



# Bertha and Clamshell Lakes Implementation Plan

## Introduction

In 2018-2019, Crow Wing and Cass Counties, Soil and Water Conservation Districts (SWCDs) and citizens partnered to develop a comprehensive watershed management plan for the Pine River. This process consisted of:

- 1) Ten stakeholder meetings that included citizens, businesses, lake associations, state agencies, and local officials.
- 2) Prioritized water and soil health issues and concerns for the watershed
- 3) Developed action items for specific watershed areas
- 4) State and local agencies adopted a ten-year watershed conservation plan.

The Bertha and Clamshell Lakes plan is based on the Pine River Comprehensive Watershed Management Plan. The plan characterized Clamshell Lake as having a decrease in water visibility (water clarity), Bertha Lake stable water clarity. Both lakes have high sensitivity to phosphorus and high economic significance to the community. The plan categorized the lake and land as Enhance/Protect Management. This plan does not address Aquatic Invasive Species (AIS) because Counties have their own AIS Plan.

### Management Focus For These Lakes Is:

Clamshell

Bertha

**ENHANCE/  
PROTECT**  
-- Fix It --

**Definition:** Reduce phosphorus loading through stormwater and agricultural best management practices.

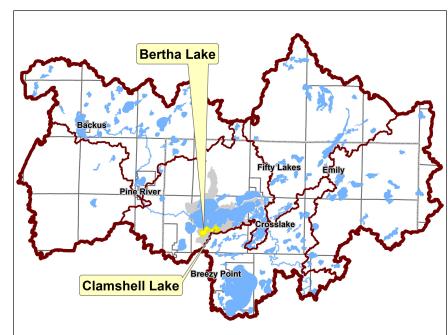
**PROTECT**  
-- Keep It --

**Definition:** Protect current water quality by protecting the surrounding land.

**VIGILANCE**

-- Keep It --

### Location of lakes within the watershed



*"Harmonizing people, water, forests, and the economy in a place to renew your spirit."*

# Why does it matter?



## Property Values

What is your lake home worth?

Studies on Minnesota lakes show that lake property values are directly tied to water quality. For a three-foot decrease in water clarity, prices were reduced up to \$594 per shoreline foot. For a three-foot increase in clarity, prices increased up to \$423 per shoreline foot. This change in value can be a significant financial loss or gain to an individual property owner as well as a community.



## Fishing & Recreation

Do you enjoy fishing and swimming? Minnesota's native gamefish, such as walleyes, need clear water to see their prey, aquatic plants to hide and spawn in, and shade to keep cool. Keeping native plants in the lake and trees along the shoreline provide shade, spawning habitat, and protection for the game fish we love to catch. These plants and trees also help stop runoff and keep the lake clear for swimming and recreational activities.



## Habitat

Do you enjoy watching loons, bald eagles, turtles, butterflies, songbirds and other wildlife at the lake?

These animals depend on shoreline plants for nesting and cover, trees and forests for their homes, and native plants and flowers for pollinating. Keeping some of your yard natural enhances the habitat for these animals, ensuring their survival.

## Be a good neighbor, take care of your lake!



Want to learn more about taking care of lakes? Watch a short video at: <https://youtu.be/dwjAoRwLrmM>





## Plan goals and current status

This plan set numerical, measurable goals for each lake to achieve in the next 10 years. Bertha and Clamshell lakes project status is indicated below.

### Phosphorus Reduction

1 Reduce annual phosphorus loading into declining lakes by 5% by implementing long-term stormwater best management practices in residential and road areas.

#### Bertha Lake Status

- o Phosphorus source: Mix
- o Phosphorus load to the lake per year: 713 lbs
- o 5% Reduction Goal: 36 lbs
- o Goal is "Protect" because the lake has an improving water quality trend
- o "Protect" goal: 10 rain gardens in 10 years

#### Clamshell Lake Status

- o Phosphorus source: Nearshore
- o Phosphorus load to the lake per year: 166 lbs
- o 5% Reduction Goal: 8 lbs
- o Goal is "Enhance" because the lake has a declining water quality trend
- o "Enhance" goal: 40 rain gardens in 10 years

### Shoreline and Land Protection

4 Protect and enhance forest cover, outstanding lake water quality, habitat, surficial sand aquifers, and downstream drinking water by promoting 75% land protection in targeted minor watersheds.

5 Protect two miles of undeveloped riparian lands, ice ridges and forested riparian corridors through outreach to private residents.

#### Bertha and Clamshell Lakes Status

- o Current % of the minor watershed protected: 66% (Whitefish chain of lakes)
- o Additional acres needed to reach the 75% protection goal: 1,498 acres (Whitefish chain of lakes)
- o Acres that have the potential to be protected: Bertha = 20 acres; Clamshell = 60 acres

### Shoreline Restoration

2 Maintain and enhance/restore two miles of riparian vegetation near streams and lakes with over 10% impervious surface/disturbed area through outreach to private residents.

#### Bertha and Clamshell Lakes Status

- o Average Impervious surface: Bertha, 15%; Clamshell, 10%
- o Number of parcels that are high priority for management (Map 1): 51
- o Ten-year goal: Bertha = 7 projects; Clamshell = 4 projects

### Groundwater

Maintain high quality drinking water in surficial sand aquifer areas by encouraging landowners to have their subsurface sewage treatment systems maintained every three years to achieve a 90% maintenance rate for the watershed.

6 Bertha and Clamshell Lakes Status

- o Estimated number of septic systems in the shoreland zone above the surficial sand aquifer: 129

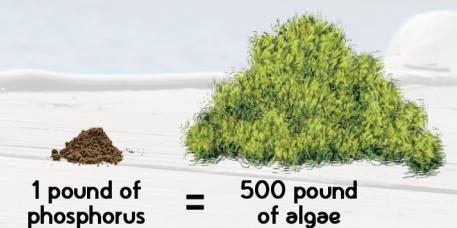
7 Locate and seal 30 unused residential wells per year to prevent groundwater contamination.

Bertha and Clamshell Lakes Status

- o Estimated number of wells in the shoreland zone above the surficial sand aquifer: 129

8 Manage chlorides reaching surface and groundwater from road salts and water softener salts going into sewage treatment systems.

Phosphorus is a nutrient found in manure, leaves, soil, and fertilizer. Under natural conditions phosphorus is typically scarce in water. Human activities, however, have resulted in excessive phosphorus loading into our lakes. Phosphorus triggers harmful algae blooms.





## What can we do?

Private landowners can help improve lake water quality and achieve watershed plan goals by implementing the following projects below. Technical and financial assistance is available to help with these projects.

Goal	Implementation Action	Minimum 10-year goal	Annual Goal	Where	Lead Entity	Supporting Entities	Estimated Cost	Landowner Cost
Phosphorus Reduction	1 Install rain gardens and stormwater management practices to capture rainwater and let it infiltrate instead of running off into the lake.	Bertha: 10 projects Clamshell: 40 projects	Bertha: 1/year Clamshell: 4/year	Map 1	Crow Wing SWCD <small>Cost share available</small>	WAPOA, Landowners	\$5,000 each \$250,000 total	Cost share may vary.
Shoreline Restoration	2 Install shoreline buffers of native plants to protect the shoreline from erosion and provide habitat for fish and wildlife.	Bertha: 7 projects Clamshell: 4 projects	1 project/year <small>total</small>	Map 1	Crow Wing SWCD <small>Cost share available</small>	WAPOA	\$4,000 each \$44,000 total	Cost share may vary.
	3 Plant trees along your shoreline.	500 trees <small>each lake</small>	50/year <small>each lake</small>	Map 1	Crow Wing SWCD Tree Sale <a href="https://crowningswcd.org/annual-tree-plant-sale/">https://crowningswcd.org/annual-tree-plant-sale/</a>	Landowners	\$36 for 25 trees \$720 total	\$36 for 25 trees
Shoreline & Land Protection	4 Develop a Forest Stewardship Plan (minimum 20-acre area).	3 forest plans <small>total</small>	1 every 3 years <small>total</small>	Map 2	Crow Wing SWCD <small>Cost share available</small>	Landowners	\$1,800	Cost share may vary.
	Sign up for Sustainable Forest Incentive Act (SFIA) to receive payments to keep wooded areas undeveloped (minimum 20-acre area).	60 acres <small>total</small>	20 acres every 3 years <small>total</small>	Map 2	Crow Wing SWCD	Landowners	\$3,788	Requires a Forest Stewardship Plan (above)
	5 Permanently protect undeveloped land and shoreline with conservation easements.			Map 2	Crow Wing SWCD	NWLT, TNC, MLT, DNR, MHB, Landowners	\$19,274	Attorney fees, title commitment, closing costs
Monitoring	Continue to monitor Secchi depth annually to track trends.	10-year trend analysis	Minimum of 5 readings per year	Site 201	WAPOA	Crow Wing County	\$0	\$0
Groundwater	6 Have subsurface sewage treatment systems maintained/pumped every three years.	Pump 3 times in 10 years	Pump every 3 years	Map 3	Crow Wing County	Crow Wing SWCD, Landowners, WAPOA, Lake Associations	Approx. \$140 each	Approximately \$140 each
	7 Seal unused wells in the Shoreland Zone.	10 wells	1/year	Map 3	Crow Wing County <small>Cost share available for half of total</small>	Landowners	\$1,000 each \$10,000 total	Approximately \$500 each
	8 Minimize chloride use on driveways, sidewalks, and in water softeners.	Only use minimum amount necessary	--	Map 1	Landowners	--	\$0	\$0

Acronyms: SWCD = Soil and Water Conservation District • NWLT = Northern Waters Land Trust • MHB = Mississippi Headwaters Board • TNC = The Nature Conservancy • MLT = Minnesota Land Trust • WAPOA = Whitefish Area Property Owners Association



## Map 1: Impervious Surface.

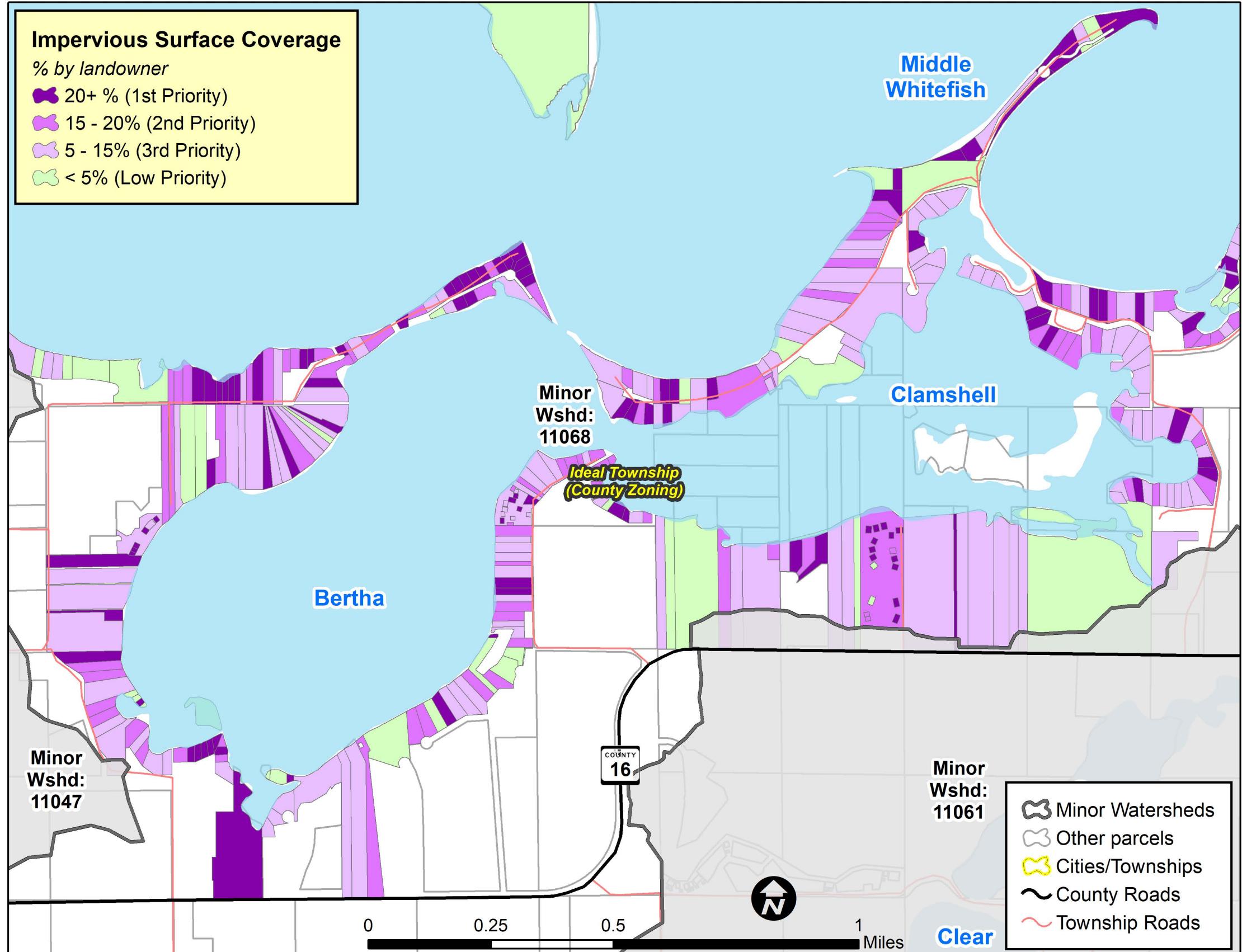
Impervious surface is where rain cannot soak into the ground and therefore runs over the surface, which includes roofs, driveways, sidewalks, and patios. When rain water soaks into the ground it gets filtered; when it runs off the land into the lake it carries with it dirt and chemicals that can harm the lake.

The Crow Wing County shoreline ordinance allows up to 25% of a lake lot to be impervious (total square footage of impervious items such as the house, shed, sidewalks, etc divided by the total lot size). For example, a 100 ft wide x 1,000 ft deep lot = 100,000 sq. ft. To stay under 25% impervious, the total house + garage + sidewalk + driveway must remain below 25,000 square feet. Contact Crow Wing County Land Services Department with any questions (218-824-1010, [landservices@crowwing.us](mailto:landservices@crowwing.us)).

Lakes with more than 15% impervious surface are required to have stormwater management. This map shows each parcel around the shoreline and its percent impervious surface. Parcels that are dark purple are the highest priority for stormwater management such as rain gardens, shoreline buffers and tree planting to minimize runoff into the lake. Large parcels that are light green could be candidates for easements for permanent protection.



Want to learn more about rain gardens?  
Watch a video at:  
<https://youtu.be/ZHeY6CUAS8s>

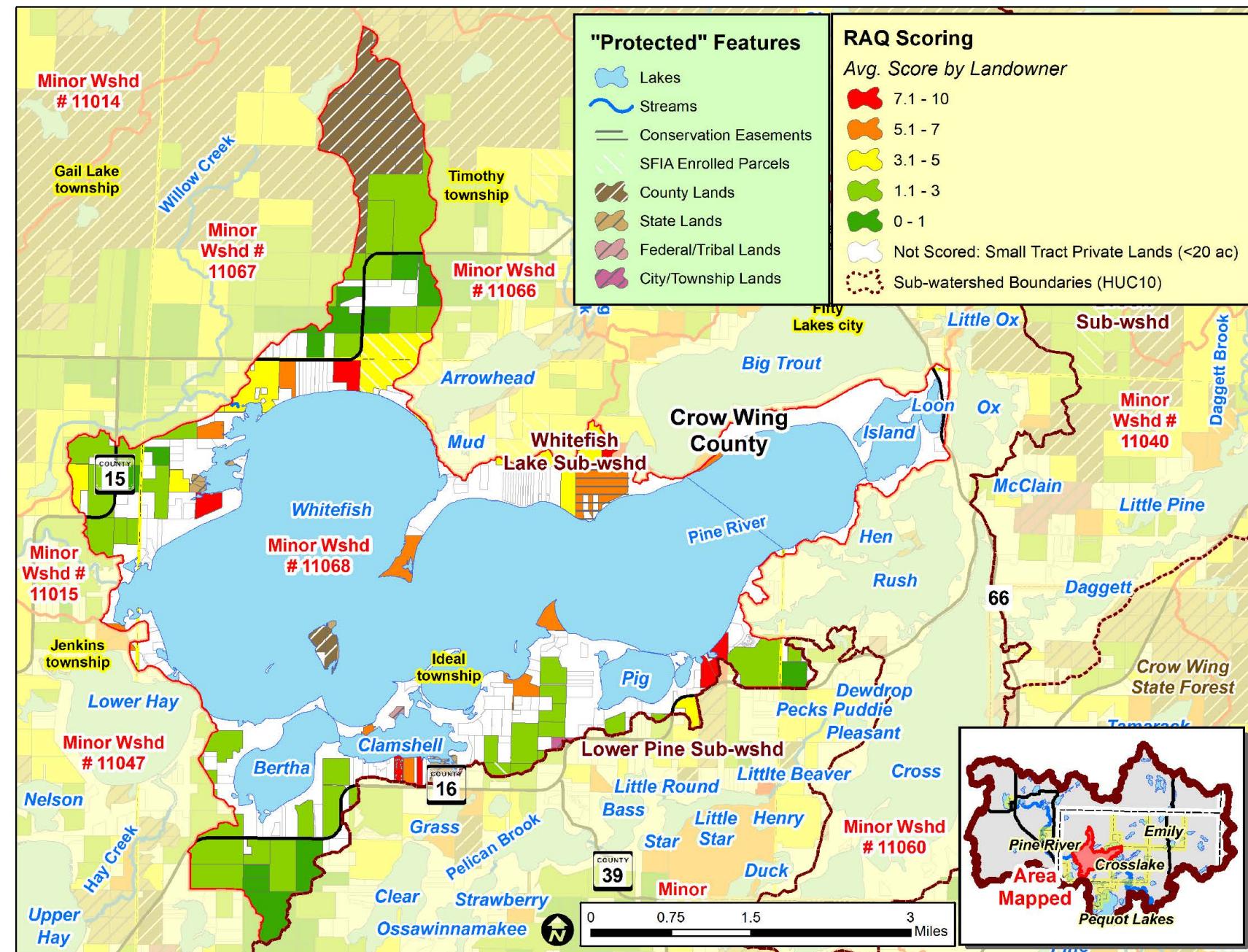




## Map 2: Protection.

This map shows each parcel in the land area that drains towards the lake. Parcels that are red or orange are the highest priority for increasing protection of the land. Landowners in these high priority areas can contact the SWCD for protection options such as Forest Stewardship Plans, the Sustainable Forest Incentive Act, and Conservation Easements.

### RAQ Scoring for Landowners in the Whitefish Lake Minor Watershed (Minor #11068)



Scoring Criteria:		
Riparian	3	Riparian
	2	Non-riparian: Shoreland (1 parcel back)
	1	2 parcels back
Adjacency	3	2 sides touching public land
	2	1 side touching public land
	1	One parcel removed from public land or touching parcel with SFIA or Easement
Quality*	3	1 point for each feature that the parcel touches: such as High or Outstanding Biodiversity (upl. or aqu.), Wild Rice L, Cisco L, Trout L/Streams, etc.
	2	
	1	

\* Quality is locally determined and for this project included other features, including groundwater resources. For this project, quality also included:

- Outstanding Resource Value Resources (MPCA)
- Old Growth Forests (DNR)
- Lakes with Exceptional IBI Scores (DNR)
- Drinking Water Supply Management Areas (MDH)
- Source Water Assessment Areas (MDH)
- Medium High or High Wildlife Action Network Score (DNR)
- Priority Shallow/Waterfowl Lakes
- Audubon Important Bird Areas (IBAs)
- Rare Species (DNR)...see disclaimer below

*Rare species data included in the RAQ scoring: Copyright 2018, State of Minnesota, Department of Natural Resources. Rare species data included here were provided by the Division of Ecological and Water Resources Division, Minnesota Department of Natural Resources (DNR), and were current as of May 2018. These data are not based on an exhaustive inventory of the state. The lack of data for any geographic area shall not be construed to mean that no significant features are present.*



PINE RIVER WATERSHED



### Map 3: Wells & Septic Systems.

The groundwater in the Pine River Watershed is very shallow and the soils are sandy, which is called a surficial sands aquifer. This shallow nature makes the groundwater susceptible to contamination.

Septic tanks and holding tanks, if not properly maintained, can leak into the ground and reach the groundwater, which makes it unsafe to drink.

The area around your wellhead should also be protected so that contaminants can't seep into the groundwater and your well. Don't park your car, apply fertilizer or chemicals, or dump waste near your wellhead.

Any unused wells should be sealed to 1) prevent children and animals from falling in, 2) prevent contamination from entering the groundwater, and 3) prevent liability issues with old, unused wells. Contact a well driller to seal any unused wells.

This map shows the locations of wells around the Bertha and Clamshell Lakeshore. It is assumed that where there are wells there are also septic systems. Property owners can refer to the Groundwater section on page 4 for guidance on properly maintaining their septic system and protecting their drinking water.



Want to learn more about wells?  
Watch a 5 minute video here:  
<https://youtu.be/gRSHJpe8pq8>





Want to find out more?

Find out more! To dig deeper into the plan details, visit: [www.crowning.us/1476/Pine-River-1W1P](http://www.crowning.us/1476/Pine-River-1W1P)

## Plan Administration

This plan will be implemented through a Memorandum of Understanding between Cass County, Cass SWCD, Crow Wing County, and Crow Wing SWCD.



Crow Wing County (218) 824-1010  
Crow Wing SWCD (218) 828-6197  
Cass County (218) 547-7241  
Cass County SWCD (218) 547-7399