Aeration Permits for Shoreline Protection: What to know before applying for an aeration permit

Lake property owners are sometimes confronted with ice heaves, a natural process in which lake ice pushes against shorelines, moving soil and rock, shifting docks, and damaging structures.

When ice heaving causes significant, documented shoreline or structural damage, an aeration system may be a workable option for limiting future impacts. However, operating an aeration system requires a permit and there are important things to know about what the DNR can and cannot authorize before application.

Regulatory criteria:

Minnesota Rule 6116.0030, Subpart 2 states that an aeration permit may be issued when the DNR determines that both of the following are true:

1. Substantial benefit to the lake resource will result.

A substantial benefit is a documented, meaningful improvement to the public water body that includes its fish, wildlife, water quality, and public uses. The benefit must be sufficient to justify the public safety risk of creating open water and benefit the lake in general and not private interests alone.

2. Aeration is compatible with natural resource management and public safety goals for the waterbody.

The proposed system must align with lake management goals and must not create a public safety hazard that cannot be adequately mitigated.



Evidence of ice heave damage moving rocks, soil and shoreline structures on Lake Lida in Otter Tail County.

Photo credit: Minnesota DNR, Ice Ridge Photos

IMPORTANT: Open water on a frozen lake is a serious public safety hazard. For this reason, not all shoreline aeration proposals can be permitted. The Minnesota Department of Natural Resources (DNR) authorizes these permits only when the demonstrated need for shoreline protection outweighs the public safety risk it creates. For example, a permit may not be issued for aeration even if it is otherwise warranted when a significant safety risk is present, such as shorelines near public access locations.

A demonstrated need is required

The existence of an undesirable natural condition, such as ice heave, does not by itself establish a demonstrated need for aeration. The applicant must demonstrate that there is a significant resource management concern to be addressed, or a specific and substantial risk to a shoreline or structure, for which aeration has been determined an appropriate management strategy, is present.

To establish demonstrated need for aeration, applicants must show there is sufficient site-specific evidence that ice heave is causing or will cause significant shoreline or structural damage **AND** that aeration is the appropriate response to mitigate that damage.

Evidence that can show demonstrated need:

- **Dated photographs:** Photos showing displaced or buckled riprap, cracked retaining walls, or impacts to man-made structures as the result of ice heaving and repair receipts for past damage at the site.
- **Site-specific physical conditions:** Evidence that suggests a high and demonstratable risk of future ice damage. For example, an existing structure on an exposed shoreline with documented recurring erosion and/or severe ice conditions.
- **Documentation provided by the applicant:** Photos or other documentation demonstrating that other reasonable shoreline protection measures, including the presence or planting of natural vegetation or setback adjustments, are insufficient or inappropriate for the specific site conditions at this location.

Evidence that does not show demonstrated need:

- **A shoreline without documented ice damage:** A shoreline that has not experienced documented damage does not demonstrate a need for aeration. The presence of riprap alone does not establish that aeration is needed or appropriate.
- **Minor ice push activity without structural damage:** Some degree of ice contact with a shoreline is normal and expected. Ice push marks or minor surface disturbance without documented structural damage or displacement do not constitute demonstrated need.
- **Damage to, or concern for, a dock, boat lift, or other structure that can be removed for winter:** Seasonal structures that can be removed do not require aeration for protection. Seasonal removal is the appropriate management response.
- **The installation of a permanent dock or other permanent structure**: This does not establish a demonstrated need for aeration if there is no history of ice heave damage. If your shoreline is prone to ice damage, a permanent structure is likely not a good choice.
- **Damage to, or concern for, a lawn, garden, landscaping, or riprap maintained in the shore impact zone[1]:** Normal seasonal ice action may cause minor disturbance or damage to lawns, landscaping, vegetation, or riprap within or near the shore impact zone. The presence of these features, or concern

[1] Shore Impact Zone: The area of a parcel that is adjacent to the lake and is half of the structure setback.

about ice contact, does not by itself demonstrate a need for aeration. Preserving natural vegetation in a shore impact zone is a great way to minimize the effects of mild ice damage.

Ice ridges can be good for the lake and your shoreline!

The ecological benefits of natural ice ridges are numerous

Ice ridges are the berms of soil, rock, and other organic material pushed shoreward by ice and are natural features that provide documented ecological benefits to Minnesota lakes:

- Over time, ice ridges build upon themselves, forming bulwarks of natural shoreline protection that improves with age and supports near-shore plant communities that protect and stabilize the shoreline.
- They create a barrier to pollutants from adjacent land, intercepting and filtering runoff before it enters the lake.
- Ice ridges and the near-shore vegetation provide shade, cover, nesting habitat, and spawning areas that benefit fish, birds, and aquatic wildlife.

Authorizing aeration to prevent ice ridge formation eliminates these ecological functions. The DNR weighs this ecological cost when evaluating whether a shoreline protection permit is compatible with natural resource management goals for the waterbody.

Can natural vegetation protect my shoreline from ice heaving?

Yes. It can be more effective than riprap or other types of armoring over the long term. Natural shoreline vegetation, both in the water and on land, provides protection against ice heave damage in several important ways:

- Root systems anchor substrate and resist ice displacement.
- Aquatic emergent vegetation, such as bulrushes, cattails, and sedges, helps dissipate ice energy before it reaches the shoreline.
- Established natural buffers absorb ice pressure and recover naturally after ice contact.
- Near-shore vegetation builds natural protective berms over time through repeated ice ridge accumulation.

The DNR's natural shoreline guidance consistently identifies native vegetation as one of the best protections against both wave erosion and ice heave. Shorelines with established natural vegetation typically demonstrate lower risk of significant ice damage than mowed or armored shorelines.

If you experience infrequent or isolated damage events and the site conditions do not indicate a high, recurring risk (i.e., lake size, shoreline exposure), natural vegetation establishment and/or allowing ice ridges to form may be a more protective response.

Shoreline Protection Aeration Permit

A shoreline protection aeration permit authorizes a property owner to operate an aeration system during the ice cover season to maintain a small area of open water adjacent to their shoreline. This open water may help reduce lake ice and the shoreline impacts it sometimes causes.

Is a permit required?

A permit from the DNR is required for any aeration system operated on public waters.

What information will the DNR ask for when you apply for a permit?

- Describe the specific problem you are trying to address. Explain in detail the "demonstrated need" for an aeration system.
- Submit photos or other documentation of ice damage on your shore and/or at other nearby shorelines on your lake.
- Describe the benefit to the water resource, not just to your property.
- Describe your shoreline, including whether it is riprapped or naturally vegetated.

For every shoreline protection permit, DNR staff evaluate:

1. What are the substantial benefits to the lake resource? How does the proposed aeration produce a positive benefit to the public water body that includes its ecology, recreation, and biology that outweighs the public safety risk of open water?
2. What is compatibility with resource management goals? Is the proposed aeration system compatible with how the lake is managed?
3. What is compatibility with public safety goals? Does the proposed open water area create an unmanageable hazard to recreational lake users, nearby public access sites, snowmobile trails, or other commonly used areas on the lake?
4. Is there a demonstrated need for aeration? Is there enough site-specific information to establish that an identifiable resource condition, management objective, or significant site-specific concern exists?
5. Is aeration the appropriate management response? It must be determined that aeration is an appropriate management strategy to address the resource concern.
6. What are the open water dimensions? Is the proposed open water area the minimum size necessary for the stated purpose? The DNR is required to limit open water to the smallest effective area. This area must not impede neighboring shoreline owners' ability to access the lake resource. Open water areas that are likely to migrate beyond property owned by the permittee during the aeration period are not likely to be authorized without the permission of neighboring landowners.

How do I apply?

If you believe that you can meet the above criteria under Minnesota Rule 6116 and have site-specific evidence supporting a demonstrated need for aeration, submit an aeration permit application through the Minnesota DNR Permitting and Reporting System (MPARS): **dnr.state.mn.us/mpars**

Application fee

A $250 non-refundable application fee is required. Proof of liability insurance, signage, and publication of public notices are also required for approved permits in most cases.

Additional considerations:

The lake resource belongs to all Minnesotans

Minnesota public waters are regulated by the state for reasons including ecological, recreational, and biological benefit of the public. An aeration permit that creates a public safety hazard on a public water body must be justified by a documented benefit to the water resource.

Before damage occurs

The simplest means of avoiding ice damage is to ensure personal property is out of the path of the ice. Removing docks and seasonal structures for the winter, maintaining natural vegetation buffers, and observing setback requirements all reduce ice heave risk without creating public safety hazards or the need for aeration.

If damage occurs in a future season

If your shoreline experiences ice heave damage after a permit has been denied, document the damage thoroughly with dated photographs and a written description of what was damaged and how. A new or revised permit application supported by that documentation will be re-evaluated.

Annual permit renewals and evolving standards

Property owners with existing permits should be aware that we are updating how we evaluate shoreline protection aeration to more closely reflect the requirements of Minnesota's aeration laws (Minn. Rule 6116). We will provide advance notice of any significant changes to renewal evaluation criteria so that applicants have time to consider alternatives and document conditions at their property.

Questions?

For more information, contact your regional DNR Area Hydrologist or the Aeration Program Coordinator: Denise Elston, (218) 580-8646, denise.elston@state.mn.us.

Natural Shoreline Resources: Where appropriate, DNR encourages you to consider natural alternatives to riprap to control shoreline erosion, enhance aesthetic values, and contribute to better water quality in your lake.

DNR Natural Shorelines: https://www.dnr.state.mn.us/lakescaping

DNR Shoreline Alterations: https://www.dnr.state.mn.us/waters/shoreline-alteration-healthy.html

DNR Shoreline Ice Ridges: https://www.dnr.state.mn.us/waters/watermgmt_section/pwpermits/ice_ridges.html