

Eelgrass (*Zostera marina*)

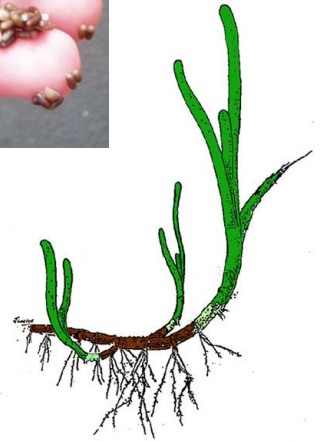
30 years of mapping status and trends in Massachusetts

Tay Evans

MassDEP
Wetlands Program



Eelgrass (*Zostera marina*) serves many ecosystem functions

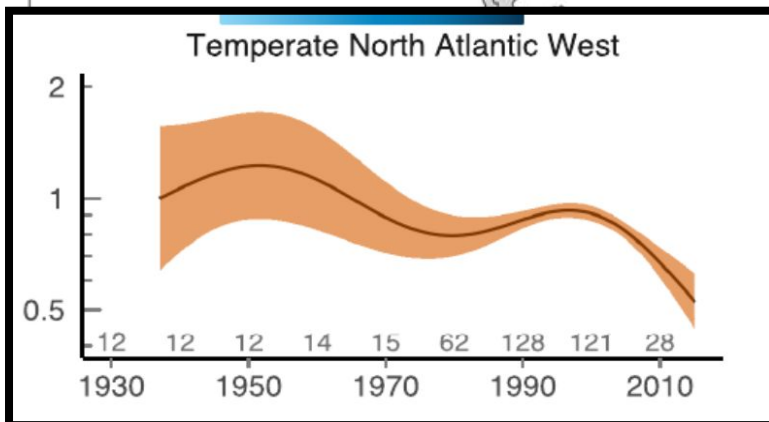
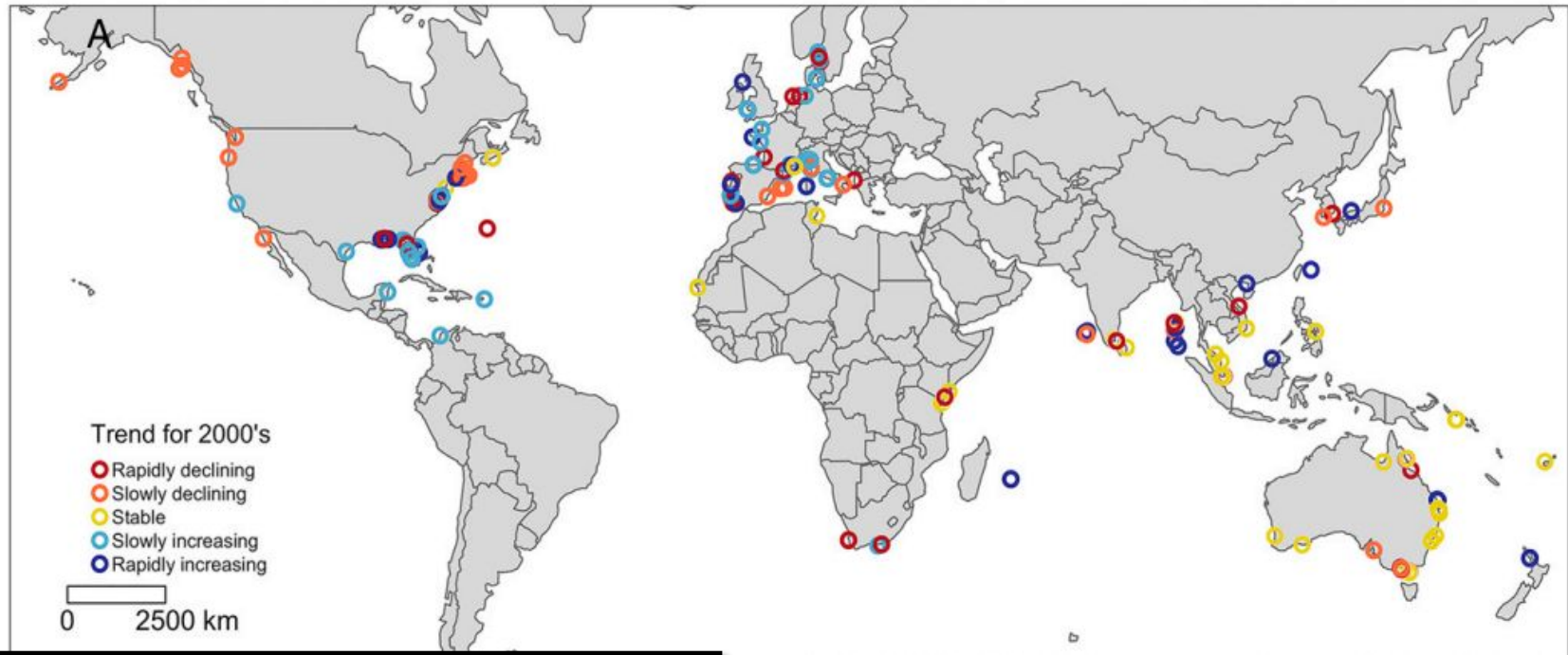


Important for:

- 3D Habitat
- Primary production
- Coastal resilience
- Carbon sequestration
- Water quality



Seagrass: Losses outweigh gains in 7 bioregions worldwide

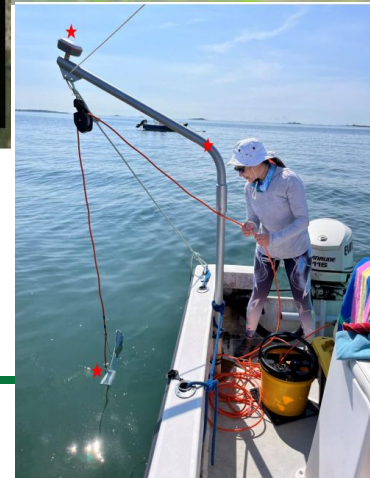
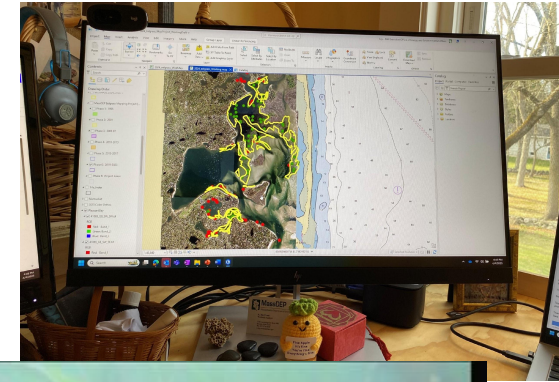
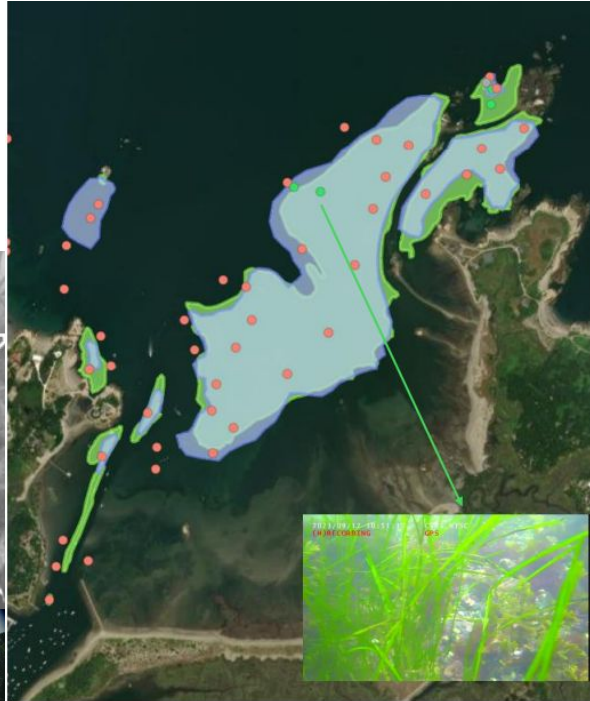


MassDEP



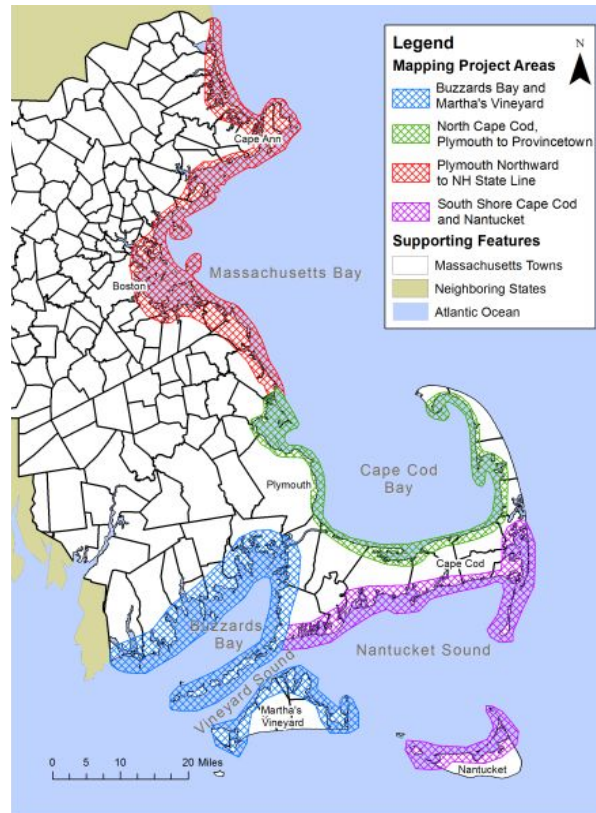
Dunic et al. 2021 Global Change Biology,

30 Years of Mapping Eelgrass 1994-2024

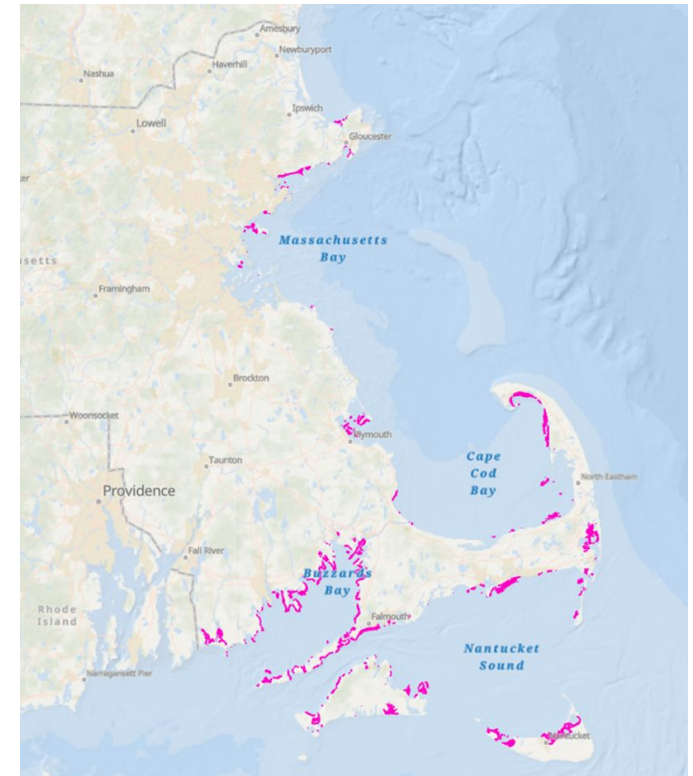


MassDEP Eelgrass Mapping Project

Mapping Phase	Years
1	1994-1995
2	2001 (partial)
3	2006- 2007 (partial)
4	2010 -2013
5	2015-2017
6	2019-2023
7	2024 -



4-5 year approach



Phase 6, 2019-2023

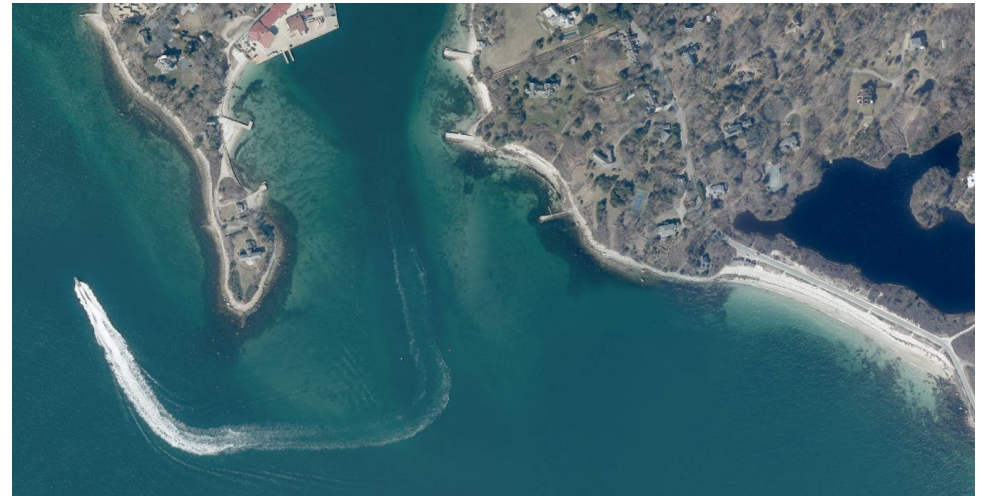
[MassGIS Data: MassDEP Eelgrass Mapping Project | Mass.gov](#)



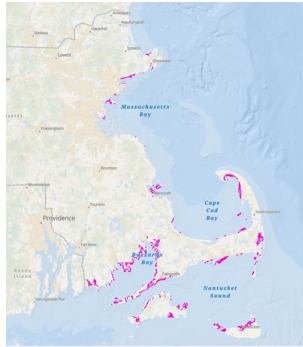
Aerial Photography and analysis that meets NOAA C-CAP specifications



Season: May-June
Tide: 2 hours around low
Sun Angle: between 30-50
Wind/Waves: <8 knots
Weather: clear, <10% clouds



Imagery analysis



Final
delineation



Aerial imagery

Prelim.
interpretation



Sample points: signature
verification, deep edge,
transects, noted areas of loss



Field data collected



2022/2023
method pilot

Semi-automated eelgrass
delineation
process

eCognition
OBIA



Original aerial imagery



Segmented into image objects

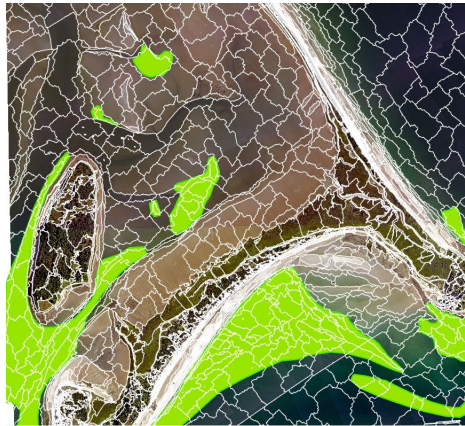


Image objects with eelgrass
spectral qualities are classified
using the eCognition algorithm
and manual photointerpretation



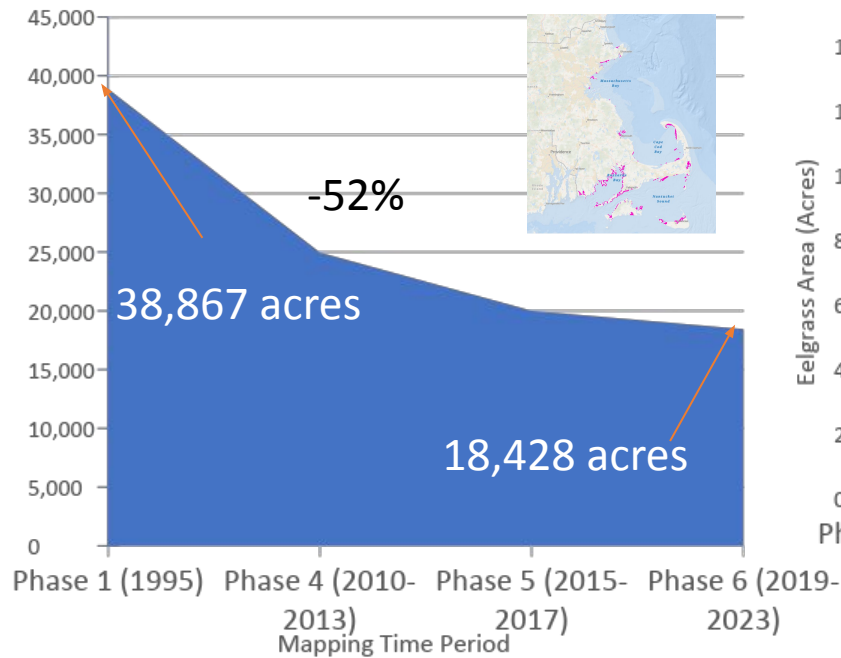
Classified image objects exported and
merged to create final eelgrass
delineation – manual interpretation is
necessary in the final step



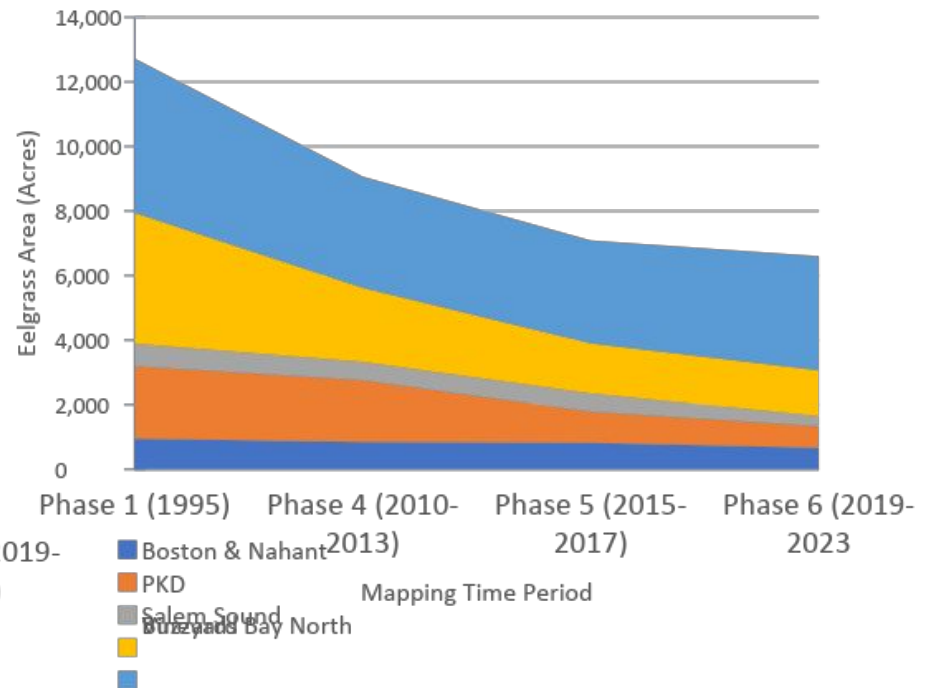


Eelgrass acres comparison 1995 to 2023

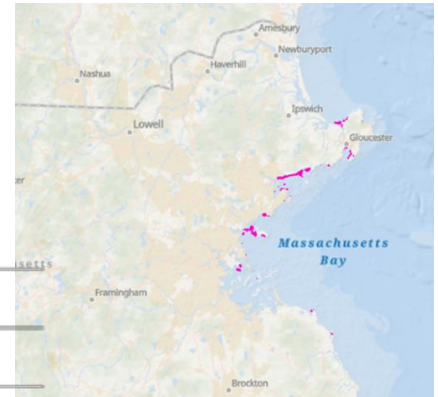
Total Eelgrass Acres Mapped



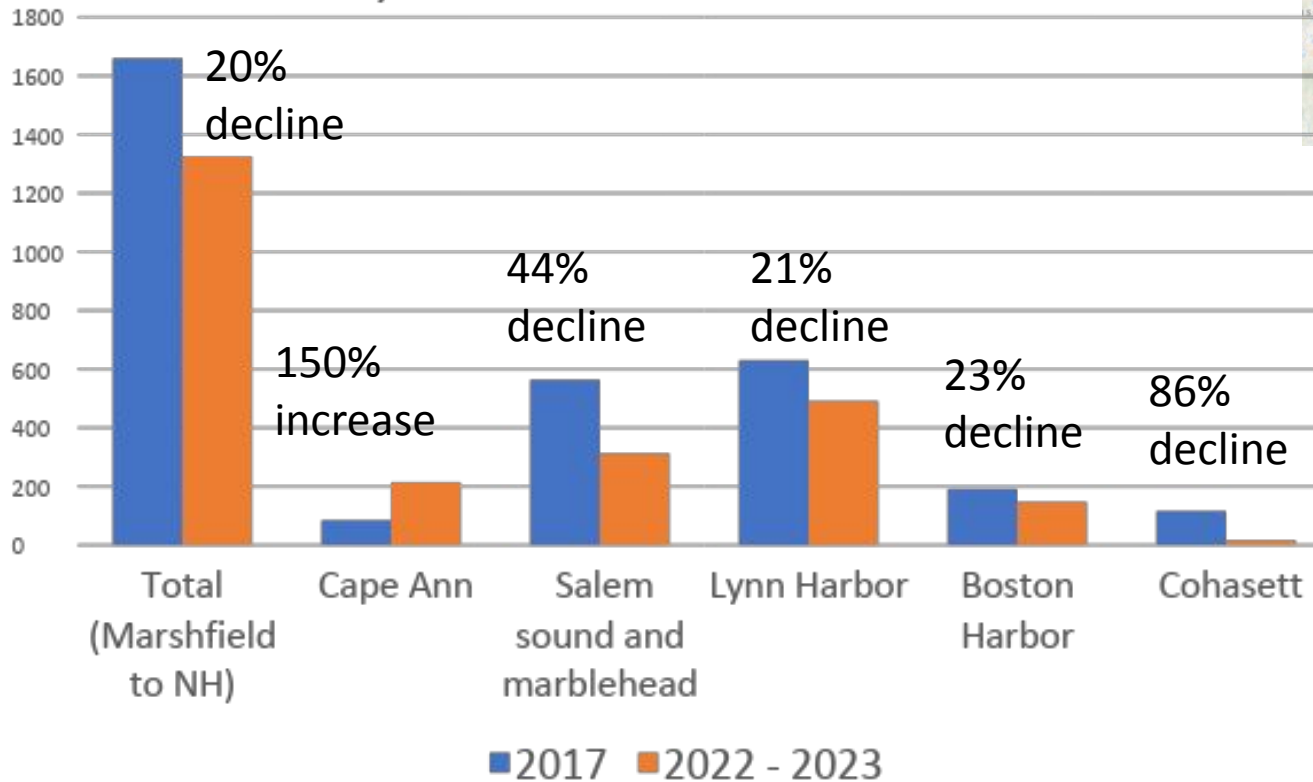
Eelgrass shown in select regions and embayments



DEP Mapped Eelgrass 2017 compared to 2023, Marshfield to NH



Marshfield to NH



How are the eelgrass maps and data used?

DEP

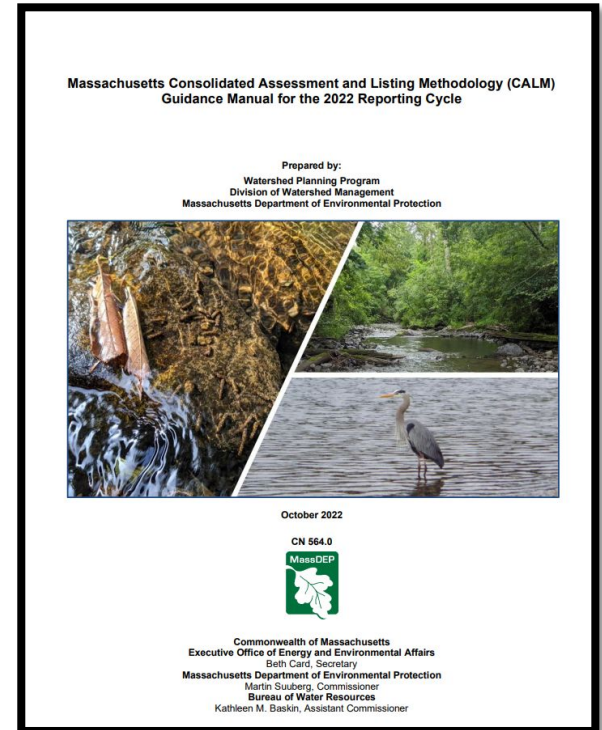
- Watershed Planning Program – Federal Clean Water Act
- Wetlands Protection Act and 401 review - *used as a guide not a regulatory line

Mass DMF & MassCZM

- Environmental review, eelgrass restoration, site status assessments, research studies, Mass Ocean Plan

Federal, state and local groups and scientists

- Planning, environmental review, research studies, restoration planning



<https://www.mass.gov/guides/watershed-planning-program>



Eelgrass: Interagency Coastal Climate Workgroup Current Topic

What do we need to do to improve protection of eelgrass?



- **Collaboration** – work together to obtain funding for more restoration, look into MESA “special concern” listing
- **Address knowledge gaps** – stressors, best restoration methods, more monitoring, signage
- **Regulation changes needed** – strengthen and clarify, consider setbacks, update guidance
- **Water quality** – Improve stormwater and wastewater management

DEP, DFG, CZM, EEA





Questions?

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