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Fish and Shellfish Program NEWSLETTER

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In This Issue

https://www.epa.gov/fish-tech

Recent Advisory News

Kansas Fish Consumption Advisories for 2024

On January 8, 2024, the Kansas Department of Health and Environment and the Kansas Department of Wildlife and Parks (collectively, "Kansas") issued fish consumption advisories for 2024. The following advisories identify types of fish, or other aquatic species, that should be eaten in limited quantities or, in some cases, avoided altogether because of contamination. General advice and internet resources are provided to aid the public in making informed decisions regarding the benefits and risks associated with eating locally caught fish from Kansas waters.

Definitions/Servings:

- **Bottom-feeding fish:** buffalo, carp, catfish, sturgeon and suckers
- **Shellfish:** mussels, clams and crayfish

Serving size (skinless fish fillets before cooking):

- Adults and children age 13 and older = 8 ounces
- Children age 6 to 12 = 4 ounces
- Children younger than 6 = 2 ounces

Statewide Mercury Advisories for Fish:

There are many health benefits associated with going outside and catching and consuming fish; however, all fish contain some amount of mercury. Consumption of mercury-rich fish can harm the development of fetuses, nursing babies, and growing children. As a result, anyone who routinely eats fish or serves fish to children, including store-bought fish, should carefully consider the type and amount of fish eaten. Therefore, mercury-sensitive individuals **(women who are pregnant, nursing, or may become pregnant, and children 17 or younger)** should follow the guidelines presented below for eating Kansas-caught fish.

Fishing and Eating Guidelines:

- Eat smaller portions — a fillet about the size of your palm.
- Eat fish species with less mercury (see "Preferred Choice Fish" chart).
- If you don't know what type or size of fish you've eaten, wait at least one week before eating fish again.
- When fishing, keep fish shorter than your forearm (fingertips to elbow) or less than 20 inches, as regulations allow. Visit Fishing Regulations / Fishing / KDWP - KDWP (ksoutdoors.com) for more information.

Preferred Choice Fish	Servings
Blue and channel catfish	1 or 2 per week
Common carp	
Crappies	
White bass, white perch, wiper, striped bass	
Walleye, sauger, saugeye	
Bullhead catfish	
drum	
Sunfish (bluegill, green, redear, etc.)	
Second Choice Fish	**Servings**
Buffalo (black, bigmouth, smallmouth)	1 or 2 per month
Flathead catfish	
Bass (largemounth, small mouth, and spotted)	

Reduce the recommendations above if you tend to keep **fish larger than 20 inches** to:

- Preferred Choice Fish — **not more than 1 serving per week**
- Second Choice Fish — **not more than 1 serving per month**

For specific questions or concerns about mercury in Kansas-caught fish, contact KDHE. For information about mercury in fish caught in other states, store-bought fish, and other types of seafood, visit the EPA and U.S. Food and Drug Administration EPA-FDA Advice about Eating Fish and Shellfish | US EPA website.

Waterbody specific advisories for all consumers

Kansas recommends restricting consumption of **bottom-feeding fish** to **2 servings per month** from the following location because of polychlorinated biphenyls (PCBs):

- **Little Arkansas River** from the Main Street Bridge immediately west of Valley Center to the confluence with the Arkansas River in Wichita (Sedgwick County).

Kansas recommends restricting consumption of **bottom-feeding fish** to **1 serving per month** from the following locations because of PCBs:

- **Cow Creek** in Hutchinson and downstream to the confluence with the Arkansas River (Reno County).
- **K-96 Lake** in Wichita (Sedgwick County).

Kansas recommends restricting consumption of **bottom-feeding fish** to **1 serving per month** from the following location because of arsenic:

- **Mill Creek** from Madison Road east of Morrowville to confluence with Little Blue River (Washington County).

Kansas recommends **not eating** specified fish or aquatic life from the following locations:

- **Antioch Park Lake South** in Antioch Park, Overland Park (Johnson County); **all fish** due to pesticides dieldrin, heptachlor epoxide, chlordane and dichlorophenyltrichloroethanes (DDTs).
- **Arkalon Park Lakes** in Liberal (Seward County) — Kansas recommends not eating **any aquatic life** because the lakes are sustained solely by treated municipal wastewater.
- **Arkansas River** from the Lincoln Street dam in Wichita downstream to the confluence with Cowskin Creek near Belle Plaine (Sedgwick and Sumner counties); **bottom-feeding fish** due to PCBs.
- **Kansas River** from Lawrence (below Bowersock Dam) downstream to Eudora at the confluence of the Wakarusa River (Douglas and Leavenworth counties); **bottom-feeding fish** due to PCBs.
- **Mill Creek** from Washington (below 18th Road) downstream to confluence of Little Blue River (Washington County); **shellfish** due to arsenic.
- **Shoal Creek** from the Missouri/Kansas border to Empire Lake (Cherokee County); **shellfish** due to lead and cadmium.
- **Spring River** from the confluence of Center Creek to the Kansas/Oklahoma border (Cherokee County); **shellfish** due to lead and cadmium.

Waterbodies affected by harmful algae blooms:

To date, measured algal toxin levels in fish samples collected from waters affected by harmful algal blooms suggest the fish are safe to eat. However, please take the following precautions:

- Avoid skin contact with water.
- Wear gloves when handling wet fish and equipment.
- Rinse fish with clean water.
- Remove skin from fillets and rinse with clean water prior to cooking or freezing.
- Eat only skinless fillets.
- Do not eat shellfish.

General advice for reducing exposure to chemicals in fish:

- Keep smaller fish to eat (regulations permitting) and let the big ones go.
- Avoid eating fish parts other than fillets.
- Trim fat from fillets and/or use cooking methods that allows fat to drip away.
- Avoid subsistence fishing (relying on wild-caught fish for daily nutritional needs) in rivers within or immediately downstream of large urban/industrial areas.
- Do not eat fish or aquatic life from wastewater outfalls, waste treatment lagoons or stormwater retention ponds.

Other information from KDHE, KDWP, the EPA and the American Heart Association:

To view the advisories online — and for information about KDHE's Fish Tissue Contaminant Monitoring Program — Fish Tissue Contaminant Monitoring Program | KDHE, KS.

For information about fishing in Kansas — including licensing, regulations, fishing reports and forecasts — Fishing in Kansas | KDWP.

For information about the health benefits and risks of including fish in your diet, visit Eating fish twice a week reduces heart, stroke risk | American Heart Association.

For technical information regarding the EPA risk assessment methods used to determine advisory consumption limits, visit EPA Guidance for Developing Fish Advisories | US EPA.

For more information, contact Jack Lapin at Jack.Lapin@ks.gov or 785-296-6220.

Source: https://www.kdhe.ks.gov/CivicAlerts.aspx?AID=943

South Dakota Department of Health Issues New Fish Consumption Advisories Following Comprehensive Sampling

South Dakota Department of Health Issues New Fish Consumption Advisories Following Comprehensive Sampling

On January 10, 2024, the South Dakota Department of Health (DOH), in partnership with the Department of Agriculture and Natural Resources (DANR) and Game, Fish & Parks (GFP), announced the completion of its annual fish collection and sampling program. This joint effort aims to assess the safety of fish consumption in various water bodies across the state.

“Our commitment to public health and safety drives the annual fish sampling program,” said Department of Health (DOH) Secretary, Melissa Magstadt. “The collaboration between the DOH, DANR, and GFP ensures that South Dakotans have the most up-to-date information regarding fish consumption advisories.”

The DOH encourages the public to stay informed about these advisories and take necessary precautions to ensure the health and well-being of themselves and their families. The recommended advisories are as follows:

- Reid Lake (Clark County) — 32”> Northern Pike advisory, in addition to the existing >23” Walleye advisory.
- Horseshoe Lake (Day County) — 18”> advisory on Walleye.
- Cottonwood Lake (Spink County) — 21”> advisory for Walleye.

These advisories are based on mercury concentrations found in the fish samples and are aimed at providing the public with essential information to make informed decisions about their dietary choices. The mercury found in fish tissue is mostly from atmospheric deposition from sources outside of South Dakota.

“We encourage everyone to check the DOH website for the latest advisories and take necessary precautions when enjoying locally caught fish,” said Magstadt.

The DOH is rolling this out statewide to all offices and partnering with the Department of Social Services to provide additional training and resources for their staff and office buildings. Naloxone boxes were deployed throughout the State Capitol Building as part of this initiative.

For more information and the complete list of state Fish Consumption Advisories, please visit the DOH website.

At the heart of the DOH’s mission is a simple yet profound goal: to protect and improve the health of all South Dakotans. The Department is entrusted with the vital task of promoting wellness, preventing disease and ensuring access to quality healthcare for all South Dakotans across our great state.

For more information, contact Aaron Leingang, SD DANR, at 605-773-3351, John Lott, SD GFP, at 605-773-4508, or John Osburn, SD DOH, at 605-394-6064.

Source: https://doh.sd.gov/news/south-dakota-department-of-health-issues-new-fish-consumption-advisories-following-comprehensive-sampling/

Health Officials Update Fish Consumption Guidance for Mississippi River South of Saint Paul Metro Area

On March 22, 2024, the Minnesota Department of Health (MDH) issued new and updated guidance on fish consumption for the Mississippi River from St. Paul to Wabasha, due to a mixture of pollutants — including per- and polyfluoroalkyl substances (PFAS) — found in fish tissue.

The new guidance, issued with support from the Minnesota Department of Natural Resources (DNR) and the Minnesota Pollution Control Agency (MPCA), applies to U.S. Lock & Dam #2 Pool, U.S. Lock & Dam #3 Pool and U.S. Lock & Dam #4 Pool, including all of the Minnesota lakes and backwaters. It recommends that:

People who are or may become pregnant, people who are breastfeeding or plan to breastfeed, and children under age 15 do not eat fish from these locations.

People not planning to become pregnant and those over age 15 limit fish consumption to one serving a month from these locations.

The guidance for Pools 3 and 4 is new, and the guidance for Pool 2 is more stringent than guidance issued last summer. MPCA provided the data to toxicologists and risk assessors at MDH, who then updated the fish consumption guidance.

“For most people, fish are part of a nutritious, well-balanced diet, because they provide a good source of protein and are rich in essential vitamins and minerals,” MDH Assistant Commissioner Myra Kunas said, “but the Minnesota Department of Health encourages people to limit their intake of fish from certain waterbodies to avoid potential negative health impacts.”

PFAS are harmful chemicals that have been widely used for decades and do not break down in the environment. They can accumulate not just in fish but also in people, and they have been linked to developmental effects in children as well as various cancers. Minnesota has therefore been taking action to eliminate PFAS.

The state has begun to implement a new state law prohibiting PFAS in products, also known as Amara’s Law, which the State Legislature passed and Governor Tim Walz signed in 2023. The law ends avoidable PFAS use in Minnesota by 2032, with prohibitions on PFAS in certain categories of products beginning in 2025.

MDH, DNR and MPCA work together to review scientific information about PFAS and other contaminants in waterbodies and fish and their potential impact on human health in order to provide Minnesotans with the information they need to make informed choices for the health and safety of their family.

For more information on fishing opportunities in Minnesota where waterbodies have been tested and identified as low-PFAS alternatives, see MDH’s Fish Consumption Guidance.

For more information, contact Angela Preimesberger, MDH Fish Consumption Guidance Lead, at angela.preimesberger@state.mn.us and 651-201-4243.

Source: https://www.health.state.mn.us/news/pressrel/2024/fish032224.html#NaN

EPA News

EPA Determines that Alaska's Water Quality Standards Need to be Updated Based on More Accurate Fish Consumption Rates to Protect Communities from Toxic Pollution

On June 6, 2024, the EPA announced a determination that Alaska's water quality standards need to be updated to more accurately reflect the amount of fish Alaskans consume. This action requires Alaska to revise its limits on toxic pollutants in the state's waters to ensure that eating fish supports healthy people and communities. The EPA's determination sets the agency on a path to issuing a federal backstop in the event that Alaska does not strengthen the state's water quality standards to protect residents.

"EPA continues to engage closely with the state of Alaska to ensure its communities, many of which rely on fish and shellfish for subsistence, are safer from pollution," said **EPA Acting Assistant Administrator for Water Bruno Pigott**. "Alaskans eat more salmon and other fish and shellfish than the average American. That's why it's important to update the science and analyses that underpin federal and state standards that protect water quality and ensure that it's safe to eat fish."

This Determination stems from long-standing concerns that the fish consumption rate used in Alaska's existing human health criteria does not reflect the fish consumption patterns of Alaska residents, including rural and Tribal consumers. Alaska's existing water quality standards, which were last updated in 2003, are based on the national default fish consumption rate at that time of approximately seven ounces per month. Data from several sources indicate that actual fish consumption rates for Alaska residents, including Alaska Native and rural subsistence consumers, likely range from 7–14 ounces per day. Updated water quality standards in Alaska will reflect the latest scientific information, including a more accurate fish consumption rate and toxicity of various pollutants.

If the state does not submit revised water quality standards, the EPA plans to propose new and revised standards for Alaska that will take this updated data into account and protect those who eat salmon and other fish and shellfish from the state's waters. The EPA will seek input from the public on the proposed rule and will consider all comments received before proceeding to the final rule stage.

Water quality standards define the water quality goals for a waterbody and provide a regulatory basis for many actions under the Clean Water Act, including reporting on water quality conditions and status; developing water quality-based effluent limits in discharge permits for point-sources; and setting pollution targets for a state's water bodies.

To learn more about the effort to update Alaska's water quality standards to better protect human health go to: https://www.epa.gov/wqs-tech/water-quality-standards-protect-human-health-alaska

For more information, contact r10_press_team@epa.gov.

Source: https://www.epa.gov/newsreleases/epa-determines-alaskas-water-quality-standards-need-be-updated-based-more-accurate

EPA Releases Information that States and Tribes Can Use to Protect Local Fish from Toxic Tire Chemicals

On June 10, 2024, the EPA published water quality screening values under the Clean Water Act related to short-term concentrations of N-(1,3-dimethylbutyl)-N'-phenyl-p-phenylenediamine (6PPD) and 6PPD-quinone (6PPD-q). These chemicals have been found in freshwater ecosystems and linked to runoff from automotive tire dust and debris. Once in freshwater, these chemicals are known toxins that can quickly cause fish-kill events. The EPA's non-regulatory and non-binding screening values provide information that Tribes, states, and local governments can use to monitor their waterways and help protect aquatic life from these harmful pollutants.

"Achieving clean water that protects aquatic life and supports commercial, recreational, and cultural fishing practices takes partnership at all levels of government," **said EPA Acting Assistant Administrator for Water Bruno Pigott**. "6PPD and 6PPD-q can be lethal to fish, so it's important we know where it's polluting waterways. The EPA's screening values provide important information that our partners can use to protect fish populations—especially coho salmon on the Pacific coast. Solutions like stormwater treatment and green infrastructure are effective at reducing concentrations of these chemicals in freshwater ecosystems."

This is the latest in a series of EPA actions to better understand and reduce freshwater aquatic life exposure to these harmful chemicals. In November 2023, the agency committed to consider establishing regulations prohibiting the manufacturing, processing, use and distribution of 6PPD in tires and also announced its intent to publish an advanced notice of proposed rulemaking under the Toxic Substances Control Act. The EPA also announced plans to finalize a rule to require manufacturers (including importers) of 6PPD to report lists and copies of unpublished health and safety studies to the agency. In January 2024, the EPA announced the publication of a draft testing method to help Tribes, states, and key stakeholders determine where and when 6PPD-q is present in local stormwater and surface waters. In March 2024, the agency announced investments in the state of Washington to help treat and control stormwater runoff that can contain 6PPD and 6PPD-q.

The EPA's screening values are based on the latest scientific knowledge about the short-term toxicity of 6PPD and 6PPD-q to freshwater aquatic life. Based on current science, the agency believes that concentrations of 6PPD and 6PPD-q at or below these screening values are likely to protect freshwater aquatic life. The EPA's recommended screening values are not regulations and they do not impose any legally binding requirements.

Learn more about the EPA's screening values for 6PPD and 6PPD-q and other work on 6PPD-q.

For more information, contact press@epa.gov.

Source: https://www.epa.gov/newsreleases/epa-releases-information-states-and-tribes-can-use-protect-local-fish-toxic-tire

EPA Releases New Science-Based Recommendations to Help More States, Tribes, and Territories Reduce Exposure to PFAS in Fish

On July 11, 2024, the EPA issued updated recommendations under the Clean Water Act for contaminants that states, Tribes, and territories should consider monitoring in locally caught, freshwater fish. For the first time, the EPA has added several PFAS to the contaminant list alongside lead, three cyanotoxins, a flame retardant, and amphetamine. The recommendation to monitor for twelve PFAS fulfills a key commitment in Administrator Regan's PFAS Strategic Roadmap and helps protect communities from exposure to these "forever chemicals."

"It's important for EPA to continue advancing the science on PFAS as part of our comprehensive effort to protect the public from these harmful substances," **said EPA Acting Assistant Administrator for Water Bruno Pigott.** "By considering the latest science in their local advisories and testing for PFAS in fish at a local level, states and Tribes can protect subsistence, recreational, and sport fishers."

States, Tribes, and territories monitor and analyze contaminants in fish and shellfish caught in local, fresh waterbodies. When they find contaminants at concentrations that can negatively impact people's health, they issue consumption advisories. Some state and territorial programs that issue fish and shellfish advisories rely on the EPA's recommendations to determine which contaminants to monitor.

Many states are already monitoring for certain PFAS in fish and using local data to issue fish consumption advisories where appropriate. Examples of states that have advisories in place include Alabama, Connecticut, Indiana, Maine, Maryland, Massachusetts, Michigan, Minnesota, New Hampshire, New Jersey, New York, North Carolina, Oregon, Pennsylvania, Washington, and Wisconsin.

With this announcement, the EPA is suggesting that states, Tribes, and territories monitor for twelve PFAS and other contaminants including lead, cyanotoxins, a flame retardant, and amphetamine. This update comes after reviewing scientific literature, analyzing data, and seeking external peer review of the agency's analysis, and it will help ensure that state and Tribal fish advisories consider the latest science.

The EPA's most recent National Aquatic Resource Survey, which monitors fish tissue from lakes and streams across the country, and numerous other studies have found PFAS in freshwater fish and shellfish at levels that may impact human health. These studies indicate the presence of PFAS in fish, but they do not give enough information at a local level to inform public health decisions, which is why the role of states, Tribes, and territories in gathering local data is essential.

The EPA recommends that people who eat locally-caught, freshwater fish and shellfish caught in local rivers and lakes consult their state, Tribe, or territory to determine the safe amount of those fish and shellfish to eat.

View the EPA's lists of contaminants to monitor and learn more about EPA Guidance for Developing Fish Advisories.

For more information, contact press@epa.gov.

Source: https://www.epa.gov/newsreleases/epa-releases-new-science-based-recommendations-help-more-states-tribes-and-territories

EPA Releases Final Integrated Risk Information System (IRIS) Assessment of Perfluorodecanoic Acid (PFDA) and Related Salts

On July 14, 2024, the EPA's IRIS Program posted the *IRIS Toxicological Review of Perfluorodecanoic Acid (PFDA) and Related Salts*. Now final, the IRIS assessment of PFDA can be used to support a variety of decision-making needs across EPA's program offices, regions, and state agencies. The toxicity assessment is posted on the IRIS website.

View the EPA's final assessment of perfluorodecanoic acid.

For more information, contact Dahnish Shams at shams.dahnish@epa.gov.

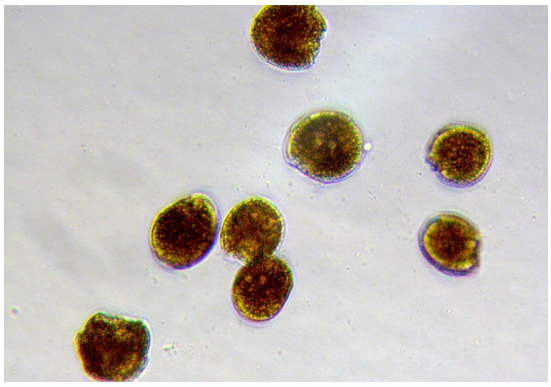
Other News

Grantee Shines New Light on Cause of Ciguatera Seafood Poisoning

On April 24, 2024, keystone Lecturer Alison Robertson, Ph.D., shared how tracking toxic algae in the marine food web can help to prevent ciguatera outbreaks.

Ciguatera poisoning is the most common non-bacterial seafood-borne illness in the world. More than 50,000 cases are reported annually, but scientists think that the true numbers may be much higher, because the symptoms — vomiting, diarrhea, tingling, muscle weakness and pain, and tactile sensitivity to cold — can be easily mistaken for other seafood illnesses.

During a February 27, 2024 Keystone Science Lecture, Alison Robertson, Ph.D., described her team's efforts to track the accumulation and movement of ciguatoxins — the source of ciguatera poisoning — in reef food webs across the world. There is no diagnostic test for ciguatoxins, which is why tracking their movement is so important.



Robertson found that the algae species called Gambierdiscus silvae — shown here under light microscopy — produced 1,000 times more ciguatoxin than the least toxic variety. (*Photo courtesy of Alison Robertson)*

"On a weekly basis, our team is contacted about poisoning outbreaks that are happening among people who have eaten seafood and ended up sick," said Robertson, an associate professor at the University of South Alabama and senior marine scientist at the Dauphin Island Sea Lab. "We've seen an increase in the number of these reports at our lab, because not a lot is known about ciguatera, and people are desperate to find answers."

Her team is interested in understanding how, when, and why the microscopic marine algae produce these potent neurotoxins, and how fish metabolize and respond to them when exposed. By tracing this complicated food web, they aim to develop better methods of predicting and monitoring ciguatoxin buildup in the environment and ultimately improve seafood safety.

"Dr. Robertson demonstrated that understanding the delicate balance of the aquatic ecosystem and marine life is crucial to answering some long-standing questions about ciguatera poisoning in humans around the globe that are pertinent for the development of prevention strategies," said Anika Dzierlenga, Ph.D., a scientific program director in the Genes, Environment, and Health Branch and lecture host. "Her work is an excellent example of One Health research capturing the interrelatedness of environmental, animal, and human health."

Fish and invertebrates can accumulate toxins if they have been feeding in an area that contains toxic algae. (*Photo courtesy of Alison Robertson)*

Uncovering the source

Robertson explained ciguatoxins first enter the food web when they are produced by some algae of the genera Gambierdiscus and Fukuyoa that live on degraded surfaces, as well as sea grasses and macroalgae in coral reefs. These microscopic algae are eaten by a wide variety of fish and marine invertebrates, which are, in turn, consumed by other reef predators, such as triggerfish, snappers, and grouper. If the fish have been feeding in an area where ciguatoxins are being produced locally, they also have the potential to bioaccumulate ciguatoxins and cause ciguatera if consumed by people.

In tracing ciguatoxin movement in the marine food web, Robertson and her collaborative team identified for the first time the specific type of algal ciguatoxin — a neurotoxin called Caribbean CTX-5 — that caused ciguatera in the Caribbean.

"We had identified *Gambierdiscus silvae* as the likely algal source species (along with a few others), but we had not yet worked out the toxin it was producing," Robertson said. "Through strong partnerships and collaborations with the National Research Council and the Norwegian Veterinary Institute, we were finally able to uncover the toxins responsible, which makes tracing them through the environment a realistic goal, and something many in the field have been chasing for decades."

Next steps

Given the lack of pre-market fish testing, diagnostic testing, and medication available to treat ciguatera poisoning, Robertson said she hopes her research will lead to more robust environmental monitoring of CTX-5 and other fish metabolites of the ciguatoxins to reduce ciguatera outbreaks in vulnerable communities.

"If money was no object, we would have teams in the water in all heavily impacted areas trying to do spatial surveys of the algae," Robertson said. "Fishermen know quite a lot about areas that are causing illness, and they're avoiding them. I would like to see teams that can integrate environmental sampling and monitoring with geospatial analysis and fisheries science to get to some kind of predictive capacity."

For more information, contact webcenter@niehs.nih.gov or Christine Bruske Flowers at bruskec@niehs.nih.gov.

Source: https://factor.niehs.nih.gov/2024/4/feature/1-feature-ciguatera-seafood-poisoning

First-Ever Freshwater Mussel Reintroduction in Texas

San Antonio River Authority and U.S. Fish and Wildlife Service (USFWS) Make History with First-Ever Freshwater Mussel Reintroduction in Texas

On May 22, 2024, USFWS announced tha, the San Antonio River Authority and USFWS released freshwater mussels raised by Inks Dam National Fish Hatchery into the Mission Reach of the San Antonio River just south of downtown San Antonio. This historic event marked the first time hatchery-produced freshwater mussels have ever been reintroduced into the wild in Texas.

"As stewards of the San Antonio River Basin, the River Authority recognizes the importance of conserving and restoring freshwater mussel populations for the benefit of both our environment and our communities," said Jim Campbell, San Antonio River Authority Chairman of the Board. "Through collaboration with national organizations like the USFWS we are able to pioneer scientific research and conservation efforts that will help safeguard the natural heritage of our region."

Austin Davis, Senior Aquatic Biologist with the San Antonio River Authority, releases a freshwater mussel raised by Inks Dam National Fish Hatchery into the Mission Reach of the San Antonio River just south of downtown San Antonio. *(Photo courtesy of U.S. Fish and Wildlife Service)*

"This is an exciting milestone that's been a few years in the making," said Amy Lueders, the Service's Southwest Regional Director. "Freshwater mussels are really challenging to propagate. They take a lot of work and innovation, and certainly there was a lot of innovation and persistence from both the Inks Dam National Fish Hatchery and the biologists at the San Antonio River Authority. We look forward to learning a lot and building on this success."

The yellow sandshell mussels were grown at Inks Dam National Fish Hatchery in Burnet, Texas through a contract established with the San Antonio River Authority and USFWS in 2019. Like other national fish hatcheries across the country, the mission at Inks Dam is to both improve recreational fishing and restore aquatic species that are in decline, at risk, and important to the health of our aquatic systems. The freshwater mussel propagation program at Inks Dam represents a relatively new facet of this mission and has evolved rapidly since its initiation in 2017.

Next, Inks Dam National Fish Hatchery hopes to transfer juveniles of three more contract mussel species, including pistolgrip, pimpleback, and threeridge, to the San Antonio River Authority for reintroduction to the Mission Reach. Propagated juvenile pistolgrip currently growing at Inks Dam have reached developmental milestones and could be ready for reintroduction to the San Antonio River as early as this summer.

Freshwater mussels help maintain healthy aquatic ecosystems, because they are one of nature's greatest natural filtration systems. In addition to protecting and improving water quality, they can also help stabilize the banks of rivers during high flow events.

”They burrow into the substrate, and they filter the water and can clean the water,” said Austin Davis, Senior Aquatic Biologist with the San Antonio River Authority. “That’s why we’re happy to have them here. It’s a good sign of high-quality habitat and high-quality water here in the Mission Reach.”

Like other mussel species across the country, Bexar County’s native mussel populations are vulnerable to threats like habitat loss and have been in decline over the years. To help combat this decline and restore their habitat, the San Antonio River Authority’s engineers and scientists have been implementing targeted water quality enhancement efforts in area waterways.

Yellow sandshell freshwater mussels prior to release. *(Photo courtesy of U.S. Fish and Wildlife Service)*

Thanks to these efforts, the River Authority said the Mission Reach of the San Antonio River is in a state that can support healthy freshwater mussel populations. Beginning in July, the team will be releasing another 5,000 freshwater mussels in what they call “a significant milestone in the River Authority’s mission to preserve and enhance the San Antonio River Basin for generations to come.”

A portion of the mussels released into the San Antonio River are being marked with tags which researchers will use to monitor their populations. In the coming years, the passive integrated transponder tags and underwater snorkeling and diving visual surveys will reveal if the released mussels are thriving, reproducing, and establishing new populations.

Davis said his favorite part of the process so far has been watching the “teeny tiny” mussels that come from the hatchery at just over 1mm long grow into adults ready to be released into the San Antonio River.

“We get to watch them grow up to be about 20mm — which is the size we are actually putting into the river,” Davis said. “Seeing this really delicate organism grow from such a small fragile size to being a self-sustaining, self-sufficient individual is really fun.”

Other organizations involved with the historic release include Utah State University, The Meadows Center for Water and the Environment, the Texas Parks and Wildlife Department and the U.S. Army Corps of Engineers.

In addition to releasing freshwater mussels, the San Antonio River Authority was recently awarded $1,000,000 through the Bipartisan Infrastructure Law National Fish Passage Program to remove Otilla Dam in the San Antonio River. Built in the 1920’s for irrigation, the dam is in a state of disrepair from years of use and degradation over time and has become a safety hazard and complete barrier for all aquatic species. The project will improve public safety, reduce flood risk, and reconnect 30 miles of upstream river habitat for recreation and aquatic species like freshwater mussels.

For more information, contact 1-800-344-WILD or Aubry Buzek at aubry_buzek@fws.gov or 512-962-0289.

Source: https://www.fws.gov/story/2024-05/first-ever-freshwater-mussel-reintroduction-texas

Recently Awarded Research

National Fish and Wildlife Foundation Announces $2.4 Million in Grants Benefiting Freshwater Species and Working Lands in the Southeastern United States

Eight projects will benefit freshwater species in targeted watersheds

On December 6, 2023, the National Fish and Wildlife Foundation (NFWF) announced $2.4 million in grants to restore and enhance aquatic habitats to improve populations of imperiled native freshwater aquatic species in Alabama, Florida, Georgia and Tennessee. The grants will leverage $1.8 million in matching contributions for a total conservation impact of $4.2 million.

The grants were awarded through the Southeast Aquatics Fund, a competitive grant program and public-private partnership with funding provided this year by six different funders, including the U.S. Department of Agriculture's Natural Resources Conservation Service (NRCS) and Forest Service, the USFWS, Cargill, Nestlé and Southern Company.

"The Southeast is a hotspot for global aquatic biodiversity, and these projects will help safeguard this incredibly valuable resource," said Jeff Trandahl, executive director and CEO of NFWF. "By improving conditions in-stream and across the landscape, these grants will address threats to aquatic species at multiple scales."

The projects supported by the eight grants will utilize a variety of conservation strategies to positively impact native freshwater species. These strategies include restoring rivers and streams, reducing harmful runoff, conserving stream flow, and assessing species and habitat conditions to prioritize future restoration actions. Several projects will also work with landowners to adopt voluntary practices that conserve aquatic habitat by improving water quality.

"America's farms, ranches, and private forests provide important aquatic habitat," said NRCS Chief Terry Cosby. "The public-private partnerships sustained by these grants will help support farmers and ranchers as they help protect these habitats and improve water quality through voluntary conservation."

"We are proud to engage in partnerships to promote healthy aquatic ecosystems and improve freshwater wildlife diversity," said Regional Forester Ken Arney, for the Forest Service's Southern Region. "Managing our resources together across all lands enables us to achieve the most impactful and beneficial restoration."

"The Service is proud to support aquatic conservation efforts in the Southeast's natural areas," said Mike Oetker, the USFWS acting regional director. "These restoration efforts will help recover several endangered and threatened species, and conserve many at-risk species, only found in this region—while also balancing working lands and community goals."

Importantly, 196,000 acres of working lands will be improved by these grants through voluntary agricultural best management practices and innovative grazing lands management which will filter water, improve soil health, and even improve the carbon sequestration capacity of the land. Additionally, by improving the quality of forage on grazing lands through improved management, these projects will increase the carrying capacity of the land resulting in higher yield. This slate of projects will benefit aquatic species including the striped bass, bridled darter, trispot darter, blue shiner, Alabama rainbow mussel and oval pigtoe mussel.

"The aquatic diversity in the southeastern United States is unrivaled," said Jesalyn McCurry, Southern Company's environmental stewardship manager. "It's important we protect natural resources in the communities we serve, which is why we are thankful for the Southeast Aquatics conservation partnerships."

Launched in 2017, the Southeast Aquatics Fund supports voluntary watershed-based restoration and improved management of aquatic systems and secure populations of native freshwater aquatic species. Including this year's grants, the program has awarded $10.5 million to 46 conservation projects expected to benefit more than 700,000 acres of working lands and riparian areas and restored more than 60 miles of the most biodiverse stream habitat in the world.

A complete list of the 2023 grants made through the Southeast Aquatics Fund is available here. Information regarding the 2024 Request for Proposals can be found here.

For more information, contact Rob Blumenthal at rob.blumenthal@nfwf.org or 202-857-0166.

Source: https://www.nfwf.org/media-center/press-releases/nfwf-announces-2-4-million-grants-benefiting-freshwater-species-and-working-lands-southeastern

Exploring Innovative Strategies to Reduce Red Snapper Discards

On June 3, 2024, National Oceanic and Atmospheric Administration (NOAA) Fisheries recommended nearly $900,000 in funding for projects that will reduce discards and increase fishing opportunities.

Fishing is a favorite pastime and an economic driver, especially in the Southeast. NOAA Fisheries recognized that recreational and commercial fishers, fishery managers, and others are frustrated by short fishing seasons for South Atlantic red snapper and high levels of dead discards. Last year the season was just 2 days.

The most recent South Atlantic red snapper population assessment indicates the species is recovering. However, it is experiencing too much fishing mortality—largely as a result of the number of fish that are discarded and subsequently die.

"We understand anglers are frustrated. We as managers are also frustrated and see the need for new, innovative management strategies to reduce snapper-grouper dead discards, including red snapper," said Andy Strelcheck, NOAA Fisheries' Southeast Regional Administrator. "We also need to better realize the social and economic benefits for the snapper-grouper fishery, and provide additional fishing opportunities as we recover fish stocks."

NOAA Fisheries recommended five projects for funding, totaling $879,211. These projects will explore new, innovative approaches to better understand and reduce red snapper dead discards, and increase fishing opportunities in the South Atlantic snapper-grouper fishery.

Projects Recommended for Funding

The projects below outline the scope of work, the organization doing the work, and the amount requested to complete the projects.

South Carolina Department of Natural Resources

The South Carolina Department of Natural Resources is requesting $209,683 to support a project characterizing South Carolina charter and private recreational red snapper fishing behavior, catch, and discard composition.

Mote Marine Laboratory

Mote Marine Laboratory is requesting $144,666 for portable electronic monitoring systems to support innovative technology data collection in the South Atlantic recreational snapper-grouper fishery.

Florida Fish and Wildlife Conservation Commission

The Florida Fish and Wildlife Conservation Commission is requesting a total of $502,862 to fund three projects. They will look at ways to reduce red snapper and snapper-grouper discards and improve angler satisfaction using their Hot Spot, Florida Snapper-Grouper, and Red Snapper Full Retention Study Fleets.

These three projects require an Exempted Fishing Permit. They would test management strategies that could:

- Reduce discards of red snapper and other managed snapper grouper species
- Create additional opportunities to participate in sustainable recreational harvest
- Improve angler satisfaction

Fishery managers and scientists could use the results of the studies to reduce recreational dead discards and increase fishing opportunities in the South Atlantic snapper-grouper fishery. If granted, the permits would authorize a limited recreational harvest of red snapper outside of the federal recreational season in South Atlantic federal waters. It would also exempt that harvest from the recreational bag and possession limits, recreational annual catch limits, and accountability measures. If granted, the permits would be valid from the date of issuance through June 31, 2025.

All studies will require the cooperation and participation of private recreational anglers and charter captains. Through this collaborative work, our goal is to gather information and data to better quantify and reduce discards, improve fishing opportunities, and inform future management. Funding these projects is a crucial part of a multiple-part plan to improve management.

Other Efforts to Evaluate and Enhance Data Collection

In addition to the funded projects, the South Atlantic Fishery Management Council is going to conduct a Management Strategy Evaluation of the snapper-grouper fishery. These evaluations allow scientists and managers to evaluate and test various management strategies to determine how best they will perform and meet management goals. In addition, the South Atlantic Red Snapper Research Program will produce an independent estimate of the population size of red snapper aged 2 years and older from North Carolina to Florida. This study will help inform the next population assessment for red snapper.

The South Atlantic Fishery Management Council is also continuing to evaluate management actions to end the overfishing of red snapper, as required by the Magnuson-Stevens Act. NOAA notified the Council in summer 2021 that overfishing was occurring, but it has yet to take action to end the overfishing of red snapper.

For more information, contact the NOAA Southeast Regional Office, 727-824-5301 or Allison Garrett at Allison.Garrett@noaa.gov.

Source: https://www.fisheries.noaa.gov/feature-story/exploring-innovative-strategies-reduce-red-snapper-discards

Tech and Tools

Summary of Technical Paper No. 498

In February 2024, the Alaska Department of Fish and Game (ADF&G) published Technical Paper No. 498, entitled Clam Reintroduction in Chenega, Alaska: A Mixed-Methods Approach to Recovery

The project focused on assessing and enhancing clam populations in Prince William Sound community of Chenega, aiming to support sustainable subsistence practices. Clam populations have declined across the Sound, impacting Chenega residents who rely on them. A collaborative effort involving Chugach Regional Resources Commission's Alutiiq Pride Marine Institute (APMI), ADF&G Division of Subsistence, the Chenega Indian Reorganization Act (IRA) Council, and Chenega community members sought to inform shellfish management through comprehensive research.

Wooden frames (beal boxes) used for predator control at Airport Beach. *(Photo courtesy of the Alaska Department of Fish and Game)*

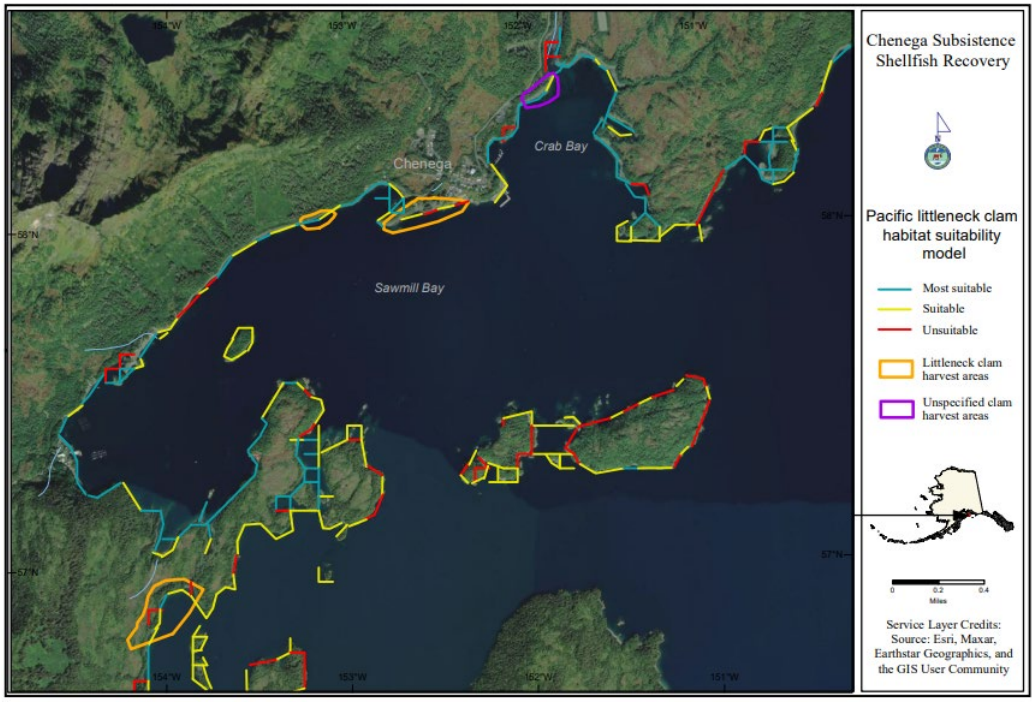
PVC pipes planted on transect line for predator control. *(Photo courtesy of the Alaska Department of Fish and*

Key objectives included identifying suitable beaches for clam reintroduction, collecting environmental data on potential clam habitats, and integrating Traditional Ecological Knowledge (TEK) with modern scientific approaches. ADF&G researchers mapped clam harvest areas and developed a Habitat Suitability Index (HSI) model, enhancing understanding of clam habitat preferences. APMI established a shellfish sanctuary at Crab Bay's Airport Beach, informed by local knowledge and HSI predictions, aiming to balance accessibility for harvesters with ideal clam habitat conditions.

The project successfully spawned and reared juvenile butter and Pacific littleneck clams at accelerated rates compared to previous hatchery operations. However, predation emerged as a significant issue, prompting the use of predator control structures like PVC pipes and wood framed boxes to protect

juvenile clams. The effectiveness of these measures varied, highlighting the need for alternative predator control strategies such as beach netting.

Community engagement was integral, with household surveys confirming long-term clam use and harvest traditions spanning decades, except for the three years following the Exxon Valdez oil spill. TEK interviews emphasized the importance of beach accessibility and timing of clam harvesting during large minus tides. Environmental assessments of Crab Bay's beaches indicated favorable conditions for both butter and Pacific littleneck clams, though predation risk highlights the complexity of the ecosystem management strategies.



HSI Model Results showing habitat sustainability in Sawmill Bay area and harvest areas, Pacific littleneck clams. (*Photo courtesy of the Alaska Department of Fish and Game)*

This project underscored the ongoing cultural and ecological importance of clams to Chenega residents while demonstrating the potential for integrating TEK with scientific models to enhance habitat management. Challenges such as predation control and broodstock availability highlighted the need for adaptive management strategies. Moving forward, sustained collaboration between researchers, local communities, and management agencies will be crucial in ensuring the resilience and sustainability of clam populations near communities in Prince William Sound.

For more information, contact Annette Jarosz at annette@alutiiqprideak.org.

Source: https://www.adfg.alaska.gov/techpap/TP498.pdf

Recent Publications

Journal Articles

The list below provides a selection of research articles.

- Evaluating Contamination of Seafood Purchased from U.S. Retail Stores by Persistent Environmental Pollutants, Pesticides and Veterinary Drugs
  Bedi, M., Y. Sapozhnikova, and C. Ng. 2024. Evaluating Contamination of Seafood Purchased from U.S. Retail Stores by Persistent Environmental Pollutants, Pesticides and Veterinary Drugs. *Food Additives and Contaminants: Part A*:1-14.
- Safe and Sustainable Fish and Seafood System and Per-and Poly-Fluorinated Substances Occurrence: The Role of PFAS Toxicity in the Assessment
  Brambilla, G. 2024. Safe and Sustainable Fish and Seafood System and Per-and Poly-Fluorinated Substances Occurrence: The Role of PFAS Toxicity in the Assessment. *Environmental Science and Pollution Research*:1-7.
- Patterns of Seafood Consumption among New Hampshire Residents Suggest Potential Exposure to Per-and Polyfluoroalkyl Substances
  Crawford, K.A., L.G. Gallagher, N.G. Giffard, C.L. Gardiner, T. Keirns, S. Fernando, T.M. Holsen, J.M. Petali, C.Y. Chen, and M.E. Romano. 2024. Patterns of Seafood Consumption among New Hampshire Residents Suggest Potential Exposure to Per-and Polyfluoroalkyl Substances. *Exposure and Health*:1-17.
- Sociodemographic Disparities in Mercury Exposure from United States Coal-Fired Power Plants
  Dai, M.Q., B.M. Geyman, X.C. Hu, C.P. Thackray, and E.M. Sunderland. 2023. Sociodemographic Disparities in Mercury Exposure from United States Coal-Fired Power Plants. *Environmental Science and Technology Letters* 10(7):589-595.
- Biofloc Technology: A Sustainable Approach Towards Wastewater Utilization and Fish Production
  Kumar, S., P.K. Srivastava, V. Kumar, and C.S. Seth. 2024. Biofloc Technology: A Sustainable Approach Towards Wastewater Utilization and Fish Production. *Lakes and Reservoirs: Research and Management* 29(1):e12449.
- Human Exposure to Per-and Polyfluoroalkyl substances (PFAS) via the Consumption of Fish Leads to Exceedance of Safety Thresholds.
  Langberg, H. A., Breedveld, G. D., Kallenborn, R., Ali, A. M., Choyke, S., McDonough, C. A., Higgins, C. P., Jenssen, B. M., Jartun, M., and Allan, I. Human Exposure to Per-and Polyfluoroalkyl substances (PFAS) via the Consumption of Fish Leads to Exceedance of Safety Thresholds. *Environment International*:108844. 2024.
- Social-Ecological Vulnerability to Environmental Extremes and Adaptation Pathways in Small-Scale Fisheries of the Southern California Current
  Micheli, F., A. Saenz-Arroyo, E. Aalto, R. Beas-Luna, C.A. Boch, J.C. Cardenas, G.A. De Leo, E. Diaz, A. Espinoza-Montes, and E. Finkbeiner. 2024. Social-Ecological Vulnerability to Environmental Extremes and Adaptation Pathways in Small-Scale Fisheries of the Southern California Current. *Frontiers in Marine Science* 11:1322108.
- Mollusk and Crustacean Consumption in the First 1,000 Days: A Scoping Review
  Oaks, B.M., E.A. Gyimah, E. Kleban, K. Ragsdale, and L.L. Iannotti. 2024. Mollusk and Crustacean Consumption in the First 1,000 Days: A Scoping Review. *Nutrition Research Reviews*:1-31.
- Considerations and Challenges in Support of Science and Communication of Fish Consumption Advisories for Per-and Polyfluoroalkyl Substances
  Petali, J.M., E.L. Pulster, C. McCarthy, H.M. Pickard, E.M. Sunderland, J. Bangma, C.C. Carignan, A. Robuck, K.A. Crawford, M.E. Romano, and R. Lohmann. 2024. Considerations and Challenges in Support of Science and Communication of Fish Consumption Advisories for Per-and Polyfluoroalkyl Substances. *Integrated Environmental Assessment and Management*.
- Estimating Lentic Recreational Fisheries Catch and Effort across the United States
  Robertson, M.D., S.R. Midway, H.S. Embke, A.L. Kaz, M. Lang, C. Paukert, N.A. Sievert, L. Wszola, and A.J. Lynch. 2024. Estimating Lentic Recreational Fisheries Catch and Effort across the United States. *Fisheries Management and Ecology* 31(1):e12650.

Upcoming Meetings and Conferences

154th American Fisheries Society Annual Meeting
September 15–19, 2024
Honolulu, Hawaii

Responsible Seafood Summit
October 21–24, 2024
St. Andrew's, Scotland

Additional Information

This bimonthly newsletter highlights current information about fish and shellfish.

For more information about specific advisories within the state, territory, or tribe, contact the appropriate state agency listed on EPA's National Listing of Fish Advisories website at https://fishadvisoryonline.epa.gov/Contacts.aspx.

For more information about this newsletter, contact Sharon Frey (Frey.Sharon@epa.gov, 202-566-1480).

Additional information about advisories and fish and shellfish consumption can be found at https://www.epa.gov/fish-tech.