swale_(landform)) in [Manitowoc County, Wisconsin](https://en.wikipedia.org/wiki/Manitowoc_County,_Wisconsin).[[1]](https://en.wikipedia.org/wiki/Point_Beach_Ridges#cite_note-1) The area is located within [Point Beach State Forest](https://en.wikipedia.org/wiki/Point_Beach_State_Forest).[[2]](https://en.wikipedia.org/wiki/Point_Beach_Ridges#cite_note-2) It was designated a [Wisconsin State Natural Area](https://en.wikipedia.org/wiki/Wisconsin_State_Natural_Areas_Program) in 1971 and a [National Natural Landmark](https://en.wikipedia.org/wiki/National_Natural_Landmark) in 1980. Consisting of alternating ridges and swales, Point Beach Ridges was formed by previous water levels of Lake Michigan. The site exhibits a range of successional vegetation states.

Figure 12 State Natural Areas



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Point Beach Ridges State Natural Area

**Nippissing Swamp**

Despite its #24, Nipissing Swamp is actually a relatively new SNA. It is located within the boundaries of Point Beach State Forest. It is almost directly across the highway from the SNA it replaced at #24, Wilderness Ridge. I asked the DNR about why Wilderness Ridge was delisted but haven't heard back yet. (Side note: a similar thing happened with #35 which used to be Ripon Prairie and is now Muehl Springs).

**Two Creeks Buried Forest**

[Joshua Mayer](https://www.flickr.com/photos/wackybadger/) [By: Joshua Mayer](https://www.flickr.com/photos/wackybadger/)

Wisconsin State Natural Area [#49](https://www.flickr.com/photos/tags/49)

**Figure 13 Point Beach Ridges**



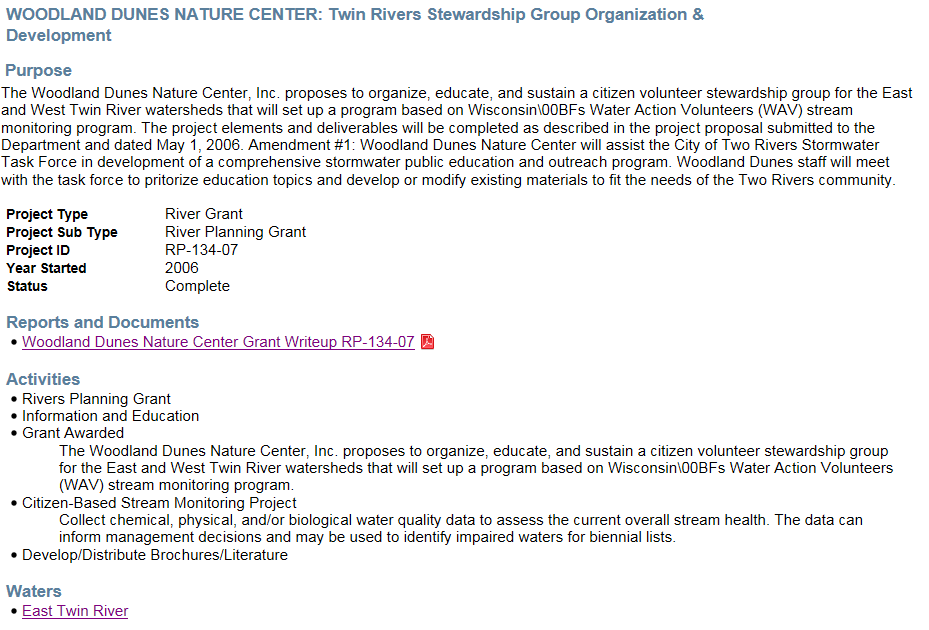
Description of the area….

Figure 14 Two Creeks Buried **Forest**

# Watershed Actions

Click on the list of projects below to learn more about the DNR funded activities in this watershed.

| [Project Name](javascript:__doPostBack('ctl00$cphMain$ctl12$ctl00$plan_name','')) (Click for Details) | [Year Awarded](javascript:__doPostBack('ctl00$cphMain$ctl12$ctl00$start_date','')) |
| --- | --- |
| [Aquatic Invasives County Coordinator - Kewaunee County](http://dnr.wi.gov/water/projectDetail.aspx?key=41879245) (proposed) | 2011 |
| [Aquatic Invasives County Coordinator - Manitowoc County](http://dnr.wi.gov/water/projectDetail.aspx?key=41879255) | 2011 |
| [KEWAUNEE COUNTY: Dairy Manure Storage](http://dnr.wi.gov/water/projectDetail.aspx?key=77692542) | 2011 |
| [KEWAUNEE COUNTY: Farm Manure Storage](http://dnr.wi.gov/water/projectDetail.aspx?key=77692545) | 2011 |
| [MANITOWOC COUNTY: Manitowoc County Shoreland Zoning](http://dnr.wi.gov/water/projectDetail.aspx?key=48987763) | 2011 |
| [GLACIERLAND RC&D, INC.: Glacierland RCD Tri-County Clean Boats Project](http://dnr.wi.gov/water/projectDetail.aspx?key=33539250) | 2010 |
| [KEWAUNEE COUNTY: Kewaunee County Shoreland Ordinance Revision Project](http://dnr.wi.gov/water/projectDetail.aspx?key=36804647) | 2010 |
| [MANITOWOC COUNTY LAKES ASSN: Manitowoc County AIS Educ, Prevention & Control](http://dnr.wi.gov/water/projectDetail.aspx?key=34799785) | 2010 |
| [MANITOWOC COUNTY: Manitowoc County Shoreland Ordinance Revision Project](http://dnr.wi.gov/water/projectDetail.aspx?key=36812475) | 2010 |
| [MANITOWOC COUNTY LAKES ASSN: Harpt's Lake Mgmt Planning Project Ph 1](http://dnr.wi.gov/water/projectDetail.aspx?key=29281106) | 2009 |
| [MANITOWOC COUNTY LAKES ASSN: Harpt's Lake Mgmt Planning Project Ph 2](http://dnr.wi.gov/water/projectDetail.aspx?key=29281103) | 2009 |
| [Waterbody use designation for the Unnamed Tributary to the East Twin River NER\_03\_10](http://dnr.wi.gov/water/projectDetail.aspx?key=29123072) | 2009 |
| [East Twin River at Paddlers Park](http://dnr.wi.gov/water/projectDetail.aspx?key=23068826) | 2008 |
| [KEWAUNEE COUNTY: Manure Storage](http://dnr.wi.gov/water/projectDetail.aspx?key=22433349) | 2008 |
| [KEWAUNEE COUNTY: Brothers Manure Storage](http://dnr.wi.gov/water/projectDetail.aspx?key=21928488) | 2008 |
| [MANITOWOC COUNTY LAKES ASSN: Manitowoc County "Stop the Hitchhikers" Campaign](http://dnr.wi.gov/water/projectDetail.aspx?key=26877356) | 2008 |
| [MANITOWOC COUNTY LAKES ASSN: Manitowoc Cty AIS Education & Planning Project](http://dnr.wi.gov/water/projectDetail.aspx?key=23055679) | 2008 |
| [LAKESHORE NATURAL RESOURCES PARTNERSHIP INC.: Lakeshore River Partnership Initiative](http://dnr.wi.gov/water/projectDetail.aspx?key=18917857) | 2007 |
| [MANITOWOC COUNTY: Manitowoc County "Beetle Mania" Education, Control & Research Project](http://dnr.wi.gov/water/projectDetail.aspx?key=16218768) | 2007 |
| [WOODLAND DUNES NATURE CENTER: Twin Rivers Stewardship Organization & Development](http://dnr.wi.gov/water/projectDetail.aspx?key=11561363) | 2006 |
| [KEWAUNEE COUNTY LCD: Wakker Farm Project](http://dnr.wi.gov/water/projectDetail.aspx?key=10101368) | 2005 |
| [KEWAUNEE COUNTY: Hall Manure Storage System](http://dnr.wi.gov/water/projectDetail.aspx?key=10101145) | 2005 |
| [MANITOWOC COUNTY LAKES ASSN: Manitowoc Cnty Shoreland Restoration Demonstration](http://dnr.wi.gov/water/projectDetail.aspx?key=10100236) | 2001 |
| [KEWAUNEE COUNTY: Kewaunee County lakes Protection Ordinance Project](http://dnr.wi.gov/water/projectDetail.aspx?key=10099505) | 1998 |
| [MANITOWOC COUNTY: Manitowoc County-wide Lake Evaluation & Class Study](http://dnr.wi.gov/water/projectDetail.aspx?key=10099547) | 1998 |
| [MANITOWOC COUNTY: Manitowoc County Lake Watershed Management Planning](http://dnr.wi.gov/water/projectDetail.aspx?key=10099544) | 1996 |

Project Spotlight



To the left Is a screen shot of the Woodland Dunes Nature Center website where Citizen Science and the stream volunteers are highlighted.

## Monitoring Projects

### [AIS Bridge Snapshot Day 2014](javascript:showPlan(104569110))

The River Alliance in partnership with more than two dozen local AIS coordinators and partners around the state are hosting a statewide AIS Bridge Snapshot Day on September 13, 2014. The River Alliance and the Wisconsin DNR, and local AIS coordinators are working to ensure that our volunteers' data compliments the new efforts of WDNR watershed biologist staff to monitor for AIS in rivers. On a single day volunteers were trained on invasive species monitoring, then sent to priority bridge crossings, and monitored prohibited and restricted NR 40 invasive species. The volunteers reconvened to submit their findings.

### New Zealand Mudsnail 2013

[Response monitoring for New Zealand Mudsnail. In October 2013, 1,080 New Zealand mudsnails (Potamopyrus antipodarum) were identified in benthic samples collected from a site near South Valley Road on Black Earth Creek west of the town of Black Earth in October 2012. In response to this discovery, benthic samples taken from the same site in December 2011/January 2012 were reexamined and identified 83 New Zealand mudsnails.   
  
New Zealand mudsnails are a non-native invasive species that could have negative impact on trout, but we are not sure what to expect. They primarily graze on algae and can displace the native benthic community, reducing food for fish. Mudsnails provide little nutrition to fish and western states have reported reduced body condition and abundance of trout. New Zealand mudsnails are very small (no more than 4-6 mm) and reproduce asexually. Each adult is born with about 230 juveniles in brood pouches. Their small size makes them very transferable. New Zealand mudsnails have broad physical and chemical thresholds. They can live out of water in a damp environment for up to 26 days. Black Earth Creek is a renowned trout stream in southern Wisconsin and is visited by transient anglers, researchers, and restoration contractors.](javascript:showPlan(87833332))

### Natural Community Stratified Sites 2010-2014

This project selects sites from all wadeable streams (88,00 miles, which includes ephemeral and macroinvertebrate streams). The random sites stratified by natural community (nc) and Region by Weigel. Two-hundred sites are sampled per year (approximately 25 sites per natural community per basin). This is a five year study. The sites are mapped on SWDV. April-October sampling for 1 fish IBI, one macroinvertebrate IBI, Qualitative Habitat, Temp, pH, D.O.,conductivity, 1TP sample in June, July OR August.

### EPA National Lakes Survey 2012

During the summer of 2012, the U.S. Environmental Protection Agency (EPA), states, tribes and other partners conducted the second nationwide survey of the condition of the nation’s lakes. The National Lakes Assessment (NLA) will help citizens and governments measure the health of our waters, take actions to prevent pollution, and evaluate the effectiveness of protection and restoration efforts. The NLA 2012 is one in a series of national surveys of the condition of the nation’s waters (see <http://www.epa.gov/aquaticsurveys> ). Designed to estimate the percentage of lakes that are in good, fair, or poor condition, the survey serves as a scientific report card on lakes which examines ecological, water quality, and recreational indicators, and assesses how widespread key stressors (such as nitrogen, phosphorus, and acidification) are across the country.

The survey is a collaborative effort that involves dozens of state environmental and natural resource agencies, federal agencies, universities and other organizations. In most states, state water quality staff will conduct the water quality sampling and habitat assessments.

### Lake Michigan Basin Wetland Intensification Study

[Monitoring data will be gathered to assess the health of existing wetlands and measure the success of restoration projects. It is clear that to report a more complete picture on the status of wetlands we will need to develop more measures of wetland quality. DNR has worked with EPA to develop methods to assess wetland health, known “condition assessments” to continue to work on additional methods. The EPA conducted a national condition assessment survey of the nation’s wetlands in 2011. DNR was part of the work group that designed the national survey. This is an intensification of the national survey that to focus in on Wisconsin wetlands, most likely within a particular watershed or river basin.](javascript:showPlan(49717016))

### High N/P Ratio Monitoring

[Through a previous project known as the “nutrient impacts study”, DNR and USGS identified thresholds in relationships between phosphorus (P) and nitrogen (N) and stream biological metrics in Wisconsin streams and rivers (Robertson et al. 2006, Robertson et al. 2008, Wang et al. 2007). The P thresholds were more distinct and consistent among biological response variables than the N thresholds, which in part led to the development of P criteria before N criteria. One factor that may have limited the ability to identify N thresholds is that there were few sites in the dataset with high N and low P concentrations. Filling this “gap” in the dataset would increase the statistical power of any additional analyses of N thresholds. The proposed project is a targeted sampling of streams with high N:P ratios. The methods used by Robertson et al. (2006) will be used to sample sites for this study. These methods consist of six monthly nutrient samples (May-October) and one-time biological sampling (fish, habitat, invertebrates, and diatoms). We identified characteristics of the few sites in the nutrient impacts dataset with high N:P ratios. These sites generally have flat watersheds with permeable soils and intensive row crop agriculture (but relatively little animal agriculture). This type of stream is common in the central sands region and in Rock and Walworth Counties. We will select 25 sites in these areas for preliminary sampling (May-June nutrient sampling). We will continue sampling nutrients at approximately 18 of these sites with the highest N:P ratios through October, and will collect biological samples at each of these sites. In addition to the ~18 primary sites, we will collect biological samples at 10 Watershed Rotation sites that had high N:P ratios, but were not biologically sampled. Following this sampling effort, Science Services staff (Diebel and Weigel) will conduct a variety of statistical analyses to describe the relationships between N concentrations and stream biological communities, and will prepare a report for internal review. The computer code used to conduct these statistical analyses will be formatted so that as additional nutrient and associated biological data are collected, the analyses can be re-run.](javascript:showPlan(44787727))

### Least Disturbed Monitoring Sites

[EPA provided funding to sample 50 "least-disturbed" wadeable stream sites thought out the Southeast Wisconsin Till Plains, Driftless Area, and North Central Hardwood Forests ecoregions in Wisconsin in 2008. Stream sites were selected based upon evaluation of watershed land use characteristics upstream of candidate sampling sites. USGS collected various water chemistry measures six times (bi-monthly) at all sites and DNR collected quantitative habitat, macroinvertebrate and fish data at all sites.](javascript:showPlan(37509690))

### Natural Community Stream Reference Sites

This study involves reference site selection and monitoring using the 2008 Streams Natural Communities dataset, which was based on stream flow and temperature modeled by WDNR Integrated Science Services and USGS Region V States. This study evaluates highest quality streams representative of each of the eleven proposed natural communities. The purpose of the study is to provide the range of biological and ecological conditions for specific communities through determining the "potential biological use" of each and to gather information that will provide insight into the value of the 11 distinct natural communities for state assessment and water quality standards work.

### [Northeast Region Nonwadeable Watershed Rotation Sites](javascript:showPlan(10600695))

[Stream water quality monitoring covering primarily biological, chemical, and habitat related monitoring to determine ambient conditions at "pour point" locations for each of state's 330 watersheds.](javascript:showPlan(10600695))

### Additional Studies

* **Great Lakes Beaches** - 2002 Pilot Project 1/1/1960 Complete Monitoring for pathogens at Great Lakes to help assessment beach quality under the state's Recreational Use Designation.
* **NER NC Stream Stratified Sites** 2010, 2011 5/24/2010 Complete Project for Natural Communities. This project selects sites from all wadeable streams (83,500 miles, which includes ephemeral and macroinvertebrate streams). The random sites stratified by natural community (nc) and Region by Weigel. Two-hundred sites are sampled per year (approximately 25 sites per natural community per basin). This is a five year study. The sites are mapped on SWDV. April-October sampling
* **NER NC Stream Stratified Sites** 2012 7/1/2012 Active Project for Natural Communities. This project selects sites from all wadeable streams (83,500 miles, which includes ephemeral and macroinvertebrate streams). The random sites stratified by natural community (nc) and Region by Weigel. Two-hundred sites are sampled per year (approximately 25 sites per natural community per basin). This is a five year study. The sites are mapped on SWDV. April-October sampling

### Volunteer Monitoring

There are five sites where volunteer monitoring is conducted in the watershed:

|  |  |  |
| --- | --- | --- |
| CBSM-10043182 | East Twin River at Mishicot Village Park | 01/30/2015 |
| CBSM-10040490 | East Twin River at Paddler's Park | 12/28/2014 |
| CBSM-10040489 | East Twin River at Hillcrest Rd | 12/28/2014 |
| CBSM-10031871 | Unnamed DS Lakeshore Rd | 05/01/2013 |
| CBSM-10008211 | Tisch Mills Creek at Cty Hwy BB | 07/12/2012 |

## Basin/Watershed Partners

## Priority Issues

## Recommendations

**This document is available electronically on the WDNR’s website. The Wisconsin Department of Natural Resources provides equal opportunity in its employment, programs, services, and functions under an Affirmative Action Plan.

midwestfisherman.blogspot.com-1600

# Contributors

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If you have any questions, please write to Equal Opportunity Office, Department of the Interior, Washington, D.C. 20240. This publication is available in alternate format (large print, Braille, audio tape, etc.) upon request. Please call 608-267-7694 for more information.

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***Wisconsin Department of Natural Resources***

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List of Monitored Waters in the TK02 Watershed   
(Assessment may not be conducted yet) Sorted by waterbody name (i.e., “unknown” represents Fish and Aquatic Life assessments).

| WBIC | WATERS ID | LOCAL NAME | START MILE | END MILE | WATER SIZE | MONITORED YEAR | Fish and Aquatic Life Condition | ORW/\_ERW | TROUT |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 85000 | 10151 | Chadha Lake |  |  | 7.0 Acres | 2014 | Unknown |  |  |
| 84000 | 18071 | East Twin River | 0.03 | 10.49 | 10.5 Miles | 2016 | Good |  |  |
| 84000 | 4700226 | East Twin River | 10.49 | 26.4 | 15.9 Miles | 2016 | Unknown |  |  |
| 84000 | 10205 | East Twin River | 26.4 | 34.18 | 7.8 Miles | 2012 | Poor |  | CLASS II |
| 84000 | 10206 | East Twin River | 34.18 | 40.91 | 6.7 Miles | 2015 | Poor | ERW | CLASS I |
| 85300 | 10153 | Engledinger Lake |  |  | 52.0 Acres | 2014 | Fair |  |  |
| 84600 | 10149 | Harpt Lake |  |  | 31.0 Acres | 2016 | Excellent |  |  |
| 85200 | 10152 | Heidman Lake (Bolt) |  |  | 24.0 Acres | 2016 | Good |  |  |
| 84300 | 10146 | Jambo Creek | 8 | 9 | 1.0 Miles | 2015 | Suspected Poor |  |  |
| 84300 | 10145 | Jambo Creek | 3.91 | 7.99 | 4.1 Miles | 2013 | Unknown |  |  |
| 84300 | 10144 | Jambo Creek | 0 | 3.91 | 3.9 Miles | 2010 | Good |  | CLASS II |
| 84100 | 10143 | Johnson Creek | 0 | 7 | 7.0 Miles | 2015 | Good |  |  |
| 86700 | 10162 | Krok Creek | 0.01 | 0.68 | 0.7 Miles | 2008 | Poor |  |  |
| 86700 | 903433 | Krok Creek | 0.69 | 3.33 | 2.6 Miles | 2008 | Poor |  |  |
| 90100 | 10164 | Molash Creek | 0 | 7.76 | 7.8 Miles | 2015 | Poor |  |  |
| 84700 | 10150 | Mott Lake |  |  | 7.0 Acres | 2014 | Unknown |  |  |
| 20 | 481979 | Neshota Park Beach |  |  | 0.7 Acres | 2015 | Unknown |  |  |
| 20 | 482011 | Point Beach State Park Beach |  |  | 1.5 Acres | 2015 | Unknown |  |  |
| 83100 | 10142 | Seidel Lake |  |  | 12.0 Acres | 2014 | Unknown |  |  |
| 20 | 1452524 | Selner Park, Lake Michigan |  |  | 1.1 Acres | 2014 | Unknown |  |  |
| 85400 | 10154 | Shea Lake |  |  | 32.0 Acres | 2016 | Good |  |  |
| 85500 | 18056 | Tisch Mills Creek | 0.01 | 2.26 | 2.3 Miles | 2015 | Good |  | CLASS II |
| 85500 | 10155 | Tisch Mills Creek | 2.6 | 5.51 | 2.9 Miles | 2008 | Fair |  |  |
| 47 | 482709 | Two Rivers Harbor |  |  | 11.4 | 2013 | Poor |  |  |
| 83700 | 26200 | Un Lake |  |  | 15.2 Acres | 2011 | Unknown |  |  |
| 5020832 | 3994857 | Unnamed | 0 | 6.37 | 6.4 Miles | 2014 | Poor |  |  |
| 5552390 | 32031 | Unnamed |  |  | 3.5 Acres | 2014 | Suspected Poor |  |  |
| 84900 | 4000342 | Unnamed | 0 | 0.16 | 0.2 Miles | 2013 | Unknown |  |  |
| 3000211 | 5534458 | Unnamed | 0 | 3.38 | 3.4 Miles | 2012 | Unknown |  |  |
| 86600 | 1479552 | Unnamed Ditch | 0 | 1.39 | 1.4 Miles | 2011 | Unknown |  |  |
| 5022207 | 5501805 | Unnamed Stream | 0 | 1.7 | 1.7 Miles | 2015 | Unknown |  |  |
| 5021866 | 5501674 | Unnamed Stream | 0 | 0.58 | 0.6 Miles | 2014 | Unknown |  |  |
| 5022137 | 5501704 | Unnamed Stream | 0 | 3.1 | 3.1 Miles | 2014 | Unknown |  |  |
| 5019988 | 5500769 | Unnamed Stream | 0 | 0.57 | 0.6 Miles | 2013 | Unknown |  |  |
| 5019833 | 5500736 | Unnamed Stream | 0 | 1.35 | 1.4 Miles | 2013 | Unknown |  |  |
| 3000213 | 5500585 | Unnamed Stream | 0 | 0.38 | 0.4 Miles | 2011 | Poor |  |  |
| 5020517 | 5498113 | Unnamed Stream | 0 | 2.84 | 2.8 Miles | 2011 | Unknown |  |  |
| 3000212 | 5500551 | Unnamed Stream | 0 | 1.93 | 1.9 Miles | 2009 | Poor |  |  |
| 5021266 | 5501343 | Unnamed Stream | 0 | 1.45 | 1.5 Miles | 2001 | Unknown |  |  |
| 5019298 | 5499827 | Unnamed Stream | 0 | 2.07 | 2.1 Miles | 2001 | Unknown |  |  |
| 5020126 | 5499160 | Unnamed Stream | 0 | 1.72 | 1.7 Miles | 1985 | Unknown |  |  |
| 86400 | 18058 | Unnamed Trib 22n 24e S9 Nwsw | 0 | 4 | 4.0 Miles | 2011 | Fair |  |  |
| 84400 | 10147 | Unnamed Trib T21n, R23e, S15 Nene | 0 | 4 | 4.0 Miles | 2015 | Unknown |  |  |
| 85100 | 18055 | Unnamed Trib T21n, R24e, S25 Nene | 0 | 1 | 1.0 Miles | 2013 | Unknown |  |  |
| 87000 | 18050 | West Twin River | 0 | 5.9 | 5.9 Miles | 2015 | Poor |  |  |

# **Appendices – Watershed Maps**