WHERE THE FOREST MEETS THE PRAIRIE
Todd County
MINNESOTA • EST. 1855

PLANNING & ZONING
215 1st Avenue South, Suite 103
Long Prairie, MN 56347
Phone: 320-732-4420 Fax: 320-732-4803
Email address: toddplan.zone@co.todd.mn.us

The following is the agenda for **Thursday, July 25th, 2024 at 6:00pm** the Todd County Board of Adjustment will hold a public hearing in the Commissioner's Boardroom, Historic Courthouse, 215 1st Ave South, Suite 301, Long Prairie.

NOTE: This meeting is again being held in-person and the public is encouraged to attend, but Zoom and phone options are still available for those who are unable to attend in person. If you wish to join via Zoom, please contact our office for the call-in information. Those who do attend in person can find parking atop the hill on the west side of the Historic Courthouse and enter through the North Doors, near the American Flag and monument.

If you have any concerns or questions in regard to the upcoming meeting and the applications on the agenda, feel free to contact the Planning & Zoning Office at either **(320) 732-4420** or **toddplan.zone@co.todd.mn.us**. All correspondence must include name & mailing address and be received 48 hours before the date and time of the hearing.

Agenda

- Call to Order
- Pledge of Allegiance
- Introduction of Board of Adjustment Members and process review
  - The applicant is introduced
  - Staff report
  - Applicant confirms if staff report accurately represents the request
  - Public comment
  - Board review with applicant, staff, and public
- Approval of agenda
- Approval of May 23rd, 2024 Board of Adjustments meeting minutes

1. **Jodi I. Marohn:** Section 25, Hartford Township
   Site Address: 28333 284th Street, Long Prairie, MN 56347 **PID:** 12-0030200
   1. Request to increase the height limit for her West and South property line fence from 6' to 8' in AF-1 Zoning district.

2. **Discussion on "Vanishing Natural Shorelines Report"**

3. **Discussion on Language Amendments to Todd County Ordinance: Section 5.03: - Variances**

Adjournment. Next meeting: **August 27th, 2024**

Minutes of the Todd County Board of Adjustment Meeting

May 23, 2024

Completed by: Sue Bertrand P&Z Staff

Site visit for Kunkel application conducted by Adam Ossefoort and Mike Soukup on April 17th, 2024.
Site visit for Rothstein application conducted by Adam Ossefoort and Larry Bebus on May 15, 2024.

Meeting attended by board members: Vice Chair Bill Berscheit, Mike Soukup, Danny Payton, Russ Vandenheuvel, and Planning Commission alternate Larry Bebus.

Staff members: Adam Ossefoort and Sue Bertrand

Other members of the public: Sign-in Sheet is available for viewing upon request.

Bill called the meeting to order at 6:00 p.m. Each board member introduced themselves and Bill explained the process for those attending.

Dan motioned to have the April 25th, meeting minutes approved. Russ seconded the motion. Voice vote, no dissent heard. Motion carried.

AGENDA ITEM 1: Mark and Gwendoline Kunkle – PID 11-0049800 – Grey Eagle Township

Adam stated the Kunkels requested to table until next month.

AGENDA ITEM 2: Michael A. and Janice Rothstein– PID 03-0033300 – Birchdale Township

1. Request to reduce the OHWL setback from 150' to 89' for proposed house addition and garage.

2. Request to increase the height limit for structures within a setback from 18' to 24' for proposed house addition and garage.

Staff Findings: Adam read through his staff report. This report may be viewed in full, upon request, at the Planning and Zoning Office.

Proposed Conditions if approved:

1. Maintain a minimum of 50% screening as viewed from the lake during leaf on conditions.
2. Establishment of a storm water retention system to capture stormwater from the proposed addition based on a 10 year/24-hour rainfall. Plans for the system shall be approved by Planning and Zoning prior to issuance of a land use permit.
3. Abide by all other applicable federal, state, and local standards.

Michael made a correction they were on the West side of the lake, not the East.

Adam confirmed the correction.

Larry went through his site visit report. This report may be viewed, in full, upon request, in the Planning & Zoning office.

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Correspondence received: None.

Public comment: None.

Board discussion:

Adam had called the Rothsteins, and if you look in the background, you will see a Tyvek covered shed that is being built to replace the existing one. After discussion, a permit was obtained showing they will be placing the shed back away from the lake, and the old shed will be removed.

Bill stated the practical difficulty has to do with topography and asked Adam to show on the overhead. Addressing Larry, asked if it is correct there is an alternate site that exists up out of the steeper topography?

Larry stated, way up in the steeper topography. The house itself was built before the zoning regulations, and the garage will be in back of the house. They will end up taking out some of the hill in the back in order to do this.

Dan clarified the addition is on the back side of the house? Asked if we had what the size of the addition is compared to the existing house structure?

Michael passed out plans of the structure for the board members and to Adam for the file and record.

Bill stated they needed to apply some diligence to "is there actually an alternative site or not"? To do an addition, it would require moving the entire structure to use an alternative site. Is it a moveable structure? Does it have deep footings?

Michael, yes, it has deep footings and it has a crawl space.

Bill explained the reason for the questions, when zoning was established in the 70's, part of the very basic principal to that, was over time, we would eliminate these non-conforming structures that significantly encroach on the lake. When you come to this board looking for a variance that's the time to ask all of these difficult questions. Is there a way to take this structure and move it back, replace it with a different structure, do something to get out of the set back? That was the goal for zoning, when it was put in on lakeshore. He stated he doesn't know that it has been successful, but that was the goal. He added, they as a board are required to do-diligence to that.

Russ asked if the back side of the house is opposite the lake?

Michael, yes.

Russ, on the picture handed out, is the taller part the existing cabin?

Michael and Jan both, no, that is the new addition. Michael added, they would like to put a gambrel roof on it,

and that would give storage above the garage. With the cabin, there is no storage and there is no basement.

If they plan to retire there, they are going to need a little more room. Instead of going larger, they would go a little higher on the garage that would give them the storage.

Mike Soukup, question for the staff, because this is a non-conforming structure and if this were to be granted, how would this extra some one thousand square footage effect, in the future, the exact for exact footprint?

Adam stated they could replace it just the same as any other non-conformity, because a variance is granted forever.

Soukup, so therefore, if a variance is granted on this, and this is attached to the house, we have just increased the footprint of a non-conforming footprint by 1300 sq. ft. roughly. Just wanted to clarify we would be expanding the footprint forever.

Dan, getting back to the addition, you are talking 2/3 the size of the original structure on the expansion. That is quite an expansion. He stated he is not 100 percent against expansion, but it is considerable. He is concerned about the height on this structure. The height is quite an addition. He does agree on what they want. Stated his mind may not be ready for that. Asked to see photos showing across the lake, stated he agrees one is very tall, but really doesn't see many that high. Stated they are already well within the setback too. A lot closer to the lake than some of these other structures.

Michael stated a lot further down the lake, the board had granted a variance to, a couple years ago, and they have a full walk out basement, and a second floor and they are pretty high, there.

Bill stated height limitations are set in place because the lake is public property, and when people are on the lake they do not want to look at a wall of houses. So, by putting height limits on structures it makes it a lot easier to screen with trees or vegetation and make them less visible from the lake. It gives the lake a more natural appearance as opposed to a wall of houses. That is primarily the reason and the logic behind the height limitations. Bill asked Adam to show the topography on the GIS and to measure a setback.

Adam showed the GIS overlay with the topography lines. He stated he wasn't sure the board knows what is going on with Long Lake, but this lake is five to six feet above the ordinary high right now.

Jan stated it has come down a little in the last couple of years.

Michael offered, it is over the ordinary high by about four feet right now.

Bill asked how long it has been that way?

Michael stated quite a while. He did not know if the board was aware of it, but they have been working alleviate this problem. All the water goes into this lake and there is no place for it to leave. Since they have been living there, it has gone up every year, with the heavy snows and rains and everything. So, the people

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around the lake are having a lot of problems with some buildings, with the water. They are planning to put in a drain that will run into the North end of Sauk Lake, and drain the lake back down to its' high-water mark.

Bill, asked who this was going through?

Michael stated the watershed district.

Adam offered more history, back when representative Poston was in office, he submitted a bonding bill to secure 1.4 million dollars. At this point, his understanding is the SRWD district is going to take that on, hire engineers and go through a bunch of stuff and basically, create a large siphon to drain the lake to Sauk Lake and be able to maintain the level of the Long Lake.

Dan asked if it will be a pump or an actual drain.

Adam stated there are no engineered plans.

Michael and Larry stated it will be drained, not pumped.

Larry added they already have the grant.

Adam explained the reason he had brought that up was he actually had to have the DNR come out and go out in the lake to find the ordinary high, so we could measure the setback. It is close to the end of the docks. Adam measured the 150 feet from the approx. ordinary high mark.

Bill stated there is actually fairly level, buildable space, right above the 150' mark.

Dan asked Adam to measure 150 feet back from the North side.

Russ, when did you move up there?

Jan stated nine years in June.

Russ, looks like there is plenty of cover there. He pointed out on Michael and Jan's drawing, listed a height of approximately 21 feet.

Michael stated after he had the plans were drawn up, he found out what the truss company needed for a gable for the gambrel roof, then he came to 21 feet. He applied for a 24' variance and he was guessing, as he didn't know for sure what he needed, then realized he only needed 21 feet.

Russ confirmed, the application states 24' variance request but they really only need 21 feet.

Michael stated that is correct.

Dan asked Adam if that is an official change?

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Adam explained the board would have to agree and let the applicants know they were okay with that, if they were to grant the variance, it would be capped at 21 feet. He stated variances should not be granted beyond what is needed to alleviate the practical difficulty. So, if the applicants are agreeable to that, the board would then consider 21-foot request instead of the 24 foot, then it would go to only a three-foot deviation instead of six.

Michael stated 21 feet it is.

Bill asked to see the lake frontage one more time, and stated we have height and are not going to flood the tress out anytime soon.

Adam stated the project should be done within the next two years, he was guessing.

Dan asked about the ordinary high, again.

Michael stated it is not quite out to the end of the dock. He had it at one time, maybe twelve feet from the shoreline, because he needed an accurate measurement to move the Tyvek shed back.

The board noticed two of the trees down by the lake shore may have been damaged already by the water and may not survive.

Bill stated we need a motion to adjust the height request from 24' down to 21', so it is official on the application prior to the criteria questions.

Dan motioned to accept the 21' foot height request instead of the 24'. Larry seconded, voice vote, no dissent heard, motion carried.

Bill called for Criteria Questions individually by request.

Criteria Question #1: Is the variance in harmony with the general purposes and intent of the official control?	
Board Member	**Vote and Comments**
Mike Soukup	Yes.
Russell Vandenheuvel	Yes.
Dan Peyton	Yes.
Bill Berscheit	Yes.
Larry Bebus	Yes.

Majority response- Yes.

Criteria Question #2: Is the variance request consistent with the goals and policies of the comprehensive plan?	
Board Member	**Vote and Comments**
Mike Soukup	Yes.
Russell Vandenheuvel	No. Agrees with Bill.
Dan Peyton	Yes.
Bill Berscheit	No. Percentage wise, this is a very large addition, so, we're increasing the footprint considerably, and when we do that, it's

	time to exercise the use of the alternative site to put this structure. He stated he believes they have established: there is an alternative space.
Larry Bebus	Yes.

Majority response- Yes.

Criteria Question #3: Is the property owner proposing to use the property in a reasonable manner not permitted by an official control?	
Board Member	**Vote and Comments**
Mike Soukup	No, because of the footprint of the addition, and as mentioned, there are alternative sites for building.
Russell Vandenheuvel	No. Agreed with Mike Soukup, doubling the size of the footprint.
Dan Peyton	Yes.
Bill Berscheit	Yes.
Larry Bebus	Yes.

Majority response- Yes.

Criteria Question #4: Is the need for a variance due to the circumstances unique to the property not created by the landowner?	
Board Member	**Vote and Comments**
Mike Soukup	No, because there is an alternative building site. Again, for the large number of square footages they are adding.
Russell Vandenheuvel	No.
Dan Peyton	No. The height is a landowner request. They could get by. The footprint is excessive, guessing 75% to 80% increase overall.
Bill Berscheit	No. We've established there is an alternative site. The request is for increased footage for living space, so that is created by the land owner.
Larry Bebus	Yes, because of the house being built prior to zoning regulations. He believes that taking it back, they are already going to have to move a lot of land and take a lot of trees out, in order to flatten this out. So, they are going to be digging into hills and can't control the scope of the land.

Majority response- No.

Criteria Question #5: Will the variance maintain the essential character of the locality?	
Board Member	**Vote and Comments**
Mike Soukup	Yes.
Russell Vandenheuvel	Yes. Across the lake, there other bigger buildings.
Dan Peyton	No. Due to the distance from the lake, it shows up more.
Bill Berscheit	Yes.
Larry Bebus	Yes. There are other buildings that are as big or bigger.

Majority response- Yes.

Criteria Question #6: Does the need for the variance involve more than just economic considerations?	
Board Member	**Vote and Comments**
Mike Soukup	Yes.
Russell Vandenheuvel	Yes.
Dan Peyton	No. He stated he believed it was a cost factor for moving it.
Bill Berscheit	Yes.
Larry Bebus	Yes.

Majority response- Yes.

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Criteria Question #7: Have safety and environmental concerns been adequately addressed?	
Board Member	**Vote and Comments**
Mike Soukup	Yes.
Russell Vandenheuvel	No. Feels there is a lot inside this setback happening if they are going to move some earth, all in the setback, and they are doubling the size of the structure, so, no.
Dan Peyton	Yes. Environmental concerns have always been his pet peeve, but due to the setback, there is a flat area, yes.
Bill Berscheit	Yes. He has significant concerns with the distance to the lake and the current high-water issue, and the lakeshore as it is now, giving us the ability to establish enough screening. Screening can somewhat be considered environmental, but he is not going to rate it as a negative vote in response to this question, so, yes. Safety and environmental concerns have been met, so long as we are using the proposed conditions that are being put together by staff.
Larry Bebus	Yes. With the proper gutters, drain spouts and water basins, and catches, there was a low spot that would have been by the proposed garage, that would have been, what he thought, a good basin for water to run into. They have already agreed to move the existing shed that was down by the lake, if that is considered environmental.

Majority response- Yes

Summary of criteria question majority responses as follows:

#1	Yes
#2	Yes
#3	Yes
#4	No.
#5	Yes.
#6	Yes.
#7	Yes.

Bill stated one thing he loved about this board is split votes, and actually giving their thoughts on the reason for the vote they put forward. Whether you agree with it or not, it's important everybody has their reason. He explained, the way this works is with a failure on question number four, unless there is something that overcomes that failure, we would now be looking for a motion.

Dan motioned to deny the proposal, Russ seconded the motion, as presented.

Roll call vote commenced as follows:

Board member	**Vote (yes or no)**
Russ Vandenhuevel	Yes.
Larry Bebus	No.
Dan Peyton	Yes.
Mike Soukup	Yes.
Bill Berscheit	Yes.

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The motion to deny the variance has been carried and your request has been denied. Bill stated the applicants can certainly visit with staff on how to proceed forward from here. Bill and Dan also stated relief from the decision would go to district court and not to the County Commissioners or other governmental units in the County. It goes to district court.

Adam offered he will be in the office tomorrow. Stated he has no further business.

Russ motioned to adjourn and Dan seconded. Voice vote to adjourn. No dissention heard. Motion carried and the meeting adjourned at 6:45 PM.

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Received
MAY 10 2024
Todd County Planning & Zoning

PLANNING & ZONING
215 1st Avenue South, Suite 103
Long Prairie, MN 56347
Phone: 320-732-4420 Fax: 320-732-4803
Email: ToddPlan.Zone@Co.Todd.MN.US

Accepted 5/10/2024
KLM

Appeal for a Variance

Applicant Jodi Marohn

Mailing Address 28333 284th Street Long Prairie

Site Address Same

Phone Number [redacted] Cell Number [redacted]

E-Mail Address [redacted]

Property Owners Name & Address (if not applicant) _____

_____

Parcel Number(s) 12-0030200

Section: 25 Township 130

Zoning District (circle one): AF-1; AF-2; R-10; R-2; UG; RT; Commercial; Industry; or Shoreland (Lake or River Name): _____

Full and Current Legal Description(s): SEE EXHIBIT A
(attach if necessary)

Do you own land adjacent to this parcel(s) ____Yes __X__No

Septic System: Date installed_____ Date of Compliance Inspection 4-29-22

Is a new system needed: ____yes __X__no ____ STS Design attached

Required for applications with existing septic systems: Approved design submitted for new system to be installed, new system installed within previous 5 years, or passing compliance inspection on existing system in previous 3 years

Variances Requested:
What standards or requirements are you unable to maintain? (Check all that apply)

Lot width____	Lot area____	Lake or River setback____	Bluff setback____
Road right-of-way setback____	Side Yard setback____		Buildable area____
Impervious surface coverage____	Building/Structure Height__X__		Other____

Receipt#2024-0220

LIST YOUR VARIANCE REQUEST(s) and what, if the variance were granted, you intend to build or use the land for. **For example:** *"Request to reduce the 10ft structural setback from my west side lot line to 8ft for the construction of a detached garage to be used for vehicle and personal storage."*

1.) Request to increase fence Height from 4 ft to ~~10~~ 8 ft SMB per: Jodi 7/2/24

2.)

3.)

4.)

**State Statutes Section 394.7 Subd7: Variances: Practical Difficulties. The BOA shall have the exclusive power to order the issuance of variances from the requirements of any official control including restrictions placed on nonconformities. Variances shall only be permitted when they are in harmony with the general purposes and intent of official control, and when variances are consistent with the comprehensive plan. Variances may be granted when the applicant for the variance establishes that there are practical difficulties in complying with official rules; the plight of the landowner is due to circumstances unique to the property not created by the landowner; and the variance, if granted, will not alter the essential character of the locality. Economic considerations alone do not constitute practical difficulties.

The Board of Adjustment may impose conditions in the granting of a variance. A condition must be directly related to and must bear a rough proportionality to the impact created by the variance.

EXPLAIN YOUR PRACTICAL DIFFICULTIES or reason why you need your request approved.**

Due to over spray, wind et dirt when the tractors are in the field

It is important that you flag your related property lines and proposed building locations

Have you flagged your lot? (Y) (N)

See attached

SKETCH DRAWING

The applicant or agent hereby makes application for a variance agreeing to do all such work in accordance with all Todd County Ordinances. Applicant or agent agrees that site plan, sketches, and other attachments submitted herewith are true and accurate. Applicant or agent agrees that, in making application for a variance grants permission to Todd County, at reasonable times during the application process and thereafter, to enter applicant's premises to determine the feasibility of granting said variance or for compliance of that application with any applicable county, state, or federal ordinances or statutes. If any of the information provided by the applicant in his/her application is alter found or determined by the county to be inaccurate, the County may revoke the variance based upon the supply of inaccurate information.

If the applicant is not the property owner, both signatures are required below.

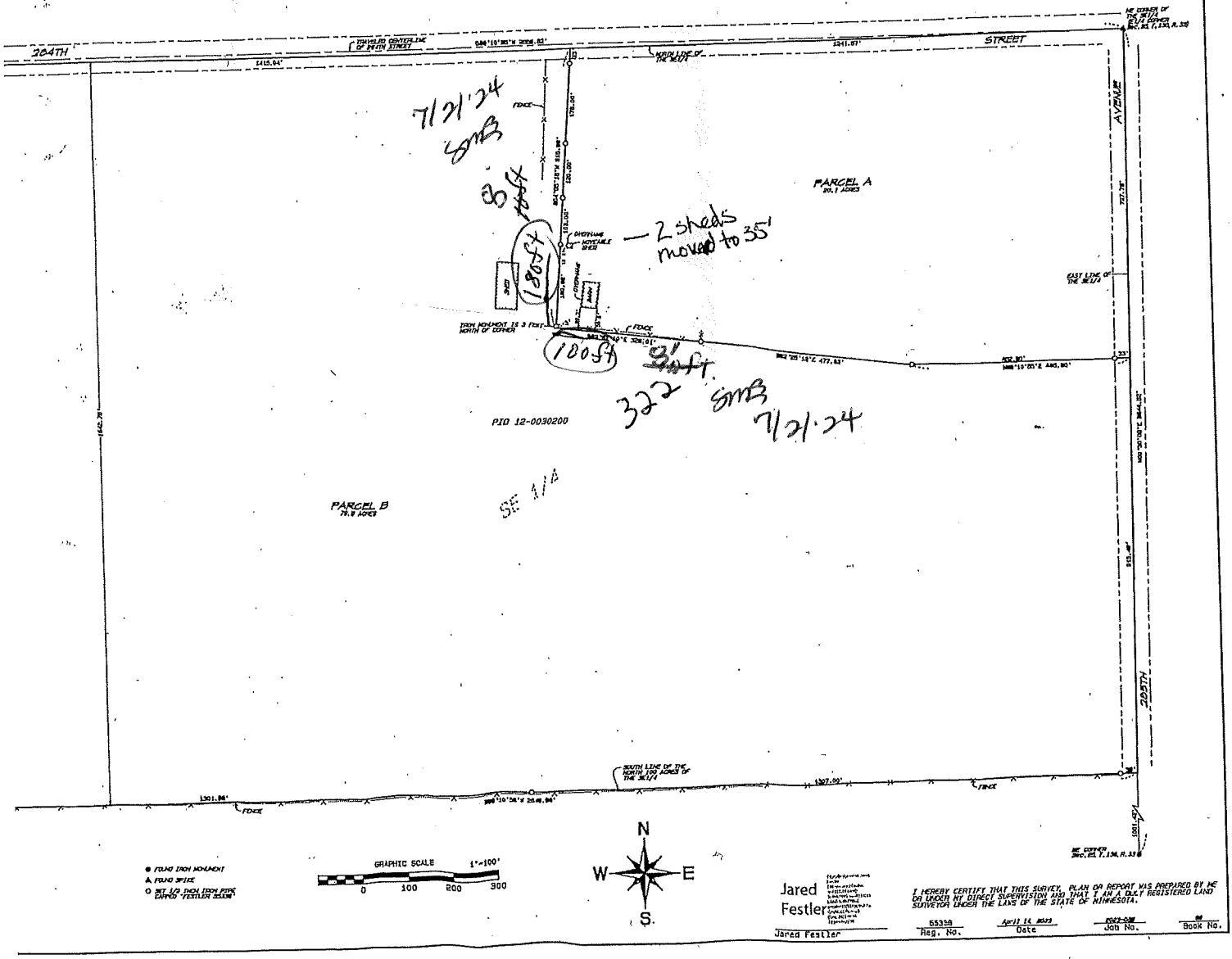
Judi Marohn	Judi Marohn	5/10/24
Applicant Name Printed	Signature	Date
Property Owner Name Printed	Signature (If different than applicant)	Date

Jared

ING

SECTION 25, TOWNSHIP 130, RANGE 33,
TODD COUNTY, MINNESOTA

SURVEY FOR: JEFF TWARDOWSKI



I HEREBY CERTIFY THAT THIS SURVEY, PLAN OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY REGISTERED LAND SURVEYOR UNDER THE LAWS OF THE STATE OF MINNESOTA.

Jared Festler

Jared Festler

55338 — Reg. No.
April 14, 2023 — Date
Job No.
Book No.

EXHIBIT "A"

That part of the Southeast Quarter of Section 25, Township 130, Range 33, Todd County, Minnesota, described as follows:
Beginning at the Northeast corner of said Southeast Quarter; thence South 89 degrees 10 minutes 55 seconds West, assumed bearing, 1241.57 feet along the North line of said Southeast Quarter; thence South 04 degrees 05 minutes 16 seconds West 615.99 feet; thence South 82 degrees 57 minutes 10 seconds East 322.01 feet; thence South 82 degrees 25 minutes 12 seconds East 477.82 feet; thence North 89 degrees 10 minutes 55 seconds East 485.80 feet to the intersection with the East line of said Southeast Quarter; thence North 00 degrees 30 minutes 09 seconds East 727.78 feet along said East line of the Southeast Quarter to the point of beginning.

Abstract Property.



Todd County
MINNESOTA

Todd County GIS
215 1st Ave S, Ste 102
Long Prairie, MN 56347
(Office) 320-732-4248

Todd County GIS

GIS Site Map

0 0.05 0.1 0.2 mi

0 0.05 0.1 0.2 mi

N W E S

The Todd County GIS & Land Services Department has made every effort to provide the most accurate and up-to-date information available in this publication and cannot be held responsible for any unforeseen errors or omissions. If the recipient wishes to locate parcel corners and property lines, employ the services of a Registered Land Surveyor.

Printed on:
Tuesday, July 2, 2024



Minnesota's Vanishing Natural Shorelines: A Loss that Contributes to Degraded Lake Quality

The Natural Shoreline Partnership's Statement of Purpose

July 2023

Justin Meissen, Flickr

Minnesota's Vanishing Natural Shorelines: A Loss that Contributes to Degraded Lake Quality

July 25, 2023

This report was formulated out of discussions with non-profit organizational leaders and government (state and local) natural resource professionals concerned about the continuing loss of shoreline vegetation, which helps protect clean water, habitat, lakeshore character, and recreation.

Minnesota Natural Shoreline Partnership:

Anne Sawyer (UMN-Extension)*, Chris Pence (BWSR), Dan Petrik (DNR), Dan Shaw (BWSR), Greg Berg (Stearns County SWCD), Jeff Forester (Minnesota Lakes and Rivers Advocates), Jeff Hrubes (BWSR), Jennifer Shillcox (DNR), Joe Shneider (MN COLA), John Linc Stine (Freshwater Society)*, Kris Meyer (Freshwater Society), Kristin Carlson (DNR), Paul Radomski (DNR), Steve Kloiber (DNR), Tom Nelson (Itasca County SWCD), Wade Johnson (DNR), Jason Moeckel (DNR), Nick Neuman (Stearns County Environmental Services), Becky Rice (Blue Thumb), Beth Carreno (Comfort Lake-Forest Lake Watershed District), Annie Knight (NWLT), Elizabeth Mboutchom (NWLT), Nicole Ward (DNR).
* - past member

Executive Summary

Many of Minnesota's lakes are in trouble. About half of Minnesota's natural shorelines have already been lost, and natural shoreline continues to vanish at an alarming rate. We are degrading our lake water quality. Mowed shorelines allow 7 to 9 times more pollutants to enter the lake than a more naturally vegetated shoreline. These pollutants accumulate in lakes, often creating serious water quality problems while also promoting algal blooms and excessive aquatic vegetation. In addition, we are losing valuable habitat for fish – and loons, frogs, butterflies and more. We are losing the beauty of diverse shorelines and the unique character of Minnesota. It is critical that we act, and act now, to protect our vanishing healthy shoreline and recover what has been lost.



We are aware that the status quo is not working. Despite fifty years of state shoreline vegetation standards and local government regulation, the system has failed to adequately protect our natural shorelines. Additional efforts such as education and enforcement have been only marginally successful.

For lake water quality, fish and wildlife communities, and to sustain the health of Minnesota lakes for our recreation and enjoyment, a reasonable natural shoreline protection and restoration goal would be that 75% of a shoreline be unmowed with natural vegetation, consisting of forbs, grasses, shrubs, and trees that is at least 25 feet in width landward from the lake. How can such a goal be achieved?

After listening to many people and organizations about protecting and restoring shorelines, several reoccurring themes emerged. First, local government staff, at the forefront of property owner interactions, need support and additional technical guidance to promote and facilitate shoreline restoration. Second, there is evidence that community leadership development, including civic engagement approaches[1], can effectively shift social norms towards protecting and restoring natural shorelines. However, it can take time for behavior shifts to successfully establish. Therefore, community leadership development requires continued support and focus to gain and sustain momentum. Third, effective partnerships from neighboring states may provide models to advance protection and restoration of natural shorelines.

Specific actions that could be taken include:

1. Strengthen the relationships between the many organizations with interest in protecting and restoring shoreline. These organizations include state government, local government, statewide non-profit organizations (like MLR, Freshwater Society, Metro Blooms, and MN COLA), and local organizations, such as lake associations.

    a. Work to understand the roles each organization plays in shoreline protection and seek to align these roles to enhance the strengths and capacity of each organization.
    b. Make a concerted effort to engage in dialogue with local organizations to better understand their needs and use this information to improve guidance, tools, and programs.
2. Improve public outreach with a sustained, consistent message from all partner organizations.
3. Provide more training and outreach opportunities for key audiences including lakeshore landowners, landscape contractors and consultants.
4. Increase one-on-one landowner contacts by supporting grassroots/local efforts and enhancing the capacity of these efforts. Examples of this include the Lake Steward, the Minnesota Water Steward, and the Lawns to Legumes programs.
5. Create incentives for shoreland protection and restoration.
6. Enhance funding to support for shoreland protection and restoration programs.



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Definitions

Natural shorelines – developed and undeveloped shoreline with (1) a substantial portion of the shoreline frontage with trees, shrubs, and natural ground cover, and (2) an aquatic zone with limited alteration and intact plant stands and woody habitat.

Healthy shoreline – "one that is sustainable – that is, it has the ability to maintain its structure (organization) and function (vigor) over time in the face of external stress (resilience)."[2]


WI DNR

Social norm – "shared standards of acceptable behavior by groups. Social norms can both be informal understandings that govern the behavior of members of a society, as well as be codified into rules and laws. Social normative influences or social norms, are deemed to be powerful drivers of human behavioral changes and well organized and incorporated by major theories which explain human behavior."[3]

The Nature of Lakes

Once something is lost, it is often hard and costly to recover. This is true for lakes. Water quality restoration projects for lakes are often measured in the millions of dollars. And unfortunately, lake ecosystems and water quality may fail to recover even after water pollution sources are eliminated or substantially reduced. For Minnesota lakes, phosphorus is the limiting nutrient for algae production[4]. Phosphorus pollution accelerates the rate of lake aging, otherwise known as eutrophication[5]. This means more frequent noxious algae blooms and fish kills, excessive plant growth, and loss of water clarity. Once in a lake phosphorus continues to cycle, degrading lake quality for a long time[6]. Eutrophication can also alter oxygen dynamics within a lake as dissolved oxygen is consumed by bacteria as they feed on dead algae and other organisms[7].

While water quality restoration is very difficult and often cost-prohibitive, fish and wildlife habitat and scenic character are more easily recovered with personal no-mow approaches or professional expertise at a manageable cost. Private property owners able to access existing lakescaping information or professional assistance can recover their natural shoreland lot by lot, lake by lake. For many lakes, natural shoreline restoration efforts also help to maintain or improve lake water quality.

Minnesota's lake shorelands require a dual approach: 1) protecting natural shorelines and 2) recovering these shorelines where they have been lost.

Benefits of Natural Shorelines

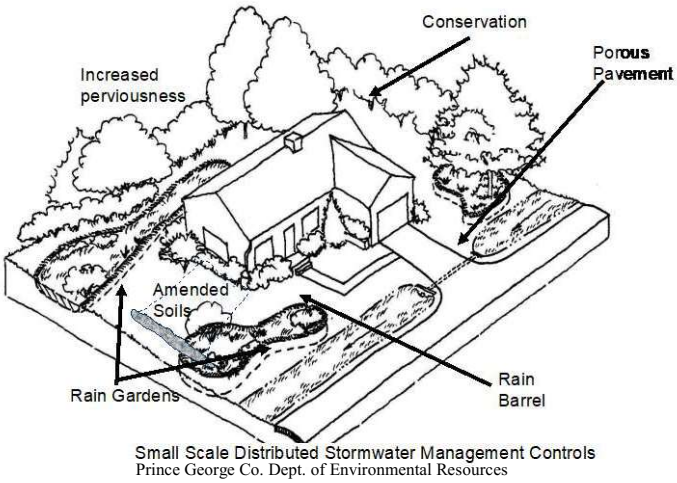
For surface waters, land conditions closest to the water greatly influence water quality. This proximity principle is key to understanding the value of natural shorelines—they are the first and last defense to protect lake and river quality. Natural shorelines are corridors of diverse vegetation along rivers, streams, and lakes which help protect water quality by providing a transition between upland development and adjoining water. Abundant, diverse vegetation holds and filters runoff; stabilizes lakeshores and riverbanks; reduces erosion and limits sedimentation; provides habitat for fish and wildlife; and offers scenic screening of shoreline development[8].

Plants growing along the shore slow the movement of rainwater runoff. Shore vegetation allows sediment contained in the runoff to settle out and water to infiltrate into the ground near where it falls. Pollutant removal increases with increasing vegetation cover. Near-shore vegetation, such as bulrush, also reduces bank and shoreline erosion. These plants dampen the force of waves, and their deep roots hold the shoreline together. Trees are an important component of natural shorelines. They provide shade, privacy screening, and wildlife habitat. Downed wood, from small branches to whole trees, supplies important habitat for fishes, frogs, turtles, waterbirds, insects, and mammals. Near-shore downed trees also blunt waves and ice action that scours the shore.



A vegetated shoreline provides benefits besides water quality protection as well. Natural shorelines adapt better to changes in precipitation and changing lake levels, as well as to intense rainfall events. Natural shorelines cost less to maintain both for bank stabilization and scenic benefits. A shoreline buffer, with thoughtfully pruned trees and shrubs, provides a beautiful picture frame for the lake that screens the view of the neighbors.

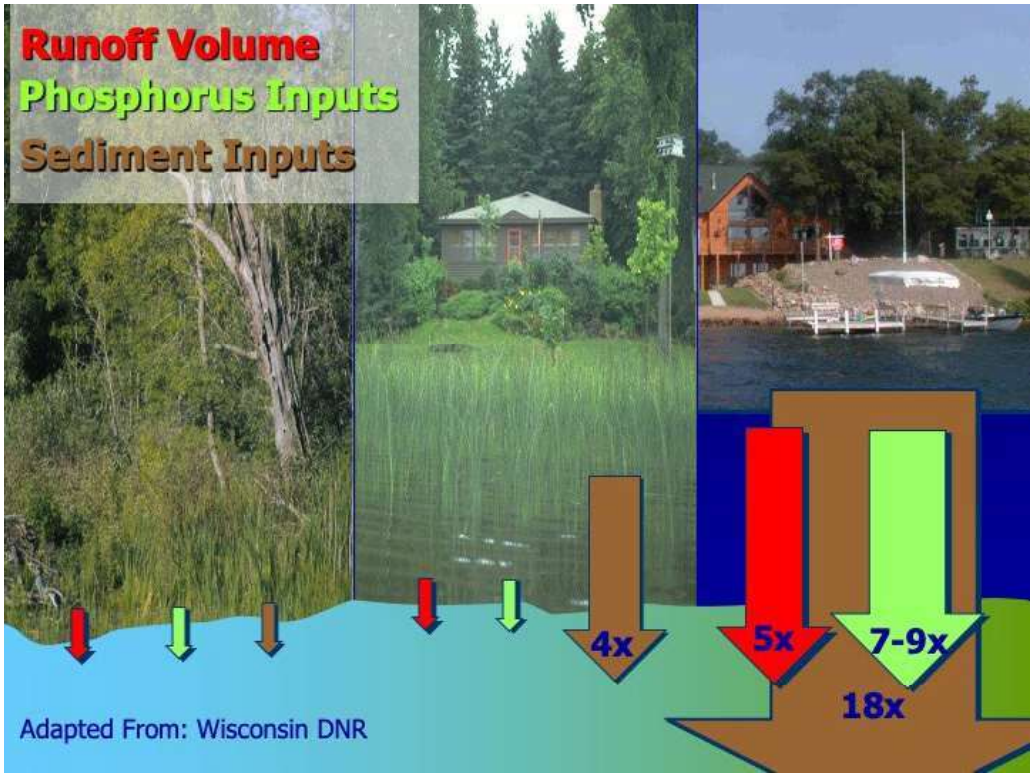




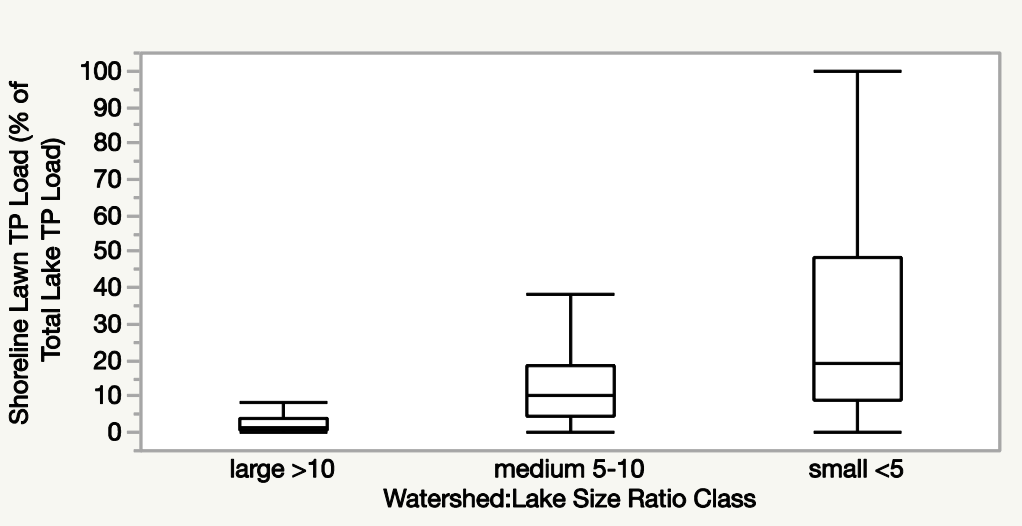
Loss of Water Quality

While many lakeshore owners leave or restore native vegetation along the shore, some homeowners plant and mow a lawn down to the lake. The loss of shoreline vegetation leads to high pollution runoff and increased soil erosion. Nitrogen and phosphorus runoff from mowed shorelines is harmful to lakes. Nitrogen runoff promotes nearshore aquatic plants. High nitrogen loads to a lake can reduce plant diversity and increase lake vegetation biomass (which is not a desire of lakeshore property owners). Small additions of phosphorus, a common plant nutrient in Minnesota soils, can lead to large reductions in water clarity. Just one pound of phosphorus added to the lake along shore can produce 500 pounds of algae near the dock and on the swimming beach.

A 'lawn down to lake' shoreline allows 7 to 9 times more phosphorus to enter the lake than a more naturally vegetated shoreline[9]. While the amount of phosphorus entering the lake from shoreline lots varies due to soil, slope, and other site-specific conditions, the average pollution from a 'lawn down to lake' lot has been estimated at 0.2 pounds of phosphorus per summer compared to 0.03 pounds per summer for a lot with a native vegetated shoreline buffer. This increase in nutrient pollution can result in the generation of 100 pounds of algae along one shore lot compared to just 15 pounds under natural conditions. This runoff pollution accumulates around a lake, often creating serious water quality problems. This situation is especially noticeable in those lakes with small watersheds and little or no surface water outflow. The 'lawn down to lake' management style also fragments the shoreline, making it vulnerable to waves from wind and boat traffic. The shallow roots of turf are insufficient to hold the soil, leading to shore and bank erosion.



The lake's watershed to lake size ratio (W:L) explains where the loss of natural shorelines is most important. Research found that lakes with large W:L ratios had a low proportion of their total phosphorus (TP) load due to the loss of natural shorelines. For these lakes, on average 1.5% of the total load came from lakeshore residential lawns and development. However, for lakes with low W:L ratios, on average 19% of the total pollutant load was attributed to lakeshore residential lawns and development, with some lakes having most of their pollutant load due to the loss of their natural shorelines. Lakes with medium W:L ratios had intermediate results; for these lakes, on average 10% of the lake's TP pollution load was coming from lakeshore residential lawns and development. (In the plot below the box represents the interquartile range, the line in the box the median, and the lines that extend from the box are extend to the minimum and maximum data values.)



The results demonstrate the consequential phosphorus pollution from the loss of natural shorelines for lakes with small or medium watersheds. About half of Minnesota lakes have small or medium W:L ratios, so strategies that prioritize the restoration and protection of these sensitive riparian areas are needed to address this source of lake pollution.

Loss of Water Infiltration

The loss of natural shorelines, with corresponding increases in impervious surfaces and lawns, increases both the amount of runoff and the quantity of pollutants and nutrients reaching lakes and rivers[10]. Our failure to manage rainwater results in erosion and sedimentation, which in turn triggers a series of processes that reduce water and habitat quality. Stormwater runoff is considered a major source of water pollution, and may be responsible for considerable water quality impairment. Perhaps the single greatest threat to lakes from sediment is as a carrier of phosphorus to the lake. In residential areas, the largest source of phosphorus entering lakes is lawn and impervious surface runoff. Rainwater runoff originates from streets, driveways, parking lots, roofs, and other impervious surfaces. Water flowing over these surfaces picks up dirt, nutrients (including applied lawn fertilizer), pesticides, toxic chemicals, pet waste, and other

pollutants. Rainwater that does not infiltrate into the ground or evaporate runs downhill to lakes, wetlands, or rivers.

Rainwater runoff from developed 'lawn down to lake' managed shorelines was measured 5 to 10 times higher than from forested shorelines, with a high percentage of storms resulting in runoff. Lawns and urban soils are often very compacted and may act like impervious surfaces in increasing rainwater runoff. Many lakeshore sites have been heavily graded during construction. The depressions and swales that would normally retard runoff are often graded over, the topsoil removed, and the underlying soil compacted, making a flat lawn that acts like pavement in its inability to infiltrate and reduce stormwater runoff. There is a direct relationship between impervious surface coverage and phosphorus runoff pollution. As impervious surface coverage increases, the amount of nutrients entering waters increases. When impervious surface coverage exceeds 10-12 percent of the lake's watershed (which is typical for suburban/urban Minnesota lakes) without a comprehensive approach to manage rainwater, water quality is generally negatively impacted.


MPCA

Loss of Fish and Wildlife

The loss of natural shorelines has a profound effect on fish and wildlife. Many Minnesota lakes are in poor biological condition because of the loss of fish and wildlife habitat[11], and over one hundred lakes have been listed for aquatic life impairment[12]. Fish diversity and abundance are altered with the loss of shoreline health[13].

Aquatic plant losses eliminate fish and wildlife habitat. Unhealthy shorelines lead to nutrient pollution, increased water turbidity and reduced deepwater oxygen supplies; these conditions impact both shallow water sight-feeding fish like panfish and bass and deepwater fish like cisco

and lake trout which require abundant oxygen in the cold, deep waters. Changes in aquatic plant communities may also occur with shoreline alterations. Riprap and retaining walls are expensive and negatively affect lakes by creating a barrier between upland areas and the shoreline environment[14]. Poor treatment of the shoreland often corresponds with poor treatment of the aquatic zone. Developed shorelines often have less floating-leaf and emergent vegetative cover than undeveloped shorelines. Elimination of this vegetation also eliminates food and cover for a variety of insects, birds, and amphibians.



Fragmented habitat forces wildlife to spend extra time and energy seeking access to nesting, basking, and feeding sites. Trees, shrubs, and the forest understory near the shore have incrementally declined over time along many developed shorelines. This change in shoreline habitat negatively affects wildlife – although geese appear to appreciate the space, and create a nuisance with their droppings, aggressive behavior, and noise. Loons, however, will not likely nest on a lawn or a beach; they prefer to nest near shore on vegetated hummocks, small islands, or masses of emergent vegetation. The loss of trees along shore means fewer trees fall into the water. Biologists have determined that this loss of trees due to development will negatively affect fish populations for centuries[15].There is also a definitive link between impervious surface cover and fish. Sedimentation and toxic pollutant runoff to streams and lakes increase with imperviousness, and lead to reduced fish reproductive success and survival. The winter use of salt for sidewalks, driveways, and road deicing results in increasing sodium and chloride concentrations in lakes, which at high concentrations can harm plants, frogs, fish, and other organisms. Within lakes, chloride does not break down or settle out, so this pollution is lasting.

State of Lake Shorelines in Minnesota

The Minnesota DNR developed a rapid assessment method for objectively evaluating shoreline health for lakes[16]. The Score-the-Shore survey protocol was designed to (1) determine a lakewide lakeshore habitat score with modest precision; (2) detect changes over time, and (3) compare lakewide lakeshore habitat scores to regional patterns and trends.

DNR biologists have conducted these surveys on 785 lakes across the state in association with MPCA's watershed-based monitoring schedule. Each survey site on the lake is scored based on a relative measure of the extent of the natural shoreline present[17].

The results from this sample of lakes indicate that Minnesota has currently lost 40 to 50% of its natural shorelines. Lakes in central Minnesota have lost the most natural shorelines (Figure 1). In this region of the state, about 28% of the lakes had shores that scored low for protection of natural shoreline. Northern Minnesota was more likely to have lakes with high scores. In all regions of the state, most lakes received moderate scores. However, this does not tell the whole story. Recomputing lake scores for only developed shores (parcels with structures) indicated even worse results – for most lakes the developed shore was rated low or very low (Figure 2). A greater percentage of northern Minnesota lakes still had high or moderate scores (48%) compared to central Minnesota lakes (32%), indicating a slight regional difference in shoreline stewardship.

The rate of natural shoreline loss is estimated to be 1 to 2% per decade[18]. In time, many of Minnesota shorelines will be damaged and unable to protect water quality and provide sufficient fish and wildlife habitat.

A natural shoreline protection and restoration goal

While the science documenting the habitat and water quality value of natural shorelines is strong, the relationship between the extent of natural shoreline and lake health is complex and studies point to the difficulty in defining a precise threshold at which nearshore habitat and water quality declines for a particular lake. As a result, it is necessary and reasonable to take a precautionary approach in a setting a protection and restoration goal for natural shorelines. This approach acknowledges that nearshore vegetation and shoreline buffers are important to reduce runoff from developed shoreland and to provide critical nearshore habitat. For lake water quality, fish and wildlife communities, and to sustain the health of Minnesota lakes for our recreation and enjoyment, a reasonable natural shoreline protection and restoration goal would be that 75% of a shoreline be unmowed with natural vegetation, consisting of forbs, grasses, shrubs, and trees that is at least 25 feet in width landward from the lake.

Figure 1. Score-the-Shore survey results by DNR administrative region.

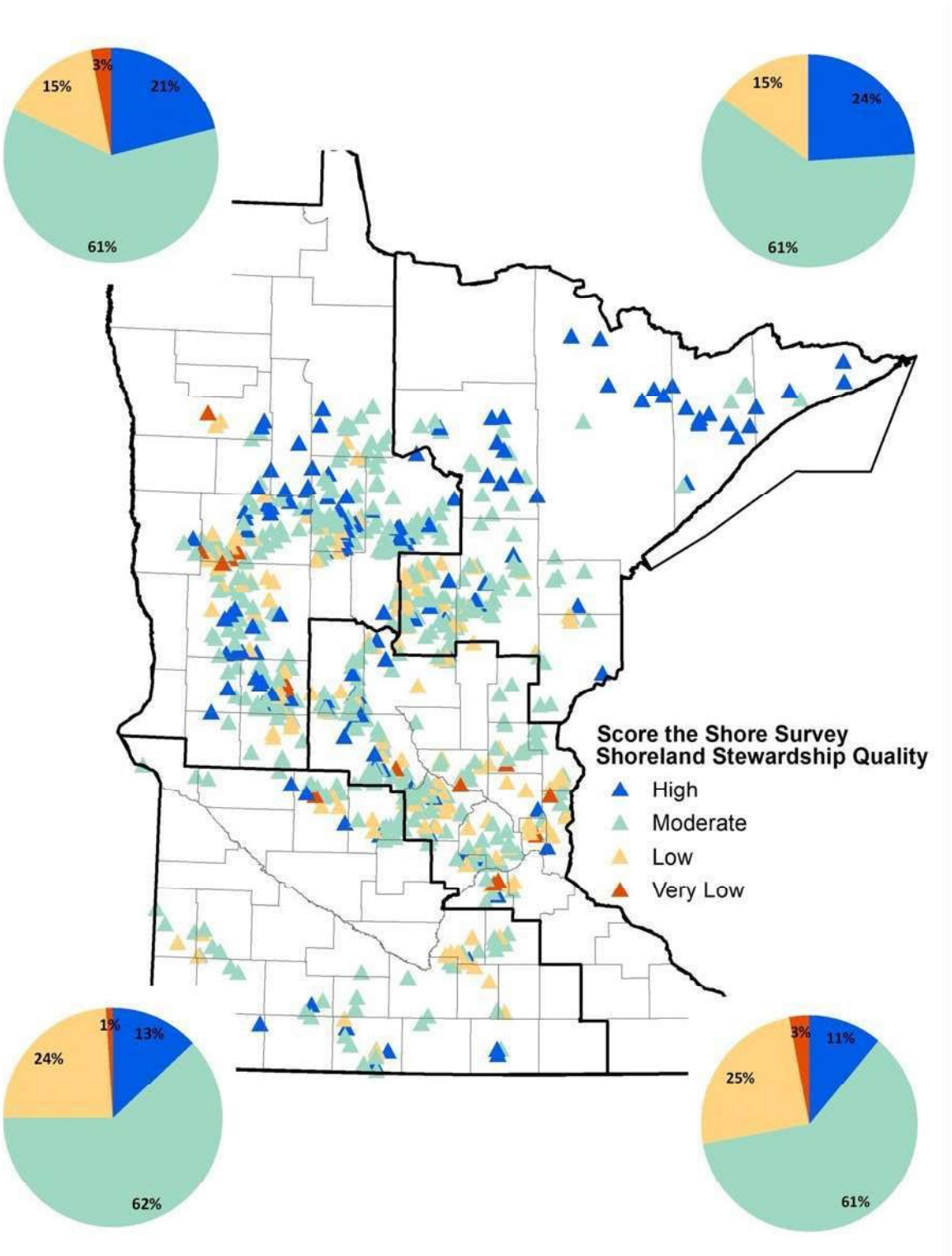
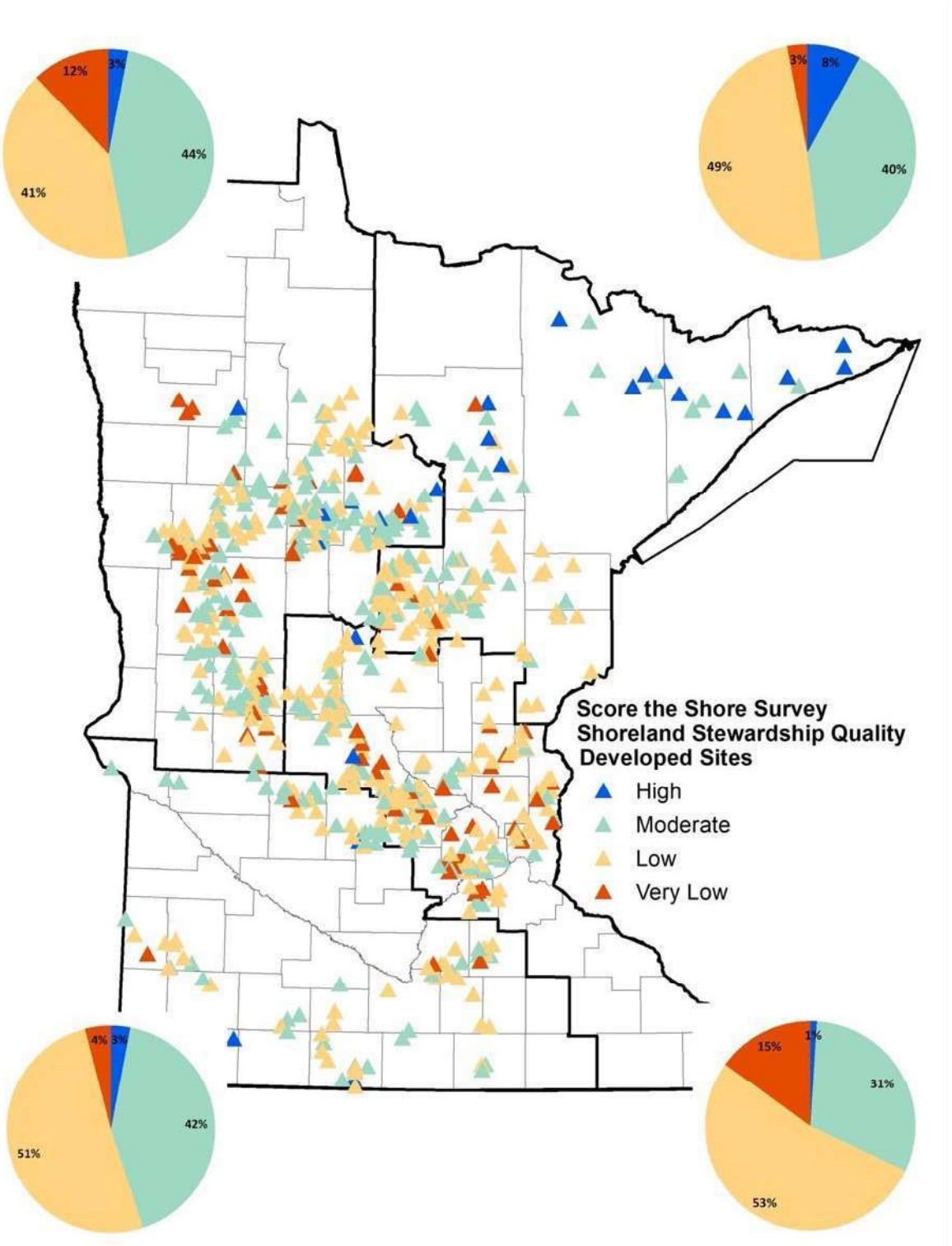


Figure 2. Score-the-Shore survey results by DNR administrative region rescored using only developed shorelands for each lake.

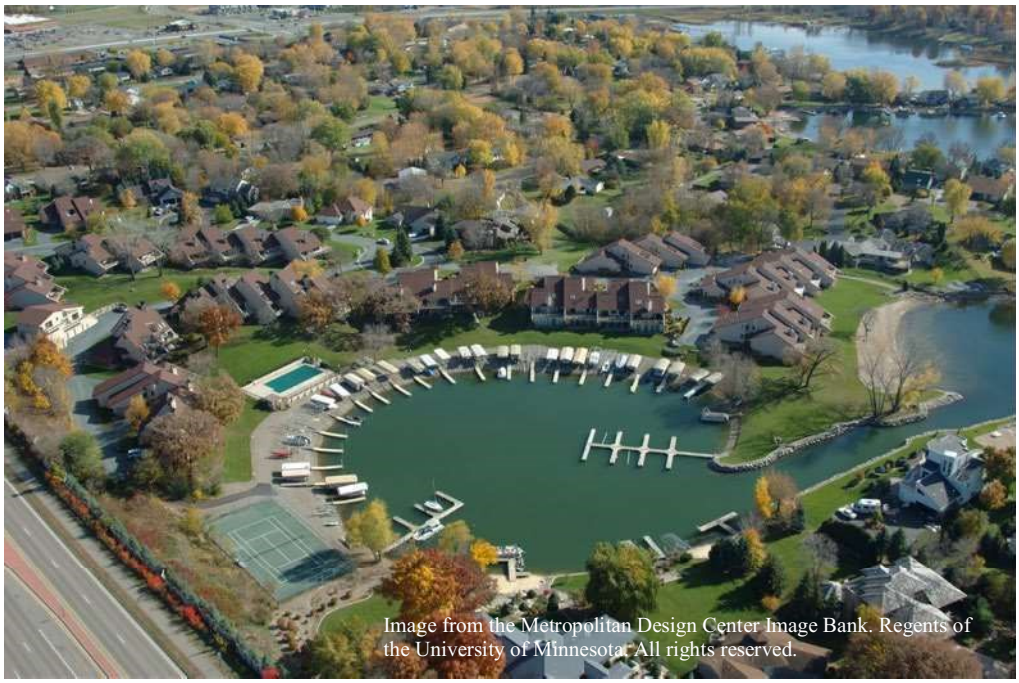


The Paradox

The Minnesota Legislature has recognized the benefits of natural shorelines by enacting policies to protect them. Minnesota Statutes specify policies to conserve and use water resources in the best interests of its people, and to promote public health, safety, and welfare. It is also the policy of the state to promote the retention and conservation of all water falling from the sky in the areas where it falls. Natural shorelines are critical in achieving these policies, so statewide shoreland development standards (Minnesota Rule 6120) include provisions to protect shorelines from destructive alteration. However, the state of lake shorelands is dire. Regulations have not stopped shoreline alterations, lot by lot, year by year, and lake by lake.

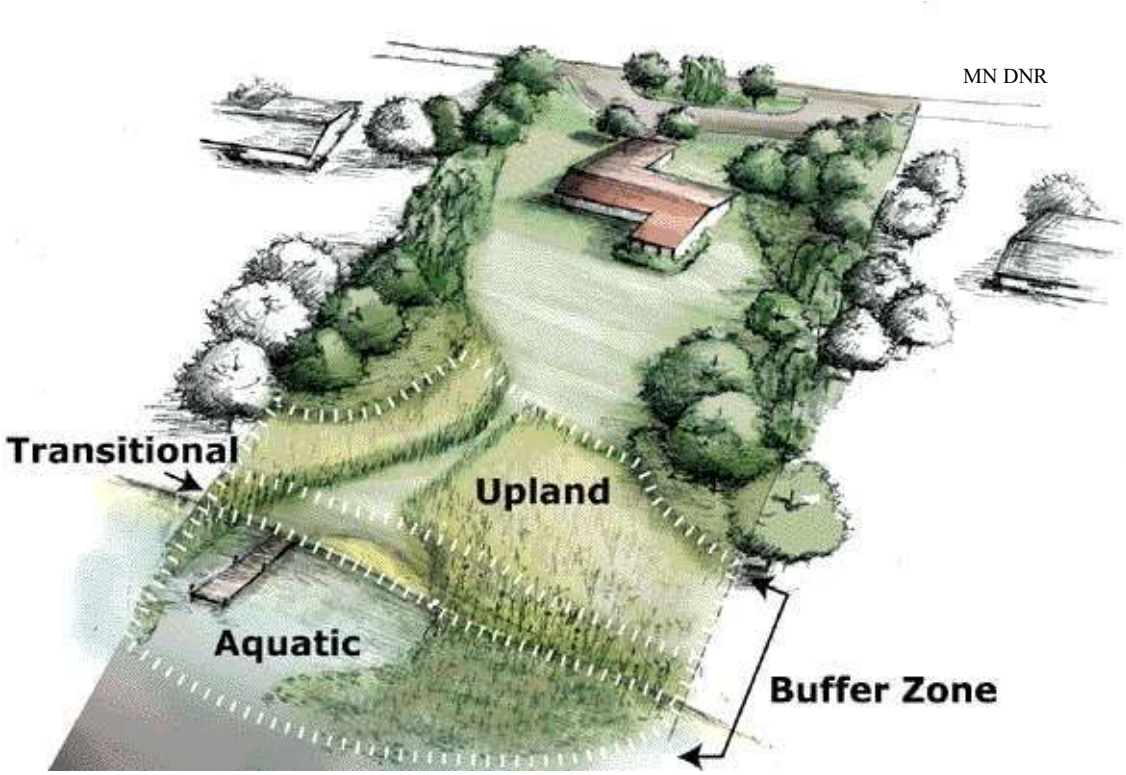
Lakeshore property owners value healthy lakes and clean water[19]. But, there is a paradox: the condition of Minnesota's shorelines suggests that action on the land is inconsistent with this value. Addressing the contradictions between values and actions will require an entirely new approach.

The science and data are available; lack of information is not the issue. The connection between behavior (both individual and collective), knowledge and values is the issue. Understanding and making this connection is critically important. In addition to revised regulations, we believe a bottom-up, community approach is necessary to provide a more comprehensive solution to this environmental problem.


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Overview of Efforts to Limit Loss of Natural Shorelines

Decline in State agency technical guidance for private property restoration
There are several agencies and organizations that invest in protecting against natural shoreline loss or assisting with the restoration of shoreline. However, there has also been a significant decline of agency funding and associated expertise available for shoreland protection and restoration. The DNR and the University of Minnesota Extension are notable examples of such technical expertise loss. With shifting priorities, this expertise is no longer available to support local governments and private lakeshore property owners requesting assistance on shoreline restoration. The DNR Legacy Fund Restoration Evaluation Report[20] noted that practitioners wanted more trainings to learn from experts. The report also recommended consistent minimum design criteria for lakeshore projects developed with guidance from the few state agency staff with this expertise. Similarly, the DNR 2020 County Shoreland Activity Summary Report[21] reported local government staff requesting more training on shoreline vegetation restoration and professional guidance on land alteration best management practices. These examples indicate a clear need for more technical guidance to local government staff on topics related to restoring shoreline.



Loss of DNR funding for private property restoration projects
Due to funding losses, the DNR phased out direct grants to property owners for shoreline restoration projects.

Limitations of State shoreland vegetation standards
Under the Shoreland Management Act, the DNR establishes shoreland regulations and sets the shoreland development standards for local governments. Counties and cities implement those regulations through local zoning. This approach has a long history in Minnesota. The Shoreland Management Act was passed through bipartisan legislation in 1969, and the shoreland development standards were last updated in 1989. The State's standards and associated criteria were intended to preserve and enhance the quality of surface waters and conserve the economic and natural environmental values of shorelands. However, state and local government officials have long recognized and acknowledged limitations of an exclusively rule-based approach to protect natural shorelands.

The State's shoreline standards afford a basic level of protection. However, they are difficult to enforce due to the enormous scale of the issue and the costs of administering this program, coupled with the limited resources of county and city government. In addition, the state standards allow for the clearing of some vegetation and other shoreline alterations (e.g. riprap and sand blankets), so there can be losses even under the current standards. These standards also do not require restoration of past shoreline alterations.

DNR efforts to promote protection and restoration of natural shorelands
In addition to oversight of shoreland ordinance administration, the DNR encourages voluntary natural shoreland protection efforts. In the early 2000s, the DNR promoted natural shorelines through their "Our Waters-Our Choices" project. The DNR also developed "Restore Your Shore", a do-it-youself tool for shoreland owners and professionals to guide shoreland restoration and protection projects[22]. Similarly, the DNR created "Score Your Shore", a tool for evaluating habitat on lake lots[23]. Finally, the DNR Shoreland Program highlights and promotes examples of innovative, voluntary higher shoreland standards that local governments have implemented. These include higher standards for shoreline vegetation protection and restoration.

Tribal Resource Management Agencies
Tribal management of natural resources incorporates local ecological knowledge in a cultural context that recognizes a reciprocal relationship with the rest of nature[24]. For example, wild rice is sacred, and cultural practices naturally incorporate protection and regulation of wild rice harvests. As we understand, the protection of water, land, forest, fish, plants, and other natural and cultural resources present on reservations and beyond is a key mission of these agencies. Their responsibilities and values include protecting the many natural resources for the use of future generations.

Minnesota Board of Water and Soil Resources (BWSR)
Through the Reinvest in Minnesota (RIM) Program, BWSR has provided resources to help protect the shorelines of priority wild rice lakes. Lakeshore restoration is being funded through Clean Water Fund grants, as well as the new BWSR Habitat Enhancement Landscape Program (HELP). The Lawns to Legumes program, which is focused on pollinator protection, is also funding shoreline plantings. These efforts will be an increased emphasis of the program through partnerships with Blue Thumb and local conservation organizations.

University of Minnesota Extension
University of Minnesota Extension has engaged in several shoreland protection and restoration initiatives over the past 20 years, including the Minnesota Shoreland Management Resource Guide[25], which provided information and resources related to sustainable shoreland management practices. Extension created the Itasca Shoreland Advisors Program, in collaboration with Itasca Waters[26], as a model for engaging local communities in shoreline protection and restoration activities. Extension currently provides information on a variety of shoreland topics to educate shoreland property owners on how to protect and preserve water quality by following best management practices (BMPs) for their property[27]. However, Extension no longer has staff dedicated to a shoreland program.

Recently, Extension has ramped up programming to address aquatic invasive species (AIS) concerns in Minnesota. The AIS Detectors program, launched in 2017, is a partnership between Extension and the Minnesota Aquatic Invasive Species Research Center. The AIS Detectors Core Course and volunteer program empowers Minnesotans to become part of the solution to aquatic invasive species problems by engaging with their communities to share knowledge and best practices. Other offerings of the AIS Detectors program include a virtual course to teach non-professionals about aquatic invasive species management (AIS Management 101), an annual aquatic invasive species early detection event (Starry Trek), a free webinar series, and more[28].

Local Resource Agencies (Soil & Water Conservation Districts, Watershed Organizations, Environmental Services, etc.)
These local resource agencies provide a critical connection to citizens on the protection and restoration of natural shorelines. Staff assist property owners with technical information, design, cost share, and implementation of stormwater, erosion control, and natural shoreline projects. They have knowledge of local values, organizations, networks and ways of leveraging local capacity that others do not.

Local Governments with zoning authority (counties, cities, townships)
Local governments implement the shoreland standards through local zoning ordinances and are the regulatory authority for land use on the land (above the ordinary high water level). Their work includes administration and enforcement of local shoreland ordinances (e.g., construction, sewer systems, drainage, stormwater management, land alterations, and vegetation removal) and other work on shoreland property that is relevant to water quality.

Many local governments are understaffed in relation to the demand of services. They approve plans and permits for development and work in the shoreland, but often do not have the time to review that the work done was in compliance with the permit or ordinance. Variances are often seen as one of the bigger problems with lake shoreland management. Some local administrators see them as an opportunity to improve shoreland conditions; for example, shoreline restoration for a granted variance may be an appropriate condition to mitigate impacts of the proposed activity. There are also some variance requests that get approved that should have never been approved.

Minnesota Lakes and Rivers Advocates (MLR)
Minnesota Lakes and Rivers Advocates is a non-profit advocacy group focused on protecting Minnesota's lake and river heritage for current and future generations by forging powerful links between lake advocates and policy makers. MLR seeks to leverage the important contributions that lake home and cabin owners and lake associations can make to the preservation of our lakes and rivers.

In the 1990s, through property owner surveys and reviews of taxing data, MLR saw evidence that as property tax pressure on shorelines grew, owners were forced to subdivide and sell shoreline property because it had become unaffordable. In the decade from 2000 to 2010 the average size of a seasonal lot fell by almost 50%, to about 40 acres. To slow this trend and help protect water quality, MLR worked to drive down the class rate on seasonal recreational property until today it is the same as a Homestead. They also worked to extend the Sustainable Forest Incentive Act (SFIA) and the Managed Forest Class rebates and tax reductions to include property adjacent to water. MLR continues to work to create a property tax refund or other incentive to encourage people to go beyond current statutes and manage their shoreline in a way that protects water quality and increases habitat.

In addition, MLR recently launched the Lake Steward program to support lake associations in their efforts to educate shoreland owners and create a shoreline preservation ethic. Shoreland owners that meet 10 criteria for lake stewardship are awarded a beautiful Lake Steward sign to put on their dock. The sign, in addition to rewarding the stewards, helps to shift the social norm (see 'social proof' below). The program was popular in its first summer, with over ten lake associations in various parts of the state participating and hundreds of site visits (the primary shoreland owner educational opportunity) completed. The Lake Steward program creates partnership opportunities with local resource managers and state agency professionals. The Board of the City of East Gull Lake voted to include language promoting Lake Steward on the permit applications for shoreland development. MLR will work to expand the Lake Steward program in the coming years.



Freshwater Society
The mission of the Freshwater Society is to inspire and empower people to value and preserve our freshwater resources. Since 1968, Freshwater has been a leading public nonprofit organization dedicated to preserving freshwater resources and their surrounding watersheds.

The Freshwater Society offers a program that equips and certifies Minnesota Water Stewards, who volunteer their time as local leaders within their communities to support and extend the work of partner watershed districts, cities, counties, and environmental groups. Stewards help improve the health of our waters in a multitude of ways from on-the-ground projects that engage and inspire their communities to participation on city and local government boards where they add their voices to influence policy.[29]. Since the Freshwater Society began the Minnesota Water Stewards program in 2013, more than 400 Stewards have been certified and are volunteering their time. These Minnesota Water Stewards have connected with thousands of people through outreach and educational events; installed or planned hundreds of projects, including rain gardens, rain barrels, cisterns, dry creek beds, permeable driveways, prairie restorations, home water audits, school gardens, and library education programs; created art that informs, educates, and inspires others to take action for water; and prevented millions of gallons of polluted stormwater runoff from entering our lakes, rivers, and streams each year.

Minnesota Coalition of Lake Association (MN COLA) & Lake Associations
MN COLA is a volunteer organization with the mission of preserving, protecting and improving the waters and shorelands of the State of Minnesota through advocacy, education, and sharing of best practices. MN COLA provides information and a regular forum for discussion among lake association members from throughout the state. While all issues of lake life, recreation and environmental protection are topics of interest, recent years have been dominated by efforts to improve protocols that prevent the spread of aquatic invasive species. As principal decision makers for private shoreland, Lake Association members and leaders are on the front line to prevent damage to the natural riparian zone by means of Best Management Practices. MN COLA also works closely with MLR for legislative advocacy which includes shoreland issues. There are many lake associations and county lake groups doing excellent work on informing their members about shoreland management issues.

Metro Blooms' Blue Thumb—Planting for Clean Water® Education Partnership
Blue Thumb is a network of clean water and native plant stewards working to bridge the gap between knowledge and action to change landscaping norms by offering resources and programs to residents on pollinator habitat, native plants, rain gardens and shoreline plantings. Blue Thumb partners include local governmental units, non-profit organizations, and private companies. Blue Thumb recently created a shoreland workshop as part of the Lawns to Legumes Program to further engage residents in efforts to protect and restore shorelines.

Northern Waters Land Trust
Northern Waters Land Trust is an accredited, nonprofit land trust working in north central Minnesota to preserve land to protect water through three methods of conservation: land acquisitions, conservation easements, and community engagement and education. Preserving environmentally sensitive land within priority watersheds and shorelines directly benefits water quality by reducing runoff and preventing erosion, which improves resiliency of wildlife habitat,

enhances the local economy dependent on healthy forests, fisheries, and clean waters, and improves overall community health.

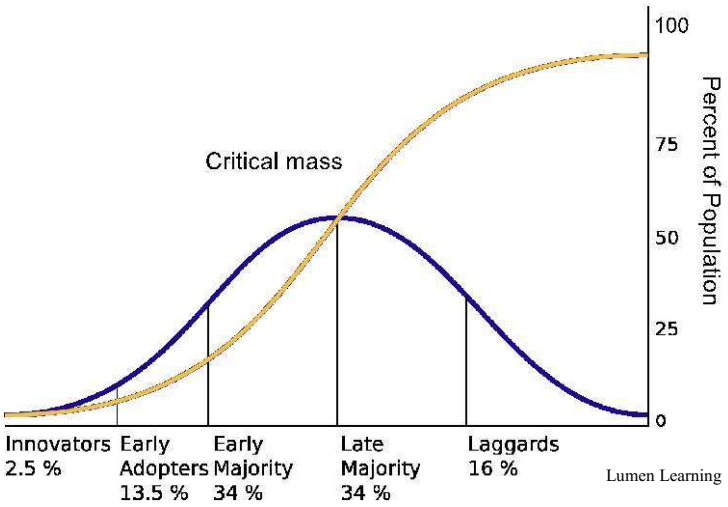
Through community outreach and education efforts, Northern Waters Land Trust aims to change behavior by providing tools and resources to local residents, seasonal property owners, and tourists on how to protect healthy water, shoreline, and shoreland. Conservation easements and fee title acquisitions are mechanisms for permanently protecting lands and waters and can also provide property owners financial benefits. These permanent land protection projects are implemented through collaboration with landowners, lake associations, government agencies, sovereign nations, and conservation organizations.

Shifting Perceptions of Shoreland Management

Our traditional approaches to protecting shoreland are insufficient. We need to find approaches that shift the social norms around shoreland management and perceptions of a healthy shoreland landscape to better align with people's stated values of clean water and healthy lakes.

If it is true that the social norm for shoreline stewardship falls on a continuum from a preference for suburban/urban lawn to a deference for nature and a more natural setting and healthy shoreland, the question is: how do we inspire more lakehome owners to shift to a desire for an ecologically friendly approach?

Our conservation problems are social problems, and solutions will require shifting norms and actions[30]. Collaborative approaches to address conservation may be the most effective way to begin working toward changing human behavior and perceptions. Brown (2011)[31] stated, "since wicked problems are generated by the society in which they are set, their resolution will necessarily involve changes in the society that produced them."



Some people may change their behavior when they are repeatedly confronted with facts, and most people are receptive to the subtle messaging of social norms. Dr. Everett Rogers (1931-2004), *Diffusion of Innovations*[32], studied how new ideas and practices permeate society and

why some innovations fail to catch on. Rogers noted that when an innovation successfully spreads through a community it generally follows an S-shaped pattern of adoption over time. An innovation is initially slow to catch on, then adoption speeds up as word spreads, and finally there is a leveling off of adoption as the innovation saturates the population. The rate of adoption is usually a function of the innovation. If the innovation has advantages over existing practices, is compatible with values and experiences, is less complex, is easy to experiment with, and has high visibility to others in the community, then it is more likely to have a high rate of adoption.

Rogers identified several important steps in the diffusion of innovation, and he found that to succeed in adoption a person needs: (1) to learn about an innovation; (2) to be persuaded about the merits of the innovation; (3) to try out the innovation, often with experimentation; and (4) to hear confirmation of the innovation's merits from peers (positive reinforcement). Rogers also grouped people into adopter categories: innovators, early adopters, early majority, late majority, and laggards. Naturally, one first needs to focus on the innovators and early adopters to advance the S-shaped adoption curve. Open-mind community opinion leaders and professionals that promote innovations help to speed up diffusion. Peer reinforcement is a key step for success (e.g., the Lake Steward sign programs are based on this principle).

Dr. Robert Cialdini's book *Influence*[33] details seven principles of persuasion, of which six are applicable for promoting natural shorelines. First, reciprocity is when we put ourselves in a position of providing and accepting information. This information may come back to us, as often people have an obligation to give when they receive. Second is 'liking the messenger', which recognizes that we prefer to say yes to those people we like. Third is social proof, in that we will follow the lead of others (the basis of Rogers's *Diffusion of Innovations*). Another is authority. We want to follow the lead of true experts or genuine authorities that we respect. Next is commitment/consistency. When we commit to somebody, we want to be consistent with that commitment. The sixth is unity. We want to say yes to those who are one of us. If these principles are used honestly and with good intent, we can help others to make good decisions and take positive action for Minnesota lakes. The shorthand for all the above is a 'public relationship', and a group or cluster of interlocking public relationships around an issue is the civic infrastructure.

Research on Natural Shoreline Promotion

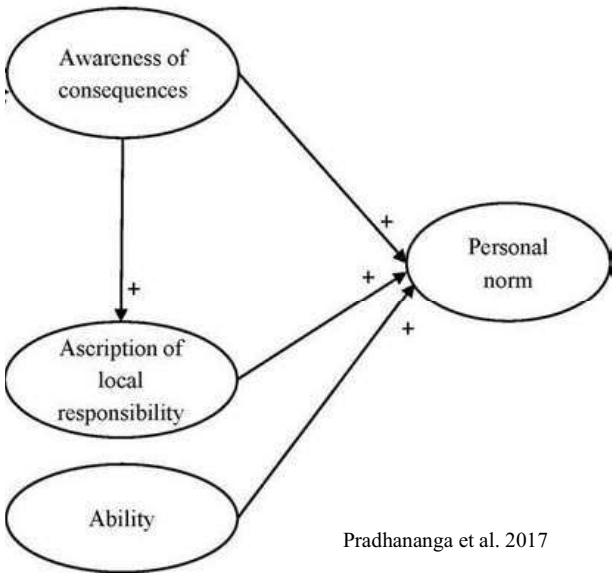
The Native Shoreland Buffer Incentives Project was led by Karlyn Eckman, University of Minnesota[34]. This project used Knowledge-Attitude-Practice (KAP) surveys to determine the best strategies for implementing a natural buffer incentive program in two Minnesota counties[35]. This research found that an understanding of the knowledge, attitudes, and practices already in place among shoreland communities could be reinforced and augmented with strategic incentives to do more. Crucially, the KAP surveys served as the foundation for action toward retaining and restoring a natural shoreline and two counties developed very different programs and results based on the research.

The trial buffer incentive program in East Otter Tail County, administered by the county LGU's shoreland technician, used a Lakeshore Landscaping Manual with design templates. Although participants were provided with workshops, printed material, and a customized approach for individual sites, the scope appeared to have been too large for a single administrator to provide

the hands-on advice necessary for implementation. The Itasca County response to the KAP information was led by Mary Blickenderfer, UM Extension agent and botanist. She developed a peer-to-peer "Lake Challenge" worksheet that was an effective tool used by lakeshore property owners to act. Neighbors from the lake association and college students made the initial contact with an owner and reviewed a series of possible "challenges." Return visits were aided by the expertise from Extension together with Master Gardeners specially schooled in lakescaping techniques.

Beginning with surveys directed at this specific demographic of lakeshore owners, it was found that the simple offer of cost-shares for specific projects was itself not a major factor in motivation. For those already inclined and challenged to "do the right thing," the most important incentive was the presence of a true expert who could provide trusted details on a project. Although it can be expensive, such an expert was found to be the most cost-effective aspect. Many lake associations have similar programs that are based on neighbors providing advice on some obvious problems, but without the ability to provide complete solutions. An award is typically provided, such as a sign for the dock or mailbox certifying a promise to do good, backed by peers, and showcase projects can be honored once in place. Again, a willing owner needs project specifics from a natural resource professional, which serves as a motivating incentive to begin.

Drs. Mae Davenport and Amit K. Pradhananga, University of Minnesota, have conducted extensive research on citizen motivations for engagement in water resources protection. They have found that property owners are more likely to engage in protection when they feel a personal or moral obligation to act and perceive that they have the ability to act[36]. Personal obligation was found to be activated by conservation strategies that appealed to a person's altruistic values, an existing strong land ethic, and unity to their community. Personal norms were driven by individual awareness of the consequences of water pollution, understanding that water resource protection was a local responsibility, and the ability to act[37].



Pradhananga et al. 2017

In 2020, researchers tested the effectivenss of online visuals to shift Lake Sunappe (New Hampshire) shoreline owners beliefs and intentions. They found a positive shift in beliefs and intentions related to lawn fertilization and shoreline buffer creation, suggesting that educational interventions can be useful in shifting personal norms[38].



Agents of Change

Given the widespread desire for suburban/urban lawn shoreland landscapes, creating an interest in and desire for ecologically friendly landscapes is a daunting task in need of strong leadership. Changing public perceptions and norms is a challenging effort to which there is no simple solution. We hope this paper encourages a broader conversation of how to effect these changes and suggest these considerations:

1. How can we harness the knowledge, passion, and existing networks of local resource agencies and non-profit organizations to coordinate and amplify efforts?
2. What key messages can be consistently delivered across the state and at the local level to build awareness of the problem and to advance property owner desires for natural shoreline landscapes?
3. What role should state agencies play?
4. What funding is needed to start and sustain this effort?
5. What kind of organization, working within what type of structure, and comprised of what people, is needed to implement the needed messages, programs and local assistance leading to this change?

The answers to some of these questions may be found in studying the work of other organizations that have addressed specific social problems. Following are examples with different organizational structures or frameworks that might provide a path forward:

1. Mothers Against Drunk Driving (MADD) – Independent organization formed for a single, highly-focused mission with funding via grants, corporate and individual donors.

Seat-belt use and reduced tobacco use are other examples of successful programs to modify social norms.

2. Midwest lake partnerships – Alignment of organizations that collaborate on a shared interest, with members sharing duties in facilitating activities and funding from existing funds or grants.
    a. The Wisconsin Lakes Partnership consists of the Wisconsin DNR, the University of Wisconsin Extension (specifically *Extension Lakes* - Wisconsin has a robust team of educators housed out of the University of Wisconsin-Stevens Point solely dedicated to preserving Wisconsin's legacy of lakes through education, communication, and collaboration), and Wisconsin Lakes (a non-profit statewide organization consisting of lake association and lake district members whose mission is to develop statewide solutions for the challenges faced by Wisconsin lakes while supporting strong local protection efforts)[39]. Their Healthy Lakes initiative and lakeshore habitat restoration training for professionals are recent activities[40].
    b. The Michigan Natural Shoreline Partnership mission is to protect Michigan lakes through conservation and restoration of natural shorelines. The partnership is a collaboration of state agencies, academia, nonprofit organizations and private industry, formed in 2008. The partnership believes that a change in shoreline development practices is necessary – away from high impact methods that change the natural riparian condition to healthier and sustainable erosion control practices that restore/preserve the ecological function of the shoreline and effectively stabilize shoreline erosion. These changes must include options attractive to lakefront property owners[41]. The Michigan Shoreland Stewards Program provides recognition for lakefront property owners who are protecting inland lakes through best management practices on their property[42].
3. New England programs – state efforts that use education and award programs to advance natural shorelines.
    a. Maine Lakes is an organization that works to protect and preserve Maine's lakes through education and advocacy. Their LakeSmart program is an education and outreach effort that rewards lakefront homeowners who manage their land to protect water quality. The program is free, non-regulatory, and voluntary. Participating homeowners receive individualized suggestions from trained evaluators for keeping pollutants from stormwater out of lake waters[43].
    b. Vermont Department of Environmental Conservation has a Lake Wise Program that awards lake-friendly shoreland property owners. The goal of Lake Wise is to establish a new culture of lakeshore landscaping that is proven to protect the lake. A property that earns the Lake Wise Award will represent a "model" shoreland property. The Lake Wise Award certifies a property is well managed, using shoreland best management practices[44].
4. Lawns to Legumes – This program,oordinated by BWSR and supported by a large number of local partners, is focused on supporting at-risk pollinators such as the federally listed Rusty Patched Bumblebee. An emphasis of the program is on building a movement to support pollinators by engaging residents across the state to "Bee the Change" for at-risk species by installing pollinator habitat. The Blue Thumb Partnership plays an important role by leading workshops and volunteer coaching, plus providing cost-share grants to residents. Since 2019 around 3000 projects have been funded, and throusands of

other DIY projects have been guided by the program. Around 6000 residents have also attended program webinars. A lakeshore workshop has been developed for the program and there will be an increased emphasis on engaging lakeshore owners in establishing pollinator habitat and restoring biodiversity[45].

Conclusion

We know that the loss of natural shorelines is a problem. We know what we've been doing to address this problem is inadequate. Top-down control through rules, education, and enforcement is not enough. The magnitude of natural shoreline loss is clear and troubling.

We have talked to many people and listened to their stories. The messages are clear and consistent. Riparian owners need more support on shoreline restoration and protection. Community leadership development has proven effective in shifting social norms and values; however, we could better coordinate and invest more deliberately in these efforts. There are organizations and partnerships from neighboring states that might serve as models to help guide work here in Minnesota.

The problem's large scale means there are no easy solutions. We suggest additional discussions and explorations on the following questions:

1. How can the magnitude of the loss of natural shoreline, with the associated negative consequences to lake quality, be better communicated with the general public and those that own lakeshore property across the state?
2. What types of strategies, programs, or initiatives – whether at the local, regional, or statewide level - demonstrate success in shoreline restoration? How can we emulate those strategies?
3. Will additional social science on the social norms of lakeshore homeowners be helpful in better understanding their awareness, attitudes, and obligations to act to protect and restore shoreline?
4. Can a consensus be found to enhance funding to the key agencies that can provide professional expertise and guidance to riparian property owners?


MN DNR

Online Resources Addressing Shoreland Issues

Minnesota Non-Profit Organizations

Freshwater Society: Lake Protection and Management Guide
Freshwater Society: Minnesota Water Stewards
Lawns to Legumes Program (Blue Thumb)
Minnesota Watersheds
Northern Waters Land Trust
Safe Wakes
Water Legacy: Protecting Minnesota Water Quality
Stearns County MN Shoreline Restoration
Minnesota Lakes and Rivers Advocacy
Itasca Waters
Deer Lake (Itasca County)

Minnesota Agencies

BWSR Lawns to Legumes
BWSR One Watershed, One Plan
DNR Watershed Health Assessment Framework (WHAF): Lakes
DNR Lakes (General topics and information)
DNR Shoreland Management Program
DNR Maintaining and Restoring Natural Shorelines
DNR Shoreland Information for Property Owners (FAQ)
DNR Score Your Shore
DNR Restore Your Shore
DNR Sensitive Lakeshore Identification
DNR Landscaping with Native Plants
DNR Value of Aquatic Plants
DNR: Lake Improvement Districts (LID)
DNR Shoreland Alteration Information Sheets
UM Extension: Shoreland Properties
UM Extension: Water
UM Extension: Shoreland Care

Resources from Beyond Minnesota

Burnett County Wisconsin: Shoreland Incentive Program
Federal Environmental Protection Agency: National Lakes Assessment
Michigan Inland Lakes Partnership: Shoreland Development
Midwest Glacial Lakes Partnership: Shoreland Living Booklets
North American Lake Management Society: Lake Management Planning
North Central Region Water Network
Wisconsin DNR Shoreland Management Program
Wisconsin DNR: Resources on Shoreland Restoration

End Notes: References Cited

[1] https://en.wikipedia.org/wiki/Civic_engagement
[2] Costanza, R., and M. Mageau. 1999. What is a healthy ecosystem. Aquatic Ecology 33:105-115.
[3] See definition of 'social norm': https://en.wikipedia.org/wiki/Social_norm
[4] Carpenter, S. R. 2008. Phosphorus control is critical to mitigating eutrophication. Proceedings of the National Academy of Science of the United States of America 105:11039-11040.
[5] Smith et al. 2014. Comment: Cultural eutrophication of natural lakes in the United States is real and widespread. Limnology and Oceanography 59:2217-2225.
[6] Osgood, D. 2016. Internal loading sustains lake phosphorus impairment. Lakeline spring:10-12.
[7] There are only a few Minnesota lakes that have recovered after phosphorus pollution was substantially reduced. For example, Trout Lake in Coleraine received untreated wastewater from 1910 to 1987, but water quality gradually rebounded after wastewater treatment began in 1987. Deep lakes with low rates of phosphorus recycling are more likely to recover after large reductions in external pollution loading than shallow lakes that generally have high rates of phosphorus recycling from sediments. The reason is that deep lakes stratify during the summer trapping phosphorus in the hypolimnion, except during spring and fall turnover, which is not the case for shallow lakes.
[8] Bentrup, G. 2008. *Conservation buffers: design guidelines for buffers, corridors, and greenways*. Gen. Tech. Rep. SRS-109, U.S. Department of Agriculture, Forest Service, Southern Research Station, Asheville, NC.
[9] Radomski, P. J., and K. Van Assche. 2014. *Lakeshore Living: Designing Lake Places and Communities in the Footprints of Environmental Writers*. Michigan State University Press, East Lansing.
[10] Schueler, T. R. 2003. *Impacts of Impervious Cover on Aquatic Systems*. Watershed Protection Research Monograph No. 1, Center for Watershed Protection, Ellicott City, MD.
[11] U.S. EPA. 2009. National Lakes Assessment: A Collaborative Survey of the Nation's Lakes. U.S. Environmental Protection Agency, Publication EPA-841-R-09-001, Office of Water and Office of Research and Development, Washington, D.C.
[12] See MPCA's impaired waters list: https://www.pca.state.mn.us/water/minnesotas-impaired-waters-list
[13] DNR. 2018. Stressors to biological communities in Minnesota's lakes. Minnesota Department of Natural Resources, Division of Fish and Wildlife.
[14] Riprap should only be used where necessary and never to replace a stable, naturally vegetated shoreline. See DNR handout on natural buffers and lakescaping: https://files.dnr.state.mn.us/publications/waters/shoreline_alterations_lakescaping.pdf
[15] Roth et al. 2007. Linking terrestrial and aquatic ecosystems: the role of woody habitat in lake food webs. Ecological Modelling 203:439-452.
[16] Perleberg, D., P. Radomski, S. Simon, K. Carlson, C. Millaway, J. Knopik, and B. Holbrook. 2019. Minnesota Lake Plant Survey Manual, version 3, for use by Fisheries Section, EWR Lake Unit, and EWR Minnesota Biological Survey Unit. Minnesota Department of Natural Resources. Ecological and Water Resources Division.
[17] Given that the social norm for shoreland stewardship likely falls on a continuum from a preference for suburban/urban lawn to a deference for nature with a preference for a more natural setting and healthy shoreland, the average of the site scores is used to assign the lake's Shoreland Stewardship Quality class (a 'High' classification indicates a lake with a lot of natural shoreland present and a 'Low' or 'Very Low' score indicates a lake with little natural shoreland remaining).
[18] This estimate is based on past losses of nearshore and aquatic vegetation and assuming concurrent shoreline losses (Radomski, P. 2006. Historical changes in abundance of floating-leaf and emergent vegetation in Minnesota lakes. North American Journal of Fisheries Management 26:932-940).
[19] Eckman, K., M. Blickenderfer, and S. Henry. 2012. Native Shoreland Buffer Incentives (NSBI) Project: Final Report—Social Research and Efficacy Outcomes. University of Minnesota Water Resources Center.
[20] See DNR's Restoration Evaluation Program website: https://www.dnr.state.mn.us/legacy/restoration-evaluation.html
[21] See DNR's Summary report on County shoreland activity: https://files.dnr.state.mn.us/waters/watermgmt_section/shoreland/county-shoreland-activities-summary.pdf
[22] See DNR's Restore Your Shore website: https://www.dnr.state.mn.us/rys/index.html
[23] See DNR's Score Your Shore survey details: https://www.dnr.state.mn.us/scoreyourshore/index.html
[24] Bussey, J., M. A. Davenport, M. R. Emery, Marla, and C. Carroll. 2016. A lot of it comes from the heart: the nature and integration of ecological knowledge in tribal and nontribal forest management. Journal of Forestry 114:97-107.

[25] See University of Minnesota Extension's archived Shoreland Management Resource Guide: https://www.shorelandmanagement.org
[26] See Itasca Waters website: https://itascawaters.org
[27] See University of Minnesota Extension's best management practices for shoreland properties website: https://extension.umn.edu/lakes-and-wetlands/shoreland-properties
[28] See Minnesota Aquatic Invasive Species Research Center's AIS Detectors Program website: www.aisdetectors.org
[29] See Freshwater Society's Minnesota Water Stewards website: https://freshwater.org/minnesota-water-stewards/
[30] Rittel, H. W., and M. M. Webber 1973. Dilemmas in a general theory of planning. Policy Sciences 4(2):155-169.
[31] Brown, V.A. 2011. Collective inquiry and its wicked problems. In *Tacking Wicked Problems through the Transdisciplinary Imagination*. Edited by V.A. Brown, J.A. Harris, and J.Y. Russell. Earthscan, Washington, D.C.
[32] Rogers, E. M. 2003. *Diffusion of Innovations, 5th edition*. Free Press, New York, NY.
[33] Cialdini, R. B. 2021. *Influence: the psychology of persuasion, expanded edition*. Harber Collins, New York, NY.
[34] Eckman, K., M. Blickenderfer, and S. Henry. 2012. Native Shoreland Buffer Incentives (NSBI) Project: Final Report—Social Research and Efficacy Outcomes. University of Minnesota Water Resources Center.
[35] See the Native Shoreland Buffer Incentives website: https://www.dnr.state.mn.us/nsbi/index.html
[36] Pradhananga, A. K., M. Davenport, and B. Olson. 2015. Landowner motivations for civic engagement in water resources protection. Journal of the American Water Resources Association 51:1600-1612.
[37] Pradhananga, A. K., M. A. Davenport, D. C. Fulton, G. M. Maruyama, and D. Current. 2017. An integrated moral obligation model for landowner conservation norms. Society and Natural Resources 30:212-227.
[38] Ward, N. K, M. G. Sorice, M. S. Reynolds, K. C. Weathers, W. Weng, and C. C. Carey. 2022. Can interactive data visualizations promote waterfront best management practices. Lake and Reservoir Management 38(1):95-108.
[39] https://www3.uwsp.edu/cnr-ap/UWEXLakes/Pages/default.aspx, https://wisconsinlakes.org
[40] Goggin, P., and P. Toshner. 2016. Wisconsin's public-private lakes partnership grows new layers. Lakeline summer:20-24.
[41] https://www.shorelinepartnership.org
[42] https://www.mishorelandstewards.org/default.asp
[43] https://www.lakes.me/lakesmart
[44] https://dec.vermont.gov/watershed/lakes-ponds/lakeshores-lake-wise/what
[45] https://bwsr.state.mn.us/lawns-legumes-partner-resources

Variances

Variance Application Procedure.

The applicant requesting a variance shall submit to the Director a full and complete variance request application form provided by the Director.

This application shall not be considered complete until all requirements of the application have been met and any application fees have been received.

Prior to submittal of an application for Variance, the applicant and/or land owner shall meet with the Township Board in which the application is located during a regularly schedule Township meeting.

The Director shall refer the application to the Board of Adjustment.

The Board of Adjustment shall hold a public hearing on the proposal. Notice of the public hearing shall be published in the official newspaper(s) designated by the County Board at least ten (10) days prior to the hearing. Property owners of record (incorporated and unincorporated areas) within 500 feet of the affected property shall be notified in writing of the public hearing on the request for a variance.

The petitioner or his representative shall appear before the Board of Adjustment in order to answer questions concerning the proposed variance.

The Board of Adjustment must take action on the application within 60 days after receiving the complete application. This deadline may be extended an additional 60 days (or longer if the applicant agrees in writing) in accordance with MN Statutes, Chapter 15.99.

Variance Criteria.

The Board of Adjustment shall have the exclusive power to order the issuance of variances from the terms of any official control including restrictions placed on nonconformities.

Variances shall only be permitted when they are in harmony with the general purposes and intent of the official control in cases when there are practical difficulties or particular hardship in the way of carrying out the strict letter of any official control, and when the terms of the variance are consistent with the comprehensive plan.

Variances may only be granted when there are practical difficulties in complying with the official controls. The means that the property owner proposes to use the property is in a reasonable manner not permitted by the official control.

Practical difficulties directly created or attributed to the applicant for the variance are deemed self-imposed and may be denied on that basis.

Variances, if granted, will not alter the essential character of the locality.

Economic considerations alone do not constitute practical difficulties so as to justify granting of the variance.

No variance may be granted that would allow any use that is prohibited in the zoning district in which the subject property is located. The Board of Adjustment may consider the inability to use solar energy systems a "practical difficulty" in the granting of variances.

In considering the application for a variance, the Board of Adjustment shall also consider the following criteria: (a) Granting the variance shall not confer on the applicant any special privilege that is denied by this Ordinance to owners of other lands, structures or buildings in the same district; (b) If a variance is granted, it shall be the minimum variance that would alleviate the practical difficulty; (c) Granting the variance shall not create a safety or environmental hazard for adjacent property or ground or surface waters that did not previously exist.

The applicant for a variance has the burden of demonstrating that the variance criteria have been satisfied. The Board of Adjustment may request that the applicant demonstrate the nature and extent of any adverse environmental or other effects that may occur.

The Board of Adjustment may impose conditions in the granting of variances to insure compliance and to protect adjacent properties and the public interest. Conditions may include, but are not limited to:

Adjusting the location of structures, wells or septic systems;

Removal of existing buildings;

Requiring approved landscaping plans;

Increasing setbacks from water bodies;

Requiring vegetative or constructed storm water management;

Requiring that vegetation be maintained or introduced;

Requiring lots boundaries to be surveyed;

Performance bonds;

Imposing a time limit for the use to exist or operate, and/or;

Requiring that the applicant allow for reasonable inspections by appropriate county officials to ensure compliance.

Any variance granted by the Board of Adjustment may be periodically reviewed by the county to ensure compliance with the variance and variance conditions. The county may enter onto the premises at reasonable times and in a reasonable manner to ensure compliance. In the event that the applicant violates any of the conditions set forth in the variance, appropriate actions may be taken by the Director or County Attorney to correct the violation.

A certified copy of any order issued by the Board of Adjustment acting upon an appeal from an order, requirement, decision, or determination by an administrative official, or a request for a variance, shall be filed with the county recorder or registrar of titles for record. The order issued by the Board of Adjustment shall include the legal description of the property involved. The Director shall be responsible for meeting these requirements.

An appeal from any order, requirement, decision, or determination of any administrative official shall be taken if the appellant files with the Board of Adjustment a notice of appeal specifying the grounds thereof within 30 calendar days of the action causing the appeal. The Board of Adjustment shall fix a reasonable time for the hearing of the appeal and give due notice thereof to the appellant and the officer from whom the appeal is taken and to the public and decide the same within a reasonable time which shall be defined in the ordinance establishing the Board of Adjustment. An appeal stays all proceedings in furtherance of the action appealed from unless the Board of Adjustment to whom the appeal is taken certifies that by reason of the facts stated in the certificate a stay would cause imminent peril to life or property. The Board of Adjustment may reverse or affirm wholly or partly, or may modify the order, requirement, decision, or determination appealed from and to that end shall have all the powers of the officer from whom the appeal was taken and may direct the issuance of a permit. The reasons for the board's decision shall be stated in writing.

Activities granted by a variance expire and are considered invalid unless they are substantially completed within thirty-six months of the date the variance is granted by the Board of Adjustment. “Substantially completed,” for the purposes of this section shall mean that the necessary permit has been obtained to complete the work approved by the variance and the permit has been acted upon within the period that permit is valid. If a permit is not required, “substantially completed” means that the activities necessary to act upon the variance have been completed. Variances granted prior to July 1, 2005 that have been discontinued for more than thirty-six months shall be considered to have lapsed and be invalid.