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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

2017 Connecticut Fish Consumption Advisory—A Guide to Eating Fish Safely

What Does The Fish Consumption Advisory Say?

The advisory tells you how often you can safely eat fish from Connecticut's waters and from a store or restaurant. In many cases, separate advice is given for the **High Risk** and **Low Risk** Groups.

- You are in the **High Risk Group** if you are a pregnant woman, a woman who could become pregnant, a nursing mother, or a child under six.
- If you do not fit into the High Risk Group, you are in the **Low Risk Group**.

Advice is given for three different types of fish consumption:

1. Statewide **FRESHWATER** Fish Advisory: Most freshwater fish in Connecticut contain enough mercury to cause some limit to consumption. The statewide freshwater advice is:
    - **High Risk Group**: Eat no more than one meal per month
    - **Low Risk Group**: Eat no more than one meal per week
2. Advisories for **SPECIFIC WATERBODIES**: Certain waterbodies contain fish with higher levels of contaminants. These waterbodies include the Housatonic River, part of the Quinnipiac River, certain lakes, and certain species from Long Island Sound. The "2017 Advisory for Eating Fish from Connecticut Waterbodies" table shown on the next page provides details on eating fish safely from these waterbodies.
3. Advice for Fish Purchased from the **MARKET**: Most fish from the market are healthy to eat and contain important nutrients such as omega-3 fatty acids. However, there are some fish that contain high levels of mercury or polychlorinated biphenyls (PCBs) and so should be eaten less or not at all. The pamphlet, "If I Catch It, Can I Eat It?" points out which fish are healthy to eat and which ones are not safe to eat (see the "Fish from the Market and Restaurant" table on the next page).

What about Fish from Markets and Restaurants?

In general, people in the **High Risk Group** can eat up to two fish meals a week from the market or at restaurants. Certain fish are especially low in contaminants and can be eaten more often. The following are specific tips for those in the **High Risk Group** to choose healthy fish from the store:

- Swordfish and shark: These contain high levels of mercury and should not be eaten.
- Canned tuna: Choose "light" tuna because it has less mercury than "white" tuna.
- Lobster and other shellfish are generally low in chemical contaminants. The tomalley portion of lobster (the green gland) can be high in contaminants and should not be eaten. This applies to lobster from Long Island Sound and elsewhere.

Fish from the Market and Restaurant

The table below provides general guidance for women and children on which fish to choose. Fish with an asterisk in the table are either especially high in omega-3 fatty acids and/or very low in contaminants and can be eaten more than twice a week. People in the **Low Risk Group** can safely eat higher amounts of market seafood. For example, swordfish or shark can be eaten once per month; and tuna steak or halibut can be eaten twice per week.

Eat Two Meals/Week		Eat One Meal/Week	Avoid
Herring*	Trout*	Tuna steak	Swordfish
Pollock*	Haddock	Halibut	Shark
Salmon (wild)*	Perch	Red snapper	King mackerel
Atlantic mackerel*	Tilapia	White tuna (canned)	Striped bass
Flounder and Fluke*	Light tuna (canned)	Catfish (farm-raised)	Tilefish (Gulf of Mexico)
Sole*	Cod	Tilefish (Atlantic)	Bluefish
Sardine and Smelt*	Salmon (farm-raised)		Tuna sushi
Shellfish: Oyster, shrimp, clams, scallops, lobster**			

* These fish are either especially high in omega-3 fatty acids and/or very low in contaminants and can be eaten more than twice a week.
** See warning above about lobster tomalley.

2017 Advisory for Eating Fish from Connecticut Waterbodies

The table below shows Connecticut's fish consumption advisory for fish caught in Connecticut. The yellow highlighted cells show the newly added advisory for 2017.

Advisory	Waterbody	Fish Species	High Risk Group[a]	Low Risk Group[b]	Contaminant
Statewide Freshwater Fish Advice	*All freshwater lakes, ponds, rivers, and streams*	Trout sunfish[c]	No limits on consumption	No limits on consumption	—
		All other freshwater fish	One meal/month	One meal/week	Mercury
Special Advice for the Housatonic River	*Housatonic River above Lake Lillinonah*	Trout, Catfish, Eel, Carp, Northern pike	Do not eat	Do not eat	PCBs
		Bass, White perch	Do not eat	Do not eat	PCBs
		Bluegill, Bullhead, Fallfish	One meal/month	One meal/month	PCBs
		Yellow perch, Calico bass (crappie), Rock bass, Sunfish	One meal/month	One meal/week	PCBs
	Lakes on Housatonic River: (Lillinonah, Zoar, Housatonic)	Catfish, Eel, Carp, Northern pike, Trout	Do not eat	Do not eat	PCBs
		White perch, Fallfish, Bullhead	One meal/month	One meal/month	PCBs
		Bass	Do not eat	One meal/2 months	PCBs

Advisory	Waterbody	Fish Species	High Risk Group[a]	Low Risk Group[b]	Contaminant
		Yellow perch, Calico bass (crappie), Rock bass, Bluegill, Sunfish	One meal/month	One meal/week	PCBs
	Furnace Brook (Cornwall)	Trout	One meal/month	One meal/month	PCBs
	Blackberry River below "Blast Furnace" (North Canaan)	Smallmouth bass	One meal/month	One meal/month	PCBs
Special Advice for Other Connecticut Freshwater Waterbodies	*Dodge Pond Lake McDonough Silver Lake Wyassup Lake*	Largemouth bass, Smallmouth Bass, Pickerel	Do not eat	One meal/month	Mercury
	Quinnipiac River (Gorge South to Hanover Pond) Meriden	All species	One meal/month	One meal/month	PCBs
	Connecticut River	Carp Catfish	Do not eat Do not eat	One meal/2 months One meal/month	PCBs PCBs
	Versailles, Papermill Ponds and attached Little River (Sprague)	All species	Do not eat	Do not eat	Mercury PCBs
	Konkapot River (North Canaan)	White suckers	Do not eat	One meal/month	Mercury
	Brewster Pond (Stratford)	Catfish Bullhead	Do not eat	Do not eat	Chlordane
	Union Pond (Manchester)	Carp, Catfish, Bass	Do not eat	Do not eat	Chlordane
Special Advice for Long Island Sound	*Long Island Sound and connected rivers*	Striped bass Bluefish over 25 inches Bluefish 13–25 inches[d] Weakfish	Do not eat Do not eat One meal/month One meal/month	One meal/month One meal/month One meal/month One meal/month	PCBs PCBs PCBs PCBs
	Mill River, Fairfield [excluding Southport Harbor]	Blue crab	Do not eat	Do not eat	Lead

[a] The **High Risk Group** includes pregnant women, women who could become pregnant, nursing women, and children under age six. The **High Risk Group** should eat no more than one fish meal per month of most freshwater fish from local waters.
[b] The **Low Risk Group** should limit eating most freshwater fish from local waters to once a week.
[c] Most trout are not part of the advisory and are safe to eat. However, the **High Risk Group** should eat no more than one meal of large trout (over 15 inches) per month and should not eat trout from the Housatonic River.
[d] Snappers (bluefish under 13 inches) are not on the advisory because they have very low contamination.

Where Can I Get More Information?

More specific fact sheets can be obtained by calling 1-877-458-FISH (3474), or by going to the Connecticut Department of Public Health (DPH) website at www.ct.gov/dph/fish. For health questions, call Connecticut DPH toll-free at: 1-877-458-FISH (3474). For questions about fishing in Connecticut, call Connecticut Department of Energy and Environmental Protection at 1-860-424-3474 or go to the website at www.ct.gov/deep/fishing.

Sources: www.ct.gov/dph/fish;
http://www.ct.gov/dph/lib/dph/environmental_health/eoha/fish_/2017_if_i_catch_it_english.pdf.

South Dakota's Consumption of Fish and Seafood

In January 2017, the South Dakota Department of Health (DOH) updated its website for fish consumption advisories. South Dakota DOH worked with its South Dakota DOH Healthy Foods Coordinator to ensure the recommendations reflected the January 2017 U.S. Food and Drug Administration's (FDA's) and U.S. Environmental Protection Agency's (EPA's) fish consumption advice (FDA-EPA fish consumption advice). South

Dakota DOH wanted to make its site easier to navigate and more interactive. The new GIS map depicts all waterbodies that have been sampled, as well as waterbodies with current consumption advisories. Those sampled with no advisory are depicted by green fish located on top of the body of water on a scalable map. The user clicks on the symbol and a description pops up indicating the name of the water body along with the species tested and the date of the most recent test. Waterbodies with current advisories are depicted by a red triangle. Clicking on this symbol will display the waterbody name, the species and length of fish included in the advisory, and the date of the most recent test. The site is also mobile device-friendly.

For more information, contact Pat Snyder, South Dakota Department of Environment and Natural Resources (DENR), at 605-773-4729; John Lott, South Dakota Game, Fish and Parks (GFP), at 605-773-4508; or Bill Chalcraft, South Dakota DOH, at 605-773-4945.

Related Links

- South Dakota DENR
- South Dakota GFP
- South Dakota DOH
- Centers for Disease Control and Prevention, Agency for Toxic Substances and Disease Registry
- Eating Fish: What Pregnant Women and Parents Should Know (FDA-EPA fish consumption advice)

Source: http://doh.sd.gov/food/Fish-Advisories.aspx.

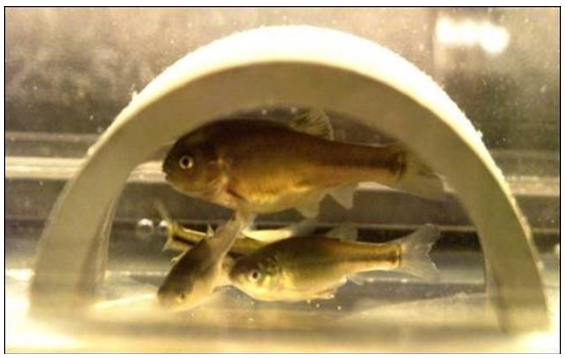
EPA News

Discovering Causes of Feminized Fish

Since the 1990s, there have been widespread reports of male fish exhibiting female fish traits in different water bodies. This "feminization," which includes changes to the appearance and reproductive ability of the males, has often been associated with exposure of the fish to chemicals in runoff from animal feedlots and discharges from wastewater treatment plants. Chemicals responsible for feminization are collectively referred to as endocrine disruptors, because of their ability to "mimic" the effects of estradiol, a natural estrogenic hormone that controls endocrine systems involved in reproduction in female animals and humans.

A significant amount of research has focused on the identity of the estrogenic chemicals causing endocrine disruption, so that their release to the environment might be controlled. A recent paper, *Re-evaluating the Significance of Estrone as an Environmental Estrogen*, showed that the hormone estrone might be a very important cause of feminization of male fish. Estrone is produced naturally by livestock and humans, and it is excreted from the body in waste. It has been known for some time that estrone can be present at high concentrations in wastewater discharges, but it has not been thought to be particularly important in causing feminization, because it is a weak estrogenic chemical. However, EPA scientists found that estrone can be changed by male fish to the much stronger estradiol, to a degree sufficient to cause their feminization. This indicates that estrone could be a much more important estrogenic endocrine disruptor than previously supposed.

The paper describing this work is featured on the cover of the May issue of *Environmental Science & Technology* and was recently selected by *The American Chemical Society* as an Editor's Choice article.



Fathead minnow (*Pimephales promelas*) used in the study. *(Image courtesy of EPA)*

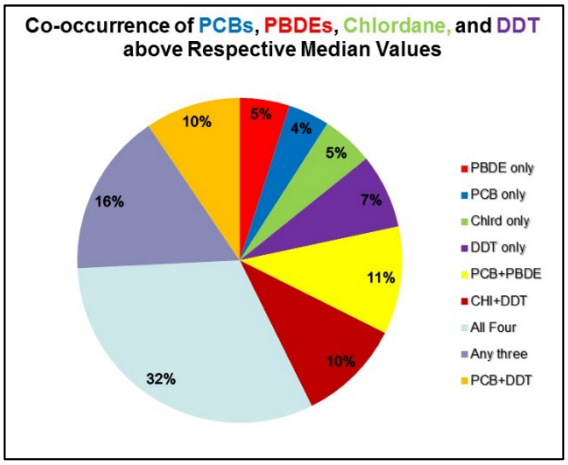
For more information, contact Gerald Ankley at Ankley.Gerald@epa.gov.

Study citation: Ankley, G.T., D. Feifarek, B. Blackwell, J.E. Cavallin, K.M. Jensen, M.D. Kahl, S. Poole, E. Randolph, T. Saari, and D. L. Villeneuve. Re-evaluating the significance of estrone as an environmental estrogen. *Environmental Science & Technology* 51(8):4705–4713.

Statistical Survey of Persistent Organic Pollutants: Risk Estimations to Humans and Wildlife through Consumption of Fish from U.S. Rivers

A journal article published in February 2017, in the journal *Environmental Science & Technology*, describes and interprets the results of analyses for PCBs, polybrominated diphenyl ethers (PBDEs), dichlorodiphenyltrichloroethane (DDT), and chlordane in fish fillet tissue from U.S. rivers, fifth order and above (based on Strahler stream order), collected as part of EPA's 2008–2009 National Rivers and Streams Assessment. The study produced nationally-representative population estimates of the concentrations of these contaminants as well as estimates for urban and non-urban river sites in the Eastern Highlands, Plains and Lowlands, and West and Mountains National Aquatic Resource Surveys (NARS) ecoregions.

Notable findings include: the exceedance of the 12 µg/kg EPA cancer screening value for PCBs in fish from 48 percent of the sampled population of river waters nationally (the national sampled population of rivers consists of 51,663 river miles) and 70 percent of the sampled population of urban river waters (the sampled population of urban rivers consists of 10,911 river miles); the occurrence of significantly higher concentrations of most of these organic compounds in urban river waters; and the significant differences among the ecoregions in fish-tissue contaminant concentrations. Estimates were compared with adjusted wildlife exposure values to estimate risk to mammalian and avian wildlife species. Among the four compound groups—PCBs, PBDEs, chlordane compounds, and DDT and degradates—the most common modes of occurrence of the compounds in fish fillet samples were for them to occur together at concentrations above their median values (see figure).



Co-occurrence of PCBs, PBDEs, chlordane, and DDT above respective median values in fish tissue samples from major U.S. rivers. *(Image courtesy of EPA)*

For further information, contact John Wathen at Wathen.John@epa.gov or Leanne Stahl at Stahl.Leanne@epa.gov.

Study citation: Batt, A.L., J.B. Wathen, J.M. Lazorchak, A.R. Olsen, and T.M. Kincaid. 2017. Statistical survey of persistent organic pollutants: Risk estimations to humans and wildlife through consumption of fish from U.S. rivers. *Environmental Science & Technology* 51(5): 3021–3031. doi: 10.1021/acs.est.6b05162.

Other News

New Approach Makes it Easier for Women to Choose the Best Fish for their Health and their Baby's Health

Equipping women who are or may become pregnant with the information they need to choose the right fish to eat—that's the goal of a new campaign launched on May 8, 2017 by the Minnesota Department of Health (MDH) and HealthPartners.

The campaign highlights the health benefits of eating fish before and during pregnancy and the importance of choosing the right fish to reduce exposure to mercury or other contaminants. ChooseYourFish.org is a new website that helps people navigate the many fish choices and choose the best ones for women who are or may become pregnant.

"We want women and children to eat fish. The benefits outweigh risks if they choose fish low in mercury and other contaminants," said Pat McCann, research scientist for MDH.

A brochure and the website were launched to reach more women and families and make it easier for them to follow MDH's fish consumption guidelines. The website provides additional information about how to select and cook fish. Building on previous research and work by the Great Lakes Consortium for Fish Advisories, including Cornell University and Essentia Health, HealthPartners Institute gathered information through a series of focus groups and surveys to understand how messages about eating fish are best delivered and what additional context is needed. The goal was to design, write, and develop materials that were clear and easy to understand. MDH originally approached HealthPartners because of its commitment to health education and regional reputation as a trusted, integrated health system. Both MDH and HealthPartners share a common priority of improving the health of Minnesotans.

"HealthPartners Institute reached out to women to find out the best and most accessible way to communicate this important information about eating fish," said Dr. Tom Kottke, HealthPartners Medical Director for Well-Being. "We want to empower women with the information they need to make an important decision that will affect their health and the health of their families."

Studies have shown that fish can provide important nutrients that help fetuses and babies develop, as long as they are low in mercury and other contaminants. The fatty acids, vitamins, and minerals in fish are also important for adults.

Increased efforts to improve advice to women about eating fish started after a 2011 study by MDH showed that 10 percent of newborns tested in the North Shore-Arrowhead region had mercury above levels of concern in their blood.

The study results spurred a collaboration among Sawtooth Mountain Clinic, Grand Portage Health Service, North Shore Health, Grand Portage Band of Lake Superior Chippewa Trust Lands, and MDH to reduce mercury exposure in women in the area and pilot an in-clinic screening for high mercury exposure. Nearly 500 women from Cook County, Grand Portage and the surrounding area participated in the Fish are Important to Superior Health (FISH) Project.

Participants provided information about which fish they ate and how often they ate fish. They also had a blood sample analyzed for mercury and healthy fatty acids. Three percent of participants had blood mercury levels above the level of concern. They received information about healthy diets that included which type (species) of fish to eat and how often they can eat fish. More information on the project is at FISH Project News.

The brochure is available in several different versions that each target a different community and/or region of the state, as well as a statewide version. The new website, ChooseYourFish.org, provides easy access to information on the web and on mobile devices. Both the brochures and website describe how often different types (species) of fish can be eaten to provide safe yet beneficial meals. The website also features simple recipes, videos, and tips for selecting and cooking fish.

These efforts were supported in part through funding from EPA's Great Lakes Restoration Initiative. A YouTube video, "New Information for Women to Choose the Best Fish," highlights the key points of the new campaign.

MDH gives fish consumption recommendations for pregnant women, women who could become pregnant, and children under age 15, as well as for men, boys age 15 and over, and women not planning to become pregnant. In general, men, boys 15 years and older, and women who are not and will not become pregnant can eat fish about 3 times more often than the guidelines for pregnant women and younger children.

To learn more about HealthPartners, visit About HealthPartners.
To learn more about MDH's recommendations, visit Fish Consumption Guidance.

For more information, contact Pat McCann at Patricia.McCann@state.mn.us, or Vineeta Sawkar at Vineeta.S.Sawkar@healthpartners.com.

Source: http://www.health.state.mn.us/news/pressrel/2017/fish050817.html.

Recently Awarded Research

New York State Department of Environmental Conservation and Great Lakes Research Consortium Award in Research Grants

On May 4, 2017, the Great Lakes Research Consortium (GLRC), in cooperation with the New York State Department of Environmental Conservation (DEC) Great Lakes Program, announced the award of $136,591 for six research projects that address priority areas in the Great Lakes Action Agenda for New York State. Funding for the grants is provided by the state's Environmental Protection Fund to the GLRC via an agreement with the State University of New York (SUNY) College of Environmental Science and Forestry (ESF), in Syracuse, New York.

"Our Great Lakes ecosystems are very complex, highly treasured and ever-changing," said DEC Commissioner Basil Seggos. "It is imperative we continue to expand our scientific knowledge of these waters and evaluate what management actions are needed to sustain the unique quality of the Great Lakes, its watershed and its communities."

"The 2017 Great Lakes Research Consortium grant awards represent critical projects that will advance the science-based understanding of the opportunities and challenges facing the Great Lakes system as a dynamic and essential resource supporting human, fishery, and wildlife populations," said GLRC Executive Director Gregory L. Boyer, Ph.D., a chemistry and biochemistry professor at SUNY ESF.

Out of the six studies that the grant funded, the following pertained to fish and shellfish:

The project from SUNY ESF, Thousand Islands Biological Station, Clayton, New York, *Influence of Spawning and Nursery Habitat in Shaping the Northern Pike Gut Microbiome*, was awarded $22,500. Some information about the project are the following:

- Gut microbiome research science has provided indicators of how intestinal microbes influence the health of mice, rats, termites, chickens, and humans, yet has only modestly been explored in fisheries science.
- With GLRC funding, researchers will examine fish gut microbiome as an indicator of spawning habitat and its impact on the health of Northern Pike, a fish native to the Great Lakes and St. Lawrence River, and a top sport fish in New York State.
- NYS DEC studies have shown significant decline of adult and juvenile Northern Pike populations in the Upper St. Lawrence River. Some Northern Pike in the 1000 Islands region have modified their spawning behavior to occur later and in deeper off-shore bay habitats. Spawning in non-traditional habitats can decrease young fish survival.
- As suitable spawning and nursery habitat decline so do fish numbers, causing the need to supplement natural populations with hatchery-bred fish. With this GLRC grant, researchers will create microhabitats in fish rearing facilities to investigate how that influences the gut microbiome and health of hatchery-raised pike.

Details of all awarded projects are posted on the GLRC website.

For more information, contact Megan Golwitzer (Office of Communication Services) at 716-851-7201, Region9@dec.ny.gov.

Source: http://www.dec.ny.gov/press/110090.html.

Recent Publications

Journal Articles

The list below provides a selection of research articles focusing on pesticides.

- Pesticide residues in water, sediment and fish from Tono Reservoir and their health risk implications
  Akoto, O., A.A. Azuure, and K.D. Adotey. 2016. Pesticide residues in water, sediment and fish from Tono Reservoir and their health risk implications. *SpringerPlus* 5(1):1849.

- Pyrethroid pesticides as endocrine disruptors: Molecular mechanisms in vertebrates with a focus on fishes
  Brander, S.M., M.K. Gabler, N.L. Fowler, R.E. Connon, and D. Schlenk. 2016. Pyrethroid pesticides as endocrine disruptors: Molecular mechanisms in vertebrates with a focus on fishes. *Environmental Science & Technology* 50(17):8977–8992.

- Pesticides in the Ebro River basin: Occurrence and risk assessment
  Ccanccapa, A., A. Masiá, A. Navarro-Ortega, Y. Picó, and D. Barceló. 2016. Pesticides in the Ebro River basin: Occurrence and risk assessment. *Environmental Pollution* 211:414–424.

- Rapid determination of organochlorine pesticides in fish using selective pressurized liquid extraction and gas chromatography–mass spectrometry
  Choi, M., I.S. Lee, and R.H. Jung. 2016. Rapid determination of organochlorine pesticides in fish using selective pressurized liquid extraction and gas chromatography–mass spectrometry. *Food Chemistry* 205:1–8.

- Tissue distribution of organochlorine pesticides in largemouth bass (*Micropterus salmoides*) from laboratory exposure and a contaminated lake
  Dang, V.D., K.J. Kroll, S.D. Supowit, R.U. Halden, and N.D. Denslow. 2016. Tissue distribution of organochlorine pesticides in largemouth bass (*Micropterus salmoides*) from laboratory exposure and a contaminated lake. *Environmental Pollution* 216:877–883.

- Distribution and residue profile of organochlorine pesticides and polychlorinated biphenyls in sediment and fish of Lake Manzala, Egypt
  El-Kady, A.A., T.L. Wade, S.T. Sweet, and J.L. Sericano. 2017. Distribution and residue profile of organochlorine pesticides and polychlorinated biphenyls in sediment and fish of Lake Manzala, Egypt. *Environmental Science and Pollution Research* 24(11):10301–10312.

- Comparison of lindane and carbaryl pesticide bioaccumulation in the common sole (*Solea solea*)
  Emanuela, F., S. Giuseppe, G. Stefano, B. Mattia, and M. Mauro. 2017. Comparison of lindane and carbaryl pesticide bioaccumulation in the common sole (*Solea solea*). *Bulletin of Environmental Contamination and Toxicology* 98(5):656–661.

- Organochlorine pesticides (OCPs) in sediment and fish of two tropical water bodies under different land use
  Hinojosa-Garro, D., A.M.B. Chan, and J. Rendón-von Osten. 2016. Organochlorine pesticides (OCPs) in sediment and fish of two tropical water bodies under different land use. *Bulletin of Environmental Contamination and Toxicology* 97(1):105–111.

- Occurrence of pesticides residues in soft tissue of *Buccinum undatum* and *Littorina littorea* from brackish water and intertidal zone of the lower Atlantic Ocean
  Ikpesu, T.O., and O.E. Temiotan. 2017. Occurrence of pesticides residues in soft tissue of *Buccinum undatum* and *Littorina littorea* from brackish water and intertidal zone of the lower Atlantic Ocean. *International Journal of Food Safety, Nutrition, Public Health and Technology* 9(3):20–27.

- The long shadow of our chemical past—High DDT concentrations in fish near a former agrochemicals factory in England
  Jürgens, M.D., J. Crosse, P.B. Hamilton, A.C. Johnson, and K.C. Jones. 2016. The long shadow of our chemical past—High DDT concentrations in fish near a former agrochemicals factory in England. *Chemosphere* 162:333–344.

- Multiclass pesticide residue analysis in fish muscle and liver on one-step extraction-cleanup strategy coupled with liquid chromatography tandem mass spectrometry
  Kaczyński, P., B. Łozowicka, M. Perkowski, and J. Szabuńko. 2017. Multiclass pesticide residue analysis in fish muscle and liver on one-step extraction-cleanup strategy coupled with liquid chromatography tandem mass spectrometry. *Ecotoxicology and Environmental Safety* 138:179–189.

- Comparative study of the intake of toxic persistent and semi persistent pollutants through the consumption of fish and seafood from two modes of production (wild-caught and farmed)
  Rodríguez-Hernández, Á., M. Camacho, L.A. Henríquez-Hernández, L.D. Boada, P.F. Valerón, A. Zaccaroni, M. Zumbado, M. Almeida-González, and C. Rial-Berriel. 2017. Comparative study of the intake of toxic persistent and semi persistent pollutants through the consumption of fish and seafood from two modes of production (wild-caught and farmed). *Science of the Total Environment* 575:919–931.

- Occurrence of antiparasitic pesticides in sediments near salmon farms in the northern Chilean Patagonia
  Tucca, F., H. Moya, K. Pozo, F. Borghini, S. Focardi, and R. Barra. 2017. Occurrence of antiparasitic pesticides in sediments near salmon farms in the northern Chilean Patagonia. *Marine Pollution Bulletin* 115(1–2):465–468.

- Persistent organic pollutants (POPs) in populations of the clam *Chione californiensis* in coastal lagoons of the Gulf of California
  Vargas-González, H.H., L.C. Méndez-Rodríguez, J. García-Hernández, R.A. Mendoza-Salgado, T. Zenteno-Savín, and J.A. Arreola-Lizárraga. 2016. Persistent organic pollutants (POPs) in populations of the clam *Chione californiensis* in coastal lagoons of the Gulf of California. *Journal of Environmental Science and Health, Part B* 51(7):435–445.

- Linear and nonlinear models for predicting fish bioconcentration factors for pesticides
  Yuan, J., C. Xie, T. Zhang, J. Sun, X. Yuan, S. Yu, Y. Zhang, Y. Cao, X. Yu, X. Yang, and W. Yao. 2016. Linear and nonlinear models for predicting fish bioconcentration factors for pesticides. *Chemosphere* 156:334–340.

Upcoming Meetings and Conferences

13th International Conference on Mercury as a Global Pollutant
July 16–21, 2017
Providence, Rhode Island

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

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

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

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

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.