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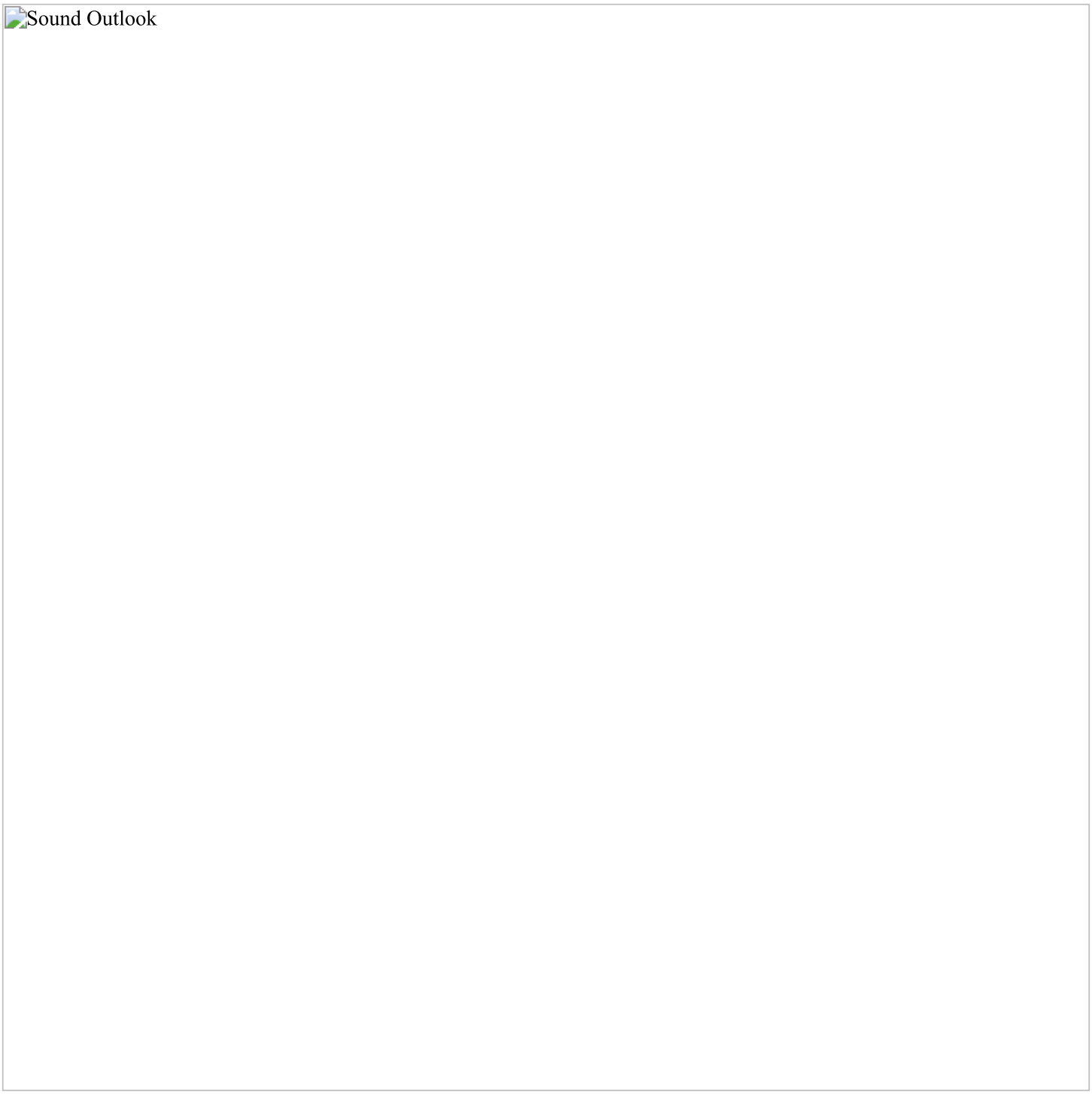

A Newsletter from the Connecticut Department of Energy & Environmental Protection
Exploring Long Island Sound - Issues and Opportunities

Get Involved with the Long Island Sound Blue Plan

You can't open an issue of *Sound Outlook* these days without seeing articles and updates about the Long Island Sound Blue Plan. This issue is no exception. That's because we want *Sound Outlook* readers to be well aware that a Blue Plan

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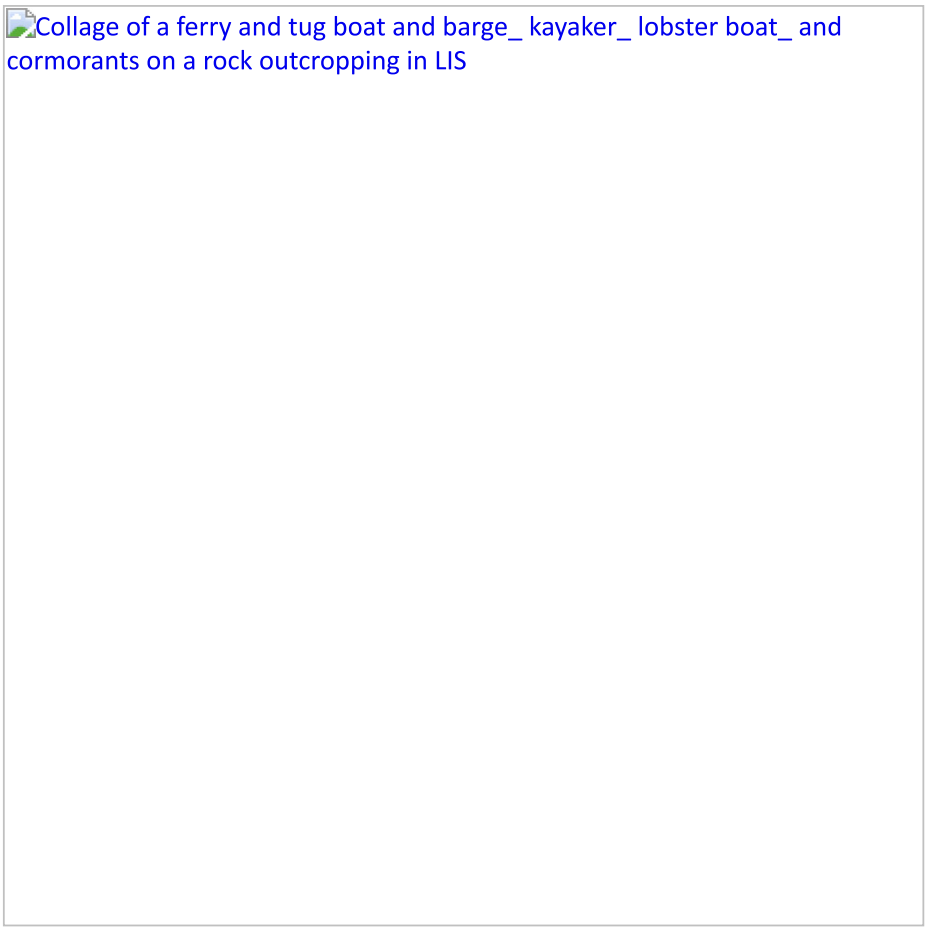
Inside

is being developed for Long Island Sound. And we want you to know that the Blue Plan can't be developed without your help: we need your input, your insight, and your support to make sure the Plan is comprehensive, meaningful, and successful.

Sound Outlook readers are a diverse group of people, but you all share a love of Long Island Sound. You might be a tugboat captain, or a fisherman, or a kayaker. Or you might be someone who appreciates how the Sound improves your quality of life without actually "using" it. Whoever you are, you have a stake in Long Island Sound and what happens to it, on it, in it, and under it. As a "stakeholder," you are one of the most important parts of the Blue Plan.


Collage of a ferry and tug boat and barge_ kayaker_ lobster boat_ and cormorants on a rock outcropping in LIS

The legislation that established a Blue Plan for Long Island Sound makes it very clear that the public and stakeholders will play a crucial role in developing the Plan. The legislation specifically calls for a transparent and inclusive process that must include widespread participation of the public and stakeholders, and encourages public participation in decision-making. The legislation also requires that the Blue Plan Advisory Committee hold three public hearings, one each in a western, central, and eastern coastal municipality, to receive comments and submissions from anyone interested in the Plan.

But three public hearings will not provide adequate opportunity for stakeholders to be heard and involved. So the legislation also allows the Advisory Committee to reach out to the public in other ways to make sure that stakeholders are included and well-represented in the process.

In an effort to start engaging stakeholders, the Blue Plan Advisory Committee held a public event on November 16, 2016 at the Maritime Aquarium at Norwalk. The Stakeholder Engagement Subcommittee, chaired by The Nature

Get Involved with the Long Island Sound Blue Plan

Spotlighted Coastal Resource: Long Island Sound-related Data and Information Posted on New York Geographic Information Gateway

Spotlighted Coastal Access: Branford Trolley Trail

Climate Change Update: New GIS Data Describes Effects of Sea Level Rise on Connecticut's Coast

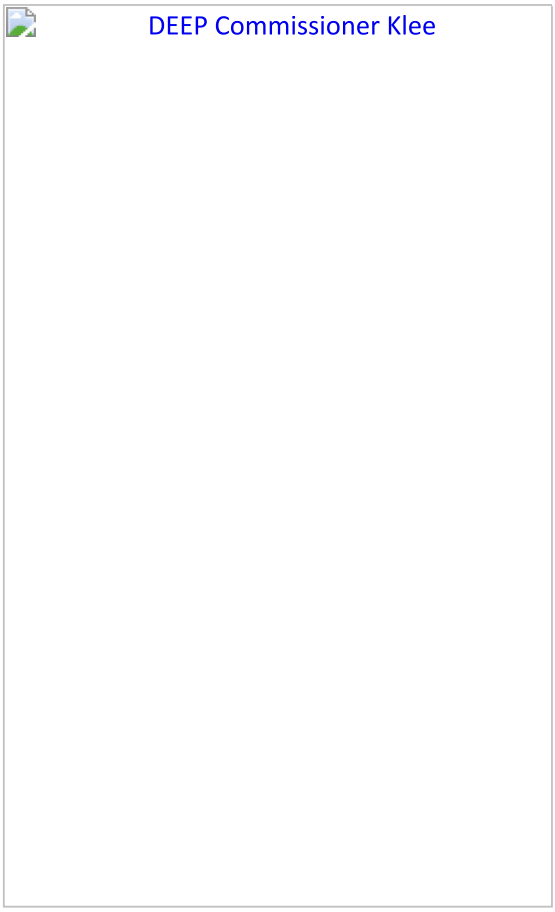
First Impressions

Sharing the "First Impressions" that make an Environmental Difference

According to Erik Eckl, the founder of Water Words That Work, his market research shows that there is a common progression among people who consider themselves to be "environmentalists." It starts with a "first impression" or experience that then makes them take a first environmental step. This step is usually then followed by a greater environmental awareness and a behavior change, and ultimately results in a "big

Conservancy's Nathan Frohling, organized the forum which presented an overview of the Blue Plan process and solicited public feedback on the issues and goals associated with the Plan. (Please see the "First Impressions" column for more about Nathan Frohling).

The event was a great success, with approximately 200 people in attendance. It began with a welcome from Aquarium Director Dr. Brian Davis and an introduction from DEEP Commissioner Rob Klee, and transitioned to a screening of the documentary "Ocean Frontiers II: A New England Story for Sustaining the Sea" about Rhode Island's experience in ocean planning.



DEEP Commissioner Rob Klee
Photo Credit: Andrew Benson,
The Nature Conservancy

The film screening was followed by a presentation from Advisory Committee member Christine Nelson, Planning Director for the Town of Old Saybrook, about the important role played by stakeholders and the public in development of the Blue Plan.

Nathan Frohling then presented information about two draft documents, a list of issues that will be addressed in the Plan, and a "Vision and Goals" document, both of which will ultimately guide development of the Blue Plan. Stakeholder input on these documents is critical.

The event culminated with a panel made up of Advisory Committee members and other experts, giving the panel a chance to explain their involvement in the Blue Plan and other ocean planning processes, and giving the audience a chance to ask questions and make their concerns known.

step," such as choosing an environmental career.

This column features the "First Impression" that set someone on his or her path to environmentalism. We hope *Sound Outlook* readers will relate to these "First Impressions" and recall their own experiences that led them to appreciate and care about Long Island Sound.

This month, we share the First Impression of Nathan Frohling, Director of Connecticut Coastal and Marine Initiatives for The Nature Conservancy in New Haven, Connecticut. Nathan is a member of the Long Island Sound Blue Plan Advisory Committee and is Chairman of the Plan's Stakeholder Engagement Subcommittee:

Nathan's "First Impression" came about during his younger years, spent in New Jersey on Barnegat Bay, visiting his grandparents at their home on the shore:

I may not have fully understood at the time how the wildness of the sea I experienced as a kid would get into my gut and drive me the rest of my life, in terms of what I love and feel drawn to. Barnegat Bay, even in the early 1960s, was fairly developed, it wasn't a pristine, untouched wild land. But my father's passion was birdwatching, and we'd go to the islands which were

The audience and panel at the Norwalk Blue Plan event
Photo Credit: Andrew Benson, The Nature Conservancy

The nearly one-hour panel discussion in Norwalk merely scratched the surface of Blue Plan issues and interests. But it serves as an important initial step in engaging stakeholders and members of the public. In addition to holding future public events like the one in Norwalk to keep you informed and get your feedback, the Blue Plan Advisory Committee has established several easy ways for you to participate.

Stay Informed:

1. Attend Blue Plan Advisory Committee Meetings--the next meeting is scheduled for Wednesday March 16, 2017 from 10:00 am to 12:00 noon at the Meigs Point Nature Center at Hammonasset Beach State Park, Madison. All are welcome to attend and share your insights with the Advisory Committee. Agendas and meeting minutes are posted online.

2. Add your name and email address to the Blue Plan listserv to be notified of Blue Plan Advisory Committee meetings, additional public events, updated web postings, and other information related to the Blue Plan.

3. Visit the Blue Plan website (www.ct.gov/deep/lisblueplan) for background information about the Blue Plan and links to related material.

4. Attend a Blue Plan event on April 25, 2017 at the UConn Avery Point Campus in Groton. The event will include a screening of the new film "Ocean Frontiers III: Leaders in Ocean Stewardship & the New Blue Economy" about the Northeast and Mid-Atlantic regional ocean plans, hosted by the UConn Maritime Studies Program. Stay tuned for more

undeveloped, open and wild. There was a solitude there, with the wind blowing and the active birdlife. And you'd go fishing or seining in the flats or the shallow areas and you'd feel alone but very happy out in the elements.

Family trips to the Northeast also played a role in shaping Nathan's love of the sea:

I fell in love with wooden boats and the experience of being on the water. The whole thing just felt like heaven to me. I just couldn't get enough of it. We went to Maine, and Nova Scotia and Peggy's Cove, and that was another one of those things of just being entranced, literally just charmed and drawn-in. It caused me to start drawing boats by the age of 4 or 5 years old.

From his younger experiences, Nathan's "First Environmental Steps" focused on getting out into nature whenever and however possible:

My family moved to Michigan when I was 9 years old. That's where my brother and I lived the "Tom Sawyer/Huck Finn life." I was so sad about losing the saltwater coast of New Jersey, so I did my best to try to find that in Lake Michigan and in smaller inland lakes mid-state between Ann Arbor and Lansing. My brother and I got a small aluminum rowboat and small outboard motor that we bought with our savings when I was 10 years old. Because we were trying to restore the kind of joy we had down at the Jersey shore.

Nathan's new life in Michigan was set in the countryside, surrounded by rural farms, rivers, fields, and the woods:

details.

5. Check out the Long Island Sound data now available on the New York Department of State's Geographic Information Gateway (please see the "Spotlighted Coastal Resource" article below for details).

6. Review information sheets about basic Blue Plan information, the stakeholder engagement process, issues that will be addressed by the Blue Plan, and the draft Vision and Goals that will help guide development of the Blue Plan. Then, let us know what you think!

Make Your Voice Heard:

1. Provide your input via the Blue Plan email address (DEEP.BluePlanLIS@ct.gov)

2. Provide comments on the Blue Plan Online Comment Form (www.ct.gov/deep/blueplancomments)

3. Send written comments to LIS Blue Plan, DEEP WPLR Land and Water Resources Division, 79 Elm Street, Hartford, CT 06106

The Blue Plan is your plan, and it will be a successful plan if stakeholders believe your issues, concerns, and vision are well represented. Please help us develop a plan to protect what is most important to you.

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SPOTLIGHTED COASTAL RESOURCE: Long Island Sound-related Data and Information Posted on the New York Geographic Information Gateway

The states of Connecticut and New York have a long history of collaborating on issues that affect Long Island Sound. The Long Island Sound Study is but one shining example of the two states working together for the Sound's greater good. Now, in support of the Blue Plan for Long Island Sound, Connecticut and New York have teamed-up once again to make Long Island Sound-related data and information available to the public: the New York Department of State (DOS) has graciously offered to host the Sound-related datasets on their Geographic Information Gateway.

The Long Island Sound Blue Plan planning process starts with data. Before anyone can develop a spatial plan to guide future use of the Sound's waters and submerged lands, data and information regarding the Sound's existing natural, social, cultural, historic, and economic resources and uses must be compiled and analyzed. The Blue Plan will be based on a comprehensive inventory of these resources and uses, which will help identify existing or potential conflicts so we can work to avoid them.

Staff from Connecticut DEEP and the New York DOS have worked together to import datasets from an assortment of sources into the Gateway. These were identified through a previous planning effort, and represent an initial selection of data that are complete, relevant, and documented such that they meet the criteria for hosting. (Work is currently ongoing to include additional materials.) The initial datasets, numbering approximately 75, are currently available on the

My brother and I would play with our neighbors in the rivers, play games out in the woods, building forts. Again, we were just being adventurous boys playing outside. But in my heart was the beauty of nature and sense of inner well-being. I built a small log cabin, using dead trees to make the logs. I called it "Log-a-Rhythms" because I was into math--I carved the name into the base plate of the door. It was built on top of a big hole I dug in the ground, around 10 x 15 feet, in the woods on our property and it was a way for me to hang out with my friends, sleep out in the woods. We built some bunks and it was a fun way to be outdoors and in nature.

Nathan's family was very environmentally conscious; they were recycling before it became the norm for the rest of us. Even so, Nathan did experience a "Behavior Change," but it was more focused on reducing environmental hazards to the "human ecosystem," much to his mother's chagrin:

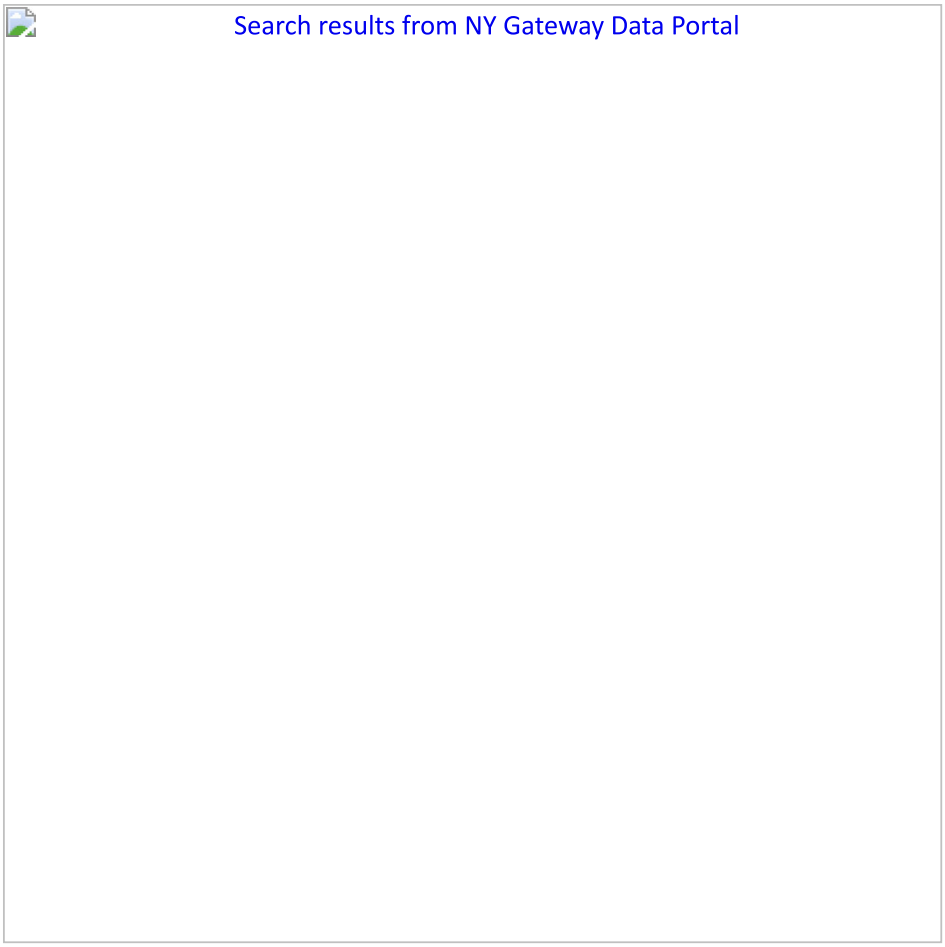
During the 1960's and early 1970's there was emerging information about nitrites in bacon and other processed meats, and other concerns about pesticides and herbicides on foods. There was a growing awareness of the harm that you could do to yourself with carcinogens, and I remember becoming a crusader within my family that we should pay attention to these things and buy different foods and eat differently...to the point where it really got under my mom's skin. She'd say, "Leave me alone already, I'm the mom, I'll decide what we eat!" My family still kids me about my being such a pain about this.

New York Gateway, and they can be found by simply typing "Long Island Sound" or "LIS" in the "find data!" search window on the homepage:

It would seem that Nathan's environmentally aware upbringing would have predestined him for his environmental career. Not so. Instead, Nathan followed his passion for drawing boats and attended the University of Michigan, with the career goal of becoming a marine engineer and naval architect. He was interested in the engineering and the technical side of boats and ships, but it was really "the art of it" that drew him into that field:

I've reflected on this as an adult and as an environmental professional: how did I get here? My career path was naval architecture. I had a four year college process at the University of Michigan as an engineering student. I could take a few electives here and there, but the vast majority was pretty hardcore math, physics, and the sciences. You felt like you had already been in the field a bit by the time you graduated, and I had done some summer jobs for naval architectural firms. I had a really great job as a naval architect with Bertram Yacht down in Florida after college. They are a relatively well-known builder of motor yachts and sports fishing boats. I worked in the field for two years, but by then I knew I needed to make a career change and get into the environmental field.

By now, the environmental challenges of the late 1970s became more and more apparent to Nathan, particularly the way suburbanization was changing the landscape. His experiences as a child were starting to catch-up with him, prompting him to take his "Big Step":



Example of NY Geographic Information Gateway
"Long Island Sound" search results
Click for larger image

If a picture is worth a thousand words, then a map must be worth ten thousand! That's because the data related to different resources and uses in Long Island Sound will eventually be put onto map "layers" that can be placed on top of each other, to see where uses and resources overlap and intersect and, possibly, conflict with or enhance each other.

For example, the following map shows locations of "epifaunal communities," which are organisms that live on the ocean floor or on other hard surfaces such as rocks and shells. Barnacles, sea stars, sponges, and oysters are examples of epifaunal communities. Knowing the location of these communities and their critical habitats will help identify the best place to locate uses on or across the seafloor.

This was when it seemed like my experiences with nature as a younger person had, without intention or design, become an important part of what mattered to me. It was like discovering a piece of my soul that I had been missing. Through my family, I saw the beauty of "grand nature" out west when we hiked in Alaska or Glacier National Park, or backpacked in the Sierra Nevadas or New Mexico, with grand mountains, huge expanses, and cold, crisp rushing rivers in untamed landscapes; in Michigan I was exposed to rural "old-time America" with its particular kind of beauty, which included playing outside every day and bushwhacking through the woods of the Upper Peninsula without following trails, just following a topo map with the goal of reaching Lake Superior; in my earliest years it had been the salty sea and the natural world there, whether the Maine or Jersey coast. All of that exposure was something that I took for granted at the time, but as an adult it emerged as shaping my sense of the world and what mattered.

Ironically, even as a graduate from college it wasn't yet clear to me how much these experiences as a kid had, in fact, shaped my understanding of meaning, beauty, and the sense of inner well-being that comes from these natural places. That sense of well-being comes not only from one's direct experience with nature but also knowing that these places exist and are intact, supporting life and the well-being of the planet.

Nathan started volunteering for environmental

Map showing clusters of epifauna in Long Island Sound
Click for larger image

The following map shows the locations of existing cables and pipelines in Long Island Sound. Knowing the location of these uses can help with locating future similar uses, which might avoid impacts to epifaunal communities and other resources elsewhere in the Sound.

Map showing locations of submerged cables and pipelines in Long Island Sound
Click for larger image

The next two maps show water depths in Long Island Sound and seabed forms, or which parts of the seafloor beneath the Sound are steep, which parts are flat,

organizations pertaining to the Everglades and the Florida coast. Soon, a job opportunity as an engineer came up at Dade County Department of Environmental Resources Management:

They were looking for an engineer who could help them do beach restoration, literally mining sand from the ocean waters off of Miami Beach and restoring the beach which had severely eroded. We also did a 10.5 mile revegetation project on the reconstructed beach. Initially there were no plans to vegetate any of it, but we were able to get enough people to support the project and raise the money to do it. The irony was, it wasn't really an environmental protection job per se, but it allowed me to get into an environmental department and learn about environmental science and policy and gain some environmental credentials along the way.

After six years of fun-in-the-sun in Dade County, Nathan heard the siren song of working for an environmental non-profit organization in Connecticut:

I knew I wanted to work for an organization whose sole mission was to protect the environment. And having spent time in Maine and one summer in Boston working for a yacht design firm, I knew I would eventually move to New England. So I got a job as the executive director of the Farmington River Watershed Association here in Connecticut. I worked there for another six years, and then went back to school at the Yale School of Forestry and Environmental Studies for a masters degree. From there I worked for Sound Waters, and

and where there are depressions in the seafloor. Maps like these will give Blue Planners an idea of the "lay of the land" underwater which can help in locating uses like cables and pipelines.

Map of water depths in Long Island Sound
Click for larger image

then came to The Nature Conservancy in 2008 to direct the Tidelands Program and have been here ever since.

Florida's loss is Connecticut's gain.

Nathan plays a significant role in making sure that stakeholders are fully engaged in the Blue Plan process. As someone who understands the "sense of inner well-being" that Long Island Sound gives to us, whether we directly use the Sound or we merely know it exists and it's in good shape, his background makes him uniquely qualified for the job.

View past issues of *Sound Outlook*

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Look Out For Upcoming Events!

Long Island Sound Day:
Friday May 26, 2017

Long Island Sound Study (LISS) Committee Meetings

Please be sure to check the Calendar of Events on DEEP's website

Map of various seabed forms in Long Island Sound
Click for larger image

These four maps--a mere fraction of the data that will eventually become available--already give *Sound Outlook* readers a good sense of how combined data layers will identify where multiple resources and uses are located in Long Island Sound, thereby helping avoid conflicts in the future.

Keep checking the Gateway for updates, as more data relating to Long Island Sound will be added in the near future. For more information about the datasets available on the New York Gateway, please contact the Connecticut DEEP's Kevin O'Brien at 860.424.3432.

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SPOTLIGHTED COASTAL ACCESS: Branford Trolley Trail

Guess what? This time of year, many of us have got a fever. But the only prescription isn't more cowbell. We're talking about Cabin Fever, and the cure can be found on a quick walk outside. And there's no better place to be "walkin'" than the Branford Trolley Trail.

Visitors to the Branford Trolley Trail will enjoy a beautiful view
right from the West Point Road parking lot!
Photo Credit: DEEP LWRD

The Branford Trolley Trail is located along an abandoned trolley right-of-way connecting Pleasant Point and Juniper Point. The trail contains a wooden footbridge across an old trolley bridge, leading to a walkway providing access to an existing nature trail across an expansive tidal wetland and estuary.

Trail signage highlights the
community partnership behind the
Branford Trolley Trail

The entire trail is merely 3/4 of a mile long and relatively flat, making it the perfect place for a quick mid-winter hike to recharge your soul. The trail can be accessed from parking lots on West Point Road and Tilcon Road off Totoket Road. Please be careful, as parts of the trail can be snow-covered and icy this time of year.

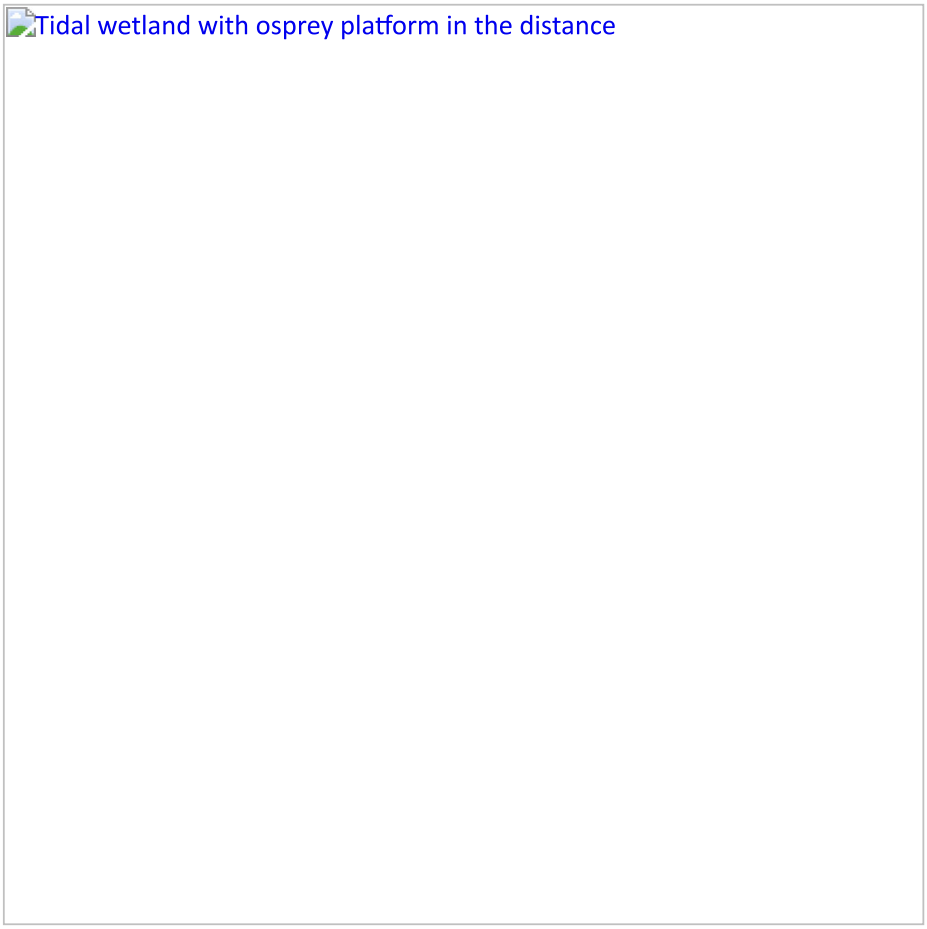
Development of the trail was a true partnership, a collaboration of government, the private sector, and individual citizens. The Town of Branford received a total of $25,000.00 from the Long Island Sound License Plate Fund, which leveraged donations of materials,

manpower, and more money to install the stanchions and rope railing. The trail was officially dedicated in April of 1998.

View from the Trolley Bridge
Photo Credit: DEEP LWRD

The trail affords visitors sweeping views of tidal wetlands and Long Island Sound. Several osprey platforms also dot the landscape, and if you're taking a stroll along the trail in late March, you might be lucky enough to see osprey return from their southern wintering grounds.

According to the DEEP Wildlife Division's Osprey Fact Sheet, osprey pairs usually return to the same nest site and add new materials to the old nest each year. An average of three eggs is laid in April, and a month-long incubation begins once the first egg is laid. The incubation period is usually completed by the female, who is fed by the male during this time. But be aware: adult osprey are very protective and may be aggressive toward anyone approaching their nests. Always respect wildlife when you're in their backyard!



View of tidal wetland with osprey platform in the distance
Photo Credit: DEEP LWRD

So, as the days start to get a little warmer and a little longer, get outside and "really explore the space" along the Branford Trolley Trail. If you still have Cabin Fever after your walk, you can always find more cures in the Connecticut Coastal Access Guide.

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CLIMATE CHANGE UPDATE: New GIS Data Describes Effects of Sea Level Rise on Connecticut's Coast

Regular readers of *Sound Outlook* may already be familiar with the Sea Level Affecting Marshes Model (SLAMM), a computer model that can help predict how sea level rise (SLR) may affect Long Island Sound's coastal marshes, beaches, and coastal infrastructure (please see the October 2014 and February 2016 issues of *Sound Outlook* for more background on SLAMM). Coastal marshes and beaches are dynamic ecosystems that provide significant ecological and economic value. Located at the margin between land and water, they are also among the ecosystems most susceptible to the effects of climate change, especially SLR. Similarly, coastal area infrastructure such as roads are increasingly susceptible to flooding in a rising sea.

Connecticut DEEP and its partners have now used new data in a recent application of SLAMM to Connecticut's shoreline, and the resulting GIS data is available for download. Early results indicate that low-lying coastal areas in or adjacent to coastal marshes and roads that currently flood infrequently--often only during coastal storms--will begin to flood more regularly during monthly extreme high tides, even when there isn't a storm cloud in the sky. Such "sunny-day" tidal flooding is expected to convert dry uplands to coastal marsh, as well as increasingly limit dry access to parts of

Connecticut's shore that now flood only during storms.

One example of predicted changes in coastal marsh and road flooding is provided at the Groton-New London Airport and Bluff Point State Park and Coastal Reserve, as shown in Figure 1. This figure shows areas currently occupied by upland lawn that have a greater than 50 % chance of converting from upland to coastal marsh, and local roads expected to flood during monthly extreme high tides under a moderate (3-foot) rise in sea level (SLAMM SLR predictions range from a minimum of 15 inches to a maximum of approximately 6 feet by the year 2100). Figure 2 shows the area and frequency of roads at risk of flooding in coastal Old Saybrook by 2085.

Figure 1: Areas of New Coastal Mash and Monthly Road Flooding by 2085

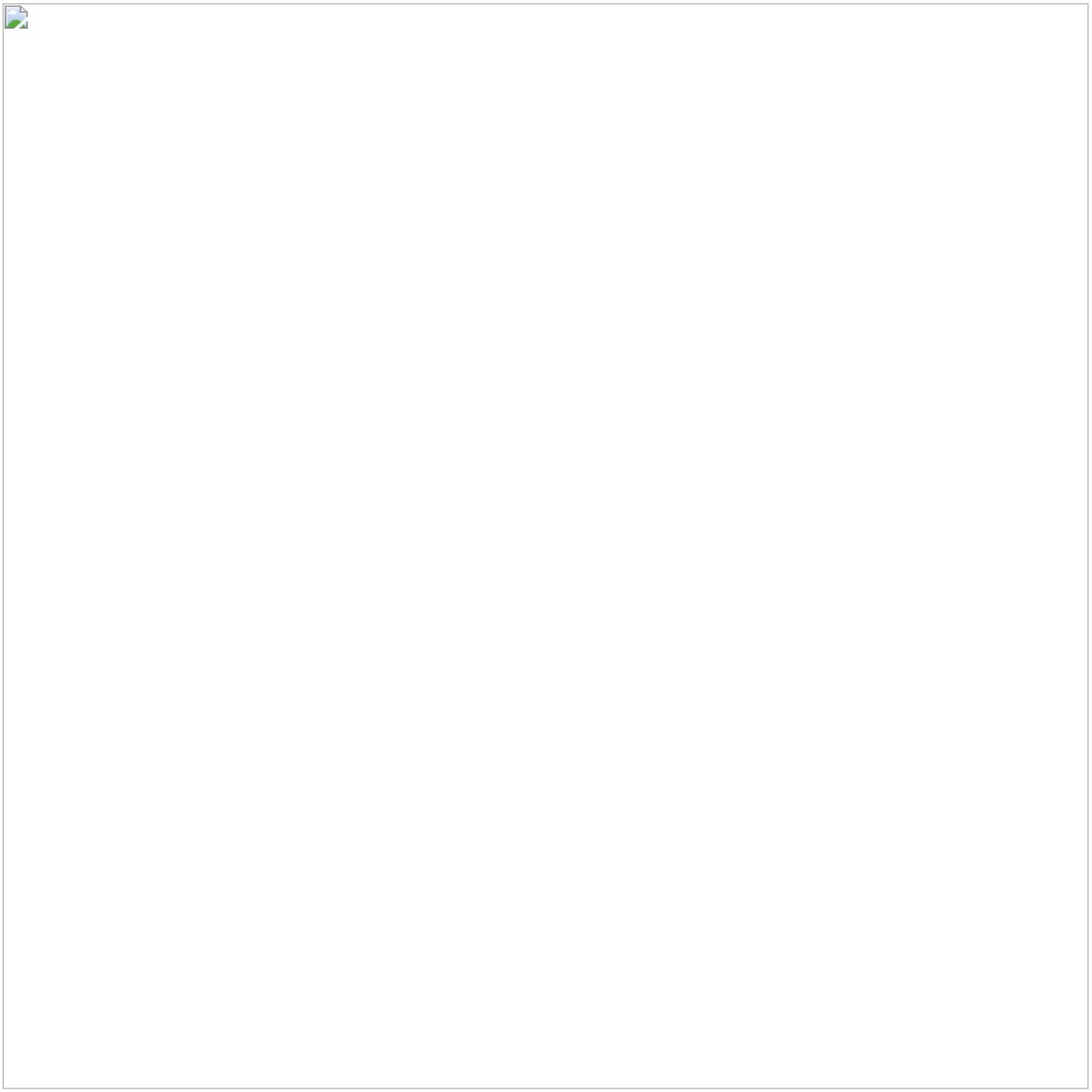

Figure 2: Roads at risk of flood inundation in Old Saybrook
Predicted Areas of Road Flooding within Old Saybrook by 2085 under a moderate SLR scenario

All SLAMM output can be classified into one of two categories based on the approach used to create it:

1. SLAMM can predict future conditions by using specific model input values at a given time (e.g., the amount of sea level rise, the rate of change in marsh surface elevation, the amount of storm surge, etc.). For any individual model result generated using this ***deterministic approach***, the result is tied directly a single set of model inputs. This type of analysis can be summarized as: "At time 'x,' under these conditions, this is the predicted result."

2. SLAMM can also examine different combinations of model input values, analyze the results, and show the likelihood of a future condition at a given time. This ***likelihood approach*** is used to help account for - and communicate - the inherent uncertainty of input values. Using this approach, model inputs are assigned a range of possible values. SLAMM is then run hundreds of times, each time using different combinations of values within that range. All the results of these model runs are summarized based upon how likely they are to occur. For any individual result generated from this likelihood approach, the output is tied to different variations in input values.

This type of analysis can be summarized as: "At time 'x,' this result is y% likely to happen." The more likely the result, the more confident we are that the model is accurately predicting a future condition.

One approach is not inherently better than the other. However, depending on how the data may be applied, SLAMM users may wish to examine both approaches to see if one is more helpful.

Anyone able to use ArcGIS files can download the data to produce the kinds of maps shown in Figures 1 and 2 and conduct a variety of other geospatial analyses (e.g., the number of days of road flooding/year by road segment). The SLAMM GIS files can be downloaded at Connecticut DEEP's GIS download page (either choose the SLAMM data category in the search window or scroll down to the "Environmental" section). This page lists most of the available SLAMM data and a description of each data layer at the download page's metadata link.

DEEP recognizes that SLAMM, like all models, has an inherent uncertainty associated with the data used to run the model. Therefore, DEEP asks any municipal public works and engineering departments that use SLAMM to compare the model's predicted road flooding data with what they are currently observing at low elevation roads during extreme high tides and coastal storms, and report back to DEEP with any significant variation from SLAMM's road flooding frequency predictions.

We also understand that those interested in using the SLAMM data will have questions about what the data means and how it can be used. To report model variations, ask questions, or obtain additional information about DEEP's recently released SLAMM GIS data, please contact Kevin O'Brien at 860.424.3432 or David Kozak at 860.424.3608.

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Visit the DEEP website at www.ct.gov/deep.

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