

Saltmarsh Restoration
Priorities for the
Saltmarsh Sparrow

Massachusetts



Last Updated April 18, 2024

Saltmarsh Sparrow. Ray Hennessy

Goal Statement

The Saltmarsh Sparrow (*Ammospiza caudacuta*) is a Special Concern species under the Massachusetts Endangered Species Act. This document is intended to provide those interested in salt marsh and Saltmarsh Sparrow conservation with information that will help with conservation implementation. It identifies areas containing salt marsh that are good candidates for restoration, enhancement, and/or conservation to provide persistent high-quality Saltmarsh Sparrow nesting habitat in the next 6 years in addition to long-term salt marsh resilience.



Saltmarsh Sparrow. Ray Hennessy

Saltmarsh Sparrow Objectives from the Atlantic Coast Joint Venture (ACJV)

The ACJV's Saltmarsh Sparrow Conservation Plan (Hartley and Weldon, 2020) identifies state-by-state population and habitat goals for the Saltmarsh Sparrow based on a goal population of 25,000 birds; this goal is lower than published population estimates as of 2011/2012 (Wiest et al. 2019) due to the projected impacts of sea-level rise on nesting success of the species (Field et al. 2017). Massachusetts' breeding Saltmarsh Sparrow population is estimated to be 10.4% of the global population; its population goal was therefore calculated as 10.4% of the regional population goal of 25,000 birds. Habitat goals listed in the table below are the minimum acres of high-quality habitat (defined below) needed to support the state's population goal. The short-term habitat goal sets a realistic target for the next 6 years (by 2030); the long-term habitat goal is set to achieve and sustain the state's Saltmarsh Sparrow population goal.

	2011/2012 Population Estimate*	State's %	Population Goal (Indiv)	2030 high marsh goal (ac)**	Total marsh needed to meet 2030 goal (ac)***	Long-term (2069) High Marsh Goal** (ac)	Total marsh needed to meet 2069 goal (ac)**
Massachusetts	6,200	10.4%	2,588	1,203	3,342	7,596	21,100
Regional	(+/- 2,700)		25,000	22,943	63,731	79,603	221,119

*Saltmarsh Sparrow abundance data for Massachusetts have a higher degree of uncertainty than other areas due to the way that Nelson's Sparrow, Saltmarsh Sparrow, and hybrid individuals were counted. In this hybrid zone, many "unidentified sharp-tailed sparrows" were observed but were not included in Saltmarsh Sparrow abundance estimates.

** Goals reflect acreage of high-quality habitat defined as habitat capable of supporting population growth

*** Acreage based on the assumption that ~36% of tidal marsh acreage is high marsh (Correll et al. 2019)

High-quality Habitat for Saltmarsh Sparrows

High-quality habitat is defined as conditions that allow sufficient reproductive success to support a stable or growing Saltmarsh Sparrow population. Conservation should focus on preserving, restoring, or enhancing high-quality breeding habitat which has the following characteristics:

- High marsh patches with the lowest flooding frequency that provide a window of at least 24 days with limited flooding.
- Extensive and dense *Spartina patens* vegetation with a deep, well-developed thatch layer; short-form *S. alterniflora*, *Distichlis spicata*, and *Juncus gerardii* also comprise high marsh areas and can support Saltmarsh Sparrow nesting.
- The highest quality habitat is most often found in the least modified marshes, such as those with limited ditching or agricultural influence, or free of tidal restrictions like road crossings.



Coastal marsh in Massachusetts. Mo Correll

Marsh Identification and Prioritization Process

Marsh parcels were identified and characterized by first identifying the highest-ranked marsh patches identified by the ACJV Saltmarsh Sparrow Habitat Prioritization Tool (top 10%; ACJV 2020). They were then reviewed and refined by a group of non-profit, academic, state, and federal partners. Marsh summaries were created, informed, and finalized via partner working groups (see Acknowledgements for full partner list). This group has sorted the following marshes into the following subcategories to further refine this prioritization within the state.

Priority Marshes: Marshes prioritized for ongoing restoration planning and action to support the Saltmarsh Sparrow in Massachusetts.

Reference Marshes: These marshes are in near-pristine condition and can act as reference marshes for restoration efforts in the state. Long-term preservation of these areas and the open space around them to facilitate long-term marsh migration is important, but no immediate restoration action is suggested for them.

Honorable Mention: The following marshes were identified by the partner group as important to keep in mind for future work.

The information in this document including spatial delineations of priority marshes are available as part of a regional set of marsh restoration priorities for the Saltmarsh Sparrow. This information is available to view on the [ACJV Saltmarsh Sparrow mapper](#).

Restoration Technique Definitions

The following terms are used repeatedly throughout this document to identify opportunity for different techniques at identified marshes, including in the “attributes” section. ***This information is meant to identify opportunity and potential for these restoration techniques at each site but is not meant to be prescriptive.*** A formal site assessment and design is always necessary to identify specific next steps and restoration strategies within each marsh parcel.

Sediment placement

Placement of material (including sediments from dredging efforts) on the marsh platform. Includes thin-layer placement, thick-layer placement, beneficial use of dredged sediments, formation of hummocks/microtopography, etc.

Repair hydrology - runnelling / channel creation

Modification of marsh platform using shallow channel creation to remove or prevent ground water saturation at the marsh surface that results in marsh vegetation death and marsh subsidence. Excavated peat is reused to create structured microtopography.

Repair hydrology - tidal restriction mitigation

Removal or modification of large-scale tidal restrictions such as road crossings, culverts, bridges, etc. to restore tidal flow.

Repair hydrology - address ditch plugs

Adjustment of ditch plugging on marsh platform to improve hydrology.

Repair hydrology - ditch remediation

Adjustment of human-made ditches on the marsh platform to improve hydrology.

Repair hydrology - berm, embankment, or levee modification

Removal or alteration of berms, stonewalls or embankments to restore hydrology of marsh platform and marsh migration corridor.

Land acquisition / protection for marsh migration

Purchase or easement of land to protect for eventual marsh migration.

Facilitated marsh migration

Active assistance of marsh migration through modification of the environment.

Invasive plant species mitigation (*Phragmites australis*, etc.)

Removal or mitigation of invasive plants.

Living shoreline development

Development of nature-based features to promote shoreline stabilization.

Wildlife herbivory mitigation

Removal or management of wildlife due to overgrazing. Wildlife includes deer, horses, crabs, geese, etc.

Stormwater mitigation

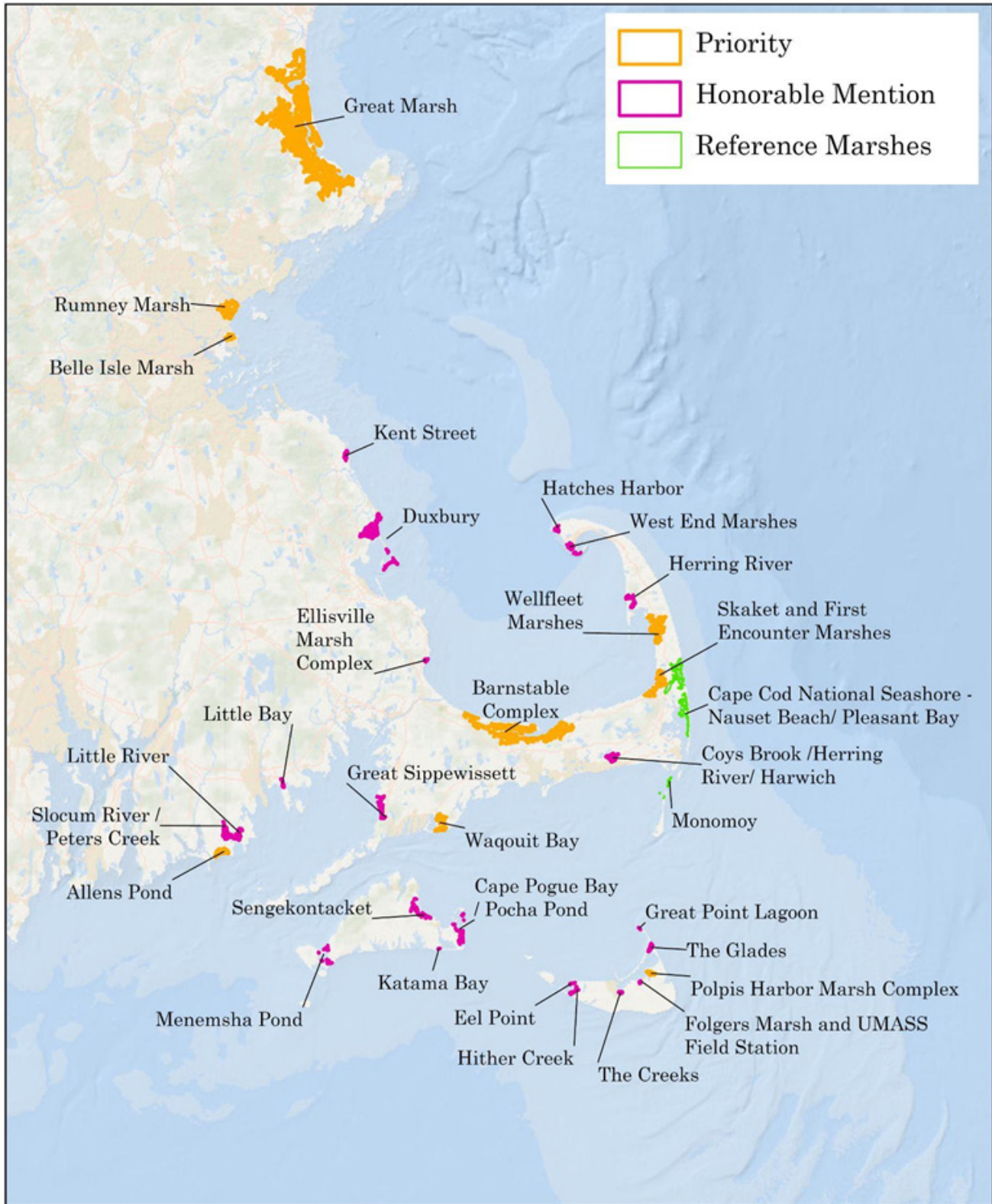
Management of stormwater inputs to reduce water, nutrients, and sediment.

Additional ecological assessment needed

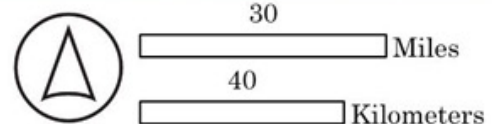
Additional monitoring and site assessment is necessary to determine specific next steps or assess existing restoration efforts at this site.

Priority Marshes

The following marshes have been prioritized for ongoing restoration planning and action to support the Saltmarsh Sparrow in Massachusetts.



Massachusetts Priority
Saltmarsh Sparrow Marshes



Great Marsh – 16,152 acres (6,536 ha)

Existing Conditions

This is the largest salt marsh complex in Massachusetts. It has evidence of historical agriculture infrastructure (e.g., embankments and ditching), mosquito control infrastructure (ditches, Open Marsh Water Management), and wildlife management infrastructure (dynamite holes, impoundments). The features of this infrastructure impairs hydrology throughout its acreage.



Great Marsh. Save the Bay

Nearly 50% of the 16,000+ acre Great Marsh is owned by 4 entities: US Fish and Wildlife Service (USFWS), MassWildlife, The Trustees, and Essex County Greenbelt. Using observations of tidal marsh responses to impaired hydrology and results from a series of well-monitored pilot projects, these partners have developed a framework to create a comprehensive hydrology restoration plan for this marsh system. The Great Marsh complex is an excellent example of cooperative conservation of a salt marsh system. Restoration projects are designed by ownership of the marsh acreage.

Existing Projects

The Trustees: 4 total projects underway. Best contact for all projects: Russ Hopping (rhopping@thetrustees.org)

Phase I (Old Town Hill): This project includes 85 acres of marsh that is fully funded and permitted and 4 years into active restoration. The marsh has received 3 years of comprehensive ditch remediation by the end of 2022. Spot treatment of remediation ditches was completed at the end of 2023 where there were voids in treated ditches. Funding is in place for comprehensive monitoring for 2 more years, including Saltmarsh Sparrow following the Saltmarsh Habitat and Avian Research Program (SHARP) point count protocol. Saltmarsh Sparrow monitoring beyond 2025 will require additional funding. Funding for lateral runnel permitting and implementation will be needed as this site did not include runnels originally.

Phase II (Ipswich, Essex and Newbury): this project includes 273 acres (243 acres on Trustees and 30 acres on MassWildlife land) are fully permitted, designed, funded (80%). Runnels 1 and 2 were completed in early 2022 with associated nesting islands and runnels 3-7 were completed in early 2023. The second year of ditch remediation was completed in late 2023; Funding is in place for comprehensive monitoring for 3 more years, including Saltmarsh Sparrow following SHARP point count protocol. Saltmarsh Sparrow monitoring beyond 2026 will require additional funding.

Phase III (NAWCA in Ipswich and Essex): this project includes 1,100 acres that is fully funded and designed, but permitting has not started yet, anticipated late March 2024.. Baseline monitoring should begin in 2024; At this time this project is fully funded. Depending on permitting and grant extension, some funding may be needed after 2025.

Phase IV (Newbury and Ipswich):

includes 3 tidal restriction removal projects. This work is either included in Trustees Phase III or MassWildlife funded projects (this includes roughly 100 acres of Trustees marsh). Support is still needed for Saltmarsh Sparrow monitoring.



Restoration practitioners work to repair the hydrology of the marsh platform. Lauren Owens Lambert.

MassWildlife: Project design for 2,000 acres within Great Marsh is underway – the plan is to prioritize acreage that will benefit the Saltmarsh Sparrow. Support still needed for permitting, implementation, and monitoring. Best contact: Pat Huckery (pat.huckery@mass.gov)

USFWS: 4 active projects underway on Parker River National Wildlife Refuge (NWR). Best contact for all Parker River NWR projects: Nancy Pau (nancy_pau@fws.gov)

Previous projects: In collaboration with SMARTeams, several pilot projects conducted from 2010-2020 tested the ability of runnels, ditch remediation and microtopography island to address legacy impacts in various marsh conditions. Results from these pilot projects were used to adapt the techniques and understand how to apply them to work with marsh processes.

The 100-acre marsh: This project combines all the previously tested techniques into one holistic restoration project to restore tidal flow to the entire marsh area. Runneling and microtopography islands were completed in 2021. Ditch remediation started in 2022, and is expected to continue annually until 2024. [Monitoring](#) of this project will continue after completion to understand longer term marsh responses.

The 1450 marsh: This project includes seven disjunct units totaling 1,450 acres and expands on the techniques used in the 100-acre marsh by incorporating dendritic and tiered channel network in the restoration design. Design is complete and permitting is expected to be complete by Spring 2024. This project will use both in-house staff (in partnership with Mass Audubon) and contractors (working with Ducks Unlimited), and work is expected to start in Spring 2024. Support is still needed for long-term monitoring.

Stage Island: Planning is underway to restore tidal flow to Stage Island Impoundment, a man-made wetland impounded in the 1950s. Preliminary designs are completed, and final design and permitting is expected in 2024. Support is still needed for implementation and long-term monitoring.

Preliminary restoration design for the remainder of the Refuge marsh acres (1,500 acres) is completed. Final review and design is expected in Fall and Winter 2024.

Mass Audubon- Rough Meadows Wildlife Sanctuary (Rowley, MA): Ditch remediation, runneling, and microtopography island creation are planned on 226 acres owned by Mass Audubon, Essex County Greenbelt, and neighboring private landowners. Partners include MassWildlife, Essex County Greenbelt, Fish and Game In-Lieu Fee Program. This project is

funded through permitting and final design, with funding for implementation and monitoring likely. Support is still needed for short- and long-term Saltmarsh Sparrow monitoring. Best contact: Annalee Tweitmann (atweitmann@massaudubon.org)

Existing Sparrow Data

Saltmarsh Sparrows are present and confirmed breeding at this site (2021/2022; SHARP 2023). Saltmarsh Sparrows are present in high densities and confirmed breeding throughout Great Marsh (2021/2022; SHARP 2023). This population has been actively studied; results indicate a -5% historical population trend (Parker River National Wildlife Refuge [NWR]; Correll et al. 2017) and mixed results concerning projected population growth rate (e.g. Field et al. 2018). Based on population estimates from 2011/2012 (Wiest et al. 2019) the Great Marsh complex supports an estimated 50% of the Massachusetts population and 5% of the global Saltmarsh Sparrow population.

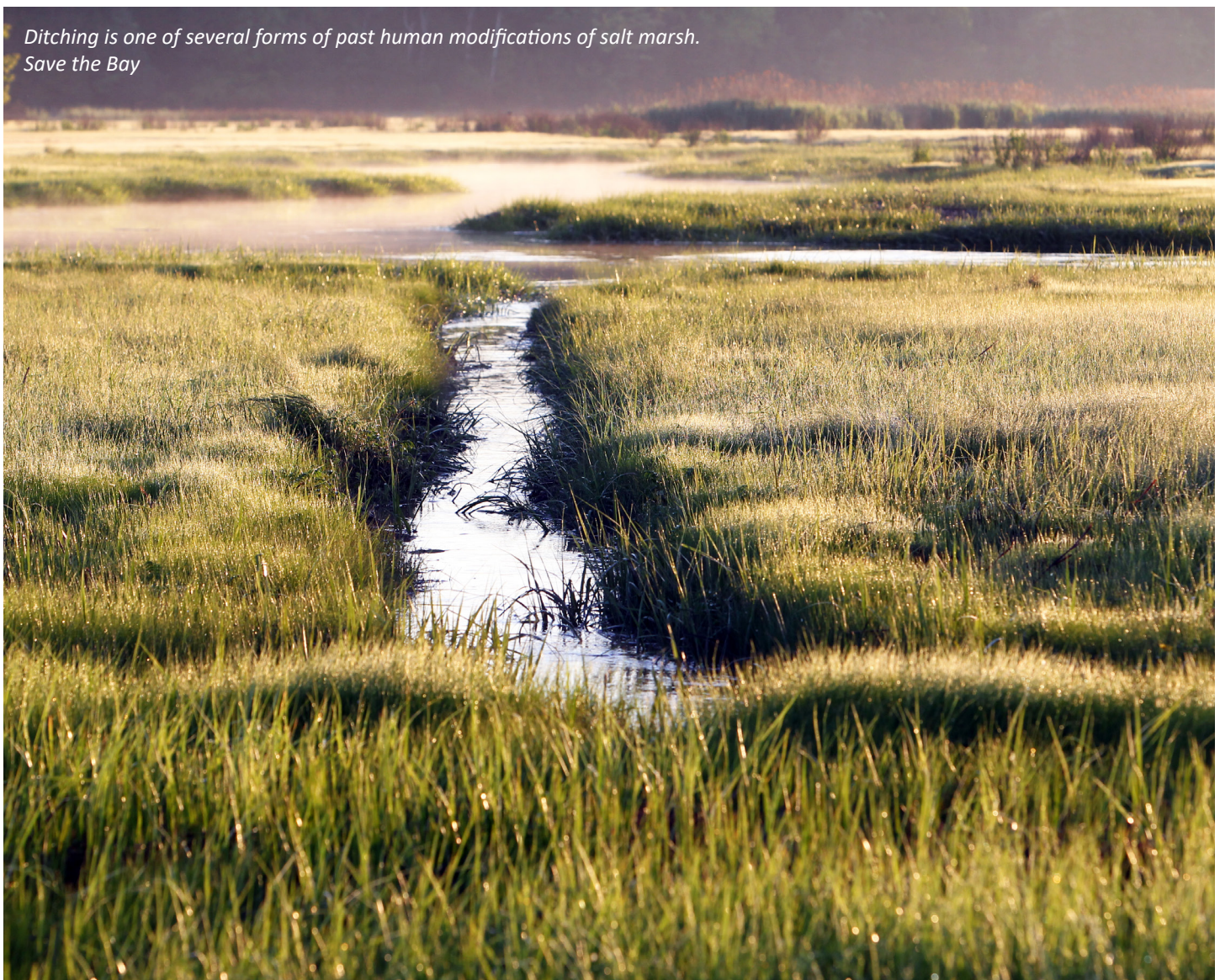
On Parker River NWR, avian point count surveys have been conducted since 2002; and demographic surveys were conducted from 2006-2012. Refuge staff have been conducting the SHARP rapid assessment protocols since 2020 on restoration sites, and will be working with SHARP to evaluate if this protocol can be used to detect SALS response to restoration at the marsh unit scale

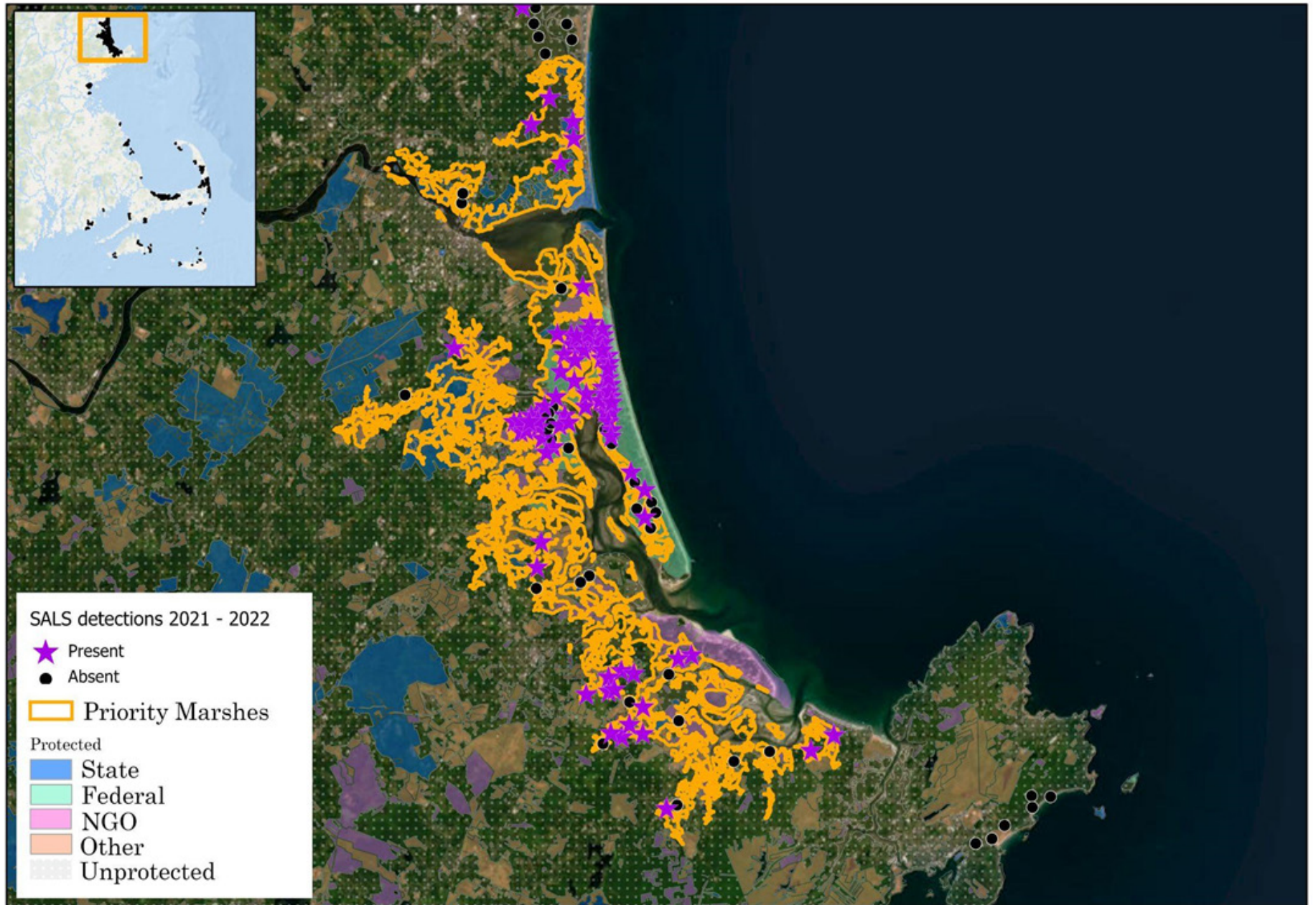
Recommended Management / Next Steps To Management Action

- Long-term monitoring for all current projects to meet regulatory permitting, especially beyond 3-years due to most grants being restricted to 2-3 years. A monitoring plan has already been developed within the Environmental Impact Report for Great Marsh (Hopping, unpublished work). A monitoring plan specific for the 100-acre marsh project and the 1450 Marsh is also available, with a full suite of protocols and data management plans.
- Analysis and publication of collected monitoring data to demonstrate short and long-term effects of restoration work. This will allow adaptive planning for monitoring efforts into the future to optimize resource use, and allow techniques to be applied to a larger geographic region.
- Support projects that are in various phases of design or permitting but not fully supported for on-the-ground restoration. These projects are likely good matches for North American Wetland Conservation Act (NAWCA) and National Fish and Wildlife Foundation (NFWF) funding sources.
- Continue conversation with State regulators on a streamlined permitting pathway for restoration projects and provide support for designated staff to review large restoration projects.
- Protect marsh migration pathways.
- Support monitoring of tidal restoration to Stage Island Impoundment to better quantify blue carbon benefits and provide data on transition post restoration (particularly bird use to maintain support from bird watchers).
- Assess tidally restricted marshes within Parker River, Ipswich River, and Essex River confluence.
- Project management capacity (ideally housed locally) to develop a work plan for this marsh as well as oversee and coordinate all projects underway in the Great Marsh complex. This will streamline work and increase efficient use of resources when they become available.

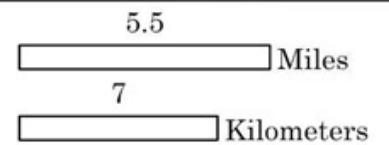
Attributes

Sediment placement	Y
Repair hydrology - runnelling / channel creation	Y
Repair hydrology - tidal restriction mitigation	Y
Repair hydrology - address ditch plugs	N
Repair hydrology - ditch remediation	Y
Repair hydrology - berm, embankment, or levee modification	Y
Tidal marsh land acquisition / protection	N
Land acquisition / protection for marsh migration	Y
Facilitated marsh migration	N
Invasive plant species mitigation (<i>Phragmites australis</i> , etc.)	Y
Living shoreline development	N
Wildlife herbivory mitigation	N
Stormwater mitigation	Y
Additional ecological assessment needed	Y





Great Marsh



Barnstable Marsh Complex - 5,380 acres (2,177 ha)

Existing Conditions

This marsh can be separated into several sections including Scorton Creek, Great Marsh (hereafter “Barnstable Great Marsh”, distinct from the north shore Great Marsh described above), and Chase Garden Creek (Chapin Beach marsh). All sections have some sediment supply through overwash and unrestricted tidal flow and are ditched to some extent. This marsh also shows signs of historical embankments, sometimes in unditched areas. This marsh is sediment starved, perhaps due to sediment being repositioned from water intake from the nearby Cape Cod Canal. Massachusetts Coastal Zone Management has a long-term monitoring station in the Barnstable Great Marsh (on Mass Audubon property). Some elevation data for this marsh are available from Association to Preserve Cape Cod (APCC). There is already some coordination between landowners in this area led by Mass Audubon and including Barnstable Land Trust, Town of Barnstable, and Orenda Land Trust.



*A healthy marsh supports an array of salt-tolerant plant species.
Lauren Owens Lambert*

Existing Projects

Massachusetts Audubon (Mass Audubon): Working with Save the Bay, SMARTeams, Cape Cod Mosquito Control, and USFWS supported by NFWF/ILF/foundation funding on designs for a hydrological restoration project planned in this location. Support is still needed for permitting, implementation, and monitoring. Best contact: Sara Grady (sgrady@massaudubon.org), Annalee Tweitmann (atweitmann@massaudubon.org)

Existing Sparrow Data

Saltmarsh Sparrows are present and confirmed breeding at this site (2021/2022; SHARP 2023).

Recommended Management / Next Steps To Management Action

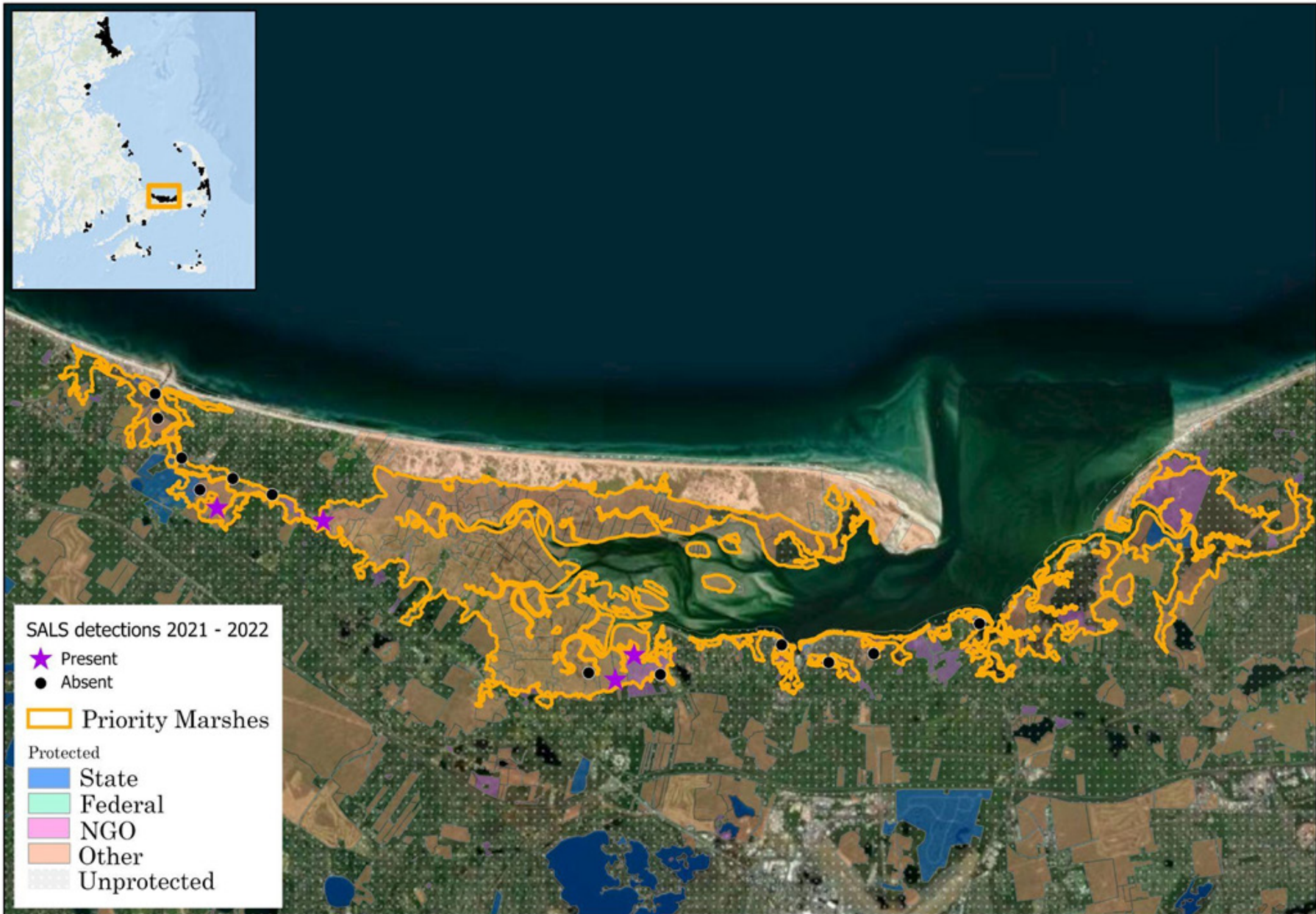
- Support Saltmarsh Sparrow monitoring to inform restoration project design.
- Work with surrounding landowners to address stormwater and nutrient input into the marsh.
- Protection of surrounding land to facilitate marsh migration.
- Explore appropriate reuse of material from restoration activity.
- Continued monitoring for internal ponding.
- Assessment for ditch remediation.
- Some modeling has been done with specific management options for this marsh complex: <https://www2.who.edu/site/marshsustainabilityandhydrology/great-barnstable-marsh-study-case/>

Attributes

Sediment placement	N
Repair hydrology - runnelling / channel creation	Y
Repair hydrology - tidal restriction mitigation	Y
Repair hydrology - address ditch plugs	Y
Repair hydrology - ditch remediation	Y
Repair hydrology - berm, embankment, or levee modification	Y
Tidal marsh land acquisition / protection	Y
Land acquisition / protection for marsh migration	Y
Facilitated marsh migration	N
Invasive plant species mitigation (<i>Phragmites australis</i> , etc.)	N
Living shoreline development	N
Wildlife herbivory mitigation	N
Stormwater mitigation	Y
Additional ecological assessment needed	Y

Misty morning on Barnstable Marsh.
Chany Crystal, Creative Commons





Barnstable Marsh Complex



2.5

Miles

3

Kilometers

Wellfleet Bay Marsh Complex – 1,013 acres (410 ha)

Existing Conditions

This complex is majority owned by Mass Audubon. This marsh is sediment starved and has high densities of Squareback Marsh Crab (*Sesarma reticulatum*; hereafter *Sesarma*); vegetated marsh area is shrinking due to grazing by this species. There are also high densities of burrowing fiddler crabs (*Uca spp*; hereafter fiddler crabs) that can weaken peat and lead to notable erosion and devegetation. It also receives nutrient-enriched groundwater from septic systems of the town. The marshes are minimally ditched.

Existing Projects

Mass Audubon: developing partnerships (e.g. National Park Service) and conceptual design for restoration plan for Wellfleet Bay Wildlife Sanctuary. Funding for feasibility and preliminary design through NFWF. Support still needed for formal design, permitting, implementation, and monitoring. Best contact: Sara Grady (sgrady@massaudubon.org), Gene Albanese (galbanese@massaudubon.org)

Existing Sparrow Data

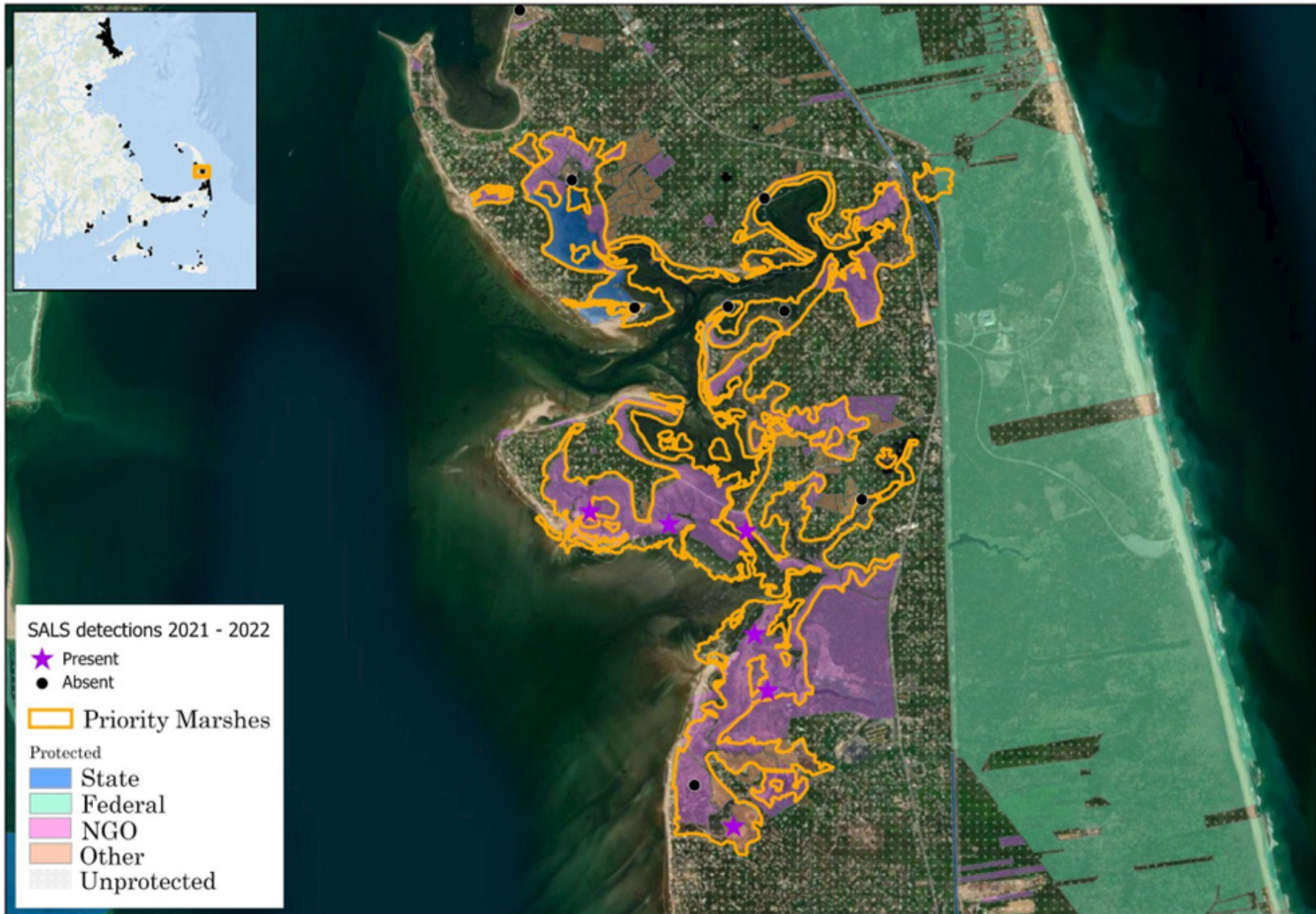
Saltmarsh Sparrow are present and confirmed breeding at this site (SHARP 2021/2022; SHARP 2023).

Recommended Management / Next Steps To Management Action

- Support Saltmarsh Sparrow monitoring to inform restoration project design.
- Assessment for potential sediment placement. Potential source in Wellfleet Bay but dredge may not be a good fit (often termed “black mayonnaise” or “black custard”, referring to waterlogged clay/mud which have a characteristic sulfur-esque smell and dark color from decomposing organic components).
- Facilitate marsh migration through small berm and dam removal.
- Address crab burrowing and herbivory.

Attributes

Sediment placement	Y
Repair hydrology - runnelling / channel creation	Y
Repair hydrology - tidal restriction mitigation	Y
Repair hydrology - address ditch plugs	Y
Repair hydrology - ditch remediation	Y
Repair hydrology - berm, embankment, or levee modification	Y
Tidal marsh land acquisition / protection	Y
Land acquisition / protection for marsh migration	Y
Facilitated marsh migration	N
Invasive plant species mitigation (<i>Phragmites australis</i> , etc.)	Y
Living shoreline development	Y
Wildlife herbivory mitigation	Y
Stormwater mitigation	Y
Additional ecological assessment needed	Y



Wellfleet Bay Marsh Complex



1
Miles

1.5
Kilometers

Rumney Marsh – 959 acres (388 ha)

Existing Conditions

This marsh is part of the Rumney Marshes Area of Critical Environmental Concern for Massachusetts and is managed by the state. All parcels are heavily ditched and sediment-starved. A former race track exists in this parcel and is surrounded by hard infrastructure. This marsh complex is made up of several marsh parcels all experiencing some form of tidal restriction. The northern parcel has several reclamation embankments that block tidal flow entirely, resulting in waterlogged marsh. This site is a good option for small-scale restoration (see below). *Phragmites* is pervasive in the northeastern parcel. Several sites are under active management, some through In-Lieu Fee (ILF) program funds. Smaller work (<10 acres per site) is occurring for *Phragmites* management in several sites that are managed by the state; all are related to mitigation work for a bridge installation nearby. Was formerly in the proposed I-95 corridor that resulted in a very large highway roadbed in the site. A large amount of fill has since been removed for beach renourishment projects. Several SRT exist that are impairing tidal flow to the area.



Like many marshes in Massachusetts, Rumney Marsh is inundated with invasive Phragmites. Randy Robertson, Creative Commons

Existing Projects

Mass DCR: Working with the Town of Saugus and City of Revere to support Woods Hole to assess sites for vulnerability through application to Municipal Vulnerability Preparedness (MVP) grant opportunity. Best contact: Sean Riley (sean.m.riley@mass.gov)

Mass DCR: Project with SMARTeams, The Nature Conservancy, Mystic River Watershed Association, Friends of Belle Isle Marsh, and Bear Creek Sanctuary to design a restoration plan for hydrological repair for Diamond Creek area. Support still needed for permitting, implementation, and monitoring. Best contact: Sean Riley (sean.m.riley@mass.gov)

Existing Sparrow Data

Saltmarsh Sparrow present and confirmed breeding at both sites (SHARP 2021/2022; SHARP 2023).

Recommended Management / Next Steps To Management Action

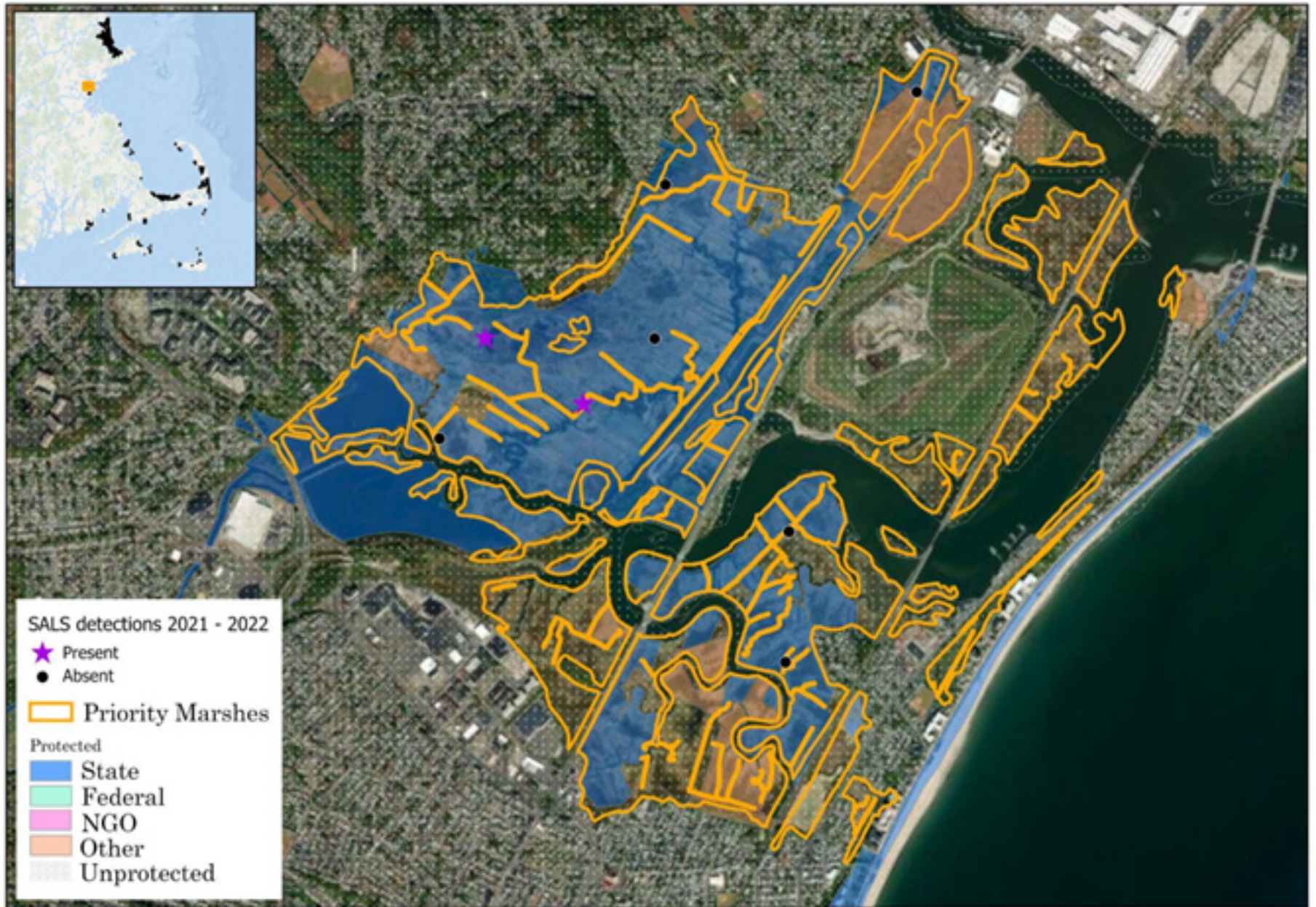
- Northern parcel within the reclamation embankment is an “easy” restoration opportunity involving the preservation/stabilization of the marsh platform through hydrological repair and monitoring. This is the highest priority for restoration within Rumney marsh.
- Control *Phragmites* on the perimeter ditch in northern parcel
- Survey and control for *Lepidium latifolium* (perennial pepperweed) will support resilient vegetation communities longer-term.
- Full hydrological assessment including SRTs to establish best restoration course of action.
- Pre/post project monitoring.

.Attributes

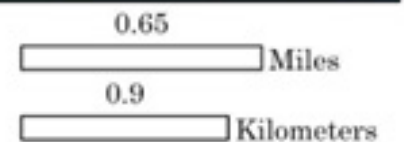
Sediment placement	N
Repair hydrology - runnelling / channel creation	Y
Repair hydrology - tidal restriction mitigation	Y
Repair hydrology - address ditch plugs	Y
Repair hydrology - ditch remediation	Y
Repair hydrology - berm, embankment, or levee modification	Y
Tidal marsh land acquisition / protection	N
Land acquisition / protection for marsh migration	N
Facilitated marsh migration	Y
Invasive plant species mitigation (<i>Phragmites australis</i> , etc.)	Y
Living shoreline development	N
Wildlife herbivory mitigation	Y
Stormwater mitigation	Y
Additional ecological assessment needed	Y

Marsh Wrens and a variety of other bird species use tidal marshes during part of their annual cycle. Ray Hennessy





Rumney Marsh



Belle Isle - 156 acres (63 ha)

Existing Conditions

This marsh is part of the Rumney Marshes Area of Critical Environmental Concern for Massachusetts and is largely managed by the state. It is also considered an Important Bird Area by Mass Audubon. All parcels are heavily ditched, sediment-starved, and multiple tidal restrictions affect Belle Isle. This parcel is almost completely surrounded by hard infrastructure. *Phragmites* occur throughout as well as old berms and impoundment infrastructure which limits tidal flow into and out of the marsh. The only high marsh (~10 ac) is located behind an aging berm, and all Saltmarsh Sparrows observed occur only in this high marsh area. There are several development projects occurring directly next to this parcel as well as sea level rise prevention through hard infrastructure (large-scale berms planned through municipal agencies (including Massachusetts Bay Transit Authority; MBTA and town/city entities). Mass DCR is working with these agencies to help inform planning to support wildlife in this area as well.

Existing Projects

Mass DCR: Inventory and modeling of hydrology was completed by Woods Hole (USGS) in 2023, and is out for public review. Conceptual design is currently underway through SMARTeams (Susan Adamowicz, Geoff Wilson, Dave Burdick). Support is still needed for design, permitting, implementation, and monitoring. Mystic River Watershed Association, The Nature Conservancy, The Friends of Belle Isle Marsh are the primary partners for this project. Best contact: Sean Riley (sean.m.riley@mass.gov)

Existing Sparrow Data

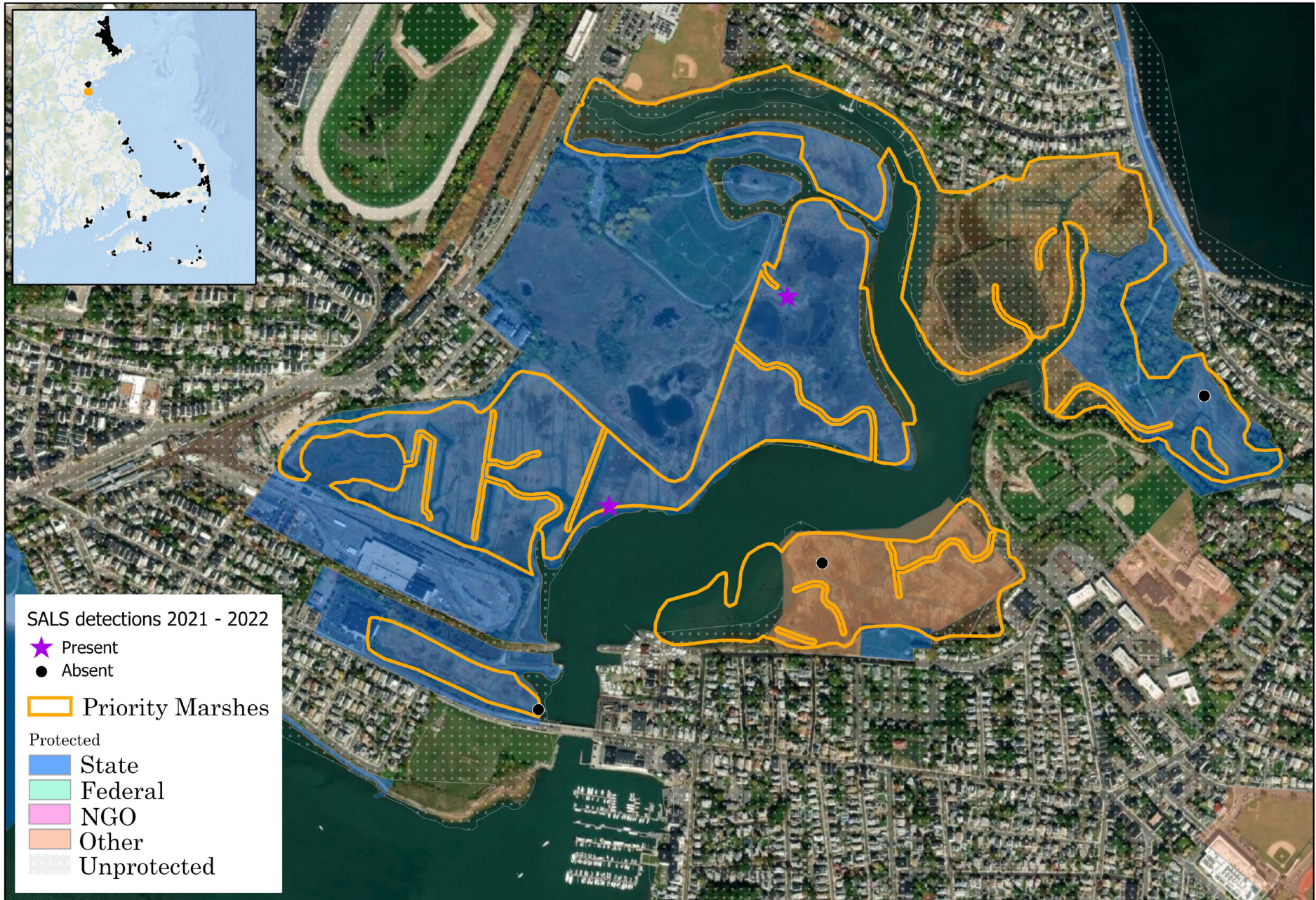
Saltmarsh Sparrow present and confirmed breeding at both sites (SHARP 2023, Mass DCR 2023).

Recommended Management / Next Steps To Management Action

- Hydrological repair through runneling and ditch remediation
- Berm modification to restore tidal flow and reconnect channels
- Explore potential to work with mosquito control as needed to jointly design restoration plans

Attributes

Sediment placement	Y
Repair hydrology - runnelling / channel creation	Y
Repair hydrology - tidal restriction mitigation	Y
Repair hydrology - address ditch plugs	Y
Repair hydrology - ditch remediation	Y
Repair hydrology - berm, embankment, or levee modification	Y
Tidal marsh land acquisition / protection	N
Land acquisition / protection for marsh migration	Y
Facilitated marsh migration	Y
Invasive plant species mitigation (<i>Phragmites australis</i> , etc.)	Y
Living shoreline development	Y
Wildlife herbivory mitigation	Y
Stormwater mitigation	Y
Additional ecological assessment needed	Y



SALS detections 2021 - 2022

- ★ Present
- Absent

Priority Marshes

Protected

- State
- Federal
- NGO
- Other
- Unprotected

Belle Isle



0.25 Miles
0.35 Kilometers

First Encounter and Skaket Creek Marshes – 801 acres (324 ha)

Existing Conditions

These marshes exhibit severe dieback driven by *Sesarma* (see above) and limited sediment supply. The marsh is typical of marshes in this area, surrounded by agriculture, and is also subsiding in some areas resulting in vegetation loss. This site has several experiments underway exploring the use of pitfall traps to capture and remove crabs, followed by *Spartina spp.* planting. There is a Herring run located in First Encounter marsh. First Encounter does not have any significant hydrological barriers but is ditched and may have historical infrastructure on the marsh platform. This marsh is owned by several local municipalities and managed by the Eastham Conservation Foundation and the surrounding towns (Orleans, Brewster).

Existing Projects

Municipal project (municipality unkn): Culvert replaced on Skaket Beach Rd. ~2010. Best contact: Bart Morris (barton.morris@mass.gov)

Mass Audubon: There is potential for support through Mass Audubon to create preliminary designs for this marsh as part of a regional set of designs (along with Barnstable and Wellfleet) funded through a recent NFWF NCRF grant. Best contact: Sara Grady (sgrady@massaudubon.org)

Existing Sparrow Data

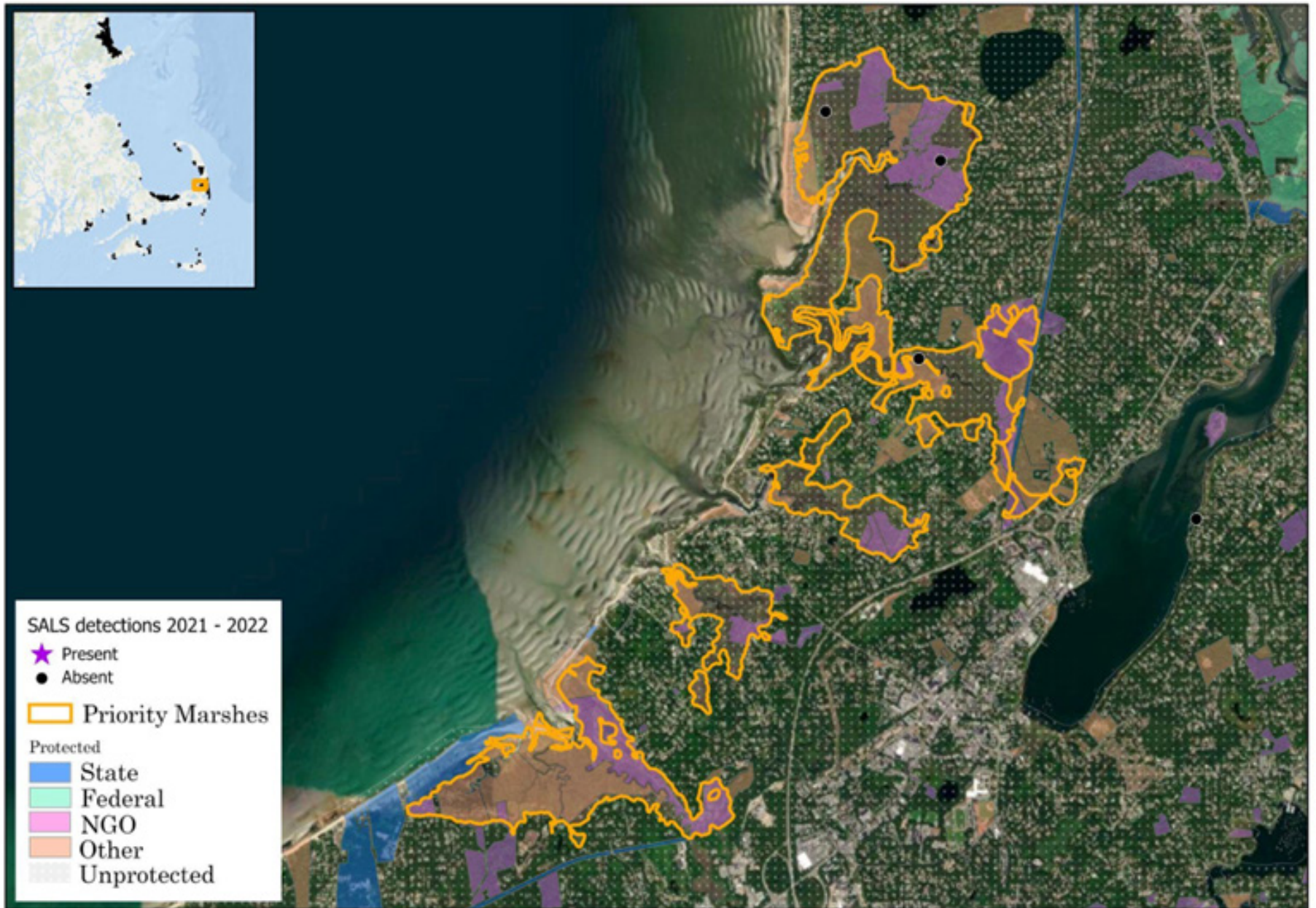
Saltmarsh Sparrows detected at this site (eBird 2022); breeding has not been confirmed.

Recommended Management / Next Steps To Management Action

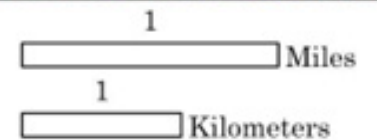
- Assessment for elevation enhancement. Potential source in Wellfleet Bay but the type of dredge material may not be a good fit (potential conflict with shellfish aquaculture).
- Address crab burrowing and herbivory.
- Assess marsh platform for hydrological repair.

Attributes

Sediment placement	Y
Repair hydrology - runnelling / channel creation	Y
Repair hydrology - tidal restriction mitigation	Y
Repair hydrology - address ditch plugs	Y
Repair hydrology - ditch remediation	Y
Repair hydrology - berm, embankment, or levee modification	Y
Tidal marsh land acquisition / protection	Y
Land acquisition / protection for marsh migration	Y
Facilitated marsh migration	Y
Invasive plant species mitigation (<i>Phragmites australis</i> , etc.)	N
Living shoreline development	Y
Wildlife herbivory mitigation	Y
Stormwater mitigation	Y
Additional ecological assessment needed	Y



First Encounter and Skaket Creek Marshes



Allen's Pond – 268 acres (109 ha)

Existing Conditions

This marsh has extensive internal ponding. The tidal inlet is owned and managed by a private community which complicates management of this system. This area can be separated into Allen's Pond East and West. Invasive plant management is happening throughout, specifically in Allen's Pond East.

Existing Projects

Buzzards Bay Coalition (BBC): Allen's Pond East (DNRT, Mass Audubon, Bristol County Mosquito Control and Save The Bay) – initial implementation of hydrological repair project using runnels and upland marsh migration facilitation was completed in 2022, with followup planned in 2025. Before After Control Impact design was implemented here with pre- and post-restoration monitoring in control and restoration locations by the BBC and partners. The first phase of the project and monitoring was funded and implemented by the Climate Adaptation Science Center and an Environmental Protection Agency's Southeast New England Program. Additional support is still needed for long-term monitoring specifically for Saltmarsh Sparrows (follow-up implementation is already funded). The 2nd phase could potentially be conducted by Bristol County Mosquito Control Project with assistance from Save The Bay and Buzzards Bay Coalition. Best contact: Wenley Ferguson (wferguson@savethebay.org), Rachel Jakuba (jakuba@savebuzzardsbay.org)

Mass Audubon: Partnering with Save the Bay on hydrological repair on Allen's Pond West – tidal hydrology project and salt marsh migration facilitation (removal of sections of stone walls, creation of runnels and selective ditch management, removal of a stonewall tidal restrictions) and to restore tidal hydrology of a brackish pond and remove barriers to inland salt marsh migration (e.g. invasive plants and debris with native revegetation of low-lying areas). This project began in 2021 and was completed on ~50 acres in 2023. A second phase of the project on the north and portions of the east side of Allens Pond was funded through a 2023 Southeast New England Program (SNEP through the US Environmental Protection Agency) grant. Implementation of barrier removal to facilitate inland migration is underway on ~40 acres. Further tidal hydrology restoration on ~50 acres of the saltmarsh is in the planning phase for implementation in 2024/2025. Partners include NOAA, Ducks Unlimited, DNRT, BCMC, WLT and USFWS. Support is still needed for long-term monitoring for Saltmarsh Sparrows. Best Contacts: Gene Albanese (galbanese@massaudubon.org), Wenley Ferguson (wferguson@savethebay.org)

Mass Audubon: Conducting ongoing invasive plant management (*Phragmites*, other woody plants) in partnership with Natural Resource Conservation Service (NRCS) along the northern marsh parcels, including some hydrological repair. Support is still needed for long-term monitoring specifically for Saltmarsh Sparrows. Best Contact: Gene Albanese (galbanese@massaudubon.org), Wenley Ferguson (wferguson@savethebay.org)

Existing Sparrow Data

Saltmarsh Sparrows detected and confirmed breeding at this site (SHARP 2021/2022; SHARP 2023).

Recommended Management / Next Steps To Management Action

- Hydrological assessment and tidal hydrology restoration plan for the southern section (backbarrier area) of Allen's Pond.

- Remove barriers and tidal restrictions and implement habitat management to facilitate marsh migration into low-lying protected areas.
- Development of an inlet management plan to determine an appropriate dredge schedule for the inlet. This is important because this inlet is solely responsible for tidal flow in and out of the pond.
- Explore possibility of sediment placement on back barrier marsh as part of inlet management plan.
- Assessment of watershed nutrient inputs and management through collaborative planning effort.

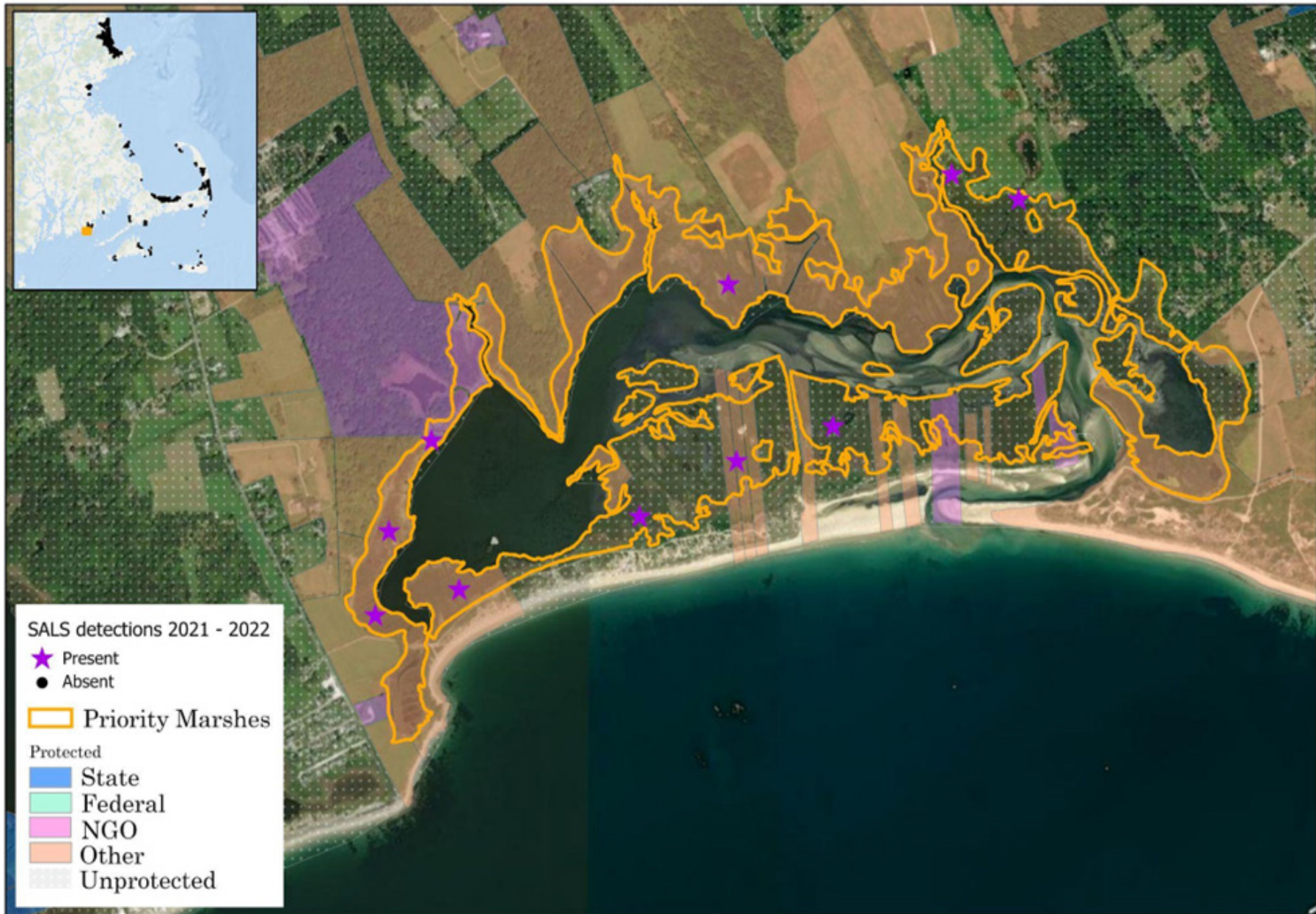
Note: Management of the inlet long-term will need to include Least Tern and Piping Plover management (both species are present on the beaches on either side of the inlet)

Attributes

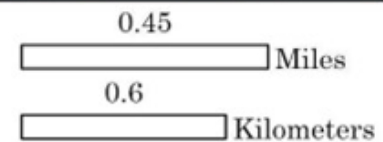
Sediment placement	Y
Repair hydrology - runnelling / channel creation	Y
Repair hydrology - tidal restriction mitigation	Y
Repair hydrology - address ditch plugs	Y
Repair hydrology - ditch remediation	Y
Repair hydrology - berm, embankment, or levee modification	Y
Tidal marsh land acquisition / protection	Y
Land acquisition / protection for marsh migration	Y
Facilitated marsh migration	Y
Invasive plant species mitigation (<i>Phragmites australis</i> , etc.)	N
Living shoreline development	Y
Wildlife herbivory mitigation	Y
Stormwater mitigation	Y
Additional ecological assessment needed	Y



Piping Plover. Ray Hennessy



Allen's Pond



Waquoit Bay – 256 acres (104 ha)

Existing Conditions

Waquoit Bay is an Area of Critical Environmental Concern (ACEC). These marshes have extensive internal ponding, some ditching, and can be separated into Sage Lot and Flat Pond complex (tidally restricted), and Hamblin and Jehu Pond complex (unrestricted). There is a large amount of fiddler crab activity and burrowing, recent dieback associated with *Sesarma* herbivory and burrowing is evident. Macroalgae accumulation in pools is prevalent and may be driving pool expansion. There is ample room for marsh migration in the surrounding area, much of it owned federally (Mashpee NWR) or by the state, and there are Surface Elevation Tables (SETs) and permanent vegetation monitoring plots throughout Sage Lot Pond as part of the Waquoit Bay National Estuarine Research Reserve (WBNERR) salt marsh monitoring program. This area is well studied by the WBNERR and as a result there is in-depth published information about vegetation change over time in these marshes (e.g. Gonnee et al. 2019)..

Existing Projects

Waquoit Bay NERR: There was experimental scale elevation enhancement (0.5 m sq) on the north side of Sage Lot Pond (from 2018-2020 [Raposa et al. 2022](#)) resulted in successful recolonization by saltmarsh plants. Best contact: Megan Tyrrell (Megan.Tyrrell@mass.gov)

Waquoit Bay NERR: Partnered with Woodwell Climate Research Center, Cape Cod Mosquito Control Project, Save the Bay, Northeastern University: Runnels were used to drain five salt marsh pools in the DogHead section of Sage Lot Pond in December 2023; ongoing maintenance will continue as needed. Best contact: Megan Tyrrell (Megan.Tyrrell@mass.gov)

Woodwell Climate Institute: In partnership with Waquoit Bay NERR, has a planning grant from NFWF for tidal hydrological restoration in Sage Lot Pond and Jehu Pond will hold a kickoff meeting with stakeholders in spring 2024. Additional support is needed for permitting, implementation, and monitoring. Best contact: Megan Tyrrell (Megan.Tyrrell@mass.gov), Linda Deegan (ldeegan@woodwell.org)

Mass CZM: A passive sediment augmentation modeling study funded by MA CZM is being conducted for Waquoit Bay. The Sage Lot Pond complex is included in Giulio Mariotti's pond evolution model under the WHOI/WBNERR/USGS Marsh Sustainability and Hydrology Project (funded by National Estuarine Research Reserve Science Collaborative): Best contact: Megan Tyrrell (Megan.Tyrrell@mass.gov)

Waquoit Bay NERR: Two proposals currently under review to NOAA NERRs (planning only) and NOAA Climate Resilience Regional Challenge (CRRC) for planning and construction for culvert replacement between Sage Lot and Flat Pond to restore tidal flow to Flat Pond. Best contact: Megan Tyrrell (Megan.Tyrrell@mass.gov)

Existing Sparrow Data

Saltmarsh Sparrows present; breeding has not been confirmed, but a potential nest identified in summer 2023. SHARP added 6 point count sites in summer 2023. two individual SALS were observed during SET monitoring in summer 2023, returning to the same location repeatedly (Tyrrell, pers. obs.).

Recommended Management / Next Steps To Management Action

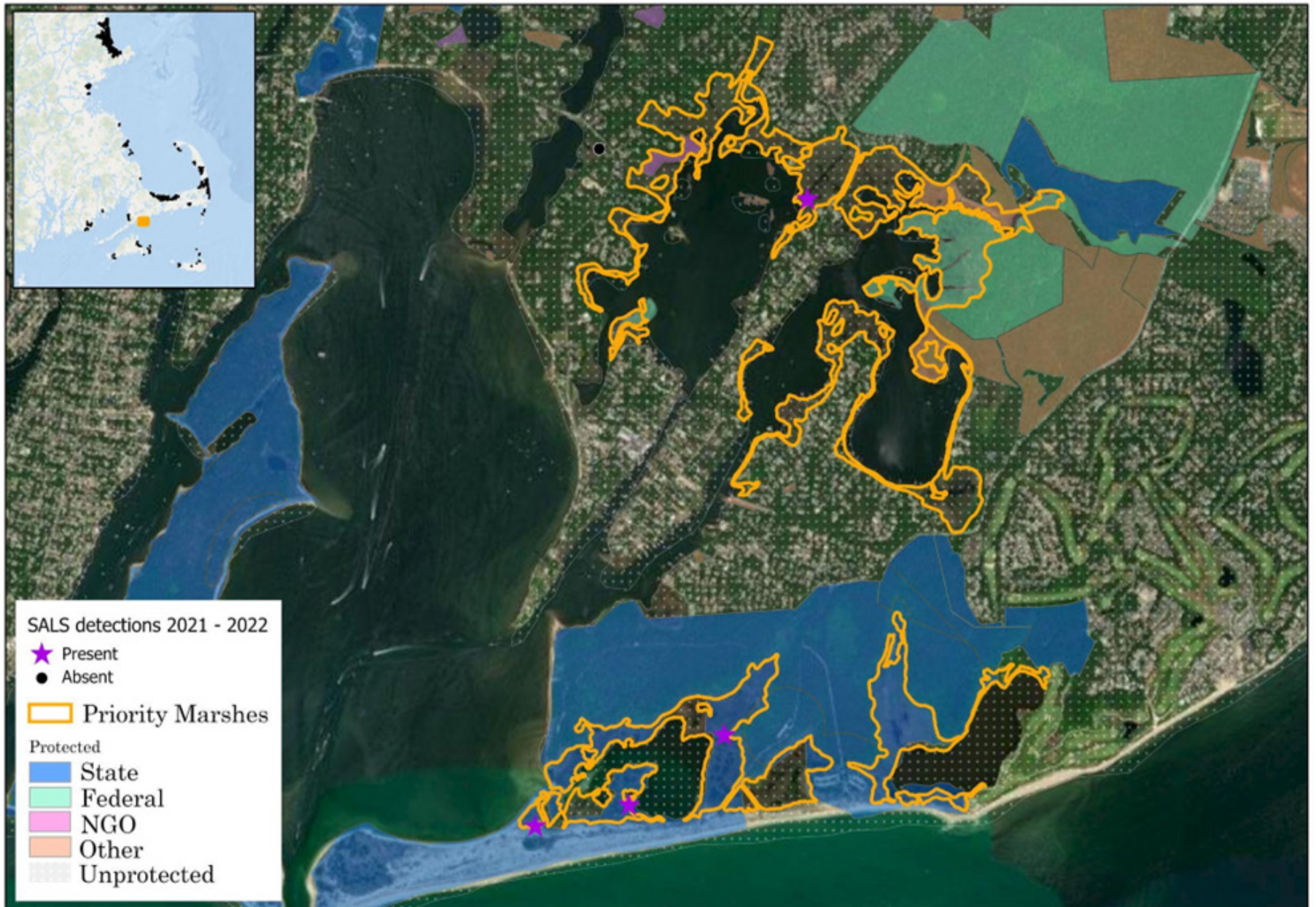
- Hydrological assessment to explore the need for restoration, specifically in Jehu Pond.
- Upland migration assessment/facilitation around Jehu and Sage Lot Ponds.
- Assess for potential elevation enhancement; there is a potential dredge source through municipal dredge operations in rivers feeding Waquoit Bay.
- Replace / widen culvert between Sage Lot and Flat Pond to restore tidal flow to Flat Pond.
- Mitigation of increasing densities of *Sesarma*, fiddler crabs.

Attributes

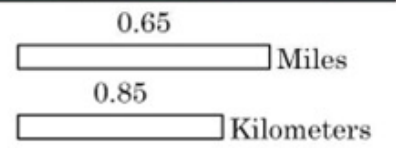
Sediment placement	Y
Repair hydrology - runnelling / channel creation	Y
Repair hydrology - tidal restriction mitigation	Y
Repair hydrology - address ditch plugs	N
Repair hydrology - ditch remediation	Y
Repair hydrology - berm, embankment, or levee modification	Y
Tidal marsh land acquisition / protection	Y
Land acquisition / protection for marsh migration	Y
Facilitated marsh migration	Y
Invasive plant species mitigation (<i>Phragmites australis</i> , etc.)	Y
Living shoreline development	Y
Wildlife herbivory mitigation	Y
Stormwater mitigation	Y
Additional ecological assessment needed	Y



Waquoit Bay. NOAA



Waquoit Bay



Polpis Harbor Marsh Complex – 121 acres (49 ha)

Existing Conditions

This marsh complex can be separated into Pocomo Meadows, Medouie Creek and minor Polpis Harbor salt marshes surrounding Polpis Harbor, an embayment of Nantucket Harbor. Overall, Polpis Harbor marshes experience *Sesarma*-driven salt marsh dieback and harbor water quality issues that may impact all marshes in the complex. The minor Polpis Harbor marshes are fringing marshes around a majority of the low energy harbor with minor dieback due to grazing by *Sesarma* as well as loss of high marsh areas due to sea level rise.



Saltmarsh Sparrow. Matt Jones

Pocomo Meadows is a moderately healthy marsh, with good sediment supply. It does have significant ditching and salt marsh dieback. Medouie Creek has experienced significant restoration within the last 20 years with removal of a tidal restriction and restoration of the salt marsh area. The culvert solution is now undersized for the tidal regime based on sea level rise and the marsh is experiencing significant erosion and hydrologic impact. It also has significant dieback from *Sesarma*. This marsh is the site of multiple restoration projection and monitoring, making it a great location to pilot nature-based restoration solutions on smaller scales as model systems.

Existing Projects

Nantucket Conservation Foundation (NCF): Medouie Creek was restored through the removal of a tidal restriction in 2008 and has developed significant *S. patens* since. Now, the culvert used in 2008 is undersized for current tidal regimes. NCF is working with Horsely-Witten, completed an alternatives analysis in 2023 and is now hoping to design a bridge crossing as a model for other infrastructure adaptations on the island. This is an ongoing project in need of support for design, permitting, construction and monitoring including impacts on Saltmarsh Sparrows, Best contact: Jen Karberg (jkarberg@nantucketconservation.org)

NCF: In 2021, Installed oyster reef beds as part of a living shoreline project to reduce erosion in Medouie Creek and assist in salt marsh migration. Work is currently funded under an In-Lieu Fee grant. Support still needed for long-term monitoring of Saltmarsh Sparrows. Best contact: Jen Karberg (jkarberg@nantucketconservation.org)

NCF: Research is exploring the effectiveness of controlling *Sesmaria* populations to restore salt marsh dieback. Additional support is needed for long-term monitoring. Best contact: Jen Karberg (jkarberg@nantucketconservation.org)

Existing Sparrow Data

Saltmarsh Sparrows are present and confirmed breeding at Medouie Creek and Pocomo Meadows (NCF 2023). Medouie Creek supports very high Saltmarsh Sparrow densities on Nantucket.

Recommended Management / Next Steps To Management Action

- Address tidal restriction caused by sea level rise impacts. Adapt the current crossing to be a model of a bridge crossing to maintain access and hydrologic function.
- Assessment for hydrological repair of the marsh platform.
- Address crab burrowing and herbivory.
- Reach out to homeowners to explain mechanisms in marsh migration in Polpis Harbor and Pocomo Meadows.

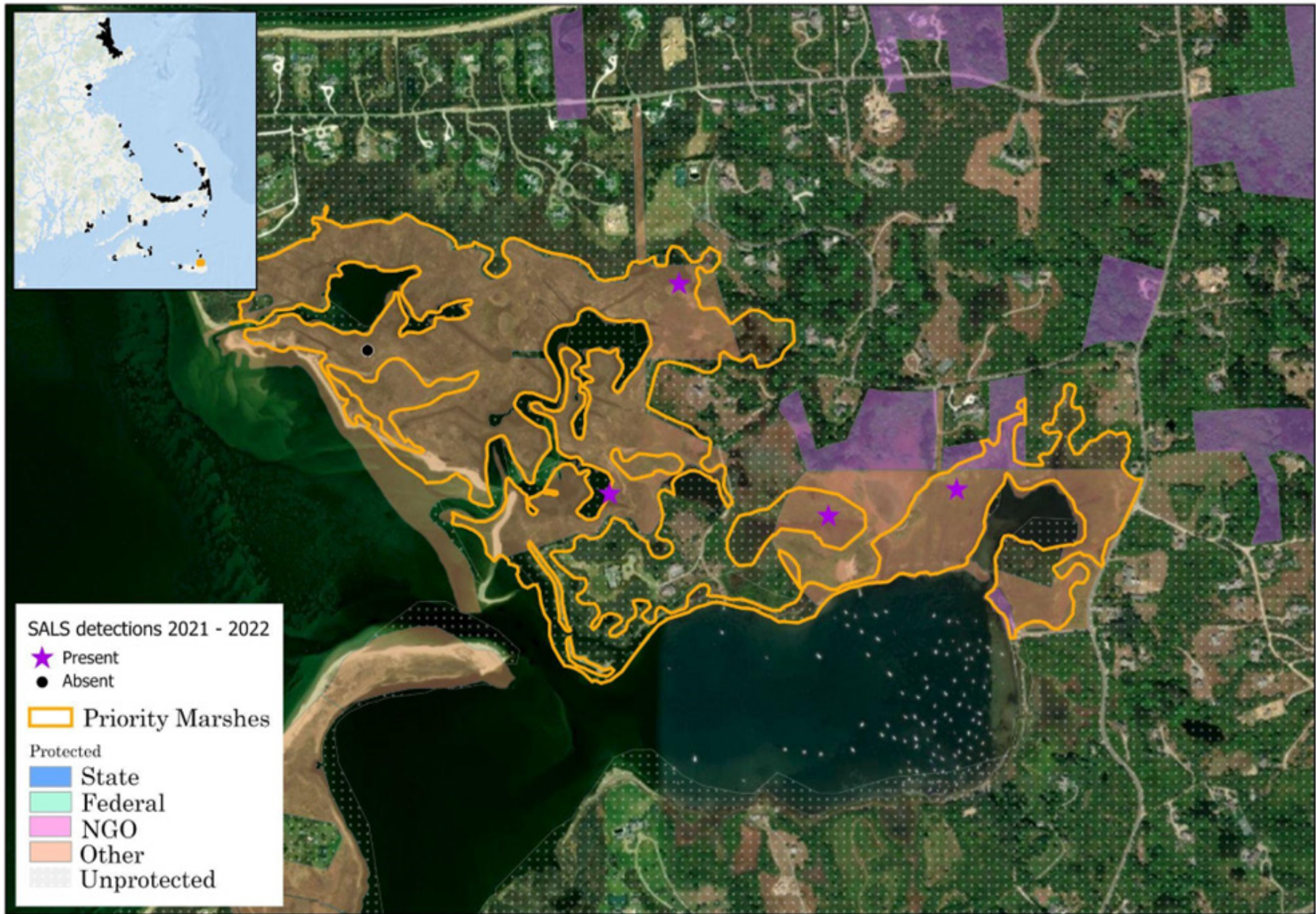
Note: We currently do not recommend any more restoration of the marsh platform in the Medouie Creek section of this marsh complex to avoid disturbance of the existing Saltmarsh Sparrow population.

Attributes

Sediment placement	N
Repair hydrology - runnelling / channel creation	Y
Repair hydrology - tidal restriction mitigation	Y
Repair hydrology - address ditch plugs	N
Repair hydrology - ditch remediation	Y
Repair hydrology - berm, embankment, or levee modification	Y
Tidal marsh land acquisition / protection	Y
Land acquisition / protection for marsh migration	N
Facilitated marsh migration	N
Invasive plant species mitigation (<i>Phragmites australis</i> , etc.)	Y
Living shoreline development	Y
Wildlife herbivory mitigation	N
Stormwater mitigation	Y
Additional ecological assessment needed	Y



A growing amount of fiddler crabs occupy marshes throughout Massachusetts. Beth Fishkind, Creative



Polpis Harbor Marsh Complex



0.3
Miles

0.4
Kilometers

Reference Marshes

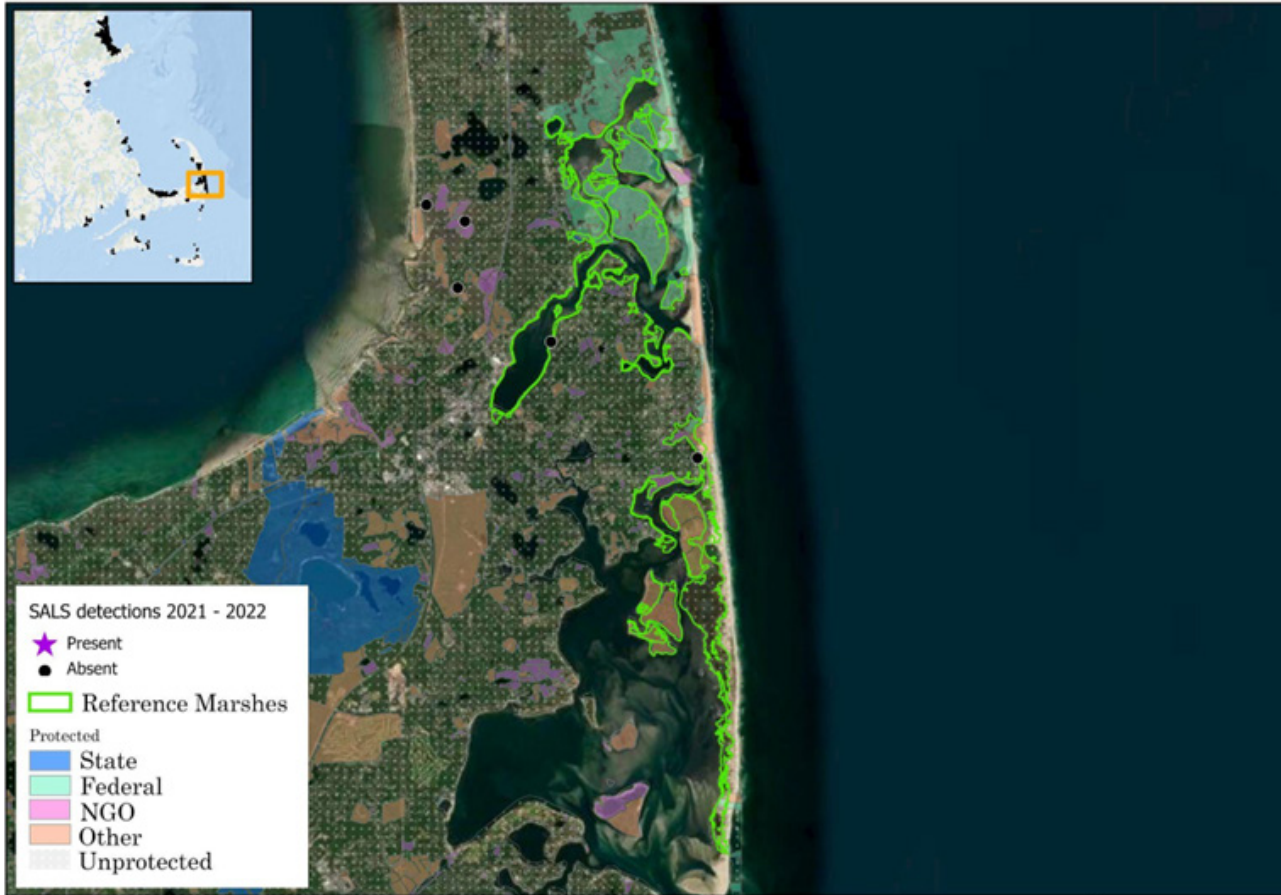
These marshes are in near-pristine condition and can act as reference marshes for restoration efforts in the state. Long-term preservation of these areas and the open space around them to facilitate long-term marsh migration is important, but no immediate restoration action is suggested for them.



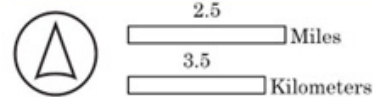
Several species of Salicornia change from green to a deep red each fall. USFWS

Nauset Beach and Pleasant Bay – 1,538 acres (623 ha)

These marshes are part of the Cape Cod National Seashore with some town ownership. They are minimally ditched and have good sediment supply (Smith et. al. 2016). Saltmarsh Sparrows are present in high densities however breeding has not been confirmed.



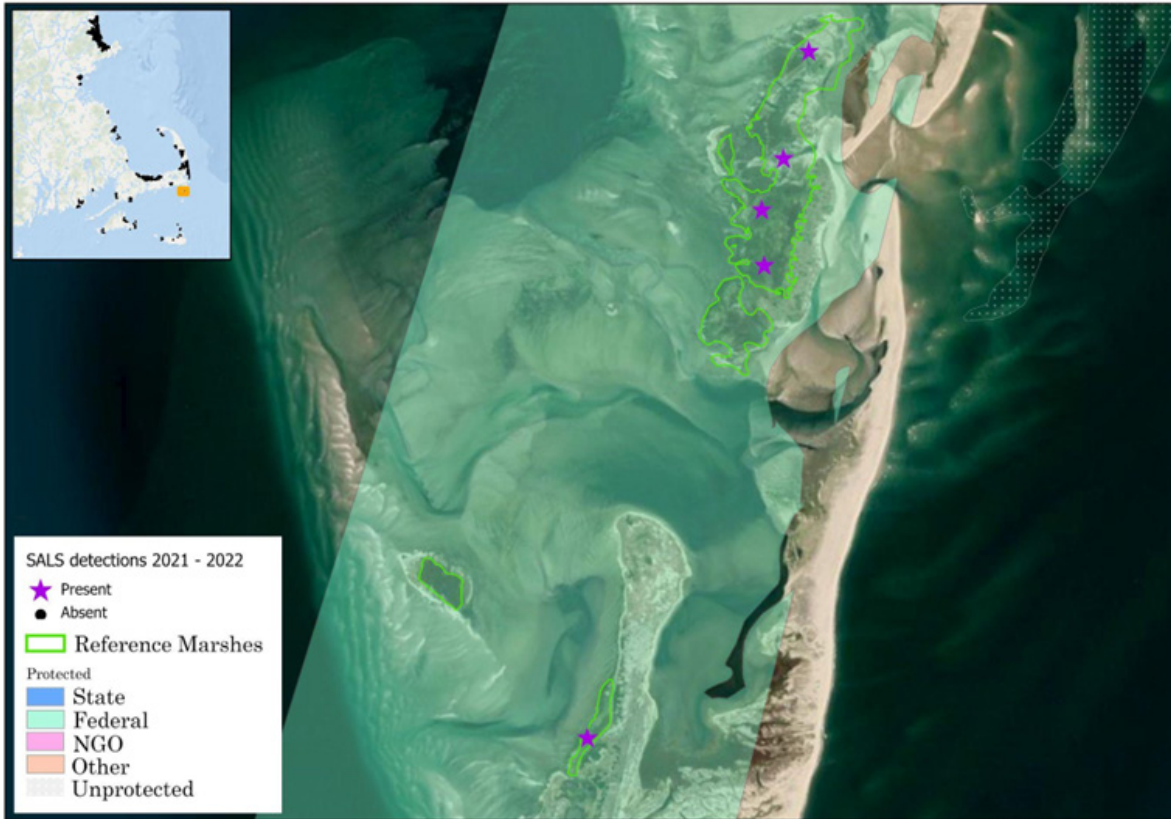
Nauset Beach and Pleasant Bay



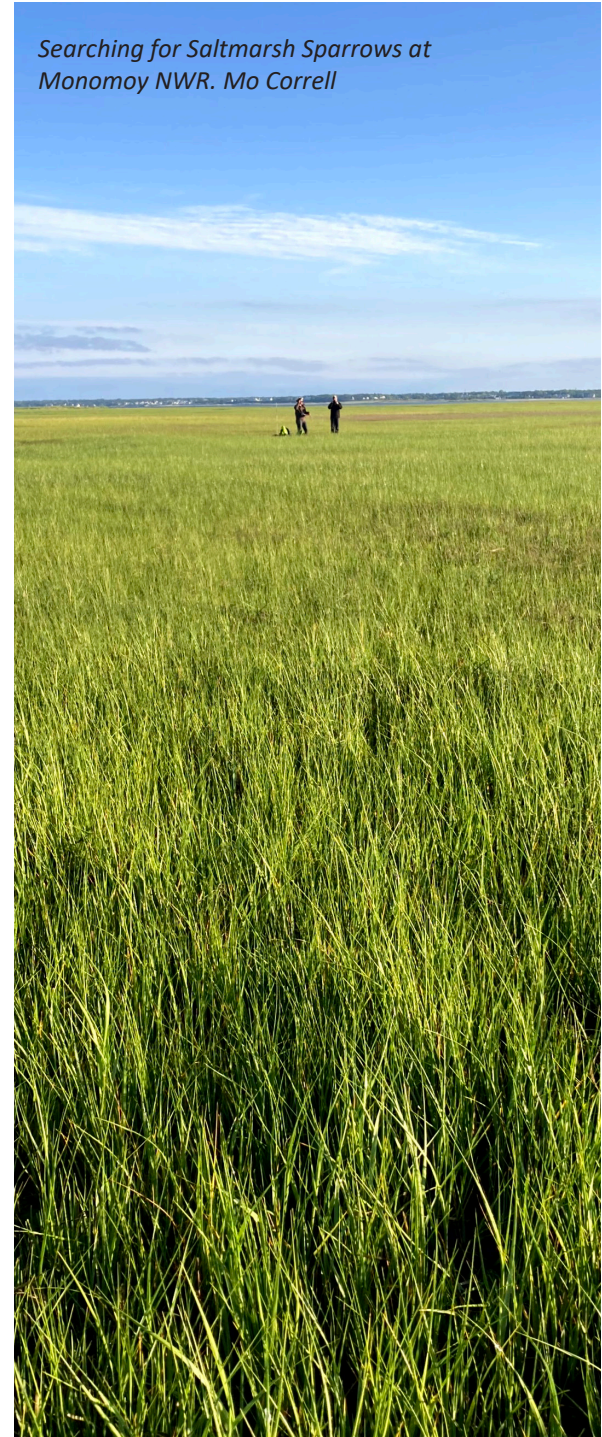
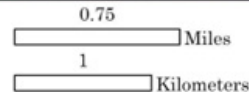
Nauset Bay. Creative Commons

Monomoy National Wildlife Refuge – 149 acres (60 ha)

This marsh is unaffected by historical marsh management and supports the only recorded stable population of Saltmarsh Sparrows globally (2005-2012; Correll et al. 2017). It is a designated federal Wilderness Area and is an example of an open coastal marsh system with no obvious human marsh modifications. Minimo, North Monomoy, and South Monomoy Island all have high-quality high marsh habitat, although this varies annually due to the dynamic natural processes occurring here (overwash, etc). Saltmarsh Sparrows are present in high densities and confirmed breeding at this site. A reassessment of the bird population at this site is necessary to update the population trend findings cited here. USFWS currently monitors Morris Island, North Monomoy, and South Monomoy Island.



Monomoy



Searching for Saltmarsh Sparrows at Monomoy NWR. Mo Correll

Honorable Mention

The following marshes were identified by the partner group as important to keep in mind for future work but either needing additional assessment before any work can be planned, or not a top priority for the Saltmarsh Sparrow specifically. For more information on Honorable Mention marshes please reach out using the contact information provided at the end of this document.

Duxbury - 1331 acres (539 ha)

Coys Brook / Harwich - 342 acres (139 ha)

West End Marshes - 238 acres (96 ha)

Cape Pogue Bay / Pocha Pond - 211 acres (86 ha)

Slocum River / Peters Creek - 195 acres (79 ha)

Little River (Fairhaven) - 187 acres (76 ha)

Little Bay - 69 acres (28 ha)

Great Sippewissett - 186 acres (75 ha)

Sengekontacket - 140 acres (57 ha)

The Glades - 136 acres (55 ha)

Hatches Harbor - 107 acres (43 ha)

Kent Street - 101 acres (41 ha)

Hither Creek - 77 acres (31 ha)

Menemsha Pond - 68 acres (28 ha)

Ellisville Marsh Complex - 64 acres (26 ha)

The Creeks - 44 acres (18 ha)

Eel Point - 37 acres (15 ha)

Folgers Marsh and UMASS field station - 27 acres (11 ha)

Great Point Lagoon - 13 acres (5 ha)

Katama Bay - 6 acres (2 ha)

Herring River - 186 acres (75 ha)

Best Practices For Marsh Management For Saltmarsh Sparrow

Any management actions should follow best practices to not irreparably harm existing Saltmarsh Sparrow habitat. Necessary precautions include:

- Consulting local land managers and property owners before any monitoring or management action is planned.
- Initially limit management impact to a small portion of the high marsh.
- If possible, conduct all management action outside the window of the active Saltmarsh Sparrow breeding season (avoid May – September annually).

Permitting

Wetland permitting has been the largest barrier to large-scale marsh restoration needed to protect and restore nesting sparrow habitat and overall salt marsh resiliency. Modernizing the permitting process could be the most impactful action taken to expedite coastal resiliency efforts in Massachusetts. We must be able to accelerate management and restoration activities, but currently the permitting process often delays projects by many months or years. Federal, state, and local organizations are working with State regulators on identifying efficient processes for efficient marsh restoration work within the State regulatory framework. Changes to regulation and procedures are needed to support the work outlined in this plan.

Monitoring

Any habitat restoration efforts should be monitored both pre-construction and post-construction to measure change and determine whether management goals have been met. This monitoring will ideally include an array of ecological metrics including (but not limited to) hydrology, vegetation, bird community, and elevation specific to tidal marshes in Massachusetts. It is integral to build upon the existing knowledge base for salt marsh restoration in this area by collecting robust pre- and post- monitoring data to understand the impact of marsh adaptation techniques and support the permitting process for new locations. Post-management monitoring should ideally extend at least 3-5 years and up to 10 for bird monitoring specifically.

The ACJV, SHARP, and Ducks Unlimited recently released [recommendations for monitoring Saltmarsh Sparrows at restoration sites](#) which includes a decision tree for deciding timelines, level and type of monitoring, and spatial distribution of data collection locations.

Existing protocols used within the state and region include:

Moore K. 2009. Long-term Monitoring of Estuarine Submersed and Emergent Vegetation Communities. [National Estuarine Research Reserve System Technical Report](#)

Raposa, K, Wasson K, Nelson J, Fountain M, West J, Endris C, and A Woolfolk. 2020. [Guidance for thin-layer sediment placement as a strategy to enhance tidal marsh resilience to sea-level rise](#). Published in collaboration with the National Estuarine Research Reserve System Science Collaborative.

Acknowledgments

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Happiness is being in the field looking for Saltmarsh Sparrows. Mo Correll





Release the Sparrow! Ray Hennessy

Contact & Citation Information

For more information or to update information contained in the document please contact:

Mo Correll, Atlantic Coast Joint Venture:
maureen_correll@fws.gov

Suggested citation: Atlantic Coast Joint Venture. 2024. Report. Saltmarsh Restoration Priorities for the Saltmarsh Sparrow: Maine. Version 2.0. Available at: https://acjv.org/documents/ME_SALS_comp_guidance_doc.pdf.

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