DELAWARE CENTER FOR THE INLAND BAYS
INLAND BAYS JOURNAL

Vanishing Vistas:
Habitat Loss Around the Inland Bays

One of the few constants in life is change. Since 2004, the State of the Delaware Inland Bays report has tracked the changes of dozens of environmental indicators in our watershed. You don't have to be a scientist to notice these changes—you can just look out your window. In 1992, agricultural fields and upland forests dominated the view. Forested buffers bordered tributaries, protecting the water that flows into the Inland Bays. Salt marshes surrounding the Bays were far healthier, with less pooling and fewer impacts from sea-level rise. These healthy habitats were home to abundant species like blue crabs and diamondback terrapins.

Today, the view from your window has drastically changed. Between 1992 and 2017, 18% of the watershed's forests and 19% of its farmlands were lost. These lands were largely replaced by development, which increased by 78% in that time frame and now takes up 73 square miles of the watershed. Across a landmass of 292 square miles that drains into the Bays, those figures represent a major change with long-lasting effects.

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Fallen trees cover a plot of land being developed near Lewes. Photo by Driscoll Drones

We are deeply saddened by the recent passing of our beloved Board Chair, Dr. Susie Ball.

Susie was a tireless advocate for the Inland Bays who served the Center in countless ways over the years. She led the Citizens' Advisory Committee before accepting her role as Board Chair, was an active member of the Development Committee, and volunteered across a number of programs and initiatives. She gave generously in every way she could to support the Center's mission.

As a Board Chair, Susie was what every nonprofit hopes for: intelligent, engaged, passionate, hardworking—the list goes on. She was a great leader who took her responsibilities seriously. But she never hesitated to trade her gavel for a pair of muck boots. When the horseshoe crabs were spawning, you'd find Susie at Tower Road leading surveys under the full moon.

Education was very important to Susie, too. She believed that if people, especially children, were engaged in the wonders of the Inland Bays, they could learn so much about themselves and positively impact the world around them. She acted on this belief, advocating and educating on behalf of the Center at every opportunity.

We lost Susie too soon, but her legacy lives on through her lifetime of accomplishments, the lives she touched and, of course, the horseshoe crabs she counted. May we all be as dedicated and selfless.

Thank you, Susie, for everything.

From the Director

This has been a year of change.

Closest to our hearts was the loss of our long-time friend, volunteer, and Board Chair, Susie Ball. Though an intellectual and professionally accomplished woman, she most notably led the Center for the Inland Bays with her heart. Her love for our people, our partners and our work permeated all her decisions and guidance. With Susie at the helm, we were well led and cared for.

On a much larger scale and as elaborated in this issue featuring the findings in the 2021 State of the Delaware Inland Bays report, life for so many—human and otherwise—is changing. Since the release of the previous report in 2016, some changes are for the better including the removal of all major point sources of nutrient pollution from the Inland Bays. Sussex County also facilitated the conversion of an estimated 52,884 septic systems to central sewer. These are both big wins for water quality.

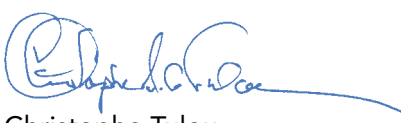
Some changes, however, are concerning. July was the hottest month our world has seen in at least the past 125,000 years. Large swaths of the planet are blanketed in unbelievable heat, drought is devastating crops, and forest fires have prompted worst-in-the-world air quality in New York, Chicago, Baltimore, and Washington, DC. And, the former capital of the Hawaii Kingdom, Lahaina, is no more—victim of an unprecedented fire on the island of Maui. All these are consequences of a changing climate.

As the lowest-lying portion of the lowest-lying state in the Nation, it would behoove us here in the Inland Bays watershed to pay attention to these and other impacts of climate change. The Center for the Inland Bays is paying attention. We embrace the Federal government's and Governor Carney's and our Delaware legislature's leadership in moving our Nation and state forward with climate targets, action plans, and an unprecedented level of funding to address climate impacts.

Working with our partners—from Congress, to Dover, to Georgetown and including our army of volunteers and citizen scientists—the Center will formulate and implement a climate resilience plan for the entire Inland Bays watershed. Focusing first and foremost on our most vulnerable places and communities, this effort will include marsh restoration, living shoreline emplacement, stormwater management (for flood protection and nutrient control), forest protection and reforestation, land acquisition and conservation, and habitat protection.

Addressing climate change is one challenge we can't opt out of. Or as the World Meteorological Organization's secretary-general Petteri Taalas recently said in response to our record-setting global heat, "Climate action is not a luxury but a must."

Yes, change can be scary. But it can also inspire the best in all of us to meet a real and present danger. After all, here in Delaware, we know what it's like to be first—and best.



Christophe Tulou
Executive Director

Donor Spotlight: Lori and Craig Hardwick

"Relocating from a lake near Chicago to coastal Delaware made me more overtly aware of the connection of water and human experience. Living on a body of water affected by tides and seeing the effects of storms and human impact to the Bays demonstrated the fragility of this natural resource that drew us here."—Lori

Community Connection through Charitable Giving

The conversation at a golf course often tends to center around a recent hole-in-one, current events, or market trends. At one particular clubhouse, however, baby oysters often find their way into the dialogue—and you can count on hearing Lori and Craig Hardwick's names come up when oysters are the topic.

Lori and Craig were new to the area in 2017 when they purchased a home on the northern end of Rehoboth Bay and became enamored with the wildlife that calls the estuary home and the "Zen-like" sunsets from their dock.

A friendly neighbor introduced the Hardwicks to the Center, and in 2021 they began to participate in the Oyster Gardening program. Their oysters became an icebreaker to get to know neighbors in the community, and soon there were six or seven oyster gardeners on their block.

As professionals in financial services, both Lori and Craig understand the impact of charitable giving to nonprofits. Lori is often a guest on podcasts, and when posed with the interview question of 'tell us something about yourself that folks don't know', she often replies, "I have an oyster farm."

The tiny oyster garden basket attached to their dock has become a conduit for creating community. Lori and Craig have hosted two social gatherings at their residence, further creating an opportunity for the Center to connect with the community. These events set the stage to discuss the critical issues facing the Bays and let folks know about current programs and projects while generating significant funds to support the Center's mission.

Craig and Lori also enjoy supporting the Center by attending the annual Decked Out fundraiser, which Lori states is a bit more relaxed than the galas they attended in Chicago.

"Education is important to us. Parks are important to us. And the Center provided a casual, approachable way for us to support these causes that resonated with us," says Craig. "The Center is a natural fit for the lifestyle that living on the Bays offers so many."

Thank you, Lori and Craig, for your generous support and for helping to connect others to the Center. We are incredibly lucky to have you as part of the Center's community.

Interested in learning more about the variety of ways you can give to the Center? Our Development team is happy to chat with you. Connect with us at inlandbays.org/donate.

VOICES OF THE BAYS

HABITAT HURDLES
We spoke to Ron Vickers, land conservation planner and Native Sussex Countian on some of the changes to the habitat he has witnessed over his lifetime.

DIFFICULT DYNAMICS
"Many people here in Sussex County are land-rich and cash poor. They work the land and that's where their money is tied up. And if they get to a point where they need to send a kid to college or retire, their relationship to the land is changed. That land-rich, cash-poor dynamic has changed things; it's not just the eastern side of the county."

DISAPPEARING DELAWARE
"You drive by places and you're like 'Oh there used to be a silo or a barn or a woodland.' Everyone is going to continue to see changes—mostly in the loss of habitat. Future generations are not going to know or get to enjoy what was before. There was green space, there were trees, and there was an open view shed to the water. And that's just in the last 40 years."

HABITAT HOPES
"Sometimes I think we've lost a shared responsibility and a shared trust for maintaining and protecting the land. "[During the pandemic], usage of public lands exploded. People needed a place to get out, to be safe, to get a break. It points to the need for connectivity on the landscape for public use, for public recreation, but expanding that, allowing for wildlife migration. I think the hook is showing people why it's good for them."

IF I HAD A MAGIC WAND FOR HEALTHY BAYS...
"I would like to see larger blocks of native habitats protected—more protected habitats along the water, with wide enough buffers back from the water. Unobstructed views from land to water and from water to the land, connections of the corridors in between. We have to look at what's left, how we protect it and how we connect it to other protected lands. It's a tough job."

(continued from page 1)

Worse, these statistics do not account for the recent development boom, which started in 2020 and continues today.

Many terrestrial and aquatic animals rely on natural areas, such as forests, meadows, wetlands, and streams to hunt, nest, and take shelter. Increased development results in the fragmentation and total loss of the habitats that these animals need to survive, causing devastating and irreversible impacts on wildlife populations. Delaware's Species of Greatest Conservation Need list comprises 689 species, and habitat loss significantly contributes to species ending up on this list. Nearly 100 native species are federally endangered and are easily recognizable by name, including the bog turtle, northern long-eared bat, piping plover, and red knot.

The changing landscape also affects us, the people visiting, recreating, and living in the Inland Bays watershed. Population growth and booming tourism brings more development and increases the pressure on natural resources. The 2020 census showed a 13% increase in full-time residents since 2010. That figure does not include the massive population growth the watershed has experienced over the last three years.

So, what do we do? How can we provide space for both people and wildlife? Oftentimes, policy is the most powerful tool to ensure that development occurs in a way that isn't harmful to the natural environment. Unfortunately, in Sussex County, there aren't many policies in place to help achieve this balance. Statewide protections are slim as well. Delaware is the only state in the Mid-Atlantic region without freshwater wetland regulations, meaning that these precious resources could be filled and drained to make way for even more development. Policy change is necessary to prevent further habitat loss. Another powerful tool is habitat restoration. The Center is currently developing a Habitat Management Plan that identifies the critical habitats throughout the watershed and how we can focus our efforts to protect what is left and to restore what we have lost.

Since 1992, the percentage of land in the watershed covered by impervious surfaces—like roads and parking lots—increased by 22.5%. This leads to more polluted runoff entering the Bays. Photo by Ken Sigvardson

The Inland Bays are a naturally dynamic and changing ecosystem. Tides rolling in and out, winds altering the currents, hot summer air churning up storms. These changes are so natural, many don't even notice them. However, there are other changes–those driven by human actions–that are more obvious and concerning. Habitat loss, pollution, and shifts in climate all impact the Bays, ultimately threatening this delicate ecosystem and our way of life.

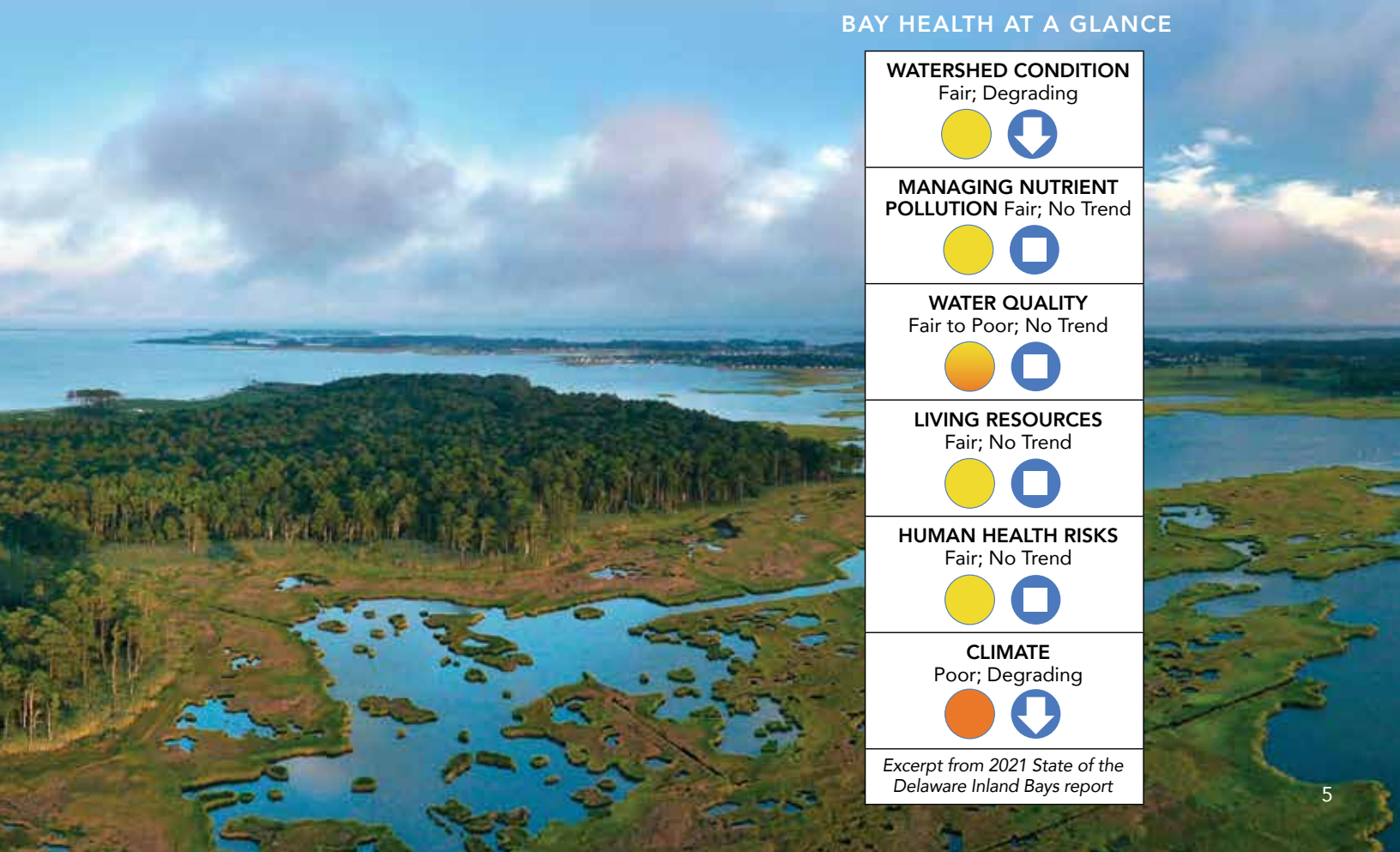
Beginning 2004, the Delaware Center for the Inland Bays' State of the Bays report has tracked these kinds of changes over five year periods, and the 2021 edition continues to present a comprehensive evaluation of the status of the Inland Bays ecosystem.

At the foundation of the report is its indicator system, designed to clearly gauge the health of the Inland Bays across dimensions that can be consistently measured over time. It employs a set of 39 indicators that provide insight into critical environmental factors, including watershed condition, nutrient pollution management, water quality, living resources, human health risks, and climate. By analyzing trends in these indicators over time, we can gain a comprehensive understanding of the Bays' health. (see summarized 2021 report chart below.)

While some improvements have been made since our last report, including the removal or mitigation of all point sources of nutrient pollution from the Bays and the growth of a shellfish farming industry, which boosts local water quality and the economy, many other threats to the Bays persist. Overall, water quality remains fair to poor. Nutrient pollution and recurrent harmful algal blooms deplete oxygen, causing the near complete absence of critical baygrasses, among other problems. Land-use changes throughout the watershed threaten natural habitats and further deteriorate water quality. Climate change only compounds these challenges. The increase in warmer weather, catastrophic storms, and rising sea levels poses a significant threat to the Inland Bays, with evident impacts already all around us.

Change, especially negative changes of this magnitude, can stir up feelings of concern and despondency—but we must not allow these feelings to prevent us from taking action. The time to restore and protect the health of the Inland Bays is now. The Center, in collaboration with partners and people like you, is dedicated to ensuring that the Inland Bays are healthy for generations to come.

The findings of the 2021 State of the Bays, which we highlight in this edition of the Inland Bays Journal, inform us of the challenges here now and the ones that lie ahead, while also empowering us all to work collaboratively towards effective environmental stewardship. As our watershed confronts a critical juncture, proactive strategies, robust environmental policies, and engaged citizens are pivotal to guiding us toward a more sustainable future for the Delaware Inland Bays.



BAY HEALTH AT A GLANCE

WATERSHED CONDITION
Fair; Degrading

MANAGING NUTRIENT POLLUTION Fair; No Trend

WATER QUALITY
Fair to Poor; No Trend

LIVING RESOURCES
Fair; No Trend

HUMAN HEALTH RISKS
Fair; No Trend

CLIMATE
Poor; Degrading

Excerpt from 2021 State of the Delaware Inland Bays report

VOICES OF THE BAYS

PEARLS OF WISDOM
We spoke to Alan Davis, owner of Inland Bays Shellfisheries, partner in Arrowhead Point Oysters, and native Sussex Countian about water quality in the Inland Bays and how oysters can help turn the tide.

SALTWATER ROOTS
"I was born in Seaford, lived in Laurel, and grew up in a commercial fishing family. My father and I had talked about starting an oyster farm. When he died in 2016, there was about $10,000 coming to me. I said 'what would he want me to do with the money?' January 1, 2019, I rode out to an aquafarm and I was hooked. So I said 'the old man's money is gonna get literally thrown overboard'."

CULTIVATING CONNECTIONS
"Nature has always been a part of my life. We hunted and fished and I became interested in nature for nature's sake. I have this holistic view of how things work. The farm runoff in the fields where I grew up has an impact on the Inland Bays. It's nice to now be part of improving the water quality. Once the nutrients are in the waterways, there's nothing you can do but grow oysters."

SPOTLIGHT ON SUSTAINABILITY
"When I'm talking about oysters, I'm talking about how they're good for the environment, good for the person eating it. Hopefully we are doing a little environmental education every time we go to sell this product. Most people don't remember any kind of industry in the Inland Bays, we need to remind people we are doing something good for the environment."

IF I HAD A MAGIC WAND FOR HEALTHY BAYS...
"I'd have a whole lot more competition! We have 300+ acres available (for aquaculture leasing) and only 12 are active. The more oysters we get in the water, the more good we are doing."

Counting on Clear Waters

The water quality of the Inland Bays—the Indian River, Little Assawoman, and Rehoboth Bays—affects us all. As the economic engine of Sussex County, the Bays generate billions of dollars in economic activity and provide thousands of jobs, all of which are directly tied to the health of their waters. Whether boating, fishing, kayaking, swimming, or just enjoying nature, the desire to engage with the Bays is what keeps our economy churning, our restaurants open, our local businesses strong, and ties us all to the fate of the Inland Bays.

Water quality in the Bays used to be much healthier than it is now. Long time residents can still remember clear waters, vast meadows of underwater grasses, and a myriad of fish species routinely visible along the bottom of the Bays. But nowadays, the water quality as a whole receives a grade of a "D", and has for at least a decade. Some areas, like open waters close to the Indian River Inlet, largely meet the established standards for healthy waters. These areas benefit from the flushing and dilution provided by ocean waters entering the Inlet and mixing with the Bay. Interestingly, most of Little Assawoman Bay also meets standards for healthy waters, despite its distance from the ocean. This may be explained by

The Center monitors water quality—every 30 minutes, 24 hours a day—using sondes at six sites in the Bays.

Blue crabs are one of the many species that depend on good water quality in our Bays to thrive.
Photo by Caitlin Chaney

the immense amount of protected, natural land that surrounds this particular Bay which helps prevent pollutants from reaching the water in the first place.

Conversely, many of the Inland Bays' tributaries have nutrient concentrations far in excess of levels deemed healthy. The Indian River Bay is especially troubled. Elevated nutrient levels, from sources like fertilizers, wastewater, and stormwater, cause dangerous algal blooms. These blooms create wild swings in dissolved oxygen levels, which harm aquatic life, lead to issues like fish kills, and impact recreational activities like crabbing, fishing, and boating that generate enjoyment and economic activity.

The Center and its partners are committed to achieving better water quality within the Bays, and in turn, a stronger economy. Limiting future nutrient pollution is a critical first step. Projects that increase forested buffers between agriculture or developed areas and the Bays, create new salt marshes or underwater meadows of grasses, and protect and restore forests are integral. But more work must be done to reduce the amount of nutrients from agriculture and urban development making their way into the Bays. Put simply, our way of life depends on it.

VOICES OF THE BAYS

CLIMATE CONNECTION
We spoke with Connie Hendricks, Dean of Elementary at Sussex Academy of Arts and Sciences, about how the Inland Bays are a platform for fostering a sense of connection and care for the Earth in her students.

PLANTING THE SEEDS
"I grew up outside, my family was always outside. If children don't understand the earth and its worth, why would they care about it?" says Hendricks. "I think it's so important for kids to get that connection early because if they don't, they might not get it later on."

GARDEN GURU
Nature gives students the space needed to truly connect with the environment and bloom in ways that a traditional classroom environment might not nurture. "I've been in education for 30 years. Some students who might not shine in the classroom do so outside. We have one student who became the 'guru of the garden'. He had so much knowledge about plants and mushrooms. He was that person that kids knew had information and would go to."

CLIMATE CONCERNS
With climate crises like floods and heat waves making headlines daily, it is only natural that students who are learning to deeply connect with our planet sometimes express concern about climate change. "We don't want them to think the world is ending tomorrow—we focus on what you can do today to help the earth so that in the future it's still here for you and your children. They know they can be heroes, they know they can recycle or compost. Everything is in the realm of your ability and every little thing adds up to an impact…you just talk about being a good human."

IF I HAD A MAGIC WAND FOR HEALTHY BAYS…
"People would be able to universally appreciate the need for healthy Bays. People would very consciously make decisions on their values and not their pocketbooks. It starts with everyone truly understanding and appreciating."

Climate Story

Whether a family member or friend, each of us may know someone who has sweltered in extreme heat, been afflicted by wildfires and smoke, or been flooded out of their homes. The more global your network of contacts, the longer the list becomes.

This is shaping up to be a devastating year. July was the hottest month on record and record-breaking heat waves continue across the globe.

Closer to home, things are also eerily different. Average annual temperatures in southern Delaware have risen almost three degrees Fahrenheit since the late 1890s. Climate models predict that the average summer air temperature in our area could increase an additional eight degrees by the end of the century. Tornados are now a threat and thunderstorms are intensifying.

These are real and present challenges across the Inland Bays watershed which threaten the $4.5 billion-a-year economic engine that is the Bays. The 2021 State of the Bays report documents persistent and accelerating evidence of a changing climate. Carbon dioxide and other greenhouse gasses are building in our atmosphere, causing increased temperatures in the air and sea. Warmer air is melting glaciers and warmer oceans are melting ice sheets. Since 1900, sea levels along the Delaware coast have risen 16 inches and are projected to rise another five feet by 2100.

As development increases around the watershed, the risk of significant damages from intensified storms grows.

As development increases around the watershed, the risk of significant damages from intensified storms grows. Photo by Driscoll Drones

Rising temperatures and seas are having consequences. Salt marshes, our first line of defense against storm damage and flooding, are slowly drowning from the combined effect of erosion, land subsidence, and sea-level rise. As they degrade, we not only lose valuable habitat for fish and wildlife, but also their capacity to protect our communities by absorbing excess rainfall and taming storm surges.

In the face of all the grim climate news, it's easy to throw up our hands and surrender ourselves to a seemingly uncontrollable fate. But, we can put up a good fight.

The Center is working hard to increase our watershed's resilience by building natural, protective shorelines, restoring ailing salt marshes and forest habitats, and promoting more robust and habitat-friendly stormwater systems. The list of efforts is as long as the suite of threats climate poses, and our goal is to produce a watershed that can—as the old Timex commercial said—take a lickin' and keep on tickin'.

We all have many reasons to be concerned and share in the obligation and opportunity to roll up our sleeves. The Inland Bays can't cure themselves—we can and must tackle our climate challenges together.

VOICES OF THE BAYS

OSPREY OBSERVATIONS
We spoke to Jodi McLaughlin, Center Community Science volunteer, Delaware Master Naturalist, and resident osprey expert, about how nature connects us all.

DEEP ROOTS
"I had the local ecological knowledge from living along the Bay since childhood, to help to guide the Osprey Survey. The first time I camped here I was ten, right around the corner from the James Farm Ecological Preserve. My family bought property here when I was 11."

BONDING OVER BIRDS
"The survey was really like a marathon, slow and steady. We had some people who really wanted to do it but were reticent. I got a lot of calls and texts from people who were nervous. They were worried that people would be upset if they were in their communities. But the reverse happened! As they were out in the field with their binoculars, people would approach them and ask them questions. As soon as people see what you're doing, they want to be involved."

IT'S ALL CONNECTED
"Nature is never just nature—it's more about understanding. It's about people AND nature. Here in the Inland Bays, we can't separate out. Ospreys embody the Inland Bays for us. To quote Rosalie Edge, 'the best time to conserve a species is when it's still common'. We learned that osprey populations are stable right now, but we don't want to be complacent. Even if you just have 5 minutes, maybe you can open people's eyes to what we have here besides the boardwalk."

IF I HAD A MAGIC WAND FOR HEALTHY BAYS...
"The Bays would be as they were 100 years ago! We all live downstream, we cannot affect everything that comes from above us but as it flows past us, we can contribute in a positive way—creating habitat for species like osprey that we love so much, cleaning up trash in our community. That's what I try to do at my home and when I'm out and about. If you love these birds, be mindful."

Sounding the "Bay Signal"

Not all superheroes wear capes. At the Center, you're just as likely to encounter heroes decked out in waders, binoculars, and headlamps while surveying by foot, bike, or boat. These heroes are our volunteers who work together to obtain key information about the status of Inland Bays species, like terrapins and horseshoe crabs, that we all hold dear. You may never see our heroes–but they are collectively responsible for gathering millions of data points over many years that help assess the health of the Bays.

The Center is well known for its established efforts to monitor horseshoe crabs and shorezone fish. During the last 15 years, over 260,000 horseshoe crabs and 10 million fish of 58 different species were successfully counted with the help of over 2,000 volunteers. And in 2021, in the middle of the pandemic, they rose to the challenge to meet a new monitoring need! The Delaware Department of Natural Resources and Environment Control was not able to perform itssurvey of active osprey nests. This is a critical metric in the suite of the State of the Bays' indicators, so the Center's whole volunteer network (and more) were called to the rescue.

Data collected since 2015 show that horseshoe crab population numbers have remained steady, yet far below historic levels. Photo by Caitlin Chaney

Osprey are a keystone species in the Inland Bays. Their breeding success is a good indicator of environmental health since they are at the top of the food chain. Photo by Caitlin Chaney

"We had to develop a monitoring protocol, recruit and train interested volunteers, and collect and analyze the data in less than six months", said Nivette Perez-Perez, Manager of Community Science at the Center. "We could not have successfully collected the information on time if it was not for the passionate cohort of volunteers that answered our call for help."

Osprey advocate and Master Naturalist, Jodi McLaughlin, leapt into action to reach every corner of the Inland Bays in search of ospreys. Unprecedented volunteer participation resulted in the highest reported number of nesting ospreys since the 1990's, with 279 active osprey nests counted. Since the previous State of the Bays report, osprey nests in the watershed have continued to increase and populations are shown to be healthy.

Our heroes are the many volunteers that make it possible to monitor fish and wildlife of the Bays. The integral work done at the Center to preserve, protect, and restore the Inland Bays and their watershed for generations to come depends on our partners and our very own heroes—capes or not.

DELAWARE CENTER FOR THE
INLAND BAYS
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The Inland Bays Journal is a publication of the Delaware Center for the Inland Bays. The Center is a nonprofit organization and a National Estuary Program. The purpose of the Inland Bays Journal is to educate and inspire people about this estuary of national significance and its restoration.

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