Sippewissett Association
Newsletter

Traffic and Safety (T&S) Committee

Speeding on Sippewissett Road and the danger and anxiety it causes to walkers, bicyclists, those checking their mailboxes or entering the Road from driveways and side streets has been a major concern to the Sippewissett Association for over 30 years. It has been addressed by each President since at least the 1990s.

For the past three years, under the leadership of Board Members David Margaretos and Charles Mann, some progress has been made in addressing this problem, although much remains to be done. The committee's approach has been to be calm but firm, persistent in the face of setbacks, and always civil in interactions with Town officials. During the pandemic year it was appropriate to yield when pressing agreed-upon actions, in sympathy with the unique challenges our Town faced during these unprecedented times.

Nevertheless, the pandemic interlude provided us an opportunity to review our progress. In early meetings of the T&S Committee we asked to what extent speeding was the result of ignorance of the speed limit. Therefore, a first goal was to upgrade the signage along the road, much of which was illegible or hidden behind vegetation. The Committee brought this to the town's attention and, as a result we now find speed signage has been upgraded, replaced or moved to more visible settings. Along Sippewissett Road we now find the speed limit clearly posted on seven or more signs, in each direction, along the 2.8 miles of roadway. The correct speed limit also appears on electronic traffic iPhone applications. It is hard to believe, now, that speeders could be unaware of the speed limit.

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Advocating for Modern Nitrogen-Reducing Septic Systems (NRSS) to Clean Up our Coastal Waters*

Viewpoint
Sylvia Vatuk

All living organisms need nitrogen. But too much nitrogen from us humans—i.e., *nitrogen pollution*—is a serious problem in many coastal regions, including Buzzards Bay. Water quality monitoring data collected by the Buzzards Bay Coalition (BBC) "Baywatchers" program, a citizens' science water quality monitoring effort, has found a steady decline in the Bay's water quality and its health over the last 25 years, as the population in the watershed has increased. More than half of the harbors, coves, and tidal rivers on the Cape currently suffer from levels of nitrogen pollution so high, that its effects are clearly visible to the naked eye: noxious algae blooms, fewer eelgrass beds, closed shell-fishing signs and the disappearance of formerly abundant fish and shellfish.

Where is all the excess nitrogen coming from? The largest single source is wastewater from residential septic systems—on the Cape it constitutes as much as 80% of the total. The other main source of nitrogen is lawn fertilizers, especially those with soluble nitrogen, which quickly leaches through our sandy soils, before it can be taken up by plants. In both instances, nitrogen ends up in the groundwater, which then flows towards the coast. Smaller amounts of nitrogen are contributed by road runoff and rain.

West Falmouth Harbor, close to home for us residents of Sippewissett, is one of the most impacted coastal embayments, with visible rafts of noxious seaweed everywhere. The inner harbor has long been rated by the BBC as having "poor" water quality. And Sippewissett Marsh—right in the backyards of many of our members—is only slightly better off, with a current rating of "fair".

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The Mystery of Hamlin Pond

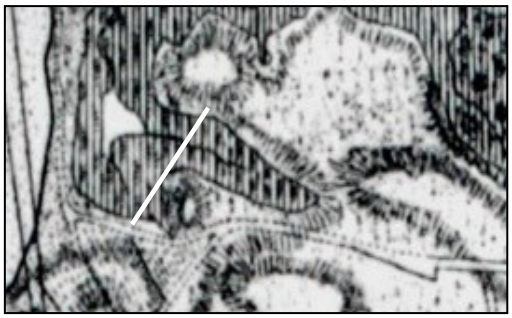
Few people have noticed a dam-like structure crossing Hamlin Pond, south of Wood Neck Road. I had not either until searching for my truant dogs I discovered them walking ankle deep across the center of the Pond. This Pond is slightly brackish and is elevated above the nearby marsh by about one foot. It is sufficiently fresh that pond marshmallows, pond lilies and frogs live there. On occasion it undoubtedly floods over the beach with seawater.

The dam or causeway does not seem to be, or to be needed for, vehicular passage. What was it for, when was it built and who built it?

The western portion of the Pond must have filled when Wood Neck Road was built about 1940, presumably to provide access to the Town Beach, acquired about that time. Where the road crosses marshland near its terminus at the beach it serves as a dam behind which fresh water can accumulate. A pipe under the roadway could drain a portion of Hamlin Pond, but such a pipe was never installed (or is clogged).

But for what purpose could the mystery structure have been built? Three possibilities come to mind, all related to useful functions of a freshwater pond: for agricultural purposes serving to water livestock; as a source of ice in the winter; and, in this setting, as a spawning pond for alewives. In the latter case, the pond would attract spawning adults where they could be captured in a weir. For the latter function the structure would need to predate Wood Neck Road.

Who built it is still a mystery. Any suggestions?



1845 map (prior to the construction of Wood Neck Road) depicts the same area as marshland. The white line is added to indicate where the structure was placed.

1960 aerial photo shows a Hamlin Pond flooded, as it is today, with a linear structure crossing the Pond.

Dr. Hartley Hoskins 1939-2021

Arthur G. Gaines

The Sippewissett Association Board announces with emotional sorrow the death of our friend and neighbor, former Association President Hartley Hoskins on January 1, 2021. He was 82.

Hartley came to Woods Hole in 1958 while an undergraduate student at MIT, the beginning of a 57 -year career at the Woods Hole Oceanographic Institution. His Senior thesis at MIT, "Primer on seismic reflection data acquisition and analysis" was the beginning of his lifelong primary disciplinary specialty in seismic technology and marine geology; but he was a polymath with substantial expertise, for example, in electricity and electronics, computer and information networking, and shipboard operations and technology. He recognized that the conduct of ocean research often crossed traditional academic disciplinary boundaries, and that technological advancements could be crucial to progress in understanding the ocean. In his years at WHOI Hoskins participated in 30 oceanographic cruises including one on the Institution's first ship, the R/V ATLANTIS, a 143 ft. sailing ketch. Over the course of his career he worked with several of the giants of ocean science on problems of seminal significance. Toward the latter part of his career, Hartley devoted increasing effort to communications: and he brought microwave, internet and fiber optic telephone to the community.

Hartley was born near Rochester, New York, he son of a medical doctor. For several years during his adolescence, Hartley's family lived in the U.S. Virgin Islands where his father worked at a tuberculosis hospital near Estate Little Princess, St. Croix. Later, the family returned to Rochester where, during high school, Hartley studied piano and organ at the Eastman School of Music, learning skills he practiced for the rest of his life, including at weekly sessions at the Christian Science Church in Falmouth.

Hartley built his family home in Sippowisset in 1974 at the edge of Beebe Woods. For the rest of his life he was an energetic supporter of the Sippewissett Association in which he served in several capacities, including as President from 1990 to 1995. Over the years he devoted his energy (and personal financing) to long-term community issues: speeding, closure of public access to the water's edge, a walking path alongside Sippewissett Road. In his last communication to me in late 2020 he presented the arguments that power lines along Sippewissett Road should be buried. Indeed such a challenging project could be related to creating a walking path and installation of fiber-optic cable for the next generation of internet.

He is survived by his wife of 41 years, Rosemary Hoskins, of Falmouth, and their son Andrew, of Spencer, New York; Margaret M. Shea, of Gradyville, Pennsylvania, the mother of his three grandchildren, Hannah, Noreen and Calvin Hoskins; and a younger brother, Kim Hoskins, who resides at the family homestead in Bloomfield, N.Y. Hartley was pre-deceased by his first wife, Judith Brennan.

A celebration of life service will be announced at a future date.

The Sippewissett Earthquake of 2020

On the morning of Sunday, November 8, 2020 at 9:11 while finishing breakfast in their home on Upland Avenue, Carolyn and Anatol Eberhard experienced a base-tone vibration of the house. Anatol, having as a child lived near Ankara, Turkey, and later near the San Andreas fault in California, immediately recognized it as an earthquake, of which he had experienced many. Carolyn had also experienced earthquakes in California, and once in Ithaca, NY, so she immediately concurred with her husband's conclusion.

Astonishingly, the event was recorded by a seismograph in Sippewissett operated by Bob Busby who is the architect and manager of an ongoing large-scale program operating hundreds of interlinked seismographs across the United States. It turns out that the Sippewissett seismograph was the closest one to the earthquake's epicenter, about ten miles to the west and three miles south of New Bedford, under Buzzard's Bay. It suggested a strength of 4.2 on the Richter scale, he lowest strength ordinarily felt by humans. Later the strength was reassessed at 3.6.

The earthquake was reported to be felt all over southeastern Massachusetts, Rhode Island and some parts of Connecticut, and by several neighbors in Falmouth.

According to the Falmouth Enterprise: Jeffress Williams, a senior scientist emeritus at USGS Woods Hole Coastal and Marine Science Center, said he felt the earthquake from his home in North Falmouth. "We were sitting at the breakfast table this morning, and it was evident right away that it was an earthquake, since there were no large trucks driving by," Mr. Williams said. Earthquakes in New England occur, but they are unusual, and the magnitude of the earthquake Sunday morning was sizable for the area"

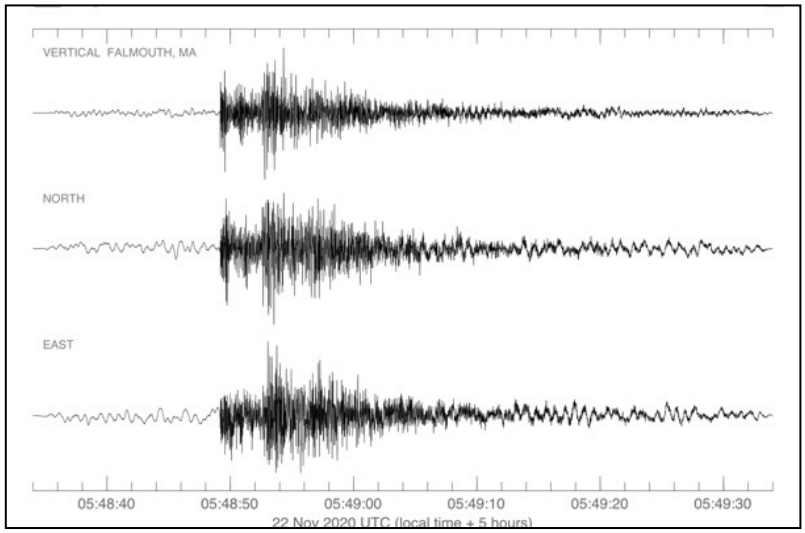
Courtney Bird, near Little Sippewissett Marsh also said he felt the earthquake. "It felt like someone backed a dump trunk down the driveway and unloaded a whole pile of rocks." He said he felt the shaking for about 10 seconds, and it was strong enough to rattle the dishes in his kitchen. "We generally don't think of earthquakes in New England."
In the Gaines household, also in the midst of breakfast, the rumbling was first attributed to the washing machine gone awry. But the washing machine was not running. In the absence of large trucks and the extended duration of the event it was concluded it must have been an earthquake. In the past, gentle earthquakes had caused framed pictures on their wall to become misaligned.

Catherine Bumpus in Woods Hole said her first reaction was that there was something wrong with her furnace. Her second reaction was the Steamship Authority must be piledriving…but it was not. "I remembered long ago I'd experience an earthquake in California, and it felt just like that," Catherine said.

Mr. Williams said if he had to make a guess, the earthquake was most likely a result of the relaxation of the earth's crust after glacier unloading, called glacial isostatic rebound.

Although Sippewissett is not thought of as an epicenter for earthquakes, it is an epicenter of geophysicists, largely from its proximity to WHOI and the USGS. Residing in our neighborhood are Dr. Carl Bowin, Mr. Robert Busby, Dr. Uri ten Brink, Dr. Ralph Stephen, Dr. Jeffress Williams, the late Dr. Hartley Hoskins, and the late Dr. Frank Press (see box).

Two weeks later there was a second earthquake near the same epicenter, this one smaller.



Seismogram of the November 8, 2020 earthquake felt in Sippewissett at 9:11 in the morning and recorded on a seismograph near Haynes Avenue by Bob Busby.

Top curve – up-down

Middle curve – north-south

Bottom curve – east-west

Frank Press – Geophysicist, Oceanographer, Educator, Advisor to Presidents.

Dr. Frank Press was recognized internationally, not only for his pioneering contributions to our basic knowledge in geophysics (the structure of the earth's crust and mantle), and oceanography, but also in lunar and planetary sciences. His wide curiosity carried him across discipline boundaries, resulting in a broad capability as an earth scientist, recorded in 160 scientific papers, and a unique textbook entitled EARTH. His exceptional ability to transfer his knowledge and judgement to matters of public affairs made him unique.

Press' formal education was completed with his PhD in geophysics at Columbia University in 1949, after which he joined their faculty. By 1952, under the influence of his mentor Maurice Ewing, also at Columbia, he became interested in oceanography (Ewing's early work in geophysics at Woods Hole helped put the Oceanographic Institution on its course).

After a productive decade at Caltech, he returned to the East Coast as head of the M.I.T. Department of Geology and Geophysics, later renamed the Department of Earth and Planetary Sciences to underline its expanded focus. Press was instrumental in creating the WHOI-MIT Joint Graduate Program in Oceanography. With his close interactions with Woods Hole scientific institutions Frank Press built a family home in 1964 on a hilltop on Beccles Road in Sippewissett, overlooking Buzzards Bay. The property is still held within his family. Our records list them as early members of the Sippewissett Association.

What sets Frank Press apart from other scientists was his ability to capture the interest, respect and confidence of political figures (and philanthropists) in bringing his knowledge and judgement to public affairs. He was a member of President Kennedy's (and later President Johnson's) Science Advisory Committee. Between 1959 and 1963, he represented the United States at four nuclear-test ban conferences in Geneva and Moscow, where seismological monitoring of atomic tests was a key issue.

In 1977 he was called to Washington, D.C., to serve as President Carter's Science Advisor. For two terms (1981-1993), he also served as President of the National Academy of Sciences, perhaps the nation's most prestigious scientific appointment.

Dr. Press helped organize and give impetus to the International Geophysical Year, a coordinated worldwide program to measure and map various geophysical phenomena--a decade long effort that also involved international explorations of Antarctica and the oceans. His leadership extended also to research and cooperative education efforts in Japan, the Peoples Republic of China and the USSR.

In all of these endeavors he was supported by his wife--the former Billie Kallick, who died in 2009. They had two children and one grandchild. Frank Press died in January 2020 at age 96.

This account is based partially on remarks of Cecil Green and of Milton Dobrin on the occasions of honors presented to Press by the Society of Exploration Geophysicists.

Wood Neck Beach Committee

Wood Neck Beach is the only Town-owned beach within our domain, from the Knob in Quissett to Wood Neck Beach itself. For perhaps half of our constituency this beach is their closest access to the water's edge, and for many it is visited year-round. In summer, demand for use of the beach is limited by the capacity of the parking lot; and on many days a long waiting line forms at the entrance.

Unlike most Town beaches, Wood Neck retains much of the charm and ecosystem services of a spectacular natural coastal complex of beach, dune, inlet and salt marsh, which together, for many, conveys a valued sense of wildness. Management of these assets - really their preservation - means contending with diverse and varying natural coastal processes; strongly held and sometimes contradictory human priorities; occasional viscous government services; and incomplete science. Our own shortcomings need to be mentioned here, as well. In the past year the pandemic has added yet another facet to these difficulties.

The beach along Buzzards Bay is, of course, one of the major assets of Wood Neck. A problem we face is impoverishment of the beach resulting from many decades of sea wall and riprap coastal protection projects to the south, where, historically, coastal erosion has provided the sand delivered by littoral drift to the north. Seemingly, the only remedy would be artificial nourishment of the beach with material from inland sources. This was suggested for Wood Neck in 2007, in a project that would supply 4,500 cubic yards to the beach. The plan had a project-life of at least six years. Such projects are expensive and whether the benefits justify the costs, given other Town priorities, is debatable. And the duration of such projects is questioned where wave driven longshore sand movement has been estimated at 500 to 2,000 cubic yards per year.

Another of our priorities has been to preserve and enhance the dune fields, which fall into two categories: the north and south dunes which occupy a mostly natural position; and the central dune seaward of the parking area, which is artificially projected seaward across the beach berm and which is especially vulnerable to storm damage. Much of the landward parking area lies where the dune would normally be. All of the dunes are naturally nourished by windblown sand, which is trapped by dune vegetation and by the landform itself. This process could be enhanced using snow fencing both on the seaward and landward sides. Snow fence barriers are also crucial to restricting pedestrian foot-traffic on the dunes, a major source of landform erosion and destruction of dune vegetation. Guiding foot traffic to limited special crossing places also protects ground nesting bird habitat on the dunes, such as for piping plovers. While some people do not value dune wildlife, including endangered species, others feel protection measures are a small price to save these creatures. In any case, the Town is required to protect them and their habitat by Federal law.

The inlet area is a favorite site for families because of the fine sand remaining there and the clean tidal water flowing through. After migrating from former positions to the south over two centuries, the inlet now has been artificially stabilized against a curved rock structure lining the Saconesset shore. Flow through the inlet provides strong flushing for the saltmarsh; and the nearby sand-lined marsh creeks provide safe wading for recreation, adventure and learning.

Many coastal processes are influenced by sea level rise. Since about 1930 tide gauges at Woods Hole and Newport, R.I., indicate sea level has risen at an average rate of about 0.01 feet per year, or about 1 foot per century. Within this period, oceanographers recognize other long-term oscillations, such as an 18.6 -year tide that rises and falls ca. 0.6 feet over that period. This tidal constituent is driven by a slow variation in the moon's angle of declination. Another long-term variation is the North Atlantic Oscillation (NAO), with a quasi-periodic cycle of 5 to 15 years. It results from atmos-

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Wood Neck Beach Committee *(continued)*

pheric pressure differences arising between Iceland and the Azores. The NAO clearly affects sea level, hurricane tracks, and extreme weather conditions on both sides of the Atlantic. Annual variations of sea level in our area (highest in summer) can also in part be related to seasonal temperature variation in our coastal waters.

An existing reality we need to face is the impact of hurricanes. In 1938 the parking lot at Wood Neck was under a tidal surge of 9 feet with all the dunes submerged. Certainly, neither snow fence nor other human dune protection measures could be relied on to save these landforms or habitats, or prevent breaching and overwash of the beach. The sobering fact we need to face is that all of our sustained efforts could be wiped out by a hurricane. The only reassuring fact is that a beach remains near here despite the many hurricanes that have assaulted this coast over centuries.

Wood Neck Coastal Complex:
Beach, dunes, inlet, saltmarsh. Having experienced intensive residential development on adjacent lands in recent decades, the beach still retains a unique wild quality. Like all Falmouth beaches, significant challenges lie ahead.

There is good evidence that sea level rise could increase dramatically in the near future, from increasing global temperature and melting of land glaciers. If sea level rises faster than we can respond to its impacts, there will still always be beaches somewhere along the emergent Falmouth coast, no doubt with enhanced littoral drift of sand; and "we" will only need to ensure public access. The same is not true of the great saltmarshes which will drown if they cannot capture sufficient tidal sediment to retain the environmental requirements of the specialized grasses adapted to the high marsh. Their reduction or loss will impact a broad community of wildlife and diverse fisheries for which the saltmarsh is an important nursery. Fringing marshes remaining along protected shores are likely to provide some compensation.

Meanwhile, in the near term, we can celebrate and defend Wood Neck beach and its natural history as it exists today.

Traffic and Safety (T&S) Committee *(continued)*

A second possible course of action was to pursue RADAR sign displays alongside the road to remind speeders of their offence and "calm" traffic. These signs are deployed around the country (and Town) and are widely regarded as effective in slowing traffic. Given that Sippewissett Road and Quissett Avenue form a single traffic corridor to and from Woods Hole and the ferries, we have joined with the Quissett Association in a joint approach to the town. As a result of several effective meetings with the Falmouth Traffic Advisory Committee (TAC), they concluded that it was appropriate to deploy electronic speed control technology along the Sippewissett Road-Quissett Avenue traffic corridor and they forwarded their recommendation to deploy these devices to the Town Manager, Julian Suso. who then placed it on the Select Board's agenda. The Select Board asked for an opinion from the Chief of Police, who asked for more traffic data to be collected on Sippewissett Road and Quissett Avenue, first baseline data, then speed data with a mobile RADAR sign present, then again with the sign removed. Although some additional data have been collected, and more is planned, the pandemic interrupted this program.

A third initiative was to ask for more police speed details along these roadways. At present there are very few per year in our area. The rationale here was not only to ticket speeders, but also to display the presence of police deployments. The reaction to this request was that the current police budget would not allow increased effort along these lines. As a result, the combined Sippewissett/Quissett organizations agreed to privately raise the needed funds to hire off-duty police speed details for an experimental year. Again, the pandemic intervened and because police resources were highly constrained during this time progress was not advanced.

Perspectives

Police and private traffic databases on Sippewissett Road/ Quissett Avenue are consistent with the conclusion that annually there are about 900,000 auto transits along these roads. Summer traffic is much higher than winter traffic. Amazingly this is an average of 2-3 per minute, more in the summer and fewer in the winter, for 16-18 hours per day.

In setting speed limits, traffic engineers assume that the frequency distribution of graphed traffic speeds statistically follows a normal or bell-shaped curve. The average speed corresponds with the top of the bell; half the speeds higher and half lower. They assign the speed limit by choosing the speed associated with one standard deviation unit to the right of (beyond) the average speed. This choice means mathematically that 16 % of traffic exceeds the posted speed limit. This means 140,000 vehicles would be exceeding the posted speed limit each year, or 390 cars per day (25 cars per hour).

We note that this speed limit is determined by decisions made by drivers. It does not include opinions of walkers, bicyclists, those worried about their children at bus stops, or those attempting to check mailboxes or join the traffic stream from driveways or side roads.

The enforcement speed, by which traffic police actually issue tickets, often exceeds the posted speed by as much as 10 mph. For perspective we consider that portion of the curve beyond *two* standard deviations to the right of the mean. Mathematically 2.2 % of the traffic exceeds the enforced speed limit. That would indicate at least 54 egregious speeders per day could be ticketed.

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With the pandemic winding down, the Committee's next meeting the Traffic and Safety Committee is scheduled to present at the June meeting of the Falmouth Traffic Advisory Committee. With summer traffic building rapidly, we will press for an early restart to the data collection program process that was derailed by the pandemic that in turn will inform the Chief of Police's recommendation to the Select Board. The Committee will also pursue the implementation of our SA-QA funded Police RADAR speed patrols as soon as conditions permit.

Advocating for Modern Nitrogen-Reducing Septic Systems (NRSS) to Clean Up our Coastal Waters* *(continued)*

Formerly, the primary source of nitrogen pollution in West Falmouth Harbor was the Town of Falmouth's sewage treatment plant, whose nitrogen-laden wastewater effluent is discharged into groundwaters, then travelling slowly to the harbor, a journey that takes approximately six years. In 2005 a state-mandated upgrade of the plant was completed, using a modern technology that can now remove up to 90% of the nitrogen that is in the effluent before it is discharged, greatly reducing the plant's percentage contribution to nitrogen input in the harbor. But the inner West Falmouth harbor will, unfortunately, continue to suffer the negative effects of nitrogen flowing in from the numerous residential septic systems in its watershed, unless something is done about it.

Most of Falmouth—and *all* of Sippewissett—relies on Title V septic systems, some even on cesspools. Title V systems—mandated by the State in 1980 for new construction and upon a change in ownership—use an antiquated technology, designed only to reduce health risks from direct contact with disease-causing bacteria in wastewater, which was a problem for the shallow, routinely flooding cesspools that were more common at the time. Title V systems were not designed to remove nitrogen in our home's wastewater nor the various pharmaceuticals and household chemicals that we pour into our toilets and down our drains. Thus, about 80% of the nitrogen—and all of the other substances—end up in the groundwater and, from there, head straight for the shore.

The effectiveness of our individual septic systems is, therefore, something that all of us who care about the health of our aquatic environment should be concerned about. We all, individually and as a group, need to do whatever we can to help protect the environmental amenities that are so vital to our Sippewissett way of life. The water in which we swim, fish, and scuba-dive, that we traverse in our boats, wade in as we walk along the beach or even just gaze at when sitting on our porches, badly needs our help!

Several types of Nitrogen-Reducing Septic Systems (NRSS) are now available and approved for residential use in Massachusetts, though very few have been installed in Falmouth. All remove far more nitrogen from household wastewater than a Title V system does. Some NRSS are designed as add-ons to an existing Title V. Others are installed, in place of a Title V, for new construction and building upgrades. Which NRSS is most suitable for a particular property depends upon such variables as lot size, proximity to a waterway, soil characteristics, water table depth, etc.

One of the first NRSS in Sippewissett was installed in 2002, at the insistence of a group of Sippewissett Association (SA) neighbors during the expansion of the Cape Codder Condominiums. Its Bioclere "package"—a type of NRSS—now treats all of the wastewater from the building's units. For twenty years it has prevented the northern end of the Gunning Point Beach from experiencing the horrific wastewater pollution that was common each summer when the original hotel on the site was operating.

Again, in 2010, members of the SA, settling a lengthy series of lawsuits brought by neighbors against the owners of a large Gunning Pond lot, were able to insert in the document a condition requiring that the builder of any future residence on the site safeguard the pond, the beach and our local coastal environment, by installing an NRSS.

While some nearby towns—including Bourne, Wareham and Tisbury, as well as Marion and Westport—have introduced regulations mandating an NRSS on certain properties close to the shore, Falmouth currently does not impose such a requirement on the vast majority of town properties. While the Conservation Commission can *recommend* the installation of an NRSS on residences adjacent to a sensitive waterway, it does not have the authority to *require* it, except in a very few situations. Since most applicants to Town boards are uninformed about the problem of nitrogen pollution and the technologies available to minimize it, it is entirely predictable that very few, after receiving a permit for a Title V, go on to install a NRSS —although, if the option were properly explained, many would gladly do so, to protect a nearby pond, beach, or other body of water.

Falmouth's Coastal Pond Overlay District does allow the Zoning Board of Appeals (ZBA) to require nitrogen-reduction for larger developments in designated nitrogen-sensitive watersheds. However, in practice, town bodies are wary of requiring NRSS for individual homeowners in these districts. Falmouth has considered requiring NRSS for large 40B projects, but developers repeatedly claim (with little data to back it up) that a package NRSS would make the project "uneconomic"--an argument often used, on appeal, to overturn any legal requirement. The possibility of requiring

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Advocating for Modern Nitrogen-Reducing Septic Systems (NRSS) to Clean Up our Coastal Waters* *(continued)*

homeowners surrounding the heavily polluted Oyster Pond to install NRSS has also been raised, but it will only do so if sewer connections prove unfeasible or unaffordable. Yet, despite its clear benefits, and although the town would absorb most of the cost, some homeowners of the million-dollar homes around the pond have voiced opposition, arguing that, for them, maintaining a system to cleanse *their own wastewater* would be "too costly"! Thus, to date, little progress has been made in Falmouth toward cleaning up nitrogen pollution, though it is abundantly clear that NRSS are effective and less costly than sewering in low density areas. It is also clear that, if the health of Falmouth's coastal waters continues to decline, so will the Town's economic base, which depends upon attracting tourists and second-home owners to come and enjoy its coastal amenities.

When my late husband and I bought our summer house on Sippewissett Rd., along with its decades-old cesspool, I was not unaware that the effluent, leaching into Gunning Pond, just beyond our back yard, would adversely affect its water quality. But, like most local residents, it took us many years to do anything about it. By then, along with other SA members, I had been volunteering for several summers as a Baywatcher for the BBC's Water Quality Monitoring Program. Sampling the waters of Gunning Pond and Sippewissett Marsh two or three times a week, we consistently found the water's oxygen content disturbingly low and nitrate levels alarmingly high—both key indicators of nitrogen pollution. Through this and through my participation in SA's denitrification efforts at the Cape Codder Condominium and other local sites, I learned more than I had previously known about the effects of excess nitrogen in our waterways.
The Buzzards Bay Coalition (BBC)—together with the state Department of Environmental Protection (DEP), the Cape Cod Commission, the Barnstable County Board of Health, the Falmouth and other town governments, and some non-profit environmental organizations—has long been involved trying to reverse the downward trend in the Bay's water quality. In 2016, under an EPA grant, the West Falmouth Nitrogen-Reducing Septic System Demonstration Project gave twenty homeowners around the harbor a $10,000 subsidy for installing state-of-the-art NRSS on their properties. Phase II of that project, in which ten more NRSS were installed in West Falmouth, was completed in June of 2020.

On each of the twenty-four systems for which at least one year's-worth of data was available, there was a reduction in nitrogen outflow of at least 74%. A third phase of this project has just begun, this time focusing on fifteen year-round homes in various coves of West Falmouth Harbor.
In 2016 we began having problems with our own cesspool and, while seeking a solution, heard about another NRSS demonstration project, just getting underway in Barnstable County, that was seeking owners of homes near the water who were willing to install a state-of-the-art NRSS and have it monitored by the Health Department for a period of years. So, in 2017, we had a so-called "layer cake" system installed. Its leachfield is made up of layers of gravel, sawdust, and sand, covered by a layer of loam and seeded with grass or—as in our case—wildflowers (see diagram below). Septic tank effluent is successively nitrified and denitrified as it percolates through the layers. Our system is still being tested on a regular basis by the Massachusetts Alternative Septic System Testing Center (MASSTC), a division of the Barnstable County Department of Health and Environment, whose scientists have done ground-breaking research on nitrogen-reducing systems. It is working well, removing 67% of the nitrogen in the effluent, far more than the average 20% that would be removed by a conventional Title V system.

Those who oppose requiring NRSS, even on water-adjacent properties, often argue that they are too expensive. But, currently, a standard Title V system costs between $20,000 and $50,000, while the West Falmouth Harbor project paid $10,000 to add an NRSS to an existing Title V, $33,000 to install a stand-alone NRSS on an unbuilt lot or to replace a

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Advocating for Modern Nitrogen-Reducing Septic Systems (NRSS) to Clean Up our Coastal Waters* *(continued)*

cesspool. Even allowing for inflation, the price differential between the two types of system is of little consequence, when one considers what it costs today to buy a lot or an existing older house by the water and build a new one. For example, the *average* assessed valuation of twelve of the fifteen houses on Gunning Pond is over $2 million! Upgrading a Title V would cost only 1.6% of the value of such homes, putting in a new NRSS perhaps .5% more. The remaining three homes on Gunning Pond date back to the 1960s. Their owners would have to spend 1.8% of their homes' $560,000 average assessed value for an NRSS. But, when sold, these houses are certain to be demolished and replaced by larger structures valued in the million-dollar-and-up range. Can we dare to hope that, by then, the Town of Falmouth will have begun requiring modern NRSS for all new construction, no longer allowing antiquated Title V systems to harm the very coastal environment that underlies these inflated real estate prices?

From its founding in 1969, a key mission of the SA has been "to preserve the natural features" of our area. Its annual donations help support the costs of the Baywatchers program, as well as the efforts of other environmental organizations—the Falmouth Water Stewards, Association to Preserve Cape Cod (APCC), Buzzards Bay Coalition, New England Coastal Wildlife Alliance (NECWA) and others—that work to improve coastal water quality in Falmouth and the wider Cape. But isn't it time that the SA—as a hundred-and-thirty-family-strong neighborhood association—do more than this?

We all, as individuals, must continue to minimize our own contribution to nitrogen pollution and to educate our neighbors about the issue. But the SA also has a vital role to play, in keeping the septic issue at the forefront of Town concerns. It can encourage the Town to be pro-active in educating its citizens about the harm caused by nitrogen pollution and in providing readily accessible information on modern solutions like NRSS. It can encourage the Town to offer incentives—subsidies, for example, or zero-interest loans (as was recently proposed by the APCC) for installing an NRSS.

And finally, it can make our collective voices heard, insisting that the Town adopt effective regulations to require NRSS for all new construction and upgrades. Some say, "too expensive"! But the cost of doing nothing is far higher, borne as it is by the continuing decline in the health of our coastal waters, Falmouth's most valuable asset. I propose, therefore, that at our next Annual Meeting we discuss ways of dealing with the Town on this matter.

For Further Reading:

"APCC Proposes County Offer Zero Interest Septic Loans," *Falmouth Enterprise,* April 2, 2021.
Costa, J. E., G. Heufelder, et al., "Nitrogen Removal Efficiencies of Three Alternative Septic System Technologies and a Conventional Septic System," *Environment Cape Cod* 5(1):15-24., September 2002.

Designing a Municipal Model for Mandating, Funding, and Managing Innovative/Alternative Septic Systems: Final Report. Buzzards Bay Coalition, Town of Falmouth Water Quality Management Committee & Science Wares, Inc., June 2020.

"Making it Easier and Quicker to Optimize Nitrogen-Reduction in Residential Septic Systems", February 02, 2021. https://www.savebuzzardsbay.org/news/making-it-easier-and-quicker-to-opptimize-nitrogen-reduction-in-residential-septic-systems/.
"Nitrogen Pollution," https://savebuzzardsbay.org/current-issues/nitrogen-pollution.

"Pilot Layer Cake Septic System Technology," https://www.eastham-ma.gov/health-department/pages/pilot-layer-cake-septic-system-technology

West Falmouth Nitrogen-Reducing Septic system Demonstration Project: Status Report, May 2017

*For her generous help with my research for this article, I am grateful to the very knowledgeable Maureen Thomas, Water Resource Specialist with the Buzzards Bay Coalition—and resident of Falmouth—, who not only provided me with a number of useful reports and other relevant documents, but also took the time to respond with lengthy emails to my many questions. Maureen Conte also contributed information and made helpful suggestions for how best to present it. I am, however, solely responsible for any errors of fact or interpretation!

Sippewissett Association Newsletter

Inside this Issue

Calendar

52nd Annual Meeting (remote)
June 26, 202, 11:00AM
Invitation by email

Summer Social (live)
Sunday, August 8, 2021
Outdoors, Cape Codder Clubhouse
Standish Road

The Sippewissett Association, Inc.
P.O. Box 501
Falmouth, MA 02541