



# Fish and Shellfish Program NEWSLETTER

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

This edition of the Fish and Shellfish Program Newsletter generally focuses on the effectiveness of fish advisories.

## Recent Advisory News

### Kansas Issues Revised Fish Consumption Advisories

The Kansas Department of Health and Environment and the Kansas Department of Wildlife, Parks, and Tourism have issued revised fish consumption advisories for 2017. The advisories identify types of fish or other aquatic life that should be eaten in limited quantities or, in some cases, avoided altogether because of contamination. General advice and Internet resources are also provided to aid the public in making informed decisions on the benefits as well as the risks associated with eating locally caught fish from Kansas waters. The change to the previous advisory is included here. The full advisory is provided in the link below.

#### General Advice for Eating Locally Caught Fish in Kansas

- Avoid subsistence level (relying on wild-caught fish for daily nutritional needs) fishing activities in large rivers within or immediately downstream of large urban/industrial areas and wastewater outfalls. Fish in these areas are more likely to contain traces of chemical contaminants.

Source: [http://www.kdheks.gov/news/web\\_archives/2017/01032017.htm](http://www.kdheks.gov/news/web_archives/2017/01032017.htm).

### Commonwealth of Pennsylvania Public Health Advisory—2017 Fish Consumption

#### Statewide Advisory

In January 2017, Pennsylvania issued general, statewide, and specific updated health advisories for recreationally caught sport fish. The general, statewide advice is that a person eats no more than one meal (eight ounces before cooking or one-half pound) per week of sport fish caught in the state’s waterways. This general advice is issued annually to protect against eating large amounts of fish that have not been tested or that may contain unidentified contaminants.

The advisory begins by explaining the nutritional benefits of fish. It then discusses potential health concerns to pregnant and breast-feeding women, women of childbearing age, children, and individuals whose diet consists of a high percentage of fish.

## Introduction to Fish Consumption Advisories

It is important to note that this advisory is not recommending that people stop eating sport-caught fish, except where “Do Not Eat” is specified in the advisory. When properly caught and prepared, eating fish regularly offers important health benefits as a good choice to replace high fat foods. These benefits can be gained by following the considerations outlined in the sport fish consumption advisory: choosing safer places to fish; picking safer species to eat; correctly trimming and cooking catch; and following the recommended meal frequencies. By following this advice, exposure to possible contaminants will be reduced.

Consumption advisories provide guidance to individuals or segments of the population that are at greater risk from exposure to contaminants in fish. Advisories are not regulatory standards, but are recommendations intended to provide additional information of particular interest to high-risk groups. These advisories apply only to recreationally caught sport fish in Pennsylvania, not commercial fish. The Food and Drug Administration establishes the legal standards for contaminants in food sold commercially, including fish.

## Contaminants in Fish

While most recreationally caught sport fish in Pennsylvania are safe to eat, chemicals such as mercury and polychlorinated biphenyls (PCBs) have been found in some fish from certain waters. While the levels of these unavoidable chemical contaminants are usually low, they could potentially be a health concern to pregnant and breast-feeding women, women of childbearing age, children, and individuals whose diet consists of a high percentage of fish.

Long lasting contaminants such as PCBs, chlordane, and mercury build up in the body over time. It may take months or years of regularly eating contaminated fish to build up amounts that are a health concern. Health problems that may result from the contaminants found in fish range from small changes in health that are hard to detect, to birth defects and cancer. Mothers who eat highly contaminated fish for many years before becoming pregnant may have children who have lower cognitive function, and therefore are slower to develop and learn. The meal advice in this advisory is intended to protect children from potential developmental problems. Adults are less likely to have health problems at the low levels that affect children. If this advisory is followed over one’s lifetime, exposure will be minimized and health risks associated with contaminants in fish will be reduced.

## How to Use This Advisory

Follow the general, statewide one-meal-per-week advisory to limit your exposure to contaminants. To determine if more protective advice applies to the fish that has been caught, find the locations and species of fish that were caught in the full table provided in the fish consumption advisory document (see the link provided at the end of this article). The table on the next page shows additions and changes to past fish consumption advisories. Find the meal advice for the caught fish. “Do Not Eat” means no one should eat those fish because of very high contamination. The other groups (“2 meals/month,” “1 meal/month,” and “6 meals/year”) are advice for how often to eat a fish meal of a specific species from a specific waterbody.

The table on the next page shows the new additions and revisions to Pennsylvania’s fish consumption advisories. One meal is assumed to be one-half pound of fish (eight ounces before cooking) for a 150-pound person. The meal advice is equally protective for larger people who eat larger meals and smaller people who eat smaller meals.

People who regularly eat sport fish, women of childbearing age, and children are particularly susceptible to contaminants that build up over time. If someone falls into one of these categories, they should be especially careful to space fish meals out, according to the full advisory table provided in the link below.

Trout stocked from Fish & Boat Commission state fish hatcheries are subject to the blanket one-meal-per-week consumption advisory that applies to recreationally caught sport fish in Pennsylvania. Hatchery fish results from 2016 were all below this blanket one-meal-per-week advisory, so no special announcement was needed.

River Basin	Water Body	Area Under Advisory	Species	Meal Frequency	Contaminant	New or Change?
Delaware	Chester Creek (Delaware Co.)	Confluence of West Branch Chester Creek to Mouth	Channel Catfish	2 meals/month	Mercury	New
	Delaware River	Source to Trenton, NJ-Morrisville, PA bridge	Rock Bass, Walleye over 17 inches*	2 meals/month	Mercury	Change
	Lake Towhee (Bucks Co.)	Entire Lake	Largemouth Bass	2 meals/month	Mercury	New
Susquehanna	Cowanesque Reservoir (Tioga Co.)	Entire Lake	Largemouth Bass, Black Crappie, Yellow Perch*	1 meal/month	Mercury	Change
	Little Pine Creek (Clinton Co.)	Entire Basin	Yellow Perch	2 meals/month	Mercury	New
	Lyman Run Reservoir (Potter Co.)	Entire Lake	Largemouth Bass	1 meal/month	Mercury	New
	Trindle Spring Run (locally Silver Spring Run) (Cumberland Co.)	Silver Spring Meeting House to mouth (approx. 1 mile)	All Trout*	1 meal/month	PCB	Change
	West Branch Susquehanna River (Clinton, Lycoming, Union and Northumberland Co.)	Bald Eagle Creek to confluence with Susquehanna River*	Channel Catfish	1 meal/month	PCB	Change
Ohio	Chapman Dam Reservoir (Warren Co.)	Entire Lake	Largemouth Bass	2 meals/month	Mercury	New
	Lopez Pond (Sullivan Co.)	Entire Lake	Yellow Perch	2 meals/month	Mercury	New

\*Indicates the changed portion of the advisory.

Source:

[http://files.dep.state.pa.us/Water/Drinking%20Water%20and%20Facility%20Regulation/WaterQualityPortalFiles/FishConsumption/FishAdvisory/PFBC\\_sumconsumption-2017.pdf](http://files.dep.state.pa.us/Water/Drinking%20Water%20and%20Facility%20Regulation/WaterQualityPortalFiles/FishConsumption/FishAdvisory/PFBC_sumconsumption-2017.pdf)

## EPA News

### Data from the National Aquatic Resource Surveys Available Online

The National Aquatic Resource Surveys (NARS) are statistical surveys designed to assess the status of and changes in quality of the nation's coastal waters, lakes and reservoirs, rivers and streams, and wetlands. Using sample sites selected at random, these surveys provide a snapshot of the overall condition of the nation's water. Because the surveys use standardized field and lab methods, people would be able to compare results from different parts of the country and between years. EPA works with state, tribal, and federal partners to design and implement the NARS.

The surveys are designed to answer questions such as:

- What percent of waters support healthy ecosystems and recreation?
- What are the most common water quality problems?
- Is water quality improving or getting worse?
- Are investments in improving water quality focused appropriately?

These surveys are providing critical, groundbreaking, and nationally consistent water quality information. Additionally, the national surveys are helping to build stronger water quality monitoring programs across the country by fostering collaboration on new methods, new indicators, and new research.

The NARS are made up of four individual surveys that are implemented on a rotating basis:

- National Coastal Condition Assessment
- National Lakes Assessment
- National Rivers and Streams Assessment
- National Wetland Condition Assessment

**To download data:** Data are available for download as comma separated values (.csv) files at <https://www.epa.gov/national-aquatic-resource-surveys/data-national-aquatic-resource-surveys>. See the [survey technical document](#) for more information on the data analyses.



Sampling during the National Lakes Assessment in 2012.  
(Image courtesy of EPA)

The data can be filtered by survey (all surveys, coastal [1999–2001]/[2005–2006], coastal [2010], lakes [2007], streams [2004–2005], rivers and streams [2008–2009], wetlands [2011], and lakes [2012]), and by indicators, such as algal toxins, chlorophyll *a*, dissolved oxygen, enterococci, fish, physical habitat, land use, and phytoplankton. See the links below to access the data.

Source: <https://www.epa.gov/national-aquatic-resource-surveys/background-national-aquatic-resource-surveys>;  
<https://www.epa.gov/national-aquatic-resource-surveys/data-national-aquatic-resource-surveys>.

## Other News

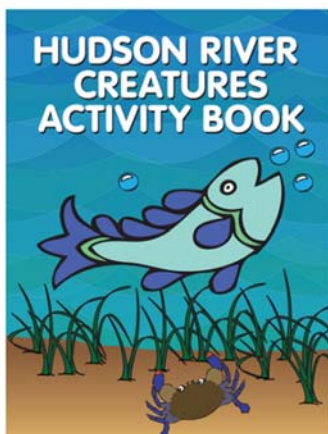
### Hudson River Fish Advisory Outreach Project—Project Update: 2009–2016

The New York State Department of Health (NYSDOH) provides health advice, or fish advisories, on eating fish people catch. NYSDOH does this because of chemical contamination of some water bodies. In 2008, NYSDOH initiated the Hudson River Fish Advisory Outreach Project, a twenty-year initiative with a goal that all Hudson fish and crab consumers know about, understand, and follow the Hudson fish advisories. The project area extends for

192 miles along the Hudson River, which is contaminated with PCBs, from Baker's Falls in Hudson Falls (Washington County) to the southern tip of the Manhattan Battery in New York City (NYC).

Eating Hudson River fish can be a concern because the fish can have many thousand times more PCBs than the surrounding water. PCBs can have a greater effect on the development of young children or developing fetuses, and NYSDOH advises that women under the age of 50 (of childbearing age) and children under the age of 15 to not eat fish or crabs from the Hudson River from Corinth in Saratoga County to the NYC Battery.

NYSDOH reaches out to people who fish on the Hudson and to their families, and works with a variety of groups, including fishing and boating associations; marinas; municipal, park and recreation staff; immigrant and food bank networks; social service providers; and many more. NYSDOH has developed a range of free materials to communicate the project messages to different audiences. These materials include brochures, posters, signs, a children's activity book, a magnet, and a pocket card. In total, NYSDOH developed nine products that are available in up to five languages. Many municipal offices distribute the materials with the fishing licenses they sell. Community organizations also give out the materials, and municipal and other property owners post signs. Six examples of free fish advisory materials that NYSDOH uses to communicate their message are shown below and on the next page. For a full list of fish advisory material from the NYSDOH, visit [https://www.health.ny.gov/environmental/outdoors/fish/hudson\\_river/index.htm](https://www.health.ny.gov/environmental/outdoors/fish/hudson_river/index.htm).



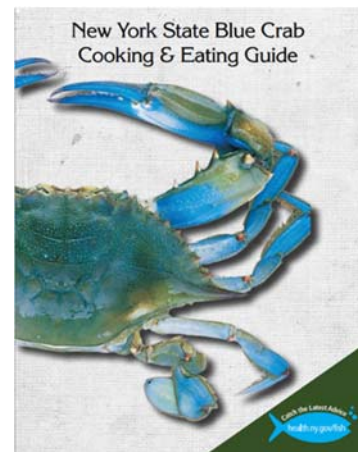
Hudson River Creatures Activity Book.

A 20-page activity book for classrooms, waiting rooms, and Hudson River community events. *(Image courtesy of NYSDOH)*



Cut the Fat to Cut PCBs.

This 4x4 inch refrigerator magnet shows how to reduce PCB levels in a fish meal by skinning and trimming fish before cooking. *(Image courtesy of NYSDOH)*



New York State Blue Crab Cooking & Eating Guide.

This booklet shows how to cook and prepare blue crabs to help reduce levels of chemicals in a crab meal. *(Image courtesy of NYSDOH)*



Can You Eat That Fish From the Hudson?

An 11 x 17 inch poster, ideal for waiting rooms or community bulletin boards. (Image courtesy of NYSDOH)



Hudson River Fish Advisory Sign.

A free Hudson River fish advisory sign for NYC Harbor waters to Rip Van Winkle Bridge at Catskill. (Image courtesy of NYSDOH)

South of Rip Van Winkle Bridge at Catskill to New York City Battery

## Advice on Eating Hudson River Fish

Includes Kingston, Poughkeepsie, Newburgh, Beacon, Peekskill, and Yonkers

**Do Not Eat**

No one should eat Hudson River catfish, walleye or American eel because they have more contamination. DEC regulations also prohibit taking Hudson River American eel for food.

Catfish      Walleye  
American eel

**For more information:**  
New York State Department of Health  
(518) 402-7530 or 1-800-458-1158  
[www.health.ny.gov/hudsonriverfish](http://www.health.ny.gov/hudsonriverfish)

2790 New York State Department of Health 3/16

**Men Over 15 and Women Over 50**

Can eat up to six crabs per week (meat only). Do not eat the tomalley (green stuff, mustard) or reuse cooking water.

Blue crab

Can eat up to one meal per month of one of these species:

Striped bass  
White perch      Carp  
Bluefish      Brown bullhead  
Smallmouth bass      Rainbow smelt  
Largemouth bass      Goldfish  
Atlantic needlefish

**All other fish** from Catskill to the Battery can be eaten once a week by men over 15 and women over 50.

**Cut the Fat to Cut PCBs**  
Follow the advice below to reduce PCBs by nearly one half.

Cut away fat along side (dark area)  
Cut away fat along back and belly  
Remove skin

- After trimming as shown, broil, grill or bake the fish on a rack so that the fat drips away.
- Do not pan-fry the fish or use drippings to make stock or sauce.

**See back panel for fish that no one should eat.**

Advice on Eating Hudson River Fish.

A waterproof, wallet-sized card lists which Hudson River fish that men over 15 and women over 50 can eat. This card is for the Hudson River from South of Rip Van Winkle Bridge at Catskill to NYC Battery. (Images courtesy of NYSDOH)

Most people who fish the Hudson also fish other local waters. NYSDOH's newest brochure, *Hudson Valley Region Health Advice on Eating Fish You Catch*, includes advice for the Hudson River and other water bodies in the counties along the Hudson—and has a positive spin on fishing. It lists some waters with New York State Department of Environmental Conservation (NYSDEC) public access where people can catch fish that are safe to eat. NYSDOH is working with the NYSDEC to include NYSDOH advice in the popular NYSDEC Pocket Ranger fishing and hunting phone app.

In 2009 and 2014, NYSDOH issued Requests for Applications to establish mini-grants for local outreach. Some funded partners reach out to the low-income community at food banks, Headstart programs, and health clinics to conduct fish consumption surveys to help learn more about who eats Hudson fish. Other partners presented the advice through classroom activities and environmental science programs.

In 2015, Arm-of-the-Sea Theater visualized Hudson fish advisory messages through their unique theatrical production, *Hook Line and Sinker: Fishing the Hudson River*.

NYSDOH and its partners share health advice with the public at county fairs and many community events, from Washington and Saratoga counties to Manhattan. To reach immigrants who are often less aware of the advice, NYSDOH collaborates with organizations like Latinos Unidos of the Hudson Valley, the U.S. Committee for Refugees and Immigrants, and the Chinese-American Planning Council, who are trusted agents in the immigrant community. The success of the Hudson River Fish Advisory Outreach Project hinges upon connections on the ground to people who eat Hudson fish. NYSDOH looks forward to working with existing partners and invites others to join in this important public health effort.

For more information, visit

[https://www.health.ny.gov/environmental/outdoors/fish/hudson\\_river/advisory\\_outreach\\_project/](https://www.health.ny.gov/environmental/outdoors/fish/hudson_river/advisory_outreach_project/).

Source: [https://www.health.ny.gov/environmental/outdoors/fish/hudson\\_river/docs/2016\\_hudson\\_report.pdf](https://www.health.ny.gov/environmental/outdoors/fish/hudson_river/docs/2016_hudson_report.pdf).

## Are Fish Consumption Advisories for the Great Lakes Adequately Protective from Chemical Mixture?

This study on the protectiveness of fish consumption advisories for the Great Lakes was published in the October 2016 edition of *Environmental Health Perspectives*.

North American Great Lakes are home to more than 140 types of fish and are famous for recreational and commercial fishing. However, the presence of toxic substances has resulted in the issuance of fish consumption advisories typically based on the most restrictive contaminant. The researchers investigated if these advisories, which typically neglect the existence of a mixture of chemicals and their possible additive adverse effects, are adequately protective of health of humans consuming fish from the Canadian waters of the Great Lakes.

Using recent fish contaminant monitoring data collected by the Government of Ontario, Canada, advisories were simulated using the most restrictive contaminant (“one-chem”) and multi-contaminant additive effect (“multi-

chem”) approaches. The advisories from the two simulations were compared to examine if there is any deficiency in the currently issued advisories.

The researchers found that about half of the advisories presently issued are potentially not adequately protective. Of the Great Lakes, the highest percentage of advisories affected would be in Lake Ontario if an additive effect is considered. Many fish, which are popular for consumption such as walleye, salmon, bass, and trout, would have noticeably more stringent advisories.

The researchers concluded that improvements in the advisories may be needed to ensure that the health of humans consuming fish from the Great Lakes is protected. In this region, total PCB and mercury are the major contaminants causing restriction on consuming fish, while dioxins/furans, toxaphene and mirex/photomirex are of a minor concern. They also concluded that regular monitoring of most organochlorine pesticides and metals in fish in these lakes can be discontinued.

Study citation: Gandhi, N., K.G. Drouillard, G.B. Arhonditsis, S.B. Gewurtz, and S.P. Bhavsar. In press. Are fish consumption advisories for the Great Lakes adequately protective from chemical mixture? *Environmental Health Perspectives*.

Source: <https://ehp.niehs.nih.gov/ehp104/#tab1>.

## Against the Tide: Fish Quickly Adapt to Lethal Levels of Pollution

Evolution is allowing some urban fish to survive in a lethal, human-altered environment, according to new results published in the journal *Science*.

While environmental change is outpacing the rate of evolution for many other species, Atlantic killifish living in four polluted east coast estuaries turn out to be remarkably resilient. These fish have adapted to levels of highly toxic industrial pollutants that would normally kill them.

The killifish is up to 8,000 times more resistant to this level of pollution than other fish, scientists found. While the fish is not commercially valuable, it is an important food for other species and an indicator of environmental health.

“This study shows that different populations of Atlantic killifish exposed to toxic pollution evolve tolerance to that pollution through changes in one molecular pathway,” said George Gilchrist, program director in the National Science Foundation (NSF)’s Division of Environmental Biology, which funded the study. “This pathway may play a similar role in many animals exposed to pollutants, with slightly different adaptations in response to different toxins.”

### Genetic Diversity Speeds Evolution

What makes Atlantic killifish so special? Extremely high levels of genetic variation, higher than any other vertebrate—humans included—measured so far. The more genetic diversity, the faster evolution works. That’s one reason insects and weeds can quickly adapt and evolve to resist pesticides, and pathogens can evolve quickly to resist drugs created to destroy them.



“Some people will see this as a positive and think, ‘Hey, species can evolve in response to what we’re doing to the environment!’” said lead author, Andrew Whitehead of the University of California-Davis. “Unfortunately, most species we care about preserving probably can’t adapt to these rapid changes because they don’t have the high levels of genetic variation that allow them to evolve quickly.”

## Killifish Genomes

The scientists sequenced complete genomes of nearly 400 Atlantic killifish from polluted and non-polluted sites at New Bedford Harbor in Massachusetts, Newark Bay in New Jersey, Connecticut’s Bridgeport area, and Virginia’s Elizabeth River.

The sites have been polluted since the 1950s and 1960s by a complex mixture of industrial pollutants including dioxin, heavy metals, hydrocarbons, and other chemicals.

At the genetic level, the tolerant Atlantic killifish populations evolved in very similar ways. This adaptation suggests that these fish already carried the genetic variation before the sites were polluted, and that there may only be a few evolutionary solutions to pollution.

The study lays the groundwork for future research that could explore which genes confer tolerance of specific chemicals. Such work could help better explain how genetic differences between humans and other species may contribute to differences in sensitivity to environmental chemicals.

“If we know the kinds of genes that can confer sensitivity in another vertebrate animal like us, perhaps we can understand how humans, with their own mutations in these important genes, might react to these chemicals,” Whitehead said.

The National Institute of Environmental Health Sciences also funded the research. The study’s co-authors are affiliated with the U.S. Department of Agriculture, EPA, Washington University School of Medicine, University of Birmingham, Indiana University, Woods Hole Oceanographic Institution, and University of Miami.

Study citation: Reid, N.M., D.A. Proestou, B.W. Clark, W.C. Warren, J.K. Colbourne, J.R. Shaw, S.I. Karchner, M.E. Hahn, D. Nacci, M.F. Oleksiak, D.L. Crawford, and A. Whitehead. 2016. The genomic landscape of rapid repeated evolutionary adaptation to toxic pollution in wild fish. *Science* 354(6317):1305–1308.

Source: [https://www.nsf.gov/discoveries/disc\\_summ.jsp?cntn\\_id=190457&org=OCE&from=news](https://www.nsf.gov/discoveries/disc_summ.jsp?cntn_id=190457&org=OCE&from=news).



New Bedford Harbor in Massachusetts is contaminated with PCBs from decades of industrial pollution. (Image by Bryan Clark, courtesy of NSF)

## Recent Publications

### Journal Articles

The list below provides a selection of research articles focusing on the effectiveness of fish advisories.

- ▶ [Fish consumption caveat: Advisories may not help with long-lived contaminants](#)  
Betts, K.S. 2014. Fish consumption caveat: Advisories may not help with long-lived contaminants. *Environmental Health Perspectives* 122(2):A57.
- ▶ [Evaluating the effectiveness of fish consumption advisories: Modeling prenatal, postnatal, and childhood exposures to persistent organic pollutants](#)  
Binnington, M.J., C.L. Quinn, M.S. McLachlan, and F. Wania. 2014. Evaluating the effectiveness of fish consumption advisories: Modeling prenatal, postnatal, and childhood exposures to persistent organic pollutants. *Environmental Health Perspectives* 122(2):178–186.
- ▶ [Comprehension of fish consumption guidelines among older male anglers in Wisconsin](#)  
Christensen, K.Y., M.R. Raymond, B.A. Thompson, C.S. Schrank, M.C.W. Williams, and H.A. Anderson. 2016. Comprehension of fish consumption guidelines among older male anglers in Wisconsin. *Journal of Community Health* 41(1):157–164.
- ▶ [How can more women of childbearing age be encouraged to follow fish consumption recommendations?](#)  
Connelly, N.A., T.B. Lauber, J. Niederdeppe, and B.A. Knuth. 2014. How can more women of childbearing age be encouraged to follow fish consumption recommendations? *Environmental Research* 135:88–94.
- ▶ [Fish consumption among women anglers of childbearing age in the Great Lakes region](#)  
Connelly, N.A., T.B. Lauber, J. Niederdeppe, and B.A. Knuth. Fish consumption among women anglers of childbearing age in the Great Lakes region. *Environmental Research* 150:213–218.
- ▶ [A qualitative exploration of fishing and fish consumption in the Gullah/Geechee culture](#)  
Ellisa, J.H., D.B. Friedman, R. Puett, G.I. Scott, and D.E. Porter. 2014. A qualitative exploration of fishing and fish consumption in the Gullah/Geechee culture. *Journal of Community Health* 39(6):1161–1170.
- ▶ [Can fish consumption advisories do better? Providing benefit and risk information to increase knowledge](#)  
Engelberth, H., M.F. Teisl, E. Frohberg, K. Butts, K.P. Bell, S. Stableford, and A.E. Smith. 2013. Can fish consumption advisories do better? Providing benefit and risk information to increase knowledge. *Environmental Research* 126:232–239.
- ▶ [Are fish consumption advisories for the Great Lakes adequately protective from chemical mixture?](#)  
Gandhi, N., K.G. Drouillard, G.B. Arhonditsis, S.B. Gewurtz, and S.P. Bhavsar. In press. Are fish consumption advisories for the Great Lakes adequately protective from chemical mixture? *Environmental Health Perspectives*.
- ▶ [A content analysis of Internet resources about the risks of seafood consumption](#)  
Henderson, H.C., J. Hong, D.B. Friedman, D.E. Porter, A.C. Halfacre, G.I. Scott, and J.R. Lead. 2016. A content analysis of Internet resources about the risks of seafood consumption. *International Journal of Environmental Health Research* 26(4):433–447.
- ▶ [Fish consumption patterns and mercury advisory knowledge among fishers in the Haw River Basin](#)  
Johnston, J.E. 2016. Fish consumption patterns and mercury advisory knowledge among fishers in the Haw River Basin. *North Carolina Medical Journal* 77(1):9–14.
- ▶ [Need for improved risk communication of fish consumption advisories to protect maternal and child health: Influence of primary informants](#)  
LePrevost, C.E., K.M. Gray, M. Hernández-Pelletier, B.D. Bouma, C. Arellano, and W.G. Cope. 2013. Need for improved risk communication of fish consumption advisories to protect maternal and child health: Influence of primary informants. *International Journal of Environmental Research and Public Health* 10(5):1720–1734.

- ▶ [Using theory to identify beliefs associated with intentions to follow fish consumption advisories among anglers living in the Great Lakes region](#)  
Niederdeppe, J., N.A. Connelly, T.B. Labuer, and B.A. Knuth. 2015. Using theory to identify beliefs associated with intentions to follow fish consumption advisories among anglers living in the Great Lakes region. *Risk Analysis* 35(11):1996–2008.
- ▶ [Examining the impact of a public health message on fish consumption in Bermuda](#)  
Pirkle, C.M., C. Peek-Ball, E. Outerbridge, and P.M. Rouja. 2015. Examining the impact of a public health message on fish consumption in Bermuda. *PLoS ONE* 10(10):e0139459.
- ▶ [Louisiana residents' self-reported lack of information following the Deepwater Horizon oil spill: Effects on seafood consumption and risk perception](#)  
Simon-Friedt, B.R., J.L. Howard, M.J. Wilson, D. Gauthé, D. Bogen, D. Nguyen, E. Frahm, and J.K. Wickliffe. 2016. Louisiana residents' self-reported lack of information following the Deepwater Horizon oil spill: Effects on seafood consumption and risk perception. *Journal of Environmental Management* 180:526–537.

## Reports

- ▶ [Factors affecting fish consumption among new mothers living in Minnesota, Pennsylvania, and Wisconsin](#)  
Connelly, N.A., K.K. Smith, T.B. Lauber, J. Niederdeppe, and B.A. Knuth. 2013. *Factors Affecting Fish Consumption Among New Mothers Living in Minnesota, Pennsylvania, and Wisconsin*. Human Dimensions Research Unit Series Publication 13-01. Cornell University, Department of Natural Resources, Ithaca, NY.

## Upcoming Meetings and Conferences

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### [Impacts of a Changing Environment on the Dynamics of High-latitude Fish and Fisheries](#)

May 9–12, 2017  
Anchorage, Alaska

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### [6<sup>th</sup> Global Summit on Aquaculture & Fisheries](#)

May 25–26, 2017  
Osaka, Japan

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### [11<sup>th</sup> International Conference on Molluscan Shellfish Safety](#)

May 14–18, 2017  
Galway, Ireland

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### [SeaWeb Seafood Summit](#)

June 5–7, 2017  
Seattle, Washington

## 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](mailto: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>.