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Recent Advisory News

Maryland Department of the Environment Issues First Fish Consumption Advisory for PFAS

On October 15, 2021, the Maryland Department of the Environment (MDE) issued its first fish consumption advisory based on levels of a chemical compound in a class known as per- and polyfluoroalkyl substances (PFAS).

MDE issued guidelines for eating three species of fish caught in Piscataway Creek in Prince George's County after sampling fish there and completing a scientific review of health risks posed by levels of perfluorooctane sulfonate (PFOS), one of the more widely studied PFAS chemicals. The recommended monthly limits are for redbreast sunfish and yellow bullhead catfish in the non-tidal portion of Piscataway Creek and largemouth bass in the tidal headwaters of Piscataway Creek.

"Maryland is committed to reducing the risks of PFAS chemicals in our state and continuing our close coordination with scientific, local, state and federal partners," said Maryland Environment Secretary Ben Grumbles. Our focus on PFAS in fish tissue and the resulting consumption advisory is another step forward in understanding, communicating, and reducing the potential for harm."

Maryland has monitored levels of certain chemicals, including polychlorinated biphenyls (PCBs) and mercury, in the state's recreationally caught fish for decades. Findings from such monitoring are the basis for MDE's fish consumption guidelines.

In the fall of 2020, MDE's fish tissue sampling program began to include sampling for PFAS. PFAS refers to a group of more than 4,000 human-made chemicals that have been used since the 1940s in a range of products, including stain- and water-resistant fabrics and carpeting, cleaning products, paints, cookware, food packaging and fire-fighting foams. These uses have led to PFAS entering the environment, where they have been measured in soil, surface water, groundwater, and seafood. Most people have been exposed to PFAS because of its use in so many common consumer goods.

The U.S. Environmental Protection Agency (EPA) has determined that exposure to PFOS over certain levels may increase the risk of developmental health effects during pregnancy

or to breastfed infants as well as the risk of cancer, immune system damage or damage to the liver, thyroid, or other organ systems.

MDE collected fish from routine monitoring, or core, stations. MDE also added two fish tissue sample locations in Piscataway Creek. MDE found elevated concentrations of PFOS in redbreast sunfish, yellow bullhead catfish and largemouth bass, leading to the new guidelines. MDE is also expanding sample collection in the larger Potomac area between the fall of 2021 and the fall of 2022.

In the fall of 2020, MDE sampled fish tissue for PFAS on the Eastern Shore, which includes stations in the Chester, Choptank, Corsica, Elk, and Wicomico rivers and Isle of Wight and Chesapeake bays. The results from that sampling showed no levels of concern.

MDE is collecting additional, targeted monitoring for PFAS in certain specific water bodies that have been identified as having nearby potential sources of PFAS as well as sampling in locations known to be frequented by subsistence anglers and fishers. MDE will assess fish tissue sampling results for PFAS in specific waters and develop advisories when necessary to reduce human health risk.

MDE is prioritizing the implementation of a science-based comprehensive plan for PFAS risk. The implementation focuses on: 1) determining whether there are locations in Maryland where there are unacceptable risks to human health associated with exposures to PFAS, and 2) whether there are locations of continuing releases of PFAS compounds. Earlier this year, MDE released a report on the first phase of sampling of public drinking water systems across Maryland. A report on the results of the second and third rounds of sampling of additional public drinking water systems is ongoing.

Additional information is available at mde.maryland.gov/MDandPFAS.

For more information, contact Jay Apperson at jay.apperson@maryland.gov.

Source: https://news.maryland.gov/mde/2021/10/15/department-of-the-environment-issues-first-fish-consumption-advisory-for-pfas/

Anglers Warned to Not Eat Fish from Neshaminy Creek Basin: PFOS Risk from All Species

On October 13, 2021, the Pennsylvania Department of Environmental Protection (DEP), Agriculture (PDA), and Health (DOH), along with the Pennsylvania Fish and Boat Commission (PFBC), announced a “Do Not Eat” advisory for all fish species caught in the Neshaminy Creek basin in Bucks and Montgomery counties due to extremely high levels of PFOS. The advisory extends to all fish throughout the Neshaminy Creek basin, including Neshaminy Creek State Park and Tyler State Park.

PFOS is one of a group of PFAS that readily bioaccumulates in fish tissue. Prior to this year, Pennsylvania’s Fish Consumption Advisory Program was evaluating sport-caught fish in Pennsylvania waters for various contaminants, including PCBs, pesticides, and heavy metals. This past year, Pennsylvania adopted tiered meal advice for PFOS and

began collecting and analyzing fish tissue samples for PFOS. Levels detected in fish tissue samples from the Neshaminy Creek watershed had levels over the 0.2 parts per million Do Not Eat advisory level.

As a result of the "Do Not Eat" advisory, the PFBC will discontinue fish stocking in the Neshaminy Creek basin until further notice. The PFBC will work to identify nearby replacement waters to redirect trout previously stocked in the basin to provide continued recreational angling opportunities for stocked trout. Fishing is still allowed in the basin, but anglers are urged to practice catch-and-release practices.

The first step in addressing this contamination is identifying sources, several of which have already been identified. Steps have been taken at these sites to remediate contaminated soils and groundwater. DEP is working to identify additional sources by asking permit holders in the Neshaminy Creek watershed to sample their discharges for PFAS.

"An advisory like this is not something that we recommend lightly," said DEP Secretary Patrick McDonnell. "The possible PFOS levels found in fish tissue is greatly concerning. DEP will continue to sample fish species and revisit this recommendation in the future."

"Whenever a stream or lake is removed from our trout stocking list, we take every opportunity to keep the fish local and place them in nearby waters for anglers to enjoy," said Tim Schaeffer, PFBC Executive Director. "We intend to do the same in this case to preserve the opening day and trout season experiences that are so important and valued in Bucks and Montgomery Counties and across the commonwealth."

For more information on Neshaminy Creek visit, www.dep.pa.gov/neshaminy.

For more information, contact Thomas Barron at tbarron@pa.gov.

Source: https://www.ahs.dep.pa.gov/NewsRoomPublic/articleviewer.aspx?id=22013&typeid=1

EPA News

Estimating the Economic Impacts of Climate Change on 16 Major U.S. Fisheries and the Marine Species Distribution Climate Indicator

Warming ocean temperatures in response to climate change have resulted in restructuring of marine species composition, changes in species phenology, and shifts in their geographic distribution. A recently published analysis by EPA, National Oceanic and Atmospheric Administration (NOAA) and other researchers shows that these shifts will have implications for U.S. fisheries and seafood consumers in the future. The study focuses on future changes to thermally available habitat. The study analyzed 16 major fisheries which together account for 56% of the current U.S. commercial fishing revenues.

- The projected change in commercial harvests assumes that the catch of each species would increase or decrease in direct proportion to the projected change in the species' thermally available habitat.

- Overall, the projected impacts on thermal habitat availability and U.S. fisheries are negative; however, some species such as blue crab and white shrimp in the Gulf of Mexico region may experience positive impacts.

- The present value of consumer surplus impacts when discounted at 3% is a net loss of $2.1 billion (2018 U.S. $) in the low emissions case and $4.2 billion in the high emissions scenario.

- Projected annual losses grow with time and reach $278–$901 million by 2100.

EPA and NOAA also collaborated on the development of a climate indicator that shows observed changes in several hundred marine species toward cooler and deeper waters. Data for this indicator were collected by the NOAA's National Marine Fisheries Service during annual bottom trawl fisheries surveys. More information about marine specifies distribution is available here.

In waters off the northeastern United States, several economically important species have shifted northward since the early 1970s. The three species (American lobster, red hake, and black sea bass) have moved northward by an average of 113 miles. This indicator examines changes in the location of fish, shellfish, and other marine species along U.S. coasts.

For more information, contact Michael Kolian at Kolian.Michael@epa.gov.

Source: https://www.worldscientific.com/doi/abs/10.1142/S2010007821500020

Other News

Restored Coho Salmon Run Supports Tribal, Sport Fisheries in Northeast Oregon for First Time in Decades

On November 13, 2020, NOAA reported that reintroduction of coho salmon took hold as record numbers headed for Grande Ronde, Lostine.

Coho salmon are returning to northeast Oregon's Lostine River in record numbers almost five decades after they disappeared from the same basin. Once again, the coho support tribal harvest and a new Oregon recreational fishery.

More than 5,000 adult coho have passed Bonneville Dam on their way to the Lostine River in the fall of 2020. This is the result of reintroductions by the Umatilla and Nez Perce tribes and the Oregon Department of Fish and Wildlife beginning in 2017. Biologists expect many of the fish to make it back to the Lostine River.

It is by far the largest return of coho salmon to the Grande Ronde River and its tributary, the Lostine River, since their reintroduction, said Becky Johnson, Production Division Manager for the Nez Perce Tribe.

"It has been a real tough couple of years in the salmon world, and this is a bright spot," she said, noting low returns of Chinook salmon and steelhead to many parts of the Columbia River Basin in recent years. The last two years (2018 and 2019) have been marked by high ocean temperatures which tend to reduce the quality of food available to juvenile salmon when they first migrate to the ocean.

Coho salmon (Photo courtesy of NOAA)

As the fish again take hold in their historic habitat, state fisheries managers have opened the first recreational fishery for coho salmon in the Grande Ronde River in 40 years.

"This is a testament to the tribal and state efforts to bring this species back to the Lostine, and to the perseverance of these fish," said Allyson Purcell, Branch Chief for Anadromous Production and Inland Fisheries in NOAA Fisheries' West Coast Region. She watched four years ago when biologists released about 500,000 coho smolts into the Lostine River to start the reintroduction effort.

Funding for the reintroduction came in part through the Mitchell Act. The Act supports production of salmon and steelhead in fish hatcheries to offset effects of dams and other development. However, Johnson noted that the project operates on a tight budget that depends on meeting objectives in terms of salmon returns.

In the early part of the last century, dam construction and other development—as well as overfishing—eliminated coho salmon from the Lostine River. This was long before the Endangered Species Act was around to protect them and before the Magnuson-Stevens Act was enacted to sustainably manage fisheries. Several earlier attempts at reintroduction did not take hold.

Recent improvements in fish habitat and coordination between federal, state, and tribal fisheries managers have provided a solid foundation for the reintroduction efforts now underway.

The program has faced some challenges, however. Ocean conditions have not supported strong salmon returns in recent years. Wildfires in the Columbia River Gorge in 2018 forced the evacuation of that year's generation of coho salmon from a hatchery there. Biologists moved them to a hatchery near the Oregon Coast, where they were ultimately raised.

The Lostine River reintroduction program depends on the return of at least 500 adult hatchery fish each year to sustain a broodstock that will supply additional fish for release in future years. The first adults began reaching the Lostine River in October 2020, and the odds are good for hitting that mark.

"We all hope that these fish will continue to do well," Johnson said.

Source: https://www.fisheries.noaa.gov/feature-story/restored-coho-salmon-run-supports-tribal-sport-fisheries-northeast-oregon-first-time?utm_medium=email&utm_source=govdelivery

The Future of Fish Feed May Lie in Insects, Mold, and Algae

On October 26, 2020, NOAA reported that innovations in recent decades have reduced the number of fish products in aquaculture feed. New research could result in replacing them altogether.

NOAA scientists searching for new fish feed ingredients made a promising discovery earlier this year: sablefish raised on mealworms grow as large as those fed fishmeal, which is made with certain wild-caught fish. This is one of the latest studies in a collaborative effort to craft a balanced diet for farmed fish with no fish products. Their results, along with industry innovations, could equip aquaculture to meet the world's growing seafood demand without increasing farmers' dependence on forage species that serve as prey for larger fish.

The mealworm study, conducted by Bernadita Anulacion at the Northwest Fisheries Science Center's (NWFSC) Aqualab, compared the growth of a total of 168 sablefish fed one of three diets. The first group got their protein from plants and fishmeal. The second chowed down on a diet of plant proteins, mealworms, and fishmeal. And the third dined on plant proteins and mealworms. At the end of 10 weeks, all 168 were alive and had clocked roughly the same growth rate.

"We've made a lot of progress towards reducing aquaculture's reliance on wild fish caught for feed in recent decades. We're seeing better use of fish trimmings for feed, and feeds now commonly incorporate plant-based proteins," said Ron Johnson, team leader of the NWFSC Fish Feed and Nutrition Team. "Now we're looking at new alternatives and ways of combining ingredients that could completely eliminate fish products from aquaculture diets while still producing a healthy seafood product for consumers."

Why Feed Alternatives Matter

Like their wild counterparts, farmed marine fish require a balanced mix of essential nutrients, amino acids, and fatty acids. Traditionally, aquaculture farmers mimicked diets found in the wild by serving fish feeds rich in whole fish, fish oils, and processing waste from commercial fisheries. That started to shift in the early 2000s.

Fishmeal and oils primarily come from small, open-ocean species like anchovies, menhaden, sardines, and mackerel. Each of these fish are sustainably managed in U.S. federal waters under the Magnuson-Stevens Act. But an over-reliance on these finite marine resources put a limit on how much the food industries, including aquaculture, could sustainably expand.

So, scientists and the aquaculture industry turned their sights to alternative ingredients. Today, commercial feed contains proteins from soybeans, corn, peas, and wheat. Fish oils have also been supplemented with soybean, canola, and flaxseed oil.

Together, these products have substantially reduced the amount of raw marine materials in aquaculture feed. For example, fish-based ingredients in some Atlantic salmon feed may have fallen from 90 percent in the 1990s to just 25 percent.

A Fish-Free Future for Aquafeeds

Crop-based products have their own limitations. Soy and corn lack some of the important building blocks of proteins. And traditional plant oils don't provide long chain omega-3 fatty acids—a nutrient that is key to fish growth and currently found only in seafood.

Known as "essential fatty acids," long-chain omega-3s also have significant impacts on human heart and brain health. They may also reduce the risk of Alzheimer's and rheumatoid arthritis and aid in the development of muscle tissues. These fatty acids are a large part of why the U.S. Dietary Guidelines recommend eating seafood at least two times a week to promote optimal health and wellness.

Feeds today still use some fish oil to ensure these important omega-3s are present in farmed fish.

To fuel the next generation of fish feeds, NOAA Fisheries and others are investigating new, innovative ingredients. The research so far suggests that insects, phytoplankton, and single-celled proteins like mold, yeast and bacteria could provide the same proteins as fishmeal. It's still unclear what impact each of these sources have on a fish's overall nutrition. For phase two of the mealworm study, researchers are testing if the sablefish raised on that diet have a different nutritional value than their fishmeal-fed counterparts.

Fish oil may prove harder to replace, but algae could hold the key here too. Some companies are developing feeds that incorporate omega-3 fatty acids harvested from algae cells, which convert sugar into essential fatty acids when they are fermented. Researchers at Ocean Era—formerly Kampachi Farms—based in Hawai'i have successfully raised almaco jack on a completely fish-free diet. Funded through NOAA Fisheries' Saltonstall-Kennedy Grant Program, the project developed a diet that used algae-based oil in place of fish oil.

"There is still work to be done, but what's clear is that fish meal and fish oil are not nutritionally required to raise healthy farmed fish that are good for consumers," said Johnson. "NOAA Fisheries and our agency partners are dedicated to finding cost-effective, nutritional alternatives so aquaculture can continue to sustainably meet global seafood demands."

Source: https://www.fisheries.noaa.gov/feature-story/future-fish-feed-may-lie-insects-mold-and-algae?utm_medium=email&utm_source=govdelivery and https://www.nature.com/articles/s41586-020-2616-y

Native Hawaiian Leads Research Effort on Valuable Traditional Hawaiian Food Source

On January 27, 2021, the U.S. Fish and Wildlife Service (USFWS) highlighted a project supported by the Pacific Islands Climate Adaptation Science Center's (CASC) Manager Climate Corps program in which researchers are studying the effects of sea level rise on native shellfish populations.

Although small in stature, the humble '*opihi* is one of the most culturally, economically, and environmentally important coastal resources in Hawai'i. The squat limpet, native to Hawai'i, has long been a major source of

shellfish consumption across the islands and is a central figure in Hawaiian culture. Yet modern stressors, including coastal development, over-fishing, and sea level rise, threaten the long-term sustainability of ‘*opihi* consumption.

Opihi shells (left) and groups of ‘opihi clinging to coastal cliffs. *(Photo courtesy: A. LaValle, NPS. Public*

In a project supported by the Pacific Islands CASC through the Manager Climate Corps program, researchers are monitoring ‘*opihi* populations across the Kalaemanō shoreline of Hawai’i to learn about seasonal shifts in shellfish habitats under present ocean conditions. They will then use this information to develop a model predicting how ‘*opihi* may be affected by different future sea level rise scenarios. This work is a collaboration between the Pacific Islands CASC, the University of Hawai‘i Hilo, the USFWS, the Hawai’i Department of Land and Natural Resources, and a few local conservation groups, including the non-profit Nā Maka Onaona.

Read the original story by the USFWS here and view the accompanying podcast episode here.

Source: https://www.usgs.gov/center-news/native-hawaiian-leads-research-effort-valuable-traditional-hawaiian-food-source

Recently Awarded Research

NFWF, EPA Announce $10 Million in Grants to Restore the Chesapeake Bay Watershed

On October 12, 2021, the National Fish and Wildlife Foundation (NFWF), EPA, and the federal-state Chesapeake Bay Program partnership announced more than $10 million in grants for projects that will protect and restore the Chesapeake Bay and its surrounding watershed. The 49 grants will generate $12 million in matching contributions for a total conservation impact of more than $22 million.

These grants will support on-the-ground projects to improve waterways, restore habitat and strengthen iconic wildlife species. Collectively, the grants will implement water quality improvement practices on more than 45,000 acres, restore more than 45 miles of streamside forest habitat and prevent more than 6,300 tons of pollutants annually from entering the rivers and streams that feed the Chesapeake Bay.

Examples of this year’s grant recipients include:

- American Forests ($49,900) will work with partners to improve tree canopy by building a tree equity tool for use across the greater Washington metropolitan region, which will focus urban forestry projects and resources on communities of highest need.

- Piedmont Environmental Council ($263,800) will pair riparian buffer restoration, livestock exclusion, and implementation of agricultural best management practices with land conservation measures to restore and sustain long-term water quality benefits.

- University of Maryland Environmental Finance Center ($50,000) will work with local governments in West Virginia to expand their capacity to address water quality improvements and mitigate hazards in a coordinated way that creates efficiencies and reduces implementation costs.

- Defensores de la Cuenca ($167,800) will pair workshops with hands-on experiences to train primarily Spanish-speaking participants in the Anacostia River watershed on watershed issues, culminating in the completion of locally led watershed restoration projects by program participants.

The grants were awarded through the Small Watershed Grants (SWG) program, a core program under NFWF's Chesapeake Bay Stewardship Fund (CBSF). CBSF is a partnership between NFWF and the EPA to provide grant funding, technical assistance and networking and information sharing in support of local, on-the-ground conservation efforts to restore the bay and its tributary rivers and streams. Additional support for the program comes from the Altria Group, the U.S. Department of Agriculture, U.S. Forest Service, and USFWS.

Since 1999, the SWG program has provided more than $83 million to 985 projects to promote on-the-ground community-based efforts, which result in measurable improvements to local stream health and habitat, and the water quality of the Chesapeake Bay. The SWG program includes two distinct funding opportunities: SWG Implementation (SWG-I) grants of $50,000-$500,000 awarded for projects that result in direct, on-the-ground actions to protect and restore water quality, species, and habitats in the Bay watershed; SWG Planning and Technical Assistance (SWG-PTA) grants up to $50,000 awarded for projects that enhance local capacity to more efficiently and effectively implement future on-the-ground actions through assessment, planning, design and other technical assistance-oriented activities.

A complete list of the 2021 Chesapeake Bay Small Watershed Grant recipients is available here. For more information about the Chesapeake Bay Stewardship Fund, visit www.nfwf.org/chesapeake.

Source: https://www.nfwf.org/media-center/nfwf-epa-announce-10-million-grants-restore-chesapeake-bay-watershed

EPA Awards 15 Northwest Tribes Nearly $2 Million For Water Quality Improvement And Wetland Program Development

On September 30, 2021, EPA awarded 15 Northwest tribes a total of $1,939,944 to boost programs that restore habitat, protect tribal water quality and wetlands across four Northwest states. The funding was awarded through EPA's Tribal Clean Water Act Nonpoint Source and Wetland Program Development Grants.

Grant funds have been awarded to the Chugach Regional Resources Commission, Coeur D'Alene, Nez Perce Tribe, Klamath Tribes, Confederated Tribes of Siletz Indians, Confederated Tribes of the Coos, Lower Umpqua, and Siuslaw Indians, Confederated Tribes of Umatilla Indian Reservation, Confederated Tribes of the Colville

Reservation, the Lummi Tribe of the Lummi Reservation, Quinault Indian Nation, Squaxin Island Tribe, Snoqualmie Tribe, Stillaguamish Tribe of Indians of Washington, and Tulalip Tribes of Washington.

Below are the projects funded in this year's round of grants:

Non-Point 319 Wetlands Grants - $799,580 total

Confederated Tribes of the Colville Reservation - $100,000

The Confederated Tribes of the Colville Reservation propose nonpoint source water pollution control work to improve water quality in the Armstrong Creek, Smith Creek, and Pe'el Creek watersheds by decommissioning approximately four miles of roads along numerous creeks. Project work will improve water quality by reducing sediment delivery from roads to streams through reduction of road mileage, which will restore natural hillslope hydrology and watershed hydrology by removing impediments to natural flow including an unnecessary culvert. This project also includes support for the tribe's Nonpoint Source Management Coordinator to monitor and administer regulation of nonpoint source pollution generating activities across the 1.4 million-acre Colville Indian Reservation.

Lummi Nation - $100,000

To improve temperature and habitat complexity in Water Resource Inventory Area 1 (WRIA 1), the Lummi Nation Natural Resources Department will provide final designs and implementation for 11 engineered logjams, including one channel spanner, to restore habitat in the South Fork Nooksack River. The Upper Fobes Reach Phase 2 project is located between river miles 19.4 and 19.0 on the main stem of the South Fork Nooksack, near Hamilton, in Skagit County, Washington, and is listed on Washington State's list of impaired waterbodies as temperature impaired. High water temperatures in the South Fork are detrimental to fish and other native species that depend on cool, clean, well-oxygenated water. The primary goal of this project is to restore natural channel and floodplain processes to maintain salmon spawning, rearing, and holding habitat, while improving late summer flow and thermal refugia for Chinook and steelhead. To achieve this goal, this project will improve connectivity with off-channel habitat, increase available thermal refuge for salmon during summer months, and increase key habitat quantity by creating pools associated with logjams as areas of refuge for salmon.

Nez Perce Tribe - $100,000

The Nez Perce Tribe proposes to reduce nonpoint source pollution in the headwaters of Lolo Creek by removing 40 acres of livestock access to Jim Brown Creek. Removing livestock access will help meet water quality targets by limiting future impacts, improving hydrologic function, and stabilizing stream banks by planting native vegetation in the heavily degraded riparian area along the creek. Project work also includes evaluating the effectiveness of best management practices through performance trend monitoring to establish which practices are most effective. Planned education and outreach about the project will promote adoption of similar water quality improvement practices and projects by adjacent landowners and others in the community.

Squaxin Island Tribe - $100,000

The goal of this project proposed by the Squaxin Island Tribe is to transform a gas station runoff stormwater basin into a bioretention facility, in collaboration with Mason Conservation District and Washington State University, to remove pollutants from runoff. Project work would also help prevent petroleum and metals-laden runoff from reaching Little Creek and Skookum Creek. Water quality and water quantity analyses will provide data on water quality parameters to inform the overall performance of the bioretention facility throughout the period of the project. Future work would include using this bioretention facility retrofit as a model for future larger projects by the Squaxin Island Tribe.

Tulalip Tribes of Washington - $100,000

The Tulalip Tribe proposed a project to remove pollution sources from Tulalip shorelines to help re-open shellfish harvesting for tribal members and enhance and restore an area of shoreline within Tulalip Bay. The tribe will work with a consulting firm to inform the actions needed to remove pollutants from Tulalip beaches and restore a 32,246 sq. ft. shoreline buffer with a planting plan that includes two years of monitoring following the planting and an 11,000 sq. ft. invasive plant removal plan. The project will also install three to five interpretive signs along the restoration site. This project implements work from a nine-element watershed-based plan (buffer restoration) and implements a watershed project (shoreline development analysis) that is a significant step towards solving nonpoint source impairments or threats on a watershed-wide basis.

The Klamath Tribes - $99,992

The Klamath Tribes will use grant funds to purchase and install a cost-effective solar powered water pump to lift high nutrient agricultural tailwater from an irrigation canal and irrigation drain into a water treatment wetland. The pump and treatment wetland are part of a larger effort led by Oregon Department of Agriculture in collaboration with the landowners, the Klamath Tribes, Natural Resource Conservation Service, Trout Unlimited, Klamath Soil and Water Conservation District, PacifiCorp, USFWS, and Klamath Watershed Partnership to design and implement best management practices to minimize external nutrient loading from the agricultural properties around Upper Klamath Lake.

Confederated Tribes of Siletz Indians - $100,000

The five-year goal of this Phase 1 project is to enhance and create complex channel habitat in the Siletz River to support juvenile salmon and lamprey during key periods of mainstem habitat use. The Tribes will construct 25 additional large wood and boulder structures at three sites within a one-mile river reach to slow velocities and capture sediment under channel forming conditions (2- year flow events and greater). With the addition of these structures, the project will increase riverbed roughness, increase bed complexity and sediment sorting, create sand bar and island habitats, and increase habitats with preferred rearing velocities for salmon fry (velocity below 0.75 ft/sec).

Confederated Tribes of the Umatilla Indian Reservation - $99,587

This project supports ongoing monitoring and ecosystem restoration to improve the water temperature of Meacham Creek. The goal of this project is to restore floodplain access and function for one mile of the Meacham Creek riparian zone between River Mile 10 and 11, and thereby increase the stability of riparian zone soils, which will support an enhanced riparian habitat on the streambanks. The project will be in conjunction with ongoing efforts to reestablish functioning floodplain ecosystem processes in lower Meacham Creek. This project will fund temporary

bridge installation, stream dewatering and all other erosion and sediment control best management practices to reduce turbidity as the larger restoration work is completed.

Wetland Development Grants - $1,140,364 total

The Klamath Tribes - $152,417

The Klamath Tribe grant agreement is for a two-year Phase 2 groundwater and surface-water monitoring study for the Klamath Marsh in Oregon. It expands monitoring begun in 2020 to include additional sample locations; installation of dataloggers for seasonally inaccessible sample sites; and extends the monitoring period to 4 years. The tribe is collaborating with the USGS on an investigation focused on monitoring groundwater adjacent to the Klamath Marsh, assessing long-term changes in marsh and open water area and changes in irrigated agricultural lands adjacent to the Klamath Marsh. The tribe will prepare a report summarizing marsh surface and groundwater levels in the Klamath Marsh and analyze water balance components to support the tribe's wetland program in conducting future restoration and acquisition projects. The tribe will also update their 2014 EPA-approved Wetland Program Plan to cover the 6-year period of 2021- 2026.

The Confederated Tribes of the Coos, Lower Umpqua, and Siuslaw Indians - $240,917

The Confederated Tribes of the Coos, Lower Umpqua, and Siuslaw Indians (CTCLUSI) grant agreement is for a two-year project designed to increase the tribes' organizational capacity and enhance their collaborative efforts to manage, restore, and protect wetland throughout their ancestral territory in southwest Oregon through development of a Wetland Program Plan. The plan will include goals, strategies, and priorities for addressing wetland restoration and protection efforts on lands under the tribes' jurisdiction. The project includes development of Tribal ordinances for the protection of wetlands; hosting a stakeholder's summit; production of up-to-date wetland maps; development of wetland monitoring processes and protocols; development of processes and protocols for deploying Traditional Ecological Knowledge (TEK) into restoration/protection strategies; and development of Tribal specific training materials and tools for program staff.

Chugach Regional Resources Commission - $122,495

The Chugach Regional Resources Commission (CRRC) grant agreement is to improve wetland conservation and management through comprehensive mapping and wetland assessment in the Chenega region of Alaska. CRRC plans to update geospatial wetlands information covering their traditional lands. Alaska is home to 65 percent of the nation's wetlands, which cover 45 percent of the state's surface area and support a diversity of important plants and animal species. USFWS's National Wetland Inventory for Alaska is outdated for the Chenega Indian Reorganization Act (IRA) Council's traditional lands and needs to be updated to allow for meaningful monitoring and management. The project includes a contemporary National Wetlands Inventory in the region for use by tribes to manage their wetlands.

Coeur D'Alene Tribe - $115,540

The Coeur D'Alene Tribe will update to their Wetland Program Plan and support funding activities that are included in the Tribe's current EPA-approved plan. The tribe will host Coeur d'Alene Tribal Wetland Workgroup meetings; conduct outreach within the Tribe and to landowners regarding their wetland/aquatic resource conservation programs; identify reference wetlands through their monitoring program for different wetland types on the Coeur d'Alene Reservation; conduct wetland assessments on at least five new wetland sites, including reference wetlands,

develop a Standard Operating Procedures manual to enroll lands into conservation programs, and research establishing a Coeur d'Alene Tribe Conservation District. The final products will be an updated Coeur d'Alene Tribe Wetland Program Plan for a 6-year period, a report summarizing the wetland assessments and conservation enrollment results, a Standard Operating Procedures manual, and a report on the results and recommendations from the research to establish a Coeur d'Alene Tribe Conservation District.

Quinault Indian Nation - $207,776

The Quinault Indian Nation will develop a Wetland Climate Change Adaptation Plan and develop a more extensive remote monitoring program including updating their wetland mapped inventory with the use of an unmanned aircraft system or drone. This 12-month project will focus on developing and refining the Quinault Environmental Protection Department's capacity to manage wetland resources as identified in the tribe's updated Wetland Program Plan (2022-2028) as well as to implement Quinault Nation's other rules and regulations to protect wetlands. Two deliverables will be development of methods and studies to address at risk or vulnerable wetland ecosystems, aquatic resources, and wetland-dependent priority species due to hazard mitigation/flood/drought planning, and development of improved wetland inventory and maps. This project will sustain the current effort at Quinault Indian Nation to make science-based decisions to protect wetland resources and their functions.

Snoqualmie Tribe - $76,354

The Snoqualmie Tribe grant agreement is to continue to lead the Pacific Northwest (PNW) Tribal Wetlands Working Group (TWIG) for two more years. The Snoqualmie Tribe has been leading the PNW TWIG for four years. The PNW TWIG is a tribally run peer-to-peer network that formed in 2010 to assist tribes in managing wetlands. The goal of the PNW TWIG is to foster a community of support for Tribal wetland managers, assisting tribes that are beginning, in process, or succeeding in their Wetland Program Plans and wetland management. Some of these ways include by participating as a key stakeholder in the Association of State and Wetland Managers proposed tribal outreach advisory working group, which will help to identify and address national tribal wetland training needs; leveraging the experience of the PNW TWIG to work with other groups across the nation in an advisory capacity; creating important professional support networks within EPA regions; and coordinating workshops and trainings of the PNW TWIG, open to tribal staff throughout EPA's Region 10 (AK, ID, OR, WA) over a two year period. Additionally, this grant will be used to enhance TWIG's online presence by sharing TWIG trainings, virtual workshops, and other visual video materials, making them available to Tribes and others across the nation.

Stillaguamish Tribe of Indians of Washington - $224,865

The Stillaguamish Tribe will develop and implement avian monitoring and assessment of estuarine wetlands and update their existing Wetland Program Plan. The objectives of the project are to develop an avian monitoring framework and sampling design for estuarine wetlands that will allow the Stillaguamish Tribe to improve its wetland management in estuarine habitats, and to identify management actions, including identifying priority approaches for restoration. This project will advance the Tribe's understanding of estuarine restoration impact on bird communities. The grant tasks include: gathering information on avian species and their needs to establish management priorities that can guide the development of monitoring; developing, implementing, and evaluating sampling designs and field protocols for monitoring estuarine birds; exploring avian monitoring data management and warehousing needs; updating the Stillaguamish Tribe's current (2019-2024) Wetland Program Plan to include

estuarine wetland restoration and protection goals; and conducting outreach to managers, agencies and monitoring practitioners involved in wetland management.

Source: https://www.epa.gov/newsreleases/epa-awards-15-northwest-tribes-nearly-2-million-water-quality-improvement-and-wetland

Tech and Tools

Uncovering Hidden Forever Chemicals: New Tool Finds and Fingerprints Previously Undetected PFAS Compounds in Watersheds on Cape Cod

Researchers from Harvard University have developed a new testing method to detect PFAS chemicals in water. This new method measures for total organofluorine and then transforms PFAS precursor chemicals to their terminal and measurable forms. The study was published on March 5, 2021, in *Environmental Science & Technology* and is accessible here: https://pubs.acs.org/doi/10.1021/acs.est.0c07296

For more information, contact Leah Burrows at lburrows@seas.harvard.edu.

Source: https://www.seas.harvard.edu/news/2021/03/uncovering-hidden-forever-chemicals

Recent Publications

Journal Articles

The list below provides a selection of research articles.

- Microplastic Exposure by Razor Clam Recreational Harvester-Consumers Along a Sparsely Populated Coastline
  Baechler, B., E. Granek, S. Mazzone, M. Nielsen-Pincus, and S. Brander. 2020. Microplastic exposure by razor clam recreational harvester-consumers along a sparsely populated coastline. *Frontiers in Marine Science* 7:588481.

- Resilience of Cold Water Aquaculture: A Review of Likely Scenarios as Climate Changes in the Gulf of Maine
  Bricknell, I.R., S.D. Birkel, S.H. Brawley, T. Van Kirk, H.J. Hamlin, K. Capistrant-Fossa, K. Huguenard, G.P. Van Walsum, Z.L. Liu, L.H. Zhu, G. Grebe, E. Taccardi, M. Miller, B.M. Preziosi, K. Duffy, C.J. Byron, C.T.C. Quigley, T.J. Bowden, D. Brady, B.F. Beal, P.K. Sappati, T.R. Johnson, and S. Moeykens. 2021. Resilience of cold water aquaculture: a review of likely scenarios as climate changes in the Gulf of Maine. *Reviews in Aquaculture* 13(1):460-503.

- Can Shellfish be Used to Monitor SARS-CoV-2 in the Coastal Environment?
  Desdouits, M., J.-C. Piquet, C. Wacrenier, C. Le Mennec, S. Parnaudeau, S. Jousse, S. Rocq, L. Bigault, M. Contrant, P. Garry, F. Chavanon, R. Gabellec, L. Lamort, L. Lebrun, P. Le Gall, C. Meteigner, A. Schmitt, J.L. Seugnet, O. Serais, C. Peltier, C. Bressolette-Bodin, Y. Blanchard, and F.S. Le Guyader. 2021. Can shellfish be used to monitor SARS-CoV-2 in the coastal environment? *Science of The Total Environment* 778:146270.

- Pharmaceuticals and Alkylphenols in Transplanted Pacific Oysters (*Crassostrea gigas*): Spatial Variation and Growth Effects
  Ehrhart, A.L., and E.F. Granek. 2021. Pharmaceuticals and alkylphenols in transplanted Pacific oysters (*Crassostrea gigas*): Spatial variation and growth effects. *Marine Pollution Bulletin* 170:112584.

- Microplastics in Shellfish and Implications for Food Safety
  Li, Q., C. Ma, Q. Zhang, and H. Shi. 2021. Microplastics in shellfish and implications for food safety. *Current Opinion in Food Science* 40:192-197.

- Maternal Transfer of Polychlorinated Biphenyls in Pacific Sand Lance (*Ammodytes personatus*), Puget Sound, Washington
  Liedtke, T.L., and K.E. Conn. 2021. Maternal transfer of polychlorinated biphenyls in Pacific sand lance (*Ammodytes personatus*), Puget Sound, Washington. *Science of The Total Environment* 764:142819.

- Benthic Macroinvertebrate Community Response to Environmental Changes Over Seven Decades in an Urbanized Estuary in the Northeastern United States
  Pelletier, M., D. Cobb, K. Rocha, K.T. Ho, M.G. Cantwell, M. Perron, M.A. Charpentier, H.W. Buffum, S.S. Hale, and R.M. Burgess. 2021. Benthic macroinvertebrate community response to environmental changes over seven decades in an urbanized estuary in the northeastern United States. *Marine Environmental Research* 169:105323.

- Exploring Biophysical Linkages between Coastal Forestry Management Practices and Aquatic Bivalve Contaminant Exposure
  Scully-Engelmeyer, K., E.F. Granek, M. Nielsen-Pincus, A. Lanier, S.S. Rumrill, P. Moran, E. Nilsen, M.L. Hladik, and L. Pillsbury. 2021. Exploring biophysical linkages between coastal forestry management practices and aquatic bivalve contaminant exposure. *Toxics* 9(3):46.

- Evidence for Rapid Gut Clearance of Microplastic Polyester Fibers Fed to Chinook Salmon: A Tank Study
  Spanjer, A.R., T.L. Liedtke, K.E. Conn, L.K. Weiland, R.W. Black, and N. Godfrey. 2020. Evidence for rapid gut clearance of microplastic polyester fibers fed to Chinook salmon: A tank study. *Environmental Pollution* 265:115083.

- Contribution of Commercial Fish Species to Human Mercury Exposure: An Evaluation Near the Mid-Atlantic Ridge
  Vieira, H.C., J. Rendón-von Osten, A.M.V.M. Soares, F. Morgado, and S.N. Abreu. 2021. Contribution of commercial fish species to human mercury exposure: An evaluation near the Mid-Atlantic Ridge. *Journal of Food Composition and Analysis* 95:103688.

Upcoming Meetings and Conferences

2021 Maryland Water Monitoring Council Annual Conference
December 2-3, 2021
Virtual

The Interstate Technology and Regulatory Council (ITRC) Harmful Cyanobacteria Blooms Training
December 2, 2021
Virtual

2nd Annual Harmful Algal Bloom Virtual Symposium
January 6-7, 2022
Virtual

Gulf of Mexico Conference
April 25-28, 2022
Baton Rouge, LA

2022 Emerging Contaminants in the Environment Conference
April 27-28, 2022
Champaign, IL and Virtual

12th International Conference on Toxic Cyanobacteria
May 22-27, 2022
Toledo, OH

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.