PUBLISHED BY LAUDHOLM TRUST IN SUPPORT OF WELLS NATIONAL ESTUARINE RESEARCH RESERVE

SPRING 2023 INSIDE

Nik's Notebook: Discovery Apple Trees Revealed Smelt Brook Surveyed York River Forever Wild SWMP Summarized Blue Crab Rediscovered

Nik's Notebook

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discovery

In 2023, the Wells Reserve at Laudholm is once again "a place to discover." We've stuck with that double-meaning tag line for seven years now; it continues to bear fruit. Into my second decade of work here, I certainly still discover new things. Most recently:

- Freshly-caught rainbow smelt are redolent of cucumber.
- The leaves of storm-downed maples sprout green but then can turn autumnal orange, even in May.
- The word "porcupine" comes from the Latin for "thorn pig," though their oinking sounds more like a squeaky dog toy.

See? There's always something new to learn. Perhaps that's why so many of us keep coming back to Laudholm. Each spring, birds in the bush flit among blooming buds. With the arrival of summer interns, scientists begin budding too. Fresh art exhibits, novel observations from the research lab, shouts of wonder from schoolkids and campers, even a newly paved parking lot—all are signs of renewal, of development, and of your continued investment in this place and its work. Some things, like a Wild & Scenic designation, can take years. Others just seem to appear one day, like a migrating Baltimore oriole.

Thank you for helping to make all of this work, beauty, and tranquility possible. Do come over and enjoy it this season, and let me know what "something new" you discover while you're here.

IN Nik Charov

Nik Charov President, Laudholm Trust Chairman, Wells Reserve Management Authority

apples how 'bout them?

Apple blossoms pull in the pollinators this time of year. In a few months, it's the apples that attract. If you've walked the trails and seen the trees, you may have wondered: How old are they? Are they from the original farm? What kind are they? Do they taste good?

Sixteen years ago, Day of Caring volunteers from York County United Way began to hack their way through decades of overgrowth to "free a tree" in an old orchard along the Barrier Beach Trail. Recently, "Team Lorax" volunteers upped the efforts there and elsewhere. And over the past year or so, special projects associate Tom Karb has mapped most of the trees, both the freed ones and those still encumbered.

The vast majority of the 700-plus apple trees on the property have grown from seed; they bear fruit of uncertain ancestry. A precious few may date back to the heyday of Laudholm Farms. Tom is in touch with specialists to investigate their provenance.

> Feel free to do a taste test when fruits appear, staying on the trail of course, but please no harvesting. Let's leave the bulk of the crop for wildlife.

Visit wells **reserve**.org/apples for more information and an interactive map

surveying smelt in the york river system

BY SCOTT RICHARDSON

The York River system is among the most promising in southern Maine for maintaining a robust population of rainbow smelt, an anadromous fish that thrives in cold, clear water.

In spring 2017, Wells Reserve researchers tallied 1275 rainbow smelt (27% of all fish caught) during more than 2700 net-hours of fishing effort in the system. They also discovered smelt were spawning in tributaries, and estimated the population could number in the tens of thousands. Those findings became an integral part of the York River Wild & Scenic Study.

Volunteers and researchers returned to the river this spring, both to see how smelt are doing and whether they are still spawning.

SMELT SPAWNING: A CITIZEN SCIENCE PROJECT

Volunteer smelt monitors were in the field soon after ice-out. Beginning in March, adult smelt journey upstream from nearshore coastal waters, navigating inland until they swim just beyond head of tide. Here they spawn, females releasing thousands of sticky eggs that adhere to stones lining the streambed. Their task complete, adults move back downstream while their ova develop (over 10–21 days) into wriggling larvae.

The spawning run is temperature dependent, so volunteers need to visit their sites often for the best chance of finding adults (normally at night) or eggs (normally in daylight). Although volunteers surveyed several *continued on page 6*



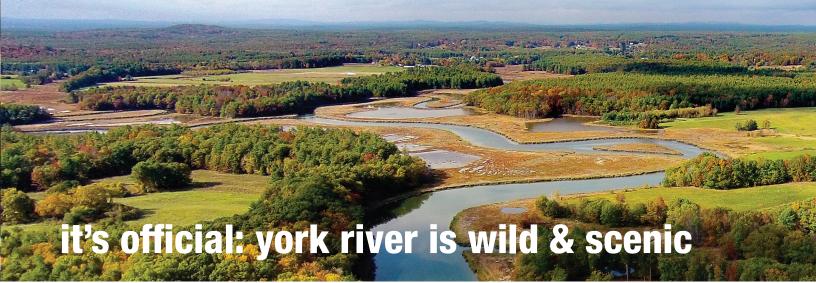
JENNIFER HUNTER AND HER SON, SAM, FOUND RAINBOW SMELT EGGS IN BASS COVE CREEK, A TRIBUTARY OF THE YORK RIVER, ON SPAWNING SURVEYS THIS SPRING.

Field Location

EDNA Sampling Smelt Brook

lame

NRESSA BEAULIEU READIES SUPPLIES AND RECORDS DATA STREAMSIDE WHI Lobe MAAN COLLECTS WATER SAMPLES FROM DESIGNATED POSITIONS WITHIN SALTE BROOK DURING A MAY 2023 EDNA SURVE. Lote Detralt FROM THE WHITEBOARD "STAFF TRACKER" IN THE MAINE COASTAL COLOGY CENTER, APRIL 27, 2023.



BY PAUL DEST

After nearly 14 years of community effort, the York River was finally designated into the National Wild and Scenic River System at the end of 2022. And it all started with a boat trip and a meeting.

This is, of course, a huge simplification: The herculean effort involved dozens of people dedicating time and ideas over an extended period. But if I had to trace its beginnings to an event or activity, that boat trip and meeting would be the sources.

The boat was that of Joey and Carol Donnelly of York, long-time champions of the York River. Upon hearing of the National Park Service's Partnership Wild and Scenic Rivers Program, they invited an NPS representative for a tour of the river in 2008. The information they gathered and the feedback they received were encouraging.

In 2009, Carol brought the idea to the oversight committee of the Mount Agamenticus to the Sea Conservation Initiative, which decided to examine the issue through its communications and policy committee, of which I was chair. Our initial analysis convinced us to further investigate: Would the program be a good fit for the river and its communities, and would the river be appropriate for the Wild and Scenic Program? Eight months later, our answers were both "Yes."

PHOTO: DAVID J. MURRAY, CI FAR FYF PHOTO

What followed was the long and involved effort to designate the river, which required two separate votes in four affected communities—first to support a Congressionally authorized study, then to support a designation bill. It drove the formation of two new entities (Friends of the York River and York River Study Committee) and two acts of Congress.

Little did I know back in 2009 that I would spend the next 14 years of my professional life at the reserve working on this project. It has been immensely gratifying to play a role in its success. It was even more rewarding to work with the many committed and talented people who accomplished it all, two of whom (Karen Arsenault and Chuck Ott of York) were involved from start to finish.



This spring, the towns of Kittery, York, Eliot, and South Berwick each appointed members to a new York River Stewardship Committee, which will establish an ongoing partnership with the National Park Service to implement projects that will benefit the York River—and the people who share and care for this amazing resource.

ON THE YORK RIVER IN 2013: FRIENDS OF THE YORK RIVER HOST CONGRESSIONAL STAFF FOR A TOUR OF THE RIVER BY BOAT, MAKING THE CASE FOR LEGISLATION TO FUND A COMPREHENSIVE STUDY BY THE NATIONAL PARK SERVICE. FROM LEFT TO RIGHT: PAUL DEST, BONNIE POTHIER (SENATOR KING'S STAFF), KAREN ARSENAULT, CHUCK OTT



RAINBOW SMELT PAINTED BY JAMES DOCHTERMANN FOR *COASTAL FISH OF SOUTHERN MAINE & NEW HAMPSHIRE*, PUBLISHED BY WELLS RESERVE & LAUDHOLM TRUST AND AVAILABLE IN THE VISITOR CENTER GIFT SHOP. POINTS OF INTEREST FROM THE BOOK: 1) RAINBOW SMELT ARE GREATLY AFFECTED BY DAMS CONSTRUCTED AT THE HEAD OF TIDE, BECAUSE THEY OFTEN SPAWN JUST ABOVE THAT POINT AND DO NOT TRAVERSE FISH LADDERS. 2) FRESHLY CAUGHT RAINBOW SMELT SMELL MUCH LIKE CUCUMBERS.

continued from page 4

sites in York County this spring, they found eggs only in the York River. But even the "negative data" are valuable in presence/absence surveys such as these, and volunteers will be on the lookout again next spring.

The Smelt Spawning project is led by the Maine Department of Marine Resources, Downeast Salmon Federation, The Nature Conservancy, and the Gulf of Maine Research Institute. The Wells Reserve coordinates volunteers in York County.

ENVIRONMENTAL DNA: AN ADVANCED TECHNIQUE

In a companion study to the 2017 fyke-net survey, reserve scientists and the University of Maine piloted environmental DNA as an alternate method for documenting the presence of smelt. The tests could identify very low concentrations of smelt DNA in stream water, so the technique can be helpful when relatively few fish/eggs are present and conventional methods are unsuccessful. The first full application using this emerging technique for smelt, in 2018–2019, resulted in a precise protocol for subsequent surveys and a piece in a scientific journal (available on our website).

The most persistent eDNA signal is likely to come from hatching eggs rather than adult smelt, so survey timing again becomes important. To bracket possible peak hatching dates, researchers visited their sites three times, two weeks apart, this spring. The reserve's stewardship director, Jacob Aman, and natural resource specialist, Vanessa Beaulieu,

covered Smelt Brook, a major tributary to the York River and a priority for habitat restoration. Field workers from other organizations covered five additional locations along the Maine coast.

Taking great care not to contaminate their samples (imagine maintaining sterile conditions while in and above a mud-banked stream), they methodically filled a series of bottles; recorded data on habitat conditions and stream flow; and recovered an automated datalogger holding weeks of water temperature data. The collected samples will be tested for smelt eDNA at the University of Maine, with results expected this summer.

Combining traditional visual surveys with modern genetic analysis is thought to provide the best opportunity to define the smelt's distribution along the Maine coast. The slender fish, labeled a "species of greatest conservation need" by the State of Maine and a "species of concern" by the National Marine Fisheries Service, is important both within the food web and among recreational anglers. Understanding its population status is an essential first step toward protecting its habitat and conserving the species.



Find more information at wellsreserve.org/smelt.

environmental monitoring snapshot

BY SCOTT RICHARDSON

Our fourth "SWMP Report Card" was issued this spring. A product of our System-wide Monitoring Program team, it's an assessment of how the water, weather, and nutrient environments within the Wells Reserve's boundary have fared over recent decades. The report features results from the 2021 monitoring period.

2021 HIGHLIGHTS

- Water and air temperature were warmer than average, particularly in Spring.
- The summer was rainier than it had been in 11 years.
- Water salinity was lower than average in Summer and higher than average in Spring.
- pH was lower than average (more acidic) in Summer.

Data for the report are obtained with a set of automated instruments that take frequent readings using carefully calibrated measurement probes. In addition to keeping a weather station running 24/7, researchers Jeremy Miller and Laura Crane maintain a set of water quality sondes that are deployed at four sites on the Webhannet and Little rivers. The pair also collects water samples for nutrient analysis and, critically, manages the abundant data produced by loggers that record multiple measurements, at intervals as tight as 15 seconds, for more than 8 months a year.

QUALITY TRUMPS TIME

When explaining why the 2021 report card did not arrive until Spring 2023, Laura and Jeremy point at that massive data set. It's not just the sheer volume of the data, they said, it's that its accuracy is imperative.

SWMP requires a 3-step review of all data from every reserve—tens of millions of readings annually. First, about



once a month, a data manager searches and graphs downloaded data to flag missing or clearly incorrect readings. Next, SWMP managers test their provisional data each quarter with tailor-made macros and tools. Any point too far outside historical patterns draws scrutiny. Finally, specialists at the NERRS Centralized Data Management Office conduct their own vetting, which may result in queries to each reserve. This stringent process takes time but imparts confidence; SWMP data are trusted well beyond any reserve's boundaries.

The authenticated data inform issues such as nutrient management, habitat restoration, storm damage analysis, and regulatory compliance. They are used to correlate specific land-use practices with the health of estuaries. Our measurements have become a backbone component of the Northeastern Regional Association of Coastal Ocean Observing Systems. Reserve scientists and their colleagues examine water quality data as they relate to the lives of fish, shellfish, and range-expanding species in the Gulf of Maine. Wells data are ingested into the Maine Environmental and Geographic Analysis database. Our time series on nutrients is the only one of its kind in the state.

PRODUCING THE REPORT

Even after annual data gains CDMO approval, it is still raw data. Over time, though, "SWMP rats" from throughout the system, working with CDMO, have developed methods and scripts that streamline data organization and analysis, and even generate reports and hundreds of graphs that become fodder for each reserve's annual summary. Our research team pored over those graphs on their quest for potent highlights and trends. Their selections, with helpful context, are available in the trend report posted at wellsreserve.org/research.

Wells installed its first environmental monitoring stations in 1995 and has deployed them annually ever since. Data from the early years, predating today's powerful software and limited by less capable hardware, is gradually being incorporated into the current system, but for now the Wells report cards are based on data from 2007 onward. With time, both to catch up and to move ahead, the SWMP baseline will only get stronger.

FOR MANY YEARS, THE WELLS FIRE DEPARTMENT HAS KINDLY SUPPORTED THE WELLS RESERVE'S MONITORING PROGRAM BY PROVIDING A COMFORTABLE WORKING PLATFORM WHEN THE WEATHER STATION NEEDS MAINTENANCE.

Have a Seat so others may also sit

Reserve your seat (or a tree for sitting under) by making a celebratory or memorial gift to Laudholm Trust. Honor a loved one, mark a moment, or share your thoughts. We'll mount a plaque to carry your message.

> Stone Bench \$7,500 Wooden Bench \$5,000 Picnic Table \$4,000 Adirondack Double \$3,000 Adirondack Chair \$2,000 Native Tree \$1,000

To learn more or to get started, please contact: Nik Charov 207-646-4521 ext 144 nik@laudholm.org

Alternatives for recognition include boardwalk planks, walkway bricks, and sections of trail.

Wells**reserve** at laudholm

flotsam

PEOPLE



Thank you, **Lottie Fortune,** for 20+ years of volunteer service in the Laudholm Trust office and for agreeing to be interviewed by Karen Stathoplos for *The Wrack* (wellsreserve.org/blog).

Farewell **Jessica Brunacini**, Ph.D., inaugural Davidson Fellow at Wells Reserve, and congratulations on your new role at Maine Sea Grant.

Welcome **Vanessa Beaulieu,** new Natural Resource Specialist at Wells Reserve.

Welcome Kat Libby, new Fundraising Coordinator

at Laudholm Trust.

Welcome back **Amanda Bailiff** for your 8th season as summer camp leader extraordinaire.

Congratulations **Emily Burke** on successfully defending your master's thesis at UNH. We're pleased you completed your research at the Wells Reserve.

Rest in peace **Diana Joyner,** fifth president of Laudholm Trust.

Welcome **Leighna Sugimoto,** summer Hollings Scholar in education, from the University of Washington.

Welcome **Zoe Scipioni,** summer Hollings Scholar in research, from the University of Rhode Island.

PLACES

At long last and to great relief, the **parking lot** is pothole-free. The public

lot was fully refurbished in the first phase of a campus-wide pavement and stormwater drainage project. The lot gets a top coat and stripes in the fall, and paving campus pathways is planned for next spring. Meanwhile, enjoy that smooth, smooth surface.

POTENTIAL

The Wells National Estuarine Sanctuary was designated in 1984 and will be celebrating its **40th anniversary** next year. Please reach out if you have ideas about how to recognize the occasion: 40years@wellsreserve.org.





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The Wells National Estuarine Research Reserve is one of 30 reserve sites throughout



the country. All reserves require local funding to match federal grants from the National Oceanic and Atmospheric Administration. The Wells Reserve is the only reserve that receives its match from a 501(c)(3) nonprofit organization. Each year, Laudholm Trust contributes private funds and in-kind services to support Wells Reserve operations and capital improvements.

documented: a blue crab overwinters

BY SCOTT RICHARDSON AND LAURA CRANE

On their second blue crab survey of the year this April, reserve scientists pulled one of their traps from a saltmarsh pool on the Webhannet estuary and discovered a live blue crab fitted with a backpack. With that momentous find, the research team answered one key question about the species: Can blue crabs survive a Maine winter?

The backpack was immediately familiar—it held one of 15 acoustic telemetry tags that Wells researchers placed on blue crabs to study their movements.

The signal from this particular tag was last detected in late November—at the very same pool where the crab was located this spring.

Some crabs tagged in 2022 appeared to move offshore before winter, presumably to spend the season in warmer, calmer waters. Those individuals may not come back to the marshes until this summer. But at least one hardy animal apparently hunkered down in the comforting mud of a saltmarsh pool.

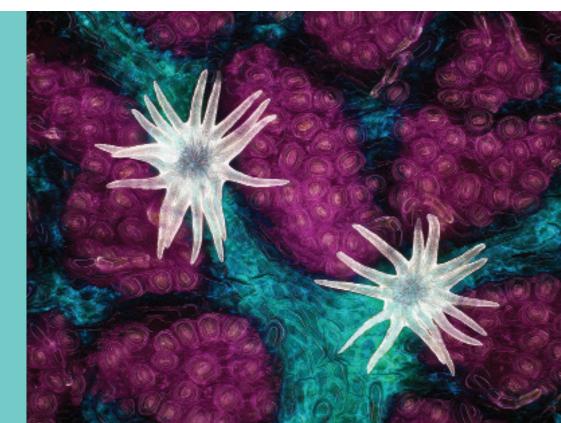
This is the fourth year research staff and volunteers have monitored blue crabs in Wells, an effort triggered by the surprise discovery of a dead blue crab in October 2019 and followup finds of numerous active crabs in fall 2020.



The blue crab is a warm-water species that supports a lucrative fishery in the Chesapeake Bay region. Historically, it has remained almost exclusively south of Cape Cod, but the rapidly warming Gulf of Maine might now be more hospitable to the species.

In addition to weekly trap surveys, which will again continue into the fall, reserve scientists have initiated other projects meant to shed light on this possible range expansion and what it might mean for lobsters and other members of the nearshore community.

DON'T MISS THE TOP 20 IMAGES FROM THE 2021 NIKON SMALL WORLD PHOTOMICROGRAPHY COMPETITION, SHOWING IN THE COASTAL ECOLOGY CENTER EXHIBIT AREA FROM NOW TO JULY. THIS FASCINATING PIECE WAS CREATED BY JASON KIRK.



thank you

In honor of

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In-kind gifts

John & Ellen Carpenter for a rigid inflatable boat and electric motor Clare Dever for a John Deere poly cart, dethatcher, and photo framing materials Elizabeth Walsh for a refrigerator

wells reserve mission

To understand, protect, and restore coastal ecosystems of the Gulf of Maine through integrated research, stewardship, environmental learning, and community partnerships. laudholm trust mission

To raise financial and community support for the Wells Reserve at Laudholm and Maine's coastal environment.

aucholm nature crafts festival WELLS RESERVE AT LAUDHOLM

SEPTEMBER 9-10, 2023

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wellsreserve.org/crafts

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