Minnesota Coastal Management Program Assessment and Strategy

2026 to 2030

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Introduction

Minnesota is proud to be a part of the National Coastal Zone Management Program. For more than 25 years, we have worked together with the National Oceanic and Atmospheric Administration (NOAA) to make Minnesota's coastal area the best it can be. With the help of hundreds of other partners, we work to keep lakes, rivers and streams clean; reduce risks from hazards like flooding and erosion; restore streams, forests and wetlands; improve access to Lake Superior and its tributaries; and ensure cities and towns grow sustainably and become more resilient.

The Minnesota Department of Natural Resources (DNR) leads the efforts on the state side through the implementation of Minnesota's Lake Superior Coastal Program (Coastal Program). Every year, the DNR receives approximately $1.0 million from NOAA, which the Coastal Program puts to work on projects and initiatives throughout the coastal area.

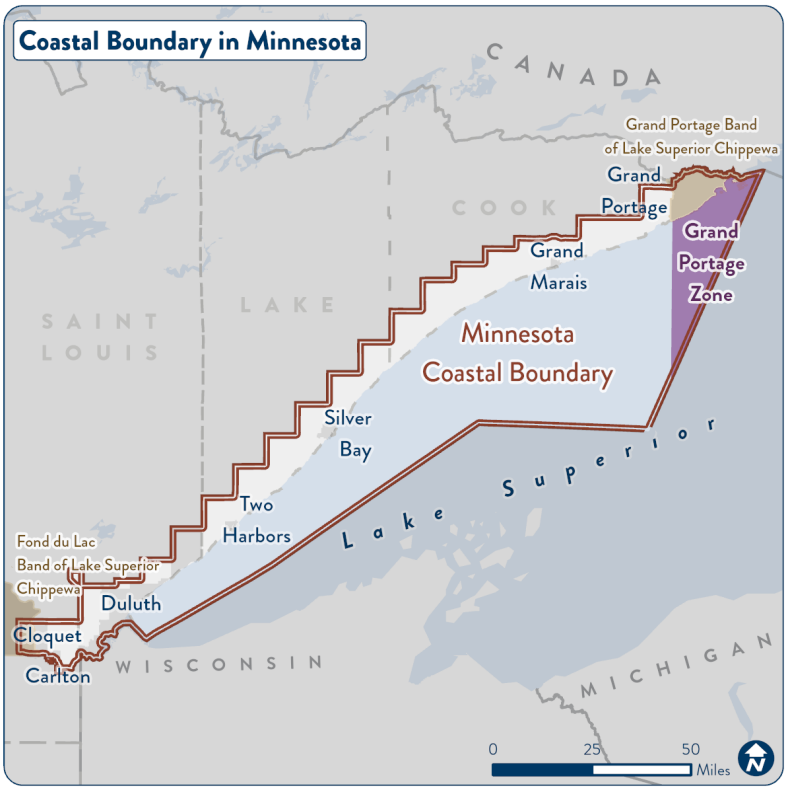

Figure 1. A map identifying Minnesota's coastal area

Every five years, NOAA opens an opportunity for the 34 national programs to complete what coastal programs call a Section 309 Assessment and Strategy, a nod to Section 309 of the Coastal Zone Management Act. Programs that complete the Assessment and Strategy are eligible for funding separate from their base funding to implement their identified strategies. In addition, they can compete for even larger awards called Projects of Special Merit.

Despite this exciting opportunity, Minnesota has not participated since 2015. This year (2026) that changes. The Coastal Program is joining most of the other programs in taking a closer look at ways the state can improve its operations across nine areas: wetlands, coastal hazards, public access, marine debris, cumulative and secondary impacts, special area management planning, Great Lakes resources, energy and government facility siting and aquaculture. It is doing so in accordance with the requirements outlined in NOAA's Enhancement Program. Steps in this process include:

1. Completing a Phase I, high-level assessment of the nine enhancement areas.
2. Identifying a high, medium or low priority to each area.
3. Completing a Phase II, more in-depth assessment of high-priority areas.
4. Developing strategies to address management needs discovered during the Phase II assessment.

As part of the process, the Coastal Program actively sought public input to inform the final version of the assessment. To engage stakeholders, the Coastal Program sent out a survey to over 400 coastal leaders and professionals. The survey was designed to gather input on what these stakeholders felt were high-priority enhancement areas for the state's coastal region, the critical problems related to those priority areas, and the greatest opportunities for the Coastal Program to strengthen and enhance its program to more effectively address those problems.

The engagement survey was open for two weeks and promoted through the Coastal Program's email contact with key stakeholders. A total of 103 responses were received, providing valuable insights into coastal management priorities and perceived Lake Superior coastal area threats.

Key findings included providing additional state-level support to the region's:

- Management Priorities
    - Survey respondents identified coastal growth and development impacts, coastal hazards, and public access as the top three priorities for coastal zone management.
    - Notably, respondents identified erosion as the most significant threat related to both coastal growth and development and coastal hazard categories.
- Needs and Information Gaps
    - Ordinances and policies to better regulate and guide coastal development and hazard mitigation.
    - Communication and outreach to improve public awareness and stakeholder engagement.
    - Technical assistance, including training and capacity building, to support local implementation and resilience efforts.

Based on these survey results and our more detailed assessment, the Coastal Program has determined that it will direct future resources towards addressing Coastal Hazards. Specifically, the program has set forth a strategy to prepare communities to address coastal erosion by equipping them with the capacity, resources and maps they need to develop or revise local policies, plans and ordinances.

Phase I Assessments

II. Wetlands

Section 309 Enhancement Objective: Protection, restoration, or enhancement of the existing coastal wetlands base, or creation of new coastal wetlands. §309(a)(1)

Note: For the purposes of the Wetlands Assessment, wetlands are "those areas that are inundated or saturated at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions." [33 CFR 328.3(b)]. See also pg. 14 of the CZMA Performance Measurement Guidance[1] for a more in-depth discussion of what should be considered a wetland.

Phase I (High-Level) Assessment Purpose: To quickly determine whether the enhancement area is a high-priority enhancement objective for the CMP that warrants a more in-depth assessment. The more in-depth assessments of Phase II will help the CMP understand key problems and opportunities that exist for program enhancement and determine the effectiveness of existing management efforts to address those problems.

Resource Characterization

1. Status and Trends of Coastal Wetlands

Using the tables below as a guide, provide information on the status and trends of coastal wetlands. Be as quantitative as possible using state or national wetland trend data. The tables are information presentation suggestions. Feel free to adjust column and row headings to align with data and time frames available in your state or territory. If quantitative data is not available for your state or territory, provide a brief qualitative narrative describing wetlands status and trends and any significant changes since the last assessment.

Current state of **all** wetland types across the coastal area in 2024 (acres): **132,537.6**[2]

[1] coast.noaa.gov/data/czm/media/czmapmsguide.pdf

[2] From GIS analysis of 2016 and 2021 NOAA C-CAP Data - Nataniel Harold and John McCommbs, January 21, 2025.

Table 1: Coastal Wetlands Status and Trends

Change in Wetlands	From 2016-2021
Percent net change in total wetlands (% gained or lost)	0%
Percent net change in freshwater (palustrine wetlands) (% gained or lost)	0%
Percent net change in saltwater (estuarine) wetlands (% gained or lost)	Not applicable (no saltwater wetlands)

Table 2: How Wetlands Are Changing

Land Cover Type	Area of Wetlands Transformed to Another Type of Land Cover between 2016-2024 (Sq. Miles)
Development	- 0.02
Agriculture	0.01
Barren Land	- 0.03
Water	2.34

Management Characterization

1. Significant Management Changes

Indicate any significant changes at the state or territory level (positive or negative) since the last assessment that could impact the future protection, restoration, enhancement, or creation of coastal wetlands.

Table 3: Significant Changes in Wetland Management

Management Category	Significant Changes Since 2016 (Yes or No)
Statutes, regulations, policies, or case law interpreting these	Yes
Wetlands programs (e.g., regulatory, mitigation, restoration, acquisition)	Yes

2. Explanation of Management Changes

For any management categories with significant changes, briefly provide the information below. If this information is provided under another enhancement area or section of the document, please provide a reference to the other section rather than duplicate the information.

a. Describe the significance of the changes;
b. Specify if these changes were 309 or other CZM-driven changes; and
c. Characterize the outcomes or likely future outcomes of the changes.

Statutes, Regulations, Policies, or Case Law

Table 4: Explanation of Changes to Statutes, Regulations, Policies or Case Law

Statutes, Regulation, Policy, or Case Law	Significance/Nature of Change	309 or other CZM-driven change (Yes or No)	General Outcome
Minnesota Statutes 2016, section 103G.005, subdivision 10b.	In wetland replacement permits.[3] Two area designations for replacement, <80% and >80%. Area designations (<80% and >80%) are based on bank service area (BSA) not county boundaries as previously designated. "County" has been eliminated as a factor in the priority order for replacement.	No	The immediate significance of the statute change is that if replacement is proposed within the same bank service area (BSA) as the impact, there are no restrictions related to replacement areas.
Sec. 76. Minnesota Statutes 2022, section 103G.005, subdivision 17b, amendment.	The Board of Water and Soil Resources (BWSR) changed definition of wetland type to wetland types classified according to Wetlands of the United States, United States Fish and Wildlife Service Circular 39 (1971 edition). Or A Hydrogeomorphic Classification for Wetlands, United States Army Corps of Engineers (August 1993), including updates, supplementary guidance, and replacements, if any, as determined by the board.	No	This allows for the use of the Hydrogeomorphic Classification for Wetlands (HGM) for determining wetland type. Circular 39 remains in statute as an optional wetland typing method and is relevant to the identification of public water wetlands under Minn. Stat. 103G.005, Subd. 15a.

[3] 2017 WCA Statute Change Related to Wetland Replacement Areas, BWSR, September 2017.

Statutes, Regulation, Policy, or Case Law	Significance/Nature of Change	309 or other CZM-driven change (Yes or No)	General Outcome
Sec. 77. Minnesota Statutes 2023 Supplement, section 103G.005, subdivision 19, amendment.	Paragraph added to include deepwater aquatic habitats that are not public waters or public waters wetlands.	No	WCA (Wetland Conservation Act) regulatory authority will now apply to deepwater habitats that are not designated as public waters. All replacement requirements, exemptions, application procedures, etc. will apply to projects involving these deepwater habitats.
Sec. 80. Minnesota Statutes 2022, section 103G.2241, subdivision 2,	(a) A replacement plan is not required for draining or filling of wetlands, except for draining wetlands that have been in existence for more than 25 years, resulting from maintenance and repair of existing drainage system including public drainage systems. (b) public drainage authority may, as part of the repair of a public drainage system install control structures, realign the ditch, construct dikes along the ditch, or make other modifications as necessary to prevent the drainage of wetlands.	No	Eliminates the drainage exemptions in subdivision 2, except for the drainage of wetlands that have existed for 25 years or less resulting from maintenance and repair of existing drainage systems. The amended exemption eliminates wetland type as a consideration for eligibility and applies to both public and private drainage systems.

Statutes, Regulation, Policy, or Case Law	Significance/Nature of Change	309 or other CZM-driven change (Yes or No)	General Outcome
Sec. 81. Minnesota Statutes 2022, section 103G.2241, subdivision 6, amendment.	A replacement plan for wetlands is not required for wetland impacts resulting from: New placement or maintenance, repair, enhancement, realignment, or [4]replacement of existing utility or utility-type service, including pipelines, when wetland impacts are authorized under and conducted in accordance with a permit issued by the United States Army Corps of Engineers under section 404 of the federal Clean Water Act, United States Code, title 33, section 1344. The direct and indirect impacts of the proposed project have been avoided and minimized to the extent possible. For repair and updating of existing subsurface sewage treatment systems necessary to comply with local, state, and federal regulations, work of an emergency nature may proceed as necessary, and any drain or fill activities must be addressed with the local government unit after the emergency work has been completed.	No	Eliminates the acreage-based condition of the utilities exemption and now subjects the exemption to a requirement that the wetland impacts be authorized by and conducted in accordance with a U.S. Army Corps of Engineers Section 404 permit. A local government unit can no longer issue a seasonal or annual exemption for a public utility as the exemption is now dependent on a Corps permit.

[4] 2024 Legislative Summary, BWSR May, 2024

Statutes, Regulation, Policy, or Case Law	Significance/Nature of Change	309 or other CZM-driven change (Yes or No)	General Outcome
Sec. 83. Minnesota Statutes 2023 Supplement, section 103G.2242, subdivision 1, amendment	Added provisions that protect, or mitigate impacts to, intermittent and perennial watercourses upstream of public waters identified under section 103G.005, subdivision 15, paragraph (a), clause (9) or (10).	No	Authorizes BWSR to amend the WCA rules to regulate reaches of intermittent and perennial watercourses that are not identified as public waters.
Sec. 84. Minnesota Statutes 2022, section 103G.2242, subdivision 2, amendment.	For wetland boundary determinations, the Technical Evaluation Panel must use the "United States Army Corps of Engineers Wetland Delineation Manual", United States Army Corps of Engineers (January 1987), including updates, supplementary guidance, and replacements. For wetland type determinations, the panel must also use Wetlands of the United States" (United States Fish and Wildlife Service Circular 39, (1971 edition), and Classification of Wetlands and Deepwater Habitats of the United States, United States Fish and Wildlife Service (August 2013 edition); or A Hydrogeomorphic Classification for Wetlands, United States Army Corps of Engineers (August 1993), according to rules authorized under this part and including updates, supplementary guidance, and replacements, if any, for any of these publications.	No	The edits update references to the Corps of Engineers wetland delineation manual and associated U.S. Fish and Wildlife Service wetland/deepwater habitat classification system. The statute now allows for the use of the HGM wetland classification system in wetland boundary/type determinations according to rules adopted by BWSR (WCA rules). The language also clarifies that future updates, supplements, and replacements of referenced documents can be used.

Wetland Programs

Table 5: Explanation of Changes to Wetland Programs

Wetland Program	Significance/Nature of Change	309 or other CZM-driven change (Yes or No)	General Outcome
Sec. 86. Minnesota Statutes 2022, section 103G.2242, subdivision 3, amendment.	The board may establish, sponsor, or administer a wetland banking program, which may include provisions allowing monetary payment to the wetland banking program for impacts to wetlands. The board may establish wetland credit and in-lieu fee payment amounts and hold money in an account in the special revenue fund, which is appropriated to the board to be used solely for establishing replacement wetlands and administering the wetland banking program.	No	Clarifies BWSR's authority to develop, sponsor, and administer the wetland banking program, including an in-lieu fee program and/or the associated collection of payments. It also clarifies BWSR's ability to establish fee payment amounts and hold money associated with deposited wetland credits and in-lieu fee payments.

Enhancement Area Prioritization

1. Priority Level

What level of priority is the enhancement area for the coastal management program?

☐ **High**

☒ **Medium**

☐ **Low**

2. Rationale

Briefly explain the reason for this level of priority. Include input from stakeholder engagement, including the types of stakeholders engaged.

Based on the 2025 stakeholder engagement process findings and resource management characterizations, the DNR has identified wetlands as a Medium-priority enhancement area. This determination reflects a combination of stable wetland trends, moderate stakeholder concern, and the presence of ongoing management efforts.

Survey participants named *development and fill* as the top threat to wetlands, selecting it 11 times as the biggest concern. Other threats—such as *pollution*, *invasive species*, and *changes to water flow* also received attention, but less often. This shows that wetlands face several challenges, although no single issue stands out as urgent.

Most respondents who chose *development and fill* as the top threat did so based on their own work or personal experience. This suggests that while experts see the problem, it may not be widely recognized by the community. Participants also pointed to several ways the State could assist in addressing these concerns, including improving ordinances and policies, improving communication about wetland issues, and offering training or capacity-building opportunities.

Wetland data from 2016 to 2021 shows no net loss in coastal wetland area, and recent changes to state wetland laws have helped improve protection. Because wetlands remain stable and no single threat or need stands out, the DNR set wetlands as a medium priority. The agency will continue to monitor conditions and support improvements while focusing more attention on areas with greater need.

III. Coastal Hazards

Section 309 Enhancement Objective: Prevent or significantly reduce threats to life and property by eliminating development and redevelopment in high-hazard areas, managing development in other hazard areas, and anticipating and managing the effects of potential sea level rise and Great Lakes level change. §309(a)(2)

Note: For purposes of the Hazards Assessment, coastal hazards include the following traditional hazards and those identified in the CZMA: flooding; coastal storms (including associated storm surge); geological hazards (e.g., tsunamis, earthquakes); shoreline erosion (including bluff and dune erosion); sea level rise; Great Lake level change; land subsidence; and saltwater intrusion.

Phase 1 (High-level) Assessment Purpose: To quickly determine whether the enhancement area is a high-priority enhancement objective for the CMP that warrants a more in-depth assessment. The more in-depth assessments of Phase II will help the CMP understand key problems and opportunities that exist for program enhancement and determine the effectiveness of existing management efforts to address those problems.

Resource Characterization:

1. General Level of Hazard Risk

In the table below, indicate the general level of risk in the coastal zone for each of the coastal hazards.

Table 6A: General Level of Hazard Risk in the Carlton County[5]

Type of Hazard	General Level of Risk (High, Medium, Low)
Flooding (riverine, stormwater)	High
Coastal storms (including storm surge, windstorms and winter storms)	High (winter storms) and Medium (windstorms and hail)
Geological hazards (e.g., tsunamis, earthquakes)	Not assessed
Shoreline erosion	Not applicable
Sea level rise	Not applicable
Great Lakes level change	Not applicable
Land subsidence	Not assessed
Saltwater intrusion	Not assessed
Other: Wildfire	High
Other: Dam Failure	Low
Other: Drought	Low
Other: Extreme Cold	Medium
Other: Extreme Heat	Low

[5] From Appendix C – County Hazard Prioritization, Minnesota State Hazard Mitigation Plan (2024). Accessed November 14, 2024 from https://maps.umn.edu/hmp_hub/a-mn-state/MN%20State%20Hazard%20Mitigation%20Plan%202024.pdf.

Table 6B: General Level of Hazard Risk in the Cook County[6]

Type of Hazard	General Level of Risk (High, Medium, Low)
Flooding (riverine, stormwater)	Medium
Coastal storms (including storm surge, windstorms, winter storms and hail)	High (windstorms, winter storms and hail)
Geological hazards (e.g., tsunamis, earthquakes)	Not assessed
Shoreline erosion	Medium (erosion in general)
Sea level rise	Not applicable
Great Lakes level change	Not assessed
Land subsidence	Medium
Saltwater intrusion	Not assessed
Other: Wildfire	High
Other: Dam Failure	Low
Other: Drought	Medium
Other: Extreme Cold	Medium
Other: Extreme Heat	Medium

[6] From Appendix C – County Hazard Prioritization, Minnesota State Hazard Mitigation Plan (2024). Accessed November 14, 2024, from https://maps.umn.edu/hmp_hub/a-mn-state/MN%20State%20Hazard%20Mitigation%20Plan%202024.pdf.

Table 6C: General Level of Hazard Risk in the Lake County[7]

Type of Hazard	General Level of Risk (H, M, L)
Flooding (riverine, stormwater)	Medium
Coastal storms (including storm surge, windstorms, and winter storms)	Medium (windstorms) and High (winter storms)
Geological hazards (e.g., tsunamis, earthquakes)	Not assessed
Shoreline erosion	Not assessed
Sea level rise	Not applicable
Great Lakes level change	Not assessed
Land subsidence	Not assessed
Saltwater intrusion	Not assessed
Other: Wildfire	High
Other: Dam Failure	Low
Other: Drought	Medium
Other: Extreme Cold	Medium
Other: Extreme Heat	Medium

[7] From Appendix C – County Hazard Prioritization, Minnesota State Hazard Mitigation Plan (2024). Accessed November 14, 2024, from https://maps.umn.edu/hmp_hub/a-mn-state/MN%20State%20Hazard%20Mitigation%20Plan%202024.pdf.

Table 6D: General Level of Hazard Risk in St. Louis County[8]

Type of Hazard	General Level of Risk (High, Medium, Low)
Flooding (riverine, stormwater)	Medium to High
Coastal storms (including storm surge, windstorms, winter storms and hail)	High (windstorms, winter storms and hail)
Geological hazards (e.g., tsunamis, earthquakes)	Not assessed
Shoreline erosion	Medium to High (erosion in general)
Sea level rise	Not applicable
Great Lakes level change	Not assessed
Land subsidence	Not assessed
Saltwater intrusion	Not assessed
Other: Wildfire	Medium
Other: Dam failure	Low
Other: Drought	Low
Other: Extreme Cold	Medium
Other: Extreme Heat	Medium

[8] From Appendix C – County Hazard Prioritization, Minnesota State Hazard Mitigation Plan (2024). Accessed November 14, 2024, from https://maps.umn.edu/hmp_hub/a-mn-state/MN%20State%20Hazard%20Mitigation%20Plan%202024.pdf.

2. Additional Detail on Level of Risk and Vulnerability

If available, briefly list and summarize the results of any additional data or reports on the level of risk and vulnerability to coastal hazards within your state since the last assessment. The state's multi-hazard mitigation plan or risk assessment or plan may be a good resource to help respond to this question.

Risk and Vulnerability of Flooding, including Coastal Flooding[9]

Research conducted as part of the 2024 update to the Minnesota State Hazard Mitigation Plan found that a total of 35,449 structures could be potentially damaged in a 1% annual chance flood across the state. Researchers concluded that the estimated total building loss would be $2.66 billion statewide. In the four-county area that intersects the state's coastal zone, researchers estimate that 2,737 buildings will be damaged with a total structure loss of over $402 million. Table 5 breakdowns the numbers by county.

Table 7: Potential Structure Loss by County, 1% Annual Chance Flood

County	Number of Damaged Buildings	Potential Structure Loss
Carlton	49	$579,847
Cook	N/A	N/A
Lake	N/A	N/A
St. Louis	2688	$402,292,497
Total	**2,737**	**$402,872,344**

In the coastal zone, coastal flooding is a possibility. Coastal flooding "is dependent on anthropogenic activities as well as storm intensity and lake levels, which vary due to precipitation, evaporation and other natural processes. Ice cover, or the lack thereof, also impacts the risk of a flood hazard significantly." Conditions were right for coastal flooding six times between 2017 and 2023 according to reports from the National Centers for Environmental Information (NCEI). During each of these events north-northeast winds pushed water onto the shore or created waves more than 12 feet tall. The result was road closures, water flooding the streets, damage to homes, and large rocks and logs pushed up on shore. Damage costs from these events are in the multi-millions. Damage to the City of Duluth's Lakewalk alone costs more than $9.0 million to reconstruct.

[9] From Minnesota State Hazard Mitigation Plan (2024), Section 5: Natural Hazards. Accessed November 14, 2024, from https://maps.umn.edu/hmp_hub/a-mn-state/MN%20State%20Hazard%20Mitigation%20Plan%202024.pdf.

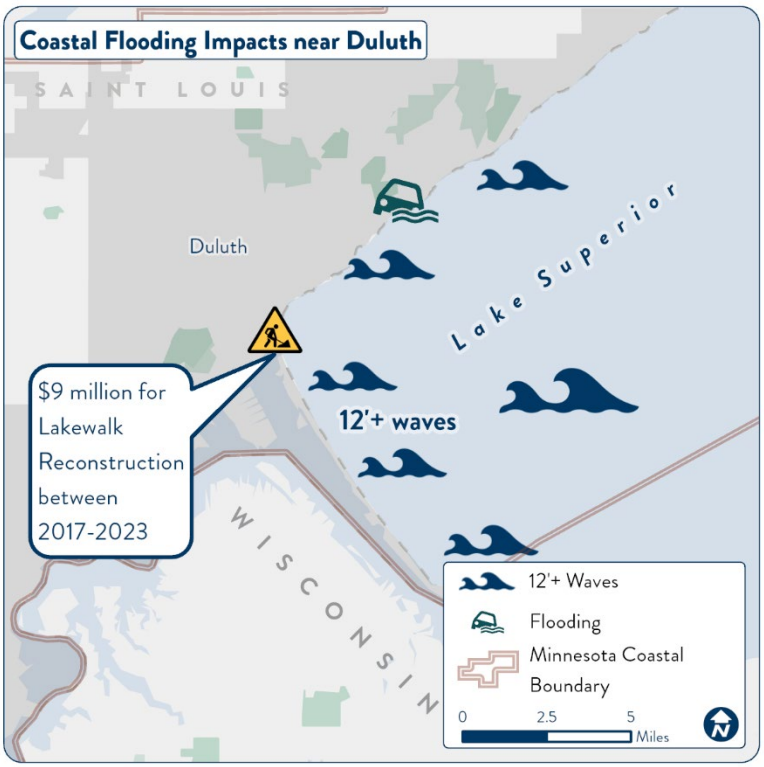

Figure 22. A map depicting the impacts of coastal flooding near Duluth

Risk and Vulnerability of Shoreline Erosion[10]

Research in the early 1990's "showed that the North Shore of Lake Superior is variable in its geology and geometry, and these variations result in varying rates of erosion. The study showed that non-bedrock areas at or near the shoreline receded at an average rate of 0.46 feet/year and a maximum of 1.1. feet/ year." More current research using the US Geological Survey (USGS) Digital Shoreline Analysis System (DSAS) to calculate shoreline boundary change indicates rates could be much higher in certain areas.[11]

Overall, shoreline erosion is a natural and more gradual process that occurs at high, average and even low Lake Superior water levels. However, during periods of high water and/or during

[10] From Minnesota State Hazard Mitigation Plan (2024), Section 5: Natural Hazards. Accessed November 14, 2024, from https://maps.umn.edu/hmp_hub/a-mn-state/MN%20State%20Hazard%20Mitigation%20Plan%202024.pdf.

[11] Little, Clinton, meeting conversation concerning Coastal Erosion Hazard Mapping (CEHM) final report results, March 17, 2025.

storms with high winds and heavy wave action, shoreline erosion is more obvious and bluff recession rates increase. Sometimes it can even become an emergency, such as when a bluff suddenly fails. The results in all cases can be serious damage to homes and businesses, roads, water and wastewater treatment facilities, and other structures in coastal communities.

Other contributing factors to erosion include depleting both tributary and shoreland sources of sediment through activities like dredging and improving navigational channels; ice ridges; and continued shoreline development, which results in increases in impervious surfaces, changes and elimination vegetation cover and alterations to beach sand.

Risk and Vulnerability of Great Lakes Level Change

Lake Superior is a dynamic system, with both seasonal and long-term variations in water levels due to precipitation, evaporation, runoff, and ice cover. While these fluctuations are natural, recent trends have amplified their magnitude and frequency, increasing risks to coastal infrastructure, ecosystems, and communities.

According to the Minnesota State Hazard Mitigation Plan[12], the frequency and severity of extreme precipitation events, which, combined with reduced ice cover, can lead to higher lake levels and more damaging wave action along the Lake Superior coast. These conditions elevate the risk of coastal flooding, erosion, and infrastructure damage.

Recent DNR and NOAA vulnerability assessments highlight specific sites at risk. For example, the Minnesota Point Pine Forest Scientific and Natural Area (SNA) in Duluth was found to have high exposure and sensitivity to lake level changes, particularly along its lakeside dunes and beaches[13]. The assessment protocol used by the DNR evaluates exposure, sensitivity, and adaptive capacity, providing a standardized approach to identifying vulnerable assets such as trails, beaches, and wetlands. These findings are supported by NOAA's Lake Level Viewer and digital elevation models, which simulate potential flooding scenarios under various lake level conditions.

The U.S. Army Corps of Engineers and NOAA jointly produce six-month forecasts and long-term water level projections for Lake Superior. These forecasts show that while average lake levels remain within historical norms, short-term extremes, such as the June 2025 meteotsunami and

[12] From Minnesota State Hazard Mitigation Plan (2024), Section 5: Natural Hazards. Accessed November 10, 2025, from https://maps.umn.edu/hmp_hub/a-mn-state/MN%20State%20Hazard%20Mitigation%20Plan%202024.pdf.

[13] From Minnesota Point Scientific and Natural Area Vulnerability Assessment (May 2022). Accessed November 10, 2025, from https://files.dnr.state.mn.us/waters/lakesuperior/struct_vulnerability_assessment_minnesotapoint.pdf.

seiche event, can cause rapid and damaging fluctuations[14]. Such events have led to infrastructure damage, navigation hazards, and localized flooding, which underscores the need for proactive and adaptive planning.

Historical extremes illustrate the variability of Lake Superior's water levels. In 2007, the lake experienced some of the lowest sustained levels ever recorded (599.9 feet), while in 2019 it reached the highest sustained levels (603.6 feet) at Duluth, MN[15]. These extremes have very different effects on the coastal environment. In the Duluth/Superior Harbor, low water levels can disrupt shipping operations, requiring the U.S. Army Corps of Engineers to dredge additional material to maintain the required draft depth for large vessels. This can result in millions of dollars in dredging and disposal costs. Furthermore, ships moor next to sheet pile walls for loading and unloading. If additional dredging is needed to allow safe mooring, dock walls must be designed for greater draft depths, meaning taller exposed sheet pile walls. Most dock walls in the Duluth/Superior Harbor are designed for water levels down to 601.1 feet, making future low-water scenarios a major concern for harbor infrastructure.

Conversely, high-water levels are widely recognized for their devastating effects, including increased erosion and damage to coastal infrastructure. Since 2019, many cities and townships have been repairing or replacing coastal infrastructure, yet billions of dollars' worth of aging assets and roadways along Lake Superior remain vulnerable. For example, Highway 61 runs parallel to Lake Superior's coastline from Duluth to Grand Portage, varying in distance from the lake. Some sections of the road were near collapse after storms in 2017 and 2018 and have since been repaired, but many stretches still require protection or relocation[16].

[14] NOAA, Great Lakes Environmental Research Laboratory. June 21, 2025 Storm Causes Significant Meteotsunami and Seiche on Lake Superior (July 2025). Accessed November 10, 2025, from https://www.glerl.noaa.gov/blog/2025/07/18/june-21-2025-storm-causes-significant-meteotsunami-and-seiche-on-lake-superior/.

[15] Krumwiede, B. *Lake Superior Water Levels and Coastal Impacts*. NOAA Coastal Management presentation. Accessed November 13, 2025, from https://lakesuperiornerr.org/wp-content/uploads/sites/319/2020/05/3-Krumwiede-Lake-Superior-Water-Levels-and-Coastal-Impacts-2019.pdf.

[16] Arrowhead Regional Development Commission. *Coastal Erosion Hazard Mapping Project*. Accessed November 17, 2025, from https://www.ardc.org/cehm/.

Management Characterization

1. *Significant Management Changes*

In the tables below, indicate if the approach is employed by the state or territory and if significant state- or territory-level changes (positive or negative) have occurred that could impact the CMP's ability to prevent or significantly reduce coastal hazards risk since the last assessment.

Table 8: Significant Changes in Hazards Statutes, Regulations, Policies, or Case Law Since 2019

Topic Addressed	Employed by State or Territory	CMP Provides Assistance to Locals that Employ	Significant Changes Since Last Assessment
Elimination of development/redevelopment in high-hazard areas	No	Yes	Yes
Management of development/redevelopment in other hazard areas	Yes	Yes	Yes
Sea level rise or Great Lakes level change	No	No	No

Table 9: Significant Changes in Hazards Planning Programs or Initiatives Since 2019

Topic Addressed	Employed by State or Territory	CMP Provides Assistance to Locals that Employ	Significant Changes Since Last Assessment
Hazard mitigation	Yes	Yes	Yes
Sea level rise or Great Lakes level change	Yes	Yes	Yes

Table 10: Significant Changes in Hazards Mapping or Modeling Programs or Initiatives Since 2019

Topic Addressed	Employed by State or Territory	CMP Provides Assistance to Locals that Employ	Significant Changes Since Last Assessment
Sea level rise or Great Lakes level change	Yes	Yes	Yes
Other hazards	Yes	Yes	Yes

2. *High-Hazard Areas Definition*

Briefly state how "high-hazard areas" are defined in your coastal zone.

Neither state statutes nor the Minnesota State Hazard Mitigation Plan define "high-hazard areas". However, the State Hazard Mitigation Plan does provide a probability ranking and criteria for hazard identification. Hazards receiving a 'high' ranking (1) impact the state annually, or more frequently; (2) are widespread, generally affecting regions or multiple counties in each event; and (3) have a reliable methodology for identifying events and locations.[17]

Related definitions include:

Erosion Hazard Area: Those areas of Lake Superior's North Shore where the long-term average annual rate of recession is one foot or greater per year."[18]

Special Flood Hazard Area: Flooding that has only a 1% chance of an annual occurrence.

3. *Explanation of Management Changes*

For any management categories with significant changes, briefly provide the information below. If this information is provided under another enhancement area or section of the document, please provide a reference to the other section rather than duplicate the information:

1. Describe the significance of the changes;
2. Specify if these changes were 309 or other CZM-driven changes; and
3. Characterize the outcomes or likely future outcomes of the changes.

[17] Minnesota State Hazard Mitigation Plan (2024). Accessed December 27, 2024, from https://maps.umn.edu/hmp_hub/a-mn-state/MN%20State%20Hazard%20Mitigation%20Plan%202024.pdf.

[18] From: North Shore Management Plan Update: A Shoreland Management Plan for Lake Superior's North Shore (2016). Accessed on December 10, 2024, from https://northshoremanagementboard.com/wp-content/uploads/2021/10/nsmb.document.full_.pdf.

Hazard Statutes, Regulations, Policies or Case Law

Table 11: Explanation of Changes to Statutes, Regulations, Policies or Case Law

Type (Statute, Regulation, Policy or Case Law)	**Significance/Nature of Change**	**309 or other CZM-driven change** (Yes or No)	**General Outcome**
Policy/Regulation	The North Shore Management Board is looking at incorporating the recently completed shoreline change values into the North Shore Management Plan (NSMP). The NSMP sets the minimum standards and criteria for the subdivision, use and development of the shoreland of Lake Superior, other than for the City of Duluth.	No. However, the Coastal Program is contributing through its service on the North Shore Management Board's Technical Advisory Committee and leadership to the CEHM (Coastal Erosion Hazard Mapping) workgroup	Maintenance of shoreline recession data using USGS Digital Shoreline Analysis System (DSAS). Updated erosion susceptibility data. Updated Lake County erosion hazard area data. Create erosion hazard area data for Cook and St. Louis Counties.

Hazard Planning Programs and Initiatives

Table 12: Explanation of Changes to Hazards Planning Programs or Initiatives

Type (Planning Program or Imitative)	Significance/Nature of Change	309 or other CZM-driven change	General Outcome
Initiative	Minnesota's Coastal Program coordinated a team to increase understanding and awareness of coastal hazards and increase resilience for Minnesota Point in Duluth.	Yes. CZM-driven	The Coastal Program worked with the Association of State Floodplain Managers in the Great Lakes Regional Challenge. Outcomes of this two-year effort include an Action Plan for Coastal Resilience (for Minnesota Point), climate futures scenario maps, a funding spreadsheet, and increased relationships and partnerships for future action.
Initiative	CHAOS (Coastal Hazards of Superior Community of Practice) continues to produce a newsletter with upcoming events, funding opportunities and resources on coastal hazards and resilience. In addition, it has started offering field trips, allowing practitioners the chance to explore topics on site with others that share a similar interest.	Yes. CZM-driven	CHAOS fosters collaboration between those impacted by coastal hazards and those with resources to study, address, and mitigate their impacts. It uses shared knowledge and resources to tackle common challenges like coastal erosion, storms, lake level change, and flooding.
Initiative	Minnesota's Coastal Program is collaborating with seven Great Lakes states, the US Army Corps of Engineers and federal agencies on the Great Lakes Coastal Resiliency Study.	No. However, the Coastal Program is contributing to the study using CZM funds and CZM paid work-in-kind.	The six-year, $14.4 million project will identify coastal areas that could be vulnerable to future storms, flooding, extreme low or high water levels, erosion, and accretion; identify a range of actions to improve coastal resiliency; and develop a collaborative-risk informed-decision framework to support the identification and prioritization of coastal investments by federal, state, and local governments, Tribal Nations, and nongovernmental organizations.

Hazard Mapping and Modeling

Table 13: Explanation of Changes to Hazards Mapping or Modeling Programs or Initiatives

Type (Mapping or Modeling Program)	**Significance/Nature of Change**	**309 or other CZM-driven change** (Yes or No)	**General Outcome**
Mapping	The Coastal Erosion Hazard Mapping (CEHM) initiative has received three separate Coastal Program grants to calculate shoreline change over time for all 189 miles of Minnesota's shoreline. This includes developing and publishing the North Shore Erosion Data Viewer[19].	Yes. CZM-driven through Section 306 pass-through grants and technical assistance	Current coastal erosion hazard mapping data exists to mitigate and plan for stressors to coastal communities, but it is not consistent, thorough, or readily available to the public. CEHM outputs will change that.
Mapping	FEMA completed an update to St. Louis County's digital flood maps in 2024	No	St. Louis County and the City of Duluth have updated digital FEMA maps. These maps now include Lake Superior VE and AE zones.

[19] https://www.arcgis.com/apps/webappviewer/index.html?id=46cbf323365e488bbc8356563ab53c2a&extent=-10000530.8881%2C6084038.8579%2C-9982186.0013%2C6092915.1078%2C102100

Enhancement Area Prioritization

1. Priority Level

What level of priority is the enhancement area for the coastal management program?

☒ **High**

☐ **Medium**

☐ **Low**

2. Rationale

Briefly explain the reason for this level of priority. Include input from stakeholder engagement, including the types of stakeholders engaged.

The DNR identified Coastal Hazards as a High-priority enhancement area for the coastal zone. This assessment is based on the frequency and severity of reported hazards, and the need for additional tools and support to manage these risks.

Stakeholder survey results showed that coastal erosion is the most significant hazard in Minnesota's coastal zone. This enhancement area received the second highest number of responses (25 total) as the single most significant management category.

Respondents cited personal (21 total) and professional experience (14 total) as the main reasons for identifying this management category, with several also noting concerns raised by constituents. This reflects both direct impacts and growing public awareness of coastal hazards risks. The survey also highlighted strong demand for state support, with high numbers of respondents selecting needs such as technical assistance, ordinances and policies, communications and outreach, and mapping/GIS and data management. When asked to identify the most important need to help address this hazard, technical assistance was the top choice, reinforcing the need for practical, on-the-ground support.

Given the combination of frequent and severe hazards, strong stakeholder concern, and the identified need for improved tools and support, the DNR has determined that coastal hazards require focused attention in the next five-year strategy. This high-priority designation will guide efforts to strengthen resilience, improve planning, and reduce risks to people, property, and natural resources in Minnesota's coastal zone.

IV. Public Access

Section 309 Enhancement Objective: Attain increased opportunities for public access, taking into account current and future public access needs, to coastal areas of recreational, historical, aesthetic, ecological, or cultural value. §309(a)(3)

Phase 1 (High-level) Assessment Purpose: To quickly determine whether the enhancement area is a high-priority enhancement objective for the CMP that warrants a more in-depth assessment. The more in-depth assessments of Phase II will help the CMP understand key problems and opportunities that exist for program enhancement and determine the effectiveness of existing management efforts to address those problems.

Resource Characterization

1. Public Access Availability in the Coastal Area

Use the following table to provide data on public access availability within the coastal zone.

Table 14: Public Access Status and Trends

Type of Access	Current number	Changes or Trends Since Last Assessment (Increase, decrease, no change, unknown)	Cite data source
Beach access sites	81	No change	EPA BEACON
Shoreline (other than beach) access sites	14	Decrease[20]	Coastal Program Public Access Inventory
Recreational boat (power or non-motorized) access sites	27	Decrease[21]	Boating on Lake Superior Public Water Access Sites in Minnesota Coastal Program Public Access Inventory
Designated scenic vistas or overlook points	29	No change	Coastal Program Public Access Inventory
Fishing access points (i.e. piers, jetties)	5	No change	Fishing piers and shore fishing sites

[20] Minnesota lost a total of three shoreline access sites, two on the Sucker River (access lost due to trespass issues) and one on Congdon Boulevard (closed due to coastal erosion)

[21] Minnesota lost one recreational boat access site at Bluebird Landing (access lost due to coastal erosion)

Type of Access	Current number	Changes or Trends Since Last Assessment (Increase, decrease, no change, unknown)	Cite data source
Coastal trails/ boardwalks	150 trails, 2,777 Miles	Increase[22]	MN DNR, Superior Hiking Trail Association, Gitchi-Gami State Trail, University of MN, City of Duluth, City of Cloquet
Acres of parkland/open space	356,813 acres (51.34%)	Unknown	Carlton, St. Louis, Lake and Cook County parcel data
Access sites that are Americans with Disabilities Act (ADA) compliant	Unknown	Unknown	No Data Source
Other: Mountain Bike Trails	15 Trails, 145.2 Mile	Increase[23]	US Forest Service, Lake County, City of Duluth and Trail Clubs

[22] Minnesota added one new trail and 11 new miles of trail between the Superior Hiking and Gitchi-Gami State Trails.

[23] Minnesota added 10 new trails (114.7 miles) since the last assessment.

2. Demand for Coastal Public Access

Briefly characterize the demand for coastal public access and the process for periodically assessing demand. Include a statement on the projected population increase for your coastal counties.

The demand for coastal public access along the North Shore of Lake Superior is rising. Many popular activities drive this rise including hiking, fishing, camping, boating, and kayaking. The North Shore of Lake Superior is relatively undeveloped, which is a draw for all people who want to get out in nature.

Demand for General Outdoor Experiences at State Parks

Minnesota's "North Shore" is home to eight Minnesota State Parks. These include Gooseberry Falls, Split Rock Lighthouse, Tettegouche, George Crosby Manitou, Temperance River, Cascade River, Judge C. R. Magney, and Grand Portage. Minnesota's North Shore parks are some of the most visited in the state. In 2024, Gooseberry Falls, Split Rock Lighthouse and Tettegouche state parks each hosted over 500,000 annual visitors.[24] All these parks are home to numerous hiking trails and existing facilities that need maintenance to ensure public safety and general upkeep.

[24] Minnesota Department of Natural Resources, Minnesota facts and figures, 2025. Accessed on September 10, 2025, from https://www.dnr.state.mn.us/faq/mnfacts/state_parks.html.

Figure 33. A map depicting the location of Minnesota State Parks within the coastal area

Demand for Fishing and Boating

Fishing and boating are a huge draw to the North Shore area. To maintain the rise of these sports, proper maintenance and additions to boat landings may become imperative. Information gathered from summer creel surveys conducted by the DNR shows a rise in sport fishers on Lake Superior. The number of sport fishers recorded increased from 20,119 in 2019 to 22,049 in 2023.[25] This shows a rise of nearly 500 sport fishers per year for the summer months along Lake Superior. Creel surveys are done yearly by the DNR and are a great resource to tabulate both the overall fishery health and number of people utilizing the resource.

[25] From Completion Report for the Minnesota Waters of Lake Superior (2019) and Completion Report for the Minnesota Waters of Lake Superior (2023)

Demand for Kayaking and Canoeing

Kayaking and canoeing are also popular tourist attractions and outdoor activities along the North Shore and St. Louis River. Both provide stunning views and ample voyages for kayaking and canoeing enthusiasts. Popular trails include:

- Lake Superior Water Trail: The Minnesota portion of the Lake Superior Water Trail extends approximately 150 miles from the St. Louis Bay in Duluth to the Pigeon River on the Canadian border. Users can access it from one of nine boat launches and camp at one of four sites. Sea Kayaks are better suited for the unprotected and often windswept waters of Lake Superior.
- St. Louis River State Water Trail: This 202-mile trail begins in the Superior National Forest and flows southwest to Floodwood, where it then turns southeast to meet Lake Superior. The lower portion that intersects the coastal area (Highway 2 to Lake Superior) includes over 10 carry-in or trailer access points and multiple campgrounds, campsites and fishing locations. Between Scanlon and Thomson Reservoir, the river provides Minnesota's only whitewater rafting opportunities. The section from Fond du Lac Dam to Lake Superior includes routes for the St. Louis River Estuary National Water Trail (see below).
- St. Louis River Estuary National Water Trail: Newly designated in 2020, the St. Louis River Estuary National Water Trail is a 16.5-mile section of river from the Fond du Lac Dam in Duluth to Lake Superior. The system includes 11 designated loop routes that provide over 73 miles of paddling and other recreational opportunities. Users include both canoeists and kayakers.

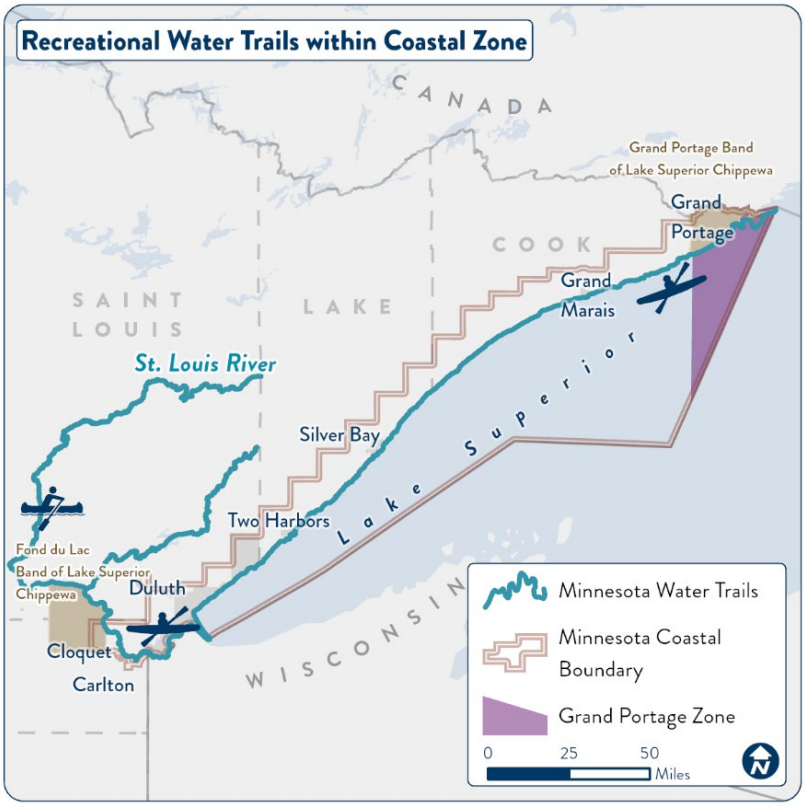

Figure 44. A map depicting the commonly used water trails within the coastal zone

In its most recent study (2000), the DNR performed a multi approach survey[26] to see interest and needs for kayakers along the North Shore. A mail survey was sent to the owners of sea kayaks in Minnesota and field counts were taken along access points along the Lake Superior Water Trail. From these surveys and inputs from local outfitters it is estimated that the North Shore is home to 12,000 to 12,500 outings each year with 3,500 to 4,000 of these using the Lake Superior Water Trail. Overall, users are hoping for more camping and water access sites due to the uncertainty and quick changes to weather along the North Shore.

Demand for canoeing and kayaking opportunities is even greater in the Twin Ports area of Duluth, Minnesota and Superior, Wisconsin. "Data from the Duluth-Superior metropolitan area indicate that 9.6 percent of the local population are either canoers or kayakers, which means

[26] Minnesota Department of Natural Resources, Division or Parks and Recreation, Trails and Waterways Division, 2001, Survey of Sea Kayak Owners in Minnesota: Kayaking the North Shore of Lake Superior. Accessed March 17, 2025 at https://files.dnr.state.mn.us/aboutdnr/reports/trails/kayaking_study.pdf.

that approximately 26,900 potential paddlers live in the greater metro area. Data from the Duluth-Superior tourist market shows that 8.4 percent of visitors to the Duluth-Superior area, approximately 235,000 people, are either canoers or kayakers. Together these two market segments result in a total of 262,100 people already living in or visiting the area who may be interested in the type of unique paddling experience offered by the River Estuary."[27]

Population Trends

Population trends for the coastal counties are mixed. The US Census Bureau estimates that St. Louis County's population will increase by 0.5%. On the other hand, Cook and Lake will decrease by 1.4% and 0.5%, respectively.[28] Despite an overall declining population, tourists, specifically people from the Minneapolis metropolitan area, are heavy users of the coastal area's public access sites. Cities like Duluth are seeing an increase in tourism. Duluth tourism tax revenue, a good indication for tourist trends in the city, were up nearly 2% from June 2023 to June 2024 and up almost 10% compared to 2022.[29]

3. Additional Data and Reports

If available, briefly list and summarize the results of any additional data or reports on the status or trends for coastal public access since the last assessment.

See question 2, above.

Management Characterization

1. Significant Management Changes

Indicate if the approach is employed by the state or territory and if there have been any significant state- or territory-level management changes (positive or negative) that could impact the future provision of public access to coastal areas of recreational, historical, aesthetic, ecological, or cultural value.

[27] City of Duluth, St. Louis River Estuary National Water Trail Master Plan, 2017. Accessed on September 10, 2025, from https://duluthmn.gov/media/7316/final-water-trail-master-plan.pdf.

[28] Population trend data taken from the US Census Bureau's 2023 Population Estimates Program.

[29] WDIO, 2024, Summer tourism numbers show improvement in Duluth. Accessed September 10, 2025, at https://www.wdio.com/front-page/top-stories/summer-tourism-numbers-show-improvement-in-duluth/.

Table 15: Significant Changes in Public Access Management

Management Category	Employed by State or Territory (Yes or No)	CMP Provides Assistance to Locals that Employ (Yes or No)	Significant Changes Since Last Assessment (Yes or No)
Statutes, regulations, policies, or case law interpreting these	Yes	No	No
Operation/maintenance of existing facilities	Yes	Yes	Yes
Acquisition/enhancement programs	Yes	Yes	No

2. Explanation of Management Changes

For any management categories with significant changes, briefly provide the information below. If this information is provided under another enhancement area or section of the document, please provide a reference to the other section rather than duplicate the information:

a. Describe the significance of the changes;
b. Specify if these changes were 309 or other CZM-driven changes; and
c. Characterize the outcomes or likely future outcomes of the changes.

Operations/Maintenance of Existing Facilities

Table 16: Explanation of Changes to Operation/Maintenance of Existing Facilities

Facility	Significance/Nature of Change	309 or other CZM-driven change (Yes or No)	General Outcome
Split Rock Lighthouse State Park	Installed fire rings, tent pads, and benches (2016)	No	New amenities for site users
Gooseberry Falls State Park	Constructed a rock wall at a popular overlook and re-graveled the hiking trails from washouts. [30] Added an electric vehicle charging station.[31]	No	Public accessibility; safety
Superior Hiking Trail	Constructed a new route traveling north of Gooseberry Falls State Park	No	New access opportunity; safety
Tettegouche State Park	Reroofed several cabins and the boathouse (2022); Performed some structural roof repairs, foundation repairs, log replacement, and rebuilding of the crib structure with funding from the Legacy Fund and the Land and Water Conservation Fund (2023); Replace the swing bridge that was damaged during the flood of 2022.[32]	No	Improved amenities for site users
Temperance River State Park	Installed a 1500 square-foot energy efficient shower building, complete with solar-thermal water heating, LED lighting and low-flow water fixtures. Improvements were made possible with $1.5 million in funding from the Parks and Trails Legacy Fund. [33]	No	New amenities for users; energy efficiency improvements

[30] From Conservation Corps Minnesota & Iowa (2016), Crews keep Split Rock & Gooseberry State Park visitors safe. Accessed March 17, 2025, from https://conservationcorps.org/updates-stories/crews-keep-split-rock-goosberry-state-park-visitors-safe/.

[31] Minnesota Department of Natural Resources (2025), Gooseberry Fall State Park. Accessed March 17, 2025, from: https://www.dnr.state.mn.us/state_parks/park.html?id=spk00172#homepage.

[32] WTIP (2023), Restoration work continues on historic Tettegouche Camp. Accessed March 17, 2025, from: https://wtip.org/restoration-work-continues-on-historic-tettegouche-camp/.

[33] Northern Wilds (2020), Campground improvements at Temperance River State Park.

3. Publicly Available Public Access Guide

Indicate if your state or territory has a publicly available public access guide. How current is the publication and how frequently it is updated?

Table 17: Publicly Available Access Guide

Public Access Guide	Printed	Online	Mobile App
State or territory has one? (Yes or No)	Yes	Yes	Yes
Web address (if applicable)	Recreation[34]	Recreation Compass[35]	Recreation Compass Mobile[36]
Date of last update	Varies by resource	Unknown	Unknown
Frequency of update	Varies by resource	Annual	Annual

The DNR provides public access guides in several formats.

- *Printed formats:* Printed format public access guides are available by individual recreation activities. Many of these resources are print-on-demand or available in hard copy. Starting at the DNR Recreation[37] webpage, users can navigate through sixteen categories of recreation in Minnesota. The DNR provides these maps in hard copy and GeoPDF format [38]. Available in GeoPDF format, the MNDNR Recreational Basemap is a collection of over 20 GIS recreational, transportation and hydrology layers.
- *Minnesota Conservation Volunteer Magazine:* The Minnesota Conservation Volunteer Magazine (MCV) is published bimonthly, delivering information on the State's conservation issues. This publication has 120,000 subscribers, including anglers, birders, hunters, hikers, bikers, and paddlers. MCV is paid for by subscribers.
- *Recreation Compass:* Recreation Compass is a web-based platform built to run in the web browser or on mobile devices. It uses different layers to help the user find information about recreation opportunities throughout the state of Minnesota.

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[34] https://www.dnr.state.mn.us/recreation/index.html

[35] https://www.dnr.state.mn.us/maps/compass.html

[36] https://maps.dnr.state.mn.us/compass/mobile/

[37] https://www.dnr.state.mn.us/recreation/index.html

[38] https://www.dnr.state.mn.us/mobile/geopdf/index.html

Minnesota has also supported the development of public access guides using CZMA Section 306 funding to inform water-based recreation. These guides often blur the lines between coastal hazards and public access.

- Minnesota Lake Superior Beach Monitoring Program[39] provides access to beach advisories.
- Paddle Safe Twin Ports[40] informs paddle sports users of current conditions.
- Paddle Safe Twin Ports was recently enhanced by the Drowning Hotspots in the St. Louis River Estuary project[41] providing the St. Louis River Estuary NowCast/Forecast surface current model and Drowning Incidents in the St. Louis River and Estuary ArcGIS story map[42].
- Park Point Beach Weather and Beach Conditions[43] provide real time data for the Lake Superior Beaches on Park Point in Duluth. This includes rip current warnings and UV index.
- The Gooseberry Falls Go App[44] provides interpretive routes with highlights on key features within the park.

Enhancement Area Prioritization

1. Priority Level

What level of priority is the enhancement area for the coastal management program?

☐ **High**

☒ **Medium**

☐ **Low**

[39] https://mnbeaches.org

[40] https://www.paddlesafetwinports.org

[41] https://seagrant.umn.edu/programs/recreation-and-water-safety-program/drowning-hotspots-st-louis-river-estuary

[42] https://storymaps.arcgis.com/stories/1d6db931f3ff4c12b113ade0f944b345

[43] https://www.parkpointbeach.org

[44] https://www.dnr.state.mn.us/mobile/geopdf/index.html

2. Rationale

Briefly explain the reason for this level of priority. Include input from stakeholder engagement, including the types of stakeholders engaged.

The DNR identified Public Access as a Medium-priority enhancement area for the Lake Superior coastal zone. This decision reflects the importance of maintaining access to Minnesota's unique coastal resources, balanced with the level of stakeholder concern and the nature of the challenges identified.

Public access is a defining feature of Minnesota's North Shore, supported by numerous state parks, trails, and publicly accessible shorelines. These assets draw significant tourism, which in turn supports the regional economy. Stakeholder input confirmed the value of public access, with 15 respondents ranking it as their top priority and 13 ranking it second, making it the third most prioritized enhancement area in the survey.

Survey participants identified several challenges to maintaining or improving public access. The most frequently cited issues included private development, cost or funding limitations, and accessibility. When asked to identify the single most significant challenge, respondents most often selected *private development* and *cost or funding options*. These concerns reflect both physical and financial barriers to maintaining access to the coast.

Respondents also highlighted the need for state support in addressing these challenges. The most frequently selected needs included ordinances and policies, technical assistance, and communications and outreach. When asked to identify the most important need, *ordinances and policies* and *technical assistance* were the top responses.

While public access remains a valued and well-utilized resource, the survey results suggest that current challenges, though important, are not as urgent or widespread as those in higher-priority areas. As such, the DNR has designated public access as a medium priority for the next five-year strategy. This designation allows the Coastal Program to continue supporting access improvements while focusing more intensive efforts on areas with greater risk or need.

V. Marine Debris

Section 309 Enhancement Objective: Reducing marine debris entering the nation's coastal and ocean environment by managing uses and activities that contribute to the entry of such debris. §309(a)(4)

Phase 1 (High-level) Assessment Purpose: To quickly determine whether the enhancement area is a high-priority enhancement objective for the CMP that warrants a more in-depth assessment. The more in-depth assessments of Phase II will help the CMP understand key problems and opportunities that exist for program enhancement and determine the effectiveness of existing management efforts to address those problems.

Resource Characterization

1. Status and Trends of Marine Debris

In the table below, characterize the existing status and trends of marine debris in the state's coastal zone based on the best-available data.

Table 18: Existing Status and Trends of Marine Debris in Coastal Zone[45]

Source of Marine Debris	**Significance of Source** (High, Medium, Low, unknown)	**Type of Impact** (aesthetic, resource damage, user conflicts, other)	**Change Since 2015** (Increase, Decrease, No change, Unknown)
Beach/shore litter	Low	Aesthetic; resource damage	Unknown
Land-based dumping	Medium	Aesthetic; resource damage	Unknown
Storm drains and runoff	Low	Aesthetic; resource damage	Unknown
Land-based fishing (e.g., fishing line, gear)	Low	Resource damage	Unknown
Ocean/Great Lakes-based fishing (e.g., derelict fishing gear)	Low	Aesthetic	Unknown
Derelict vessels	Low	Aesthetic; resource damage	Unknown
Vessel-based (e.g., cruise ship, cargo ship, general vessel)	Low	Resource damage	Unknown
Hurricane/Storm	Low	Aesthetic	Unknown
Tsunami	Not applicable	Not applicable	Not applicable

2. Additional Detail on the Status and Trends or Potential Impacts from Marine Debris

If available, briefly list and summarize the results of any additional state- or territory-specific data or reports on the status and trends or potential impacts from marine debris in the coastal zone since the last assessment.

[45] Significance of source ratings based on professional judgement informed by articles cited in Question 2: Additional state- or territory-specific data or reports on the status and trends or potential impacts from marine debris in the coastal zone.

According to a report in the Duluth News Tribune[46], litter and illegal dumping remain a problem for the city of Duluth, the coastal area's largest city. Discarded items range from carpet, furniture and kitchen garbage to cigarette butts, plastic grocery bags, and tires. Quantities can be quite high. In 2016, a group of students removed more than 1,000 pounds of illegally dumped garbage along a trailhead in just one day. This issue has persisted despite programs that allow individuals to dispose of certain materials for free at the Western Lake Superior Sanitary District.

To help combat the problem, individuals and groups are stepping up. The Downtown Duluth Waterfront District employs a Clean and Safe team. In 2015, they bagged 20,000 pounds of litter across a small area of the city. The city also has Keep Duluth Clean. In one month in 2021, 700 volunteers with the group picked up seven tons of trash across the city.[47] Other groups like the St. Louis River Alliance clean up areas along the St. Louis River, an area used extensively for dumping as a matter of household routine years ago. Legacy items are all but gone, but the group still finds hundreds of pounds of trash, litter and other illegally dumped items during their cleanup events.

Moving towards the lake, the type of litter changes to mostly plastics. According to the Great Lakes Alliance[48], plastics constituted 86% of the litter found on Great Lakes beaches between 2003 – 2023. For the last 10 years, the top litter items collected are tiny plastic pieces, followed by cigarette butts, tiny foam pieces, plastic bottle caps, and food wrappers.

Plastic pollution threatens human health and the environment. In the environment, plastics break down into microplastics that make their way into the Great Lakes. There, fish and people consume them. Researchers have shown that these microplastics can absorb toxic chemicals and can harbor potentially dangerous microbes.[49]

[46] A 'never-ending battle': City attempts to keep pace with litter, illegal dumping. Published May 14, 2016, in the Duluth News Tribune. Accessed on December 27, 2024, from https://www.duluthnewstribune.com/news/a-never-ending-battle-city-attempts-to-keep-pace-with-litter-illegal-dumping.

[47] Keep Duluth Clean Results. Accessed December 27, 2024 from https://www.keepduluthclean.org/results.

[48] New Report: Vast Majority of Great Lakes Litter is Plastic. Press release published April 11, 2024, by the Great Lakes Alliance. Accessed December 27, 2024, from https://greatlakes.org/2024/04/new-report-vast-majority-of-great-lakes-litter-is-plastic/.

[49] Great Lakes Plastic Pollution (2024). Accessed December 27, 2024, from https://greatlakes.org/great-lakes-plastic-pollution-fighting-for-plastic-free-water/.

Management Characterization

1. *Significant Management Changes*

Indicate if the approach is employed by the state or territory and if there have been any significant state- or territory-level management changes (positive or negative) for how marine debris is managed in the coastal zone.

Table 19: Significant Changes in Marine Debris Management

Management Category	Employed by State/Territory (Yes or No)	CMP Provides Assistance to Locals that Employ (Yes or No)	Significant Changes Since Last Assessment (Yes or No)
Marine debris statutes, regulations, policies, or case law interpreting these	Yes	No	No
Marine debris removal programs	Yes	Yes	No

2. *Explanation of Management Changes*

For any management categories with significant changes, briefly provide the information below. If this information is provided under another enhancement area or section of the document, please provide a reference to the other section rather than duplicate the information:

- Describe the significance of the changes;
- Specify if these changes were 309 or other CZM-driven changes; and
- Characterize the outcomes and likely future outcomes of the changes.

There were no significant changes to marine debris statutes, regulations, policies, case law or removal programs since 2015, the last year of our last assessment. In a related effort though, Minnesota enacted Extended Producer Responsibility (EPR) legislation in May 2024[50]. Packaging producers now bear the responsibility for the lifecycle of packaging materials. This is a significant step towards sustainable waste management and has the potential to reduce the amount of plastic and other pollution in our land and waters.

[50] Extended producer responsibility for packaging (2024). Accessed on December 27, 2024, from https://www.pca.state.mn.us/air-water-land-climate/extended-producer-responsibility-for-packaging.

Enhancement Area Prioritization

1. Priority Level

What level of priority is the enhancement area for the coastal management program?

☐ **High**

☐ **Medium**

☒ **Low**

2. Rationale

Briefly explain the reason for this level of priority. Include input from stakeholder engagement, including the types of stakeholders engaged.

The DNR determined Marine Debris as a Low-priority enhancement area. This determination reflects the relatively limited stakeholder concern, the diffuse nature of the challenges identified, and the absence of a clearly defined or urgent need for programmatic enhancement at this time.

Stakeholder engagement results indicate that while marine debris is a recognized issue, it does not currently rise to the level of other enhancement areas. The most frequently cited concerns included microplastics, storm surge debris, and illegal dumping. However, when asked to identify the single most significant challenge, responses were limited and spread across multiple categories, with *microplastics* and *litter at access sites* receiving the most mentions. This distribution suggests that while marine debris is present, it is not perceived as a widespread or urgent threat in Minnesota's coastal area.

Respondents who identified marine debris as a concern primarily cited personal and professional experience, with only a few referencing constituent concerns. This indicates that while some stakeholders encounter marine debris directly, it is not a broadly shared or highly visible issue among the wider community.

When asked about needs and information gaps, respondents identified *education and outreach*, *ordinances and policies*, and *marine debris reduction programs* as the most helpful areas for state support. However, when asked to select the most important need, responses were limited and varied, with *education and outreach* and *marine debris reduction programs* receiving the most support. This lack of consensus further supports the conclusion that marine debris, while relevant, does not currently demand focused programmatic attention.

The Coastal Program will continue to monitor this issue and support education and outreach efforts as appropriate, while prioritizing areas with more pressing needs.

VI. Cumulative and Secondary Impacts

Section 309 Enhancement Objective: Development and adoption of procedures to assess, consider, and control cumulative and secondary impacts of coastal growth and development, including the collective effect on various individual uses or activities on coastal resources, such as coastal wetlands and fishery resources. §309(a)(5)

Phase 1 (High-level) Assessment Purpose: To quickly determine whether the enhancement area is a high-priority enhancement objective for the CMP that warrants a more in-depth assessment. The more in-depth assessments of Phase II will help the CMP understand key problems and opportunities that exist for program enhancement and determine the effectiveness of existing management efforts to address those problems.

Resource Characterization

1. Changes in Population and Housing Units

Using National Ocean Economics Program Data on population and housing, please indicate the change in population and housing units in the state's coastal counties between 2011 and 2023. You may wish to add additional trend comparisons to look at longer time horizons as well (data available back to 1970), but at a minimum, please show change over the most recent five-year period data is available (2017-2021) to approximate current assessment period.

Table 20: Trends in Coastal Population and Housing Units

	2011	2023	Percent Change (2011-2023)
Number of people	252,148	253,833	1%
Number of housing units	132,091	134,197	2%

Note: *We opted to document changes over a longer period. 2011 is the year of our last Section 309 Assessment and Strategy.*

2. Land Cover Changes and Development Trends

Using the tables below as a guide, provide information on land cover changes and development trends. Be as quantitative as possible using state or national land cover data. The tables are a suggestion of how you could present the information. Feel free to adjust column and row headings to align with data and time frames available in your state or territory. If quantitative data on land cover changes and development trends are not available, provide a brief qualitative narrative describing changes in land cover, especially development trends, including significant changes since the last assessment.

Table 21: Distribution of Land Cover Types in Coastal Counties[51]

Land Cover Type	**Land Area Coverage in 2021** (Acres)	**Gain/Loss Since 2016** (Acres)
Developed, High Intensity	914.93	+56.04
Developed, Medium Intensity	2,161.68	+94.74
Developed, Low Intensity	14,721.21	-57.71
Developed, Open Space	1,110.86	+54.26
Grassland	13,155.77	-1,941.95
Scrub/Shrub	102,148.86	-17,986.63
Barren Land	2,462.58	-154.56
Open Water	64,834.33	-1,570.33
Agriculture	3,365.06	-111.64
Forested	847,589.17	+20,150.53
Forested Wetland	211,565.59	-589.35
Scrub Shrub Wetland	38,250.36	+4.23
Emergent Wetland	10,607.12	+2,047.37
Unconsolidated Shore	358.06	No Change

Note: *The loss in scrub shrub indicates that young forests are maturing. The result is an increase in forest cover. The increase in emergent wetlands suggests that 2021 was a wet year.*

Table 22: Development Status and Trends for Coastal Counties[52]

	1996	**2024**	**Percent Net Change**
Percent land area developed	1.43%	1.44%	+.01%
Percent impervious surface area	0.48%	0.49%	+.01%

[51] From GIS analysis of 2016 and 2021 NOAA C-CAP Data - Nataniel Harold and John McCommbs, January 21, 2025.

[52] From GIS analysis of 2016 and 2021 NOAA C-CAP Data - Nataniel Harold and John McCommbs, January 21, 2025.

Table 23: How Land Use Is Changing in Coastal Counties[53]

Land Cover Type	Areas Lost to Development Between 2016 and 2021 (Acres)
Barren Land	32.91
Wetland	25.58
Open Water	4.0
Agriculture	20.24
Scrub/Shrub	23.8
Grassland	27.13
Forested	100.52

3. Coastal Shoreline Changes

Briefly characterize how the coastal shoreline has changed in the past five years due to development, including potential changes to shoreline structures such as groins, bulkheads and other shoreline stabilization structures, and docks and piers. If available, include quantitative data that may be available from permitting databases or other resources about changes in shoreline structures.

There has been very little change in coastal growth and development since the last assessment. As shown in Table 22, there has been a net increase of 0.01% developed or impervious areas. This shows urbanization has been minimal and as a result, there has been minimal habitat fragmentation due to urbanization. Shoreline hardening has been implemented along various locations along the North Shore of Lake Superior for both public and private facilities. According to research conducted by Minnesota's Coastal Management Fellow in 2021, there has been a 1700% increase in the number of shoreline hardening permits between 2014 and 2020[54]. The number of permits issued increased as water levels on Lake Superior increased (see Figure 5). The shoreline hardening designs implemented have mostly been utilized to prevent erosion caused by Lake Superior's wave and ice forces.

[53] From GIS analysis of 2016 and 2021 NOAA C-CAP Data - Nataniel Harold and John McCommbs, January 21, 2025.

[54] Perello, Melanie, C. Little, A. Westerbur and C. Moore, 2021. Erosion Hazards on the St. Louis River Estuary and Minnesota Point. Presentation given at the St. Louis River Summit, February 18, 2021.

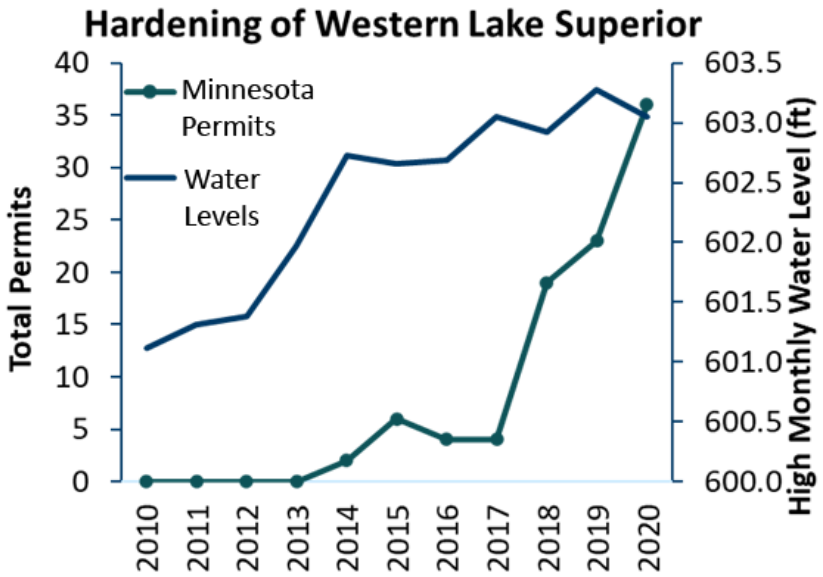

Figure 55: Total Shoreline Hardening Permits Relative to Lake Superior Water Levels

4. Additional Data on Cumulative and Secondary Impacts of Coastal Growth and Development

Briefly summarize the results of any additional state- or territory-specific data or reports on the cumulative and secondary impacts of coastal growth and development, such as water quality, shoreline hardening, and habitat fragmentation, since the last assessment.

Minnesota does not have any specific reports on the cumulative and secondary impacts of coastal growth and development. However, it does have watershed-based comprehensive water management plans that address issues related to growth and development. The coastal area has two: Lake Superior North Comprehensive Watershed Management Plan (2024)[55] and St. Louis River Watershed Comprehensive Watershed Management Plan (2022). Issues like stormwater management, impaired and nearly impaired waters, and subsurface sewage treatment systems are concerns in both watersheds.

[55] https://www.co.lake.mn.us/wp-content/uploads/2024/09/Lake-Superior-North-CWMP_Amend2024_Formal-Review.pdf

Management Characterization

1. Significant Management Changes

Indicate if the approach is employed by the state or territory and if there have been any significant state-level changes (positive or negative) in the development and adoption of procedures to assess, consider, and control cumulative and secondary impacts of coastal growth and development, including the collective effect on various individual uses or activities on coastal resources, such as coastal wetlands and fishery resources, since the last assessment.

Table 24: Significant Changes in Management of Cumulative and Secondary Impacts of Development

Management Category	**Employed by State or Territory** (Yes or No)	**CMP Provides Assistance to Locals that Employ** (Yes or No)	**Significant Changes Since Last Assessment** (Yes or No)
Statutes, regulations, policies, or case law interpreting these	Yes	No	Yes
Guidance documents	Yes	Yes	Yes
Management plans (including SAMPs)	Yes (North Shore Management Plan)	Yes	Yes

2. Explanation of Management Changes

For any management categories with significant changes, briefly provide the information below. If this information is provided under another enhancement area or section of the document, please provide a reference to the other section rather than duplicate the information:

a. Describe the significance of the changes;
b. Specify if these changes were 309 or other CZM-driven changes; and
c. Characterize the outcomes or likely future outcomes of the changes.

Statutes, Regulations, Policies or Case Law

Table 25: Explanation of Changes to Statutes, Regulations, Policies or Case Law

Type (Statute, Regulation, Policy or Case Law)	**Significance/Nature of Change**	**309 or other CZM-driven change** (Yes or No)	**General Outcome**
Statute	Minnesota's 2023 cumulative impacts law (Minnesota Stat. §116.065) requires the Minnesota Pollution Control Agency (MPCA) to conduct cumulative impacts analyses for certain air permit decision – when permitting the construction or expansion of a new facility or when reissuing an existing permit – in specific areas within the Twin Cities metro area, Duluth, Rochester, or on tribal lands, where people are most vulnerable to pollution. The law also directs the MPCA to consider the socioeconomic conditions that could increase harm to residents in those areas.	No	Cumulative impacts analyses can support arguments that certain areas of the state have faced disproportionate impacts from pollution and can provide new insights to address negative outcomes.

Guidance Documents

Table 26: Explanation of Changes to Guidance Documents

Guidance Document Name	Significance/Nature of Change	309 or other CZM-driven change (Yes or No)	General Outcome
Citizen's Coastal Erosion Monitoring Guide	The goal of this guide is to empower citizens to document the process of coastal erosion along the North Shore.	Yes. Section 306 pass-through grant	The guide provides easy-to-follow, step-by-step directions for measuring coastal erosion on one's property.
Coastal Erosion Factsheet	General guidance document that touches on topics such as why shorelines erode, who to contact for assistance, various types of shoreline protection measures and where to start on managing water and soil on one's property.	Yes. Coastal management fellow product	New easy-to-follow reference for landowners/homeowners.
Lake Superior Shoreline Projects: Permits Factsheet	General guidance document that touches on who has a role in protecting the coast, who is responsible for getting permits, who has permitting authority, helpful tips for working with regulators, projects that may need a permit, and who to contact for assistance	Yes. Coastal management fellow product	New easy-to-follow reference for landowners/homeowners.
Lake Superior Shoreline Projects: Find the Right Professional	General guidance document that touches on steps to follow to find a profession, who to consult and how to properly consult a coastal professional.	Yes. Coastal management fellow product	New easy-to-follow reference for landowners/homeowners
Locating Coastal Engineers and Contractors on Lake Superior	List of engineering firms, contractors, and other businesses that work around Lake Superior	Yes. Coastal management fellow product	New easy-to-follow reference for landowners/homeowners.

Guidance Document Name	Significance/Nature of Change	309 or other CZM-driven change (Yes or No)	General Outcome
Understanding Coastal Erosion: A Guide for Landowners	A new resource that summarizes and highlights key points to the accompanying "Understanding Coastal Erosion: A Guide for Landowners" virtual workshop	Yes. Section 306 pass-through grant	New easy-to-follow reference for landowners/homeowners
Cook County Planting Contractors and Vendors List	List of native plant suppliers and/or contactors as well as tree seedling sources in Cook County	No	New easy-to-follow reference for landowners/homeowners
Lake County Planting Contractors and Vendors List	List of native plant suppliers and/or contactors as well as tree seedling sources in Lake County	No	New easy-to-follow reference for landowners/homeowners

Management Plans

Table 27: Explanation of Changes to Management Plans

Management Plan	Significance/Nature of Change	309 or other CZM-driven change (Yes or No)	General Outcome
North Shore Management Plan	The North Shore Management Board updated the North Shore Management Plan in 2016 and is updating it once again. The 2016 update was minor, and included updating definition, including references to current activities in the area (e.g., comprehensive water management planning) and making the plan accessible online. The current update is more extensive. Members are considering adding bluff setback requirements, drafting new shoreland alteration policies and refining shoreland development standards.	Yes. Section 306 pass-through grants in 2016 and in 2024.	All local units of government that exercise zoning authority on the North Shore of Lake Superior (except Duluth) will need to update their ordinances to meet or exceed the standards outlined in the North Shore Management Plan.

Enhancement Area Prioritization

1. Priority Level

What level of priority is the enhancement area for the coastal management program?

☐ **High**

☒ **Medium**

☐ **Low**

2. Rationale

Briefly explain the reason for this level of priority. Include input from stakeholder engagement, including the types of stakeholders engaged.

The DNR has identified Cumulative and Secondary Impacts [56](CSI) as a Medium-priority enhancement area. While the survey results could advance this area to a "High" priority, the DNR has identified this as more locally governed, while supported by state-level review and input regarding the state's regulatory jurisdiction. Respondents recognize multiple development-related threats and a clear call for improved planning tools and policy support, though the overall urgency remains moderate compared to the Coastal Hazards priority area.

Respondents identified a range of significant and emerging threats associated with coastal growth and development including erosion and sedimentation, loss of habitat and open space, stormwater runoff, and shoreline modification. When asked to identify the single most significant threat, erosion and sedimentation and habitat loss were most frequently selected, indicating concern about both direct and indirect impacts of development on Lake Superior coastal resources.

Respondents largely based their concerns on professional experience, with additional input from personal encounters and constituent feedback. This suggests that while the threats are not necessarily new, they are persistent and recognized by those actively engaged in coastal management.

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[56] The engagement results summary references this enhancement area as "Coastal Growth and Development" to more clearly identify how *Cumulative and Secondary Impacts* affect the Lake Superior coastal area. This terminology was used for improved understanding by survey respondents.

Survey respondents also identified a broad set of needs to help address these challenges. Ordinances and policies, technical assistance, and training and capacity building were among the most frequently cited needs. When asked to identify the most important need, ordinances and policies stood out, highlighting the importance of clear, enforceable frameworks to guide development and protect coastal resources.

The DNR has determined that CSI warrants a medium priority designation, which will allow the Coastal Program to continue supporting local governments and partners in managing long-term development impacts.

VII. Special Area Management Planning

Section 309 Enhancement Objective: Preparing and implementing special area management plans for important coastal areas. §309(a)(6)

The Coastal Zone Management Act defines a special area management plan (SAMP) as "a comprehensive plan providing for natural resource protection and reasonable coastal-dependent economic growth containing a detailed and comprehensive statement of policies; standards and criteria to guide public and private uses of lands and waters; and mechanisms for timely implementation in specific geographic areas within the coastal zone. In addition, SAMPs provide for increased specificity in protecting natural resources, reasonable coastal-dependent economic growth, improved protection of life and property in hazardous areas, including those areas likely to be affected by land subsidence, sea level rise, or fluctuating water levels of the Great Lakes, and improved predictability in governmental decision making."

Phase 1 (High-level) Assessment Purpose: To quickly determine whether the enhancement area is a high-priority enhancement objective for the CMP that warrants a more in-depth assessment. The more in-depth assessments of Phase II will help the CMP understand key problems and opportunities that exist for program enhancement and determine the effectiveness of existing management efforts to address those problems.

Resource Characterization

1. Geographic Areas for SAMP Consideration

In the table below, identify geographic areas in the coastal zone subject to use conflicts that may be able to be addressed through a SAMP. This can include areas that are already covered by a SAMP but where new issues or conflicts have emerged that are not addressed through the current SAMP.

Table 28: Areas of the Coastal Zone Subject to Use Conflict

Geographic Area	Opportunities for New or Updated Special Area Management Plans (Major conflicts/issues)
St. Louis River	Issues: Sediment transport, pollution, and erosion
North Shore of Lake Superior	Issues: Shoreline erosion and other coastal hazards

2. Additional Detail on SAMPS

If available, briefly list and summarize the results of any additional state- or territory-specific data or reports on the status and trends of SAMPs since the last assessment.

The state does not have any data or reports on the status and trends of SAMPs.

Management Characterization

1. *Significant Management Changes*

Indicate if the approach is employed by the state or territory and if there have been any significant state- or territory-level management changes (positive or negative) that could help prepare and implement SAMPs in the coastal zone.

Table 29: Significant Changes in Special Area Management Planning

Management Category	**Employed by State or Territory** (Yes or No)	**CMP Provides Assistance to Locals that Employ** (Yes or No)	**Significant Changes Since Last Assessment** (Yes or No)
SAMP policies, or case law interpreting these	No	No	No
SAMP Plans	Yes	Yes	Yes

2. *Explanation of Management Change*

For any management categories with significant changes, briefly provide the information below. If this information is provided under another enhancement area or section of the document, please provide a reference to the other section rather than duplicate the information:

a. Describe the significance of the changes;
b. Specify if these changes were 309 or other CZM-driven changes; and
c. Characterize the outcomes or likely future outcomes of the changes.

SAMPs

Table 30: Explanation of Changes to SAMPs

See "Cumulative and Secondary Impacts" for details on the North Shore Management Plan, the coastal area's only fully recognized SAMP.

SAMP or SAMP-like Plans	Significance/Nature of Change	309 or other CZM-driven change (Yes or No)	General Outcome
Lake Superior Headwaters Sustainability Partnership Vision	The Lake Superior Headwaters Sustainability Partnership established an intentional framework for how and where to work to achieve a thriving estuary landscape and community. They are taking a holistic approach to protecting and restoring the natural resources of the St. Louis River Estuary and surrounding watersheds that can be scaled up geographically over time.	Yes. CZM Bipartisan Infrastructure Law pass-through grants.	In the future, visioning will be taking place in the following areas: Keene Creek, Kingsbury Creek, Knowlton Creek, Spirit Lake, Grassy Point, Munger Landing, Mud Lake, Magney-Snively Natural Area and Spirit Lake Recreation area. The intent of these visions is to establish a partner- and community-supported vision for restoration on a meso-scale, such that individual projects undertaken by partners align with and contribute to achievement of estuary restoration over time.

Enhancement Area Prioritization

1. Priority Level

What level of priority is the enhancement area for the coastal management program?

- ☐ **High**
- ☒ **Medium**
- ☐ **Low**

2. Rationale

Briefly explain the reason for this level of priority. Include input from stakeholder engagement, including the types of stakeholders engaged.

The DNR identified SAMP as a Medium-priority enhancement area based on stakeholder responses. This designation reflects moderate stakeholder interest, the presence of complex use conflicts in key locations, and the need for improved coordination and planning tools.

Stakeholder input highlighted several coastal areas where use conflicts are most pronounced, including the Duluth Harbor, St. Louis County Lakeshore, and the St. Louis River Estuary. These areas involve overlapping interests such as sensitive habitats, multiple stakeholder groups, and coastal-dependent economic activity, making coordinated planning especially important.

Respondents emphasized the need to strengthen ordinances and policies and to enhance communication and outreach to help local governments and partners navigate these complex planning environments. While overall development pressure in the coastal zone remains relatively low, the nature of land and water use in these high-conflict areas calls for more integrated and strategic planning approaches.

The medium priority designation will enable the Coastal Program to support targeted planning efforts in these areas while directing greater resources toward enhancement areas with more immediate or widespread needs.

VIII. Ocean and Great Lakes Resources

Section 309 Enhancement Objective: Planning for the use of ocean [and Great Lakes] resources. §309(a)(7)

Phase 1 (High-level) Assessment Purpose: To quickly determine whether the enhancement area is a high-priority enhancement objective for the CMP that warrants a more in-depth assessment. The more in-depth assessments of Phase II will help the CMP understand key problems and opportunities that exist for program enhancement and determine the effectiveness of existing management efforts to address those problems.

Resource Characterization

1. Ocean and Great Lakes Economy Information

Understanding the ocean and Great Lakes economy can help improve management of the resources it depends on. Using Economics: National Ocean Watch (ENOW), indicate the status of the ocean and Great Lakes economy as of 2021 (the most recent data) in the tables below. Include graphs and figures, as appropriate, to help illustrate the information.

Table 31: Status of Ocean and Great Lakes Economy for Coastal Counties (2021)

	All Ocean Sectors	Living Resources	Marine Construction	Ship and Boat Building	Marine Transpor-tation	Offshore Mineral Extraction	Tourism & Recreation **
Employment (Number of Jobs)	7,291	Suppressed*	381	Suppressed*	198	Suppressed*	6,393
Establishments (Number of Establishments)	374	Suppressed*	39	Suppressed*	15	Suppressed*	365
Wages (Millions of Dollars)	$207.2 million	Suppressed*	35,900,000	Suppressed*	21,100,000	Suppressed*	139,900,000
GDP (Millions of Dollars)	$450 million	Suppressed*	63,200,000	Suppressed*	68,100,000	Suppressed*	299,900,000

Notes: * = 'Suppressed' in general means that some values cannot be published without violating the confidentiality of one or more businesses. By law, these non-zero values must be suppressed in published data, although they are reflected in higher-level totals. ** = Minnesota has more recent data (2023), courtesy of Travis

Grout, Regional Economist, NOAA Office for Coastal Management[57]. His research indicates that coastal tourism and recreation supported 8,400 jobs and $357 million in labor income in Cook, Lake and St. Louis Counties in 2023. The sector's output (total value of production) was over $1.1 billion, and it contributed $626 million to the gross domestic product in those counties.

Table 32: Change in Ocean and Great Lakes Economy for Coastal Counties (2016-2021)*

	All Ocean Sectors	Living Resources	Marine Construc-tion	Ship & Boat Building	Marine Transpor-tation	Offshore Mineral Extraction	Tourism & Recreation
Employment (# of Jobs)	-447	Suppressed	Suppressed **	Suppressed	-58	Suppressed	-743
Establishments (# of Establishments)	+53	Suppressed	Suppressed **	Suppressed	-7	Suppressed	+32
Wages (Millions of Dollars)	46,500,000	Suppressed	Suppressed **	Suppressed	-1,700,000	Suppressed	+6,704,000
GDP (Millions of Dollars)	-5,400,00	Suppressed	Suppressed **	Suppressed	-108,800,000	Suppressed	+45,100,000

Notes: *NOAA ENOW data for 2021 reflects possible impacts of the COVID epidemic. ** Marine Construction data were suppressed in 2016. 'Suppressed' in general means that some values cannot be published without violating the confidentiality of one or more businesses. By law, these non-zero values must be suppressed in published data, although they are reflected in higher-level totals.

2. *Uses of the Minnesota Waters of Lake Superior*

Understanding existing uses within ocean and Great Lakes waters can help reduce use conflicts and minimize threats when planning for ocean and Great Lakes resources. Using Ocean Reports, indicate the number of uses within the ocean or Great Lakes waters off of your state. To avoid duplication, energy uses (including pipelines and cables) are reported under "Energy and Government Facility Siting" in the following template. However, feel free to include energy uses in this table as well if listing all uses within ocean and Great Lakes waters in one place is preferred. Add additional lines, as needed, to include additional uses that are important to your state. Note: The Ocean Reports tool does not include data for the Great Lakes states. Great Lakes states should fill in the table as best they can using other data sources.

[57] Travis Grout, Regional Economist, NOAA Office for Coastal Management

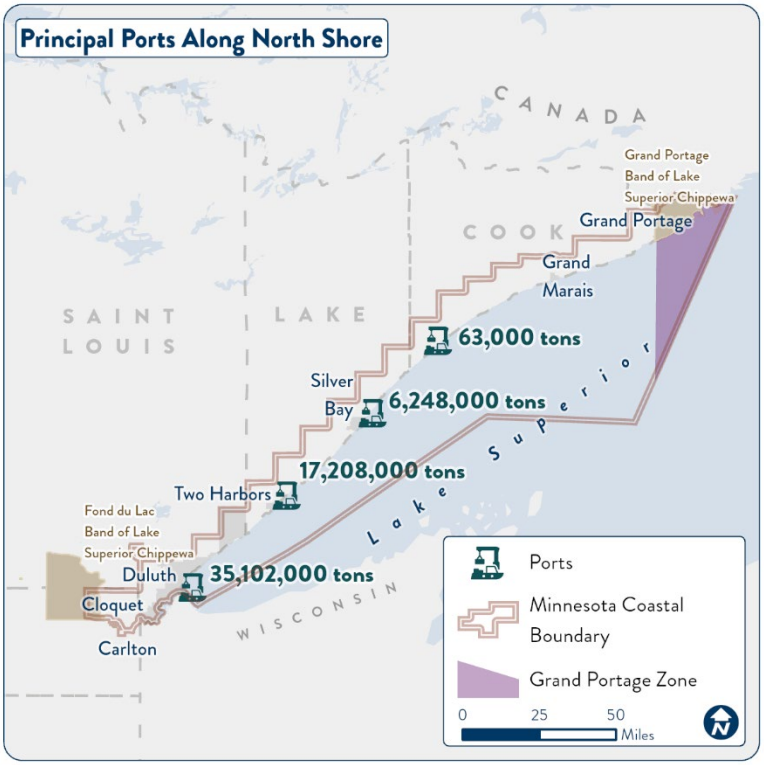


Figure 66: A map depicting the principal ports and tonnage produced along the North Shore

Table 33: Uses within Great Lakes Waters

Type of Use	Number of Sites
Federal sand and gravel leases *(Completed)*	None
Federal sand and gravel leases *(Active)*	None
Federal sand and gravel leases *(Expired)*	None
Federal sand and gravel leases *(Proposed)*	None
Beach Nourishment Projects[58]	2*
Ocean Disposal Sites	None
Principle Ports *(Number and Total Tonnage)*[59]	Duluth-Superior – 35,102,000 tons Two Harbors – 17,208,000 tons Silver Bay – 6,248,000 tons Taconite Harbor – 63,000 tons Total 4 Ports – 58,621,000 tons
Coastal Maintained Channels	Duluth-Superior Federal Navigation Channel (18 miles)[60]
Designated Anchorage Areas	Unknown
Danger Zones and Restricted Areas	None
Public Water Supply	Unknown**

Notes: * = One site, Minnesota Point in Duluth, has been nourished twice. The first nourishment event was in 2020. The US Army Corps of Engineers placed 48,766 cubic yards of material on the lakeside beach near the Duluth shipping canal. In 2021, the US Army Corps placed approximately 100 cubic yards along the lakeside beach, picking up from the 2020 event and proceeding southeast. ** = According to the Great Lakes Regional Water Use Database[61], in 2023 (the most recent data) public water suppliers in Minnesota withdrew approximately 30 million gallons/day from Lake Superior.

[58] Duluth-Superior Harbor Maintenance Dredging and Beach Nourishment on Minnesota Point, January 2021. Accessed September 26, 2025, at https://parkpointcommunityclub.org/wp-content/uploads/2020/12/PPCC-MN-POINT-BEACH-NOURISHMENT-USACE-12-JAN-21-.pdf

[59] American Great Lakes Ports Association (2021). Minnesota. Accessed September 26, 2025, at https://www.greatlakesports.org/wp-content/uploads/2021/01/Minnesota-2021-Update.pdf

[60] Duluth-Superior Harbor Maintenance Dredging and Beach Nourishment on Minnesota Point, January 2021. Accessed September 26, 2025, at https://parkpointcommunityclub.org/wp-content/uploads/2020/12/PPCC-MN-POINT-BEACH-NOURISHMENT-USACE-12-JAN-21-.pdf

[61] Great Lakes Commission (2025). Great Lakes Regional Water Use Database: Basin Reports. Accessed September 26, 2025, at https://waterusedata.glc.org/reports/basin-reports

3. *Threats to and Use Conflicts within the Minnesota Waters of Lake Superior*

In the table below, characterize how the threats to and use conflicts over ocean and Great Lakes resources in the state's or territory's coastal zone have changed since the last assessment.

Table 34: Significant Changes to Ocean and Great Lakes Resources and Uses

Resource/Use	**Change in Use Since Last Assessment** (Increase, decrease, no change, unknown)	**Change In Threat to Resource Since Last Assessment** (Increase, decrease, no change, unknown)
Benthic habitat (including coral reefs)	Increase	Increase
Living marine resources (fish, shellfish, marine mammals, birds, etc.)	Increase	Increase
Sand/gravel	No change	No change
Cultural/historic	No change	No change
Transportation/navigation	Increase	No change
Offshore development*	No change	No change
Energy production	No change	No change
Fishing (commercial and recreational)	Increase	No change
Recreation/tourism	Increase	No change
Sand/gravel extraction	No change	No change
Dredge disposal	Increase	No change
Aquaculture	Decrease	No change

Notes: * = Offshore development includes underwater cables and pipelines, although any infrastructure specifically associated with the energy industry is in the "energy production" category.

4. *Major Contributors to Increased Threat and Use Conflicts*

For those ocean and Great Lakes resources and uses in the table above that had an increase in threat to the resource or increased use conflict in the state's or territory's coastal zone since the last assessment, characterize the major contributors to that increase. Place an "X" in the column if the use or phenomenon is a major contributor to the increase.

Table 35: Major Contributors to an Increase in Threat or Use Conflict to Ocean and Great Lakes Resources

Contributor Type	Benthic Habitat (Yes, No)	Living Marine Resources (Yes, No)
Land-based development	No	No
Offshore development	No	No
Polluted runoff	No	No
Invasive species	Yes	Yes
Fishing (commercial and recreational)	No	Yes
Aquaculture	No	No
Recreation	No	No
Marine transportation	No	No
Dredging	No	No
Sand/mineral extraction	No	No
Ocean acidification	No	No

5. *Additional Detail on Status and Trends of Great Lakes Resources*

If available, briefly list and summarize the results of any additional state- or territory-specific data or reports on the status and trends of ocean and Great Lakes resources or threats to those resources since the last assessment to augment the national data sets.

Benthic Habitat

Benthic habitat refers to the ecological zone located at the bottom of a waterbody including lakes, rivers, oceans, and ponds. To measure the threat to the Great Lake resource both North Shore tributaries and Lake Superior were considered.

The largest threat to the benthic zone of near shore Lake Superior and its tributaries is the rising population of *Didymosphenia geminate* (Didymo). Didymo is a large freshwater diatom (a type of algae) that can form nuisance mats (called "rock snot") in coldwater streams worldwide. Researchers first discovered Didymo in Lake Superior tributaries in the Poplar River in 2018. In 2024, they confirmed it in eight more streams: Caribou River, Devil Track River, Flute Reed River, Kadunce River, Two Island River, Kimball River, Onion River, and Carlson Creek.[62]

[62] M.L 2020 Approved Final Report for Invasive Didymosphenia Threatens North Shore Streams. 2024. Environment and Natural Resources Trust Fund. Accessed December 15, 2025 at https://www.lccmr.mn.gov/projects/2020/finals/2020_06g.pdf.

Additional reports from both researchers and citizen scientist observations have expanded the area of Didymo observations throughout Minnesota's coastal area, as shown in Figure 7.

Formation of Didymo mats in streams has aesthetic, economic and recreational impacts. Specifically, Didymo mats disrupt community structure and ecosystem function in streams, alter habitat and food web dynamics and impact fish and invertebrate abundance and diversity. Particularly troubling is their tendency to cover up crucial fish spawning habitat in both the tributaries and nearshore areas of Lake Superior.

Living Marine Resources

The threat to living marine resources focuses on trout and salmon species present in Lake Superior. The major threat is from the Didymo (see section above). Another threat to fish species in Lake Superior especially trout species is sea lampreys. There are various efforts around the lake to eliminate these invasive species. Most of the effort is in streams during the lamprey spawning seasons as they are more concentrated then. Another slight threat could be increased angling pressure. The number of sport fisher people recorded increased from 20,119 in 2019 to 22,049 in 2023. While this is an increase, it is not believed that it poses a major threat to the resource. Commercial fishing is also minimal along Lake Superior's North Shore with quotas changing per year based on fish populations.

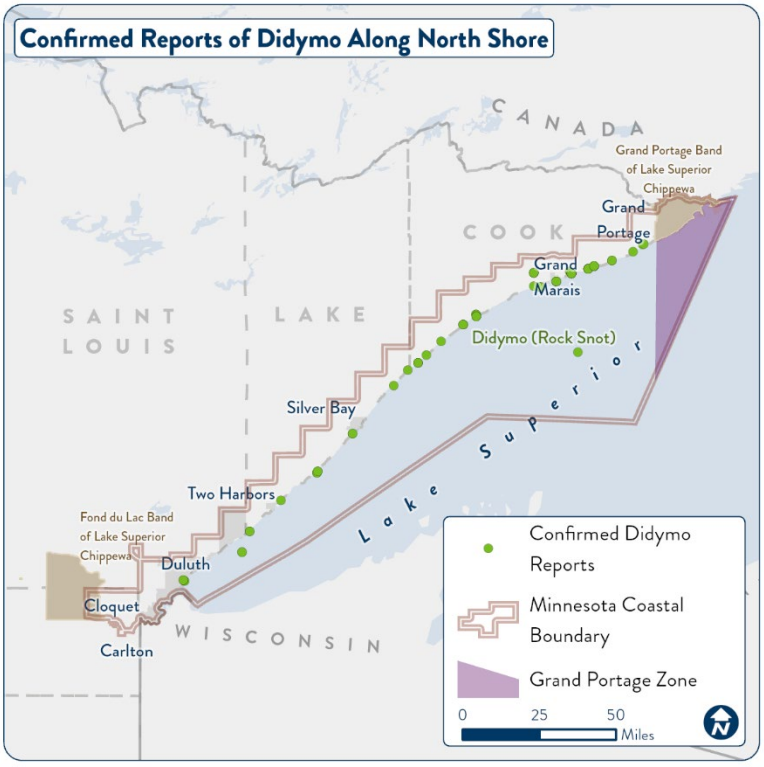


Figure 77: A map depicting the reported locations of the invasive species Didymo along the North Shore

Management Characterization

1. Significant Management Changes

Indicate if the approach is employed by the state or territory and if any significant state- or territory-level changes (positive or negative) in the management of ocean and Great Lakes resources have occurred since the last assessment.

Table 36: Significant Changes to Management of Ocean and Great Lakes Resources

Management Category	**Employed by State or Territory** (Yes or No)	**CMP Provides Assistance to Locals that Employ** (Yes or No)	**Significant Changes Since Last Assessment** (Yes or No)
Statutes, regulations, policies, or case law interpreting these	Yes	No	Yes
Regional comprehensive ocean/Great Lakes management plans	Yes	No	Yes
State comprehensive ocean/Great Lakes management plans	No	No	No
Single-sector management plans	No	No	No

2. Explanation of Management Changes

For any management categories with significant changes, briefly provide the information below. If this information is provided under another enhancement area or section of the document, please provide a reference to the other section rather than duplicate the information:

a. Describe the significance of the changes;
b. Specify if these changes were 309 or other CZM-driven changes; and
c. Characterize the outcomes or likely future outcomes of the changes.

Table 37: Explanation of Changes to Statutes, Regulations, Policies or Case Law

Statutes, Regulation, Policy, or Case Law	Significance/Nature of Change	309 or other CZM-driven change (Yes or No)	General Outcome
Quota limits for commercial fishing	The Great Lakes Fishery Commission and Lake Superior Committee generally set quota limits for commercial fishing. These groups create and update management plans to maintain a sustainable ecosystem. Fish quotas are set from the estimated population by species. They do this by conducting creel surveys, collecting harvest data from commercial fisher people, and performing annual hydroacoustic surveys.	No	A healthy ecosystem and sustainable fishery for both sport fisher people and commercial use.

Table 38: Explanation of Changes to Great Lakes Management Plans

Great Lakes Management Plan	Significance/Nature of Change	309 or other CZM-driven change (Yes or No)	General Outcome
Lake Superior LAMP (Lakewide Area Management Plan) 2020 - 2024	The Lake Superior Partnership identified 49 actions to address priority environmental threats to water quality and the ecosystem health of Lake Superior. It follows the successful implementation of the 2015-2019 LAMP, where 27 government agencies undertook actions in cooperations with over 170 other organizations, businesses, communities and academic institutions.	No	The Lake Superior LAMP fulfills the United States of America and Canadian commitments under the 2012 Great Lakes Water Quality Agreement to assess ecosystem conditions, identify environmental threats, set priorities for research and monitoring, and to identify further actions to take by governments and the public.

3. Overview of Great Lakes (Lake Superior) Management Plans

Indicate if your state or territory has a comprehensive ocean or Great Lakes management plan.

Comprehensive Ocean/Great Lakes Management Plan	State Plan	Regional Plan
Completed plan (Y/N) (If yes, specify year completed)	No	Yes
Under development (Y/N)	No	Five-year update is under development
Web address (if available)	Not applicable	Lake-Superior-LAMP-2020-2024.pdf
Area covered by plan	Not applicable	Lake Superior watershed

Enhancement Area Prioritization

1. Priority Level

What level of priority is the enhancement area for the coastal management program?

☐ **High**

☒ **Medium**

☐ **Low**

2. Rationale

Briefly explain the reason for this level of priority. Include input from stakeholder engagement, including the types of stakeholders engaged.

The DNR identified Great Lakes Resources as a Medium-priority enhancement area for Minnesota's coastal zone. This decision reflects a moderate level of stakeholder concern, a range of emerging threats, and a need for continued support in monitoring and management without the urgency seen in higher-priority areas. Of the enhancement area categories, Great Lakes Resources was the fourth most important based on the stakeholder engagement survey.

Survey participants identified land-based development, polluted runoff, aquatic invasive species, and mineral extraction as key threats to Great Lakes resources. When asked to select the single most significant threat, responses were split among land-based development, polluted runoff, and aquatic invasive species, indicating that no single issue dominates stakeholder concern. Instead, the results suggest a broad awareness of multiple, interconnected pressures on the resource. Respondents cited both personal and professional experience as reasons for identifying these threats, with some also referencing constituent concerns. This mix of perspectives supports the need for continued engagement and coordination across sectors.

Stakeholders also identified several areas where the state could provide support, including monitoring, communication and outreach, ordinances and policies, and technical assistance. While no single need stood out as the top priority, the responses point to a desire for improved tools and information to guide decision-making and resource protection.

The medium priority designation allows the Coastal Program to continue supporting efforts to protect and manage these resources while focusing more intensive efforts on areas with more immediate or concentrated threats.

IX. Energy and Government Facility Siting

Section 309 Enhancement Objective: Adoption of procedures and enforceable policies to help facilitate the siting of energy facilities and Government facilities and energy-related activities and Government activities which may be of greater than local significance. §309(a)(8)[63]

Phase 1 (High-level) Assessment Purpose: To quickly determine whether the enhancement area is a high-priority enhancement objective for the CMP that warrants a more in-depth assessment. The more in-depth assessments of Phase II will help the CMP understand key problems and opportunities that exist for program enhancement and determine the effectiveness of existing management efforts to address those problems.

Resource Characterization

1. Status and Trends of Energy Facilities and Activities

In the table below, characterize the status and trends of different types of energy facilities and activities in the state's or territory's coastal zone based on best-available data. If available, identify the approximate number of facilities by type.

[63] CZMA § 309(a)(8) is derived from program approval requirements in CZMA § 306(d)(8), which states:

> "The management program provides for adequate consideration of the national interest involved in planning for, and managing the coastal zone, including the siting of facilities such as energy facilities which are of greater than local significance. In the case of energy facilities, the Secretary shall find that the State has given consideration to any applicable national or interstate energy plan or program."

NOAA regulations at 15 C.F.R. § 923.52 further describes what states need to do regarding national interest and consideration of interests that are greater than local interests.

Table 39: Status and Trends in Energy Facilities and Activities in the Coastal Zone

Type of Energy Facility/Activity	**Exists in Coastal Zone** (Number, Yes, or No)	**Change in Existing Facilities/Activities Since Last Assessment** (Increase, decrease, no change, unknown)	**Proposed in Coastal Zone** (Yes, no, or number)	**Change in Proposed Facilities/Activities Since Last Assessment** (Increase, decrease, no change, unknown)
Pipelines	1*	Increase	No	No change
Electrical grid (transmission cables)	Yes	Unknown	Unknown	Unknown
Ports	4	No change	No	No change
Liquid natural gas (LNG)	No	No change	No	No change
Electric Power Facilities (Oil)	No	No change	No	No change
Electric Power Facilities (Gas)	No	No change	No	No change
Electric Power Facilities (Coal)	1**	Decrease	No	No change
Electric Power Facilities (Nuclear)	No	No change	No	No change
Electric Power Facilities (Wave)	No	No change	No	No change
Electric Power Facilities (Tidal)	No	No change	No	No change
Electric Power Facilities (Current ocean, lake, river)	4***	No change	No	No change
Electric Power Facilities (Hydropower)	No	No change	No	No change
Electric Power Facilities (Ocean thermal energy conversion)	No	No change	No	No change

Type of Energy Facility/Activity	**Exists in Coastal Zone** (Number, Yes, or No)	**Change in Existing Facilities/Activities Since Last Assessment** (Increase, decrease, no change, unknown)	**Proposed in Coastal Zone** (Yes, no, or number)	**Change in Proposed Facilities/Activities Since Last Assessment** (Increase, decrease, no change, unknown)
Electric Power Facilities (Solar)	No	No change	No	No change
Electric Power Facilities (Biomass)	1****	Decrease	No	No change
Other (please specify)	No	No change	No	No change

Notes:

*: Enbridge is replacing Line 3. This will include rerouting through the southern portion of the coastal zone. Construction is still ongoing.

**: There were two electric power facilities utilizing coal in the coastal zone. The Hibbard Renewable Energy Center in Duluth, Minnesota is still currently in operation. The other facility, Taconite Harbor Energy Center in Schroeder, MN, was retired in 2020.

***: Minnesota Power utilizes four river-based electric power facilities in the coastal zone. These are the Fond du Lac Dam, Thomson Dam, Scanlon Dam, and Knife Falls Dam. All these facilities are located along various stretches of the St. Louis River and are currently in operation.

****: The only electric power facility utilizing biomass is the Hibbard Renewable Energy Center in Duluth.

2. Additional Detail on the Status and Trends for Energy Facilities

If available, briefly list and summarize the results of any additional state- or territory-specific information, data, or reports on the status and trends for energy facilities and activities of greater than local significance in the coastal zone since the last assessment.

No additional detail is available regarding energy facilities in the coastal zone.

3. Status and Trends for Federal Government Facilities and Activities

Briefly characterize the existing status and trends for federal government facilities and activities of greater than local significance[64] in the state's coastal zone since the last assessment.

Minnesota coastal area has several individual federal buildings and sites; activities at these sites have only local significance. Absent from the coastal area are large military installations and government complexes that have greater than local significance.

Management Characterization

1. Significant Management Changes

Indicate if the approach is employed by the state or territory and if significant state- or territory-level changes (positive or negative) that could facilitate or impede energy and government facility siting and activities have occurred since the last assessment.

Table 40: Significant Changes in Energy and Government Facility Management

Management Category	**Employed by State or Territory** (Yes or No)	**CMP Provides Assistance to Locals that Employ** (Yes or No)	**Significant Changes Since Last Assessment** (Yes or No)
Statutes, regulations, policies, or case law interpretations	Yes	No	No
State comprehensive siting plans or procedures	Yes	No	No

[64] The CMP should make its own assessment of what government facilities may be considered "greater than local significance" in its coastal zone, but these facilities could include military installations or a significant federal government complex. An individual federal building may not rise to a level worthy of discussion here beyond a very cursory (if any at all) mention).

2. Explanation of Management Changes

For any management categories with significant changes, briefly provide the information below. If this information is provided under another enhancement area or section of the document, please provide a reference to the other section rather than duplicate the information:

a. Describe the significance of the changes;
b. Specify if these changes were 309 or other CZM-driven changes; and
c. Characterize the outcomes or likely future outcomes of the changes.

There were no significant changes to energy and government facility siting statutes, regulations, policies, case law or state comprehensive siting plans or procedures since 2015, the year of our last assessment.

Enhancement Area Prioritization

1. Priority Level

What level of priority is the enhancement area for the coastal management program?

☐ **High**

☐ **Medium**

☒ **Low**

2. Rationale

Briefly explain the reason for this level of priority. Include input from stakeholder engagement, including the types of stakeholders engaged.

The DNR has identified Government and Energy Facility Siting as a Low-priority enhancement area. This determination reflects minimal stakeholder concern, limited recent activity in the coastal zone, and a lack of pressing challenges or needs identified through engagement.

Of the 103 total responses to the stakeholder engagement survey, no respondents selected this enhancement area as their top priority, and only four selected it as their second priority. Among those who did, the most cited challenges were regulatory process coordination and review, followed by concerns about coastal resource impacts and conflicting uses. However, these concerns were limited in number and did not indicate widespread or urgent issues.

Respondents who identified challenges did so primarily based on professional experience or constituent input, rather than personal encounters. When asked about needs the state could address, suggestions included improving ordinances and policies, providing technical assistance, and supporting research. Still, no single need emerged as a dominant priority, and overall engagement with this topic was low.

The Coastal Program will continue to monitor this area but will focus its resources on enhancement areas with greater demonstrated need.

X. Aquaculture

Section 309 Enhancement Objective: Adoption of procedures and policies to evaluate and facilitate the siting of public and private aquaculture facilities in the coastal zone, which will enable states to formulate, administer, and implement strategic plans for marine aquaculture. §309(a)(9)

Phase 1 (High-level) Assessment Purpose: To quickly determine whether the enhancement area is a high-priority enhancement objective for the CMP that warrants a more in-depth assessment. The more in-depth assessments of Phase II will help the CMP understand key problems and opportunities that exist for program enhancement and determine the effectiveness of existing management efforts to address those problems.

Resource Characterization

1. Status and Trends of Aquaculture Facilities

In the table below, characterize the existing status and trends of aquaculture facilities in the state's coastal zone based on the best-available data. Your state Sea Grant Program may have information to help with this assessment.

Table 41: Status and Trends of Aquaculture Facilities and Activities

Type of Facility/Activity	**Number of Facilities**	**Approximate Economic Value**	**Change Since Last Assessment** (Increase, decrease, no change, unknown)
Private Aquaculture Pond	3	Unknown	No change
Private Aquaculture Tanks/Buildings	2	Unknown	No change
MN DNR French River Cold Water Fish Hatchery	0	Not applicable	Decrease
Devil Track Fish Hatchery	0	Not applicable	Decrease
MN DNR Walleye Rearing Pond	1	Unknown	No longer a rearing pond, but is now a holding pond

2. Additional Detail on Status and Trends or Potential Impacts from Aquaculture

If available, briefly list and summarize the results of any additional state- or territory-specific data or reports on the status and trends or potential impacts from aquaculture activities in the coastal zone since the last assessment.

The Agriculture Utilization Research Institute's Ag Innovation Partnership (AIP) program published a report, Minnesota Aquaculture Opportunities and Challenges (2020-2021) which provides information on the current aquaculture industry landscape and promotes strategies for Minnesota's agricultural sector to capitalize on this growing industry.

In addition, the State of Minnesota, through the Department of Agriculture, recently brought together a group of policy makers, stakeholders, producers, researchers and business development specialists to chart a path forward for the aquaculture sector for development of the Minnesota Aquaculture Plan 2025. This plan describes opportunities, needs and challenges for a vibrant aquaculture industry in Minnesota. The plan outlines a strategy to grow the aquaculture industry in Minnesota, projecting $10.5 million in annual revenue by 2034, up from a current $3.9 million annually. The three primary aquaculture sectors of proposed aquaculture growth in Minnesota are baitfish, sportfish, and food fish. The plan identifies the following priorities to achieve proposed goals: (1) incentive programs; (2) research and development; (3) regulatory reforms; and (4) public-private collaboration.

Management Characterization

1. *Significant Management Changes*

Indicate if the approach is employed by the state or territory and if there have been any state- or territory-level changes (positive or negative) that could facilitate or impede the siting of public or private aquaculture facilities in the coastal zone.

Table 42: Significant Changes in Aquaculture Management

Management Category	Employed by State or Territory (Yes or No)	CMP Provides Assistance to Locals that Employ (Yes or No)	Significant Changes Since Last Assessment (Yes or No)
Aquaculture comprehensive siting plans or procedures	No	Yes	No
Other aquaculture statutes, regulations, policies, or case law interpreting these	No	No	No

Note: Of all the places for potential aquaculture sites in Minnesota, the coastal zone is the least likely location for new aquaculture facilities to be located due to the harsh environment and cold surface water sources.

2. Explanation of Management Changes

For any management categories with significant changes, briefly provide the information below. If this information is provided under another enhancement area or section of the document, please provide a reference to the other section rather than duplicate the information:

a. Describe the significance of the changes;
b. Specify if these changes were 309 or other CZM-driven changes; and
c. Characterize the outcomes or likely future outcomes of the changes.

There were no significant changes to aquaculture comprehensive siting plans or procedures or statutes, regulations, policies, or case law since 2015, the year of our last assessment.

Enhancement Area Prioritization

1. Priority Level

What level of priority is the enhancement area for the coastal management program?

☐ **High**

☐ **Medium**

☒ **Low**

2. Rationale

Briefly explain the reason for this level of priority. Include input from stakeholder engagement, including the types of stakeholders engaged.

The DNR has identified Aquaculture as a Low-priority enhancement area. This determination reflects minimal stakeholder interest, limited current activity, and a lack of urgent or widespread challenges identified through engagement.

No respondents selected aquaculture as their top priority in the stakeholder engagement survey, and only a small number identified any related challenges. Among those who did, aquatic invasive species, regulatory coordination, and waste treatment were noted as potential concerns. However, these issues were mentioned infrequently and did not indicate a strong or consistent pattern of concern.

Respondents who identified aquaculture-related challenges did so primarily based on professional experience, with limited input from constituents or personal encounters. When asked about needs the state could address, suggestions included communication and outreach, mapping, and decision support tools. Still, no single need emerged as a clear priority, and overall engagement with this topic was low.

The Coastal Program will continue to monitor this area and remain responsive to future developments but will focus its resources on enhancement areas with greater demonstrated need.

Phase II Assessment

XI. Coastal Hazards

In-Depth Resource Characterization

Purpose: To determine key problems and opportunities to improve the CMP's ability to prevent or significantly reduce coastal hazard risks by eliminating development and redevelopment in high-hazard areas and managing the effects of potential sea level rise and Great Lakes level change.

1. Minnesota's Most Significant Coastal Hazards

Based on the characterization of coastal hazard risk, what are the three most significant coastal hazards within your coastal zone? Also indicate the geographic scope of the hazard, i.e., is it prevalent throughout the coastal zone, or are there specific areas most at risk?

Table 43: Minnesota's Most Significant Coastal Hazards

	Type of Hazard	**Geographic Scope** (throughout coastal zone or specific areas most threatened)
Hazard 1	Shoreline erosion	189-miles of Lake Superior shoreline, from the City of Duluth to the Canadian border. Particularly prevalent during periods of high lake levels.
Hazard 2	Flooding	Throughout the coastal zone, especially along rivers/streams and near the shoreline. Particularly prevalent during periods of high lake levels.
Hazard 3	Storms	Throughout the coastal zone, especially along the shoreline. Particularly damaging during period of high lake levels.

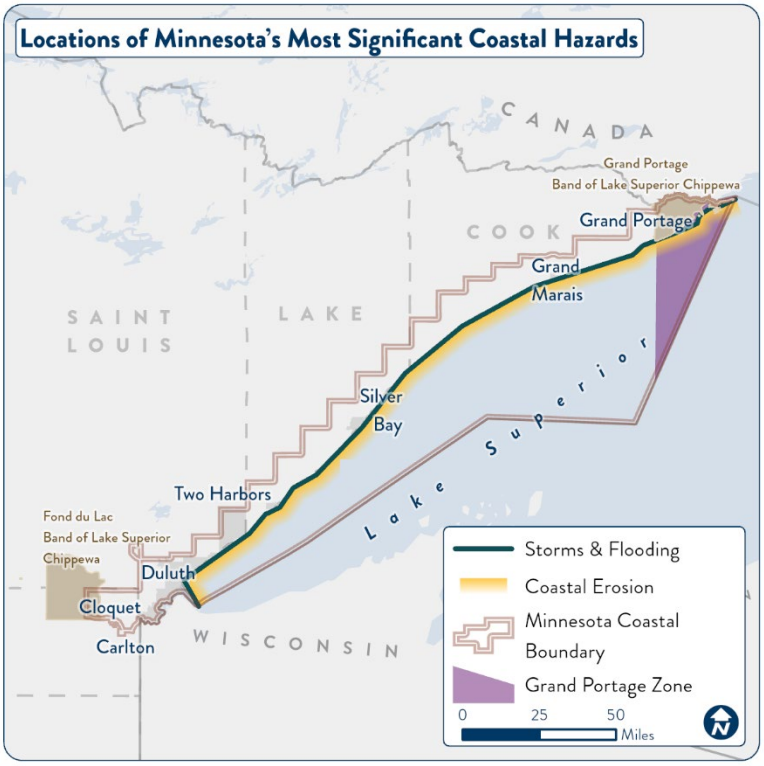


Figure 88: A map depicting the top hazards within the coastal area

2. Explanation of Assessment

Briefly explain why these are currently the most significant coastal hazards within the coastal zone. Cite stakeholder input and/or existing reports or studies to support this assessment.

Mitigation and damage costs are the key reasons why shoreline erosion, flooding and storms are Minnesota's most significant hazards.

Shoreline Erosion Costs

Recent studied completed by Ramboll US Consulting[65] for the City of Duluth and St. Louis County illuminate the costs associated with mitigating shoreline erosion. Costs range from $50,000 for monitoring alone to more than $4 million for hardened protection.

Storms and Flooding Costs

During the recent high lake levels of 2014-2020[66], portions of the North Shore of Lake Superior, including places such as Duluth's Lakewalk[67] and Brighton Beach[68], experienced millions of dollars in damage during storms. Although water levels are on a declining trend now, storms still can bring lakeshore flooding, a phenomenon that occurs when water is driven onto land from an adjacent water body.

In addition to lakeshore flooding, storms can bring concentrated amounts of rainfall that can be very damaging. In June 2012, the coastal area experienced a "mega-rain" event (events where six inches of rain covers more than 1000 square miles in 24 hours or less, with at least eight inches falling somewhere in that area)[69], which caused over $108 million in damage to public infrastructure[70]. In June 2024, a slightly smaller event resulted in areas receiving between 3-8 inches of rain, something one would expect to see once or twice in a lifetime if at all.[71] More

[65] Coastal Infrastructure Resilience Research and Development: Shoreline Mitigation Feasibility Study, Duluth, Minnesota. 2023. Ramboll US Consulting, Inc. Accessed November 3, 2025, from https://duluthmn.gov/media/g1dk3jgy/north-shore-feasibility-study.pdf.

[66] Lake Superior Retrospective: A Product of the Great Lakes Water Quality Agreement. 2025. GLISA. Accessed on October 31, 2025, from https://glisa.umich.edu/lake-superior-retrospective/.

[67] Protecting the Lake Superior Coastline from Severe Storm Events. 2024. Healing Our Waters Great Lakes Coalition. Accessed October 31, 2025, from https://www.healthylakes.org/latest-news/protecting-the-lake-superior-coastline-from-severe-storm-events.

[68] Duluth: Storm caused estimated $18.4M in damage. 2018. Minnesota Public Radio. Accessed October 31, 2025, from https://www.mprnews.org/story/2018/10/19/duluth-damage-storm-estimate.

[69] Flooding Rains in Northeast Minnesota, June 19 – 20, 2012. 2025. Minnesota Department of Natural Resources. Accessed October 31, 2025, from https://www.dnr.state.mn.us/climate/journal/duluth_flooding_120620.html.

[70] Flood damage to public infrastructure tops $108M. 2012. MPR News. Accessed November 3, 2025, from https://www.mprnews.org/story/2012/06/29/flood-damage-to-public-infrastructure-tops-108m.

[71] Extreme Rainfall Drenches Northeastern Minnesota. 2024. Minnesota Department of Natural Resources. Accessed November 3, 2025, from https://www.dnr.state.mn.us/climate/journal/extreme-rainfall-northeast-mn-june-18-2024.html

than six inches of rain swelled the Baptism River, flooding trails and destroying a bridge at Tettegouche State Park[72].

Rain at that level is bound to cause damage, but environmental factors across the coastal area make it even more damaging. Much of the North Shore's soil is clay which has a very low infiltration rate. This in addition to fast changes to the topography lead to high levels of surface runoff. When this runoff channelizes to a concentrated flow it can accumulate large amounts of debris causing clogging of culverts and other infrastructure damage. Once a culvert gets clogged, the water can over top the roadway, undermine the roads subgrade, and cause washouts.

Winter Considerations

Minnesota is known for its winters and large snowfall amounts. Duluth normally receives 86.1 inches of snow per season which can start as early as late October and extend into April.[73] Come Spring, the area can experience rapid snowmelt. It is not uncommon for water conveyance features such as culverts, storm drains, and pipes to remain frozen. This can lead to a host of problems, primarily localized flooding and infrastructure damage.

Along with snow, comes ice. Lake Superior ice coverage has decreased by approximately 79% between 1973 and 2010[74]. Reduced ice cover results in increased winter wave activity and lake-effect precipitation, both of which can be damaging. Amid a winter storm in April 2023, the area saw waves up to 20 feet high, which crashed against cliffs.[75] Ice encased trees along the shore and inland causing extensive tree damage.

[72] Heavy rain brings flooding to the North Shore, closes trails and roads. 2024. MPR News. Accessed November 3, 2025, from https://www.mprnews.org/story/2024/06/19/heavy-rain-brings-flooding-to-the-iron-range-north-shore

[73]. Northland Winter Season Climate Stats and Records. 2025. National Weather Service, Duluth MN Weather Forecast Office. Accessed November 17, 2025, from https://www.weather.gov/dlh/duluthwinterclimate.

[74] Great Lakes Ice Coverage. 2021. Great Lakes Integrated Science and Assessment Program. Accessed November 17, 2025, from https://glisa.umich.edu/resources-tools/climate-impacts/great-lakes-ice-coverage/#:~:text=Lake%20levels%20began%20declining%20after,ever%20return%20to%20previous%20conditions..

[75] Photos: Massive waves hit Minnesota's North Shore amid winter storm. 2023. Minnesota Public Radio News. Accessed November 17, 2025, from https://www.mprnews.org/story/2023/04/05/photos-massive-waves-hit-minnesotas-north-shore-amid-winter-storm.

3. Emerging Issues of Concern

Are there emerging issues of concern, but which lack sufficient information to evaluate the level of the potential threat? If so, please list. Include additional lines if needed.

Table 44: Emerging Issues of Concern

Emerging Issue	Information Needed
Coastal erosion	• Additional recession rate calculations (through additional mapping of shorelines and applying the USGS' DSAS model). • Analysis and evaluation of erosion susceptibility along the shore. • Up-to-date, electronically accessible map of erosion hazard areas for the North Shore Management Board set by the counties.
Local ordinance gaps related to setbacks from the shoreline	• Definition of 'bluffs' for inclusion in North Shore Management Plan and subsequently local ordinances. • Research and analysis of what constitutes an appropriate bluff setback. • Research and analysis into appropriate shoreline setbacks
Clay bluff mapping	• Maps of the clay bluffs, particularly in the North Shore Management Board's boundary. • Research and evaluation of how to determine bluffs on-site.
Coastal protection structures	Research and evaluation of the effect of in-water and onshore coastal structures on coastal processes, the cumulative impacts of coastal structures, and alternative coastal management solutions including nature-based solutions in high wave energy environments.
Fluctuating lake levels	Research and evaluation of impacts of future water levels scenarios under different temperature and precipitation conditions such that communities can determine risk and prepare for future damages to their built and natural resources.
Flood mapping	Continuation of flood elevation mapping in Lake and Cook Counties (Carlton and St. Louis Counties are complete).
Ice	Research to understand interactions between flooding, ice cover, and lake levels, and the impacts of winter ice shoves.

In-Depth Management Characterization

Purpose: To determine the effectiveness of management efforts to address identified problems related to the coastal hazards enhancement objective.

1. *Significant Changes in Coastal Hazard Management Categories*

For each coastal hazard management category below, indicate if the approach is employed by the state or territory and if there has been a significant change since the last assessment.

Table 45: Significant Changes in Coastal Hazards Statutes, Regulations, and Policies

Management Category	**Employed by State/ Territory** (Yes or No)	**CMP Provides Assistance to Locals that Employ** (Yes or No)	**Significant Change Since the Last Assessment** (Yes or No)
Shorefront setbacks/no build areas	Yes	No	No
Rolling easements	No	No	No
Repair/rebuilding restrictions	Yes	No	No
Hard shoreline protection structure restrictions	No	No	No
Promotion of alternative shoreline stabilization methodologies (i.e., living shorelines/green infrastructure)	Yes	Yes	Yes
Repair/replacement of shore protection structure restrictions	Yes	No	No
Inlet management	Yes	No	Yes
Protection of important natural resources for hazard mitigation benefits (e.g., dunes, wetlands, barrier islands, coral reefs) (other than setbacks/no build areas)	Yes	Yes	No
Repetitive flood loss policies (e.g., relocation, buyouts)	Yes	No	Yes
Freeboard requirements	Yes	No	Yes
Real estate sales disclosure requirements	No	No	No
Restrictions on publicly funded infrastructure	No	No	No
Infrastructure protection (e.g., considering hazards in siting and design)	Yes	Yes	No

Table 46: Significant Changes to Coastal Hazard Management Planning Programs or Initiatives

Management Category	**Employed by State/ Territory** (Yes or No)	**CMP Provides Assistance to Locals that Employ** (Yes or No)	**Significant Change Since the Last Assessment** (Yes or No)
Hazard mitigation plans	Yes	Yes	Yes
Sea level rise/Great Lake level change or adaptation plans	Yes	No	No
Statewide requirement for local post-disaster recovery planning	Yes	No	No
Sediment management plans	Yes	Yes	No
Beach nourishment plans	Yes	Yes	No
Special Area Management Plans (that address hazards issues)	Yes	Yes	No
Managed retreat plans	No	Yes	Yes
Other (please specify): Rip Current Forecasting and Public Outreach	No	Yes	Yes

Table 47: Significant Changes to Coastal Hazard Research, Mapping, and Education Programs or Initiatives

Management Category	Employed by State/ Territory (Yes or No)	CMP Provides Assistance to Locals that Employ (Yes or No)	Significant Change Since the Last Assessment (Yes or No)
General hazards mapping or modeling	Yes	Yes	Yes
Sea level rise mapping or modeling	Not applicable	Not applicable	Not applicable
Hazards monitoring (e.g., erosion rate, shoreline change, high-water marks)	Yes	Yes	Yes
Hazards education and outreach	Yes	Yes	Yes

2. *Studies to Illustrate the Effectiveness of Minnesota's Management Efforts*

Identify and describe the conclusions of any studies that have been done that illustrate the effectiveness of the state's management efforts in addressing coastal hazards since the last assessment. If none, is there any information that you are lacking to assess the effectiveness of the state's management efforts?

There have not been studies directly evaluating the state's management efforts in addressing coastal hazards since the last assessment. Several projects, however, have focused on identifying needs and regulatory gaps through policy analysis and community engagement. The Coastal Hazard Regulations in Great Lakes States: A Summary Analysis[76] summarizes noteworthy coastal hazard regulations that Minnesota and the other Great Lakes states have enacted. The Great Lakes States' Coastal Armoring Laws: A Comparison[77] examines and compares coastal armoring statutes and regulations across the eight Great Lakes states. Finally, CHAOS provides evidence that communities of all sizes are still looking for strategies to deal with flooding, erosion and storms.

[76] Association of State Floodplain Managers Flood Science Center. (2023). *Coastal Hazard Regulations in Great Lakes States: A Summary Analysis.* Accessed on November 17, 2025, from https://floodsciencecenter.org/projects/coastal-hazard-regulations-in-great-lakes-states/.

[77] Sutherland, C., Scanlan, M. (2024) *Great Lakes States' Coastal Armoring Laws: A Comparison.* University of Wisconsin – Milwaukee Publications. Accessed on November 17, 2025, from https://uwm.edu/centerforwaterpolicy/great-lakes-armoring-laws-comparison/.

Identification of Priorities

1. Management Priorities

Considering changes in coastal hazard risk and coastal hazard management since the last assessment and stakeholder input, identify and briefly describe the top one to three management priorities where there is the greatest opportunity for the CMP to improve its ability to more effectively address the most significant hazard risks. (Approximately 1-3 sentences per management priority.)

Management Priority: Capacity building

Description: Capacity building is a holistic, on-going process that covers a wide range of activities and investments to strengthen the skills, resources, and processes of individuals, organizations and communities. It is a foundation upon which the area can improve coastal development regulations and hazard mitigation policies, a topic of great interest by stakeholders. It is also one way that leaders and professionals gain confidence and learn about resources to better communicate with the public and stakeholders, a second area of importance for stakeholders.

Management Priority: Mapping/GIS/Modeling

Description: Data and maps provide essential information to coastal managers as they navigate the challenges around coastal hazards. Data and maps are always changing though. The Coastal Program is in an excellent position to stay abreast of these changes, influence the development of new data and maps, and see to it that managers are using the very latest. This will feed and inform communications and outreach (see below).

Management Priority: Communications and Outreach

Description: There is no shortage of coastal hazard tools and resources available to coastal managers to support decision- and policy- making but finding and applying the right ones can at times be overwhelming. That's where communication and outreach come in. The Coastal Program is well positioned to be able to find the right tools and share where and how to access them. In addition, we are committed to sharing best practices and information about funding opportunities through our broad network of partners and CHAOS, the region's coastal hazard community of practice.

2. Explanation of Priority Needs and Information Gaps

Identify and briefly explain priority needs and information gaps the CMP has for addressing the management priorities identified above. The needs and gaps identified here should not be limited to those items that will be addressed through a Section 309 strategy but should include any items that will be part of a strategy.

Table 48: Coastal Hazard Priority Needs and Information Gaps

Priority Needs	Need? (Yes or No)	Brief Explanation of Need/Gap
Research	Yes	Research needed to inform and evaluate: (1) Future responses to fluctuating lake levels under different temperature and precipitation scenarios; (2) Effects of waves/wave run-up on the coastline; (3) Feasibility and cost of coastal hazard solutions/management actions, including nature-based solutions; (4) Impact of coastal structures on coastal processes; (5) Coastal riverine bathymetry and flow monitoring; (6) Impacts of ice cover on erosion; (7) Site-level monitoring protocols; (8) Changes in coastal storms relative to temperature and precipitation changes – are they getting worse; (9) Health and function of the dunes of Minnesota Point; and (10) Usable/appropriate vulnerability and risk assessment tools for Minnesota's coastal communities.
Mapping/ GIS/Modeling	Yes	Mapping/GIS/modeling needs include: (1) Accurate maps outlining erosion susceptibility and high erosion hazard areas; (2) Nearshore hydrodynamic modeling; (3) Watershed/stormshed hydrologic and hydraulic and/or flow modeling; (4) Standardization of existing datasets; (5) Flood mapping in Lake and Cook Counties; (6) Continued updates to county aerial photography and oblique images of the coastline; (7) Asset mapping; (8) Tapping into the state plan for landslide susceptibility; and (9) Coastal structures in Cook County
Data and information management	Yes	Data and information management needs include: (1) Percentage of shoreline armoring; (2) Coastal community stormwater systems; (3) Real time buoy information; (4) Launching and maintaining a digital coastal atlas with relevant state, regional, and local data and resources; (5) Integration of data sources between agencies/organizations, including the new statewide LiDAR; (6) Updating DNR webpages with new/existing resources; (7) Improving knowledge about what data are available, where to find it, and how to use it; and (8) Developing an oblique imagery viewer.

Priority Needs	**Need?** (Yes or No)	**Brief Explanation of Need/Gap**
Training/Capacity building	Yes	Training and capacity needs include: (1) Helping communities access existing tools, data sets, funding and best management practices; (2) Providing guidance on how to integrate coastal hazard data into long-term plans; (3) Encouraging proactive coastal resiliency efforts to minimize costly emergency response; (4) Teaching decision-makers on how to use published erosion hazard data; (5) Providing guidance on how to do a risk assessment based on existing resources in the easiest way possible; (6) Providing permitting authorities and/or SWCDs the opportunity to consult with a coastal engineer; and (7) Professional development for Coastal Program staff. There is an on-going need for a wide range of training/capacity building efforts as there is constant turnover.
Decision-support tools	Yes	Decision-support tools needs include: (1) Updates to the North Shore Erosion Data Viewer, including more mapped shorelines and application of the DSAS model; (2) A guidebook to help people if they can't afford to get a coastal engineer; (3) Completing green infrastructure code audits; (4) Incorporating Lake Superior into the DNR's Bluff Determination tool; (5) Different assessment tools – from self-assessment tools custom made for this region to hands-on risk assessment assistance for specific sites of high priority for coastal communities.

Priority Needs	Need? (Yes or No)	Brief Explanation of Need/Gap
Communication and outreach	Yes	Communication and outreach needs include: (1) Sharing funding sources; (2) Promoting the use of LiDAR, orthophotography, and GIS data layers; (3) Producing more public information on erosion control measures and guidance documents on erosion related setbacks; (4) Identifying and providing North Shore Management Board with outreach materials to share with municipalities to support planning and ordinance development; (5) Using simple renderings of models and maps to communicate risk to decision makers; (6) Providing updated information regarding river/lake inundation potential associated with high water levels and flooding; (7) Conducting social science-informed outreach to increase adoption of best management practices; (8) Updating existing materials to keep them relevant; (9) Transitioning highly-technical information into an easy-to-digest format; (10) Producing a public awareness campaign on preparedness; and (11) Producing information that speaks to how in-land lake dynamics differ from Lake Superior.
Coordination and collaboration	Yes	Maintaining partnerships with Minnesota and Wisconsin Sea Grant, Wisconsin Coastal Management Program, and the Lake Superior Reserve in the implementation of CHAOS

Enhancement Area Strategy Development

1. *Plan for Strategy Development*

Will the CMP develop one or more strategies for this enhancement area?

Yes ☒

No ☐

2. *Rationale for Strategy Development*

Briefly explain why a strategy will or will not be developed for this enhancement area.

Coastal hazards were consistently identified as a high-priority concern through both stakeholder engagement and the technical evaluation. Stakeholders highlighted shoreline erosion, flooding, and coastal storms as the most significant hazards affecting Minnesota's Lake Superior coastal zone. These hazards are widespread, with erosion impacting nearly the entire 189-mile shoreline and flooding and storm impacts occurring throughout the coastal zone.

Since the last assessment, the frequency and severity of these hazards have increased, as documented by events such as the June 2024 storm that caused widespread infrastructure damage. Additionally, high Lake Superior water levels in recent years have amplified erosion and storm impacts, particularly in areas with clay bluffs and inadequate shoreline protection.

The Level II assessment also identified several emerging issues and information gaps, including the need for training/capacity building, mapping/GIS/modeling, and communication and outreach. While some local initiatives—such as Duluth's managed retreat and dune restoration projects—have made progress, there is a clear opportunity for the Coastal Program to expand support and improve regional resilience.

Given the combination of high stakeholder concern, increasing hazard impacts, and clear opportunities for improved management, the DNR has determined that a targeted strategy is necessary to enhance the state's ability to address coastal hazards effectively.

Strategy: Preparing Communities to Address Coastal Erosion

XII. Issue Area(s)

The proposed strategy or implementation activities will primarily support the following high-priority enhancement area(s):

- ☐ Aquaculture
- ☐ Energy and Government Facility Siting
- ☒ Coastal Hazards
- ☐ Ocean/Great Lakes Resources
- ☐ Special Area Management Planning
- ☐ Cumulative and Secondary Impacts
- ☐ Wetlands
- ☐ Marine Debris
- ☐ Public Access

The proposed strategy or implementation activities will also support the following enhancement areas:

- ☐ Aquaculture
- ☐ Energy and Government Facility Siting
- ☐ Coastal Hazards
- ☐ Ocean/Great Lakes Resources
- ☐ Special Area Management Planning
- ☒ Cumulative and Secondary Impacts
- ☐ Wetlands
- ☐ Marine Debris
- ☐ Public Access

XIII. Strategy Description

The proposed strategy will lead to, or implement, the following types of program changes:

☐ A change to coastal zone boundaries;

☒ New or revised authorities, including statutes, regulations, enforceable policies, administrative decisions, executive orders, and memoranda of agreement/ understanding;

☐ New or revised local coastal programs and implementing ordinances;

☐ New or revised coastal land acquisition, management, and restoration programs;

☐ New or revised special area management plans (SAMP) or plans for areas of particular concern (APC) including enforceable policies and other necessary implementation mechanisms or criteria and procedures for designating and managing APCs; and,

☒ New or revised guidelines, procedures, and policy documents which are formally adopted by a state or territory and provide specific interpretations of enforceable CZM program policies to applicants, local government, and other agencies that will result in meaningful improvements in coastal resource management.

Strategy Goal

Prepare communities to address coastal erosion by equipping them with the capacity, resources and maps they need to develop or revise local policies, plans and ordinances.

Description

This strategy will focus on three areas:

- **Updating existing erosion data and maps to provide necessary information for communities to include in planning and decision-making**
  Minnesota's coastal erosion hazard maps are more than 25 years old and exist in a non-digital format. The Coastal Program will follow a three-step process to update and modernize these critical data. First, we will provide communities with updated erosion (recession) rates and ensure they are available publicly. Next, we will identify areas susceptible to shoreline erosion, relying heavily on a data set from the Department of Transportation. Finally, we will produce accurate digital maps outlining high erosion hazard areas.
- **Increasing local government capacity**
  Capacity building is about strengthening the skills, resources, and processes of individuals, organizations and communities. Specifically, the Coastal Program will focus on skill building. Paramount is training decision-makers on how to use published erosion

hazard data and its limitations. We will also contribute time and expertise to the North Shore Management Board's (NSMB) Technical Advisory Committee (TAC), NSMB's Coastal Erosion Hazard Mapping (CEHM) workgroup and the region's hazard-related community of practice, CHAOS (Coastal Hazards of Superior). As active participants in the TAC and CEHM, we can help both apply new resources and the latest information into their decision making. Through CHAOS, we will continue to deliver training on coastal erosion and other hazard topics to on-the-ground practitioners and decision-makers working throughout the coastal area. Finally, we will work with at least two local governments to help them incorporate the erosion hazard area maps into their policies and ordinances.

- **Enhancing communication and outreach efforts to and from local governments about coastal erosion**
  Timely and relevant communication and outreach is a critical component to most any initiative. With regards to erosion, local governments need good information coming in if they are going to make good decisions. Equally important is the information coming out to stakeholders. Landowners, for example, routinely look to local and state governments for resources that will help them protect their properties from coastal erosion. The easier to digest, the better.

  To enhance both these efforts, the Coastal Program will:
  - Provide guidance on how to interpret erosion hazard area maps; produce a guidance document and/or outreach materials.
  - Update existing erosion handouts produced by the DNR's coastal management fellow in 2020 to keep them relevant; add them and other coastal erosion resources to the DNR's website.
  - Produce more public information on erosion control measures that communities, soil and water conservation districts (SWCDs), DNR and others can distribute to private landowners.

XIV. Needs and Gaps Addressed

Survey respondents expressed a need for practical, on-the-ground support related to coastal hazards and specifically coastal erosion. This strategy does that, helping to address several identified needs and gaps in our Phase II assessment related to capacity building/training, communications and outreach, mapping/GIS/modeling and decision support tools (see Table 48). Taking the steps to address these interrelated areas over the next five years will strengthen skills, processes, and resource that communities and organizations need to initiate change. It will make them more effective, adaptable, and sustainable in achieving their goals, foster innovation, and ensure they can tackle challenges. We see this as an investment in internal strength, improving community and organization performance and ability to drive towards

important program changes; it lays the foundation for communities to adopt better erosion policies, plans and ordinances.

XV. Benefits to Coastal Management

In general, this strategy will provide local communities with the tools and support they need to develop local protections for coastal erosion. Specifically, it will:

- Build professionals and leaders' skills in using web-based maps to identify areas at risk for erosion.
- Enhance CEHM and the TAC's problem-solving capabilities by bringing in an additional viewpoint.
- Connect coastal communities and stakeholders to tools and resources available to support policy and decision-making though CHAOS.
- Enhance learning, improve retention and provide lasting references about coastal erosion and the measures one can take to mitigate those risks.
- Inform communities about their vulnerability to current and future erosion hazards.
- Help communities develop and prioritize effective adaptation strategies for erosion in the future.

XVI. Likelihood of Success

There is a high likelihood of success for the Coastal Program to accomplish the work within this strategy. The Coastal Program has a strong network of partners it routinely works with in the erosion space, including the TAC, CEHM, CHAOS, University of Minnesota, Lake and Cook SWCDs and the Arrowhead Regional Development Commission. We can leverage this network along with the existing and ongoing resources and initiatives of other partnering organizations and agencies.

However, it is important to note that the Coastal Program does not have any rule making authorities; adoption of policies, plans and ordinances is within the sole control of local governments. Accordingly, the Coastal Program cannot guarantee the achievement of the programmatic changes or recommendations within the five-year assessment and strategy cycle.

XVII. Strategy Work Plan

Strategy Goal: Prepare communities to address coastal erosion by equipping them with the capacity, resources and maps they need to develop or revise local policies, plans and ordinances.

Total Years: 5

Total Budget: $375,000

Year(s): 1-5

Description of activities:

- Enhance communication and outreach.
    - Provide guidance on how to interpret erosion hazard area maps; produce a guidance document and/or outreach materials.
    - Update existing erosion handouts produced by the DNR's coastal management fellow in 2020 to keep them relevant; add them and other coastal erosion resources to the DNR's website.
    - Produce more public information on erosion control measures that communities, SWCDs, DNR and others can distribute to private landowners.
- Update erosion hazard area maps.
    - Map additional shorelines and apply the US Geological Survey's Digital Shoreline Analysis System to calculate shoreline change over time.
    - Identify areas susceptible to shoreline erosion.
    - Digitally map erosion hazard areas from Duluth to the Canadian border.
    - Train decision-makers on how to electronically view the data.
- Work with communities to incorporate new erosion hazard area maps into decision-making.
    - Identify up to two early adopters.
    - Meet with the two communities to understand their needs and ultimate goals.
    - Build their capacity for adoption.
    - Work towards updated plans/policies/ordinances.

Major Milestone(s):

- Year 1:
    - Updated existing erosion handouts available.
- Year 2:
    - New resources on erosion control measures for landowners created.
- Year 3:
    - Erosion hazard area map(s) completed.
    - Identification of two communities to work with in incorporating new erosion hazard area maps into their decision-making.
- Year 4:
    - Completed guidance document to assist local governments on how to interpret erosion hazard area maps.
    - At least one training completed on using on-line erosion data viewer.
- Year 5:
    - Updated local plans and policies in two communities as possible.

Budget: $375,000

- $75,000/year; approximately 1000 hours/year at approximately $62.00 (salary and fringe)/hour plus 20.44% indirect costs

XVIII. Fiscal and Technical Needs

A. Fiscal Needs

The Coastal Program expects that Section 309 funding will not be sufficient to carry out elements of the proposed strategy. The erosion mapping is where it is at today thanks to Section 306 pass-through and staff funding, in-kind contributions from partners, an external grant and the work of a coastal management fellow. Creative and diverse funding will likely be necessary to take it to the next level.

B. Technical Needs

The Coastal Program may need the experience of a coastal engineer to perform QA/QC on the mapping. We have funds designated for an engineer through the program's Inflation Reduction Act (IRA) award. If needs exceed IRA funding levels, we may reduce the number of staff hours allotted to contract with an engineer.

XIX. Projects of Special Merit (Optional)

The Coastal Program does not have any specific projects of special merit in mind at this time. We will consider our options in advance of NOAA releasing the federal funding opportunity.

5-Year Budget Summary by Strategy

Table 49: 5-Year Budget Summary by Strategy

Strategy Title	Anticipated Funding Source (309 or Other)	Year 1 Funding	Year 2 Funding	Year 3 Funding	Year 4 Funding	Year 5 Funding	Total Funding
Preparing Communities to Address Coastal Erosion	Section 309	$75,000	$75,000	$75,000	$75,000	$75,000	$375,000
Total Funding		**$75,000**	**$75,000**	**$75,000**	**$75,000**	**$75,000**	**$375,000**

Summary of Stakeholder and Public Comment

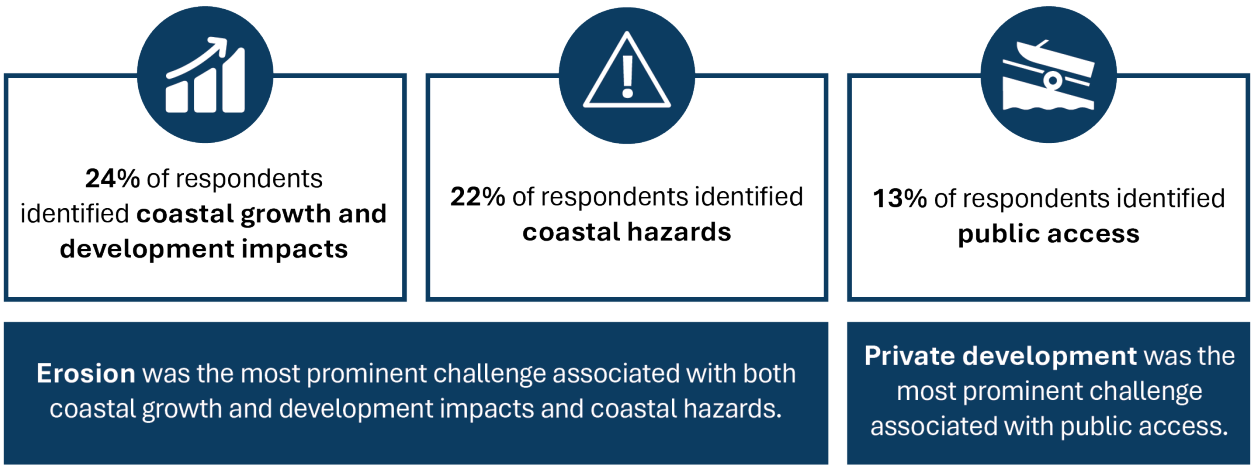
XX. Stakeholder Comments

The Coastal Program collected public feedback through an online survey, which has helped to shape the final assessment. The survey was distributed to over 400 coastal leaders and professionals. Respondents were asked to name key management priorities for the state's coastline, identify related problems or threats, and suggest needs or information gaps the Coastal Program could address. The survey was distributed via email to the entities listed in Appendix A; stakeholders were given two weeks to respond. The survey received 103 responses, and a full summary of all stakeholders engaged can be found in Appendix A. The survey responses can be found in Appendix B.

1. Key Management Priorities

Respondents were asked to identify two management priorities that they believe are most important for the state to achieve. **The survey showed three popular management priorities:**

Figure 99. Management Priorities Identified During Stakeholder Engagement



2. Needs or information gaps among the management priorities:

Results from the stakeholder engagement process identified gaps where more information is warranted. Working to gather data and fill these gaps will help the DNR improve its coastal program management priorities.

Figure 1010. Information Gaps Identified During Stakeholder Engagement

Survey responses from stakeholders offered valuable perspectives on coastal management and threats to Minnesota's coast. Based on these survey results, the Coastal Program has determined that future Section 309 resources will be directed toward addressing Coastal Hazards, with a particular focus on erosion and its intersection with development pressures and hazard impacts.

XXI. Public Comments

Appendices

Appendix A: List of Stakeholder Entities Engaged

Below are the entities the Coastal Program reached out to as part of its engagement efforts:

1854 Treaty Authority

AE2S

Arrowhead Regional Development Commission

Beaver Bay City Council

Beaver Bay Mayor's Office

Birch Point Sanitary District

Board of Water and Soil Resources

Bollig Engineering

Canosia Board of Supervisors

Caribou Lake Property Owners Association

Carlton City Council

Carlton County Board of Commissioners

Carlton County Land Department

Carlton County Transportation Department

Carlton County Zoning and Environmental Services Department

Carlton Mayor's Office

Carlton Soil and Water Conservation District

Cartlon Public Works Department

Cloquet City Council

Cloquet Community Development Department

Cloquet Mayor's Office

Cloquet Parks and Recreation Department

Cloquet Public Works Department

Cook County Board of Commissioners

Cook County Chamber of Commerce

Cook County Emergency Management Department

Cook County Highway Department

Cook County Historical Society

Cook County Land Department

Cook County Soil and Water Conservation District

Cook County Soil and Water Conservation District Board of Supervisors

Cooperation Station

Department of Health

Department of Natural Resources - Enforcement Division

Department of Natural Resources - Fish & Wildlife Division

Department of Natural Resources - Forestry Division

Department of Natural Resources - Gooseberry Falls State Park

Department of Natural Resources - Grand Portage State Park

Department of Natural Resources - Operation Services Division

Department of Natural Resources - Parks & Trails Division

Duluth City Council

Duluth Economic Development Authority

Duluth Emergency Management Department

Duluth Mayor's Office

Duluth Natural Resources Office

Duluth Parks & Recreation Department

Duluth Planning and Development Department

Duluth Property & Facilities Department

Duluth Seaway Port Authority

Duluth Sustainability Office

Duluth Township Board of Supervisors

Duluth Township Planning and Zoning Office

Duluth Utilities Department

Fond du Lac Environmental Programs

Fond du Lac Natural Resources Department

Fond du Lac Tribal and Community College

Fond du Lac Tribal Council

Fond du Lac Tribal Historic Preservation Office

Gitchi-Gami Trail Association

Governor's Council on Minnesota's Coastal Program

Grand Lake Board of Supervisors

Grand Marais City Council

Grand Marais Mayor's Office

Grand Marais Park Board

Grand Marais Planning and Zoning Commission

Grand Portage Band of Lake Superior Chippewa Trust Lands Department

Hamline University

Hermantown City Council

Hermantown Community Development Office

Hermantown Mayor's Office

Hermantown Utility and Infrastructure Office

Knife River Recreation Board

Lake County Board of Commissioners

Lake County Emergency Management Department

Lake County Environmental Services Department

Lake County GIS Department

Lake County Highway Department

Lake County Land Department

Lake County Soil and Water Conservation District

Lake Superior National Estuarine Research Reserve

Lake Superior Water Trail Association of Minnesota

Lutsen Township Board of Supervisors

Midway Township Board of Supervisors

Midway Township Permit Office

Midway Township Planning Commission Office

Minnesota Department of Natural Resources - Ecological and Water Resources Division

Minnesota Department of Natural Resources - Jay Cooke State Park

Minnesota Department of Transportation

Minnesota Environmental Partnership

Minnesota Erosion Control Association

Minnesota Pollution Control Agency

Minnesota Sea Grant

MP50 (Minnesota Point 50-year Strategic Plan)

MSA Professional Services

North House Folk School

North St. Louis Soil and Water Conservation District

Park Point Community Club

Pine View Mountain Bike Group

Poplar River Management Bard

Proctor City Council

Proctor Mayor's Office

Proctor Street Department

Proctor Utilities Department

Rice Lake Building and Zoning Department

Rice Lake City Council

Rice Lake Mayor's Office

Rice Lake Public Works Department

Scanlon City Council Office

Scanlon Mayor's Office

Scanlon Public Works Department

Schroder Area Historical Society

Schroeder Township Board of Supervisors

Silver Bay City Council

Silver Bay Mayor's Office

Silver Bay Parks & Recreation Department

Silver Bay Public Works Department

Silver Bay Utilities Department

Silver Brook Township Board of Supervisors

Silver Creek Township Board of Supervisors

South St. Louis Soil and Water Conservation District

South Terrence Elementary School

St. Louis County Board of Commissioners

St. Louis County Economic & Community Development Department

St. Louis County Enterprise GIS Department

St. Louis County IT Department

St. Louis County Lands and Minerals Department

St. Louis County Planning and Zoning

St. Louis County Property Management Department

St. Louis County Public Works Department

Sugarloaf: The North Shore Stewardship Association

Superior Hiking Trail Association

The Nature Conservancy

Thomson Township (Esko) Public Works Department

Thomson Township (Esko) Zoning Department

Thomson Township Board of Supervisors

Tofte Historical Society

Tofte Township Board of Supervisors

Twin Lakes Township Clerk's Office

Two Harbors City Council

Two Harbors Finance Office

Two Harbors Mayor's Office

Two Harbors Planning Office

Two Harbors Public Works Department

University of Minnesota

University of Minnesota - Duluth

University of Minnesota - Natural Resources Research Institute

University of Minnesota Extension

Visit Cook County

Wolf Ridge Environmental Learning Center

Wrenshall Clerk's Office

WTIP North Shore Community Radio

University of Minnesota - Natural Resources Research Institute

University of Minnesota Extension

Visit Cook County

Wolf Ridge Environmental Learning Center

Wrenshall Clerk's Office

WTIP North Shore Community Radio

Appendix B: Full Summary of Survey Responses

Below are the Minnesota Coastal Zone Management Act Section 309 Raw Public Survey results:

Respondents Identified their highest priority (priority 1) and second highest priority (priority 2) and then answered follow-up questions on their two selections. Data are separated into responses from respondents who identified each area as their top priority, and respondents who identified it as their second.

Select the objective that you think is most important for the State to achieve. You will be asked follow-up questions about the priority you select and then redirected to this page to select your second priority.

Priority 1 Totals	Number of Responses
Coastal Growth and Development Impacts - Develop policies to assess and control the collective impacts of coastal growth and development on individual uses of coastal resources, like wetlands and fisheries	34
Coastal Hazards - Manage development in high-hazard areas, and anticipate and plan for the effects of Great Lakes water level changes to protect lives and livelihoods	29
Public Access - Increase opportunities for public access to places of recreational, historical, aesthetic, ecological, or cultural value	15
Great Lakes Resources - Plan for the use of Great Lakes resources	5
Wetlands - Protect, restore, enhance, and create coastal wetlands	6
Special Area Management Planning - Prepare and implement special area management plans for important coastal areas	8
Marine Debris - Reduce marine debris entering the coastal environment by managing uses and activities that create such debris	6
Energy and Government Facility Locations - Adopting procedures and enforceable policies to facilitate the siting of energy and government facilities, ensuring consideration of broader regional and environmental impact	0
Aquaculture - Adoption of policies to evaluate and facilitate the siting of public and private aquaculture facilities in the coastal zone	0
Total Responses	103

Below are nine program objectives. Select another objective that you think is also important for the State to achieve. You will be asked follow-up questions about the second priority you select.

Priority 2 Totals	Number of Responses
Coastal Growth and Development Impacts - Develop policies to assess and control the collective impacts of coastal growth and development on individual uses of coastal resources, like wetlands and fisheries	17
Coastal Hazards - Manage development in high-hazard areas, and anticipate and plan for the effects of Great Lakes water level changes to protect lives and livelihoods	18
Public Access - Increase opportunities for public access to places of recreational, historical, aesthetic, ecological, or cultural value	13
Great Lakes Resources - Plan for the use of Great Lakes resources	17
Wetlands - Protect, restore, enhance, and create coastal wetlands	11
Special Area Management Planning - Prepare and implement special area management plans for important coastal areas	13
Marine Debris - Reduce marine debris entering the coastal environment by managing uses and activities that create such debris	7
Energy and Government Facility Locations	4
Aquaculture	3
Total Responses	103

Coastal Hazards

What are some significant coastal hazards in Minnesota's coastal zone? (You may select multiple answers)

Totals – Priority 1	Number of Responses
Coastal flooding	17
Upland – riverine flooding	8
Coastal storms (including storm surge)	19
Changing Great Lakes water levels	22
Ice heaves	1
Landslide	8
Coastal erosion	28
Overuse	6
Total Responses	109
Totals – Priority 2	**Number of Responses**
Coastal flooding	14
Upland - riverine flooding	9
Coastal storms (including storm surge)	16
Changing Great Lakes water levels	10
Ice heaves	4
Landslide	5
Coastal erosion	13
Overuse	4
Total Responses	75

Please identify the most significant coastal hazard. (Select one)

Totals – Priority 1	Number of Responses
Coastal flooding	1
Upland – riverine flooding	2
Coastal storms (including storm surge)	5
Changing Great Lakes water levels	2
Ice heaves	0
Landslide	0
Coastal erosion	18
Overuse	1
	29
Totals – Priority 2	**Number of Responses**
Coastal flooding	2
Upland – riverine flooding	3
Coastal storms (including storm surge)	5
Changing Great Lakes water levels	1
Ice heaves	0
Landslide	0
Coastal erosion	7
Overuse	0
	18

Why did you identify this as the most significant coastal hazard? (Select one)

Totals – Priority 1	Number of Responses
I had to deal with this hazard personally	13
I had to deal with this hazard professionally	7
I heard this as a concern from one of my constituents	0
I heard this as a concern from many of my constituents	9
Total Responses	29

Totals – Priority 2	Number of Responses
I had to deal with this hazard personally	8
I had to deal with this hazard professionally	7
I heard this as a concern from one of my constituents	1
I heard this as a concern from many of my constituents	2
Total Responses	18

What needs or information gaps could the state fill to more effectively address coastal hazard risks? (Select all that apply)

Totals – Priority 1	Number of Responses
Research	15
Mapping/GIS	11
Data and information management	11
Training/capacity building	12
Decision support tools	8
Communication and outreach	15
Ordinances and policies	15
Technical assistance	19
Total Responses	106
Totals – Priority 2	**Number of Responses**
Research	7
Mapping/GIS	11
Data and information management	11
Training/capacity building	9
Decision support tools	4
Communication and outreach	8
Ordinances and policies	6
Technical assistance	10
Total Responses	66

Please identify the most important need or information gap. (Select one)

Totals – Priority 1	Number of Responses
Research	1
Mapping/GIS	1
Data and information management	3
Training/capacity building	3
Decision support tools	3
Communication and outreach	5
Ordinances and policies	6
Technical assistance	7
Total Responses	29

Totals – Priority 2	Number of Responses
Research	1
Mapping/GIS	2
Data and information management	2
Training/capacity building	1
Decision support tools	1
Communication and outreach	3
Ordinances and policies	2
Technical assistance	6
Total Responses	18

Public Access

What are some existing or emerging challenges to creating or maintaining public access in Minnesota's coastal zone? (You may select multiple answers)

Totals – Priority 1	Number of Responses
Overuse or increased demand	9
Accessibility	12
Coastal erosion	5
Changing water levels	5
Conflicting uses	4
Private development	6
Natural disasters	4
Cost or funding options	9
Total Responses	54
Totals – P2	**Number of Responses**
Overuse or increased demand	6
Accessibility	7
Coastal erosion	6
Changing water levels	0
Conflicting uses	5
Private development	10
Natural disasters	1
Cost or funding options	6
Total Responses	41

What is the most significant challenge to creating or maintaining public access in Minnesota's coastal zone? (Select one)

Totals – Priority 1	Number of Responses
Overuse or increased demand	0
Accessibility	3
Coastal erosion	0
Changing water levels	0
Conflicting uses	0
Private development	2
Natural disasters	0
Cost or funding options	4
Total Responses	9

Totals – Priority 2	Number of Responses
Overuse or increased demand	0
Accessibility	2
Coastal erosion	0
Changing water levels	0
Conflicting uses	0
Private development	7
Natural disasters	1
Cost or funding options	3
Number of Responses	13

Why did you identify this as the most significant challenge to creating or maintaining public access? (Select one)

Totals – Priority 1	Number of Responses
I had to deal with this challenge personally	2
I had to deal with this challenge professionally	6
I heard this was a challenge from one of my constituents	0
I heard this was a challenge from many of my constituents	1
Total Responses	9
Totals – Priority 2	**Number of Responses**
I had to deal with this challenge personally	4
I had to deal with this challenge professionally	6
I heard this was a challenge from one of my constituents	0
I heard this was a challenge from many of my constituents	3
Total Responses	13

What needs or information gaps could the state fill to more effectively respond to public access stressors? (Select all that apply)

Totals – Priority 1	Number of Responses
Research	2
Mapping/GIS	2
Data and information management	3
Training/capacity building	3
Decision support tools	3
Communications and outreach	6
Ordinances and policies	5
Technical assistance	4
Total Responses	28

Totals – Priority 2	Number of Responses
Research	5
Mapping/GIS	6
Data and information management	2
Training/capacity building	4
Decision support tools	4
Communications and outreach	5
Ordinances and policies	8
Technical assistance	6
Total Responses	40

Please identify the most important need or information gap. (Select one)

Totals – Priority 1	Number of Responses
Research	0
Mapping/GIS	0
Data and information management	0
Training/capacity building	1
Decision support tools	1
Communications and outreach	4
Ordinances and policies	1
Technical assistance	2
Total Responses	9

Totals – P2	Number of Responses
Research	0
Mapping/GIS	1
Data and information management	0
Training/capacity building	2
Decision support tools	1
Communications and outreach	1
Ordinances and policies	6
Technical assistance	2
Total Responses	13

Coastal Growth and Development Impacts

What are some significant or emerging threats associated with coastal growth and development in Minnesota's coastal zone? (You may select multiple answers)

Totals – Priority 1	Number of Responses
Loss of habitat and open space	27
Erosion and sedimentation	32
Stormwater runoff	23
Planning and zoning issues	25
Shoreline modification	20
Impervious surface increase	19
Forestry activities	8
Agriculture activities	4
Invasive Species	16
Number of Responses	174
Totals – Priority 2	**Number of Responses**
Loss of habitat and open space	13
Erosion and sedimentation	13
Stormwater runoff	8
Planning and zoning issues	10
Shoreline modification	13
Impervious surface increase	9
Forestry activities	3
Agriculture activities	3
Invasive Species	10
Total Responses	82

What is the most significant threat associated with coastal growth and development in Minnesota's coastal zone? (Select one)

Totals – Priority 1	Number of Responses
Loss of habitat and open space	6
Erosion and sedimentation	12
Stormwater runoff	4
Planning and zoning issues	7
Shoreline modification	4
Impervious surface increase	0
Forestry activities	0
Agriculture activities	0
Invasive Species	1
Total Responses	34
Totals – Priority 2	**Number of Responses**
Loss of habitat and open space	5
Erosion and sedimentation	7
Stormwater runoff	0
Planning and zoning issues	0
Shoreline modification	4
Impervious surface increase	0
Forestry activities	1
Agriculture activities	0
Invasive Species	0
Total Responses	17

Why did you identify this as the most significant threat associated with coastal growth and development? (Select one)

Totals – Priority 1	Number of Responses
I had to deal with this threat personally	7
I had to deal with this threat professionally	22
I heard this was a threat from one of my constituents	0
I heard this was a threat from many of my constituents	4
Total Responses	33
Totals – Priority 2	**Number of Responses**
I had to deal with this threat personally	10
I had to deal with this threat professionally	5
I heard this was a threat from one of my constituents	0
I heard this was a threat from many of my constituents	2
Total Responses	17

What needs or information gaps could the state fill to more effectively respond to coastal growth and development impacts? (Select all that apply)

Totals – Priority1	Number of Responses
Research	16
Mapping/GIS	13
Data and information management	15
Training/capacity building	22
Decision support tools	12
Communication and outreach	16
Ordinances and policies	26
Technical assistance	26
Water Quality monitoring	16
Total Responses	146
Totals – Priority 2	**Number of Responses**
Research	10
Mapping/GIS	3
Data and information management	7
Training/capacity building	6
Decision support tools	4
Communication and outreach	13
Ordinances and policies	13
Technical assistance	10
Water Quality monitoring	7
Total Responses	63

Please identify the most important need or information gap. (Select one)

Totals – Priority 1	Number of Responses
Research	2
Mapping/GIS	1
Data and information management	1
Training/capacity building	3
Decision support tools	3
Communication and outreach	4
Ordinances and policies	17
Technical assistance	2
Water Quality monitoring	0
Total Responses	31

Totals – Priority 2	Number of Responses
Research	1
Mapping/GIS	0
Data and information management	0
Training/capacity building	3
Decision support tools	1
Communication and outreach	4
Ordinances and policies	7
Technical assistance	1
Water Quality monitoring	0
Total Responses	16

Great Lakes Resources

What are some significant existing or emerging threats to Great Lakes resources use within Minnesota's coastal zone? (You may select multiple answers)

Totals – Priority 1	Number of Responses
Land-based development	4
Off-shore development	1
Polluted runoff	4
Aquatic invasive species	3
Terrestrial invasive species	1
Sport fishing	0
Commercial fishing	0
Aquaculture	0
Recreation	0
Marine transportation	1
Dredging	0
Mineral extraction	3
Total Responses	17
Totals – Priority 2	**Number of Responses**
Land-based development	12
Off-shore development	2
Polluted runoff	13
Aquatic invasive species	10
Terrestrial invasive species	5
Sport fishing	1
Commercial fishing	1
Aquaculture	0
Recreation	0
Marine transportation	3
Dredging	6
Mineral extraction	12
Total Responses	65

What is the most significant threat to Great Lakes resources use within Minnesota's coastal area? (Select one)

Totals – Priority 1	Number of Responses
Land-based development	2
Off-shore development	0
Polluted runoff	3
Aquatic invasive species	0
Terrestrial invasive species	0
Sport fishing	0
Commercial fishing	0
Aquaculture	0
Recreation	0
Marine transportation	0
Dredging	0
Mineral extraction	0
Total Responses	5
Totals – Priority 2	**Number of Responses**
Land-based development	4
Off-shore development	1
Polluted runoff	5
Aquatic invasive species	5
Terrestrial invasive species	0
Sport fishing	0
Commercial fishing	0
Aquaculture	0
Recreation	0
Marine transportation	0
Dredging	0
Mineral extraction	1
Total Responses	16

Why did you identify this as the most significant threat to Great Lakes resources use? (Select one)

Totals – Priority 1	Number of Responses
I had to deal with this threat personally	2
I had to deal with this threat professionally	3
I heard it was a significant or emerging threat from one of my constituents	0
I heard it was a significant or emerging threat from many of my constituents	0
Total Responses	5
Totals – Priority 2	**Number of Responses**
I had to deal with this threat personally	3
I had to deal with this threat professionally	7
I heard it was a significant or emerging threat from one of my constituents	1
I heard it was a significant or emerging threat from many of my constituents	5
Total Responses	16

What needs or information gaps could the state fill to more effectively respond to threats to Great Lakes resource use? (Select all that apply)

Totals – Priority 1	Number of Responses
Research	2
Mapping/GIS	4
Data and information management	2
Training/capacity building	1
Decision support tools	1
Communication and outreach	3
Ordinances and policies	3
Technical assistance	2
Monitoring	5
Total Responses	21
Totals – Priority 2	**Number of Responses**
Research	7
Mapping/GIS	2
Data and information management	6
Training/capacity building	7
Decision support tools	5
Communication and outreach	10
Ordinances and policies	11
Technical assistance	7
Monitoring	13
Total Responses	61

Please identify the most important need or information gap. (Select one)

Totals – Priority 1	Number of Responses
Research	0
Mapping/GIS	0
Data and information management	0
Training/capacity building	0
Decision support tools	2
Communication and outreach	2
Ordinances and policies	0
Technical assistance	1
Monitoring	0
Total Responses	5
Totals – Priority 2	**Number of Responses**
Research	1
Mapping/GIS	0
Data and information management	1
Training/capacity building	3
Decision support tools	0
Communication and outreach	4
Ordinances and policies	3
Technical assistance	4
Monitoring	1
Total Responses	16

Wetlands

What are the some of the biggest current or future threats to wetlands in Minnesota's coastal zone? (You may select multiple answers)

Totals – Priority 1	Number of Responses
Development/fill	7
Hydrological alteration/channelization	3
Erosion	2
Pollution	6
Invasive species	6
Great Lakes water level change	2
Total Responses	26
Totals – Priority 2	**Number of Responses**
Development/fill	8
Hydrological alteration/channelization	8
Erosion	7
Pollution	8
Invasive species	7
Great Lakes water level change	4
Total Responses	42

What is the biggest threat to wetlands in Minnesota's coastal zone? (Select one)

Totals – Priority 1	Number of Responses
Development/fill	5
Hydrological alteration/channelization	0
Erosion	0
Pollution	0
Invasive species	1
Great Lakes water level change	0
Total Responses	6
Totals – Priority 2	**Number of Responses**
Development/fill	6
Hydrological alteration/channelization	0
Erosion	2
Pollution	1
Invasive species	2
Great Lakes water level change	0
Total Responses	11

Why did you identify this as the biggest threat to wetlands? (Select one)

Totals – Priority 1	Number of Responses
I had to deal with this threat personally	2
I had to deal with this threat professionally	3
I heard it was a significant or emerging threat from one of my constituents	0
I heard it was a significant or emerging threat from many of my constituents	1
Total Responses	6
Totals – Priority 2	**Number of Responses**
I had to deal with this threat personally	2
I had to deal with this threat professionally	5
I heard it was a significant or emerging threat from one of my constituents	1
I heard it was a significant or emerging threat from many of my constituents	3
Total Responses	11

What needs or information gaps could the state fill to more effectively respond to threats to wetlands? (Select all that apply)

Totals – Priority 1	Number of Responses
Research	3
Mapping/GIS	2
Data and information management	2
Training/capacity building	4
Decision support tools	0
Communication and outreach	5
Ordinances and policies	5
Technical assistance	3
Total Responses	24
Totals – Priority 2	**Number of Responses**
Research	7
Mapping/GIS	6
Data and information management	6
Training/capacity building	8
Decision support tools	4
Communication and outreach	8
Ordinances and policies	8
Technical assistance	4
Total Responses	51

Please identify the most important need or information gap. (Select one)

Totals – Priority 1	Number of Responses
Research	1
Mapping/GIS	0
Data and information management	0
Training/capacity building	0
Decision support tools	0
Communication and outreach	1
Ordinances and policies	2
Technical assistance	2
Total Responses	6

Totals – Priority 2	Number of Responses
Research	1
Mapping/GIS	1
Data and information management	0
Training/capacity building	2
Decision support tools	2
Communication and outreach	2
Ordinances and policies	3
Technical assistance	0
Total Responses	11

Special Area Management Planning

Where (geographic location) are some significant use conflicts within Minnesota's coastal zone? (You may select multiple answers)

Totals – Priority 1	Number of Responses
St. Louis County Lakeshore	6
Lake County Lakeshore	2
Cook County Lakeshore	2
Carlton County River Frontage	0
St. Louis River Estuary	7
North Shore Management Board Boundary	1
Duluth Harbor	6
Total Responses	24
Totals – Priority 2	**Number of Responses**
St. Louis County Lakeshore	9
Lake County Lakeshore	5
Cook County Lakeshore	5
Carlton County River Frontage	2
St. Louis River Estuary	5
North Shore Management Board Boundary	5
Duluth Harbor	8
Total Responses	39

What location has the most significant use conflicts within Minnesota's coastal zone? (Select one)

Totals – Priority 1	Number of Responses
St. Louis County Lakeshore	2
Lake County Lakeshore	0
Cook County Lakeshore	0
Carlton County River Frontage	0
St. Louis River Estuary	2
North Shore Management Board Boundary	2
Duluth Harbor	2
Total Responses	8
Totals – Priority 2	**Number of Responses**
St. Louis County Lakeshore	3
Lake County Lakeshore	2
Cook County Lakeshore	0
Carlton County River Frontage	1
St. Louis River Estuary	1
North Shore Management Board Boundary	2
Duluth Harbor	4
Total Responses	13

Why is this area in need of improved planning and cooperation? (Select all that apply)

Totals – Priority 1	Number of Responses
Multiple stakeholders	5
Location of rare or special habitats	5
Location known to contain hazardous areas	4
Public and private interests	0
Location for coastal-dependent economic growth	6
Needs better governmental decision making	3
Total Responses	23

What needs or information gaps could the state fill to more effectively prepare and implement special area management plans? (Select all that apply)

Totals – Priority 1	Number of Responses
Research	5
Mapping/GIS	3
Data and information management	4
Training/capacity building	4
Decision support tools	2
Communication and outreach	5
Ordinances and policies	7
Technical assistance	3
Total Responses	33

Totals – Priority 2	Number of Responses
Research	8
Mapping/GIS	5
Data and information management	8
Training/capacity building	7
Decision support tools	5
Communication and outreach	8
Ordinances and policies	10
Technical assistance	6
Total Responses	57

What needs or information gaps could the state fill to more effectively prepare and implement special area management plans? (Select all that apply)

Totals – Priority 1	Number of Responses
Research	0
Mapping/GIS	0
Data and information management	0
Training/capacity building	2
Decision support tools	1
Communication and outreach	1
Ordinances and policies	4
Technical assistance	0
Total Responses	8
Totals – Priority 2	**Number of Responses**
Research	1
Mapping/GIS	1
Data and information management	0
Training/capacity building	3
Decision support tools	1
Communication and outreach	0
Ordinances and policies	5
Technical assistance	1
Total Responses	12

Marine Debris

What are some significant or emerging challenges related to marine debris within Minnesota's coastal zone? (You may select multiple answers)

Totals – Priority 1	Number of Responses
Microplastics	6
Illegal dumping	5
Derelict fishing equipment and supplies	2
Derelict vessels	2
Litter at access sites	4
Refuse and recycling options	0
User behavior	3
Storm surge debris	3
Identification and removal	1
Education and outreach	1
Total Responses	27
Totals – Priority 2	**Number of Responses**
Microplastics	7
Illegal dumping	5
Derelict fishing equipment and supplies	2
Derelict vessels	2
Litter at access sites	4
Refuse and recycling options	3
User behavior	5
Storm surge debris	7
Identification and removal	3
Education and outreach	4
Total Responses	42

Please identify the most significant challenge related to marine debris within Minnesota's coastal zone. (Select one)

Totals – Priority 1	Number of Responses
Microplastics	2
Illegal dumping	1
Derelict fishing equipment and supplies	0
Derelict vessels	0
Litter at access sites	3
Refuse and recycling options	0
User behavior	0
Storm surge debris	0
Identification and removal	0
Education and outreach	0
Total Responses	6
Totals – Priority 2	**Number of Responses**
Microplastics	3
Illegal dumping	1
Derelict fishing equipment and supplies	0
Derelict vessels	0
Litter at access sites	1
Refuse and recycling options	0
User behavior	1
Storm surge debris	1
Identification and removal	0
Education and outreach	0
Total Responses	7

Why did you identify this as the most significant or emerging challenge related to marine debris? (Select one)

Totals – Priority 1	Number of Responses
I had to deal with this challenge personally	3
I had to deal with this challenge professionally	2
I heard it was a challenge from one of my constituents	1
I heard it was a challenge from many of my constituents	0
Total Responses	6
Totals – Priority 2	**Number of Responses**
I had to deal with this challenge personally	4
I had to deal with this challenge professionally	1
I heard it was a challenge from one of my constituents	1
I heard it was a challenge from many of my constituents	1
Total Responses	7

What needs or information gaps could the state fill to more effectively address marine debris challenges? (Select all that apply)

Totals – Priority 1	Number of Responses
Research	2
Mapping/GIS	0
Data and information management	1
Training/capacity building	1
Decision support tools	1
Education and outreach	2
Ordinances and policies	4
Technical assistance	1
Marine debris reduction programs	4
Total Responses	16
Totals – Priority 2	**Number of Responses**
Research	2
Mapping/GIS	2
Data and information management	2
Training/capacity building	3
Decision support tools	2
Education and outreach	6
Ordinances and policies	5
Technical assistance	3
Marine debris reduction programs	5
Total Responses	30

Please identify the most important need or information gap. (Select one)

Totals – Priority 1	Number of Responses
Research	1
Mapping/GIS	0
Data and information management	0
Training/capacity building	0
Decision support tools	1
Education and outreach	
Ordinances and policies	1
Technical assistance	0
Marine debris reduction programs	2
Total Responses	6

Totals – Priority 2	Number of Responses
Research	0
Mapping/GIS	0
Data and information management	0
Training/capacity building	0
Decision support tools	0
Education and outreach	4
Ordinances and policies	2
Technical assistance	0
Marine debris reduction programs	1
Total Responses	7

Energy and Government Facility Locations

What are some significant or emerging challenges to facilitating energy and government facility locations and activities in Minnesota's coastal zone? (You may select multiple answers)

No Responses as Priority 1.

Totals – Priority 2	Number of Responses
Conflicting uses	2
Coastal resource impacts	3
Regulatory process coordination and review	3
Insufficient data	1
Natural disasters	1
National security	0
Total Responses	10

What is the most significant challenge to facilitating energy and government facility locations and activities in Minnesota's coastal zone? (Select one)

No responses as priority 1

Totals – Priority 2	Number of Responses
Conflicting uses	1
Coastal resource impacts	1
Regulatory process coordination and review	2
Insufficient data	0
Natural disasters	0
National security	0
Total Responses	4

Why did you identify this as the most significant challenge to facilitating energy and government facility locations and activities? (Select one)1

No Responses as priority 1

Totals – Priority 2	Number of Responses
I had to deal with this challenge personally	0
I had to deal with this challenge professionally	2
I heard it was a challenge from one of my constituents	1
I heard it was a challenge from many of my constituents	1
Total Responses	4

What needs or information gaps could the state fill to more effectively address the challenges with facilitating energy and government facility locations and activities? (Select all that apply)

No responses as priority 1

Totals – Priority 2	Number of Responses
Research	2
Mapping/GIS	0
Data and information management	1
Training/capacity building	1
Decision support tools	0
Education and outreach	0
Ordinances and policies	3
Technical assistance	2
Marine debris reduction programs	0
Total Responses	9

Please identify the most important need or information gap. (Select one)

No responses as priority 1

Totals – Priority 2	Number of Responses
Research	0
Mapping/GIS	0
Data and information management	0
Training/capacity building	1
Decision support tools	0
Education and outreach	0
Ordinances and policies	2
Technical assistance	1
Marine debris reduction programs	0
Total Responses	4

Aquaculture

What are some significant existing or emerging challenges to facilitating aquaculture within Minnesota's coastal zone? (You may select multiple answers)

No responses as priority 1

Totals – Priority 2	Number of Responses
Conflicting uses	0
Coastal resource impacts	0
Regulatory process coordination and review	1
Insufficient data	1
Natural disasters	0
Aquatic invasive species	2
Waste treatment or disposal	1
Total Responses	5

What is the most significant challenge to facilitating aquaculture within Minnesota's coastal zone? (Select one)

No responses as priority 1

Totals – Priority 2	Number of Responses
Conflicting uses	0
Coastal resource impacts	1
Regulatory process coordination and review	0
Insufficient data	0
Natural disasters	0
Aquatic invasive species	2
Waste treatment or disposal	0
Total Responses	3

Why did you identify this as the most significant challenge related to aquaculture in Minnesota's coastal zone? (Select one)

No responses as priority 1

Totals – Priority 2	Number of Responses
I had to deal with the challenge personally	0
I had to deal with the challenge professionally	2
I heard it was a challenge from one of my constituents	0
I heard it was a challenge from many of my constituents	1
Total Responses	3

What needs or information gaps could the state fill to better respond to the most significant aquaculture challenges? (Select all that apply)

No responses as priority 1

Totals – Priority 2	Number of Responses
Research	1
Mapping/GIS	1
Data and information management	1
Training/capacity building	1
Decision support tools	1
Communication and outreach	2
Ordinances and policies	1
Technical assistance	0
Total Responses	8

Please identify the most important need or information gap. (Select one)

No responses as priority 1

Totals – Priority 2	Number of Responses
Research	0
Mapping/GIS	1
Data and information management	0
Training/capacity building	0
Decision support tools	0
Communication and outreach	2
Ordinances and policies	0
Technical assistance	0
Total Responses	3