

# The Accelerating Erosion of Dyke Marsh

## BASIC FINDINGS OF THE U.S. GEOLOGICAL SURVEY STUDY

In 1940, the wetland known as Dyke Marsh was around 180 acres. By 2010, it was around 53 acres.

It is eroding six to eight feet or 1.5 to two acres per year on average. "Analysis of field evidence, aerial photography, and published maps has revealed an accelerating rate of erosion and marsh loss at Dyke Marsh, which now appears to put at risk the short term survivability of this marsh." - USGS

*At this rate, Dyke Marsh could be gone in 30-40 years.*

Dredging of sand and gravel from 1940 to 1972 was a strong destabilizing force, transforming it from a net depositional state to a net erosional state. Dredging removed around 101 acres or 54 percent of the 1937 marsh.

Erosion is both continuous and episodic. The changes caused by dredging have made the marsh subject to significant erosion by storm waves, especially from winds traveling upriver. Damaging storms occur approximately every three years.

Dredging out a promontory removed the geologic wave protection of the south marsh that existed back to at least 1864 and altered the size and function of the tidal creek network.

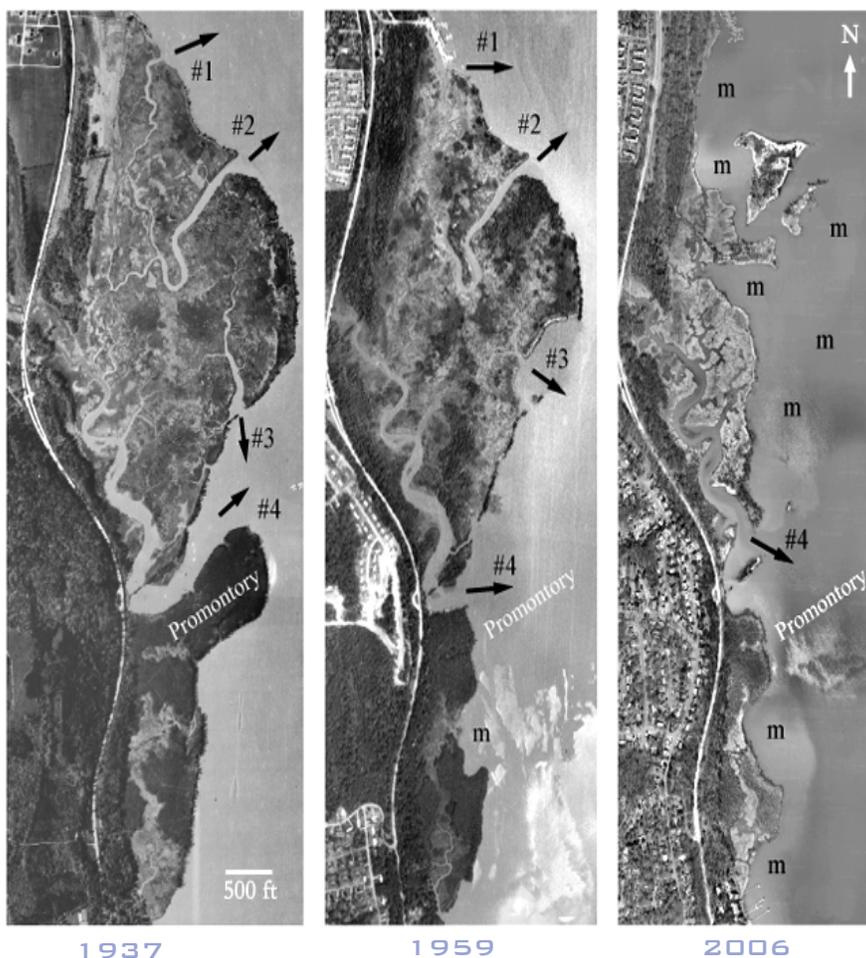
"This freshwater tidal marsh has shifted from a semi-stable net depositional environment (1864-1937) into a strongly erosional one . . . The marsh has been deconstructed over the past 70 years by a combination of manmade and natural causes. The marsh initially experienced a strong destabilizing period between 1940 and 1972 by direct dredge mining of the marsh surface. By 1976 the marsh had entered a net destructive phase, where it remains at present." - USGS

The minimal protection needed to protect and enhance natural deposition includes a wave break in the location of the former promontory.



Ned Stone

Dyke Marsh shoreline erosion



1937

1959

2006

The USGS study can be found at: [www.pubs.usgs.gov/of/2010/1269](http://www.pubs.usgs.gov/of/2010/1269).

*Analysis of the Deconstruction of Dyke Marsh, George Washington Memorial Parkway, Virginia: Progression, Geologic and Manmade Causes, and Effective Restoration Scenarios.* By Ronald J. Litwin, Joseph P. Smoot, Milan J. Pavich, Helaine W. Markewich, Erik Oberg, Ben Helwig, Brent Steury, Vincent L. Santucci, Nancy J. Durika, Nancy B. Rybicki, Katharina M. Engelhardt, Geoffrey Sanders, Stacey Verardo, Andrew J. Elmore, and Joseph Gilmer

## WHAT, WHERE IS DYKE MARSH?

The Dyke Marsh Wildlife Preserve is a 480-acre freshwater, tidal wetland ecosystem on the Virginia shoreline of the Potomac River in northern Mount Vernon district, Fairfax County, Virginia, two miles south of Alexandria. It is a unit of the George Washington Memorial Parkway, managed by the U.S. National Park Service, U.S. Department of Interior. Congress added it to the National Park Service system in 1959 “so that fish and wildlife development and their preservation as wetland wildlife habitat shall be paramount.” (P.L. 86-41)



Inlet at Dyke Marsh in the spring



Left: Tiger Swallowtail Butterfly feeds on a Turk's Cap Lily. Right: Osprey with fresh catch



Black and Yellow Garden Spider, aka the Writing Spider

## WHY RESTORE DYKE MARSH?

### The Dyke Marsh Wetland Is Unstable

A 2010 U.S. Geological study found that in 1940, the wetland known as Dyke Marsh spanned about 180 acres. By 2010, it had declined to 53 acres. The marsh is losing 1.5 to two acres a year and could disappear in 30 to 40 years without action ([www.pubs.usgs.gov/of/2010/1269](http://www.pubs.usgs.gov/of/2010/1269)). The U.S. National Park Service (NPS) has prepared four restoration options ([www.parkplanning.nps.gov/gwmp](http://www.parkplanning.nps.gov/gwmp)) and is now finalizing a plan.

### Rare

Dyke Marsh is a rare, freshwater, tidal wetland along the Virginia shoreline of the Potomac River in the Washington, D.C., area, one of the most highly-valued habitats in the region. It is one of the most significant temperate, climax, riverine, narrow-leafed, cattail marshes in the U.S. national park system. According to USGS scientists, the southern part of Dyke Marsh is at least 2,200 years old. Other parts of Dyke Marsh, such as the northern part, are around 500 years old, having survived in a large, heavily-developed, metropolitan area.

### Habitat Loss Means Species And Opportunities Lost

Over the years, there has been a decline in many species and some have become extinct in Dyke Marsh. Dyke Marsh supports the only known nesting population of marsh wrens (*Cistothorus palustris*) in the upper Potomac tidal zone, a species once found in many of the marshes that lined the Potomac River. In 1950, 87 singing males were counted. In 2012, two nests were found. The least bittern, which also nests in Dyke Marsh, is on Virginia's threatened species list. A restored



Clockwise from top left: Red Fox, Bullfrog, Muskrat, Eastern Amberwing, King Snake

## THE MARSH WREN— LOSS OF HABITAT, LOSS OF BIRDS

It's a little brown bird that lives in marsh cattails, bulrushes or cordgrass, and known for its calls. Some people hear a rusty hinge. Others say it's a sputtering, bubbling trill. Other fans liken the call to a clattering sewing machine, a guttural rattle or a liquid gurgle, ending in chatter. It can be a loud little bird, especially on a spring night.

It is the marsh wren (*Cistothorus palustris*), once a common bird in the Dyke Marsh Wildlife Preserve. The Preserve today supports the only known nesting population of marsh wrens in the upper Potomac River tidal zone.

National Park Service biologist Brent Steury wrote, “Marsh wrens are cute little brown-eyed birds not much over five inches long and weigh in at about half an ounce. Their dark brown cap rests atop a bold white supercilium, or eyebrow, that broadens as it extends from the base of the bill to the base of the neck. The body is chestnut, with a black, white streaked cape over the shoulders. The throat is nearly white and the belly pale buff. Sexes are identical. Active and noisy, they flutter rapidly among the cattails, often observed when perched with splayed legs, each foot tightly clasping a separate stem, bill agape in loud unmistakable song.” They usually hold their tails upright or often almost laying on the back, a distinctive trait.

Marsh wrens breed in fresh and brackish marshes, usually in areas of dense, reedy vegetation. They construct elaborate football-shaped nests with round openings by weaving grasses or cattail leaves in a circular manner anchored to reeds or cattails a few feet above the water. The male builds several “dummy nests” nearby, presumably to trick predators.

Seeing a marsh wren can be challenging, except during the breeding season, when males perform aerial displays before alighting on singing perches on the perimeters of their claimed breeding territories or when building one of their dummy nests. They often flit around furtively, popping up now and then to look around.



Marsh Wren

### A Steady, Sad Decline

The Dyke Marsh Wildlife Preserve was once popping with marsh wrens. In the late 1800s, observers reported of hundreds of globular marsh wren nests affixed to reeds in the wetlands that lined the Potomac River, wetlands now largely gone.

Louis Halle, who biked from Washington, D.C., to Dyke



Least Bittern is one of the world's smallest herons

In 1950, surveyors counted 87 singing males in Dyke Marsh. “Thirty-one territories were located in 1998 and 34 in 1999. The minimum estimated population size for 1998 was 38 (34 territorial males and seven breeding females); and for 1999, 48 (34 territorial males and 14 breeding females),” wrote Sandy C. Spencer in her 2000 master's degree thesis for George Ma-

Marsh, extolled this little bird in his 1947 Spring in Washington: “We heard the wrens this morning before there was light to see them. All over the marshes we heard them, singing in a steady chorus, each song a gurgling chatter, brief but repeated with hardly time for breath between. When it became light enough, we saw the singing wrens as far as the eye could reach over the marshes, carried upward on fluttering wings above the grass-tops by the very exuberance of their song, and sinking back again. The dots were bobbing up and down everywhere, like a natural effervescence given off by the marsh.”

son University. (Spencer is now Supervisory Wildlife Biologist at the Patuxent Research Refuge.)

In 2007, surveyors found six established territories; in 2008, 10 breeding pairs; in 2010 and 2011, 12 established territories, but in these years, surveyors probably did not cover the same areas. In the 2012 survey, Larry Cartwright, head of FODM's annual breeding bird survey, confirmed only two active nests and reported that surveyors saw or heard eight territorial males and possibly two to four more, conservative estimates he believes. In 2014, there may have been at least 16 territorial males and a minimum of six nests on the north side of the Haul Road peninsula. Additional nests were likely obscured by the thick vegetation. South of the Haul Road peninsula, marsh wrens have been present in small numbers or entirely absent.

As Dyke Marsh erodes away, a major factor in the marsh wren's decline is loss of habitat. Spencer offered this guidance in 2000: “Available habitat comprises only 12 percent of the entire preserve, but actual use by marsh wrens for nesting territories was only 3.6 percent in 1999, because of very narrow habitat selection preferences (tall, dense, emergent vegetation adjacent to water). Protection of the remaining habitat from reduction or degradation due to expansion of invasive plants and erosion and restoration of lost habitat are strongly recommended to ensure persistence of this population over the long term.”

Dyke Marsh can provide expanded habitats for birds, fish, other wildlife and plants and increase biodiversity and opportunities for recreation, education and scientific study.

### Cleaner Water

The restoration of Dyke Marsh can help improve water quality in the Potomac River and the Chesapeake Bay because wetlands filter out pollutants and sediment loads from stormwater runoff. The Potomac provides drinking water to over five million people in the Washington area. Minimizing contaminants that might be missed during water treatment procedures can improve human health.

### Restoration May Buffer Flooding, Surges

Wetlands can stem flooding. A one-acre wetland can store about three acre-feet of water or one million gallons (U.S. Environmental Protection Agency) -- the equivalent of one foot of water covering three-fourths of a football field. Preserving and rebuilding natural defenses against storms is one of the most cost-effective and sustainable ways to protect communities and natural resources (Defenders of Wildlife, [www.defenders.org/press-release/hurricane-season-begins-new-report-demonstrates-nature-best-defense-against-natural](http://www.defenders.org/press-release/hurricane-season-begins-new-report-demonstrates-nature-best-defense-against-natural)). Virginia has lost almost half of its wetlands.



Volunteers conduct a herpetology survey in Dyke Marsh.



Yellow Warbler feeding young



Youngsters of all ages learn all about raptors at the annual raptor demonstration. Gabrielle Hrycyszyn of the Raptor Conservancy of Virginia explains raptor characteristics.

### Rich In Diversity

Dyke Marsh has 300 known species of plants, 6,000 arthropods, 38 fish, 16 reptiles, 14 amphibians and over 230 birds. It is the only site in the upper Potomac River with a breeding population of marsh wrens and has a state-threatened breeding population of least bitterns. A restored marsh can support and expand that biodiversity.

### Congress Stressed Preservation

In 1959, the U.S. Congress passed a law designating Dyke Marsh as part of the National Park Service system "so that fish and wildlife development and their preservation as wetland wildlife habitat shall be paramount." In 1974, Congress authorized the U.S. Army Corps of Engineers to assist NPS in restoring the "historic and ecological values of Dyke Marsh." Congress reaffirmed its support and the marsh's significance in 2009 by approving House Resolution 701 and Senate Resolution 297, recognizing the marsh as a unique and precious ecosystem and commending the FODM for its longstanding commitment and stewardship.

### Human Caused

Extensive dredging of almost half the marsh from 1940 to 1972 destabilized the marsh (USGS). Humans inflicted the damage; it is up to us to fix it.

### PLEASE HELP SAVE DYKE MARSH

The National Park Service (NPS) has prepared a restoration plan that would stabilize the marsh, create hydrologic processes needed to create a sustainable marsh and increase wetland and marsh habitat by 180 acres. The plan is posted at [www.parkplanning.nps.gov/document.cfm?documentID=61945](http://www.parkplanning.nps.gov/document.cfm?documentID=61945). FODM supports full restoration.

You can help by urging the NPS to implement the plan by emailing [Jon\\_Jarvis@nps.gov](mailto:Jon_Jarvis@nps.gov) and by urging your elected officials to support it. Visit [www.senate.gov](http://www.senate.gov) and [www.house.gov](http://www.house.gov) to find yours. You can also help by joining the Friends of Dyke Marsh. Visit [www.fodm.org](http://www.fodm.org) and [Facebook.com](https://www.facebook.com).

