

New project tests Ceded Territories for PFAS at request from tribes

Researchers are assessing aquatic environments for PFAS contamination, evaluating the accumulation of PFAS in different plants and animals, and beginning to assess the health affects of PFAS exposure. PAGE 8

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Aquatic Sciences Chronicle

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STAY CONNECTED



ON THE COVER: Zhewaab Reggie Cadotte, Native American studies faculty and cultural coordinator, Lac Courte Oreilles Ojibwe University; and Gavin Dehnert, Sea Grant and the University of Wisconsin Water Resources Institute, inspect a maple tree for sap sampling on Lac Courte Oreilles tribal land in northern Wisconsin.

FEATURED PODCAST



Podcast host Richelle Wilson interviews Lee Donahue from the town of Campbell's board of supervisors. The town is on French Island and struggles with PFAS-contaminated drinking water.

New podcast explores "forever chemicals" in Wisconsin

Story and images by BONNIE WILLISON

This spring, Sea Grant's Bonnie Willison traveled to Peshtigo and French Island, Wisconsin, to speak to residents affected by PFAS groundwater contamination. As part of a partnership with Midwest Environmental Advocates (MEA), Willison is assisting MEA Public Humanities Fellow and UW-Madison Ph.D. candidate Richelle Wilson with the production of a new podcast series called "Public Trust."

PFAS are an emerging contaminant that can be found in groundwater, surface water, soil, air, plants, animals and humans. Over the past five years, communities like Peshtigo and French Island have been alerted to the fact that their drinking water is contaminated with PFAS, rendering it unsafe to drink.

Wilson spent the 2022-23 academic year developing the podcast series, and she and Willison have recorded interviews with scientists, journalists, community members and others. The program will trace these toxic "forever chemicals" across the state to understand how Wisconsinites have been affected and what state and local officials are doing about it. Each episode features the voices of community members who have been directly affected by environmental contamination.

Visit midwestadvocates.org/podcast to learn more. ■



Campbell residents Jim Boisen and Margie Walker (left) live near the airport and can't drink their well water because of PFAS contamination. Willison and Wilson (right) interviewed them in their home.



Love the lakes?

Deadline approaching to nominate the next Wisconsin Sea Grant Great Lakes Champion award-winner

By MOIRA HARRINGTON

The deadline to nominate the 2023 Great Lakes Champion award-winner is fast approaching. Submit a nomination form, background on the nominee and optional letters of recommendation at seagrant.wisc.edu/championaward. Complete the materials by midnight CT June 14.

Sea Grant presents the award every two years to raise awareness about the importance of the Great Lakes to Wisconsin's culture and economy.

Those eligible for the award are any group, program, organization or individual that displays:

1. A demonstrated commitment to the Great Lakes through some or all of these factors: dedicated actions, facilitated education or enacted policies that have resulted in the conservation and sustainable use of lakes Michigan and Superior, and the rest of the basin, if applicable.
2. Long-term consistent care and concern for the Great Lakes in keeping with the Wisconsin Sea Grant mission—promoting the sustainable use of the Great Lakes through research, education and outreach. As well as in support of the program's vision statement—thriving coastal communities.
3. Leadership in some or all of the following areas: cultivating freshwater partnerships; fostering collaborative action on behalf of Great Lakes issues; enhancing environmental justice, diversity and inclusion in the basin; or service built upon trust and transparency.
4. A contribution to accomplishments in some or all of Sea Grant's focus areas: healthy coastal ecosystems, sustainable fisheries and aquaculture, resilient communities and economies and/or environmental literacy and workforce development.

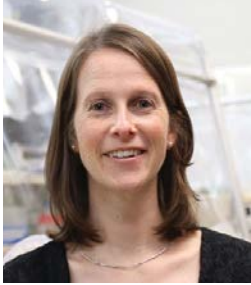
In 2021, Brown County Port and Resource Recovery Department Director Dean Haen was selected. This will be the second time the award is presented, and it will occur at an event to be held in Milwaukee in August. ■



PFAS plume moves into Green Bay via groundwater

By MOIRA HARRINGTON

NOAA CoastWatch Great Lakes



Christy Remucal (left) and Sarah Balgooyen (right), both of the UW–Madison Department of Civil and Environmental Engineering, used a fingerprinting technique to track the movement of PFAS through groundwater and surface water.

A new study has found that a plume of per- and polyfluoroalkyl substances (PFAS) from an industrial source has made its way into Green Bay, Lake Michigan, through the movement of groundwater.

PFAS are often referred to as “forever chemicals” because they do not readily break down in the environment. They have been used to make a wide range of products resistant to water, grease, oil and stains and are also found in firefighting foams, which are a major source of environmental PFAS contamination. The chemical compounds have been shown to have adverse effects on human health.

Christy Remucal with the University of Wisconsin–Madison Department of Civil and Environmental Engineering and postdoctoral co-investigator Sarah Balgooyen published their work in the Dec. 27, 2022, issue of the journal *Environmental Science & Technology*, [go.wisc.edu/6bph35](https://doi.org/10.1021/acs.est.2c0335). It was funded by a grant from the Wisconsin Sea Grant College Program.

“We used a forensics approach to investigate how the PFAS fingerprint from an industrial source changes after undergoing environmental and engineered processes,” Remucal said.

Researchers tracked the movement of PFAS through groundwater and surface water flow, as well as the chemicals’ presence in biosolids on land. Analysis of samples showed that, unfortunately, a large PFAS plume has moved into Green Bay, Lake Michigan.

Green Bay is one of the largest bays on the Great Lakes, an interconnected freshwater system providing drinking water for 30 million U.S. and Canadian residents. That makes it even more important for researchers to understand what contaminants are present and where they may have come from.

The source of this Great Lakes contamination has been traced to Tyco Fire Products. The company’s

fire-training facilities in Marinette and Peshtigo have previously been identified as a source of PFAS contamination in groundwater and private drinking water wells in the area.

The forensic technique in this study used PFAS fingerprinting, a process that uses ratios of individual PFAS compounds to identify PFAS contaminants and their sources. In this case, the PFAS fingerprint in Green Bay is nearly identical to PFAS associated with Tyco and includes PFAS known to be active ingredients in firefighting foams. This fingerprinting method could be used to hold polluting companies responsible for the contaminated water, the researchers said.

The study also found that PFAS associated with the industrial facility are present in streams near some agricultural fields. The researchers believe this PFAS contamination may have come from the treated biosolids many farmers use to fertilize their fields.

Biosolids are a product of wastewater treatment and are rich in nutrients like nitrogen and phosphorus. PFAS in wastewater undergo extensive processing and some PFAS tend to concentrate in biosolids during treatment.

Remucal and Balgooyen determined that PFAS from biosolids can still mobilize after being spread on land. So, when farmers spread biosolids on their fields, PFAS can eventually make their way to adjacent streams.

“Treated biosolids are commonly spread on fields all across Wisconsin,” Balgooyen said. “This information may impact how municipalities across Wisconsin and other states approach the use of biosolids as an agricultural fertilizer.” ■



One of the dark-plumaged red-tailed hawks that Pesano studied for her master's research. This bird was captured in the Twin Cities (Minnesota) in February 2021 and was named "Manley." He was the first dark red-tailed hawk fitted with a satellite transmitter. Manley spent the last two summers in northern Manitoba and has returned to the same winter territory in the Twin Cities since researchers have been studying his movements.



Allie Pesano: On a treasure hunt for birds

By MARIE ZHUIKOV

Allie Pesano first got turned onto birds as an undergraduate at Unity College in Maine. She was studying wildlife biology and, for one class, students were required to learn about various common North American wildlife species. The variety of birds sparked her curiosity, ultimately leading to her current six-month fellowship in avian toxicology with the Environmental Protection Agency's Great Lakes Toxicology and Ecology Division in Duluth, Minnesota.

Allie Pesano is a fellow with the EPA in Duluth, Minnesota, evaluating reproductive success of birds in the area.

"I realized that every bird I saw wasn't the same thing," Pesano said. "They're all very nuanced and unique. That led to my interest in learning more about birds in general. Even in my spare time, I would flip through the bird guide and just kind of go on a treasure hunt in my own back yard to see what kinds of birds were around."

Her back yard was in Syracuse, New York. After obtaining her undergraduate degree, she flitted about the country like a bird, researching migrating hawks in Nevada, nesting endangered sparrows in Florida and resilient saltmarshes in Massachusetts, which, of course, provide homes for wetland birds. Most recently, she graduated with a master's degree in integrated biosciences from the University of Minnesota Duluth. There, in collaboration with the Hawk Ridge Bird Observatory, she used satellite transmitters to determine where some unique, dark-plumaged red-tailed hawks were migrating from on

their way through Duluth. These hawks are usually only found in the western part of North America and are rare in the East. This bird treasure hunt led her to northeastern Canada.

"We discovered they had been spending summers and the breeding season in northern Manitoba and Ontario. Birds that look really dark like that would not, to our historical knowledge, be nesting and breeding in those provinces usually. They would more likely nest in Alaska or British Columbia," Pesano said.

Pesano's latest quest involves researching the impacts of per- and polyfluoroalkyl substances (PFAS) on the reproductive success of birds in the Duluth area.

Under the mentorships of Matt Etterson and John Haselman at the EPA, Pesano is studying tree swallows, black-capped chickadees and house wrens with another EPA Fellow, Emily Pavlovic. Funded by the University of Wisconsin-Madison but working in Duluth, Pesano



Pesano's latest quest involves researching the impacts of per- and polyfluoroalkyl substances (PFAS) on the reproductive success of birds in the Duluth area.

is looking into things like the quality and quantity of food to see if there's any correlation between what the birds are eating and their reproductive success.

The goal of this research is to create a toxicology model that scientists can use to predict, based on contamination concentrations in the environment, what the exposure risk would be to birds in that area.

The three-year U.S. Environmental Protection Agency Human Health and the Environment Research Fellows program is a partnership between the EPA, the University of Wisconsin–Madison and its Aquatic Sciences Center. The intention is to train the next generation of scientists in environmental and ecosystem health. ■

Above: Pesano checks a tree swallow nest as part of her EPA avian PFAS study.

WISCONSIN WATER LIBRARY



Birds of a feather

As the only animal with feathers, birds captivate us with their beauty, their song and their diversity. And birdwatching is awe-inspiring – a great activity for all ages. Even better is reading beautiful books about our feathered friends. These are some of our favorites for children.

Birdology: 30 Activities and Observations for Exploring the World of Birds by Monica Russo. Chicago: Chicago Review Press, 2015.

Birds and Their Feathers by Britta Teckentrup. Munich; London; New York: Prestel, 2018.

The Birdwatchers by Simon James. Cambridge, Mass.: Candlewick Press, 2002.

Counting Birds: The Idea That Helped Save Our Feathered Friends by Heidi E.Y. Stemple. Lake Forest, Calif.: Seagrass Press, 2018.

Binesi-Dibaajimowinan: Ojibwe Bird Stories Unique to Northern Minnesota by LLTC Design & Print Shop, Leech Lake Tribal College, Cass Lake, Minn., 2019.

Hooray for Birds! By Lucy Cousins. Somerville, Mass.: Candlewick Press, 2017.

Little Bird Takes a Bath by Marisabina Russa. New York: Schwartz & Wade Books, 2015.

My Book of Birds by Geraldo Valério. Toronto; Berkeley: Greenwood Books: House of Anansi Press, 2016.

A Nest Is Noisy by Dianna Hutts Aston. San Francisco: Chronicle Books, 2015.

Olivia's Birds: Saving the Gulf by Olivia Boulter. New York: Sterling Children's Books, 2011.

Anyone in Wisconsin can borrow these books. Just email askwater@aqu.wisc.edu.



WISCONSIN WATER RESOURCES INSTITUTE COVER STORY

New project tests Ceded Territories for PFAS at request from tribes

By MARIE ZHUIKOV | Images by BONNIE WILLISON

When Jonathan Gilbert, director of biological services with the Great Lakes Indian Fish and Wildlife Commission (GLIFWC), received a report about levels of PFAS (per- and poly-fluoroalkyl substances) in wolves taken during the 2021 hunting season in Wisconsin, he was flummoxed. The scientific report contained terms and measurements that even he, a biologist, didn't understand. Gilbert's quest for answers led to a larger project that is testing maple syrup, walleyes and lake water for PFAS in areas of the Midwest where Ojibwe tribal members harvest food.



Jonathan Gilbert, Great Lakes Indian Fish and Wildlife Commission.

During the wolf season, hunters volunteered their wolf remains to GLIFWC for PFAS testing. Gilbert said

about 40% of the wolves had detectable levels of these chemicals. He was given Gavin Dehnert's name as someone who could help answer his questions about the PFAS report. Dehnert, with Sea Grant and the University of Wisconsin Water Resources Institute, is an emerging contaminants scientist who specializes in PFAS.

"So, I called him up and we had a nice conversation and he answered all my questions and educated me quite a bit on this," Gilbert said.

Gilbert needed to present the wolf data to the Voigt Intertribal Task Force—a group composed of 10 of the 11 Ojibwe tribes that harvest from Ceded Territories in parts of Minnesota, Wisconsin and Michigan. The task force ensures safe harvest limits and is advised by GLIFWC. Gilbert invited Dehnert to attend the meeting.

Dehnert said, "We spent probably two to three hours just listening to the questions they had, concerns they had—big questions they were really hoping to answer." Those questions involved PFAS levels in fish, wild rice,

maple syrup and other things tribal members harvest on a regular basis.

"Gavin kept saying, 'Well, we don't know, we don't know.' But he took what he heard there, and he wrote up a grant proposal to test the waters in rice lakes and in walleye lakes, and to test the sap of maple trees. That's exactly what the tribes were telling him they were really concerned about," Gilbert said.

The three-year tribally driven project, "Quantifying PFAS bioaccumulation and health impacts on economically important plants and animals associated with aquatic ecosystems in Ceded Territories," was recently funded by the U.S. Geological Survey's Water Resources Research Act Program, the same program through which WRI is funded.

The project has three goals: 1) assess aquatic environments for PFAS contamination in the Ceded Territories, 2) determine the accumulation of PFAS in different plants and animals and 3) understand the health impacts from PFAS exposure. In addition to Dehnert and Gilbert, the project involves Emily Cornelius Ruhs with the University of Chicago, Sean



Opposite: Zhewaab Reggie Cadotte, Native American studies faculty and cultural coordinator, Lac Courte Oreilles Ojibwe University; and Gavin Dehnert, Sea Grant and the University of Wisconsin Water Resources Institute, inspect a maple tree for sap sampling on Lac Courte Oreilles tribal land in northern Wisconsin.

Above: Eve Milusich, UW–Madison, pours maple sap from a collecting bag into a bottle for testing for PFAS.

Top right: Andre Bennett, Lac Courte Oreilles Ojibwe University, prepares a maple sap collecting bag.

Bottom right: A research project team collects maple tree sap for PFAS sampling on Lac Courte Oreilles tribal land in spring 2023. Pictured, left to right, are Eve Milusich, Andre Bennett, Gavin Dehnert, Jonathan Gilbert and Zhewaab Reggie Cadotte.

Strom with the Wisconsin Department of Natural Resources, and Christine Custer and Robert Flynn with USGS.

Dehnert said that part one of the project will explore lakes where there’s high harvests of walleye and other fish species and wild rice in Ceded Territories. Researchers will look for the presence of PFAS and determine the levels.

Part two involves understanding the bioaccumulation of PFAS in harvestable goods. “If we know that it’s in the water source where these walleye or wild rice are living, we want to be able to have some sort of correlation between how much PFAS is in the lake water and then how much is then getting into the fish and wild rice,” Dehnert said. Gilbert stressed that they don’t know how much PFAS moves from the water into fish and plants. They will also test vats of maple sap harvested by tribal members.

Part three will look at impacts on organisms that live in aquatic environments, focusing on tree swallows. This part, led by Ruhs, will explore how PFAS can affect the

immune function of tree swallows in different life stages, from nestlings to adults. The swallows are considered an indicator species for contaminated water because they feed near their nesting area almost solely on aquatic insects. Researchers will take blood samples from the birds and look at white blood cell count and antibodies.

Part one began this spring with sampling of maple sap and lake water in 25 lakes.

Dehnert is looking forward to the project.



Gavin Dehnert, Sea Grant and the University of Wisconsin Water Resources Institute.

“It’s not focusing on just science for science. There’s a true actionable side to it. That was why we chose the plants and animals that were highly harvested by these tribes. If you’re finding high concentrations of PFAS in these types of harvestable goods, they are going to disproportionately impact the tribes because they are relying on them for their sustainability and food consumption. Sometimes in science people might look at different plants and animals that don’t really have a cultural tie. So that, to me, has always been why we got so excited about this project,” Dehnert said. ■

LISTEN TO THIS STORY 



Wisconsin Water News
Episode 48
Testing Ceded Territories
for PFAS at request of tribes
go.wisc.edu/de1bm6

Emily Pavlovic: Up-close and personal with birds

By MARIE ZHUIKOV



Emily Pavlovic's love of birds didn't come to the fore until after college when she worked at an Audubon Center. She turned that love into her vocation and is now a fellow at the Environmental Protection Agency's Great Lakes Toxicology and Ecology Division in Duluth, Minnesota. Under mentorship from Matt Etterson, Pavlovic is looking at the impacts of per- and polyfluoroalkyl substances (PFAS) on the reproductive success of birds in the Duluth area.

After Pavlovic earned her bachelor's degree in biochemistry from Earlham College, she spent five years working as an environmental educator at various nature centers around the U.S. before earning her master's degree.

At the Aullwood Audubon Center and Farm in Dayton, Ohio, Pavlovic had the chance to work with an American kestrel. This small, fierce raptor became an educational bird after an accident broke its wing.

"This kestrel was spunky and loud. It didn't always do the things I wanted it to do. It taught me a lot," Pavlovic said. "Seeing peoples' reactions when they saw this beautiful bird up close was pretty incredible."

Pavlovic's passion for birds led her to the Hawk Ridge Bird Observatory in Duluth, a nature reserve along the Lake Superior coast that's one of the premier bird-watching sites in fall as birds migrate south. For her master's degree in integrated biosciences at the University of Minnesota Duluth, Pavlovic collected feathers from three different species of juvenile raptors that were caught in mist nets (red-tailed hawks, sharp-shinned hawks and northern saw-whet owls). Analyzing the feathers for hydrogen-stable isotopes allowed her to identify where geographically the birds had been born, providing more information for the ridge's long-term dataset.

For her six-month EPA avian toxicology fellowship, Pavlovic is studying tree swallows, black-capped chickadees and house wrens, along with another EPA Fellow, Allie Pesano. "We've got a bunch of nest box locations around Duluth that we're assessing for reproductive success and various metrics of how the birds are doing. Then we're relating that to the amount of PFAS in the environment in those areas," Pavlovic said.

The goal of this research is to create a toxicology model that scientists can use to predict, based on contamination concentrations in the environment, what the exposure risk would be to birds in that area.

The three-year U.S. Environmental Protection Agency Human Health and the Environment Research Fellows program is a partnership between the EPA, the University of Wisconsin-Madison and its Aquatic Sciences Center. The aim is to train the next generation of scientists in environmental and ecosystem health. ■



"I was able to work up close and personal with the birds and really see the power they have on engaging the public," Pavlovic said. "The birds capture people's attention so that you can teach about other really important things like contaminants in the environment or basic ecology."

Top left: Emily Pavlovic, EPA Fellow in avian toxicology, holds a northern saw-whet owl.

Top right: A nest box holds a black-capped chickadee nest and eggs.

Lower right: One of the nest boxes used for Pavlovic's PFAS study.

Find your summer adventure along the coasts

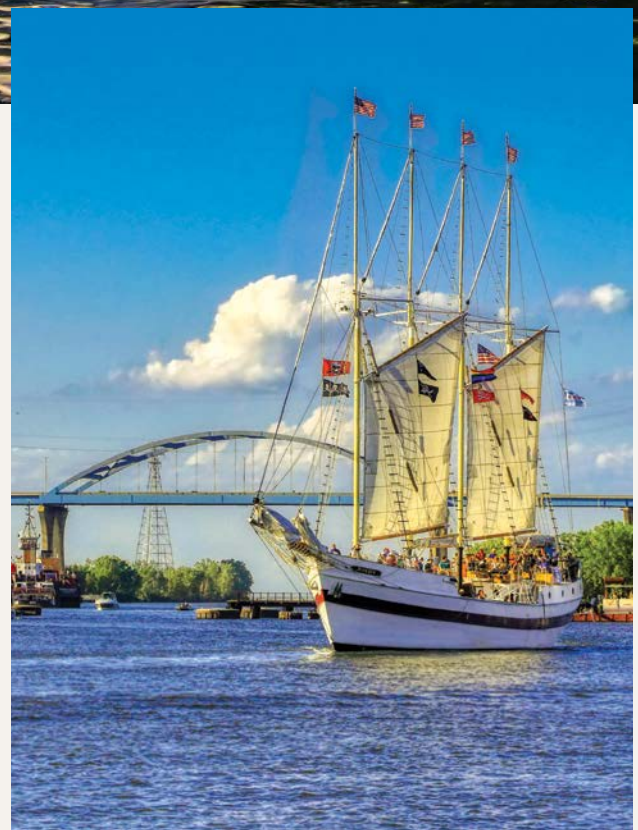
By MOIRA HARRINGTON | Images by Bob Hundt Photography

Summer in Wisconsin can feel fleeting so it's important to maximize your time during those glorious sun-filled days. A tool for finalizing plans is the Wisconsin Coastal Guide.

More than 100 sites have recently been added to this online coastal access inventory first introduced in 2018. It sparks deeper experiences with lakes Michigan and Superior, and all the natural, cultural and recreational assets connected with them in the 15 counties that ring the big lakes. Now, the 429 points that make up the inventory offer a one-stop place to locate museums, historic markers, boat launches, beaches and lighthouses.

Even armchair traveling is possible because stunning photography takes the viewer to large ships in Marinette, Milwaukee's famed lakefront art museum or a tranquil shoreline in Ashland County and more. ■

wisconsincoastalguide.org



Top: Interstate Falls on the Montreal River. Above: Fox River waterfront.



A tasty class project

By SHARON MOEN | Images by Pat Deninger, University of Wisconsin–River Falls

Marie Zhuikov and Sharon Moen, hosts of “The Fish Dish,” met Chef Karalyn Littlefield while recording an episode of the Wisconsin Sea Grant podcast. Their conversations with Littlefield, an instructor of food science at the University of Wisconsin–River Falls, led to a class project and competition focused on Wisconsin fish.

In March, Littlefield’s students were divided into teams and tasked with creating one of five recipes found on the Eat Wisconsin Fish website, plus the Fisherman’s Brunch recipe. The students used walleye and perch caught and donated by the father of one of the students. UW–River Falls media specialist, Pat Deninger, was on hand to photograph the results.

Find all the recipes the product development teams tackled at eatwisconsinfish.org/cooking.



Members of the "Food Product Development and Sensory Evaluation" class from left to right. Back row: Riley Schultz, Karalyn Littlefield (instructor), Caleb Getschel, Matt Cody, Morgan Seitz, Rafael Larosiliere; Middle row: Bailee Aisenbrey, Sierra Kolodjski, Anna Euerle, Kate Petersen; Front row: Emma Hinz, Essie Whitehead, Yihong Deng. Not pictured: Arrayan Young.

LISTEN TO THE FISH DISH EPISODE THAT INSPIRED THIS NEW PARTNERSHIP 



The Fish Dish
Karalyn’s Fish Dish Students
go.wisc.edu/5f34pa



Farmed Rainbow Trout With Sesame, Garlic and Ginger

Serves 4

INGREDIENTS

- 4 (6-ounce) fillets boneless, skinless rainbow trout or similar fish**
- 2 teaspoons soy sauce**
- To taste salt and pepper**
- 1 teaspoon brown sugar**
- 1 teaspoon sesame oil**
- 1 teaspoon minced garlic**
- 1 teaspoon minced fresh ginger**
- 4 green onions, chopped**

DIRECTIONS

- RUB** rainbow trout fillets with soy sauce. Season with salt, pepper and brown sugar; set aside.
- HEAT** sesame oil in a large skillet over medium-high heat. Add garlic, ginger and green onions. Cook and stir until golden brown.
- ADD** rainbow trout fillets and cook until browned and crispy, about 3 minutes. Flip fillets over and continue cooking until the fish flakes easily with a fork, about 3 minutes more.



Great Lakes Whitefish With Tomato Basil Compote

Serves 4

INGREDIENTS

- 4 (6-ounce) boneless and skinless lake whitefish fillets
- 2 tablespoons extra-virgin olive oil
- 2 tablespoons unsalted butter
- 1/2 teaspoon dried thyme
- 2 shallots, chopped
- 4 garlic cloves, chopped
- 1 cup chopped ripe tomatoes
- 2 tablespoons chopped fresh basil leaves
- 1 teaspoon sugar
- 1/4 teaspoon sea salt
- 1/4 teaspoon fresh black pepper

DIRECTIONS

1. **SEASON AND COOK** whitefish fillets with salt and pepper. In large skillet, heat olive oil over medium-high heat. Add fish and cook on both sides until light golden, about 6-8 minutes total. Remove from heat and set aside in warm oven or covered with foil.
2. **MAKE THE SAUCE.** Turn heat to medium-low and add butter to skillet. When hot, add thyme, shallots and garlic; sauté 30 seconds, until fragrant. Add tomatoes, fresh basil and sugar. Bring to a simmer and cook until sauce thickens, 1-2 minutes total. Season with salt and pepper and serve atop warm fish fillets.

Oven-Fried Perch Fillets With Tartar Sauce

Serves 2

INGREDIENTS

- 1 pound perch fillets
- 1/2 cup wheat germ
- 1/2 cup toasted bread crumbs (preferably whole wheat)
- 4 tablespoons margarine or butter, melted
- 1/2 cup milk
- Salt and pepper for seasoning

DIRECTIONS

3. **MIX** wheat germ and bread crumbs on piece of waxed paper. Dip fillets in milk, then press into crumb mixture.
4. **OIL** a flat pan with 2 tablespoons margarine. Place the fillets skin-side down, and drip the remaining 2 tablespoons margarine over top and season with salt and pepper.
5. **BAKE** at 500° for 10 minutes.

TARTAR SAUCE INGREDIENTS

- 1 cup mayonnaise
- 2 tablespoons vinegar
- 1 teaspoon prepared mustard
- 2 tablespoons pickle relish
- 2 tablespoons honey or sugar

DIRECTIONS

Combine ingredients, stir well and serve with oven-fried fillets.



Continued on page 14

Continued from page 13

Smoked Lake Whitefish Sushi

Serves 6-8

SEASONED RICE INGREDIENTS

- 2 cups sushi rice
- 2 cups water, plus extra for rinsing
- ¼ cup rice wine vinegar
- 2 tablespoons sugar
- 1 teaspoon salt

DIRECTIONS

1. **PLACE** rice in bowl and cover with water, swirling the rice. Pour off and repeat 2 times to remove some starch.
2. **IN A LARGE POT**, bring the water to a boil. Add rice. After 2 to 3 minutes, place on low heat and let simmer for 10 to 15 minutes. Stir to prevent rice from sticking to pot and add extra water as needed.
3. **PREPARE** sushi vinegar by mixing rice vinegar, sugar and salt in saucepan over low heat. Heat until the sugar dissolves. Let cool.
4. **POUR** vinegar mixture over the rice, gently folding to incorporate. Keep warm.

ROLL INGREDIENTS

- 2 smoked lake whitefish fillets, flaked
- 1 package nori
- 1 sweet potato, sliced into strips
- 2 tablespoons maple syrup
- 1 apple, peeled and sliced into one-inch pieces

Seasoned rice

Chives, to taste

Materials: ice cold water, bamboo sushi mat, sharp knife

DIRECTIONS

1. **IN A POT**, boil sweet potatoes strips in water. Cook until sweet potato is soft, about 8-10 minutes, and drain water. Let cool in bowl. Add maple syrup and gently toss to coat the potatoes.
2. **PLACE** a sushi mat down on a clean cutting board with the slats running horizontally. Place a nori sheet shiny side down on the mat.
3. **USE** wet hands to spread a thin layer of seasoned rice evenly over the nori sheet, leaving a 1-inch border along the furthest edge from you.
4. **ARRANGE** the fillings across the center of the rice. Do not overstuff the roll!
5. **PICK UP** the edge of the mat closest to you and gently begin to roll the mat over to enclose, using forefingers to keep fillings inside the roll.
6. **WET** the narrow, rice-free border and enclose roll like envelope.
7. **SHAPE** your hands around the mat to gently tighten the sushi roll.
8. **USE** a wet very sharp knife to cut into 1-inch pieces.
9. **ARRANGE** sushi on a serving platter and serve with pickled ginger and wasabi.



Find the recipes at eatwisconsinfish.org/cooking



Vineyard Trout

Serves 4

INGREDIENTS

4 trout fillets (6-8 ounces each)

Wine bouillon

1 cup water

1/4 teaspoon dill seed

1/4 teaspoon rosemary

1/2 cup dry white wine

1/2 teaspoon seasoned salt

WINE SAUCE INGREDIENTS

1/4 cup finely chopped celery

1 tablespoon finely chopped onion

1/8 teaspoon pepper

Dash of marjoram leaves

Dash of dried thyme leaves

2 tablespoons butter

2 tablespoons flour

1/2 cup half-and-half

1/2 cup shredded Monterey Jack cheese

1/2 cup white wine

DIRECTIONS

1. **MIX** water and wine in a large pan. Adjust the amount of water and wine to taste.

2. **ARRANGE** trout fillets on a rack, cover with a lid and steam for 10-11 minutes or until they flake easily with a fork.

3. **REMOVE** fillets to a platter. Carefully remove any bones, leaving each fillet in a solid piece. Discard remaining liquid.

DIRECTIONS

1. **IN A SMALL SAUCEPAN**, sauté celery and onion in the butter over medium heat until tender, about 5 minutes.

2. **ADD** the flour, pepper, marjoram and thyme, stirring until smooth. Gradually blend in the half-and-half and continue over medium heat stirring constantly until the sauce thickens and begins to boil, about 5 minutes.

3. **MIX** in the cheese until it is all melted and remove from heat.

4. **MERGE** the wine with the sauce slowly, and then cover the steamed fillets generously with the sauce.

Fisherman's Brunch

Serves 4

INGREDIENTS

1 cup cooked flaked fish (lake trout or rainbow trout are good options)

4 frozen tart pastry shells or 1 9-inch pie shell

1/2 cup grated Swiss cheese

1 tablespoon finely chopped onion

4 slightly beaten eggs

1 teaspoon salt

1 teaspoon pepper

Paprika

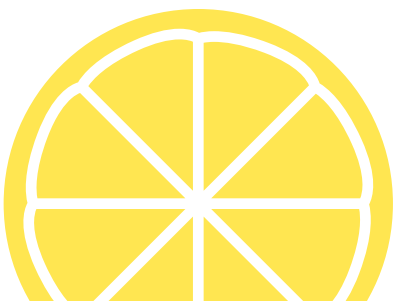
–add spices, herbs and garnishes as desired–

DIRECTIONS

1. **BAKE** pastry shells at 350° for 5 minutes or until slightly browned. Remove from oven.

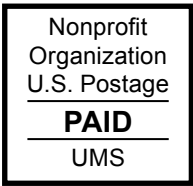
2. **COMBINE** all other ingredients except for paprika and garnishes. Pour into pastry and sprinkle with paprika.

3. **BAKE** at 350° for 20 minutes. Add garnishes after baking.



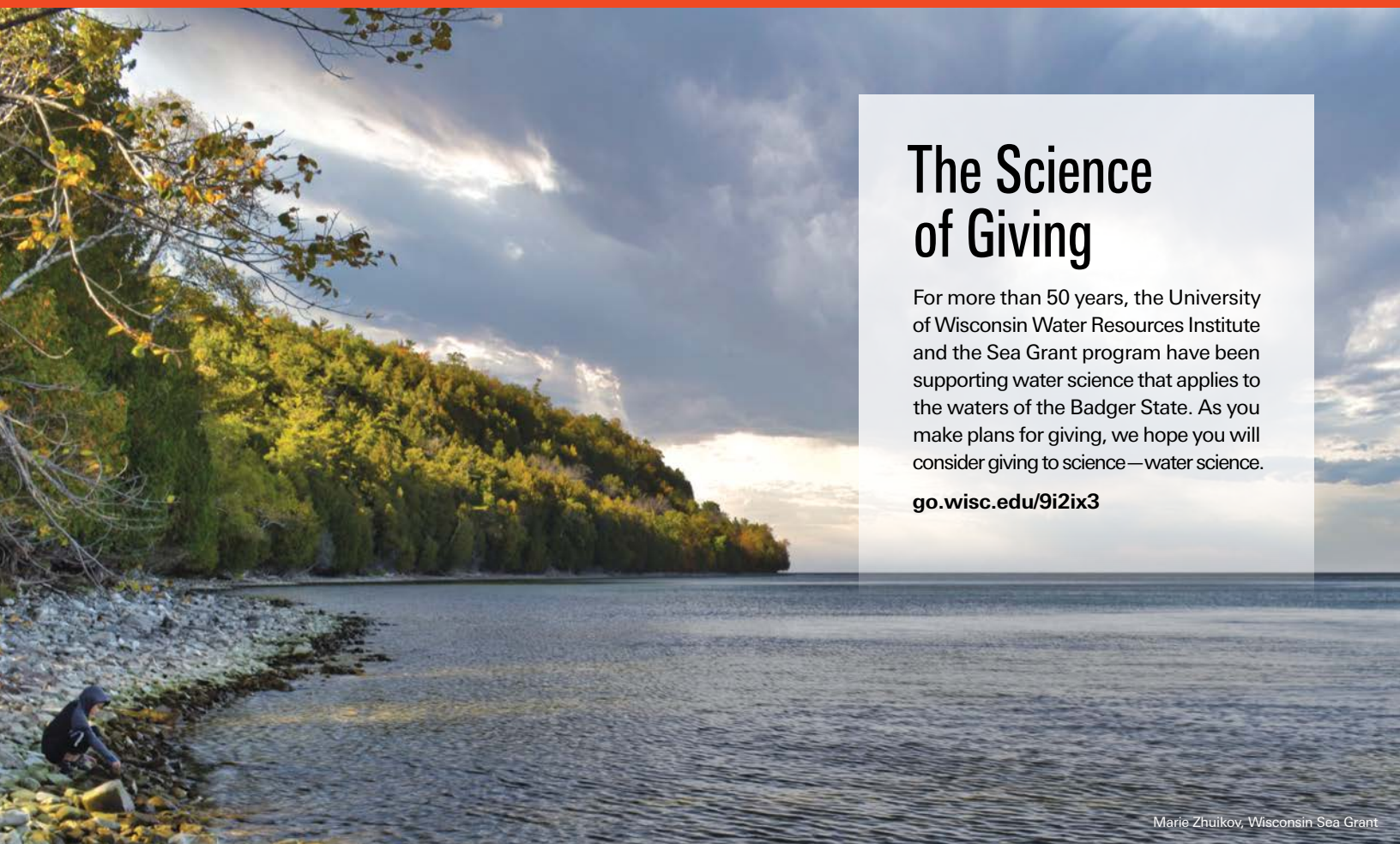


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Aquatic Sciences Chronicle

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For more than 50 years, the University of Wisconsin Water Resources Institute and the Sea Grant program have been supporting water science that applies to the waters of the Badger State. As you make plans for giving, we hope you will consider giving to science—water science.

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Marie Zhuikov, Wisconsin Sea Grant