



Score Your Shore  
Lake Steward Program  
Watershed Health Assessment Framework for Lakes (WHAF for Lakes)

Paul J. Radomski  
March 18, 2024  
DNR Division of Ecological and Water Resources



# We Have a Problem



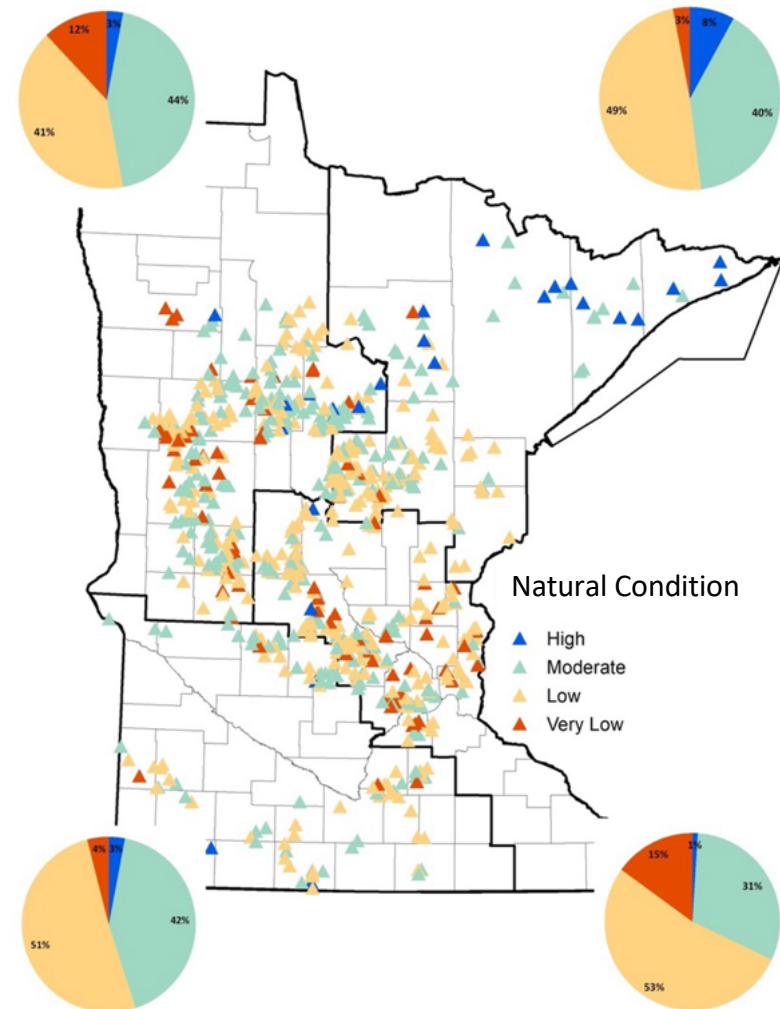


## Lakeshore Buffers –

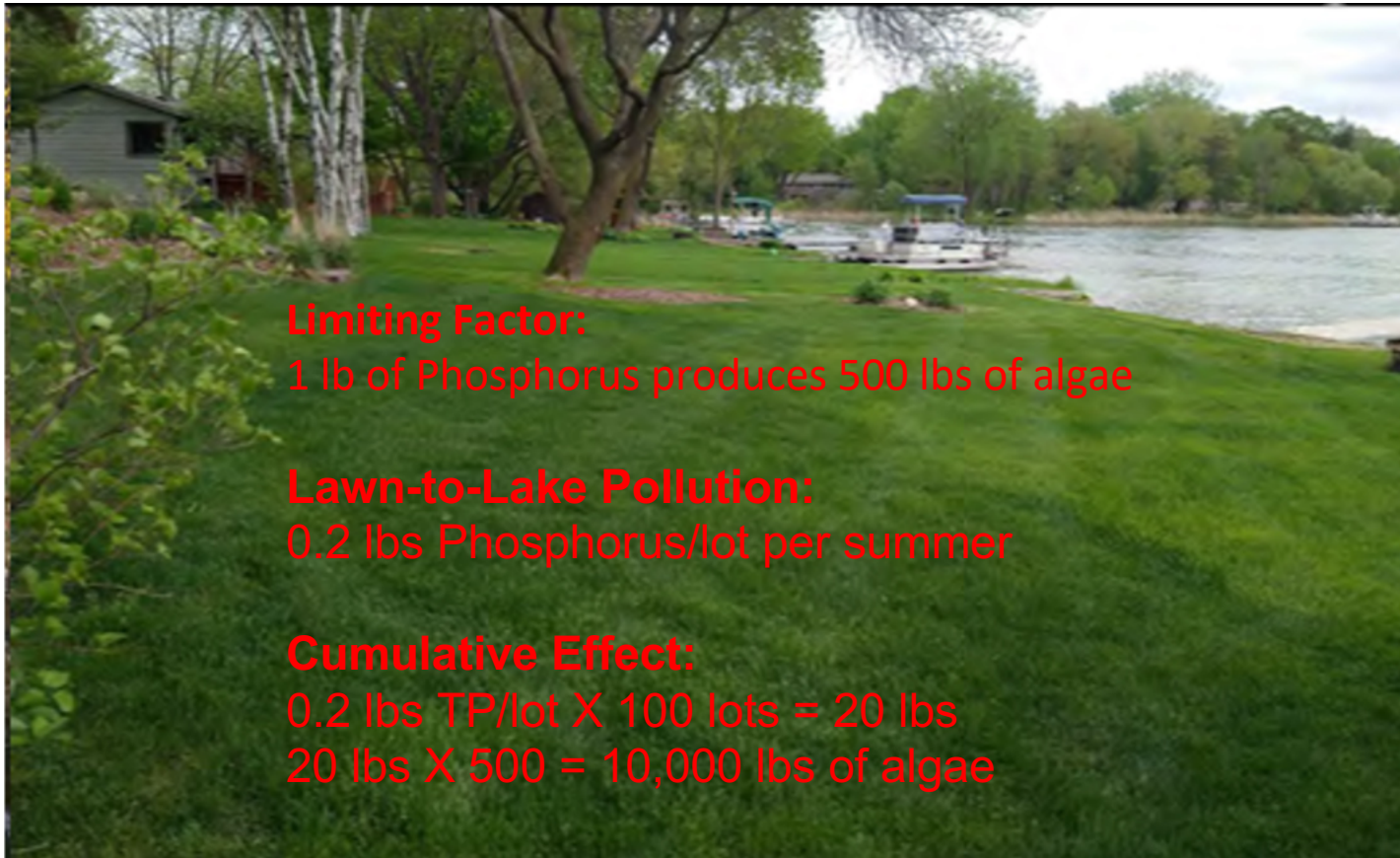
We've lost 40-50% of  
our natural lakeshores

1-2% loss per decade

See the **Natural Shoreline  
Partnership's** report:  
*Minnesota's Vanishing  
Natural Shorelines*



Score-the-Shore survey results by DNR administrative region rescored using developed sites for each lake.



**Limiting Factor:**

1 lb of Phosphorus produces 500 lbs of algae

**Lawn-to-Lake Pollution:**

0.2 lbs Phosphorus/lot per summer

**Cumulative Effect:**

0.2 lbs TP/lot X 100 lots = 20 lbs

20 lbs X 500 = 10,000 lbs of algae







# Shore





# Shore

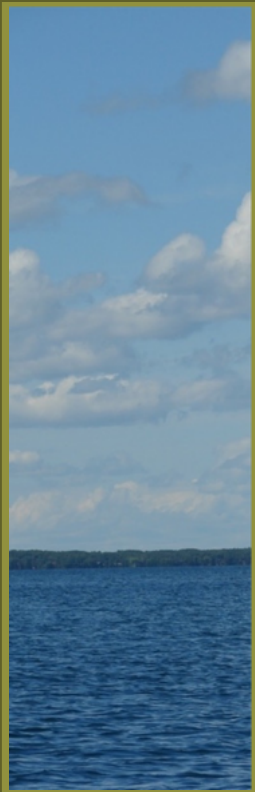






Andrea Lee Lambrecht





Eric Engbrettson

# Resources Available

## Score Your Shore

- Assess habitat conditions of developed lake lots
- Determine stewardship practices on land
- Assigns “points” for quality of entire property

## Restore Your Shore

- Information on restoring your shore
- Plant selection
- Tools & Techniques



[www.dnr.state.mn.us/rys/index.html](http://www.dnr.state.mn.us/rys/index.html)



# Score your Shore

A Citizen Assessment of  
Developed Lake Lots

**Donna Perleberg, Paul  
Radomski, Stephanie Loso**



Minnesota DNR  
Ecological and Water Resources



# Buffers





Lake lots can be developed with minimal impact to vegetation.



Lake  
view



Lot view

Vegetation reduces nutrient runoff and shoreline erosion, and provides privacy screen and wildlife habitat.

# Shoreland Stewardship

Protection



Wildflower planting



Where do I start ?

No-Mow Buffer Zone



Tree Planting





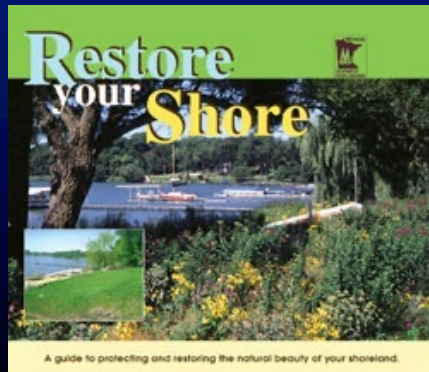
## Score your Shore

a simple tool to assess condition of  
developed shorelines



- ❑ Self-assessment
- ❑ Non-biologists
- ❑ Rapid “snapshot” survey
- ❑ Low tech
- ❑ Standard criteria

Score  
your Shore



## Objectives

- Assess remaining habitat at developed sites
- Generate awareness of what makes a high-quality buffer
- Recognize and promote good stewardship
- Identify potential sites for restoration

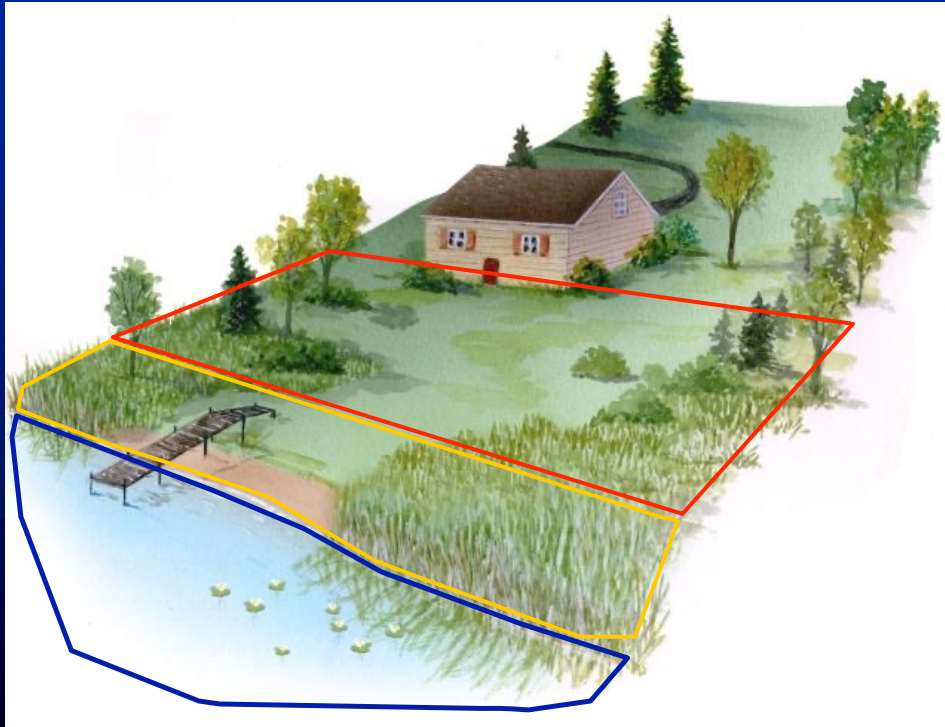


# Applications

- Single lot assessment by individual riparian owner
- Lakewide assessment by Volunteer Group



## 3 Habitat zones at site



**Upland – house to bank top  
(about 2/3<sup>rd</sup> of lot)**

**Shoreline – bank top to water's  
edge (about 1/3<sup>rd</sup> of lot)**

**Aquatic – water's edge to deep end  
of weed bed (or to 15 feet depth)**






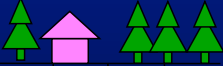
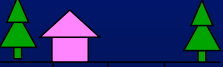

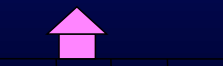
Points are assigned to each zone based on how much habitat remains

Zone	Score-able features	Possible points	Total possible points
Upland	Trees	25	65
	Shrubs	20	
	Ground Cover	15	
Shoreline	Trees/Shrubs	20	35
	Ground Cover	15	
Aquatic	Emergent/Floating-leaf	40	100
	Submerged	35	
	No un-natural channels	5	
	Overhead woody habitat	10	
	Downed woody habitat	10	



# Sites with more habitat score more points

Example – Upland zone: tree cover

	% of lot with trees	Points
	75-100%	25
	50-74%	18
	25-49%	13
	1-24%	9
	0%	0



# Step 1: Identify 3 habitat zones

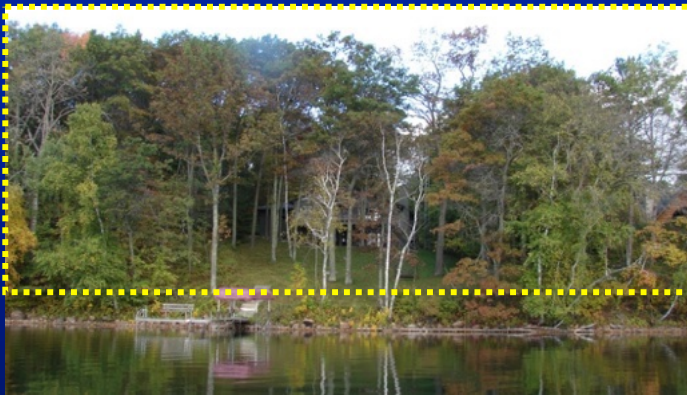


Upland

Shoreline

Aquatic

# Step 2: Score Upland Zone



	% of lot with trees	points
	75-100	25
	50-74	18
	25-49	13
	1-24	9
	0	0

	% of lot with shrubs	points
	75-100	20
	50-74	15
	25-49	10
	1-24	5
	0	0

	% of lot With unmowed Ground cover	points
	75-100	20
	50-74	15
	25-49	10
	1-24	5
	0	0

**25**  
**+15**  
**+15**  


---

**55 points**





## Step 3: Score Shoreline Zone



% of lot with trees or shrubs		points
	75-100	20
	50-74	15
	25-49	10
	1-24	5
	0	0

% of lot With unmowed Ground cover		points
	75-100	15
	50-74	12
	25-49	7
	1-24	4
	0	0

**15**  
**+15**  


---

**30 points**



# Step 4: Score the Aquatic Zone (100 pts)

Focus on plant life forms, obvious human disturbance, woody habitat

1. Emergent / Floating-leaf ....40
2. Submerged.....35
3. Continuous plant beds  
(no man-made openings).....5
4. Overhead woody habitat....10
5. Downed woody habitat .....10





# Individual Action Steps



→ Protect



Restore Shoreline;  
Ask about Aquatic Zone  
Restoration



Restore Upland



Restore Upland + Shoreline;  
Ask about Aquatic Zone  
Restoration

# Lakewide Action Steps



Identify sites for Stewardship Awards

Prioritize sites for restoration



Set Lakewide Management Goals



present – average lake lot score = 10

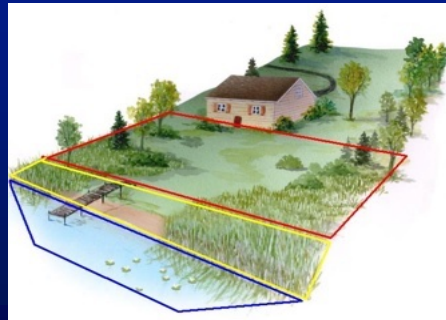
future – average lake lot score = 30



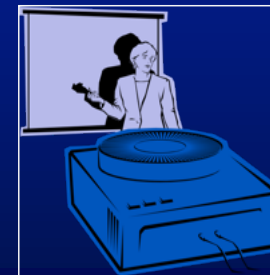
# Score your Shore



User Manual



Quick Guide



Slide show

Available online at: <http://www.dnr.state.mn.us/scoreyourshore>





## Lake Steward Program

- Designed for Lake Association use to encourage shoreline restoration projects
- Educate about sustainable land management as it relates to water quality
- Awards are given for healthy, native shorelands

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<https://mnlakesandrivers.org/lake-associations/lake-association-programs/lake-steward/>



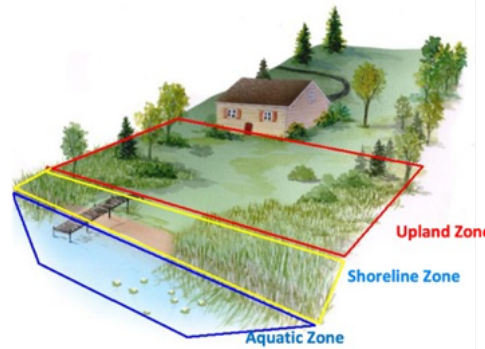
Image courtesy MLR





## Lake Steward Survey App

- Easy entry
- Phone/tablet
- Browser/Survey123 app
- Data stored in cloud
- Autogenerated reports



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lily@mnlakesandrivers.org

Lake Steward Property Evaluation

Basic Information

Surveyor\*

Lake\*

County for Lake\*

Lake Association\*

If not on the list, select "Other" and enter in the next line

Survey Ticket Number

2023-09-11 14:16

Shore Location\*

When at site and location services available, press the target icon. Alternatively, press the map icon to enter address or place the blue flag at location. You may have to touch/click the check mark to save location.

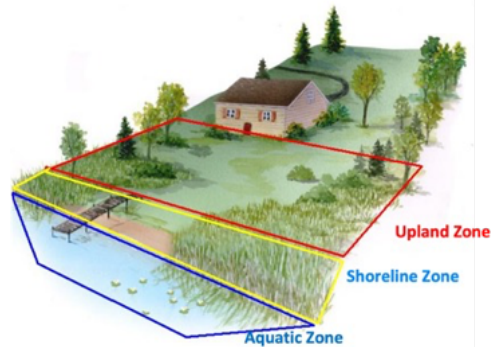
The map interface shows a world map with a search bar at the top that says "Find address or place". Below the map, there is a tip: "Tip: This question will try to use your location. Press to continue." The map includes standard navigation controls like zoom in (+), zoom out (-), and a home button.



## Lake Steward Survey App

- Neighbors assessing neighbors
- Restoration/Protection recommendations
- Awards given to quality lakeshores

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### Lake Steward Property Evaluation

**Basic Information** ▾

**Surveyor\***

**Lake\***

**County for Lake\***

**Lake Association\***  
If not on the list, select "Other" and enter in the next line

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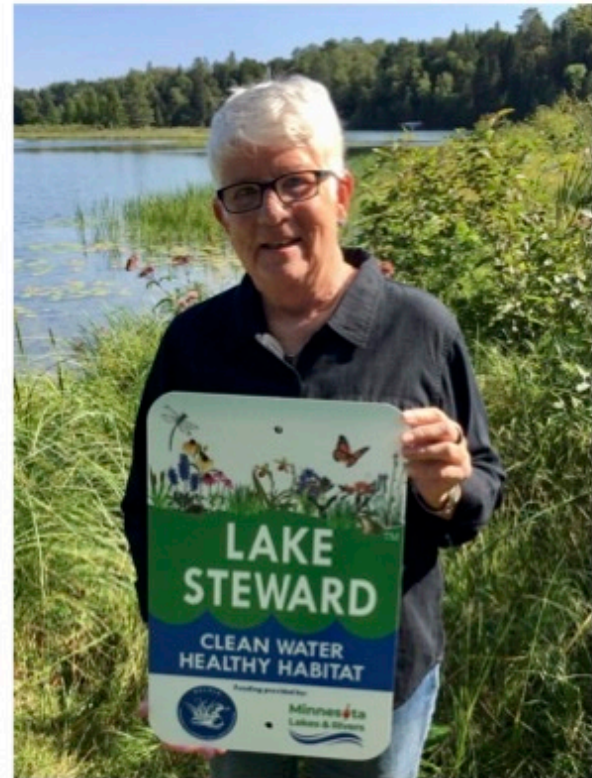
A world map with a search bar at the top. The map shows continents and oceans. A tip at the bottom reads: "Tip: This question will try to use your location. Press to continue." The map interface includes zoom in (+) and zoom out (-) buttons, a home button, and a refresh button.

# Resources Available



- Initial focus on advocacy, education, project grants
- Lake Steward Program
  - Leverages existing networks
  - Taps into local values
  - Fosters behavior change via shifting social norms

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# Watershed Health Assessment Framework (WHAF)



# WHAF for Lakes

## KEY CONCEPTS:

### HEALTH

Define Lake Health

Score Lake Health (including Grades)

### COMPLEXITY

Apply the 5 Components to Lake Health

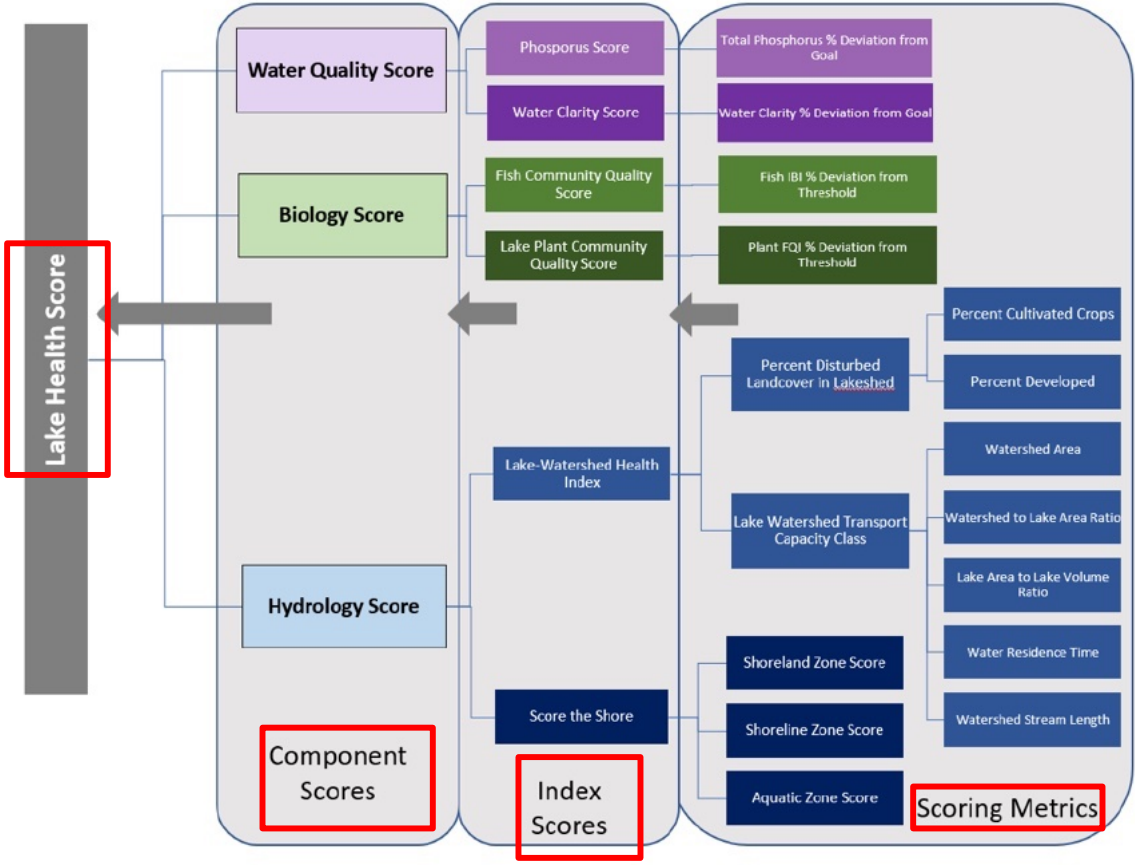
Deliver Lake Metrics and Indices

### **SCALE**

Connect Lake Health to Lakeshed Health

Compare Lakes

# WHAF for Lakes -- Health



**Data Partners**  
 U of MN Lake Browser,  
 Water Clarity  
 MPCA, and MPCA  
 Volunteer WQ Data  
 DNR Lake Ecology Unit  
 DNR Fisheries



# WHAF for Lakes

- **Component Pages**

- Use tabs to navigate to each Component
- ‘Water Quality’ tab shows how lake scored for different aspects of water quality
- Learn More buttons to understand each health concern and how the data was used.
- ‘Stewardship’ tab provide information on risks and opportunities to improve and protect lake health.

The screenshot displays the 'Water Quality' component page of the WHAF for Lakes website. The page features a dark blue header with a 'menu' icon on the right. Below the header is a navigation bar with five tabs: 'SUMMARY', 'WATER QUALITY' (which is highlighted with a green underline), 'BIOLOGY', 'HYDROLOGY', and 'STEWARDSHIP'. The main content area is titled 'Water Quality' and includes a descriptive paragraph about water quality's impact on lake health. Below this is a section titled 'About the Score' with a 'Learn More' button. The text explains that the Water Quality Component Score is an average of Phosphorus and Water Clarity Scores on a 0 to 100 scale. It shows a 'Water Quality Score (▲): 55' and compares it to a 'Major Watershed Water Quality Score Mean (⊖): 48' and a 'Major Watershed Water Quality Score Min/Max: 6/92'. A horizontal bar chart shows the score of 55 as a white triangle on a green-to-white gradient bar, with 'Low' on the left and 'High' on the right. Below this is a section titled 'Phosphorus' with a descriptive paragraph. It includes an 'About Phosphorus' section with a 'Learn More' button. The text explains that the Phosphorus Score is based on the distance of the lake's Total Phosphorus measurement from the aquatic recreation goal on a 0 to 100 scale. It shows a 'Phosphorus Score - Water Quality Score Input #1 (▲): 73' and compares it to a 'Major Watershed Phosphorus Score Mean (⊖): 62' and a 'Major Watershed Phosphorus Score Min/Max: 7/100'. A horizontal bar chart shows the score of 73 as a white triangle on a green-to-white gradient bar, with 'Low' on the left and 'High' on the right.

# Complexity

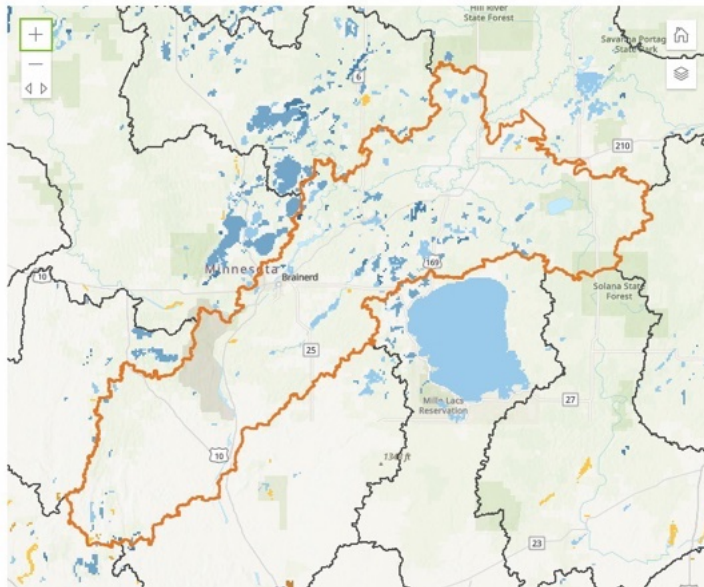
### Select an area

Scale

Major Watershed

Major Watershed

Mississippi River - Brainerd (10)



### Mississippi River - Brainerd (10) Major Watershed Details

Area Acres	1,076,300
Area Square Miles	1,682
Within Basin	Mississippi Headwaters (0701)
Contains Upstream Areas	No

### Scored Lakes within Area

Excel CSV

Name ↑	Lake ID	Health Score	Health Grade	Water Quality Score	Biology Score	Hydrology Score	Acres	Lakeshed Acres
<a href="#">Agate</a>	18006000	70	B	46		98	187	754
<a href="#">Bass</a>	18025600	70	B	52	66	84	285	647
<a href="#">Bass</a>	77002400	65	B	72	41	87	123	640
<a href="#">Bass</a>	18030600	85	A	57	100	97	399	642
<a href="#">Bay</a>	18003400	70	B	55	64	85	2,330	16,970
<a href="#">Beauty</a>	77003500	65	B	55	53	86	240	1,792
<a href="#">Big</a>	77006300	60	C+	40	49	87	297	1,629
<a href="#">Big Swan</a>	77002300	55	C+	34	63	67	947	22,316
<a href="#">Birch</a>	01020600	65	B	43	52	100	442	1,194
<a href="#">Black</a>	18005900	75	B+	59	69	97	106	706

# Scale

## Lake Search

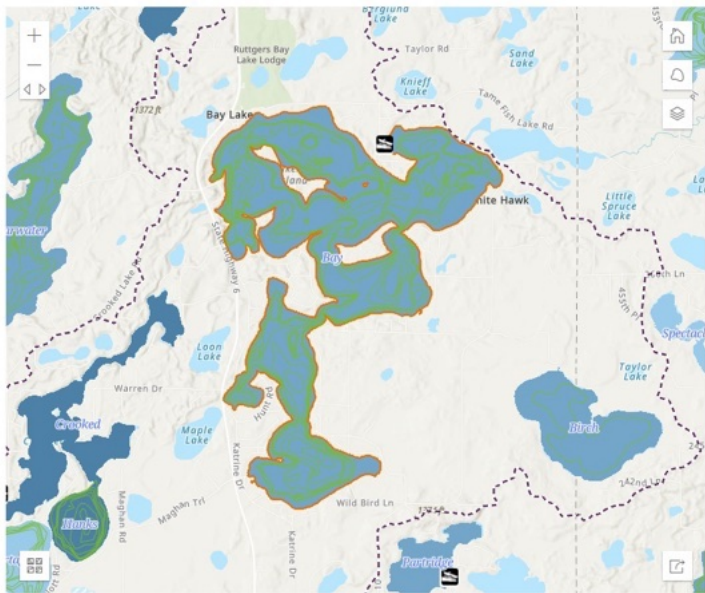
Search Lakes

Lake Name or Lake ID  
Bay (18003400)

Go To Lakes List

Previous Lake

Next Lake



Esri, NASA, NGA, USGS, FEMA | Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS... Powered by Esri

## SUMMARY

## WATER QUALITY

## BIOLOGY

## HYDROLOGY

## STEWARDSHIP

### Lake Health

A healthy lake is one that is near its natural state. Water entering the lake has low levels of pollution. A healthy lake is protected by a natural shoreline and by investments in careful stewardship of the lake and its watershed (lakeshed).

#### About the Score

Learn More

The Lake Health Score is an average of the Water Quality, Biology, and Hydrology Lake Health Component Scores and is on a 0 to 100 scale.

Lake Health Score (▲): 70

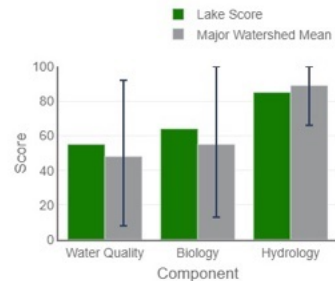
Lake Health Grade: B

Lake Health Score Major Watershed Mean (●): 64

Lake Health Score Major Watershed Min/Max: 40/85



#### Lake Health Component Scores



Water Quality Score: 55

Water Quality Score Major Watershed Mean: 48; Min/Max: 8/92

Biology Score: 64

Biology Score Major Watershed Mean: 55; Min/Max: 13/100

Hydrology Score: 85

Hydrology Score Major Watershed Mean: 89; Min/Max: 66/100



# LakeFinder Connection

**m** DEPARTMENT OF NATURAL RESOURCES

RECREATION DESTINATIONS NATURE EDUCATION & SAFETY LICENSES, PERMITS & REGULATIONS EVENTS & SEASONS ABOUT DNR

Home > LakeFinder >

**Lake Reports**

- Fisheries Lake Survey
- Water Access Sites
- Fish Stocking
- Ice In/Out
- Fish Consumption
- Water Levels
- Water Quality
- Lake Health
- Aquatic Plant Survey

**Lake Maps**

- Water Clarity
- Lake Depth
- Recreation Compass
- Google Earth/KML

**Fish Minnesota**

- Fishing regulations
- Buy a fishing license
- Learn more



## Bay (18003400)

**Fish consumption advisory**  
Read about [fish consumption guidelines](#) provided by the Minnesota Department of Health for this waterbody.

ID: 18003400  
County: [Crow Wing](#)  
Near: Deerwood (Crow Wing)  
Border water: No  
[Sentinel Lake](#): No

**Size and depth**  
Area: 2329.9 acres  
Littoral Area<sup>®</sup>: 1005 acres  
Shore length: 24.1 miles  
Maximum depth: 74 feet

**Fish species:** black bullhead, black crappie, bluegill, brown bullhead, hybrid sunfish, largemouth bass, northern pike, pumpkinseed, rock bass, tullibee (cisco), walleye, yellow bullhead, yellow perch, bowfin (dogfish), white sucker, banded killifish, blackchin shiner, blacknose shiner, bluntnose minnow, central mudminnow, golden shiner, iowa darter, Johnny darter, logperch, mimic shiner, pugnose shiner, shiners, spottail shiner, tadpole madtom

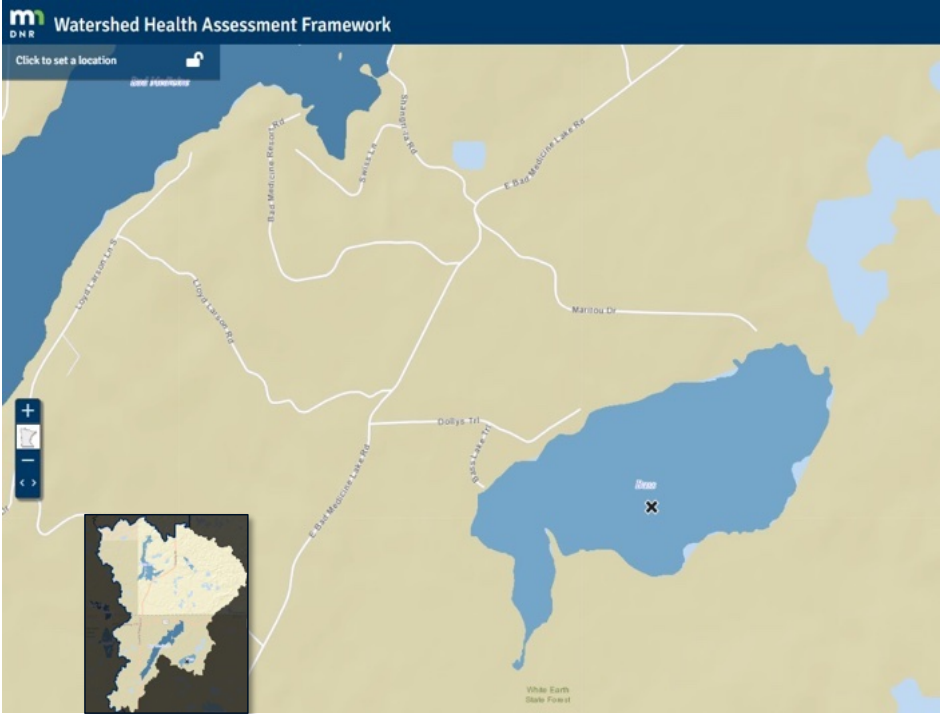
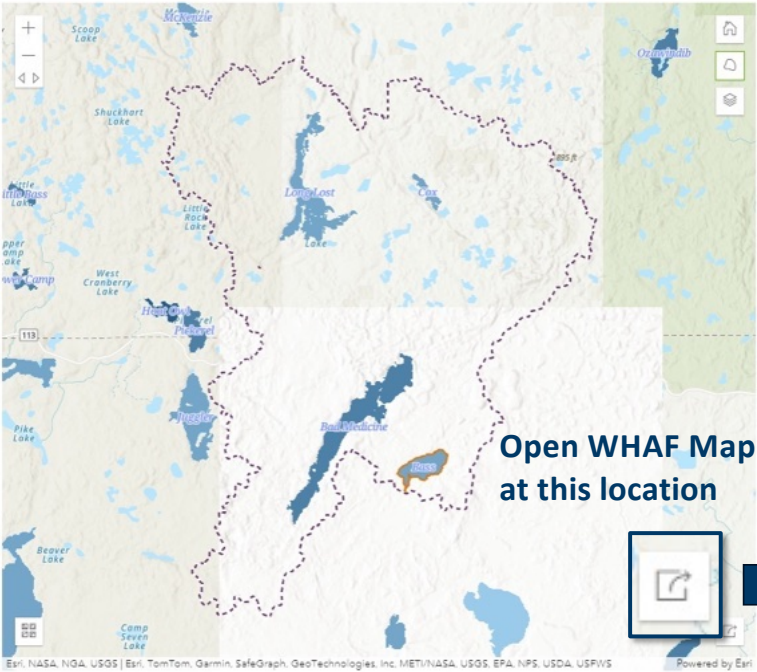


# WHAF for Lakes and WHAF Map Connection

Lake Search

Bass (03008800)

Go To Lakes List Previous Lake Next Lake



## Where to get information?

- Lake Protection and Prioritization Technical Document
- MN Geospatial Commons <https://gisdata.mn.gov> & in DNR Quick Layers
  - Lakes of Phosphorus Sensitivity Significance
  - Lakes of Biological Significance
  - Lake Benefit Cost Assessment
  - Lake Hydrology Deliverables for Watershed Planning
  - Watershed Health Assessment for Lake Scores
- Spreadsheet
- WHAF for Lakes <https://arcgis.dnr.state.mn.us/ewr/whaflakes/>