

What can (and should) I do about fluctuating water levels on my property?

Purpose

The purpose of this document is to provide shoreline property owners experiencing fluctuating water levels with information to help them protect their property without damaging natural resources, causing problems on neighboring properties, or incurring repeat maintenance costs.

Overview

Minnesota has experienced several years of very wet conditions. More frequent and extreme rain events have resulted in high water on some lakes and rivers around the state, particularly on landlocked lakes that have no natural outlets. At the same time, parts of the state are experiencing low water levels. With climate change, this could become the new norm. It is disheartening to see property lost to high water or erosion, and many property owners are asking what they can do to protect their homes and property. This document provides information to help property owners make informed decisions when dealing with water level problem.



Erosion is common on waterbodies with fluctuating water levels. The establishment of adaptable deep rooted, native, woody vegetation and can prevent damage and beautify the lake. Photo credit: Murray County

How is land regulated along lakes and rivers?

Before determining an approach for dealing with high water, it is important to know what regulations apply. Local floodplain and shoreland ordinances are the primary regulations affecting activities like filling, and are in place to preserve natural benefits of shoreline and floodplain areas.

Key statewide minimum requirements include:

(Contact your local government for special regulations and permitting requirements that may apply to your lake or river)

- **Floodplain management ordinances:**
 - Prohibit filling that causes increases in flood elevations or increases in potential flooding on other properties.
 - Prohibit filling that has the potential to change water flow patterns that causes erosion.
 - Prohibit storage of materials that are injurious to human, animal, or plant life, such as pesticides, fuel, lawn chemicals, pool supplies, and batteries.
- **Shoreland management ordinances:**
 - Prohibit intensive vegetation removal in the near shore area, or Shore Impact Zone (SIZ). Removing vegetation to place fill or placing fill over existing vegetation that effectively kills the vegetation can constitute intensive vegetation removal.
 - Require a permit for filling or grading in excess of 10 cubic yards in the SIZ, which requires an assessment by the local government of any impacts to wetlands.
 - Limit the size, design, and grading associated with riprap. Riprap that extends below the ordinary high water level may require DNR approval or permits.

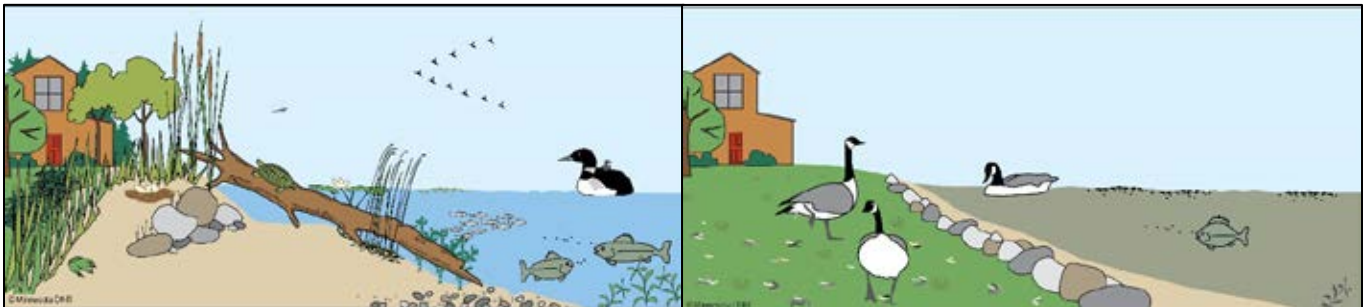
What are options to reduce high water damage without damaging shore health?

The options for reducing high water damage while retaining and/or improving shoreline health depend on a variety of factors, including the type of problems high water is causing, topography, and physical space limitations. In general, the preferred methods for dealing with high water damage in order of priority include:

- Moving small nonconforming structures out of low lying areas.
- Elevating structures in place on raised foundations.
- Elevating structures, facilities and water access paths on fill with creating lower retention areas or rain gardens and restoring natural vegetation.
- Elevating structures, facilities and access paths on fill and hard armoring waterside with riprap or walls while creating lower retention areas or rain gardens and restoring with natural vegetation.

Why do water levels change?

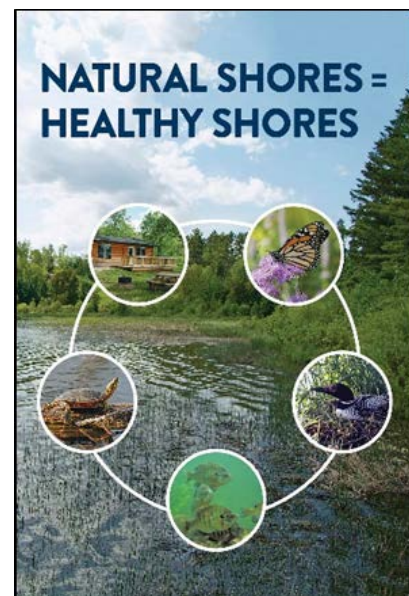
- Lakes and rivers go through natural wet and dry cycles. These natural cycles can last from weeks to years.
- The degree of water level fluctuation vary based on factors like watershed size, outlet capacity, soils, impervious coverage, and type of land cover and development. To see the water levels on your lake, visit the [DNR's LakeFinder](#).
- We are experiencing measurable trends from climate change – warmer winter lows and more frequent and extreme rain events. Although we don't know the magnitude of future changes, periods of extended high water, as well as low water levels, are predicted.



The left image shows water quality, habitat, and rich biodiversity of a natural shoreline in contrast with the altered shoreline to the right.

In all cases, filling in the near shore areas and hard armoring should be a last resort. Natural shores are healthy shores.

Because of the many benefits of natural shorelines, vegetation removal and filling along the shore should be limited to the minimum necessary to provide a path to the dock and to provide sitting or beach areas that meet local regulations. In certain cases, filling may be required to protect homes that were built before current regulations. Where filling is necessary to protect against structural damage, it is important for zoning administrators to evaluate the activities to prevent intensive vegetation removal – which is prohibited by ordinance. Permitting standards will typically require that altered areas are revegetated immediately, and often additional lands once water recedes.



What are the benefits of a natural shoreline?

Natural vegetation has deeper roots than typical lawns, and plants native to shore areas are better able to withstand the natural high and low water cycles.

The strip of land along lakes and rivers provides natural functions that are crucial for the health of our lakes and rivers. When vegetation is left natural and undisturbed in near shore areas, it:

- Creates a natural defense against the introduction and spread of invasive species.
- Holds soils in place and prevents erosion.
- Reduces erosion from wave and ice action.
- Protects water quality by filtering nutrients and pollutants.
- Stores water during flooding and periods of high water.
- Provides habitat for insects and animals that support the food web in lakes and rivers.
- Discourages congregation of geese.



Contrast the shallow roots of Kentucky bluegrass to the deep, dense roots of natives.

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Common Scenarios & Options for Addressing High Water

The main types of high water damage include damages to:

- Primary structures (i.e., homes and businesses) with potential impact to health and safety.
- Accessory structures and recreational facilities, or reductions in ability to use those resources.
- Lawns and loss of access to or use of portions of property.
- Loss of square footage for the parcel.

The following pages detail four scenarios commonly encountered during high water. For all scenarios, consult local zoning officials early in the process about the options.

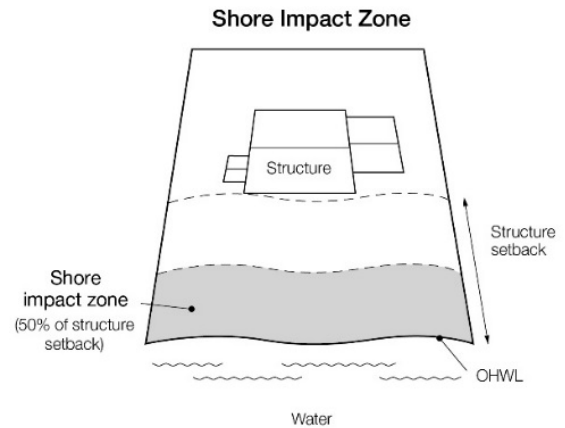
Scenario 1 - Home built legally before current regulations is too low and close to the lake.

Best Options:

- Move the building to higher ground, or a new higher foundation, further from the shoreline. This is likely to be the best long-term option if the structure is in the shore impact zone (see figure below).
- If there is no room to move the building further back, fill the crawl space or basement and raise the building and place it on new elevated foundation.
- Restore natural vegetation along as much of the shore area as possible to help prevent further scour and future damage due to high water.

Other Options:

- Fill and hard-armour only the minimum needed to protect the building, and ensure these activities are not increasing flood elevations or causing additional runoff onto neighboring properties. If fill and hard-armor are necessary in the shore impact zone, minimize the removal of existing vegetation and restore any vegetation that has been removed.



Scenario 2 – Water oriented accessory structures, play sets, other accessory structures are too low and subject to flooding.

Best Option: Move to higher location. Restore affected area with natural vegetation and allow to flood.

Other Options:

- Replace or retrofit structures with flood resistant materials and design.
- If located outside of the Shore Impact Zone, consider selective filling to elevate and reduce future damage potential.



Flood prone accessory structures on a lake with fluctuating water levels. Photo credit: Lake Shamineau Lake Improvement District

Scenario 3 – Damage to retaining wall or riprapped shoreline.

Best Options:

- Work with your local officials, including Soil and Water Conservation District (SWCD) and/or watershed district staff (when available) on a stabilization plan for your shoreline.
- Replace walls/riprap with a sloped area protected with natural vegetation that is more tolerant of wetter conditions and has deeper roots (In areas with history of ice damage and waves, a bio-engineered approach – using a combination of riprap and natural vegetation, should be considered).
- Replace current and perennially waterlogged lawn areas with natural native vegetation, or regrade to balance adequate lawn areas and paths to the dock with lower retention areas or “rain gardens.”

Other Options:

- Outside of the Shore Impact Zone, consider fill to prevent encroachment of flood waters on existing buildings, as long as it does not increase flood damage potential for neighbors.
- Within the Shore Impact Zone, do a combination of regrading to retain path to dock and allowable beach area, while providing more retention area (e.g., “rain gardens”) and replacing shallow rooted lawn areas that are easily eroded with deep rooted natural native vegetation.



Property owners are encouraged to seek alternative solutions to shoreline erosion issues other than hard armoring. Many Soil and Water Conservation Districts often provide recommendations and assistance for this type of shoreline protection. Photo credit: Stearns County SWCD

Scenario 4 – Wet lawns & threatened trees

Best Options:

- Replace perennially waterlogged lawns with natural buffers suited to wet conditions. Balance access and recreational use areas with these buffers or rain gardens designed to capture runoff. Work with your local Soil and Water Conservation District (SWCD) and/or watershed district staff (when available) on a protection or restoration plan for your lot.
- Consider planting, and maintaining, new trees or shrubs better suited to wet conditions.

Other Options:

- Where erosion has exposed root systems of woody vegetation, fill as necessary to protect the root system to prevent uprooting and further loss. Reestablish the areas around the trees or shrubs with other deep rooted native vegetation to hold the soil in place.
- Do combination of regrading to retain path to dock and beach area, while providing more retention area (e.g., “rain gardens”) and replacing shallow rooted lawn areas that are easily eroded with deep rooted natural native vegetation.



A shoreline restoration doesn't mean a property owner needs to sacrifice all recreational uses of their yard. The design above included a natural approach to shore stabilization, establishment of a native buffer, while accommodating for shoreline access and a view to the water. Photo credit: Stearns County SWCD

DNR Resources

- [Restore Your Shore](#) (online tool for shoreland owners and professionals to use in shoreland restoration and protection projects)
- [Shoreline Alterations: Natural Buffers and Lakescaping \(2012\)](#)
- [Healthy Shorelines \(2012\)](#)
- [Natural Shoreline: Natural Shorelines Minimize Development Impacts on Minnesota Lakes and Streams \(2008\)](#)
- [Score Your Shore](#) (tools to assess your site)
- [The Shape of Healthy Streams: Characteristics of Natural Watercourses](#)
- [Stream Habitat Program Resource Sheet 1: Streambank Erosion and Restoration](#)
- [Stream Habitat Program Resource Sheet 2: The Value and Use of Vegetation](#)
- [Shoreline Alterations: Riprap](#)
- [Shoreline Alterations Information Sheets](#)

This document is informational only and should not be interpreted as creating new criteria or requirements beyond what is established in state law.