Maine Seagrass Action Plan

Problem Statement: Two species of seagrasses typically occur in Maine: eelgrass (Zostera marina), and widgeon grass (Ruppia maritima). Eelgrass meadows are declining rapidly along the coast of Maine, and the status of ruppia is not well understood.

The Casco Bay region lost 54% of its seagrass between 2018 and 2022, and similar large scale losses have been observed in other regions of Maine, with 60% losses in the Midcoast Region between 2005 and 2023 and 35% losses in Penobscot Bay between 2003/2005/2008 and 2024. The causes of this decline are not yet well understood and continued research is needed. Action must be taken to encourage awareness of seagrass as an important natural resource, foster research into the drivers of eelgrass loss, and to protect and restore eelgrass meadows in Maine.

Maine Won't Wait, the state's climate plan updated in 2024, includes many goals that align with the Maine Seagrass Action Plan:

- "Better monitor inland and coastal and marine ecosystems to increase resilience,"
- "Restore and increase the resilience of coastal, marine, and inland habitats,"
- "Expand public and private capacity to support conservation acquisition and stewardship,"
- "Prioritize habitat restoration and resilience, aiming to repair and rebuild along with mitigating harm,"
- "Develop a landscape conservation blueprint, inclusive of inland and coastal habitats,"
- "Increase technical assistance and capacity to provide guidance on climate solutions to communities and natural resources industries, including through nature-based solutions."

Plan Principles: The Maine Seagrass Consortium is a group of organizations and individuals that recognize the need to protect and restore seagrass as a vital coastal resource and protect the benefits it provides to fisheries, water quality, coastal resilience, and coastal ecosystems. Membership includes state government, municipal government, academia, nonprofits, community groups, and others.

This plan is intended as a strategy document to outline goals and actions to support healthy and resilient seagrass meadows in the state of Maine. As a comprehensive

plan, some of these actions are already in progress, while others are identified opportunities for the future.

This Action Plan will be accompanied by an “Implementation Plan” to break down specific activities across the sections and how implementation will occur.

Section 1: Outreach, Engagement, and Advocacy

Goal 1) Increase awareness of seagrass beds as a vital habitat and provider of essential ecosystem functions in Maine

Actions

1. Work with coastal municipalities, marine industries, coastal landowners, fishers, and other target audiences to educate on the importance of seagrass beds as a habitat (including essential fish habitat), a carbon sink, a coastal resilience measure, and as a resource that supports fishing and aquaculture industries.
2. Support the efforts of harbormasters and educate harbor commissions and the public on the importance and benefits of seagrass and the negative impacts of seagrass decline.
3. Host workshops or public events to increase awareness and build capacity, seek to connect with existing efforts to leverage resources.
4. Engage the cultural community (artists, poets, storytellers, educators, etc.) in the importance of this ecosystem and the critical role of communities as stewards
5. Engage the media to share stories of seagrass successes.
6. Release periodic public-facing reports on the status of seagrass beds in Maine and what is being done to address changes.

Goal 2) Actively engage communities in stewardship of seagrass

Actions:

1. Enlist community scientists to help in stewardship activities (monitoring, pictures, snorkeling, diving, etc.)
    a. Facilitate a statewide (or multiple regional) ‘Seagrass Snapshot’ modeled after FOCB’s Casco Bay Seagrass Snapshot
    b. Find opportunities to involve communities in hands-on restoration work
2. Educate and engage communities on actions that protect seagrass such as reduced or no fertilizer use, minimizing coastal erosion, conservation moorings etc.
3. Integrate traditional ecological knowledge and wisdom into the stewardship of seagrass meadows.
4. Support community-led efforts that focus on long term stewardship of seagrass meadows.

Goal 3) Advance policy, management action, and reform to support the Seagrass Action Plan

Actions:

1. Identify ways state and local permit review, regulations, and other governance mechanisms can be amended to better conserve seagrass beds and seagrass habitat.
2. Work with regulatory agencies to bring transparency to regulatory and permitting decisions regarding seagrass and supply expertise on rulemaking and impact interpretation that increases seagrass protection
3. Work with IF&W to update Tidal Waterfowl and Wading Bird Habitat criteria as it relates to seagrass
4. Identify potential/political will for “protected area” status for critical seagrass meadows.
5. Work with Maine DMR to better understand relationships between aquaculture and seagrass and establish best management practices
6. Work with the Maine Office of Community Affairs to pilot a marine spatial planning project for historial eelgrass embayments with marine commercial uses
7. Identify policy and regulatory pathways to support healthy seagrass

Goal 4) Seek new funding and financing pathways to support the Seagrass Action Plan

Actions:

1. Leverage existing funding and financing sources in Maine that may not currently focus on seagrass (e.g. MNRCP)
2. Work with other organizations doing seagrass work on a national and international level to identify new funding pathways
3. Attract philanthropic interest and investment

Section 2: Monitoring and Research

Goal 1) Increase frequency and resolution of seagrass monitoring along the Maine coast

Actions:

1. Support high-resolution mapping efforts at state and local levels
    a. Increase capacity for higher frequency (currently on a 5-year rotation) statewide seagrass distribution mapping
2. Increase state and local capacity for monitoring including deployment and maintenance of long-term temperature and light sensors in representative locations
3. Develop community/volunteer based monitoring of target beds
4. Connect with monitoring happening in adjacent habitats to encourage landscape level monitoring approaches.
    a. Connect with mudflat monitoring being done by Manomet/UMass Amherst

b. Bathymetry mapping by MCMI

Goal 2) Facilitate sharing of knowledge, resources, and data to support monitoring efforts

Actions:

1. Create a central location for sharing, storage, and communication of seagrass monitoring data
    a. Focus first on a metadata list that can be shared with the group that includes what data sources are currently available for this groups
2. Standardize sampling and monitoring methodologies (i.e., SOPs) across sites and research groups to better compare future and long-term data sets
3. Build a repository of equipment (sensors) and supplies that can be lent to partners for monitoring purposes

Goal 3) Build capacity at Maine academic institutions to support seagrass research on science and policy

Actions:

1. Find ways to attract tenured faculty positions that would support seagrass research
2. Engage undergraduate students in hands-on seagrass experiences to create a culture of seagrass education at local institutions
3. Engage graduate students in achievable research to boost project outcomes
4. Find ways to support a postdoctoral position to help answer key questions identified by the network

Goal 4) Support and conduct research to fill key knowledge gaps on seagrass ecology and restoration techniques

Actions:

1. Work with academic institutions and other scientific partners and experts to develop research questions through an applied science lens
2. Compile selection of candidate areas for bed-level study to determine contributions of various stressors to seagrass loss
3. Research the most common and impactful stressors to eelgrass in Maine
    a. Conduct a comprehensive analysis of seagrass change relative to environmental stressor data to better assess reasons for decline or resilience. Stressor data should include water quality information as well as knowledge of biological interactions, esp. invasive species, inventory of shoreline erosion, stabilization and in-water structure development, aquaculture lease and license locations, commercial fishing activity, and mooring fields.
4. Identify key knowledge gaps for seagrass ecology in Maine and facilitate research to address these gaps

    a. Increase understanding of the winter ecology of seagrasses in Maine, including timing of seed germination and responses to stressors such as winter storms.
    b. Increase understanding of seagrass blue carbon sequestration and destruction emissions potential.
    c. Work to understand the dynamic relationships between green crab populations and seagrass health, how outside controls on green crabs may have secondary effects on seagrass, and how increasing populations of blue crabs may influence green crabs and seagrass
    d. Perform controlled seeding experiments in lab and field conditions to understand how environmental conditions and restoration techniques influence seed establishment success
5. Research innovative pathways for policy action and regulatory reform to support the protection and restoration of seagrass in Maine.

Section 3: Protection and Restoration

Goal 1) Identify key stressors and develop mitigation pathways that can be implemented on the local level

Actions:

1. Release periodic guidance on mitigating the most common seagrass stressors
2. Draft model ordinance for municipalities to encourage seagrass protective actions (reducing nitrogen loads, controlling sediment plumes from construction, etc.)
3. Work with harbormasters to identify where frequent boat anchoring overlaps with seagrass beds and establish conservation moorings to decrease anchor scarring of beds
4. Support local monitoring and observation efforts to understand targeted stressors and causes of decline on the level of individual beds
5. Innovate management solutions for key seagrass stressors

Goal 2) Increase restoration capacity and knowledge in Maine to facilitate large-scale restoration

Actions:

1. Build the capacity of the Maine Seagrass Consortium to facilitate state and regional collaboration and knowledge exchange regarding seagrass restoration.
2. Identify potential donor meadows for reproductive shoots and use of seeds in target restoration activities.
3. Build state capacity for the collection, processing, temporary storage and placement of seeds.
4. Carry out and compare results of small-scale restoration pilots using manual seed dispersal, buoy-based dispersal, and living shoot transplants

5. Assess methods and conditions associated with successful restoration outcomes and use these insights to produce a guide to restoration best practices
6. Develop methods to assess suitability of sites for restoration, including building restoration suitability indices and expanding the use of test plots.

Goal 3) Restore declining and recently vanished seagrass beds by supporting natural recovery and active restoration

Actions:

1. Restore or support recovery of target beds that support healthy regional seagrass metapopulations.
2. Coordinate with coastal landowners and communities to prevent damage and stress to restored seagrass beds.
3. Seek funds and resources to support at least one large-scale multi year restoration project.
4. Work to monitor and adaptively manage restoration projects.