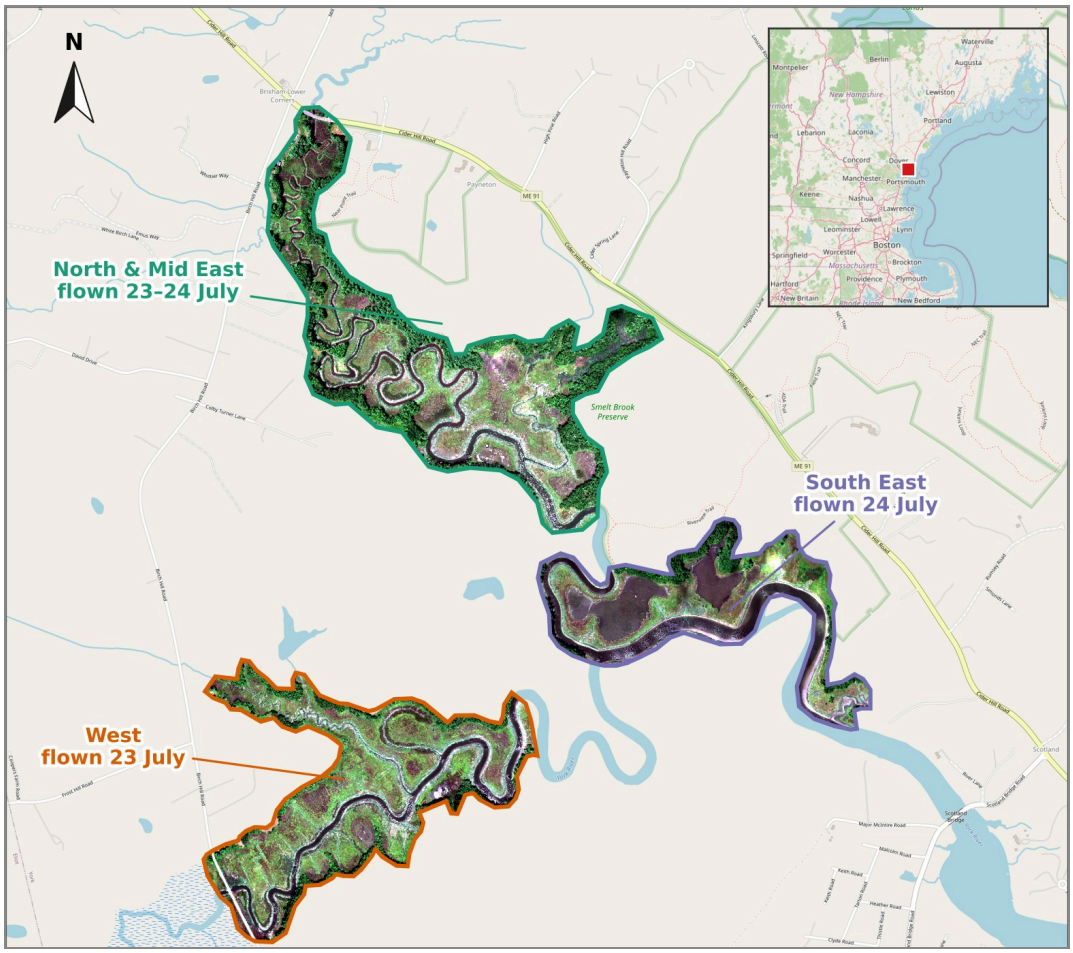
SUMMARY REPORT · OCTOBER 2026

York River Marsh 2026 baseline mapping

Land cover, salt-marsh pools and *Phragmites* from drone surveys flown 23–24 July 2026 in York, Maine: the pre-restoration baseline for the York River – Smelt Brook Salt Marsh Restoration Project.



PREPARED BY

Stefan Claesson, Ph.D.
Nearview, LLC

PREPARED FOR

York River Stewardship Committee
Under agreement with the Wells National Estuarine Research Reserve (WNERR)

Drone imagery: U.S. Fish and Wildlife Service, Gulf of Maine Coastal Program.
Funding: York River Stewardship Committee and the National Park Service Wild and Scenic Rivers Program.

NEAR VIEW

York River Marsh 2026 baseline mapping – summary report

Drone imagery flown on 23–24 July 2026 mapped the four project areas of the York River – Smelt Brook Salt Marsh Restoration Project, 132.7 acres, within 308 acres of marsh surveyed along the upper York River and Smelt Brook in York, Maine. These maps are the project's pre-restoration baseline. Repeating them in 2028 and 2030 will show how the marsh responds to restoration.

- **The four restoration project areas** (132.7 acres) are 83% vegetation. They hold 219 salt-marsh pools (16.5 acres) and 10 stands of the invasive common reed *Phragmites* (4.3 acres).
- **Two large ponds** in Area 2 make up most of that pool area, and most of the *Phragmites* (3.2 acres) is in Area 3.
- **Across the whole survey** (308 acres), vegetated marsh and forest cover 242 acres (79%), 263 pools cover 19 acres and 20 *Phragmites* stands 5.5 acres.
- The rest of the survey is **open water** in tidal channels and the river (32 acres), **bare mud or sand** (8.5 acres) and roads and structures (1 acre).

The project

The York River Stewardship Committee supports the restoration project, led by the Maine Coast Heritage Trust, for ~132 acres of salt marsh damaged by historic agricultural ditching and embankments. The marsh study and restoration area lies on York Land Trust preserves and on the Edkins parcel of the Rachel Carson National Wildlife Refuge. The three survey sections lie within about 2 miles (3 km) of each other on the upper York River, upstream of Scotland Bridge.

The restoration design by Northeast Wetland Restoration (December 2025) calls for filling in old ditches, digging small runnels to drain waterlogged areas, and controlling *Phragmites*. The monitoring approach uses drone surveys before restoration and in the years after, to track the results. This report turns the first of those surveys into a series of baseline maps needed to measure change over time.

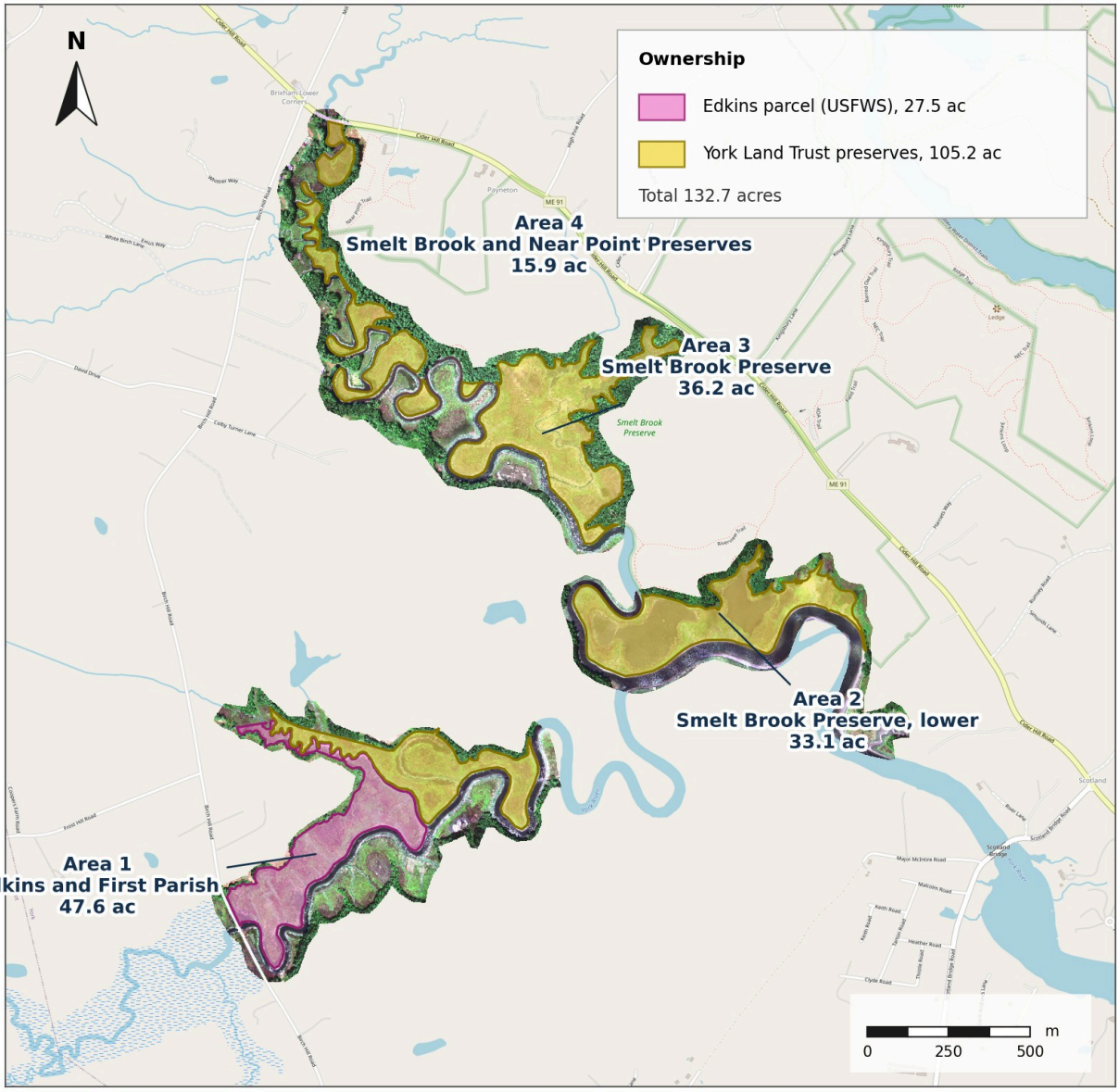
Nearview, LLC provided the mapping under an agreement with the Wells National Estuarine Research Reserve (WNERR) for the Stewardship Committee. The project team is the Stewardship Committee, York Land Trust, Maine Coast Heritage Trust, the U.S. Fish and Wildlife Service (USFWS) and the WNERR. Stefan Claesson (Ph.D.), Nearview LLC, served as the mapping analyst for the project.

Restoration project areas

The restoration design's four project areas cover 132.7 acres, all mapped by the 2026 survey. They hold 219 of the survey's 263 pools and 4.3 of its 5.5 acres of *Phragmites*, and vegetation covers 83% of their area.

York River - Smelt Brook restoration project areas

Project areas of the restoration design (Northeast Wetland Restoration, 2025) over the July 2026 drone survey



Project areas: Northeast Wetland Restoration (2025), for the York River Stewardship Committee.
Drone imagery: U.S. Fish and Wildlife Service, Gulf of Maine Coastal Program. Basemap: © OpenStreetMap contributors.
Map: Nearview, LLC. NAD83(2011) / Maine West (ftUS), EPSG:6486.

Project area	Area (acres)	Vegetation	*Phragmites*	Salt-marsh pools	Open water in channels	Bare mud or sand	Other
1 – Edkins (USFWS) and First Parish	47.6	45.46 (96%)	1.01 (2%), 4 stands	0.85 (2%), 51 pools	0.05 (0.1%)	0.20 (0.4%)	0.02 (<0.1%)
2 – Smelt Brook Preserve, lower	33.1	19.99 (60%)	none	12.52 (38%), 50 pools	0.01 (<0.1%)	0.58 (2%)	0.02 (0.1%)
3 – Smelt Brook Preserve	36.2	29.39 (81%)	3.15 (9%), 5 stands	3.13 (9%), 113 pools	0.22 (1%)	0.28 (1%)	<0.01
4 – Smelt Brook and Near Point Preserves	15.9	15.61 (98%)	0.07 (0.4%), 1 stand	0.02 (0.1%), 5 pools	0.03 (0.2%)	0.13 (1%)	<0.01
All areas	**132.7**	**110.45 (83%)**	**4.23 (3%), 10 stands**	**16.52 (12%), 219 pools**	**0.30 (0.2%)**	**1.19 (1%)**	**0.04 (<0.1%)**

Each class is given in acres and its share of the restoration area; the classes add up to the area, all of which was mapped. Areas 2–4 and the First Parish parcels of Area 1 belong to the York Land Trust. Pools and stands are counted when any part lies inside an area: every pool lies wholly inside one area, and five of the ten stands cross an area boundary. Highlights of each area:

- **Area 1.** Its 27.5-acre USFWS Edkins parcel holds all 1.0 acre of the area's *Phragmites*; the 20.1 acres of York Land Trust First Parish parcels have none.
- **Area 2.** The two large ponds make up most of its 12.5 acres of pools, more than a third of the area. No *Phragmites* is mapped here.
- **Area 3.** It holds most of the restoration areas' *Phragmites*, 3.2 acres, including nearly all of the survey's largest stand (2.6 acres), and 113 pools.
- **Area 4.** It is almost entirely vegetated, with five small pools and the edge of one small *Phragmites* stand.

Project area maps

Each map shows the land-cover classes inside one project area over the full drone imagery and a street map, so the area can be seen in its setting. These four maps and an overview map are also delivered as a slide deck.

Restoration project area 1 – Edkins and First Parish

47.6 acres, West section: all-classes classification inside the project area, over the 2026 USFWS drone orthomosaic



Classes inside the project area

Open water - channel / river	0.05 ac
Mud / sand	0.20 ac
Pool - open water	0.34 ac
Pool - mud / sand	0.51 ac
Vegetation	45.46 ac
Phragmites - likely	1.01 ac
Other	0.02 ac
Project area boundary	

Project area 47.6 acres, all mapped: 51 salt-marsh pools and 4 Phragmites stands, counted where any part lies inside. Classes at 80 % opacity (vegetation 55 %).

N

scale 1:6,000 at 13.33 x 7.5 in

0 150 300 m

NEAR VIEW

Imagery and DSM: U.S. Fish and Wildlife Service, Gulf of Maine Coastal Program; Sentera 6X, 5.5 cm, flown 23 July 2026.
Classification: Nearview, LLC.
Project areas: restoration design, Northeast Wetland Restoration (2025).
Basemap: © OpenStreetMap contributors.
Funding for this project was provided by the York River Stewardship Committee and the National Park Service Wild and Scenic Rivers Program.
NAD83(2011) / Maine West (ftUS), EPSG:6486

Restoration project area 2 – Smelt Brook Preserve, lower

33.1 acres, South East section: all-classes classification inside the project area, over the 2026 USFWS drone orthomosaic



Classes inside the project area

Open water - channel / river	0.01 ac
Mud / sand	0.58 ac
Pool - open water	11.82 ac
Pool - mud / sand	0.69 ac
Vegetation	19.99 ac
Phragmites - likely	-
Other	0.02 ac

Project area boundary

Other project area (not coloured)

Project area 33.1 acres, all mapped: 50 salt-marsh pools and no Phragmites stands, counted where any part lies inside. Classes at 80 % opacity (vegetation 55 %).

N

scale 1:4,500 at 13.33 x 7.5 in

0 100 200 m

NEARVIEW

Imagery and DSM: U.S. Fish and Wildlife Service, Gulf of Maine Coastal Program; Sentera 6X, 5.5 cm, flown 24 July 2026.
Classification: Nearview, LLC.
Project areas: restoration design, Northeast Wetland Restoration (2025).
Basemap: © OpenStreetMap contributors.
Funding for this project was provided by the York River Stewardship Committee and the National Park Service Wild and Scenic Rivers Program.
NAD83(2011) / Maine West (ftUS), EPSG:6486

Restoration project area 3 – Smelt Brook Preserve

36.2 acres, North & Mid East section: all-classes classification inside the project area, over the 2026 USFWS drone orthomosaic



Classes inside the project area

Open water - channel / river	0.22 ac
Mud / sand	0.28 ac
Pool - open water	1.95 ac
Pool - mud / sand	1.18 ac
Vegetation	29.39 ac
Phragmites - likely	3.15 ac
Other	< 0.01 ac

Project area boundary

Other project area (not coloured)

Project area 36.2 acres, all mapped: 113 salt-marsh pools and 5 Phragmites stands, counted where any part lies inside. Classes at 80 % opacity (vegetation 55 %).

N

scale 1:4,900 at 13.33 x 7.5 in

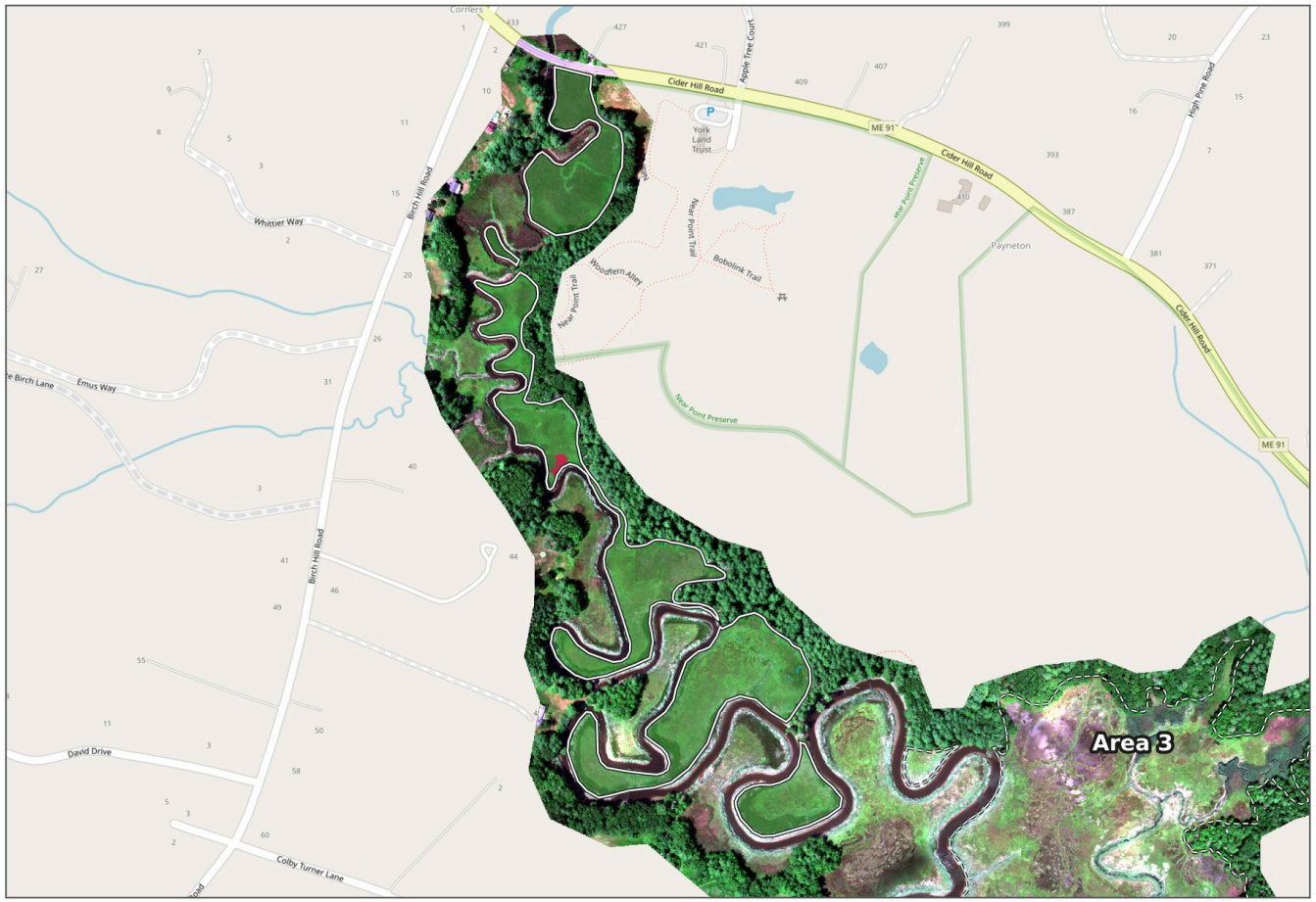
0 125 250 m

NEAR VIEW

Imagery and DSM: U.S. Fish and Wildlife Service, Gulf of Maine Coastal Program; Sentera 6X, 5.5 cm, flown 23–24 July 2026.
Classification: Nearview, LLC.
Project areas: restoration design, Northeast Wetland Restoration (2025).
Basemap: © OpenStreetMap contributors.
Funding for this project was provided by the York River Stewardship Committee and the National Park Service Wild and Scenic Rivers Program.
NAD83(2011) / Maine West (ftUS), EPSG:6486

Restoration project area 4 – Smelt Brook and Near Point Preserves

15.8 acres, North & Mid East section: all-classes classification inside the project area, over the 2026 USFWS drone orthomosaic



Classes inside the project area

Open water - channel / river	0.03 ac
Mud / sand	0.13 ac
Pool - open water	0.01 ac
Pool - mud / sand	0.01 ac
Vegetation	15.61 ac
Phragmites - likely	0.07 ac
Other	< 0.01 ac
Project area boundary	
Other project area (not coloured)	

Project area 15.8 acres, all mapped: 5 salt-marsh pools and 1 Phragmites stand, counted where any part lies inside. Classes at 80 % opacity (vegetation 55 %).

N

scale 1:6,600 at 13.33 x 7.5 in

0 150 300 m

NEAR VIEW

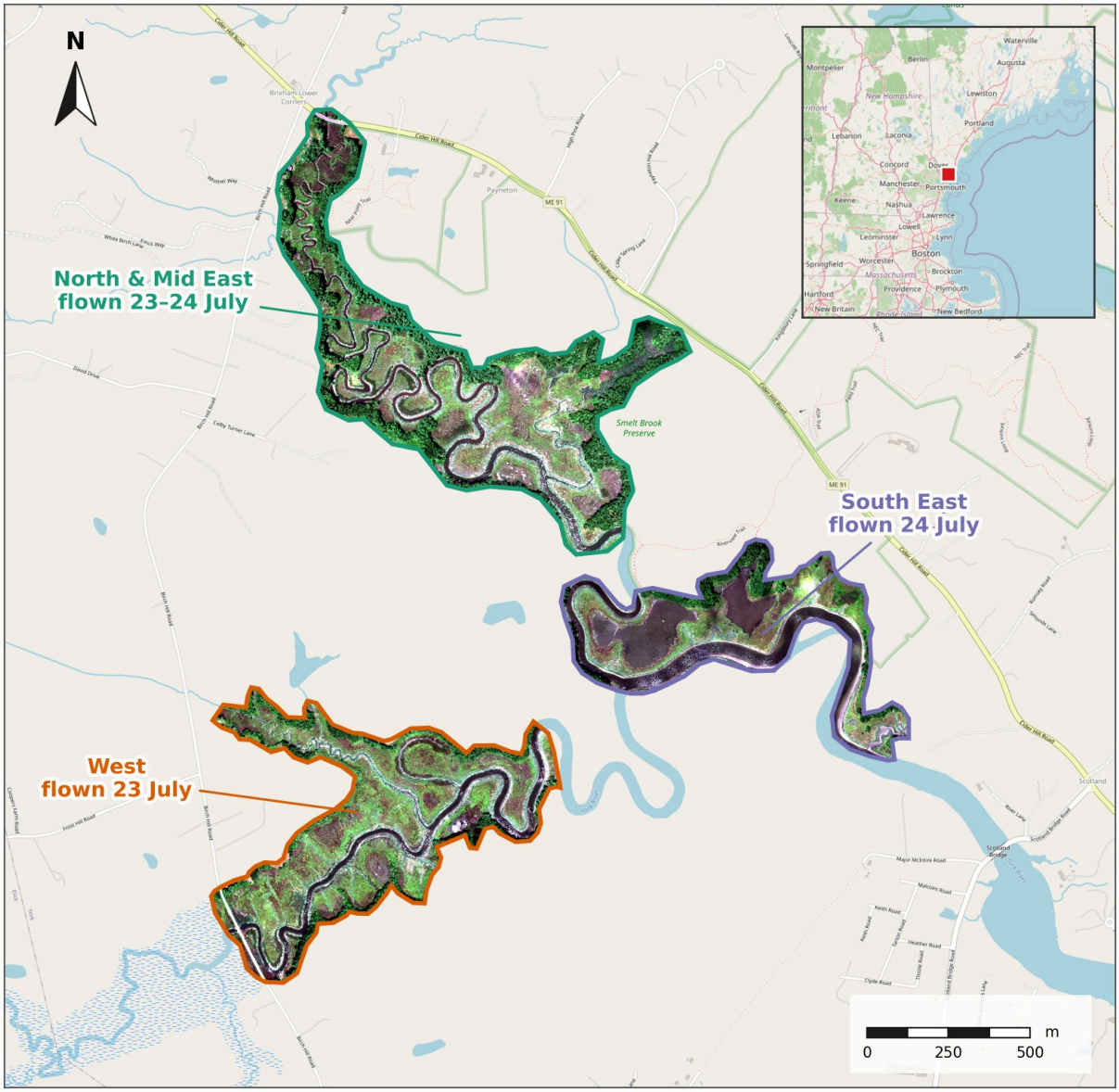
Imagery and DSM: U.S. Fish and Wildlife Service, Gulf of Maine Coastal Program; Sentera 6X, 5.5 cm, flown 23–24 July 2026.
Classification: Nearview, LLC.
Project areas: restoration design, Northeast Wetland Restoration (2025).
Basemap: © OpenStreetMap contributors.
Funding for this project was provided by the York River Stewardship Committee and the National Park Service Wild and Scenic Rivers Program.
NAD83(2011) / Maine West (ftUS), EPSG:6486

The whole survey

The drone survey mapped 308 acres of marsh in three sections, including all four restoration project areas. The sections differ most in their open water: South East is one-fifth open water and holds the two largest ponds, while North & Mid East and West are more than four-fifths vegetated.

York River Marsh – survey sections

Drone survey by the U.S. Fish and Wildlife Service, 23–24 July 2026, York, Maine



Drone imagery: U.S. Fish and Wildlife Service, Gulf of Maine Coastal Program. Basemap and inset: © OpenStreetMap contributors.
Map: Nearview, LLC. NAD83(2011) / Maine West (ftUS), EPSG:6486.

Section	Area mapped (acres)	Vegetation	*Phragmites*	Salt-marsh pools	Open water in channels	Bare mud or sand	Other
North & Mid East	133.4	112.7 (85%)	3.4 (3%), 7 stands	4.5 (3%), 156 pools	9.9 (7%)	2.5 (2%)	0.4 (0.3%)
South East	71.0	40.0 (56%)	none	12.5 (18%), 50 pools	14.4 (20%)	4.1 (6%)	<0.1
West	103.4	89.1 (86%)	2.0 (2%), 13 stands	1.8 (2%), 57 pools	8.0 (8%)	1.9 (2%)	0.6 (1%)
All sections	**307.8**	**241.8 (79%)**	**5.4 (2%), 20 stands**	**18.9 (6%), 263 pools**	**32.2 (10%)**	**8.5 (3%)**	**1.0 (0.3%)**

Each class is given in acres and its share of the section's mapped area; the classes add up to the area mapped. Salt-marsh pools include their water and their exposed mud; open water and mud outside pools are counted separately. The *Phragmites* class covers 5.4 of the stands' 5.5 acres, because water and bare ground inside a stand keep their own class. Highlights of each section:

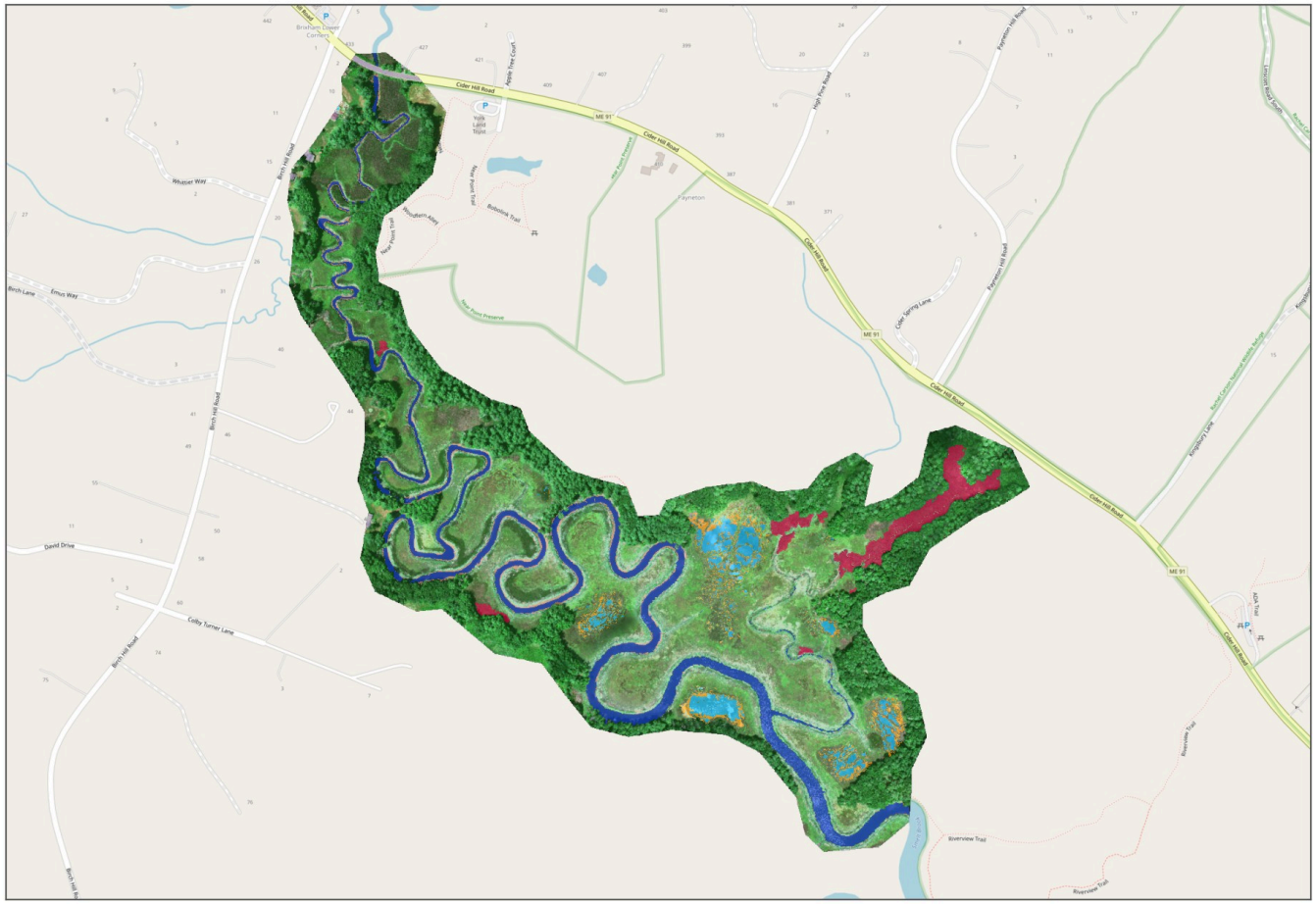
- **North & Mid East.** Most of its 156 pools are small: 130 are under about 1,100 square feet. The largest *Phragmites* stand of the survey, 2.6 acres, lies at the east end of this section.
- **South East.** Two ponds of 6.6 and 3.8 acres hold most of the section's pool area. No *Phragmites* is mapped here.
- **West.** Pools are few and small; the largest is half an acre. The 13 *Phragmites* stands mostly cluster in the southwest corner, around the Birch Hill Road crossing.

Maps

Each map shows the classes over the drone imagery, on a street map for orientation. Vegetation is drawn lightly so the marsh surface shows through.

York River Marsh – North & Mid East section

Land cover, salt-marsh pools and Phragmites stands – all-classes classification of the 2026 USFWS drone survey



Classes

Open water - channel / river	9.86 ac
Mud / sand	2.47 ac
Pool - open water	2.82 ac
Pool - mud / sand	1.68 ac
Vegetation	112.74 ac
Phragmites - likely	3.41 ac
Other	0.38 ac

mapped area 133.4 acres; classes drawn at 65 % opacity (vegetation 35 %) over the drone orthomosaic

N

scale 1:9,700 at 13.33 x 7.5 in

0 250 500 m

NEAR VIEW

Imagery and DSM: U.S. Fish and Wildlife Service, Gulf of Maine Coastal Program; Sentera 6X, 5.5 cm, flown 23–24 July 2026.
Classification: Nearview, LLC.
Basemap: © OpenStreetMap contributors.
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NAD83(2011) / Maine West (ftUS), EPSG:6486

York River Marsh – South East section

Land cover, salt-marsh pools and Phragmites stands – all-classes classification of the 2026 USFWS drone survey



Classes

	Open water - channel / river	14.41 ac
	Mud / sand	4.12 ac
	Pool - open water	11.82 ac
	Pool - mud / sand	0.69 ac
	Vegetation	39.95 ac
	Phragmites - likely	-
	Other	0.02 ac

mapped area 71.0 acres; classes drawn at 65 % opacity (vegetation 35 %) over the drone orthomosaic

N

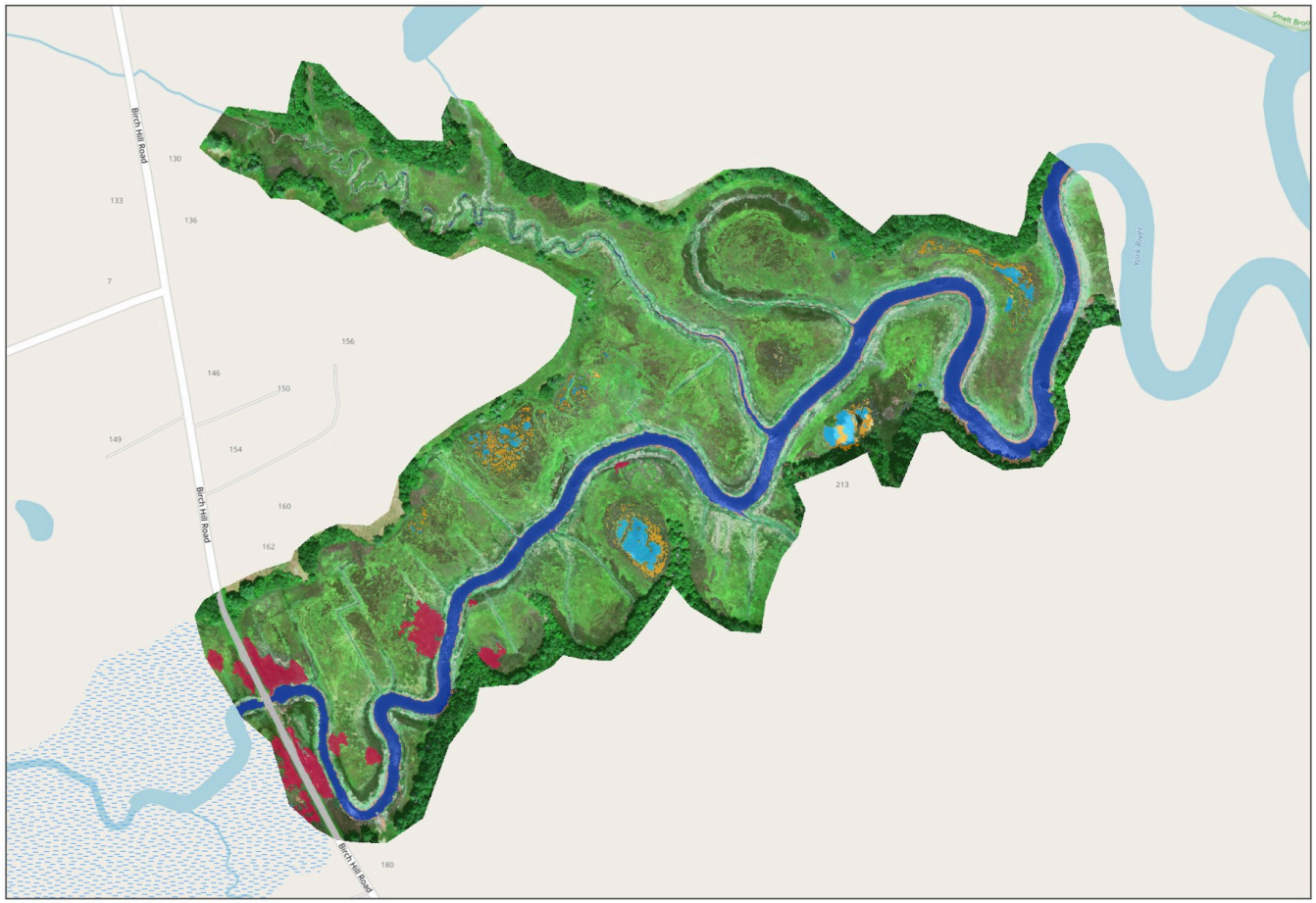
scale 1:5,200 at 13.33 x 7.5 in

0 125 250 m

Imagery and DSM: U.S. Fish and Wildlife Service, Gulf of Maine Coastal Program; Sentera 6X, 5.5 cm, flown 24 July 2026.
Classification: Nearview, LLC.
Basemap: © OpenStreetMap contributors.
Funding for this project was provided by the York River Stewardship Committee and the National Park Service Wild and Scenic Rivers Program.
NAD83(2011) / Maine West (ftUS), EPSG:6486

York River Marsh – West section

Land cover, salt-marsh pools and Phragmites stands – all-classes classification of the 2026 USFWS drone survey



Classes

	Open water - channel / river	7.96 ac
	Mud / sand	1.90 ac
	Pool - open water	0.95 ac
	Pool - mud / sand	0.89 ac
	Vegetation	89.08 ac
	Phragmites - likely	2.02 ac
	Other	0.62 ac

mapped area 103.4 acres; classes drawn at 65 % opacity (vegetation 35 %) over the drone orthomosaic

N

scale 1:6,600 at 13.33 x 7.5 in

0 150 300 m

NEARVIEW

Imagery and DSM: U.S. Fish and Wildlife Service, Gulf of Maine Coastal Program; Sentera 6X, 5.5 cm, flown 23 July 2026.
Classification: Nearview, LLC.
Basemap: © OpenStreetMap contributors.
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NAD83(2011) / Maine West (ftUS), EPSG:6486

How the maps were made

USFWS flew a drone with a multispectral camera over three sections of marsh: West on 23 July, South East on 24 July, and North & Mid East over both days. The camera recorded blue, green, red, red-edge and near-infrared light at about 2 inches (5.5 cm) per pixel. Healthy plants reflect near-infrared strongly and water absorbs it, which is what lets a computer model tell them apart. The same photos, using Structure from Motion (SfM), also produced a model of surface height, or a Digital Surface Model (DSM).

All flights were around midday and within about two hours of low tide, on small (neap) tides.

Section (flight)	Date	Time (EDT)	Tide	Tide height, start to end (ft)
West	23 July	12:14–1:16 pm	Falling, in the last hour before low tide (1:20 pm)	2.1 to 1.7
North & Mid East (Northeast flight)	23 July	2:25–3:17 pm	Rising, 1 to 2 hours after low tide (1:20 pm)	2.2 to 3.2
North & Mid East (Mid East flight)	24 July	12:13–12:49 pm	Falling, 1½ to 2 hours before low tide (2:18 pm)	3.3 to 2.7
South East	24 July	2:00–2:36 pm	At low tide (2:18 pm)	1.9

Tides are NOAA predictions for York Harbor, the tide station nearest to the project area, at the mouth of the river (station 8419518). NOAA only predicts the tide there and does not measure the water level. Heights are in feet above mean lower low water (MLLW). High tides on the two days reached 7.4 to 8.7 ft, so every flight fell in the lowest quarter of the tide. The marsh lies upriver, where the tide runs somewhat later than at the river mouth. The nearest station that measures water level (Seavey Island, Kittery, station 8419870) read within 0.2 ft of its own prediction. Any available water level logger data from the restoration area will help to more precisely measure the tide levels.

1. **Water, mud and vegetation.** Rules based on the light each surface reflects sort every pixel into open water, bare mud or sand, vegetation, or other (roads and structures).
2. **Pools.** Bare or flooded patches sitting on the marsh surface are mapped as salt-marsh pools. Tidal creeks are separated from pools by how deeply they cut below the marsh, measured on the DSM.
3. ***Phragmites*.** A machine-learning model learned what *Phragmites* looks like from 100 patches of reed and 369 look-alike patches (such as cattail and tall cordgrass) that the analyst identified, with limited field spot checks. It then mapped stands across all three sections. Only stands the model rates at least 70% likely to be *Phragmites* are reported.
4. **Review and corrections.** The analyst checked the maps against the imagery and hand-corrected what the rules could not get right: tree shadows, glare on water, seams in the imagery, dead plant mats and wrack. The 188 corrections changed 2.2 acres.

What the maps can and cannot tell you

The maps are a detailed picture of the marsh in late July 2026, suited to planning and to measuring change. Read them with five limits in mind.

- **One moment in time.** Water and bare mud depend on the tide and the season. These maps show them near low tide on small tides. Later surveys should be flown at a similar or lower tide to be comparable.
- **Checked, but not field-surveyed.** The analyst reviewed every section against the imagery and spot checked *Phragmites* in the field. No independent field survey has measured the maps' accuracy. A sample of field points for *Phragmites* (live and dead) would provide an accuracy assessment.
- **Small features.** Pools smaller than about 20 square feet and *Phragmites* stands smaller than about 110 square feet are not mapped. Narrow creeks hidden under grass or trees can be missed.
- **Heights are relative.** The height model is reliable for how far a creek or pool sits below the surrounding marsh, not for true elevations.
- **Dead *Phragmites*.** The maps show live stands only: dead *Phragmites* was either absent when the drone flew in July 2026 or is not yet known, and no fully dead stands have been reported. Field points taken at a Smelt Brook stand on 13 October 2026 found green, living reed with dormant stems mixed throughout, but no dead (i.e., as a result of herbicide application) or patches of senescent *Phragmites*.

Data deliverables

The data come in two packages, one for the restoration project areas and one for the whole survey. Each is a zip file holding this report, a README that lists every file, and a QGIS project with the data styled and ready to open. Each GIS dataset is delivered with FGDC-standard metadata describing how it was made, and can be opened directly in ArcGIS or QGIS.

Restoration project areas package

The survey data clipped to the four project areas, one folder per area.

Dataset	What it holds	Format
Project areas	The four project areas of the restoration design and their five ownership units	Shapefiles
Project-area figures	Land cover, pools, channels and *Phragmites* for each area, each ownership unit and in total (the figures in the project-area table above)	Table (CSV)
Survey data, per project area	Each dataset of the whole-survey package clipped to the area: land-cover map and polygons, pools and channels, *Phragmites* stands and orthomosaics	GeoTIFF, shapefiles and tables
Map slides	An overview map and the four project area maps above	PDF and PowerPoint

Whole survey package

The three survey sections in full.

Dataset	What it holds	Format
Land-cover map, per section	The classes on a 2-inch (5.5 cm) grid	GeoTIFF and ENVI raster
Land-cover polygons, per section	The land-cover map above, converted to vector polygons: one shape for each patch of a class, with its class and area	Shapefiles
Salt-marsh pools and tidal channels, per section	One record per pool, with its size, water and mud area	Shapefiles
Phragmites stands, all sections	The 20 stands, with area and the model's confidence	Shapefile, table and KMZ for Google Earth
Class areas, per section	The area of each class in each section (the figures in the whole-survey table above)	Table (CSV)
Orthomosaics, per section	The USFWS drone imagery on the same grid: all five bands for analysis, plus true-colour and colour-infrared copies for viewing	Cloud-Optimized GeoTIFF
Project-area outlines	The four restoration project areas and their ownership units, for reference	Shapefiles
Map slides	The three section maps above	PDF and PowerPoint

Acknowledgements

Funding for this project was provided by the York River Stewardship Committee and the National Park Service Wild and Scenic Rivers Program.

Drone imagery and the height model: U.S. Fish and Wildlife Service, Gulf of Maine Coastal Program. Mapping and report: Nearview, LLC. Restoration design: Northeast Wetland Restoration. Tide predictions: NOAA. Street map: © OpenStreetMap contributors.