

# Saltmarsh Restoration Priorities for the Saltmarsh Sparrow New York

*Last updated 14 April 2022*

## Goal Statement

---

The Saltmarsh Sparrow (*Ammodramus caudacuta*) is a Species of Greatest Conservation Concern in New York. 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 10-15 years in addition to long-term salt marsh resilience.

## 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. New York’s breeding Saltmarsh Sparrow population is estimated to be 8.7% of the regional population as of 2011/2012 (Wiest et al. 2019). Its population goal was therefore calculated as 8.7% 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 10 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	Confidence Interval	State's %	Population Goal (Indiv)	Short-term Habitat Goal (ac)	Long-term Habitat Goal (ac)	Current High Marsh (ac)
New York	5,300	(+/- 1,300)	8.7%	2,170	<b>1,338*</b>	4,286*	11,892**
Regional	60,000			25,000	23,000	79,605	

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

\*\*Current high marsh acres are primarily marsh that has been altered and in need of restoration.

## 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 without ditching, or that are downstream, or free of tidal restrictions like road crossings

## **Marsh Identification and Prioritization Process**

---

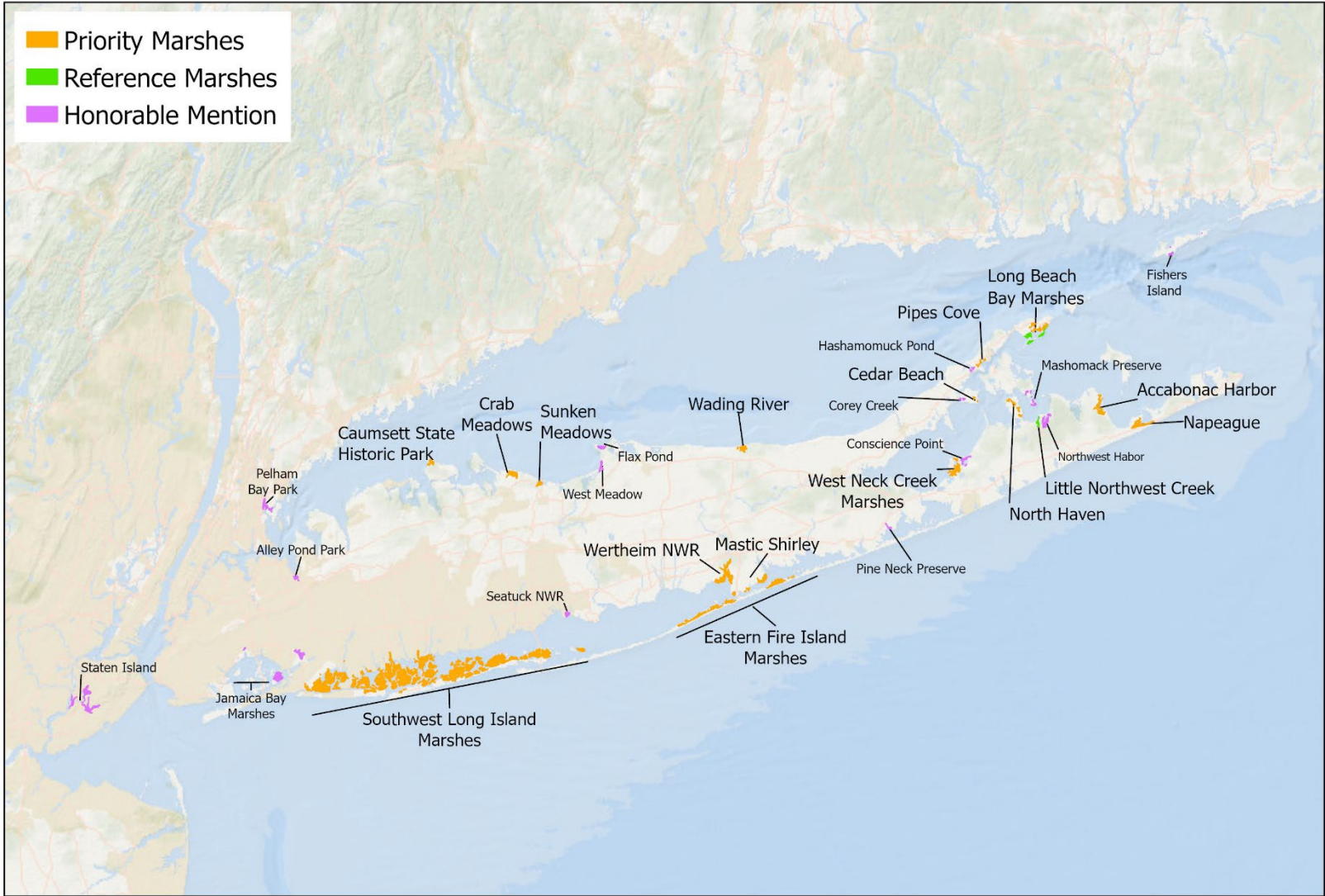
Marsh parcels were identified and characterized by first identifying the highest-ranked marsh patches identified by the ACJV Saltmarsh Sparrow Habitat Prioritization Tool (top 10%; ACJV 2020). They were then reviewed and refined by a group of non-profit, academic, state, and federal partners. Marsh summaries 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 New York.

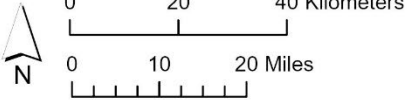
**Reference Marshes:** These marshes are in near-pristine condition and can act as reference marshes for restoration efforts in the state. Long-term preservation of these areas and the open space around them to facilitate long-term marsh migration is important, but no immediate restoration action is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

**Honorable Mention:** The following marshes were identified by the partner group as important to keep in mind for future work but needing additional assessment before any work can be planned.

This document will be updated over time to reflect additional expert input, changes in species conservation status, and implementation efforts that represent collective progress towards habitat goals.



# New York Priority Saltmarsh Sparrow Marshes



## Priority Marshes

---

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

### Southwest Long Island – 947 acres (383 ha)

---

**Existing conditions:** This large marsh complex is perhaps the most important area of marsh in New York for the Saltmarsh Sparrow. These marshes are heavily ditched, and most of the acreage is marsh islands which are sediment-starved with minimal room for marsh migration long-term. There are several channels that are regularly dredged and potential sources of sediment, but there is a competing need for sand to maintain nearby beaches. Existing projects:

- Town of Hempstead/State of NY: Smith marsh (south end), High Meadow, Alder Island: projects are planned but NY DEC permitting is pending. Dredge comes from Jones Inlet which is regularly dredged. Implementation is funded but has not started, hopeful for a 2022 start date. No long-term monitoring is currently funded.
- Town of Hempstead: Current project measuring / predicting tidal inundation into the future in the entire Hempstead Bay.

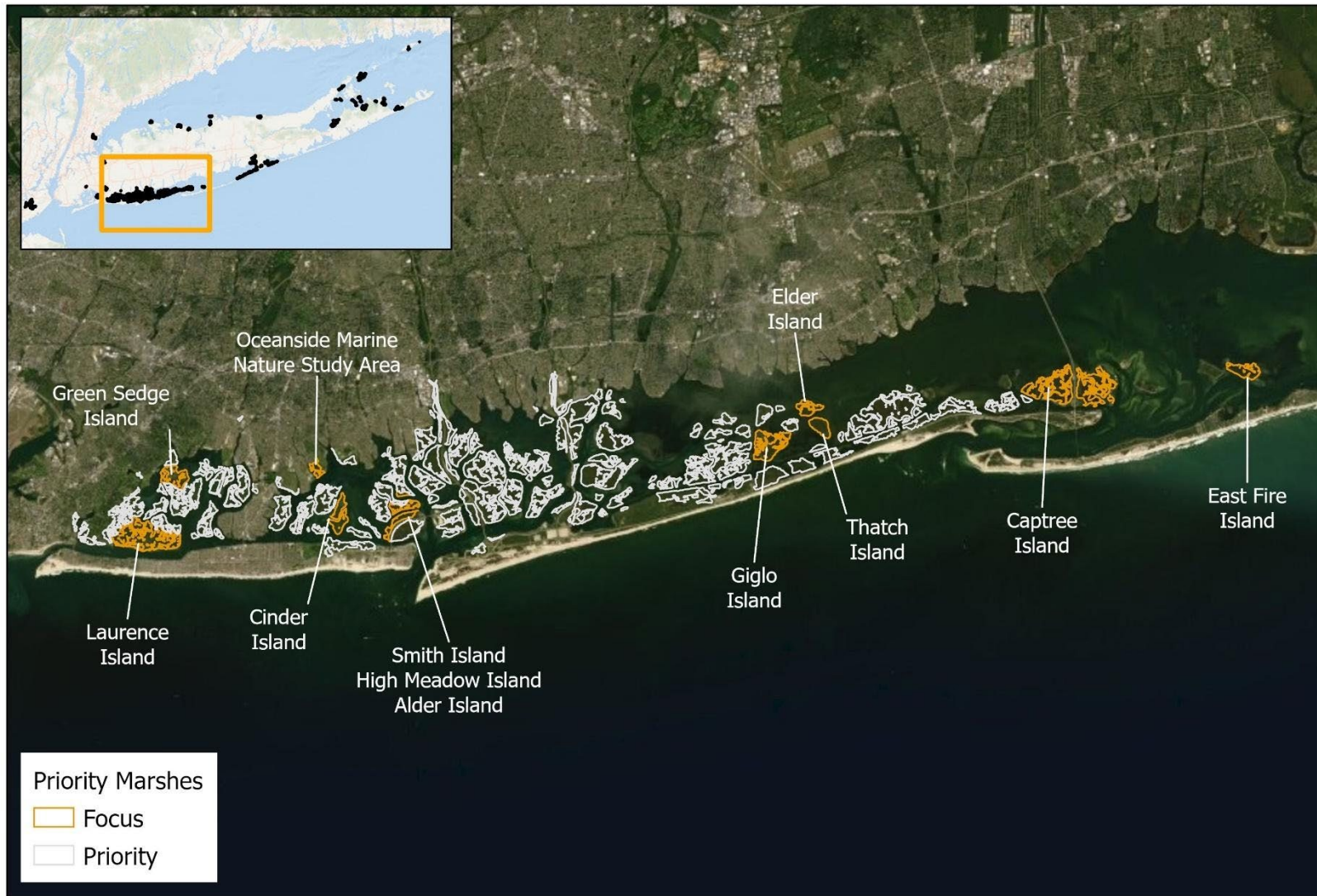
Within this large marsh complex we suggest a focus on Cinder Island, Smith Island, High Meadow Island, Alder Island, Lawrence Island, Captree Island, Cedar Island, Gilgo Island, Thatch Island, and East Fire Island (see map) because these areas all have current high marsh and existing Saltmarsh Sparrow populations that could be managed for additional acreage. Several dredge spoil islands exist in the area from channel ditching locally (overseen by Suffolk County) that are higher in elevation, but human use of these islands is high.

**Existing sparrow data:** Saltmarsh Sparrow present and confirmed breeding at North Cinder Island and Marine Nature Study Area. North Cinder Island has the current highest known concentration of sparrows for the area. Assessment of all the marsh islands for sparrow populations is currently underway through a Back Bay study (US Army Corps of Engineers; USACE). The Biodiversity Research Institute found high levels of mercury in Saltmarsh Sparrows at this site in 2011/2012 (Lane et al. 2012).

### Recommended management / next steps to management action:

- Elevation enhancement is necessary for any marsh island to persist. A comprehensive assessment of all marsh islands is necessary to further identify restoration opportunities.
- Collaboration with NY DOT to maintain islands that also support causeways.
- Laurence Marsh needs hydrological assessment, but has potential for smaller-scale restoration work (e.g. runnelling, ditch remediation).
- Hydrologic assessment for potential elevation enhancement – local dredge source is available in the Town of Babylon.
- Protection of Thatch and Elder Islands from kite surfing activity May – September.





Southwest Long Island Marshes

## **Eastern Fire Island Marshes (distinct from East Fire Island) – 903 acres (365 ha)**

---

This barrier beach island is managed by the US Park Service as Fire Island National Seashore as well as several local municipalities. The barrier beach is sectioned into a western section which is considered a wilderness area, and an eastern section that includes Suffolk County's Smith Point County Park and Great Gun Park in Brookhaven. Elevation of this barrier island is declining rapidly due to lack of sediment supply.

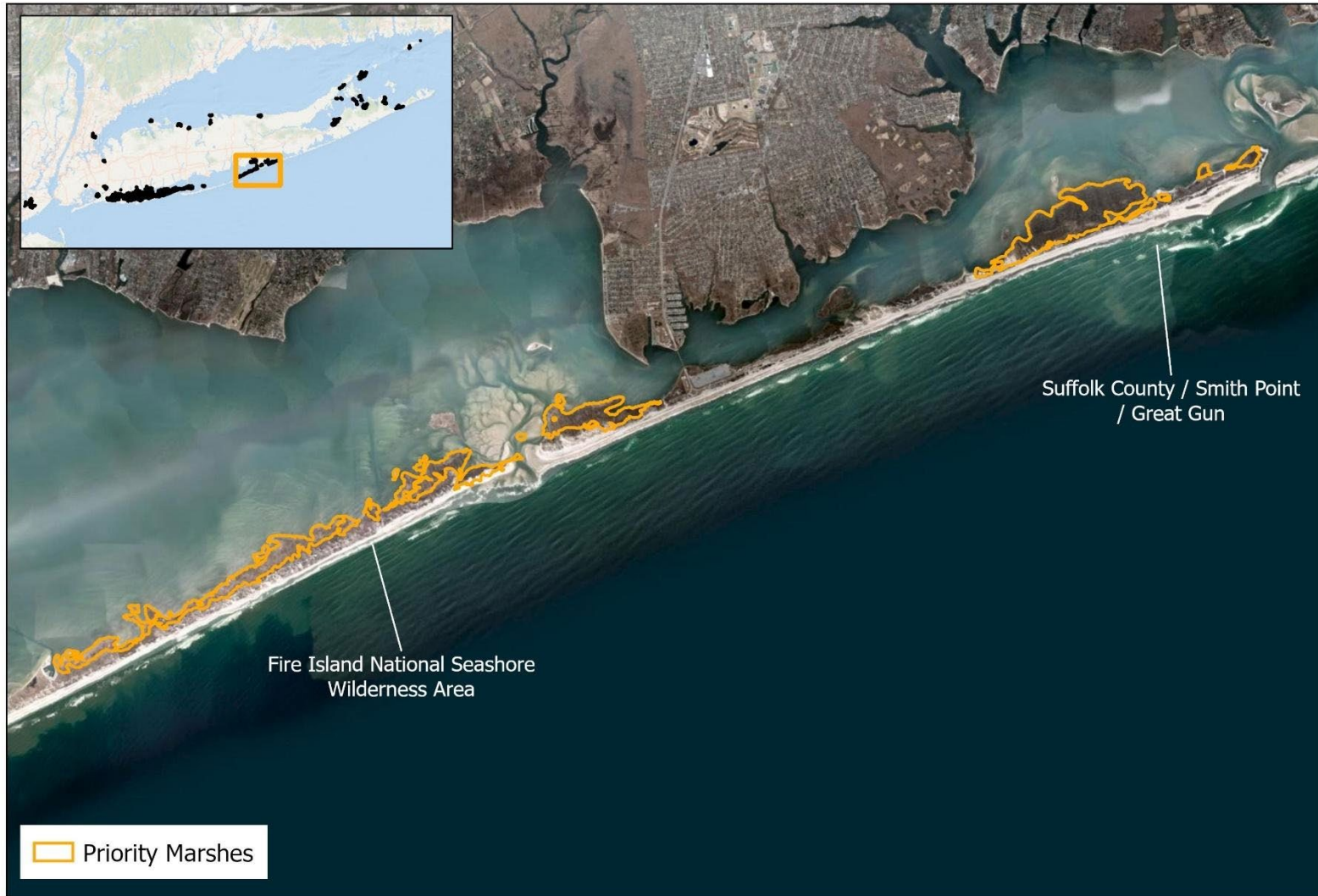
### **Existing conditions:**

- Wilderness area: Extensive mosquito ditching exists within the wilderness area. These marshes are sediment-starved and shrinking quickly with sea-level rise. Watch Hill Marina (run by National Park Service) has been recently dredged; material was pumped onto the ocean beach but later removed due to contaminants. There is an additional small dredge project planned near the entrance to the marina which will be placed upland in a picnic area. Existing projects include:
  - New inlet has created new sediment supply from Hurricane Sandy, US Army Corps of Engineers has adaptive management going on (Fire Island to Montauk Point plan is working on this) in this area
- Smith Point County Park / Great Gun - These marshes are heavily ditched and unmaintained. Some ditches were plugged to put water on marsh to create pannes, but this is now resulting in internal ponding. Piping Plovers nest on the ocean side, beach is closed due to plover presence during the summer months. Regular dredging at inlet results in sediment deposition on the ocean/beach side of Smith Point County Park. Additionally, Hurricane Sandy affected dune such that in 3 places marsh now has a thick layer of sand without much vegetation.

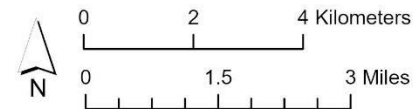
**Existing sparrow data:** Saltmarsh Sparrows present; breeding has not been confirmed.

### **Recommended management / next steps to management action:**

- All areas: Elevation enhancement is the most important aspect of maintaining these marshes long-term, particularly in the bay area. A full assessment of marshes is necessary to identify the best marsh islands for elevation enhancement.
- Smith Point County Park: Revegetation of 3 sand overwash zones.



Eastern Fire Island Marshes



## **Fireplace Neck (Wertheim NWR and Fireplace Neck State Park) – 758 acres (307 ha)**

---

**Existing conditions:** Heavily ditched marsh with mixed State and Federal ownership. Existing projects:

- State of NY: Fireplace neck restoration is already underway by the state.
- USFWS: Restoration work occurred at Wertheim NWR (2015-2018). The project involved ditch remediation using peat fill and coir logs, excavation of new channels and removal of ditch plugs to further improve hydrology. Herbicide treatment of Phragmites stands occurred during 2014 and 2015. Post-restoration monitoring is currently underway and planned to end in 2022.
- Suffolk County Division of Vector Control/USFWS: Integrated Marsh Management project involved reconfiguring the tidal flow network by creating new hydrologic features (tidal channels and pools) and filling in old grid ditches with peat removed during the pool and channel installation process. This effort was completed in 2004 and 2005.
- USFWS/Ducks Unlimited: Open Marsh Water Management that included the installation of more than 100 ditch plugs. This effort occurred in the late 1980's. Many of these ditch plugs were removed during the 2015-2018 restoration effort, but plugs and marine grade plywood are still present.

**Existing sparrow data:** Saltmarsh Sparrow present and confirmed breeding at this site.

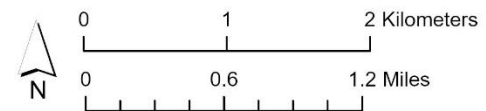
**Recommended management / next steps to management action:**

- Hydrological modeling to inform future restoration actions at this site into the future.
- Long-term monitoring for existing restoration sites.
- Additional restoration work is needed to install runnels, remove ditch plugs (as appropriate), and removal of remnant agriculture features (e.g. berms to promote marsh migration)





Wertheim NWR and  
Fireplace Neck Tidal Wetlands Area



## West Neck Creek Marshes – 294 acres (119 ha)

**Existing conditions:** This marsh is jointly owned by The Nature Conservancy, Town of Southampton, and the Peconic Land Trust. It is heavily ditched with some internal ponding on the southern end of the marsh. A descriptive habitat restoration plan developed by the Peconic Estuary Partnership exists for these marshes (PEP, 2020).

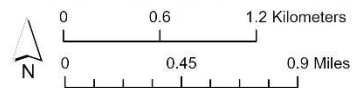
**Existing sparrow data:** Saltmarsh Sparrows present and confirmed breeding at this site.

### Recommended Management / next steps to management action:

- Protection of surrounding areas to facilitate marsh migration.
- Assessment for potential ditch remediation.



West Neck Creek Marshes





## Napeague Meadows – 279 acres (113 ha)

**Existing conditions:** This state-park-owned marsh is heavily ditched and bisected by Napeague Meadow Road which affects tidal flow to the marsh. Despite these modifications there are several high-quality high marsh areas, however there are also several stands of Phragmites. A habitat restoration plan developed by the Peconic Estuary Partnership exists for these marshes (PEP, 2020).

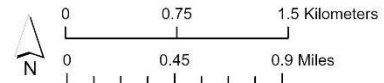
**Existing sparrow data:** Saltmarsh Sparrow has not been detected at this site.

### Recommended management / next steps to management action:

- Protection of surrounding land for marsh migration.
- Restoration of tidal flow through culvert maintenance/replacement.
- Assessment for Phragmites control and ditch remediation.



Napeague



## **Mastic and Shirley – 278 acres (113 ha)**

---

**Existing conditions:** This priority area includes several marshes on Long Island under various ownership and management including Mastic Beach, the William Floyd Estate, and Smith Point Marina County Park (distinct from Smith Point County Park).

- **Mastic Beach:** Mastic Beach and Suffolk County have a managed coastal retreat program that will buy out land along coastal areas from private landowners due to sea-level rise, making room for marsh migration. Existing projects:
  - **Audubon New York:** One project underway on southern mastic beach, ~147 acres of floodplain restoration (funded by the National Fish and Wildlife Foundation). This project is planned and permitted but actual implementation is not yet funded. This project includes ditch remediation and redirection of salt water into Phragmites stands. Roads will also be removed to increase tidal flow.
- **William Floyd Estate:** This recently acquired property is federally owned and managed by the Fire Island National Seashore. The marsh is heavily ditched. There is evidence of Dichlorodiphenyltrichloroethane (DDT) in 3 man-made ponds; there is a concern is that with sea level rise and natural movement of the marsh the ponds will breach and release DDT into the marsh and surrounding water bodies. Additionally, marsh is quickly migrating into the surrounding oak hickory / black gum forest, creating ghost forests. Data collected between 2014 and 2021 documented a quick transition from forest to ghost forest (pers comm. J Raphael, 2022).
- **Smith Point Marina County Park:** Marsh is ditched with internal ponding and a good potential candidate for elevation enhancement. Existing projects:
  - County submitted a plan for marsh restoration at this site, permitting is in place – small-scale elevation enhancement through ditch remediation and filling to improve hydrology.

**Existing sparrow data:** Saltmarsh Sparrow present throughout Mastic Beach; not detected on William Floyd Estate or Smith Point Marina County Park.

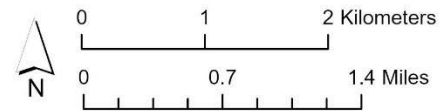
### **Recommended management / next steps to management action:**

- **Mastic Beach:** hydrological assessment to investigate waterlogged characteristics of the marsh and potential for elevation enhancement.
- **William Floyd Estate:** This area is currently protected and there is ample room for marsh migration, but a hydrological, elevation, and bird population assessment is necessary to determine specific next steps. Pond-breaching potential should be explored to understand the risk of releasing of DDT into system as marsh migration continues to occur. Direct elevation enhancement is an option here, but there is no known sediment supply.





## Mastic Shirley





## Accabonac Harbor – 269 acres (109 ha)

**Existing conditions:** These marshes are ditched with some internal ponding, and some agricultural berms are present from past marsh management. Some ditches were subsequently plugged with sandbags. Several large patches of high marsh exist in these parcels. There are also signs of historical marsh migration. These marshes are largely surrounded by development, but there is some potential for marsh migration in surrounding lands, with mixed ownership of town, state, The Nature Conservancy, and the Peconic Land Trust. There is a local dredge operation through inlet through Suffolk County; current practice is to place dredge material on shoreline to minimize erosion of the beach. A habitat restoration plan developed by the Peconic Estuary Partnership exists for these marshes (PEP, 2020).

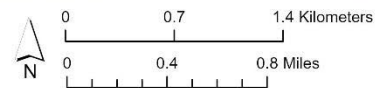
**Existing sparrow data:** Saltmarsh sparrow present; breeding has not been confirmed.

### Recommended management / next steps to management action:

- Hydrological assessment for potential ditch remediation and removal of tidal restrictions.
- Assessment for potential elevation enhancement.



Accabonac Harbor



## Crab Meadow Park – 267 acres (104 ha)

**Existing conditions:** This marsh is heavily ditched and sediment-starved. Development exists on the east and west but there is room for marsh migration through golf course area. The tidal inlet is not restricted.

**Existing sparrow data:** Saltmarsh Sparrow present; breeding has not been confirmed for this site.

### Recommended management / next steps to management action:

- This marsh needs elevation enhancement to persist long-term. There is a potential dredge source near a power plant to the west; current practice is to deposit dredge material currently used to supplement a nearby beach.



Crab Meadows



## Long Beach Bay Marshes – 210 acres (85 ha)

**Existing conditions:** This collection of marsh parcels includes both Priority and Reference marshes. Broad Meadows / Narrow River marshes and the Whitcom Marsh Preserve are both considered Priority marshes, however the southern parcels included are Reference marshes and can be used as a local reference site for any restoration that may occur here. Both priority marsh parcels are ditched and experience some tidal restriction. A habitat restoration plan developed by the Peconic Estuary Partnership exists for these marshes (PEP, 2020). Existing projects:

- Ducks Unlimited: NAWCA grant to restore specifically for Saltmarsh Sparrow habitat. This project will restore tidal flow north of the dyke using a self-regulating tide gate and implementation is fully funded.

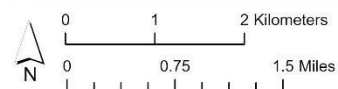
**Existing Sparrow Data:** Saltmarsh Sparrow has not been confirmed at this site.

### Recommended management / next steps to management action:

- Support for existing project to restore tidal flow to priority marsh parcels.
- Culvert replacement/enlargement on Narrow River Rd is necessary to facilitate migration for reference marshes.



Long Beach Bay Marshes



## Wading River – 175 acres (71 ha)

**Existing conditions:** This marsh is majority-owned by The Nature Conservancy and is the top priority site for Saltmarsh Sparrows within the state for this group. The marsh is situated to the east of a nuclear power plant that was built but never went into full operation. The state of NY is in the process of acquiring the undeveloped land to the west. When this undeveloped parcel is combined with marsh east of the plant this area (~1,000 acres) will be one of the larger undeveloped tracts of land on the north shore of Long Island and has potential for larger-scale marsh migration.

**Existing sparrow data:** Saltmarsh Sparrow is present and confirmed breeding at this site.

### Recommended management / next steps to management action:

- Restoration of tidal flow to marsh in western parcel.
- Assessment for elevation enhancement of eastern parcel.



Wading River

**Caumsett State Historic Park – 107 acres (43 ha)**

---

**Existing conditions:** This marsh is experiencing edge erosion but is unditched and unrestricted. It is included as a priority because of its placement in Long Island Sound where intact tidal marsh is relatively scarce.

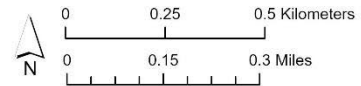
**Existing sparrow data:** Saltmarsh Sparrow present; breeding has not been confirmed at this site.

**Recommended management / next steps to management action:**

- Assessment for potential elevation enhancement.



Caumsett State Historic Park





## North Haven Marshes – 98 acres (40 ha)

**Existing conditions:** This priority area includes several marsh parcels with room for marsh migration around them. There is some ditching and internal ponding, but all parcels have substantial high marsh which could be managed to increase acreage over time.

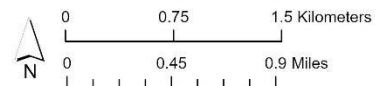
**Existing sparrow data:** Saltmarsh Sparrows have not been detected at this site.

### Recommended management / next steps to management action:

- Protection of surrounding area to facilitate marsh migration.
- Assessment for ditch remediation.
- Widen culvert to increase tidal flow in Genet Creek.



North Haven Marshes



## Sunken Meadows State Park – 83 acres (34 ha)

**Existing conditions:** This marsh experiences edge erosion and has been heavily infiltrated by Phragmites. It is also tidally restricted by several road crossings. Existing projects:

- Audubon New York: Restoration design underway specifically for the Saltmarsh Sparrow (NAWCA/NFWF)

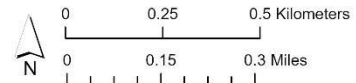
**Existing sparrow data:** Saltmarsh Sparrow present; breeding has not been confirmed at this site.

### Recommended management / next steps to management action:

- Marsh hydrologic assessment is already underway through Audubon New York project, implementation and permitting support still needed. It is likely that elevation enhancement will be necessary at this site.



Sunken Meadows





**Pipe's Cove – 56 acres (23 ha)**

---

**Existing conditions:** This marsh is jointly owned by Greenport West and Suffolk County. Several patches of high marsh exist in this parcel. A habitat restoration plan developed by the Peconic Estuary Partnership exists for these marshes (PEP, 2020).

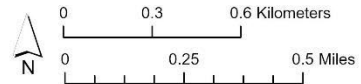
**Existing sparrow data:** Saltmarsh Sparrows not detected at this site.

**Recommended management / next steps to management action:**

- Phragmites mitigation and removal.
- Facilitated marsh migration.



Pipes Cove



## Cedar Beach – 25 acres (10 ha)

**Existing conditions:** This marsh is sediment-starved and slowly being inundated by sea-level rise. The northern parcel is severely tidally restricted by the bisecting Cedar Beach Road. A habitat restoration plan developed by the Peconic Estuary Partnership exists for these marshes (PEP, 2020). Existing projects:

- Cornell Cooperative Extension: marsh island restoration project, stalled in USACE permitting. This will restore 5 acres of habitat.

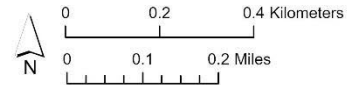
**Existing sparrow data:** Saltmarsh sparrow is present; breeding has not been confirmed.

### Recommended management / next steps to management action:

- Hydrological assessment needed for potential elevation enhancement.
- Restoration of tidal flow to northern parcel.
- Acquisition of private parcels to facilitate marsh migration to the north.



Cedar Beach Creek



## Reference Marshes

---

These marshes are less degraded and can act as reference marshes for restoration efforts in other marshes within 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.

**Brown's Point / Peter's Neck** – 103 acres (42 ha)

**Orient State Park** – 97 acres (39 ha)

**Little Northwest Creek** – 57 acres (23 ha)

**Long Beach Bay marshes (southern parcels)** – 201 acres (81 ha)

## Honorable Mention

---

The following marshes were identified by the partner group as important to keep in mind and further assess for future work, but not within the highest priorities for the state through the lens of Saltmarsh Sparrow conservation.

**Jamaica Bay** – 570 acres (231 ha)

---

**Existing conditions:** These marshes are of mixed ownership and are high-profile within the state due to the proximity to New York City and John F. Kennedy International Airport. Sediment supply is very limited in the area and there is no room for marsh migration, however there are existing populations of Saltmarsh Sparrows here that have been intensively studied. JoCo and Idewild marsh are best opportunities for marsh restoration to benefit the Saltmarsh Sparrow in Jamaica Bay.

- **JoCo:** Highest elevation marsh in Jamaica Bay system. Difficult to work on because of proximity to airport and it contains a large Laughing Gull colony, has some ditching but it is not pervasive. Gateway National Recreation Area.
- **Idewild Marsh:** SALS have become increasingly present over the last decade, confirmed nesting in area and using both high and low marsh habitat for nesting purposes (Kocek 2016). Hugsley Creek restoration planned using dredged sediment (NYC parks) but has not yet started (start fall 2022). Marsh access is difficult, marsh is sinking, driving conversion of high marsh to low marsh. No room for marsh migration. New York City Parks.
- **Spring Creek:** Phragmites is pervasive at the site, but good potential for sparrows if looking for marshes near New York City; access is difficult. New York City Parks.

### Existing projects:

- NPS: Living shoreline work in progress.
- USACE: The 2022 federal budget includes planning for 64 acres of marsh habitat restoration (Stony Creek, Duck Point, Elders Center, Pumpkin Patch West, Pumpkin Patch East).
- NYC Parks: Elevation enhancement through thin layer placement application at Idlewild 2022, high marsh planting at Four Sparrow Marsh 2022.



**Existing sparrow data:**

- JoCo: Saltmarsh Sparrows present, breeding has not been confirmed
- Idewild Marsh: Saltmarsh sparrows present and confirmed breeding at this site (-8%, unpublished data, A Kocek)
- Spring Creek: No sparrows have been detected at this site.

**Recommended management / next steps to management action:**

- Site assessments of hydrology and elevation are necessary to determine restoration next steps, but beneficial use of dredged sediments is the only way to maintain elevation on marsh islands due to lack of migration space.

**Additional Honorable Mention sites:**

---

**Staten Island** – 529 acres (214 ha)

**Northwest Harbor** – 225 acres (91 ha)

**Pelham Bay Park** – 176 acres (71 ha)

**West Meadow** – 94 acres (38 ha)

**Seatuck NWR** - 81 acres (33 ha)

**Mashomack Preserve** – 73 acres (30 ha)

**Conscience Point NWR** – 72 acres (29 ha)

**Flax Pond** – 67 acres (27 ha)

**Corey Creek County Park** – 23 acres (9 ha)

**Alley Pond Park** - 54 acres (22 ha)

**Fisher's Island** – 42 acres (17 ha)

**Pine Neck Sanctuary** – 34 acres (14 ha)

**Hashamomuck Pond** – 29 acres (12 ha)

**Best practices in marsh management**

---

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

- Consulting local land managers and owners before any monitoring or management action is planned.
- Initially limit management impact to a small portion of the high marsh (e.g. <25%).
- Conduct all management action outside the window of active Saltmarsh Sparrow breeding season (avoid May – September annually).

## Monitoring

---

Any habitat restoration efforts should be monitored both pre-construction and post-construction to measure change and determine whether vegetation goals and elevations have been met. This monitoring will ideally extend at least 5 years after initial restoration actions and include an array of ecological metrics specific to tidal marshes in New York and will be integral to build upon the existing knowledge base for salt marsh restoration in this area.

## Acknowledgments

---

Thank you to working group members Sam Apgar, Vinny Biondo, Michael Farina, Alexa Fournier, Joe Janssen, Alison Kocek, Jillian Liner, Robert Longiaru, Annie McIntyre, Steve Papa, Patty Rafferty, Jordan Raphael, Tara Schneider, John Sepenoski, Terra Willi, and all workshop participants for informing the content of this document. Thank you to the Saltmarsh Habitat and Avian Research Program (SHARP) for providing detection data for Saltmarsh Sparrows which informed our sparrow data sections for each marsh.

## Contact Information

---

For more information or to update information contained in this document please contact: Mo Correll, Atlantic Coast Joint Venture: [maureen\\_correll@fws.gov](mailto:maureen_correll@fws.gov)

Suggested citation: Atlantic Coast Joint Venture. 2022. Report. Saltmarsh Restoration Priorities for the Saltmarsh Sparrow: New York. Available at: [www.acjv.org](http://www.acjv.org).

## References

---

Atlantic Coast Joint Venture. 2020. The Saltmarsh Sparrow Habitat Prioritization Tool. Available at:

<https://fws.maps.arcgis.com/apps/MapSeries/index.html?appid=1bc5b29be4ac43d8949b2941d2ce5174>

Field, CR, Ruskin, KJ, Benvenuti, B, Borowske, A, Cohen, JB, Garey, L, Hodgman, TP, Kern, R, King, E, Kocek, AR, Kovach, AI, O'Brien, KM, Olsen, BJ, Pau, N, Roberts, SG, Shelly, E, Shriver, WG, Walsh, J, and CS Elphick. 2018. Quantifying the importance of geographic replication and representativeness when estimating demographic rates, using a coastal species as a case study. *Ecography* 41:971-981.

Hartley, MJ and AJ Weldon, eds. 2020. Saltmarsh Sparrow Conservation Plan. Atlantic Coast Joint Venture. Available at: [acjv.org/documents/SALS\\_plan\\_final.pdf](http://acjv.org/documents/SALS_plan_final.pdf)

Kocek, A. 2016. Factors impacting tidal marsh sparrow nesting presence and nest survival in an urban environment of New York City. M.S. Thesis, State University of New York College of Environmental Forestry, Syracuse, New York.

Lane, O, Edmonds, S, Buck, D and K Regan. 2012. Mercury assessment of Saltmarsh Sparrows on Long Island, New York, 2010-2012. NYSERDA 11139.  
<http://www.nyserda.ny.gov/-/media/Files/Publications/Research/Environmental/2012-mercury-assessment-saltmarsh-sparrows.pdf>

Peconic Estuary Partnership, 2020. Peconic Estuary Partnership Habitat Restoration Plan. Available at: <https://www.peconicestuary.org/wp-content/uploads/2021/04/PEP-2020-Habitat-Restoration-Plan-FINAL.pdf>.

Wiest, WA, Correll, MD, Marcot, BJ Olsen, BJ, Elphick, CS, Hodgman, TP, Gunterspergen, GR, and WG Shriver. 2019. Estimates of tidal marsh bird densities using Bayesian networks. *Journal of Wildlife Management* 3:109-120.