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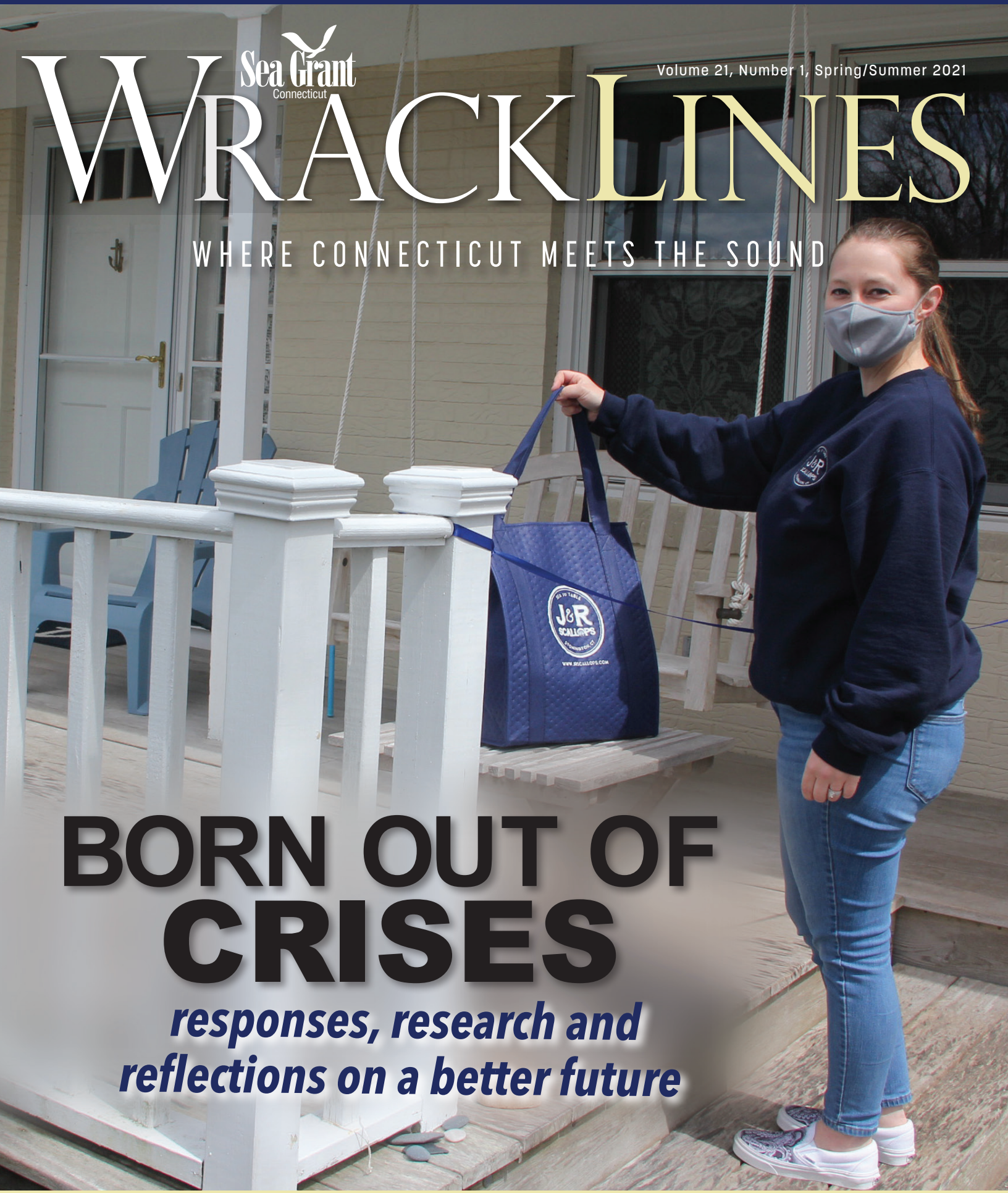
Sea Grant Connecticut

WRACK LINES

Volume 21, Number 1, Spring/Summer 2021

WHERE CONNECTICUT MEETS THE SOUND



BORN OUT OF CRISES

responses, research and reflections on a better future

REBUILDING AFTER LOSS • CT & NC AS WATER RISES • SEAFOOD SELLERS' PANDEMIC PIVOT

Sea Grant
Connecticut

Volume 21, No. 1 Spring/Summer 2021

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From the EDITOR

Earth Day on April 22 brought snow flurries and bracing winds to UConn's Avery Point campus, hardly ideal conditions for an outdoor puppet show.

Yet young and old came, swaddled in winter coats, knit caps and blankets. Weary of screen life, they settled on the cold ground for an experience that all but disappeared during the pandemic—live performance. Felicia Cooper, a UConn Master of Arts student in puppetry, would be staging her original show, "Ish," a more hopeful retelling of the "Moby-Dick" tale with an 11-year-old girl as protagonist. Recipient of one of CT Sea Grant's 2020 arts support awards, Cooper's show at Avery Point was one of several she's offered to outdoor audiences around the state, from Mansfield to Hartford. As she lines up more venues for the summer, Cooper is working on rigging up her bicycle with a cart to transport herself and her set gear in the most environmentally friendly fashion.

At Avery Point on Earth Day, the tale that unfolded through shadow puppets, original recorded music by Juliana Carr and Cooper's animated one-woman performance did not disappoint. All ages connected with its messages about dealing with fear and isolation, then finding courage to face big challenges — even ones as big as global plastic pollution.

"It took lots of adaptation in the pandemic," she said a few days after the performance. Originally conceived as a six-person show on a large stage, "Ish" had to be simplified. It became mobile, and more accessible. "It ended up we were doing more, smaller shows," she said. "It opened more doors."

Towards the end, the main character, Ish, sums up what she's learned by facing hard problems, and finding a way forward.

"We don't have to be the smartest," she tells the audience. "We just have to be smart-ish—our version of smart. We don't have to be the bravest. We just have to be brave-ish—just brave enough to take the next step."

Both the story of "Ish," and the story behind the story couldn't be a more fitting parable for this issue of *Wrack Lines*. Readers will find the same plucky spirit of that 11-year-old girl in the oystermen and other seafood purveyors, researchers, coastal communities and environmental science experts profiled in the articles as they respond to different kinds of crises.

Sellers of fished and farmed seafood in Connecticut created new ways to get their products to customers during the pandemic. Their counterparts in Southeast Asia clearly need additional support, but did their best to adapt, too. Robert Klee, former state Department of Energy and Environmental Protection Commissioner and now a Yale University lecturer, mined the lessons of the past year that show the benefits of living more sustainably.

Another article recounts how researchers including CT Sea Grant Director Sylvain De Guise focused on figuring out the long-term effects of the largest oil spill in U.S. waters on bottlenose dolphins. They reached troubling conclusions that call attention to the continued perils of fossil fuel dependence on the planet. Coastal communities in North Carolina and Connecticut are facing another side effect of the oil-and-gas economy: the rising seas caused by climate change. Some are turning to managed retreat or buyouts as the best solutions to get people and homes out of the way of floodwaters. Waiting for 100% certainty isn't an option. Just like Ish discovers, sometimes the only way is to go outside and meet the whale.

For information about "Ish," visit: https://www.feliciatmcooper.com/ish

Judy Benson, editor
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Above photo: Felicia Cooper, right, sees the silhouette of a passing whale as she's traveling through the ocean in her submarine during her original puppet show, "Ish." Photo: Judy Benson

Cover photo: Nicole Dawson, sales and delivery clerk at J & R Scallops, leaves a refrigerated bag of scallops, crab cakes, salmon and cod fillets to a customer's home on April 22. Photo: Judy Benson

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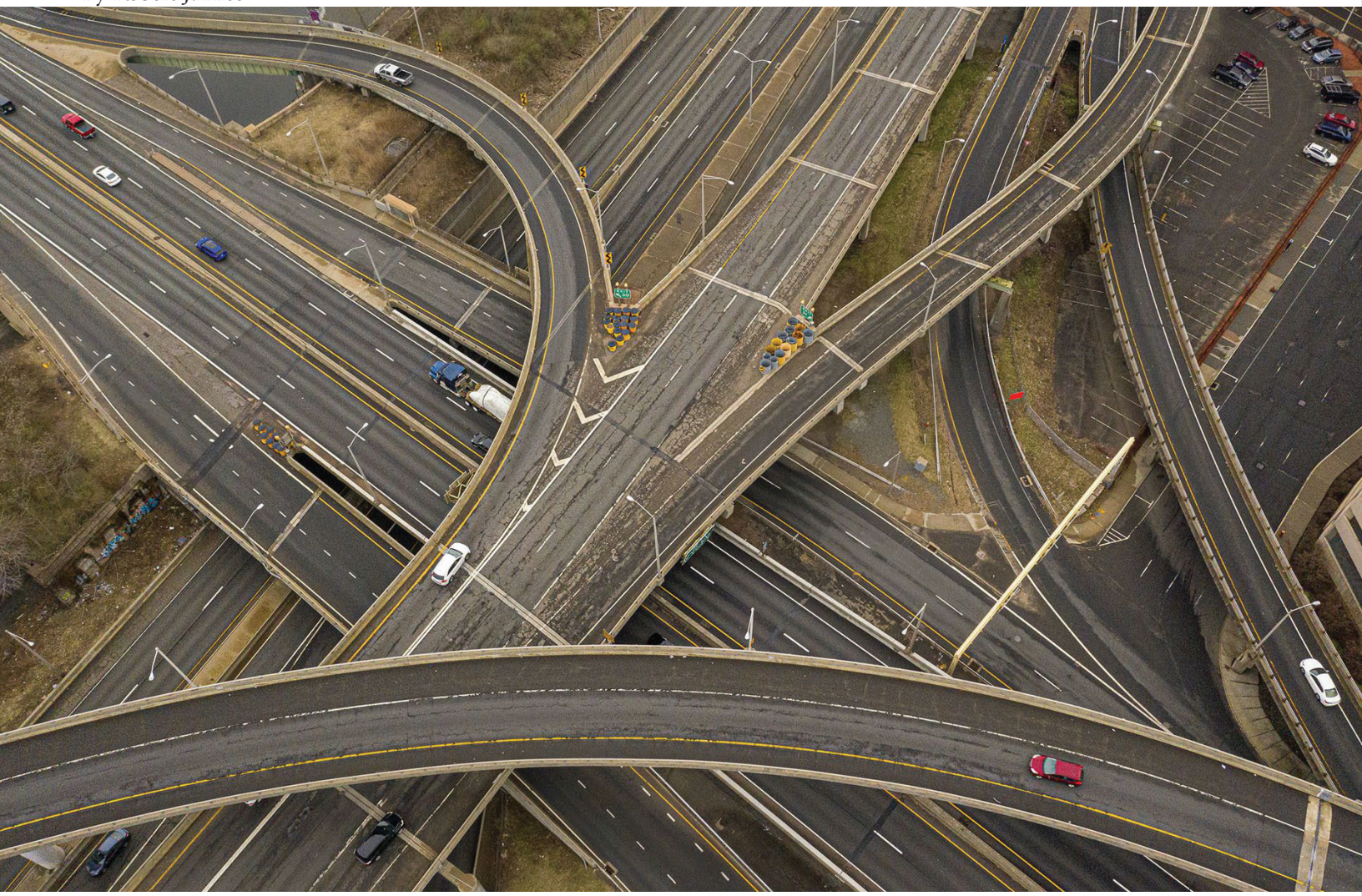
TALK TO US

Send comments and questions about this issue to: judy.benson@uconn.edu. We'll share as many as possible, along with our responses, at: seagrant.uconn.edu

REBUILDING A HOPEFUL FUTURE AFTER A YEAR OF LOSS

By Robert J. Klee



In spring of 2020 at the beginning of the pandemic shutdown, the I-84/I-91 interchange in Hartford is nearly devoid of cars during what would normally be rush hour. Photo: Mark Mirko / Hartford Courant

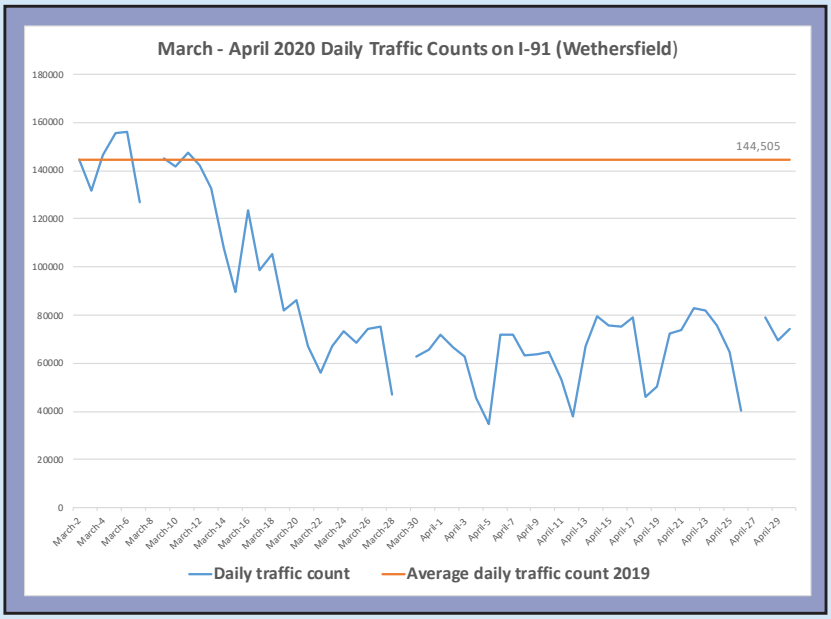
Looking back over the past year of the pandemic, I have trouble wrapping my head around how much we've lost: time spent together, jobs and businesses, our physical and mental health, and, of course, more than 580,000 loved ones and family members in just the United States alone. These are open wounds in our families, lives and communities that will be slow to heal.

Talking about lemonade is almost too hard when the lemon of the past year was so sour, and that taste is still fresh in too many people's lives.

But if we can't stop and reflect on what the pandemic revealed about us, about what mattered, what was really important, we will miss a real opportunity to replace what was lost with something better. I sincerely believe we can use this awful year to envision and build what President Biden's national climate advisor Gina McCarthy calls "a hopeful future," and perhaps in the process begin to tackle the next crisis: global warming.

CLEAR THE AIR WITH CLEAN CARS AND TELECOMMUTING

Let's begin at the beginning, in the spring of 2020, when the world stopped in its tracks. The images from that time were dramatic, as smog-afflicted cities across the world suddenly had clear skies. This happened largely because we stopped driving cars to work and flying in airplanes. As Yale School of the Environment's Ken Gillingham and colleagues found, energy consumption in these two sectors during the height of



Source: Connecticut Department of Transportation

the pandemic dropped by about 30% and 50% respectively.

Of course, a pandemic-induced lockdown and crash of the global economy is no way to clean the air. Still, many of us have now experienced and breathed clean air—some for the first time in our lifetime in our more polluted cities. We essentially ran a real-world experiment on what our transportation system would look like if we could dramatically and rapidly shift to zero emission electric vehicles. A fitting response to a global pandemic that attacked our respiratory system—and disproportionately afflicted urban, minority communities—would be to accelerate the electrification of cars, buses and the rest of our transportation system. Concerted investment in clean transportation will not only address about 40% of our economy-wide greenhouse gas emissions but will also remove local air pollutants such as particulate matter and smog, making every day more like those clear, crisp early clean air days of the pandemic.

The pandemic also upended the workforce, the workplace and our understanding of who are truly essential workers—the first responders, healthcare professionals, delivery workers, grocery workers, sanitation workers and countless others who helped hold our world together as it seemed to fall apart.

But the pandemic also transformed what it means to go to work. The traffic counts around the state dropped by about 40-50%, which around I-84 in Hartford translated to about 70,000 fewer cars on the road each day. Before the pandemic, only about 4% of U.S. employees worked from home. That number rose to more than 50% during the height of the pandemic, or about 70 million people. Private and public employers alike quickly pivoted, and many sectors of the economy kept running through the now ubiquitous Zoom meetings.

Of course, not everyone in the workforce can work from home. According to a recent Pew Research Center Report, about 62% of workers with a bachelor's degree or more education can work from home, compared to only 23% of those without a college degree. About 56% of upper income workers can work from home, compared to about 24% of lower income workers. The pandemic revealed that rural households, and minority and poorer urban households, still find themselves on the wrong side of the digital divide and are more likely to not have broadband access. And we cannot forget that working from home is not always easy, particularly when juggling home schooling and childcare—challenges that fell unevenly on women in the workforce.

As we emerge from the pandemic, many employers are rethinking their need for office space (a major cost to their operations) and are encouraging employees to telecommute for at least part of the work week. By the end of 2021, Global Workplace Analytics estimates that 25-30% of the total U.S. workforce would telecommute multiple days per week, which represents a dramatic reduction of the number of cars on the road. If telecommuting becomes the new normal, we will have achieved significantly lower vehicle emissions through behavioral change faster and more effectively than anyone would have previously thought possible. Now, of course we should pay close attention to the folks who have fled cities, because the classic suburban, two-car lifestyle is not nearly as sustainable as urban living. But the reduction in rush hour traffic from telecommuting will likely be a net positive for the environment and our climate.

REORIENT CITIES TOWARDS PEOPLE, NOT CARS

The pandemic also showed how to reset and re-balance the relationship between cities, cars and ourselves.

Cars have commandeered our cities to the detriment of the people who live there. Urban areas often devote 50-60% of their downtown real estate to roads and parking. Many multi-lane streets cannot easily be crossed by pedestrians, even with traffic lights. Sidewalks have shrunk to the point where two

A sign at the corner of College and Chapel streets in downtown New Haven last summer directs pedestrians away from the sidewalk, where outdoor dining had been expanded, to a closed off portion of the street. Photo: Laura Glesby / New Haven Independent

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Above, Pacifico and South Bay restaurants bustle with customers in the expanded outdoor dining area in downtown New Haven in July 2020. Below left, bartender Raasikh Muhammad mixes a drink at Anchor Spa bar in the outdoor dining area. Right, Alana Dina, left, Craig Holmes and Evongee Smart enjoy guacamole and drinks at at Pacifico restaurant. Photos: Laura Glesby / New Haven Independent

strollers cannot pass each other going in opposite directions.

With cars temporarily out of the picture during the pandemic, cities such as Oakland, Calif., closed their streets to through traffic, to open new opportunities for socially distant walking and active transportation by bicycle, with a particular focus on areas of the city which had lower access to parks and bike lanes. As the Slow Streets movement caught on and disrupted city planning, communities across the country had new, and sometimes challenging, conversations about resetting the relationship between the community and its streets. From Seattle, Wash., to Durham, N.C., and countless places in between, cities are now exploring how to extend these Slow Streets programs beyond the pandemic, to capture the lasting benefits to urban life from simply closing lanes and slowing down cars.

Here in Connecticut, I got a taste of that vibrant, high-quality urban life during the pandemic summer, with the renaissance of outdoor dining. New Haven's Town Green District, in partnership with the City's Department of Transportation, Traffic and Parking, pioneered an effort to reclaim street parking as terraced dining opportunities—taking back some of the car's domain for people. Restaurants and other small businesses also wanted to use more outdoor square footage—from off-street parking and other areas—to safely accommodate patrons and protect their workers for health reasons. But nearly every zoning code in the country requires property owners to devote some minimum amount of their land to parking. Gov. Ned Lamont issued an executive order to suspend those parking requirements for the pandemic, making outdoor dining easier in every community. Post-pandemic, reducing or eliminating parking requirements in our zoning codes has the potential to stimulate development and create more vibrant downtowns and main streets.

Fewer cars clogging our urban roads will also create opportunities for revitalized and rapid bus transit. One of the biggest complaints about the buses, our most common form of public transit, is that they seldom run on time. That is because most buses have to compete with all the single passenger cars on the road. A bus transit system with dedicated lanes, special traffic signals, improved and simplified routes, all the modern amenities including Wi-Fi, good shelters, real time information on arrival times, and zero emission electric drivetrains, are all within reach. Yes, post-pandemic we will have to get people excited about being close together on public transit again. But relatively cheap investments in bus transit systems that work will improve the commuting lives of millions of people, put people to work, and simultaneously help solve our urban pollution and climate problems.

RECONNECT WITH THE NATURAL WORLD

Particularly in its early days, the pandemic quieted the world—literally and figuratively. Scientists call this time the "anthropause"—the "global slowing of modern human activities." Because of that human pause, there were widespread reports of wild animals venturing into more suburban and even urban spaces. With the volume of humans and our activity turned way down, bird song seemed louder, or at least more noticeable.

For many, the pandemic either rekindled or lit anew an appreciation for the natural world. In nature, we collectively sought solace during a time of immeasurable loss, freedom from feeling stuck indoors, and recharge from seemingly never-ending Zoom calls.

By all accounts, our state and local parks, trails, and nature preserves were full: CT DEEP reported that residents went outdoors in "extraordinary" numbers, and Eric Hammerling, executive director of the Connecticut Forest and Park Association, saw state trail usage increase "tremendously." Backyard birdfeeder sales skyrocketed, and the National Audubon Society promoted birding as a fun, socially distant hobby that connected people to nature.

But many people, myself included, also just took walks in the neighborhood, appreciating the local, not-so-wild world around us.

I draw three key lessons from our re-discovery of the natural world during the pandemic. First, spending time in nature has been shown to improve health, reduce stress, and promote healing. We should actively promote time outdoors as a critical part of a healthy, well-balanced lifestyle, and part of the antidote to the pandemic—and in so doing we will hopefully create a new generation of environmental stewards.

Second, our natural world and our local parks both need care and maintenance. Unfortunately funding for parks and natural spaces has been in decline for decades at the federal, state and local levels. But there are a few signs of hope. Just before the pandemic hit, Congress permanently reauthorized the Land & Water Conservation Fund, which finances conservation programs at the state and local level. And, the various coronavirus relief bills contain funds that communities could use to support parks.

These and other types of investments in our parks and natural spaces put people to work, stimulate economic activity

The Klee family poses for a selfie while on a hike at Nehantic State Forest in Lyme in August 2020. Photo: Robert J. Klee

continued on inside back cover

Tested by the pandemic, seafood businesses now poised to emerge stronger

By Judy Benson

Above, juvenile branzino swim in one of the tanks at Ideal Fish in Waterbury. Inset, Ideal Fish owner Eric Pedersen stands beside some of the tanks. Photo by Judy Benson.

COVID-19 made the going tough for many businesses. Those who grow, harvest and sell seafood in Connecticut were no exception.

They faced some unique and daunting challenges when the restaurants and wholesalers that made up more than 70 percent of their sales stopped buying their products.

"The pandemic was really a challenge, because it threw our market into total disarray," said Eric Pedersen, owner of a five-year-old indoor aquaculture operation in Waterbury called Ideal Fish. "Our main source of revenue went away overnight. We had to figure out how to do something different."

As though inspired by the adage about how crisis makes the tough get going, Pedersen and others around the state who sell wild caught and farmed seafood reimagined their businesses, embraced new opportunities and started shaping a better future. With creativity, adaptability, perseverance and a little help from Connecticut Sea Grant and the state Bureau of Aquaculture, they did much more than merely survive. They invented new ways to get their products to customers themselves when the middlemen they relied on stopped buying, offering their wares fresh and in prepared dishes at farmers' markets, breweries and in boxes delivered to front doors.

Sales clerk Nicole Dawson shows a 1-pound container of scallops to a customer at J & R Scallops in Stonington in April. Photo by Judy Benson

"Home delivery was really our only option," said Allison Cole, co-owner with Andrew Maderia of the J & R Scallops retail shop in Stonington, an offshoot of the seafood supply business started by their fathers, John Castodio and Richie Maderia.

"It really was born out of the pandemic," added Andrew Maderia.

Tessa Getchis, aquaculture extension specialist at Connecticut Sea Grant, said she is impressed with how these mostly small businesses responded to the moment with innovation and a willingness to try something new.

"They had to rewrite their business plans and change their whole business model overnight," she said.

Sea Grant, working closely with the state Department of Agriculture Bureau of Agriculture, lent a hand, offering guidance on how to start direct sales markets, listing them

on a new seafood sales website and helping with applications for state and federal financial assistance. They also put together a project to keep shellfish workers, the largest group in the seafood sector, employed. The project was designed to yield long-term benefits to keep this valuable industry—worth $30 million annually—viable.

"My wholesalers weren't buying because the restaurants weren't open," recalled oyster farmer Kim Granbery, owner of Leets Island Oysters in Guilford. "Without the oyster buyback program, I would have had to chase down some other source of revenue."

Most of the oysters harvested in Connecticut are sold fresh when they reach legal size of three inches. When they get much larger, there's virtually no market, Granbery explained. He and other oystermen would have been stuck with a glut of oversized shellfish if the CT Sea Grant-Bureau of Aquaculture buyback project hadn't come to the rescue.

"On June 24, 2020," he recalled, "my wife, my friends and my dog all started working to harvest 3,000 of our large oysters. It was a real community effort. It took us a week, but we met the deadline."

Said Gretchen, his wife: "We all pitched in. It was a lot of fun."

Through the project, Granbery and other oyster farmers were paid for their oversized shellfish, which were then relocated to reseed state-owned natural shellfish beds. The large mature oysters were planted to replenish natural oyster populations, so the program had environmental as well as economic benefits.

Bureau of Aquaculture Director David Carey said the buyback program was part of a three-phase project to keep some cash flowing to shellfishermen while government relief funds were being processed.

"And we're hopefully making an investment in the future," he said.

More than 30 of the state's 45 shellfish companies participated in at least one of the three components, he said. In addition to the buyback, shellfish workers were also able to harvest clams from state-owned beds they could then sell and help rejuvenate the beds for new growth in the process.

In another phase of the project, oystermen including Jonathan Waters were hired to restore 1,800 acres of the natural shellfish beds that are the main source of oyster seed for farmers. Using tined scoops called seed oyster dredges extended from boats, the bottom is combed to raise shell buried under accumulated silt. This gives oyster larvae places to set and grow, restoring productivity to these areas.

"We've been wanting to do rehabilitation work on these beds for some time, but hadn't been able to do it," Carey said. The pandemic created the right set of circumstances—an available workforce and the emergency response funds to pay them.

Waters has been oystering in the Thimble Islands section of Branford since 1985. Now 70, he said his business was transitioning to growing oysters in cages instead of harvesting them off the bottom, and bringing his 33-year-old daughter Emily Waters Harris into the operation. When the pandemic happened, it turned out to be good timing for him to employ the 30-foot vessel he built himself, the F/V Merlin, toward turning the bottom of the oyster grounds like a farmer tills a field before planting.

"The activity was welcome," he said. "It was constructive. I'm really into the preservation and continuation of this business."

On a foggy morning late last March, Waters steered Merlin away from the dock to the waters around the Thimble Islands, with Emily Waters Harris maneuvering the oyster dredge.

Above, Guilford oyster farmer Kim Granbery shows some of the oysters just harvested from Hoadley Creek near his home on a day in early March. Photos: Judy Benson

"It really needs to be worked more," he said about the oyster bed as his daughter lowered the dredge. "Hopefully, this (rehabilitation work) will help supply small oysters down the road for other people to grow out."

Carey of the Bureau of Aquaculture is also looking toward the future.

"Through this restoration plan, I'm hoping we can come up with a new management strategy," he said. "I'd like to be continuing what we did."

While Granbery and Waters stayed focused on doing their part to keep the state's shellfish industry moving forward despite the pandemic, those with other types of seafood businesses pursued different paths to get through the crisis.

J & R Scallops had been relying almost exclusively on wholesale customers, despite Cole and

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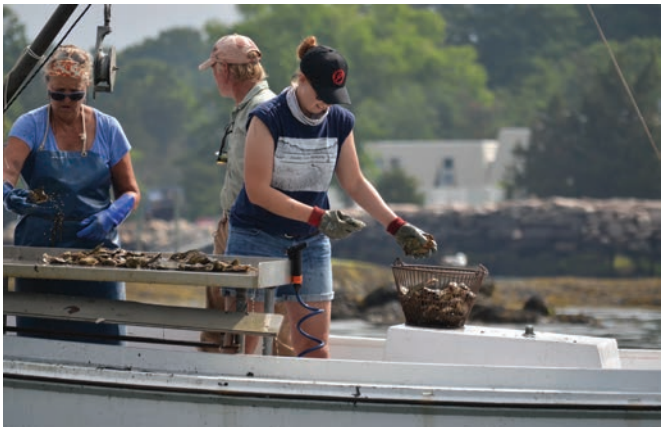

Above, oyster farmer Kim Granbery and a crew of family and friends harvest oversized oysters from his beds in Guilford in June. The oysters were sold to the state and relocated as part of a program to reseed natural oyster beds. Photos: Bill Sauerbrey

Left, Emily Waters Harris empties shellfish and seaweed from the oyster dredge while the F/V Merlin plies the waters around the Thimble Islands in Branford. Center, Jonathan Waters steers the vessel on a foggy March morning. Photos: Judy Benson

Andrew Maderia urging their fathers to diversify.

"We'd been hounding them about getting a website started," the younger Maderia said.

Both he and Cole began applying their marketing skills to build a social media presence, and started offering home delivery of fresh local lobsters, scallops, haddock, salmon and other seafood from the new website, much of it caught by New England fishermen. Vans once used for wholesale deliveries were redirected for weekly runs in a 30-mile radius around Stonington, from East Lyme to Charlestown, R.I.

"We're doing about 40 to 100 delivery customers a month," Cole said. "We ran a good social media plan, and it caught on."

As customer demand grew, they decided to open a store in a former velvet mill in Stonington repurposed for small retail outlets, a brewery and other boutique businesses. It's open Thursday through Sunday.

"Everything in the shop is offered online, but people wanted to be able to go to the store and pick up their fish," Cole said. "All aspects of our business are now firing on all cylinders at this point. We're going to keep all of this going after the pandemic."

At Ideal Fish, the Internet also provided the means to keep the unique young business afloat. The company raises branzino, or European sea bass, in indoor tanks in a former button factory, and had been selling virtually all of its fish to restaurant and wholesale customers before the pandemic lockdowns began. When those sales suddenly plunged, Pedersen decided to harvest, process and freeze all his full-grown fish, and take a pause on starting a new crop to make improvements to his plant to allow future expansion.

In the meantime, online sales with home deliveries began, with customers able to order whole or filleted frozen branzino, which Pedersen described as a "mild, buttery, flakey fish." Offerings were expanded with salmon, rainbow trout, barramundi, several types of smoked fish and other types of seafood raised by other aquaculture producers. Word spread about the business through the Ideal Fish Facebook and Instagram pages, and through the company's regular presence at several farmers markets in Fairfield County. Pedersen is looking to add a farmers market in Manhattan this summer.

"We launched an Internet e-commerce distribution channel," said Pedersen. "All the other companies whose products we sell adhere to our high standards for sustainability. The packages are shipped via FedEx the next day. We're really pleased with it. We've got about 2,000 pounds going out in a national distribution range, and traffic to our site is increasing every week."

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Small-scale fishers at sea in the Philippines. Photo: Alice Joan Ferrer

Small-scale fisheries in Southeast Asia see harsh impacts of COVID-19

Editor's note: Robert Pomeroy, extension specialist and marine resource economist with Connecticut Sea Grant and UConn professor emeritus, has spent his career on research and development projects with small-scale fisheries in Southeast Asia and other parts of the developing world. While those who sell fished and farmed seafood in Connecticut were presented with significant challenges during the pandemic, those same challenges were magnified for their counterparts in Indonesia, Malaysia, Myanmar, Philippines, Thailand, Vietnam and neighboring countries. They also lacked the resources and government support programs that were critical for the Connecticut seafood industry.

In this article, Pomeroy summarizes the findings of a paper published in March with Southeast Asian colleagues in the academic journal Asian Fisheries Science. Their conclusions offer an important reminder that the ability to fully overcome crises often depends on forces beyond one's control. While the Southeast Asian fishers adapted as well as they could, the obstacles they faced highlight the need for ways to help them become more resilient before the next crisis. Pomeroy and his fellow authors give several specific recommendations to achieve this.

By Robert Pomeroy

Though global in scale, the COVID-19 pandemic did not spread its impacts equitably.

In Southeast Asia, the disparities with other parts of the world were starkly apparent among those who depend on seafood for their livelihoods, from small-scale fishers to those who process, sell and distribute the ocean's bounty.

Small-scale fisheries significantly contribute to the well-being of coastal communities in Southeast Asia as providers of food, livelihood and income. Fisher households are prone to various crises and shocks that put a lot of stress on their already vulnerable condition, making them less economically resilient.

Given the few assets of fishing-dependent households, their ability to cushion the negative impact of crises and shocks is limited. Women, who work primarily in processing the seafood harvest, are often significantly impacted. The pandemic delivered another serious threat to these coastal households and communities.

Fisher households' livelihoods, nutrition and health have been impacted. They have met with difficulties due to national lockdown measures in many countries that prohibited them from going out to sea to fish or from selling their fish.

Due to reduced demand for seafood from local markets, restaurants and hotels, the collapse of prices has reduced fishing activity. This spilled over to the suppliers, traders, processors, transporters, financiers and others in the small-scale fisheries value chain. Access to ice, fuel, bait and fishing gear has been restricted as suppliers closed due to limited fishing activity. Trade slowed as transportation restrictions prevented movement of products. Seafood processing facilities closed or are operating at reduced capacity.

The pandemic has exposed the poverty, vulnerability and marginalization of the small-scale fisheries sector. The pandemic and the accompanying policies in these countries inflicted far-reaching impacts on the small-scale fishers. It has also highlighted the importance of the fisheries sector, the problems that have long existed and presented an opportunity to reshape it.

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Tested by pandemic...*continued from page 10*

In late April, a few of the company's 2,500-gallon tanks were again full of young branzino swimming in endless circles through the brackish water. A new batch of fingerlings was on its way from a hatchery in France.

"In three to four months we expect to be back online and harvesting our fish," Pedersen said.

Seafood wholesalers found new ways to keep their businesses going, too. Chad Simoneaux, co-owner with his wife Camille of Gulf Shrimp Co. in Plantsville, shifted more of their products from the wholesale to the retail side of their business when the pandemic hit. They added curbside and home delivery services. But while wholesale orders from restaurants declined, other wholesale customers increased.

"Our grocery stores and fish market orders grew," he said, "because people still needed to eat. We had our best year ever."

Simoneaux said he and his wife decided at the beginning of the pandemic they were going to stay open no matter what.

"We just said, 'we've got to make it work,'" he said. "We're not just going to let 30 years in business go because something happens."

As the pandemic lifts, neither Gulf Shrimp, Ideal Fish, J & R Scallops, nor the oystermen expect a return to the way their businesses used to run. Carey, of the Bureau of Aquaculture, believes this could be a transformative time for the state's seafood growers and purveyors, when selling direct to customers started to become the rule rather than the exception, and new appreciation for the state's seafood resources brings sustained investment.

Getchis said that CT Sea Grant and the Bureau of Aquaculture have been advocating for direct seafood sales for years but that many businesses owners didn't have much interest at the time.

"When you can sell everything you harvest or grow to a middleman, it doesn't make financial sense to divert the time and effort to direct sales," she said. "But consumer demand has been growing and more people are asking for fresh local seafood. If one good thing came out of the pandemic, it's forced people to consider other business models and they're being met with success."

Getchis herself is a regular customer of the fresh salmon from J & R Scallops and oysters from the local farmers market. "I'm not just an advocate—I'm a customer," she said.

For information about Ideal Fish, Gulf Shrimp and other companies offering direct seafood sales, visit: https://shellfish.uconn.edu/seafood-sales/ For information about J & R Scallops, visit: www.jrscallops.com

Small scale fisheries...*continued from page 11*

The effects of COVID-19 varied at different times and in different ways across Southeast Asia, reflecting the differences in their economic and social situations. Many households were unprepared and lacked viable ways to cushion the impact of fishing and market closures. The pandemic has further exposed the political and economic marginalization by many governments of the small-scale fisheries sector.

The small-scale fishers had to fend for themselves in the early months of the pandemic. Most government support to the fishers came in the middle-to-end of 2020, signifying the lack of systematic program planning and action to support the sector. Governments supplied financial help and food subsidies as short-term coping strategies to address immediate challenges brought about by the pandemic. The financial help provided to fishing households was critically important to purchase necessities. Some governments provided support to obtain fishing gear and improved post-harvest infrastructure, while others provided low-interest loans to fishers or helped to strengthen their fish marketing systems. Fishers took adaptive responses such as direct fish marketing, online marketing and home delivery services.

While short-term responses of providing food and financial assistance have been helpful, long-term support to address future pandemics and other stressors will require developing more resilient fishing households. The lessons learned from the pandemic suggest several approaches and interventions to improve household resilience and to be better prepared for similar challenges and threats in the future.

These include:

- strengthening the fishing households' social network of friends, relatives and neighbors to serve as both a social safety net and a bridge towards the transition to financial inclusion
- diversifying livelihoods to reduce dependency on the fishery and provide for additional sources of income and food
- promoting financial stability through savings, credit, digital payment products and insurance
- value chain upgrading through post-harvest fish handling and processing methods
- providing access, especially for women, to social protection measures such as government health insurance and social security.

A copy of the full paper was published in the March 2021 issue of the journal Asian Fisheries Science: (http://www.asianfisheriessociety.org/publication/current.php).

To learn more about Robert Pomeroy and his work, read the profile in the Fall-Winter 2020-21 issue: https://seagrant.uconn.edu/?p=6969

A tale of two coastal states as the world gets wetter

By Lynn Bonner

In this aerial view, sandbags line the shoreline of North Topsail Beach, on the Outer Banks in North Carolina. Photo courtesy of the Western Carolina University Program for the Study of Developed Shorelines. Below, the southeast corner towns of Kinston and North Topsail Beach are shown in an inset of the profile of North Carolina. Map: Maxine A. Marcy

Connecticut and North Carolina have at least two things in common.

Both have shorelines considered among their most important natural and economic resources, and both are confronting the reality of rising waters.

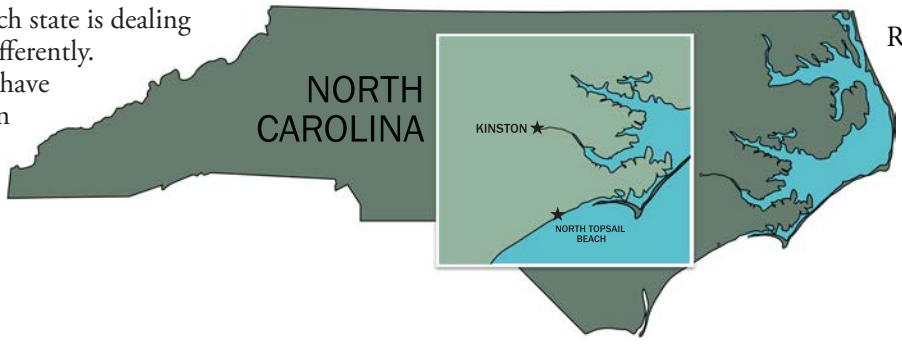
North Carolina, though, has had more extensive experience with this challenge. Perhaps some of the examples there could yield important lessons for this fellow East Coast state to follow as the need for relocating waterside homes and businesses intensifies.

"Moving people and infrastructure out of harm's way is happening around the country—in both coastal and inland locations," said Juliana Barrett, coastal habitat specialist at Connecticut Sea Grant. "Whether it is called managed retreat or another name, this is a national issue that each state is dealing with a bit differently. Even so, we have much to gain from understanding and sharing what is and is not working in other places."

In Connecticut, the term "managed retreat" is being used in discussions about what to do about neighborhoods repeatedly finding themselves under water. The city of West Haven is leading the way for action, with a buyout project under way in the Old Field Creek neighborhood, where the nearby waters of Long Island Sound are encroaching.

In North Carolina, there's a long history of moving people and buildings out of the way of floods. It's just not called retreat. Usually, the preferred term there is "buyouts."

Property purchases that aim to move residents out of floodplains and leave the land as open space have been going on there for decades—usually through FEMA buyout programs—and gained steam in the late 1990s.



Records show that between 1989 and 2017 nearly 3,000 properties in North Carolina had been purchased and cleared using FEMA buyouts. North Carolina has also

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Above, floodwaters cover much of the town of Kinston, N.C., after Hurricane Matthew in 2016. Photo: Jocelyn Augustino/FEMA

Left center: Workers from All Habitat Services plant bayberry, a native species, at a former home site in West Haven as part of a project to restore the natural floodplain. Photo: Judy Benson

Below: Kristin Walker, USDA program coordinator for the West Haven project, talks with the supervisor of the landscaping crew as work continued at the site in the fall of 2020. Photo: Judy Benson

spent millions in federal Housing and Urban Development money and state funds on property buyouts after hurricanes. The purchases continue to this day.

Climate change is making hurricanes wetter and the oceans rise. Inland and coastal communities are figuring out the best ways to adapt. For some it means getting out of the way of the risks.

Relocations in the North Carolina city of Kinston are among the most studied in the state. Kinston sits in the Neuse River floodplain in the inland county of Lenoir. Heavy rain and river flooding from hurricanes, including Fran in 1996, Floyd in 1999, Matthew in 2016 and Florence in 2018 collectively damaged thousands of Kinston homes.

At the National Oceanic and Atmospheric Administration (NOAA), the Office for Coastal Management has featured Kinston's relocation

strategy on its Digital Coast website (https://www.coast.noaa.gov/digitalcoast/). In that community, thousands of residents were moved out of the way of the rising river, and more than 50% of the floodplain left as open space.

Kinston wanted to keep those relocated residents in the city. It turned an old high school into affordable apartments for senior citizens, according to a 2006 University of North Carolina master's thesis by Monica McCann. It also relocated some families from two mobile home parks to new lots, and built single-family homes on vacant lots, McCann wrote.

Governments coordinate the FEMA buyouts, but it's usually residents who are tired of repeated flooding, upheaval and damage who tip the scales toward relocations, said A.R. Siders, an expert in managed retreat and environmental justice at the University of Delaware.

Buyouts happen when enough residents are "sick and tired of having their homes destroyed over and over again and they're looking for relief," she said.

Hurricanes have also reshaped Connecticut communities. Flooding and storm surge from a monster hurricane in 1938 left more than 600 people in New England dead. Along its destructive path, the hurricane leveled homes on Ocean Beach in New London. The city used eminent domain to buy the land and built Ocean Beach Park, popular today for its wide beach, boardwalk, splash park, nature trail and other features.

Hurricane Sandy in 2012 triggered Connecticut's more recent experience with home removals using a voluntary program administered by the U.S. Department of Agriculture.

West Haven started helping residents move out of the floodplain using the USDA's Emergency Watershed Protection-Floodplain Easement program, in which the federal government buys development rights and restores the land as closely as possible to its natural state. The land is kept as permanent easement.

The West Haven program is on its third round of purchases. Twenty-five properties were purchased in the first two rounds in West Haven. Most are near Old Field Creek, a stream that connects to Long Island Sound, said Thomas Morgart, state conservationist with the USDA.

Program coordinator Kristin Walker recalled when an elderly couple came by their old home while it was being demolished. Walker said she was worried the scene would be traumatizing for them. "They said, 'Nope. We're glad to see it go,'" she said.

Landowners whose properties flood repeatedly know restoring the natural floodplain is the right thing to do, she said.

The goal is to get the land back to as close to its natural condition as possible.

A formal restoration plan for the land includes removing any buildings and impermeable surfaces, stabilizing the soil to prevent erosion, grading and bringing in native plants. The properties are intended to be low-maintenance, Walker said.

"It's not intended to be a park," she said. "It's intended to be a floodplain in a natural area."

A sponsor, West Haven in this case, takes responsibility for maintenance.

Climate change is bringing increased likelihood of both inland and coastal flooding.

Climate change is bringing increased likelihood of both inland and coastal flooding.

All states will feel the effects of climate change, but specific impacts vary by region.

The Connecticut Institute for Resilience and Climate Adaptation at UConn predicted that the state will see up to 20 inches of sea level rise by 2050, leading to more frequent flooding.

Average precipitation is expected to increase by about 8%, or 4 inches a year.

A 2020 North Carolina Climate Science Report says heavier rains will make inland flooding worse. Sea level rise and the increasing intensity of storms will increase storm surge flooding on the coast. Coastal erosion will increase the risk of property damage. A state Climate Risk Assessment and Resilience Plan describes beach and dune nourishment as a short-term solution to preserving the state highway that runs through the fragile Outer Banks, the thread of barrier islands that feature some of the state's best-known beaches.

But it's become routine for Outer Banks communities to pile sand on eroded beaches to protect homes from the encroaching ocean, and some plan to do it indefinitely.

Moving beach homes to safer spots has historical precedent. After a devastating hurricane in 1899, hundreds of residents left a settlement called Diamond City located on a barrier island called Shackleford Banks. Some people even put their Diamond City homes on barges and floated them to Harkers Island, said Rob Young, director of the Program for the Study of Developed Shorelines at Western Carolina University.

"Those were the days when the public sector didn't come in on a white horse to protect investment properties," he said. Homes along North Topsail Beach sit precariously on shifting sands, which governments and residents have spent millions trying to protect from hurricane scouring. North Topsail Beach is on the Outer Banks.

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The northern part of the town is near an inlet that is particularly unstable. The town tried to realign the channel about eight years ago, but it didn't help. Then came the walls of sandbags —3,600 feet worth—meant to protect the homes.

Young released an economic analysis two years ago that concluded that it would be less expensive long-term for the town to buy homes on the unstable stretch of beach, demolish them and let nature take over.

The analysis looked at costs over 30 years and calculated it would cost less to purchase and demolish 347 properties along the beach rather than have the town push ahead with its plan. That plan was to replace the sand and build a hardened concrete structure, called a terminal groin, to try to keep it in place.

"Nobody ever does the math because no one wants to do the math," he said. "There's an ingrained belief that it would be the end—that it would be giving up the fight. We showed you could walk away from 3% of the tax base and you could spend time and money on 97% of the tax base that was really more sustainable. Good luck in getting everyone to buy into that argument at the present time."

North Topsail is moving on its plan for a terminal groin and beach nourishment.

Fran Way, an engineer working for the town, told its governing board last fall that the terminal groin would help keep the sand from washing away so quickly, like it did the last time the town tried to reshape the inlet.

"We want to create a healthy beach and dune system," he told them.

The town is joining a neighboring town on a beach renourishment plan that will cost $900 million to replenish sand periodically over 50 years. The U.S. Army Corps of Engineers would pay 65% of the cost, with the state and local governments picking up part of it. Town leaders are considering using an increase in the occupancy tax, basically the tax that tourists pay to rent houses and condos, to help pay its share.

For another Outer Banks village, elected leaders voted to levy a tax on properties in the village of Avon to help pay for beach nourishment.

The special tax levy on Avon property owners would pay to help widen the beach and better protect buildings and the state highway that runs through the northern Outer Banks.

The cost would come to about $11 million to add 1 million cubic feet of sand to about 2½ miles of beach to make it about 120 feet wide. In five years, they'll have to do it again.

Avon didn't used to be an erosion hot-spot, but that's changed, Dare County Manager Bobby Outten told property owners this year as he presented the tax plan.

It used to have two rows of dunes and a wide beach, but the dunes are gone and the beach has narrowed.

"The rate of erosion has increased dramatically," Outten said. Climate change and sea level rise were not mentioned at these two North Carolina beach community meetings.

But climate change was the central topic of a webinar in a Fairfield County, Connecticut community last year hosted by a group called Sustainable Fairfield.

About 60% of Connecticut's population lives in coastal communities, and, in 2010, more than 32,000 homes sat in various floodplains across the state. Becky Bunnell, a member of the Sustainable Fairfield Task Force and chair of the town's Flood and Erosion Control Board, described the grim prospects that could come with sea level rise.

Sunny day flooding will become more frequent in the beach areas, she said. Heavy storms will overwhelm storm drains.

A category 1 or category 2 hurricane combined with sea level rise would flood streets throughout the beach area, where15% of the town lives, and where the town hall, six churches, several schools, historic buildings, and more than 250 commercial buildings sit.

The town depends on tax revenue from the beach area homes, Bunnell said.

Like North Carolina beach towns, Fairfield has turned to engineering solutions to address its problems.

The town has installed a detention basin, dry wells, and catch basins downtown, and has studied putting detention basins in the Rooster River watershed.

In the beach area, living breakwaters of oyster reefs, aquatic plants and other natural elements, beach nourishment or adding spurs to existing groins could mitigate wave impacts and erosion, she said.

Siders, the expert on climate adaptation policies, said the problem of beach erosion depends on how you look at it. It's the homes on the beach that are causing the beach to disappear, she said, because they stop natural beach migration inland.

Engineering projects to control erosion may still leave homes at long-term risk, she said.

She emphasized the need for long-term planning for communities and for property owners, she said. People who sign 30-year mortgages should think about whether their home is going to be safe for 30 years.

"Yes, the beach is disappearing," she said. "The other solution is for us to get out of the way and let the beach maintain itself."

The Western Carolina University report on North Topsail Beach can be found at: https://seagrant.uconn.edu/wp-content/uploads/sites/1985/2021/04/NTB-July-1-2019.pdf

In Connecticut, workshop starts the difficult conversation about managed retreat

Retreat isn't defeat.

It's deliberately stepping back to make a better future.


A.R. Siders

"Retreat is very difficult, but it's going to happen," said A.R. Siders, assistant professor in the Biden School of Public Policy and Administration at the University of Delaware. "Wouldn't it be better to have a managed process? It can be an opportunity to do something more exciting than elevating a few houses, and there are resources available."

A national expert and keynote speaker at the "Managed Retreat in the Age of Climate Change" virtual workshop in Connecticut last November 2020, Siders challenged the audience of about 130 municipal and state land-use officials and others to rethink notions of what's possible. Rising seas and more frequent flooding of coastal and riverine areas means getting people out of harm's way is necessary, she said. But it can also be a chance to improve our waterfronts for everyone.

Siders said she began focusing on how retreat can be done in an orderly, methodical way—rather than as a haphazard reaction to a disaster—after Superstorm Sandy in 2012. It's the better alternative to the other options: avoidance, fortifying shorelines with concrete or accommodating rising seas by elevating properties, she said.

To begin the hard conversation with communities, Siders urged land use professionals to pose it as challenge to realize a positive vision for the future: "What do you want your city or community or coast to look like in 30 years? 100 years?

"I don't want to see a coast that's armored with sea walls, but I would love to see open beaches all the way from Maine to Texas, so everyone can access them. It won't happen if we don't plan for retreat," she said.

The workshop was the latest in a series hosted by the Climate Adaptation Academy, a partnership of Connecticut Sea Grant and The Center for Land Use Education & Research (UConn CLEAR). Juliana Barrett, CT Sea Grant coastal habitat specialist, and fellow organizer Bruce Hyde, extension educator with CLEAR, emphasized that this workshop is considered the first in a series on managed retreat that will delve into this complex and important issue.

"We see this as just getting the conversation going," said Barrett.

Left, a boy rides his bicycle in Meriden Green, a 14-acre downtown park created in a flood-prone area in 2016 at a cost of $14 million. Right, a sign reminds visitors to avoid using one of the footbridges at the park when Harbor Brook floods. Photos: Judy Benson

Two examples offered inspiration for what can be accomplished. In downtown Meriden, a $14 million project funded by various state and federal agencies has transformed a blighted, flood-prone area into a municipal park. Public Works Director Howard Weissberg, City Engineer Brian Ennis and Assistant Planning Director Paul Dickson took turns describing various aspects of what one of them described as "a flood control site first, a park second, and an economic development parcel third."

Twenty-five properties were purchased and razed for the project, which resulted in improved flood protection for more than 100 surrounding acres and a new public space for farmer's markets, concerts and commercial businesses.

"Property values are going up around the park" since it opened in 2016, Dickson said.

In West Haven, the Old Field Creek neighborhood is undergoing a different kind of transformation. Arde Ranthum and Kristin Walker, state conservation engineer and civil engineer, respectively, for the USDA's Natural Resources Conservation Service in Connecticut, are leading a years-long effort to convert a flood-prone working-class neighborhood back into the wetlands that existed there before the 1920s.

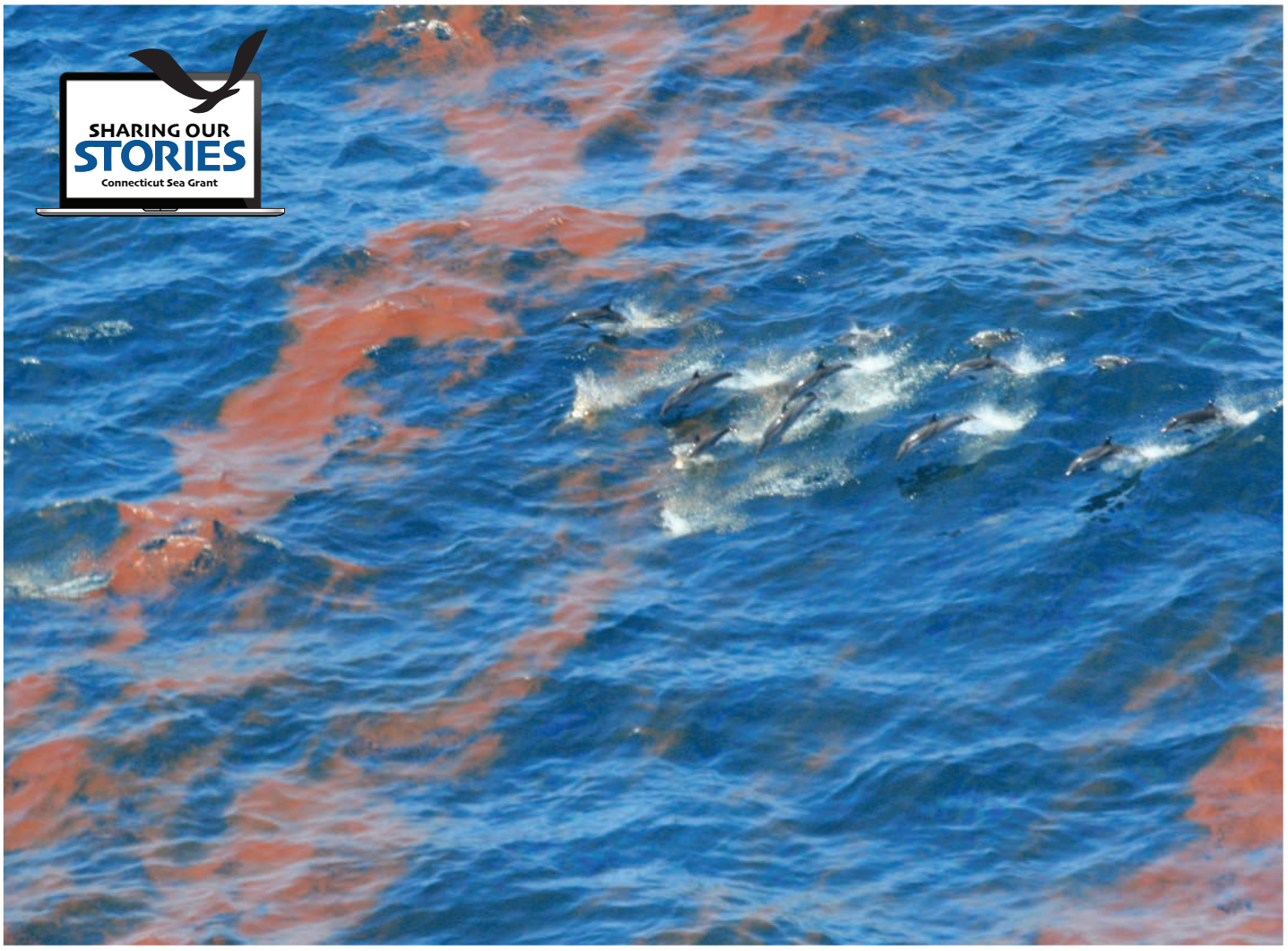
Working since 2014, the project has thus far purchased 25 homes slated for demolition, and another 39 are in line for a later phase.

"This is 100% voluntary," Ranthum emphasized, with residents offered the market value of their homes on the day before Superstorm Sandy struck.

Walker said residents in the neighborhood were hit especially hard by Sandy, and the flooding from nearby Old Field Creek, a short tidal channel connected to Long Island Sound, never abated after that.

"You're talking about residents who had water up to the first floor," she said.

– Judy Benson



CTSG's De Guise helped lead research into long-term effects of Deepwater Horizon oil spill on dolphins

By Judy Benson

Above, a pod of striped dolphins, which share the Gulf of Mexico with the bottlenose dolphins in the study, swims through oil on April 29, 2010, in this photo taken from a helicopter survey nine days after the Deepwater Horizon drilling rig explosion. Photo: NOAA Fisheries

Center, the research team measures one of the Barataria Bay dolphins. Right, Sylvain De Guise holds a dolphin's tail up for sampling blood from the veins on the underside of the tail. Photos: Todd Speakman / National Marine Mammal Foundation

A Coast Guard MH-65C rescue helicopter and crew document the fire aboard the mobile offshore drilling unit Deepwater Horizon, while searching for survivors on April 21, 2010. Multiple Coast Guard helicopters, planes and cutters responded to rescue the Deepwater Horizon's 126-person crew. Photo: U.S. Coast Guard

Above: The inset map shows Barataria Bay, where the bottlenose dolphin research took place; Sarasota Bay, where the control population was located; and the approximate site of the explosion. Map: Maxine A. Marcy

Left, Rob Yordi, zoological director of SeaWorld, holds one of the dolphins with Sylvain De Guise, CT Sea Grant director, as they check vital signs. Center, a suction cup is attached to a dolphin's jaw to play back sound as part of a hearing test. Photos: Todd Speakman, National Marine Mammal Foundation

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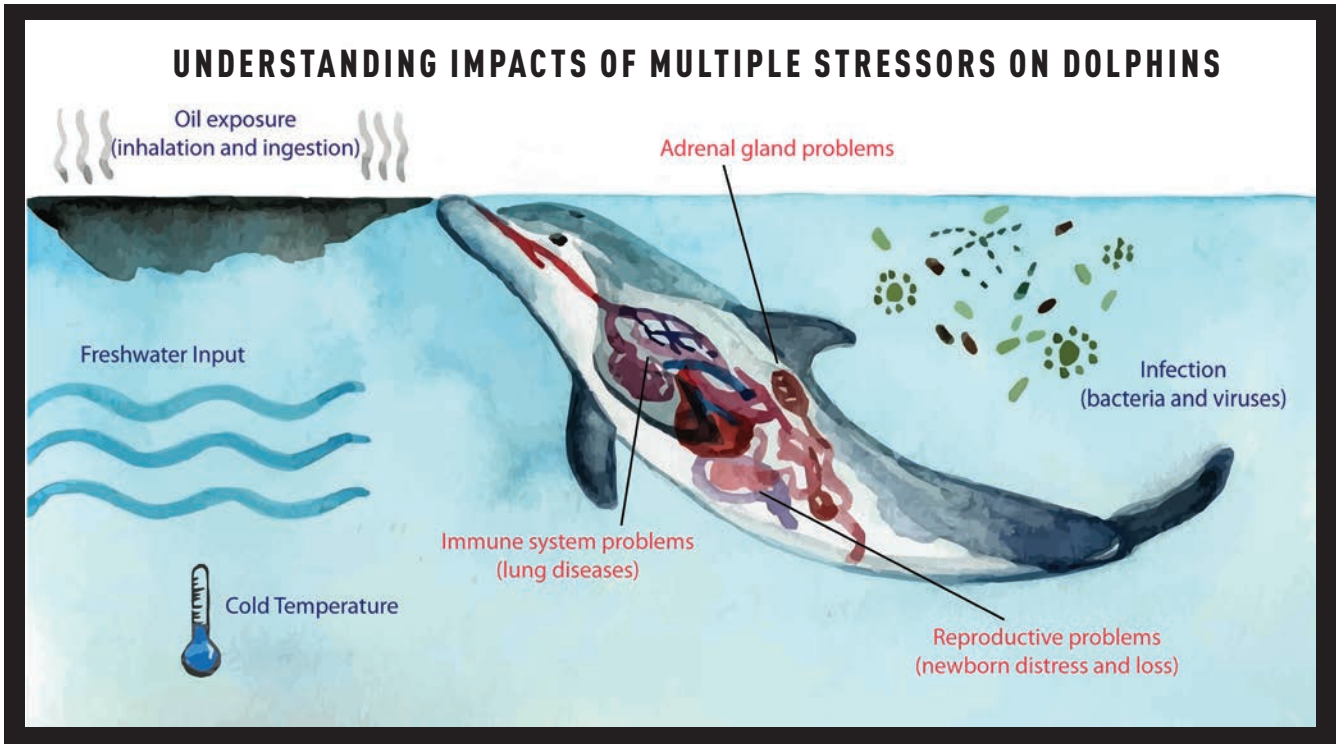

Above Graphic: Anna Hinkeldey / Oil Spill Science Outreach Team-Mississippi-Alabama Sea Grant Consortium

Oil that gushed from the explosion of the Deepwater Horizon drilling platform 11 years ago opened a large wound in the Gulf of Mexico that remains unhealed.

Remnants of the more than 200 million gallons of spilled oil linger in the sediments. The disaster left diminished populations of sea turtles, pelicans and sheepshead minnows, among other animals, and chronic stressors on one of the most iconic species of this marine environment, bottlenose dolphins.

Though the largest oil spill in U.S. waters, media and public attention faded quickly after the immediate disaster, which killed 11 people and thousands of animals, including an estimated 1,300 dolphins.

But the team of researchers that included Connecticut Sea Grant Director Sylvain De Guise didn't forget. Instead, they spent much of the last decade on research that documented the damage to the approximately 1,700 surviving dolphins that live in Barataria Bay, off the southeastern Louisiana coast some 125 miles from the explosion site. While their conclusions are troubling, they can give added urgency to efforts to build an energy economy based on renewable resources.

"As long as we are dependent on fossil fuels, there are going to be spills, even with the best technology," said De Guise. "The dolphins of Barataria Bay are kind of the poster child for how there are long-term consequences for what we do."

Separate from his duties running CT Sea Grant, De Guise has built a distinguished career as a veterinary pathologist. He specializes in toxicology—figuring out how chemical exposures impact marine animal health, with an active research lab at UConn's main campus in Storrs. While he has studied lobsters, shellfish and fish, his expertise is with dolphins and whales.

Beluga whales, particularly, are the species that set the course for his career.

Now 55, he grew up in a small town in Quebec on the St. Lawrence River, where swimming, boating and fishing were instinctive. Over time he saw troubling changes in the local environment. He couldn't drink the water from the river like his father and grandparents used to. Increasing pollutants made swimming and eating fish from the river hazardous.
"It was a slow awareness that drew me to asking questions," he said. "How come we can't do the things my grandparents and parents used to be able to do?"

After completing veterinary school, he continued studies in veterinary pathology and ultimately earned a doctorate in immunotoxicology. Along the way, he got the chance to work with a researcher doing a necropsy on a beluga whale. De Guise was fascinated. Relatively small among whales, these 3,000-pound, all-white cetaceans are found in the St. Lawrence, often in polluted environments where they suffer from a variety of diseases, and in the relatively pristine Arctic. His curiosity took him to harsh, remote places, chasing after whales amid icebergs.

"Seeing belugas in their natural environment was just incredible," he said.

As his career progressed, he moved through several academic and research appointments until landing at UConn in 1998 and Connecticut Sea Grant in 2005. Six years later he and the dolphin research team began their work in Barataria Bay. The work was funded initially by the National Oceanic and Atmospheric Administration and then through multi-million-dollar grants from a program originally set up with funds from BP, owner of the Deepwater Horizon rig. It required trips to the Gulf each summer to capture, examine, X-ray and sample blood and tissue of three-to-four-year-old calves to adult dolphins.

"In some ways, it was like going back to camp each summer," De Guise said. "There was a lot of professional camaraderie in the group. But it was also very sobering, because of the gravity of what we were finding."

The first of the projects found reproductive impacts, with miscarriage and stillbirth rates 46 percent higher among female dolphins that survived the oil spill compared to a control population. The second phase looked at immune system effects, finding Barataria Bay dolphins had three times more of the type of white blood cells that cause dysfunction in the body's response to infections compared to the control group. This in turn was associated with persistent inflammation in the lungs of many of the dolphins studied. Even more worrisome, these effects were found across generations, both in dolphins alive at the time of the spill and in their offspring.

"Their health has not improved over time, but gotten worse," said Lori Schwacke, chief scientist for conservation medicine at the National Marine Mammal Foundation.

A statistician and epidemiologist on the research team, Schwacke was one of the authors of a paper published last December in the journal *Environmental Toxicology and Chemistry*. De Guise was the lead author.

"The dolphins are still showing chronic lung disease that seems to be getting progressively worse," Schwacke said. "It's like their immune systems are on overdrive. This research has given us an opportunity to understand the impacts of the oil spill and look at why these animals aren't recovering. But it's absolutely heartbreaking to see the impacts.

"There is no antidote to the oil," she added.

Schwacke noted that another of the seven authors on the recent paper was Jean Herrman, a veterinary dentist who is married to De Guise. Using her unique expertise, Herrman developed a way to age the dolphins using radiographs created from X-rays of dolphin teeth. This was a significant improvement both for the dolphins and the researchers, Schwacke said.

"We used to have to extract their teeth," she said.

A third co-author, Randy Wells, brought his special skills doing long-term research with dolphins in Sarasota Bay off the Florida coast. The Sarasota Dolphin Research Program animals served as the reference population for comparison with their Barataria Bay cousins.

De Guise, Wells said, is a "top-notch scientist" who helped expand the immunological understanding not just of the Barataria Bay dolphins, but also those in Sarasota Bay.

Sylvain De Guise holds X-ray film in a plate holder to make dental radiographs used to assess dental pathology and determine the age of one of the dolphins in the control population at the Sarasota Dolphin Research Program. In the foreground is De Guise' wife Jean Herrman, a veterinary dentist who is taking the radiographs. Photo by the Chicago Zoological Society's Sarasota Dolphin Research Program, taken under NMFS Scientific Research Permit No. 15543

"He's one of my favorite colleagues, because he really cares about the people and the animals he's working with," said Wells, who is director of the Sarasota research program.

Ultimately, he said, he hopes the findings will inform future recovery programs, as well as possible development of a vaccine to help the dolphins with compromised immunity due to chronic exposure to oil.

While every research project is unique, the work with the Barataria Bay dolphins had some singular characteristics, De Guise said. The level of complexity was multiplied by the involvement of the federal government, which invoked the Natural Resources Damage Assessment process to commission the research. The federal lawsuit against BP and subsequent settlement meant that all the science became "a very legally

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...an opportunity to understand the impacts of the oil spill...But it's absolutely heartbreaking to see the impacts.

bound process," from the research protocols to the content of published articles.

"Lawyers were involved every step of the way," he said.

And then, of course, there were the dolphins.

"They're in their own environment, where they're more agile and more knowledgeable than we are," De Guise said. "They're pretty powerful animals. One part of it is restraining them, the other part is treating them like a patient, and the other part is that they are scientific subjects."

A dolphin pushes a dead calf through the waters of Barataria Bay in March 2013. This behavior is sometimes observed in female dolphins when their newborn calf does not survive. Barataria Bay dolphins have seen a disturbingly low rate of reproductive success in the wake of the Deepwater Horizon oil spill. Photo: Louisiana Department of Wildlife and Fisheries

Weighing up to 600 pounds each, the dolphins are surrounded by nets that are gradually closed around them. Over about an hour, the researchers monitor their heart rate, blood gas and other vital signs while they extract samples for lab analysis. They can feel the dolphin's heart beating. Sometimes a captive calf will start calling for its mother.

"We try to keep them face-to-face, to be understanding and respectful of their social behaviors," De Guise said. "It's a very humbling part of it."

The prognosis for the future of the Barataria Bay dolphins is far from certain. Current estimates, De Guise said, show the population will take 30 years to recover to pre-oil spill levels—barring any new stressors. But that appears unlikely, with climate change impacts affecting marine environments worldwide. In addition, a current plan to restore Barataria Bay may not be good for the dolphins.

The plan calls for diverting sediment from the Mississippi River to make up for land being lost to sea level rise around Barataria Bay. It could benefit birds and some other wildlife populations, Schwacke said, but she and others on the research team are concerned about how dolphins would be affected because it would bring in more fresh water, reducing the salinity of the bay.

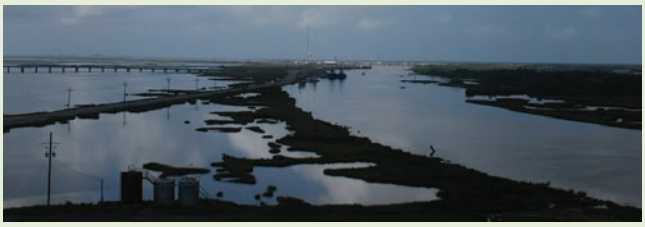
Dolphins develop skin lesions and other serious conditions when exposed to too much fresh water, De Guise said. It would be another stressor on an already over-stressed population. But in the end, the research, findings and any actions taken as a result aren't just about the Barataria Bay dolphins.

In the broader view, the project highlights the need for better understanding of how all the pieces of nature and human civilization are interconnected to yield better decisions for the future.

"If there are effects on one species," De Guise said, "it's also on the rest of the ecosystem, and people, too, because we're part of the ecosystem."

MORE INFORMATION:

- "Oil spill has long-term immunological effects in dolphins," from the Feb. 2021 issue of *Environmental Toxicology and Chemistry:* https://setac.onlinelibrary.wiley.com/doi/10.1002/etc.4980
- "Exposure of cetaceans to petroleum products following the Deepwater Horizon oil spill in the Gulf of Mexico," from National Oceanic and Atmospheric Administration: https://repository.library.noaa.gov/view/noaa/20380
- Oil spill science fact sheets from the Oil Spill Science Outreach Team-Mississippi-Alabama Sea Grant Consortium: https://gulfseagrant.org/oilspilloutreach/publications/



Oil residues are visible in the marshes near the town of Grand Isle, LA, in early June 2010, six weeks after the Deepwater Horizon disaster. Photo courtesy of Louisiana Sea Grant

What's in our names?

What are wrack lines? The word wrack is a term for various kinds of seaweed, and wrack lines are the collections of organic matter (sea grass, shells, feathers, seaweed and other debris) that are deposited on shore by high tides. More generally, wrack lines are where the sea meets the land.

With our magazine *Wrack Lines*, we tell stories about the intersection of the land, sea and Connecticut Sea Grant. So what is Connecticut Sea Grant? One of 34 Sea Grant programs across the country, it helps residents make the most of our coastal resources and inland waterways.

It addresses the challenges that come with living by the water or within the Long Island Sound watershed, in a state with 332 miles of shoreline and three major tidal rivers. This NOAA-state partnership based at UConn's Avery Point campus works with aquaculture farmers, fishermen and seafood purveyors to help their businesses prosper.

It funds research essential to understanding and managing our changing coastal and inland environments. It provides communities and local leaders with the information they need to make better land and shoreline decisions that result in more resilient communities and healthier watersheds. It educates students as well as teachers and adults of all ages about the marine environment.

Connected to experts and residents who live, work and recreate in the Sound and its watershed, it brings diverse interests together around a common purpose of working for mutually beneficial solutions to problems.

Small in staff but big in impact, Connecticut Sea Grant is like a pilot boat that navigates the way for large vessels toward safe harbors. Since 1988, Connecticut Sea Grant has supported "Science Serving the Connecticut Coast."

Children run out of the water towards the wrack line at Eastern Point Beach in Groton. Photo: Judy Benson

Robert Klee, *continued from page 7*

Everett Williams, in foreground, plays with his older brothers Declan, center, and Maddox at Toby May Park in New London in May. The need for more investment in parks is one of the insights to emerge from the COVID pandemic shutdown. Photo: Judy Benson

and can create lasting benefits for humans and natural ecosystems, including sequestering carbon dioxide and reducing urban heat islands (where pavement, buildings and other infrastructure elevate outdoor temperatures).

Third, we must confront the fact that not everyone has equal access to parks and natural spaces. A special report by The Trust for Public Land on parks and the pandemic highlighted the fact that more than 100 million people, including 28 million children, do not have a park within a 10-minute walk from home. Any concerted effort on improving access to nature must be centered around correcting past injustice and must have outdoor equity as a key metric of success.

STAY HOPEFUL

My pandemic year reaffirmed the interconnectedness of our world, the importance of leadership, the value of science and discovery, and the centrality of family and community. Coming out of this year of immeasurable loss, I still remain hopeful about our future, and the opportunity to take the hard lessons learned and apply them towards making the world a better place.

Links to the articles and sources cited in this article can be found at: https://seagrant.uconn.edu/?p=7495

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Meriden Green, once a blighted part of the city prone to frequent flooding, is now a popular park with footbridges over Harbor Brook, paths and trails for walking and bicycling, an amphitheater and a summer farmers market. Photo: Judy Benson

Sea Grant
Connecticut

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