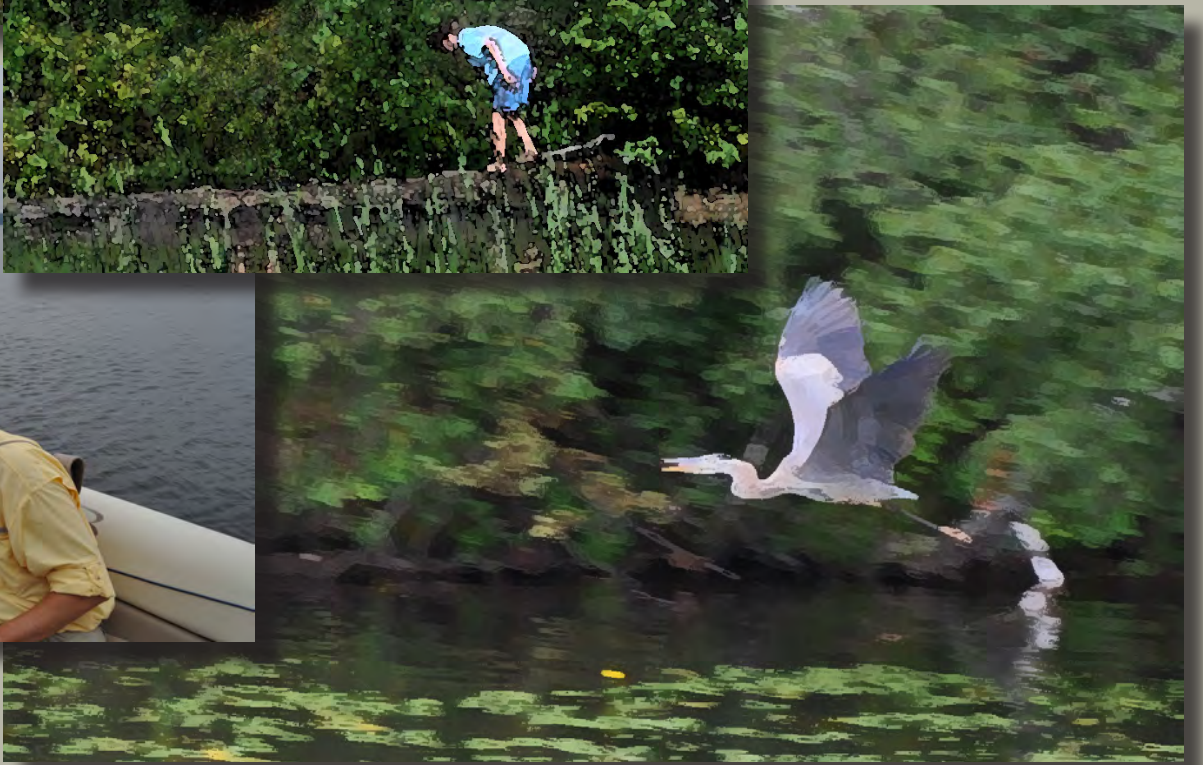


# Citizen Assessment of Critical Habitats & Priority Shorelines Map Book - 2010



Grindstone Lake and the Grindstone Lake Watershed  
Sawyer County, Wisconsin

Funded by the Wisconsin Department of Natural Resources  
Lake Planning Grant Program

Sponsored by the Grindstone Lake Association



Document prepared by Douglas Miskowiak, GIS Education Specialist  
Maps prepared by Jon Galloy and Mike Broton, GIS Student Interns  
University of Wisconsin-Stevens Point, GIS Center



# Citizen Assessment of Grindstone Lake

It is the Grindstone Lake Association's strategy to build upon previous studies and reports to address critical issues and engage its membership to help protect and manage aesthetic and ecological resources on Grindstone Lake. This plan builds upon previous reports and engages the membership to establish an objective record of ecological and aesthetic characteristics, features, and indicators of Grindstone Lake's shorelines. This information is fundamental to help develop a conservation strategy that takes advantage of the unique features and characteristics of Grindstone Lake and its watershed. Much of Grindstone Lake's shorelines are owned privately. With thoughtful management and strategic conservation, Grindstone Lake can remain clean and naturally beautiful, provide healthy and stable habitats for wildlife, and provide enjoyment to the people that inhabit and recreate there.

This project provides the first known systematic inventory of Grindstone Lake and its watershed since the Land Economic Inventory Maps from the 1930's. Updated spatial inventories and subsequent analyses are critical for sound lake and watershed planning. They provide useful information for identifying and managing shorelines that are important for maintaining healthy fish and wildlife habitats, high water quality, and areas of

exceptional natural beauty. Information about land use, land cover, topography, impervious surfaces, sensitive features, and natural resources are documented in this report, providing local residents and decision-makers, including the Grindstone Lake Association, information in a comprehensive format. The intent is to provide this information for making well-informed lake, land, and watershed management decisions, including critical habitat assessment.

The Grindstone Lake Association has utilized the shoreline inventories to identify critical habitats as defined by the WDNR and to identify high-priority shorelines worthy of conservation. This process is intended to firstly inform the WDNR's process for critical habitat assessment on Grindstone Lake. Grindstone Lake is in the queue for a critical habitat assessment conducted by the WDNR. The Grindstone Lake Association intends to use its analysis of critical habitats to inform the WDNR's assessment of critical habitats and augment the dialogue between the association and the WDNR. Secondly, the association is prioritizing shorelines to assist in their own efforts to identify shorelines most worthy of conservation and those in need of rehabilitation.

## Project Partners and Participants

The following project partners and participants are recognized and appreciated for their commitment to the Citizens Assessment of Grindstone Lake.

### Wisconsin Department of Natural Resources

The Wisconsin Department of Natural Resources awarded the Grindstone Lake Association with a Large Scale Lake Planning Grant to assist with project work.

### Grindstone Lake Association Board of Directors

The Grindstone Lake Association sponsored the Lake Planning Grant and helped to organize project activities and events. The following members of the Grindstone Lake Board of Directors are recognized for their commitment to the project.

- Steven Buss, President
- Bruce Paulson, Vice President
- Pat O'Leary, Secretary
- Vanessa Cossetta, Treasurer
- Frank Cossetta, Membership Coordinator
- Dag Sohlberg, Newsletter Coordinator
- Hal Meeker, At Large
- Larry Berg, At Large
- Brian Pabich, At Large
- Dan Tyrolt, LCO Conservation, LCO Liaison and Water Quality

### Grindstone Lake Citizen Contributors

The following citizens have contributed their time and effort to inventory the aesthetic and ecological characteristics of Grindstone Lake's riparian and littoral zones. Contributors include:

- Sandy Bandli, Riparian trees inventory.
- Ann Berg, Aesthetic beauty inventory.
- Larry Berg, Prioritizing Grindstone Lake shorelines.
- Barb and Lyn Britton, Visible structures inventory.
- Steve Buss, Prioritizing Grindstone Lake shorelines.
- Al and Cooper Campbell, Emergent aquatic macrophyte inventory.
- Dina Deno, Aesthetic beauty inventory.
- Stan Deno, Emergent aquatic macrophyte inventory.
- Lew and Nancy Landt, Coarse woody habitat inventory.

- Laura and Marti Lewellen, Riparian wetland and bottom structure inventories.
- Hal Meeker, Riparian trees inventory.
- Chuck and Linn Newton, Visible structures inventory.
- Kathy O'Cull, Emergent aquatic macrophyte inventory.
- Bruce Paulson, Pontoon boat.
- Linda Rogers, Aesthetic beauty inventory.
- Mark and Susan Schmiel, Visible structures inventory.
- Lee and Nancy Skelly, Riparian trees inventory.
- Dag Solberg, Visible structures and coarse woody habitat inventories.
- Mary Trousdale, Riparian wetland and bottom structure inventories.
- Bob Trousdale, Riparian wetland inventory.

### Project Cooperators

- Brian Devries, Sawyer County Land Records Department. Brian provided geographic information system (GIS) data necessary for understanding the resource.
- Kristi Maki, Sawyer County Land and Water Conservation. Kristi provided valuable expertise in identifying emergent aquatic macrophytes and aquatic invasive species.
- Kathy Moe, United States Forest Service. Kathy provided valuable information about Grindstone Lake's riparian woody vegetation and veteran trees.
- Alex Smith, Wisconsin Department of Natural Resources. Alex provided significant insight to the WDNR's critical habitat assessment process. Alex helped citizens inventory riparian wetlands and littoral zone lake bottom structure.
- Dan Tyrolt, LCO Conservation Liaison and Water Quality. Dan provided testimony to the importance of various shoreline characteristics for prioritizing shorelines for conservation and identifying critical habitats.

### Project Education and Assistance

- Douglas Miskowiak, GIS Educator and Project Manager. GIS Center – University of Wisconsin-Stevens Point.
- Jon Galloy, Lead GIS Technician and Intern. GIS Center – University of Wisconsin-Stevens Point.
- Mike Broton, GIS Technician and Intern. GIS Center – University of Wisconsin-Stevens Point.
- Corinna Neeb, GIS Technician and Intern. GIS Center – University of Wisconsin-Stevens Point.

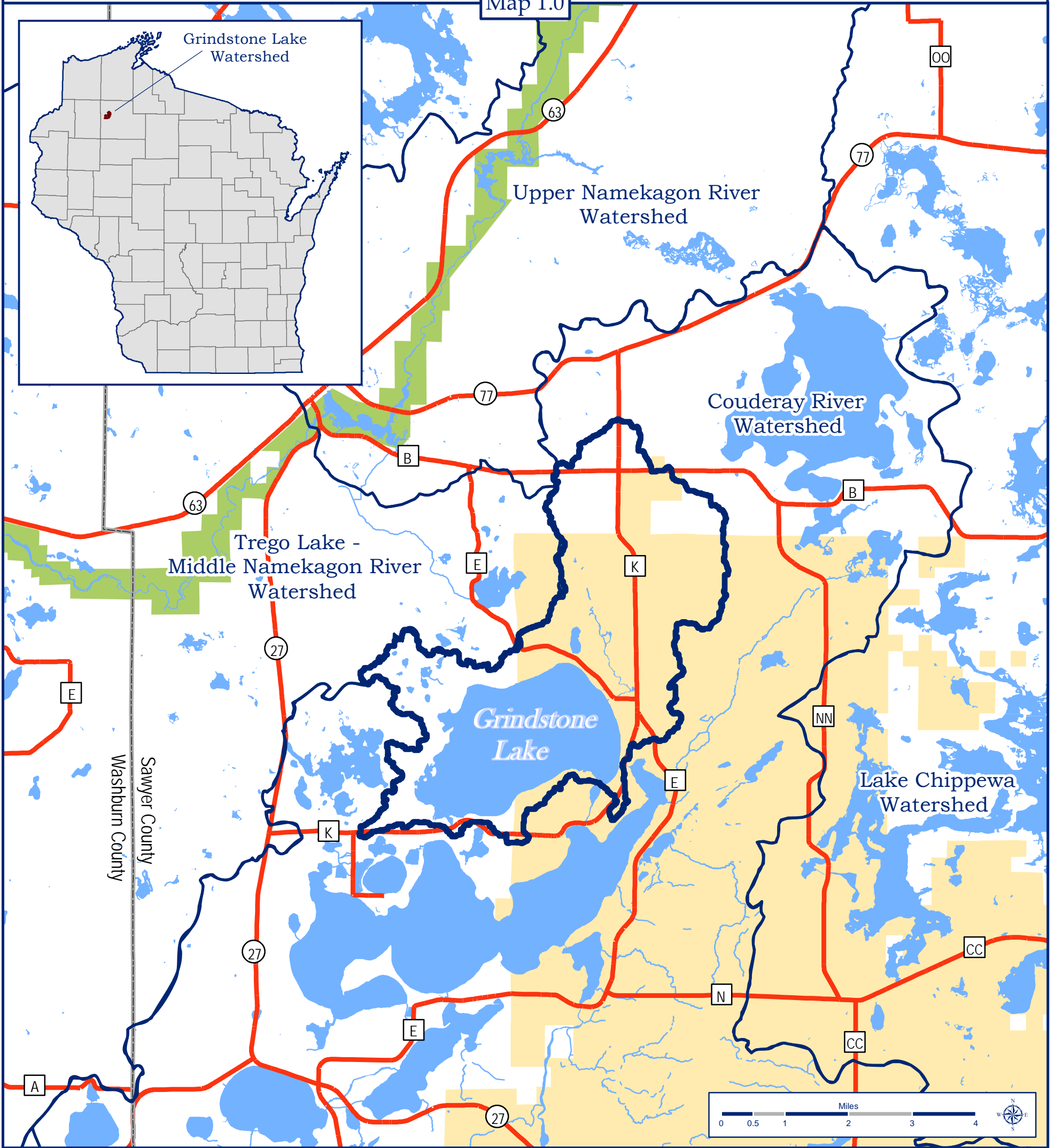
## **Table of Maps**

Project Extent and Context	3
<b>Grindstone Lake Watershed Map Series</b>	
Water Resources	4
Environmental Corridors	5
Pre-settlement Vegetation	6
Land Cover 2001	7
Publicly Managed Lands	8
Impervious Surfaces	9
Tree Canopy Density	10
Glacial Geology	11
<b>Grindstone Lake Map Series</b>	
Shoreline Ownership	12
Shoreline Bottom Structure	13
Riparian Wetlands	14
Emergent Aquatic Macrophytes	15
Coarse Woody Habitat	16
Visible Shoreline Development (a)	17
Visible Shoreline Development (b)	18
Visible Shoreline Development (c)	19
Visible Shoreline Development (d)	20
Riparian Trees	21
Veteran Tree Specimens	22
Shoreline Aesthetic Condition	23
Wildlife Observations	24
Critical Habitat Assessment	25
Priority Shorelines Assessment	26









# Project Extent

## Grindstone Lake Watershed, Sawyer County, Wisconsin

Map 1.0



### Project Extent Context Features

- |  |   |
|--|---|
|  Grindstone Lake Watershed          |  Tribal Lands      |
|  Adjacent Watersheds                |  County Boundaries |
|  Surface Water                      |  State Highways    |
|  St. Croix National Scenic Riverway |  County Highways   |

### Project Extent Description

This map displays Grindstone Lake and the Grindstone Lake Watershed within the larger context of the region. The Grindstone Lake Watershed exists within the Couderay River Watershed and the larger, Upper Chippewa River Basin.

Map Created by Jon Galloy & Michael Broton. Edited by Douglas Miskowiak -- Version 9/23/2011

Funding by Wisconsin Department of Natural Resources Lake Planning Grant Program



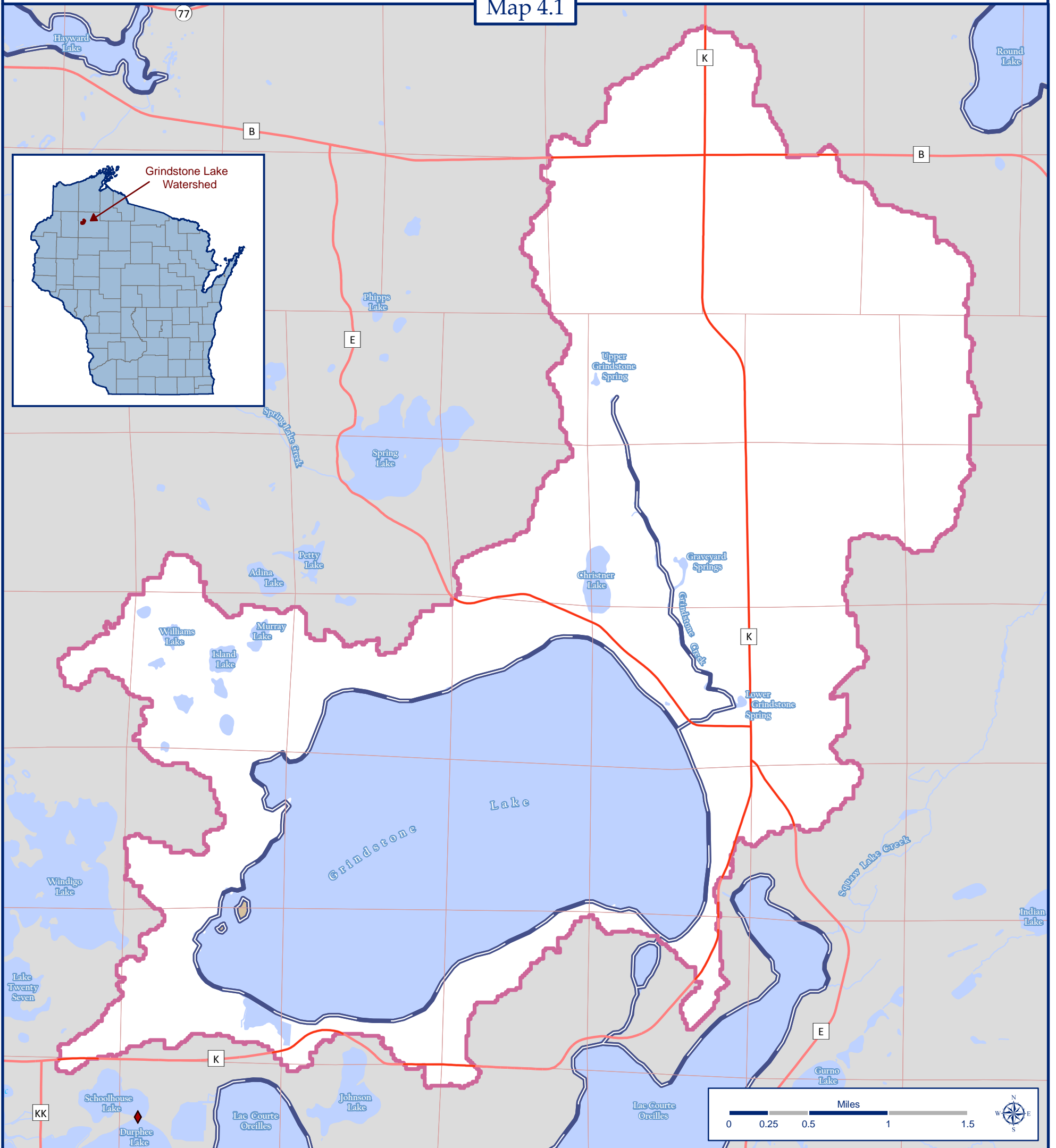
Sponsored by the Grindstone Lake Association



# Water Resources

## Grindstone Lake Watershed, Sawyer County, Wisconsin

Map 4.1



### Water Resources and Watershed Statistics

Outstanding/Exceptional Resource Waters	14 Miles
Dam	0 Total
Watershed Boundary	11,700 Acres
Surface Water	3,261 Acres
Islands	7 Acres
Total Shoreline	24 Miles
Public Land Survey System Section Boundaries	
County Trunk Highway	

Grindstone Lake Watershed equals 11,700 total acres

### Data Sources

Surface waters and islands from the Wisconsin Department of Natural Resources (WDNR) 1:24,000 Hydrography version 6 database, 2007.

Watersheds from the WDNR derived from 1:24,000 topographic maps.

Outstanding/Exceptional Resource Waters and Dams from the WDNR.

Surface water area statistic derived by measuring open-water or HYD-SHAI polygons.

Outstanding Resource Waters statistic derived by measuring the shoreline of assigned lakes and the centerline of assigned rivers and streams.

Total Shoreline statistic derived by measuring line segments with attributes representing single-line streams, banks, or shorelines.

Map Created by Jon Galloy & Michael Broton – Version 2/10/2011

Funding by Wisconsin Department of Natural Resources Lake Planning Grant Program

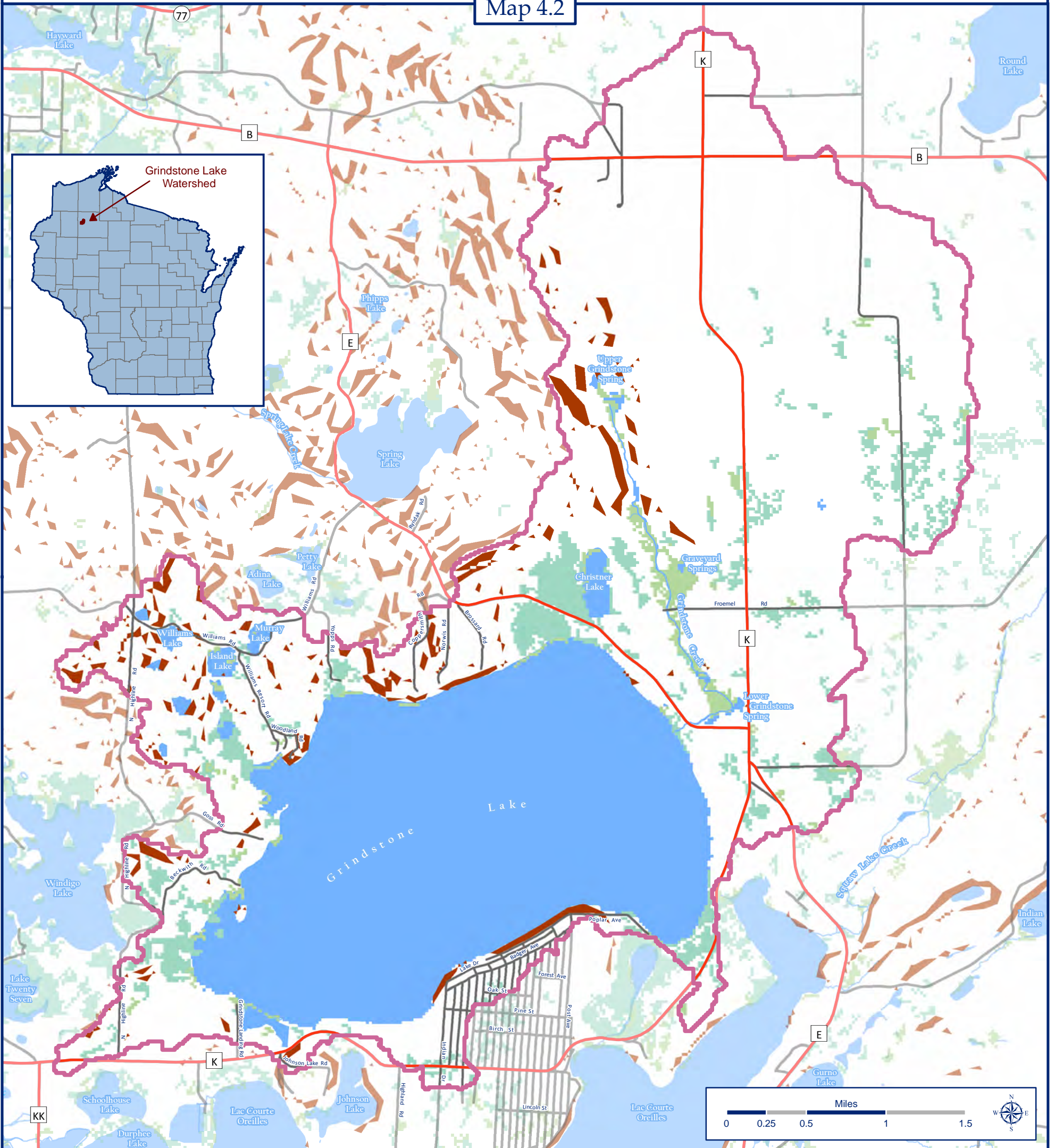


Sponsored by the Grindstone Lake Association

# Environmental Corridors

## Grindstone Lake Watershed, Sawyer County, Wisconsin

Map 4.2



### Environmental Corridors and Watershed Statistics

- Surface Water ————— 3,344 Acres
- Emergent Herbaceous Wetlands — 627 Acres
- Woody Wetlands ————— 167 Acres
- Slopes  $\geq$  12.5% ————— 266 Acres
- Watershed Boundaries
- County Trunk Highway
- Roads

Grindstone Lake Watershed equals 11,700 total acres

### Data Sources

Surface waters derived from the Wisconsin Department of Natural Resources 1:24,000 Hydrography Version 6 data set.

Wetland data from the National Land Cover Database, 2001.

Slopes greater than 12.5% derived using ArcGIS Spatial Analyst and from the Wisconsin Department of Natural Resources 30 meter digital elevation model.

Map Created by Jon Galloy & Michael Broton -- Version 2/22/2011

Funding by Wisconsin Department of Natural Resources Lake Planning Grant Program



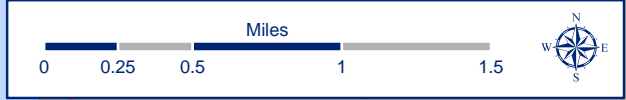
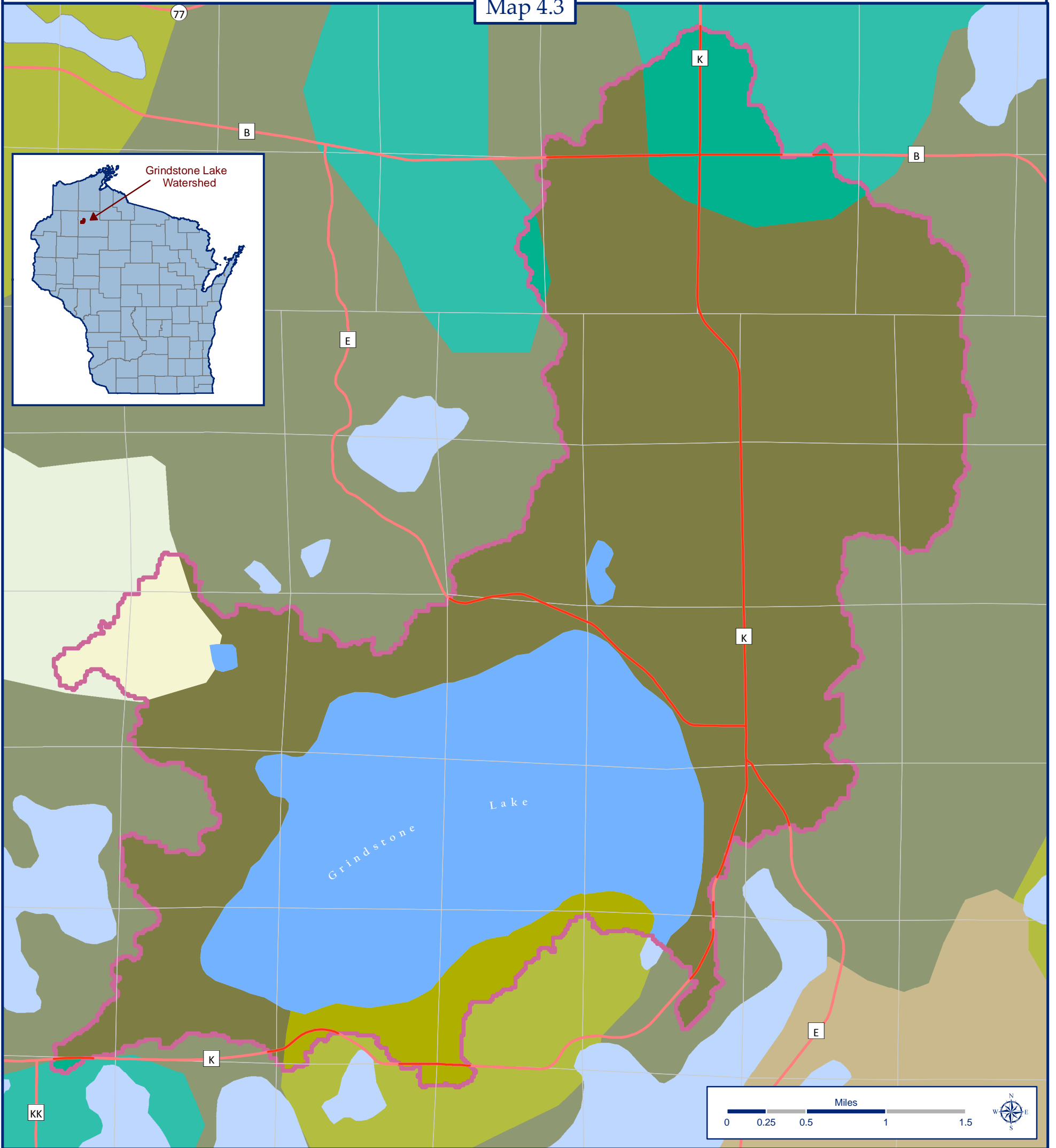
Sponsored by the Grindstone Lake Association



# Pre~Settlement Vegetation

## Grindstone Lake Watershed, Sawyer County, Wisconsin

Map 4.3



### Pre~settlement Vegetation and Watershed Statistics

	White, Black, & Bur Oak	0 Acres		Watershed Boundary
	Aspen, White Birch, Pine	323 Acres		Section Boundaries
	Jack Pine, Scrub, Barrens, & Oak Forest	463 Acres		County Trunk Highway
	Sugar Maple, Yellow Birch, White & Red Pine	669 Acres		
	White & Red Pine	7,135 Acres		
	Surface Water	3,110 Acres		

Grindstone Lake Watershed equals 11,700 total acres

### Data Sources

Pre-settlement vegetation from the Wisconsin Department of Natural Resources derived from a 1:500,000 scale map showing the pre-settlement vegetation cover in Wisconsin. Data digitized from a 1976 map created from land survey notes written in the mid 1800's when Wisconsin was first surveyed.

Map Created by Jon Galloy & Michael Broton - Version 12/22/2010

Funding by Wisconsin Department of Natural Resources Lake Planning Grant Program



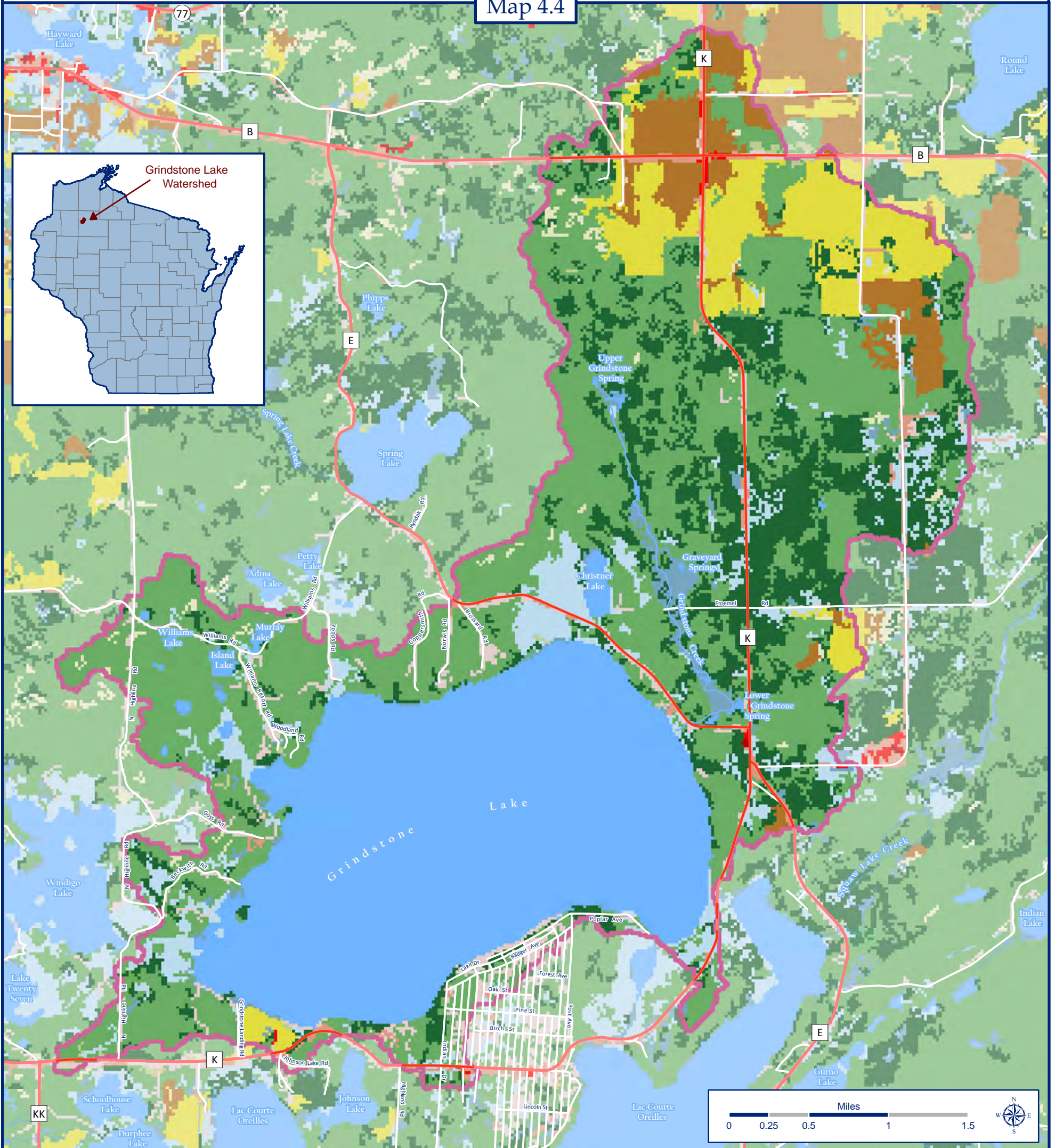
Sponsored by the Grindstone Lake Association



# Landcover ~ 2001

## Grindstone Lake Watershed, Sawyer County, Wisconsin

Map 4.4



### Land Cover and Watershed Statistics

	Cultivated Crops	467 Acres		Grassland/Herbaceous	64 Acres
	Deciduous Forest	4,195 Acres		Mixed Forest	23 Acres
	Developed - High Intensity	1 Acre		Open Water	3,261 Acres
	Developed - Low Intensity	158 Acres		Pasture/Hay	744 Acres
	Developed - Medium Intensity	15 Acres		Shrub/Scrub	3 Acres
	Developed - Open Space	304 Acres		Woody Wetlands	626 Acres
	Emergent Herbaceous Wetlands	166 Acres		Watershed Boundaries	
	Evergreen Forest	1,673 Acres		County Trunk Highway	

Grindstone Lake Watershed equals 11,700 total acres

### Data Sources

Land cover from the National Land Cover Database, 2001. Database project conducted by the Multi-Resolution Land Characteristics Consortium - a partnership among federal agencies including:

- U.S. Geological Survey
- National Oceanic and Atmospheric Administration
- U.S. Environmental Protection Agency
- U.S. Department of Agriculture
- U.S. Forest Service
- National Park Service
- U.S. Fish and Wildlife Service
- Bureau of Land Management
- USDA Natural Resources Conservation Service

Map Created by Jon Galloy & Michael Broton -- Version 1/21/2011

Funding by Wisconsin Department of Natural Resources Lake Planning Grant Program



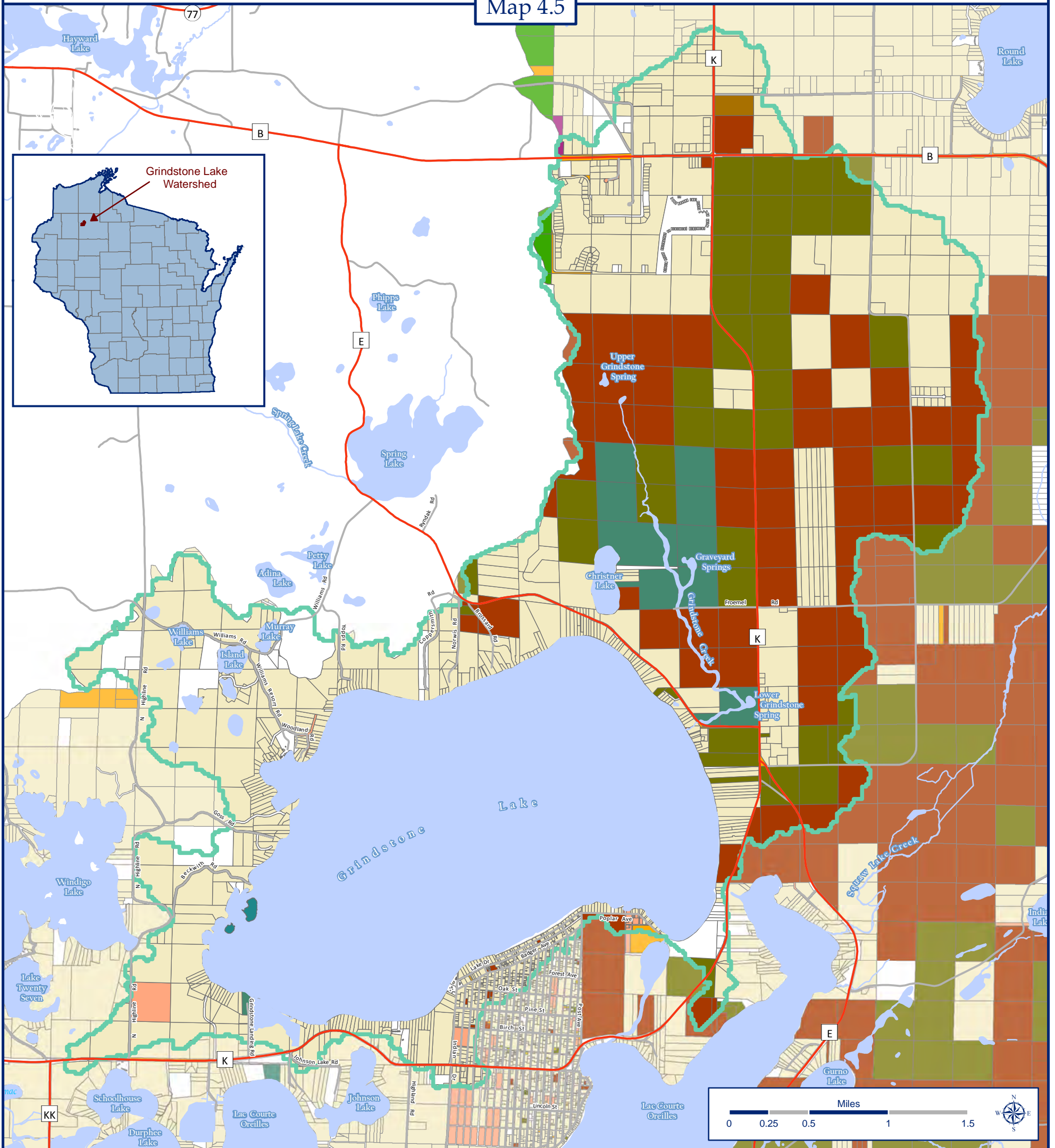
Sponsored by the Grindstone Lake Association



# Publicly Managed Lands

## Grindstone Lake Watershed, Sawyer County, Wisconsin

Map 4.5



### Publicly Managed Lands and Watershed Statistics

- |   |                            |
|---|----------------------------|
| Private 3,948 acres                               | State of Wisconsin 7 acres |
| Lac Courte Oreilles Band 1,947 acres              | Utilities 2 acres          |
| Federal Trust for Lac Courte Oreilles 1,392 acres | Data Unavailable 471 acres |
| WDNR Managed Lands 412 acres                      | Surface Water 3,318 acres  |
| Township 65 acres                                 | Watershed Boundary         |
| Sawyer County 57 acres                            | Major Highways             |
| Sawyer County Forest 20 acres                     | Roads                      |
| St. Croix Band 20 acres                           |                            |

Grindstone Lake Watershed equals 11,700 total acres

### Data Sources

Parcel ownership derived from shapefiles obtained from the Sawyer County Land Information Office. These shapefiles contain incomplete records accounting for the "Data Unavailable" acreage denoted on the map for the years 2005 and 2008. Conversations with officials from the Bureau of Indian Affairs and the Lac Courte Oreilles Realty Office helped delineate and confirm lands held by the LCO and those lands held in trust for the LCO.

Map Created by Jon Galloy & Michael Broton -- Version 2/22/2011

Funding by Wisconsin Department of Natural Resources Lake Planning Grant Program



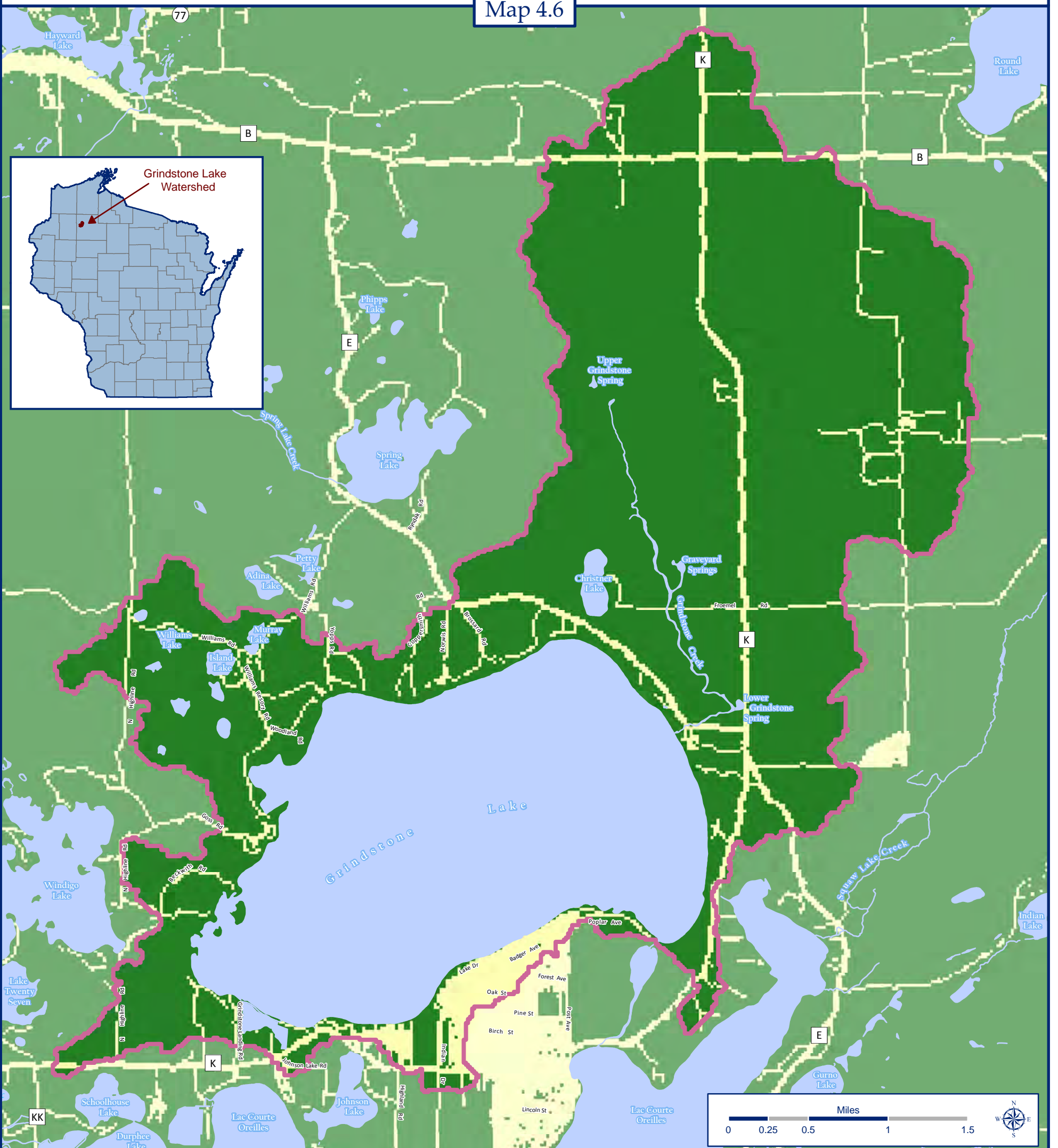
Sponsored by the Grindstone Lake Association



# Impervious Surfaces

## Grindstone Lake Watershed, Sawyer County, Wisconsin

Map 4.6



### Impervious Surfaces and Watershed Statistics

- Pervious Surface (entire pixel is pervious to water) — 93 percent of the watershed
- Impervious Surface (part of the pixel is impervious to water) — 7 percent of the watershed
- Surface Water
- Watershed Boundaries

\* The size of a pixel is 30 meters square or approximately .2224 acres. Data from satellite imagery likely underestimates impervious surfaces. Features, such as driveways and houses that are covered with a dense tree canopy might not be visible for satellite interpretation.

Grindstone Lake Watershed equals 11,700 total acres

### Data Sources

Imperviousness data from the National Land Cover Database, 2001. This data layer is an ESRI Grid delineating percent surface imperviousness (0-100%) using 30 meter square cells. Database project conducted by the Multi-Resolution Land Characteristics Consortium - a partnership among federal agencies including:

- U.S. Geological Survey
- National Oceanic and Atmospheric Administration
- U.S. Environmental Protection Agency
- U.S. Department of Agriculture
- U.S. Forest Service
- National Park Service
- U.S. Fish and Wildlife Service
- Bureau of Land Management
- USDA Natural Resources Conservation Service

Map Created by Jon Galloy & Michael Broton - Version 1/18/2011

Funding by Wisconsin Department of Natural Resources Lake Planning Grant Program



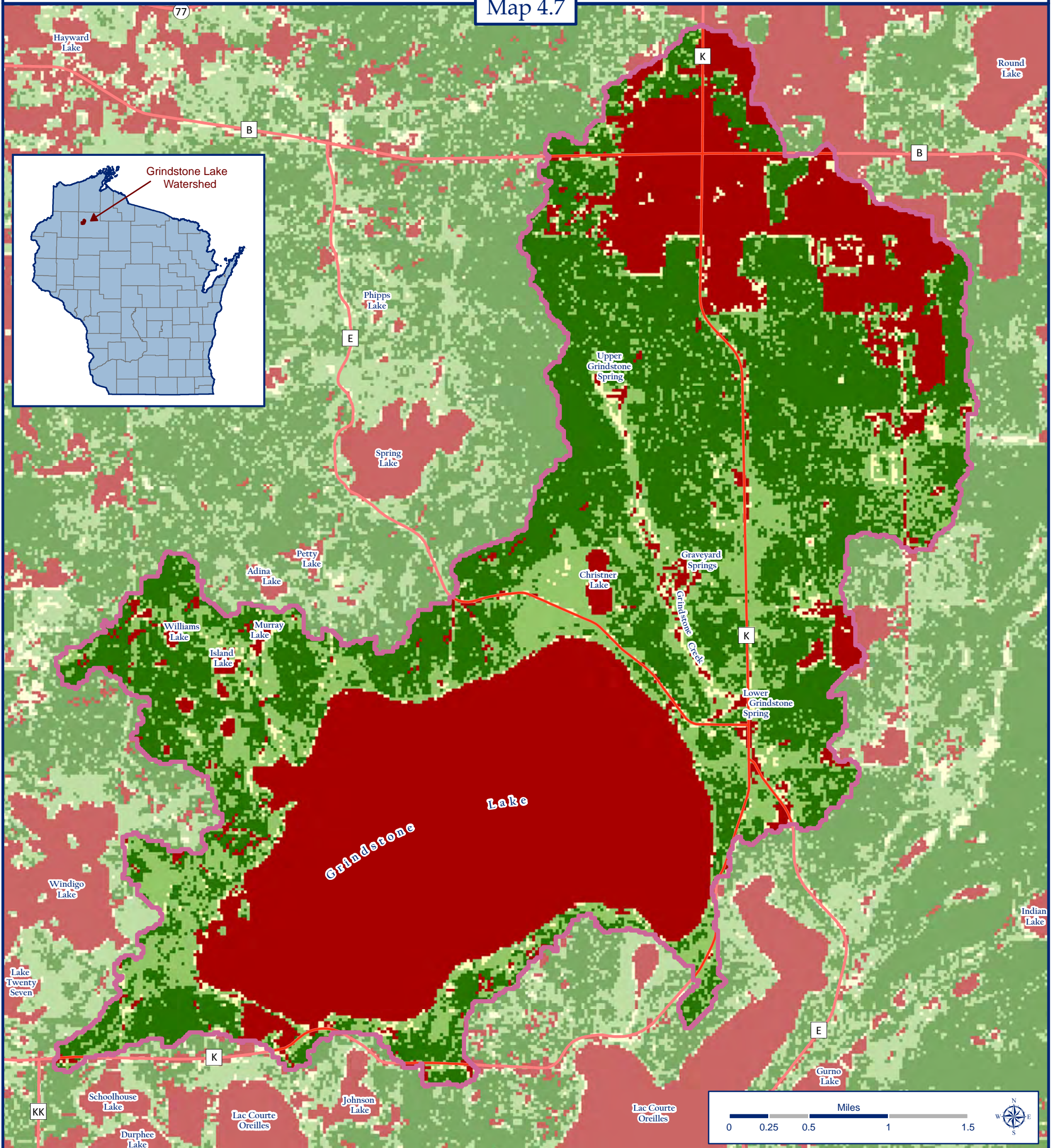
Sponsored by the Grindstone Lake Association



# Tree Canopy Density

## Grindstone Lake Watershed, Sawyer County, Wisconsin

Map 4.7



### Tree Canopy Density and Watershed Statistics

	0 Percent Forested	4,782 Acres
	1 - 23	3 Acres
	24 - 65	350 Acres
	66 - 87	2,396 Acres
	88 - 100	4,169 Acres
	Watershed Boundaries	
	County Trunk Highway	

Grindstone Lake Watershed equals 11,700 total acres

### Data Sources

Tree canopy density from the National Land Cover Database, 2001. This data layer is an ESRI GRID delineating percent tree canopy (0-100%) using 30-meter cells. Database project conducted by the Multi-Resolution Land Characteristics Consortium - a partnership among federal agencies including:

- U.S. Geological Survey
- National Oceanic and Atmospheric Administration
- U.S. Environmental Protection Agency
- U.S. Department of Agriculture
- U.S. Forest Service
- National Park Service
- U.S. Fish and Wildlife Service
- Bureau of Land Management
- USDA Natural Resources Conservation Service

Map Created by Jon Galloy & Michael Broton -- Version 12/22/2010

Funding by Wisconsin Department of Natural Resources Lake Planning Grant Program



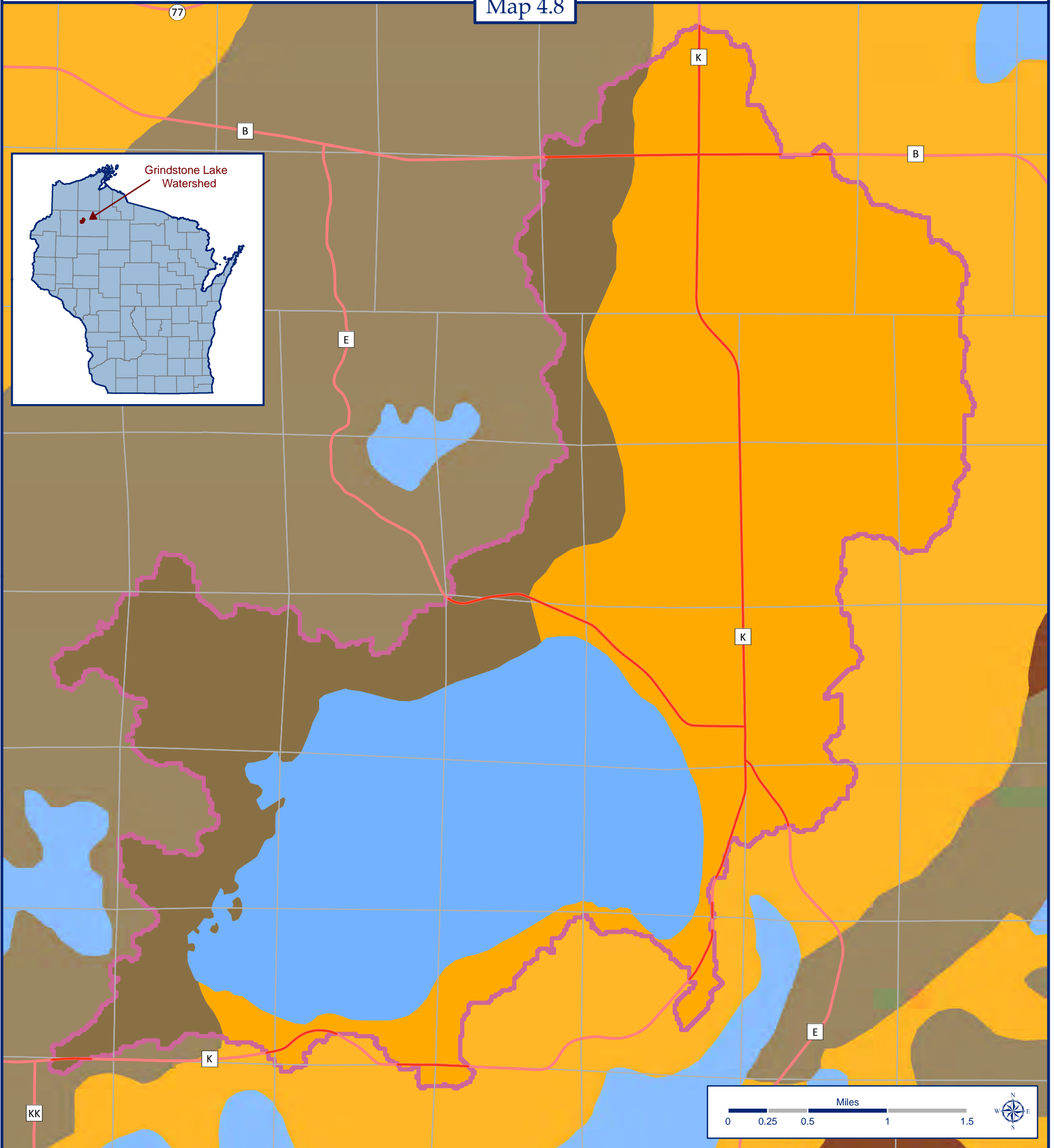
Sponsored by the Grindstone Lake Association











# Glacial Geology

## Grindstone Lake Watershed, Sawyer County, Wisconsin

Map 4.8



### Glacial Deposits and Watershed Statistics

	Outwash	0 Acres
	Pitted Outwash	5,775 Acres
	Ground Moraine	0 Acres
	End Moraine	2,748 Acres
	Surface Water	3,177 Acres
	Watershed Boundary	
	Public Land Survey System Section Boundaries	
	Major Highways	

Grindstone Lake Watershed equals 11,700 total acres

### Data Sources

Glacial deposits from Glacial Deposits of Wisconsin: Sand and Gravel Resource Potential map developed by the Land Resources Analysis Program, Wisconsin Geological and Natural History Survey, University of Wisconsin-Extension, and State Planning Office-Department of Administration, 1976.

Map was scanned and georeferenced by Jon Galloy, UW-Stevens Point GIS Center. Digital scan was digitized by Michael Broton, UW-Stevens Point GIS Center.

Map Created by Jon Galloy & Michael Broton -- Version 2/8/2011

Funding by Wisconsin Department of Natural Resources Lake Planning Grant Program



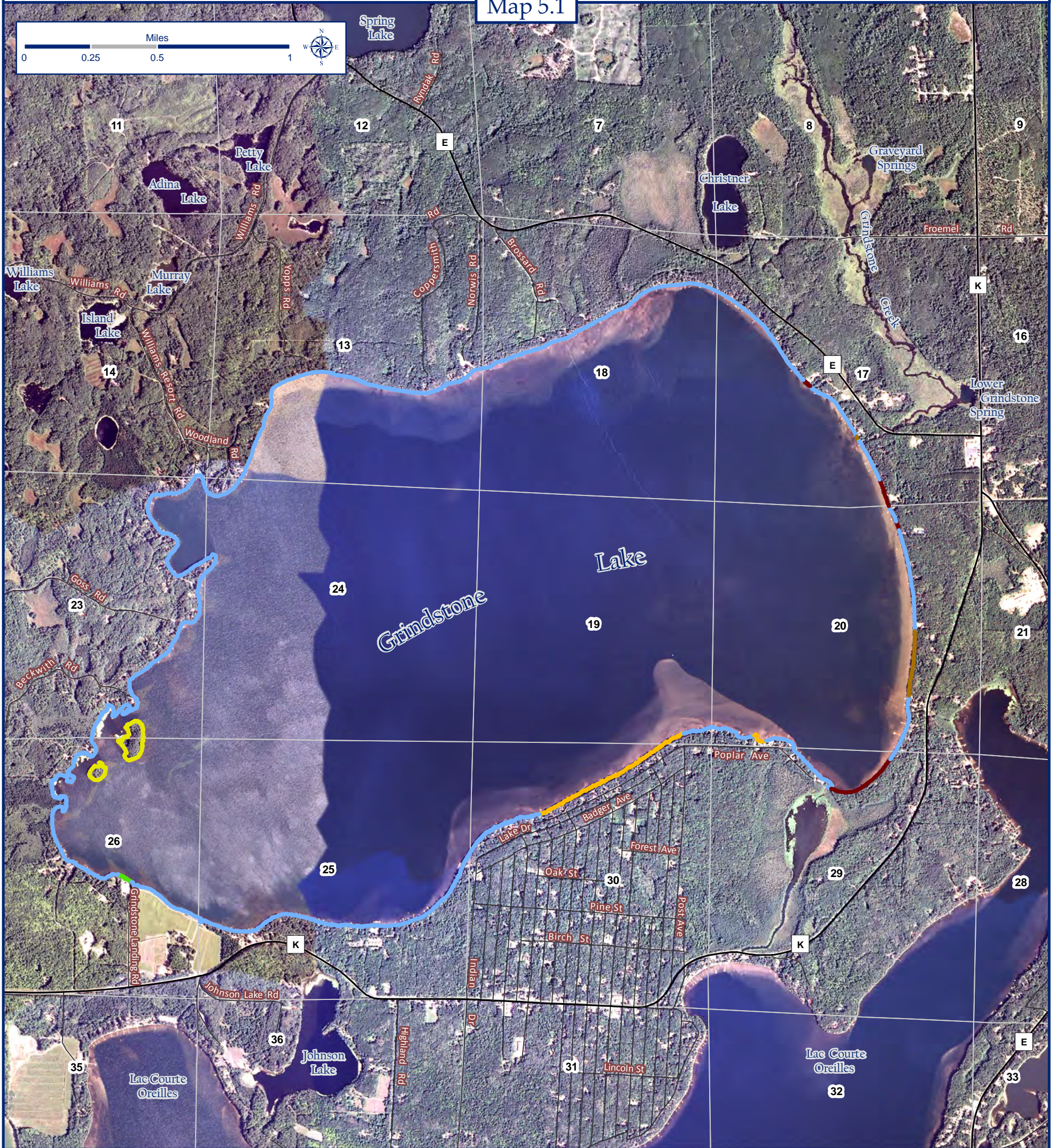
Sponsored by the Grindstone Lake Association



# Shoreline Ownership

## Grindstone Lake, Sawyer County, Wisconsin

Map 5.1



### Shoreline Ownership Type and Statistics

	Private	10.00 Miles		Municipal Road
	Town of Bass Lake	0.91 Miles		County Trunk Highway
	State of Wisconsin	0.73 Miles		Section Boundaries
	Held in Trust for LCO	0.49 Miles		Island Shoreline = 0.73 Miles
	Lac Courte Oreilles Band	0.26 Miles		Mainland Shoreline = 11.73 Miles
	WDNR	0.07 Miles		

Total shoreline for Grindstone Lake equals 12.46 miles

### Data Sources

Shoreline ownership digitized from two parcel shapefiles for years 2005 and 2008 obtained from the Sawyer County Land Records Department. The 2005 data covers the western half of Grindstone Lake, while the 2008 data covers the eastern half. These findings were transposed onto the digitized Grindstone Lake shoreline geodatabase which was derived from rectified imagery acquired from Sawyer County. Though there are incomplete records within the parcel data sets, conversations with the Sawyer County Land Information Office, The Bureau of Indian Affairs and the Lac Courte Oreilles Realty Office were used to fill in these gaps in parcel ownership along the riparian shoreline.

Map Created by Jon Galloy & Michael Broton - Version 12/20/2010

Funding by Wisconsin Department of Natural Resources Lake Planning Grant Program



Sponsored by the Grindstone Lake Association










# Shoreline Bottom Structure

## Grindstone Lake, Sawyer County, Wisconsin

Map 5.2



### Bottom Structure and Statistics

 Sand	6.32 Miles	 Silt	0.07 Miles
 Rubble/Cobble	3.60 Miles	 Municipal Road	
 Coarse Gravel	1.35 Miles	 County Trunk Highway	
 Detritus/Muck	0.46 Miles	 Section Boundaries	
 Fine Gravel	0.33 Miles		
 Area Not Inventoried	0.24 Miles		
 Small Boulder	0.09 Miles		

Total shoreline for Grindstone Lake equals 12.46 miles

### Data Sources

Shoreline bottom structure field inventories conducted by citizen volunteers of the Grindstone Lake area in conjunction with the UW-Stevens Point GIS Center, Summer 2010. Technical assistance was provided by Alex Smith, WDNR Northern Region Critical Habitat Coordinator. The inventory was conducted by boat in the littoral zone of Grindstone Lake. Attributes denoting type of bottom structure found in the littoral zone were affixed to the shoreline denoted on large-format, hard copy maps. Hardcopy maps were scanned, georeferenced to the Sawyer County Coordinate System and digitized to the Grindstone Lake shoreline geodatabase by Jon Galloy and Michael Broton from the UW-Stevens Point GIS Center. Birch Island, the smaller of Grindstone's two islands, was not inventoried for bottom structure.

Map Created by Jon Galloy & Michael Broton -- Version 12/20/2010

Funding by Wisconsin Department of Natural Resources Lake Planning Grant Program



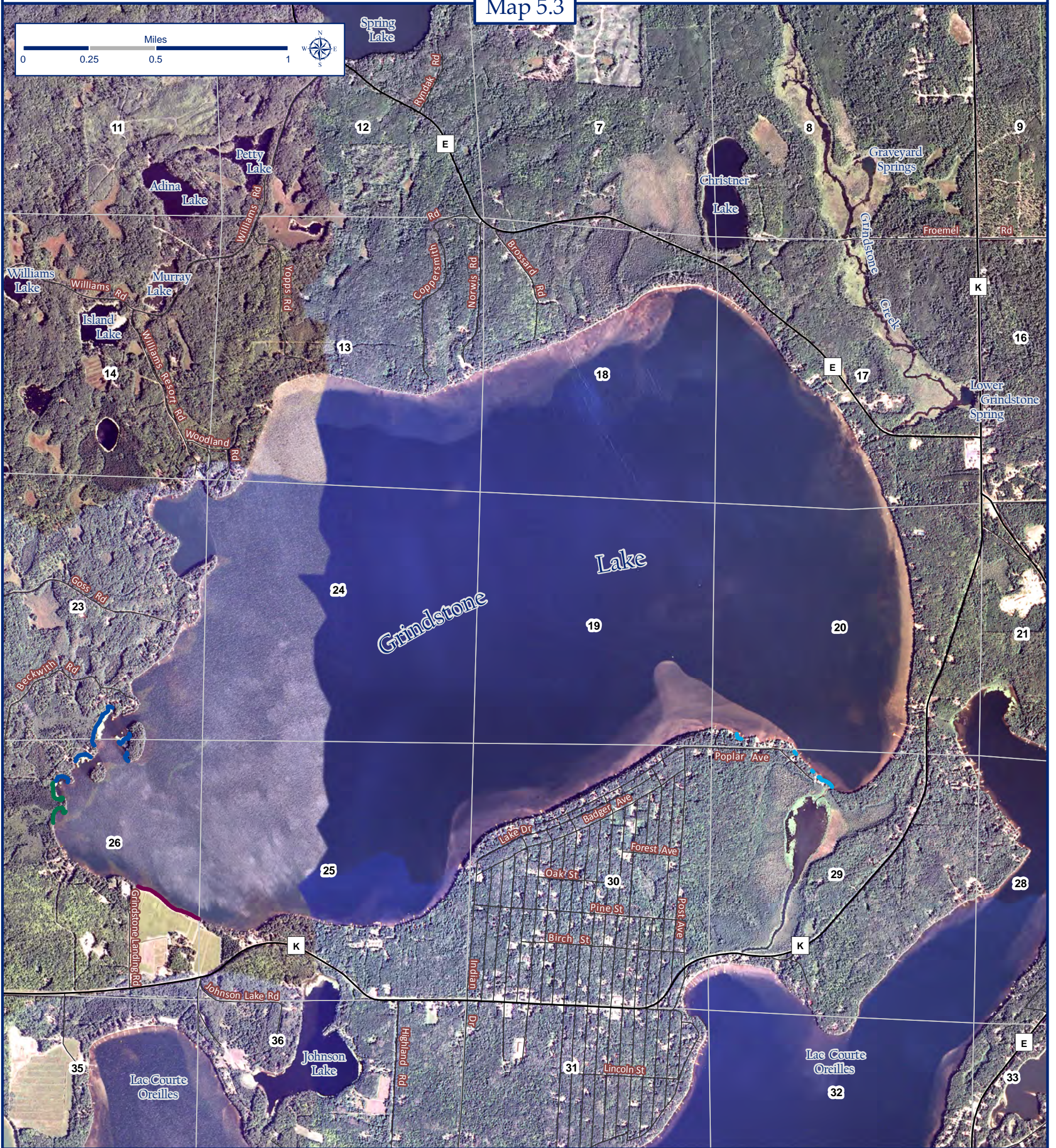
Sponsored by the Grindstone Lake Association











# Riparian Wetlands

## Grindstone Lake, Sawyer County, Wisconsin

Map 5.3



### Riparian Wetlands and Statistics

	Cattails	0.12 Miles		Municipal Road
	Tamarack Bog	0.23 Miles		County Trunk Highway
	Cranberry Bog	0.27 Miles		Section Boundaries
	Scrub/Shrub Wetland	0.50 Miles		
	No Wetlands Present	11.34 Miles		

Total shoreline for Grindstone Lake equals 12.46 miles

### Data Sources

Riparian wetland field inventories conducted by citizen volunteers from the Grindstone Lake area in conjunction with the UW-Stevens Point GIS Center, Summer 2010. Technical assistance was provided by Alex Smith, WDNR Northern Region Critical Habitat Coordinator. The inventory was conducted by boat within the littoral zone of Grindstone Lake. Attributes, indicating type of wetland, were affixed to large-format, hardcopy maps denoting the shoreline. Hardcopy maps were scanned, georeferenced to the Sawyer County Coordinate System, and digitized to the Grindstone Lake shoreline database by Jon Galloy, UW-Stevens Point GIS Center. This map denotes the wetland type found in the riparian areas of Grindstone Lake.

Map Created by Jon Galloy & Michael Broton -- Version 1/4/2010

Funding by Wisconsin Department of Natural Resources Lake Planning Grant Program



Sponsored by the Grindstone Lake Association













# Emergent Aquatic Macrophytes

## Grindstone Lake, Sawyer County, Wisconsin

Map 5.4



### Emergent Macrophytes (dominant species) and Statistics

 Unidentified Emergent — 0.01 Miles	 Water Lily (Yellow & White) — 0.58 Miles
 Cattails — 0.06 Miles	— No Macrophytes Present — 11.08 Miles
 Pickerelweed — 0.08 Miles	— Municipal Road
 Mixed Vegetation — 0.11 Miles	— County Trunk Highway
 Water Willow — 0.11 Miles	 Section Boundaries
 Soft-Stem Bulrush — 0.15 Miles	INVASIVE SPECIES
 Sedge — 0.28 Miles	 Purple Loosestrife — 6 Total

Total shoreline for Grindstone Lake equals 12.46 miles

### Data Sources

Emergent macrophyte field inventories conducted by citizen volunteers from the Grindstone Lake area in conjunction with the UW-Stevens Point GIS Center, Summer 2010. Technical assistance was provided by Kristy Maki, Sawyer County Aquatic Invasive Species Coordinator. The inventory was conducted by boat in the littoral zone of Grindstone Lake. Attributes, indicating type of emergent macrophyte, were affixed to large-format, hardcopy maps denoting the shoreline. Hardcopy maps were scanned, georeferenced to the Sawyer County Coordinate System and digitized to the Grindstone Lake shoreline geodatabase by Jon Galloy, UW-Stevens Point GIS Center. Only the dominate emergent macrophytes present in each patch are denoted. Purple loosestrife, an invasive species on Grindstone Lake, is also denoted.

Map Created by Jon Galloy & Michael Broton -- Version 12/22/2010

Funding by Wisconsin Department of Natural Resources Lake Planning Grant Program



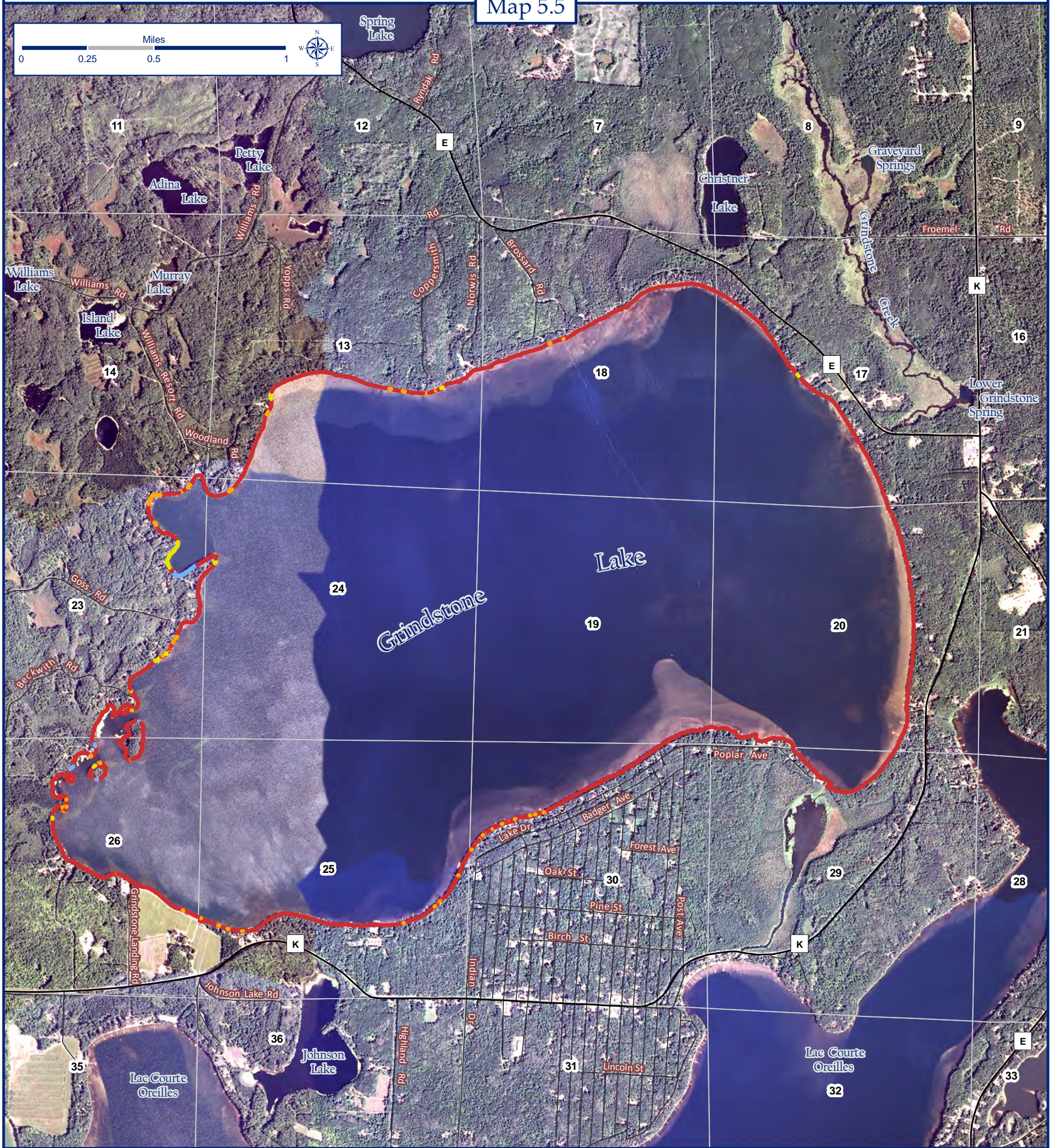
Sponsored by the Grindstone Lake Association



# Coarse Woody Habitat

## Grindstone Lake, Sawyer County, Wisconsin

Map 5.5



### Coarse Woody Habitat and Statistics

	Continuous	0.16 Miles		Municipal Road
	Scattered	0.26 Miles		County Trunk Highway
	Isolated	0.34 Miles		Section Boundaries
	Absent	11.70 Miles		

Total shoreline for Grindstone Lake equals 12.46 miles

### Data Sources

Coarse woody habitat field inventories conducted by citizen volunteers of the Grindstone Lake area in conjunction with the UW-Stevens Point GIS Center, Summer 2010. The inventory was conducted by boat in the littoral zone of Grindstone Lake. Attributes, indicating the density of woody habitat along the shoreline, were affixed to the Grindstone Lake shoreline denoted on large hardcopy maps. Hardcopy maps were scanned, georeferenced to the Sawyer County Coordinate System and digitized to the Grindstone Lake shoreline geodatabase. Jon Galloy and Michael Broton, from UW-Stevens Point GIS Center scanned, georeferenced and digitized the coarse woody habitat.

Map Created by Jon Galloy & Michael Broton -- Version 12/28/2010

Funding by Wisconsin Department of Natural Resources Lake Planning Grant Program



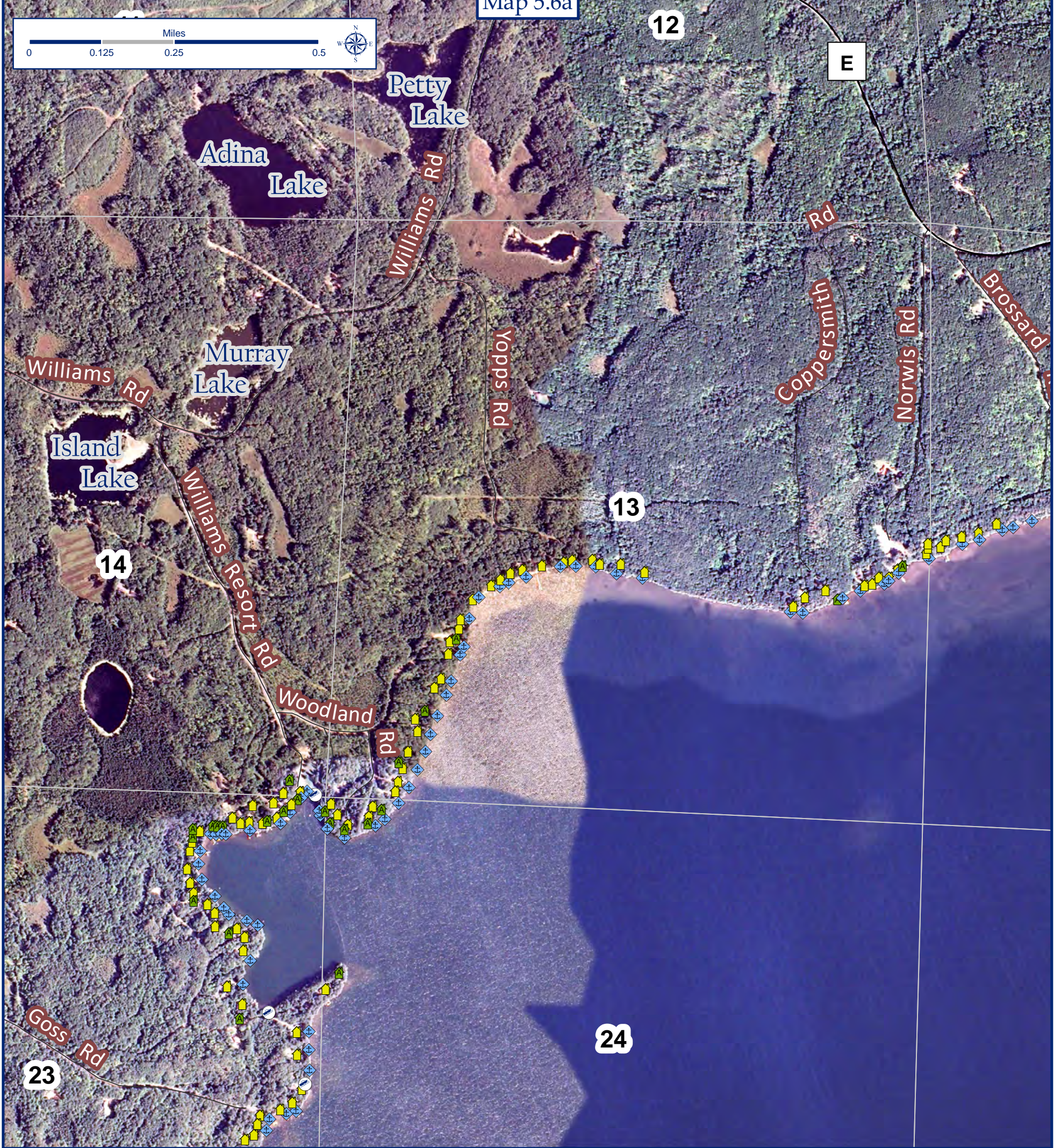
Sponsored by the Grindstone Lake Association



# Visible Structures

## Grindstone Lake, Sawyer County, Wisconsin

Map 5.6a



### Structures Visible from Littoral Zone and Statistics

- |   |                       |  |
|---|-----------------------|--|
|  Miscellaneous       | 0 Total Observations  |  Municipal Road       |
|  Boat Launch/Landing | 3 Total Observations  |  County Trunk Highway |
|  Accessory Building  | 23 Total Observations |  Section Boundaries   |
|  Deck, Dock or Pier  | 66 Total Observations |  |
|  Residence           | 79 Total Observations |  |

Total shoreline for Grindstone Lake equals 12.46 miles

### Data Sources

Visible structure field inventories conducted by citizen volunteers from the Grindstone Lake area in conjunction with the UW-Stevens Point GIS Center, Summer 2010. The inventory was conducted by boat in the littoral zone of Grindstone Lake during full leaf-on tree canopy conditions. Only structures visible to the naked eye were documented. Locations of structures were affixed to large-format hard copy maps and assigned a personal identification number. Attributes indicating type of structure, were recorded in a log book. Hard-copy maps were scanned, georeferenced to the Sawyer County Coordinate System, and digitized to the Grindstone Lake geodatabase by Jon Galloy and Michael Broton, UW-Stevens Point GIS Center.

Map Created by Jon Galloy & Michael Broton -- Version 1/7/2011

Funding by Wisconsin Department of Natural Resources Lake Planning Grant Program



Sponsored by the Grindstone Lake Association



# Visible Structures

## Grindstone Lake, Sawyer County, Wisconsin

Map 5.6b



### Structures Visible from Littoral Zone and Statistics

- |  |                     |                       |  |                      |
|--|---------------------|-----------------------|--|----------------------|
|  | Miscellaneous       | 1 Total Observations  |  | Municipal Road       |
|  | Boat Launch/Landing | 1 Total Observations  |  | County Trunk Highway |
|  | Accessory Building  | 16 Total Observations |  | Section Boundaries   |
|  | Deck, Dock or Pier  | 46 Total Observations |  |                      |
|  | Residence           | 77 Total Observations |  |                      |

Total shoreline for Grindstone Lake equals 12.46 miles

### Data Sources

Visible structure field inventories conducted by citizen volunteers from the Grindstone Lake area in conjunction with the UW-Stevens Point GIS Center, Summer 2010. The inventory was conducted by boat in the littoral zone of Grindstone Lake during full leaf-on tree canopy conditions. Only structures visible to the naked eye were documented. Locations of structures were affixed to large-format hard copy maps and assigned a personal identification number. Attributes indicating type of structure, were recorded in a log book. Hard-copy maps were scanned, georeferenced to the Sawyer County Coordinate System, and digitized to the Grindstone Lake geodatabase by Jon Galloy and Michael Broton, UW-Stevens Point GIS Center.

Map Created by Jon Galloy & Michael Broton -- Version 1/7/2011

Funding by Wisconsin Department of Natural Resources Lake Planning Grant Program



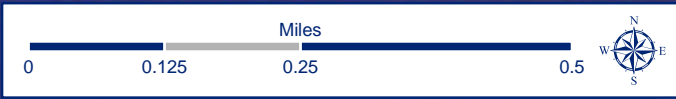
Sponsored by the Grindstone Lake Association



# Visible Structures

## Grindstone Lake, Sawyer County, Wisconsin

Map 5.6c



### Structures Visible from Littoral Zone and Statistics

- |                     |                       |                      |
|---------------------|-----------------------|----------------------|
| Miscellaneous       | 2 Total Observations  | Municipal Road       |
| Boat Launch/Landing | 1 Total Observations  | County Trunk Highway |
| Accessory Building  | 17 Total Observations | Section Boundaries   |
| Deck, Dock or Pier  | 43 Total Observations |                      |
| Residence           | 67 Total Observations |                      |

Total shoreline for Grindstone Lake equals 12.46 miles

### Data Sources

Visible structure field inventories conducted by citizen volunteers from the Grindstone Lake area in conjunction with the UW-Stevens Point GIS Center, Summer 2010. The inventory was conducted by boat in the littoral zone of Grindstone Lake during full leaf-on tree canopy conditions. Only structures visible to the naked eye were documented. Locations of structures were affixed to large-format hard copy maps and assigned a personal identification number. Attributes indicating type of structure, were recorded in a log book. Hard-copy maps were scanned, georeferenced to the Sawyer County Coordinate System, and digitized to the Grindstone Lake geodatabase by Jon Galloy and Michael Broton, UW-Stevens Point GIS Center.

Map Created by Jon Galloy & Michael Broton – Version 1/7/2011

Funding by Wisconsin Department of Natural Resources Lake Planning Grant Program



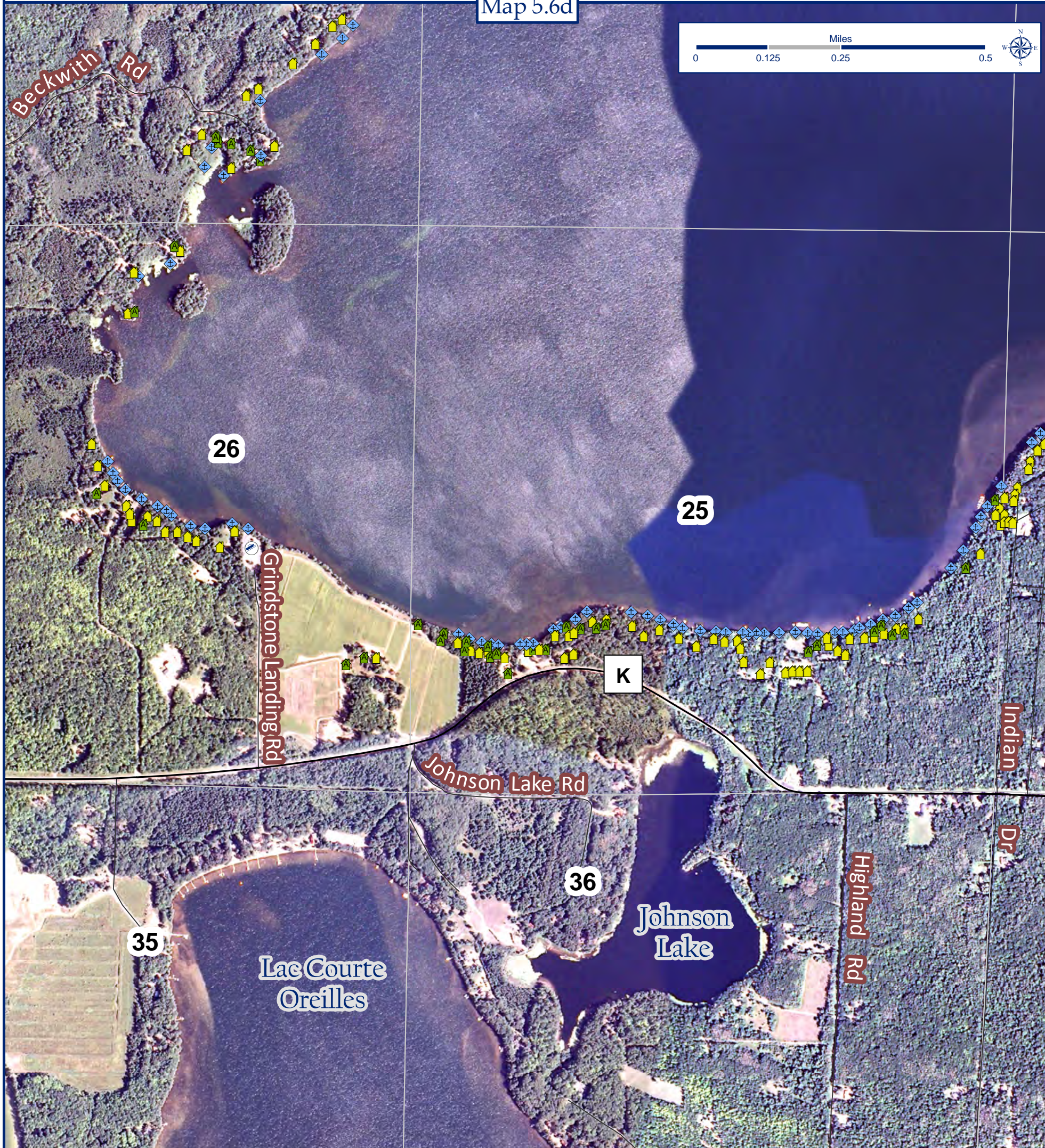
Sponsored by the Grindstone Lake Association



# Visible Structures

## Grindstone Lake, Sawyer County, Wisconsin

Map 5.6d



### Structures Visible from Littoral Zone and Statistics

	Miscellaneous	0 Total Observations		Municipal Road
	Boat Launch/Landing	1 Total Observations		County Trunk Highway
	Accessory Building	34 Total Observations		Section Boundaries
	Deck, Dock or Pier	67 Total Observations		
	Residence	85 Total Observations		

Total shoreline for Grindstone Lake equals 12.34 miles

### Data Sources

Visible structure field inventories conducted by citizen volunteers from the Grindstone Lake area in conjunction with the UW-Stevens Point GIS Center, Summer 2010. The inventory was conducted by boat in the littoral zone of Grindstone Lake during full leaf-on tree canopy conditions. Only structures visible to the naked eye were documented. Locations of structures were affixed to large-format hard copy maps and assigned a personal identification number. Attributes indicating type of structure, were recorded in a log book. Hard-copy maps were scanned, georeferenced to the Sawyer County Coordinate System, and digitized to the Grindstone Lake geodatabase by Jon Galloy and Michael Broton, UW-Stevens Point GIS Center.

Map Created by Jon Galloy & Michael Broton -- Version 1/7/2011

Funding by Wisconsin Department of Natural Resources Lake Planning Grant Program



Sponsored by the Grindstone Lake Association



# Dominant Riparian Trees

## Grindstone Lake, Sawyer County, Wisconsin

Map 5.7



### Dominant Riparian Trees and Statistics

	Unidentified Aspen	0.12 Miles		Red Pine	3.33 Miles
	White Cedar	0.35 Miles		White Pine	4.45 Miles
	No Dominant Species Present	0.36 Miles		Municipal Road	
	Unidentified Birch	0.42 Miles		County Trunk Highway	
	Tamarack	0.45 Miles		Section Boundaries	
	Red Oak	1.08 Miles			
	Unidentified Oak	1.90 Miles			

Total shoreline for Grindstone Lake equals 12.46 miles

### Data Sources

Dominant Riparian Tree field inventories conducted by citizen volunteers from the Grindstone Lake area in conjunction with the UW-Stevens Point GIS Center, Summer 2010. Technical assistance was provided by Kathy Moe, Biological Technician for the United States Forest Service. The inventory was conducted by boat in the littoral zone of Grindstone Lake. Attributes, indicating tree type, were affixed to large format, hardcopy maps denoting the shoreline. Hardcopy maps were scanned, georeferenced to the Sawyer County Coordinate System and digitized to the Grindstone Lake shoreline geodatabase by Jon Galloy, UW-Stevens Point GIS Center. Only dominant tree species within the riparian area are denoted.

Map Created by Jon Galloy & Michael Broton – Version 12/30/2010

Funding by Wisconsin Department of Natural Resources Lake Planning Grant Program



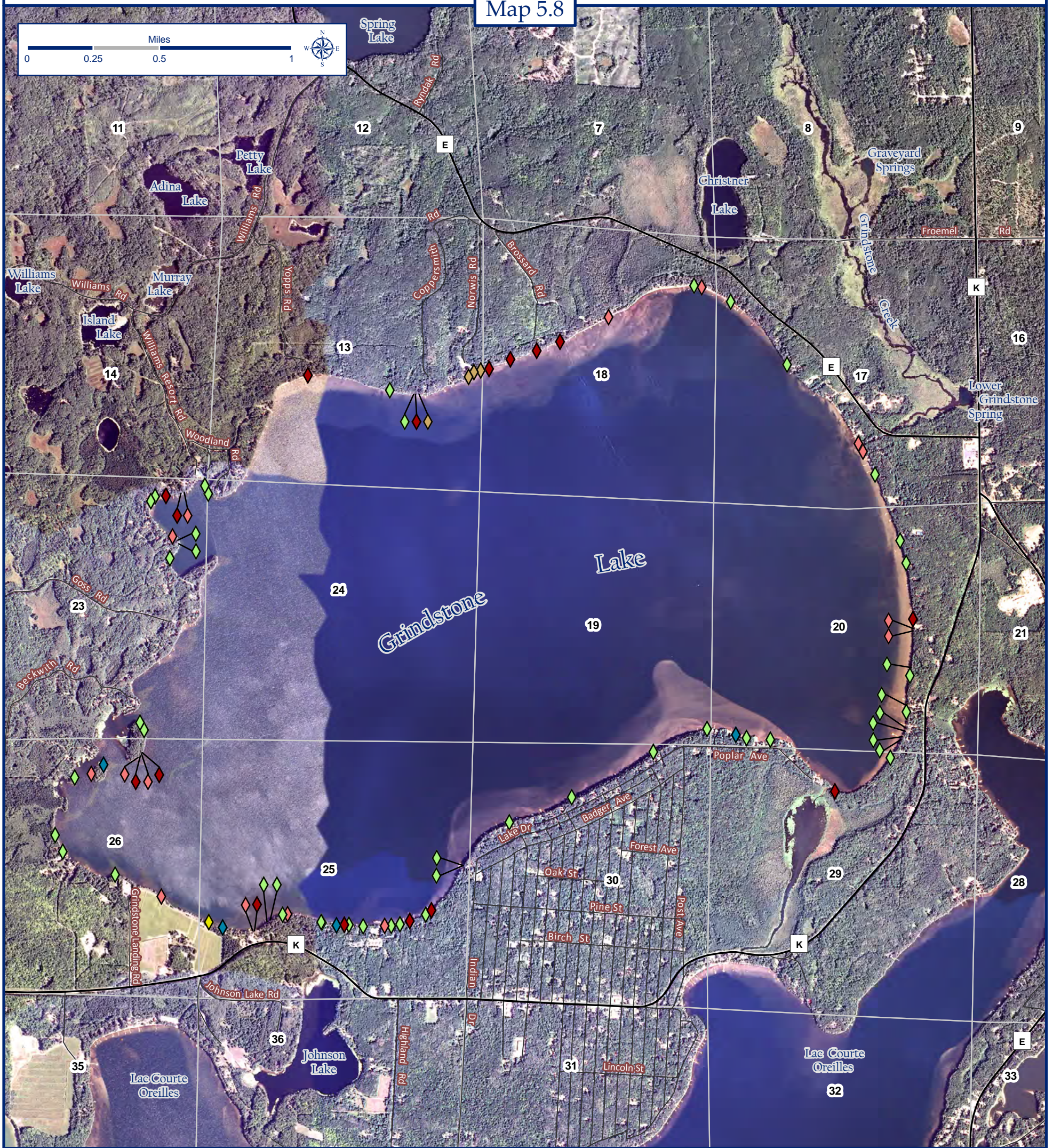
Sponsored by the Grindstone Lake Association



# Veteran Tree Specimens

## Grindstone Lake, Sawyer County, Wisconsin

Map 5.8



### Veteran Tree Specimens and Statistics

- |   |                          |
|---|--------------------------|
| ◆ Bigtooth Aspen — 1 Total Observation    | — Municipal Road         |
| ◆ Unidentified Oak — 4 Total Observations | —K— County Trunk Highway |
| ◆ White Cedar — 4 Total Observations      | 35 Section Boundaries    |
| ◆ Red Oak — 15 Total Observations         |                          |
| ◆ Red Pine — 16 Total Observations        |                          |
| ◆ White Pine — 47 Total Observations      |                          |

Total shoreline for Grindstone Lake equals 12.46 miles

### Data Sources

Veteran tree specimens were inventoried by citizen volunteers from the Grindstone Lake area in conjunction with the UW-Stevens Point GIS Center, Summer 2010. Technical assistance was provided by Kathy Moe, United States Forest Service Biological Technician. The veteran tree inventory was conducted by boat in the littoral zone of Grindstone Lake. Attributes, indicating tree type, were affixed to large-format, hardcopy maps denoting the shoreline. Hardcopy maps were scanned, georeferenced to the Sawyer County Coordinate System and digitized to the Grindstone Lake shoreline geodatabase by Jon Galloy, UW-Stevens Point GIS Center. Only dominant tree specimens within the riparian area are denoted.

Map Created by Jon Galloy & Michael Broton -- Version 12/29/2010

Funding by Wisconsin Department of Natural Resources Lake Planning Grant Program



Sponsored by the Grindstone Lake Association



# Shoreline Aesthetic Condition

## Grindstone Lake, Sawyer County, Wisconsin

Map 5.9



### Shoreline Condition and Statistics

	Highly Modified	3.93 Miles		Municipal Road
	Natural Shoreline	3.48 Miles		County Trunk Highway
	Slightly Modified	2.84 Miles		Section Boundaries
	Moderately Modified	2.21 Miles		

Total shoreline for Grindstone Lake equals 12.46 miles

### Data Sources

Shoreline aesthetic condition field inventories conducted by citizen volunteers from the Grindstone Lake area in conjunction with the UW-Stevens Point GIS Center, Summer 2010. Areas observed by boat from the littoral zone of Grindstone Lake were classified as follows: Natural - no visible structures or disturbance of riparian vegetation. Slightly Modified - structures slightly visible and riparian vegetation slightly modified. Moderately Modified - structures somewhat hidden and/or riparian vegetation moderately modified. Highly Modified - structures prominent and/or riparian vegetation highly modified. These categories serve as an indicator of natural scenic beauty.

Map Created by Jon Galloy & Michael Broton -- Version 12/22/2010

Funding by Wisconsin Department of Natural Resources Lake Planning Grant Program



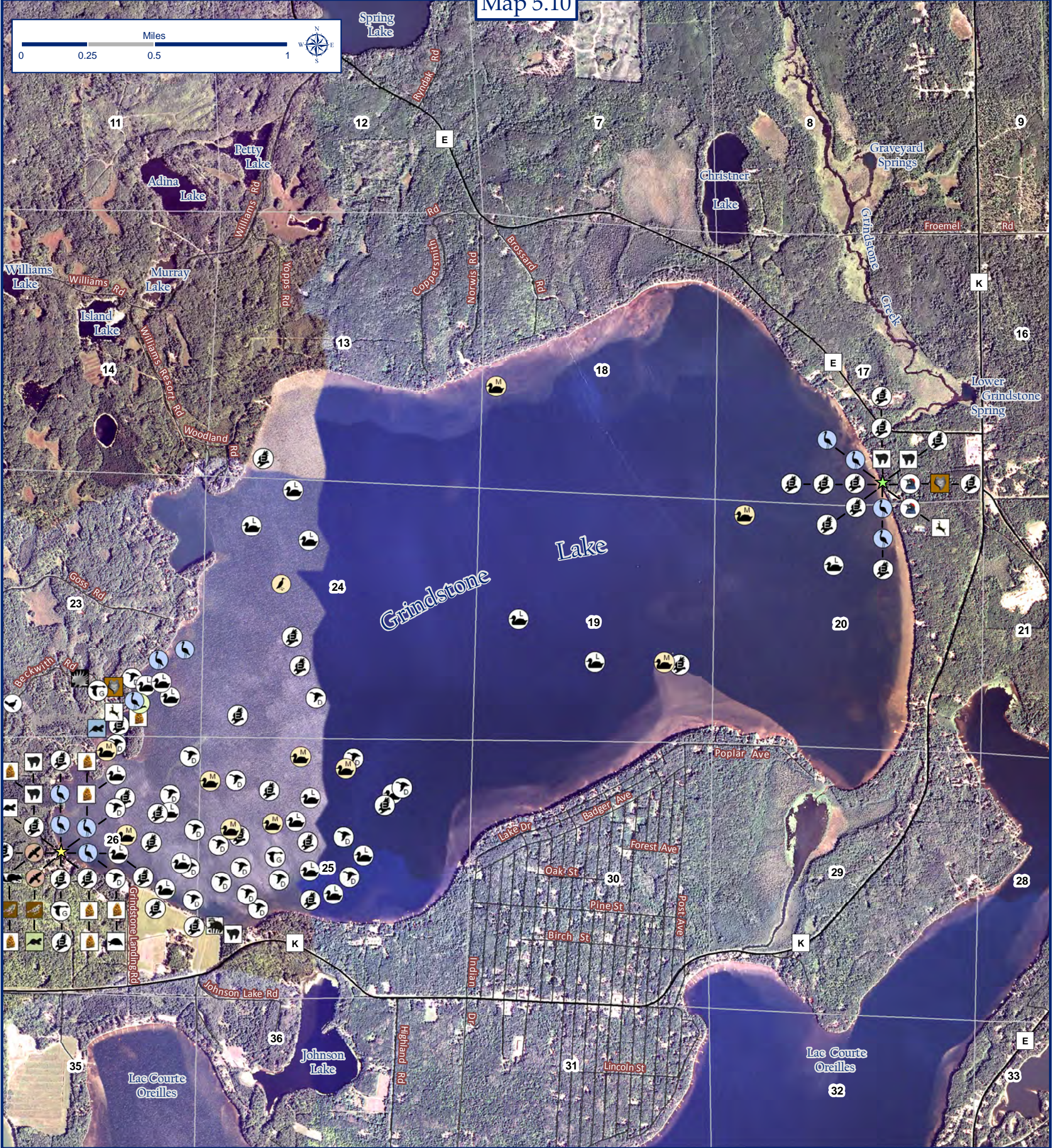
Sponsored by the Grindstone Lake Association



# Wildlife Observations

## Grindstone Lake, Sawyer County, Wisconsin

Map 5.10



### Wildlife Observations and Statistics

Red-Winged Blackbird — 1	Merganser — 10	Muskrat; Mink — 1
Bald Eagle — 33	Woodpecker — 2	Otter — 1
Heron — 11	Bear — 5	Porcupine — 1
Goose — 3	Fox — 2	Raccoon — 1
Ruffed Grouse — 1	Beaver — 8	Turtle — 1
Cormorant — 1	Deer — 2	Chipmunk — 1
Hawk — 2	Eastern Phoebe — 2	Observation Point One
Duck — 21	Fisher — 1	Observation Point Two
Loon — 20		

Total shoreline for Grindstone Lake equals 12.46 miles

### Data Sources

Wildlife observation field inventories conducted by citizen volunteers from the Grindstone Lake Association in conjunction with the UW-Stevens Point GIS Center, Summer 2010. Locations and attributes of wildlife observations denoted on hardcopy maps. Locations and attributes modified and digitized for cartographic display by Michael Broton, UW-Stevens Point GIS Center. Locations denoted by citizens are preserved in a spatial geodatabase.

Locations denoted with a star document multiple wildlife sightings observed from a single location, not the location where wildlife was present.

Map Created by Jon Galloy & Michael Broton -- Version 2/21/2011

Funding by Wisconsin Department of Natural Resources Lake Planning Grant Program



Sponsored by the Grindstone Lake Association



# Critical Habitat Features






## Grindstone Lake, Sawyer County, Wisconsin

Map 6.1



### Critical Habitat Shoreline Legend & Statistics

#### Critical Habitat Feature(s) Present

-  No ————— 5.28 Miles or 42.38 % of Total Shoreline
-  Yes ————— 7.18 Miles or 57.62 % of Total Shoreline
-  Municipal Road
-  County Trunk Highway
-  Section Boundaries

Total shoreline for Grindstone Lake equals 12.46 miles

### Data Sources

Critical habitat was designated yes by the presence of any one of the following shoreline attributes: Aquatic Emergent Macrophyte (any type), continuous or scattered Course Woody Debris, tamarack or shrub/scrub Riparian Wetland or Bottom Structure consisting of fine or course gravels, rubble/cobble or small boulders and Shoreline Aesthetic existing in a natural (undisturbed) condition 395 feet or greater in length. The shoreline attributes used to derive critical habitat were collected by members of the Grindstone Lake Association with assistance from members of the UWSP GIS Center during shoreline inventories collected summer, 2010. The parameters used to define critical habitat are outlined in "Wisconsin's Critical Habitat Designation Manual" prepared by Paul Cunningham of the Wisconsin Department of Natural Resources.

Map Created by Jon Galloy & Michael Broton-- Version 6/20/2010

Funding by Wisconsin Department of Natural Resources Lake Planning Grant Program



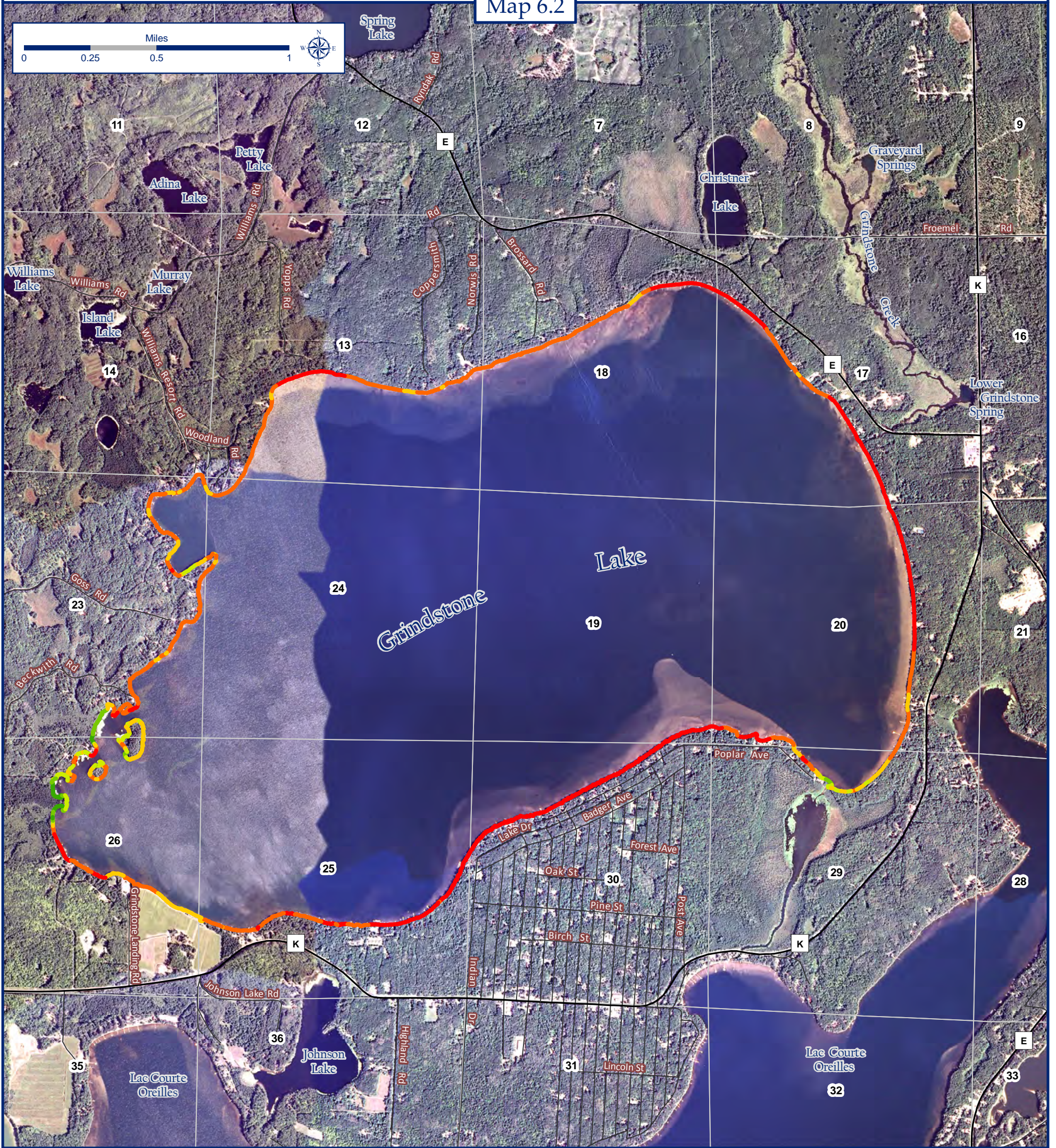
Sponsored by the Grindstone Lake Association



# Priority Shorelines

## Grindstone Lake, Sawyer County, Wisconsin

Map 6.2



### Priority Shorelines Legend & Statistics

#### Priority Ranks ( Highest to Lowest )

	5	0.21 Miles or 1.69 % of Priority Shoreline		Municipal Road
	4	0.27 Miles or 2.17 % of Priority Shoreline		County Trunk Highway
	3	0.65 Miles or 5.22 % of Priority Shoreline		Section Boundaries
	2	1.59 Miles or 12.76 % of Priority Shoreline		
	1	5.25 Miles or 42.13 % of Priority Shoreline		
	0	4.49 Miles or 36.03 % of Priority Shoreline		

Total priority shoreline for Grindstone Lake equals 12.46 miles

### Data Sources

Shoreline priority was derived by members of the Grindstone Lake Association on May 7th, 2011 at the Bass Lake Town Hall. The priority criteria consisted of those areas of the riparian shoreline that present any of the following critical habitat indicators: Any Emergent Aquatic Macrophyte, scattered or continuous Course Woody Debris, tamarack or shrub/scrub Riparian Wetlands, fine or coarse gravel, rubble/cobble or small boulder Bottom Structure and a natural condition Shoreline Aesthetic of 395 feet or greater. The presence of Tamarack or White Cedar was given priority over other tree species occurring on the riparian shoreline. The presence of a Critical Habitat Indicator was scored with a value of 1 and the absence was scored as 0. The presence of priority tree species Tamarack and White Cedar was also scored as 1 with all other species scored as 0. Scores were then summarized to priority rank the Grindstone shoreline.

Map Created by Jon Galloy & Michael Broton-- Version 12/29/2010

Funding by Wisconsin Department of Natural Resources Lake Planning Grant Program



Sponsored by the Grindstone Lake Association