

Lake Washington 2018 Directory



www.lakewashingtonassn.com

Lake Washington Improvement Association of Meeker County, Inc
P.O. Box 68, Dassel, Minnesota 55325

Lake Property Landscaping Specialist

Annandale, MN Nisswa, MN www.backyardMN.com



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SHORELINE WORK
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LAKE WASHINGTON IMPROVEMENT ASSOCIATION

We all take pride in our homes and our lake. Please consider the information provided in this directory when boating, fishing, landscaping, fertilizing, weeding and maintaining your septic systems.

It is up to all of us to keep our lake beautiful now and for generations to come!

Important Dates to Remember

- The first Saturday in May is the annual meeting and dinner for members.
- The first Saturday in August is the BBQ and Pot Luck.
- Board meetings are open to all members and are held on the first Tuesday or Thursday of the month from February through October. All members are welcome.

Connect with us

www.lakewashingtonassn.com

Follow us on Facebook

**Lake Washington Improvement
Association @LakeWashington**

Contact us

info@lakewashingtonassn.com

membership@lakewashingtonassn.com

lostfound@lakewashingtonassn.com

**Lake Washington Improvement Association
of Meeker County., Inc
P.O. Box 68, Dassel, Minnesota 55325**

1st year of current term

Steve Grotbo President

Pat Hanson

Mark Johnson

Dave Rathe

2nd year of current term

Ron Bubany

Sharon Daniels

Tom Hauer

Dean Shaner

3rd year of current term

Cathy Klehr Membership Chair

Skip Sustacek

Steve Ullom Secretary

Lyle Walker Treasurer

Mike Wosmek Vice President

Sandy Wosmek

2017 BOARD MEMBERS

END OF THE DOCK

By Steve Grotbo, President

LWIA primary objective is to protect and preserve Lake Washington for current and future generation to enjoy. Supporting this goal LWIA developed a comprehensive Lake Management Plan. This plan focuses on, communication & education, water quality, aquatic invasive species, fish, shoreline, and watershed/lake improvements. This plan, and other info can be viewed at www.lakewashingtonassn.com.

To achieve the goals of the Lake Management Plan, we do water quality and vegetation sampling monthly during the summer, publish 3 newsletters each year, provide guest speakers at membership meetings, manage a website that includes Facebook, and update a lake directory every 5 years. We work with outside agencies such as the DNR Fisheries monitoring and managing the fish population. We actively communicate, with local, county and state government. We Apply and obtain grant money for lake projects and programs. We applied and received tax exempt status under the Federal income tax section 501c3 of the internal revenue code - this opens the door to apply for additional grant dollars. We are members of the Meeker County Association of Lakes (MCAL) and Minnesota Waters. We Organize Shoreline Captain Groups that are instrumental in communicating between Lake Members and Board of Directors. We Work with the DNR to increase watercraft inspection at the landings, along with installing and maintaining the ILIDS at Ellsworth landing. We Financially support programs such as U of M research for zebra mussel control. These efforts have been key in keeping

Lake Washington in the upper percentile for water quality as measured by the Minnesota Pollution Control Agency.



As this indicates, we are a very active Lake Association involved in protecting and preserving this valuable resource. The Board of Directors would like to thank our members who have supported these efforts through their contributions over the years. Also one of our goals is for everyone to be a member. So if you are not a member please join. Consider helping out by becoming a volunteer to keep Lake Washington a quality lake for all to enjoy.

Enjoy this Lake Directory, the lake and the activities it offers.

WHAT HAS YOUR LAKE ASSOCIATION DONE?

Projects

- Successfully treated Eurasian Water Milfoil infestations.
- Implemented an I-LIDS system at Ellsworth landing.
- Water inlet filtration projects around the lake.

Social Events

- Pork Chop Dinner in May
- Potluck Dinner in August
- Fund Raising Events

Membership & Certifications

- Meeker County Association of Lakes (MCAL)
- Certified Aquatic Invasive Species (AIS) Detector - Board Member



- Developed a comprehensive Lake Management Plan. The information within this directory provides additional detail while following the plan outline.
- Water quality and clarity monitoring.
- Maintain a website to keep members and the public informed.
- Publishes a newsletter 3 times per year to keep lake members informed on recent work and information.
- Works with the DNR, the township, Meeker County and State.
- Apply for and receive grants to help fund lake projects.
- Education on issues that impact the lake such as lake vegetation, shoreline landscaping and lake quality issues.
- Installed lights and siren at Ellsworth Landing.
- Summer 2018: Create and provide to members a comprehensive lake map with up to date information and depth.



Become a Lake Association Member Today!

SHORELINE CAPTAINS

Communicating between neighbors is always important to the prosperity and safety of a neighborhood. The Lake Washington Association recently created an information network that is led by members of the neighborhood. These volunteers are called Shoreline Captains. It is the responsibility of the Shoreline Captain to convey information to approximately 25 of their neighbors-residents that live on the lake, near the lake, or anyone interested in the longevity and recreational use of Lake Washington.

Keeping Shoreline Captains informed is a crucial part of each neighborhood. If you notice that a property has been sold please contact your Shoreline Captain so that they may greet the new neighbor and inform them about our association. Over time, each neighborhood should become more cohesive and organized. As more and more people relocate to our lake, it is more difficult to get acquainted with our neighbors. Shoreline Captains can help make neighborhoods feel like a close knit community, which only benefits Lake Washington.

Anyone interested in becoming a Shoreline Captain should contact a board member and learn about becoming more involved in their neighborhoods. If you are not sure who your Shoreline Captain is, or would like to find out more, contact any Board member.

Summary of Responsibilities

- 1 Visit homeowners in assigned area. Keep addresses and phone numbers current.
- 2 Help generate memberships. Inform neighbors about how they can help special causes like fighting milfoil and fundraisers.
- 3 Be available to answer questions a homeowner may have about our lake. Refer them to a board member if needed.
- 4 Monitor the shoreline area in your neighborhood. Report concerns. Help inform neighbors about issues that impact the lake.
- 5 Provide feedback to the board on concerns of property owners in assigned area. Be the eyes and ears for your area.

LAKE WASHINGTON FACTS

Washington Lake Property Owners Organize At Meeting; Officers Elected



The Lake Washington Property Owners Association was organized at a meeting held on the Harry E. Andersen's house boat on Sunday, September 2. The purpose of the organization is for the improvement of fishing conditions and obtaining better roads and other improvements which may arise.

Nineteen property owners were present and all joined. Membership fees were set at \$1.00 each. The following officers were elected: Dr. H. E. Gaustad of Cokato, president; Vern Nelson of Minneapolis, vice president; W. H. Fernstrom of Minneapolis, treasurer; and Harry E. Andersen of Minneapolis, secretary.

Committees appointed were as follows: Fish—S. E. Jepson, Vern Nelson, Clifford E. Olson and Clifford Nelson. Roads—Donald MacJunkin, Neal W. (Woody) Johnson, Leo Weimer and V. L. Swanson. Membership—Carl O. J. Peterson, Edward C. Rucks, D. C. Johnson and Carl Peterson.

Another meeting of the organization was held at the Dr. H. E. Gaustad cottage on Sunday, September 9. Twenty-one more members joined to bring the total membership to 40. A report was given by the fish committee. Game Warden Ed. Reed of Silver Lake gave an interesting and informative talk on Lake Washington and fish traps. Mr. Jergenson of the State Game and Fish department gave some interesting information on conditions of Lake Washington and about fish planted in the lake the past years.

The next meeting will be called after a report from the Fish and Road committees.

There are about 100 landowners on the shores of Lake Washington, with 98 cottages.

Lake Washington Improvement Association



Dassel & Darwin, Minnesota
Meeker County

Dassel Dispatch 9/13/1951

Lake Washington Association formed in 1951

- Lake Washington community is one of seasonal and permanent homes. Approximately 50% of all lakeshore and lake-view properties are year round residences.
- Four different townships intersect the lake: Darwin, Dassel, Ellsworth and Collinswood.
- The lake covers 2,639 acres with 10.6 miles of associated shoreline; of this acreage 2,449 acres are littoral.
- The lake is relatively shallow with a mean depth of 8.6 feet, maximum depth of 17 feet and considered an eutrophic lake.
- The configuration of the lake is oblong, with a 3-mile long major axis oriented in an east-west direction and 1.5 mile north-south axis.
- The primary inlet from the surrounding watershed is via Lake Stella on the west side of the lake. The outlet is located on the north-northeastern edge of the lake and discharges into Washington Creek.

- The watershed draining into Lake Washington is 22,063 acres. Several smaller lakes, streams, culverts, and creeks in the watershed eventually drain into the lake.
- The land in this watershed is a mixture of agriculture (primarily crop), with some larger stands of deciduous trees, and other large areas in Conservation Reserve Program acres.
- There are two public landings. One is located on the south shore (Ellsworth Landing) and the second is located on the east shoreline. The Minnesota DNR maintains both.
- Lake Washington has been infected with three Aquatic Invasive Species (AIS): Eurasian Water Milfoil discovered 1999, Curly Leaf Pond Weed pre-1993, and Zebra Mussels discovered upstream in Lake Stella in 2015.



WE DELIVER!

Inside Dining • Delivery • Take Out

275-9344

- Jimmy's offers Pizza, Pasta, Wings, Calzones, Take and Bake Pizzas, Gluten Free crusts, and Desserts.
- All of our food is Stone-Oven Baked using 100% Real and locally-produced Cheese, our own Secret Recipe Sauce, Hand-Rolled Crusts, Locally-produced meats, and a good selection of quality toppings for that classic pizzeria taste.
- **We accept credit cards by phone for delivery orders.**
- We Deliver everything on our menu including Take and Bake Pizzas.
- Ask us for a menu and ask us about our specials.
- **We also offer fundraising opportunities.**
- **4-9pm Daily**

ICE OUT HISTORY

Lake Washington Historical Records

The "official" ice out dates are in the third generation for tracking. It started with Hazel Gayner in 1954, her son Dean Gayner taking over in 1999, and Dean's daughter Jenna O'Brian taking over in 2010. The rule for ice out is that everyone must be able to get their dock in. Jenna has a number of volunteers around the lake who help keep her honest and report if too much ice is still present. In the end, it is her call.

YEAR	DATE	YEAR	DATE	YEAR	DATE
1954	April 9	1976	April 3	1998	April 5
1955	April 1	1977	April 9	1999	April 1
1956	April 17	1978	April 16	2000	March 15
1957	April 18	1979	April 23	2001	April 20
1958	April 6	1980	April 17	2002	April 17
1959	April 5	1981	March 25	2003	April 11
1960	April 14	1982	April 12	2004	April 3
1961	March 28	1983	April 6	2005	April 8
1962	April 22 (snowed)	1984	April 14	2006	April 7
1963	April 1	1985	April 10	2007	April 14
1964	April 17	1986	April 10	2008	April 18
1965	April 29	1987	April 9	2009	April 16
1966	March 30	1988	April 14	2010	April 1
1967	April 7	1989	April 10	2011	April 14
1968	March 29	1990	April 1	2012	March 19
1969	April 17	1991	April 1	2013	May 2
1970	April 18	1992	April 4	2014	April 26
1971	April 15	1993	April 18	2015	April 5
1972	April 23	1994	April 14	2016	March 17
1973	March 30	1995	April 14	2017	March 27
1974	April 18	1996	April 26	2018	July ??
1975	April 25	1997	April 21		

Earliest Freeze
October 31, 1989

Latest Freeze
December 20, 2001

Fewest Ice Days
96 days
1999-2000

Most Ice Days
176 days
1951-1952

Average Ice Off
April 11

FROM THE 1900'S

By Virginia Kirchoff & Wilma Ahlgren - March 1992

Memories are wonderful....

Memories bring back some of the good old days and many remembrances that we have.

After visiting and hearing from several people that have lived out at Lake Washington for many years, it is with great pleasure to extend to our members a recap of those memories.



Carl Rusch has lived on Lake Washington for over 30 years and reminisces about the dry years in the 1930's. The lake was raised about 17 inches after the dam was put in. He noticed that weed beds had disappeared in the last 5 years which he felt has had an effect on the fishing.

Lois (Langley) O'Neill said her father bought the property at Lake Washington in the late 1920's (Property by Idle Wave Resort). Northeast of their property was a dance hall that belonged to Jepson's Resort. On Saturday nights they had dances and parties and on Sunday morning's area owner's property would be littered with debris. In order to get rid of the nuisance her father had a six foot high chain link fence put up all around their property to alleviate the problem. The dance hall wasn't there very long - a few years later it burned down.

Lois also told me about the drought in the early 1930's. The dam had not yet been built at that time so the lake was very low. You had to walk out at least a block before you came to any water. Grass and small trees grew up in this area and you had to walk on a beaten path to get to the lake. Then the dam was built. The lake level went back up. You were able to walk all along the shore line in the bay from Cedar point to the Darwin road.

I visited with Dean & Arlys Gayner and Dean's mother, Hazel Gayner. Some of the memories Dean has are when a cousin from California came to visit in 1952 and brought some wide wood water skis with him. Dean asked "what is water skiing"? Well they tried water skiing behind an aluminum boat with a 10 horsepower motor on it, and it worked. Dean & his cousin didn't wear life jackets. Dean told him the water was real shallow on the lake. Needless-to-say they skied over the

16 foot deep hole once in awhile. I guess his cousin couldn't swim - lucky guy! That was the first time Dean water skied.

Warren Nelson talked about his father, Clifford Nelson, who owned the farm on the north side of Lake Washington. Clifford was an avid hunter and enjoyed the great hunting around that area. He was also a great handyman; he dug basements, septic systems, cisterns, and delivered ice from the lake, eggs, and cream to the people on the north side of the lake. He sold ice to the Hotel (the large gray home) West of Idle Wave Resort (Warren has many of the antique tools his father used). Clifford rented out boats and picnic tables in the 1950's, and there was a picnic area and small ball diamond with campers in his pasture area a block west of their farm. Pasture land went all the way West to the Myrtle Skoog cabin. The Nelson's gave some of their farm land to the county to widen the road around the north side.

Hazel Gayner & Warren Nelson remember several resort areas on Lake Washington. Jepson's Resort (now Idle Wave Association) was on the NE side of the lake. Mrs. Jepson would serve Sunday noon meals there. They had a woman come out to counsel young girls that came to camp at the resort. Hazel also remembers many fun times at the dance hall that used to be in that area, owned by the resort.

Going further West on the road past Jepson's (Idle Wave Resort), you came to another resort called Trails End Resort. Trails End served noon lunches. Berg's Resort was built in the 1950's (Leslie Berg) and bought out in the early 1970's as Gordon's Resort located on the North side near the Nelson farm area. They had a bait house and snacks for sale. There also was Twin Lakes Resort between Lake Stella and Lake Washington. They had boat rentals on both lakes. There were 2-3 cabins for rent on the North side (Benson's Red

Barn on road to Sportsman's Park). Hazel remembers having girl friends out and renting a cabin - they always had a chaperone with them. Another boat rental area was the Oliver Broberg property. Enclosed is a picture of the Broberg boat rental on the SE side of Lake Washington - the picture was given to us by Ilo Broberg. Oliver Broberg rented out boats and had a building for selling candy, pop etc.

The first area to build up homes / cabins on the lake was around Cedar Point. Mr. Julius Lindquist (World War I Veteran - now 97 yrs. old and living in the Watkins Nursing Home) was the prime contractor for all the sewage systems on the north side of the lake. They were all dug by hand, had a tank, and instead of a drain field, they drained directly into the lake. The newest developed area is the south side of the lake.



Different areas had names. Hazel Gayner's area (by Sportsman's Park) was named "Breezy Point". The area by the Manthei's (now Lee VanHorn's) was called "Stoney Point". The point on the middle/north side of L.W. is called Cedar Point. The point East of the Sportsman Park (where a mobile home exists now) was called "Whiskey Point". There must be a good story behind that one.... Using all the roadways on the lake, you would have to drive 22 miles to completely drive around the entire lake and into each area.

A "Hunters Paradise" was noted by many of the locals as the area from the Warren Nelson farm and west toward Lee Van Horns. During the Armistice Day Snowstorm, many duck hunters found it very difficult to return home. Other notes; There is a sunken island in the bay, deeper on one side and very shallow on the other. At one time, you could drive across that entire area.



There were approximately 13 herds of cattle and much farmland around the lake. The entire south side of the lake was farm/pasture land. The water was very clear years ago and no pollution was noted.

The Sportsman's Club used to be farm land; in 1955 the land was given to the Sportsman's Club by the Benson family designated for a club house. That's about when Dean Gayner's mother & dad - Carl & Hazel Gayner- bought their lot. They were the first people in that area to have a home. It is one of the newer divisions on our lake.

The old dam (very near the Warren Nelson farm) was built in 1932 by Rueben Anderson. The new dam was built in 1953. The dam allowed the lake to rise up approximately 15"-17" and stay up to that level.

All the people that live in the Sportsman's Park area and east had two roads to exit from. There was a road that exited out to the East (by the

Gabrielson farm). The county closed that road several years ago, even after every one in that area signed a petition to keep it open. If a train blocked the road (as you turn off on hwy 12 to Sportsman's Park), you were unable to get out of the area. A

The Harry Andersen (North side) have been very active hosts for the Shriners Club and also the Lake Association for many years. Again, an enormous "Thank You" to Harry & Alma Anderson and the entire family for their interest and all they have done for our Lake Association. The cabin cruiser setting on their property, we heard, used to cruise the lake. Must have been a beautiful site.

Mel Gramsted, who now lives on Lake Stella, told us that the new #14 road (between the two lakes) was built in 1964. The west end of Lake Washington was cut down and replaced with a gradual bank to the road edge. The shoreline was lined with rocks 100ft from the old channel which was located approximately 725 feet south of the culvert/channel now in existence. The property north of the old channel was left as meander land that had to be filled which came from the Huhn property north of the channel. The county failed to fill in the channel and for years there was stagnant, mosquito infested water until it got filled by Mr. Gramsted.

Some of the biggest changes in the lake, noted from our friends and neighbors who lived in this area for years were the loss of cattails and weed areas; the addition of homes and cabins; and the pollution of our lake waters.





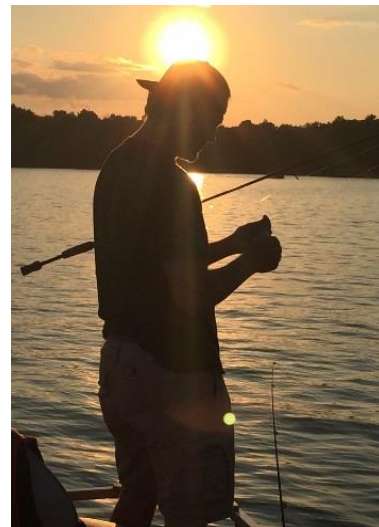
Lighthouse donated by John and Clarice Bengtson
In memory of Arvid and Vivian Bengtson



Dassel Rod & Gun Club is located at
Sportsman's Park on Lake Washington

Clubhouse & Park

- Annual Memberships available and encouraged
- Air conditioned banquet area and kitchen
 - Seats 120
- Great for Special Events:
 - Graduation
 - Weddings
 - Birthdays
 - Family and Class Reunions
- Clubhouse Rental available
Call 320-275-9109 for information and scheduling
- Boat launch and dock
 - Fee for Non-Members
- Picnic Shelter, Volleyball Court, Swing Set, Archery Range and Park Area



Fishing



Boat launch and dock

Community

- Annual Spring Fish Fry
- Annual Fishing Opener Breakfast
- DC HS Scholarship
- MN State HS Bass Fishing Contest
- Donate aluminum cans for Wildlife Foundation



LAKE MANAGEMENT PLAN

Lake Washington, along with most of the lakes in Meeker County, was carved out of the landscape by glaciers during the last ice age. About 10,000 years ago the ice melted and filled these basins.

Lake Washington was much larger than it is today. The depth of the water may have been as much as twenty feet higher. This assumption is based on an unusual geologic formation along Washington Creek, located 1 3/4 miles north of the lake. Washington Creek is unusual; it has steep thirty foot banks on both sides and it passes through a hill about two hundred yards wide. This hill acted as a dam 10,000 years ago, backing water up for many miles south of this point. Slowly the water ate its way through this hill, gradually lowering the stream bed. Today, the rock covered channel, with its steep trees covered banks, is thirty feet below the top of the hill.

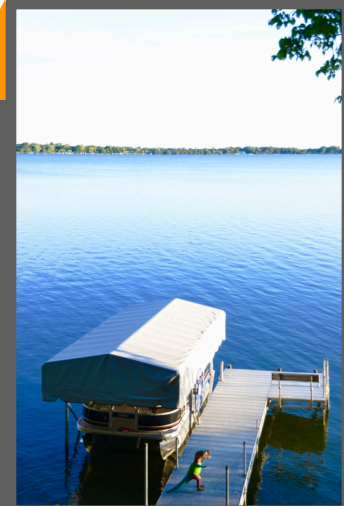
Soon after the glaciers receded, new plants and animals started living on the land and in the water. One thousand years passed and the water level in the lakes gradually declined as Washington Creek slowly eroded its way through the Dassel hills, on its way to the Crow River.

Approximately 9,000 years ago, man moved to Dassel. Several Indian villages were located in the Dassel area, including two on Spring Lake, one between Spencer Lake and Lake Jennie, and one on the north side of Lake Washington, just east of Sportsman's Park. The peninsula was an ideal place for a village because water was readily available, it was easier to catch the breeze in the summer, and in times of war the village could be more easily defended. Man has long recognized Lake Washington as a beautiful and unique body of water. It has been man's home for 9,000 years.

With good management, hopefully it will be man's home for another 9,000 years or more.

LAKE MANAGEMENT PLAN MISSION

A renewable plan to provide high quality sustainable practices to protect, maintain, and improve the water quality and value of Lake Washington as a resource for generations.



Lake Washington's Management Plan is designed to address current concerns and issues and look at long range planning for the lake community. The plan is intended to be a dynamic document providing direction and aid in cooperative decision making for residents of the lake, members of the lake association, state organizations, county and state government, and the public with vested interests in establishing and maintaining high standards of water quality and sustainable use of this lake as a natural resource for generations to come.

The Lake Washington Improvement Association Board of Directors of Meeker County has determined the following five areas to be essential elements for this lake management plan.

Goals have been developed in each area with specific strategies to help achieve these goals. Some areas are actively being worked, other areas need continuous monitoring, while others are long range in nature and yet others will provide historical documentation so future generations will know what and how we attempted to tackle the problems of our day.

1

EDUCATION, COMMUNICATION & INVOLVEMENT

2

WATER QUALITY MANAGEMENT

3

AQUATIC INVASIVE SPECIES (AIS) MANAGEMENT

4

WILDLIFE MANAGEMENT

5

SHORELINE & WATERSHED MANAGEMENT

1

EDUCATION, INVOLVEMENT & COMMUNICATION

Goal

Keep all stakeholders educated, informed, knowledgeable, and involved in matters impacting the lake and surrounding areas. Provide direct lines and means of communication with all people concerned with the life, health and well-being of the Lake Washington Community.

Education, communication and involvement are cornerstones for LWIA public relations.

Strategies that support this goal:

- Hold 2 public meetings annually to inform and discuss lake topics. Meetings are in May and August.
- Publish 3 newsletters per year to inform membership of current issues, planned actions, and upcoming events.
- Maintain working relationships with the MnDNR, Crow River Organization of Waters (CROW), local and state Soil and Water Conservation, Meeker County Commissioners, Meeker County Association of Lakes (MCAL), and Townships to keep members informed of changes to rules, laws, and new information
- Use Shoreline Captains as a means to gather and provide information and bring feed-back from lake shore owners directly to the board.
- Provide local, county, and state officials with the most current information on issues, subjects, and concerns of the lake community.
- Continuously improve and update the Lake Washington web site.
- Periodically update the Lake Washington Directory
- Develop and maintain an email database to more easily contact and communicate with members and others.
- Form committees to learn and more fully understand issues, develop ideas and provide the knowledge necessary to make informed decisions.
- The lake association through donations installed a Civil Defense warning alarm siren at the Ellsworth Landing. This siren is maintained by the Meeker County Sheriff's Department since.
- Develop additional ways to get information out in a timelier manner.
- Conduct surveys to enhance feedback to the Board.
- Improve and update regularly the LWIA Webpage (www.lakewashingtonassn.com). Submit information to area newspapers about happenings on Lake Washington.
- Encourage lake residents to belong to LWIA with the ultimate goal of having all property owners be members.
- Encourage lake residents to support "Neighborhood Watch", "Crime Stoppers", and Code Red notifications.

SAFETY! SAFETY! SAFETY!

Minnesota Department of Natural Resources

Ice is Never 100% Safe!



m DEPARTMENT OF
NATURAL RESOURCES

mndnr.gov/icesafety

BOATING TIPS TO STAY SAFE

1

Wear your life jacket – And make sure your children wear theirs.

2

Stay sober – Booze and boating don't mix. Alcohol is the #1 factor in boating fatalities.

3

Tell a friend – Tell someone where you're going and when you will be back. If you're not back, they should call 911. Bring a phone or VHF radio.

4

Be weather aware – Don't let a storm sneak up on you – delay your trip or head to shore. Go slow in rough water to avoid capsizing.

5

Get a clue – Understand your boat; stay alert; stay seated and low in the boat so you don't fall overboard; take a boating safety course.

SWIMMERS ITCH

Minnesota Department of Natural Resources

What is Swimmers Itch?

Swimmer's itch is a temporary skin rash that is caused by an allergic reaction to microscopic parasites that are carried by waterfowl, semi-aquatic mammals, and snails. As a part of their life cycle, these parasites are released by infected snails into the water, where they may come in contact with people and burrow into their skin.

The good news is the organism that causes swimmer's itch cannot complete its life history in the human body. Your body's immune system detects it as a foreign protein, then attacks and kills it shortly after it penetrates your skin. The itching and welts are not caused by the organism living under your skin, but by an allergic reaction. Not everyone is sensitive to swimmer's itch.

Some people show no symptoms of swimmer's itch even though others swimming at the same time and place break out severely. Much like poison ivy, however, your sensitivity to swimmer's itch will increase with each exposure. There are several over the counter remedies your pharmacist can recommend to help relieve the discomfort, but see your physician for a definitive diagnosis.

The cercariae only live for a day or so and typically swim around in the upper few inches of lake water. This increases their chances of coming into contact with a duck. Once the cercariae is in the duck, it easily moves around the lake as a parasite, and ultimately along the shoreline.

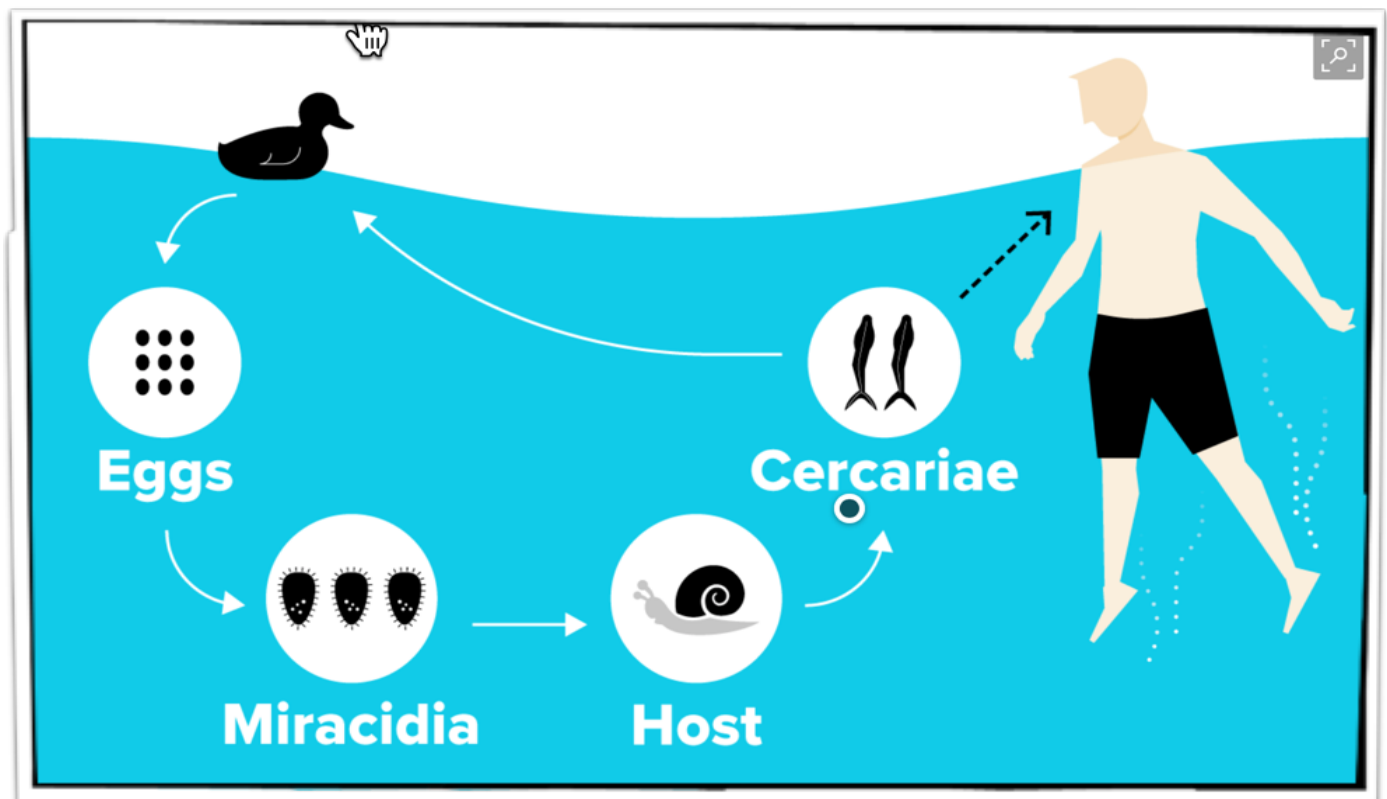
Where Does it Come From?

The organism that causes swimmer's itch has a complicated life history.

- It starts out as a worm (parasite) in the intestinal lining of aquatic birds and mammals (host).
- The worms lay eggs inside the the host animal.
- The eggs are eliminated by the host and drop to the bottom of the lake.
- Then the eggs hatch into miracidia that swim around in the water until they find a snail.
- Once they find a snail, they live inside them and develop into cercariae.
- The snails then release the cercariae back into the water where they look for another host - aquatic birds, mammals or humans.
- When the cercariae find a potential host, they burrow into the host's skin.
- If the host is suitable, the life cycle starts all over again.
- Humans are not a suitable host and the cercariae die after penetrating the skin. Swimmer's itch is not spread from person to person.

There are actions you can take to help reduce your odds of getting swimmer's itch.

- Keep waterfowl away from your dock and shoreline. If you are feeding waterfowl (ducks and geese) from your dock, stop. If ducks like to rest on your dock, do what you can to discourage them. You can try putting an owl wind sock or statue on your dock and move it around occasionally so the ducks don't become accustomed to it.
- Stay out of the water by the shore. The swimmer's itch organism may originate somewhere else in the lake and is being brought to your shoreline by wave action or currents. You may want to try swimming from a raft or boat farther out from shore where you are less likely to come into contact with the cercaria. Of course, this strategy may not be practical if you don't swim or have young children who want to play in the water near shore.
- Apply a water repellent substance such as petroleum jelly, waterproof sunscreen or other skin oils to reduce the ability of the Cercariae from penetrating the skin.
- Dry off with a towel as soon as you get out of the water. When you get out of the lake, don't let the water evaporate off your skin. The organism in the droplets of water on your skin will look for somewhere to go as the droplet of water evaporates.



PET ORDINANCE

Meeker County Government Website

ARTICLE ONE TITLE, INTENT & PURPOSE

1.01. Title. This Ordinance shall be known as the Meeker County Pet Ordinance.

1.02. Intent and Purpose. It is the intent and purpose of this Ordinance to enact controls over the controlling of pets by their owners or caretakers in unincorporated yet densely populated areas of Meeker County.

A. The running loose without adequate controls by pets in populated areas constitutes a potential danger to the safety of persons and property.

ARTICLE TWO AREA OF APPLICATION

2.01. This Ordinance shall be effective in the following-described zoning districts of the unincorporated areas of Meeker County, as defined and described in the Meeker County Zoning Ordinance: R-1 Suburban Residential; R-2 Rural Residential; C-2 Neighborhood Commercial.

2.02. This ordinance shall be effective in any public park, picnic ground, campground, or wayside rest in the unincorporated areas of Meeker County.

2.03. This ordinance shall not be applied to any law enforcement canine units.

ARTICLE THREE DEFINITIONS

3.01. "Pet" is defined as including dogs, cats and any other animal that is kept primarily for private, non-commercial or non-agricultural purposes.

3.02. "Owner" means any person owning, harboring or keeping a pet.

3.03. "At large" means off of the premises of the owner and not under the control of the owner or some other person, either by leash or some other effective means of confinement.

3.04. "Premises" means property owned or leased by owner or property where the owner has obtained express permission from the property owner or leaseholder to allow the pet uncontrolled access.

ARTICLE FOUR CONTROLS

4.01. No pet shall be permitted to run at large within the area of application of this Ordinance at any time.

A. A. When a pet is found running at large and no owner is present, it is presumed that the owner permitted the activity.

B. An owner shall be responsible for the actions of any minors under their control or supervision under the age of 12 years.

ARTICLE FIVE VIOLATIONS

5.01. Unless otherwise stated herein, violation of this Ordinance shall be punishable by a fine of \$25.

5.02. For any owner with a conviction under this ordinance or Minnesota Statute 346 and 347 within two years preceding the present offense, violation shall be punishable as a petty misdemeanor with a maximum penalty of a fine of \$200.

5.03. For any owner with two convictions under this ordinance or Minnesota Statute 346 and 347 within two years preceding the present offense, violation shall be punishable as a misdemeanor with a maximum penalty of \$700 fine and/or 90 days in jail.

5.04. If while running at large, the pet causes any injury to any person, violation of this Ordinance shall be punishable as a misdemeanor with a maximum penalty of a \$700 fine and/or 90 days in jail. For purposes of this provision, provocation shall not constitute a defense.

ARTICLE SIX ADMINISTRATION

6.01 SEVERABILITY. The provisions of this Ordinance are severable. Should any action, paragraph, sentence, clause, phrase, or portion of this Ordinance be declared invalid by a court of competent jurisdiction, the remainder of this Ordinance shall not be affected.

6.02. Effective Date. This Ordinance shall be effective upon publication.

USEFUL INFORMATION

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NEIGHBORHOOD WATCH PROGRAMS



Neighborhood Watch Programs is where neighbors work together to prevent crimes and to solve them if they happen. It works through neighbors knowing each other and watching out for each other. By watching and by reporting suspicious incidents to the Sheriff's Office, it helps to make the neighborhood a safer place to live. It also provides a structure for education and action on crime and public safety concerns, and for neighborhood social activities.

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LIMITING IMPACT OF RECREATION ON WATER QUALITY

Shoreland Best Management Practices (BMP's)

Keeping Your Lake or River Healthy

Recreational activities can adversely affect both water quality and the shoreline, particularly when they focus on the waterfront. You can minimize these adverse impacts by developing and practicing a stewardship attitude as you enjoy your shoreline property and participate in outdoor activities.

Recreational opportunities are a primary reason people choose to live by or visit Minnesota lakes and rivers, and the demand on our water resources is always increasing. That increasing demand also increases the potential for damage to water quality and shorelines.

Assessing and improving leisure-time activities will help preserve water quality for fish and wildlife habitat as well as for our own recreational purposes. Poor water quality can affect recreation in and on the water, degrade fish and wildlife habitat, pose a health risk for water-contact recreation, and threaten the safety of your drinking water supply.

Over time, the waterfront environment has developed a natural balance based on linkages between water, land, vegetation, and wildlife. This delicate equilibrium can be easily disrupted when humans move in and rearrange the shoreline area or when any of the components are destroyed.



Best Management Practices

When using the waterfront for recreation, make sure your activities do not cause lasting damage to the shoreline or water. As a property owner, you should consider existing characteristics of the property to determine whether development is suitable. If you decide to alter your waterfront, develop a site plan that uses existing natural features of your shoreline instead of requiring major alterations.

Plan for both passive enjoyment of water resources and active pastimes. If a view of the water is important, consider strategic removal of vegetation to create a line-of-site rather than clear-cutting and establishing an open lawn. Before removing vegetation in the shore impact zone, check with local zoning officials for guidelines. Remember to include appropriate aquatic and terrestrial wildlife habitat in your plans to enhance your shoreline enjoyment.

If you landscape your lot, plan to preserve or re-establish vegetation, install appropriate erosion control methods, and reduce runoff to protect your shoreline property and water quality.

Managing Vegetation

Soil and rock in the shore land area have characteristics that influence the type and amount of natural aquatic and upland vegetation and ground water in your area. Vegetation physically slows runoff, enhances infiltration of runoff, and takes up nutrients dissolved in runoff and ground water. Fish, ducks, and other life depend on vegetation for food, spawning, and shelter. In addition, aquatic vegetation protects your shoreline by damping wave action (see Figure 1).



Best Management Practices

Remember to:

- Follow your site plan when developing your property, which includes the installation of beaches, docks, accesses, and buildings
- Minimize disturbance of aquatic vegetation; BEFORE altering or removing any aquatic vegetation, contact the MN Department of Natural Resources (DNR) Area Fisheries Supervisor to determine whether a permit is needed
- Remove aquatic plants only where they seriously interfere with recreational use of water and then clear only the smallest possible area
- Never use chemicals for controlling aquatic plants without first obtaining a permit from the DNR; although aquatic herbicides may be purchased without a permit, it is illegal to use them without a permit.

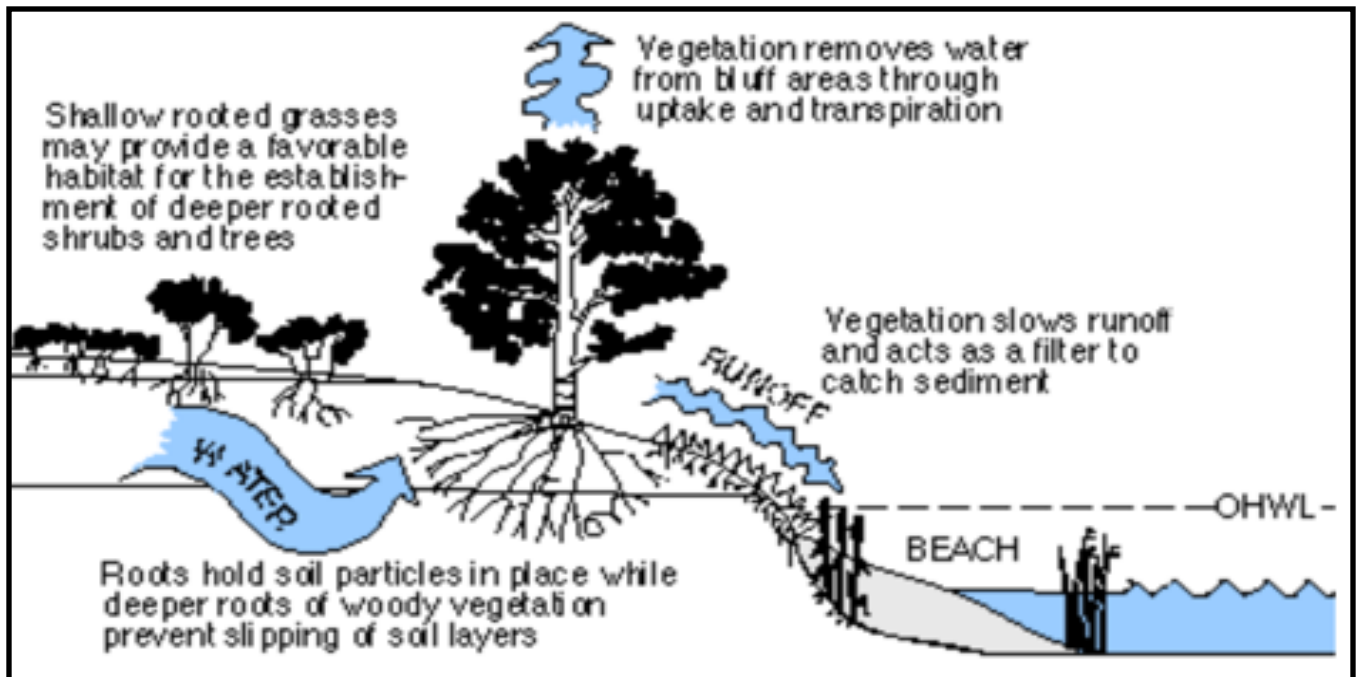


Figure 1: Terrestrial vegetation minimizes runoff that can impair water quality and aquatic vegetation dampens wave action to help reduce shoreline erosion.

Beaches and Swimming

If a swimming beach is a priority, try to purchase a lake or river lot that already has an established beach or sandy shoreline. If you choose to develop a beach, select a site that requires minimal alteration of your shoreline. FIRST contact your DNR Area Hydrologist for information and appropriate permits for beach development.



Best Management Practices

A good beach site should:

- Have a gentle slope of less than 10:1, or 10 feet horizontal distance per each foot of vertical drop
- Be located where the bottom is firm, with less than 6 inches of muck or silt, and no springs or flowing water
- Be located in an area with minimal wave action; established aquatic vegetation dampens wave action on the shoreline
- Be located away from areas of significant fish or wildlife habitat, such as wild rice, bulrush, and other protected vegetation

If you decide to develop a beach, consider the impact of alteration on the shore: you may be "gaining" a beach, but you will lose habitat, runoff control, and erosion control. For additional information obtain a copy of the Beach Sand Blankets brochures from the DNR Division of Waters.

A beach sand blanket may consist of washed sand ranging in grain size from very fine sand to "pea-gravel." If you add sand, use the largest available grain size, e.g., pea-gravel, to provide a more stable beach. Use of a swimming raft may be a good alternative to the development of a sand beach. Due to boating safety concerns, the county sheriff's department requires an easily obtainable permit for floating rafts.



Best Management Practices

When swimming:

- Do not use soap or shampoo in the water
- Insist that swimmers leave the water to use the bathroom

Boating and Fishing

Many recreational activities involve the use of motorized watercraft, including personal watercraft, inboard and outboard motor boats for fishing or water-skiing, and houseboats.



Best Management Practices

The following BMPs will help minimize potential damage to lakes and rivers:

- Avoid spilling gas, oil, paint, varnish, or stripper; never pour over the water during fueling or boat maintenance; do not "top-off" fuel tanks; fuel the boat on the trailer whenever possible.
- Install fuel storage tanks far away from the waterfront. Properly store and dispose of all wastewater, both greywater (from sinks) and human waste, while boating or fishing, especially on houseboats.
- Adjust your speed to reduce the wake and consequent wave action that can damage the shoreline; observe surface water use guidelines, including "no-wake" and low speed zones.
- Fish responsibly; it is illegal to deposit fish entrails or parts into public waters or onto lake or stream shores. Inspect boats and trailers to avoid moving non-native plants or animals from one water body to another; in Minnesota, it is illegal to transport exotic specie.
- Store and properly dispose of wastewater when ice fishing; human waste from several ice houses can have a significant impact on the water quality in your lake or river.

Camping

Camping is a recreational activity that takes us away from regular habitats for cleanup, washing, and waste disposal. Same practices that will help minimize impact on the environment are listed below:



Best Management Practices

- Use the latrine whenever one is provided; if none is available, bury human waste a minimum of 100 feet from water's edge; bacteria and viruses in human waste transmit disease.
- Properly dispose of all garbage, including litter you find. Never dispose of fish guts or other waste in the water, even if it is "biodegradable"; it attracts pests and can add nutrients to the water.
- Never wash in the lake or river; wash dishes, hair, clothes, and yourself at least 150 feet from the water's edge; always use biodegradable soap.
- If using surface water for drinking, collect it from below the surface near the center of the lake, not from near-shore; running water is more likely to carry giardia parasites, so avoid using river water for drinking; purify the water before drinking by boiling for 5 minutes; filters and chemicals are not always effective in removing giardia; for more information contact the U.S. Forest Service or MN Department of Health.
- Remember to always follow the specific rules or guidelines established for the areas in which you are camping (e.g., wilderness areas, state parks, or private campgrounds).

Buildings Near the Shore

Local units of government have established standards based on statewide shoreland regulations for nearshore structures, such as boat houses, saunas, and gazebos. In developing a site plan or planning a waterfront structure, property owner should:



Best Management Practices

- First contact the local zoning official to determine if the structure is permitted and what standards are required
- Minimize shoreland alteration and use adequate erosion control methods
- Design the structure to reduce its visibility from the water and adjacent property
- Locate boat houses where the water depth is sufficient to launch the boat and where aquatic plants need not be removed, store gasoline, oil, and other potentially hazardous materials away from the water in a building with a solid floor; store emergency clean-up materials with the chemicals
- Drain greywater from saunas through the septic system or connect with sewer lines to avoid adding soaps, oils, and bacteria to your water
- Contact the DNR Area Hydrologist to obtain permit information BEFORE repairing any existing structures built over the water

Docks, Decks, and Accesses

Docks, boat ramps, and decks offer ways to reach and enjoy the waterfront. If not properly constructed and maintained, they may cause water quality problems.



Best Management Practices

For more information contact the DNR Area Hydrologist or county zoning office and follow these BMPs:

- Follow your site plan when installing a docking facility; permanent docks, if allowed in your area, and seasonal docks must follow DNR guidelines.
- Use naturally resistant wood (cedar, tamarack, redwood), metal, or plastic instead of treated wood because the chemicals used to treat the wood may cause water quality problems.
- Construct all docks to allow free flow of water beneath them to prevent erosion and sedimentation along the shore.
- Construct the smallest possible dock to meet your needs.
- Never apply wood preservatives or paint to decks or docks while they are in or over the water. Follow shoreland ordinances when building decks near the shoreline; some setback requirements apply to decks to help protect water quality and minimize visual impact to other water users.
- Minimize the amount of ground surface covered with decks and patios to avoid increasing runoff and erosion. Eliminate paths to the waterfront that cut directly up and down slopes or over bluffs because they decrease stability of the shoreline and increase erosion; replace with stairways when necessary.
- Consider using the public access instead of developing your own boat ramp to minimize waterfront disturbance.

Off-Road Vehicles

The use of off-road vehicles, such as all-terrain vehicles (ATVs), mountain bikes, and snowmobiles, can have a severe effect on lakes and rivers by increasing erosion, turbidity, and sedimentation.



Best Management Practices

Follow these BMPs to minimize the impact of your off-road recreation on water quality:

- Stay on well-maintained trails. Construct crossings over streams and wetlands to avoid damaging the bottom and banks (contact the DNR Area Hydrologist for appropriate permits).
- When entering or leaving an ice-covered lake or river, avoid wet or muddy areas and do not break down bluffs or banks.
- Stay away from sensitive areas during spring melt when the ground is thawing and very susceptible to rutting and erosion.
- Observe dates and time periods designed to regulate off-road recreation during muddy seasons.
- Stay off thin ice; not only is it potentially fatal to riders, but when motorized vehicles break through, petroleum products and battery acid can contaminate water.

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Your Investment and Costs

Planning and maintaining a healthy waterfront is far less costly than trying to fix a disturbed system and benefits are far greater. Repairing shoreline damage is rarely successful and often impossible. For some shoreline modification projects, you will need a permit. Fees for permits vary; contact the DNR Area Hydrologist for more information. Fees for many recreational licenses help enhance Minnesota's water-based recreation through educational programs, research, fish stocking, trails and access development, and habitat protection. Your investment in Minnesota's water resources will pay off in returns to you and future generations through enhanced recreation and improved wildlife habitat.

Regulations that Apply

Any alteration of the lake/river bottom below the Ordinary High Water Level (OHWL) is subject to the regulatory jurisdiction of the DNR. Any alteration of the shoreland above the OHWL is subject to the regulations of the local unit of government (county, township, or municipality). The OHWL is the highest water level that a lake has maintained for enough time to leave evidence on the landscape. It is often identified as where natural vegetation changes from aquatic to upland species. For streams, the OHWL is generally the top of the bank of the channel. You should determine the location of the OHWL on your waterfront property.

Contact your DNR Area Hydrologist or county zoning officials for assistance. Your DNR Area Fisheries Supervisor can assist you with questions regarding aquatic plant management methods and permits. In some areas, concerned citizens or lake associations have informally established restrictions for recreational use of surface waters. Some of these, such as "no-wake" zones, are intended to help protect water quality. Others are more social and are designed to enhance community enjoyment, such as noise reduction and curfews. In some cases, county boards have enacted ordinances to formalize these guidelines into regulations. Check with your zoning officials or property owners association about whether any apply in your area.

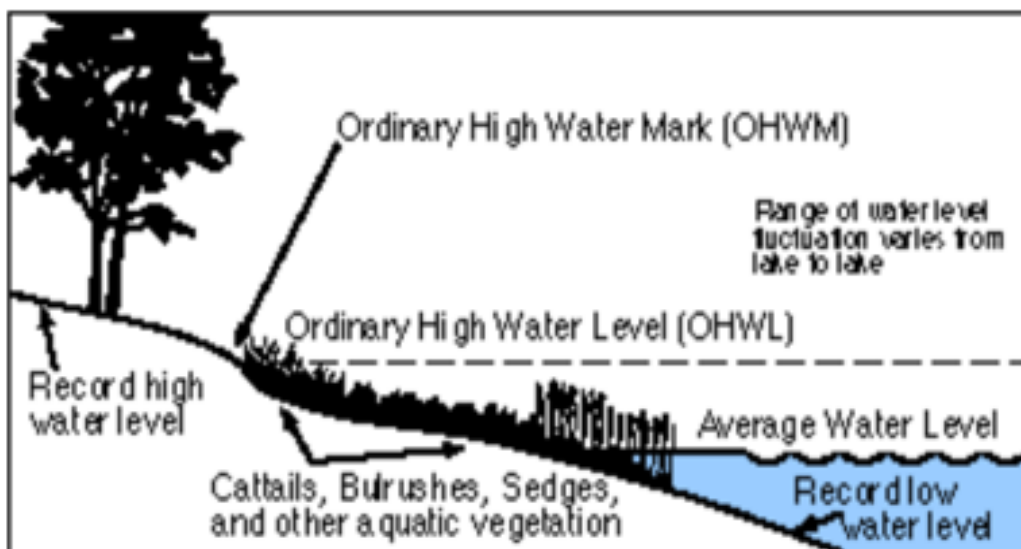


Figure 2:

Cross section showing the ordinary high water level (OHWL) which is the legal boundary of the lakebed; in some cases, the OHWL is located many yards away from the open water.

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WATER QUALITY MANAGEMENT

Goal

Maintain and/or improve the water quality in Lake Washington

Water quality testing is completed April through September and are conducted to monitor the following:

- Total phosphorus (nutrient needed for plant growth)
- Chlorophyll-A (measures amount of algae in the water)
- Secchi disk (measures water clarity)
- Trophic state index (measure overall nutrient enrichment, or average of phosphorus, chlorophyll-A and secchi depth)

Strategies that support this goal

- Test water from April through September each year. Share secchi disk readings with the state.
- Maintain records for yearly comparisons.
- Monitor water levels.
- Record ice in and ice out dates.
- Analyze the water quality data we gather each year in Lake Washington, use this information to provide direction for planning.
- Explore all sources of water / runoff into the lake and the impact this has on the water quality.
- Continue exploring septic options to minimize the impact on drinking and lake water qualities in Lake Washington Community.
- Make water quality test information available on Lake Washington Improvement Association website



Drainage, Morphometry, and Land Use

The Washington chain of lakes flows from Minnie-Belle Lake in the headwaters through Manuella Lake and Stella Lake prior to discharging to Washington Lake which in turn discharges into Washington Creek. The chain of lakes is located in the south-central portion of the North Fork Crow River watershed and completely contained within Meeker County (Figure 3-5).

The cities of Darwin and Litchfield fall within the boundaries of the Washington chain of lakes, however, the urban runoff accounts for a relatively small portion of the watershed area. The Washington chain of lakes receives runoff primarily from cropland in Meeker County. Lake Washington has a small watershed to lake area ratio due to its extremely large surface area (2,434 acres). Lake Washington only has a two year residence time, which is relatively low compared to several other lakes in this study due to the large watersheds of upstream lakes. As mentioned previously, there are several lakes upstream lakes which likely protect water quality in Lake Washington. This suggests that upstream lake watersheds are more sensitive to nutrient runoff and Lake Washington may be more sensitive to biological influences due to its small watershed and shallow nature.

Washington Chain of Lakes Morphometry

Lake Name	Surface Area	Average Depth	Maximum Depth	Lake Volume	Residence Time	Littoral Area	Depth Class	Total Drainage Area ¹	Watershed: Lake Area Ratio
Units	acre	feet	feet	ac-ft	years	%	--	acre	Acre:Acre
Minnie Belle	578	26.4	49	15,247	24.6	32%	Deep	1,938	3
Manuella	290	20.2	51	5,866	0.6	28%	Deep	11,111	38
Stella	596	17.2	75	10,248	1.2	59%	Deep	16,033	27
Washington	2,434	8.1	17	19,775	2.0	100%	Shallow	21,890	9

¹Watershed includes entire upstream drainage area

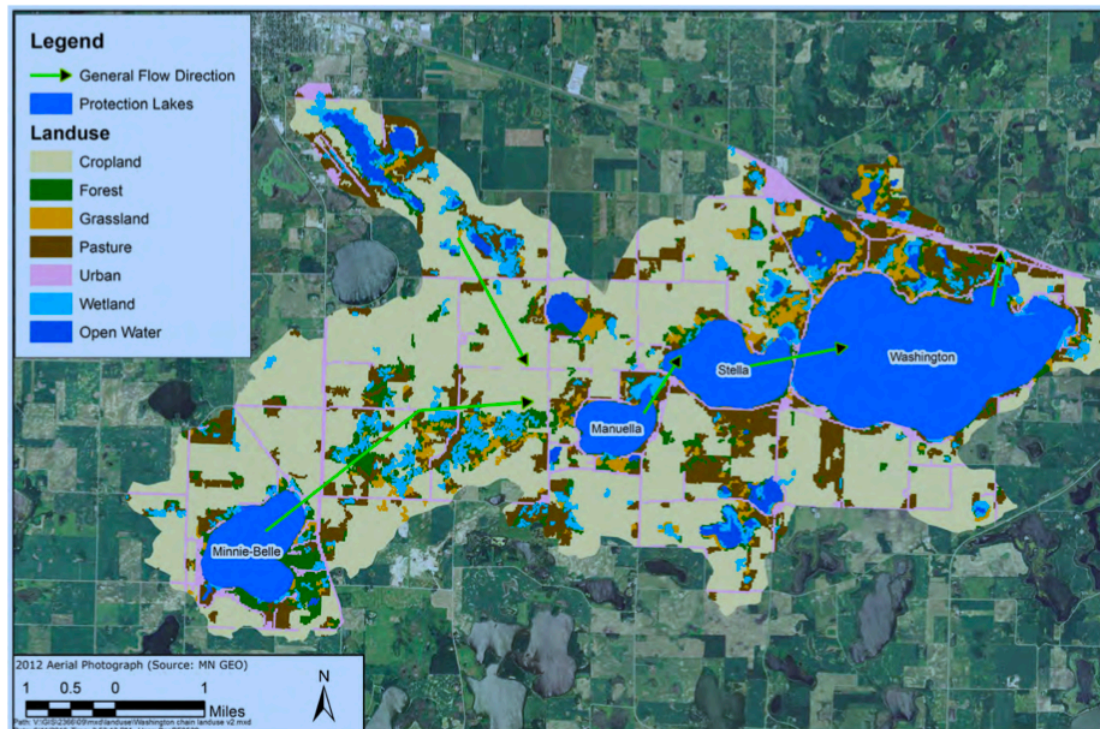


Figure 3-5: Overview of Washington chain of lakes watershed land use.

Nutrients and Water Quality

Water quality in Minnesota lakes is often evaluated using three associated parameters: total phosphorus, chlorophyll-*a*, and Secchi depth.

1

Trophic State Index (TSI) is a measure of overall lake productivity, which is a combination of total phosphorus, chlorophyll-*a*, and secchi depth readings.

2

Total phosphorus is typically the limiting nutrient in Minnesota's lakes, meaning that algal growth will increase with increases in phosphorus. However, there are cases where phosphorus is widely abundant and the lake becomes limited by nitrogen or light availability.

3

Chlorophyll-*a* is the primary pigment in aquatic algae and has a direct correlation with algal biomass. Since chlorophyll-*a* is a simple measurement, it is used to evaluate algal abundance rather than expensive cell counts.

4

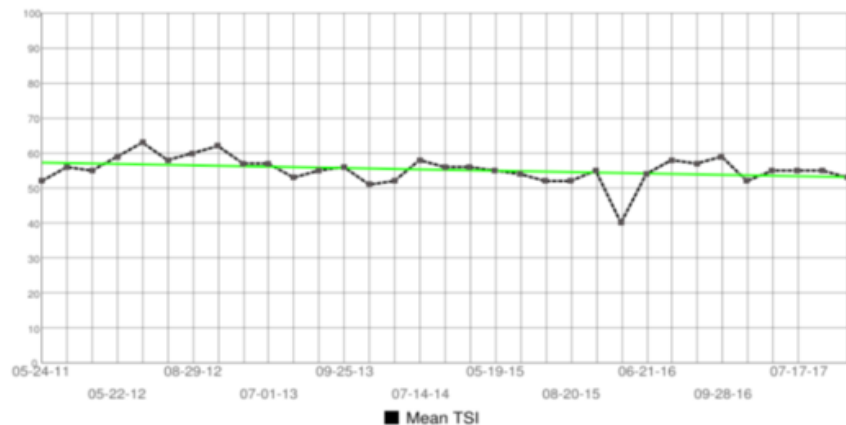
Secchi depth is a physical measurement of water clarity by lowering a white disk until it can no longer be seen from the surface. Higher Secchi depths indicate less light-refracting particulates in the water column and better water quality.

TREND ANALYSIS REPORTS

Trophic State Index (TSI)

What Does it Mean?

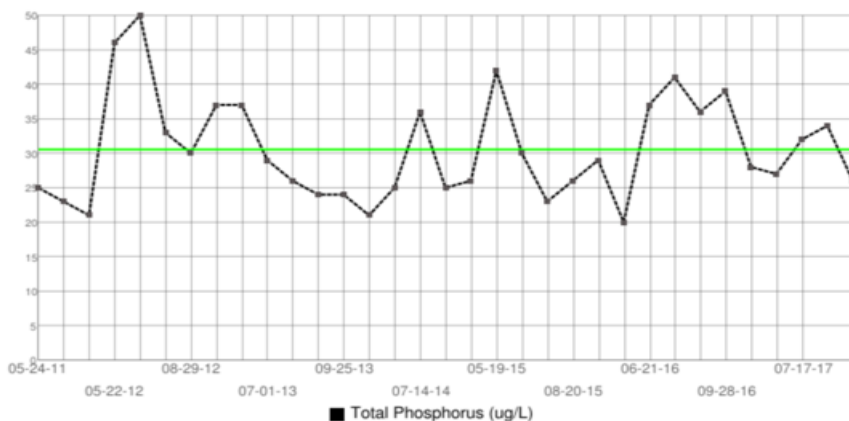
- Average of phosphorus, chlorophyll-*a*, & secchi depth
- TSI > 50 = Eutrophic
- MPCA looking for 8-10 year trends.
- Water quality has improved slightly since 2011.



Total Phosphorus (TP)

What Does it Mean?

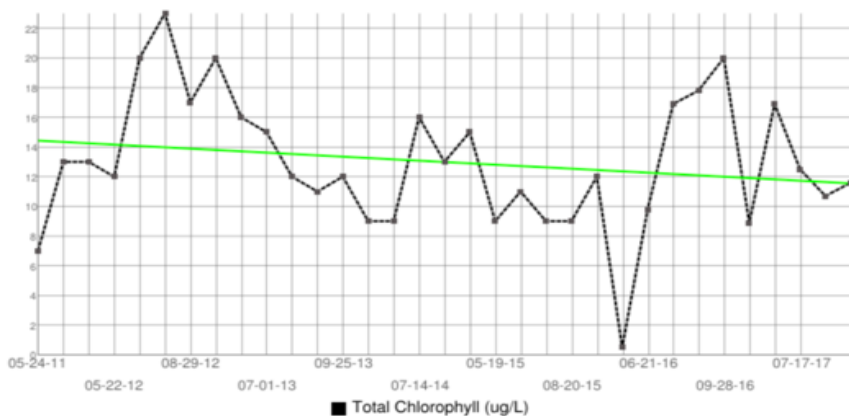
- Sources - animal wastes, soil erosion, detergents, septic systems, runoff.
- TP = 30 Low end of Eutrophic range.
- Little change in TP since 2011.



Chlorophyll-a

What Does it Mean?

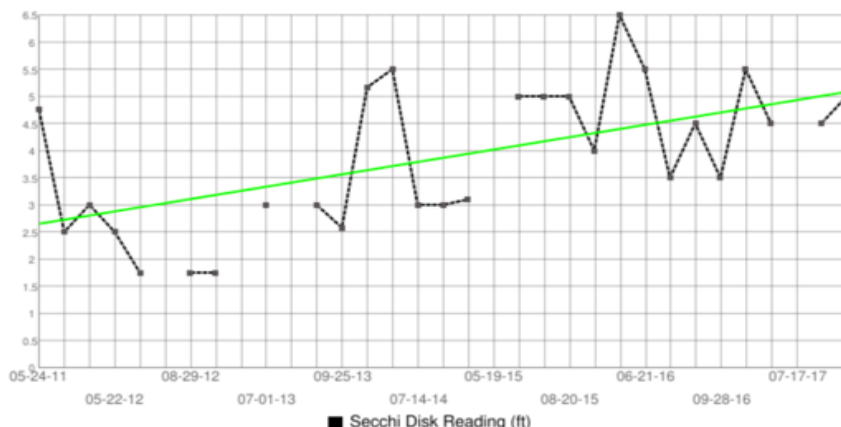
- Measure of algae concentration.
- Seasonal variations, generally lower in the spring.
- Chlorophyll-a >10=Eutrophic
- Water is less green (improving) since 2011



Secchi Depth

What Does it Mean?

- Measure of algae & sediment particles in the water.
- Secchi depth < 5.5 = Eutrophic
- Water is getting clearer since 2011.



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MAINTAINING YOUR SHORELINE SEPTIC SYSTEM

Shoreland Best Management Practices (BMP's)

Why Are Septic Systems a Problem?

In shoreland areas it is particularly important to maintain your septic system properly because soil and water conditions near shore may make the system less efficient in treating wastewater. Incomplete treatment can result in health risks for humans and water quality problems.

Potential health risks are the most serious concern related to failing septic systems. Hepatitis, dysentery, and other diseases may be spread by bacteria, viruses, and parasites in wastewater. These disease-causing organisms, called pathogens, may make nearshore water unsafe for recreation. Flies and mosquitoes that are attracted to and breed in wet areas where wastewater reaches the surface may also spread disease. Many of the synthetic cleaning products or other chemicals used around the house can be toxic to humans, pets, and wildlife.

These products may reach the ground surface or the water. Excessive nitrate levels in drinking water can result in serious health problems for infants. High nitrate levels in ground water can result from inadequately treated wastewater. Inadequate treatment can also allow excess nutrients to reach your lake, promoting algae or weed growth. Algal blooms and abundant weeds not only make the lake unpleasant for swimming and boating, but they also affect water quality for fish and wildlife habitat. As plants die, settle to the bottom, and decompose, they use up oxygen that fish need to survive.

How a Septic System Works

The purpose of an on-site wastewater treatment system, commonly known as a septic system, is to treat sewage from your household. A septic system has two parts: the sewage tank and the soil treatment system. The most common sewage tank in Minnesota is a septic tank that receives raw sewage from the household. Three layers form in the tank: solids settle to the bottom and a layer of scum or grease floats on the surface of a liquid layer (Figure 1). raw sewage is added to the tank, an equal amount of liquid flows out into the soil treatment system.

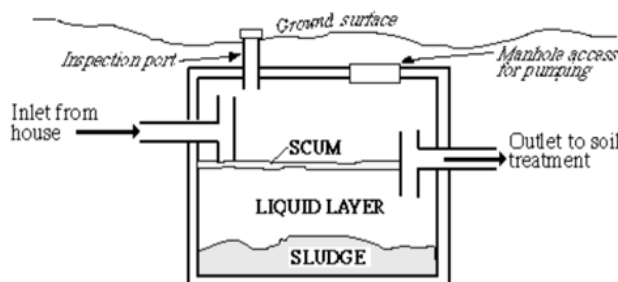


Figure 1:

Typical cross section of a septic tank showing the layers of sludge, liquid, and scum. Newer tanks will have access ports for pumping. Older tanks may have a manhole cover that should be removed for pumping. Inspection ports on older tanks are not suitable for pumping.

Wastewater treatment is completed in the soil absorption area. There are three basic types of soil treatment systems. Drainfield trenches are the most common and do the most effective job of treating wastewater. They take full advantage of evaporation and plant life to help treat sewage. Seepage beds do not require as large a lawn area, but they have a smaller capacity and are less efficient than drainfield trenches. Mounds are elevated systems that may use pressure to distribute sewage effluent. Seepage pits, dry wells, and cesspools are no longer approved and may not be installed. On-site systems with seepage pits should be upgraded to include the proper size tank and drainfield to accommodate the house size and number of residents.

In the soil, microscopic organisms break down remaining biological contaminants such as bacteria or viruses. Nutrients are absorbed by soil particles or taken up by plant life. These processes only work in soil that is not saturated with water. If the soil is too wet, biological breakdown may be incomplete and nutrients may move much greater distances, sometimes hundreds of feet from the drainfield or mound and possibly into surface water (Figure 2). Even systems that appear to be working well or are in compliance with the health code may allow nutrients or bacteria to reach the water.

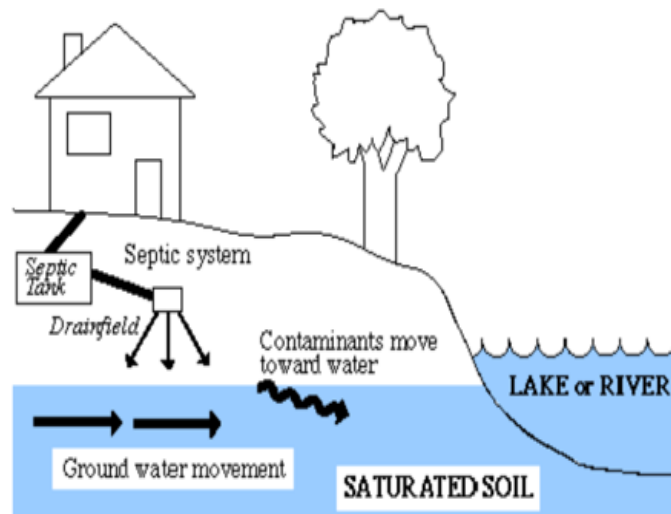


Figure 2:

Avoid water contamination from inadequate wastewater treatment! If your system is improperly designed or located too close to the water, contaminants may reach your lake. This figure shows how ground water moving toward the lake can carry contaminants in saturated soil.

How to tell if there is a problem

These conditions indicate your septic system may be failing

- Sewage backup in your drains or toilets. This may be a black liquid with a bad odor.
- Slow toilet flushing. Even if you use plungers or drain cleaners, drains may run slower than usual.
- Wet areas or water seeping near drainfield. It may or may not have an odor. Excessive growth of aquatic weeds or algae in the lake near your home. Incomplete treatment of nutrient-rich water seeping from your system promotes this growth.
- Unpleasant odors around your house. This may result from improper venting or a failing system. Bacteria or nitrates are found in your well water. This indicates a serious water contamination problem that may come from your own or a neighbor's failing system.
- Biodegradable dye flushed through the system shows up in the lake or river.

What to do if your system fails

Immediate Action

- Call the local health or zoning and planning department. They will help you get the expert advice you need to solve your problem.
- Have the septic tank pumped, making sure that sludge as well as liquid is removed. This will often help solve the problem temporarily, particularly if you also cut back significantly on water use. If the drainfield or household piping is clogged or if high water levels are a problem, this won't help.
- Fence off the area to minimize contact with wastewater (for humans, pets, wildlife).
- Don't use additives. Additives are no benefit and may harm the system.

These actions may help if the system fails

- Increase the absorption field size of the existing system. This will help if the original field was sized too small for the household or if water doesn't percolate well through the soil.
- Connect to a community or lakeshore "cluster" sewage system. Although initial costs may be high, this strategy offers long-term protection for your water resources and environment.
- Installing a holding tank system is considered a temporary alternative in many counties, and is not a method of treating.

How to Keep Your System in Shape

Household Habits

- Conserve water. Excessive water use is the most common cause of septic failure, so reduce water used for bathing, laundry, and flushing the toilet.
- Identify and repair leaking pipes, sticking float valves in toilets, and dripping faucets to reduce water waste. A dripping faucet can waste 15-20 gallons per day.
- Shorten shower times and choose showers over baths to minimize wasted water. A full bath uses 50-60 gallons, while a shower uses only about 5 gallons per minute. Of course, a 20-minute shower is not a savings over a bath.
- Install low-volume toilets and low-flow showerheads. Typical toilets use 5-6 gallons per flush, providing nearly half the wastewater from a house. Flush toilets using 1 1/2 gallons of water are available.
- Keep a container of drinking water in the refrigerator. This saves having to run water until it's cold. Use toilet tissue that breaks up easily when wet to help prevent clogging. To test tissue quality, place a piece in a jar half full of water and shake. If the tissue breaks up easily, it is suitable. The color of tissue has no effect on septic system action.
- Do not use the toilet as a wastebasket. Don't flush facial tissue, diapers, tampons, or any kind of plastic down the drain. Eliminate the use of garbage disposals. Ground-up garbage does not decompose easily, causes rapid buildup of solids in the tank, and may move out of the tank into the drainfield, clogging distribution pipes and soil spores. If you have a disposal--don't use it. When building or remodeling--don't install one.
- Never put coffee grounds down your drain. Dispose of household hazardous waste properly. See fact sheet #14 for additional tips on reducing household hazardous waste.

For cleaning and laundry

- Wash only full loads in the dishwasher. Typical dishwashers use about 13 gallons for each wash. Newer models use 8-9 gallons.
- Use low-phosphate dishwasher detergent. In Minnesota, detergents may contain up to 11% phosphorus by weight; but some brands may exceed this level, so check the labels.
- Wash only full loads of clothes and use front-loading washers and suds-savers to save water. To avoid overloading your system, spread washing over the week instead of washing several loads on one day. A single load takes about 40 gallons.
- Use liquid laundry detergent because it's less likely to have fillers or carriers that may damage the septic system. Try to use the minimum amount because detergents can cause problems with the system. Minimize use of household chemicals and cleaners. Normal amounts of household detergents, bleaches, drain cleaners, toilet bowl deodorizers, and other cleaners won't harm bacterial action in the septic tank.

Maintain the Septic Tank

- Discharge all sewage waste from the house into the septic tank. Don't run wastewater from laundry or saunas directly into the drainfield as the detergent or soap scum will quickly clog soil pores and cause failure.
- Do not add "starters" to your septic system. Enough bacteria are available in the wastes flushed into the septic tank. Even after the tank has been pumped, enough bacteria will be provided when you use the system again.
- Do not use additives in your system. They are of no benefit and may harm the system. Additives that cause the accumulated sludge to increase in volume or float will result in sludge being flushed into the drainfield, plugging soil pores. Also, some additives, particularly degreasers, may be carcinogens that will flow into ground water with treated wastewater.
- Pump the septic tank every year to remove solids and scum. Although tanks away from lakes or rivers may not need it every year, annual pumping is excellent insurance near shorelines.
- Remove the manhole cover when having the tank pumped to make sure that all solids have been removed. The sludge in the tank should be mixed during pumping. A tank cannot be adequately cleaned through a 4-inch inspection pipe. Pumping through the inspection port may clog the outlet baffle with scum & grease.

Your Investment and Costs

It will cost \$75 to \$180 each time you have a septic tank pumped, but replacing the entire system and drainfield may cost from \$10,000 to \$15,000. Threats to human health and water quality increase if your septic system is not properly maintained. If water quality in the lake deteriorates, property values are likely to decrease. In addition, if your on-site treatment system fails, you'll have the inconvenience of being able to use household plumbing until the system is replaced. For property transactions, a septic inspection is required and the financial institution generally requires proof that the septic system conforms to standards. Minnesota's shoreland regulations require that septic systems within shoreland areas are in compliance with state standards before building permits for additions or new construction are issued. Overall, your investment to properly maintain a septic tank and drainfield is minimal compared with the cost involved in repairing or replacing the system.

Regulations that Apply

Regulations may vary somewhat in different counties. The state of Minnesota has minimum requirements that apply to shoreland areas, but some counties may have more restrictive ordinances. Check with your county Zoning and Planning, Health, or Shoreland offices for the setback requirements and permits needed in your county.

Setback is the distance away from the shore and is usually measured from the ordinary high water level. In some cases, the setback may be measured from a bluff face or where vegetation begins. The setback for septic systems depends on the type of lake or river, Required setbacks range from 50 feet for general development lakes to 150 feet for remote river segments or natural environment lakes.

The Minnesota Rules for on-site waster treatment systems are governed by the Department of Health and the Pollution Control Agency in Chapter 7080. When upgrading or building a new system , be sure to use a licensed contractor who has been trained to comply with these standards.

Maintain Your Septic System Avoid Costly Repairs

The University of Minnesota recommends having your septic system **pumped every two years**. By scheduling regular pumpings, you will:

- Extend the life of your drainfield
- Ensure proper treatment of all waste products
- Keep your system working properly

To schedule an appointment call:



[320-894-7608](tel:320-894-7608)

REDUCING THE USE OF HOUSEHOLD PRODUCTS

Shoreland Best Management Practices (BMP's)

Why Are Hazardous Household Products a Problem?

Many common household cleaners and home improvement products contain ingredients that are corrosive, toxic, or flammable. When used improperly or disposed of improperly, these products can become personal health and safety concerns and can also cause problems in the environment, contaminating ground water and soil and eventually reaching surface waters.

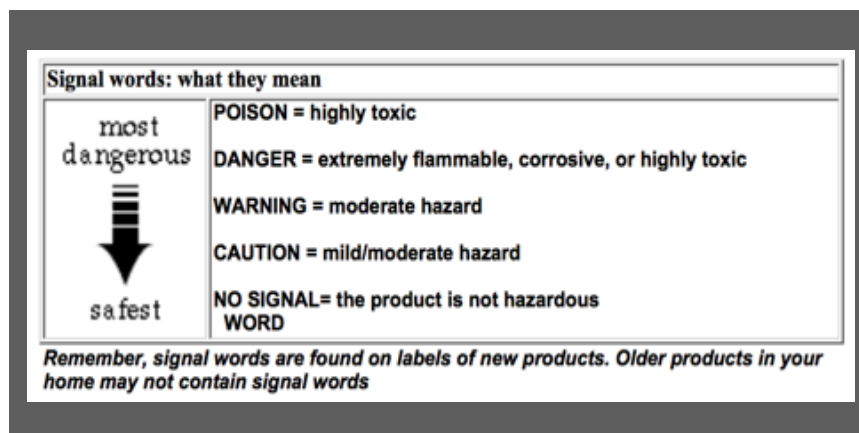
Smart Shopping

Think twice before buying household cleaning and maintenance products. General purpose products may work just as well as products developed for a specific surface or appliance. Some products may contain hazardous ingredients, such as degreasers, which contain petroleum distillates. Purchase nontoxic or less toxic products whenever possible (like water-based rather than solvent-based paints and cleaners). Alternatives to hazardous cleaning products are cheaper and some are equally effective. Do not use pesticides unless you have tried all other alternatives without success. The Western Lake Superior Sanitary District (WLSSD), the MN Pollution Control Agency (PCA), and the University of Minnesota Extension Service can provide information on alternatives to pesticides, cleaning products, and other hazardous products.

If you use a hazardous product, read the label carefully before purchasing. Make sure the product will do what you want it to. Buy only the amount you need, and use it up. If you can't, give it to someone who can.

Read the Label!

Reading product labels is the best way to get information about that product. Labels contain information about product ingredients, how to store and use safely, and hazards associated with the product. Labels on hazardous products contain SIGNAL WORDS, which tell how hazardous the product is to humans. This can give some indication of the potential problems to the environment.



Safe Storage and Disposal

Follow label instructions for use and storage of all household products. Do not store paints and pesticides in unheated buildings where they will freeze and become waste. Dispose of banned or unusable products properly. Do not pour leftovers down the drain, on the ground, or into a storm sewer. Empty containers, including paint cans (lids should be left off) and aerosol cans, should be placed in the trash.

Pesticide containers must be triple-rinsed before disposal. The rinse water should be used for the same purpose the pesticide was used for. The clean, empty containers can then be placed in the trash. In some areas, pesticide containers can be collected to be recycled into new pesticide containers. Hazardous product containers should not be recycled through community recycling programs. Call your county solid waste office for information about household hazardous waste collections in your area. Special Concerns About Mercury

Mercury in the environment is a serious public health issue in northern Minnesota. Many household products, including paints, batteries, thermometers, and fluorescent tubes, contain small amounts of mercury. When these products are not disposed of properly, mercury can be released into the environment. Mercury in lakes and rivers can accumulate in fish and be passed on to humans who eat them.

Fish consumption advisories have been established by the MN Department of Health. Advisories have been set for certain lakes and fish species. Product manufacturers are aware of the problems with mercury and many are modifying their products to reduce or remove it. Alkaline batteries sold in Minnesota after January 1, 1996, have no added mercury and can safely be discarded in the trash.

Here are some things you can do to reduce mercury waste:

- Look for alternatives; many mercury-free products are available and can replace mercury-containing products.
- Purchase alkaline batteries with no added mercury. Use rechargeable nickel-cadmium batteries to reduce overall battery waste by 90%; nickel-cadmium batteries should be saved for a collection and recycling program.
- Button batteries, used in watches, cameras, and calculators, are recyclable. Return these to a retail outlet that collects them, or to a household hazardous waste collection program.
- Fluorescent tubes--contact your county solid waste officer for disposal or handling advice.
- Take paints, thermostats, mercury switches, thermometers, blood pressure cuffs, and other items containing mercury to a household hazardous waste collection program for recycling; do not throw these in the trash.
- Look before you buy items to see if they contain mercury; many products you might not suspect contain mercury (e.g., some red-light tennis shoes).

How Mercury is added to the food chain

Here's what can happen when mercury is improperly disposed of and mercury compounds enter a river or lake food chain:

1
2
3
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Mercury enters the river or lake.

Mercury attaches to particles of organic material or sediment and falls to the river or lake bottom.

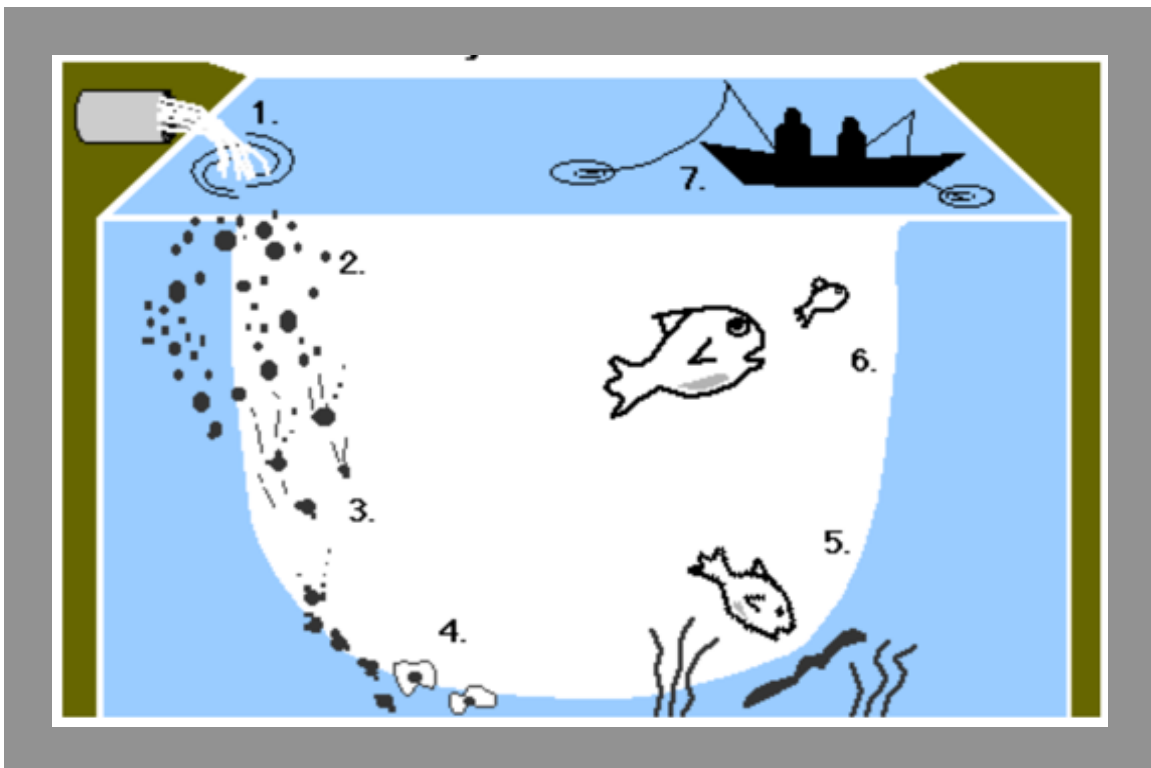
Bacteria and other microorganisms consume the mercury and convert it to a fat-soluble form.

Bacteria that contain mercury are eaten by small animals on the riverbed and the mercury enters their fatty tissues.

Small fish eat the small animals.

Larger fish eat the smaller fish and the mercury builds up in their tissues. The older the fish, the more mercury it contains.

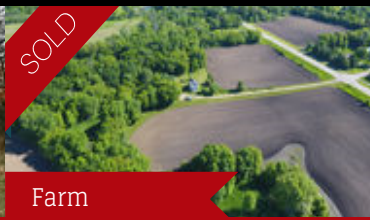
If a contaminated fish is eaten by a human, the mercury in the fish is absorbed into human fatty tissues. Although mercury will be eliminated from our bodies over time, frequent meals of contaminated fish will cause accumulation of mercury in human tissue to potentially unsafe levels. No method of cleaning or cooking fish will reduce the amount of mercury in its flesh.



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AQUATIC INVASIVE SPECIES MANAGEMENT

Goal

Manage EWM and Curly Leaf Pond Weed (CLPW) to minimize its impact on recreation, while encouraging the development and growth of natural vegetation. Implement actions to reduce or eliminate the spread of AIS both into and out of Lake Washington. In addition work with the DNR and the University of Minnesota to track the spread of Zebra mussels in Lake Washington.

The Minnesota DNR and Lake Washington Improvement Association (LWIA) have been managing Eurasian Water Milfoil (EWM) since 1999. Treatment areas have been 0 to 100 acres.

Strategies that support this goal:

- Develop and monitor the yearly management plan for invasive species to identify needs, determine treatment options, and provide treatment earlier in the year to obtain maximum benefits of the treatment. The current plan proposes treating 20% of the EWM currently surveyed in the spring, up to 100 acres each year. This will allow the Invasive Species Committee/Lake Washington Association to develop a long range budgeting plan for the treatments. The areas treated for EWM will rotate around the lake as the committee sees necessary to provide coverage for specific sites around the lake.
- Continue conducting lake vegetation surveys to establish a picture of what the lakes vegetation looks like on a year to year basis.
- Continue partnerships with local and state units to work together providing information, expertise, support, and knowledge about needs and updated technologies/treatment/management options.
- Annually seek (financial and professional) support from all state and local agencies that are stakeholders in this management plan.
- Seek permits and grants as required from local and state agencies for EWM and CLPW treatment and management strategies for zebra mussels.
- Use Zebra mussel settlement plates to monitor and record their spread.
- Install, maintain and monitor a self-contained video inspection system at Ellsworth landing to capture boat launches and provide an audio message to remind boaters to clean and inspect their watercraft.

Page 56-73 is a portion of an aquatic plant identification guide provide by Minnesota Aquatic Invasive Species Research Center (MAISRC) It shows both invasive and native plants. Use this to help us early detect invasive plants!

LAKE WASHINGTON VEGETATION

Minnesota Department of Natural Resources

Submersed Plants (Plants with most leaves growing beneath the water surface)

<i>Myriophyllum sibiricum</i>	Northern Watermilfoil
@ <i>Myriophyllum spicatum</i>	Eurasian Watermilfoil
<i>Najas flexilis</i>	Bushy Pondweed, Common Naiad
<i>Potamogeton illinoensis</i>	Illinois Pondweed
<i>Potamogeton richardsonii</i>	Claspingleaf Pondweed
<i>Stuckenia pectinata</i>	Common Sago Pondweed

Floating-leaf Plants (Plants with leaves that float on the water surface)

<i>Persicaria amphibia</i>	Water smartweed
<i>Potamogeton gramineus</i>	Variable Pondweed
<i>Potamogeton natans</i>	Floating Leaf Pondweed

Emergent Plants (Plants with leaves extending above the water surface)

<i>Sagittaria cristata</i>	Crested arrowhead
<i>Schoenoplectus acutus</i> var. <i>acutus</i>	Hard-stem bulrush
<i>Typha latifolia</i>	Broad-leaved cattail

Shoreline Plants (Plants associated with the wetland habitat)

<i>Asclepias incarnata</i>	Swamp milkweed
<i>Salix</i> sp.	Willow



PREVENTING THE INTRODUCTION OF EXOTIC SPECIES

Shoreland Best Management Practices (BMP's)

Why are exotic species a problem?

Today, "exotics"-the term for organisms that have been introduced into areas where they are not native-are considered to be among the most severe, worldwide agents of habitat alteration and degradation.

They are a major cause in the continuing loss of biological diversity throughout the world. They have caused extinction of some native species. Exotic species can be thought of as "biological pollutants." Moving plants or animals, accidentally or intentionally, from one habitat into another where they have never been before is risky business.

In the absence of predators, parasites, pathogens, and competitors from their native habitat, species introduced under favorable conditions will often overrun their new home and crowd out important native species. Once established, exotics can rarely be eliminated. To Protect Your Lake from Exotics

There are many BMPs you can adopt as an individual to minimize the spread of aquatic exotic plants and animals: Learn what these organisms look like and monitor for their presence.

If you suspect a new infestation of an exotic plant or animal, report it to Minnesota Sea Grant Extension in Duluth, (218) 726-8712, or the MN Department of Natural Resources (DNR) Exotic Species Program in St. Paul, 1-800-766-6000 or (612) 296-2835, or a local DNR fishery office.

Species of Concern

Aquatic exotic species that are causing particular concern in Minnesota today are shown below. Other exotics of concern are the common carp, sea lamprey, rusty crayfish, white perch, flowering rush, and curly leaf pondweed. Species are not drawn in correct proportion to each other.

**Don Luce Bell
Museum of
Natural History**
Zebra Mussel
(*Dreissena
polymorpha*)
Size 1/to 2 inches



MN DNR
Eurasian Water
Milfoil
(*Myriophyllum
spicatum*) Leaflet:
1/2 life size

M. Baradlai
Eurasian Ruffe
(*Gymnocephalus
cernuus*)
Size: 2 to 5
inches





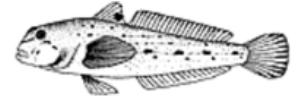
Best Management Practices

- Consult the DNR for recommendations and permits before you try to control or eradicate an exotic pest. Remember, exotic species thrive on disturbance. Do-it-yourself control treatments often make matters worse and can harm native species.
- Organize educational campaigns and committees. Contact Sea Grant if you would like to become a volunteer zebra mussel monitor. Your lake association or civic group could also undertake an educational campaign in your area. Conduct public awareness events at water accesses (at DNR accesses, notify the DNR before planning an activity). Don't transport water, animals, or plants from one lake or river to another. In Minnesota, it is illegal to transport surface water, aquatic plants, or exotic species.
- Remove plants and animals from your boat, trailer, and accessory equipment (anchors, centerboards, trailer hitch, wheels, rollers, cables, and axles) before leaving the water access area.
- Drain your livewell, bait bucket, and bilge water before leaving the water access area. Empty your bait bucket on land, never into the water. Never dip your bait bucket into one lake if it has water in it from another. And, never dump live bait from one water body into another.
- Wash your boat, tackle, downrigger cables, and trailer with hot water. Flush hot water (at least 104°F) through your motor's cooling system and other boat parts that normally get wet. If possible, spray your boat, trailer, and accessories with hot, high pressure water. Let everything dry for five days before transporting your boat to another body of water (both hot water and drying will kill zebra mussels).

Species of Concern

Donna Francis

Round Goby
(*Neogobius melanostomus*)
Size: 2 to 12 inches



Don Luce Bell Museum of Natural History

Spiny Water Flea
(*Bythotrephes cederstroemi*)
Size: 3/8 inch



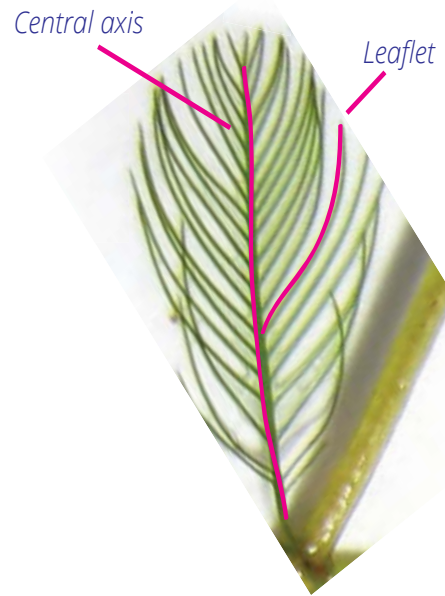
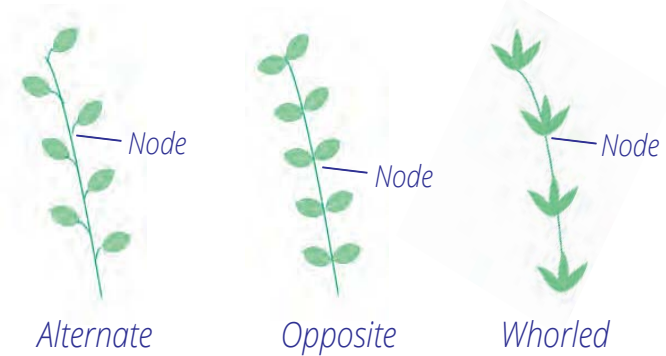
MN DNR

Purple Loosestrife
(*Lythrum salicaria*)
Size: 2 to 7 feet

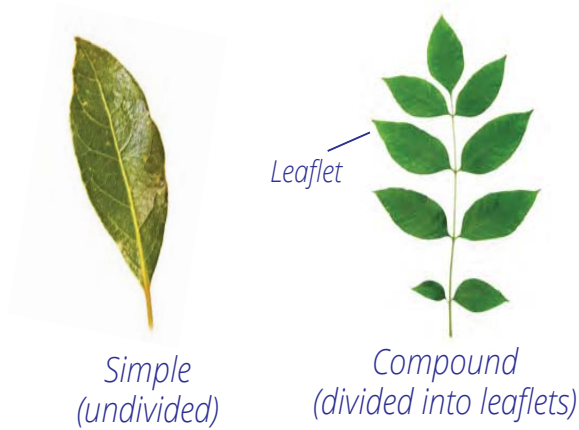


Introduction to aquatic plants

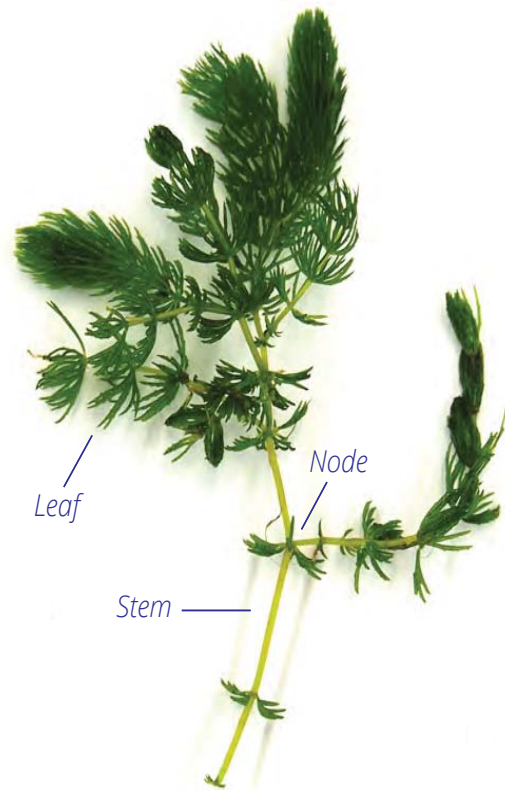
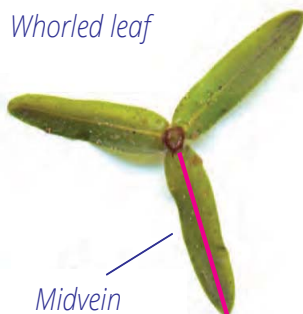
Leaf arrangement:



Leaf type:



Leaf margins:



INVASIVE

Eurasian watermilfoil

Myriophyllum spicatum

KEYS TO ID

- Feathery looking with four leaves per whorl
- Leaves have central axis with 12 – 20 leaflet pairs
- Can grow up to 10 feet long
- Produces pink and white flowers on spike above surface
- Leaves become limp when taken out of water

LOOKS SIMILAR TO

- Northern watermilfoil (native)
- Coontail (native)
- Bladderworts (native)
- White water crowfoot (native)
- Water marigold (native)

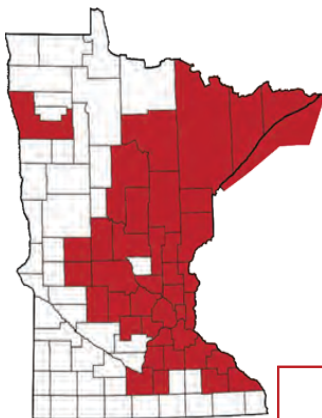
Note: Eurasian watermilfoil is known to hybridize with northern watermilfoil.

Hybrid watermilfoil is also considered invasive and should be reported.

WHERE TO LOOK

- In lakes, ponds, and slow-moving areas of rivers or streams
- Grows best in depths of 3 – 15 feet

CURRENTLY FOUND



Above-surface flowers

Four leaves per whorl with 12 – 20 leaflet pairs per leaf



NATIVE

Northern watermilfoil

Myriophyllum sibiricum

KEYS TO ID

- Four leaves per whorl
- Each leaf has between 4 – 11 leaflet pairs
- Leaves have a central axis and are rigid when taken out of water

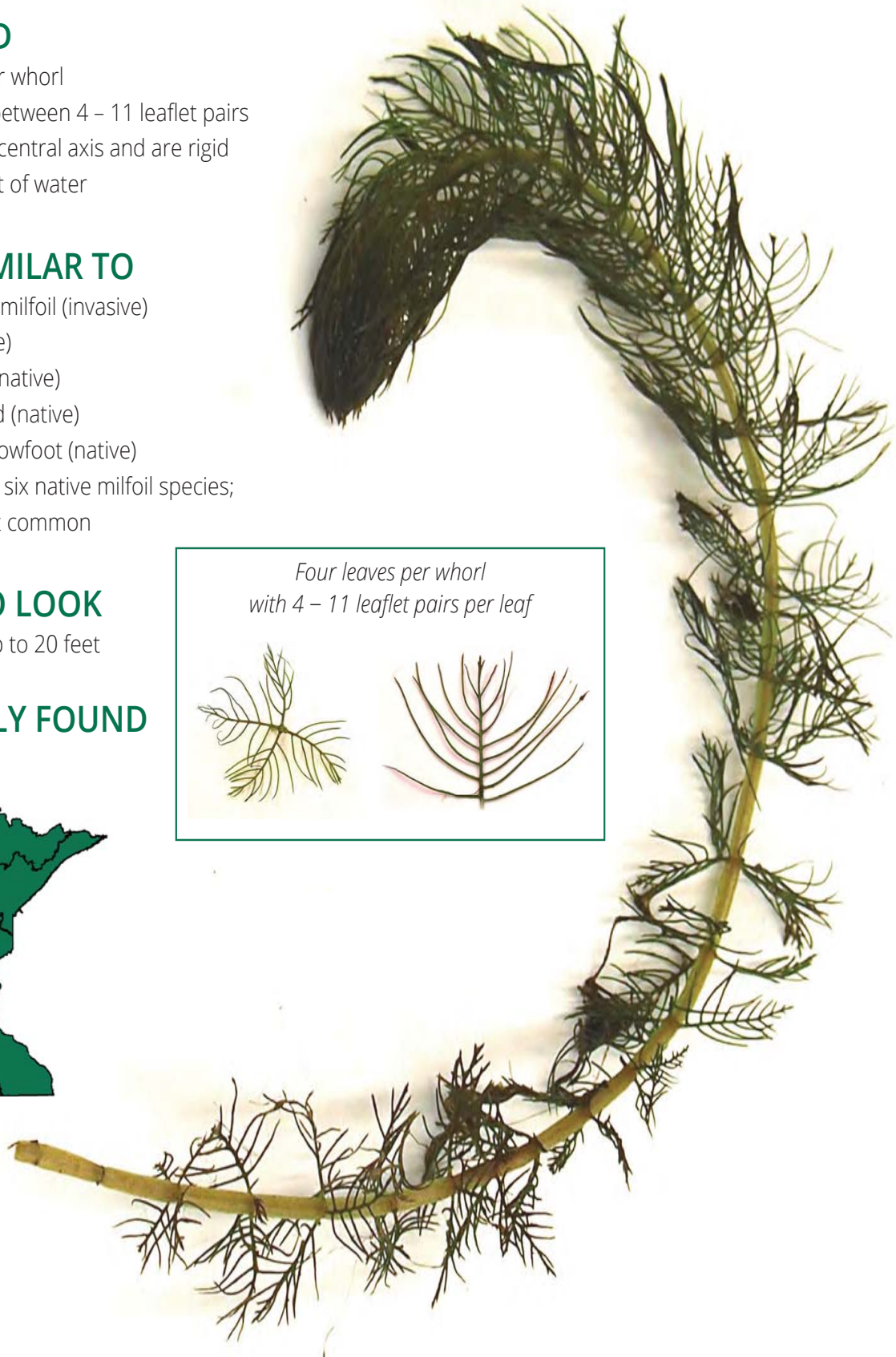
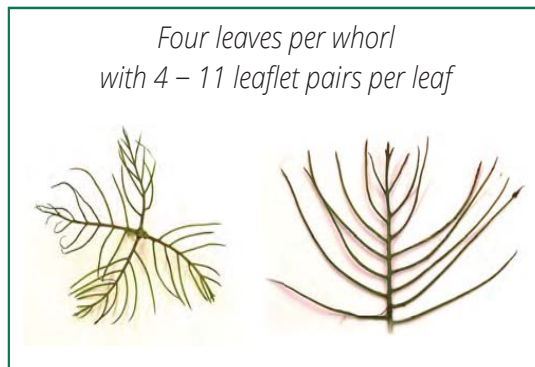
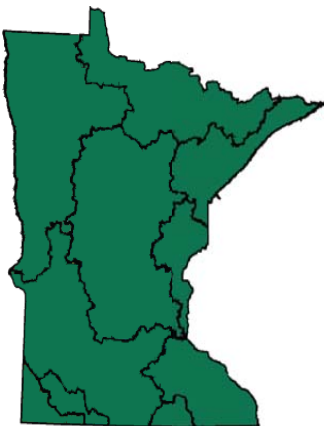
LOOKS SIMILAR TO

- Eurasian watermilfoil (invasive)
- Coontail (native)
- Bladderworts (native)
- Water marigold (native)
- White water crowfoot (native)
- Minnesota has six native milfoil species; this is the most common

WHERE TO LOOK

- In depths of up to 20 feet

CURRENTLY FOUND



NATIVE

Coontail

Ceratophyllum demersum

KEYS TO ID

- Leaves have no central axis and are branching
- Can grow up to six feet long
- Often free-floating

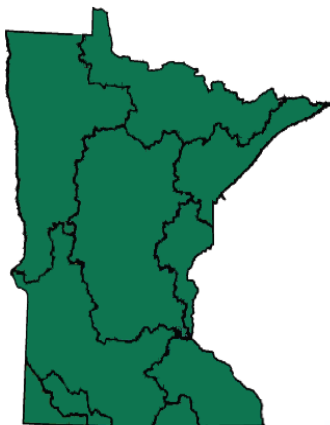
LOOKS SIMILAR TO

- Eurasian watermilfoil (invasive)
- Water marigold (native)
- Northern watermilfoil (native)
- Bladderworts (native)
- White water crowfoot (native)

WHERE TO LOOK

- In water up to 20 feet deep
- Upper leaves may reach surface and form dense patches
- Can become highly abundant and form "oil slicks" when it dies back

CURRENTLY FOUND



NATIVE

Bladderworts

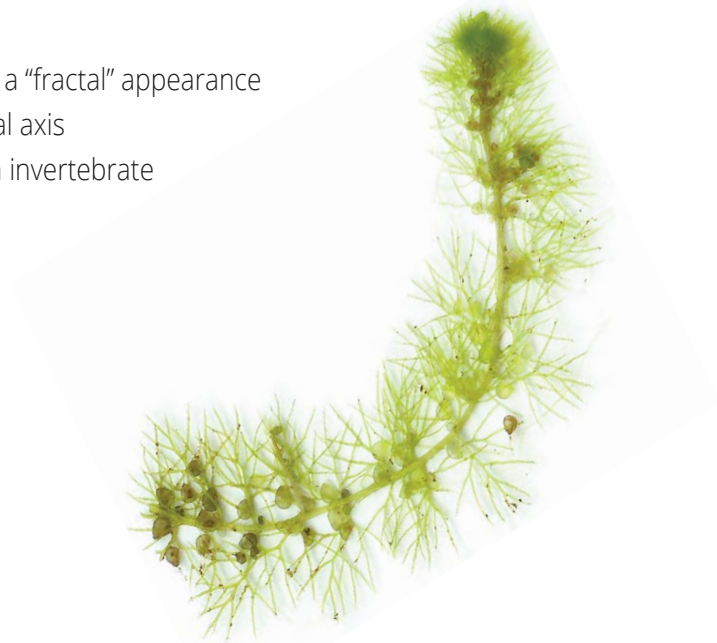
Utricularia spp.

KEYS TO ID

- Thin leaves branching and zig-zagging can give a “fractal” appearance
- Leaves are highly dissected and have no central axis
- Has bladders, some of which may be filled with invertebrate victims of these carnivorous plants
- Has snapdragon-like flowers

LOOKS SIMILAR TO

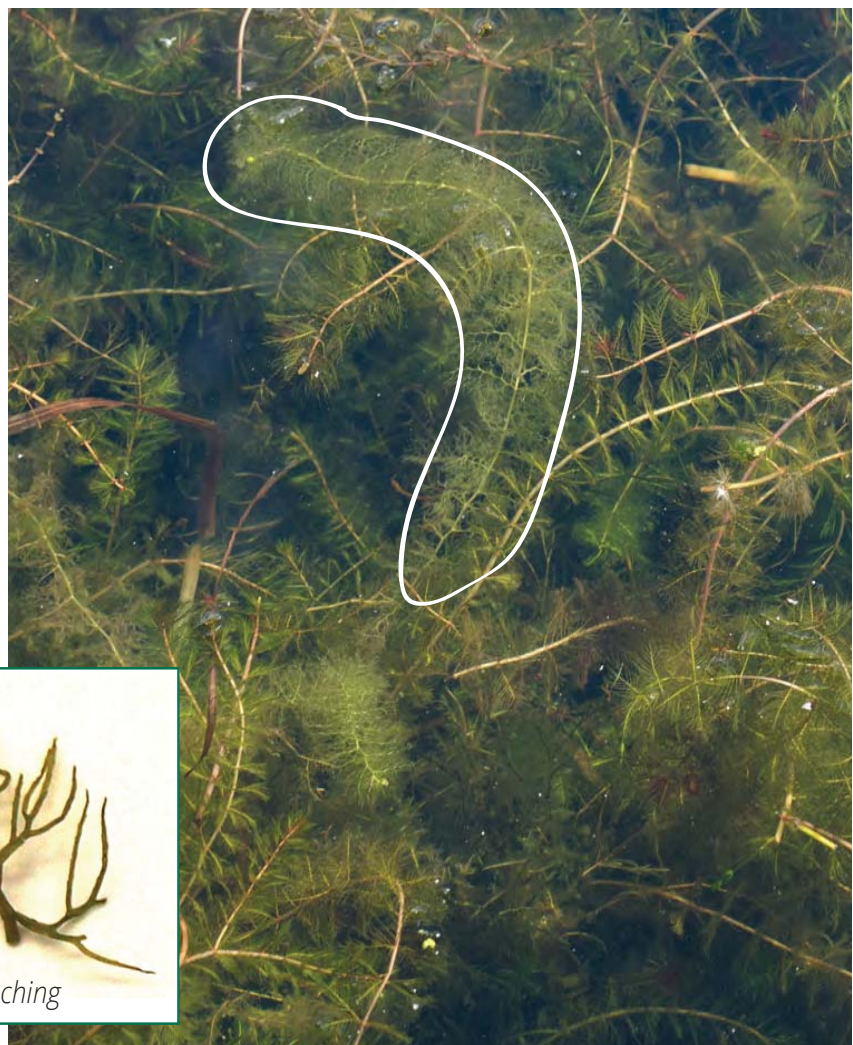
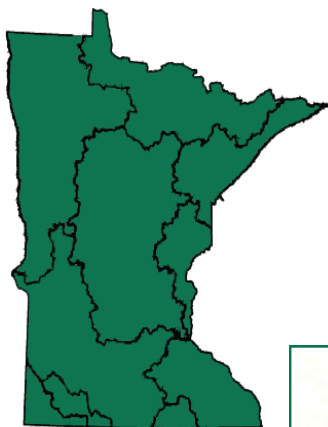
- Eurasian watermilfoil (invasive)
- Northern watermilfoil (native)
- Coontail (native)
- Water marigold (native)
- White water crowfoot (native)
- Minnesota has eight bladderwort species



WHERE TO LOOK

- Usually found in shallow waters
- Some are free-floating, some prefer to be buried in sediment

CURRENTLY FOUND



Branching

NATIVE

White water crowfoot

Ranunculus aquatilis

KEYS TO ID

- Grows in mats on the water's surface
- Leaves are highly dissected
- Produces flowers with yellow centers and five white petals
- Often has modified leaves at surface

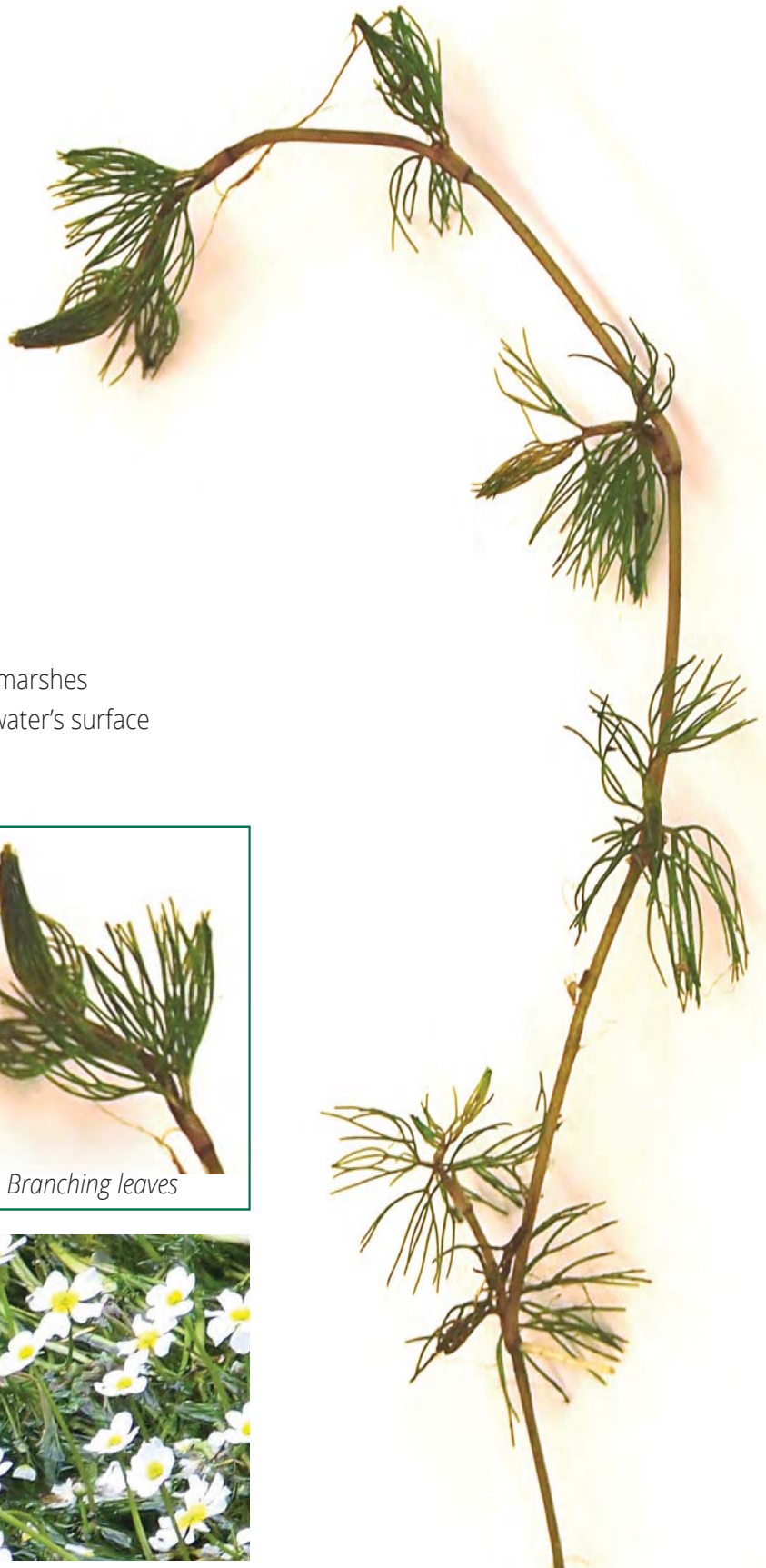
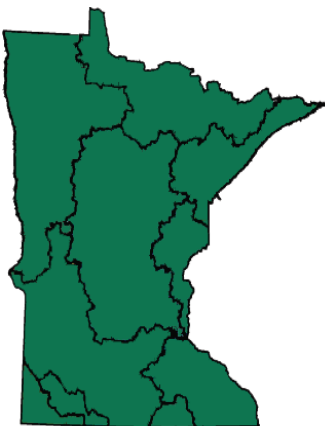
LOOKS SIMILAR TO

- Eurasian watermilfoil (invasive)
- Water marigold (native)
- Northern watermilfoil (native)
- Bladderworts (native)
- Coontail (native)

WHERE TO LOOK

- In ponds, slow-moving streams, and marshes
- Can grow up to 1 to 6 inches above water's surface

CURRENTLY FOUND



NATIVE

Water marigold

Bidens beckii (formerly *Megalodonta beckii*)

KEYS TO ID

- Opposite to whorled, highly dissected leaves that are variable along stems
- Leaves do not have a central axis
- Produces yellow buttercup flowers with more than five petals in mid- to late-summer
- Has two simple emergent leaves under the flower that are serrated

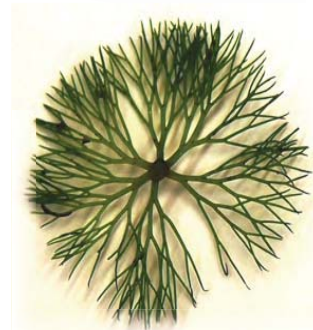
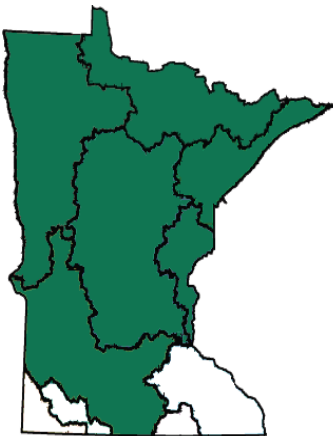
LOOKS SIMILAR TO

- Eurasian watermilfoil (invasive)
- Coontail (native)
- Northern watermilfoil (native)
- Bladderworts (native)
- White water crowfoot (native)

WHERE TO LOOK

- In water up to 12 feet deep
- Flowers are above water

CURRENTLY FOUND



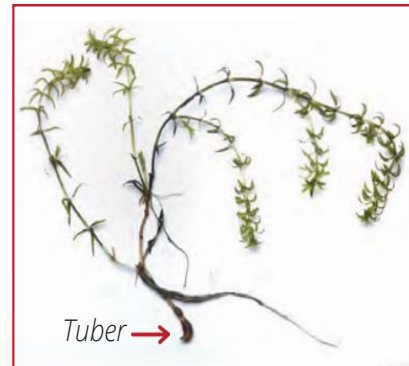
INVASIVE

Hydrilla

Hydrilla verticillata

KEYS TO ID

- Submersed plant that grows into thick mats
- Leaves are bright green with a midvein down the center and are between $\frac{1}{8}$ and $\frac{3}{4}$ inches long
- Leaves directly attached to stem (stalkless) in whorls of 3 – 10; often 5
- Ascending stems can grow up to 30 feet long
- Tubers or turions may be present
- Leaves have sharply toothed serrated edges that may require a hand lens to see



LOOKS SIMILAR TO

- *Elodea* (native)
- Brazilian waterweed (invasive)

WHERE TO LOOK

- Streams, lakes, and ponds
- In shallow or deep waters
- May invade deep waters where native plants can't grow
- Has not been found in Minnesota

CURRENTLY FOUND



INVASIVE

Brazilian waterweed

Egeria densa

KEYS TO ID

- Leaves in whorls of 4 to 6
- Leaves are between $\frac{2}{5}$ and 1.5 inches long
- Small white flowers with 3 petals may be visible
- Can form dense mats that look bushy

LOOKS SIMILAR TO

- Elodea (native)
- Hydrilla (invasive)

WHERE TO LOOK

- Submersed; can be free-floating or rooted
- Commonly used in home aquaria
- No established populations in Minnesota

CURRENTLY FOUND



NATIVE

Common waterweed

Elodea canadensis

KEYS TO ID

- Whorls of 3 oval-shaped leaves; whorls of 4 may occur
- Can grow up to three feet tall
- Leaves have smooth edges and are between $\frac{1}{4}$ and $\frac{3}{8}$ inches long
- Small white flowers visible above water in the summer



Three leaves per whorl

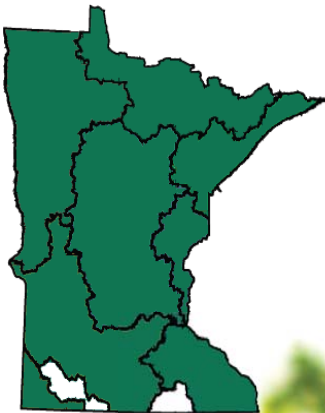
LOOKS SIMILAR TO

- Hydrilla (invasive)
- Brazilian waterweed (invasive)
- Minnesota has three native *Elodea* species

WHERE TO LOOK

- In water up to 10 feet deep
- Near stream inlets
- May be free-floating

CURRENTLY FOUND



INVASIVE

Starry stonewort

Nitellopsis obtusa

KEYS TO ID

- Long, smooth branchlets are attached in whorls of 5 – 8 and branch asymmetrically at tips
- Stems are smooth
- Small, star-shaped bulbils form on clear threads at base of plant and may be found above or below the sediment surface
- Small, orange spheres called antheridia may be visible, these are male reproductive structures
- Branchlets typically several inches long, longer than *Chara* or *Nitella*
- Can fill water column and form surface mats

LOOKS SIMILAR TO

- Native *Chara* (native)
- Native *Nitella* (native)
- Sago pondweed (native)
- Water stargrass (native)

WHERE TO LOOK

- In shallow, still water and near accesses

CURRENTLY FOUND



Actual size of bulbils

Below: orange antheridia



NATIVE

Muskgrasses

Chara spp.

KEYS TO ID

- Stems are typically rough and crunchy
- Thin branchlets form whorls around thin stems
- Branchlets are not forked at tips
- May produce bulbils, but not star-shaped
- May have musky odor



Rough stems; whorled branchlets

LOOKS SIMILAR TO

- Starry stonewort (invasive)
- Native *Nitella* (native)
- Sago pondweed (native)
- Water stargrass (native)
- Minnesota has nine *Chara* species

WHERE TO LOOK

- Fully submerged
- Along lake bottoms forming patches called meadows

CURRENTLY FOUND



NATIVE

Stoneworts

Nitella spp.

KEYS TO ID

- Stems are smooth
- Branchlets fork off evenly into two or three tips at end
- Typical branchlets are around an inch; much shorter than starry stonewort
- Unlike starry stonewort, forked tips are of equal length
- Becomes limp when out of water

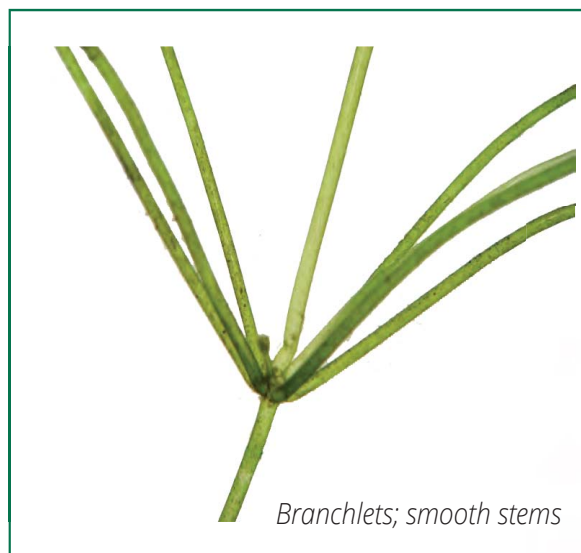
LOOKS SIMILAR TO

- Starry stonewort (invasive)
- Native *Chara* (native)
- Sago pondweed (native)
- Water stargrass (native)

WHERE TO LOOK

- Often in deeper zones of lake
- At depths up to 30 feet

CURRENTLY FOUND



NATIVE

Sago pondweed

Stuckenia pectinata

KEYS TO ID

- Has narrow, stiff leaves alternating off the slender stem
- The base of leaves are tightly attached to stem for about 1/4 of an inch before coming off the stem
- Produces clusters of egg-shaped fruits
- Leaves are very fine and almost look like pine needles
- Grows up to three feet tall

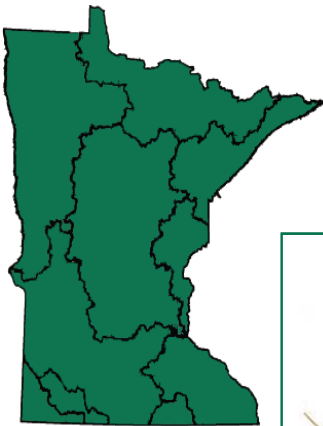
LOOKS SIMILAR TO

- Starry stonewort (invasive)
- Native *Chara* (native)
- Native *Nitella* (native)
- Water stargrass (native)

WHERE TO LOOK

- Usually in shallow waters up to six feet
- Entirely submersed in water

CURRENTLY FOUND



Alternating leaves



Fruit

NATIVE

Water stargrass

Heteranthera dubia

KEYS TO ID

- Small yellow flowers visible above water in mid- to late-summer
- Leaves lack a visible midvein
- Slender and branching stems with alternating leaves
- Leaves are narrow and flat
- May create dense mats

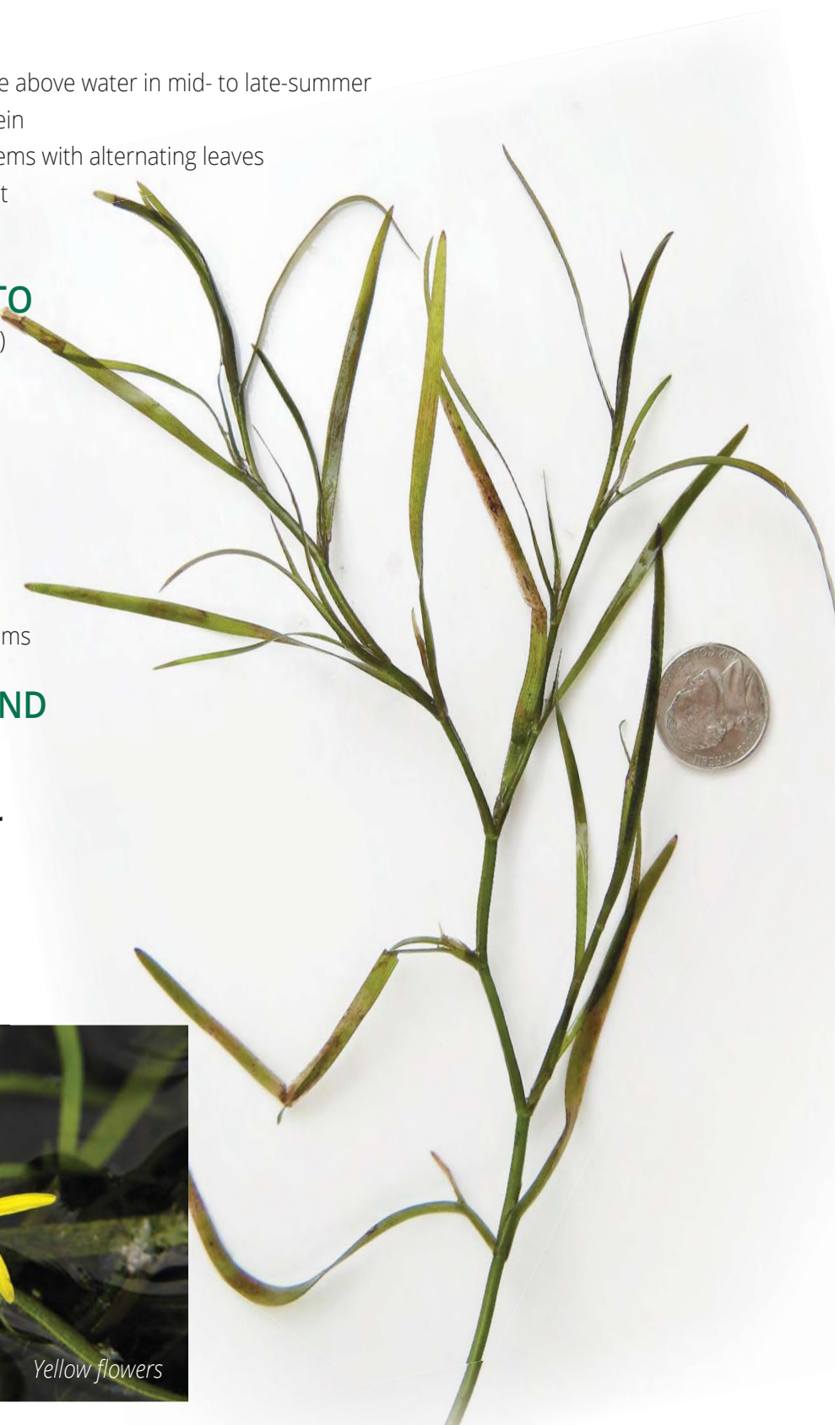
LOOKS SIMILAR TO

- Starry stonewort (invasive)
- Native *Chara* (native)
- Sago pondweed (native)
- Native *Nitella* (native)

WHERE TO LOOK

- Mostly in shallow waters and near stream banks
- On sandy or muddy bottoms

CURRENTLY FOUND



INVASIVE

Curly-leaf pondweed

Potamogeton crispus

KEYS TO ID

- Thin, submerged leaves have distinct “teeth” and wavy edges
- Produces turions that look like small, greenish-brown pinecones
- Generally the first pondweed to come up in the spring; dies back in midsummer
- Leaves do not clasp around stem where they connect

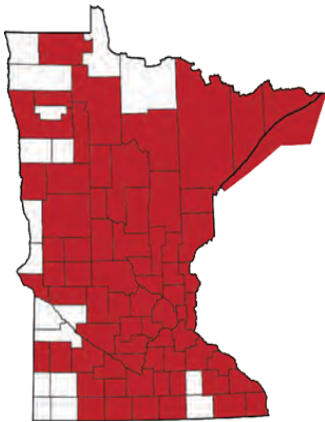
LOOKS SIMILAR TO

- Clasping-leaf pondweed (native)

WHERE TO LOOK

- Lakes, rivers, and streams in waters up to 15 feet deep

CURRENTLY FOUND



Teeth on edges



Turions

NATIVE

Clasping-leaf pondweed

Potamogeton richardsonii

KEYS TO ID

- Leaves alternate along the stem
- Leaves are wide and wavy, but don't have "teeth" like curly-leaf pondweed
- Leaves clasp around stem

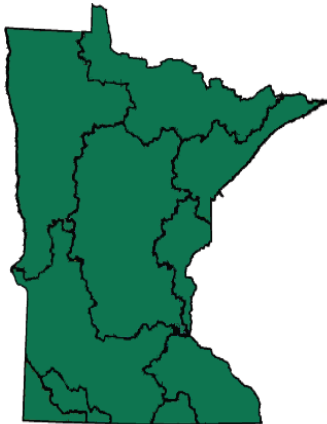
LOOKS SIMILAR TO

- Curly-leaf pondweed (invasive)
- Also called Richardson's pondweed

WHERE TO LOOK

- Fully submersed
- In water up to 12 feet

CURRENTLY FOUND



Leaves clasping stems



Quick reference guide

Eurasian watermilfoil

	Eurasian watermilfoil	Northern watermilfoil	Hybrid watermilfoil	Coontail	Water marigold	White water crowfoot	Bladderworts
Leaves alternate						X	X
Bladders present on leaves							X
Leaves whorled	X	X	X	X	X		
Leaflets on a central axis	X	X	X				
Leaves with <12 leaflets (4-11)		X					
Leaves with ≥12 leaflets (12-20)	X		X				

Hydrilla

	Hydrilla	Brazilian waterweed	Elodea (waterweed)
≤ 3 leaves in a whorl			X
≥ 3 leaves in a whorl	X (usually 5)	X (usually 4)	
Showy white flowers		X	
Serrated leaf margins	X		
Produces tubers and turions	X		

Starry stonewort

	Starry stonewort	<i>Chara spp.</i>	<i>Nitella spp.</i>	Sago pondweed	Water stargrass
Alternate, flat leaves					X
Branching needle-like leaves				X	
Whorled branchlets, like stem	X	X	X		
Strong odor		Some species			
Rough stems		X			
Forked branchlets	X		X		
Forked tips symmetrical			X		
Stays rigid out of water	X				
Star-shaped bulbils	X				



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WILDLIFE MANAGEMENT

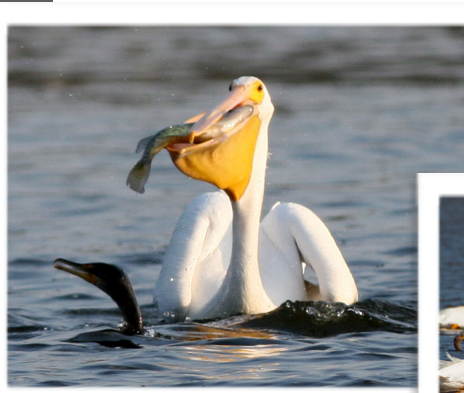
Goal

Support and be active members in the local Minnesota Fisheries plans for monitoring and managing the fish populations in Lake Washington. Support wildlife management in conjunction with the DNR to enhance lake recreation.

Wildlife and especially fishing are very important parts of the culture of Lake Washington.

Strategies that support this goal

- Work with local DNR office to develop cormorant management for the local halo of lakes.
- Maintain open communication with the DNR and support their fish management plans for the lake.
- Support fish surveys.
- Stay informed of the fish populations and what we as association members can do to support fish management.
- Look for ways to encourage healthier fish environments.
- Encourage lake residents not to feed waterfowl to reduce the likelihood of AIS introduction and swimmers itch.



FISHERIES SURVEY LAKE WASHINGTON

Minnesota Department of Natural Resources

Area: 2,433.91 acres
Littoral Area: 2,266.04 acres
Shore Length: 10.28 miles

Mean Depth: 8 feet
Maximum Depth: 17 feet
Average Water Clarity: 3.2 feet

Stocking Report

Fish Stocked by Species for the Last Ten Years

Year	Species	Size	Number	Pounds
2017	Walleye	fry	2,266,000	21.4
2015	Walleye	fry	2,283,693	22.3
2013	Walleye	fry	2,270,912	19.2
2011	Walleye	fry	2,349,000	18.1
	Walleye	fry	114,000	1.0
2009	Walleye	fry	1,169,357	11.0
	Walleye	fry	884,771	9.6
	Walleye	fry	395,770	3.6

Stocking Notes

1 - indicates fish purchased and stocked by private citizens and sporting groups.

2 - indicates fish purchased by the DNR for stocking.

Stocking Fish Sizes

Fry - Newly hatched fish that are ready to be stocked usually called "swim-ups". Walleye fry are 1/3 of an inch or around 8 mm.

Fingerling - Fingerlings are one to six months old and can range from a size of one to twelve inches depending on the species. Walleye fingerlings range from three to eight inches each fall.

Yearling - Yearling fish are at least one year old. A one-year-old fish can range from three to twenty inches depending on the species. Walleye yearlings average from six to twelve inches.

Adult - Adult fish are fish that have reached maturity. Depending on the species, maturity can be reached at two years of age. Walleye reach maturity between the ages of four and six years.

Length of Select Species Sampled - All Gear Combined

Species	Number of fish caught in each category (inches)													Total
	0-5	6-7	8-9	10-11	12-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50+	
black bullhead	8	2	6	5	18	0	0	0	0	0	0	0	0	39
black crappie	8	46	152	1	11	0	0	0	0	0	0	0	0	218
bluegill	301	102	3	0	0	0	0	0	0	0	0	0	0	406
bowfin (dogfish)	0	0	0	0	0	0	2	5	0	0	0	0	0	7
brown bullhead	0	0	0	1	0	0	0	0	0	0	0	0	0	1
common carp	0	0	0	0	0	0	1	1	0	0	0	0	0	2
channel catfish	0	0	0	0	0	1	0	0	0	0	0	0	0	1
green sunfish	1	0	0	0	0	0	0	0	0	0	0	0	0	1
hybrid sunfish	5	12	0	0	0	0	0	0	0	0	0	0	0	17
largemouth bass	8	1	6	2	0	14	0	0	0	0	0	0	0	31
northern pike	0	0	0	0	0	8	29	27	3	0	0	0	0	67
pumpkinseed	8	5	0	0	0	0	0	0	0	0	0	0	0	13
smallmouth bass	2	1	1	1	7	21	0	0	0	0	0	0	0	33
walleye	0	0	17	13	3	83	29	2	0	0	0	0	0	147
white sucker	0	0	0	1	25	2	0	0	0	0	0	0	0	28
yellow bullhead	0	2	3	2	4	0	0	0	0	0	0	0	0	11
yellow perch	172	99	4	0	0	0	0	0	0	0	0	0	0	275

Report a Violation in Progress



To report a violation, call 800-652-9093 24 hours a day, or key in #TIP on your cell phone.

Include important information

All violations reported through our online form will be investigated. Please provide as many details as you can to help the Conservation Officer with the investigation.

- Location: It is especially important to include the county and nearest town to the violation.
- Violator's identity: If you know the identity of the individual(s) committing the violation, please indicate their name(s) on the form.
- Contact information: Indicate on the report form if it is all right for a Conservation Officer to contact you to follow up on the request.

Remain anonymous

If you wish to remain completely anonymous, you must contact TIP by phone.

Stay safe!

Never put yourself in a dangerous position, and never take the law into your own hands.

STATUS OF THE FISHERY

Minnesota Department of Natural Resources

Washington Lake was designated infested with Eurasian water milfoil in 1999. The plant spread prolifically and formed dense mats around the lake, was subject to some herbicidal treatments in subsequent years, and as recently as 2014 and 2016 has been at nearly undetectable levels around the lake. Monitoring efforts for the species continue. In 2015, zebra mussels were discovered in the lake. Lakeshore owners retrieving their docks in the fall of 2016 report that the mussels are increasing as their dock structures were covered in adjoined mussel shells. What impact the filter-feeding organisms will have on the lake's fish populations and food web relationships is unknown. One concern with zebra mussels and increasing water transparency is the idea of thermal-optical habitat area loss. Too much transparency could change the ecology of the lake and resulting habitat conditions could favor species other than walleye, the present primary fisheries management species.

A standard survey was conducted at Washington in 2016 to monitor the lake's fish population. In 2016, a total of 22 species, plus Hybrid Sunfish, were sampled in the gill and trap nets, by spring night-time electrofishing, or with traditional (0.25") shoreline seining. The lake was well mixed on 7/25/16, with oxygen near the surface being 9.1 mg/l, and 7.7 mg/l just off the bottom. Water clarity was poor (2.9 feet) due to an algae bloom. Neascus parasites (black spot), which are common throughout Minnesota, were observed on Northern Pike, Walleye, and Yellow Perch. Gill nets sampled high numbers of Walleye (143) for a catch rate of 9.5/net, which was within the normal range for lakes similar to Washington. The 2012 and 2014 catch rates were similar at 9.5 and 8.3/net, respectively. Catch rates from 1951

to 2016 (n=15), under various stocking regimes, were variable, ranging from 2.2 to 41.2/net with an average of 13.9. The latest stocking regime (2,266,000 fry every other year) was initiated in 1991. Gill net catch rates during this regime (1999, 2001, 2004, 2008, 2012, 2014, and 2016) ranged from 5.8 to 19.0/net with an average of 12.0. In 2016, gill netted Walleye were 9.2 to 25.9 inches long with an average of 16.8. Approximately 78% of the gill net catch was 15 inches or longer, indicating a quality size structure.

In 2016, Walleye were age-1 through age-15 with twelve year classes being represented. In the gill nets, age-1's, 2's, 3's and 5's accounted for 20%, 29%, 26% and 15% of the catch, respectively. The 2015, 2014, 2013, and 2011 year classes would all be ranked as moderate in size. The contribution from non-stocked years (natural reproduction) was 37% of the gill net aged fish, mainly due to the substantial 2014 year class. The contribution from fry stocked years was 63%. It was unknown if that 63% came from the fry stocking, natural reproduction, or some combination of both. Analysis of gill net age data, from 1991 to 2016 (n=8 assessments), indicated that only one strong year class (2006) was produced during a non-stocked year (n=12). Fry stocked years (n=13) produced six strong year classes during that time period. Overall, growth could be categorized at moderate. Gill nets sampled low numbers of Northern Pike (67) for a catch rate of 4.5/net, which was within the normal range for lakes similar to Washington. The 2014 catch rate was similar at 3.5/net. Catch rates from 1951 to 2016 (n=15) were mostly low, ranging from 0.0 to 8.5/net with an average of 3.3. This indicated that recruitment was low (<5/net) most

years at Washington Lake. Northern Pike were 17.4 to 32.2 inches long with an average of 24.4. Approximately 31% of the gill net catch was 26 inches or longer, indicating a size structure with some opportunities for larger fish. Fish were age-1 to age-6 with six age classes being present. Growth was fast in recent years.

Gill nets sampled moderate numbers of Yellow Perch (189) for a catch rate of 12.6/net, which was within the normal range for lakes similar to Washington. Catch rates from 1951 to 2016 (n=15) were highly variable, ranging from 0.2 to 54.7/net with an average of 12.5. Yellow Perch were 5.1 to 9.6 inches long with an average of 6.2. Only four fish were 8 inches or longer, indicating a poor size structure, as far as perch anglers would be concerned. Yellow Perch ages were estimated to be age-2 to age-6 with four year classes present. Age-2 fish accounted for 78% of the gill net sample, indicating consistent recruitment and/or predation. Recent growth could be categorized as moderate.

Trap nets failed to sample any Black Crappie in 2016, as was the case in 2014. These two years produced the lowest catch rates ever recorded since trap netting began in 1951. Trap nets had not sampled good numbers of Black Crappie since 1983 (5.5/net). Catch rates from 1951 to 2016 (n=14) were with an average of 3.7. This likely mostly low, ranging from 0.0 to 22.6/net indicated that trap nets, in early August, often don't do a good job of sampling Black Crappie at Washington Lake. Gill nets sampled moderate numbers of Black Crappie (218) for a catch rate of 14.5/net, which was above the normal range for lakes similar to Washington and the highest ever recorded at Washington.

The 2014 gill net catch rate was the lowest on record (1.2/net). Catch rates from 1957 to 2016 (n=14) were

generally low, ranging from 1.2 to 14.5/net with an average of 5.7. After examining many decades of data, gill nets usually did a better job of sampling Black Crappie than trap nets did. Gill netted Black Crappie were 4.8 to 14.4 inches long with an average of 8.5. Approximately 75 of the gill net catch was 8 inches or longer, while 6% were 11 inches or longer, indicating a decent size structure. Black Crappie were age-1 to age-8 with six year classes present. Age-2 (2014) fish made up 91% of the sample, indicating a strong year class that averaged 8.2 inches in late July, 2016. That year class should be at least 9 inches long by the spring of 2017. Growth was moderate.

Trap nets sampled moderate numbers of Bluegill (331) for a catch rate of 22.1/net which was above the normal range for lakes similar to Washington. The 2014 catch rate was 9.5/net. Catch rates from 1951 to 2016 (n=14) ranged from 0.2 to 23.9/net, with an average of 12.7. In 2016, trap netted Bluegill were 3.4 to 8.2 inches long with an average of 5.2. Approximately 21% of the trap net catch was 6 inches or longer, but only 6% were 7 inches or longer. Gill nets sampled Bluegill up to 9.1 inches in length. Bluegill were age-2 to age-8 with seven year classes present. Age-2 and age-3 fish were well represented accounting for 38% and 53% of the trap netted fish, respectively. Growth was considered moderate. Spring night-time electrofishing, targeting Largemouth Bass, sampled low numbers (16) of fish for a catch rate of 10.7/hr. The 2014 catch rate was similar at 11.6/hr. Historic catch rates (n=9), from 1993 to 2016, were variable, ranging from 8.7 to 40.1/hr. with an average of 16.7. Largemouth Bass were 4.9 to 17.3 inches long with an average of 12.3.

Largemouth Bass were age-1 to age-8 with eight year classes present. Growth was moderate. Electrofishing on Washington may not be as effective as it is on other lakes, due to an

abundance of offshore emergent and submergent vegetation. Anecdotal reports from anglers (especially bass fishing clubs) mention Washington Lake as having a quality Largemouth Bass fishery.

Gill nets sampled moderate numbers of Smallmouth Bass (27) for a catch rate of 1.8/net, which was within the normal range for lakes similar to Washington. The 2014 catch rate was at 2.7/net. Catch rates from 1951 to 2016 (n=15) were mostly low ranging from 0.0 to 2.7/net with an average of 0.7. Relative abundance increased in the 2000's, when compared to the 1950 through 1990's time period. In 2016, gill netted Smallmouth Bass were 8.9 to 19.7 inches long with an average of 15.6. Approximately 67% of the catch was 16 inches or longer, indicating a high quality size structure.

Spring night time electrofishing sampled low numbers (2) of Smallmouth Bass, as is usually the case, for a catch rate of 1.3/hr. The 2014 catch rate was also low (1.7/hr.). Historic spring electrofishing catch rates (n=9) were mostly low, ranging from 0.4 to 9.4/hr. with an average of 3.6. Electrofished Smallmouth Bass were 4.2 and 17.0 inches long. Smallmouth Bass were age-1 to age-9 with seven year classes present. Recruitment was somewhat inconsistent. Gill nets sampled low numbers of Channel Catfish (1) for a catch rate of 0.1/net. This was also the catch rate in 2012 and 2014. The 2016 fish was 17.1 inches long. It was unknown how this fish ended up in Washington Lake, but it likely immigrated up Washington Creek and swam over the outlet dam during a high water event.

Trap nets sampled low numbers of Common Carp (2) for a catch rate of 0.1/net, which was below the normal range for lakes similar to Washington. The 2016 and 2014 catch rates tied the record low from 2008. Historic catch rates (n=14) were variable, ranging

from 0.1 to 15.7/net with an average of 2.2. Trap net catch rates have been below the normal range since the 1979 survey. Trap netted Common Carp were 20.1 and 27.4 inches long. Gill nets sampled 0 Common Carp for a catch rate of 0.0/net which was below the normal range for lakes similar to Washington. Historic gill net catch rates, dating back to 1957, ranged from 0.0 to 1.4/net with an average of 0.5.

Gill nets sampled low numbers of Black Bullhead (39) for a catch rate of 2.6/net, which was below the normal range for lakes similar to Washington. The catch was also low in 2014 (1.8/net). The last time that Black Bullhead were sampled in moderate numbers was in the 2004 assessment (51.2/gill net). Historic catch rates from 1951 through 2016 (n=15) were generally low, ranging from 0.0 to 51.2/net with an average of 7.1. Black Bullhead were 5.0 to 14.9 inches long with an average of 10.4. Black Bullhead were not sampled in trap nets in 2016 or 2014, which tied the record low from 1951. Historic Black Bullhead trap net catch rates have been below the normal range 11 out of 13 times (85%) at Washington Lake.

Additional species sampled in the standard gill and trap nets included; Bowfin, Brown Bullhead, Green Sunfish, Hybrid Sunfish, Pumpkinseed Sunfish, White Sucker, and Yellow Bullhead.

Seining (0.25" mesh) sampled 12 species; Johnny Darter, Banded Killifish, Bluegill, Bluntnose Minnow, Brook Silverside, Hybrid Sunfish, Largemouth Bass, Log Perch, Pumpkinseed Sunfish, Smallmouth Bass, Tadpole Madtom, White Sucker, and Yellow Perch. Young of the year species sampled were; Bluegill (11), Bluntnose Minnow (2), Largemouth Bass (7), Smallmouth Bass (1), White Sucker (1), and Yellow Perch (433).

For More Information

Hutchinson Area Fisheries Supervisor
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5

SHORELINE & WATERSHED MANAGEMENT

Goal

Continue to promote and support efforts by local and state organizations to enhance Lake Washington's shoreline. Encourage the development of improved shoreline management practices. Reduce the quantity of harmful chemicals and silt entering Lake Washington, through active participation with plans to better understand and manage the watershed.

The shoreline and watershed practices have a significant impact on runoff, filtering of waters entering the lake, and lake structural integrity.

Strategies that support this goal:

- Support plans and encourage projects enhancing the lake's natural beauty and provide for stabilization of lakeshore including; potential holding pond locations, other watershed and lake shore improvements.
- Provide in-kind services to encourage the sponsorship of projects by local and state organizations. Provide information about what these projects do and survey stakeholders about their options. Keep lakeshore property owners informed of plans and projects.
- Provide continued education and updates about lake-scaping and shoreline management.
- Provide resources in the way of plans and nurseries providing high quality plants intended for use around the lake.
- Share books, CD's from the DNR, and videos we have or know of.
- Talk to other lake associations that have created Lake Improvement Districts (LID) and how they did it.



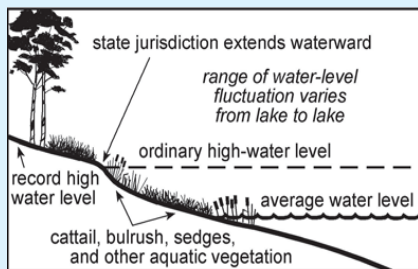
Shoreline Alterations: Riprap



Is an individual permit required?

For most projects constructed *below* the ordinary high-water level* (OHWL) of public waters, an individual Public Waters Work Permit is required by the Minnesota Department of Natural Resources (DNR).

Riprap exception: An individual permit from the DNR is not required for riprap placement if the conditions outlined in this information sheet are followed.



Shoreline cross section.

If you have questions concerning the contents of this information sheet, contact your local DNR Area Hydrologist. See contact information on reverse side.

Please note that local units of government and other agencies may require a permit for this project.

*For lakes and wetlands, the OHWL is the highest elevation that has been maintained as to leave evidence on the landscape. It is commonly that point where the natural vegetation changes from predominantly aquatic to predominantly terrestrial. For watercourses, the OHWL is the top of the bank of the channel. For reservoirs and flowages, the OHWL is the operating elevation of the normal summer pool.

What can I do to keep my shoreline from washing away?

If your shoreline is eroding, any of the following events may be destabilizing your soil, resulting in erosion: fluctuating water levels, increased wave or wake action, ice pushes, loss of natural vegetation, and human activity. Protecting your shoreline from erosion may not require you to replace natural shoreline with a high-cost, highly engineered retaining wall or riprap.

There are affordable, low-impact methods to stabilize your shoreline and still protect property values, water quality, and habitat. The Minnesota Department of Natural Resources (DNR) encourages you to consider planting native vegetation to control shoreline erosion, enhance aesthetic values, and contribute to better water quality in your lake (see Lakescaping information sheet).

Both riprap and retaining walls can reduce erosion, but they can be expensive and negatively affect lakes by creating a barrier between upland areas and the shoreline environment. Riprap should only be used where necessary and never to replace a stable, naturally vegetated shoreline. Additionally, installing riprap on a stream or river bank is a special condition that may require professional advice to ensure that the structure will stand up to the fluctuations in water levels and flowing conditions.

Natural rock riprap consists of coarse stones randomly and loosely placed along the shoreline. You should consult your DNR Area Hydrologist to determine whether your shoreline needs riprap to stop erosion. If there is a demonstrated need, such as on steep slopes, you may want to consider placing riprap or a combination of riprap and vegetation. In most cases, vegetation planted in the rocks will stabilize the riprap and improve the appearance of your shoreline. Naturalizing your shoreline is the most important contribution you can make to enhance water quality, maintain fishery resources, and provide wildlife habitat.

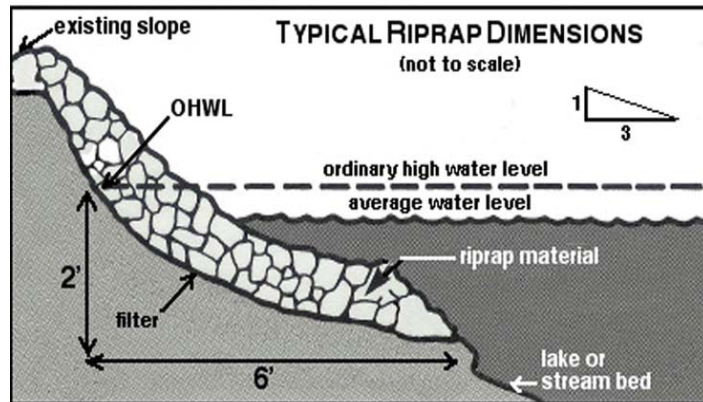


Shoreline stabilized with riprap and enhanced with a vegetative buffer.

Shoreline Alterations: Riprap

Installation of riprap is allowed only where there is a demonstrated need to stop existing erosion or to restore an eroded shoreline. An individual DNR Public Waters Work Permit is *not* required if the installation meets all of the following conditions:

- The riprap must not cover emergent aquatic vegetation, unless authorized by an aquatic plant management permit from the DNR's Division of Fisheries.
- Only natural rock (cannot average less than 6 inches or more than 30 inches in diameter) may be used that is free of debris that may cause pollution or siltation. Concrete is not allowed.
- A filter of crushed rock, gravel, or filter fabric material must be placed underneath the rock.
- The riprap must be no more than 6 feet waterward of the ordinary high-water level (OHWL; see sidebar on page 1).
- The riprap must conform to the natural alignment of shore and must not obstruct navigation or the flow of water.
- The minimum finished slope waterward of the OHWL must be no steeper than 3 to 1 (horizontal to vertical).
- The riprapped area must be no more than 200 linear feet of shoreline along lakes and wetlands or, along shorelines of streams, must be less than five times the average width of the affected watercourse.
- The site must not be a posted fish spawning area, designated trout stream, or along the shore of Lake Superior.



What are some other issues to consider?

A row of boulders at the water's edge is not considered natural rock riprap. Rows of stacked boulders function as a retaining wall, and installation would *require* an individual permit from the DNR. Retaining walls are very damaging to the near-shore environment. Retaining walls cause wave action that scours the lakebed, displacing bottom sediment and creating an extremely sterile environment. The cumulative effect of numerous wall structures on a lake reduces critical habitat for fish and wildlife resources and much of the food chain they depend on. Retaining walls require structural maintenance and are frequently damaged by ice action and undermined by wave action.

Riprap is not maintenance free and does not eliminate ice heaving, but it is easier to return the rocks to their original positions than to repair a wall. Consider planting within the riprap to add color, interest, and diversity. Live cuttings and plant plugs can be planted within riprap to provide additional slope stability and give your shoreline a more natural appearance.

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DNR Contact Information



DNR Ecological and Water Resources website and a listing of Area Hydrologists: <http://mndnr.gov/waters>

DNR Ecological and Water Resources
500 Lafayette Road, Box 32
St. Paul, MN 55155
(651) 259-5100

DNR Information Center

Twin Cities: (651) 296-6157
Minnesota toll free: 1-888-646-6367
Telecommunication device for the deaf (TDD): (651) 296-5484
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This information is available in an alternative format on request.

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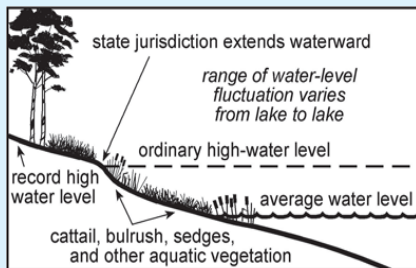
Shoreline Alterations: Ice Ridges



Is an individual permit required?

For most projects constructed *below* the ordinary high-water level* (OHWL) of public waters, an individual Public Waters Work Permit is required from the Minnesota Department of Natural Resources (DNR).

Ice ridges exception: An individual permit from the DNR is not required for the grading or removal of an ice ridge if the conditions outlined on this information sheet are followed.



Shoreline cross section

If you have questions concerning the contents of this information sheet, contact your local DNR Area Hydrologist. See contact information on reverse side.

Please note that local units of government and other agencies may require a permit for this project.

*For lakes and wetlands, the OHWL is the highest elevation that has been maintained as to leave evidence on the landscape. It is commonly that point where the natural vegetation changes from predominantly aquatic to predominantly terrestrial. For watercourses, the OHWL is the top of the bank of the channel. For reservoirs and flowages, the OHWL is the operating elevation of the normal summer pool.

What causes ice ridges and what can I do about them?

Property owners occasionally return to their cabins in the spring only to discover they are dealing with property damage caused by a phenomenon called “ice heaving” or “ice jacking”. This powerful natural force forms a feature along the shoreline known as an “ice ridge”. The result may include significant damage to retaining walls, docks and boat lifts, and sometimes even to the cabin itself.



Ice ridge formed along the shore of Shamineau Lake in Morrison County.

How do ice ridges form? Ice ridges are caused by the pushing action of a lake’s ice sheet against the shore. Cracks form in the ice because of different contraction rates at the top and bottom of the ice sheet. This is especially true in years that the ice sheet lacks an insulating snow cover. Ice cracks also develop because the edges of the ice sheet are sometimes firmly attached to the shore. When water rises in the cracks and freezes, the ice sheet expands slightly. Rising air temperatures warm the ice, leading to additional expansion, which exerts a tremendous thrust against the shore. Alternate warming and cooling of the ice sheet leads to additional pushing action, causing the ice to creep shoreward and scrape, gouge, and push soil and rock into mounds (called “ice ridges”, “ice pushes”, or “ramparts”).

What can be done about ice ridges *after* they form? Because ice ridges do provide ecological benefits (described below), the ideal reaction to the formation of an ice ridge would be to do nothing other than remove personal property from its zone of influence. However, this is often impractical. Ice ridges can impede use of the lake by a property owner or the users of public lakeshore facilities. Therefore, action may be taken to remedy the results of ice activity.

Shoreline Alterations: Ice Ridges

Lake access can be obtained by ramping over or cutting through the ice ridge. There are circumstances, however, when it may be necessary to remove or grade an ice ridge. An individual Public Waters Work Permit is *not* required from the DNR to remove or grade an ice ridge if the work meets the following conditions:

- The ice ridge resulted from ice action within the last year.
- The project is either exempt from local permits or is authorized by issuance of a local government permit.
- Not more than 200 feet of shoreline is affected.
- All ice ridge material that is composed of muck, clay, or organic sediment is deposited and stabilized at an upland site above the ordinary high-water level (OHWL; see sidebar on page 1).
- All ice ridge material that is composed of sand or gravel is removed as provided above or graded to conform to the original cross section and alignment of the lakebed, with a finished surface at or below the OHWL.
- No additional excavation or replacement fill material occurs on the site.
- All exposed areas are immediately stabilized as needed to prevent erosion and sedimentation (see Lakescaping information sheet).
- Local zoning officials, the watershed district (if applicable) and the soil and water conservation district are given at least 7 days' notice before beginning the project.

Removal or grading of an ice ridge must not disturb emergent aquatic vegetation, unless authorized by an aquatic plant management permit from the DNR's Division of Fisheries.

What can be done about ice ridges *before* they form? The simplest means of avoiding ice-related damage to shoreline property is to ensure that personal property is out of wrath's path. State and local shoreland regulations requiring setback limits not only lead to improved aesthetics but also help to minimize personal property damage from ice action and wave-induced erosion. Engineering solutions are sometimes pursued to remedy ice ridge problems, but they can be expensive and ineffective. If an engineering solution is pursued, property owners should seek the advice of a professional.

What are the benefits of ice ridges? Ice ridges are natural berms that have formed around Minnesota's lakes over thousands of years. These mounds of material provide the lake with ecological benefits by creating a barrier to nutrient loading. Nutrients collect on the landward side of the mound, producing fertile soil where plants and trees thrive. The root systems of this near-shore plant community help to protect the shore from erosion and soak up additional nutrients. Shade and habitat offered by near-shore plants benefit organisms along the shore and in the lake, thus supporting nesting and spawning fish.

Ice ridges also work to protect the shore from the lake itself. For example, a small ice ridge formed one year is followed by additional pushes in ensuing years. The ridge is fortified by jamming rocks into it. The roots of the near-shore plant community bind together the soil and rock to form natural shoreline protection.

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DNR Contact Information



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Shoreline Alterations: Natural Buffers and Lakescaping

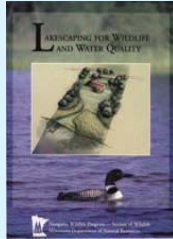


Where can I find additional information?

Book and Online Resources

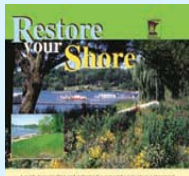
Lakescaping for Wildlife and Water Quality

(C.L. Henderson, C.J. Dindorf, F.J. Rozumalski, 1999, Department of Natural Resources*) is a book showing techniques to prevent shoreline erosion and restore wildlife habitat, wildflowers, and clean water.



Restore Your Shore

(2002, Department of Natural Resources) is a sequel to the lakescaping book. This on-line tool presents ideas to use in protecting and restoring natural shorelands. Visit the *Restore Your Shore* website at: mndnr.gov/restoreyourshore



Score Your Shore is a tool for landowners to evaluate the habitat on their developed lake lots. Visit the *Score Your Shore* website at: mndnr.gov/scoreyourshore

Information about native plants and suppliers is available through the DNR, University of Minnesota Extension Service, and Wild Ones:

- mndnr.gov/gardens/nativeplants/suppliers.html
- extension.umn.edu/distribution/horticulture/DG7447.html
- extension.umn.edu/shoreland
- wildones.org/landscap

Technical assistance is available from local watershed districts and soil and water conservation districts:

- bwsr.state.mn.us/directories

*Available through Minnesota's Bookstore: minnesotasbookstore.com

What can I do to create a more natural shoreline?

A natural shoreline is a complex ecosystem that sustains fish and wildlife and protects the entire lake. Native vegetation along the shore acts as a buffer zone, intercepting nutrients and reducing runoff, erosion, and sedimentation. Aquatic plants provide food and shelter for ducks, songbirds, and other animals while reducing problems caused by Canada geese and burrowing muskrats. Plants growing in and near the water are critical for wildlife and fish habitat and a healthy lakeshore. Tall plants like bulrush, lake sedge, and cattail can reduce the energy of wave action to minimize erosion and help maintain water quality.

Creation of a buffer zone is the essence of the lakescaping concept. A buffer zone is an unmowed strip of native vegetation that extends both lakeward and landward from the water's edge. A buffer zone that extends 25-50 feet from shore is preferable, but even 10-15 feet provides benefits. Installing a buffer zone can restore many functions critical to the health of the lake that may have been eliminated previously by sod, hard structures, or mowing. Planting grasses and flowering plants that are native to your area will diversify and enhance your shoreline and provide a seasonal show of color.



A buffer zone of vegetation provides a natural appearance to your shoreline and protects wildlife habitat, water quality, and fish.

Creating and maintaining natural buffer zones along the shore does not mean your property has to look unkempt. Buffers and upland islands of trees, shrubs, and flowers can bring natural beauty to your yard. Additionally, tall native plants typically have deep root systems. They will slow erosion, decrease ice damage, increase rain infiltration, and act as a barrier to discourage geese from walking on your shoreline property.

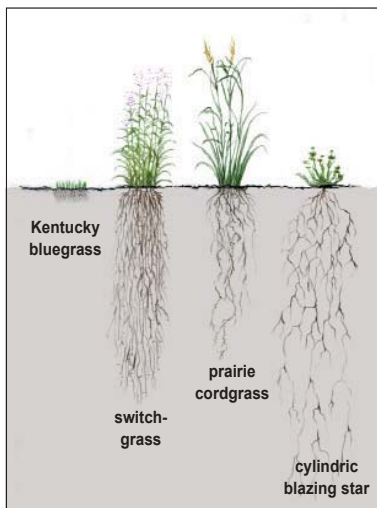
Your shoreline is part of a larger community and ecosystem. Individual choices by many have cumulative impacts on a lake and its ecosystem. Your actions can restore or degrade the quality of the ecosystem. Restoring your lakeshore to a more natural condition is important, even if your neighbors are not restoring theirs, because it can help wildlife habitat, water quality, and fish.

Shoreline Alterations: Natural Buffers and Lakescaping

Lakescaping and Erosion Control

Vegetation is extremely important for controlling erosion. Native trees, shrubs, and grasses dissipate the energy of raindrops, slow the water, and allow it to infiltrate the soil. The DNR and your county soil and water conservation district can help you select the right plants for your project. Listed below are some other erosion-control recommendations.

- Prevent erosion. Preventing erosion by maintaining native vegetation is less costly than fixing an eroded area. Think “root systems.” Native plants typically have greater rooting depth and root density. For example, the roots of the little bluestem (*Schizachyrium scoparium*) are about 2-3 feet long and have a great capacity to hold soil. In contrast, the roots of lawn grass are only 2-3 inches long.
- Identify and address the cause of erosion. Causes may include excessive foot traffic on fragile soils, vegetation clearing (both upland and in the lake), yard waste on the bank that kills vegetation, wave action from boat traffic and prevailing winds (especially when water is high), ice heaves, overland runoff down slopes, stairways that channel water, and runoff from impervious surfaces.
- Choose erosion-control methods that are “light” on the landscape. For example, use biodegradable erosion control materials that contain biodegradable netting, not photodegradable plastic netting which can trap wildlife. If wave action is eroding the bottom (toe) of the bank, consider reinforcing only the toe of the bank and planting native vegetation on the remainder.
- Plant aquatic vegetation. In-lake vegetation can help prevent erosion. Native aquatic vegetation disperses wave energy, anchors soil, limits ice heaves, and provides excellent fish and wildlife habitat.



The picture contrasts the shallow (2-3 inches) roots of Kentucky bluegrass to the deep (3-5 feet) and dense roots of native grasses. The root systems of native grasses may be effective for preventing erosion.



Contrast the eroded shoreline lacking vegetation (foreground) with the well-vegetated, uneroded shoreline in the distance.

Lakescaping Design Factors to Consider

Look around your lake and note how nature works to minimize erosion on healthy, more natural shorelines. What types of wildflowers, grasses, trees, and shrubs do you see in your area? Then determine how much of your lakeshore to naturalize, keeping in mind how much you need for lake access, swimming areas, docks, and dock storage areas. Talk to your neighbors, share ideas, and coordinate efforts to increase habitat and natural shorelines. Natural shorelines are gaining acceptance as people understand the important role shorelines play in protecting their lake and a diverse ecosystem. Many lake associations are developing demonstration projects on area lakes.

Steps for Creating a Buffer Zone

Describe your shoreline area, including the following elements:

- Natural features, including existing vegetation and woody debris, fish and wildlife use, and opportunities for links to neighboring habitat;
 - Removal of structures or construction debris, such as retaining walls or concrete, respectively;
 - Location of the house, views, trees, pathways or stairways, docks, and swimming areas;
 - Sun, including amount and number of hours of direct sunlight;
 - Topography, including ice ridges and slopes (facing directions and steepness);
 - Soil characteristics, including type, drainage, texture, and fertility;
 - Water, such as natural seeps, wet areas during high water, drainage, wave action, and runoff; and
 - Fetch (miles of open water/waves), prevailing winds and ice push.
- These elements will help determine what types of erosion control measures (biologs, brush bundles, erosion control fabric) might be needed in order to get vegetation established on the site.

Shoreline Alterations: Natural Buffers and Lakescaping

Think about your preferences. How will the site be used (viewing, swimming, boating, fishing)? What kinds of native trees, shrubs, flowers, and grasses do you like? Consider their color, height, and appearances at different times of the year. The type of vegetation you select may affect the shoreline's ability to withstand erosion.

Develop a design and management plan based on your lakeshore and preferences. Consult references such as the *Lakescaping for Wildlife and Water Quality* book or the on-line program *Restore Your Shore* (see front page) for assistance on designing your restoration project. You can also look at the DNR Fisheries lake surveys for information. Visit nearby natural areas or other shorelines to get ideas. Obtain any necessary permits from your local unit of government or the DNR. Be realistic about the size of your shoreline project. Start small, if necessary, and add to it in phases.



Planting

Identify the areas for planting native vegetation and prepare the site for planting. It may be necessary to control non-native, invasive species and turf grass first. Upland plants should be spaced from 1 foot to 3 feet apart; trees and shrubs should be 6 feet to 14 feet apart. If you decide to use an erosion-control blanket, the supplier can help you determine which type to use. After installing the blanket, simply cut a hole in it for each plant. As an alternative to the blanket, mulch could be used to control erosion, retain moisture, and suppress weeds.

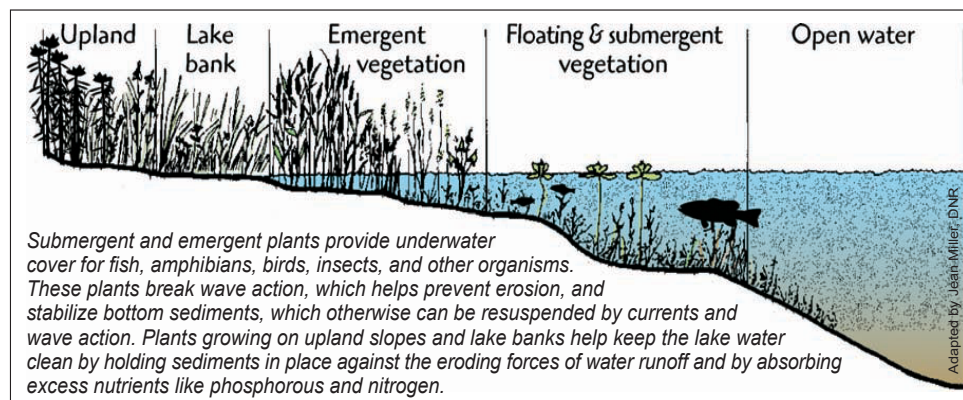


(TOP) Lakefront of home on Lake Marion, Dakota County. (BOTTOM) Closer view of the same lakefront after revegetation.

If you add aquatic plants, a temporary barrier in the water may be needed to protect new plants until they are established. For guidance on aquatic plantings, please refer to the *Restore Your Shore* on-line program or your local Soil and Water Conservation District.

Maintenance

Your new plantings require some maintenance in the first few years as they become established. Provide from 1 inch to 2 inches of water per week the first season and during dry periods in the second season. Weeding during the first few years helps the plants become established and gives them an edge. Replace vegetation that did not survive by replanting species that were most successful at your site. By the third year, watering is no longer necessary, but you should continue to remove weeds.



Shoreline Alterations: Natural Buffers and Lakescaping



(ABOVE) In 2000, start of restoration along Lake Phalen in St. Paul. (RIGHT) View of the same site in 2002.



photos by Bill Bartodziej

Permit Requirements

For most projects constructed *below* the ordinary high-water level* (OHWL) of public waters as determined by the DNR, an individual Public Waters Work Permit is required, but an individual permit is not required for planting buffer zones. Collecting, transplanting, spraying, or removing aquatic vegetation below the OHWL, however, may require a permit from the DNR Fisheries Aquatic Plant Management (APM) Program. Please go to: mndnr.gov/shorelandmgmt/apg/regulations.html for more information on APM Permits.

If you have questions concerning the contents of this information sheet, contact your local DNR Area Hydrologist. Other governmental units (federal, state, city, county, township, and watershed authority) may require a permit for that portion of the project within their jurisdiction, which usually involves work above the OHWL. It is advisable to contact them.

*For lakes and wetlands, the OHWL is the highest elevation that has been maintained as to leave evidence on the landscape. It is commonly that point where the natural vegetation changes from predominantly aquatic to predominantly terrestrial. For watercourses, the OHWL is the top of the bank of the channel. For reservoirs and flowages, the OHWL is the operating elevation of the normal summer pool.

Summary

Maintaining a healthy lake is far less costly than trying to fix a degraded one. If you are fortunate enough to have a natural shoreline, maintain or enhance it as a buffer zone and minimize erosion on the areas used for access or recreation. If your property lacks natural areas, plant native vegetation or let areas grow naturally. You will be surprised at the aesthetic appeal, as well as the energy and time you save, of helping your lake help itself.



DNR Contact Information



DNR Ecological and Water Resources website and a listing of Area Hydrologists: mndnr.gov/contact/ewr.html
DNR Ecological and Water Resources
500 Lafayette Road, Box 32
St. Paul, MN 55155
(651) 259-5100

DNR Shoreland Habitat Coordinator in St. Paul:
500 Lafayette Road, Box 12, St. Paul, MN 55155, (651) 259-5212

DNR Information Center

Twin Cities: (651) 296-6157
Minnesota toll free: 1-888-646-6367
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This information is available in an alternative format on request.

Shoreline Alterations: Beach Blanket



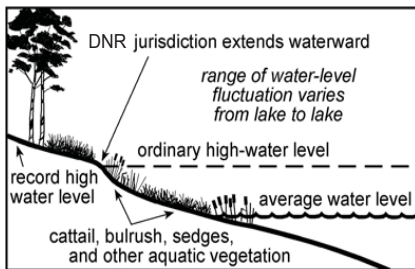
Will a sand beach work on my shoreline?

IS AN INDIVIDUAL PERMIT REQUIRED?

For most projects constructed *below* the ordinary high-water level* (OHWL) of public waters as determined by the Minnesota Department of Natural Resources (DNR), an individual permit is required from the DNR.

Beach blanket exception: An individual permit from the DNR is not required for beach sand or gravel placement if the conditions outlined in this information sheet are followed.

If you have questions concerning the contents of this information sheet, contact your local DNR Area Hydrologist. See contact information on reverse side.



Shoreline cross section

ARE OTHER PERMITS REQUIRED?

Other governmental units (federal, state, city, county, township, and watershed authority) may require a permit for that portion of the project within their jurisdiction, which usually involves work above the OHWL. It is advisable to contact them.

*For lakes and wetlands, the OHWL is the highest elevation that has been maintained as to leave evidence on the landscape. It is commonly that point where the natural vegetation changes from predominantly aquatic to predominantly terrestrial. For watercourses, the OHWL is the top of the bank of the channel. For reservoirs and flowages, the OHWL is the operating elevation of the normal summer pool.

One goal of DNR Ecological and Waters Resources is to limit unnecessary and potentially damaging alterations to shorelines. Specifically, use of beach sand and other types of fill is limited in order to prevent damage to fish spawning areas, aquatic habitat, and water quality of Minnesota's lakes.

Although natural sand beaches can be found on many Minnesota lake-shores, landowners often attempt to create them on shores where they do not naturally occur (i.e., a muddy-bottom lake). If you are considering adding a beach blanket, you should know a few important things before investing your money.

- Beach material that erodes into the lake may coat aquatic plant beds and fish spawning grounds, degrading fish and wildlife habitat and damaging the water quality of your lake.
- Beach material must be clean and washed free of fine particles and must be of the appropriate grain size (coarse sand or larger) to stay in place under wave action. Placed material that migrates from your site may constitute a violation of water quality standards. To further minimize the risk of your beach migrating away from the site, maintain aquatic vegetation on both sides of your beach, like in the diagram on page two.
- The lakebed must be capable of holding beach material in place. If the lake bottom is soft, the sand or gravel will only sink into the muck and disappear.
- You are only allowed to install sand or gravel twice in the same location without a permit.
- Vegetation will constantly emerge through the beach material, and additional plant control will be needed on the beach. If you plan to weed by hand or apply herbicide, an aquatic plant management permit may be required from the DNR Division of Fisheries.
- Beach blankets may not be placed over emergent vegetation such as bulrush or cattails unless you obtain a permit from the Division of Fisheries.

Keep in mind that you are *not* allowed to install any plant barrier or liner (e.g., filter fabric or plastic) underneath your constructed beach. If owning lakeshore property with a sandy beach is a high priority for you, look for lakeshore property where sandy beaches occur naturally before you make that important purchase.



Beach blanket at shoreline.

Shoreline Alterations: Beach Blanket

If you have considered all of the conditions above and you think adding beach sand or gravel will work for your shoreline, you may install a beach blanket without an individual permit if the installation meets all of the following conditions:

- The sand or gravel layer may be up to 6 inches thick; up to 50 feet wide along the shoreline or one-half the width of the lot, whichever is less; and up to 10 feet waterward of the ordinary high-water level (OHWL; see sidebar on page 1).
- The beach blanket does not cover emergent aquatic vegetation, unless authorized by an aquatic plant management permit (contact your local DNR Fisheries office).
- The sand or gravel is clean and washed so that it is free of fine particles.
- Local watershed district and local zoning officials are given at least 7 days' notice by the landowner.
- No plant barrier or liner (i.e., filter fabric or plastic) is installed underneath your beach sand.

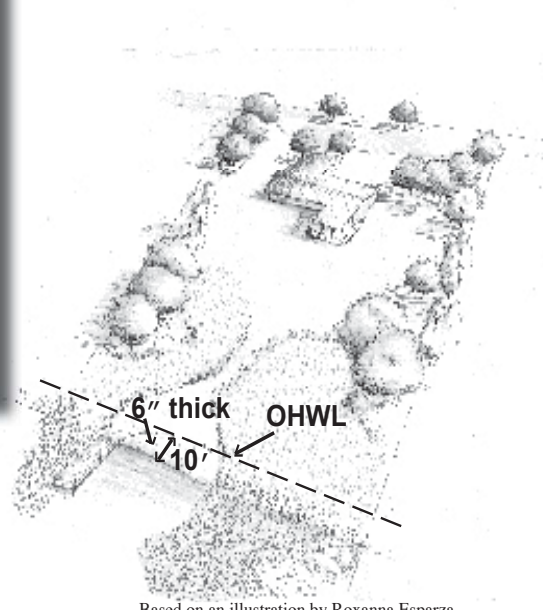
Installation of sand and gravel may be repeated *once* at the same location but may not exceed the amount of sand and dimensions of the original sand blanket.

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Another example of a beach blanket is pictured above.

The plan view of a diagram (right) shows dimensions of a beach blanket surrounded by vegetation with a path to the sand area.



Based on an illustration by Roxanna Esparza.

DNR Contact Information



DNR Ecological and Water Resources
website and a listing of Area Hydrologists:
<http://mndnr.gov/contact/ewr.html>

DNR Ecological and Water Resources
500 Lafayette Road, Box 32
St. Paul, MN 55155
(651) 259-5100

For information about aquatic plant management permits:
<http://mndnr.gov/shorelandmgmt/apg/regulations.html>

DNR Information Center

Twin Cities: (651) 296-6157
Minnesota toll free: 1-888-646-6367
Telecommunication device for the deaf (TDD): (651) 296-5484
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This information is available in an alternative format on request.

Docks and Access in Public Waters



Do I need a permit for my dock?*

No permit is needed to install, construct, or reconstruct your dock on shoreline property you own if you comply with the following:

- A dock is a narrow platform or structure extending toward the water from the shoreline. A dock may provide access to moored watercraft or deeper water for swimming, fishing, and other recreation.
- The structure, other than a watercraft lift or watercraft canopy, is **not more than 8 feet wide** and is not combined with other similar structures so as to create a larger structure.
- The dock is no longer than needed to achieve its intended use, including reaching navigable water depth.
- The structure is not a hazard to navigation, health, or safety.
- The structure will allow the free flow of water beneath it.
- The structure is not used or intended as a marina.
- The structure is consistent with the guidelines of the local unit of government.
- Docks placed on rock-filled cribs are located only on waters where the bed is predominantly bedrock.

Restrictions on docks and other structures

You may not place a dock or other structure in public waters if the structure:

- obstructs navigation or creates a hazard;
- is detrimental to fish or wildlife habitat or is placed in a posted fish spawning area;
- is intended to be used for human habitation;
- includes walls, a roof, or sewage facilities; or
- is located on property you do not own or have rights to use.

If you have questions concerning the contents of this brochure, contact your DNR Area Hydrologist. See contact information on reverse side.

**Based on Minnesota Rules, Chapter 6115.0210 and 6115.0211.*

What you should know about docks and other water access structures

Docks and watercraft lifts are commonly used access structures on Minnesota lakes and rivers. If you own waterfront property, a temporary structure that provides access to a lake or river is preferred to a permanent structure. Permanent structures are more likely to sustain ice damage, and a snow-covered structure over the ice poses a hazard to recreational vehicle users.



The blue box to the left lists installation guidelines for docks and access structures like boat lifts. These guidelines are intended to minimize impacts on water resources and shoreline habitat. If you follow these guidelines, no permit is needed from the Department of Natural Resources (DNR). Local units of government may have additional dock rules related to public safety and other local issues and should be contacted.

A shoreline owner may request a permit to install a dock wider than 8 feet. The permit applicant must show a specific need and show that the wider dock represents the minimal impact solution to that need. Docks serving single-family homes or residential planned unit developments generally will not need a dock wider than 8 feet. Public docks and mooring structures that are otherwise not serving as a marina may need to be a wider structure and will be reviewed individually. Docks that have no permit and that exceed the 8-foot-wide limit are subject to enforcement action, including a citation, an order to remove the dock, and fines for both the landowner and the dock installer.

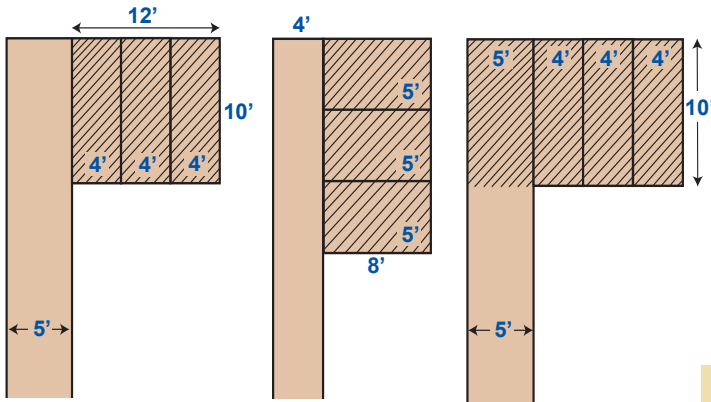
Design and locate your dock and boat lift to avoid interfering with your neighbor's use of the water. Docks and boat lifts should be placed so that mooring and maneuvering of watercraft can normally be confined within the property lines if they were extended into the water.

General Permit 2008-0401

A general permit was issued in 2008 to allow a modest platform at the lake end of a dock under certain conditions. This general permit allows a single, temporary platform up to 120 square feet measured separately from the access dock, or 170 square feet including the area of the adjacent access dock, if the following conditions exist: the access dock must be 5 feet or less in width and the dock must be on a lake with a shoreland classification of General Development or Recreational Development. See typical dock configurations on the next page. Refer to General Permit 2008-0401 at: http://www.dnr.state.mn.us/waters/watermgmt_section/pwpermits/docks.html for more details.

Docks and Access in Public Waters

Authorized by General Permit 2008-0401



Platform area (not including walkway) up to 120 square feet.

Platform area (including walkway) up to 170 square feet.

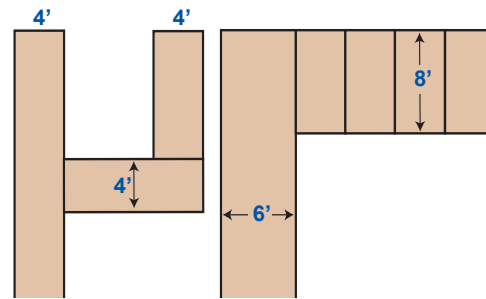
Purpose of the dock rules

Intensive shoreland development causes deterioration of a lake's ecosystem. Dock installations and their associated uses are factors in this deterioration. Studies of lakes in the Midwest show that docks and boat lifts may shade out important aquatic plants and eliminate critical habitat where fish spawn, feed, grow, and find shelter from predators. Shoreline views may also suffer when large dock systems are installed. Also, there is a growing concern about the private use of the water surface if docks and associated structures extend too far, cover too much surface area, or span the entire owned frontage. The proliferation of dock configurations and dimensions is a concern to the DNR, lake associations, anglers, lakehome owners, and others. Finding the appropriate balance between reasonable access and resource protection requires collaboration by all interests.

Another issue of concern is any attempt to control access to a lake bed or water surface. Even when land ownership extends into the lake bed, all who own land abutting the water or gain legal access have the right to use the entire surface of the water. For this reason, a dock configuration should never close off part of the lake to other users.

If the dock is designed and used for access to navigable water depth, a DNR permit will rarely be needed. A dock does not need a permit if it is no more than 8 feet wide, is designed to simply meet the need of reaching navigable depths, and follows the other guidelines on the front of this brochure.

No Permit Required



No area of the dock is wider than 8 feet.

If buying, selling or moving a dock from one body of water to another, owners should make sure all zebra mussels, vegetation or other invasive species are removed and let dry for a minimum of 3 weeks before placing in another water. When using a business to place or remove your dock, make sure that they have a valid Lake Service Provider permit and the staff have an aquatic invasive species training certificate. For more information see: mndnr.gov/invasives



The removal or destruction of aquatic plants is a regulated activity under the DNR Aquatic Plant Management Program. If your shoreline plans include removal of aquatic vegetation, please contact a regional DNR Fisheries office because a permit may be required. Removal of native plants may provide open space for invasive species to take hold.

DNR Contact Information



DNR Ecological and Water Resources website and a listing of Area Hydrologists: mndnr.gov/contact/ewr.html
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Water Laws in Minnesota



Questions and Answers about Minnesota Water Laws

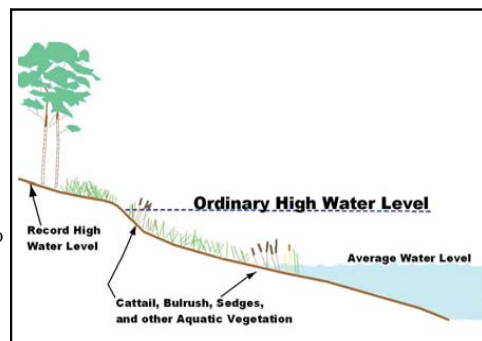
Basic Water Laws

Who owns the bed of a lake, marsh, or watercourse?

When a waterbasin or watercourse is *navigable* under the federal test, the State of Minnesota owns the bed below the natural ordinary low water level [see Minnesota Statute 84-032; *Lamprey v. State*, 52 Minn. 1981, 53 N.W. 1139 (1983) and *United States v. Holt State Bank*, 270 U.S. 49 (1926)]. The federal test used for navigability is “when they are used, or are susceptible of being used, in their natural and ordinary condition, as highways for commerce, over which trade or travel are or may be conducted.” [See *State v. Longyear Holding Co.*, 224 Minn. 451, 29 N.W. 2d 657 (1947).] If a court has found that a lake is non-navigable and meandered, the shoreland owners own the bed of the lake in severalty. [See *Schmidt v. Marsobel*, 211 Minn. 543, 2d 121 (1942).] If a stream is non-navigable but has been meandered, the shoreland owners own to the thread (centerline) of the stream. If a lake or stream is non-navigable and not meandered, ownership of the bed is as indicated on individual property deeds.

What is the ordinary high water level?

The ordinary high water level is an elevation that marks a regulatory boundary of a Public Water lake, wetland, or stream. It is the highest level at which the water has remained long enough to leave its mark upon the landscape. [See *Lake Minnetonka Improvement*, 56 Minn. 513, 58 N.W. 295 (1894), and Minnesota Statutes, Section 103G.005, subd. 14.] Generally, for basins, it is the point where the natural vegetation changes from predominantly aquatic to predominantly terrestrial. On streams and rivers, it is the top of the bank of the channel.



What are riparian rights?

Riparian rights are property rights arising from owning property abutting water. They include the right to wharf out to a navigable depth; to take water for domestic and agricultural purposes; to use land added by accretion or exposed by reliction; to take ice; to fish, boat, hunt, swim; and to such other uses as water bodies are normally put [see *Sanborn v. People's Ice Co.*, 82 Minn. 43, 84 N.W. 641 (1900) and *Lamprey v. State*, 52 Minn. 181, 53 N.W. 1139 (1893)]. The riparian owner has the right to use the water over its entire surface [see *Johnson v. Seifert*, 257 Minn. 159, 100 N.W. 2d 689 (1960)].

What are riparian duties?

It is the duty of the riparian owners to exercise their rights reasonably, so as not to unreasonably harm the ecosystem nor interfere with the riparian rights of others [see *Petraborg v. Zontelli*, 217 Minn. 536, 15 N.W. 2d 174 (1944)]. They cannot dike off and drain, or fence off, their part of the waterbody [see *Johnson v. Seifert*, 257 Minn. 159, 100 N.W. 2d 689 (1960)]. It is a public nuisance and a misdemeanor to “interfere with, obstruct, or render dangerous for passage waters used by the public” [see Public Nuisance Law, Minnesota Statutes 609.74].

What are public rights?

Where the public is a riparian landowner, such as where there is a public access site, the public has riparian rights. [See *Flynn v. Beisel*, 257 Minn. 531, 102 N.W. 2d 284 (1960).]

What is considered trespassing when the public seeks access to a water body?

The belief that the state owns a strip of land around all Minnesota lakes for public use is false. Riparian property (property abutting a lake, river, or wetland) is either privately or publicly owned. The general public can access water bodies or watercourses via public property, but not through private property. Individuals entering private property without permission from the landowner are trespassing and may be prosecuted under the state trespass laws. A person who has legally gained access to a water body may use its entire surface for recreation, such as boating, swimming, or fishing; and any “incidental use” of the bed or bottom, such as anchoring a boat or decoys, wading to fish or swim, and poling a boat, is allowed.

Water Laws in Minnesota

Regulation and Water Use

What are waters of the state?

Waters of the state are *any* surface waters or underground waters, except those surface waters that are not confined but are spread and diffused over the land [see Minnesota Statutes, Section 103G.005, subd. 17]. This includes *all* lakes, ponds, wetlands, rivers, streams, ditches, springs, and waters from underground aquifers regardless of their size or location.

When is a DNR permit needed to appropriate or use water?

A water appropriation permit from the Minnesota Department of Natural Resources (DNR) is needed to appropriate or use waters of the state for any use that exceeds 10,000 gallons in any one day or 1,000,000 gallons in a year except for domestic use serving less than 25 persons. [See Minnesota Statutes, Section 103A.201 and Section 103G.271, subd. 1, and Minnesota Rules, Part 6115.0600.]

What priorities are set for water use?

If there is not enough water for everyone, Minnesota law sets general priorities for which users can appropriate waters of the state. [See Minnesota Statutes, Section 103G.261.] These priorities, from highest priority to lowest priority, are as follows:

1. Domestic water supplies and power producers who have DNR-approved contingency plans
2. Uses of water consuming less than 10,000 gallons per day
3. Agricultural irrigation and processing of agricultural products (consuming in excess of 10,000 gallons per day)
4. Power production, without approved contingency plans
5. Other uses that consume over 10,000 gallons per day
6. Nonessential uses of water



What are the limitations on the use of ground water?

DNR is responsible for protecting ground water supplies and has authority to establish water appropriation limits through its water use permitting program. Applications for water appropriation proposals must show that the use will be sustainable now and into the future; and that the proposed use will not harm ecosystems, degrade water quality, or reduce water levels beyond the reach of public water supply and private domestic wells. [See Minnesota Statutes, Section 103G.287.]

What are the limitations on the use of surface water?

Minnesota law sets water use limits for waterbasins and watercourses and discourages taking water from waterbasins of less than 500 acres. [See Minnesota Statutes, Section 103G.285 and 103G.261.] On any waterbasin, the total of all withdrawals cannot be more than one-half acre-foot per acre per year (6 inches of water taken off the surface of the waterbasin). The DNR also establishes minimum *protection elevations* for waterbasins and *protected flows* for watercourses. Surface water withdrawals within a watershed may be suspended when water levels fall below minimum protection levels at indicator sites. *[See Minnesota Statutes, Section 103G.285, subs. 2 and 3.]

Regulation of Public Waters and Public Waters Wetlands

What are public waters and public waters wetlands?

Public waters are all waterbasins, wetlands, and watercourses that meet the criteria set forth in Minnesota Statutes, Section 103G.005, subd. 15, and are designated on the DNR's public waters inventory maps. *Public waters wetlands* include all type 3, 4, and 5 wetlands (as defined in U.S. Fish and Wildlife Service Circular No. 39, 1971 ed.) that, at the time of designation, were 10 or more acres in rural areas and 2½ or more acres within cities and are designated on the DNR's public waters inventory. [See Minnesota Statutes, Section 103G.005, subd. 18.]

Water Laws in Minnesota

When is a DNR permit needed?

A DNR *public waters work permit* may be needed to do any work that will change or diminish the course, current, or cross section of any lake, wetland, or watercourse that is designated as a public water or *public waters wetland* on the DNR's public waters inventory maps. Any work done below the ordinary high water level of public waters or public waters wetlands may require a permit. Examples of such work include draining; filling; dredging; channelizing; constructing dams, harbors, or permanent offshore structures; and placement of bridges and culverts. [See Minnesota Statutes, Section 103G.245, subd. 1, and Minnesota Rules, Part 6115.0150.] Certain projects are exempt from needing a permit provided they are done in accordance with conditions spelled out in Minnesota Rule (Part 6115).

What is the Public Waters Inventory (PWI)?

This is a map prepared by the DNR showing all public waters and public waters wetlands for each county in the State. [See Minnesota Statutes, Section 103G.201.] These maps are available for viewing on the DNR web site (mndnr.gov/waters/watermgmt_section/pwi/maps.html). The DNR is in the process of converting the original paper and scanned PWI maps to more accurate GIS-based maps. Until the GIS-based maps are completed for every county, the paper maps will continue to be available from the Minnesota Bookstore located at 660 Olive Street, St. Paul, MN 55155, telephone 651-297-3000 (metro area) or 1-800-657-3757 (statewide). The GIS-based maps available on the website should be used where available as they more accurately depict the basin and stream locations and they contain corrections to errors discovered on the original paper maps.

Is the state's regulation of public waters and public waters wetlands constitutional?

The Minnesota Supreme Court has held that DNR's inventory of public waters and public waters wetlands, and the DNR's regulation of work that changes the course, current, or cross section of public waters and public water wetlands are clearly constitutional. [See *State v. Kulwar*, 266 Minn. 408, 418, 123 N.W. 2d 699, 706-707 (1963); *State v. Olsen*, 275 N.W. 2d 585 (Minn. 1979); and Minnesota Supreme Court file number C5-86-332, decided on December 24, 1987.]

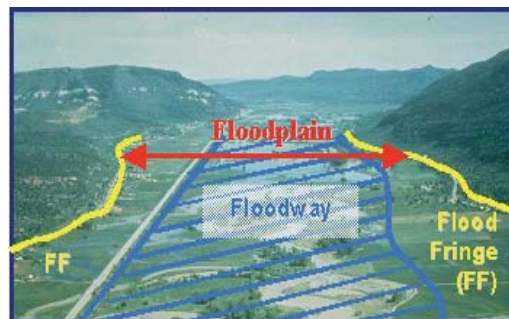
Regulation of Lands Adjoining Public Waters

What types of Land Use Regulations do we have in Minnesota?

Land use regulations guide development and land management activity on lands adjacent to public waters through city and county zoning ordinances. These regulations seek the wise development of shoreland areas to preserve their economic and natural environmental values and to protect surface water quality. Most of Minnesota's water-related land use regulations are authorized in Minnesota Statutes, Chapter 103F. These land use regulations generally fall into two categories: floodplain and shoreland. Floodplain regulations work to minimize damage to property and human life. Shoreland regulations work to maintain the ecological and hydrological services of shoreland areas, and to protect the wild, scenic and recreational values of designated river segments. Minnesota's floodplain regulations address the Federal Emergency Management Agency (FEMA) floodplain and flood insurance requirements, as well as Minnesota standards. Minnesota has a variety of shoreland programs covering different bodies of water, including select rivers and river segments. The DNR establishes the minimum statewide standards and criteria for all floodplain and shoreland programs, and local governments implement the programs through land use ordinances. Always check with your local zoning authority for specific ordinance requirements.

What is floodplain zoning?

Floodplain zoning ordinances apply to the land around lakes, rivers, and streams inundated by the 100-year flood (the flood having a 1-percent chance of being equaled or exceeded in any single year). This land is known as the floodplain and is divided into two zones. Local ordinances specify the uses and construction activity permitted in each zone. The floodway is that part of the floodplain where floodwaters are likely to be deepest and fastest. This area needs to be kept free of obstructions to allow floodwaters to move downstream. The area of the floodplain outside the floodway is called the flood fringe. Development is generally allowed in the flood fringe, but it must be placed on fill or floodproofed high enough to keep it dry during a 100-year flood. The emphasis of the program is to minimize flood damage by promoting nonstructural remedies instead of construction of costly levees, dikes, or dams. [See Minnesota Statutes, Section 103F.101-103F.155, and Minnesota Rules, Parts 6120.5000-6120.6200.]



Water Laws in Minnesota

How do the shoreland regulations apply to local zoning?



Minnesota's shoreland programs originated in the 1970s with public concern over poor shoreland development in general and with specific high valued rivers in particular. All programs described here are implemented through local government zoning ordinances. Zoning provisions typically include minimum lot size and width, structure height, structure and septic system setbacks from the water, bluff and vegetation protections, stormwater management, and impervious surface limits. Following is a brief description of the shoreland management regulations in Minnesota.

Shorelands

This regulatory program covers land adjacent to most public waters in Minnesota. Shoreland protection is extended to land within 1,000 feet of the ordinary high water level of a lake, pond, or flowage, and within 300 feet of a river or stream or to the landward extent of a designated floodplain on a river or stream, if it is wider than 300 feet. Waterbodies vary greatly in their size, depth, use and type of habit and are classified to reflect these characteristics. Minimum lot size and width and structure and septic system setbacks vary depending on the waterbody classification. These dimensional standards are intended to manage development impacts appropriate to the waterbody classification. Eighty-five Minnesota counties and about 160 cities have shoreland ordinances. Many of these communities are also covered by other program regulations (description of these other programs follows). In some cases performance standards for the different programs may overlap and conflict. In these situations, the stricter standard applies. [See Minnesota Statutes, Section 103F.201-103F.227, and Minnesota Rules, Parts 6120.2500-6120.3900.]

Wild and Scenic Rivers

This program applies to all or portions of seven rivers including the St. Croix (the only federal-designated river), the Mississippi, the Kettle, the Minnesota, the Rum, the Cannon, and the North Fork of the Crow. The boundary generally follows a land survey line or road and includes areas that are visible from the river. Locally administered ordinance standards vary for each river and are based on the management plan specific to each river and river classification. Segments of these rivers are classified as wild, scenic, or recreational. Note that the river management plans have been promulgated into Minnesota State Rules pertaining to each river. [See Minnesota Statutes, Section 103F.301-103F.345, and Minnesota Rules, Parts 6105.0010-6105.1700.]

Mississippi River Critical Area

The Mississippi River Critical Area includes designated land adjacent to the 72-mile section of the Mississippi River that runs through the 7-county metro area. This area was originally designated in 1976, and the designation was extended in 1979 by Executive Order 79-19 and made permanent by resolution of the Metropolitan Council in Minnesota Statute 116G. The Critical Area boundary coincides with the boundary of the Mississippi National River and Recreation Area, a unit of the National Park Service. All cities containing land within the boundary are required to develop a management plan and adopt zoning ordinances that implement the plan. The DNR and the Metropolitan Council review and approve community land use plans and ordinances. [See Minnesota Statutes, Section 116G.15 and Minnesota Rules, Parts 4410.8100-4410.9910.]

Other River-Related Land Use Regulations

A number of river segments are protected through local management plans and regulations that are jointly administered by local governments. These include:

Upper Mississippi River Headwaters: The upper 400 miles of the Mississippi River and seven headwater lakes are covered by land use regulations developed by the Mississippi Headwaters Board (MHB) in its management plan. All of the eight counties from the headwaters to Little Falls have adopted zoning ordinances that implement land use standards of the MHB. The district includes land within 500 feet of the river for the scenic portion of the river and 1000 feet of the river for the wild portion of the river. Land use applications are reviewed and approved by the county and then sent to the MHB for final review and certification. [See Minnesota Statutes, Section 103F.361-103F.377 and <http://www.mississippiheadwaters.org/>]

Minnesota River: Shoreland along the Minnesota River between the City of Franklin in Renville County and the City of Le Sueur in Le Sueur County is protected by the zoning ordinances of Renville, Redwood, Brown, Nicollet, Blue Earth, and Le Sueur counties. These ordinances implement the policies developed in the 1981 Project Riverbend Comprehensive Plan. [See Minnesota Statutes, Section 103F.381-103F.393.]

DNR Contact Information



DNR website and a listing of Area Hydrologists: mndnr.gov/contact/ewr.html

DNR Ecological and Water Resources
500 Lafayette Road, Box 32
St. Paul, MN 55155
(651) 259-5700

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STABILIZING YOUR SHORELINE TO PREVENT EROSION

Shoreland Best Management Practices (BMP's)

Recognizing Erosion Problems

With more shoreline than California, Florida, and Hawaii combined, Minnesota is bound to have areas where shoreland erosion is a problem. It is obvious that wave-pounded properties lose soil and ultimately their value. What is not as obvious is that this erosion process can be accelerated or slowed by the practices you adopt, and that sediment going into the lake or river is a pollutant. Erosion is a natural process and, therefore, some sediment does end up in surface water. Clearing shoreland vegetation and beach rocks, and increasing runoff to the shore will accelerate shoreland erosion.

Bluff Stabilization

Increased runoff is especially detrimental to high bluffs (Figure 1). Slumping of waterfront bluffs results from unstable soil, usually because surface or ground water is reaching the bluff. On lakes, waves can erode supporting soil at the bottom of the bluff and cause slumping. Along river bluffs, river currents may erode the supporting soil.

Figure 1: Factors that can make bluffs unstable.

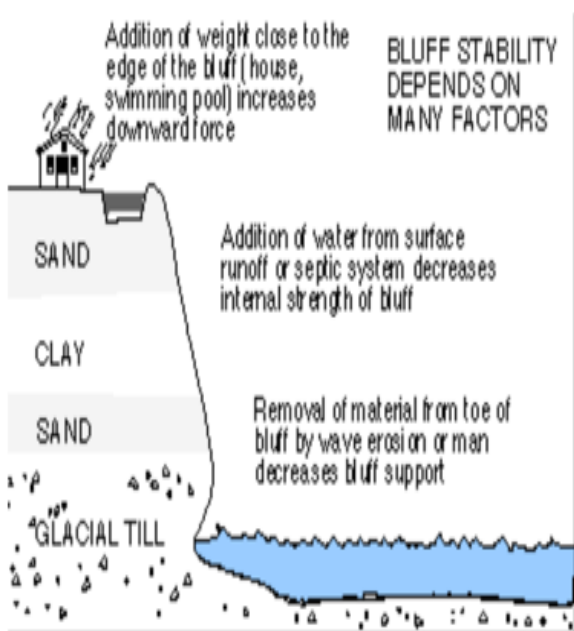


Figure 1: Factors that can make bluffs unstable.



Best Management Practices

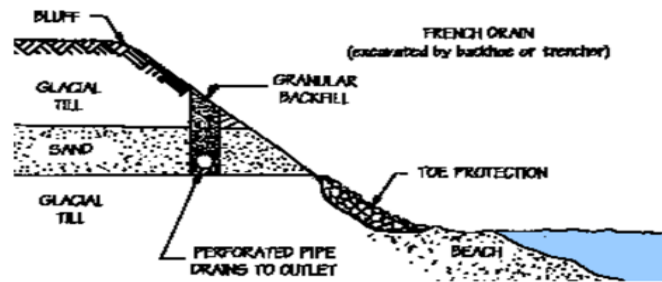
Erosion of higher shoreline bluff areas can be prevented by:

- Retaining moisture-absorbing vegetation on the bluff.
- Outletting rain gutters and diverting surface runoff away from the bluff.
- Reducing runoff rate toward the bluff.
- Minimizing paved areas that increase runoff.
- Limiting ground water flow toward the bluff.
- Installing septic systems and drainfields away from the bluff.
- Avoiding additional weight on the bluff edge, such as pools, buildings, or storage sheds.

On property with steep slopes or bluffs, reducing the amount of water reaching the bluff will help with stabilization. If diverting water away from the bluff is impractical, it should be routed through a non-perforated plastic drain pipe that outlets at the very bottom of the bluff. Rock should be placed around the outlet to prevent erosion at the bottom of the drain. Surface water and some ground water can be intercepted before it reaches the bluff by installing a "French drain"(Figure 2).

Figure 2:

French drains intercept surface water and increase soil stability. Deeper drains will intercept more ground water, but shallower drains are effective also & may cause less disturbance on the bluff. The maximum depth for French drains is 15 to 20 feet.

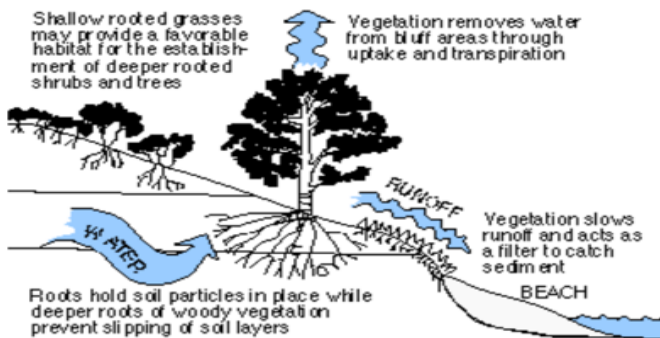


A French drain is a narrow trench set back from, but parallel to, the top of the bluff and filled with free-draining sand or gravel. A perforated, corrugated plastic pipe at the bottom collects water and should drain away from the bluff. The entire perforated length of pipe must be wrapped with fabric or a filter sock. Installing deeper drains will intercept more ground water and provide better protection for the bluff

No additional weight such as a building, garage slab, or vehicle should be placed near the top of the bluff. Septic systems and swimming pools are especially inappropriate near the top of a bluff because they add weight and water.

For most property that slopes toward water, leaving the natural shoreland undisturbed is often the best and least expensive protection against erosion. A filter strip of thriving vegetation on and near the shore binds the soil and minimizes soil loss from surface runoff and waves, and from use by people (Figure 3). Existing vegetation can be enhanced by planting woody or aquatic plants.

Figure 3: Well-established vegetation on the shore stabilizes soil and helps remove water.



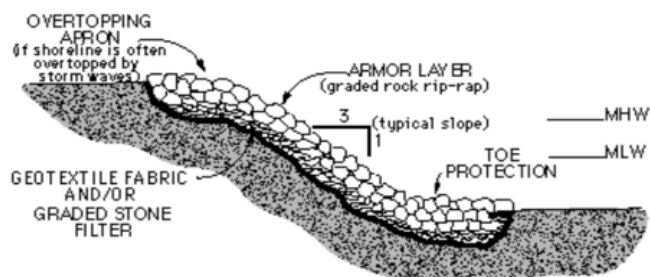
Natural shoreline features provide natural protection. While swimmers may not enjoy walking on cobblestones, and an ice-pushed ridge may block some of the view from your lawn chair, these features help "nourish" your beach by reducing erosion and trapping sand. Even driftwood absorbs a certain amount of wave energy that otherwise erodes soil.

Shore Protection

Regardless of the natural protection on your shore, the right combination of conditions (such as high lake level and wind direction) can result in a severe wave pounding, and shoreland soil may need additional protection.

Placement of large rock, usually referred to as rip-rap, is the preferred and most common form of shore protection (see Figure 4). Technical methods are available to determine rock size, placement geometry, and elevations to ensure the best protection. Your county Soil and Water Conservation District (SWCD), the MN Board of Water and Soil Resources (BWSR), and the federal Natural Resources Conservation Service (NRCS) can provide technical assistance.

Figure 4: Proper rip-rap placement (MHW=mean high water, MLW=mean low water).



A few of the alternatives can be placed by hand. Some other alternatives, such as railroad ties, are often tried but rarely work. If you have your own idea for a solution, you should seek technical advice first.

If rip-rap is used, crushed or blasted rock locks together better than rounded boulders, but can be very expensive unless it is readily available.

Geotextile fabric is usually placed beneath the rock rip-rap to prevent soil loss through the rip-rap openings. It is easy to place and provides an excellent filter barrier (Figure 4). In order to prevent punctures, plenty of slack should be provided over protruding objects that cannot be removed.

A layer of sand or fine gravel can be placed on the fabric for extra protection against puncture. Enough fabric should be laid out so that the rip-rap periphery can be "wrapped" by bringing the fabric up and back down into the rip-rap. This will help hold the rip-rap together as one structural unit. Keep in mind that sunlight will degrade exposed fabric. As an alternative to the fabric, a graded filter layer can be used beneath rip-rap to prevent soil loss through the rip-rap openings.

Sufficient rock must be placed at the base of the rip-rap for toe protection. Excavated toe material must be removed from the lakebed and placed in a non-wetland area.

Costs

The price of rip-rap placement depends on local contractors, distance to the nearest rock source, and access to the project site. It also depends on how much other work, such as clearing or earthwork, is required. Inquire at the county SWCD office about cost-share assistance. A project cost can also be estimated by calling earthwork contractors in your area. A big savings can be realized if you can install these items yourself. If you want to stabilize a slumping bluff, find out about soil types and ground water level. The record from when your well was drilled may be a good information source and can be obtained from the state or county health department or from your well driller. Contact your county SWCD for information on soils. Effective bluff stabilization will require technical assistance. Request an engineer from the BWSR, SWCD, or NRCS to inspect your site, or consider hiring a geotechnical engineering firm to take soil borings, analyze soil properties, and recommend a remedy.

Regulations that Apply

All erosion protection projects that alter the lake- or riverbed require a protected waters permit from the Department of Natural Resources (DNR). Contact the DNR Area Hydrologist for permit guidelines, which other agencies might require a permit, and for assistance in planning your erosion prevention project. Some rip-rap projects may not need a permit. For those projects requiring a permit, the fee is \$75 (1996). Permit fees for projects other than rip-rap are a minimum of \$75 (1996).

MINIMIZING RUNOFF FROM SHORELINE PROPERTY

Shoreland Best Management Practices (BMP's)

Why is Runoff a Problem?

When an area is developed or altered, the way water flows is also changed. As land surfaces are covered with roads, driveways, or impervious surfaces (rooftops, decks, sidewalks, and parking lots), less water can seep into the soil, so runoff increases. This increased runoff is usually channeled into ditches, drainage ways, storm sewers, or road gutters and often ends up in nearby lakes and streams. High flows of water can cause flooding or erosion, as well as increasing sediment in streams and lakes. Fine sediment can also transport nutrients such as nitrate or phosphorus, and pollutants such as sands or salts from icy roads. All of these processes have an adverse effect on water quality.

Preventing Runoff

Planning ahead is the first and most important step in preventing or minimizing erosion due to runoff. An easy way to do this is to pretend that you are a raindrop. In looking at the landscape or any impervious surfaces, which route would you travel?

Obviously, you would want to take the easiest path downhill. Keeping that in mind, note any areas that runoff would choose to travel. Evaluate your property before you begin your landscape design. Consider slope, soil type, and existing vegetation as you plan your development.

IDENTIFYING PROBLEMS CAUSED BY RUNOFF

Problem	Possible Cause
Is the water near shore cloudy?	Excess sediment reaching water
Is there an oily rainbow film on the water?	Possible petroleum contamination
Are there algal blooms, green scum, or abundant plant growth in the water?	Excess nutrients such as nitrate or phosphorus reaching the water
Are washouts, trenches, small piles of sediment, leaves, or debris found at the bottom of slopes?	Excessive runoff across the property



Best Management Practices

Follow these long-term BMPs to minimize runoff and prevent erosion:

- Limit paved and covered areas that prevent water from seeping into the ground. Invest in permanent stabilization practices for long-term protection of your shoreland property by planting new vegetation, installing erosion control structures, and diverting drainage.
- Retain trees and shrubs; trees provide a natural umbrella by shedding water and can reduce runoff by as much as 50%.
- Plan and complete an annual maintenance schedule to make sure that your runoff and erosion control plan is working to protect your property.
- Limit clearing and grading on slopes and minimize cutting and filling for roads, sidewalks, and footpaths to reduce erosion and still provide access.
- Avoid damaging adjacent property with temporary erosion control methods, because water does not stop flowing at your property line.

Drainage Ways

- Use existing natural drainage systems such as valleys or low areas instead of digging new ditches.
- Design culverts and drainage structures to handle excessive amounts of runoff; assistance is available from your county Soil and Water Conservation District (SWCD) or the Natural Resources Conservation Service (NRCS).
- Protect storm sewers from sedimentation so they are able to carry storm water as intended.

Roads, Driveways, and Sidewalks

Minimize pavements and impervious surfaces.

- Use gravel driveways instead of pavement.
- Where paved areas are necessary, locate them as close to the main road as possible to minimize the length of paved driveway.
- Do not pave wasted space such as corners near buildings that are not large enough for parking or driving. Locate driveways, sidewalks, stairways, and footpaths away from slopes because steeper slopes have greater erosion potential; if you must cross a hillside, follow the contour of the slope.
- Use steps when a walkway must go directly up and down a slope, particularly near the waterfront.
- Minimize road crossings over waterways and cross at a right angle to the stream if possible. Sweep driveways or sidewalks instead of washing them down with a hose, to prevent sediment, salt, and petroleum products from washing into storm sewers; cover stockpiles of salt and sand with a tarp or store in a building.
- Use shallow grassed areas by roadsides instead of curb and gutter runoff and storage for snow.
- Install water bars on sloping roadways to slow and divert runoff.
- Use paving stones instead of solid concrete for walkways; this allows water to seep around the stones instead of running off.
- Avoid shortcutting down slopes because shortcutting causes erosion; compacted soil on footpaths also promotes excessive runoff.

Landscaping and Construction

- When landscaping, stage construction so one area is stabilized before another area is disturbed. Avoid construction in areas with: --little vegetative cover; preserve existing cover --erodible soils (sands, or soils that appear fluffy when dry) --mainly bedrock with a thin covering of soil --steep slopes of greater than 10%; to picture a 10% slope, imagine putting the bottom end of a board 10 feet out from the wall and the top end at 1 foot up the wall; this is a 10% slope (see Figure 1)

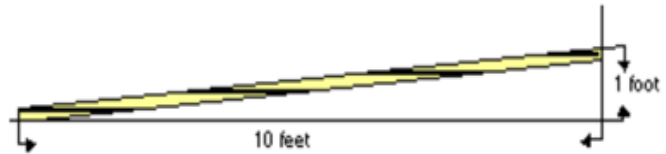
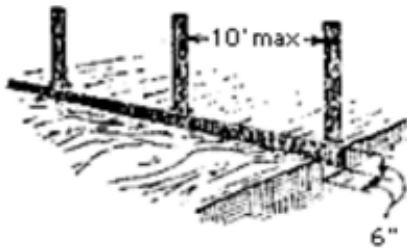


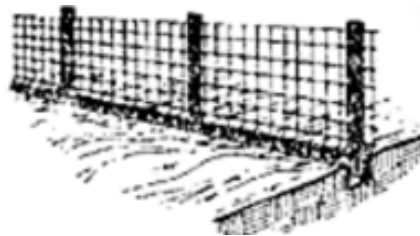
Figure 1: A 10% slope is represented by leaning a board against the wall with the top at 1 foot and the base set 10 feet away from the wall.

- Control erosion during construction by using temporary methods such as diversions to carry water away from the construction site to where it can be safely dispersed or silt fences or hay bales to trap sediments before they enter the water; a combination of methods may be the best solution (see Figures 2 and 3).
- Use only clean fill (free from debris and dirt) such as rock, sand, or gravel near lakes and streams. Use only solid concrete forms such as interlocking blocks or slabs; do not use liquid concrete and avoid treated timbers or railroad ties.

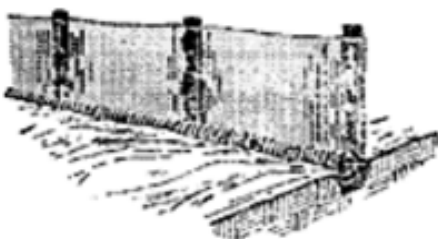
1. Set posts and excavate a 6"x6" trench upslope along the line of posts.



2. Staple wire fencing to the posts.



3. Attach the filter fabric to the wire fence and extend it into the trench.



4. Backfill and compact the excavated soil.

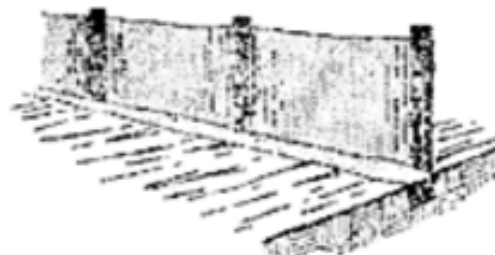


Figure 2: Constructing a silt fence to slow runoff and prevent erosion

1. Excavate the trench.



2. Place and stake straw bales.



3. Wedge loose straw between bales.



4. Backfill & compact the excavated soil.



Figure 3: Constructing a straw bale barrier to slow runoff and prevent erosion

Buildings and Runoff

- Install rain gutters along the edge of rooftops to help carry water off of the roof and away from the building to areas where soil won't be eroded; make sure there is erosion protection where the gutters outlet onto soil.
- Keep gutters free from debris and draining properly. Keep rooftops free of snow and ice buildup to help control the magnitude of runoff in the spring and protect your roof from damage.
- Pave patios with flagstones or decay-resistant wood blocks instead of solid material to permit some water to seep around the stones or blocks.
- Position rooftops so they are perpendicular to the slope, instead of parallel, to slow down runoff (Figure 4).

Figure 4: Build rooflines perpendicular to slopes roofline perpendicular to slope slows down runoff



roofline parallel to slope increases potential for runoff damage



Regulations that Apply

Most zoning ordinances restrict the amount of impermeable surface allowed in the shoreland area; check with your local zoning officials for more information. Alteration or filling of wetlands is strictly regulated; check with your county Soil and Water Conservation District before beginning any projects that impact wetlands. For any development along waterways or lakeshores, contact the Department of Natural Resources, Division of Waters for any necessary permits.

CARING FOR SHORELAND LAWNS & GARDEN

Shoreland Best Management Practices (BMP's)

Why Are Lawns and Gardens a Potential Problem?

Lawns and gardens near shorelands must be carefully planned and maintained to prevent possible contamination of surface waters. Native vegetation should be considered as a quality alternative to cultured lawns and landscapes.

Landscapes will revert to a native state if no maintenance is performed; planting native vegetation will hasten the process. Establishment of new lawns must conform to Shoreland Management Regulations, which prohibit excessive removal of vegetation near the shore and on slopes and bluffs. Check with your local zoning authority for specific regulations governing the body of water.

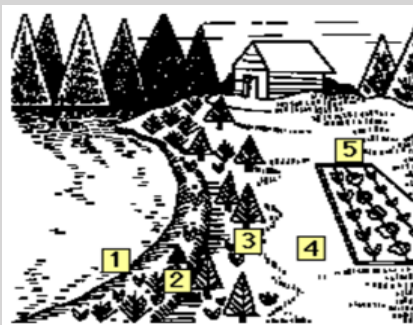
Existing lawns & gardens must be maintained in a manner that prevents possible contamination of ground and surface waters. Before beginning any practice, stop and think about potential risks to water quality. Shoreland owners must be aware of potential problems caused by soil erosion, and pollution due to chemical amendments & organic yard waste. Special attention must be paid if the following conditions exist:

- There are areas of exposed soil--flower beds, vegetable gardens, or poorly established vegetation.
- Soils have a coarse texture, such as sands or sandy loams.
- The property slopes toward surface water.
- There are impervious surfaces, such as sidewalks and driveways.
- Lawn or landscape maintenance is being done close to the surface water.
- Fertilizers, pesticides, or soil amendments are being applied.

Avoid or minimize the use of chemical fertilizers and pesticides.

A well-designed landscape plan includes:

- Natural vegetation along water's edge
- An intact ice ridge or added berm
- A natural vegetation filter strip
- Well-established grass or ground cover
- A level garden set back from waterfront



Preventing Soil Erosion

Surface waters can be contaminated by soil particles that are washed or blown into the water. In addition to the problem of sediment, soil particles can carry phosphorus, which is a potential pollutant, into the water. To avoid this problem:

- Maintain a vigorous growing zone of grass, trees, & shrubs next to surface waters.
- Minimize areas of exposed soil by maintaining native vegetation or dense turf preserve ice ridges or construct an earth berm near the shore to minimize the possibility of runoff; the berm, which is a small mound of earth, should run parallel to the shore to prevent runoff into surface water.

Preventing Potential Problems from Fertilizers

If possible avoid the use of chemical fertilizers. Native vegetation does not require the application of additional fertilizer. Use caution if applying fertilizers to lawns and adhere to the following guidelines:

- Have your soil tested to determine how much fertilizer is needed and minimize the use of chemical fertilizers; soil test sample bags are available through the county offices of the University of Minnesota Extension Service.
- Use compost or manure; this is preferable to chemical fertilizer. However, these also have the potential to damage water quality if used in excessive amounts.
- If chemical fertilizers are used, select slow-release (water insoluble) forms; see recommendations for fertilizing on next page.
- Water your lawn after fertilizing, but do not allow excess water to run off into surface waters.
- Sweep up any fertilizer spilled on hard surfaces such as walks and driveways, instead of washing it off.
- Use extra caution when applying fertilizer near surface waters; do not spread fertilizer within 75 feet of surface waters or wetlands; use a "drop" spreader and not a "cyclone" spreader to minimize the possibility of getting fertilizer directly into the water.
- Never apply fertilizers to frozen ground.
- Leave a natural vegetation filter strip of grass, trees, and/or shrubs next to the shoreline; another option would be to construct a berm directly into the water along the shore.

Preventing Potential Problems from Pesticides

If possible avoid the use of chemical pesticides. Consult a professional from the University of Minnesota Extension Service or Soil and Water Conservation District to determine if the use of a pesticide is justified.

The following practices will minimize the potential of contamination from pesticides:

- Properly identify whether the pest is an insect, disease, or other problem.
- Determine if there is an economic or aesthetic justification for initiating control of the pest. Consider control options other than the use of a chemical pesticide; biological controls and pest-resistant plant varieties are becoming more available.
- Use the least toxic and most readily degradable pesticide that will be effective.
- Read the pesticide label carefully and pay special attention to safety precautions and warnings about use near water.
- Do not apply pesticides when it is windy to avoid the possibility of drift.
- When purchasing pesticides, buy only what is needed to control the problem during the current season.
- Waste pesticides should be disposed of properly. Never pour excess pesticides on the ground, into surface waters, or into sanitary treatment systems; consult with your county solid waste office, the Minnesota Pollution Control Agency, or your sanitary district for proper methods of collection and disposal.



Best Management Practices for Lawns

The establishment of new lawns must conform to Shoreland Management Regulations. Natural vegetation cannot be excessively removed from the "Shore Impact Zone," generally a distance of 50 to 100 feet from the surface water, depending upon the county, and lake or river classification. Removal of vegetation from slopes and bluffs is also regulated. Check with your local zoning authority for specific regulations.

ESTABLISHING NEW TURF

- If permitted by regulation, a grass lawn can be established with either sod or seed.
- Sod should always be used if there is a slope and the danger of soil erosion exists. Seeding is effective if runoff is not a problem and if the seedbed can be kept moist. Bluegrass seed requires three weeks to establish, and if the seed bed dries out during this time, the seedlings may die.
- When seeding, preparation of a good seedbed is necessary for success. Seed-soil contact is essential. Select seed varieties that are suitable for full sun or partial shade.

MAINTAINING ESTABLISHED TURF

Fertilizing

For dense growth, grass requires the addition of some form of nitrogen fertilizer. Nitrogen is a very mobile nutrient and attention must be paid to application rates and timing to eliminate the possibility of water contamination. Do not apply more than 1 lb. of actual nitrogen per 1,000 square feet of lawn per year. If soils are sandy or grass is sparse, 1/2 lb. of nitrogen per 1,000 square feet per application is appropriate. (The analysis of fertilizers is a percentage by weight. For example, a 34-0-0 fertilizer is 34% nitrogen by weight; 3 lb. of fertilizer contains 1 lb. of actual nitrogen.)

- Low-maintenance lawns will grow well with one application of fertilizer per year (1 lb. of actual nitrogen per 1,000 square feet). The best time of year to apply this fertilizer is in the early fall, during the month of September.
- The use of slow-release nitrogen is desirable. This may be some form of organic fertilizer or "synthetic" slow-release form.
- Never apply fertilizer to frozen ground or on snow.
- Use extreme caution when applying fertilizers near water. Never allow any fertilizer to enter surface water or wetlands.
- Always sweep up any fertilizer that is on hard surfaces and reapply to the grass. Never wash it off.
- Apply commercial fertilizers just before moderate rain or irrigate immediately after application

Watering

- Bluegrass lawns generally do not require watering. They will become dormant during the dry part of the summer, but will revive when it rains.
- If quality growth is desired, bluegrass lawns will require additional water during dry summer months. Water deeply, but infrequently. Sandy soils require 1 or 2 inches of water per week. Clay soils require 1 inch of water per week.
- Water in the early morning to prevent water loss due to evaporation and to minimize the potential for disease.

Mowing

- Mow regularly and leave the clippings on the grass. By leaving the clippings on the lawn, nutrients are naturally recycled to the grass plants.
- Never allow grass clippings to enter the water. Clippings and other organic material contain nutrients that may contaminate the water.



Best Management Practices for Gardens

Flower and vegetable gardens can add to the quality of life for shoreland owners. Certain precautions must be taken to prevent the possibility of surface water contamination.

LOCATION:Gardens should not be located on slopes because they can promote accelerated soil erosion and runoff. An alternative on slopes is to install a terraced garden. Dense turf or other vegetation should be established on slopes.

- Gardens should not be located on septic system drainfields or mounds. Exposed soil increases the possibility of septic systems freezing. Drainfields and mounds should be covered with dense turf.
- To minimize the area of exposed soil, use intensive growing techniques such as inter-cropping, succession planting, and raised beds.

SOIL FERTILITY MANAGEMENT:

- Excessive application of fertilizers has the potential for ground and surface water contamination. This can be avoided by the following practices: Test the soil to determine nutrient needs; apply only the recommended amounts of nutrient; soil test bags and forms are available at the county offices of the University of Minnesota Extension Service.
- Make split applications of the total amount of nutrient required; this would include "side-dressing" nitrogen-loving crops, such as sweet corn, vine crops, and the cabbage family.
- Use organic fertilizers if available and practical; these include well-rotted manures and compost.

PEST MANAGEMENT: Use pesticides only if necessary and if there are no other options for pest control. Always read the pesticide label and pay careful attention to warnings on the potential for surface water contamination.

VEGETABLE WASTES: Vegetable wastes, such as corn husks, pea pods, or other plant material, should never be deposited in the water. Compost these materials instead and apply to garden soil.

YARD WASTE DISPOSAL: Yard waste, including leaves, grass clippings, fruit and vegetable wastes, and woody materials, should never be allowed to enter the water. These materials contain phosphorus and may contribute to degradation of surface water quality. Collect and compost yard waste. Compost provides an excellent material for amending flower and vegetable gardens. Information on composting is available from your county office of the University of Minnesota Extension Service or the County Solid Waste office.

CONSERVING WATER

Why Is Conserving Water Important?

Reducing our use of water will decrease water pollution, increase energy savings, and create more efficient use of our water resources. Too much water in an on-site sewage treatment system can flush untreated material through before organisms have a chance to break it down. If untreated material gets to the drain-field, the material can plug up the soil within the drain-field and shorten the life of the septic system. Sending too much water down the drain can also cause systems to "blow out," allowing untreated material to flow out onto the ground. If this occurs, the system needs to be dug up and repaired. Failing septic systems can:

- contaminate drinking wells
- cause health risks such as hepatitis or dysentery
- cause chemical pollution from household cleaning products
- contribute excess nutrients to ground water, lakes, or streams

Conserving water in rural areas will increase the life of existing septic systems. Conserving water within a municipal water system will reduce household expenses, increase treatment plant efficiency, and reduce the amount of electricity and chemicals needed to treat wastewater. In both situations, conserving water protects water quality through improved wastewater treatment.

Saving Water Saves Energy and Money

By conserving water, you will save money. Using a low-flow showerhead will annually save you an estimated \$10 per person in waterheating savings alone. Savings can be realized from water and wastewater service fees, electric city bills, and longevity of your pumps and switches. The largest savings in the rural setting is your septic system performance and longevity.

MAINTAINING SHORELAND VEGETATION

Why Are Shoreland Trees Important?

Trees and shrubs are an excellent inexpensive and attractive way to control runoff and erosion. Roots hold soil and help stabilize slopes by trapping and using precipitation that would otherwise run off. They also increase soil porosity, allowing water to infiltrate rather than run off. Vegetation helps protect water quality by filtering out nutrients and pesticides that could otherwise reach a lake or stream and cause algal blooms or excessive plant growth. Trees and shrubs also improve air quality by taking in carbon dioxide and giving off oxygen. In addition, trees provide shade and help moderate weather extremes such as hot sun or strong winds. Trees and shrubs offer habitat for wildlife and privacy for humans by screening adjacent property.



Best Management Practices

- Rake dead leaves and brush away from the water; compost vegetation in a sturdy structure away from the shoreline.
- Never dump leaves or vegetative debris into a lake or stream because this releases nutrients and organic acids into the water.
- Avoid burning on the beach or near shore because the remaining ash is highly alkaline and may change the pH of the lake and promote growth of undesirable plants.
- Use lake water for irrigating trees, shrubs, and lawns; lake water usually can supply nutrients your near-shore vegetation needs to promote healthy growth.
- Use chemicals responsibly and only the required amount.



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BRIEF HISTORY OF LWIA

1977	Concerns for a petition to stop the construction of a dam between Lake Washington and Lake Stella and the prevention of Dutch elm disease. The DNR stocked 322,560 walleye and 2,650 pounds of bullheads were removed from the lake. An entertainment night was held at Sportsman's Park. The treasury held \$225.84. President: Norm Ostrovak.
1978	Demonstrations of CRP and making a life jacket from a pair of pants were given at the annual meeting by Don Holgrem and Jill Scott. David Underhill and Larry Osborne put on a water ski show.
1979	Members look into marking the dangerous rocks in the lake, treating weeds with copper sulfate, and decided not to invite Lake Stella residents to join the Association. The treasury held \$303.56. President Marlyn Berquist.
1980	Concerns were illegal fishing at the north dam, wake control and water quality. Annual steak fries were being held at the Anderson's on the north side of the lake. The treasury held \$407.63.
1981	The DNR was asked to mark dangerous rocks, perhaps a sign of low water levels. Only two meetings were held. President: Shirley George.
1982	Yearly dues were \$3.00 The treasury held \$347.46.
1983	Only 35 members attended the spring picnic. Russ Debb presented a demonstration on taxidermy. President: Morris Anderson.
1984	Concerns were weeds and more weeds. The Ecology Services division of the DNR visited the lake and made recommendations for weed control and swimmers itch control. 119 members attended the August Steak Fry. The treasury held \$508.00. President: Peter Olfelt.
1985	Water transparency readings and MN Pollution Control Agency' Citizen Monitoring program began. No old or new business at the August steak fry so it was declared the shortest meeting in history. The treasury held \$434.78. President: Harry Bengston.
1986	The Crow River Band played music for the August steak fry. The concerns were cormorants, high utility rates, and lake weeds. Only 30 members attended the spring meeting and there were discussions of abandoning this function. Annual dues were raised to \$5.00. The treasury held \$197.55
1987	A committee was formed to study information about a Lake Washington Watershed District to help control pollution. A limnologist was consulted and it was decided to form a district by petitioning the State Water Resource Board. The county would not help clean up the water unless the Association became more powerful, and peer pressure was the only recourse left to members. The committee began preliminary work.

1988	<p>By-laws were written for the Lake Washington Improvement Association (LWIA). 84 adults attended the spring meeting. The new membership committee mailed out 400 letters to potential members, and left the treasury with \$182.96. The watershed committee reported; to form a district, the association must become larger and stronger, \$3000 was needed to begin work, and 50% membership roster out of 400 eligible. The Board began monthly meetings and it was voted to ask each member to donate \$20 to start a lake clean-up fund. The membership committee distributed info packets to all lakeshore owners. By fall, the association had 151 members signed, \$1300 for the lake study, and \$665 in special donations. A consulting firm gave its report on the lake study, which included water-sampling program, identification of sources of pollution and zoning ordinances. The cost of hiring the firm was beyond the Associations' means. Steve Knapp was elected president, Chris Ullom, vice president and Peg Hampe secretary.</p>
1989	<p>The 1st directory of lakeshore owners was published, with advertising paying the cost. Dues were raised to \$20 per member in hopes of obtaining a lake study project. The board sent a letter to Meeker County Commissioners protesting a plan for a bait house and boat rental variance on Lake Washington and Stella. Signs warning of Eurasian Milfoil were posted at each public landing. It was suggested that water testing go forward without further funding. Fund raising was discussed and sweat and tee shirts were made available for sale. 13 members attended the fall steak fry and the balance on hand was \$2737.45. A Certificate of Deposit for \$2000. Treasury balance \$218.04.</p>
1990	<p>Spring newsletters were sent out, informing the lakeshore owners of the progress made on water quality issues and a general call for participation. Preliminary water quality testing was done by a lakeshore volunteer. The Association joined the Meeker County Association of Lakes.</p>
1991	<p>Harold Nohner was elected president, with Jim Kirchoff as chairperson. The Board studied issues of incorporation, and the by-laws were changed to accommodate more voting members. Thirteen members were elected to be on the Board of Directors. At the spring meeting, \$500 was given to the water patrol to go toward equipment, and agreement to participate in the Freshwater Foundation's Lake Watch. The water quality testing results indicated high concentrations of nitrogen and phosphorous entering the lake. It was agreed to contact those responsible for these sites including farmers, county road maintenance or private parties. Total funding the treasury were \$7920.</p>
1992	<p>Work plans from Minnesota Pollution Control Agency were studied as Lake Washington was chosen for the Lake Assessment Program. Ellsworth Township agreed to put in new culverts and control run-off as recommended from the perimeter inspections. An adoption by Meeker County of a new shoreline management program was announced. The first annual Lake Washington July 4th boat parade was noted as a success.</p>
1993	<p>It was voted to use the Meeker Count Tip Line to offer \$200 toward the apprehension of persons damaging lake property or breaking fishing laws. Garfield Busse did a survey of our septic system problems. The Association by-laws were revised and printed. Concerns of the board were south side wetlands preservation, improvement of septic systems and owner awareness of existing problems, increase awareness of Eurasian Milfoil, continuation of water testing, association membership in Minnesota Lakes Association, and larger involvement in programs by more of our members. A summary from the MPCA of the lake assessment was submitted to members.</p>

1994	The board researched fund raising options including pull tabs. The application process was much too difficult. President: Ken Neu.
1995	The board, under the direction of Dieter Bargel voted to incorporate the association. The articles of incorporation were filed under "Lake Washington Improvement Association of Meeker County". Strategies for reducing erosion were discussed and implemented. The board with DNR approval installed a year round light at Ellsworth landing and agreed to pay the electricity.
1996	A 4th of July boat parade was held with prizes going to the top 3 boats. Western Gas announced that natural gas would be available around the lake. A 4 color design Lake Washington Association logo was created and sweatshirts with the logo were ordered.
1997	New letterhead stationary with the Lake Washington logo was ordered. Publication of a new lake directory was approved and the process of updating addresses began. The Meeker County Planning Force approved a small wetland project for the south side of the lake, but the property was too expensive to purchase. A July 4th parade was held with prizes for a pontoon and boat division. The association looked into holding an ice fishing contest but the time frame was too short and the winter too warm. The Dassel Township board was approached regarding flooding of the road on the northeast corner and debris washing into the lake. The association sponsored a float in the Darwin Twine Ball Day and the Red Rooster Day parades. President: Kathy Allen.
1998	Lee and Peg Hampe were honored by the board for their many years of service and contributions to the Lake Washington Improvement Association. Applications were taken from property owners for a grant from the DNR to improve shoreline landscaping. The new directory was completed and distributed to all lakeshore owners. A 4th of July parade was held with the theme "Your Favorite Song"; there were 18 participants.
1999	The "Lake Washington Shore Lunches" cookbook was put together by Wilma Ahlgren, Kim Schimmelpfenning, and Connie Caspers as a fundraiser. This was the best money maker idea we have had in a longtime. There were 450 recipes, 500 copies were ordered and sold for \$10. Lakescaping projects funded by the DNR were awarded to Scott Drew and D. Lindquist/M Olson. Dassel Township begun discussion of building a new emergency access road and proposed putting some funds forward so the township can fix the runoff problem. 140 people attended the Spring Membership Meeting and pork chop dinner. July 4th boat parade theme "The Last 4th of July of the Century". Lake Association Board began a drive to have a severe weather warning siren installed on the lake at Ellsworth landing. Lake Association gets grant money for building a holding pond south of the Ellsworth landing, and began negotiating with the two property owners. Lake would do in-kind work and pay \$200 dollars per acre of the \$88-1000 dollars per acre proposed in the grant. Kathy Allen confirmed with local DNR fisheries people 5 healthy spots of Eurasian Milfoil in Lake Washington from Ellsworth landing to the southeast corner of the lake and in the channel to Stella. An open meeting on Eurasian Milfoil was held on August 26. The DNR will begin treating these areas this fall. Board purchased a GPS unit and volunteers began plotting milfoil found on the lake. The treasury held \$11,664.

2000

Phosphorous levels (unexplainably high) were found during the lake testing in 1999. Kathy will do more testing next year to see if a trend is developing. DNR milfoil specialist spoke at the spring membership meeting. Lake cast with brown tint in spring was tested and proved to be diatom bloom (microscopic organisms that can be good for fish) and cleared up later in the year. The treated 8 1/2 acres with 2 4 D last fall looked good. DNR hired applicators to check for milfoil on west and north side of the lake. July 4th parade theme "Story Books". 162 people attended the spring Membership meeting. The board put money towards a PA system at the Dassel Rod'n Gun Club.

2001

Money approved by RIM to build holding pond on south side of the lake. County Attorney's office helping with abandonment of court ditch and need proper owners to sign off on agreement. Orin Ortloff wrote the grant and is working with the county to get it started. Soil and Water people chose to drop this project because of difficulty getting landowners to sign off on it. Boards explored sharing a severe weather siren with Stella and have it put between the lakes. Concerns about how effective it would be reaching east side of the lake. Stella board members involved in discussions, but unable to raise their half of the cost. Lake Board ok'd starting a storm siren fund with donations marked specifically for this project. Board started holding regular monthly meetings February through October at Dassel Rod'n Gun Club. Treasuries at year's end \$16,872.91. Secchi disk reading more than 5 1/2 feet.

2002

New access road built on northeast corner of the lake. Township needed special request from Board to put in culvert. Orin continues work on development of a holding pond on south side of the lake. In discussions with property owners, he has found other funding. Discussions of putting in pumps to move the water were considered. Kathy Allen, longtime board member and president of Lake Washington Association, passed away this year, which left a huge void because of her knowledge of water testing and contacts through other state organizations. There was discussion at annual meeting about the granting of conditional use permits by the county and the potential impact this could have on the lake. The permit most discussed was the development of a large feeder pig operation south of the lake. Many members donated money for the specific purpose of questioning this proposal. Bob Paulson led plotting milfoil sites, communicating with DNR and getting grant money. The DNR classified Lake Washington as a maintenance management class lake, meaning they stop paying for milfoil treatments. There are several matted areas on the southwest side of the lake. Secchi disk reading were at times in the 4.5-5 foot range. Kim Winter elected president.

2003

Steve Thatcher Enterprises volunteered to do a septic feasibility study. Many ice houses fell into the lake during an unusual warm spell. Noted HEAVY infestation of Eurasian milfoil in northwest area of the lake. Bob Paulson contacted licensed applicators (there are only 5 in the state the DNR recognizes). Over 200 acres of matted milfoil were identified by DNR exotic species specialist. With funds from Lake Association treasury and grant money, \$27,690 was spent to treat 78 acres of milfoil on the lake. The 120 acre matted areas of the northwest corner were not treated as directed by the DNR. Some property owners hired a harvesting company to come in and cut paths so they could get boats out away from their docks. Addressing the milfoil problems became the board's focus and goal for this year and next year. Fund raising became the primary focus of the board. Formed milfoil committee to explore treatment options, develop plan, and track infestation on the lake. Began development of a 5-10 year treatment plan; looking at costs, treatment options, equipment, and volunteer applicators.

2004

The milfoil committee (Bob Paulson, Earl Fitzloff, Donnie Hoversten and Gary Christianson) bought a spreader and chemicals and applied using a laptop and GPS. 135 acres was treated in June and 35 acres in July for \$33,000. Fundraising was done to cover \$25-30,000 for yearly milfoil treatments. Began organizing Shoreline Captains to improve communication with property owners and the Board. Each shoreline captain will represent approximately 25 neighbors each. Out Door Corp was hired for water testing 4-5 times (part of the UM extension service).

2005

The directory committee (Jenna O'Brien, Cammy Moses, Rick Fernstrom, Steve Ullom) are creating a lake directory. Kim Winter and Jim Wendling will sell ads to pay \$2714 for printing and binding. Kay Yoch volunteered to coordinate the Shore Line Captains. Donnie Hoversten updated LWIA website(<http://www.lakewashingtonassn.com>). Milfoil Committee (Bob Paulson, Gary Christianson, John VonEschen) reported very little milfoil on the lake. DNR found more curly leaf pond weed than milfoil this year. The board acknowledged the lack of milfoil was due to the great job of treatment by the Milfoil Committee and volunteers. LWIA developed a long range Lake Improvement Plan, which identifies goals and objectives to guide improvements in Water Quality, Education, Aquatic Plant Management, Fish Management, Shoreline Management, and Communication. Board developed standing committees for Exotic Species, Membership/Shore Line Captains, Social Committee, Communications/Public Relations, and Finance/Fundraising. Board approved ordering the Storm Siren to be installed before the summer storms and are asking for donations to pay for the balance. LWIA joined Stella and Manuella for a "Spring Fling" in March with a speaker to provide information for our lake associations. Jenna O'Brien and Cammy Moses set up a committee and began collecting recipes to publish a cookbook. Outdoor Corp continues doing water testing for \$500 per site. President: Kim Winter. Paid membership: 211.

2006

The Storm Siren was installed at Ellsworth Landing in May, with the help of Meeker Coop and Bob Ahlgren. The Dassel Fire Department agreed to annually check operation and batteries of the siren. Outdoor Corp will do water testing and provide a report for \$2500. At Spring Membership meeting, Lee Sundmark from Hutchinson DNR and Jacquelyn Bacigalupi, Exotic Species specialist from New Ulm talked. Exotic Species committee reported only three areas of matted milfoil and no areas were treated. Professional Lake Management began water testing and presented a detailed analysis of the sampling completed May thru October. The Board changed the August Picnic from a steak fry to having BBQ beef with the potluck dinner. Jean Ward found volunteers and Rick Fernstrom took charge of creating the newsletters. Rick Fernstrom and Jenna O'Brien have been getting email addresses of lake shore owners to quickly and easily share information and reduce costs. The Board approved purchasing general liability insurance for the LWIA Board. Jenna O'Brien and Cammy Moses formed a committee to publish a new Lake Washington cookbook. President: Kim Winter. Paid membership: 201

2007

Milfoil Committee treated 20 acres of curly leaf pond weed east of Cedar Point, an area of concern from last year but did not become an issue this year. DNR allowed PLM to treat three different areas of EWM (strips east of Cedar Point) for 16 acres. Received a DNR grant for \$6400 and \$3000 from Meeker County Associations of Lakes, thanks to the work of Bill Craig. "Celebration of 50 years for the Lake Association" cookbooks were ready in September, thanks to Jenna O'Brien and Cammy Moses. Local merchants will sell 657 copies at \$15, for a profit of \$6400. Mike Engel volunteered to update and maintain our website. Kay Yoch continues coordinating the Shore Line Captains. Began sending newsletters to local lake presidents, government officials, and DNR people we work with. President: Kim Winter. Paid membership: 219.

2008

LWIA updated the Lake Improvement Plan with info about treatments, actions, and plans the Board has made the past 3 years. Agreed on a contract with PLM for exotic species treatments, water quality testing, and point intercept vegetation surveys. Vegetation Plans are required to get state grants. The Board discussed the formation of a Lake Improvement District. Kay Loch continues coordinating the Shore Line Captains. John Fink organized the March Spring Fling at Peter's and the county assessor spoke. 434 cookbooks sold since Sept 2007. Dennis Westendorp lead the development of a LWIA monthly and yearly budget. DNR approved treatment of 28 acres of EWM; west of Cedar Point and small strips east of Cedar Point to the mouth of the lake. Follow up surveys noted no signs of EWM in treated areas. The Exotic Species Committee and PLM identified 300 acres of EWM, but the DNR thought areas could be avoided by boaters and do not warrant treatments. The Board talks about a Lake Vegetation Management Plan. Peter's Signs (Litchfield) volunteered to replace information signs around the lake. LWIA donated \$1030 to the Dassel Fire Dept. President: Dennis Westendorp. Paid Memberships: 209.

2009

PLM completed a point intercept aquatic vegetation survey and matched with details from 2008. The information fulfilled a necessary requirement when applying for grant money. The Board approved filing for 501(c)3 status as a nonprofit; making all contributions to LWIA tax deductible and allows access to more grant money. Ken Klehr, Lyle Walker Cammy Moses and Steve Hanson, CPA, from Hutchinson complied the documentation and submitted it to the IRS. By Laws and Articles of Incorporation were updated as a result. Dave Berry, board member and lake spokesman passed away suddenly and is missed. The Board approved changing "Exotic" to "Invasive" Species Committee. PLM reported 200 acres of EWM and treated 78 acres NW side from the inlet, west and east of Cedar Point \$35,667. Bill Craig (Invasive Species Committee Chair) procured a state grant for \$18,124 and Meeker Co Association of Lakes contributed \$3000. Bill noted in 2007, treatments and water testing cost \$61,186 and Grants covered \$49,703. LWIA, Lee Sundmark (Hutchinson Fisheries) and Joe Eisterhold (Area Invasive Species) developed a Lake Vegetation Management Plan; a workable plan to define how many acres to treat yearly, with a five year rotation around the lake. The plan allows us to budget and setup treatment scenarios for quicker permitting and earlier treatments. Kay Yoch continues to lead Shore Line Captains. Jeff Norlin, Meeker County Sheriff, set up a county wide Crime Alert using email to notify people about crimes in the area. Thanks to Milt Lueneburg, we obtained a permit to dredge 14 inches of silt in the lake east of the culvert. Reiner Construction performed this service free. LWIA donated \$1320 to Dassel Fire Dept. President: Ken Klehr. Paid Memberships: 225.

2010

LWIA was approved as a 501(c)3 nonprofit corporation. Members approved changes to the By Laws and Articles of Incorporation at the spring meeting. The Lake Vegetation Management Plan was submitted to the DNR and approved. Work began on a directory to be completed summer of 2011. Jeff Norlin, Meeker County Sheriff, informed that Meeker County is taking over management and upkeep of the counties Storm Sirens. The lake received a Watercraft Inspection Grant from DNR and stationed trained individuals at Ellsworth and the Rod 'n Gun Club landings. Steve Grotbo continues to improve and update our website and facebook page. Edward Swain, Scientist with the MPCA spoke about the Water Quality Assessment from 2009, with no significant changes since the last report. A permit was submitted to treat 70 acres of EWM along the NW shore and around Cedar Point, but with inspections by Board members and the DNR, no problem sites developed. Jenny Kjell volunteered to lead the Shore Line Captains. Peter's Signs (Litchfield) donated a sign for Ellsworth Landing encouraging people to join LWIA. LWIA members donated \$1175 to the Dassel Fire Dept. President: Ken Klehr. Paid Membership: 227.

2011

With LWIA support, Rick Fernstrom and area lake associations formed a Cormorant/Pelican committee that met with DNR officials to discuss impacts these birds have on fish populations. Cormorant populations at Pigeon Lake have increased in recent years, with reports of several thousand nesting cormorants on the lake at one time. Cormorants are Federally protected migratory birds and DNR officials do not believe increased cormorant populations (estimate of 3,000-4,000) on our lake have a significant impact on fish populations. The Board completed a lake directory and Shoreline Captains distributed in August. It was a very wet spring with several heavy rains. A severe storm on July 1 damaged buildings and trees, mainly on the NW part of the lake. The Eurasian Milfoil Committee had 69 acres treated for \$31,281. PLM completed Water quality testing May-September. Additional water testing was completed in the NW corner showing increased suspended solids near culverts. Ken Klehr secured state grants of \$9995 and \$4000 from Meeker Co. Association of Lakes for milfoil treatments and water quality testing. LWIA donated \$1000 to Pheasants Forever to sponsor 62.2 acres of Conservation Reserve Program for farm land draining into Lake Washington. Steve Grotbo continues to update our website and Facebook page. LWIA donated \$1235 to the Dassel Fire Dept. New board members: Cathy Klehr, Tom Hauser, Sandy & Mike Wosmek. President: Ken Klehr. Paid Membership 227.

2012

Cormorant and Pelican impacts are a primary focus for lakes within a 10 mile radius of Pigeon Lake. Rick Fernstrom and George Kraemer (Collinswood Lake) created a committee with DNR officials, local and federal representatives, and Federal Wildlife Agencies due to receiving many calls and emails from lakes in Cokato and Howard Lake concerning cormorant populations. In DNR officials opinions the declining fish populations are normal. The Fisheries people decided to do another fish survey in Lake Washington this year. An outbreak of Newcastle disease in the cormorant population has diminished their population. We were unable to get an idea of how many dead bird bodies were burned to stem the spread of this disease. It was a very warm spring with many hot days during the summer and very little rain. Many had to move docks and lifts out by mid July. PLM treated 70 acres of milfoil, primarily on the east and south sides of the lake for \$31,850 and Ken Klehr secured a \$10,500 state grant. A follow up survey showed 25 acres near the Rod and Gun Club needed to be retreated in 2013. The Invasive Species Specialist from Hutchinson DNR did a point intercept vegetation survey of the entire lake in May and August and found concentrations of milfoil infestations in untreated areas were significantly decreased in the August survey. They have never seen this decline in vegetation surveys throughout the state. Ken Klehr secured a \$3550 grant from MCAL for water testing and milfoil treatment. LWIA members donated \$1335 to the Dassel Fire Department. President: Ken Klehr. Paid Membership 217.

2013

146 acres of Eurasian Milfoil was treated by PLM and Lake Restoration, using 2,4-D liquid for \$31,468. Ken Klehr secured \$14,950 grant from the State and \$3,550 from MCAL to pay for this treatment and water quality testing. The cormorant/pelican committee and 18 members met with DNR reps from around the state. DNR Fisheries person stated "I don't think there is a problem." When pressed about the fish survey information, they agreed to perform fish surveys every 2 years. A survey conducted by the UM reported 2,325 nesting cormorant pairs on Pigeon Lake. One comment was that Lake Vermillion used baby oil on eggs to decrease the hatch rate of cormorants. The Board conducted a Survey to gather historical, demographic, and logistical data on property owners ideas, knowledge, and perception of the boards role. The four most used words in written responses were cormorant, pelican, milfoil, and re-stocking. Ken Klehr & Skip Sustacek worked with Meeker Co. Soil and Water to develop plans to slow runoff specifically upgrading drainage on the SW corner of the lake. Steve Grotbo monitored visits to our website and the Facebook page showed promise as a way to share information. President: Ken Klehr. Paid Membership: 220

2014

Invasive Species Committee led by Ron Bubany started to analyze collected vegetation data and chart vegetation growth trends. PLM continued water quality testing and Vegetation surveys found no milfoil. Cormorants/Pelican committee met with DNR officials and reviewed last years fish survey. DNR still states that fish population fluctuations are normal and not due to cormorants and pelican populations. DNR agreed to another fish survey and the results suggested that sizes and numbers of fish found in the survey is lower than in the past and the results are within the normal range for comparable lakes in our region. The Watershed Committee led by Skip Sustacek and Meeker Co. Soil & Water, completed construction of a holding pond on the lakes SW corner. The farmer across the road made changes to drain tile heads to slow the flow of water to the pond. The pond cost \$13,500, paid by Meeker Co., MCAL, Darwin Township and LWIA. Ron Bubany redesigned the LWIA Newsletters adding professional touches that include more pictures, articles and info for property owners. Lake Property Owners Survey data was compiled, graphed, and summarized in newsletter articles. Caroline Ullom presented the survey results at the spring membership meeting. Steve Grotbo reports 3-4 visits to our website per day during the summer. LWIA members donated \$1,235 to the Dassel Fire Department. President: Ken Klehr. Paid Membership: 217.

2015

The Invasive Species Committee reported no Eurasian milfoil found on any of the 50 waypoint vegetation surveys and for a second year, no Eurasian milfoil treatments required. The Hutchinson DNR also did vegetation assessments and reported finding no Eurasian milfoil. Zebra mussels were discovered in Lake Stella and due to our connection, Lake Washington was designated infested. Surveys of docks and lifts around the channel found no zebra mussels. The Board led by Dave Rathe began working on how to identify zebra mussels in our lake. Another invasive, Starry Stonewart has been found on Lake Koronis. Meeker County established an AIS committee to manage the monies legislated for addressing Invasive species at a local level instead of state. LWIA is exploring a camera system at the Ellsworth Landing that provides steps to take when putting watercraft in and out of the lake. Cormorants/Pelicans committee met with DNR for their interpretation of the 2014 fish survey. The DNR used fish survey data from 2012 and 2014 and compared data to other parts of the state, concluding there is no difference of fish populations compared to similar lakes around the state. Latest count has 2600 nesting pairs on Pigeon Lake. Fewer cormorant and pelican sightings have been reported this summer. Rick Fernstrom's analysis of the fish survey going back to 1990 showed a significant decline in fish sizes and populations over time. The DNR's analysis: fish populations maybe lower and smaller than in the past, but compared to other comparable lakes in our region our fish populations are normal. The DNR plans to do surveys in "Halo" lakes around Pigeon Lake next summer. Asked the DNR if they would consider stocking walleye fingerlings vs. fry. Lee Sundmark, Hutchinson DNR Fisheries, added that increased northern populations and the presence of milfoil could be impacting fish populations in our lake. The LWIA completed water quality testing once a month from 3 different sites and sent to a lab for testing. Seechi disk reading will be done every 2-3 weeks from May through September, with results reported to the MPCA. Ken Klehr prepared a summary of the water samplings submitted for analysis showing no significant differences from previous testing. This year was marked by a wetter spring and summer, with lake levels remaining at higher levels throughout the year. It was a warm fall, but with several frosty evenings in September. The Watershed Committee, spear headed by Skip Sustacek, reported the holding pond appears to be working effectively. The farmer partnering with LWIA reworked tile outlets to slow water flowing from them for a cost of \$7000. Skip, in cooperation with Joe Norman, Meeker Co. Soil & Water, have identified nine culverts that they will work on modifying to slow the flow of water. Skip's plan is to look at all areas that carry runoff into the lake over the next 2-3 years. \$1860.00 was donated to the Dassel Fire Department. President: Ken Klehr. Paid Membership: 203.

The Invasive Species Committee vegetation surveys this year found no milfoil. Nick Brown, DNR Invasive Species Specialist Hutchinson office, completed a point intercept vegetation survey and did not find any milfoil during this survey. This is the third year in a row where vegetation surveys have found no milfoil. Nick reported they have never seen anything like this, where lakes infested with milfoil suddenly has no milfoil. Dave Rathe and Mike Wosmek built zebra mussel settlement plates/hotels, a series of plastic plates that are hung off docks and/or lifts, designed to detect zebra mussels in a lake. Eleven sights around the lake were chosen to place these hotels and they were inspected each month. When removing the hotels several zebra mussels were found along the western shoreline near the culvert from Lake Stella. Several property owners, near the culvert, reported a few zebra mussels on docks and lifts.

LWIA purchased an I-LIDS unit, a video monitoring system triggered by vehicle traffic that records a video and delivers a message to individuals as they put water craft in and out of the lake. This unit was installed by Dave Rathe, Skip Sustacek, Mike Wosmek, and Tom Hauer on the east side of the Ellsworth landing. The cost for this unit was \$10,000, with Meeker Co AIS Committee providing a grant of \$4600 for this purchase and to help offset the yearly monitoring cost of about \$1850. Water quality testing continued this year, testing water at one sight in the middle of the lake. Secchi disk readings every 2-3 weeks were done in 5 sites around the lake. Water in the holding pond were also tested. Results from Mark Johnson showed slight fluctuations during the year but readings were very similar to the past. This information was shared with the MPCA. Grant money from Meeker Co. of \$300 was made available to help pay for water testing.

The Watershed Committee in cooperation with Joe Norman, Meeker Co Soil & Water, have identified 10 areas to address regarding runoff into the lake. More rocks were added to the field tiles to slow the rate of water flow into the holding pond on the southwest corner of the lake. Some of the things this group is doing: changing culverts by adding a 90 degree pipe, in some cases putting rocks around these sites, getting cooperation of land owners with modifying ditches that drain into the lake, and exploring ways to slow the flow of water going into the lake. A grant for \$2500 was awarded from MCAL to offset some of these costs.

This year was marked by an early spring, but cool weather in May. There was a tornado north of Litchfield in July. A mild fall with ice freeze over on the lake occurring in late November. Scott Mathenthun, DNR Fisheries in Hutchinson, met with the Cormorant/Pelican Committee. When it comes to reducing the population of double crested cormorants it is required to have a Private Depredation Order and show a need and adverse impacts the birds demonstrate. Scott shared preliminary data on the most recent fish survey with more analysis by the DNR coming later this year. Dean Shaner reported there is a lawsuit in Federal Court that is moving slowly that would look at limiting overpopulations of cormorants. US Fish and Wildlife must get involved and be willing to accept the numbers reported by state organizations. Scott Mathenthun shared articles about Federal Judges reviewing cormorants as protected migratory bird.

Sharon Daniels took over grant applications and put together a Five-Year Plan detailing total costs, in kind volunteer hours, cooperating organizations, expenses related to invasive species, education for property owners, water quality testing, and watershed activities related to control of runoff. Dave Rathe updated the Lake Washington Management Plan and posted on our website. 68 members donated \$1885 for the Dassel Fire Department President: Steve Grotbo. Paid Membership: 209.

The Invasive Species Committee completed vegetation surveys in May, July, August checking 40-60 waypoints. For the 4th year in a row no Eurasian Milfoil was found. Overall, vegetation appeared to be diminished this year. LWIA has built a reserve of \$120,000 after 4 years of not having to treat milfoil. However, as treasurer Lyle Walker notes; a few major treatments of milfoil, zebra mussels or other Aquatic Invasive Species would use up much of these funds; Many zebra mussels were found this year. Mike Wosmek and Dave Rathe placed 11 hotels around the lake and in September many of the hotels showed the presence of smaller zebra mussels (microscopic to ½ to ¾ inch) around much of the lake. Dave Rathe froze 35 samples and took them to the University of Minnesota for DNA testing. At our spring membership meeting, Dr. Mike McCartney, U of M Invasive Species Research Project, shared information regarding zebra mussels at different sites around the state. There is no cost-effective treatment for zebra mussels that would not affect other native aquatic species. LWIA donated \$5000 to the U of M Invasive Species Zebra Mussels Research Project.

LWIA continued the practice of water quality testing at one site on the lake and secchi disk readings every 2-3 weeks throughout the summer. Test results and secchi disk readings were sent to the MPCA. A grant from Meeker Co. AIS for \$750 was used to help pay for water testing costs. It was a very cool dry summer with only a few days in the 90's, but rains in late August thru mid September kept water flowing over the dam. LWIA purchased a new GPS device, Ron Bubany reports the new device will be able to provide us more information about what the lake looks like below the surface. The I-LIDS unit was installed before fishing opener and has been updated and moved resulting in much better pictures. A grant from Meeker Co. AIS for \$1750 helped pay for the annual cost of the I-LIDS system.

Steve Grotbo wrote an article for the spring newsletter looking at the increase in swimmers itch throughout the summer and correlation to the increase of cormorants being on the lake all summer vs. migratory birds that move through in the spring resulting in out breaks only in early June.

The Watershed Committee led by Skip Sustacek and Dave Rathe supported by other volunteers have reworked several culverts, added rocks to some outlets, and cleared the ditch on the east side of Ellsworth landing. Meeker Soil and Water have agreed to over-seed this area. There have been several heavy rains this summer and the flow from reworked culverts and ditches show water flowing into the lake with very little if any silt in it. Skip continues to work his way around the lake looking at all culverts or areas of run off into the lake. Sharon Daniels was able to get the following grants \$2500 with the possibility of up to \$5000 to help pay for these improvements from MCAL. Meeker County paid a \$3,165.91 grant request for AIS and I-LIDS expenses.

Mark Johnson volunteered to be the lead in publishing a new 2018 Directory. Board members volunteered to find advertisers and help with the editing. As part of this effort Cathy Klehr provided lists of all properties on Lake Washington for Shore Line Captains to use in contacting residents. These contacts updated ownership, permanent addresses, email addresses, and phone numbers. The goal is to have the directories available for Shore Line Captains to begin passing them out by the end of May 2018. 68 members donated \$1845 to the Dassel Fire Department
President: Steve Grotbo. Paid Membership: 214

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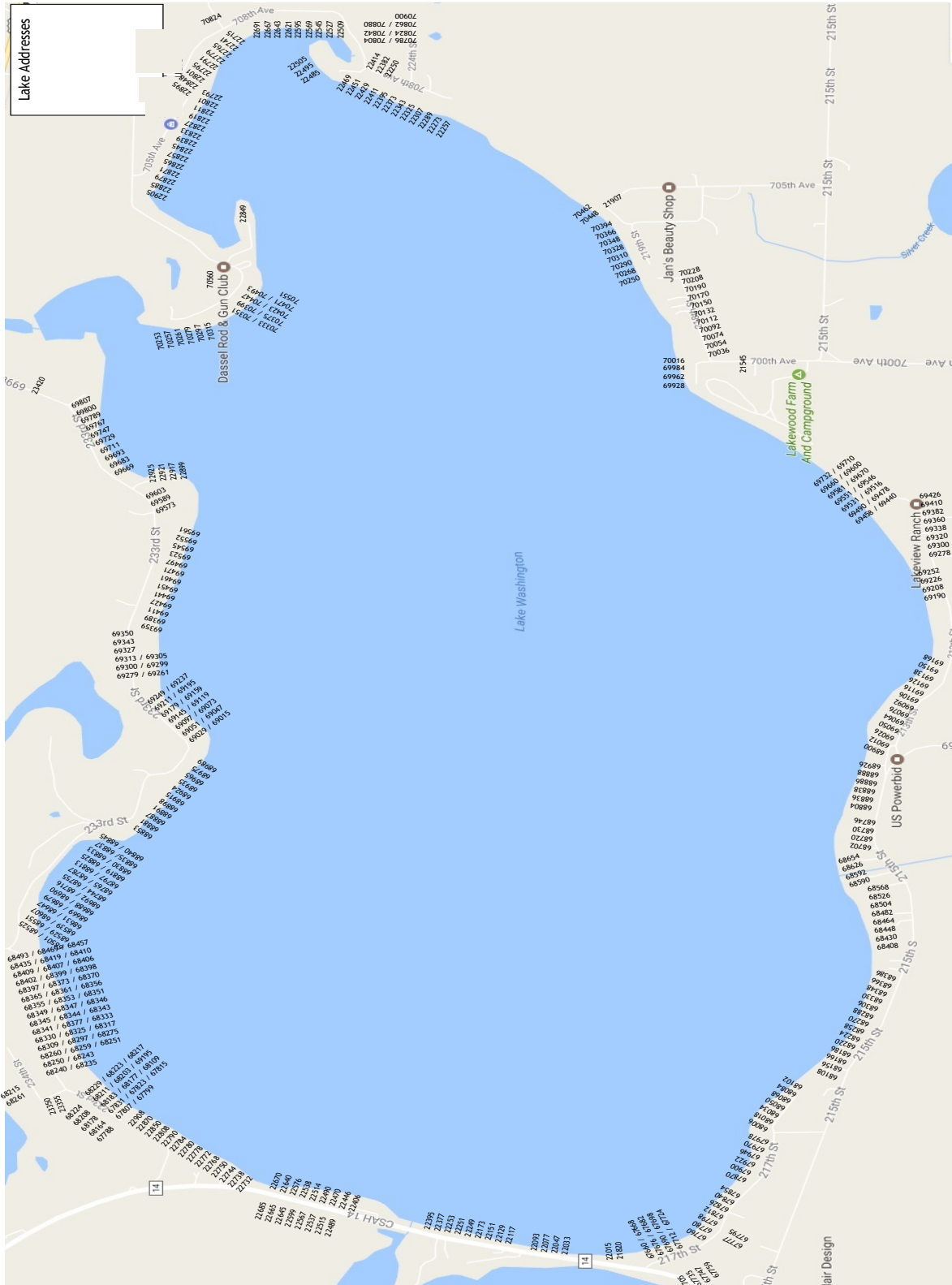
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PROPERTY ADDRESSES

Lake Washington Directory



LAKE WASHINGTON DIRECTORY

Abeln, Rick & Bonnie	70448	219 St	Dassel,	MN	55325
Adams, Bruce & Janice	22790	CSAH 14	Darwin,	MN	55324
Ahlgren, Alisha	70132	218 St	Dassel,	MN	55325
Ahlgren, Wilton	22849	703 Ave	Dassel,	MN	55325
Albright, Susan	22870	CSAH 14	Darwin,	MN	55324
Allen, James	22395	CSAH 14	Darwin,	MN	55324
Allers, John & Judy	67712	217 St	Darwin,	MN	55324
Andersen, John & Caroline	68607	233 St	Dassel,	MN	55325
Anderson, Curt J. & Pennie	22545	708 Ave	Dassel,	MN	55325
Anderson, Duane & Carol	22750	CSAH 14	Darwin,	MN	55324
Anderson, Ken & Mary	22621	708 Ave	Dassel,	MN	55325
Appenzeller, William & Wendy	68260	233 St	Dassel,	MN	55325
Aubol, Sally & Judy Strolberg	70297	229 St	Dassel,	MN	55325
Bahr, Mel & Marilyn	68833	233 St	Dassel,	MN	55325
Bahr, Richard & Carla	68825	233 St	Dassel,	MN	55325
Baker, Paul & Debbie	22249	CSAH 14	Darwin,	MN	55324
Baldwin, Jack & Lori	22505	708 Ave	Dassel,	MN	55325
Ballard, Kenneth & Jane	69138	213 St	Darwin,	MN	55324
Barnes, James F. & Annette	67780	217 St	Darwin,	MN	55324
Barsness, John & Jeanette	68347	233 St	Dassel,	MN	55325
Bartz, John	68525	233 St	Dassel,	MN	55325
Becker, Kris & Dean	68435	233 St	Dassel,	MN	55325
Bengtson, Clarice & John	22819	705 Ave	Dassel,	MN	55325
Bengtson, David & Susan	22839	705 Ave	Dassel,	MN	55325
Benjamin, Charles & Sharon	68837	233 St	Dassel,	MN	55325
Benson, Gary & Cindy	69410	213 St	Darwin,	MN	55324
Benson, Keith	22895	708 Ave	Dassel,	MN	55325
Bentley, Lynn & Ronald	68224	215 St	Darwin,	MN	55324
Benz, Tim & Anastasia	69490	213 St	Darwin,	MN	55324
Berg, Jackie	68343	233 St	Dassel,	MN	55325
Berg, Jennifer	68343	233 St	Dassel,	MN	55325
Bergquist, Lail	21545	700 Ave	Dassel,	MN	55325
Berndt, Brian & Marlys	22033	CSAH 14	Darwin,	MN	55324
Berney Robert, Rachael DiBenardin	68366	215 St	Darwin,	MN	55324

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Betker, Bryan	67695	217 St	Darwin,	MN	55324
Betker, Gene & Barb	67676	217 St	Darwin,	MN	55324
Betker, Jerome & Bonnie	22470	CSAH 14	Darwin,	MN	55324
Betker, Paul & Jan	67812	217 St	Darwin,	MN	55324
Blackwell, Torrey & Melissa	70351	229 St	Dassel,	MN	55325
Blake, Jeff & Amy	67815	233 St	Dassel,	MN	55325
Blake, Jon R	67823	233 St	Dassel,	MN	55325
Blake, Lynda	22685	CSAH 14	Darwin,	MN	55324
Blum, Matt & Katy Kessler	69327	233 St	Dassel,	MN	55325
Bock, Nelson & Bev	68746	215 St	Darwin,	MN	55324
Bollman, Don & Jane	22451	708 Ave	Dassel,	MN	55325
Bonniwell, Jack & Dianne	68631	233 St	Dassel,	MN	55325
Borg, John & Kate	69660	213 St	Darwin,	MN	55324
Bowman, Wayne & Susan	69179	233 St	Dassel,	MN	55325
Boyum, Marlys	68211	233 St	Dassel,	MN	55325
Braaten, Mary	69359	233 St	Dassel,	MN	55325
Braun, Chris & Suzanne	69570	213 St	Darwin,	MN	55324
Brice, Hap, Sue & Amy	69116	213 St	Darwin,	MN	55324
Brill, Chuck & Iverne	68355	233 St	Dassel,	MN	55325
Brinkmann, Grace	69426	213 St	Darwin,	MN	55324
Broll, David & Lori	70253	229 St	Dassel,	MN	55325
Brown, Carol & Ben	69338	213 St	Darwin,	MN	55324
Brueggemeier, Ray & Julie	69389	233 St	Dassel,	MN	55325
Bruhjell, Arlen & Kathy	70190	218 St	Dassel,	MN	55325
Brunes, Shari	70092	218 St	Dassel,	MN	55325
Bubany, Ronald & Rita	67682	217 St	Darwin,	MN	55324
Burgstahler, Neil & Patty	68504	215 St	Darwin,	MN	55324
Burrill, Connie	68975	233 St	Dassel,	MN	55325
Burt, Steve & Diana	68224	233 St	Dassel,	MN	55325
Carlson, Douglas & Rori	70228	218 St	Dassel,	MN	55325
Carlson, Lisa	68306	215 St	Darwin,	MN	55324
Carlson, Wilbert & Joyce	68220	215 St	Darwin,	MN	55324
Cartwright, Darlene Rotzien	22595	708 Ave	Dassel,	MN	55325
Castro, Feliciana	68787	233 St	Dassel,	MN	55325

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Catlette, Ben & Naseen	68353	233 St	Dassel,	MN	55325
Christianson, Gary & Peggy	69711	233 St	Dassel,	MN	55325
Colberg, S. (Mike) & Karin	69603	233 St	Dassel,	MN	55325
Colberg, Shane	69471	233 St	Dassel,	Mn	55325
Cole, Matt & Carrie	69313	233 St	Dassel,	MN	55325
Coppa, Rodger & Pam	70150	218 St	Dassel,	Mn	55325
Cowan, Bill & Bev	70315	229 St	Dassel,	MN	55325
Crawford, Jodie & Brian Shupe	68398	233 St	Dassel,	MN	55325
Crowe, Thomas & Jan	21907	705 Ave	Dassel,	MN	55325
Dalen, Dean & Theresa	68836	215 St	Darwin,	MN	55324
Daly, Frank	68469	233 St	Dassel,	MN	55325
Daniels, Gary & Sharon	68419	233 St	Dassel,	MN	55325
Daniels, Tim & Danette	68348	215 St	Darwin,	MN	55324
Danielson, Scott & Pam	70462	219 St	Dassel,	MN	55325
Dassel, Rod & Gun Club	70560	229 St	Dassel,	MN	55325
Dawson, Randy & Donna	69350	233 St	Dassel,	MN	55325
Determan, Mark	70348	219 St	Dassel,	Mn	55325
Douglas, Michelle	70394	219 St	Dassel,	MN	55325
Drew, Scott & Donna	22801	708 Ave	Dassel,	MN	55325
Dullinger, Craig & Dr. Anita Strei	68881	233 St	Dassel,	MN	55325
Eckroad, Christopher & Kellie	68526	215 St	Darwin,	MN	55324
Eggersgluess, Brad & Carol	68345	233 St	Dassel,	MN	55325
Eichten, Noel & Sharon	67807	233 St	Darwin,	Mn	55324
Ellesson, Ted & Angie	68186	215 St	Darwin,	Mn	55324
Ellis, Mike & Sheri	70208	218 St	Dassel,	MN	55325
Ellsworth, Township Landing	68900	213 St	Darwin,	MN	55324
Engel, Bill	69669	233 St	Dassel,	MN	55325
Engh , Andy & Vicki	69545	233 St	Dassel,	MN	55325
Erickson, Kevin & Terrie	67978	217 St	Darwin,	MN	55324
Evjen, Jay & Julie	22273	708 Ave	Dassel,	MN	55325
Fahey, Jeffrey	68068	217 St	Darwin,	Mn	55324
Faust, Sheryl H. & Dan	70333	229 St	Dassel,	MN	55325
Fay, Margaret	68183	233 St	Dassel,	MN	55325
Fernstrom, Gaylord & Jeanenne	69073	233 St	Dassel,	MN	55325

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Fernstrom, Rick & Abby	69073	233 St	Dassel,	MN	55325
Fernstrom, Robert & Chika	69073	233 St	Dassel,	MN	55325
Field, Mike & Cheryl	68886	215 St	Darwin,	MN	55324
Fink, John E. & Ruth	69427	233 St	Dassel,	MN	55325
Finkenaur, Bob & Nancy	22411	708 Ave	Dassel,	MN	55325
Flor, Jerry & Rhonda	68813	233 St	Dassel,	MN	55325
Flores, Phil & Mary Jo	68309	233 St	Dassel,	MN	55325
Fouts, Darlene & Pat	68325	233 St	Dassel,	MN	55325
French, James & Nancy	70170	218 St	Dassel,	MN	55325
Froemming, Dale & Helen	69064	213 St	Darwin,	MN	55324
Furst, Jerry & Addie	67900	217 St	Darwin,	MN	55324
Gayner, Tom & Jo Ann	70493	229 St	Dassel,	MN	55325
Gillman, Brice & Chantel	68408	215 St	Darwin,	MN	55324
Ginsburg, Ladd & Dana	70250	219 St	Dassel,	MN	55325
Glaser, Tom & Joyce	68813	233 St	Dassel,	MN	55325
Goff, Brian & Jen	22921	696 Ave	Dassel,	MN	55325
Goff, Dave & Missy	22921	696 Ave	Dassel,	Mn	55325
Gorder, David & Christine	67705	217 St	Darwin,	MN	55324
Gramentz, Alan & Judy	68203	233 St	Dassel,	MN	55325
Grams, Bill & Jane	68341	233 St	Dassel,	MN	55325
Griep, Mary	69278	213 St	Darwin,	MN	55324
Griffith, Robert & Dianne	67799	233 St	Dassel,	MN	55325
Griffith, Sara	67788	233 St	Dassel,	MN	55325
Griffiths, Kay	69015	233 St	Dassel,	MN	55325
Grotbo, Stephen & Elizabeth Walke	68409	233 ST	Dassel,	MN	55325
Gruhlke, Tom & Cindy	22429	708 Ave	Dassel,	MN	55325
Haag, Scott & Kay	68838	215 St	Darwin,	MN	55324
Haapala, Randy & Anne	70290	219 St	Dassdl,	MN	55325
Haefner, Andy & Marcia	68251	233 St	Dassel,	MN	55325
Haefner, John & Laurie Stimart	69126	213 St	Darwin,	MN	55324
Hall Steve, Danny Della Lana	68887	233 St	Dassel,	MN	55325
Hammers, John & Donna	68288	215 St	Darwin,	MN	55324
Hansen, LaVonne	68317	233 St	Dassel,	MN	55325
Hansen, Ronald & Mary	22732	CSAH 14	Darwin,	MN	55324

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Hanson, Allen & Melanie	69211	233 St	Dassel,	MN	55325
Hanson, Patricia A. & Larry R.	68259	233 St	Dassel,	MN	55325
Hanson, Scott & Delores	22567	CSAH 14	Darwin,	MN	55324
Hauer, Tom & Patty	68166	215 St	Darwin,	MN	55324
Hausladen, Emmett & Jane	68337	233 St	Dassel,	MN	55325
Havemeier, Lonnie & Linda	22538	CSAH 14	Darwin,	MN	55324
Haverkamp, Jack & Judy	68654	215 St	Darwin,	MN	55324
Heck, Darryl	68177	233 St	Dassel,	MN	55325
Heimerl, Duayne & Sue	68365	233 St	Dassel,	MN	55325
Helmer, Eugene & Evelyn	68891	233 St	Dassel,	MN	55325
Henderson, Jim & Jessica	68669	233 St	Dassel,	MN	55325
Hendrycks, Judd & Julie	68333	233 St	Dassel,	MN	55325
Herd, Daniel & Sheila	68464	215 St	Darwin,	MN	55324
Hesse, Chad & Vanessa Trobec	68755	233 St	Dassel,	MN	55325
Hewitt, Troy & Cindy	69600	213 St	Darwin,	MN	55324
Hoese, Elaine	22325	708 Ave	Dassel,	MN	55325
Hoffman, Mark & Lisa	69441	233 St	Dassel,	MN	55325
Hoffmann, LuAnn	22857	705 Ave	Dassel,	MN	55325
Hogan, Jane & Paul	68050	217 St	Darwin,	MN	55324
Hogg, Matt & Kelsi	68744	233 St	Dassel,	MN	55325
Holmgren, Donald	68251	233 St	Dassel,	MN	55325
Horacek, Jeff & Denise	69732	213 St	Darwin,	MN	55324
Horman Rich & Sue, and Deb Currie	22257	708 Ave	Dassel,	MN	55325
Hoversten, Donald			Dassel,	MN	55325
Idle Wave, Association	68346	233 St	Darwin,	MN	55324
Isakson, Gary & Byrnina (Bee)	69807	233 St	Dassel,	MN	55325
Jans, Dennis & Kristin	69478	213 St	Darwin,	MN	55324
Jasinski, Mike & Missy	68402	233 St	Dassel,	MN	55325
Jensen, Jeff & Renae	68345	233 St	Dassel,	MN	55325
Jensen, Jerry	22691	708 Ave	Dassel,	MN	55325
Jensen, Josh	68353	233 St	Dassel,	MN	55325
Johnson, Bryan & Sheri	68840	233 St	Dassel,	MN	55325
Johnson, Dave & Cindy	69343	233 St	Dassel,	MN	55325
Johnson, Keith & Laurie	22289	708 Ave	Dassel,	MN	55325

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Johnson, Leon & Pat	69168	213 St	Dassel,	MN	55325
Johnson, Mark & Laurie	69523	233 St	Dassel,	MN	55325
Johnson, Phyllis A.	68501	233 St	Dassel,	MN	55325
Johnson, Richard & Marcia	70447	229 St	Dassel,	MN	55325
Johnson, Robin	68164	233 St	Dassel,	MN	55325
Johnson, Todd & Julie	68006	217 St	Darwin,	MN	55324
Kadelbach, Gene & Julie	Lot44	Lakewood Campground	Darwin,	MN	55324
Kaiser, Kraig & Kelly	68275	233 St	Dassel,	MN	55325
Karlson, Dave & Bev	69573	233 St	Dassel,	MN	55325
Keeler, James M. & Sue	69252	213 St	Darwin,	MN	55324
Keithahn, Kim R.	22117	CSAH 14	Darwin,	MN	55324
Keppers, Melvin	69047	233 St	Dassel,	MN	55325
Kerstein, Robert & Ruth	22343	708 Ave	Dassel,	MN	55325
Kieffer, Gregory	68965	233 St	Dassel,	MN	55325
Kivi, Helen	70471	229 St	Dassel,	MN	55325
Kizer, James F	22509	708 Ave	Dassel,	MN	55325
Kjell, Steve & Jenny	22811	705 Ave	Dassel,	MN	55325
Klehr, Ken & Cathy	69693	233 St	Dassel,	MN	55325
Kleis, Gary & Priscilla	70824	227 St	Dassel,	MN	55325
Klitzke, Shirley	68034	217 St	Darwin,	MN	55324
Kluver, Tom & Jacqueline	67698	217 St	Darwin,	MN	55324
Knacke, Clinton & Michelle	68568	215 St	Darwin,	MN	55324
Komarek, Dan & Ruth Lotsof	68989	233 St	Dassel,	MN	55325
Koski, Jim & Megan	68935	233 St	Dassel,	MN	55325
Kost, Beth	22485	708 Ave	Dassel,	MN	55325
Kotila, Larry & Gloria	22643	708 Ave	Dassel,	MN	55325
Kotzer, Steve & Amy	22768	CSAH 14	Darwin,	MN	55324
Kraemer, Thomas & Sandra	69029	233 St	Dassel,	MN	55325
Kraft, Joel & Catherine	67690	217 St	Darwin,	MN	55324
Kral, Alan & Susan	68590	215 St	Darwin,	MN	55324
Kramb, Phyllis & Mike	68351	233 St	Dassel,	MN	55325
Kreger, Gregg	22772	CSAH 14	Darwin,	MN	55324
Krogstad, Sandra	68335	233 St	Dassel,	MN	55325

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Lakeview, Ranch	69531	213 St	Dassel,	MN	55325
Lakewood, Campground	21545	700 Ave	Dassel,	MN	55325
Lambrecht, Tom & Jenny	69928	218 St	Dassel,	MN	55325
Lange, Diane	68406	233 St	Dassel,	MN	55325
Larson, James & Nancy	67668	217 St	Darwin,	MN	55324
Larson, Mark & Jan	69747	233 St	Dassel,	MN	55325
Lawver, Harvey & Lynn	22173	CSAH 14	Darwin,	MN	55324
Lee, Patrick & Desiree	68258	215 St	Darwin,	MN	55324
Lee, Sharel & Barbara	22765	708 Ave	Dassel,	MN	55325
Lee, Tricia	68356	233 St	Dassel,	MN	55325
Lenz, Robert & Gina	68702	215 St	Darwin,	MN	55324
Leonard, Diane & Chris	22489	CSAH 14	Darwin,	MN	55324
Lhotka, Gary & Terri	68330	215 St	Darwin,	MN	55324
Lindell, Stacie & Todd	70423	229 St	Dassel,	MN	55325
Lindquist, Dick & Lynne	69145	233 St	Dassel,	MN	55325
Longhenry, Janice	68435	233 St	Dassel,	MN	55325
Longhenry, Tom & Cindy	69984	218 St	Dassel,	MN	55325
Loosbrock, Kelly & Holly	69026	213 St	Darwin,	MN	55324
Lovald, Jill	22514	CSAH 14	Darwin,	MN	55324
Lueneburg, Brad & Jeri	22446	CSAH 14	Darwin,	MN	55324
Lueneburg, Milton	22446	CSAH 14	Darwin,	MN	55324
Lukes, Fritz & Jo	68217	233 St	Dassel,	MN	55325
Lundeen, Todd & Carlynn	22576	CSAH 14	Darwin,	Mn	55324
Lundstrom, Tim	22645	CSAH 14	Darwin,	MN	55324
Lyke, Thomas & Mary Jo	69012	213 St	Darwin,	MN	55324
Macho, Tom & Marilyn	69249	233 St	Dassel,	MN	55325
Madsen, Kevin & Judy	22865	705 Ave	Dassel,	MN	55325
Madson, Alice	68235	233 St	Dassel,	MN	55325
Madson, Randy & Linda	68235	233 St	Dassel,	MN	55325
Maercklein, Robin & Irene	68469	233 St	Dassel,	MN	55325
Maiers, Matthew & Ashley	22414	708 Ave	Dassel,	MN	55325
Manthei, David & Pam	68716	233 St	Dassel,	MN	55325
Maresh, Wendy	68853	233 St	Dassel,	MN	55325
Martin, Robert & Kathryn	69458	213 St	Darwin,	MN	55324

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Matthias, Mark & Ronda	70310	219 St	Dassel,	MN	55325
McCoy, Sue & Larry	69710	213 St	Dassel,	MN	55325
McGraw, Linda	22778	CSAH 14	Darwin,	MN	55324
McGuire, Pat	69683	233 St	Dassel,	MN	55325
McKimm, Mike & Renae	70257	229 St	Dassel,	MN	55325
McLain, Luke & Erin	69561	233 St	Dassel,	MN	55325
Messner, Michael & Cheryl	68399	233 St	Dassel,	MN	55325
Messner, Russell & Teresa	68370	233 St	Dassel,	MN	55325
Milbrandt, Pat & Wally	69237	233 St	Dassel,	MN	55325
Miller, Russ & Beverly	69451	233 St	Dassel,	MN	55325
Milne, Paul & Elizabeth	68501	233 St	Dassel,	MN	55325
Moorhead, Ian	69051	233 St	Dassel,	MN	55325
Moorhead, Kevin	69051	233 St	Dassel,	MN	55325
Moses, Cammy & Karl Terning	69767	233 St	Dassel,	MN	55325
Motzko, Jean	69195	233 St	Dassel,	MN	55325
Munsell, Beau	68156	215 St	Darwin,	MN	55324
Murray, Stevan & Kathryn	68926	215 St	Darwin,	MN	55324
Nathe, Richard & Jean	68647	233 St	Dassel,	MN	55325
Nelson, Tom C. & Debbie	22905	705 Ave	Dassel,	MN	55325
Nelson, Warren C.	69800	233 St	Dassel,	MN	55324
Neu, Kenneth G. & Mary	70054	218 St	Dassel,	MN	55325
Nielson, Ron & Joyce	22093	CSAH 14	Darwin,	MN	55324
Noplos, John & Janice	21820	CSAH 14	Darwin,	MN	55324
Oakes, Oscar & Roni	22250	708 Ave	Dassel,	MN	55325
O'Brien, Terry & Jenna	70366	219 St	Dassel,	MN	55325
Ohme, Daniel G. & Sheryle	69226	213 St	Darwin,	MN	55324
Olsen, Mark & Dianne M.	69159	233 St	Dassel,	MN	55325
Olsen, Trygve & Tonia	69300	233 St	Dassel,	MN	55325
Olson, Field & Cynthia	22925	696 Ave	Dassel,	MN	55325
Olson, James & Joanne	67735	217 St	Darwin,	MN	55324
Omberg, Eric & Pauline	22780	CSAH 14	Darwin,	MN	55324
Omberg, Patricia	22850	CSAH 14	Darwin,	MN	55324
Ooley, Bill & Bev	67760	217 St	Darwin,	MN	55324
Ooley, William	68679	233 St	Dassel,	MN	55325

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O'Shea, Lori	67922	217 St	Darwin,	MN	55324
Parks, Doug & Lisa	69551	213 St	Darwin,	MN	55324
Paul, Steven & Diane	22537	CSAH 14	Darwin,	MN	55324
Paulson, Amy	22395	708 Ave	Dassel,	MN	55325
Paulson, David & Connie	69279	233 St	Dassel,	MN	55325
Paulson, Robert & Sheila	68430	215 St	Darwin,	MN	55324
Paulson, Timothy & Candace	70375	229 St	Dassel,	MN	55325
Peterson, Daniel	70016	218 St	Dassel,	MN	55325
Phelps, Mike & Brenda	22373	708 Ave	Dassel,	MN	55325
Plath, Kyle & Leah	68186	215 St	Darwin,	MN	55324
Polt, Beverly & James	22307	708 Ave	Dassel,	MN	55325
Portele, Rod	22151	CSAH 14	Darwin,	MN	55324
Quast, David & Sheila	68240	233 St	Dassel,	MN	55325
Quast, Douglas & Connie	68344	233 St	Dassel,	MN	55325
Quinn, Reagan	22738	CSAH 14	Darwin,	MN	55324
Raisanen, Grant	70112	218 St	Dassel,	MN	55325
Rasmussen, Brett	67724	217 St	Darwin,	MN	55324
Rasmussen, Brett & Lisa	68482	215 St	Darwin,	MN	55324
Rasset, Gary & Robyn	22917	696 Ave	Dassel,	MN	55325
Rathe, Dave & Sue	69382	213 St	Darwin,	MN	55324
Read Tim, & Mary Jo Loncorich	22667	708 Ave	Dassel,	MN	55325
Reddi, Paul & Laurie	68830	233 St	Dassel,	MN	55325
Reed, Lonny	70423	229 St	Dassel,	MN	55325
Reed, Mark & Lynn	69497	233 St	Dassel,	MN	55325
Regenscheid, Ron & Steph	22741	708 Ave	Dassel,	MN	55325
Reichow, Robert & Karen	67854	217 St	Darwin,	MN	55324
Reinke, Kenneth & Dorothy	68297	233 St	Dassel,	MN	55325
Rettke, DuWayne & Janet	22871	705 Ave	Dassel,	MN	55325
Rettman, Georgia	68108	215 St	Darwin,	MN	55324
Rickeman, John & Donna	68448	215 St	Darwin,	MN	55324
Riebe, Steve	68102	217 St	Darwin,	MN	55324
Rindal, Gary & Linda	70074	218 St	Dassel,	MN	55325
Roehl, Benno & Marlys	22077	CSAH 14	Darwin,	MN	55324
Rogers, John & Brenda	22490	CSAH 14	Darwin,	MN	55324

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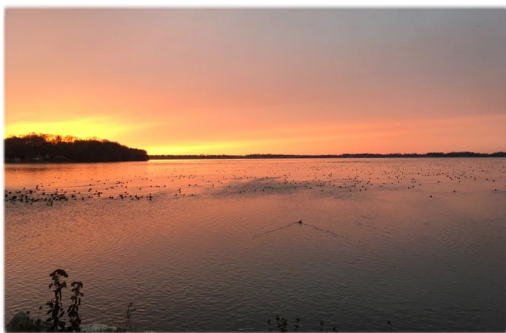
Rohy, David & Joyce	22599	CSAH 14	Darwin,	MN	55324
Roiger, Randy & Angie	68330	233 St	Dassel,	MN	55325
Rothstein, Dan & Abby	22382	708 Ave	Dassel,	MN	55325
Rueckert, Roxanne & Richard Block	67759	217 St	Darwin,	MN	55324
Rusch, Roger & Marge	68804	215 St	Darwin,	MN	55324
Ruschmeyer, Vernon & Renee	70036	218 St	Dassel,	MN	55325
Saber, David	68373	233 St	Dassel,	MN	55325
Saber, Tony & Terry	68361	233 St	Dassel,	MN	55325
Samson, Kalin & Nancy	68195	233 St	Dassel,	MN	55325
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