



FACT SHEET

Contaminants to Monitor in Fish and Shellfish Advisory Programs

July 2024

Summary

Fish and shellfish advisory programs in states, Tribes, and territories monitor and analyze contaminants in fish and shellfish in waterbodies within their jurisdictions. When contaminants occur in high enough concentrations to potentially affect the health of people eating fish and shellfish from those waters, those programs issue consumption advisories. To help state, Tribal, and territorial programs that issue fish and shellfish advisories, the EPA recommends contaminants to monitor. The EPA has updated those recommendations. EPA added, among other contaminants, a list of PFAS, thereby fulfilling the agency's commitment in the [PFAS Strategic Roadmap](#) to finalize a list of PFAS for use in fish advisory programs. By issuing this factsheet, the EPA encourages advisory programs to update the contaminants for which they monitor to protect people from eating potentially harmful concentrations of contaminants.

Two Recommended Lists of Contaminants to Monitor

The EPA has established two lists of contaminants that advisory programs should consider monitoring in fish and shellfish. Both lists contain substances that have been found to occur in the edible tissue of fish and shellfish at concentrations that may be of concern for human health.

1. The first list, "Contaminants to monitor for advisories" (shown in Table 1), contains contaminants for which the EPA or other federal agencies have released measures of oral toxicity in humans (e.g., reference dose, cancer slope factor). The EPA recommends that advisory programs use this list for monitoring and issuing advisories with consumption limits.
2. The second list, "Contaminants to monitor to watch" (shown in Table 2), contains contaminants for which the EPA or other federal agencies have not yet released assessments of the effects on human health. The EPA recommends that advisory programs monitor for compounds on this list to determine if they are accumulating in fish in local waters. The advisory programs could calculate their own or use another agency's scientifically based measures of oral toxicity in humans to calculate consumption limits, or wait for such values to be released from a federal agency.

These lists of contaminants are not intended to be all-encompassing. Any time a fish and shellfish advisory program deems a contaminant is of public health concern within its jurisdiction (e.g., there is a spill or known discharge source, or it is found in high enough concentrations to potentially affect the health of people eating fish and shellfish), they should include it in their contaminant monitoring program. In addition, inclusion of a contaminant on these lists is not meant to imply that it is present in all waters nationwide. Inclusion indicates the contaminant has been found to accumulate in fish or shellfish in ambient waters to a level that could be deleterious to human health and is therefore capable of being problematic if released into local waters. Furthermore, as part of this update effort the EPA did not conduct an extensive review of contaminants that were already on the monitoring list to determine if any should be removed.

Contaminants to Monitor for Advisories

The EPA has updated its list of contaminants that it recommends fish and shellfish advisory programs include in their contaminant monitoring program and issue consumption advisories for when needed. Table 1 contains the complete updated list; new contaminants are in bold.

Table 1. Contaminants to monitor for fish and shellfish advisories

Group	Analyte		
PFAS	Perfluorodecanoic acid (PFDA) Perfluorohexane sulfonic acid (PFHxS) Perfluorononanoic acid (PFNA) Perfluorooctanoic acid (PFOA) Perfluorooctane sulfonic acid (PFOS)		
Cyanotoxins	Microcystins		
Flame retardants	BDE-47		
Pharmaceuticals	Amphetamine		
Metals	Arsenic (inorganic) Cadmium Lead	Mercury (methylmercury) Selenium Tributyltin	
Organochlorine pesticides	Chlordane, total (<i>cis- and trans-chlordane, cis- and trans-nonachlor, oxychlordane</i>) DDT, total (<i>2,4'-DDD, 4,4'-DDD, 2,4'-DDE, 4,4'-DDE, 2,4'-DDT, 4,4'-DDT</i>) Dicofol Dieldrin Endosulfan (I and II)	Endrin Heptachlor epoxide Hexachlorobenzene Lindane (γ -hexachlorocyclohexane; γ -HCH) Mirex Toxaphene	
Organophosphate pesticides	Chlorpyrifos Diazinon Disulfoton Ethion Terbufos		
Chlorophenoxy herbicides	Oxyfluorfen		
Polycyclic aromatic hydrocarbons (PAHs)	Dibenz[<i>a,h</i>]anthracene Benzo[<i>a</i>]pyrene Benz[<i>a</i>]anthracene Benzo[<i>b</i>]fluoranthene Benzo[<i>k</i>]fluoranthene Indeno[<i>1,2,3-cd</i>]pyrene Anthracene Benzo[<i>g,h,i</i>]perylene	Chrysene Acenaphthene Acenaphthylene Fluoranthene Fluorene Phenanthrene Pyrene	
Polychlorinated biphenyls (PCBs)	2,4' diCB 2,2',5 triCB 2,4,4' triCB 3,4,4' triCB 2,2'3,5' tetraCB 2,2'4,5' tetraCB 2,2',5,5' tetraCB	2,2',4,5,5' pentaCB 2,3,3',4,4' pentaCB 2,3,4,4',5 pentaCB 2,3',4,4',5 pentaCB 2,3',4,4',6 pentaCB 2',3,4,4',5 pentaCB 3,3',4,4',5 pentaCB	2,3',4,4',5,5' hexaCB 2,3',4,4',5',6 hexaCB 3,3',4,4',5,5' hexaCB 2,2',3,3',4,4',5 heptaCB 2,2',3,4,4',5,5' heptaCB 2,2',3,4,4',5',6 heptaCB 2,2',3,4,4',6,6' heptaCB

Group	Analyte		
	2,3',4,4' tetraCB	2,2',3,3',4,4' hexaCB	2,2',3,4',5,5',6 heptaCB
	2,3',4',5 tetraCB	2,2',3,4,4',5' hexaCB	2,3,3',4,4',5,5' heptaCB
	2,4,4',5 tetraCB	2,2',3,5,5',6 hexaCB	2,2',3,3',4,4',5,6 octaCB
	3,3',4,4' tetraCB	2,2',4,4',5,5' hexaCB	2,2',3,3',4,4',5,6,6' octaCB
	3,4,4',5 tetraCB	2,3,3',4,4',5 hexaCB	2,2',3,3',4,4',5,5',6 nonaCB
	2,2',3,4,5' pentaCB	2,3,3',4,4',5 hexaCB	2,2',3,3',4,4',5,5',6,6' decaCB
	2,2',3,4',5 pentaCB	2,3,3',4,4',6 hexaCB	
Dioxins	2,3,7,8-TCDD	1,2,3,6,7,8-HxCDD	1,2,3,4,6,7,8-HpCDD
	1,2,3,7,8-PeCDD	1,2,3,7,8,9-HxCDD	OCDD
	1,2,3,4,7,8-HxCDD		
Furans	2,3,7,8-TCDF	1,2,3,6,7,8-HxCDF	1,2,3,4,6,7,8-HpCDF
	1,2,3,7,8-PeCDF	1,2,3,7,8,9-HxCDF	1,2,3,4,7,8,9-HpCDF
	2,3,4,7,8-PeCDF	2,3,4,6,7,8-HxCDF	OCDF
	1,2,3,4,7,8-HxCDF		

Contaminants to Monitor to Watch

The EPA also has created a new Contaminants to Monitor to Watch list that contains nine contaminants (two cyanotoxins and seven PFAS compounds); these are shown in Table 2. These compounds were documented in studies as occurring in edible tissue of consumed fish or shellfish species at a concentration that could be of concern for human health, based on the EPA's analyses (described in Process section). These compounds do not currently have measures of oral toxicity in humans (e.g., reference doses or cancer slope factors) issued by a federal agency. After relevant toxicity values are developed for any of these contaminants, advisory programs should evaluate the concentrations they have found in local fish and shellfish to determine if they need to issue consumption advisories.

Table 2. Contaminants to monitor to watch

Group	Analyte
Cyanotoxins	BMAA (β -methylamino-L-alanine) DABA (2,4-diaminobutyric acid dihydrochloride)
PFAS	Perfluorodecanesulfonic acid (PFDS) Perfluorododecanoic acid (PFDoA) Perfluoroheptanesulfonic acid (PFHpS) Perfluorooctanesulfonamide (PFOSA) Perfluorotetradecanoic acid (PFTeDA) Perfluorotridecanoic acid (PFTrDA) Perfluoroundecanoic acid (PFUdA, PFUnA, PFUnDA)

Process

The EPA developed the lists after a multi-year process that included review of the scientific literature for contaminants measured in species of fish and shellfish that can be found in U.S., analysis of the data, and external peer review.

Literature Search. The EPA performed a literature search to identify contaminants that bioaccumulate in fish and shellfish and their corresponding concentrations. After searching multiple databases using a specified set of search terms, the EPA screened articles to remove any that contained species not found in U.S. waters or

contained concentration data from dosing in laboratory studies. The EPA extracted concentrations of contaminants in fish and shellfish from the papers and toxicity information (e.g., reference dose and cancer slope factor) for contaminants from sources such as EPA's Integrated Risk Information System and DHHS' Agency for Toxic Substances and Disease Registry.

Analysis of Data. A contaminant's presence in fish or shellfish does not necessarily indicate a human health risk exists. The EPA used each contaminant's concentration and toxicity information in advisory equations found in EPA's *Guidance for Assessing Chemical Contaminant Data for Use in Fish Advisories* to determine if the levels found in fish or shellfish would exceed thresholds for safely eating eight ounces of seafood per week, as recommended by the *Dietary Guidelines for Americans*, or thresholds for frequent eaters, who were assumed to eat five ounces of seafood per day. Those contaminants whose levels were found to exceed the thresholds are included in Table 1.

Not all the contaminants found in fish and shellfish had toxicity information available. For the contaminants without toxicity values, the EPA calculated a generic screening level for each group of contaminants to capture contaminants with fish tissue concentrations high enough to potentially be a human health concern. Those contaminants whose levels potentially could exceed thresholds for safely eating eight ounces of seafood per week are included in Table 2.

Peer Review. The EPA solicited external peer review of the literature review, analysis, and results by a set of independent subject matter experts in toxicology and human health risk assessment. The EPA analyzed all the peer reviewers' comments and recommendations and made some changes in response to their evaluations.

Where can I find more information?

Information on understanding fish advisories: <https://www.epa.gov/choose-fish-and-shellfish-wisely>

Information on developing fish advisories: <https://www.epa.gov/choose-fish-and-shellfish-wisely/epa-guidance-developing-fish-advisories>

Information on what was submitted to peer review, peer reviewer comments, and actions taken in response to the peer review: <https://www.epa.gov/choose-fish-and-shellfish-wisely/epa-guidance-developing-fish-advisories>