

Salt Marsh Ditches of the South Shore – Part 1

North & South Rivers Watershed Association <https://www.nsrwa.org/>

Posted on [November 1, 2022](#) by [Lori](#)

By Jim Glinski, Scituate



2015 aerial photo of North River and ditches courtesy of Gary M. Banks and William E. Richardson.

Author's Note: Although the focus of this article is on the marshes of the North and South Rivers, the information and issues generally apply to the salt marshes of all South Shore coastal communities.

As a guide on the North and South Rivers Watershed Association's History of the North River pontoon boat tours, I would inevitably be asked questions about the many ditches in the river marshes. My initial response was that they were dug as boundary lines by colonial farmers to designate ownership of the salt marsh hay flats. After doing more research and discussing the issue with people who knew the river better I learned that others believed that the ditches were dug to control the mosquito population of the marshes. The reality appears to be that both answers are correct.

From the early settlement of the South Shore until the great storm of 1898, the Portland Gale, the ditches were the result of the importance of salt marsh hay to the local economy and were dug to both improve the harvesting of salt marsh hay and as markers of individual farmers' salt marsh hay meadows. However, beginning in the late nineteenth and early twentieth centuries, and continuing to the present, the ditches were primarily dug as components of mosquito control

programs. As William Gould Vinal stated in his booklet, *Salt Haying in the North River Valley (1648-1898)*, how and why these ditches were dug remains the “\$64.00 question” for those interested in the history of the marshes.¹

Salt Marsh Ditches Before 1898

When English settlers first came to the South Shore of Massachusetts they found an area that had been home to Indigenous peoples for over 10,000 years. Most New England Native Americans lived in villages of perhaps a few hundred people. These villages changed their size and location as the seasons changed, depending on where they could find the largest supply of natural food. Unlike Native Americans who lived on the northern New England coast, the Native Americans who lived on the South Shore also raised crops, such as corn, beans, and squashes. These crops were raised by women while the men would hunt and fish in the spring, summer, and fall. In March and April runs of migratory fish like smelt, alewives, sturgeon, and salmon would supply plentiful food which would be followed in May by fish such as brook trout, flounder, and striped bass caught with nets or weirs, and offshore, by cod, caught with hook and line.

Although there is some evidence that Native Americans conducted ditching in the salt marshes, extensive ditching would not occur until the arrival of English settlers.² The South Shore Native American fishing techniques, especially the use of fish weirs, and the fact that they did not harvest salt marsh hay to the great extent that the English settlers did, meant that they had no reason to dig ditches in the marshes.³

However, for English settlers, the presence of salt marsh hay was a major factor in determining the location of towns settled before 1650, such as Scituate, Marshfield, and Duxbury, as the settlers of Plymouth left the town and set up new towns with extensive salt hay marshes.⁴ It would soon become clear to the settlers of these areas that the salt marsh hay, which grew in abundance in the marshes, was there to be harvested largely for livestock feed, but also roofing thatch and wall insulation. “The huge tracts of God-given salt-hay lands required no clearing, grubbing, rolling out boulders, plowing, manuring, planting, hoeing, or weeding.” Salt marsh haying was essentially harvesting a wild crop.⁵

The ditches farmers dug helped to drain the marshes that allowed cattle to graze and farmers to cut salt marsh hay. The harvesting of this valuable commodity would continue for over 250 years, until the November 1898 Portland Gale changed the nature of the salt marshes of the region. Now, instead of flooding a few times a month, the marshes flooded twice a day with greater volumes of salt water, making salt marsh haying more difficult and changing the type of grasses that grew in the marshes. These changes, along with the decreasing need and demand for salt marsh hay, put an end to the large-scale harvesting of salt marsh hay.

Even after the Portland Gale of 1898 anyone traveling over the salt marshes or through them in a boat could observe the numerous salt marsh ditches that were dug over the 250 years of salt marsh haying. Why did farmers over those 250 years dig these ditches? There were two primary reasons. The first was to drain the marshes, which would allow cattle to graze and farmers to cut salt marsh hay. The second was to mark the property boundaries of the individual farmer’s salt marsh property.

William Gould Vinal believed that salt marsh haying remained essentially unchanged over the years and that the salt marsh property of farmers “was passed on from generation to generation in

as good condition as it is received.”⁷ This is not a completely accurate statement. Scientists such as Susan C. Adamowicz from the U.S. Fish and Wildlife Service and Sara Grady of the North and South Rivers Watershed Association have conducted recent studies of salt marshes. They show that over the first 200 years salt marsh hay farmers developed new techniques to increase salt hay production, such as large embankment systems to freshen the hay beds and increase salt hay yields. Using 1935 USGS maps and 2005 GoogleEarth imagery to study Bartlett’s Island in Marshfield, these scientists were able to identify changes made in the use of ditches over 200 years, including the use of terraced embankments to increase crop yields.⁸



Ditches at Bartlett’s Island Marshfield. Photo by Jim Glinski

Ditching also provided easier access to harvest hay especially in areas further away from the high meadows and extending further into the river. In some of these areas, horses were fitted with “meadow shoes” of wood, iron, and leather, which allowed them to move across the muddy salt marsh flats, similar to snow shoes allowing us to move across snow. However, the ditches were sometimes impediments for both horses and men harvesting salt marsh hay with both sometimes falling into the ditches. Most salt marsh meadows were not completely accessible by land and required the use of specially designed boats known as gundalows.

A gundalow was a large flat-bottomed boat, which could be up to 40 feet long and could carry 2-8 tons of hay, which was rowed or sailed to an upstream landing where it would be loaded onto carts for transport to market. The extensive use of gundalows required ditching on a much larger scale and sometimes the widening of natural creeks. While the early digging of ditches was done exclusively by farmers, with the increased use of gundalows it became a profession that paid 16 cents per rod.⁹



c.1890s gundalow loaded with hay. Photo courtesy of Norwell Historical Society.

Adopting land practices from the regions of England from which they came, in the early years of the settlements on the South Shore the salt marshes were held in common by the freeholders of a town and often worked cooperatively with no private ownership of salt marsh lots. Most towns initially divided town lands according to their function as meadows, woodlots, or cornfields. Scituate would be different because its settlers came from a region in England where farmers owned their land and as a result, they were interested in quickly transferring land from common to private property. However, "the colonial systems for fixing property boundaries were not fully articulated until late in the seventeenth century." Once land began to be transferred into private hands, deeds began to more precisely define property boundaries and there was a tremendous increase in real estate transactions.¹⁰



c.1890s painting of gundalow with sails by George W. Harvey. Used with permission of Cape Ann Museum and Archives.

It is unclear when the first ditches were dug in the salt marshes of the South Shore. Because of the land ownership practices discussed previously, it is hard to determine, even in Scituate, when the first ditches were dug and used as boundary markers. A good source to find evidence of ditches as boundary markers is Jeremy Bangs's exhaustive digest of seventeenth deeds in the Town Records of Scituate. A careful reading of Bangs reveals that there were land grants of marshland to individuals as early as 1636/37, at the time of the 1636 incorporation of Scituate. By the 1660s there were numerous deeds indicating the sale of marsh meadow that used terms such as *channel or straight line* to delineate property boundaries, but it appears that the first specific reference to a ditch as a boundary description occurred in June 1666. "On June 27, 1666, William Randolph sold eighteen acres of upland on the westerly side of the North River to Josiah Wormall, carpenter, for an unspecified sum;...the other meadow parcel being two acres, bounded to the east to a *ditch* dividing it from the meadow of John Bryant, to the south to a *ditch* dividing it from the meadow of William Curtis...."¹¹ Another issue that complicated the identification on the use of the term ditch as boundary lines is the use of words used to label a ditch. This can be seen in a deed dated February 18, 1686/7 which states: "Laid out to Joaseph Oatice Three ackers of swampe Land being granted to John Oatice deceased by the former Comity in sittuate and is Bounded as ffolloeth beginning at the end of a *dick* Ston wall being the Northeast Corner of the Land...." As Bangs notes, does *dick* mean ditch or dyke?¹²

The use of the term ditch as a boundary marker in deeds became commonplace in the eighteenth and nineteenth centuries. William Gould Vinal cites old deeds of salt marsh purchases by his ancestors on the South Shore (ditch emphasized in the following examples). In 1796, Peter Sears, his great-great-grandfather bought two and one-quarter acres of salt meadow marsh from Elijah Clapp described as "adjoining Wills's Island (so-called) thence Easterly with the Herring River (so-called), to a *ditch* which separates it from the aforesaid Capt. Joshua Jacobs meadow, thence with said *ditch* and said Jacobs range to the first named corner...." In 1800, "Nathaniel Cushing,

Gentleman and Charles Cushing, yeoman, both of Pembroke, for the sum of \$15.00 sold Peter Sears of Scituate, Gentleman 44 rods of salt meadow lying and being in Scituate beginning at a stake in a *ditch*, etc.” In 1829, a land division deed divided salt meadow land lying in Scituate between Ichabod Jacobs and Abial Farrow with “their dividing line to commence at a stake in the *ditch line* near the shores... and that Abial own and occupy the Easterly side of the line and the said Ichabod occupy the Westerly side of said line.”¹³

The use of ditches as boundary markers was not limited to salt marsh meadows. In July 1692, the Town of Marshfield appointed a jury of 15 men to lay out the town’s highways. One section of their report stated that the boundary of one highway was “also from the aforesaid way that leadeth from Samuel Little’s on to said Barker’s land southward to the eastward of a white-oak tree, and so along to the eastward swamps by the *ditch*, and so along between the house and barn of said Barker...”¹⁴

As noted earlier, the 1898 Portland Gale changed the nature of many of the salt marshes on the South Shore, which would lead to the demise of the harvesting of salt marsh hay in the region. However, other developments contributed to the end of the importance of salt marsh hay. One factor was that the region’s farmers were now growing hay to feed their livestock on inland farms away from the marshes, which was less arduous than harvesting salt marsh hay.

Even before the Portland Gale changed the environment of the North and South Rivers there were construction projects on the coast, most notably in Marshfield’s Green Harbor. In 1872, the construction of a dyke that changed the course of the Green Harbor River, the installation of a series of jetties, and later a seawall at the beaches made the beaches more attractive for recreational activities at a time when social changes made oceanfront recreation more popular. Meanwhile the advent of railroads, and later automobiles, made South Shore towns more accessible to city dwellers who began to rent or build homes in Scituate, Marshfield, and Duxbury, creating what became known as the Irish Riviera. All of these developments initiated the transition of the region from an agricultural-based economy into bedroom communities, ending the importance of salt marsh hay.¹⁵

The collapse of salt marsh haying on the South Shore did not mean the end of ditching in the marshes. Instead for several reasons, including some outside the scope of the South Shore, ditching entered its new stage of being a component of mosquito control programs.

In my search for information on salt marsh ditches I have been joined by local historian and author, Lyle Nyberg. For those interested in learning more about this topic I have attached the link to Lyle’s web site which includes his bibliography of sources on salt marsh ditching and his upcoming book, *Ditching the Marshes: A History and Bibliography*.
<https://lylenyberg.com/copy-of-seacoast-by-air>.

Notes

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Salt Marsh Ditches of the South Shore – Part 2

By Jim Glinski, Scituate

<https://www.nsrwa.org/salt-marsh-ditches-of-the-south-shore-part-2/>

Salt Marshes Ditches After 1898

As South Shore towns transitioned from being farming communities to summer resort and bedroom communities the beaches and rivers and their marshes were increasingly used for recreation. This put residents and visitors in close contact with the area's mosquitoes, the most bothersome of which were the salt marsh mosquitoes. At the same time, the United States was increasing its presence in Central America and the Caribbean as it developed into a world power

and engaged in what was known as the “New Imperialism.” A major symbol of this change was the construction of the Panama Canal.

Soon after gaining control of the Panama Canal Zone in 1903, the United States began construction of a canal across the isthmus of Panama that was completed in 1914. A major factor that contributed to the failure of earlier attempts to build a canal had been the high mortality rate of construction workers from yellow fever and malaria.

In 1898, at the end of the Spanish-American War, an American army doctor, William Gorgas, determined that yellow fever and malaria were caused by mosquitoes. In 1904 he developed methods to reduce the mosquito population in the Panama Canal Zone and dramatically reduced the mortality rate among workers building the Panama Canal. One of the most effective methods for reducing the mosquito population was the drainage of standing water. It was not long before residents of the South Shore began to call for the drainage of their marshes to control the mosquito population, ushering in an expanded program of marsh ditching in the early twentieth century that continues to this day.



Oilers at Work in Marsh.

Ditches dug for mosquito control were grid-ditches. They consisted of ditches creating a grid like a checkerboard, with straight parallel spaced ditches 115 to 230 feet apart. They ran from the edge of high marshes or old pond holes to large tidal creeks. They were shallow, narrow, hand-dug ditches designed to remove standing water from the marshes to prevent the breeding of mosquitoes. Grid-ditching probably began in New Jersey in the early 1900s, but it was most

widely practiced in the 1930s during the Depression. The New Deal public works programs of the era, such as the Works Progress Administration (WPA) and the Civilian Conservation Corps (CCC), supported grid-ditch draining projects, not only to control mosquitoes but also to provide employment for millions of unemployed workers. It appears that providing jobs for the numerous unemployed may have been more important than controlling mosquitoes.

These programs resulted in the ditching of many low marsh areas that did not breed mosquitoes, which caused a decrease in the fish and birds in those marshes while not effectively controlling mosquitoes. Some studies of these marshes have noted that “considerable breeding (of mosquitoes) still occurred in the areas between the ditches; and many of the ditches quickly silted-in sometimes creating isolated depressions where prodigious amounts of mosquitoes could be produced.” These programs were so extensive that by 1938, 94% of the tidal marshes along the New England coast had been ditched. The grid-ditching program was also an indication that ownership of the salt marshes was increasingly shifting from private to public ownership, a trend that has continued into the present.¹⁶



Ditch in marsh off Driftway Conservation Park in Scituate. Photo by Jim Glinski.

On the South Shore, much of the effort to control the mosquito population was done by the state and local cities and towns. In 1918 Massachusetts established the Massachusetts Drainage Board to oversee the drainage of wetlands in the state for agricultural, industrial, and public health purposes. In 1922 this board was renamed the State Reclamation Board, and in 1983 it became

the State Reclamation and Mosquito Control Board.¹⁷ In the early 1930s, the State Reclamation Board created four separate Mosquito Control districts, which included the South Shore Mosquito Control Commission which included coastal towns from Weymouth to Plymouth. In 1931 the Commission was chaired by Scituate selectman James W. Turner and included commissioners Frank L. Sinnott from Marshfield and Hollis Gleason from Cohasset.¹⁸

The first mention of mosquito control and ditching in Scituate occurred in the 1928 Annual Town Report. The report mentions the use of oiling of mosquito breeding grounds as recommended by the State Engineer and that about two miles of ditching was done in Scituate. The report commented that there was “a great deal of ditching to be done to dry up the swamps and marshes, and by doing so the work of eliminating the mosquitoes would be much easier.”

Three years later the Report of the Selectmen in the 1931 Annual Town Report included an account of the work done in Scituate in the campaign created by the State Reclamation Board’s South Shore Project. With its share of the \$70,000 appropriation from the state and an additional \$10,000 contributed by Scituate, the Town dug 150 miles of trench, for \$25,000, beginning on April 6th in the marshes between Hollett Street and Cohasset Harbor in the Gulph River. Their report noted that it created “a substantial amount of employment at a time when employment was appreciated.” In the spring of 1931, the South Shore Mosquito Control Commission placed a notice in *The Scituate Herald* informing residents that mosquito control projects would begin shortly from Weymouth to Plymouth and would “consist mainly of ditching the marshes to allow them to drain and of making outlets for these ditches through the beach when necessary.”¹⁹



Google image photo of Gulph River marsh channels, August 2022.

The importance of ditching work to provide employment during the Depression was highlighted at a public hearing of the State Agricultural Committee on the project of the Mosquito Control Commission. Scituate town officials, including selectman James E. Turner and the head of the Public Works Department, Vernon Mann, called the project “the best unemployment relief program in operation” with 90% of the money spent going to labor. They also stated that the “work is showing remarkable results in ridding many summer colonies of this most persistent pest.”²⁰ However, in 1934 the state suddenly stopped spending money on mosquito control making it a year that seemed “to be one [of] the finest years ever for large, ferocious, man-eating mosquitoes.”²¹



Ditch in Gulph River near Gannett Street, Scituate. Photo Jim Glinski.

It took a little more time for the neighboring town of Marshfield to support mosquito control projects. The first mention of mosquito control in Marshfield can be found in the Board of Health's report in the 1929 Annual Town Report. It stated that at Brant Rock "it was deemed necessary to clean out all the lateral ditches and drains leading to the Marshes, some filling beneath the buildings, eliminating stagnant water, disagreeable odors, and a start on the mosquito question. The expenses carried out by the Board outside of this year's budget."

A Marshfield special Town Meeting in September 1930 appropriated \$1,000 to take by eminent domain part of the Green Harbor Marshes south of the Dyke. This is an example of the increase in public ownership of the marshes. However, in 1931, another article to spend up to \$5,000 "for the eradication of mosquitoes by the Board of Health in cooperation with the Mosquito Control Committee," was passed over [not voted on]. In the late 1920s and early 1930s, it appeared that gypsy moth control was a more important problem in Marshfield than mosquitoes, with the town appropriating between \$2,000 to \$3,000 a year during this period on suppressing the gypsy moth population.

However, beginning in 1932 and continuing throughout the decade, Marshfield participated in the State Reclamation Board's South Shore Mosquito Control Project and appropriated \$3,500 annually to support this effort. The Board of Health commented that the project "has by draining the lands adjacent to several of our summer colonies seen a distinct improvement." The ditching program reached its peak in Massachusetts in the mid-1930s when over 11,000 men used sod saws and two-man shovels to dig nearly 3,000 miles of salt marsh ditches.²²

When the United States entered World War II in December 1941, the nation's attention shifted from combating the problems caused by the Depression and focused entirely on what became known as "The War Effort" to defeat fascism. With full employment created by the need for war

production and millions of citizens recruited by the military, there were few workers available to sustain the ditching programs of the Depression Era.

However, in the late 1940s and early 1950s, the “Baby Boom” contributed to a massive shift of population from urban areas, like Boston, to the suburbs, including the towns on the South Shore. During this same period, the grid ditches dug in the 1930s had been neglected and caused a tremendous growth in the mosquito population near the salt marshes. Since this coincided with population growth in areas near the marshes this made some areas almost uninhabitable. This led to grass-roots efforts that pressured the State Legislature to create special mosquito control districts. Two of these districts were on the South Shore. One district was the Plymouth County Mosquito Control Project, which included all the towns of Plymouth County, along with the City of Brockton, and the town of Cohasset. The other district was the South Shore Mosquito Control Project, which included the City of Quincy and the towns of Braintree, Cohasset, Duxbury, Hingham, Hull, Marshfield, Norwell, Scituate, and Weymouth.²³

The main task of these new districts was to remove sand, silt, and other obstacles to allow the maximum flow of water in the ditches. Unable to draw on the large pool of labor available for the ditching projects of the 1930s, these new reclamation projects depended on the use of new mechanized equipment to dig salt marsh ditches. This included the use of a scavel plow, which is described in the Appendices of the Open Marsh Water Management Standards as “a large wedge-shaped device mounted under a wing plow which could be attached to the front of a tractor or towed behind it. As the wedge peeled spoil out of the ditch the wing plow would roll the spoil into furrows approximately six feet wide on both sides of the ditch. These furrows of spoil were then either run over to flatten them or plowed off the marsh.”



Plymouth County Mosquito Control Project excavator. Photo courtesy of Plymouth County Mosquito Control Project.

It was important for fill from ditch excavation to be graded so that no pockets of water were left as breeding grounds for mosquitoes. Another type of machine used by reclamation projects was a

track-driven excavator. These new machines could excavate two or more miles of ditches per day.²⁴

Scituate's Annual Town Report in 1962 included a Report of the South Shore Mosquito Control Project that cited the amount of ditching done in Scituate in 1961. It was, 1,250 feet of ditches cleaned, 23,025 feet of ditches reclaimed, and 2,985 feet of new ditches excavated. The 1968 town report showed a continued increase in mosquito source reduction efforts with 50,330 feet of ditches reclaimed, 4,110 feet of new ditches dug, 23,335 feet of brook and stream cleaned, and 15,235 feet of brush cleared. However, with hundreds of miles of ditches to excavate and the need for repeated maintenance every two years, it became clear that this would be an endless task which led to a search for alternatives to grid-ditching.



1968 aerial photo of Peggotty Beach and marsh off Kent Street in Scituate. Scituate Town Archives, CGL-134.

One promising technique to restore salt marshes and control mosquitoes was Open Marsh Water Management (OMWM). This technique uses several methods to eliminate mosquito breeding locations and improve tidal circulation, as well as improve access to the marshes for mosquito predators, such as small fish. One part of the process of applying OMWM techniques to control mosquitoes is the construction of ponds or shallow pools along with channels from the ponds or pools to eliminate mosquito breeding grounds and increase water circulation throughout the system. In addition, these pools of varying depths serve as refuges for fish and forage sites for many salt marsh birds. Rotary ditching equipment spreads the spoil in a thin layer over the surface of the marsh and reduces the need for grading and provides opportunities for natural vegetation to return to the marsh. According to some scientists, when properly implemented OMWM “provides excellent mosquito control with concomitant reduction of elimination of pesticides while minimizing negative impacts to marsh resources.”²⁵

In the 1980 Scituate Annual Town Report, the report of the South Shore Mosquito Control Project appears to indicate the adoption of OMWM by the project. The report notes that there was an increase in the number of days to apply water management techniques on the salt marshes, including the removal of many obstacles which restored maximum flow in the many drainage ditches on the marshes. In 1980, the project removed maximum flow obstructions from 82,125 feet of ditches, along with reclaiming 110,300 feet of marsh ditches and constructing 2,450 feet of new ditches through the entire region.

In recent years, in part because of increased concern about the mosquito-borne diseases of Eastern Equine Encephalitis (EEE) and West Nile Virus (WNV), there has been an increased interest in mosquito control. This has led to increased cooperation and effort by the Plymouth County Mosquito Control Project, local boards of health, and the Massachusetts Department of Health. Although the project has increased the use of insecticides, it has continued to use OMWM techniques.

In 2008, Scituate continued its water management practices of removing obstacles to maximum flow and using both of the Plymouth County Mosquito Control Project’s track-driven excavators to reclaim 1,060 feet of upland and salt marsh ditch. Twelve years later, in 2020, Scituate reclaimed 1,585 feet of ditches. In that same year, the 2020 report of the Plymouth County Mosquito Control Project noted that Marshfield used machine reclamation to remove blockages and other obstructions from 2,215 feet of ditches and streams to prevent overflows or stagnation.

These renewed efforts, including the use of OMWM techniques, aimed to reclaim and restore salt marsh hydrology. This included the digging of new ditches in the salt marshes of the South Shore. However, in its 2021 report, the Plymouth County Mosquito Control Project announced that it had discontinued the use of OMWM “due to current restriction regulations as well as possible negative impacts to the salt marsh when combined with sea level rise.” This decision has caused a decrease in recent work on salt marsh ditches.

The New \$64.00” Question: To Fill or Not to Fill?

As noted in the introduction, the stated purpose of this article is to provide answers to William Gould Vinal’s “\$64.00” questions of when, by whom, and why ditches were dug in the salt water marshes of the South Shore. Hopefully I have been at least partially successful in answering these questions. However, I would like to conclude this article by asking some additional questions: What has been the impact of almost 400 years of ditching on these marshes? What is

the current status of the existing ditches? How have they been impacted by rapidly accelerating climate change? In responding to these questions I would remind readers that this article is a history of the marshes of the South Shore and not a scientific study. That said, I will base my responses to these questions on recent scientific studies of salt water marshes. I would encourage readers who want to dig more deeply into these issues to read local historian and author, Lyle Nyberg's most recent work, *Ditching the Marshes: A History and Bibliography*.

In recent years there have been several scientific studies and articles on the impact of ditching on the coastal salt water marshes of the United States, some specifically dealing with those of New England, including the South Shore. The conclusion one can reach about these studies is that there is no consensus on what the impact of ditching has been on salt water marshes. On almost every topic related to the impact of ditching on salt water marshes, whether it be birds, fish, vegetation, wildlife habitat, or pollution, there are contradictory studies. Although over 90% of salt water marshes in the Northeast have been ditched, some studies of salt water marshes do not even discuss ditching.

Mosquito control, an important reason for ditching in the marshes of the South Shore after 1898, is a specific example of these contradictory studies, which differ on the effectiveness of ditching to reduce mosquito populations. The conclusions of these studies are all over the map. Many studies support ditching effectiveness in reducing mosquito larvae habitat and as a result, reducing the mosquito population, while others believe that they are ineffective in controlling mosquitoes, especially if the ditches are not well maintained. One study simply states that ditching is of "questionable value" for controlling mosquitoes. However, it appears that the managers of mosquito control programs, including those on the South Shore, believe that ditches are beneficial in controlling mosquitoes. This factor appears to be one reason why mosquito control programs still remediate old ditches or dig new ones.



Phragmites

One exception to the contradictory conclusions of these studies has been on the invasion of Phragmites. Most studies conclude that ditching has been "an important agent" in Phragmites

expansion by fostering conditions that promote the growth and expansion of these invasive plants. This expansion has had a negative impact on fish and birds in marshes. Yet there is one study that concluded that Phragmites had a positive effect on salt marshes because they may raise the elevation of marshes, which helps combat the effects of rising sea levels.²⁷

However, most recent studies of the impact of ditching in New England salt marshes conclude that mosquito ditching has made the marshes more vulnerable to rising sea levels and more numerous major storms because they contribute to subsidence or sinking of the marshes. New strategies to mitigate this problem include runneling (digging shallow channels connected to tidal creeks), creating microtopography (higher areas less likely to flood), and ditch remediation.

The technique of ditch remediation was originally developed and pilot-tested in the Great Marsh on the North Shore. This technique, also known as “mow and roll,” includes cutting small patches of salt marsh hay which is raked into adjacent ditches, and held by twine, trapping the sediment in the water column, filling and healing the ditch over time. After a few years the ditches are shallow enough to support the growth of cordgrass, which continues to trap sediment elevating the marsh platform relative to sea level rise. This simple and inexpensive technique would hopefully be used in partnerships, including mosquito control programs.²⁸

There are currently no similar pilot programs of ditch remediation for the South Shore marshes. However, according to North and South Rivers Watershed Association Executive Director Samantha Woods, “the NSRWA is interested in pursuing ditch remediation as a technique to make our salt marshes healthier and more resilient to rising sea levels” and has made this one of its goals in its most recent strategic plan. The Association has taken some initial steps toward this goal by establishing salt marsh monitoring programs. One of these is its Salt Marsh Sentinels program, in which property owners who have docks along the North River gather basic data on the changes they observe in the marshes on their property. Another is the establishment of long term monitoring stations in the marshes by NSRWA ecologist Sara Grady.²⁹

The adoption of these new techniques to mitigate some of the problems facing the salt water marshes perhaps mean that the new “\$64.00” question regarding the ditches of the salt water marshes of the South Shore is, as Lyle Nyberg wonders, whether to fill or not to fill them?

In my search for information on salt marsh ditches I have been joined by local historian and author, Lyle Nyberg. For those interested in learning more about this topic I have attached the link to Lyle’s web site which includes his bibliography of sources on salt marsh ditching and his upcoming book, [*Ditching the Marshes: A History and Bibliography*](#).

Notes

16. There are numerous studies on grid-ditching and its impact on salt marshes including Nixon. *The Ecology of New England High Salt Marshes*, Timothy Brush, et al. *Colonial Waterbirds Vol.9, No.2*, 189-195, JSTOR.org/152212. “Habitat Use by Salt Marsh Birds and Responses to Open Marsh Water Management, Jorge R. Rey, et al. *Int J Environ Res Public Health*. Dec.10, 2012; 9(12) 4537-4605. “North American Wetlands and Mosquito Control.” <https://ncbi.nlm.nih.gov/pmc/articles/PMC3546777/>
17. Historical/Bio note in Collection Description at the Massachusetts State Archives of the State Reclamation and Mosquito Board, Collection # EN2.01

18. "Great Area Drained in Mosquito War." *The Boston Globe*, 25 July, 1931.
https://www.newspapers.com/search/?query=Mosquito%20War&s_place=Boston%2C%20MA&md=07-25.
19. South Shore Mosquito Control Notice, *The Scituate Herald*, 17 April, 1931. 8. Scituate Town Library Community History Archives.
20. "Want Mosquito Work Continued." *The Scituate Herald*, 26 February, 1932. Scituate Town Library Community History Archives.
21. "Editorial Points.." *The Boston Globe*. 26 May, 1934. 14.
https://www.newspapers.com/search/?query=Mosquito%20control&s_place=Boston%2C%20MA&ynd=1934-05-26.
22. *Annual Town Report of the Town Officers of Marshfield*. (Boston: Rapid Service Press, 1928-1940). Marshfield Town Library.
23. *History of Salt Marsh Management for Mosquito Control: Appendix A*. and The Plymouth County Mosquito Control Project, "Report of Plymouth County Mosquito Control Project." State Reclamation and Mosquito Control Board, 2020.
24. "Mosquito Control Open Marsh Water Management Standards." Appendix A, 2010.
25. Rey, et al. Timothy Bush, et al. *Colonial Waterbirds*. Vol.9, No.2:189-192, 1986. JSTOR.org/152212.
26. *Town of Scituate Annual Report*, 2008 and 2020. *Plymouth County Mosquito Control Project Report*, 2020.
27. David J. Tonjes. "Impacts from Ditching Salt Marshes in the Mid-Atlantic and Northeastern United States" (2013). Technology & Society Faculty Publications. 19.
<https://commons.library.stonybrook.edu/techsoc-articles/19>. (Very comprehensive discussion of the scientific studies on the impact of Mid-Atlantic and Northeastern coast marshes).
28. David M. Burdick, Gregg E. Moore, Susan C. Adamowicz, Geoffrey M. Wilson, Chris R. Peter. "Mitigating the Legacy Effects of Ditching in a New England Salt Marsh." *Estuaries and Coasts* (2020), V.43 no.7, 1672-1679
<https://pubag.nal.usda.gov/catalog/7113427> Debra Reynolds. "Innovative Salt Marsh Restoration Project Launched in the Great Marsh of Massachusetts." Atlantic Coast Joint Venture (01/19/2021) <https://acjv.org/innovative-salt-marsh-restoration-project-launched-in-the-great-marsh-of-massachusetts/>
29. NSRWA Executive Director Samantha Woods. Email. Received by James Glinski Sept. 21, 2022.

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