Delaware Department of Natural Resources and Environmental Control
Delaware Coastal Management Program

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11/5/2026
By DCMP

Initial Review: _____
Updated On: _____
Complete: _____
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Coastal Zone Management Act Federal Consistency Form

This document provides the Delaware Coastal Management Program (DCMP) with a Federal Consistency Determination or Certification for activities regulated under the Coastal Zone Management Act of 1972, as amended, and NOAA's Federal Consistency Regulations, 15 C.F.R. Part 930. Federal agencies and other applicants for federal consistency are not required to use this form; it is provided to applicants to facilitate the submission of a Consistency Determination or Consistency Certification. In addition, federal agencies and applicants are only required to provide the information required by NOAA's Federal Consistency Regulations.

Project/Activity Name:	Cedar Creek Tract Salt Marsh Restoration

I. Federal Agency or Non-Federal Applicant Contact Information:

Contact Name/Title: Brian Marsh/Team Lead

Federal Agency Contractor Name (if applicable): _____

Federal Agency: USFWS Delaware Bay Coastal Program
(either the federal agency proposing an action or the federal agency issuing a federal license/permit or financial assistance to a non-federal applicant)

Mailing Address: Delaware Bay Coastal Program, 2591 Whitehall Neck Road, Smyrna, DE 19977

City: Smyrna State: DE Zip Code: 19977

E-mail: [redacted] Telephone #: [redacted]

II. Federal Consistency Category:

- (●) Federal Activity or Development Project (15 C.F.R. Part 930, Subpart C)
- ( ) Outer Continental Shelf Activity (15 C.F.R. Part 930, Subpart E)
- ( ) Federal Financial Assistance (15 C.F.R. Part 930, Subpart F)
- ( ) Federal License or Permit Activity (15 C.F.R. Part 930, Subpart D)
- ( ) Federal License or Permit Activity which occurs wholly in another state (interstate consistency activities identified in DCMP's Policy document)

III. Detailed Project Description (attach additional sheets if necessary):

See attached plans and narrative. We propose to do two main actions at this site at the Cedar Creek Tract of the Milford Neck Wildlife Area in Sussex County, Delaware.
1) To make the salt marsh more resilient, we are proposing to install 1,511 feet of runnels and 4,868 feet of ditch maintenance that will reduce inundation rates which will lead to revegetation and increased health of existing vegetation which in turn will increase biological and sediment accretion that will help decrease degradation and help the marsh keep pace with sea level rise.
2) To improve salt marsh vegetation coverage and health, we are proposing the placement of peat like material over select areas of salt marsh. Improved vegetation, especially high marsh plant species, will increase overall productivity of the area and provide better habitat for avian nesters, forage fish, and other groups of species. The material will come from the northern end of Slaughter Beach (aka Cedar Beach).

IV. General Analysis of Coastal Effects (attach additional sheets if necessary):

The effects of the project will be beneficial to beach, salt marsh, and to resilience. Strategic ditch maintenance, runneling, and placing peat like material on the marsh at Cedar Creek will help the hydrology and allow the vegetation to improve which will increase resilience and habitat value. This project will restore more effective tidal influence on the flood and especially ebb tides and reduce platform inundation rates. Removal of the peat like material from the beach will provide a temporary benefit to horseshoe crab spawning and shorebird foraging in spring during the annual shorebird stopover.

V. Detailed Analysis of Consistency with DCMP Enforceable Policies (attach additional sheets if necessary)**:**

Policy 5.1: Wetlands Management

The project will restore, preserve, and protect the functions of salt marsh wetlands by reducing current degradation from high inundation and saturation rates that have reduced vegetation health and cause large areas to start losing vegetation becoming mudflats prone to becoming deeper pools. Restoring hydrology will halt some of the wetland degradation, stabilize the salt marsh platform, improve habitat, increase biological accretion (underground accretion) that is critical for elevation gains needed to keep up with SLR, as well as increase the likelihood that suspended sediments accrete.

Policy 5.2: Beach Management

The area of the north end of Slaughter Beach (aka Cedar Beach) where the peat like material will be removed from is not an area used as a bathing beach. However, residents do walk on the beach in this area. The project will not change beach management. The material is being removed from the surface of the beach not to include underlying sand. The removal will not alter the sand profile of the beach. The peat like material will likely return to the beach by the following summer so this is only a temporary change to the beach.

Policy 5.3: Coastal Waters Management (includes wells, water supply, and stormwater management. Attach additional sheets if necessary)

The project will restore, preserve, and protect intertidal salt marsh. Without this project, we are concerned that the area will continue to lose marsh vegetation, continue to have marsh platform breaking down and becoming unconsolidated sediment, unnatural and large ponding areas to continue to expand, continue to not gain elevation due to lost biological (underground) accretion and normal sediment accretion and therefore have relative elevation losses, continue to lose high quality habitat to salt marsh species, and to become more destabilized. Eventually, these areas could transition mostly to low marsh vegetation or bare sediment.

Policy 5.4: Subaqueous Land and Coastal Strip Management

The project will restore and protect the natural environment of salt marsh for long-term benefits and there will be short-term benefits to beach. The project will not have an adverse effect on economics, aesthetics, or neighboring land uses. The community of Slaughter Beach has been advocating for the project and the removal of the peat material from the upper parts of the beach face.

Policy 5.5: Public Lands Management

The project occurs on State public land being salt marsh that is part of the Milford Neck Wildlife Area (the beach is mostly part of the Mispillion Marine Reserve). The project will not alter the use or potential use of the land and will not create a requirement for added land management. Access will not be changed through the project. The project will help with the Delaware Division of Fish and Wildlife's land management by maintaining the high marsh habitat they are interested in for the area.

Policy 5.6: Natural Lands Management

The project will help with the Delaware Division of Fish and Wildlife's land management goals for the area by helping to maintain the salt marsh present at the site. The project will also help improve horseshoe crab spawning habitat and shorebird foraging habitat temporarily. We have coordinated with Delaware Division of Fish and Wildlife since the project's inception.

Policy 5.7: Flood Hazard Areas Management

The project does not involve actions that may affect state or local flood hazard areas management.

Policy 5.8: Port of Wilmington

Not applicable

Policy 5.9: Woodlands and Agricultural Lands Management

Not applicable

Policy 5.10: Historic and Cultural Areas Management

The project area is of interest to the State and Tribes for cultural resources. Both have expressed concern that creating new channels, even shallow runnels, could expose pre-contact cultural resources. Therefore, following input from DE SHPO (see included letter), we will have SOI certified archaeological monitoring of the site while any runnel is created in the area of Sheppard's Island at the northern part of the salt marsh site. Per our coordination with DE SHPO, they have said we will not need the monitors during ditch maintenance. We may also have archaeological monitoring while removing peat material from the beach. We our coordinating with the Tribes to ensure they can have Tribal Monitors on site throughout the work.

Policy 5.11: Living Resources

The project will benefit living resources by slowing or halting the degradation of the salt marsh, restoring vegetation, restoring resilience, and restoring habitat. The project design will prevent adverse impacts to resources by concentrating much of the work in the footprint of existing salt marsh ditches, implementation will take place outside of the growing season, and equipment use will be minimized and only involve low ground pressure equipment. The project will benefit nongame and rare and endangered State species that may increase nesting in the area such as saltmarsh sparrow. By removing the peat like material from the upper beach face, there will be a temporary benefit of increase horseshoe crab spawning and shorebird foraging during the spring stopover.

Policy 5.12 Mineral Resources Management

Not applicable

Policy 5.13: State Owned Coastal Recreation and Conservation

The project will not change coastal recreation of the area. The main project area is salt marsh and limited to only passive recreation or hunting, neither of which will be changed by the work or access to either be changed. The project goal is conservation of salt marsh and has been developed in coordination with the Delaware Division of Fish and Wildlife who manages the property. The beach area where the peat like material will be removed will remain accessible to the public and will be temporarily improved for recreation use because of the removal of the material.

Policy 5.14: Public Trust Doctrine

The project does not increase limits on public access or use of the sites. The project will help maintain the main project area as salt marsh for the benefit of the public.

Policy 5.15: Energy Facilities

Not applicable

Policy 5.16: Public Investment

The project does not necessitate State public investment. The project proponent is a federal agency with NGO partners. The State's Mosquito Control Section will be helping with the ditch maintenance component of the work but through funding from the US Fish and Wildlife Service specific for the work.

Policy 5.17: Recreation and Tourism

The salt marsh project area is not easily accessible to the public other than potentially hunting or passive recreation such as bird watching. The project will help maintain the natural salt marsh cover of the area and the recreation and ecotourism it offers. The project will not alter the viewshed of the salt marsh potentially important to coastal ecotourism. The project will temporarily make the beach more usable for passive recreation by removing the peat like material.

Policy 5.18: National Defense and Aerospace Facilities

Not applicable

Policy 5.19: Transportation Facilities

Not applicable

Policy 5.20: Air Quality Management

Not applicable

Policy 5.21: Water Supply Management

Not applicable

Policy 5.22: Waste Disposal Management

Not applicable

Policy 5.23: Development

Not applicable

Policy 5.24: Pollution Prevention

Not applicable

Policy 5.25: Coastal Management Coordination

This project has potential value for elsewhere in the State on and off State lands for showing how subtle hydrological restoration may improve coastal resources. The project will also involve the novel use of peat like material that accumulates on Slaughter Beach. The community had been pursuing removal of this material as waste but this project can potentially show an alternative use. We welcome coordination on this project amongst agencies and partners interested in coastal resource conservation and preservation.

VI. JPP and RAS Review (Check all that apply)**:**

Has the project been reviewed in a monthly Joint Permit Processing and/or Regulatory Advisory Service meeting?

☒ JPP ☐ RAS ☐ None

*If yes, provide the date of the meeting(s): 6/20/24

VII. Statement of Certification/Determination and Signature (Check one and sign below):

☒ **FEDERAL AGENCY CONSISTENCY DETERMINATION.** Based upon the information, data, and analysis included herein, the federal agency, or its contracted agent, listed in (I) above, finds that this proposed activity is consistent to the maximum extent practicable with the enforceable policies of the Delaware Coastal Management Program.

OR

☐ **FEDERAL AGENCY NEGATIVE DETERMINATION.** Based upon the information, data, and analysis included herein, the federal agency, or its contracted agent, listed in (I) above, finds that this proposed activity will not have any reasonably foreseeable effects on Delaware's coastal uses or resources (Negative Determination) and is therefore consistent with the enforceable policies of the Delaware Coastal Management Program.

OR

☐ **NON-FEDERAL APPLICANT'S CONSISTENCY CERTIFICATION.** Based upon the information, data, and analysis included herein, the non-federal applicant for a federal license or permit, or state or local government agency applying for federal funding, listed in (I) above, finds that this proposed activity complies with the enforceable policies of the Delaware Coastal Management Program and will be conducted in a manner consistent with such program.

Signature:	BRIAN MARSH Digitally signed by BRIAN MARSH Date: 2026.11.05 10:29:29 -05'00'		
Printed Name:		Date:	

Pursuant to 15 C.F.R. Part 930, the Delaware Coastal Management Program must provide its concurrence with or objection to this consistency determination or consistency certification in accordance with the deadlines listed below. Concurrence will be presumed if the state's response is not received within the allowable timeframe.

Federal Consistency Review Deadlines:

Federal Activity or Development Project (15 C.F.R. Part 930, Subpart C)	60 days with option to extend an additional 15 days or stay review (15 C.F.R. § 930.41)
Federal License or Permit (15 C.F.R. Part 930, Subpart D)	Six months, with a status letter at three months. The six month review period can be stayed by mutual agreement. (15 C.F.R. § 930.63)
Outer Continental Shelf Activity (15 C.F.R. Part 930, Subpart E)	Six months, with a status letter at three months. If three month status letter not issued, then concurrence presumed. The six month review period can be stayed by mutual agreement. (15 C.F.R. § 930.78)
Federal Financial Assistance to State or Local Governments (15 C.F.R. Part 930, Subpart F)	State Clearinghouse schedule

OFFICIAL USE ONLY:

Reviewed By:	Fed Con ID:	Date Received:
Public notice dates: to	Comments Received: ☐ NO ☐ YES *[attach comments]*	
Decision type: *(objections or conditions attach details)*	Decision Date:	

PROJECT NARRATIVE

Project title: Cedar Creek Tract Salt Marsh Restoration

PROJECT PARTNERS

Delaware Division of Fish and Wildlife, U.S. Fish and Wildlife Service Delaware Bay Coastal Program, Ducks Unlimited, Partnership for the Delaware Estuary

PROJECT LOCATION

Cedar Creek project site: Cedar Creek Tract of the State-owned Milford Neck Wildlife Area, Sussex County, Delaware. The site is an approximately 156-acre area of salt marsh west of the community of Slaughter Beach with an approximate center of 38.9200 N -75.3200 E

Parcels: 330-9.00-3.00; 330-9.00-4.00; and 230-1.00-4.00

Cedar Beach project site: Approximately 3 acres of the northern portion of Slaughter Beach often referred to as Cedar Beach. Most of the beach is within the Mispillion Marine Reserve but the southernmost area lies along the bayside of private properties. The exact area and extent will depend on conditions at the time. The approximate project center is at 38.9403 N -75.3158 E. All the area is intertidal along the upper high tide but the adjacent upland parcels are as follows.

Parcels: 330-5.00-41.00, 330-5.00-93.00 through 98.00; 330-5.00-67.00, 71.00, 75.00, 79.00, 84.00, 88.00, 107.00. 110.00, 114.00.

PROJECT GOALS

1) Make the salt marsh more resilient by reducing inundation rates which will lead to revegetation and increased health of existing vegetation which in turn will increase biological and sediment accretion that will help decrease degradation and help the marsh keep pace with sea level rise.
2) Improve salt marsh vegetation coverage and health by placement of peat like material over select areas of salt marsh. Improved vegetation, especially high marsh plant species, will increase overall productivity of the area and provide better habitat for avian nesters, forage fish, and other groups of species.

SITE CONDITION AND HISTORY

This project primarily involves restoration of salt marsh on the Cedar Creek Tract. However, the project also includes a component on Cedar Beach to benefit the Cedar Creek Tract salt marsh.

In 2022, we identified an approximately 247-acre area of salt marsh of the Cedar Tract as having potential to benefit from restoration. Between 2023 and 2025 we assessed this area primarily looking at hydrology and elevation but also examining the avian and plant communities. Based on the assessment, we selected an approximately 156-acre site within this area for developing a restoration design. In the future, we may assess and pursue restoration of other areas of the tract's or bordering properties' salt marsh as future separate actions.

All work proposed at the Cedar Creek Tract is on the State-owned land although access and staging will likely be on adjacent municipal land or road right of way. The Cedar Creek site lies along Slaughter Creek and Cedar Creek. The Cedar Creek site is entirely salt marsh and entirely surrounded by salt marsh. The platform across the site is mostly intact and mostly walkable although areas of the marsh are very soft vegetated marsh especially over remanent ditches or bare ponded unconsolidated sediment. Tidal creeks bisect the site as do numerous remanent ditches.

The site was ditched extensively. Large ditches or channelized creeks were in place by the mid-1930s over much of the site with additional work apparently being done in the following decades based on a review of historical aerials. A 1968 aerial attached at the end of the narrative shows the extent of ditching. The majority of ditches have partly or mostly filled in while a few have begun to naturalize into effective tidal creeks.

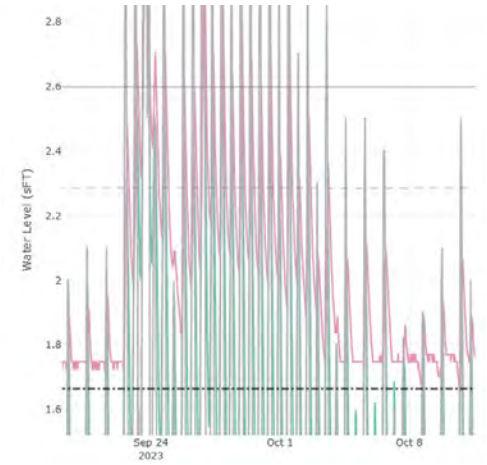
Most of the Cedar Creek salt marsh is exposed to higher tides. However, most of the site does not fully drain on the ebb tide leaving water standing on the platform throughout the tidal cycle. This persistent inundation and or at least saturation results in stressed and dying vegetation, ponding, and the breakdown of underlying peat.

Vegetation type across the site is mostly a mix of tall and short form *Spartina alterniflora* (syn *Sporobolus alterniflorus* or smooth cordgrass). Sections of this low marsh appear healthy, healing from past ditching, and stable. However, other areas of low marsh show clear signs of degradation such as very short sparse *S. alterniflora* growth and extensive bare sediment patches. Small patches of high marsh consisting of *Distichlis spicata* (saltgrass) and *Spartina patens* (syn *Sporobolus pumilus*, salt meadow cordgrass, or salt hay) are found near wood lines and previous spoil mounds from past ditch creation or maintenance. The high marsh areas appear to remain saturated and often show signs of degradation such as an uneven platform, pockets of exposed sediment, and sparse weak growth.

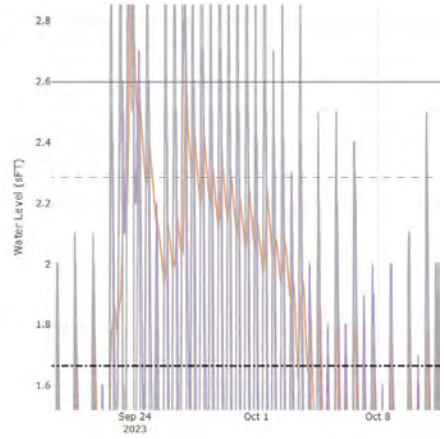
The marsh platform should be less inundated and saturated than it is based on tidal datums we calculated from water level data from the site. Our assessment indicates water remains on the surface due to four reasons. First, the site has likely become flatter due to the history of ditching causing a loss of the subtle gradients that allow an unaltered marsh to drain despite having few channels. Second, and likely the most significant issue at this site, the marsh hydrology is reliant on sections of remanent mosquito ditches that have begun to fill in. Many ditches tend to fill in because the relatively lower energy flows that occur in them compared to natural tidal creeks that are fewer in number and therefore have more flow, more energy, and better ability to move sediment. Ditches filling in can be a beneficial part of the marsh naturally healing from the past alterations but in spots it leaves the altered marsh system with fewer channels than needed and too little drainage. Third, as sections of marsh are not able to ebb at low tide, the vegetation health decreases causing a reduction in belowground growth (i.e., biological accretion) that is particularly important in Mid-Atlantic salt marsh for gaining elevation. As the marsh in these interior areas lose accretion abilities, an elevation deficit is created relative to the ditches which causes even more ponding, further vegetation stress or loss, further relative negative accretion compared to the ditches, and so on. Fourth, this marsh degradation is further enhanced because sediment on flood tides quickly drops out as the water moves out from the ditches and creeks creating slight berms near those channels. The low energy in marsh ditches compared to natural channels exacerbates these microberms because the sediment is even more likely to accumulate

very near the ditch edges rather than move onto the marsh platform. These microberms then contribute to trapping water on the marsh as high tides flood the marsh but cannot completely ebb during each tidal cycle. Our assessment data provide evidence of the degraded condition on the marsh.

We had a combination of Hobo and Hyfi water level loggers across the Cedar Creek site from September 2023 to February 2024. A map at the end of this narrative shows the logger locations. An examination of the hydrographs from the water level data shows some of what is happening at this site. The graph below shows an example period of time and water levels at the site. The dark dashed line is the elevation of the platform corresponding to where a water logger (Cedar_surface_1) was located on the surface. The pink line shows the water levels of that surface logger in contrast to data in the green color from one of the loggers (Cedar_channel_1) placed in a channel with normal tidal influence. The graph shows that the tide ebbs from the channel to an elevation well below the platform in functional channels but the platform remains inundated. This can be addressed by runnels, shallow hand dug channels that enhance the connection between the platform and the existing channels.



The below graph compares peak water level data from one of the channels close to Slaughter Creek (Cedar_reference) in purple to another channel in brown that is a ditch well into the salt marsh (Cedar_channel_2). For this example time period showing a period of spring tides, the graph shows the ditch is not able to fully ebb before the next rising tide in contrast to creeks open to the full tidal range of Slaughter Creek. The muting of the tide and the stacking up of the tide in smaller channels that are well into the marsh are expected on any salt marsh but the degree to which this happens on a salt marsh like Cedar Creek is indicative of highly constricted channels due to a combination of sediment accretion and vegetation growth into the channel. Our field observations of the most problematic ditches at Cedar Creek suggest dense growth of vegetation growing into the channels is the biggest problem at this site. The stacked up water in the ditch that results from these constrictions prevents the surrounding marsh from draining. This can be addressed by strategic ditch maintenance which involves partially cleaning out select ditches to facilitate a more natural tidal hydrology on both the flood and ebb tides.



An examination of elevation data compared to tidal datums we calculated from the water level data supports the restoring this marsh through improvements to the hydrology. For example, the below table shows tidal datums for two water loggers near each other. One is on the surface and the other is in a channel that is free flowing. The surface logger was at an elevation of 1.67 ft which is well above MTL for the channel but the surface logger was inundated 87% of the time. This contrast shows water is being trapped on the surface and creating conditions too wet for *S. alterniflora* or other vegetation. However, this contrast also shows that, if the surface was better connected to the channel such as by a runnel, we would expect the inundation rate on the surface to instead be approximately 40% which corresponds with good growing conditions for *S. alterniflora*. This condition of high flooded platform at elevations above MTL in nearby channels is seen across the site.

Logger name	MLW	MTL	MHW	Logger elevation	Observed inundation rate	Predicted inundation rate*
Channel_1	0.13	1.03	1.93	-0.36		
Surface_1	1.73	1.85	1.96	1.67	87%	40%

*if the platform was connected to nearby channels

Data from biobenchmark points across the site also provide evidence of the impaired hydrology. These points are where we record both elevation and type of vegetation cover. The data are not recorded at random points but instead taken at representative areas of the particular type of cover and usually where at least two square contiguous meters around the point are predominantly that kind of cover. As an example, the table below shows biobenchmark data from around the largest area of ponded water at the middle of the site. We observed a MTL in the pool of 2.12 ft. MLW in the pool is only 2.09 ft. Both of those datums are well above MTL seen at the loggers in the creeks on the site such as at Cedar_reference to the south where MTL is 1.00 ft and at Cedar_channel_1 to the north where it is 1.03 ft. If this large pool was partly able to drain on ebb tides, the MTL would go down and areas around the pool now transitioning to bare sediment could revegetate and the growth of existing stressed vegetation, such as the stressed short-form *S. alterniflora*, would improve. This increased tidal connection can be achieved using a runnel on the north side of the pool to reconnect it to a more tidally influenced channel.

	n	mean	stdev
S. alterniflora	2	1.81	0.02
S. alterniflora-medium	11	1.90	0.13
S. alterniflora-medium_stressed	1	2.03	N/A

S. alterniflora-short	55	1.90	0.10
S. alterniflora-short_stressed	104	1.79	0.08
S. alterniflora-tall	28	1.92	0.31
S. alterniflora-tall_stressed	6	2.45	0.06
exposed sediment	56	1.52	0.19
Salicornia spp	7	1.79	0.05
transitioning from veg to bare sediment	18	1.80	0.07

PEAT BUILD UP ON CEDAR BEACH

In 2021, Anchor QEA reported on the excessive buildup of detritus on an area at the north end of Slaughter Beach often referred to as Cedar Beach. The community paid for the study to characterize the material and find ways to dispose of it as a waste product. Anchor QEA provided the study in 2021 to the Service and we began to communicate to the community that the material should be considered a resource for local restoration. We incorporated the use of this material into our plans for restoration at Cedar Creek.

Photos at the end of the narrative show what the detritus material looks like. The material consists mostly of finely broken-down vegetation and algae typically found in wrack lines and looks very much like eroded peat from Delaware Bay salt marshes. However, the material sometimes accumulates to a few feet thick over the sand surface along this beach making the area unusable by the community, unusable as spawning habitat for horseshoe crabs, and lost foraging area for migratory shorebirds relying on horseshoe crab eggs during their May migratory stopover in Delaware Bay.

The exact location and depth of the material varies between years and seasons. The boundary between the material and the underlying sand is usually well defined unless storm energy is enough to cause mixing.

Organic material like this detritus is ideal for enhancing elevation on salt marsh because it creates a substrate well suited for the growth of high marsh plant species such as *S. patens*. Enhancing elevation in areas of the marsh also improves drainage.

Use of material like this from a beach to help restore a salt marsh is novel. However, compost has been trialed for salt marsh restoration at a site on Edwin B Forsythe National Wildlife Refuge in New Jersey successfully and compost is planned for use at at least three more sites in New Jersey. Demonstration that the beach material could be effectively used for salt marsh restoration would provide a model to use elsewhere or at sites at recurring intervals with a benefit to the salt marsh habitat and resilience and beach habitat. The Service trialed growing vegetation in the material on Cedar Beach at the Cedar Creek Tract. The material successfully grew *S. alterniflora* and *S. patens* at a variety of elevations.

PROPOSED PLAN

Strategic ditch maintenance, runneling, and placing peat like material on the marsh at this site will help the hydrology and allow the vegetation to improve which will increase resilience and

habitat value. This project will restore more effective tidal influence on the flood and especially ebb tides and reduce platform inundation rates.

Ditch maintenance

Ditch maintenance involves partially cleaning out select remanent mosquito ditches to facilitate a more natural tidal hydrology on both the flood and ebb tides. We propose approximately 4,864 linear ft of ditch maintenance at the Cedar Creek site over approximately 10 sections of ditch. Most of the areas needing clearing are partly open and mostly only closed by vegetation growing in from the sides and only limited sediment accretion. Some flow currently gets through these areas but they are very constricted. Targeted depth to open up smaller ditches in the tideshed would be approximately 1.5 ft below the marsh platform but some of the larger and lower ditches in the tideshed could be up to 2.5 ft below the marsh platform to ensure restored flow. This depth would be below the invert elevation of the most degraded areas on the marsh platform ensuring water will have a sufficient gradient and open flow to move off the marsh platform where needed during ebb tide. To obtain these depths below the platform, the average amount of material to remove will be far less because the platform in most places is already higher than the current top of sediment or vegetation restriction in the ditches.

The average width of ditch maintenance will be approximately 1.8 to 3 ft depending on the equipment used and the size of the channel. The ditch maintenance will be done using a pontoon excavator but the bucket width may vary from 1.8 to 3 ft.

We expect the amount of material to be removed during ditch maintenance to be at most 540.8 cyd. We expect the amount of material to be well under this estimate because there are many small pockets of water in the ditches that for this conservative estimate for permitting we assume are instead solid material and much of what material is actually present is comprised of loosely aggregated roots and rhizomes instead of solid sediment or peat.

The majority of ditch maintenance at this site will be done by pontoon excavator but the smallest sections of ditch maintenance or cleanup work may need to be done by hand using serrated shovels and marsh sleds to move the material as needed.

The proposed design for ditch maintenance will help enforce a condition where the hydrology of any one section of marsh will be dominated by the hydrology of one channel (i.e., single channel hydrology). This condition is generally most effective at moving water, preventing revegetation within the channel footprint, and is what typically occurs on natural unaltered marshes.

The proposed depth of ditch maintenance and resulting hydrology will not remove all water from the site. At low tide, many of the current pools will still retain water to provide refugia for nekton that are forage fish or mosquito larvae predators.

Runnels

Runnels are shallow channels cut through marsh platform where there is typically not evidence of previous ditches or natural channels. Runnels connect existing negative relief to regain tidal influence and may or may not be to the invert elevation or below of the area they target for increased drainage.

We plan an estimated sixteen sections of runnel for an estimated 1,511 linear ft at the Cedar Creek site. The depth of runnels will vary based on the needs of the immediate area and gradient

but average approximately 0.6 ft below the surrounding platform elevation and be a maximum of 1 ft in depth. The width of runnels will also vary but the maximum will be 1 ft. We expect the amount of material to be removed during runnel creation to be at most 56 cyd assuming all runnels are at maximum depth and width. All runnels will be hand dug using serrated shovels and the spoil material moved by hand pulled sled as needed.

Habitat Mounds

Material removed from ditch maintenance or runnels will be placed into habitat mounds. Mounds will be placed mostly in low unvegetated areas on the marsh platform and close to where the material will be removed from. Material will be shoveled from runnels or excavated from ditch maintenance and directly put on these low areas of marsh in the immediate vicinity or some may be moved using hand-pulled marsh sleds to areas that especially need the material. Mounds will be approximately 0.5 to 1 ft high. We will gently press the mounds flat so they create a surface for *S. patens* or other vegetation to grow, so they do not have small pockets that will produce mosquitoes, and so that high uneven areas are avoided that would quickly break down. Based on our recent experience creating runnels and doing ditch maintenance at Prime Hook National Wildlife Refuge in Delaware, we expect the material from ditch maintenance will mostly be saturated vegetation that will quickly be reduced in volume due to dewatering and settling. Material from runneling will mostly be saturated peat that will settle more gradually.

The diameter of the mounds will vary based on the amount of material being removed in the immediate area. Exact locations will be determined at the time of placement based on marsh condition. Mound sizes will vary but average approximately 25 ft^2 and contain approximately 0.5 to 1 cyd.

Slaughter Beach Peat

The peat like detritus will be removed from the surface of Cedar Beach using a loader or similar equipment. Only detritus on the surface will be removed. Underlying sand or sand and peat mix will not be removed to preserve the beach profile. The peat will be moved from the beach and transferred to the edge of the salt marsh by dump truck or similar conveyance. Access on and off the beach can occur using the end of several streets that terminated at the beach where there are no physical barriers. The material will be stockpiled either on the marsh edge near the site in one of two lots owned by the town on the marsh side of Bay Avenue or on side streets on the bayward site of Bay Avenue.

The volume of peat on the beach varies greatly over time. Therefore, we propose to permit the use of a maximum amount of material that could be present of upwards of 5,000 cyd but with the expectation it will likely be far less. Based on observation of the site over several years, approximately 400 cyd are reliably present and therefore most planning, contracting, etc. will likely be pursued using that estimate.

The plans show three potential placement areas for the peat on the salt marsh. The smaller amount of material involved the more likely we would only use the placement area closest to the road to limit site disturbance and cost. Placement onto the marsh will be done using an airboat with deck space configured for hauling this type of material or by using a marshmaster and sled. An airboat is the preferred method because the condition of the surface is relatively soft for a marshmaster especially if pulling a sled and there will be at least one channel to cross repeatedly.

The material would be placed in mounds sized to the bare or stressed areas where placement was occurring but be approximately 50 feet in diameter. The material would be spread by hand tools. Targeted average elevations after settling would be approximately 2.2 ft. In many areas this would correspond to approximately 6 inches after settling and therefore initial placement depths would be approximately 9 inches with an estimated settling of 30% or more. We proposed depths of up to 1 ft. Targeted depths are based on biobenchmark data with the intention of creating high marsh elevations. For example, in the placement area closest to the road, bare sediment elevation averages 1.50 ft, stressed short-form *S. alterniflora* 1.69 ft, stressed *S. patens* and *D. spicata* 1.91 ft, and healthier *S. patens* and *D. spicata* 2.12 ft.

The sparse and mostly *S. alterniflora* vegetation under areas where peat is placed will be expected to grow through the peat in most cases. *S. alterniflora* on projects where 6 inches of denser dredged material is placed on salt marsh is able to grow through the placed material and therefore we expect at least as much growth through this lighter material. However, we want to encourage the growth of high marsh vegetation. *D. spicata* and particularly *S. patens* do not easily colonize bare areas. Therefore, dependent on resources, we will plant at least some of these areas with *S. patens* plugs in early spring after the placement.

If the removal of the peat significantly alters the beach profile, we will place and spread new sand on the beach to restore the profile. We would use mined sand at the largest grain size available.

Timeline

All work will be done between September 15 to March 1outside of the growing and nesting season. All runnels and ditch maintenance will likely be implemented during one scheduled effort to the degree resources allow. All peat placement will likely be implemented during one separate scheduled effort. Any planting would be done the following early spring after placement.

Minimizing impacts to the marsh

Impacts to the salt marsh will be minimized. The proposed plan involves doing only a limited amount of runneling and ditch maintenance to minimize disturbance and to ensure the desired changes happen without unintended effects on the marsh. Construction will take place outside of the growing season and nesting season. Most of the marsh platform at the Cedar Creek site is still firm and can be walked on with little threat of compaction. We will use established paths, single entry points to the site, and walk on planks across the softest areas to further reduce disturbance. Equipment use will be limited and use low ground pressure machines such as airboats and a pontoon excavator. The plan minimizes sediment redistribution or sediment loss because we will keep the ditch maintenance and runnels shallow, most of the ditch maintenance will be removing vegetation growing in the ditches not sediment, and most of the runnels will be dug into peat rather than unconsolidated sediment.

MAINTENANCE AND ADAPTIVE MANAGEMENT PLAN

We do not expect extensive maintenance but do think the project will have greater success with some occasional maintenance by hand to remove mobilized sediment that has accreted in

constriction points in runnels or ditch maintenance sections and potentially to remove new *S. alterniflora* re/growth (vertically or horizontally) in these areas where it causes restrictions.

As tidal influence is restored, the flows in the reopened channels may alter channel size to fit the flow in them. This will be natural and expected leading to a new and more stable state closer to equilibrium for the project area.

MONITORING

The six variables listed below will demonstrate success for the project. One through three will begin to happen within one tidal cycle of implementation and can be measured by continuing to have water level loggers in the current locations at least during the growing season. Four through six will begin to be seen after one growing season but will likely take three growing seasons. Four and five will be monitored with the least disturbance and cost by observing the areal extent of vegetation as evidenced by ground and drone imagery from set x, y, and z coordinates during low tides at the end of the growing season for at least 3 years.

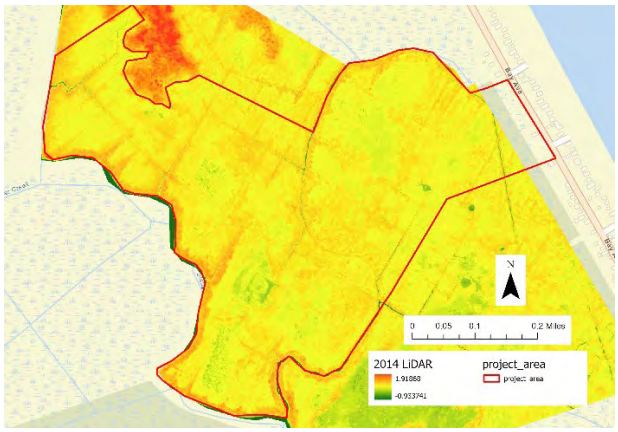
1) Reduced water levels on the marsh soon after implementation.
2) Reduced inundation rates of water on the marsh soon after implementation.
3) Increased agreement between the tidal patterns on the marsh surface and channel network.
4) Reduced loss in vegetation from horizontal expansion of pools and bare areas.
5) Return of vegetation and increased vegetation density that are currently bare sediment or mostly bare sediment.
6) Vegetation of placed peat mounds through existing vegetation growing through them or by planted vegetation getting established.

FIGURES

1968 aerial showing the extensive ditching across the site. The large pools that now characterize parts of the site are not present but there are remanent smaller natural salt marsh pools still present. Most of the ditches visible in the aerial have now entirely or partly filled in leading to parts of the marsh healing but other parts experiencing ponding.



LiDAR of the project area showing the difference in elevations between the low areas in green and the surrounding higher elevations that contribute to the ponding.



Peat like detritus built up on Cedar Beach/Slaughter Beach in May 2023. Moving some of this material to the Cedar Creek Tract to rebuild elevation and enhance the growing medium for high marsh vegetation is proposed.



Peat like detritus built up on Cedar Beach/Slaughter Beach in May 2023. Moving some of this material to the Cedar Creek Tract to rebuild elevation and enhance the growing medium for high marsh vegetation is proposed.



Locations of Hobo and Hyfi water level loggers in place during 2023-2024. Two groundwater loggers not shown were also installed. We also had a separate Hyfi logger near the mouth of Cedar Creek near Mispillion Harbor.



Photos from the DE State Archives of a 1936 competition among members of the CCC to see who could dig marsh ditches the fastest on the salt marsh that is now the Cedar Creek Tract. The photos give some idea of the firmness of the marsh at that time, the thickness of peat, and the extent of the effort to ditch this marsh.



SITE PHOTOS - DRONE IMAGES

Image locator (2024 aerial)



Drone photo 1: Looking northeast over an area targeted for ditch maintenance and runneling that will reduce ponding. During the ebb tide, the water seen ponded on the marsh largely remains due to a lack of connection between the marsh platform and the tidal creek in the middle of the image.



Drone photo 2: Looking northwest over an area targeted for ditch maintenance and runneling that will reduce ponding.



Drone photo 3: Looking southeast over a large ponded area. A runnel connecting this area to the ditch going across the foreground will reduce the expansion of the pool. The vegetation around the perimeter is currently inundated most of the time and is dying. The intent is not to drain an area like this on a low tide but instead to reduce the depth of water to reduce inundation of the surrounding vegetation.



Drone photo 4: An area where vegetation has begun to die off and ponding is occurring. This is an excellent example of where a runnel will be effective because the platform is still intact and elevation capital is still present. This area is also targeted for peat placement.



Drone photo 5: The same large area of ponding shown in photo 3 but looking towards the west. The marsh in the foreground remains saturated.



Drone photo 6: The same large area of ponding shown in photo 3 and 5 but looking towards the north. The foreground shows an area the large pool is expanding into. Water sits in this area throughout the tidal cycle despite the area being close to Slaughter Creek visible on the left.



Drone photo 7: Looking south over an area targeted for ditch remediation and runneling to increase tidal influence and especially to allow water to ebb from these ponded areas on the falling tide. Currently, much of this marsh looks like this throughout the tidal cycle due to tidal ingress during spring tides but limited egress.



Drone photo 8: Looking south over a large pool that only partly drains during the falling tide despite being slow close to Slaughter Creek visible in the background. Ditch maintenance and runneling will improve tidal influence of the pool.



Drone photo 9: Looking northeast over much of the area also shown in photo 7. The ditch extending into the background on the right is a good target for ditch maintenance.



Drone photo 10: Looking north over the same pool shown in photo 8. Decreasing the water levels and rate of inundation in this pool could allow shallow bare areas, such as in the foreground, to revegetate.



Drone photo 11: Looking southwest over an area that will benefit from ditch maintenance and runneling. Parts of this area are also targeted for peat placement. This is the closest peat placement area to the road and will likely be given priority.



SITE PHOTOS - GROUND IMAGES

Image locator (2024 aerial)



Ground photo 1: Looking east over an area that will benefit from runneling and ditch maintenance.





Ground photo 2: A Hobo surface water logger is at the bottom of this PVC pipe. The data from the logger shows the area often remains flooded during low tides. Elevation data show that the area is high enough for water to move off the marsh if we dig a runnel to connect the area to a more tidally influenced ditch.

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Ground photo 3: Looking east over an area of mostly D. spicata in the middle of the image. The marsh in this area remains saturated and the D. spicata would respond favorably to reduced inundation due to proposed runnels.

Ground photo 4: Looking southwest over an area of ponded marsh that will benefit from runneling. Much of the vegetation in this area is very low density short-form S. alterniflora and much is already turning to bare ground.



Ground photo 5: Looking northeast over an area that will benefit from runneling. This marsh is starting to convert to bare sediment.



Ground photo 6: Looking east/southeast over an area of marsh that has mostly healed from the history of ditching. A remanent and revegetated ditch channel can be seen extending from the foreground to the background.



Ground photo 7: Looking south showing a ditch that has open sections but is mostly closed off by new growth of S. alterniflora. Ditch maintenance will allow this ditch to function more like a natural tidal channel and allow adjacent marsh platform to more effectively drain on the ebb tide.



Ground photo 8: Looking southwest over marsh where vegetation is becoming sparse and stressed. Ditch maintenance and runneling in nearby marsh will improve the conditions here, allowing vegetation to rebound.



Ground photo 9: Looking northeast over an area where ditch spoils potentially from decades ago have been colonized by high marsh vegetation.



Ground photo 10: Looking northeast at one of our Hyfi (foreground) and Hobo (background) water level loggers. Both provide similar data showing the water levels in this large ponded area remain mostly the same regardless of the tidal fluctuations in nearby channels.



Ground photo 11: Looking down at an area that typifies vegetation in those areas stressed by extended periods of inundation at this site. The vegetation is mostly very sparse short-form S. alterniflora with occasional Salicornia spp. This is not cover suggestive of a stable resilient marsh.



Ground photo 12: Looking north over degrading marsh extending from the large, ponded area in the background. Reducing water levels in the ponded area and making it more tidally influenced would allow this area to revegetate.



Ground photo 13: Looking south over a large area of ponded marsh that sometimes partly drains depending on the condition of the one constricted ditch that provides most of the tidal influence. Many of the larger pools on this marsh are converting to unconsolidated sediment difficult to walk through suggesting the underlying peat has brokendown.

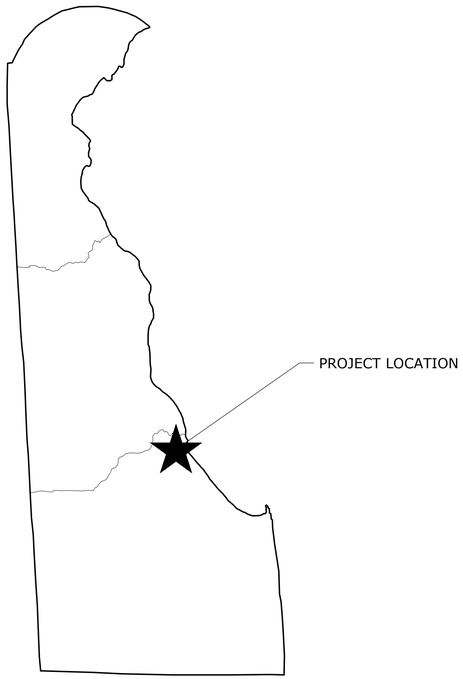


CEDAR CREEK
SALT MARSH RESTORATION

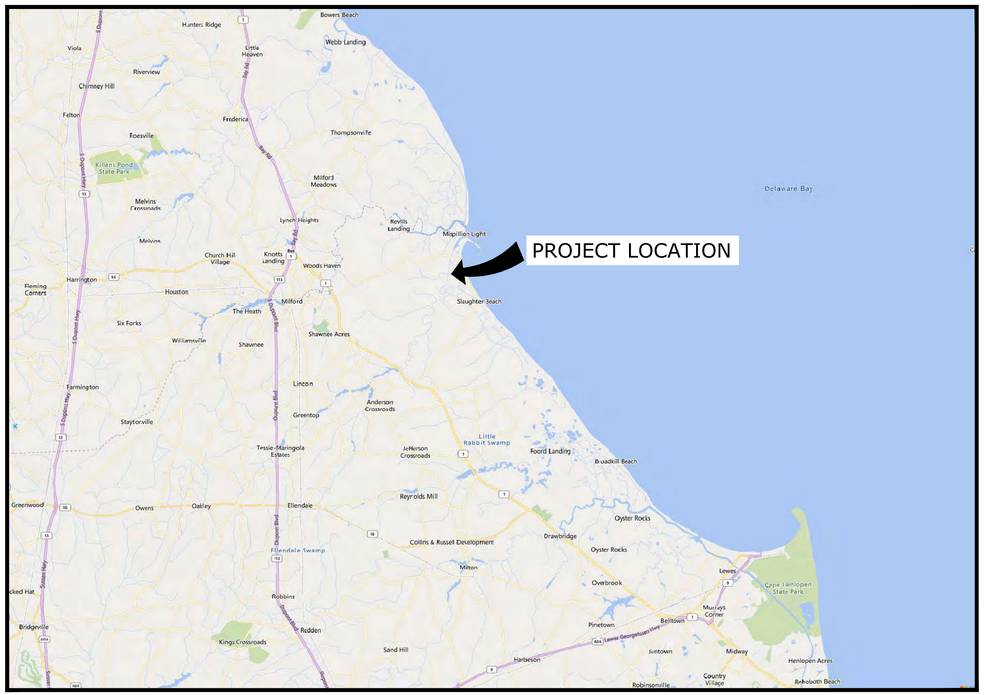
MILFORD NECK WILDLIFE AREA
SLAUGHTER BEACH, SUSSEX COUNTY, DELAWARE

IN COOPERATION WITH

U.S. FISH AND WILDLIFE SERVICE



DELAWARE



PROJECT LOCATION MAP

SCALE: NOT TO SCALE

SHEET LIST TABLE	
SHEET NUMBER	SHEET TITLE
C001	COVER SHEET
C101	OVERALL SITE PLAN
C102	SITE PLAN 1
C103	SITE PLAN 2
C104	SITE PLAN 3
C301	DETAILS 1
C302	DETAILS 2

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DEXTER, MICHIGAN 48130
(734) 623-2000
www.ducks.org

AFFIX SEAL: DUCKS UNLIMITED, INC.

ON:

COVER SHEET
CEDAR CREEK
SLAUGHTER BEACH
SUSSEX COUNTY, DE

Revision	Sheet	Revisions	Date	By

CAD FILE: NJ-100-5 CEDAR CREEK COVER

DESIGNED BY: LL

DRAWN BY: ZB / JB

SURVEYED BY:

BIOLOGIST: JF

DATE: 8/20/26

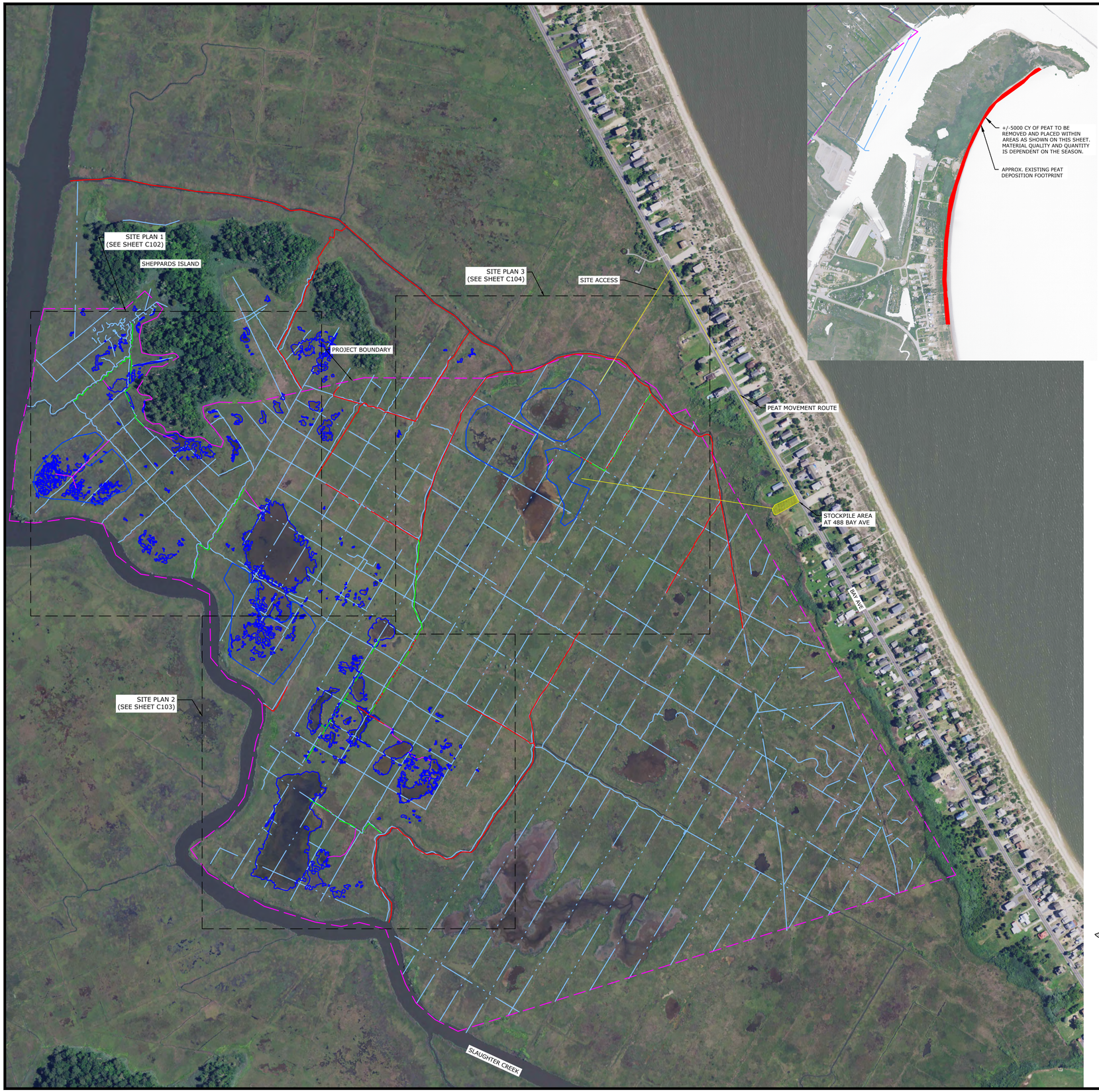
PROJECT NUMBER: US-NJ-100-5

C001

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LEGEND

- PROJECT BOUNDARY
- PROPOSED RUNNEL
- PROPOSED DITCH MAINTENANCE
- EXISTING OPEN WATER
- EXISTING DITCHES
- EXISTING TIDAL CHANNELS
- PEAT MOVEMENT ROUTE
- PLACEMENT AREA
- PROPOSED PEAT REMOVAL

TIDAL PARAMETERS	
	CEDAR_REFERENCE
MHHW	2.29
MHW	2.09
MSL	1.00
MTL	1.00
DTL	1.03
MLW	-0.08
MLLW	-0.23

NOTES:

1. SURFACE, GROUND WATER AND CHANNEL LOGGER DATA WAS PROVIDED BY UNITED STATES FISH AND WILDLIFE SERVICE (USFWS) STAFF.
2. ALL VALUES SHOWN ARE IN US SURVEY FEET NAVD88.
3. DATA WAS COLLECTED FROM AUGUST 2023 THROUGH FEBRUARY 2024.

IMPACTS	TOTAL SQUARE FEET	TOTAL ACRES
PERMANENT COASTAL WETLANDS IMPACTS	99,678	2.29
TEMPORARY COASTAL WETLANDS IMPACTS	-	-

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N

GRAPHIC SCALE

300 0 150 300 600 1200

1 inch = 300 feet

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ON:

OVERALL SITE PLAN
CEDAR CREEK
SLAUGHTER BEACH
SUSSEX COUNTY, DE

Revision	Sheet	Revisions	Date	By

CAD FILE:
NJ-100-5 CEDAR CREEK SITE PLAN

DESIGNED BY: LL
DRAWN BY: ZB / JB
SURVEYED BY:
BIOLOGIST: JF
DATE:
8/20/26
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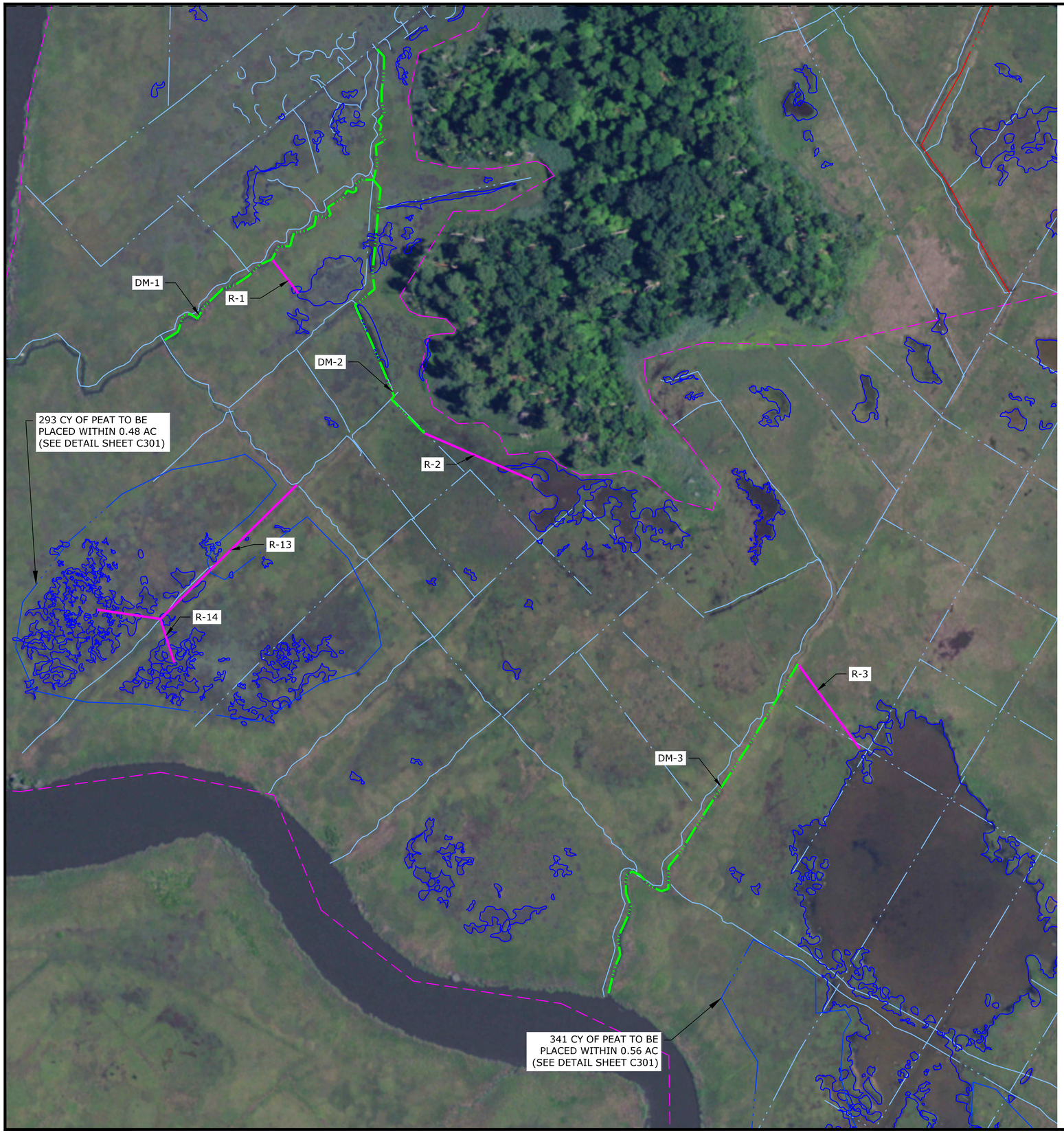
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None

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LEGEND

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N

GRAPHIC SCALE

80 0 40 80 160 320

1 inch = 80 feet

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ON:

SITE PLAN 1
CEDAR CREEK
SLAUGHTER BEACH
SUSSEX COUNTY, DE

Revision	Sheet	Revisions	Date	By

CAD FILE: NJ-100-5 CEDAR CREEK SITE PLAN

DESIGNED BY: LL

DRAWN BY: ZB / JB

SURVEYED BY:

BIOLOGIST: JF

DATE: 8/20/26

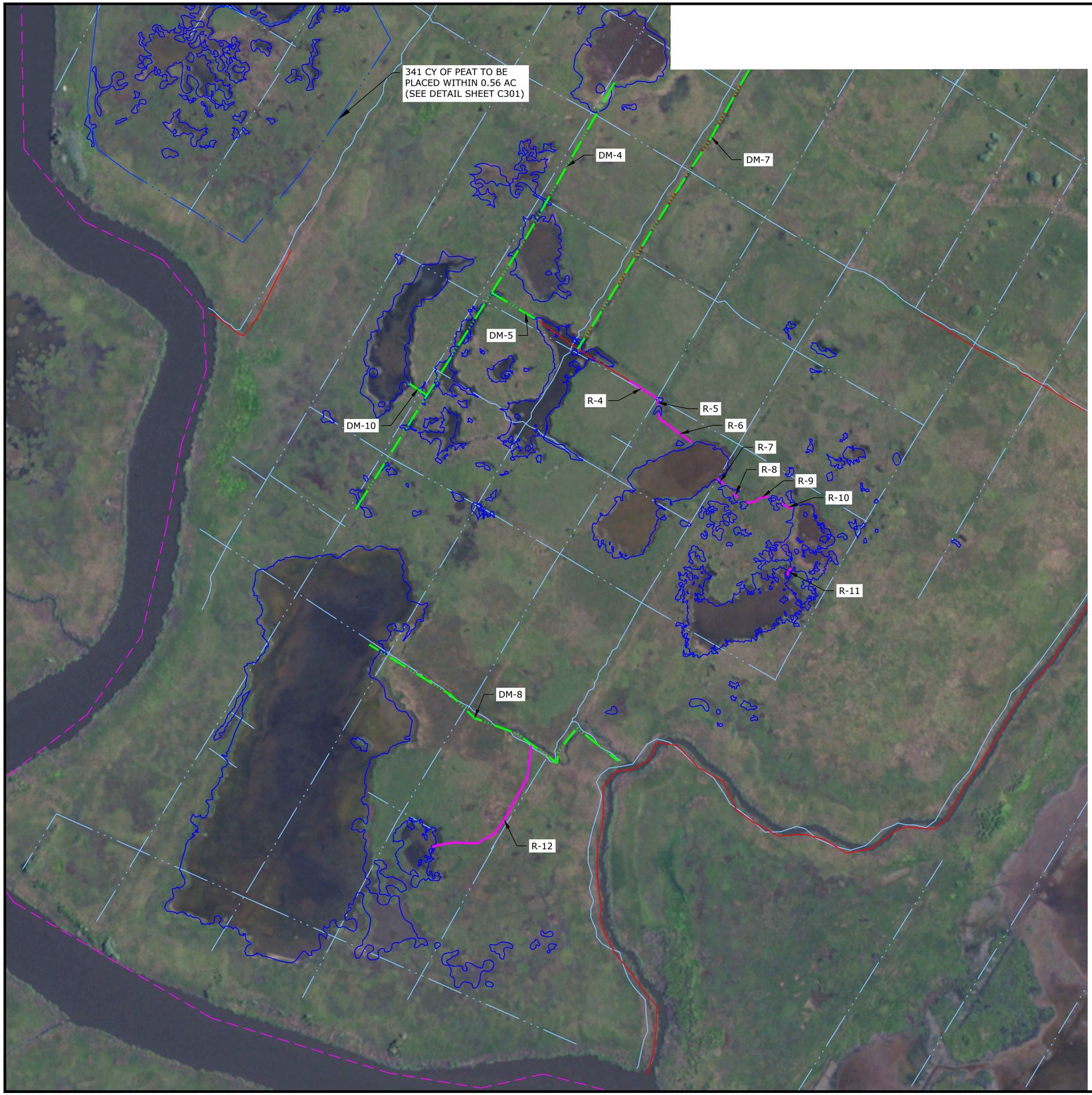
PROJECT NUMBER: US-NJ-100-5

C102

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LEGEND

- PROJECT BOUNDARY
- PROPOSED RUNNEL
- PROPOSED DITCH MAINTENANCE
- EXISTING OPEN WATER
- EXISTING DITCHES
- EXISTING TIDAL CHANNELS
- PEAT MOVEMENT ROUTE
- PLACEMENT AREA
- PROPOSED PEAT REMOVAL

TIDAL PARAMETERS	
	CEDAR_REFERENCE
MHHW	2.29
MHW	2.09
MSL	1.00
MTL	1.00
DTL	1.03
MLW	-0.08
MLLW	-0.23

NOTES:

1. SURFACE, GROUND WATER AND CHANNEL LOGGER DATA WAS PROVIDED BY UNITED STATES FISH AND WILDLIFE SERVICE (USFWS) STAFF.
2. ALL VALUES SHOWN ARE IN US SURVEY FEET NAVD88.
3. DATA WAS COLLECTED FROM AUGUST 2023 THROUGH FEBRUARY 2024.

IMPACTS	TOTAL SQUARE FEET	TOTAL ACRES
PERMANENT COASTAL WETLANDS IMPACTS	99,678	2.29
TEMPORARY COASTAL WETLANDS IMPACTS	-	-

NOTES:

1. IMPACTS SHOWN INCLUDE MATERIAL DISTURBED AND HABITAT CONVERTED BY RUNNELING, DITCH MAINTENANCE AND PEAT PLACEMENT.

DRAWING NOTES:

1. PROJECT COORDINATES AND THIS DRAWING ARE NAD83 2011, DELAWARE STATE PLANE COORDINATES SYSTEM, UNITS U.S. SURVEY FEET. THE VERTICAL DATUM IS NAVD88 (NORTH AMERICAN VERTICAL DATUM OF 1988).
2. EXISTING FEATURES SUCH AS OPEN WATER, DITCHES, TIDAL CHANNELS, AND PROPERTY LINES SHOWN WERE PROVIDED BY U.S. FISH AND WILDLIFE SERVICE (USFWS), DUCKS UNLIMITED (DU), AND OTHER EXTERNAL SOURCES.
3. FIELD OBSERVATIONS AND SITE RECONNAISSANCE WAS CONDUCTED BY USFWS, DU, PARTNERSHIP FOR THE DELAWARE ESTUARY (PDE), ENTOSTAT, AND OTHER PARTNERS.
4. PROJECT AND DESIGN GOALS WERE SET BY USFWS. IMPLEMENTATION SHALL BE CARRIED OUT BY USFWS STAFF.
5. ALL LOCATIONS FOR PROPOSED ITEMS ARE APPROXIMATE AND THE FINAL PLACEMENT SHALL BE DETERMINED IN THE FIELD BY THE USFWS STAFF ACCORDING TO EXISTING SITE CONDITIONS.
6. EVERY EFFORT SHALL BE MADE TO MINIMIZE IMPACTS TO THE SITE. IMPLEMENTATION SHALL BE DONE BY HAND OR BY MACHINERY. EROSION AND SEDIMENT CONTROL MEASURES SHALL BE USED WHERE POSSIBLE.
7. HABITAT MOUNDS WILL BE CREATED FROM SIDE CAST MATERIALS FROM RUNNELING AND DITCH MAINTENANCE AND WILL NOT EXCEED LOCAL MHW TO MHHW ELEVATIONS AFTER SETTLING. FINAL LOCATIONS WILL BE DETERMINED AND RECORDED DURING CONSTRUCTION.
8. ALL PROPERTY LOCATED WITHIN THE PROJECT BOUNDARY BELONGS TO THE DELAWARE DIVISION OF FISH AND WILDLIFE.
9. ONLY LARGER, MORE PROMINENT OPEN WATER FEATURES ARE DELINEATED.
10. PEAT PLACEMENT MOUNDS WILL VARY CONSIDERABLY IN SIZE AND SHAPE BUT WILL BE MAXIMUM 50 FEET IN DIAMETER.
11. UP TO 5000 CY OF MATERIAL COULD BE AVAILABLE FROM SLAUGHTER BEACH AND THEREFORE IS INCLUDED AS A MAXIMUM IN DESIGN AND FOR PERMITTING. APPROXIMATELY 400 CY IS ANTICIPATED AS BEING RELIABLY AVAILABLE AND WILL LIKELY BE THE PROJECT TOTAL.
12. DEGRADED MARSH SURFACE TARGETED FOR RE-VEGETATION WILL HAVE STANDING WATER REMOVED DURING EBB/LOW TIDES VIA DITCH MAINTENANCE AND/OR RUNNELING.
13. POOLS SELECTED FOR POOL EDGE STABILIZATION AND RE-VEGETATION WILL HAVE POOL MARGINS RETRACTED, WATER LEVELS LOWERED, AND STANDING WATER ON ADJACENT DEGRADING MARSH PLATFORMS DURING EBB/LOW TIDES VIA DITCH MAINTENANCE AND/OR RUNNELING POST-RESTORATION, ALLOWING AN INCREASE IN VEGETATION VIGOR AND DENSITY.

N

GRAPHIC SCALE

80 0 40 80 160 320

1 inch = 80 feet

Know what's **below.** **Call before you dig.**

FOR PERMIT

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DEXTER, MICHIGAN 48130
(734) 623-2000
www.ducks.org
DUCKS UNLIMITED

AFFIX SEAL: DUCKS UNLIMITED, INC.

ON:

SITE PLAN 2
CEDAR CREEK
SLAUGHTER BEACH
SUSSEX COUNTY, DE

By								
Date								
Revisions								
Sheet								
Revision								

CAD FILE:
NJ-100-5 CEDAR CREEK SITE PLAN
DESIGNED BY: LL
DRAWN BY: ZB / JB
SURVEYED BY:
BIOLOGIST: JF
DATE:
8/20/26
PROJECT NUMBER:
US-NJ-100-5
C103

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LEGEND

- PROJECT BOUNDARY
- PROPOSED RUNNEL
- PROPOSED DITCH MAINTENANCE
- EXISTING OPEN WATER
- EXISTING DITCHES
- EXISTING TIDAL CHANNELS
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N

GRAPHIC SCALE

80 0 40 80 160 320

1 inch = 80 feet

Know what's **below.** **Call** before you dig.

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AFFIX SEAL: DUCKS UNLIMITED, INC.

ON:

SITE PLAN 3
CEDAR CREEK
SLAUGHTER BEACH
SUSSEX COUNTY, DE

By									
Date									
Revisions									
Sheet									
Revision									

CAD FILE:
NJ-100-5 CEDAR CREEK SITE PLAN
DESIGNED BY: LL
DRAWN BY: ZB / JB
SURVEYED BY:
BIOLOGIST: JF
DATE:
8/20/26
PROJECT NUMBER:
US-NJ-100-5
C104

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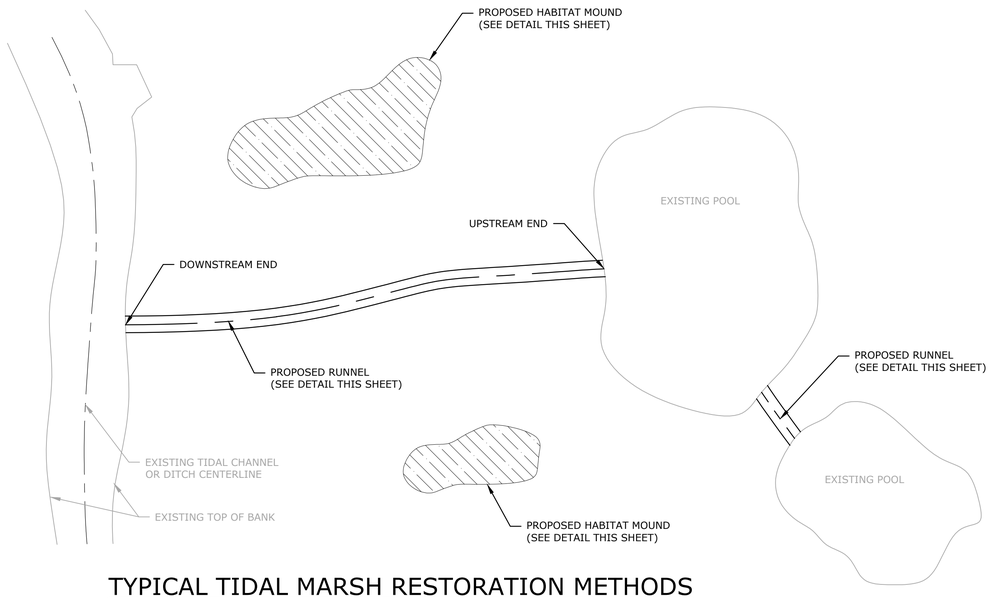
RUNNEL ID	UPSTREAM ELEVATION	DOWNSTREAM ELEVATION	SLOPE (%)	APPROX. LENGTH (FT)	UPSTREAM NORTHING	UPSTREAM EASTING	DOWNSTREAM NORTHING	DOWNSTREAM EASTING	QTY OF MATERIAL (CY)
R-1	2.0	1.8	0.3	63	33814.21	257483.29	33864.14	257444.75	2.3
R-2	2.1	2.0	0.1	174	33539.25	257827.84	33608.88	257668.54	6.4
R-3	2.2	2.1	0.1	154	33145.13	258308.18	33269.59	258217.64	5.7
R-4	1.7	1.7	0.1	51	31958.57	259020.6	31985.93	258977.95	1.9
R-5	1.7	1.7	0.7	7	31948.56	259022.04	31955.50	259022.67	0.3
R-6	1.9	1.7	0.3	71	31889.39	259075.28	31935.50	259023.50	2.6
R-7	2.0	1.9	0.8	13	31824.85	259124.86	31833.47	259115.71	0.5
R-8	2.0	1.9	1.1	9	31803.77	259147.26	31810.04	259140.60	0.3
R-9	2.0	1.9	0.1	36	31805.11	259194.79	31796.69	259160.61	1.3
R-10	2.0	1.9	0.3	17	31785.53	259231.78	31793.28	259217.15	0.6
R-11	1.8	1.7	0.4	12	31683.21	259223.62	31694.00	259229.50	0.5
R-12	2.2	2.0	0.1	256	31259	258670.4	31419.03	258825.11	9.5
R-13	2.0	1.3	0.2	375	33349.4	257187.77	33532.46	257480.91	13.9
R-14	2.0	1.9	0.1	69	33271.8	257301.63	33335.75	257280.40	2.6
R-15	1.8	0.0	3.6	49	33396.5	259864.5	33431.00	259898.50	1.8
R-16	2.0	1.8	0.1	155	33628.5	259654.5	33561.00	259794.50	5.8

RUNNEL LAYOUT TABLE

NOTE: ALL ELEVATIONS SHOWN ARE IN NAV88

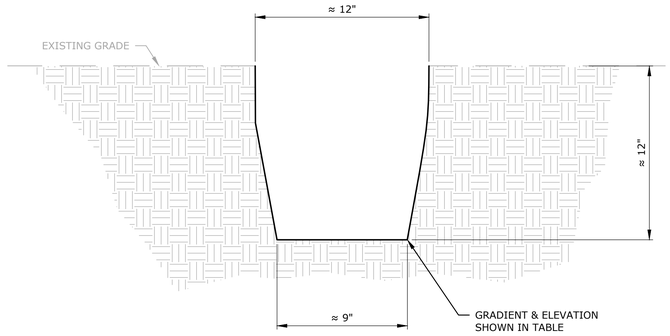
DITCH MAINTENANCE ID	APPROX. LENGTH (FT)	UPSTREAM NORTHING	UPSTREAM EASTING	DOWNSTREAM NORTHING	DOWNSTREAM EASTING	QTY OF MATERIAL (CY)
DM-1	664	34173.09	257599.07	33745.66	257286.95	73.7
DM-2	424	33608.88	257668.54	33980.84	257593.67	47.1
DM-3	641	33269.59	258217.64	32785.94	257939.25	71.2
DM-4	779	32451.34	258954.59	31785.12	258550.87	86.6
DM-5	78	32083.10	258830.26	32123.45	258763.00	8.7
DM-6	497	32989.41	259166.94	32504.26	259187.03	55.2
DM-7	553	32504.26	259187.03	32035.60	258897.46	61.4
DM-8	497	31574.53	258572.29	31392.67	258960.77	55.2
DM-9	702	33472.24	259998.11	33784.54	260433.92	78.0
DM-10	33	31981.65	258634.78	31963.20	258662.16	3.7

DITCH MAINTENANCE LAYOUT TABLE



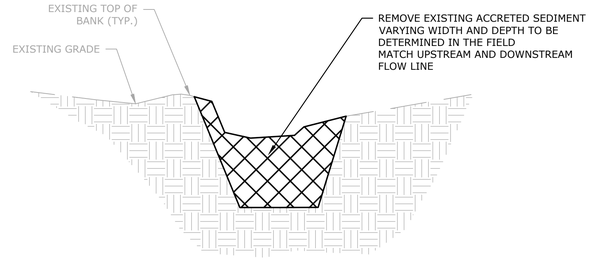
TYPICAL TIDAL MARSH RESTORATION METHODS

NOT TO SCALE



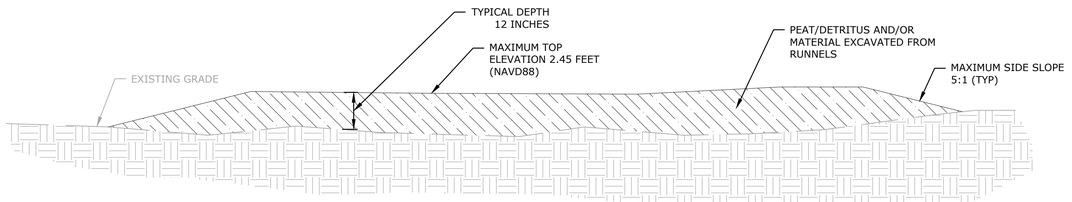
TYPICAL RUNNEL EXCAVATION CROSS SECTION

NOT TO SCALE



TYPICAL DITCH MAINTENANCE CROSS SECTION

NOT TO SCALE



TYPICAL HABITAT MOUND CROSS SECTION

NOT TO SCALE

RUNNEL, DITCH MAINTENANCE AND HABITAT MOUND NOTES:

1. MATERIAL EXCAVATED FROM THE RUNNELS AND DITCH MAINTENANCE SHALL BE PLACED FOR THE HABITAT MOUNDS. THE LOCATION FOR THE HABITAT MOUNDS WILL BE UP TO THE DISCRETION OF THE ENGINEER OR APPROVED OTHER.
2. HABITAT MOUNDS SHALL BE PLACED IN SUCH A MANNER THAT WILL NOT PREVENT THE DRAINAGE OF WATER FROM THE MARSH SURFACE TO THE PROPOSED RUNNELS.
3. ALL MATERIAL EXCAVATED WILL REMAIN ONSITE AND NO MATERIAL SHALL BE PLACED ABOVE AN ELEVATION 2.45 FEET (NAVD88).
4. DOWNGRADIENT END OF RUNNEL SHALL DAYLIGHT INTO EXISTING TIDAL CHANNEL OR DITCH AND UPSTREAM END OF RUNNEL SHALL BE CUT INTO EDGE OF EXISTING POOL OR OVERLY SATURATED AREAS WHERE WATER IS REPEATEDLY INUNDATING THE MARSH (SEE TYPICAL RUNNEL CROSS SECTION).
5. THE AREAL SIZE OF THE MOUNDS WILL VARY BASED ON THE AMOUNT OF MATERIAL BEING REMOVED IN THE IMMEDIATE AREA AND THE SIZE OF THE DEGRADED MARSH AREA WHERE THE MOUND IS BEING PLACED. MOST MOUNDS WILL BE 25 SQFT ON AVERAGE.

FOR PERMIT

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ON:

DETAIL SHEET 1
CEDAR CREEK
SLAUGHTER BEACH
SUSSEX COUNTY, DE

Revision	Sheet	Revisions	Date	By

CAD FILE: NJ-100-5 CEDAR CREEK DETAILS

DESIGNED BY: LL

DRAWN BY: LL

SURVEYED BY: N/A

BIOLOGIST: JF

DATE: 8/20/26

PROJECT NUMBER: US-NJ-100-5

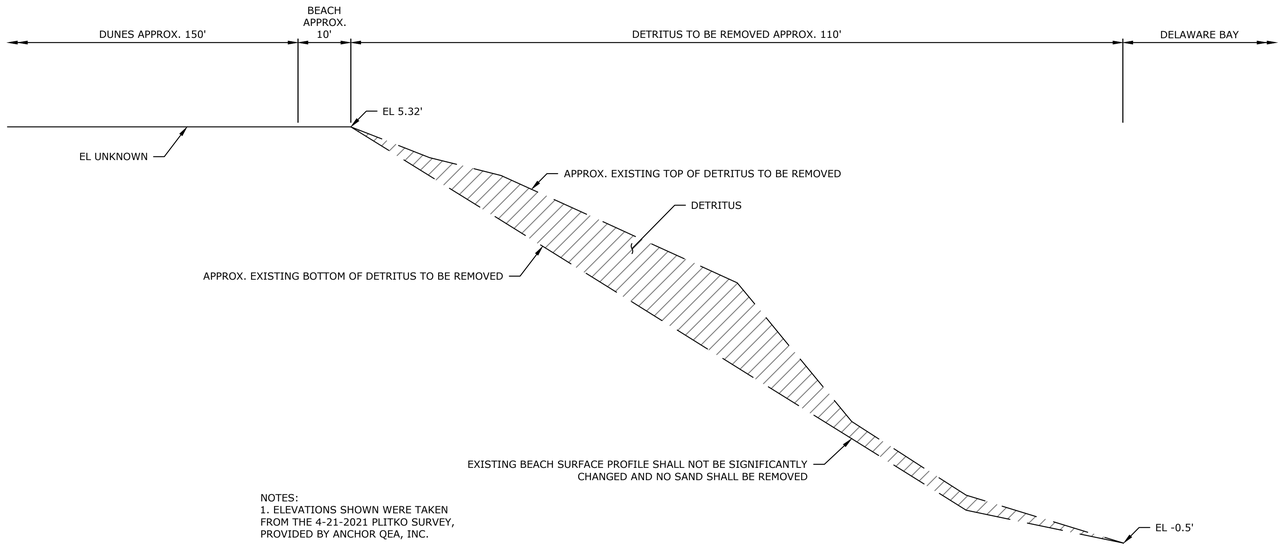
C301

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Details 1, None

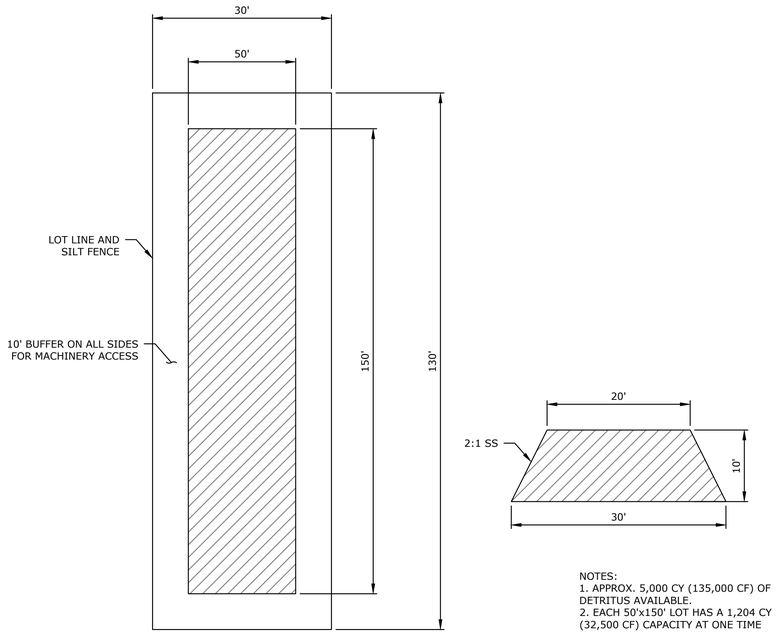
C:\Users\zbaroudi\OneDrive - Ducks Unlimited Incorporated\GLARC3D - Documents\NJ\NJ00100012 Cedar Creek\NJ-100-5 CEDAR CREEK DETAILS.dwg, 8/20/2026 12:00 PM, Zaryn Baroudi, Details 1, None



NOTES:
1. ELEVATIONS SHOWN WERE TAKEN FROM THE 4-21-2021 PLITKO SURVEY, PROVIDED BY ANCHOR QEA, INC.

PROFILE OF DETRITUS BEACH REMOVAL

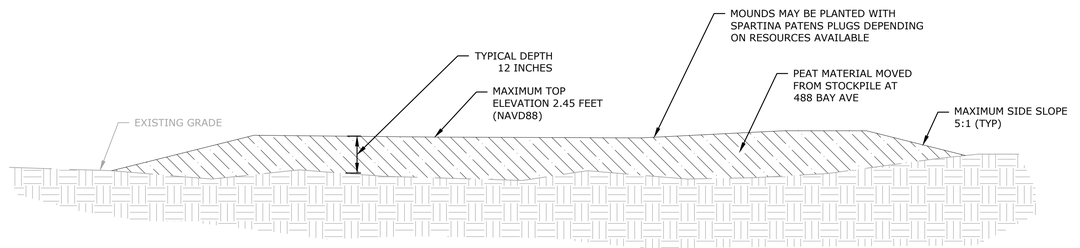
SCALE: 1"=10'



NOTES:
1. APPROX. 5,000 CY (135,000 CF) OF DETRITUS AVAILABLE.
2. EACH 50'x150' LOT HAS A 1,204 CY (32,500 CF) CAPACITY AT ONE TIME

STOCKPILE PROFILE AND LAYOUT

SCALE: NTS



TYPICAL PEAT PLACEMENT CROSS SECTION

NOT TO SCALE

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C:\Users\zbaroudi\OneDrive - Ducks Unlimited Incorporated\GLARC\3D - Documents\NJ\NJ0100012 Cedar Creek\NJ-100-5 CEDAR CREEK DETAILS.dwg, 8/20/2026 12:00 PM, Zaryn Baroudi, Details 2, None

DUCKS UNLIMITED
GREAT LAKES/ATLANTIC REGIONAL OFFICE
7322 NEWMAN BOULEVARD, BUILDING 2, STE. 200
DEXTER, MICHIGAN 48130
(734) 623-2000
www.ducks.org

AFFIX SEAL: DUCKS UNLIMITED, INC.

ON:

DETAIL SHEET 2
CEDAR CREEK
SLAUGHTER BEACH
SUSSEX COUNTY, DE

By	Date	Revisions	Sheet	Revision

CAD FILE:
NJ-100-5 CEDAR CREEK DETAILS

DESIGNED BY: LL
DRAWN BY: LL
SURVEYED BY: N/A
BIOLOGIST: JF
DATE: 8/20/26
PROJECT NUMBER: US-NJ-100-5

C302

FOR PERMIT

NOT FOR CONSTRUCTION

INTRA-SERVICE SECTION 7 BIOLOGICAL EVALUATION FORM

Project Name:	Salt Marsh Hydrological Modification at Delaware Salt Marshes: Port Mahon, Murderkill, Cedar Creek, and Buckaloo	**Originating Person:**	Brian Marsh
Landowner:	Delaware Division of Fish and Wildlife	**Telephone number:**	[redacted]
Project Address:	Multiple sites	**Email:**	[redacted]
County:	Kent and Sussex Counties, DE	**Date:**	5/11/2026

I. Region: R5 - Northeast

II. Service Activity (Program): The Delaware Bay Coastal Program (DBCP) proposes to restore the hydrology of salt marsh at four State-owned sites in Delaware: Davey Crockett Tract (aka Port Mahon site) of the Little Creek Wildlife Area, Kent County; Hall Tract (aka Murderkill site) of the Milford Neck Wildlife Area, Kent County; Cedar Creek Tract (aka Cedar Creek site) of the Milford Neck Wildlife Area, Sussex County; and Buckaloo Tract (aka Buckaloo site) of the Ted Harvey Conservation Area, Kent County (an adjoining private property may be hydrologically affected too but not require access). The work proposed primarily involves doing ditch maintenance to partly clear out old mosquito ditches and to create runnels. Improved hydrology will reduce excessive saturation and inundation on the marsh that is causing ongoing vegetation loss, habitat loss, and resilience loss. For the Cedar Creek site, we also propose to move accumulated peat-like material from Cedar Beach (north end of Slaughter Beach) and place it on the marsh to restore elevation and high marsh substrate while temporarily improving horseshoe crab spawning and shorebird foraging habitat on Cedar Beach.

DBCP will do some of the work ourselves and we propose to partly do the implementation of this work through a Cooperative Agreement with American Conservation Experience and likely a Cooperative Agreement with the Delaware Mosquito Control Section. We will also be submitting to the Corps for either use of one Nationwide 27 approval to cover the four projects or submitting for four separate uses of Nationwide 27.

III. Pertinent Species and Habitat:

A. Listed species and/or their critical habitat within the action area:

- eastern black rail (*Laterallus jamaicensis ssp. jamaicensis*)
- rufa red knot (*Calidris canutus rufa*)

B. Proposed species and/or proposed critical habitat within the action area:

- monarch (*Danaus Plexippus*)
- tricolored bat (*Perimyotis subflavus*)

C. Candidate species within the action area:
none

D. Include species/habitat occurrences on a map. see attached plans

IV. Description of proposed action (attach additional pages as needed): See attached plans and project summaries for more detail.

We propose to improve the hydrology at four salt marsh sites that have limited tidal connection during most tidal conditions which results in ponding marsh, vegetation loss, resilience loss, elevation loss, and habitat degradation. By restoring intertidal character through strategically clearing out portions of salt marsh ditches (i.e., ditch maintenance) and creating runnels, we plan to reduce inundation/saturation rates which will lead to vegetation recovery that will in turn improve the sites' resilience and habitat value.

As material is removed during ditch maintenance and runnel creation, it will be used beneficially on the surrounding marsh by being placed in low habitat mounds in relatively low areas where vegetation has died or become stressed due to unnatural persistent saturation or inundation.

The problems at these sites are mostly caused by the history of ditching which causes leveling of the marsh surface, lower tidal energy, sediment deposition leaving low berms along ditch edges, loss of biological accretion (i.e., belowground growth), oxidation of peat, loss of natural tidal channels, and ditches that fill in leaving areas of the marshes without tidal connection during much of the tidal cycle. Typically, the highest tides reach these sections of marsh but the water is not able to ebb leaving marsh too inundated or at least too saturated for vegetation.

The priority for our work at Cedar Creek is the restoration of the hydrology. However, we are proposing to include an additional component to the project. Peat-like material accumulates on Cedar Beach throughout the year likely coming mostly from salt marsh vegetation or edge erosion of salt marshes throughout the bay. The amount and exact location varies by season and storms but can at times be several feet thick. The community had wanted to remove this material from the beach as a waste product to improve the accessibility and recreational use of the beach. We propose removing the material to improve horseshoe crab spawning habitat and shorebird habitat and then using the material beneficially at the Cedar Creek site to improve high marsh habitat. This will be a pilot effort to test the feasibility and benefits of this kind of action based on recent success seen at EBF NWR using compost in a similar manner. The use of this peat material is a secondary priority. We are pursuing it for permitting but, if funding and partner support is limited, we may only do the ditch maintenance and runneling work at Cedar Creek. More material will likely return to the beach within a season after we remove it so the benefits to the beach will be temporary. The north end of Cedar Beach is eroding towards the Mispillion Inlet so we are not certain the currents will maintain this pattern of deposition of material on Cedar Beach.

V. Determination of effects:

A. Explanation of effects of the action on species and critical habitats in items III. A, B, and C (attach additional pages as needed):

- Eastern black rail: May Affect but Not likely to Adversely Affect. We have done two years of surveys at the four sites using the SHARP protocol and we have not seen or heard black rail and we have not heard black rail while in the areas doing other work throughout the year. However, a partner on the project heard a black rail at Port Mahon outside of a survey. That rail was not picked up on ARUs that have also been in use at the site for two seasons. Of the four sites, Port Mahon is most likely to have black rail and there are at least limited records of them in the general area such as along Port Mahon Road to the south of our proposed area. Cedar Creek and Murderkill are mostly low marsh but Buckaloo and especially Port Mahon do have high marsh where black rail could be present. The intent of the proposed work is to improve the health and cover of the vegetation which includes high marsh vegetation at Port Mahon and Buckaloo. The proposed work will have positive effects on the habitat for black rails by improving vegetation and maintaining high marsh. Very limited patches of high marsh at Cedar Creek and Murderkill could also benefit but would not be expected to significantly add to black rail habitat. The work at Cedar Creek and Port Mahon will include some work done by pontoon excavator. All work at Buckaloo and Murderkill and part of the work at Cedar Creek and Buckaloo will be by hand but involve crews of up to ten people on the marsh at a time.

- Rufa red knot: May Affect but Not likely to Adversely Affect. We have not seen evidence of red knot using any of the salt marsh at these four sites for roosting and would not expect it due to a mix of ponding, low elevations, and some of the vegetation being too high for roosting habitat in areas where ponding does not occur. Removal of the peat-like material from Cedar Beach could affect red knot by temporarily improving foraging habitat. Currently, horseshoe crabs get stranded in the material, little spawning occurs, and shorebirds avoid the peat-like material likely due to the lack of spawning and egg availability. Even shorebird species, such as short-billed dowitchers and dunlin, that are typically more often found in peat and mud areas do not forage in this material. Red knot generally do not favor the other areas of Cedar Beach where the material has not accumulated but occasionally they may occur in the area and therefore could benefit from the project by having improved foraging opportunities. The benefits will only be temporary assuming more of the material will likely begin to deposit within the area within months of our project. The material will be taken off the beach using equipment such as a skidsteer loader and dumptruck.

- Monarch: May Affect but Not likely to Adversely Affect. The sites are predominantly low marsh vegetation and ponded salt water not likely providing monarch habitat. However, at Buckaloo and particularly at Port Mahon, high marsh vegetation will benefit from the project. This may include some of the highest areas of the marsh where plants beneficial to pollinators could benefit such as seaside goldenrod (*Solidago sempervirens*) and perennial salt marsh aster (*Symphyotrichum*

tenuifolium). However, benefits to these plant species is not a goal of the project and any positive effect on pollinators, such as monarch butterfly, would be minimal.

- Tricolored bat: No Effect. No trees will be removed or otherwise disturbed. The sites are open salt marsh and one beach and all will be accessed through open areas without needing to disturb tree cover.

B. Explanation of actions to be implemented to reduce adverse effects:

Impacts to salt marsh habitat: Work will take place outside of the growing season, likely in February or ideally March. No installation work will take place between April 1 and September 15.

We do propose using a pontoon excavator at Port Mahon but only in areas of low marsh. We will also use a pontoon excavator at Cedar Creek but outside of the small remanent areas of high marsh. The work in the large area of high marsh at the north end of our Port Mahon site will only be by hand to prevent damage to the existing cover such as from the pontoon excavator turning and tearing up the *Spartina patens*. By using only hand tools in the most sensitive areas of the marsh where high marsh vegetation is present, we can control the depth and width of ditch work and runneling far better than the large bucket of an excavator.

We will limit field crew time on the marsh, have them avoid unnecessary walking in healthy areas of salt marsh, and they will use planks to cross some of the softest degrading areas.

We propose to place the peat-like material from Cedar Beach onto the marsh at Cedar Creek. We will likely to do this using an airboat to minimize impact to the marsh surface. If we use a Marshmaster and sled to move the material which is unlikely, we would use single points of entry, minimize trips, travel over areas of intact but unvegetated platform, and repair areas damage from the Marshmaster tracks by placing more of the peat material and planting it. The material will be spread by hand. We will favor placement sites that require the least passage time over the salt marsh of the airboat.

Habitat mounds of the spoil material from ditch maintenance and runneling will be placed in degraded marsh to gain elevation not areas where good high marsh habitat already exists and could be used by black rail.

Impacts to beach habitat: Work will take place outside of the horseshoe crab spawning season or shorebird migratory stopover period. Work will likely take place in February or ideally March.

We do not propose removing sand below the accumulated material on the beach. We do not expect a change in beach profile. If the beach profile does change, we would add sand. We would use mined sand of the largest grain size available and spread it on the beach using a skidsteer loader or similar equipment.

VI. Effect determination and response requested: [* = optional]

A. Listed species/designated critical habitat:

Determination	**Response requested**
no effect/no adverse modification (species: *tricolored bat*)	X Concurrence
may affect, but is not likely to adversely affect species/adversely modify critical habitat (species: *rufa red knot, eastern black rail, monarch*)	X Concurrence
may affect, and is likely to adversely affect species/adversely modify critical habitat (species:_____)	____ Formal Consultation

BRIAN MARSH Digitally signed by BRIAN MARSH Date: 2026.05.11 12:09:44 -04'00'

_____ _____

Project Biologist (Requestor), Delaware Bay Coastal Program Date

VII. Reviewing ESFO Evaluation:

A. Concurrence X

B. Formal consultation required_____

C. Conference required_____

D. Informal conference required_____

E. Remarks (attach additional pages as needed):

JULIE SLACUM Digitally signed by JULIE SLACUM Date: 2026.05.12 12:47:01 -04'00'

_____ _____

Endangered Species Biologist (Reviewer), Chesapeake Bay Field Office Date

_____ _____

Endangered Species Biologist (Reviewer), Chesapeake Bay Field Office Date

Outlook

[EXTERNAL] Re: EFH and FWCA consultation for four salt marsh sites in Delaware

From Robert Bourdon - NOAA Federal <[redacted]
Date Wed 6/10/2026 11:08 AM
To Marsh, Brian [redacted]
Cc Ripple, Kaitlyn (Kaity) [redacted]

This email has been received from outside of DOI - Use caution before clicking on links, opening attachments, or responding.

Hi Brian,

Thank you for providing these consultation materials for our review. We view these proposed marsh modifications as minor and temporary disturbances to essential fish habitat that will result in net biological uplift. Therefore, we have no comment on the proposed actions.

Good luck with the project. If you ever need an extra hand in the field, keep me in mind. I'd be interested in helping out and seeing a few of the sites you are working on.

Thanks,
Rob

On Wed, May 13, 2026 at 4:14 PM Robert Bourdon - NOAA Federal [redacted] wrote:

> Hi Brian,
>
> Thanks for providing this information. I think it will be fine for us to consult on all of these locations at once even if you end up having to split them for USACE permitting. I'll review these materials soon and let you know if I need more information.
>
> Regards,
> Rob
>
> On Wed, May 13, 2026 at 1:30 PM Marsh, Brian [redacted] wrote:
>
> > Hi Rob -

We are proposing to do work at four salt marsh sites in Delaware. The sites are on the same planned timeline, all on DE Division of Fish and Wildlife lands, and mostly involve the same work so we've been thinking of them as a single project.

We plan to submit an application to the Corps for NWP27 approval around the end of June or early July so therefore are providing the attached materials to you for consultation on EFH and for FWCA. The EFH Mapper suggests a lot of EFH in the general project area but a review of the species habitat needs didn't suggest to us that EFH is present in the immediate areas we're working in.

We are planning on one application to the Corps. If for some reason we end up needing to submit separate applications to the Corps, let us know if consulting with you on them together is a problem.

Attached are project summaries of each site with site photos, monitoring plan, location maps, and plans. Also attached are the EFH list and EFH form. The EFH list showed the same list of species regardless of which of the four sites was used as the center point.

We have somewhat longer project narratives that provide more information than the attached summaries especially on the hydrology if you'd like more info.

The projects all involve two main actions. Ditch maintenance by shallow partial clearing out of select mosquito ditching that was created in the 1930s, or later in some cases. This would be done by hand for the smallest ditches or where the marsh surface is especially vulnerable. For larger ditches at two of the sites (Port Mahon and Cedar Creek), we propose using a pontoon excavator. Runneling is creating shallow channels between areas on the salt marshes that have started to pond water or remain saturated and ditches or other channels that are open to the tide. A third action is proposed just at Cedar Creek where we propose to remove accumulated peat like material from the north end of Slaughter Beach (aka Cedar Beach) and place it in low areas on the salt marsh. A study on that material was done in 2021 and also attached.

Happy to provide more info or we could show you these sites or the Prime Hook NWR site where the runneling and ditch maintenance were done this past winter.

-Brian

Brian Marsh
USFWS - Delaware Bay Coastal Program
2591 Whitehall Neck Road
Smyrna, DE 19977
mobile: [redacted]

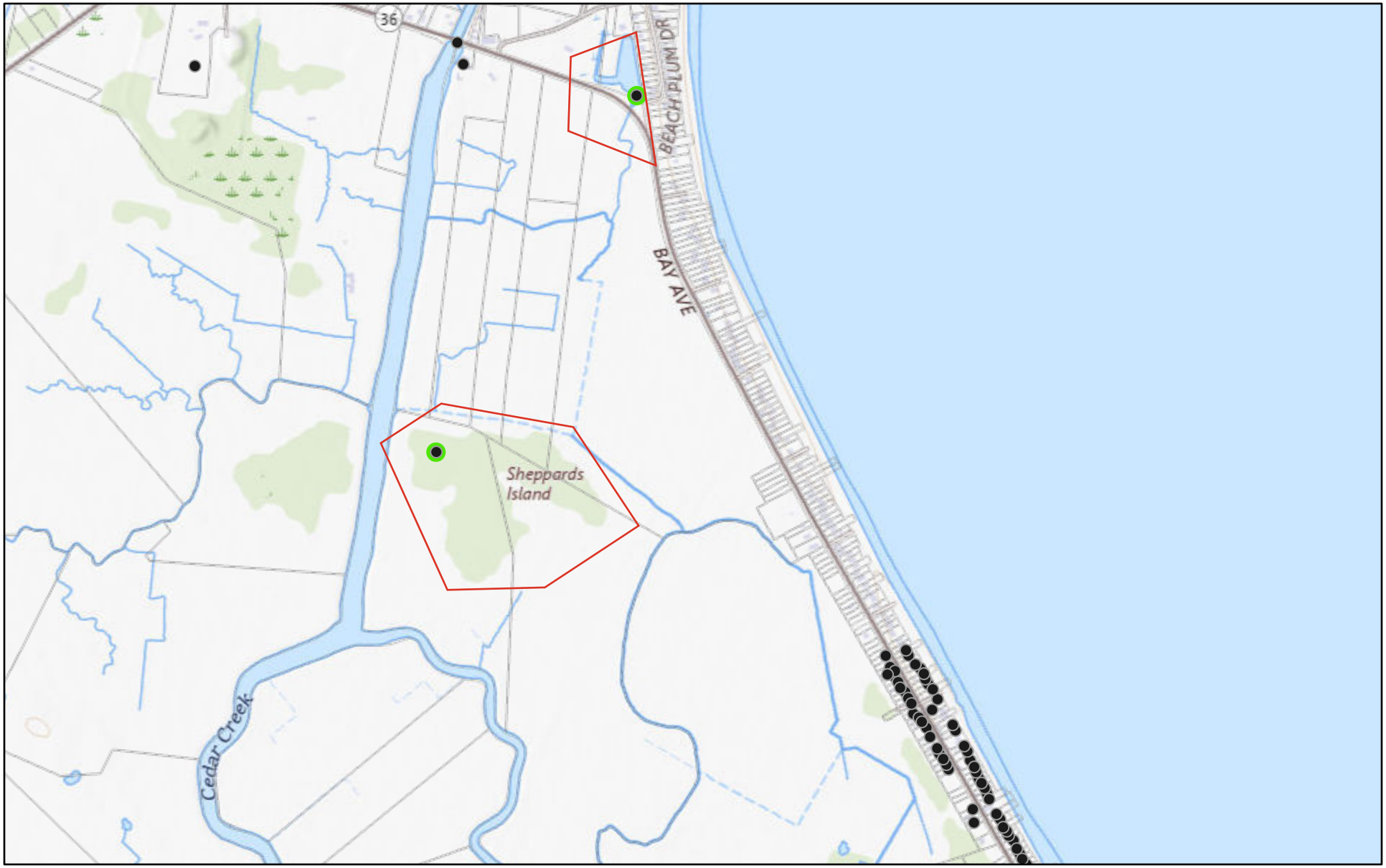
Brian Marsh
USFWS - Delaware Bay Coastal Program
2591 Whitehall Neck Road
Smyrna, DE 19977
mobile: [redacted]

--

Robert Bourdon
Marine Habitat Resource Specialist
Greater Atlantic Regional Fisheries Office
NOAA Fisheries | U.S. Department of Commerce
Office: [redacted]
www.fisheries.noaa.gov



Research/Edit Map (Basemap - USGS National Map)



September 8, 2026

1:18,056

0 0.1 0.2 0.4 mi

0 0.17 0.35 0.7 km

HistoricPropertySync

- other surveyed, assigned CRS inventory #

HistoricProperty_Archaeo

State Parcels

USGS The National Map: National Boundaries Dataset, 3DEP Elevation Program, Geographic Names Information System, National Hydrography

HCA
DELAWARE HISTORICAL & CULTURAL AFFAIRS

Delaware Division of Historical & Cultural Affairs
29 N. State St., Dover, Delaware 19901
Tel. (302) 736-7400 | Fax. (302) 739-5660
history.delaware.gov

October 28, 2026

Brian Marsh, Wildlife Biologist
US Fish and Wildlife Service – Delaware Bay Coastal Program
2591 Whitehall Neck Rd, Smyrna, DE 19977
Sent via email to: [redacted]

Subject: Salt Marsh Hydrological Modification, Buckaloo, Cedar Creek, Murderkill, Port Mahon
DE SHPO Project Review #2026.07.02.02, 2026.07.02.03, 2026.07.02.04, 2026.07.02.05

Dear Brian Marsh,

In response to the letter sent, the staff of the Delaware State Historic Preservation Office (DE SHPO) has reviewed the material submitted regarding the above cited project by the US Fish and Wildlife Service (FWS). The undertaking has been described to include the clearing of pre-existing ditches and excavation of new ditches and runnels in four locations in Delaware's salt marshes to improve natural hydrology. This undertaking is subject to compliance with Section 106 of the National Historic Preservation Act of 1966 (as amended).

The DE SHPO and FWS agreed to split the four locations that are part of this project as four separate projects for the DE SHPO's records. However, as the recommendations and conditions for these projects are connected, we are addressing all four undertakings in a single letter.

The four locations being considered for the undertakings described are Buckaloo Marsh north of Bowers Beach, a portion of marshland just south of Bowers Beach alongside the Murderkill River, an area just south of the town of Port Mahon, and an area just south of Cedar Beach alongside Cedar Creek. These areas are in the jurisdiction of the Delaware Department of Natural Resources and Environmental Control (DNREC).

At all four sites, older ditches that have not been maintained since approximately the mid-20th century are to be cleared of organic material and returned to their original dimensions, and new runnels of no deeper than six to twelve inches will be dug in strategic locations to improve water flow. At Cedar Creek, peat-like material from the nearby Cedar Beach will be harvested and placed within the Cedar Creek project area for beneficial habitat creation. The material grows over a large area, so the final collection locations will be selected based on where the material is concentrated and will be determined closer to the time of the undertaking. At Port Mahon, some new ditches will be dug to similar dimensions as the extant ditches. Heavy machinery will be used only at Cedar Creek and Port Mahon for these extra undertakings. The soil and other material collected from the project will be used within the project areas as beneficial habitat creation. The Areas of Potential Effect (APEs) for the four sites will include the area where the channels are being modified and runnels are being dug, along with any other ground disturbing work being done, as well as any access, staging, or stockpiling.

The extant ditches are mosquito and drainage ditches from approximately the 1920s and 30s and, based on archival research, most were dug by the Civilian Conservation Corps (CCC). There are also more modern ditches in the vicinity from the Delaware Open Marsh Water Management (OMWM) program that were mainly dug in the 1980s and 90s, but these are not being modified and thus are not being considered in this project. After consultation with the DE SHPO, DNREC, and FWS, all parties agreed that so long as the improvements to the ditches do not purposely change the original dimensions of the ditches, our Office has no concerns with this portion of the undertaking.

American Alliance of Museums Accredited Museum

All four project areas have a high potential for precontact archaeological resources. All four project areas are in the larger coastal salt marsh region which is known for both precontact and historic settlement and use. Three of the project areas have known archaeological sites within the APE or in the vicinity: The Buckaloo APE is in the vicinity of a known precontact site (7K-F-164). The Murderkill project area is in the vicinity of a large archaeological complex with mainly precontact but some historic components, and a site that is listed on the National Register for Historic Places (NR). There is a known archaeological site within the Cedar Creek APE (7S-A-012) and there is a known archaeological site in the vicinity of the wider location proposed for peat collection at Cedar Beach (7S-A-005).

Our Office has archaeological concerns about the ground disturbing work within the four project areas. However, due to the limited but widespread nature described for the undertakings, archaeological monitoring during work on portions of all four project areas shall be a condition of our concurrence. After consultation, our Office provided maps showing the loose areas of highest archaeological potential for the four sites. An SOI qualified archaeological monitor must be on site during any work in those areas. The SOI qualified archaeologist will sample portions of the soil excavated from digging the channels at Port Mahon and the runnels on all four sites as needed. If archaeological resources are identified during work, all work must stop and our Office and DNREC's cultural resource office are to be notified immediately. Once work has been completed, the monitor shall submit a report on their findings for the DE SHPO.

For Cedar Creek, as the archaeological site at Cedar Beach is only in the vicinity of a small portion of the overall potential collection area, please contact our Office once the peat collection locations have been determined to consider the need for further monitoring.

FWS has informed our Office that they are in the process of consulting with the Federally Recognized Tribes on their concerns and conditions.

So long as the conditions laid out in this letter are followed, our Office finds there to be No Adverse Effect to historic properties from the proposed undertaking. If you have any other questions at this time, please feel free to contact me at (302)-736-7437 or at Hannah.lewis@delaware.gov.

Sincerely,

Hannah Lewis

Hannah Lewis, Archaeologist, SHPO

cc: Gwen Davis, Deputy SHPO
Sarah Carr, Archaeologist, SHPO
Amy Wood, FWS
Esther Westfall, FWS
Kaitlyn Ripple, FWS
Taylor Reynolds, DNREC
Linda Seminario, DNREC

DELAWARE DEPARTMENT OF
NATURAL RESOURCES AND
ENVIRONMENTAL CONTROL

89 Kings Highway
Dover, DE 19901
302-739-9000
dnrec.delaware.gov

October 2, 2026

Brian Marsh

USFWS – Delaware Bay Coastal Program

2591 Whitehall Neck Road

Smyrna, DE 19977

Re: USFWS 2026 Cedar Creek Tract Salt Marsh Restoration

Dear Brian:

Thank you for contacting the Species Conservation and Research Program (SCRP) about information on rare, threatened and endangered species, unique natural communities, and other significant natural resources as they relate to the above referenced project.

State Natural Heritage Site

A review of our database indicates that there are currently no records of state-rare or federally listed plants, animals or natural communities at this project site. As a result, at present, this project does not lie within a State Natural Heritage Site, nor does it lie within a Delaware National Estuarine Research Reserve which are two criteria used to identify "Designated Critical Resource Waters" in the Army Corps of Engineers (ACOE) Nationwide Permit General Condition No. 22. A copy of this letter shall be included in any permit application or pre-construction notification submitted to the Army Corps of Engineers for activities on this property.

Marsh Restoration

Wetland restoration activities (e.g., beneficial use of dredge material)

Tidal wetland restoration activities, such as through the beneficial use of dredge material, can negatively affect marsh vegetation necessary for breeding marsh birds in the short-term, even if these activities aim to improve wetland condition in the long-term. Sediment application to the marsh surface, or associated construction activities, may also destroy marsh bird nests. Therefore, we recommend a time of year restriction of **April 1st to July 31st** to avoid impacts to marsh nesting birds.

Migratory Shorebirds (incl. Red Knot)

To date we have no records of migrating shorebirds using the wetlands at this site. However, prior research indicates federally protected red knot (*Calidris canutus*), may roost in marsh habitat behind the Delaware Bay shore beaches. We recommend avoiding work between **April 15th – June 7th** to mitigate disturbance to such species during their brief migration stopover in the Delaware Bay.

Fisheries

American Eel

Slaughter Creek is used by large numbers of American eel (*Anguilla rostrata)*. We request that in-stream work not take place from **March 1st to May 15th** to allow upstream passage of elvers (young eels).

Peat Removal (Slaughter Beach)

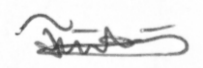
Migratory Shorebirds (incl. Red Knot)

Slaughter Beach provides critically important habitat for migratory shorebirds, including the federally-listed threatened red knot (*Calidris canutus rufa*). Red knot and other migrating shorebirds stop in Delaware to acquire food resources, including horseshoe crab eggs, and gain weight to optimize their body condition before completing their migration to Arctic nesting grounds. To avoid interrupting red knot activity during this critical stage of their migration, we recommend a time of year restriction of project activities between **April 15th to June 7th**. Note that because federally-listed threatened red knots may be affected, Section 7 consultation with the U.S. Fish and Wildlife Service (USFWS) may be necessary. For more species-specific information, please contact our Environmental Review team (DNREC_EnvReview@delaware.gov).

We are continually updating our records on Delaware's rare, threatened and endangered species, unique natural communities and other significant natural resources. If the start of the project is delayed more than a year past the date of this letter, please contact us again for the latest information.

Please feel free to contact me with any questions or if you require additional information.

Sincerely,



Faith Garcia

Environmental Review Coordinator

Phone: (302) 735-8665

Cell: (302) 443-3812

Email: christinefaith.garcia@delaware.gov

89 Kings Highway

Dover, DE 19901