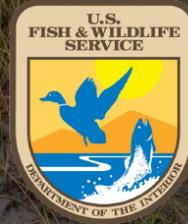


# Ninigret Barrier Beach Restoration

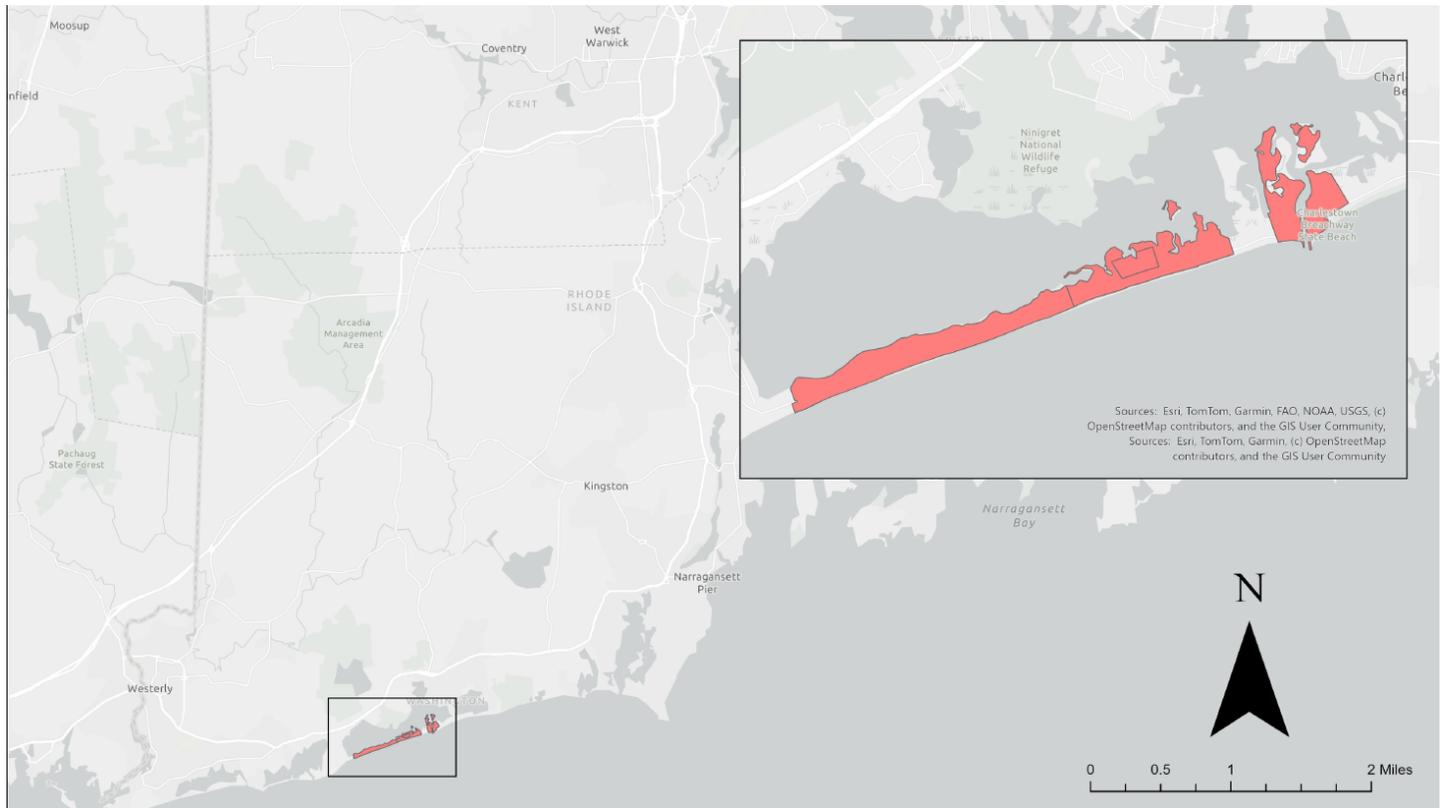
## Information Meeting – Project Overview



This presentation will introduce the Ninigret barrier beach and salt marsh system in Charlestown, outline current conditions and stressors, and describe upcoming terrestrial habitat restoration activities. We'll focus on why this area is so important for coastal birds and marsh resilience, and what to expect on the landscape over the next several years as work progresses.

An accompanying presentation will outline all in-marsh restoration activities associated with this project.

## Slide 2



The Ninigret barrier beach and marsh system covers about 234 acres and is jointly owned and managed by RIDEM and the U.S. Fish & Wildlife Service.

The barrier beach shields Ninigret Pond, a coastal salt pond connected to the ocean through the manmade Charlestown Breachway. The inland shoreline of the barrier is buffered by several discrete salt marshes.

Importantly, this is the longest stretch of undeveloped coastal habitat in mainland Rhode Island and supports a variety of species dependent on coastal beach, dune, and salt marsh habitats.

## Project Area Overview

- Barrier beach dune systems are naturally dynamic: shaped by wind, waves, and overwash
- Japanese Black Pines planted 1970-1980 for beach stabilization projects
- Transformation from open dune habitat to forest/shrubland



1972-2024

An ideal barrier beach dune system is naturally dynamic and ever-changing. They are shaped and maintained by storm events, wind and wave action, and other natural processes. They are not meant to be a stagnant habitat. At Ninigret, we have seen quite a bit of change to the landscape, but most of it not natural, and is actually impeding the natural processes that help to sustain resilient dune and salt marsh habitats.

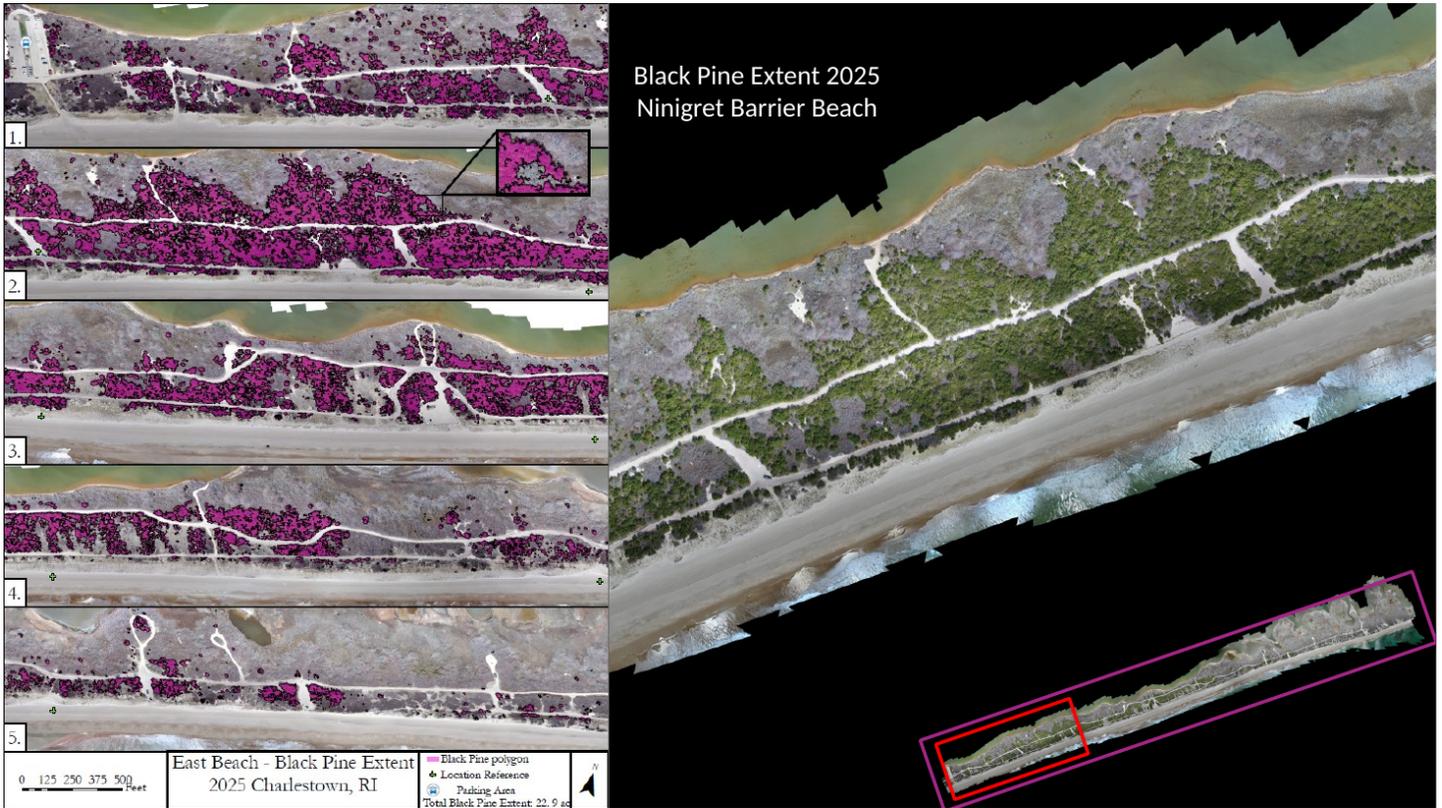
Beginning in the 1970s, Japanese Black Pines were planted at Ninigret. At the time, this was a new concept in barrier beach protection aiming to stabilize and reforest dune areas... to keep them from changing by preventing sediment loss via storms and erosion. By 1980, over 30,000 seedlings were planted between Ninigret, Charlestown, and Quonnie by local organizations and volunteers.

As these pines continued to take root and proliferate on the barrier, we begin to see the landscape slowly change from a coastal barrier beach dune system, to a predominately forested environment.

Follow the below link to see the full catalog of aerial imagery at Ninigret Conservation Area from 1939 – 2025.

<https://www.arcgis.com/apps/webappviewer/index.html?id=a2960d1a022e4dccaab14aa4a58f5d45>

Slide 4



Here is our most recent drone imagery from Ninigret showing just how dominant and widespread the pines have become. The compressed map on the left-hand side shows the full extent of black pines in purple.

The habitat looks almost unrecognizable compared to 50 years ago, resulting in profound impacts to the function of the system as a whole.

## Current Conditions & Impacts

- Over-stabilization of the barrier has interrupted natural overwash events and sediment transport to back-barrier marshes
- Reduced sediment deposition inhibits barrier migration and the ability of back-barrier salt marshes to keep pace with sea level rise
- Increased beach front erosion and dune scarping = reduced usable beach area for both wildlife and recreation



However well-meaning, the pine plantings have resulted in a vastly altered habitat and severely impacted the processes that would naturally maintain it:

Instead of allowing sand to move landward during storms and overwash events, the pines trap sediment in place and block natural barrier migration. In a way they are fulfilling their intended purpose, but our understanding of these systems has evolved enough to recognize that such over-stabilization of the sediment regime actually inhibits the necessary processes that maintain these rare coastal habitats.

As a result of this over-stabilization, we see less sediment delivered to the back-barrier marshes, making it harder for those marshes to build elevation and keep up with sea level rise over time. We also see dune scarping, and widespread narrowing of the beach front, since the barrier is effectively locked in place and unable to compensate for beach front erosion.

## Current Conditions & Impacts



Asiatic sand sedge



Oriental bittersweet



Japanese knotweed



Beach Rose

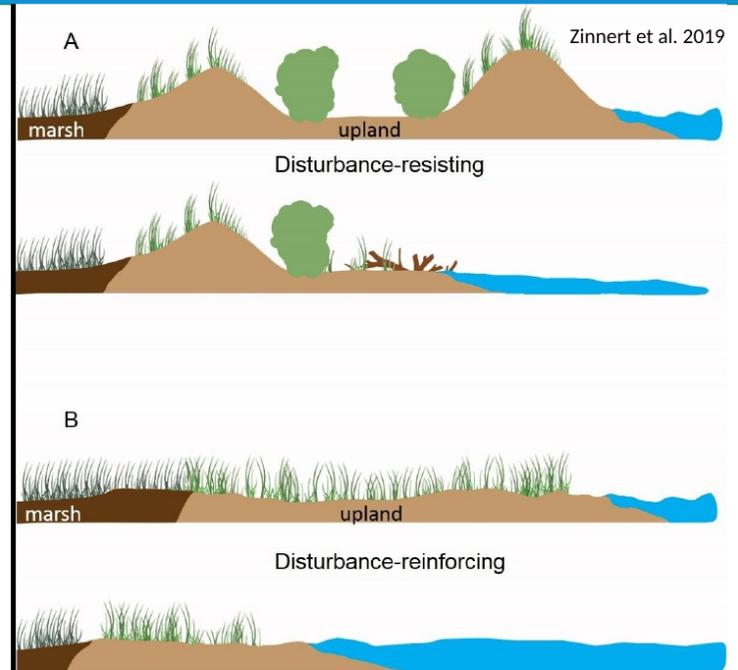
- Proliferation of other invasive plants
  - Asiatic sand sedge
  - Oriental bittersweet
  - Beach Rose
  - Bush honeysuckle
  - Japanese knotweed
- Contribute to degraded habitat and barrier structure

Invasive plants have also begun to proliferate on the barrier, species like Asiatic sand sedge and woody invasives such as beach rose, bush honeysuckle, knotweed, and bittersweet, which take root where conditions are now favorable.

Aside from degrading general habitat composition and functionality as a whole, all of these can contribute to altered dune structure, interrupted sediment flow, and a narrower, less functional beach for both wildlife and for the public.

# Impacts to Species of Conservation Concern

- Piping plovers, least terns, and other coastal specialists are early successional species- they rely on **disturbance events** to cyclically create open, sparsely vegetated habitat
- Storm and wave action set back vegetation and create important habitats like **washover fans** created from sediment movement across the barrier
- Invasive pine monoculture prevents natural sediment movement and washover. This impacts important native habitat and long-term barrier migration and resiliency



The barrier is currently in a “disturbance-resisting” state, making it less resilient over the long-term, more susceptible to catastrophic loss.

This state impacts species that rely on disturbance events to create open, sparsely vegetated habitats characteristic of natural coastal barrier beach systems.

Climate change is also facilitating the spread of woody vegetation on barrier uplands, which impacts native dune vegetation, altering rare coastal habitats.

## Impacts to Species of Conservation Concern

- Reduced usable nesting and foraging area for Piping Plovers (federally threatened) and Least Terns
  - Invasive plants encroach into otherwise suitable interdune nesting habitat and can impede plover chick access to foraging areas
- Pines provide nesting sites for American Crows and Fish Crows, major predators of plover nests



These structural changes translate directly into impacts on our highest priority species in the state.

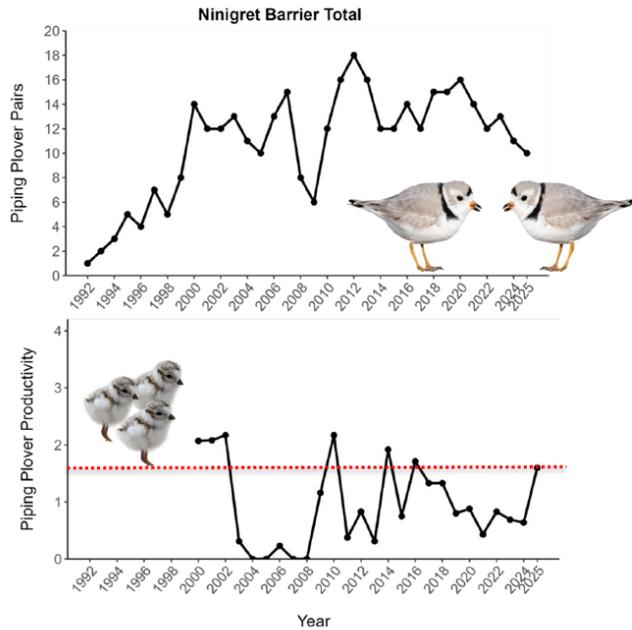
The following slides will mostly focus on non-game birds. However, it is important to recognize these species are indicators of their environments. By studying them, we can gain insight into the health of the system as a whole, as well as all the other fish and wildlife relying on it.

Piping Plovers and Least Terns, are two of the primary species reliant on open, beach habitats for nesting. These are both major species of conservation concern, and are emblematic of these special coastal habitats which have seen increasing pressure from human use and development over time. Ninigret should be a stronghold for these species in the state, and over the years it has held large breeding populations of both species.

However, the structural changes we see here at Ninigret are greatly reducing the quality and extent of suitable breeding habitat. The combination of a narrowed beach and invasive woody vegetation means there is simply less open, sandy habitat for nesting. Interdune areas that would otherwise serve as nesting or chick-rearing habitat are being taken over by invasive vegetation, making it harder for chicks to move freely to foraging areas

The Japanese black pines also create a rather unique problem: they provide nesting habitat for American Crows and Fish Crows. These are now some of the primary predators driving plover nest losses at Ninigret, and the pine stands help sustain higher local crow numbers.

# Impacts to Species of Conservation Concern



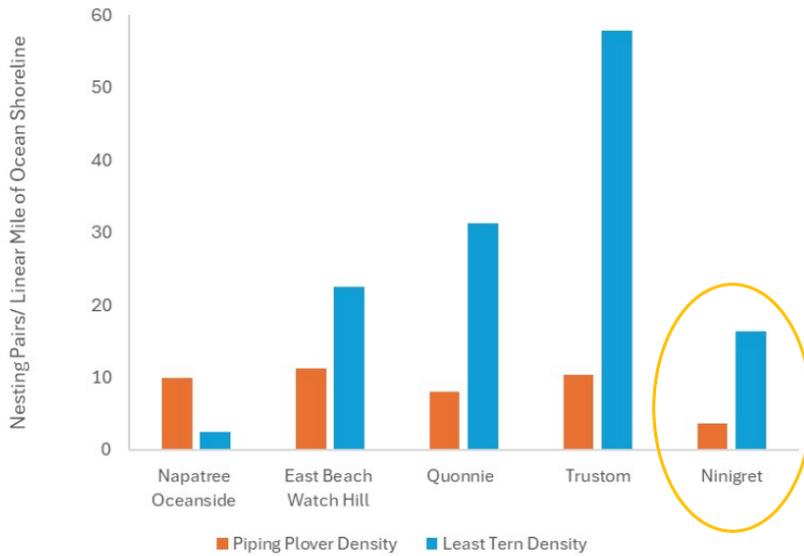
- Piping plover pair numbers trending downward on Ninigret, despite overall upward trends state and region-wide. Indicative of site-specific issue.
- Number of young produced at Ninigret has been below target for most years since 2016
- Similar pattern for Least Terns

As habitat becomes more unsuitable at this site due to a combination of increased woody vegetation, beach-front erosion (induced by over stabilized sediments), and increased predators, Piping Plover pair numbers at Ninigret have slowly decreased.

The number of young produced at this site has also suffered. Of the few birds that are attempting to breed here, few are successful.

# Impacts to Species of Conservation Concern

Nesting Density of Piping Plover and Least Terns on RI Beaches



- Despite undeveloped habitat and relatively lower disturbance, plover and tern density is lower on the Ninigret barrier compared to other large sites in Rhode Island.



This figure shows the density of Piping Plovers and Least Terns relative to coastline. Ninigret should be a stronghold for these species, being the longest stretch of undeveloped coastal habitat in the state. But habitat degradation is greatly hampering its potential, and undermining beach-nesting bird recovery efforts in the state.

These species are important indicators of barrier beach health. While we often stress these birds as conservation targets, restoration that impacts them positively also benefits all other fish and wildlife dependent on these unique habitats.

The birds are telling us that the system is failing, and prudent action is necessary to restore it to natural function for the benefit of all fish and wildlife reliant on barrier beach habitats.

## Impacts to Species of Conservation Concern

- Current conditions undermine long-term resiliency for Saltmarsh Sparrows (at-risk) and other marsh-dependent birds and fish
- Degraded dune systems impact high-priority migrants of conservation concern, like Ipswich Sparrows (global pop. <6,000 indiv.)



As mentioned earlier, under the current conditions, sediment exchange to the back-barrier marshes is reduced by the presence of pines and other woody invasives. This results in slower rates of marsh accretion, leaving these habitats increasingly vulnerable to sea level rise, and in turn, all of the birds and fish dependent on them. One of these being the Saltmarsh Sparrow, a salt marsh-obligate species that has declined as much as 90% since the turn of the century, and, without prudent restoration efforts, such as this project, will likely go extinct in the very near future.

We also see impacts to migrant species that are high on our list of conservation concern. One great example of these is the Ipswich Sparrow, a bird with a global population no larger than 6,000 individuals, making it statistically speaking, the rarest bird to regularly occur in Rhode Island. This is a species that is almost never found away from coastal areas, and specifically depends on grassy dune habitats. It should occur regularly here at Ninigret, but due to current state of the habitat, is now only rarely observed here.

## Current Site Use



- Pines used by migrant finches (Red Crossbills, Pine Siskins, etc.) and other passerines (Red-breasted Nuthatches)
  - Pine-cone specialists are highly nomadic, since cone crop levels vary significantly from year to year
  - Not dependent on individual core-use sites or coastal areas, evolved to adapt to landscape-level changes in food abundance
- Limited breeding bird community
  - Geography and habitat community unfavorable for pine-barren breeders of conservation concern (Prairie Warbler, Field Sparrow, Eastern Whip-poor-will, etc.)

It is important to acknowledge that the pine stands do support some bird use, particularly by species such as Red Crossbills, Pine Siskins, and other finches, and Red-breasted Nuthatches. However, these species are well-known for being irruptive and nomadic; they have evolved to respond to landscape-level in food availability, since their primary food source is quite cyclical and varies in abundance from year to year. These birds are not dependent on single, core-use sites, habitats, or coastal areas.

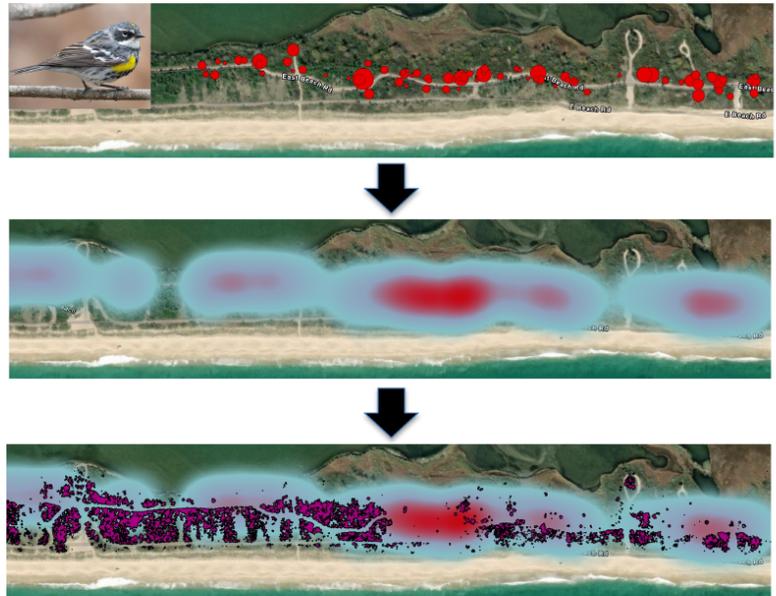
In contrast, species such as Piping Plovers, Least Terns, Ipswich Sparrows, and Saltmarsh Sparrows exhibit a much stronger dependence on specific coastal habitats and are of far greater conservation concern.

Aside from providing habitat for nomadic finches, the pine stands provide relatively limited value to breeding birds. When we think of pine barren habitats, there are a suite of declining species associated with those habitats (Prairie Warbler, Field Sparrow, Eastern Whip-poor-will), but we don't see any of them at Ninigret. This is due to a variety of factors, but predominately the geography, patch size, and general habitat community.

## Current Site Use

### 2023 Fall Landbird Surveys

- Current conditions provide limited benefit to migrant landbirds
  - Though geography favors large concentrations of passerine migrants on optimal conditions (n=8,934 indiv.) the majority (77.9%) are not stopping over in habitat, rather continuing migrations overhead along the barrier
- Landbirds that are stopping over preferentially select for areas more characteristic of target restoration habitat (open dune scrub, bayberry, no pines)
  - Myrtle Warbler: SGCN dependent on coastal habitats
  - Accounted for >50% of all individual landbirds observed on the ground



2023 Myrtle Warbler density with Japanese Black Pine overlay

In 2023, the RIDFW conducted fall landbird surveys from September through December to evaluate the utility of the barrier for migrant landbirds. We found that, yes, there are plenty of migrating landbirds here comprising a variety of species, yet the vast majority (nearly 80% of the roughly 9,000 individuals observed) are not stopping over in the habitat. Rather, they merely encounter it during their nocturnal migrations due to its prime geographic location, and continue their migrations overhead along the barrier.

What we also learned from this study was that, of the birds that do opt to stopover in the habitat, (namely Myrtle Warblers) they are preferentially selecting for areas without Japanese Black Pines. We see the largest concentrations in more open dune/scrub habitats, especially those with bayberry, more characteristic of our restoration target.

The take home message here is that of the migrant landbirds using this habitat, we expect to see benefits to the species most in need of conservation, and those most dependent of these coastal areas. While we may have some species making use of the Black Pines, those limited benefits do not outweigh the negative impacts to species of conservation concern, and the habitat as a whole.

## Restoration Plan & Timeline

- January 2026: Cut and mulch Japanese black pines and surrounding woody invasive shrubs and vines (e.g., beach rose, bush honeysuckle, bittersweet).
- 2026–2027: Follow-up herbicide treatments targeted at Asiatic sand sedge and Japanese knotweed in dune areas.
- Year 3+ assess and plant native vegetation as needed to restore dune and shrub communities



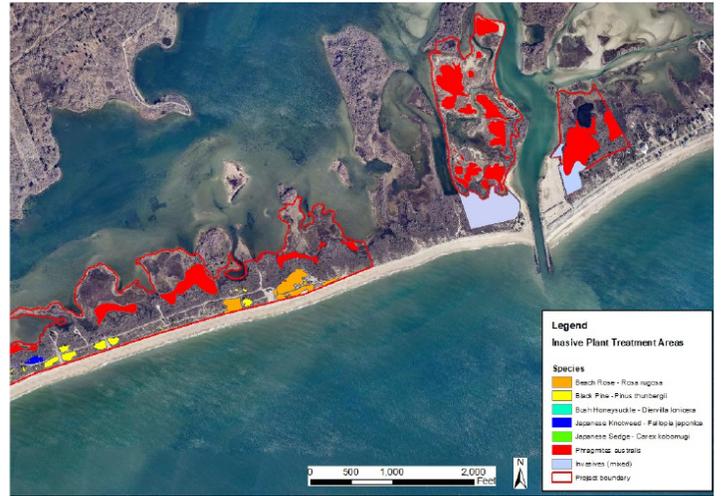
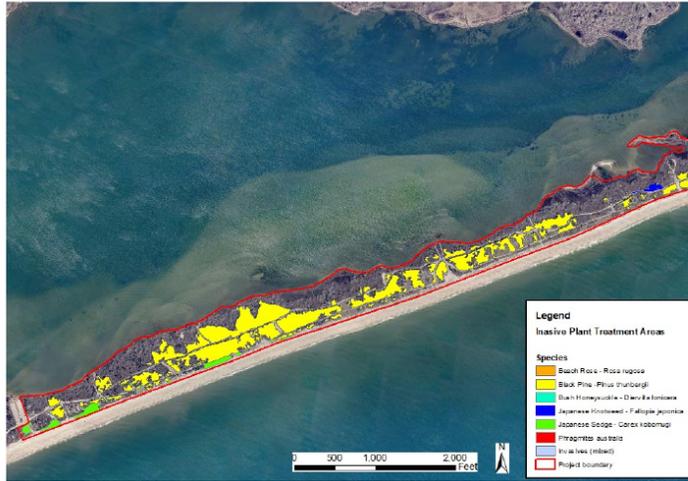
Here is an overview of the planned terrestrial restoration activities.

Within the designated treatment area, all black pines and non-native shrub and vine species will be mulched in place. The resulting mulch will be evenly distributed within a 200-foot radius of each treated tree. It's anticipated that the mulch will decompose naturally within two to three years following treatment.

Targeted herbicide spot treatment for Asiatic sedge and Japanese Knotweed were implemented in dune habitats during the fall of 2025. Follow-up treatments targeting these invasive species, as well as the regrowth of the mulched non-native shrub species, are scheduled for late summer or fall in both 2026 and 2027 to support long-term habitat restoration and native species recovery.

Native vegetation is expected to naturally recolonize in the absence of invasive plants. Plantings will occur as needed to augment natural recolonization.

# Restoration Plan & Timeline



Treatment plan overview

## Restoration Targets

- Restore natural barrier beach processes and sediment dynamics
- Increase resilience of natural systems and nearby coastal communities to storms and sea level rise
- Enhance nesting habitat and reduce predator pressure for the federally threatened Piping Plover and Least Tern to support ongoing recovery initiatives
- Improve salt marsh health and migration corridors, supporting the imperiled Saltmarsh Sparrow and all other fish, shellfish and waterbirds dependent on salt marsh habitats
- Improve stopover habitat for coastal migratory landbirds of conservation concern, such as Ipswich Sparrows and Myrtle Warblers

By removing invasive pine and woody vegetation and controlling invasive grasses, we can restore the natural barrier beach processes that move sand landward and nourish the marsh. That directly benefits nesting Piping Plovers and Least Terns by expanding open beach habitat and reducing crow perches.

Back-barrier salt marshes will gain more sediment, improving their ability to build elevation and migrate inland, which is essential habitat for Saltmarsh Sparrows and many other marsh birds. We also expect benefits for other coastal and migratory species such as Ipswich Sparrows, Myrtle Warblers, and Tree Swallows.

Ultimately, a healthier, more dynamic barrier and marsh system will better protect both wildlife and nearby coastal communities from storms and sea level rise.

# Questions/Discussion

