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Fish and Shellfish Program NEWSLETTER

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In This Issue

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

This issue of the Fish and Shellfish Program Newsletter generally focuses on New York and the Chesapeake Bay.

Recent Advisory News

2017 New York Fish Advisory

The New York State Department of Environmental Conservation (NYSDEC) routinely monitors contaminant levels in fish and game. The New York State Department of Health (NYSDOH) issues advisories on eating sportfish and game taken in New York State because some of these foods contain levels of chemical contaminants that may be harmful to human health. The health advisories include general, specific, and regional advice on sportfish taken from waters in New York State, and advice on game harvested in New York State. The advisories are developed and updated regularly. For the most up-to-date and accurate data regarding fish consumption advisories, visit the NYSDOH's website, New York State Health Advice on Eating Fish You Catch.

The 2017 advisory updates include changes for the Leatherstocking/Central, Adirondack, and St. Lawrence Valley regions:

- In the **Leatherstocking/Central Region**, Mud Creek, a tributary to Sauquoit Creek, has been added to the list of waters with specific advisories. White sucker and brown trout have been added to the "do not eat" category in Mud Creek due to contamination from polychlorinated biphenyls (PCBs). White sucker has been added to the "do not eat" category in a portion of Sauquoit Creek also due to PCBs. Younger women (women under 50) and children under 15 should not eat any fish from waters with specific advisories. For more information about the Leatherstocking/Central Region Advisories, go to the Leatherstocking/Central Region Fish Advisory webpage.
- In the **Adirondack Region**, the length-based advisory of lake trout in Schroon Lake was updated, due to mercury contamination. For more information about the Adirondack Region Advisories, go to the Adirondack Region Fish Advisory webpage.
- In the **St. Lawrence Valley Region**, an "eat up to one meal per month" advisory was issued for carp in a portion of the Black River, due to PCB contamination. For more information about the St. Lawrence Valley Region Advisories, go to the St. Lawrence Valley Region Fish Advisory webpage.

Sources: https://www.health.ny.gov/environmental/outdoors/fish/health_advisories/whats_new.htm; http://www.dec.ny.gov/outdoor/7736.html.

Fish Consumption Advisory for Dan River, Virginia

Metal Concentration in Fish Tissue—Implications for Public Health Following Coal Ash Release

Abstract

On February 2, 2014, approximately 39,000 tons of coal ash was released into the Dan River from a retired energy facility in Eden, North Carolina. A damaged storm water pipe beneath an ash basin reportedly caused the release. Coal ash is a gray, powdery material that is left over after coal is burned. Coal ash may contain metals such as arsenic, cadmium, chromium, mercury, and selenium. As part of a collaborative response to the event, the Virginia Department of Health (VDH) was responsible for identifying any public health risks associated with fish consumption following the coal ash spill, and they partnered with the Virginia Department of Environmental Quality (DEQ) to evaluate fish tissue data from the Dan River. In 2014 and 2015, Virginia DEQ collected fish samples along the Dan River to analyze them for 17 metals. To evaluate health implications of these metals, VDH determined acceptable concentrations in fish tissue using the U.S. Environmental Protection Agency's (EPA's) 2011 Exposure Factors Handbook, minimal risk levels, recommended dietary allowance, and adequate intake where appropriate. VDH determined that no additional fish consumption advisories were necessary for the Dan River but that the existing VDH fish consumption advisory for PCBs and mercury, which was in place prior to the coal ash release, should continue to be followed.

Background

The source of the Dan River is in Patrick County, Virginia and the river flows approximately 215 miles, crossing Virginia and North Carolina borders eight times, and ultimately forms the Kerr Reservoir in Mecklenburg, Virginia. The City of Danville and Town of South Boston are located on the Dan River and the river is the public drinking water source for both. The Dan River is also used frequently for recreational and agricultural activities. The coal ash release occurred in North Carolina approximately 25 miles southwest of Danville, and 70 miles from South Boston. The release prompted local residents to express concern regarding the impacts of coal ash on fish consumption, in addition to concerns related to public drinking water, agricultural use, and swimming.

Methods and Results

In 2014 and 2015, Virginia DEQ collected fish along the length of the Dan River, from the Virginia/North Carolina border to the Clarksville Marina. This was done to evaluate whether the coal ash release at Duke Energy in North Carolina has resulted in changes in heavy metal concentrations in fish tissue from the Dan River upstream of Danville.

In both 2014 and 2015, 160 fish samples were collected from 9 different sites along the Dan River and were analyzed for 17 different metal analytes including: aluminum, antimony, arsenic, barium, beryllium, cadmium, chromium, copper, lead, manganese, nickel, selenium, silver, thallium, vanadium, zinc, and mercury. In all of the samples tested, aluminum, arsenic, barium, chromium, copper, manganese, mercury, selenium, silver, and zinc were detected at measurable levels. All samples (except for some mercury samples) in which the analytes were detected at measurable levels were below their respective VDH screening values. Therefore, these samples (with the exception of those mercury samples that were above its screening value of 0.5 parts per million [ppm]) are of no concern.

Mercury was detected in all fish samples collected along the Dan River; however, most were below the VDH screening values. Concentrations of mercury exceeded the VDH screening value of 0.5 mg/kg (ppm) wet weight in fish collected in six of the sampling sites in 2014 and in two of the sampling sites in 2015, with tissue concentrations ranging from 0.51–1.25 ppm. The species with the highest mercury concentrations included largemouth bass, smallmouth bass, white bass, walleye, flathead catfish, and blue catfish.

Conclusions and Recommendations

Concentrations of metals analyzed in fish within weeks of the coal ash spill did not warrant a change to the existing fish consumption advisory for the Dan River. An increase in mercury concentration in fish occurred between 1999 and 2014. It is not known what caused the increase, but is not thought to be associated with the coal ash spill. In a letter dated March 9, 2017 to Virginia DEQ, VDH concluded that based on the 2014 and 2015 studies, the existing fish consumption advisory for the Dan River (see table below) is protective of human health.

Waterbody and Affected Boundaries	Affected Localities	Contaminant	Species	Advisories/Restrictions
Dan River (within the state of Virginia from the Brantley Steam Plant Dam in Danville downstream to the confluence with Roanoke River on John H. Kerr Reservoir, including its tributaries Hyco River up to Rt. 738 bridge and Banister River up to the Banister Dam. These river segments comprise approximately 67 miles).	Danville City, Pittsylvania County, Halifax County, and Mecklenburg County	PCBs, Mercury	Flathead Catfish ≥ 32 inches	DO NOT EAT
		PCBs, Mercury	Flathead Catfish < 32 inches	No more than two meals/month
		PCBs	Carp	
		PCBs	Redhorse Sucker	
		PCBs	Channel Catfish	
		PCBs, Mercury	Striped Bass	
		PCBs, Mercury	White Bass	
		PCBs	White Perch	
		PCBs, Mercury	Blue Catfish	
		PCBs	Walleye	
		PCBs, Mercury	Longnose Gar	
		Mercury	Largemouth Bass	

For more information, contact Dwight Flammia at Dwight.Flammia@vdh.virginia.gov.

Sources:

Flammia, D.D., R. LePrell, M.F. Skiljo, and E. Egiebor. 2014. *Metal Concentration in Fish Tissue: Implications for Public Health Following Coal Ash Release to Dan River*. Presented at the 2014 National Fish Forum on Contaminants in Fish, September 21–24, 2014, Alexandria, VA.

VDH (Virginia Department of Health). 2017. *Evaluation of Heavy Metal Concentrations in Fish from the Dan River in 2014 and 2015: Dan River, Danville, Virginia*. Letter Health Consultation. Virginia Department of Health, Division of Environmental Epidemiology.

EPA News

EPA Review Projects Long-term Success for Hudson River PCB Cleanup

On June 1, 2017, EPA released for public comment its second review of the historic cleanup of PCB-contaminated sediment from the upper Hudson River. The review concluded that the Hudson River cleanup is working as designed and, while not yet protective, is expected to accomplish its long-term goal of protection of human health and the environment when the cleanup is completed. In the interim, the state of New York has fishing restrictions and advisories in place to control human consumption of contaminated fish. Under the Superfund law, cleanups generally must be reviewed every five years after construction starts on a project to determine if they are working as intended and remain protective of human health and the environment.

EPA's second five-year review is the culmination of an eleven-month evaluation process which included collecting new data, conducting an objective analysis of project activities, and a quantitative analysis of all available fish, water, and sediment data. The more than 1000-page report includes a detailed technical assessment and various technical data evaluations as appendices. The five-year review acknowledges that as many as eight or more years of post-dredging fish data may be needed to establish, with a high degree of confidence, a long-term statistical trend in levels of PCBs in the fish. The report is available at www.epa.gov/hudson.

"EPA followed the requirements of the federal Superfund law and used the best available science to conduct this review," said former Acting Regional Administrator Catherine McCabe. "The question that the five-year review asks is 'do we still think the cleanup decision we made in 2002 will provide long-term protection of human health and the environment?' Based on the information and data that we have today, that answer is 'yes.'"

EPA's two-part cleanup plan called for the targeted environmental dredging of PCB-contaminated sediment from a 40-mile stretch of the Upper Hudson River between Fort Edward and Troy, New York, followed by a period of monitored natural recovery. Dredging began in 2009 and was completed in 2015. It was one of the largest and most logistically complex environmental dredging projects ever undertaken in the United States, and resulted in the removal of about 2.75 million cubic yards of PCB-contaminated sediment. Approximately 310,000 pounds of PCBs were permanently removed from the river—twice the mass anticipated—representing an estimated 72 percent reduction in the overall mass of PCBs in the Upper Hudson River. The first five-year review for the site was conducted in 2012.

This second five-year review considered all available data, including all fish, water, and sediment data collected over the past five years, but necessarily reflects only a single year of data about the post-dredging state of the river and fish. Because dredging was completed in 2015, the fish collected for sampling in both spring and fall 2016 were still affected by elevated PCBs levels during the dredging project.

The data collected since the last five-year review show that the results are generally consistent with what EPA expected. The 2016 fish data suggest that the fish have begun to recover from dredging impacts and are generally back to pre-dredging levels. However, the 2016 data alone are not sufficient to evaluate post-dredging trends.

"The early information that we have for sediment, water, and fish is encouraging. In the years ahead, we will collect more data to identify long-term trends," said former Acting Regional Administrator Catherine McCabe. "While the project was designed to set the river on a course for recovery, we have always explained that the recovery will take many years. It is not possible for the fish to fully recover immediately after the conclusion of dredging."

As expected, average PCB concentrations in fish in the Upper Hudson are declining but have not yet reached protective levels. When EPA made its cleanup decision in 2002, they predicted that it would take years after dredging is completed for PCB levels in fish to reach levels where the existing fish consumption advisories may begin to be relaxed, and decades before fish can safely be eaten frequently. As a result, the fish consumption advisories are a necessary component of the site remedy. This is typical for Superfund sediment cleanup sites across the country. Since 1976, high levels of PCBs in fish have led New York State to close various recreational fisheries and to issue advisories restricting the consumption of fish caught in the Hudson River.

As natural recovery of the river continues, human exposure to PCB-contaminated fish will continue to be controlled through fishing restrictions and fish consumption advisories issued by New York State. EPA set interim targets for the reduction of PCBs in fish tissue that would allow New York State to adjust the advisories and loosen the restrictions over time. The NYSDOH controls adjustments to the advisories. Hudson River-area residents who eat fish are encouraged to closely review and adhere to the advisories set by New York State. The five-year review includes a discussion of some of the efforts New York State has taken to improve the effectiveness of the advisories. EPA will continue to work closely with the NYSDEC and NYSDOH to improve their fish advisory outreach program.

The sediment cleanup is now transitioning from the dredging phase of the project to a robust monitoring phase that will track the long-term recovery of the river over time to confirm that the cleanup is functioning as intended. This includes monitoring of sediment, fish, water, reconstructed habitats, and the caps that were placed in some of the areas of the river where PCBs remained.

If EPA determines that the recovery is not occurring as expected, EPA will evaluate next steps. The next five-year review is expected to be completed in 2022.

The next major component of the cleanup of the Hudson River PCBs Superfund site is now underway, and includes a comprehensive study of PCB contamination in low-lying areas of the Upper Hudson River that are subject to flooding, called the floodplains. Extensive soil sampling was conducted in 2016 and will continue in 2017.

The five-year review report is available at www.epa.gov/hudson. During the public comment period, which has been extended to September 1, 2017, comments can be sent by mail or email to:

Gary Klawinski, Director
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Albany, NY 12205
Email: epahrfo@outlook.com

EPA held two public information meetings, (June 28 in Poughkeepsie, New York and July 19 in Saratoga Springs, New York). Follow EPA Region 2 on Twitter at https://twitter.com/eparegion2 and visit their Facebook page at https://facebook.com/eparegion2.

For more information, contact Larisa Romanowski at Romanowski.Larisa@epa.gov.

Source: https://www.epa.gov/newsreleases/epa-review-projects-long-term-success-hudson-river-pcb-cleanup.

Other News

Climate Patterns Influence Amount of Fecal Bacteria in Maryland Shellfish Harvest Waters

National Oceanic and Atmospheric Administration's (NOAA's) National Centers for Coastal Ocean Science (NCCOS) scientists and their partners have identified a link between inter-annual patterns of precipitation and air temperature and fecal coliform levels in shellfish harvest waters in Maryland's portion of the Chesapeake Bay.

Drawing on 34 years of monitoring data (1979–2013) from the Maryland Department of the Environment, the team found that fecal coliform tended to be higher in years when the bulk of precipitation occurred throughout the summer and fall. The study also revealed an intra-annual delay in timing between elevated precipitation and bacterial levels. Fecal coliform often peaked in late fall and winter, with precipitation peaking in summer and early fall. Additionally, continental-scale sea level pressure analysis showed an association between storm-generating atmospheric patterns and very high fecal coliform years.

While natural resource managers have worked to reduce bacterial levels in the Chesapeake Bay, most rivers in the region contain areas where shellfish harvest is restricted due to excessive fecal bacteria. Understanding the links between these bacteria and climate variables will inform decisions about restricting access to shellfish harvest beds. The results of this study will also be useful for management of shellfish aquaculture, a growing industry in Maryland waters.

This study was in done in collaboration with the Maryland Department of the Environment and the University of Maryland Center for Environmental Science, and was recently published in *Water Research*.

For more information, contact AK.Leight@noaa.gov.

Study Citation: Leight, A.K., R. Hood, R. Wood, and K. Brohawn. 2016. Climate relationships to fecal bacterial densities in Maryland shellfish harvest waters. *Water Research* 89(1):270–281. doi: 10.1016/j.watres.2015.11.055.

Source: https://coastalscience.noaa.gov/news/climate/climate-patterns-influence-amount-fecal-bacteria-maryland-shellfish-harvest-waters/.

Small Fish Could Be in Big Trouble Without Wetlands

Coastal population growth and a desire to guard against sea level rise and coastal erosion has led to extensive conversions of natural wetlands and beaches to bulkheads and riprap. A new NOAA NCCOS-funded study recently published in *Estuaries and Coasts* explores how these changes are affecting fish and crustaceans in nearshore areas of the Chesapeake Bay.

Across all species, small fish (≤60 millimeters [mm], or 2.4 inches) were most abundant near wetlands and beaches, while large fish (>100 mm, or 3.9 inches) were most abundant at hardened shorelines. Shallow water can provide refuge from predators, making this habitat important to the survival of small fish, including juveniles of larger species.

Very close to shore, water was deeper near hardened shorelines, which allowed larger fish to occupy these areas. Smaller fish either avoided deeper hardened shorelines, or were driven out or eaten by larger fish. In addition to harboring smaller fish, natural shorelines showed a greater variety of species, suggesting that shoreline hardening that comes at the expense of natural habitat likely reduces overall estuarine production.

For more information, contact Elizabeth Turner at Elizabeth.Turner@noaa.gov.

Study Citation: Kornis, M.S., D.M. Bilkovic, L.A. Davias, S. Giordano, and D.L. Breitburg. 2017. Shoreline hardening affects nekton biomass, size structure, and taxonomic diversity in nearshore waters, with responses mediated by functional species groups. *Estuaries and Coasts*. doi:10.1007/s12237-017-0214-5.

Source: https://coastalscience.noaa.gov/news/coastal-resilience/living-shoreline/small-fish-big-trouble-without-wetlands/.

Webinar Series: Introduction to Remote Sensing of Harmful Algal Blooms

The National Aeronautics and Space Administration's (NASA's) Applied Remote Sensing Training Program (ARSET) will conduct a free, four-session online webinar series in September 2017 about remote sensing and harmful algal blooms (HABs). HABs can have a negative impact on the ecosystem and human health. Satellite remote sensing allows frequent data collection over a large area to identify impaired water quality from HABs. These data can inform decision-makers on where best to put their resources for taking water samples, determine what toxins are in the water, and inform decision-makers whether they need to change or move drinking water intakes and whether a fishery needs to be closed. Remote sensing data enable individuals and organizations to have more flexible plans for water sampling. The data can also be used to determine a more efficient and appropriate allocation of resources for protecting human health. The course agenda is available on the training webpage.

Learning Objectives

By the end of the training, attendees will be able to:

- identify NASA's Earth Science remote sensing data products for the identification and monitoring of HABs;
- describe how coupled remote sensing and modeling approaches are used in decision support tools; and
- use a selection of NASA Earth Science data tools to monitor HABs.

Intended Audience

This training is intended for local, regional, state, federal, and international organizations interested in using satellite imagery for coastal and ocean applications. Governmental and non-governmental organizations in the public and private sectors engaged in environmental management and monitoring will be given preference over organizations focused primarily on research.

Prerequisites:

Complete Session 2C: Fundamentals of Aquatic Remote Sensing or have equivalent experience. Attendees that do not complete prerequisites may not be properly prepared for the pace during the training.

Course Date and Time

Four, one-hour sessions will be held every Tuesday in September (September 5, 12, 19, and 26) at 11:00 AM–12:00 PM and 9:00–10:00 PM, EDT (UTC-4). The session will be broadcast twice per day to allow for international participation.

Registration

This webinar is free and open but you must register. Please only register for one of the daily sessions. You can check your local time to select your session preference. Visit this training's webpage to register. A certificate of completion will be provided to participants that attend all live webinars and complete all homework assignments.

For more information about NASA's ARSET program and the webinar, visit the NASA ARSET website.

Source: https://arset.gsfc.nasa.gov/water/webinars/HABs17.

Recently Awarded Research

NOAA Fisheries' Species Recovery Grants Awarded

A number of grants have been funded through the Species Recovery Grants to States and Species Recovery Grants to Tribes programs. A full list of the funded grants to states and tribes are available on the NOAA Fisheries website. Below is information specific to the mid-Atlantic area because this issue of the newsletter focuses on New York and the Chesapeake Bay. Grants using fiscal year 2016 funds are those most recently awarded.

- The Delaware Department of Natural Resource and Environmental Control was awarded $80,028 to assess **Atlantic sturgeon** spawning success and year class strength in the Delaware River. Funding will support sampling for river-resident juveniles (age 0–2), maintenance of a large-scale passive acoustic array, and data sharing with other researchers through the Atlantic Coastal Telemetry network.
- The Virginia Department of Game and Inland Fishes was awarded $356,763 to locate and characterize important habitats for **Atlantic sturgeon** (reproductive, nursery, and forage habitats) within multiple Chesapeake Bay river systems and assess habitat connectivity by sampling additional river reaches that might support Atlantic sturgeon populations (e.g., Rappahannock River). Data collected will inform state and federal management efforts for various life history stages.

Source: http://www.nmfs.noaa.gov/pr/conservation/states/funded.htm#2016.

Recent Publications

Journal Articles

The list below provides a selection of research articles focusing on the Chesapeake Bay.

- Gutsy genetics: Identification of digested piscine prey items in the stomach contents of sympatric native and introduced warmwater catfishes via DNA barcoding
  Aguilar, R., M.B. Ogburn, A.C. Driskell, L.A. Weigt, M.C. Groves, and A.H. Hines. 2017. Gutsy genetics: Identification of digested piscine prey items in the stomach contents of sympatric native and introduced warmwater catfishes via DNA barcoding. *Environmental Biology of Fishes* 100(4):325–336.

- Microcystin in aquatic food webs of the Baltic and Chesapeake Bay regions
  Bukaveckas, P.A., J. Lesutienė, Z.R. Gasiūnaitė, L. Ložys, I. Olenina, R. Pilkaitytė, Ž. Pūtys, S. Tassone, and J. Wood. 2017. Microcystin in aquatic food webs of the Baltic and Chesapeake Bay regions. *Estuarine, Coastal and Shelf Science* 191:50–59.

- Draft genome sequences for seven *Streptococcus parauberis* isolates from wild fish in the Chesapeake Bay
  Haines, A., E. Nebergall, E. Besong, K. Council, O. Lambert, and D. Gauthier. 2016. Draft genome sequences for seven *Streptococcus parauberis* isolates from wild fish in the Chesapeake Bay. *Genome Announc*ements 4(4):e00741–16.

- Factors affecting the abundance of age-0 Atlantic menhaden (*Brevoortia tyrannus*) in Chesapeake Bay
  Houde, E.D., E.R. Annis, L.W. Harding, Jr., M.E. Mallonee, and M.J. Wilberg. 2016. Factors affecting the abundance of age-0 Atlantic menhaden (*Brevoortia tyrannus*) in Chesapeake Bay. *ICES Journal of Marine Science* 73(9):2238–2251.

- Effects of co-varying diel-cycling hypoxia and pH on growth in the juvenile Eastern Oyster, *Crassostrea virginica*
  Keppel, A.G., D.L. Breitburg, and R.B. Burrell. 2016. Effects of co-varying diel-cycling hypoxia and pH on growth in the juvenile Eastern Oyster, *Crassostrea virginica*. *PLoS ONE* 11(8):e0161088.

- Hypoxia effects within an intra-guild predation food web of *Mnemiopsis leidyi* ctenophores, larval fish, and copepods
  Kolesar, S.E., K.A. Rose, and D.L. Breitburg. 2017. Hypoxia effects within an intra-guild predation food web of *Mnemiopsis leidyi* ctenophores, larval fish, and copepods. Chapter 11 in *Modeling Coastal Hypoxia*, ed. D. Justic, K.A. Rose, R.D. Hetland, and K. Fennel, pp. 279–317. Springer International Publishing (ebook).

- Shoreline hardening affects nekton biomass, size structure, and taxonomic diversity in nearshore waters, with responses mediated by functional species groups
  Kornis, M.S., D.M. Bilkovic, L.A. Davias, S. Giordano, and D.L. Breitburg. 2017. Shoreline hardening affects nekton biomass, size structure, and taxonomic diversity in nearshore waters, with responses mediated by functional species groups. *Estuaries and Coasts*:1–21.

- Climate relationships to fecal bacterial densities in Maryland shellfish harvest waters
  Leight, A.K., R. Hood, R. Wood, and K. Brohawn. 2016. Climate relationships to fecal bacterial densities in Maryland shellfish harvest waters. *Water Research* 89(1):270–281.

- Spatial harvest regimes for a sedentary fishery
  Mykoniatis, N., and R. Ready. 2016. Spatial harvest regimes for a sedentary fishery. *Environmental and Resource Economics* 65(2):357–387.

- Quantifying the effects of commercial clam aquaculture on C and N cycling: An integrated ecosystem approach
  Murphy, A.E., K.A. Emery, I.C. Anderson, M.L. Pace, M.J. Brush, and J.E. Rheuban. 2016. Quantifying the effects of commercial clam aquaculture on C and N cycling: An integrated ecosystem approach. *Estuaries and Coasts* 39(6):1746–1761.

- High salinity relaying to reduce *Vibrio parahaemolyticus* and *Vibrio vulnificus* in Chesapeake Bay oysters (*Crassostrea virginica*)
  Parveen, S., M. Jahncke, S. Elmahdi, H. Crocker, J. Bowers, C. White, S. Gray, A.C. Morris, and K. Brohawn. 2017. High salinity relaying to reduce *Vibrio parahaemolyticus* and *Vibrio vulnificus* in Chesapeake Bay oysters (*Crassostrea virginica*). *Journal of Food Science* 82(2):484–491.

- Variability in fish tissue proximate composition is consistent with indirect effects of hypoxia in Chesapeake Bay tributaries
  Tuckey, T.D., and M.C. Fabrizio. 2016. Variability in fish tissue proximate composition is consistent with indirect effects of hypoxia in Chesapeake Bay tributaries. *Marine and Coastal Fisheries: Dynamics, Management, and Ecosystem Science* 8:1–15.

Upcoming Meetings and Conferences

American Fisheries Society 147th Annual Meeting
August 20–24, 2017
Tampa, Florida

7th International Symposium on GIS/Spatial Analyses in Fishery and Aquatic Science
August 21–25, 2017
Hokkaido, Japan

71st Annual Shellfish Conference & Tradeshow
September 19–21, 2017
Welches, Oregon

Interstate Shellfish Sanitation Conference 2017 Biennial Meeting
October 14–19, 2017
Myrtle Beach, South Carolina

2017 State of Lake Michigan Conference
November 7–10, 2017
Green Bay, Wisconsin

9th International Charr Symposium
June 18–21, 2018
Duluth, Minnesota

37th International Symposium on Halogenated Persistent Organic Pollutants (POPs)—Dioxin 2017
August 20–25, 2017
Vancouver, Canada

18th International Conference on Diseases of Fish and Shellfish
September 4–8, 2017
Belfast, United Kingdom

2017 Organization of Fish & Wildlife Information Managers
October 1–5, 2017
Chattanooga, Tennessee

Aquaculture Europe 2017
October 17–20, 2017
Dubrovnik, Croatia

9th U.S. Symposium on Harmful Algae
November 11–17, 2017
Baltimore, Maryland

Additional Information

This monthly 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.