

CLEAN WATER • THE BLUE PLANET'S FIRST RESPONDERS • CITIZEN ACTION

WATERKEEPER[®]

BE THE CHANGE

*Diane Wilson waged a 30-year fight against industrial giant Formosa Plastics
— and won.*



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THE CHANGEMAKERS WHO ARE FIGHTING FOR THEIR COMMUNITIES AND FOR THE PLANET.

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product
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40 YEARS OF PEOPLE, PRODUCT & PLANET



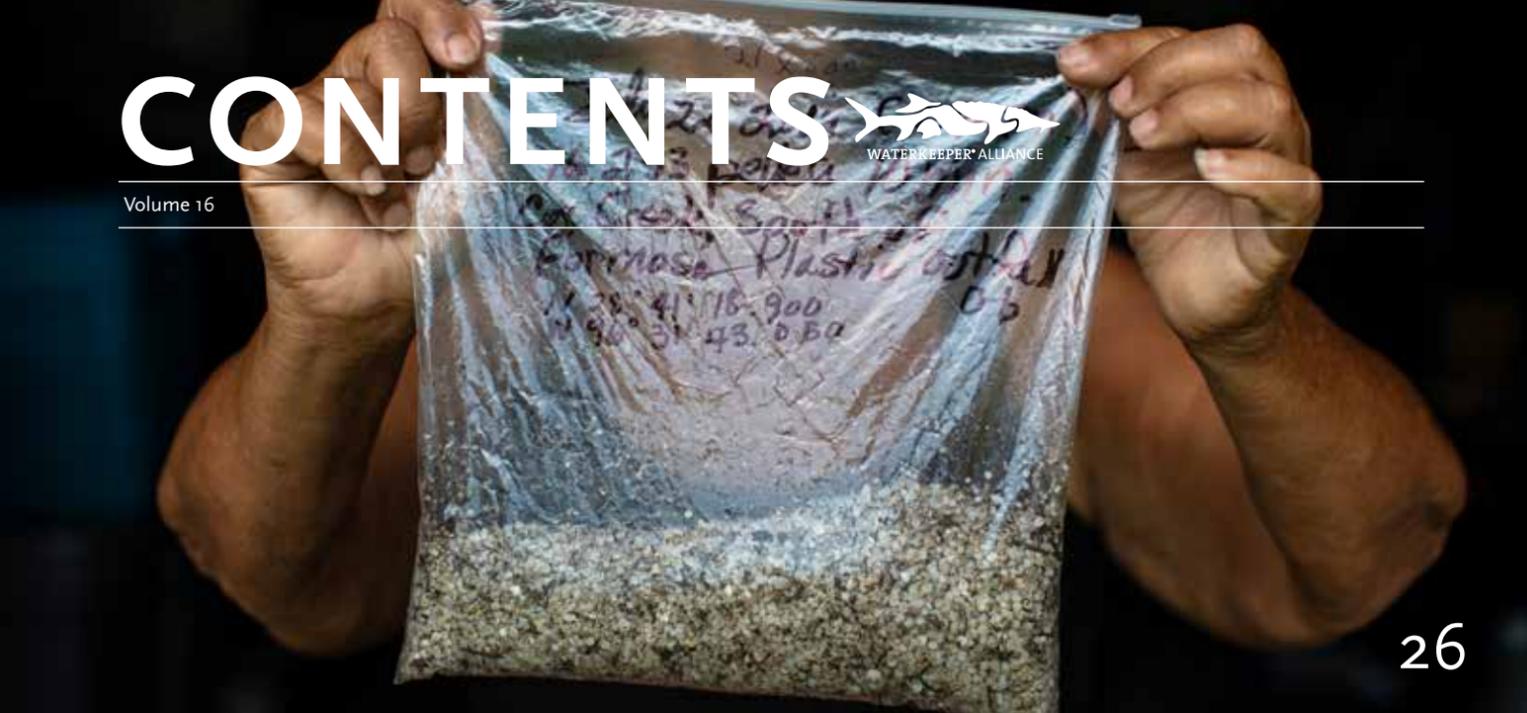
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THE WAY FORWARD

When Richard Nixon vetoed the Clean Water Act in 1972, he called the Act “budget-wrecking,” saying, “Legislation which would continue our efforts to raise water quality, but which would do so through extreme and needless overspending, does not serve the public interest.”

In rolling back nearly 100 environmental regulations, the Trump administration is essentially making the same argument. And they’re doing it at the worst possible time. Environmental health is key to human health, and, as we’re tragically realizing now, a healthy population is the critical infrastructure our entire world economy is built on.

Smog-choked air, dying rivers, and oil-soaked soil won’t help us rebuild our economies. That work will take all of us, and we’ll need to do it in as healthy an environment as possible.

Just one U.S. environmental regulation, the Mercury and Air Toxics Standard, averts up to 11,000 premature deaths in the country each year, preventing 4,700 heart attacks and 130,000 asthma attacks annually, according to the Environmental Protection Agency. Yet the Trump administration is chipping away at that very standard.

Protecting the environment means protecting human life. In

protecting the waters they love, Waterkeepers also protect the people who depend on those waters.

For example, the Upper Huai River Waterkeeper installs water purification systems in Chinese villages where industrial pollution is so endemic, they’re called “Cancer Villages.” Since 2008, Upper Huai River Waterkeeper staff and their partners have built 50 purification systems in 47 villages. Thanks to their efforts, more than 80,000 villagers now have clean water. The cancer rate in those villages has dropped by 90 percent over 10 years, falling from 330 cases per 100,000 people to 30 per 100,000.

This is just one example of the work the women and men of the Waterkeeper movement do every day, in virtually every part of the world. The stories in this magazine, about battling plastic pollution in Texas, tackling algal blooms in Florida, and working for solutions to the water crisis in the Middle East, are all inspiring examples of Waterkeepers taking on long odds for the health of their communities.

We’re all in the fight of our lives right now. I’d be remiss if I didn’t mention the struggle of Black people, Indigenous people, and people of color in the United States, and across the world, for justice and equality.

For too long the fight for justice for our planet and the fight for justice for all people have been seen as separate struggles. They are not.

As protestors have marched throughout the U.S., and the world, we at Waterkeeper Alliance are looking inward to see what we can do to deepen our commitment to racial justice.

This has called for some hard conversations.

It has helped us to see, even more clearly, as we work through this time, that the illusion that the earth is separate from us, and thus exploitable, is inextricably connected to the illusion that some people are different from us and inherently disposable.

After Nixon’s veto, Sen. Edmund Muskie of Maine led the override effort, saying on the Senate floor, “Can we afford clean water? Can we afford rivers and lakes and streams and oceans which continue to make possible life on this planet? Can we afford life itself?”

Congress overrode Nixon’s veto and we all got the answers to Muskie’s questions in the decades of expansion and prosperity after the Clean Water Act became law in 1972. The answer was a clear and ringing, “Yes.”

Yes, we can afford clean water. Yes, we can afford rivers and lakes and streams and oceans that continue to make possible life on this planet. Yes, we can afford life itself.

Let’s not forget that lesson now.

Wherever you are, I hope this finds you safe and well. And I’m grateful to you, beyond measure, for continuing to fight for this blue planet and for all its people.



ON THE COVER:

Diane Wilson, the San Antonio Bay Estuarine Waterkeeper, heads toward the giant Formosa Plastics plant, the polluter she fought for 30 years before her final history-making victory.

Photo by Tamir Kalifa

Design by BoyBurnsBarn/John Turner

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The official magazine of Waterkeeper Alliance

MISSION: Waterkeeper Alliance strengthens and grows a global network of grassroots leaders protecting everyone's right to clean water.

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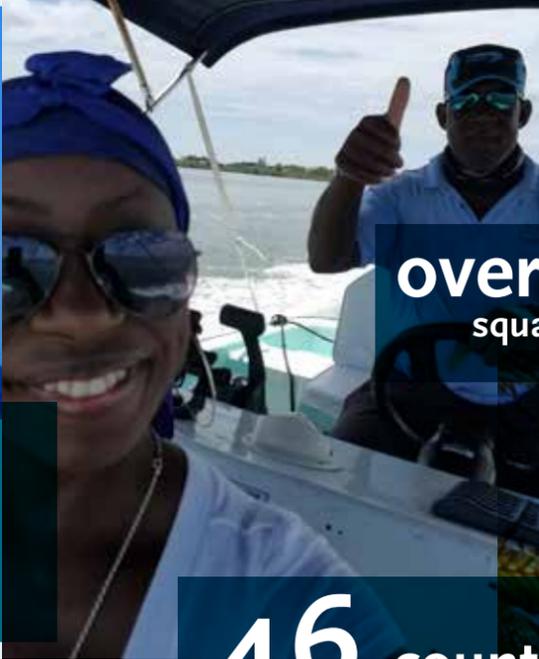
Whether on the water tracking down polluters, in courtrooms enforcing environmental laws, advocating in town meetings or teaching in classrooms, Waterkeepers speak for the waters they defend with the backing of their local communities.

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Who Is Waterkeeper Alliance?



over 2.5 million
square miles of watersheds

46 countries



more than 350 waterways

**First person: Arreini Palacio Morgan,
Placencia Lagoon Waterkeeper, Belize**

The Placencia Village, where we work, really is a village; it's connected with a path, almost like a boardwalk. People here know me now, and they know what I'm doing.

The goal that keeps me going is ensuring that our marine ecosystem remains as pristine as possible. It's not the big fights — although the big fights are very important — that keep me fueled up. It's the smile on the face of a child who understands, the “good job” affirmation from a fisherman who used to be opposed to the general idea of our work, the kind words from tour guides who used to have no confidence in our work saying, “I see what you are doing, great job! How can I help?”

The number of developments here has ballooned; there are 14 offshore developments on different cays that have gone up in the last five years, developments that include dredging, removing mangroves, and other activities that will have a negative impact on our marine environment.

Our Department of the Environment isn't able to monitor each of them. Our work is cut out for us! When I see these things happen, it hurts me and I am disappointed. I want better for the fisherman's child, for the tour guide's child. That's what keeps me going.

We've advocated for, and won, a seat on the National Environmental Appraisal Committee, which evaluates environmental impact assessments. As a part of that committee, we're able to contribute a vote on projects. We're able to look at projects from a community perspective, see whether something is a fit and raise the alarm if it's not.

I want our successes and challenges to be known in the nation's board rooms — and on our boardwalk.
— As told to Ellen Simon, advocacy writer at Waterkeeper Alliance

Learn more about Placencia Lagoon Waterkeeper's work — and how you can help — at www.seabelize.org.

Waterkeeper Alliance strengthens and grows a global network of grassroots leaders protecting many of the world's great water sources and everyone's right to clean water.

Today, Waterkeeper Alliance unites more than 350 Waterkeeper groups that are on the frontlines of the planetary environmental crisis, patrolling and protecting more than 2.5 million square miles of rivers, lakes, and coastal waterways on 6 continents.

From Alaska to the Himalayas, the Great Lakes to Australia, the Waterkeeper movement defends the fundamental human right to drinkable, fishable, and swimmable waters, and combines firsthand knowledge of waterways with an unwavering commitment to the rights of local communities.

Waterkeeper Alliance ensures that the world's Waterkeeper groups are as connected to each other as they are to their local waters, organizing the fight for clean water into a coordinated global movement.

Everyone has the right to clean water. It is the action of supporting members that ensures our future and strengthens our fight for clean water. To join Waterkeeper Alliance as a supporting member go to www.waterkeeper.org/donate. You can also join by mail. Send your check, payable to Waterkeeper Alliance, to Waterkeeper Membership, 180 Maiden Lane, Suite 603 New York, NY 10038.

Thanks for your support!



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Ripples



DESPITE THE RISKS TO CLIMATE AND THE ENVIRONMENT, MANY OIL COMPANIES, RATHER THAN TURNING OFF THEIR TAPS, ARE RETOOLING AND TRANSITIONING TO PRODUCING PLASTICS.

PUGET SOUNDKEEPER

PHOTO BY CRUSH CREATIONS, LLC/SHUTTERSTOCK

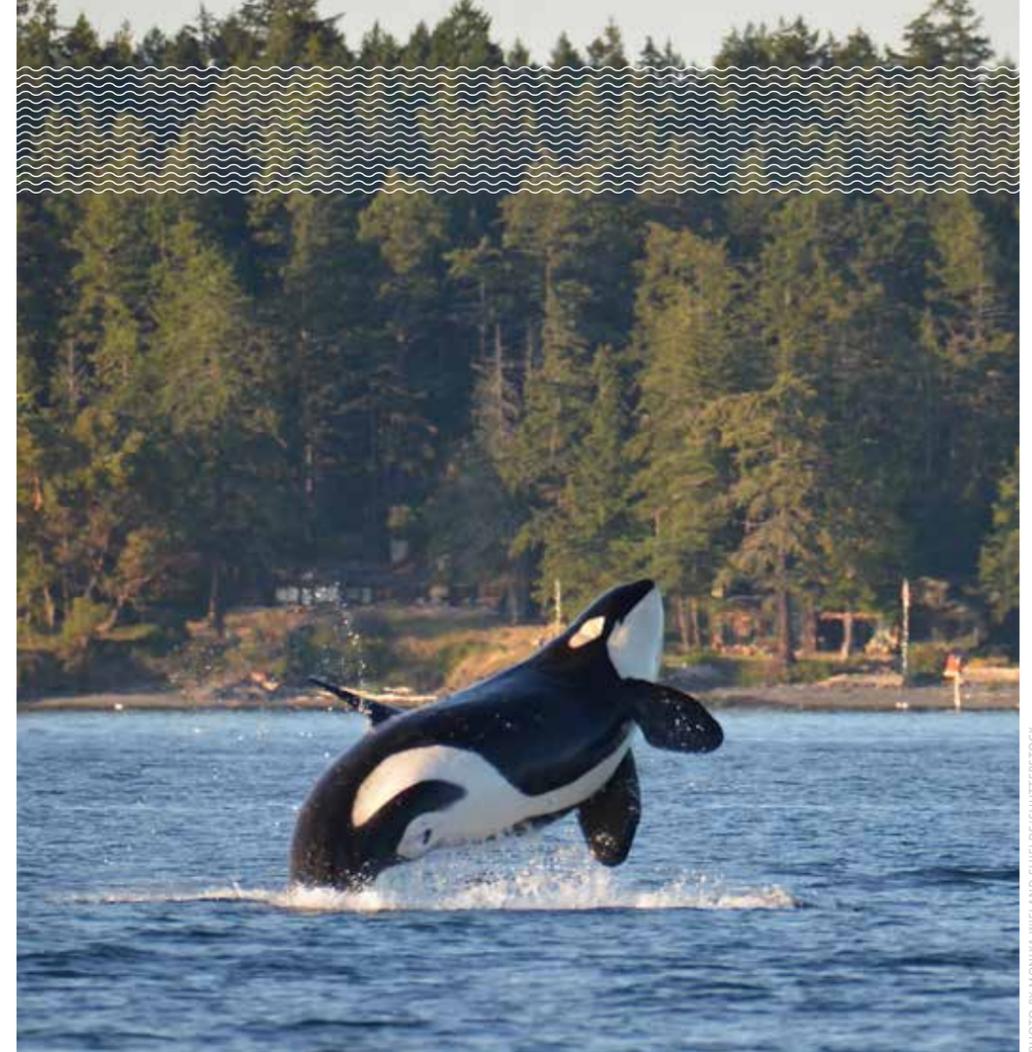


PHOTO BY MONIKA WIELAND SHIELDS/SHUTTERSTOCK

LEFT, SMOKE FROM THE ANACORTES OIL REFINERY OBSCURES MOUNT BAKER IN THE BACKGROUND. ABOVE, AN ENDANGERED SOUTHERN RESIDENT ORCA BREACHES NEAR HENRY ISLAND IN WASHINGTON STATE.

PUGET SOUNDKEEPER SENDS BIG PLASTICS PACKING

The Anacortes Oil Refinery sits at the edge of the majestic San Juan Islands, in Washington State along the southern end of the Inside Passage to southeast Alaska. The San Juans are a magnet for international tourism and a critical habitat for salmon and endangered Orcas.

From this sensitive location, the refinery's owners planned to manufacture and ship to China 15,000 barrels per day of mixed xylenes, a toxic petrochemical used in the manufacture of plastics. The proposal would have resulted in a climate impact equivalent to adding 75,000 vehicles to the road.

Puget Soundkeeper and its allies opposed the retooling, based on obvious risks to climate, communities, and endangered Orcas. On December 31, 2019, the partners, represented by Crag Law Center, closed out the year with a major win for clean water, when the company withdrew its proposal and settled the permit appeal.

Still, many communities like Anacortes are seeing a spike in proposals to build petrochemical facilities. Although demand for gasoline and other fossil fuels is projected to decline over the next decade, the petrochemical sector expects to grow, and sees plastics as an expanding market. Despite the risks to climate and the environment, many oil companies, rather than turning off their taps, are retooling and transitioning their product portfolios.

Soundkeeper is also working to address the plastic marine-debris problem directly, by monitoring and cleaning up waterways, performing microplastics sampling and analysis, and working to ban single-use plastic bags and certain polystyrene foam food-packaging products. Soundkeeper educates the public about the relationship between dirty fuels and plastics, showing how plastics pollute waterways throughout the manufacturing process by producing toxic emissions, causing climate impacts, and choking our rivers, lakes, and oceans with "forever waste." The xylenes proposal is a reminder that we can stop pollution best when we remain vigilant and nimbly respond to the threats of this evolving industry.

— Alyssa Barton, Policy Manager, Puget Soundkeeper, and Chris Wilke, Global Advocacy Manager, Waterkeeper Alliance

Soundkeeper is also working to address the plastic



PHOTO BY GILES ASHFORD

JAMES RIVER SELECTED AS THE 2019 THIESS INTERNATIONAL RIVERPRIZE WINNER

The International River Foundation awarded Virginia's James River Association the 2019 Thiess International Riverprize, the biggest honor a river can receive for restoration efforts.

The prestigious award "champions integrated river basin management for the restoration, protection and sustainable management of the world's rivers...by facilitating leadership, celebration and collaboration."

The James River Association, James Riverkeeper's host organization, has led efforts to restore the river's health since 1976, and submitted the application chronicling the James' progress from the sewage, chemical, and sediment pollution that forced fisheries to close in the late 1970s to a consistent rating as the healthiest major tributary in the Chesapeake Bay today. The award comes with a cash prize of more than \$137,000 and the opportunity to network with other river managers around the world.

"Winning the 2019 International Riverprize is truly a reflection of Virginia's progress and the collective impact made over several decades to restore the health of the James River," said Jamie Brunkow, James Riverkeeper. "James River Association has been the leading voice for the James throughout this comeback story, and this award strengthens our resolve to continue advocating for clean water and making sure the river is an asset for communities and generations to come."



FIRST PERSON: ADENIKE ADEIGA, LAGOS LAGOON WATERKEEPER, NIGERIA

I'm a fisheries biologist, but I've shifted much of my focus to human behavior.

People believe that if they've been doing something for years, like littering the shore with plastic bottles, or open defecation, it will never contaminate the water. I hear, "This is how we've been living, and we've been living free."

Our organization was founded by Felix Abayomi — who is a zoologist and the executive director, and also heads Wildlife of Africa Conservation Initiative — in 2017. We have been focused on changing that behavior, and changing minds. We have to show people the connection between their actions and the quality of their water. That's one of our main tasks.

We plan on building toilets using plastics recovered from the beach and encouraging people who grew up with open defecation to use them.

Another important task is providing government officials with the knowledge they need to protect the water and its wildlife.

We trained a few government officials in the Department of Biodiversity and Wetlands on how to monitor sea turtles, how to protect them when they nest on the beach, how to keep the water clean. We're winning them over to our side.

Before, no one in government heard our voice. Now, we know them, we have access to them, we can call them. And we do.

Nature belongs to all of us. It's intergenerational. When you misuse it, you compromise the needs of others and that of future generations.

— As told to Ellen Simon, advocacy writer at Waterkeeper Alliance.



PHOTOS BY JAMES RIVER ASSOCIATION



ABOVE, DUE, IN LARGE PART, TO THE WORK OF JAMES RIVERKEEPER, THE JAMES RIVER, PICTURED HERE NEAR RICHMOND, VA., HAS EXPERIENCED A NEAR-MIRACULOUS RECOVERY IN RECENT DECADES, AS EVIDENCED BY THE REAPPEARANCE OF JUVENILE ATLANTIC STURGEON, SUCH AS THE ONE PICTURED HERE. ONE HALLMARK OF THE RIVERKEEPER'S WORK HAS BEEN THE DEVELOPMENT OF INNOVATIVE YOUTH ENVIRONMENTAL EDUCATION PROGRAMS.

FROM OUR WATERWAYS TO YOUR HOME

Waterkeeper Alliance has partnered with FreeWill to give all our waterkeepers and friends a free, online tool to help you write a will in 20 minutes or less. A will is the most powerful way to take care of the people you love the most. And it can be a bold step in fighting for clean water without having to pay a cent today.

Visit FreeWill.com/Waterkeeper to start your will today.



RIGHT, DUKE ENERGY'S ROXBORO PLANT ON NORTH CAROLINA'S DAN RIVER, WITH ITS MASSIVE COAL-ASH STORAGE PIT IN THE FOREGROUND, WAS THE SITE OF A CATASTROPHIC SPILL IN 2014 THAT COATED THE DAN RIVER WITH TOXIC COAL ASH FOR 70 MILES.

AT LAST, GIANT DUKE ENERGY MUST COME CLEAN



PHOTO BY SANJAY SUCHAK

It took nearly a decade of work by a broad, dedicated coalition of groups, including several Waterkeepers, but Duke Energy, the nation's largest power company, has finally agreed to clean up their coal-ash mess in their home state of North Carolina.

This will be the largest coal-ash cleanup in American history — over 122-million tons of toxic ash at six facilities. It comes after years of legal actions by the Southern Environmental Law Center, on behalf of Waterkeeper Alliance, several North Carolina Waterkeeper organizations and other environmental groups. A settlement agreement signed at the end of 2019 between the company, the environmental groups, and the state was the final step in Duke Energy agreeing to clean up all of its coal ash sites in North Carolina.

"This settlement is a fantastic victory for the Catawba and all North Carolinians," said Brandon Jones, Catawba Riverkeeper. Two out of the final six coal ash facilities affected by the 2019 settlement sit within the Catawba-Wateree river basin. "With this agreement, the total amount of ash being removed from leaking pits on the banks of North Carolina waters is well over 100 million tons," Jones said. "It is the culmination of countless hours of work by dozens of groups and thousands of individuals. We are proud to have filed the first lawsuit in 2013 and we are encouraged by the completed excavation at several of the sites."

For decades, Duke Energy stored coal-ash in unlined pits alongside rivers and streams, contaminating them and

poisoning drinking water and the surrounding environment with heavy metals and other toxins.

As a result this settlement, Duke Energy must excavate the coal ash stored in these dangerous leaking pits and either safely recycle the ash into concrete or move it to lined landfills away from the waterways.

The issue of coal-ash storage drew national attention following a massive spill in Tennessee in 2008. Cleanup became a priority in North Carolina after a 2014 leak from a Duke Energy site left ash coating 70 miles of the Dan River. Water sampling done by groups, including Waterkeeper Alliance and local Waterkeepers, prior to and following the Dan River spill, brought further attention to the fact that Duke Energy's coal-ash sites were contaminating drinking-water wells.

Duke Energy pleaded guilty in 2015 to federal environmental crimes for the Dan River spill and for failing to maintain equipment and allow the release of toxic coal ash and coal-ash wastewater into waterways at four other power plants. The company agreed to pay \$102 million in fines and restitution.

The Southern Environmental Law Center reached the December 2019 settlement with Duke Energy and the N.C. Department of Environmental Quality to clean up coal ash at the six North Carolina sites on behalf of Appalachian Voices, MountainTrue, Catawba Riverkeeper, Waterkeeper Alliance, Sierra Club, Cape Fear Riverkeeper, Neuse Riverkeeper/Sound Rivers, and N.C. State Conference of the NAACP.

This win is the culmination of decades of work by an even broader coalition, including Clean Water for NC, Environment NC, Greenpeace, NC Conservation Network, NC League of Conservation Voters, NC Sierra Club, Southern Alliance for Clean Energy, Winyah Rivers Alliance, and Yadkin Riverkeeper.



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LEFT AND BELOW, ACTIVISTS COSTUMED AS PLASTIC BOTTLES, DISCARDED DIAPERS AND NEWSPAPERS, AND OTHER KINDS OF GARBAGE, PROTESTED CONDITIONS AT THE SULAYMANIYAH CITY DUMP THAT WERE CONTRIBUTING TO POLLUTION IN THE TANJARO RIVER. "WE ARE IN AN AWAKENING PROCESS," SAYS NABIL MUSA, THE IRAQ UPPER TIGRIS WATERKEEPER. "BECAUSE OF OUR WATERKEEPER PROGRAMS, I CAN SEE YOUNG PEOPLE TAKING UP THE WORK."



FIRST PERSON: NABIL MUSA, IRAQ UPPER TIGRIS WATERKEEPER

"WHEN I THINK ABOUT POLLUTION ON THE TIGRIS, I FEEL LIKE I'M THE HUMMINGBIRD IN THE CHILDREN'S TALE WHO FIGHTS A FOREST FIRE BY BRINGING DROPS OF WATER."

War here has destroyed lives; it also destroyed so much of our infrastructure — both the infrastructure from nature and from humans.

This nation and other nations marshaled so many people and so much equipment to wage war here; in the aftermath, we've been left to fend for ourselves. If war took all the effort of building a rocket to send to the moon, the effort of the cleanup and rebuilding has been like a paper airplane.

Most of our sewage treatment plants were destroyed by war; none have been rebuilt. The city of Mosul has had no services since 2014. There's human waste on the streets there, but also war waste, with no garbage collection, no government effort to rebuild. The Mesopotamian Marshes, the largest marshland in the Middle East, were largely destroyed by Saddam Hussein, and are only now being restored.

When I think about pollution on the Tigris, I feel like I'm the hummingbird in the children's tale who fights a forest fire by bringing drops of

water. The elephant and the lion, they say, "You're stupid." But I'm doing what I can. And doing it helps me sleep better.

Where I live, we are in an awakening process. Because of our Waterkeeper programs in the region, I can see young people taking up the work. University students have been to my workshops, they've started their own environmental groups, they were at the swim I organized in the Tigris River. We inspired them.

I've worked hard to focus attention on conditions at the Sulaymaniyah City dump, which leaks into the Tanjaro River, a tributary of the Tigris. There's an artist, Tara Abdulla, who's led street protests in Sulaymaniyah City about conditions at the dump. People dressed as nine characters, with garbage pinned to the outside of their clothes. One was a newspaper; one was bottles; one was dirty diapers. Activism is risky here; people get arrested; people disappear. They risked their lives to do that. I was proud to join them.

Now the government is starting to clean up the dump; it's building a recycling center.

There are many resources that are not renewable, but maybe activism is.

— As told to Ellen Simon, advocacy writer at Waterkeeper Alliance



KICKING PLASTIC OUT OF SOUTHEAST WATERWAYS

Waterkeeper Alliance is proud to be a partner of SweetWater Brewing Company, which has been supporting local Waterkeeper groups tackling clean-water issues across the Southeast for more than a decade and has become invaluable in the fight for clean waterways.

During the summer of 2019, they increased their commitment to clean waters, teaming up with Costa Sunglasses to #KickPlastic. Plastic pollution is an ever-growing threat to bodies of water, with eight million tons entering our oceans each year. At that rate, by 2050, there will be more plastic in the ocean than fish. By partnering with Costa and local Waterkeeper groups, SweetWater brought awareness and action to this growing issue. They even launched their new Kick Plastic Pilsner, which benefits various clean water partners, including Waterkeeper Alliance!

Learn more at waterkeeperbrew.org

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- CAPE FEAR RIVERKEEPER
- CATAWBA RIVERKEEPER
- CHATTAHOOCHEE RIVERKEEPER
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- WHITE RIVER WATERKEEPER
- WACCAMAW RIVERKEEPER
- YOUGHIOGHENY RIVERKEEPER

"SWEETWATER HAS BEEN A BIG SUPPORTER OF CONGAREE RIVERKEEPER FOR NEARLY A DECADE NOW, NOT ONLY PARTNERING WITH US FOR FUNDRAISERS AND EVENTS, BUT ALSO HELPING ORGANIZE CLEANUPS AND RAISING AWARENESS. THE FOLKS AT SWEETWATER KNOW THAT CLEAN WATER IS THE MOST IMPORTANT INGREDIENT FOR GOOD BEER, BUT THEY ALSO KNOW THAT BEER TASTES BEST AFTER YOU'VE REALLY EARNED IT BY GETTING DIRTY CLEANING UP YOUR LOCAL WATERWAYS." — CONGAREE RIVERKEEPER BILL STANGLER



PHOTO BY DREW HAMILTON

ONE MORE REASON TO FIGHT ALASKA'S PEBBLE MINE



ABOVE LEFT, THE NATURAL GAS PIPELINE POWERING THE PROPOSED PEBBLE MINE WOULD TEAR OPEN THE WILDLANDS OF LOWER COOK INLET. ABOVE, A BROWN BEAR HUNTS FOR SALMON IN THE KATMAI PRESERVE, WHERE THE LARGEST CONCENTRATION OF BROWN BEARS IN THE WORLD ARE THREATENED BY THE PEBBLE MINE. LEFT, THE BEACH AND WETLANDS OF AMAKDEDORI CREEK WOULD BE TRANSFORMED INTO AN INDUSTRIALIZED EXPORT FACILITY.

percent of the world's sockeye salmon harvest. It also provides habitat for 29 fish species, over 190 bird species, and over 40 terrestrial animals that rely on Bristol Bay's well-being for their survival.

All of this is being threatened by the proposed Pebble Mine at the headwaters of the Nushagak and Kvichak rivers in Bristol Bay. If built, the Pebble Mine would be one of the world's largest open-pit copper and gold mines, with an earthen dam that would ultimately hold up to 10 billion tons of toxic tailings and contaminated water, threatening nearby waterways with heavy metals and other toxic pollutants.

If it feels like you've been hearing about the Pebble Mine fight for a long time, it's because you have. Cook Inletkeeper was the first green group to meet with Northern Dynasty — the Canadian mining company behind the Pebble project — way back in 2003. Since that time, four major investors have come and gone, yet, like a zombie, the project keeps returning to life. Now, the Trump Administration has helped revive the project — and with a state government in the pocket of the mining industry — Pebble's pushing hard to get the federal permits it needs to start construction.

While most of the attention around the Pebble Mine has focused on Bristol Bay and its incredible salmon fisheries, few people know the project will also devastate the highest concentration of brown bears on the planet. That's because Pebble's natural gas pipeline — to power the mine — and its export terminal would tear open the wildlands of Lower Cook Inlet. Pebble would build this infrastructure at Amakdedori Creek in Kamishak Bay, in close

Bristol Bay is home to the world's largest salmon fishery, supporting all five species of Pacific salmon and producing about 46

proximity to two national parks (Katmai and Lake Clark) and the McNeil State Game Refuge.

In 2018, staff from Cook Inletkeeper took the trip 80 miles across Cook Inlet to check out the area around Amakdedori Creek first-hand. In addition to the spectacular scenery and incredible wildlife, Inletkeeper confirmed what it had heard from numerous fishermen: the area's radical weather patterns, coupled with shallow reefs and massive (25') tides, make it no place to load large bulk carriers with ore concentrate.

"The Pebble people are desperate to find investors, so they cobbled together a ridiculous export scheme to make the project seem viable," said Inletkeeper Bob Shavelson. "But Alaskans who live and work on the water know Pebble's just blowing smoke."

In the race to get its federal permits, however, Pebble is cutting a lot of corners. For example, in its environmental reviews, it completely ignored the significant economic contributions that come from a growing bear-viewing industry. In response, Inletkeeper commissioned a study that found the bear-viewing industry drives around \$40 million into Alaska's economy each year.

That's a lot of money. And it helps explain why bear guides, bed and breakfasts, and a host of small businesses have come out to oppose Pebble and its plans for Lower Cook Inlet.

"Alaskans overwhelmingly oppose the Pebble Mine," says Shavelson. "But the Trump Administration doesn't care, and it's ignoring science and the law by trying to ram this stupid project through."

The Army Corps expects to issue a final EIS this summer, and Inletkeeper will join others in litigation to stop it. "Because from every angle," Shavelson adds, "the vantage point is the same: we must say No Pebble Mine."

— *Bart Mihailovich, Organizing Manager, US*



PHOTO BY JAMES RIVER ASSOCIATION

"OUTSTANDING WIN" AGAINST COAL ASH

"WE CAN ONLY HOPE REMOVING MILLIONS OF TONS OF ASH PROVIDES SOME LEVEL OF SATISFACTION TO THESE IMPACTED COMMUNITIES."

ABOVE, SMOKE BILLOWS FROM DOMINION ENERGY'S CHESTERFIELD POWER STATION, WHICH WAS DEVASTATING THE AREA'S WATERS. ABOVE RIGHT, A HOMELESS CAMP ALONG NORTHERN CALIFORNIA'S RUSSIAN RIVER. "WE REALIZED THAT WE COULDN'T KEEP OUR RIVER CLEAN WITHOUT HELP FROM THE PEOPLE SCRAPPING FOR SHELTER ALONG ITS BANKS," SAYS RUSSIAN RIVERKEEPER DON MCENHILL.

For their work fighting Dominion Energy and stopping the leaking of coal-ash pits into the Potomac and James rivers and neighboring drinking-water wells, the Waterkeepers Chesapeake coalition has given Potomac Riverkeeper Dean Naujoks and James Riverkeeper

Jamie Brunkow its Waterkeeper Outstanding Win Award.

Dean was the first to document the leaching of toxic coal-ash pits into the river, the first to test the drinking water of nearby residents, and the first to believe that a small nonprofit could take on a large corporation like Dominion Energy and win.

"I've been fighting Duke Energy and Dominion Power for the past five years," said Dean. "Finding a way to make these polluters clean up their toxic coal ash is obviously rewarding, but there is no real justice for the communities and people these companies poisoned. We can only hope removing millions of tons of ash provides some level of satisfaction to these impacted communities."

After four years of diligent investigation and advocacy by Dean and Jamie, Virginia lawmakers approved Senate Bill 1533 to resolve Virginia's longstanding coal-ash-pollution problem. Dominion Energy's unlined coal-ash pits continue to leak toxic waste and chemicals into the Potomac, James, and Elizabeth Rivers, but the legislation requires all 28 million tons of "legacy" coal ash stored in the company's ash ponds to be recycled or safely landfilled within 15 years.

"For years Virginia has considered options for safely closing coal-ash ponds," said Brunkow. "Our elected leaders and vocal concerned citizens have remained steadfast in pursuing the right path for Virginia. By tackling this tremendous challenge we'll ensure that the river is cleaner for the next generation."



PHOTO BY RUSSIAN RIVERKEEPER

A RIVER HOME FOR THE HOMELESS

By Don McEnhill, Russian Riverkeeper

My love for the Russian River has taken me places I never thought I'd go, like homeless camps.

An estimated 1,148 people live in homeless camps along the Russian River — which flows south through Mendocino and Sonoma Counties in northern California — and along its tributaries. We realized that we couldn't keep our river clean without help from the people scrapping for shelter along its banks.

The first thing we at Russian Riverkeeper focus on when we speak with people at homeless encampments is something most outdoorsy people learned as children: leave-no-trace practices. Most people in homeless camps have never camped before; leave-no-trace is new to them.

We encourage people in larger camps to consolidate from many kitchen areas to one big kitchen, which consolidates trash, making our pickups easier. We now serve 121 homeless camps with weekly garbage pickups.

Under a 2018 grant from Sonoma County, 21 homeless people worked for us to pick up trash in downtown Guerneville. While we no longer have funding for that program, we can still enlist some people we know and hand them bags and gloves to fill our trailer. Then we take them to lunch. Counting homeless people and employees, we now have volunteers and staff cleaning up the river seven days a week.

One couple who've been monitoring trash on the coastal beaches for over 25 years told us they can't fill a bag anymore at Salmon Creek Beach.

We're changing behavior. And, doing that, we've changed the river.



YARRA RIVERKEEPER, IN SOUTHEASTERN AUSTRALIA, WAS AWARDED A SUBSTANTIAL GRANT BY THE FEDERAL GOVERNMENT TO CREATE A COMPREHENSIVE PLAN FOR PROTECTING THE YARRA RIVER AND ITS UNIQUE WILDLIFE, SUCH AS THE TIGER QUOLL, LEFT, AND THE LYREBIRD, LOWER LEFT.



AUSTRALIAN GOVERNMENT HEARS YARRA RIVER'S CALL OF THE WILD

A federal grant of \$500,000, Australian, was awarded to the Yarra Riverkeeper Association to begin the process of “rewilding” the Yarra River.

We use the word “rewilding,” but in a continent that has had more than 50,000

supports more productive ecosystems than the surrounding landscape, creating places of refuge, and the water flow allows connection along the river’s length.

The Yarra River is the principal river of the city of Melbourne, capital of the State of Victoria in southeastern Australia. It is at the heart of the city’s image of itself. Melbourne, the country’s fastest-growing city, is projected to almost double in size by 2030. Fortunately, it contains continuous parklands from the central business district to the source of the river in the nearby mountains.

The upper catchment was closed in 1888 to protect the city’s water supply. It remains as pristine forests of mountain ash. The river is a series of cores linked by corridors, with major parklands dotted along the river, surmounted by a forested and protected closed catchment. When seen in this way, it is an obvious imperative that its ecological processes be protected so it can continue to deliver the environmental services that are so critical to the region. Yarra Riverkeeper has proposed a frame for such work on the river to the federal government, and has been awarded a substantial grant to begin the process of protecting the cores and corridors that are the life of the river.

The work began in March, with the appointment of Karin Traeger Hermosillo to the role of project manager and a review of the ecological assets of the Yarra corridor to identify key sites where stewarding can most effectively be applied. Stay tuned.

— Andrew Kelly, Yarra Riverkeeper

“WE USE THE WORD ‘REWILDING,’ BUT IN A CONTINENT THAT HAS HAD MORE THAN 50,000 YEARS OF CONTINUOUS HUMAN LANDSCAPE MANAGEMENT FROM FIRST PEOPLES, WE PREFER TO USE THE WORD ‘STEWARDING.’”

years of continuous human habitation by First Peoples, we prefer to use the word “stewarding,” to acknowledge the continuity of their involvement in shaping the landscape.

The idea of rewilding began with Dave Foreman of “Earth First!” and Michael Soule, a founder of the discipline of “conservation biology.” The idea was a step up from the notion of protected sanctuaries, or cores, to looking at ecological restoration on a landscape scale. The current geological age has been characterized as the “Anthropocene,” because human activity has been the dominant influence on the planet’s climate and the environment since the Industrial Revolution. One of the results has been the fragmentation of ecosystems by human development that now must be reconnected, which can be accomplished through the restoration of natural corridors.

There are now a significant number of landscape-scale projects, in many countries. They tend to be either along mountain ranges or along rivers. Rivers make perfect corridors. Often, due to flooding risk, they retain continuous vegetated expanses, the water

LOWER SUSQUEHANNA RIVERKEEPER'S LEGAL ACTION WILL REQUIRE A HISTORIC COAL-ASH CLEANUP AT A FACILITY THAT IS CONSIDERED ONE OF THE MOST POLLUTING COAL-FIRED POWER PLANTS IN THE NATION.



ABOVE, LOWER SUSQUEHANNA RIVERKEEPER TED EVGENIADIS AT THE BRUNNER ISLAND POWER PLANT, WHICH NOW MUST PAY \$1 MILLION FOR ITS COAL-ASH POLLUTION, THE LARGEST SUCH PENALTY IN PENNSYLVANIA HISTORY. BELOW, POLLUTION FROM THE BRUNNER ISLAND PLANT DOCUMENTED BY LOWER SUSQUEHANNA RIVERKEEPER DURING A SAMPLING TRIP IN DECEMBER 2017.



COURT SLAMS TOP POLLUTING POWER PLANT

After months of negotiation, Waterkeeper Alliance, Lower Susquehanna Riverkeeper, and PennEnvironment, represented by the Environmental Integrity Project, signed a consent decree that will require a historic coal-ash cleanup at the Brunner Island Steam Electric Plant, one of the most polluting coal-fired power plants in the nation. The agreement, joined by the Pennsylvania Department of Environmental Protection, also requires Talen Energy Corporation, the owner of the plant, to pay a \$1 million penalty to the state and set aside \$100,000 for environmental-restoration projects.

The \$1 million assessment is the largest coal-ash-pollution penalty in Pennsylvania history.

Brunner Island is a coal- and natural-gas-fired electric generation facility bordering the Susquehanna River and Black Gut Creek in York County, PA. Waterkeeper Alliance and Lower Susquehanna Riverkeeper documented dangerous coal-ash pollutants seeping out of disposal sites at the plant, and further research uncovered widespread groundwater contamination. The consent decree sets requirements for

the excavation and safe disposal of an estimated 3.2 million tons of coal ash from the site and imposes strict monitoring to prevent further ground- and surface-water contamination.

“Our grassroots organization detected high levels of toxic heavy metals leaching from Brunner Island’s unlined coal-ash dump, and rallied local support for the cleanup of the leaking waste site,” said Ted Evgeniadis, the Lower Susquehanna Riverkeeper. “Those of us who use and enjoy the Lower Susquehanna River can rest easier knowing that concrete measures and timelines are in place to reduce toxic pollution in the river.”

Brunner Island also has been blamed for several significant fish kills in recent years, due to high heat discharges to the river. The consent decree includes provisions to reduce thermal discharges from the plant and requires Talen Energy to produce reports on impacts to fish. The projects funded by this settlement will also help restore two local streams, ensuring that the Lower Susquehanna River will be in better shape to serve future generations.

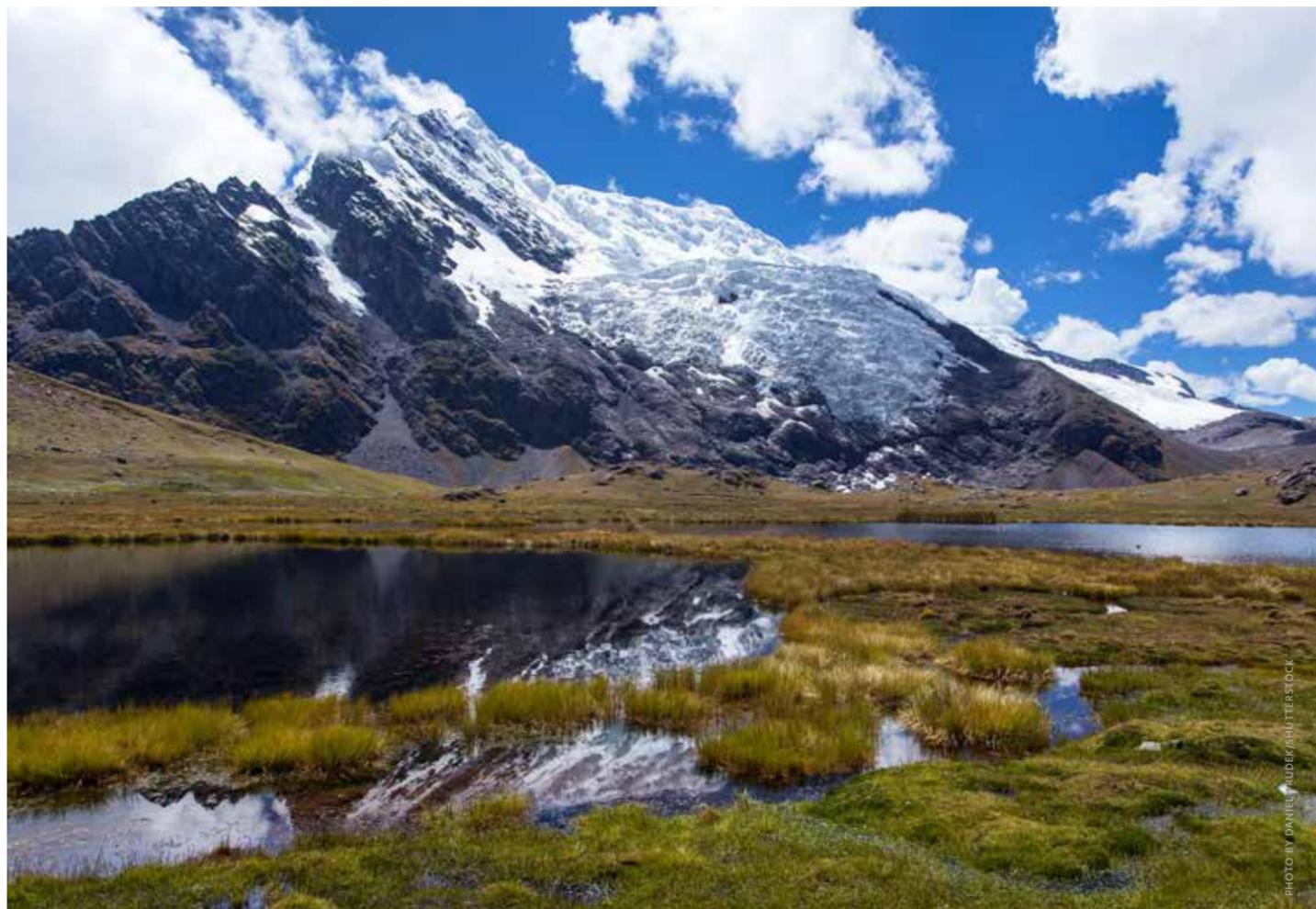


PHOTO BY DANIEL RADEY/SHUTTERSTOCK

A MOUNTAIN SAVED, A PEOPLE'S WAYS PRESERVED

In 2008, the regional government of Cusco in Peru declared its intention to protect many of the most valuable ecosystems in the region by designating them Regional Conservation Areas because of their biodiversity, the environmental services they provide, and their spiritual and cultural importance to the Quechua native people. One of them was the chain of snow-capped Andean mountains of Ausangate, an area which includes the world's largest tropical glacier, Quelccaya. In addition, the waters of the Ausangate range feed important rivers such as the Vilcanota and the Mapacho.

Río Mapacho Waterkeeper has been working on the dream of declaring the Quelccaya glacier and the Ausangate ecosystem a Regional Conservation Area since 2014.

This area has faced increasing amounts of pressure in recent years due to rising global temperatures and mining activity. These factors made it more challenging for the region to receive protected status. In fact, the official government agency that oversees mining activity, the Geological, Mining and Metallurgical Institute, granted mining concessions to many applicants, thereby preventing the integration of a considerable amount of the region into the Ausangate conservation area.

Between 2008 and 2013, there were a series of delays because the proposed conservation area was not a government priority. Changes in the regional government and bureaucratic delays were also factors. By August 2017, there were nine Quechua communities involved in the creation of the Ausangate conservation area.

By law, because of a long history of mistreatment and exploitation of the Quechua people, there had to be an extensive consultative process. This process was a contentious one with some arguing that the creation of the conservation area could



PHOTOS BY RIO MAPACHO WATERKEEPER



RIO MAPACHO WATERKEEPER HAS BEEN WORKING ON THE DREAM OF DECLARING THE QUELCCAYA GLACIER AND THE AUSANGATE ECOSYSTEM A REGIONAL CONSERVATION AREA SINCE 2014.

OPPOSITE PAGE, THE MAGNIFICENT CUSCO REGION, IN THE PERUVIAN ANDES, INCLUDES THE WORLD'S LARGEST TROPICAL GLACIER, QUELCCAYA, AND MANY OTHER NATURAL WONDERS BUT FACES INCREASING THREATS FROM MINING ACTIVITY AND CLIMATE CHANGE. LEFT, RIO MAPACHO WATERKEEPER RONALD CATPO LED THE FIGHT TO CREATE THE 66,514-HECTARE AUSANGATE REGIONAL CONSERVATION AREA.

have negative effects on their collective rights, such as the right to land, access to natural resources, and the ability to keep their cultural practices, since the regional government of Cusco would manage the protected area.

In addition, there was also the fear among some of the communities that mining concessions would be granted and with them a host of environmental and health problems. Ultimately, of the nine Quechua communities involved, only two were firm in becoming part of the conservation area.

On December 12, 2019, the Ausangate Regional Conservation Area was officially declared with 66,514 hectares, including the Quelccaya Ice Cap; and with it approximately 20 percent of the mountains that give life to the upper basin of the Mapacho River received permanent protection. All in all, it was a great triumph considering the difficulties the process presented, and those of us who championed the initiative are confident that the successful preservation effort and the lessons learned can be put to good use convincing other towns to join in the future.

— Ronald Catpo, Río Mapacho Waterkeeper



PHOTOS BY GREEN ZHEJIANG



ABOVE AND LEFT, QUAN ZHANG, A MEMBER OF QIANTANG RIVER WATERKEEPER'S LEGAL TEAM, DURING AN INVESTIGATION OF THE SHANGLIN TANNERY, WHICH WAS FINED 30 MILLION RENMINBI (ABOUT \$4.3 MILLION) AS A RESULT OF QRW'S LEGAL ACTION, THE FIRST SUCCESSFUL PUBLIC INTEREST SUIT IN THE HISTORY OF CHINA'S ZHEJIANG PROVINCE.

A WATERSHED WIN FOR QIANTANG RIVER WATERKEEPER

When China's environmental laws changed in 2015 for the first time in 25 years — promising harsher penalties for polluters, giving regulators greater power to assess daily fines, and allowing nongovernmental organizations to sue polluters on behalf of citizens for the first time — Qiantang River Waterkeeper Hao Xin was ready. Throughout the 1990s, Shanglin Tannery outside Haining City had illegally buried its sludge in nearby farmlands, polluting five acres.

After hearing about the issues faced by village residents, Qiantang River Waterkeeper began conducting onsite investigations.

The new laws also spelled out, for the first time, exactly what nongovernmental organizations would have to do to achieve standing to sue, so the Qiantang River Waterkeeper had to go through a process to

confirm that it is a NGO, and to register with the government above the municipal level.

It completed that process before the end of 2015, and was named a joint prosecutor on the case. Working with two of China's most influential environmental nonprofits—China Biodiversity and Green Development Foundation and Friends of Nature — which provided financial support, the Waterkeeper filed suit, in the Zhejiang Province Intermediate People's Court of Jiaxing City, against the tannery's owners. The case was the first environmental public interest suit in Zhejiang Province, which hugs the coast of the East China Sea and is home to 54 million people.

After three years, in September 2019, the court ruled in Qiantang River Waterkeeper's favor. The result: The tannery's owners were fined a total of almost 30 million Renminbi (about \$4.3 million).

"Water and land here needed someone to speak for them," said Hao. "I'm honored that we had the chance, and I'm thrilled with the result."

— Ellen Simon

NURDLES

ALL

THE

WAY

DOWN

Diane Wilson and her scrappy crew of volunteer citizen-scientists took on a polluting billion-dollar plastics company and, nurdle by nurdle, won.

BY LILY MOORE-EISENBERG

On a windy winter morning in 2009, a retired shrimp boat captain named Diane Wilson pulled her red Chevy pickup into the parking lot of the Hideout, a metal box of a bar on the outskirts of Rockport. A self-identified “eco-outlaw” and fourth-generation Gulf Coaster, Wilson had spent the previous two decades fighting what she calls a “Diane-versus-Goliath” battle to prevent chemical plants and refineries from polluting the bays that her family has fished, shrimped, crabbed, and oystered for over a century. The week before, Wilson had gotten a call from Dale Jurasek, a former wastewater operator at the Formosa Plastics plant in nearby Point Comfort. He had asked to meet her in person. Wilson had heard of him—in the nineties he had reported his then employer to federal regulators for safety and environmental hazards at the plant. Wilson had her own history with Formosa. In 1994 she tried to scuttle her 42-foot shrimp boat near the outfall where the plant discharges its chemical-laden wastewater, as a “permanent monument to the suffering of the bay.” (The Coast Guard ultimately stopped her.)

When Wilson walked into the bar, Jurasek, who was sitting alone at a table in the corner wearing a cowboy hat and a scowl, waved her over. Then he asked to check her purse for wires. She laughed in surprise. “Hop to it,” she said.

Jurasek had faced retaliation after reporting Formosa, so he was slow to trust strangers. Satisfied that Wilson wasn't a spy for the company, Jurasek began describing the growing number of plastic pellets inundating Cox Creek, the brackish stream that feeds into Lavaca Bay near Formosa's plant. Jurasek had first noticed the plastic pellets when he worked at the plant, and in 2000 he had alerted the company to the problem. But after he left his job, he'd spent a lot of time fishing in Cox Creek and Lavaca Bay, and he told Wilson that he began noticing the pellets “everywhere”: in his skiff, on the bottoms of his children's feet after a day

on the bay.

Wilson, who has tousled black hair, deep smile lines, and the squint of a woman raised on the water, is familiar with a dizzying number of harmful sludges, foams, and powders produced by the petrochemical industry. Though she was aware of nurdles, as the plastic pellets are often called, she had never paid them much mind; they seemed minor compared with the contaminated soup that flowed from Formosa into Cox Creek.

The meeting with Jurasek prompted Wilson to investigate on her own. Nurdles, she discovered, are the building blocks of most plastic products and—because of how easily they slip from the supply chain into the environment—of plastic pollution.

A few months later, along with Jurasek and a few other Formosa whistleblowers, Wilson drove to Cox Creek to see the problem for herself. She didn't have to look for long: the bank was littered with white pellets. By the boat ramp, not far from where Formosa discharges stormwater, nurdles were caked in the mud to a depth of four inches, Wilson said. “It looked like it had hailed.”

Wilson spent the next seven years contacting state regulators and filing Freedom of Information Act requests to see if Formosa had been disciplined for apparent violations of the Clean Water Act. She found citizen complaints and even photographs depicting nurdles but no record of enforcement. Her sleuthing eventually spurred the Texas Commission on Environmental Quality to reevaluate Formosa's wastewater permit. During permit negotiations in 2015, Formosa conceded to the TCEQ that releasing nurdles into the environment would “indisputably be a permit violation” that must be reported within 24 hours. Yet the pellets kept coming, and the company never bothered to report the problem to the TCEQ. Wilson finally decided to take matters into her own hands.

Nearly every week since January 2016, she and a scrappy crew of citizens, including Jurasek, have hiked and kayaked along the banks of alligator-infested Cox Creek in search of nurdles.



PHOTO BY TAMIR KALIFA



PHOTO BY TAMIR KALIFA

LEFT AND ABOVE, DIANE WILSON, THE SAN ANTONIO BAY ESTUARINE WATERKEEPER, HOLDS NURDLES—SMALL, WHITE BB-SIZED PELLETS—THAT SHE COLLECTED NEAR THE FORMOSA PLASTICS PLANT. HER RELENTLESS DEDICATION TO COLLECTING THE NURDLES WAS CRUCIAL TO HER HISTORIC COURT VICTORY AGAINST FORMOSA.

They are organized loosely as the San Antonio Bay Estuarine Waterkeeper, part of a global network of groups affiliated with the Waterkeeper Alliance, a clean-water advocacy organization with headquarters in New York. Wilson and her Waterkeepers snap photos and use miniature nets from Walmart to scoop pellets into Ziploc bags, which they label with the date, time, and location of the sample. A former Formosa supervisor named Ronnie Hamrick, 65, goes out four or five days a week. (He likes a good rainstorm, because it tends to dislodge nurdles from the weeds.) “If we were trying to pick up everything we could find, there’s no way we’d ever finish, so we take a sample,” said Wilson, who’s 70. “It’s overwhelming sometimes.”

Today, Wilson’s barn at her home in Seadrift contains roughly 30 million nurdles. Along the walls are plastic bins, each one stuffed with sandwich bags full of the pellets—a peculiar inventory resulting from three years of painstaking collection.

Now Wilson’s trove of pellets is part of the evidence against Formosa in a federal lawsuit that could help revolutionize the way citizens hold corporate polluters to account.

The story of a lost nurdle begins and ends in the ground. Drilling companies extract oil and natural gas from the earth and sell the raw fossil fuels to chemical plants that make plastics and synthetic resins. (Forty-six companies have permits to do so in Texas, with more facilities coming soon.) Some plants, such as Formosa, transform molten plastic into pellets. They then sell the pellets to manufacturers that turn them into consumer goods like straws, Styrofoam, and water bottles. Along the way, billions of nurdles—which have an unfortunate tendency to roll

and ricochet—escape, spilling onto roads or riding wastewater into the sea.

The origin of the word “nurdle” is unknown, but synonyms abound: scientists who study pollution sometimes use the technical term “plastic resin pellet,” whereas the more whimsical “mermaid tear” is popular among beachcombers. (“Nurdle” has other definitions too, including a strategically gentle shot in cricket and the little blob of toothpaste that sits on the bristles of your toothbrush.) Plastic-industry insiders, meanwhile, favor the bloodless term “preproduction plastic pellet,” a reference to the nurdle’s place in a supply chain that stretches from underground petroleum deposits to grocery-store shelves.

Globally, microplastics—bits of plastic smaller than five millimeters in diameter, including nurdles, microbeads, fragments, fibers, and foam—account for an estimated 85 percent of plastic pollution found on shorelines. And they tend to stick around. Jeremy Conkle, a Texas A&M University–Corpus Christi professor who studies plastics in the ocean, said that plastic can persist in the environment for “hundreds to thousands of years.” Every year, an estimated 250,000 tons of nurdles enter the ocean. According to Eunomia, a UK-based environmental consultancy, they are the second-largest direct source of marine microplastic pollution, after rubber tire dust.

Though the study of nurdles is still in its infancy, researchers have determined that the pellets are vehicles for toxins and pathogens. Pummeled by waves and fried by ultraviolet light, the pellets degrade over time, growing porous and accumulating

Globally, microplastics—bits of plastic smaller than five millimeters in diameter, including nurdles, microbeads, fragments, fibers, and foam—account for an estimated 85 percent of plastic pollution found on shorelines.

RIGHT, FORMOSA PLASTICS' POINT COMFORT PLANT. EVERY YEAR, AN ESTIMATED 250,000 TONS OF NURDLES ENTER THE OCEAN AND ACCOUNT FOR THE SECOND LARGEST DIRECT SOURCE OF MARINE MICROPLASTIC POLLUTION, AFTER RUBBER TIRE DUST. OPPOSITE PAGE, DALE JURASEK, A FORMER WASTEWATER OPERATOR AT THE FORMOSA PLANT, FACED RETALIATION AFTER REPORTING THE GROWING NUMBER OF PLASTIC PELLETS FROM THE PLANT INUNDATING COX CREEK.

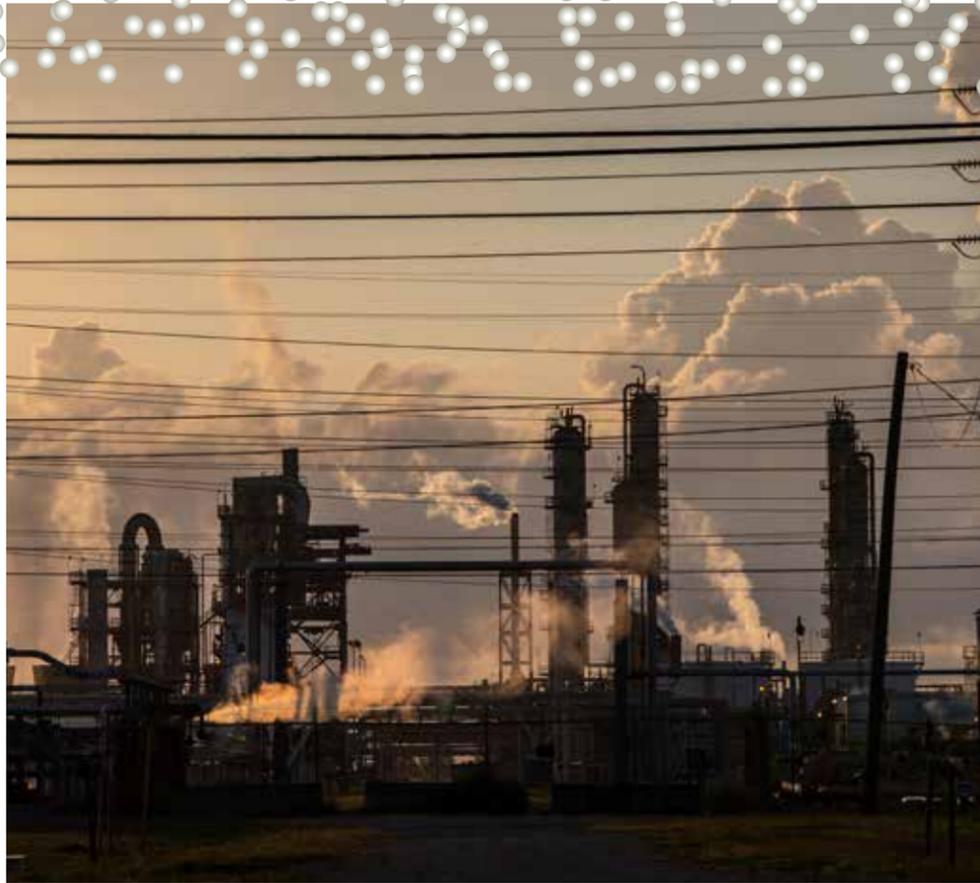


PHOTO BY TAMIR WALIFA

Nurdles can contain concentrations of toxins up to 10 million times greater than what's found in seawater. The pellets also spread harmful bacteria such as *E. coli*, which colonize the slimy biofilm that forms on submerged plastic.

contaminants such as industrial chemicals and pesticides. Nurdles can contain concentrations of toxins up to 10 million times greater than what's found in seawater. The pellets also spread harmful bacteria such as *E. coli*, which colonize the slimy biofilm that forms on submerged plastic. If animals mistake the pellets for food—including endangered species found along the Texas coast, such as the Kemp's ridley sea turtle and the whooping crane—they can starve to death, their bellies full of plastic that lacks nutrition and defies digestion. Scientists are also concerned that toxins could travel up the food chain from nurdle-eating fish to fish-eating people, posing a serious health risk to humans.

"They're just accumulating, and they're not going anywhere," said Jace Tunnell, a marine biologist at the University of Texas Marine Science Institute in Port Aransas. "We're at the point now where we need to make a decision. Are we going to keep producing these things without any regulation? Or are we going to say, 'Look, we've had enough. We need to be able to regulate these pellets?'"

On Texas beaches, the lack of regulatory enforcement shows. Like the tar balls that washed ashore in the eighties, plastic has become a coastal plague. A recent study found that from 2015 to 2017, the accumulation rates of marine debris, 93

percent of which is plastic, were ten times greater in Texas than in other Gulf states. Without robust regulation, concerned Texans have resorted to less conventional means of environmental protection, from filing citizen suits to participating in "citizen-science" projects—crowdsourced research campaigns that scientists use to study pollution. By enlisting individuals to collect nurdles and document their findings, researchers can expand the size and geographic diversity of their data sets and make better estimates of the magnitude of nurdle pollution worldwide.

Grassroots projects can also help environmental organizations bring polluters to court. Armed with samples and photos, plaintiffs like Wilson and the Waterkeepers have a better shot at winning lawsuits that often hinge on physical evidence. Kelly Haragan, the director of the environmental law clinic at the UT School of Law, believes that the future of environmental regulation is "people-powered." Regulators, she noted, currently rely on companies to report their own violations. "We're on the cusp of the public being able to hold industry much more accountable."

While the Waterkeepers were building their case against Formosa, Tunnell started a different kind of people-powered nurdle campaign. Last fall, Tunnell was watching the sunset from Bob Hall Pier, on North Padre Island, when he spotted

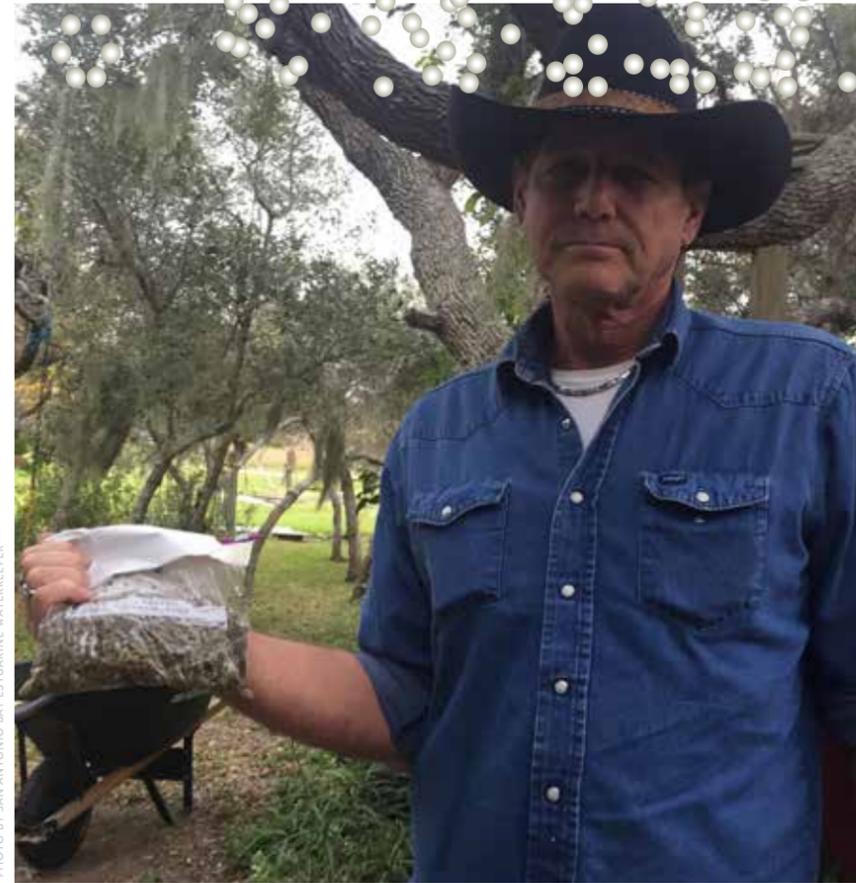


PHOTO BY SAN ANTONIO BAY ESTUARINE WATERKEEPER

what looked like white foam in the high-tide line—a telltale sign of nurdles. Tunnell called the Coast Guard, which notified the TCEQ, which contacted Tunnell a few days later. He was dismayed to learn that the agency had taken samples but didn't plan to pursue the problem.

A few months later, in response to the TCEQ's inaction, Tunnell launched Nurdle Patrol—a research and cleanup campaign that uses crowdsourced data to document the spread of nurdles along the Gulf Coast. In total, 543 "Nurdle Patrollers" removed 172,952 nurdles from Texas beaches between November and July. By tracking how many pellets a single citizen can collect by hand in ten minutes, Tunnell's team can roughly compare levels of pollution in different areas. Near Galveston Bay, for instance, one woman collected a record-breaking 30,846 nurdles. (Wilson, the previous record-holder, had gathered 16,500 nurdles at Cox Creek.) Similar campaigns in other countries—such as the Great Nurdle Hunt, a global citizen-science project run by a Scottish nonprofit called Fidora—are helping scientists reconstruct the paths of nurdles from their sources through the ecosystem.

On March 25, the first day of the

Waterkeeper v. Formosa trial, Wilson and a couple of her fellow kayakers lined up at the door of the federal courthouse in Victoria, towing thirty plastic bins containing an estimated 26 million nurdles. When the security officers, reasonably enough, refused to let them bring in their giant loads of trash, the federal district judge overseeing the trial, Kenneth M. Hoyt, stepped in. Wilson agreed to store the nurdles in the courthouse basement; when the time came, Hoyt and Formosa's lawyers would troop downstairs to inspect them.

San Antonio Bay Estuarine Waterkeeper and Wilson alleged that Formosa had violated the Clean Water Act by repeatedly discharging huge numbers of nurdles into Cox Creek and had failed to report its pollution to the state a single time since 2016. Though Formosa disputed many of the plaintiffs' claims, the definition of "trace amount" proved to be the crux of the case. According to Formosa's permit, the company may release only "trace amounts" of floating solids, including nurdles, into the environment. Formosa's attorneys argued that the term was ambiguous: by their calculations, it could mean more than nine thousand pellets a day from just Outfall 006, one of twelve points along Cox

Creek where Formosa discharges stormwater and wastewater. Besides, they argued, the permit in question was issued in 2016. How could anyone tell whether a nurdle was released yesterday or twenty years ago? Perhaps the nurdles that the Waterkeepers had found were "legacy pellets." When the answer came out in court, so did a story about a squabble between the Waterkeepers and Formosa's security detail.

"Have you ever seen any pellets actually exit an outfall?" Formosa attorney Steve Ravel asked Wilson during cross-examination.

"Yes, I have. I've been in Outfall 006, literally inside Outfall 006," Wilson replied. She, Hamrick, and Jurasek had explored the area on foot—before Formosa's security team banned them from the bank.

"How often?" Ravel asked.

"Well," Wilson said, "until they stopped us from doing it."

Formosa disputes that any pellets in excess of trace amounts have exited its outfalls since 2016. It claims that the cleanup crews they hired, equipped with vacuum trucks and hoses, were clearing away pellets released into the creek years before Formosa's 2016 permit. But scientists testifying for the plaintiffs presented what Hoyt later called "compelling and reliable" evidence that many of the nurdles were new, and the Waterkeepers themselves brought photos and samples of nurdles whose bright white color indicated that they were released recently.

In June, Hoyt ruled in favor of Wilson and the Waterkeepers, writing that Formosa's violations were "enormous." Of the engineering expert who defended Formosa's stormwater systems, Hoyt wrote, "His conclusion is illogical. Formosa cannot be in compliance simply by saying so."

Hoyt rejected the company's argument that nurdles existed only in trace amounts in Cox Creek and Lavaca Bay, and he didn't buy the idea that they were "legacy pellets." (A spokesperson said the company does not comment on pending litigation. In court filings, Formosa argued that its release of nurdles did not violate the 2016 permit and denied that its practices had harmed the plaintiffs.)

Hoyt also condemned the TCEQ for its "difficulty or inability . . . to bring Formosa into compliance." Despite numerous citizen complaints and documentation by TCEQ inspectors of nurdles escaping the facility,

DAVID SUMPTER (RIGHT) AND RONNIE HAMRICK, A FORMER SUPERVISOR AT FORMOSA, ARE TWO OF WILSON'S RELENTLESS CREW. EVEN AFTER THE TRIAL ENDED IN MARCH, HAMRICK WENT OUT ALMOST EVERY DAY TO COLLECT NURDLES.



the agency had fined the company just \$122,000.

For the growing cohort of Texas environmentalists focused on plastic pollution, the ruling marked a major victory. There is no comprehensive record of litigation involving nurdles, but anecdotal evidence suggests that *Waterkeeper v. Formosa* is the first nurdle-centric case to go to trial in Texas and possibly the United States. Amy Johnson, an attorney with Texas RioGrande Legal Aid who represents the plaintiffs, called the case “unprecedented.”

“What’s really powerful and unusual is that our clients gathered the evidence but also that they gathered it in such a tremendously consistent and voluminous manner,” Johnson said. The case has already served as a model for lawyers and citizens across Texas: attorneys from other legal aid organizations traveled to watch the trial, and another client of Johnson’s recently started taking photos of algae growth in a river near her home, downstream from her city’s wastewater treatment plant. “I’ll get a call from some fisherman who’s been out there, and they’ll say, ‘Amy, there’s a whole lot of powder out here today,’” Johnson said. “They’re feeling stewardship.”

Hoyt’s emphatic ruling does not necessarily guarantee lasting change, however. Formosa has faced many fines and adverse court rulings over the years. In 1997, under pressure from Wilson, Formosa promised to discharge pollution-free wastewater from its Point Comfort plant in an agreement signed by Wilson, the TCEQ, and the EPA. It was a landmark settlement, but the TCEQ effectively undermined the deal, Wilson argued at the time, by increasing the amount of copper and chloroform the company was allowed to release in its wastewater.

The real test of this citizen-powered litigation strategy will likely come sometime in the fall, when Hoyt is expected to decide how much Formosa must pay in fines. The Waterkeepers are seeking a \$166 million penalty, along with an injunction ordering Formosa to comply with its permit—enough, they believe, to compel the billion-dollar company to change its ways.

Still, after Hoyt issued his decision, Wilson sounded ecstatic. “I know what justice feels like,” she said over the phone. “It’s unbelievable. It’s Christmas in July!”

One sunny morning in June, a few weeks before the trial and ten years after their talk at the Hideout bar, Wilson and Jurasek met, as they often do, by the boat ramp at Cox Creek. Miniature net in hand, Wilson searched for nurdles in the weeds. It didn’t take her long to find a cluster of bright white pellets. “I knew those buggers were someplace,” she said.

Even after the trial ended in March, Wilson and her fellow Waterkeepers didn’t stop their work. Hamrick still goes out almost every day, and Wilson averages once a week. Haragan, the UT law professor, considers their project proof that organized citizens can hold polluters—and regulators—accountable. “If you want environmental compliance,” she said, agencies should be enlisting citizens in oversight “rather than putting up barriers.” But years of regulatory inaction have taught the Waterkeepers not to trust the state to safeguard the future of the bay. They see themselves both as stewards and witnesses: as long as nurdles keep coming, they’ll keep collecting.

At Cox Creek, after the group had inspected the shore for nurdles, Wilson dragged a kayak to the beach and hopped in. Jurasek gave her a push.

She stopped a few yards from the thick orange booms that encircle Outfall 006. Formosa has installed the floating structures to help contain nurdles, but nearby, a patch of pellets floated on the open water outside the booms.

In front of her, the plant’s stacks loomed like skyscrapers, skeletal and shining under the scorching South Texas sun. She paused by the cluster of bobbing nurdles, pulled a sandwich bag from her satchel, and reached toward the murk. **W**

Lily Moore-Eissenberg is a recent graduate of Yale University, where she completed double majors in English and Philosophy. She has written for Time, Slate, and Texas Monthly, among other publications.

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PHOTO BY TAMIR KALIFA

NO MORE NURDLES

BY JULIA WIDMANN

After Judge Hoyt’s strongly worded decision in Diane Wilson’s favor, she and her fellow citizen-scientists remained as faithful as ever to their nurdle-sampling routine while they waited for next steps.

Finally, in October 2019, four months after the court ruling, Diane received incredible news: Formosa Plastics Corporation had agreed to a historic settlement of \$50 million that also requires the company to clean up all existing pollution at their Point Comfort plant and reach zero discharge of all plastic pollution moving forward. The settlement made headlines: Diane Wilson had won the largest-ever Clean Water Act settlement in a suit filed by a private citizen.

“The agreement for zero discharge of plastics is ground-breaking and sets the standard for the industry,” said lead attorney Amy Johnson, who crafted the consent decree. The 30-page document allows the plaintiffs an unusually active role in the cleanup process. “Zero discharge is not an empty promise,” said Johnson.

As required by the consent decree, Diane and Formosa agreed on two outside hires: “a remediation consultant, to manage the cleanup effectively,” Johnson explained, “and a monitor to track discharges, if they occur, while the plant is being redesigned for zero discharge.” The hired monitor will work in the field twice a week. Diane and her crew plan to continue sampling, too – at least until zero discharge is achieved.

Formosa must transform their entire operation to prevent stormwater from carrying plastics outside the facility. “The new system will be tested for six months to confirm that it works,” said Johnson, “and plaintiffs can participate in that process.” The agreement sets out opportunities for Diane to review and comment on the engineering changes. It also requires that Formosa

provide Diane with regular updates on the proposed changes at the plant.

“I realized after 30 years of opposing Formosa that there would be a challenge in trusting and collaborating with my new ‘partners,’” said Diane. “But to make zero discharge work, put \$50 million into local environmental projects, and to clean up the plastic pollution from the bays and waterways, I am very willing to try.” She added: “I also have a wonderful legal team at Texas Rio Grande Legal Aid, a very tight and highly detailed consent decree, and Judge Hoyt to back me up.”

All of the \$50 million settlement will be paid out over five years to a wide variety of environmental restoration, research, and education projects in Lavaca Bay and the surrounding area. Formosa also agreed to pay the costs of Diane’s attorneys and experts fees throughout the entire process. “This ensures full participation of plaintiffs during the implementation of the consent decree,” noted Johnson. Her hope? “That the Formosa resolution becomes the model for zero discharge by the plastics industry.”

Diane is using the momentum of her success against the Point Comfort plant to fight for better regulations for other plants statewide, and potentially nationwide. Not only will she and San Antonio Bay Estuarine Waterkeeper continue monitoring the Formosa plant in Point Comfort, they are monitoring two other corporation’s plastic plants: Union Carbide/Dow at the Seadrift, Texas plant and, recently, Chevron Phillips at the Sweeney, Texas plant.

“We’re working towards a state policy of zero discharge of plastics in plastic plants,” Diane explained. “We’re hopeful that the standard of zero discharge of plastics will be implemented here and will be used by the Texas Commission on Environmental Quality as a standard for plastic plants in Texas, and, eventually, the United States.”

National regulations are not a pipe dream; legislators have already begun to consider these standards. In February, Diane was invited to Washington, D.C., to speak on a panel following a screening of a new documentary – in which she is featured – called “The Story of Plastic,” coinciding with the introduction of the Break Free from Plastic Pollution Act to Congress. If approved, the act would comprehensively address plastic pollution by shifting responsibilities to producers, introducing national prohibitions on single-use plastic products, creating more comprehensive recycling systems, halting the rapid expansion of plastic plants like Formosa’s, and requiring zero-discharge of plastic pollution at all existing and future U.S. facilities.

Outside of rewriting the nation’s laws on one of the most pressing environmental issues, what’s next for Diane? “I am writing a book,” she says. It’s going to be called “Unreasonable Woman and the Plastic War: True Story of Gators and Snakes, and How to Wrestle a Corporation to the Ground.”

Julia Widmann is Waterkeeper Alliance’s organizer for the Gulf and South Atlantic regions.

“The agreement for zero discharge of plastics is ground-breaking and sets the standard for the industry.”



RIVER OF MEMORY RIVER OF HOPE

EcoPeace's Israeli, Palestinian, and Jordanian Waterkeepers are proving that working together on water and climate security issues is critical to a better future for all the region's peoples.

By Ellen Simon

The Secretary-General for the Jordanian Valley Authority sat in his dark office with its heavy curtains, wearing a dark suit, showing no emotion. The team of Jordanians and Israelis from EcoPeace had spent four years on the plan they were pitching him. They kept looking for a sign — any sign — of enthusiasm.

They gave data. He stayed quiet. They gave economic projections. No response.

For roughly forty minutes, the team kept talking. As they uncertainly gathered their briefing books to leave, he spoke.

"I remember fishing in the Jordan with my father," he said, joy spreading over his face. "Wouldn't it be remarkable if I could take my son fishing in the Jordan River?"

Conflict and competition have nearly drained the Jordan River, taking away 95 percent of its freshwater flows, turning a river holy to half of humanity — to Jews as the crossing to the Promised Land, to Christians as the place Jesus was baptized, to Muslims as a site where several of the prophet Mohammed's companions were buried — into a river that trickles by, in most stretches, as an open sewer, a river you smell before you see.

It flows strongly only in a few stretches, and in the collective memory of the region's elders.

The 50-person staff at EcoPeace, an environmental and peacebuilding organization with offices in Tel Aviv, Amman, and Ramallah, is trying to change that.

Born out of the optimism of the Oslo Accords, reshaped in its bitter aftermath, EcoPeace is the only trilateral organization in the region. It has three co-directors who also serve as the Jordan River Waterkeepers for each of their countries. Nada Majdalani, who has a master's in environmental assessment and management from the U.K., has been the Palestinian co-director since 2017; Yana Abu Taleb, who has a degree in archeology, has been the Jordanian co-director since 2018; Gidon Bromberg, an environmental lawyer who co-founded EcoPeace, has been the Israeli co-director for 25 years.

Its board is balanced, with 12 members, four from each country. Its staff is balanced too; every staffer has a counterpart in the other two countries.

EcoPeace's mission is to build shared water resources

in a region beset by conflict. To do this, the organization enlists everyone from Palestinian students to Israeli tour guides to Japanese and German international aid agencies. In the process of working for solutions to the region's water crisis, it's also building an army of peacemakers — an army that may serve as a model for an increasingly parched world.

Originating at the Lebanon-Syria border, the Jordan River runs a 223-mile course, meandering southward through the Sea of Galilee and emptying into the Dead Sea. It separates Israel from Jordan and Syria, and Palestine from Jordan. A militarized border in a land of conflict, it is fenced off, laced with landmines, and largely inaccessible. Half its flows were taken by Israel, the other half by Syria and Jordan, leaving nothing for the Palestinians in the river's southern stretch, and nothing for nature.

"While the water was taken for legitimate purposes — domestic needs, industrial needs, agricultural needs — all the water was also taken in order to deny the enemy, from all sides, additional water," says Gidon, the Israeli co-director. "Water, in the desert, means power."

With the water gone, all sides continued to send the river their sewage, turning it into a moving cesspool.

One of EcoPeace's first projects brought together Jordanian, Israeli, and Palestinian researchers to study the Jordan's flows. "Before, if you had asked what was happening at the Jordan River, the experts would say, 'It's the other side,'" Gidon says. "Our aim was to move away from the blame game, because blaming leads to paralysis."

The researchers risked their lives to measure the velocity of the river and test its waters, following the hoofprints of animals to avoid landmines.

Their conclusion, released in a joint paper in 2005, was that every side had something at stake in returning the river to life, and every side had responsibility — maybe not the same amount of responsibility — for its ruin.

Another conclusion: Half the Jordan's biodiversity, the plants and animals in the holy books of three religions, had been killed off. For instance, the Book of Isaiah in the Jewish Bible includes the phrase, "And they shall spring up among



ABOVE, THE RUINS OF A RAILWAY BRIDGE THAT ONCE CONNECTED JORDAN AND ISRAEL. JUST AS THE PHYSICAL INFRASTRUCTURE BETWEEN THE TWO NATIONS WAS LARGELY DESTROYED, GIDON BROMBERG FOUND THAT THERE WAS ALSO NO INFRASTRUCTURE FOR PEACE; ECOPEACE IS COMMITTED TO CHANGING THAT.

EcoPeace found the willows on the banks of the Jordan were all gone. The polluted, saline water that came with conflict had killed off trees that had flourished there long before the birth of Christ.

the grass, as willows by the watercourses." EcoPeace found the willows on the banks of the Jordan were all gone. The polluted, saline water that came with conflict had killed off trees that had flourished there long before the birth of Christ.

EcoPeace was founded in 1994, the same year that Jordan signed a comprehensive peace treaty with Israel, and the year after the signing of the first Oslo Accord peace deal between the Palestine Liberation Organization and Israel. When Yasser Arafat, the head of the Palestine Liberation Organization, and Yitzhak Rabin, the Israeli Prime Minister, shook hands on the White House lawn that September, the world watched. Peace seemed to be breaking out across the region.

At the time, Gidon was studying international environmental law at American University. His research question: Would peace be good for the environment?

It didn't look like it. For one thing, the

booming development promised by the peace deals didn't look sustainable. There were 50,000 new hotel rooms planned on the Dead Sea alone. The wages of peace, it seemed, could suck the region dry.

Gidon's research found there was also no infrastructure for peace, no networks of cross-border organizations to help it survive.

To build such a network, he envisioned convening the first-ever meeting of environmental leaders from Egypt, Palestine, Jordan, and Israel. He took his proposal to funder after funder. Every one of them turned him down.

Gidon's demeanor is generally calm and reserved, but he also has plenty of *chutzpah*, Yiddish for audacity and nerve. He went back to them and asked again. One said, "If you can get everyone together, I'll fund it, and I'll come."

The meeting was held in Taba, Egypt in 1994. The funder came. The second day of the meeting, EcoPeace was born.

Twenty-five years later, its staff is made up of people whose commitment to

the work dates back to that time.

"When I was 13, 14 years old, it was still the good years after the Oslo agreement," says Nada Majdalani, the Palestinian co-director. There was a boom of cross-border, people-to-people programs. "They wanted to prepare the young people to live together, to learn about each other," she says. Her school was part of an environmental cross-border program, where Israeli and Palestinian teens learned together and camped together.

Nada carried memories of that experience into adulthood; those camping trips prepared her for the work she does now. Nada recruited the teacher who enrolled her in that program to EcoPeace's staff. The teacher is now an EcoPeace program manager for transboundary environmental education.

In its early years, EcoPeace focused on creating scrupulously detailed reports aimed at decision makers, like the one it presented to the impassive Secretary-General of the Jordanian Valley Authority.

But by 2001, the region was engulfed in violence. As the promise of peace dimmed, EcoPeace's leaders realized that, if the organization was to sway decision makers, it first had to convince ordinary people. And if it was to convince the people, it would first have to find people with enough *chutzpah* to meet their neighbors across the border.

EcoPeace introduced a program in 2001 called Good Water Neighbors, which pairs neighboring communities on different sides of the borders and political divides to work on common water issues. Initially, it selected 11 Israeli, Palestinian, and Jordanian communities.

Local field staff work closely in each community with groups of EcoPeace "Youth Water Trustees" and adult activists to create awareness of their own water reality, their neighboring community's water reality, the interdependence between the two, and the need for shared solutions to shared problems.

It isn't easy.

School children must get their

parents' permission to participate. Some parents refuse. Meeting the people whom they've come to regard as enemies is too much for some — it's not uncommon for a student to walk out of an EcoPeace program in tears.

But the students who stick with it learn how to monitor the river. They work in concert at EcoPeace camp, lashing together rafts to float down the Jordan's navigable stretches. They collect oral histories from their parents and grandparents of their memories of the river, stories about fishing, stories about jumping from apartment balconies into the deep water, stories grandparents tell with tears in their eyes about a time when the Jordan was a real river and they had access to it.

"A resident of the Jordan Valley told me, 'The best tea we used to take was when the river was clean. I'd go picnicking with my family, and we'd use the water directly from the river to make tea,'" says Yana Abu Taleb, the Jordanian co-director of EcoPeace.

The students do research projects, and present their findings to their towns'

mayors and other decision makers, asking them to lead the rehabilitation of the river.

"Israeli and Palestinian and Jordanian kids coming together is a rare exception," Gidon says. "The parents have to approve. That alone has allowed the mayors to stand up to any condemnation. Through the leadership of school kids, we're able to create a constituency."

Adele Stoller, an Israeli Youth Trustee, says "EcoPeace helped me by showing me that there's a possibility, for even a 16-year-old student such as me, to make a better change."

The mayors' involvement led to memorandums of understanding signed between cities on opposite sides of the conflict, and to meetings where mayors compete to see who can do more to rehabilitate the river.

EcoPeace organized an event called The Big Jump, where Palestinian, Israeli, and Jordanian mayors joined hands, in front of international news reporters, to jump into parts of the Jordan — both the clean parts and the less clean parts. The

ECOPEACE'S "GOOD WATER NEIGHBORS" PROJECT USES TRANSBOUNDARY WATER PROBLEMS AS A MEETING POINT TO CREATE POSITIVE INTERACTION AMONGST YOUTH OF THE REGION. HERE, PROGRAM PARTICIPANTS CREATE A MURAL EXPRESSING THEIR VISION OF A HEALTHY JORDAN RIVER.

"Israeli and Palestinian and Jordanian kids coming together is a rare exception. The parents have to approve. That alone has allowed the mayors to stand up to any condemnation. Through the leadership of school kids, we're able to create a constituency."



PHOTO BY ECOPEACE MIDDLE EAST



first Big Jump was in 2005; it took five years of planning. There have been five Big Jumps with mayors since then, as well as so many similar events with school children that EcoPeace no longer keeps count.

The school children have changed international policy makers' minds, too. EcoPeace gets much of its funding from Europe; its funders include the German Christian Democratic Union's foundation, and the Swedish International Development Agency. When Germany announced it was pulling funds for a project on the Zommer/Alexander Stream in Palestine, EcoPeace sent Youth Ambassadors to meet with German officials. The funding was reinstated.

The program has become an international model. EcoPeace trainers have taken the Good Water Neighbors program to Bosnia Herzegovina, where the program has been active since 2014; as well as Kosovo, Sri Lanka, and a watershed shared by India and Pakistan.

In the face of intransigent conflict, EcoPeace is flexible.

It trained Jordanian women to become plumbers, teaching them how to install household greywater systems. (Greywater is the name given to water that's already been used for washing purposes, such as laundry, handwashing, showering, and bathing.) It subsidized greywater systems for impoverished Jordanian families. It bought water tanks for Palestinian and Jordanian schools so the children there had water to drink. It built paths along the Jordan, giving access to the river to people who have long been denied it. It built the Sharhabil Bin Hassneh EcoPark, which gets 20,000 visitors a year, on land from the Jordan Valley Authority.

Its work has also changed the minds of high-level policy makers. EcoPeace raised three million euros to create the first integrated regional master plan for the rehabilitation of the river and its valley. Its campaign around rehabilitating the Jordan led to Israel building a sewage plant south of Tiberius, USAID and Germany funding Jordanian sewage plants, and the Japanese

SEWAGE TRUCKS IN JORDAN BRING RAW SEWAGE TO A SMALL WASTEWATER TREATMENT PLANT. MORE THAN 600,000 JORDANIAN RESIDENTS IN THE JORDAN VALLEY ARE NOT LINKED TO A SEWAGE NETWORK AND SO MUST RELY ON SUCH TRUCKS.

government building a sewage plant in the Palestinian city of Jericho.

As sewage was removed from the Jordan's headwaters, EcoPeace launched a public awareness campaign to let people know that, without it, the Jordan would be dry. Israel's water authority then agreed to release 24 million gallons of water a year from the Sea of Galilee. Today, pipes are being laid that could bring hundreds of millions of gallons of desalinated water to the Sea of Galilee; EcoPeace will be advocating that some of that water be released into the Jordan River.

"Our efforts have resulted in

Its work has also changed the minds of high-level policy makers. EcoPeace raised three million euros to create the first integrated regional master plan for the rehabilitation of the river and its valley.

investments of \$100 million," Gidon says. But there's still much to be done. Jordan faces a deficit of 400 million cubic meters of water a year. The influx of Syrian refugees that began in 2011 means Jordanians only get government water one day a week, which they load into tanks in their homes.

"I try to do my laundry that same morning, before we come to work, to make sure it's all done that same day, when we have water," says Yana Abu Taleb, the Jordanian co-director. "Even the plants in the garden, we try to water the same day we receive that water."

Palestine also gets far less water per person per day than the World Health Organization recommends. In Gaza, thirty percent of illnesses are from water-borne

ECOPEACE'S CREATION OF THE FIRST INTEGRATED REGIONAL MASTER PLAN FOR THE JORDAN RIVER AND ITS VALLEY HOLDS REAL PROMISE FOR THE REGION'S FENCES TO FINALLY COME DOWN, BOTH FIGURATIVELY AND LITERALLY.





PHOTO BY ECOPEACE MIDDLE EAST



PHOTO BY FRANK DABBA-SMITH

TOP, THE “GOOD WATER NEIGHBORS” PROJECT HAS RAISED AWARENESS AMONG ISRAELI, PALESTINIAN, AND JORDANIAN YOUTH THAT THE REGION’S WATER CRISIS CAN ONLY BE SOLVED IF THEY WORK TOGETHER. ABOVE, (FROM LEFT TO RIGHT) ECOPEACE’S PALESTINIAN DIRECTOR NADA MAJDALANI, JORDANIAN DIRECTOR YANA ABU TALEB, AND ISRAELI DIRECTOR GIDON BROMBERG AT LONDON CLIMATE ACTION WEEK IN JULY 2019. OPPOSITE PAGE, THE GOLAN HEIGHTS AND THE MOUNTAINS OF GALILEE AS SEEN IN THE DISTANCE FROM THE JORDAN RIVER.



PHOTO BY GUY ZIDEL/SHUTTERSTOCK

“We are so pleased we are part of this process. We may not see it happen in our lifetime, but we are at least laying the right ground to see it happen for our kids and their kids.”

pathogens. There’s no sewer network; most homes still have waste cesspits, which allow sewage to percolate into groundwater, 97 percent of which is contaminated.

Delays in material and equipment due to more than 12 years of blockade by Israel have resulted in delayed construction of additional modern treatment plants. Power shortages frequently shut Gaza’s sewage treatment plants. In turn, the equivalent of 34 Olympic swimming pools of raw sewage is dumped into the Mediterranean daily. EcoPeace obtained records revealing that those releases intermittently shut down the Israeli desalination plant that provides 15 percent of Israel’s drinking water.

Disengagement may or may not work in politics. With water, it’s impossible.

EcoPeace has embraced that, releasing a regional plan in 2017 detailing how solar energy from Jordan could power desalination plants in Israel and Palestine. The pitch: Last century’s water conflicts were driven by a shortage of natural water, but investment and technological advances could create enough new water, through desalination, to satisfy the region’s thirst.

No one expects that to happen tomorrow. “People in the valley understand that the process is complicated,” says Yana. “They’re saying, ‘We are so pleased we are part of this process. We may not see it happen in our lifetime, but we are at least laying the right ground to see it happen for our kids and their kids.’”

from the Palestinians and the Israelis,” Gidon says.

Nada, the Palestinian co-director, spoke first, talking about Mohammed Ahmed Salim al-Sayes, a five-year-old boy from a Palestinian family who died in 2017 of a virus he caught swimming in the sewage-choked Mediterranean.

“Rather than be negligent, Gidon and I stand before you, together, with Yana, as part of a dedicated team who refuse that our children and our environment remain hostage to the conflict,” she testified. “We are here to impress upon your excellencies that water and climate security issues are critical to a better future for all the people in our region. While politicians speak of disengagement policy, the fact is, we cannot disengage from our entire region, and our shared environment.”

When both Nada and Gidon had spoken, both the Palestinian ambassador and the Israeli ambassador to the Security Council thanked EcoPeace.

“Almost every other ambassador hit the floor,” Gidon says. “They’d never seen the two ambassadors sort of agree on something.”

He added, “If we can work productively on one issue, such as water, it pulls the rug from those who claim there is no partner to peace, that we’re incapable of working with the other side because the other side doesn’t want to work together on anything.”

“We prove the opposite,” he says. “And by creating that precedent, we build trust and we build hope.” **W**

Ellen Simon is Waterkeeper Alliance’s advocacy writer and a contributing editor at Waterkeeper Magazine.

EcoPeace was invited last year to speak before the United Nations Security Council, which was interested in its work because, “in the day-to-day, they hear nothing but condemnation of each other



PHOTO BY BOB VIRNSTEIN

PHOSPHORUS BLOOMS

Florida's waters are at a tipping point as phosphorus and nitrogen pollution and climate change combine to create a perfect storm for the increasingly frequent outbreaks of toxic blue-green algae and red tides. St. Johns Riverkeeper Lisa Rinaman and Calusa Waterkeeper John Cassani are leading the fight against this growing scourge.

BY LISA W. FODERARO

The phones at St. Johns Riverkeeper in Florida started ringing in early April of last year. Something strange was happening on Lake George, one of the St. Johns River's many lakes, and boaters were calling to report the odd sightings. A mysterious substance in the shapes of large rectangles and trapezoids was floating on the surface.

"It looked like ice-blue plastic sheets on the river as far as you could see," recalls Lisa Rinaman, the St. Johns Riverkeeper. "At first we thought it was some kind of pollution spill. But it was a type of blue-green algae."

It didn't make national headlines like the harmful algal blooms of 2018, when vast stretches of blue-green algae covered Lake Okeechobee and the Caloosahatchee River in South Florida, looking alternately like guacamole, spilled paint or an eerie Day-Glo green. But for the St. Johns River, which meanders 310 miles along the eastern part of the state, the outbreak was a harbinger of another grim season. "That particular blue-green algae was around for two weeks," Lisa said, "but we had different kinds of toxic algae in that section of the

river for 90 days."

In recent years, blue-green algae and red tides have become a major focus for Florida's 14 Waterkeepers, as nutrient pollution and climate change combine to create a perfect storm for the potentially toxic outbreaks. Runoff from agriculture, septic systems, wastewater treatment plants and nonpoint source pollution is streaming into the state's waterways like never before, leading to a spike in nitrogen and phosphorus on which the algae feed. At the same time, global warming has led to torrential rains, which speed the movement of nutrients from land to water, as well as rising water temperatures, which can exacerbate harmful algal blooms.

Add to that the growing population of Florida (an estimated 900 people are moving to the state every day) and the sluggish response from state government, and it is small wonder that environmental stewards in the Sunshine State are feeling under siege.

At a documentary screening earlier this year, worried residents in the city of Bonita Springs peppered John Cassani, the Calusa Waterkeeper,

with questions about the health impacts of harmful algal blooms. The attendees had just watched “Troubled Waters,” a film produced by John’s group. It explores the connection between toxic algae and serious diseases like liver cancer, ALS (Lou Gehrig’s Disease), Parkinson’s Disease, even Alzheimer’s.

“We want to make sure you know how to protect yourself,” said John, an ecologist by training. “It’s really important that you are aware of the risks. How do we fix a problem that has been decades in the making? That is really the dilemma of our time here in Florida right now. It’s not going to be easy. The underlying problem is nutrient pollution, and Florida really, really struggles with that issue.”

But Waterkeeper groups also say the growing severity of the problem in recent years – threatening public health, tourism and property values – might also mean it is finally getting the attention it is due.

Blue-green algae are not algae at all, but types of bacteria called cyanobacteria that are present mainly in freshwater bodies but can also occur in brackish water. The bacteria flourish in nutrient-heavy, warm waters and can rapidly form blooms. Those blooms can appear briefly or for long periods of time and can cover entire lakes or just small sections.

When the blooms produce cyanotoxins, they can become dangerous, threatening fish, marine mammals, and humans. Exposure includes swallowing water, skin contact, and breathing in airborne droplets. Depending on the type of exposure, symptoms can include vomiting, diarrhea, rash, headache, cough, and sore throat. “And if the exposure is long enough,” Cassani says, “it may contribute to a neurodegenerative disease.” Some dogs that have drunk contaminated water have died suddenly.

Red tide occurs in salt or brackish water. Like blue-green algae, red tide has grown more severe in Florida in recent years, both in terms of its extent and its duration. Red tide harms marine life and can cause serious health problems. Exposure can cause breathing difficulties, burning eyes and rashes and can lead to seizures and other neurological symptoms in dogs.

Harmful algal blooms, or HABs for short, have popped up all over the state. But two of the hardest-hit regions are the St. Johns River and Calusa Waterkeeper’s

area of responsibility, namely Lake Okeechobee and the Caloosahatchee River. Each has experienced devastating outbreaks in recent years. The blooms have hurt people and pets; killed fish, sea turtles and dolphins; closed beaches; and destroyed aquatic plants by starving them of sunlight and oxygen.

Both Waterkeeper organizations share some of the same sources of nutrient pollution, from densely populated urban areas to vast tracts of farmland dedicated to citrus and sugar production. But they face unique pressures as well.

The St. Johns River, in particular, is feeling the effects of a policy change that was aimed at protecting the Everglades. About 10 years ago, the state ordered that biosolids, or the sludge left over from the sewage treatment process, could no longer be deposited on farms in South Florida, but rather must be trucked north. Farmers there started accepting the biosolids for a fee, and not soon after phosphorus loads began fouling local waterways, including the St. Johns.

“The state legislature gave South Florida waters special protections from this practice because of off-the-chart runoff of phosphorus, so it’s really not a surprise it’s happening here now,” said Lisa, the St. Johns Riverkeeper. “It’s because you have politics driving decision-making and not science. Now the state is saying, ‘Well, we can’t ban this practice everywhere, because it has to go somewhere.’ But there is no place in Florida where this practice makes sense.”

Another environmental change, albeit one rooted in good intentions, also had negative consequences for the 8,800-square-mile St. Johns watershed. To avoid wasting precious drinking water, Central Florida leads the nation in the use of reclaimed water, which is highly treated wastewater used for irrigating crops, watering lawns and golf courses, even car washes. But that water is high in nutrients, which are running off residential properties into lakes and streams. In addition, the watershed has three million septic tanks, and as Lisa points out, “even a perfectly functioning septic system can have nutrient pollution problems.”

On a cool, overcast day in late January, well before peak algae season, all that nutrient pollution was hiding beneath the surface. Instead, a tour of the

“The damage is going to be so deep and the soil so saturated that we are going to have decades of legacy pollution problems.”

OPPOSITE PAGE, TOP, IN FLORIDA, GOVERNMENT INACTION, WIDESPREAD NITROGEN AND PHOSPHORUS POLLUTION, AND CLIMATE CHANGE HAVE CREATED A POTENT COCKTAIL FOR THE RUNAWAY GROWTH OF ALGAE, SUCH AS THE SAMPLE PICTURED HERE; AN ALGAL BLOOM IN FULL FORCE IN THE CAPE CORAL TIDAL CANAL OFF THE CALOOSAHATCHEE RIVER.



PHOTO BY TIM HO

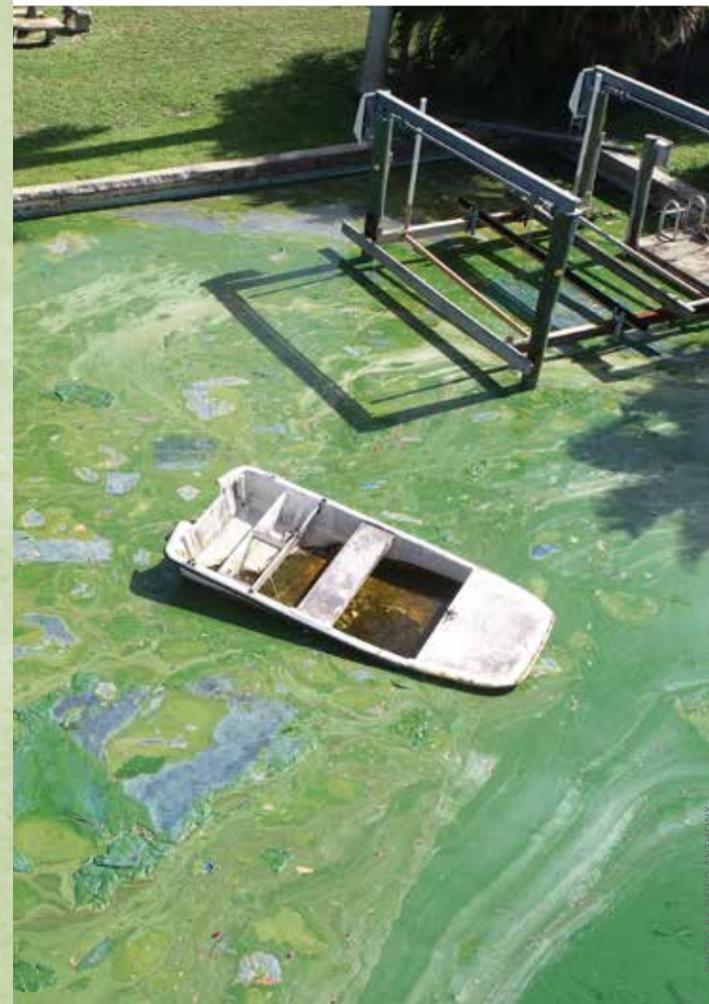


PHOTO BY ANTHONY

FOURTEEN WATERKEEPERS, ONE VOICE

To confront the ever-growing list of problems facing Florida’s waters, the state’s 14 Waterkeeper organizations banded together in late 2018 to form Waterkeepers Florida. The idea was to share expertise and speak with one voice on issues ranging from algal blooms to plastic pollution to land conservation, so that it was more likely that the state’s lawmakers and others would take notice. St. Johns Riverkeeper Lisa Rinaman was named the chair, and Matanzas Riverkeeper Jen Lomberk the vice-chair.

The umbrella group advocates for 45,000 square miles of watershed, which is home to 15 million residents. “It seemed like it would benefit all of us if there was a little more cohesion and communication across all the Waterkeeper groups in the state,” explains Jen. “In Florida, everything is so connected when it comes to waterways, and we all sort of had tunnel vision with our own watersheds.”

A main focus this year was the Clean Waterways Act, a package of state legislation that Waterkeepers fought to strengthen, but without success. The act failed to address the problem of agricultural runoff and biosolids, they say, and only nibbled around the edges of septic-tank and stormwater pollution by initiating a process for new state regulations.

“We weren’t able to get it amended to our satisfaction,” says Jen. “But we were able to change the narrative about the bill in the media from ‘this is the answer to the state’s water quality issues’ to ‘it’s a start but there’s a lot more work to be done.’” Given Florida’s current political climate, Lisa sees that as a victory. “Getting legislators and state agencies to admit that this was not the ‘silver bullet’ they originally branded it as, was an important reframing of the issue.”

Another recent lobbying effort centered on Florida Forever, the state’s land acquisition program. Since the inception of the program in July 2001, the state has purchased some 814,000 acres of land with more than \$3 billion. But Waterkeepers Florida says the current funding thresholds are inadequate.

“We are losing natural lands to development at an alarming rate,” Jen says, “and so we are losing the ecosystem services that those lands provide, including stormwater retention, water filtration, and wildlife habitat.” Historically, Florida Forever was funded at around \$300 million. Last year, that amount fell to \$33 million, and this year, advocates expect the state to allot \$100 million, rather than the \$470 million Waterkeepers called for. “Getting it back up to \$100 million after years of negligible funding was still progress,” says Jen.

Currently Waterkeepers Florida is pushing the state to adopt water quality standards for cyanotoxins as well as urging the state department of health to uniformly implement public health notifications and warnings when harmful alga blooms are present.

The group is also fighting a new regulation from the U.S. Environmental Protection Agency that will drastically weaken the Clean Water Act, harming public health and Florida’s already fragile ecosystems. The regulation has been branded by the Trump administration as the “Navigable Waters Protection Rule,” but it definitely won’t protect America’s waters. Instead, it’s a gift to polluters and a grave environmental threat. The rule narrows the definition of “waters of the United States,” which are the waters the Clean Water Act authorizes the federal government to protect.

The Florida Department of Environmental Protection estimates that more than 800,000 acres of wetlands in the Panhandle region would lose protection under the proposed changes to the rule. In addition to this, almost half of Florida’s 52,000 miles of rivers and streams could lose the protection. “Any risk posed to these waterways is a direct risk to our economy and our livelihoods,” states Waterkeepers Florida’s annual report.

middle basin of the St. Johns in the city of DeLand, aboard a flat-bottom vessel called Great Blue, revealed a rich, serene ecosystem. A manatee nosed its way alongside a bed of aquatic plants. Farther along, a baby alligator rested by the shore, so well camouflaged it was visible only to the trained eye of our boat captain. An American bittern foraged for food, while an anhinga, which resembles a cormorant, dried its wings Dracula-style on a tree branch.

“The St. Johns is a gorgeous river, and most of the time it is accessible and wonderful to use in so many different ways,” Lisa said. “But it has this excess nutrient pollution problem that comes to the foreground when the conditions are right, with warmer weather, and then it can be highly toxic and make our waterways unusable.” She added that the state needed to get to the “root cause” of the problem by reducing nitrogen and phosphorus.

Advocates for clean water in Florida are encouraged that Gov. Ron DeSantis seems to be taking the threat of harmful algal blooms seriously. In the past year, he formed a Blue-Green Algae Task Force and reorganized a dormant Red Tide Task Force, two actions that Waterkeepers Florida had advocated for. In announcing the latter, his office pointed out that from the fall of 2017 to early 2019, red tides affected the state’s southwest, northwest and east coasts simultaneously.

There are some proposed changes at the state level that could also protect the St. Johns River, including a draft regulation that would require annual soil testing of sites where biosolids are now spread. (Currently, testing is mandated only once every five years.) Moreover, farmers would not be allowed to apply biosolids on soil with an elevated water table. According to Lisa, that would affect 70 percent of the land in the St. Johns watershed where the practice now occurs.

The problem, Lisa says, is that the rule, which requires ratification by the state legislature, won’t come up for a vote until next year at the earliest, and then there is a three-year grandfather clause on top of that, delaying compliance. She and others fear that will be too late.

“By then,” she says, “the damage is going to be so deep and the soil so saturated that we are going to have decades of legacy pollution problems.”

Some 200 miles to the south of DeLand, John Cassani is dealing with a different set of problems that contributed to the historic blue-green algal blooms in the Caloosahatchee River. In 2018, Calusa Waterkeeper, based in Fort Myers, was thrust into the national spotlight when aerial images showed just how extensive the toxic blooms were; John found himself giving nearly 100 interviews to the news media in the months following the bloom, including the CBS Evening News on July 7, 2018.

A few factors set that year apart. Heavy rains from successive storms washed enormous amounts of nutrients into Lake Okeechobee, where the water level rose rapidly. To prevent flooding, the Army Corps of Engineers opened a gate to lower the water level, just as blue-green algae was spreading across its 448,000 acres. That, in turn, sent the toxic bloom into the Caloosahatchee River and its many tributaries and channels.

“Essentially the Corps, without intending to, inundated the river and eventually the estuary with probably the worst blue-green algae bloom in recorded history in this area,” John told the audience after the screening of “Troubled Waters.”

In the audience was Lucille Hartman, who lives in Pelican Landing, a sprawling residential community in Bonita Springs

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PHOTO BY DAVID ANTHONY

that hosted the event. She recalled her own encounter with red tide last summer. “We had company and we drove to Bonita Beach on the Gulf,” she said. “The water was brown, and I thought, ‘Boy, I’m having trouble breathing.’ When I walked back to the car, I felt better.”

The experience made her aware of the dangers of agricultural and lawn fertilizers. “We are all going to have to get used to those pretty little dandelions if we want to save the natural resources that we have,” she said.

Calusa Waterkeeper, Waterkeeper Alliance and the Center for Biological Diversity ended up filing a federal lawsuit in the southern district of Florida. The suit challenged the Army Corps on its releases from Lake Okeechobee, asserting that the agency ignored the potential health impacts on people and wildlife. (Also named were the U.S. Department of the Interior, the National Marine Fisheries Service, and the U.S. Fish and Wildlife Service.) While that litigation unfolds, the Corps says it is working to update its current discharge schedule, and some environmental advocates believe the Corps may have already begun modifying its approach by proposing a “Deviation” to the current Lake schedule to better protect downstream communities from toxic algae.

“The Army Corps miraculously found some latitude to alter their release schedule,” said K.C. Schulberg, executive director of

Calusa Waterkeeper, pointing to the lake-water discharges last year. (K.C. wrote and directed “Troubled Waters.”)

“Historically,” he added, “they said they were just following the rules, that they had to release when the water got to a certain point. The change is partly because of the public outcry, and our lawsuit probably had some effect as well.”

While there is optimism on that front, at least in southwest Florida, Waterkeeper groups and other advocates across the state are bitterly disappointed by bills that recently passed in the Florida Senate and House of Representatives. Called the Clean Waterways Act, the legislation is so weak, advocates say, that it might as well have been written by polluters and corporate interests. Rather than take aim at agricultural runoff and the spreading of biosolids, the legislation tweaks regulations for wastewater treatment plants and septic tanks.

In a newspaper opinion piece, John Cassani wrote that the proposed law relies on the flimsy principles underscoring the adage: “The solution to pollution is dilution.” He chastised lawmakers for “deceptive criteria” and “blurred or meaningless compliance thresholds for clean-up plans.”

In a statement, St. Johns Riverkeeper Lisa Rinaman pointed out that SB 712, as the Senate version of the bill is known, “weakens



PHOTO BY DR. ANTHONY GUILLETTE

TOP, CALUSA WATERKEEPER WAS THRUST INTO THE NATIONAL SPOTLIGHT WHEN AERIAL IMAGES SHOWED JUST HOW EXTENSIVE TOXIC ALGAL BLOOMS IN THE CALOOSAHATCHEE RIVER WERE. ABOVE, DR. MELINDA SIMMONS, ASSISTANT PROFESSOR OF MARINE SCIENCE AT JACKSONVILLE UNIVERSITY, IDENTIFIES A SPECIES OF BLUE-GREEN ALGAE PLAGUING THE ST. JOHNS RIVER FROM A SAMPLE SHE TOOK ON THE WATER WITH ST. JOHNS RIVERKEEPER LISA RINAMAN.



efforts to protect our waters by providing polluter loopholes that allow the dangerous dumping of concentrated human waste to further degrade our springs, our rivers and our waters.”

Calusa Waterkeeper, along with the Center for Biological Diversity and the Sanibel-Captiva Conservation Foundation, also asked the Florida Department of Environmental Protection to adopt new water-quality standards and swim advisories for two cyanotoxins.

“Our petition came on the heels of the United States Environmental Protection Agency’s announcement in May 2019 of their final guidelines for recreational exposure to both cyanotoxins,” John Cassani said. “The states are under pressure to adopt the standards, and if they don’t, they have to explain to EPA why they are not.”

Over lunch at St. John’s River Grille in DeLand, Lisa explained the political dynamic in the state of Florida, one that puts certain waterways like the St. Johns River at a disadvantage. South Florida, she said, has more political clout than North Florida. Even though the current governor is more sympathetic than the previous administration, he still seems to be “sending all his environmental promises” to South Florida.

“What’s irritating is that they thought moving [biosolids] from one location to another was a solution,” she said. “They also thought no one was paying attention. I don’t think they realized it would cause so much damage so quickly.”

A growing concern among scientists and residents in Florida is the possible connection between the toxins produced by blue-green algae and neurodegenerative diseases like ALS, Parkinson’s, and Alzheimer’s. One class of toxins, known as microcystins, has long been known to cause damage to the liver. But another toxin produced by blue-green algae is an amino acid known as BMAA, or beta-methylamino-L-alanine. The neurotoxin, which accumulates in the marine food chain, has been found in the brains of people who have died from those diseases.

A study published last year in the journal Plos One examined the brain tissue of 14 dolphins from Florida and Massachusetts. The dolphins died after becoming stranded in areas that are subject to harmful algal blooms. All but one had BMAA in their brains. “Exposures to cyanotoxins are a public health concern as they are linked to organ system damage and disease,” the study concluded. “Examining the levels of the cyanobacterial toxin BMAA in apex predators, such as dolphins and sharks, provides a powerful bio-indicator of the potential for human exposures.”

One of the authors of the study was Larry E. Brand, a professor of marine biology and fisheries at the University of Miami. He worries that health officials are deeming water bodies safe after ruling out the presence of microcystins only. “No, it’s not OK,” he said in an interview, “because you don’t know about all these other toxins.”

While some scientists have thrown cold water on the link between cyanobacteria and brain disease, Brand believes there is an association, and possibly a cause-and-effect. He has found high concentrations of BMAA throughout the marine food web in South Florida, including shrimp, crabs and fish. In a separate study, he examined the brains of six dolphins in the Indian River Lagoon, and “five of the six had high levels of BMAA in their brain, comparable to that which you see in the brains of humans that have died of Alzheimer’s or ALS.”

Researchers who study the behavior of dolphins in the lagoon also report that they are acting strangely. “They tell me that they see



OPPOSITE PAGE, ALGAE IN A MARINA ON THE CALOOSAHATCHEE RIVER; A GROWING CONCERN AMONG SCIENTISTS AND RESIDENTS IN FLORIDA IS THE POSSIBLE CONNECTION BETWEEN THE TOXINS PRODUCED BY BLUE-GREEN ALGAE AND NEURODEGENERATIVE DISEASES LIKE ALS, PARKINSON’S, AND ALZHEIMER’S. ABOVE, BECAUSE THERE ARE SO MANY RESIDENTIAL COMMUNITIES IN FLORIDA, SUCH AS THIS ONE ON THE CALOOSAHATCHEE RIVER, SOME ENVIRONMENTAL ADVOCATES BELIEVE ENLISTING THEM IN THE FIGHT FOR SAFER, CLEANER WATERS IS KEY.

dolphins that seem confused, that seem to be getting lost, swimming up rivers into freshwater lakes,” Brand said. “So it’s almost like an Alzheimer’s patient. This does seem like a very serious health risk to people here in South Florida. I would not eat any of the seafood in any of these water bodies that get blooms of blue-green algae.”

One of the worst outbreaks of red tide in years occurred along the Gulf Coast, centered on Sarasota Bay. “There was vast devastation of marine life,” said Justin Bloom, founder of Suncoast Waterkeeper. “Our waterways were clogged with dead fish. The ones that tug at the heartstrings were whales, porpoises, sea turtles, snook and tarpon. I mean these are the keystone species that people cherish here.”

The suspected sources of the extreme red tide, which lasted from late 2017 to early 2019, included agricultural and stormwater runoff. But aging sewer systems were also to blame. In a 2018 article on the bloom’s toll on birds and marine life, Brand told *The New York Times* that red tides were now 15 times worse than 50 years ago. Suncoast Waterkeeper, which protects the Sarasota Bay and Tampa Bay estuaries, was a plaintiff in an action against Sarasota County under the Clean Water Act; the group had sued the cities of Gulfport and St. Petersburg over sewage

discharges even before the outbreak.

All three settled, collectively committing hundreds of millions of dollars to upgrade and repair collection pipes and treatment plants. “It was incredibly successful and we are super proud,” Justin says. “Now we have our sights on the next city polluting Tampa Bay with its big nitrogen problem.”

“What’s irritating is that they thought moving [biosolids] from one location to another was a solution. They also thought no one was paying attention.”

Because there are so many residential communities in Florida, some environmental advocates believe enlisting their muscle in the fight for safer, cleaner waters is key. While some communities are reluctant to engage in politics, Pelican Landing in Bonita Springs, with 3,318 units of housing and three golf courses, has entered the fray. The association’s Eco Club, for instance, organized the screening of “Troubled Waters.”

“We want to be as green as possible and cut down on fertilizers,” said June Ricks, president of the Pelican Landing Community Association, which has passed resolutions in support of state legislation. “It’s alarming, especially the connection to Parkinson’s and other neurological diseases. We all need to take action.”

W Lisa W. Foderaro was a staff reporter for *The New York Times* for more than 30 years and has also written for *National Geographic*, *Audubon Magazine*, and *Adirondack Life*.

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