

Frequently Asked Questions

Increasing Coastal Resiliency at Hammonasset

This document answers common questions about the “Increasing Coastal Resiliency at Hammonasset Beach State Park Project,” including project overview, designs and models, environmental and wildlife impacts, public engagement and support, and construction and maintenance.

Project Overview

Who are the partners involved?

NOAA, USFWS, Connecticut Department of Energy & Environmental Protection (CT DEEP), Ducks Unlimited, Menunkatuck Audubon Society, UCONN, and Friends of Hammonasset.

What is the total cost of this project likely to be?

The total cost is estimated to be at least \$5–10M. Living Shorelines are generally more cost-effective than other types of shoreline armoring, such as bulk heads. Once established, they typically require less repair and maintenance.

Will creating a Living Shoreline and marsh restoration address the problem of hardened shorelines?

There are hardened shorelines in the vicinity of Hammonasset. While we cannot remove those existing structures, the Living Shoreline will not contribute to this problem.

Designs & Models

What model are you using for sea level rise?

The proposed alternatives are being evaluated under current conditions and flooding scenarios, including a 50-year coastal storm scenario consistent with CT DOT guidelines, a 100-year rainfall/runoff scenario, and a 2-foot rise in mean sea level scenario. The 2-foot sea level rise scenario is consistent with the Connecticut Institute for Resilience and Climate Adaptation recommendation to plan for 0.5 meters of Sea level rise by 2050.

As sea level rises, what happens to any devices or structures implemented? Will they survive into the future?

Any structures or devices we implement are designed with future sea-level rise in mind. However, rising water levels and stronger tides can gradually erode or damage them over time. Our goal is to increase resilience by using nature-based designs that can adjust and adapt with the changing marsh, rather than relying on rigid structures that may fail. These approaches help the marsh and its features survive longer and continue to function as the sea level rises.

What will the Living Shoreline look like? How will the view change?

We are working with an artist on a rendering so people can see what it may look like. One question for the community is: are you willing to accept some changes to the viewshed to protect the marsh? We want to hear your thoughts on this.

Who makes the final decision of what is the best design plan?

The project involves multiple partners who work collaboratively to evaluate and agree on the preferred design plan. Because the project is located on state-owned land, the State of Connecticut will provide final approval.

Is the Army Corps weighing in on culvert designs?

The state of Connecticut is weighing in on this because these are state roads. State specific criteria exist and are taken into consideration.

Are there plans to protect the viewing platform?

Installing a Living Shoreline is one way that we could protect the viewing platform. Another option is to move the viewing platform back onto the bedrock. This would maintain a beautiful marsh viewing experience while protecting it from shoreline erosion.

Environmental & Wildlife Impacts

How much shoreline has been lost at Hammonasset?

Approximately 27 acres of shoreline habitat have been lost. The shoreline continues to erode at an average rate of about 9 feet per year.

How do hurricanes impact erosion on shorelines?

Hurricanes can significantly accelerate shoreline erosion. Strong winds, large waves, and storm surge remove sand and sediment, reshape beaches and marshes, and can damage protective dunes or vegetation. While some areas may naturally recover over time, repeated or severe storms can lead to long-term shoreline loss.

Is sea level rise the main reason behind higher tides?

Sea level rise is a factor, but tidal cycles also play a role. We are currently moving through a 19-year Metonic cycle, which causes naturally higher tides when the moon is closer to Earth.

Where are the sand and sediment from the beach going?

Much of the sand and sediment from Hammonasset is moving offshore and into Clinton Harbor.

How soon do you hope to have bird populations recover?

Improving bird habitat is one of the project's primary goals. Recovery will take time, as vegetation must become re-established. As the habitat improves and native vegetation grows back, we hope to see a gradual increase in the bird populations.

How can we protect shorebirds given the high demand for recreational access to beaches?

Protecting shorebirds is about sharing the shore. Birds choose where to nest, and we can protect them with exclosures, fencing, and monitoring. By spreading awareness and making small efforts, like avoiding the fenced-off areas, people can help shorebirds while still enjoying the beach.

Will this work impact nesting bird habitat on Cedar Island?

At this time, impacts are not anticipated.

If you put sediment in the natural area preserve, will that flow to Cedar Island?

The engineering firm that we are working with has recently developed a sediment transport model. This model will help us to understand how sediment might move around following placement.

Has any consideration been given to how the proposed work on the eastern shore of the preserve will impact Cedar Island?

While our analysis was focused on the shoreline adjacent to the eastern marsh, the modeling results suggested that impacts to Cedar Island from work in the Natural Area Preserve would be negligible.

In addition to using channel dredge material, have you looked at sediment along the south shore of Cedar Island?

Piping Plovers, Least Terns, and American Oystercatcher used to nest in the Hammonasset Natural Area Preserve. With the erosion of their habitat in the NAP in recent year, these species are now nesting on Cedar Island. We would prefer to use dredge material to create additional habitat.

How can you be sure the sediment from Clinton Harbor is not contaminated?

The U.S. Army Corps of Engineers conducts regular sediment testing, including collecting and analyzing sediment cores. These tests determine whether the material meets environmental standards for placement, which will inform us of the conditions of the sediment.

With sea level rise, is more water entering the marsh? Does this project decrease the amount of water entering the marsh and if so, where does it go?

A salt marsh restoration project doesn't necessarily change the total amount of water coming in from sea level rise. What it changes is *how* the water moves through the marsh. When natural channels and elevations are restored, water spreads out across the marsh and moves through winding tidal creeks instead of moving in and out through straight, fast-draining ditches. This means the water enters and exits more slowly, stays on the marsh platform longer, and is absorbed or filtered instead of quickly rushing out. So, while the same tide may bring in a similar amount of water, the restored marsh handles it more gradually and naturally.

How does salt water interact with fresh ground water as the marsh migrates inland?

As sea levels rise, salt water is pushed further inland, a process called saltwater intrusion. This can increase the salinity of groundwater. At Hammonasset, what visitors may notice is change in the types of vegetation. Plant species that require fresh water will be replaced by plant species that are more salt water tolerant, such as eastern red cedars, northern bayberry, high tide bush, groundsel bush, seaside goldenrod, and salt marsh grasses.

Have you considered using the money to buy land north or inland so the marsh can migrate?

In Connecticut, marshes don't have much room to move inland because homes, bedrock, roads, and other built structures block their path. This situation is known as *coastal squeeze*. Since the marsh can't easily migrate, our goal is to slow erosion and maintain healthy habitat for as long as we can.

Are mosquito ditches detrimental? How long have they been there? Can you block them off?

Mosquito ditches affect the flow of salt water in and out of marshes. When the tide rises, water flows in quickly along the ditches, and when the falls, it flows back out just as fast. As a result, sediment carried by the tides does not have time to settle on to the marsh platform. This sediment is what allows marshes to build elevation over time.

Ditching of marshes has been occurring for many years. About 50% of the marshes in Connecticut were ditched for salt hay farming up until the mid-1800's. In the early 1900's, in response to malaria outbreaks in nearly every town in Connecticut, ditches were also used to reduce mosquito breeding habitat. By 1950, approximately 90% of marshes from Maine to Virginia had been ditched.

At Brucker Marsh, a section of the Barn Island Wildlife Management Area, we are working with CT DEEP to study how marshes respond to the blocking ditches with marine plywood. It is a long-term monitoring project, and it may take up to 10 years before we fully understand the viability of this solution.

How are Long Island Sound marshes different from other Atlantic coast marshes?

In Connecticut, the elevation change along the shoreline is steep compared to mid-Atlantic marshes. This means there is less opportunity for marsh migration—the gradual movement of marshes inland in response to sea level rise—than in the mid-Atlantic.

Public Engagement & Support

Who gives permission for a project like this?

Audubon would have to apply for multiple permits to do this work. Ultimately, approval comes from a combination of local, state, and federal government entities such as local conservation and shellfish commissions, CT DEEP, and U.S. Army Corps of Engineers.

What is CT DEEP's role in this?

CT DEEP is a partner in the project and relies on non-profits like Audubon to take the lead on projects like this. As a non-profit, Audubon can apply for certain funds that CT DEEP is ineligible for. We coordinate closely with CT DEEP, and certain decisions, especially those involving the state park, require their approval. Ultimately, this project is about finding the right balance and working together. It's a collaborative partnership among organizations that share the same goals.

How can we support this project?

You can support this project by spreading the word and letting us know if you are in favor of this work. In the future, there may also be opportunities for volunteers to help with activities like monitoring bird species or planting native grasses.

Are there policies or legislation that we should advocate for? Any regulations that need to change?

H.B. No. 5004, also known as Public Act No. 25-125, was signed by the Governor on July 1, 2025. The Act establishes comprehensive greenhouse gas emissions reduction targets for Connecticut, mandating a 45% reduction from 2001 levels by 2030, a 70% reduction from 2016 levels by 2040, and achieving net-zero emissions by 2050.

Additionally, the Act establishes the Connecticut Clean Economy Council to advise on climate mitigation and clean energy strategies, particularly for vulnerable communities, and mandates the development of a structured career ladder for green jobs.

There are regulations that may require language adjustments to allow for the placement of dredged material on a marsh to help them keep pace with sea level rise. These include:

- CGS section 22a-92(b)(1)(D) - Requires that structures in tidal wetlands and coastal waters be designed, constructed, and maintained to minimize adverse impacts on coastal resources, circulation and sedimentation patterns, water quality, flooding, and erosion; to reduce to the maximum extent practicable the use of fill; and to minimize conflicts with the riparian rights of adjacent landowners
- CGS section 22a-359(a), (as referenced by CGS section 22a-92(a)(2)) – Requires the Commissioner of Environmental Protection to regulate dredging; the erection of structures; and the placement of fill; and work incidental thereto, in the tidal, coastal, or navigable waters of the state waterward of the high tide line.

Is there federal legislation that we can advocate for to bend the bird curve?

Yes, the *Local Communities and Bird Habitat Stewardship Act* (H.R.3276) provides vital support for bird conservation in cities and towns across the United States and is currently being considered in Congress. The bill seeks to provide \$1 million annually for a competitive grant program to conserve rural and urban bird habitat, reduce hazards, and promote community engagement.

The funding would equip communities to invest in a range of projects, such as creating green spaces, restoring habitat, and supporting education about bird conservation. These efforts would provide numerous benefits for both people and bird species, including improving local parks and reducing hazards to birds in urban environments, such as collisions with buildings.

Is there an animal that we can use to connect kids to this project?

Yes, one example is fish. Many fish and shellfish species spend part of their life in a salt marsh. When kids go fishing or grocery shopping, you can help them make the connection that the fish they catch or buy are available because we have healthy salt marshes.

Construction & Maintenance

Can you talk about the Living Shoreline project at Stratford Point and how that might translate to the work at Hammonasset?

At Stratford Point, a Living Shoreline project began in 2014 with the installation of reef balls. Within two years, about a foot of sediment had accumulated behind the reef balls, with significant buildup in front as well. The remaining reef balls were installed in 2016, and between 2014 and spring 2025, around 30,000 spartina plugs were planted. This led to a strong growth of intertidal marsh behind the reef balls, demonstrating that the approach worked well at this site.

The reef balls were so effective that when additional wave-attenuation options were discussed, reef balls remained the preferred choice. However, one drawback is that installing them requires heavy machinery. To avoid disrupting the marsh as it was becoming established, additional reef balls weren't installed.

The success at Stratford Point offers valuable lessons that can inform similar Living Shoreline efforts at Hammonasset, though the approach may need to be adapted to local conditions.

What are reef balls made from?

Reef balls are made from concrete. For use in New England states, they have a specific formula that allows the reef balls to survive winter freezes. More information on reef balls can be found at: <https://reefballfoundation.org/reef-ball-description/>.

Where would reef balls be placed?

Reef balls are typically placed from the mean low water mark to the mean high-water mark, but the exact placement of the reef balls (or similarly functioning alternative) has not been determined yet.

Are there low risk, experimental actions that can be taken first?

These are called low-tech, low-cost solutions because they are easy solutions that we can get some benefits from. One of the proposed options is filling in some ditches. We

still have to go through the same regulatory process whether its placing shells or filling in ditches with dredge material.

Will you be filling in any ditches?

A final decision has not yet been made whether any ditches will be filled in, or which ones. Our hydrologists and coastal engineers are still evaluating the site. The diagram below shows one potential ditch the engineering team has discussed filling. This ditch is man-made and had been expanding over time. A nearby sinuous channel would allow water to flow in and out of the area naturally if the larger mosquito ditch were filled.



What does maintenance for a project like this look like?

Maintenance often involves adaptive management, which means monitoring and adjusting the project to ensure restoration goals are met. For example, Audubon and partners completed a 44-acre restoration project in 2021; we're still actively managing the site today. This work includes controlling invasive species, such as mugwort and phragmites, which tend to thrive in restoration areas. Having funders that are open to adaptive management allows us to stay involved in the project and continue to monitor it.

Who will be doing the maintenance or adaptive management?

Initially, Audubon will handle the maintenance using funds set aside for adaptive management. However, since this is a state-owned facility, the state may also participate. Our plan is to stay involved for 1-3 years after the project's completion, then transition responsibility to the state.

What is the timeframe for the culvert replacement?

The culvert replacement is anticipated to take place during the winter months of 2026 - 2027. Scheduling construction in the winter helps minimize impacts to park visitors and reduces potential disturbance to birds and other wildlife.

Regarding the increase in culvert size, have you looked at possible flood impacts upstream?

Based on our modeling and engineering analyses, the proposed design will not increase upstream flooding. In fact, the new culverts are expected to improve marsh drainage. If flooding does occur upstream, water is anticipated to drain more quickly than under existing conditions.

Are the Wave Attenuation Devices (WADs) secured or loosely placed? Do tides or storms have the potential to move them?

The WADs are not anchored when placed on site. Based on wave condition studies, they are designed to be large and heavy enough that they will not shift during typical tidal activity or normal storm events. In the case of a severe or catastrophic storm, however, there is some potential for movement. We've also conducted studies to determine how much weight the underlying sediment can support, which helps ensure the structures remain stable under expected conditions.

What's the longevity of Wave Attenuation Devices?

The longevity of WADs depends on their materials and site conditions. When properly designed for local wave and sediment conditions, they can last several decades. Regular monitoring and maintenance help ensure they remain stable and effective over time.

Have you considered self-regulating tide gates that have been used elsewhere?

No, we haven't investigated that as an option for this project. These structures are generally considered an additional obstruction that can restrict tidal flow.

What is the end date for the project at Hammonasset?

The [timeline on the Storymap](#) currently extends through 2027, as that is the period for which we have funding. The creation of a Living Shoreline and the restoration of the marsh will take place after that and will likely occur in phases.

Are there rules and regulations about what materials can be used in a Living Shoreline?

Yes, there are best practices when construction Living Shorelines. There is a preference for natural materials and avoiding plastics. In Connecticut, because winters can be very cold, the components of a Living Shoreline need to withstand freezing and thawing conditions. Additionally, there are concerns about using oysters in Living Shorelines because Connecticut has a strong oyster industry. We do not want to risk introducing any oyster diseases.

What is the permitting process like?

The permitting process is complex, so it is advisable to meet with permittees early and regularly. We need to demonstrate a thorough understanding of the system, clearly explain what we want to do, and show that our plans comply with environmental regulations.

Have you looked at the Living Shoreline project in Staten Island?

We're aware of Living Shoreline projects in other areas. Materials and approaches used in Living Shorelines are part of a rapidly evolving field, with new technology and innovation emerging regularly.

We often reference reef balls as one example because there are already projects using them in Connecticut. Reef balls can be cast on-site using molds, which reduces shipping and associated impacts. However, there are many possible solutions, and we are committed to identifying the most appropriate and innovative option for this location.

Any downsides to using oyster bags as a Living Shoreline?

The Aquacultural Division within CT DEEP regulates all oyster leases and activities in state waters. In the past, there have been concerns about using oysters/oyster shells in shoreline projects due to the potential risk of spreading disease to native oyster beds. For that reason, they are cautious about introducing oysters or shell material from other areas. Oyster-based Living Shorelines have been successfully used in states such as New York and elsewhere, and they can be an effective nature-based solution. We look forward to continuing discussions with the Aquaculture Division to determine whether oysters or oyster shells sourced from onsite or nearby areas could be used safely and appropriately for this project.

What are bags made of if using oyster bags?

Oyster bags can be made from biodegradable materials, plastic, or mesh. In some cases, there are strategies to grow oysters in large clumps or blocks, eliminating the need for bags. Using oysters would be a great opportunity and we'd love to do that on site as they are great for breaking up wave energy and they also filter the water.

Are there any impediments to utilizing dredge material from Clinton Harbor?

Before dredge material from Clinton Harbor could be used for this project, several steps would need to be completed. These include finalizing designs, determining whether the harbor's dredged material is suitable and recommended for use, obtaining all required permits, and securing approval from the Army Corps.