Toxic-Impaired Waterbodies on 303(d) Lists in the Columbia River Basin

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May 2020

Acknowledgements

This project relied on contributions from many U.S. Environmental Protection Agency employees. In particular, the author wishes to thank Mary Lou Soscia for championing efforts to address toxics in the Columbia River Basin, for inspiring this project, and for her detailed review and thoughtful suggestions. In addition, the following EPA staff deserve recognition for their feedback and recommendations:

U.S. Environmental Protection Agency Region 8:
Peter Brumm

U.S. Environmental Protection Agency Region 10:
Keyyana Blount
Jill Fullagar
Lon Kissinger
James Lopez-Baird
Miranda Magdangal
Martin Merz
Michelle Wilcox

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Executive Summary

Under the Clean Water Act (CWA), states are required to assess their waters biennially and identify waterbodies that fail to meet their designated uses due to impaired water quality conditions on the [CWA Section] 303(d) list. This report focuses on two categories of toxic-impaired waterbodies on 303(d) lists: category 4a and category 5 waters. Category 4a waters have been identified as impaired and have an EPA-approved Total Maximum Daily Load (TMDL) that sets out a pollution budget. Category 5 waters are impaired and require a TMDL or water pollution control plan.

Recognizing how difficult it was to develop TMDLs to address toxics, in 2005 the U.S. Environmental Protection Agency (EPA) established the Columbia River Toxics Reduction Working Group to share information and coordinate actions to understand and reduce toxics. In 2016, Congress amended the CWA, creating Section 123, the Columbia River Basin Restoration Act. Section 123 directed EPA to establish the Columbia River Basin Restoration Working Group modeled after the existing Columbia River Toxics Reduction Working Group and provided a framework for future funding of toxic reduction, monitoring, and outreach actions through a competitive grant program.

This report is intended for use by the Columbia River Basin Restoration Working Group members and other entities working to understand and reduce toxics in the Columbia River Basin (the Basin). Waterbodies listed as impaired for toxic pollutants can serve as a starting point for prioritizing restoration and management actions and the absence of waterbodies on 303(d) lists can help identify data gaps to inform future monitoring and assessment efforts. This report:

1) identifies the more than 50 toxic contaminants that are on 303(d) lists of impaired waters in the Columbia River Basin,
2) summarizes the location of impaired waters for ten toxic contaminants, and
3) provides links to EPA-approved TMDLs and implementation plans.

The ten contaminants featured in the report are:

- arsenic
- copper
- lead
- mercury
- selenium
- Aldrin/Dieldrin
- Chlorpyrifos
- Dichlorodiphenyltrichloroethane (DDT) and its breakdown products
- polychlorinated biphenyls (PCBs)
- polycyclic aromatic hydrocarbons (PAHs)

Toxics-impaired waters are broadly distributed throughout the Basin. The mainstem Columbia River is impaired sporadically in Washington and nearly the entire reach from McNary Dam to the mouth of the estuary is impaired for one or more toxic pollutants. The mainstem Snake River has multiple segments with identified category 5 impairments, including the entire reach that forms the border between Oregon and Idaho. In total, 31 TMDL documents that address at least one toxic pollutant have been developed in the Basin. Every state has developed at least one TMDL for toxic pollutants: Idaho (5), Montana (13), Oregon (4), Washington (9), and EPA developed a basin-wide Dioxin TMDL that covers the lower mainstem Columbia River. Significant reaches of the upper Pend Oreille River watershed in

Montana and the Willamette River watershed in Oregon are covered by TMDLs for one or more toxic pollutants.

Although states are not required under CWA Section 303(d) to develop TMDL implementation plans, many states include a description of the actions that will be taken to achieve the pollutant load reductions. EPA is not required to and does not approve TMDL implementation plans. For organochlorine pesticides, implementation plans focus on strategies to keep contaminated sediment from entering waterways using agricultural and urban best management practices. To address metals contamination from legacy mining activities, implementation plans commonly recommend remediation and restoration of mine and waste sites and additional source assessment monitoring.

Purpose

This document is intended for use by Columbia River Basin Restoration Program Working Group members and other interested entities working to better understand and reduce toxics in the Basin. The document 1) identifies the more than 50 toxic contaminants that are on Clean Water Act (CWA) 303(d) lists of impaired waters in the Columbia River Basin, 2) summarizes the location of toxics-impaired waters for ten contaminants regulated under the Clean Water Act, and 3) provides links to the EPA-approved TMDLs that calculate pollution budgets for toxic pollutants and implementation plans that specify how to attain required pollutant load reductions.

Background

Toxic contaminants are naturally occurring or manufactured chemicals that can be harmful to fish, wildlife, and people. Many toxic contaminants break down slowly and can accumulate in the environment and concentrate in plants, wildlife, and people through bioaccumulation/magnification[1]. For the purposes of this document, toxic contaminants are defined as metals, pesticides and their breakdown products, and/or organic or inorganic compounds that are known to negatively affect the health of fish, wildlife, and human health. Conventional pollutants, such as temperature, total nitrogen/phosphorus, and bacteria, among others, are not considered toxic contaminants and are excluded from the analysis.

Although many data gaps remain, monitoring and assessment of toxic contamination in the Basin has increased over the last several decades. In the early 1990s, EPA published the National Study on Chemical Residues in Fish which found toxic contaminants were present in fish tissues in the Basin at elevated levels that could negatively impact aquatic life and human health (EPA, 1992). In 2002, EPA released the Columbia River Basin Fish Contaminant Survey: 1996-1998 which analyzed concentrations of 132 chemicals in the tissues of anadromous and resident fish species collected at 24 locations throughout the Basin. All species of fish had some levels of toxic chemicals in their tissues. Of the chemicals analyzed, a breakdown product of DDT, PCBs, zinc, and aluminum were detected in the highest concentrations in most of the fish tissues (EPA, 2002). In 1997-1998, researchers from the U.S. Geological Survey collected and analyzed over 500 fish, predominately common carp, black bass, and largescale sucker, from 16 sites in the Basin. Concentrations of lead in the upper Columbia River, selenium in the lower and middle Columbia River, and mercury throughout the basin exceeded one or more wildlife criteria in composite fish samples (Hinck et al., 2004). EPA has published a reference document featuring peer reviewed science and federal, state, and tribal government reports and publications related to toxic pollutants in the aquatic environment on its Columbia River website.

Fish and fisheries used by Columbia River Tribes are part of tribal culture, spirituality, nutrition, and economics. It has been documented that tribal members historically consumed much higher amounts of fish (Harper & Walker, 2015). As a result, Native Americans (and other high fish-consuming populations) are at much higher risk due to exposure to contaminants in fish. The Columbia River Inter-Tribal Fish Commission (1994) published a fish consumption survey of its member tribes that found, on average, adult tribal members consumed 58.7 grams of fish per day, 9 times the fish consumption rate of 6.5 grams per day used by EPA to establish water quality criteria at the time. A more recent fish consumption survey of Idaho tribes has corroborated these results. In recognition of this, Oregon and

[1] Bioaccumulation refers to the accumulation of a toxic chemical in the tissue of a particular organism; biomagnification refers to the increased concentration of a toxic chemical the higher an animal is on the food chain.

Washington have used fish consumption rates of 175 grams per day, approximately the 95th percentile fish consumption rates from the Columbia River Inter-Tribal Fish Commission (1994) survey to establish state water quality criteria. Tribes would like to increase their fish consumption and at the same time, avoid unacceptable health risks. This can only be done by reducing toxic contaminant levels in the Columbia River and its tributaries.

In 2005, EPA established the Columbia River Toxics Reduction Working Group, a voluntary collaboration between tribal, state, and local governments; federal agencies; industry; soil and water conservation districts; and nonprofit organizations. The group was created to share information, coordinate activities, and develop actions to assess and reduce toxics in the Basin. There was a recognition that this work was needed due to the difficulty in developing Total Maximum Daily Loads and implementation plans for toxic pollutants, many of which had unknown sources and unknown actions to reduce those pollutants. The Working Group summarized available information on four priority indicator chemicals in the 2009 State of the River Report for Toxics and identified 61 actions to reduce toxic pollutants the 2010 Columbia River Toxics Reduction Action Plan.

In 2016, Congress amended the Clean Water Act by adding Section 123 which required EPA to establish the Columbia River Basin Restoration Program. It was the first legislation to officially designate the national importance of restoring the Basin. Clean Water Act Section 123 directed EPA to establish the Columbia River Basin Restoration Program Working Group modeled after the Columbia River Toxics Reduction Working Group and provided a framework for future funding of toxic reduction, monitoring, and outreach actions. In fiscal year 2019, Congress appropriated $1 million to EPA to implement the program and in provided $1.2 million for 2020.

There are over 86,000 chemicals registered for use in commerce in the United States (EPA, 2019i). Only a small number, however, are regulated under the Clean Water Act (CWA), the primary law regulating pollution of the nation's waterways. While not comprehensive, two lists, the Toxic Pollutant List and the Priority Pollutant List, were developed in the mid-1970's to help states and EPA address toxics chemicals through effluent limits, permits, and water quality criteria (either numeric or narrative). The Toxic Pollutant List specifies 65 pollutants or groups of pollutants and is referenced by the CWA at Section 307(a)(1). The Priority Pollutant List builds off the Toxic Pollutant List by specifying 126 specific pollutants that were produced in significant quantities, found in the nation's waterways at a frequency occurrence of at least 2.5 percent, and had published analytical test methods (EPA, 2019a).

Section 305(b) of the CWA requires states to assess the quality of their waters every two years and submit a report to the EPA on the condition of their surface waterbodies. The statewide assessment information is referred to as the "[CWA Section] 305(b) list". Waterbodies are classified into one of five categories ranging from category 1 (meets water quality standards) to category 5 (polluted waters that require a pollution control measure). Waterbodies that fail to meet numeric and/or narrative water quality criteria established to achieve their designated use(s) are considered "impaired" under the CWA. Impaired waterbodies are cataloged in a list, referred to as the "[CWA Section] 303(d) list."

This report focuses on two categories of toxic(s)-impaired waterbodies on 303(d) lists: category 4a and category 5 waters. Category 4a waters have been identified as impaired and have an EPA-approved TMDL that sets out a pollution budget, including allocations for point and nonpoint sources of pollution. The waterbody remains on the 303(d) list until the implementation actions achieve the pollutant load reductions identified in the TMDL and the water quality meets applicable water quality criteria. The report also identifies category 5 waters. Category 5 waters are impaired and require a water quality

improvement project. Under the CWA, states are required to establish TMDLs for the pollutant(s) that cause the category 5 impairments.

This document provides information on known toxics-impaired waterbodies which may be helpful for prioritizing monitoring and reduction actions. In addition to identifying all toxic contaminants on 303(d) lists and TMDLs that have been developed for toxics in the Basin, the report summarizes the location of waterbodies impaired by ten metals and inorganic compounds, pesticides, and persistent organic pollutants:

Metals/Inorganics:
1. Arsenic
2. Copper
3. Lead
4. Mercury
5. Selenium

Pesticides:
6. Aldrin/Dieldrin
7. Chlorpyrifos
8. DDT (and its breakdown products)

Persistent Organic Pollutants:
9. PCBs
10. PAHs

Data Sources

The States of Idaho, Montana, Oregon, and Washington publish Integrated Reports that contain their 305(b) and 303(d) lists, including the geographic data specifying the location and extent of the river/lake reaches and the cause of the impairment, among other information. For the purpose of this report, the data used to create the tables, maps, and description of the location of impaired waterbodies were downloaded directly from each state's database (Table 1). For Idaho, Montana, and Washington, the report uses the most recent EPA-approved Integrated Report data. For Oregon, the memo relies on the state's final 2018/2020 Integrated Report submitted to EPA in April 2020 for review and approval. As of May 2020, EPA had not approved the new Integrated Report. Until the new Integrated Report is approved by EPA, Oregon's 2012 Integrated Report remains in effect for CWA purposes.

Table 1. Data sources.

State	Assessment Cycle	Document Status	Date of EPA Approval	Data Source
Idaho	2016	Final	June 2019	https://opengisdata-idahodeq.opendata.arcgis.com/datasets/idaho-deq-2016-final-%C2%A7305b-%C2%A7303d-integrated-report-rivers-streams-lakes-reservoirs
Montana	2018	Final	February 2019	https://svc.mt.gov/deq/dst/#/app/cwaic
Oregon	2018/2020	Submitted to EPA for approval	N/A	https://www.oregon.gov/deq/wq/Pages/2018-Integrated-Report.aspx
Washington	2012	Final	July 2016	http://geo.wa.gov/datasets/waecy::waecy-water-quality-assessment-305b-report-current

Overview of Impaired Waters

More than 50 toxic pollutants have been identified as causing category 4a or 5 impairments to surface waterbodies in the Basin (Table 2). Five contaminants impair surface waterbodies within the Basin in each of the four states – arsenic, copper, lead, mercury, and zinc. DDT and its breakdown products, cadmium, Chlorpyrifos, and PCBs have been identified as causing impairments within three states.

The absence of waters identified as impaired for a pollutant is not inherently indicative of better water quality and may be due to a lack of credible monitoring or assessment data available to the state. Conversely, waterbodies that were listed as impaired by non-persistent toxics that have since been banned or voluntarily phased out, may not currently have measurable concentrations that exceed water quality standards. For example, the Oregon Department of Environmental Quality has not detected the insecticides Guthion (azinphos-methyl), Parathion and Methyl Parathion in Oregon waters by since 2013 even though pesticide monitoring has expanded over the past 6 years (K. Masterson[2], personal communication, March 24, 2020). Similarly, there have been no detections of those insecticides by the Idaho State Department of Agriculture in Idaho waters since 2010 (K. Masterson, personal communication, May 7, 2020).

Direct comparisons between the states or between watersheds in the same state can be difficult. States have different water quality standards and different methodologies for determining the size of impaired reaches. Impairments can differ markedly in total area (e.g. stream miles or acres of lakes). A greater number of impairments may not necessarily translate into a larger overall area of impaired water. For additional information, including the location and extent of specific impaired waterbodies for each pollutant, refer to each state's respective Integrated Report data referenced in Table 1.

Table 2. Toxic pollutants on 303(d) lists in the Columbia River Basin.

Toxic Contaminant	State(s)
2,3,7,8-TCDD (Dioxin)	Oregon, Washington
2,3,7,8-TCDD TEQ	Washington
4,4'-DDD	Idaho, Oregon, Washington
4,4'-DDE	Idaho, Oregon, Washington
4,4'-DDT	Idaho, Oregon, Washington
Aldrin/Dieldrin	Idaho, Oregon, Washington
Alpha-BHC	Washington
Aluminum	Montana
Antimony	Idaho, Montana
Arsenic	Idaho, Montana, Oregon, Washington
Benz(a)anthracene [PAH]	Oregon
Benzo(a)pyrene [PAH]	Oregon
Benzo(b)fluoranthene 3,4 [PAH]	Oregon
Benzo(k)fluoranthene [PAH]	Oregon
Beryllium	Montana
Cadmium	Idaho, Montana, Washington
Chlordane	Oregon, Washington
Chlorine	Washington
Chlorpyrifos	Idaho, Oregon, Washington

[2] Toxics Coordinator, Oregon Department of Environmental Quality

Toxic Contaminant	State(s)
Chromium VI	Oregon
Chrysene	Oregon
Copper	Idaho, Montana, Oregon, Washington
Cyanide	Montana, Oregon
Diazinon	Oregon
Endosulfan	Oregon, Washington
Endosulfan Sulfate	Oregon
Endrin Aldehyde	Oregon
Ethylbenzene	Oregon
Ethylhexyl Phthalate bis 2	Oregon
Guthion	Oregon
Heptachlor	Oregon
Heptachlor Epoxide	Oregon, Washington
Hexachlorobenzene	Oregon, Washington
Indeno(1,2,3-cd)pyrene	Oregon
Iron	Montana, Oregon
Lead	Idaho, Montana, Oregon, Washington
Malathion	Idaho, Oregon
Manganese	Montana
Mercury	Idaho, Montana, Washington, Oregon
Methyl Parathion	Idaho
Methylmercury	Oregon
Oil and Grease	Idaho, Montana
Parathion	Oregon
Polychlorinated Biphenyls (PCBs)	Montana, Oregon, Washington
Polycyclic Aromatic Hydrocarbons (PAHs)	Oregon
Selenium	Idaho, Montana
Sulfate	Montana
Silver	Oregon, Washington
Tetrachloroethylene	Oregon
Thallium	Oregon
Toxaphene	Washington
Trichloroethylene	Oregon
Zinc	Idaho, Oregon, Montana, Washington

Note: The names of toxic contaminants have been standardized and may be represented differently on state 303(d) lists. Text in brackets was added to identify specific PAH compounds.

Category 5 impairments for toxics are broadly distributed throughout the Basin (Figure 1). Segments of the mainstem Columbia River are impaired sporadically through Washington State including the segments above the mouth of the Chelan River, above and below the Wenatchee River confluence, and the stretch of the river within the Hanford Reach National Monument. Nearly the entire length of the mainstem Columbia River from McNary Dam to the estuary is impaired for one or more toxic pollutants. Category 5 impairments cover significant portions of the mainstem Snake River as well. The Snake River is impaired for one or more toxic contaminants between Idaho Falls and the American Falls Dam, the entire reach that forms the Oregon and Idaho border, and in multiple segments between Lewiston, ID

and the confluence with the Columbia River near the Tri-Cities, WA[3]. Major tributary basins in Oregon with category 5 toxic impairments include the Owyhee, Malheur, Umatilla and Willamette River watersheds. In Idaho, major watersheds that have stream segments with one or more category 5 toxic impairments include the Coeur d'Alene and Pend Oreille River watersheds. Major tributary basins in Washington with toxics-related category 5 impairments include the Spokane River, Lake Chelan, Wenatchee River, and Yakima Rivers. In Montana, Lake Koocanusa and Flathead Lake are listed as category 5 for being impaired or threatened by at least one toxic pollutant.

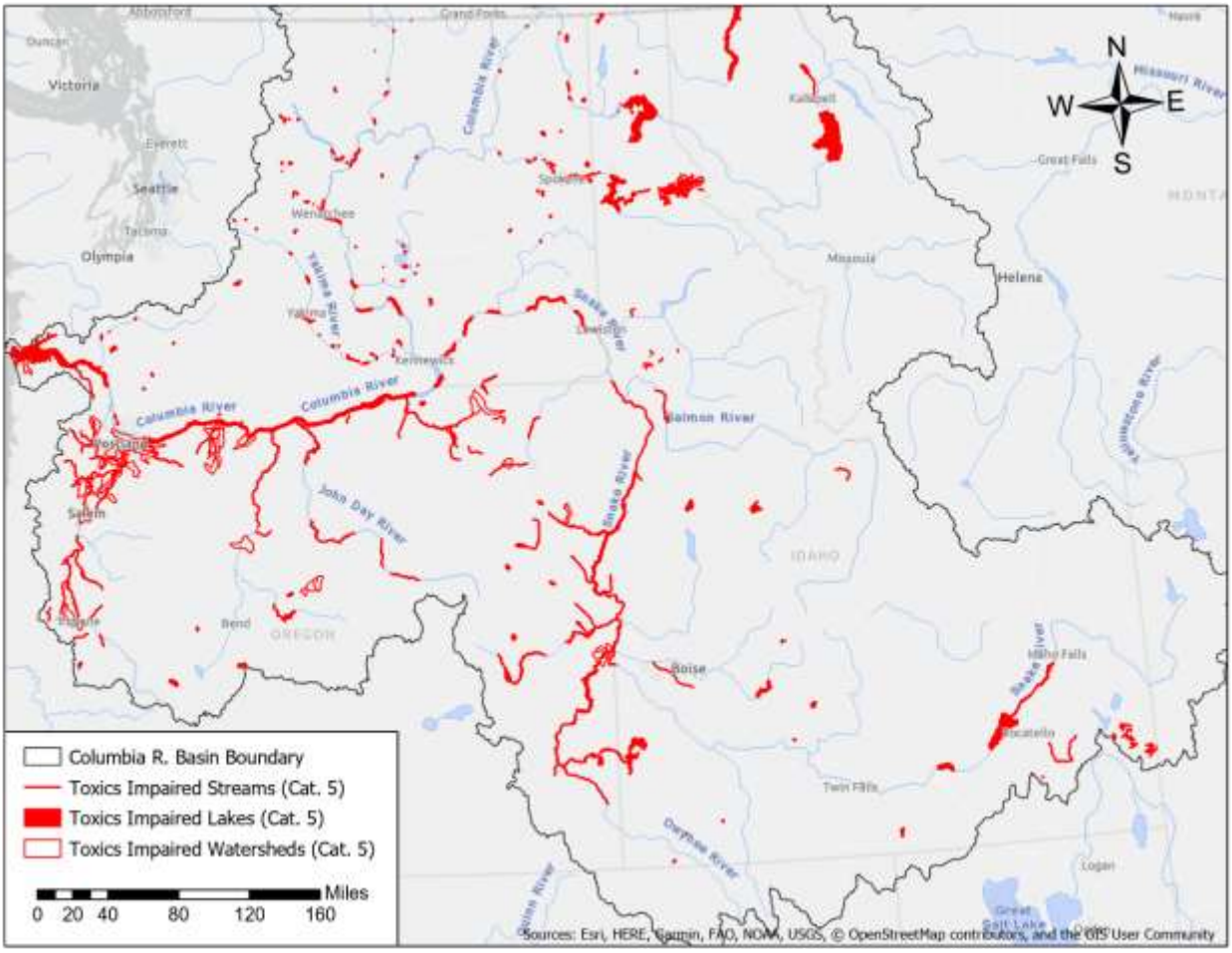


Figure 1. Category 5 toxics-impaired waters in the Columbia River Basin. The map is not authoritative and should be used for reference purposes only. The map is not to be used for legal purposes. Impaired waterbody segments have been slightly enlarged to improve their visibility and are not to scale.

TMDLs have been developed for toxics in each of the four basin states, and several TMDLs cover portions of one or more states. In 1992, EPA developed a basin wide TMDL for dioxins that covers reaches of the mainstem Columbia River. Idaho and Oregon jointly issued a TMDL in 2004 for DDT and its breakdown products and Dieldrin for the Hells-Canyon reach of the Snake River that forms the border between the two states. Montana has developed 19 TMDLs in the Columbia River Basin portion of the state to address contamination from legacy mining impacts, predominately in the Pend Oreille River basin. Major tributary watersheds with at least one toxic(s) TMDL in Washington include the Lake

[3] The Kennewick–Pasco–Richland metropolitan area

Chelan, and the Spokane, Similkameen, Yakima, and Walla Walla River basins. In Oregon, the Willamette River watershed has multiple TMDLs for toxics.

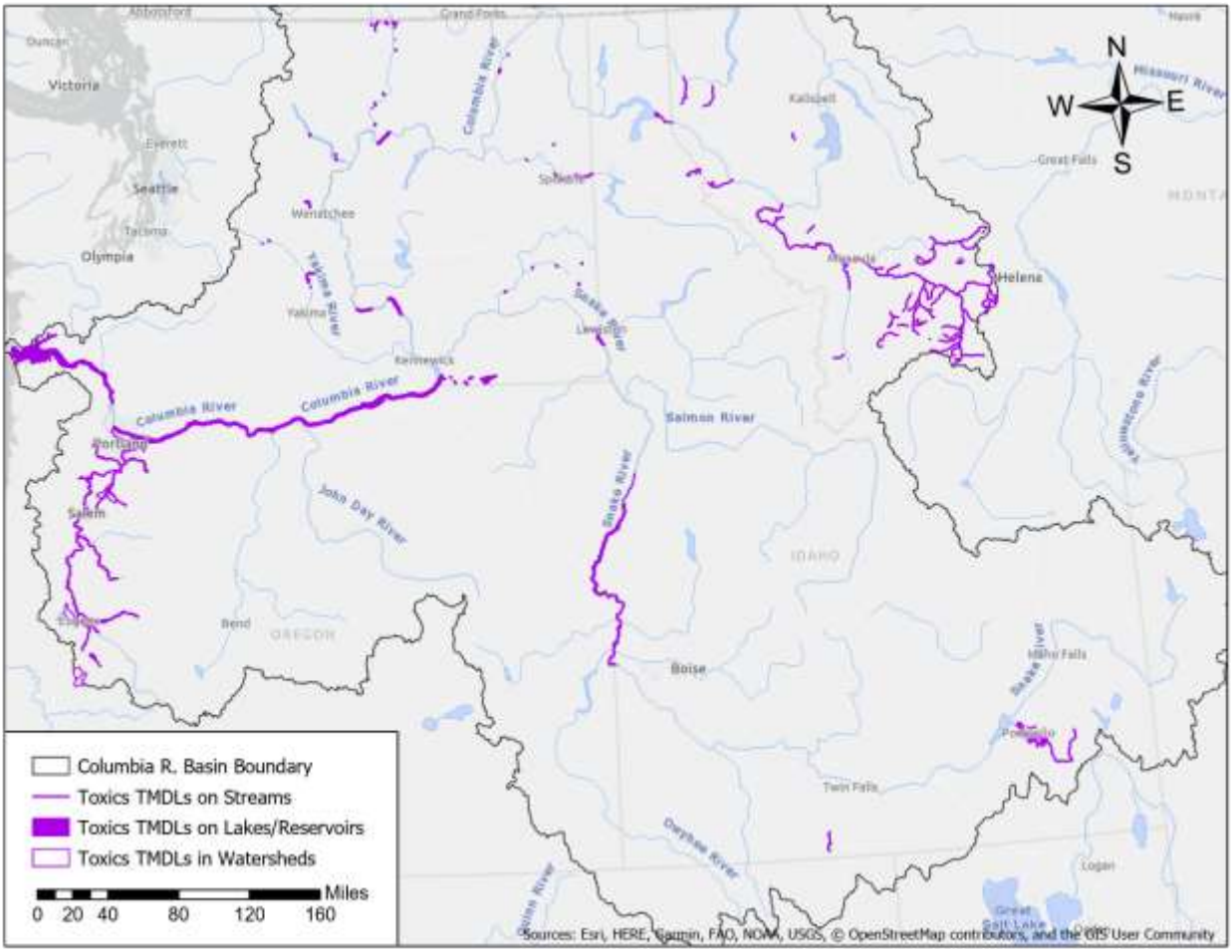


Figure 2. EPA-approved TMDLs for toxic pollutants in the Columbia River Basin. The map is not authoritative and should be used for reference purposes only. The map is not to be used for legal purposes. Impaired waterbody segments have been slightly enlarged to improve their visibility and are not to scale.

The following section provides a description of ten toxic contaminants (or classes of contaminants), identifies their major sources or pathways into the environment, and details the locations of impaired waters listed under Category 4a or 5 on the mainstem Columbia and Snake Rivers and in tributary watersheds.

Metals/Inorganics

Arsenic

Arsenic is a naturally occurring element found in the Earth's crust. Arsenic combined with oxygen, chlorine and sulfur is considered inorganic arsenic; arsenic combined with carbon and hydrogen is referred to as organic arsenic. Inorganic arsenic, long recognized as a human poison, is the form of greatest concern and has been classified as a human carcinogen by the U.S. EPA's Integrated Risk Information System (IRIS) in 1995 (EPA, 2017b). Natural sources of arsenic include volcanic activity and weathering of arsenic-containing minerals and ores. Major anthropogenic sources of arsenic include metal mining and smelting, pesticides, leaching from pressure-treated lumber, combustion of coal or wood products, glass manufacturing, and waste incineration (EPA, 1998).

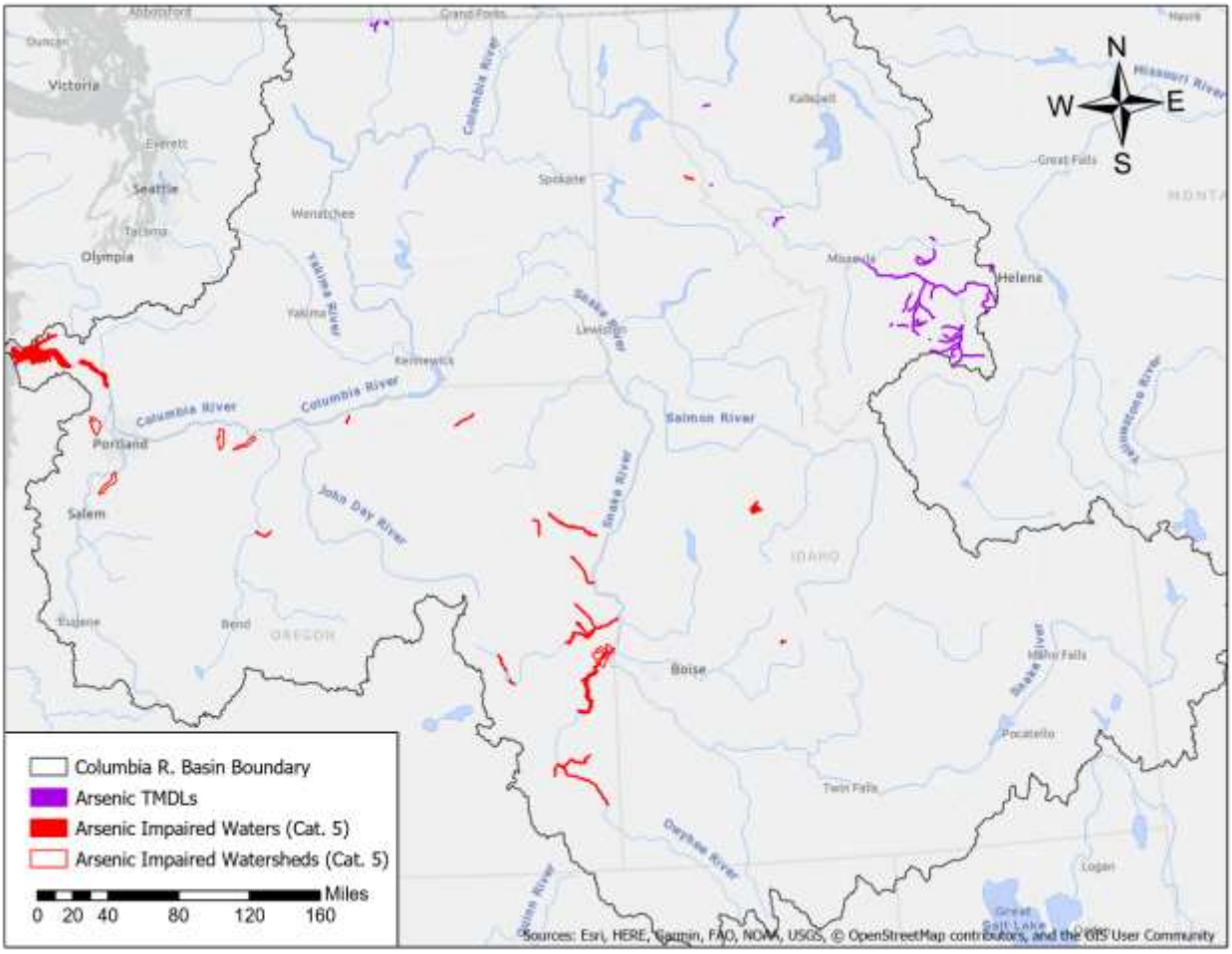


Figure 3. Arsenic impaired waterbodies in the Columbia River Basin. The map is not authoritative and should be used for reference purposes only. The map is not to be used for legal purposes. Impaired waterbody segments have been slightly enlarged to improve their visibility and are not to scale.

Inorganic arsenic impairs most of the lower Columbia River from the Willamette River confluence to the mouth of the estuary. There are no identified arsenic-impaired stretches of the Snake River.

Oregon has multiple watersheds with identified category 5 impairments (Figure 3). Arsenic impairs rivers in the Owyhee, Malheur, Powder, Umatilla, Burnt, Deschutes, and Willamette River basins. In Montana's portion of the Basin, multiple TMDL planning areas in the Pend Oreille River watershed have arsenic

TMDLs, and arsenic impairs a stream in the Flathead Lake watershed[4] that is not covered by a TMDL. The South Fork Salmon, Upper Coeur d'Alene, and North and Middle Forks Boise River watersheds in Idaho have at least one river reach impaired for arsenic. The Similkameen River watershed in Washington has both a TMDL for arsenic and also includes one waterbody listed as impaired for inorganic arsenic, Connors Lake, that is listed under category 5 and not covered by the TMDL.

Table 3. Watersheds with arsenic impaired waters.

State	Location of impaired waters without a TMDL (Category 5)	Location of EPA-approved TMDLs (Category 4a)
Idaho	South Fork Salmon, Upper Coeur d'Alene, and North and Middle Forks Boise River watersheds	None
Montana	Flathead Lake watershed	Clark Fork – Drummond, Clark Fork – Silver Bow Creek, Flint Creek, Kootenai – Fisher Project, Little Blackfoot River, Middle Blackfoot – Nevada Creek, Prospect Creek
Oregon	Mainstem Columbia River; Owyhee, Malheur, Powder, Burnt Umatilla, Deschutes, and Willamette River watersheds	None
Washington	Similkameen River watershed	Similkameen River watershed

Note: The Montana TMDLs are listed by the name of their respective planning areas.

Copper

Copper is an abundant trace metal commonly found in aquatic systems as a result of both natural and anthropogenic sources. Natural sources of copper include geological deposits, volcanic activity, and weathering and erosion of rocks and soils. Anthropogenic sources of copper include mining activities, agriculture, automobile brake-pad wear, metal and electrical manufacturing, sludge from publicly owned treatment works, and pesticide use (EPA, 2019f). Copper is primarily a contaminant of concern due to its ecotoxicity, as compared to its human health impacts.

[4] Note: The impaired river segment is obscured by the Kalispell label on Figure 3.

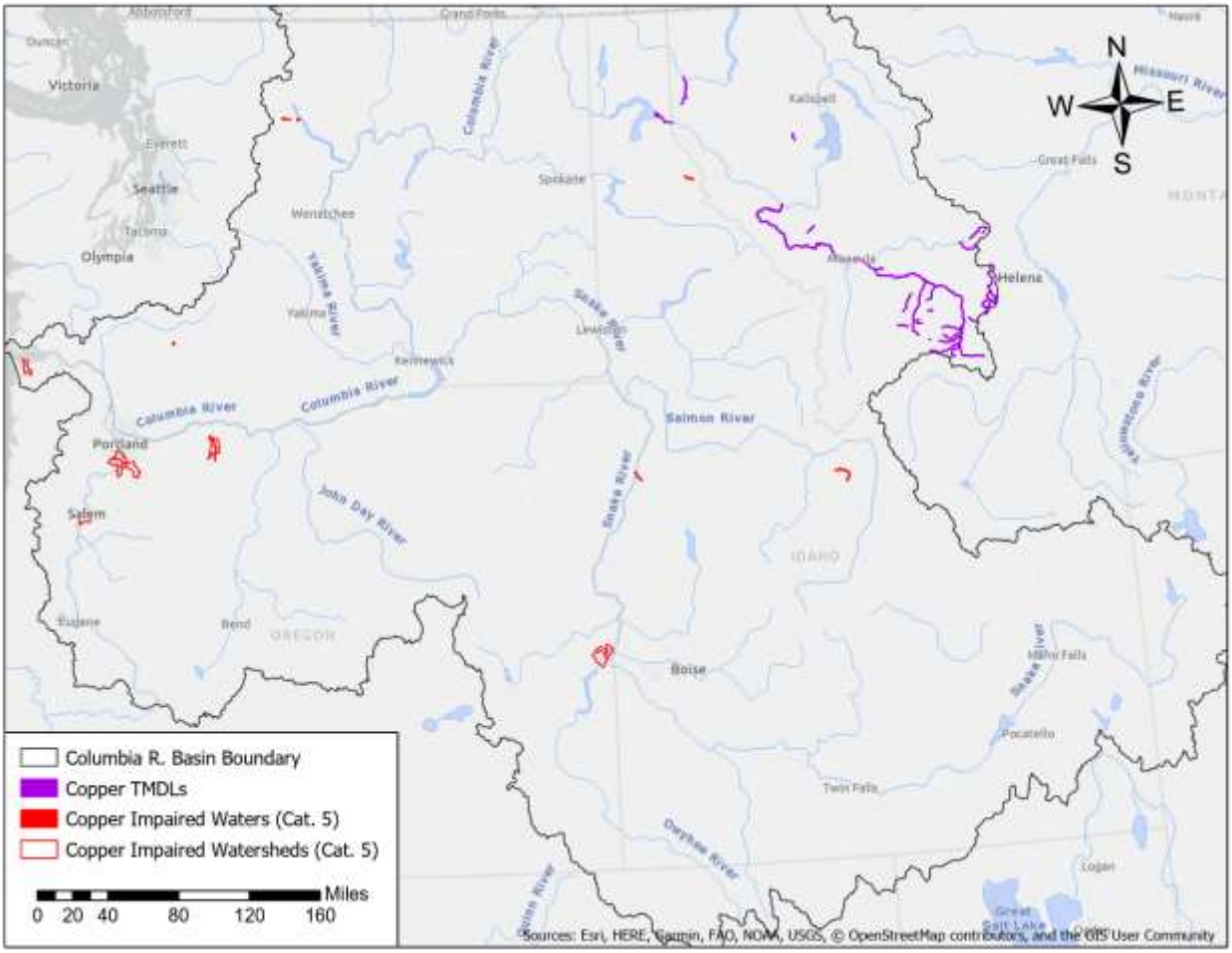


Figure 4. Copper impaired waters in the Columbia River Basin. The map is not authoritative and should be used for reference purposes only. The map is not to be used for legal purposes. Impaired waterbody segments have been slightly enlarged to improve their visibility and are not to scale.

Multiple TMDL planning areas in Montana have a copper TMDL; there are no category 5 copper impaired waters in Montana's portion of the Basin without an approved TMDL (Figure 4). In Idaho, copper impairs rivers in the Hells Canyon, the Middle Salmon-Panther, and Coeur d'Alene River basins; the Lower Clark Fork River has a copper TMDL. In Washington State, copper impairs streams in the Lake Chelan and Lower Cowlitz River watersheds. Oregon has identified the greatest extent of category 5 copper-impaired waters. The Owyhee, Willamette, Hood, and Lower Columbia River watersheds contain at least one waterbody with an identified category 5 copper impairment. There are no copper TMDLs in Oregon's portion of the Basin (Table 4).

Table 4. Watersheds with copper impaired waters.

State	Location of impaired waters without a TMDL (Category 5)	Location of EPA-approved TMDLs (Category 4a)
Idaho	Hells Canyon, Middle Salmon-Panther, and Coeur d'Alene River watersheds	Lower Clark Fork River watershed
Montana	None	Blackfoot Headwaters, Clark Fork – Drummond, Silver Bow Creek – Clark Fork River, Flint Creek watershed, Kootenai – Fisher, Little Blackfoot River, Thompson Project, Blackfoot River – Nevada, Ninemile, Rock Creek, and Upper Clark Fork River
Oregon	Owyhee, Willamette, Hood River, and Lower Columbia River watersheds	None
Washington	Lake Chelan and Lower Cowlitz River watersheds	None

Note: The Montana TMDLs are listed by the name of their respective planning areas.

Lead

Although the element occurs naturally in the Earth's crust, human activities are the primary source of lead in the aquatic environment. Industrial processes and mining activities may release significant quantities of lead into the environment (EPA, 2019e). In the past, the combustion of leaded gasoline was a major pathway into the air and aquatic environments. A gradual phase-out of leaded gasoline was implemented between 1975 and 1996. Due to EPA regulations, the national average lead concentration in ambient air deceased by 99% between 1980 and 2018 (EPA, 2019b).

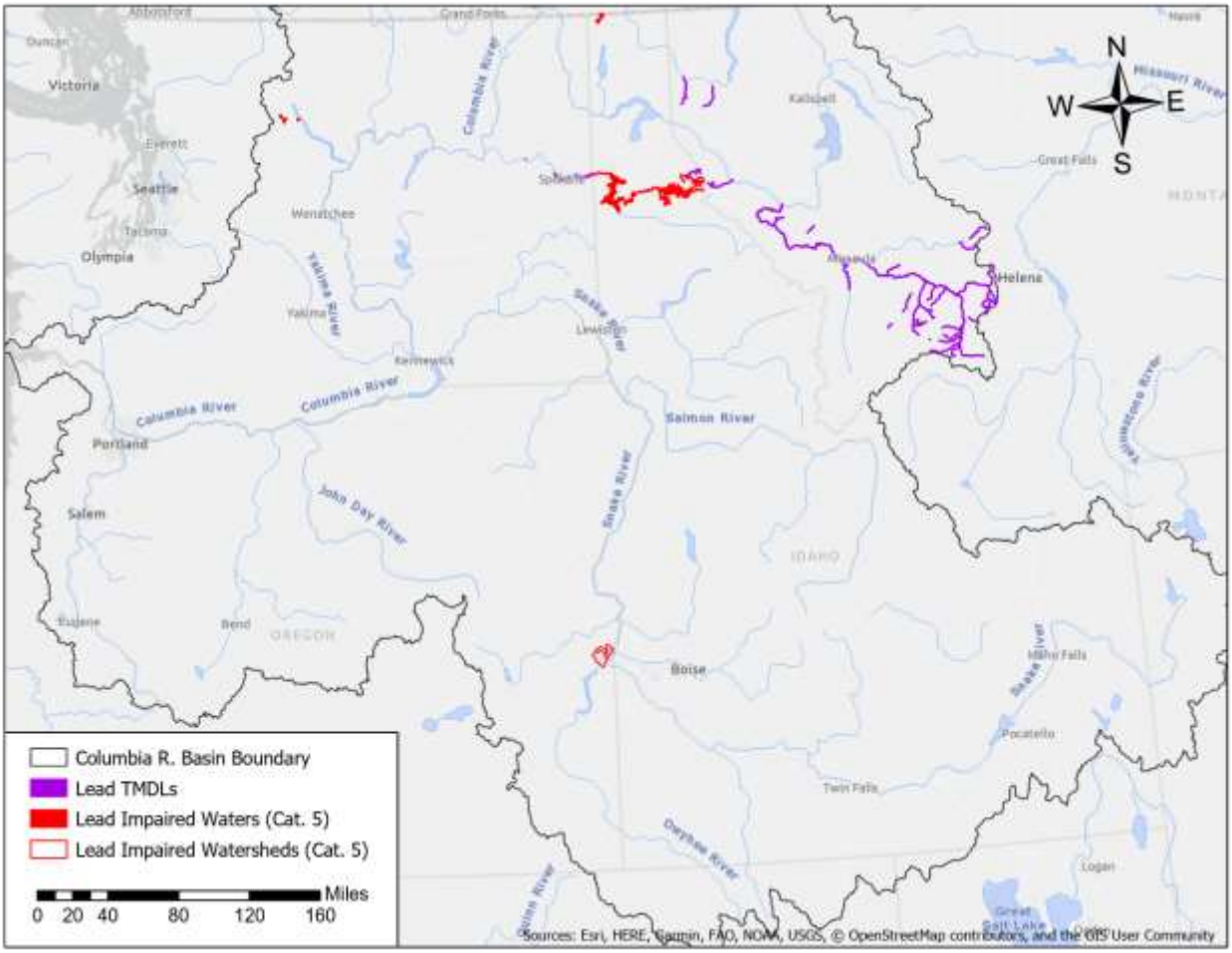


Figure 5. Lead impaired waters in the Columbia River Basin. The map is not authoritative and should be used for reference purposes only. The map is not to be used for legal purposes. Impaired waterbody segments have been slightly enlarged to improve their visibility and are not to scale.

Mining or industrial activities are the primary causes of lead impairments. Idaho has the greatest number of identified category 5 impairments in the Columbia River Basin (Figure 5). The Coeur d'Alene River, Upper Spokane River and Lower Kootenai River watersheds contain at least one waterbody listed as impaired by lead. The East Fork of Eagle Creek in the Upper Coeur d'Alene River watershed has a lead TMDL. In Oregon, lead impairments without an approved TMDL occur in the Owyhee River watershed. A lead TMDL was developed for the Columbia Slough in the Willamette River watershed in 1998, but recent water quality monitoring data indicates the watershed is achieving water quality standards for aquatic life and the watershed is listed as category 2 for lead in the state's final 2018/2020. The Lake Chelan watershed is the only Washington basin with lead-impaired waters without an approved TMDL. A lead TMDL has been developed in the Spokane River watershed. Within Montana's portion of the Basin there are nine lead TMDLs and there are no identified category 5 lead impairments.

Table 5. Watersheds with lead impaired waters.

State	Location of impaired waters without a TMDL (Category 5)	Location of EPA-approved TMDLs (Category 4a)
Idaho	Coeur d'Alene River, Upper Spokane River and Lower Kootenai River watersheds	Upper Coeur d'Alene River
Montana	None	Bitterroot River, Blackfoot Headwaters, Clark Fork – Drummond, Clark Fork – Silver Bow Creek, Flint Creek, Kootenai – Fisher Project, Little Blackfoot River, Middle Blackfoot River, Ninemile, Prospect Creek, Rock Creek, and Upper Clark Fork River
Oregon	Owyhee River watershed	None
Washington	Lake Chelan watershed	Spokane River watershed

Note: The Montana TMDLs are listed by the name of their respective planning areas.

Mercury

Mercury is a naturally occurring metal that cycles through various chemical and physical forms in the environment. Inorganic mercury can enter the water or soil from the weathering of rocks that contain inorganic mercury salts. The inorganic mercury ore found at mining sites is often composed of mercuric sulfide or cinnabar. Elemental mercury is a shiny liquid at room temperature that is used in older thermometers, fluorescent lightbulbs, batteries and other products. Mercury enters waterways through multiple sources, including atmospheric deposition (e.g. coal combustion), industrial (e.g. gold production) or wastewater discharges, mining activities, or stormwater runoff (EPA, 2019j). Bacteria can convert inorganic mercury in the aquatic environment into methylmercury, a form of the element that readily bioaccumulates in organisms and biomagnifies in the food chain – which can lead to elevated levels of mercury in the tissue of predator species, including birds, and resident fish caught for human consumption. Elevated levels of methylmercury in fish tissues can lead to recommendations to restrict consumption of resident fish species (i.e. fish advisories). There are numerous fish advisories due to mercury in all Basin states, including statewide advisories for bass in Idaho, Oregon, and Washington. For information on specific advisories, refer to EPA's Columbia River Health Advisories webpage.

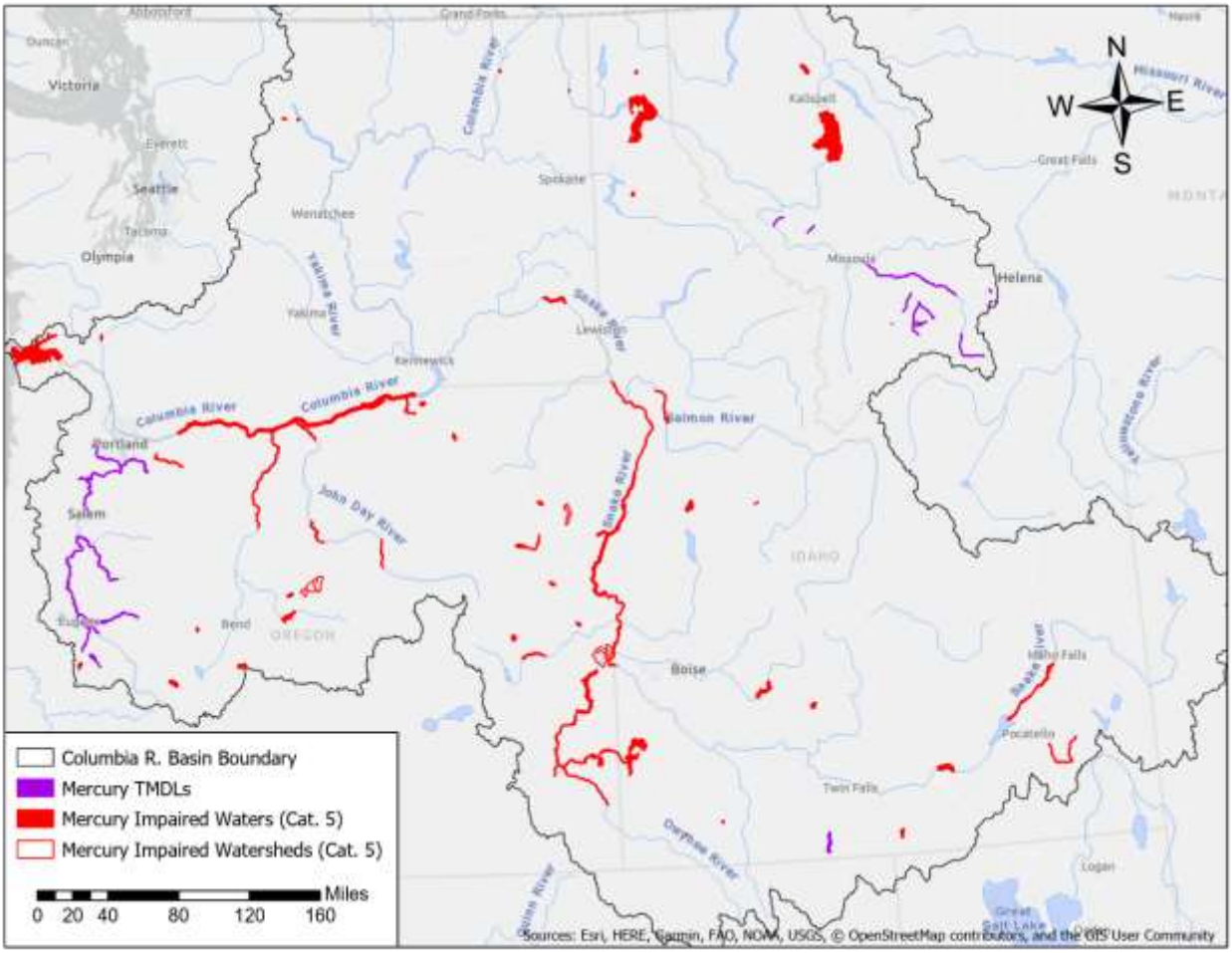


Figure 6. Mercury impaired waters in the Columbia River Basin. The map is not authoritative and should be used for reference purposes only. The map is not to be used for legal purposes. Impaired waterbody segments have been slightly enlarged to improve their visibility and are not to scale.

Mercury is the only toxic contaminant that is the cause of Category 5 impaired waters in all four Columbia River Basin states. Mercury impairments are commonly found in watersheds with historic and/or active mining activities, and in basins with lakes with large surface areas that receive mercury through atmospheric deposition.

Methylmercury impairs significant lengths of the mainstem Columbia and Snake Rivers (Figure 6). A small section of Lake Roosevelt south of Kettle Falls, WA is listed as impaired for mercury. The lower mainstem Columbia River immediately upstream of McNary Dam down to Eagle Creek immediately above Bonneville Dam and the Columbia River estuary below Puget Island are impaired for methylmercury.

On the upper Snake River, mercury impairs the reach between Idaho Falls, ID and the upstream boundary of the American Falls Reservoir, as well as Walcott Lake, the impounded water behind Minidoka Dam. Farther downstream, methylmercury impairments cover the mainstem Snake River beginning where it crosses into Oregon east of Caldwell, ID, through Hells Canyon, Oxbow and Brownlee Reservoirs, and downstream to the northeastern tip of Oregon's state boundary. The Snake River is also impaired for mercury from Lower Granite Dam to Penawawa Canyon, WA.

In Idaho, mercury impairs lakes and tributary river reaches in the Owyhee, Boise, Payette, Bruneau, Coeur d'Alene, Kootenai, Salmon, Goose, and Upper Snake River basins. Idaho developed a mercury TMDL that covers the Salmon Falls Creek Reservoir within the Upper Snake River watershed. In Montana's Flathead River watershed, Whitefish and Flathead Lakes are impaired for mercury. Tributary basins in Oregon with mercury or methylmercury impairments include the Owyhee, Malheur, Powder, John Day, Deschutes, Sandy, and Willamette River watersheds. Tributary watersheds with mercury impairments in Washington include the Pend Oreille River, Lake Chelan, and Cowlitz River.

Table 6. Watersheds with mercury impaired waters.

State	Location of impaired waters without a TMDL (Category 5)	Location of EPA-approved TMDLs (Category 4a)
Idaho	Mainstem Snake River; Owyhee, Boise, Payette, Bruneau, Coeur d'Alene, Kootenai, Salmon, Goose, and Upper Snake River watersheds	Upper Snake River watershed
Montana	Flathead River watershed	Clark Fork – Drummond, Clark Fork – Silver Bow Creek, Flint Creek, Little Blackfoot, Ninemile, and Rock Creek
Oregon	Mainstem Columbia and Snake Rivers; Owyhee, Malheur, Powder, John Day, Deschutes, Sandy, and Willamette River watersheds	Willamette River watershed
Washington	Mainstem Columbia and Snake Rivers; Lake Chelan, Pend Oreille, and Cowlitz River watersheds	None

Note: The Montana TMDLs are listed by the name of their respective planning areas.

Selenium

Selenium is a naturally occurring element found in sedimentary rocks, shales, coal and phosphate-containing soils. Selenium can be released into water naturally through the weathering of selenium-containing rocks, and by human activities such as surface mining, coal-fired power plants, and irrigated agriculture (EPA, 2019g). Selenium's toxicity to livestock is the major effect of concern.

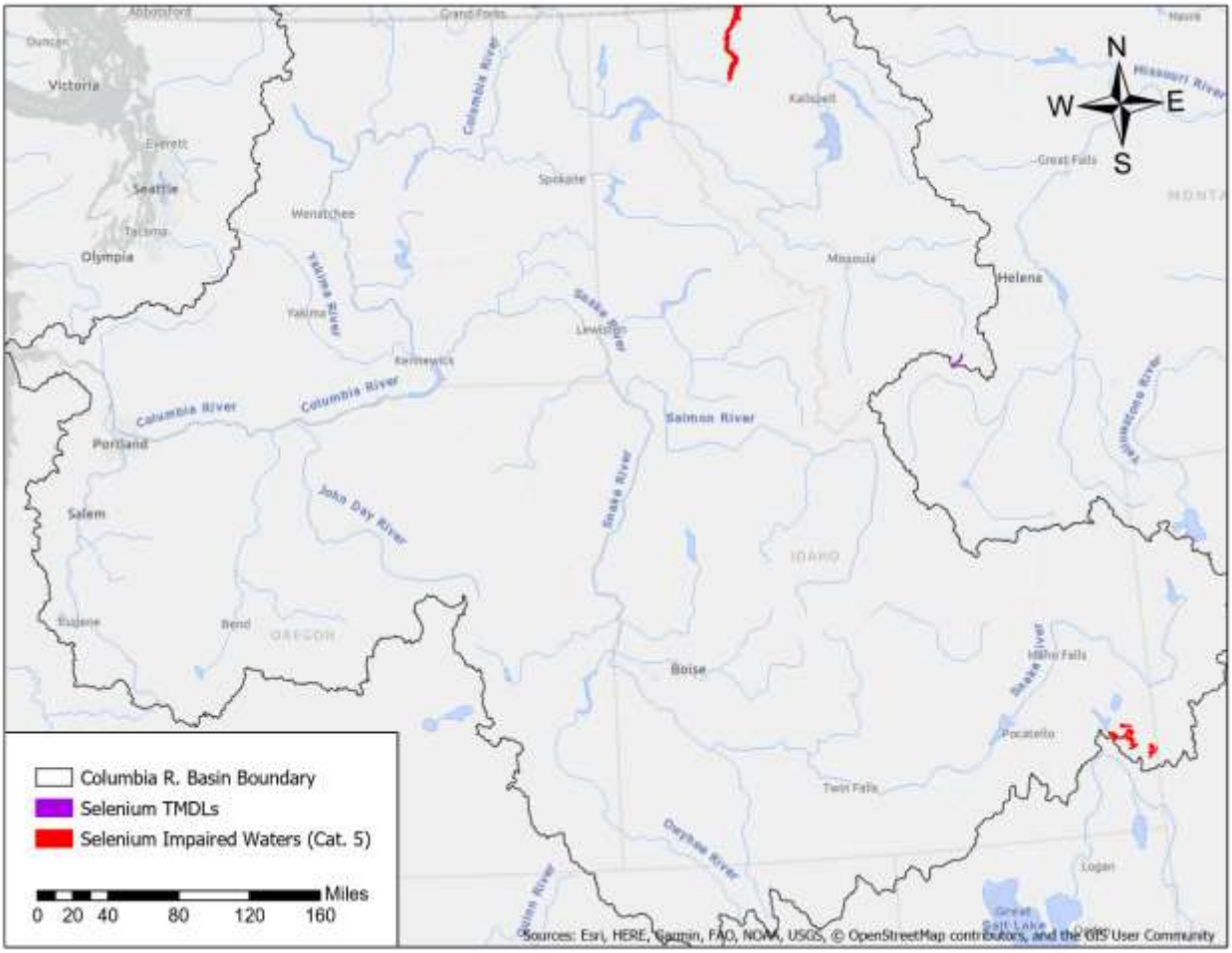


Figure 7. Selenium impaired waters in the Columbia River Basin. The map is not authoritative and should be used for reference purposes only. The map is not to be used for legal purposes. Impaired waterbody segments have been slightly enlarged to improve their visibility and are not to scale.

Selenium impairments are found in regions with historic or active mining activities. Affected Idaho basins include the Blackfoot and Salt River watersheds. In Montana, Lake Koocanusa in the Upper Kootenai watershed is impaired/threatened for selenium and there is a Selenium TMDL in the Upper Clark River watershed planning area (Figure 7). There are no identified selenium impairments in Oregon or Washington.

Table 7. Watersheds with selenium impaired waters.

State	Location of impaired waters without a TMDL (Category 5)	Location of EPA-approved TMDLs (Category 4a)
Idaho	Blackfoot and Salt River watersheds	None
Montana	Upper Kootenai River watershed	Upper Clark Fork River watershed
Oregon	None	None
Washington	None	None

Note: The Montana TMDL is listed by the name of its planning area.

Pesticides

Aldrin/Dieldrin

Aldrin and Dieldrin are legacy organochlorine insecticides with similar chemical structures that were used in agriculture, timber preservation, and in rubber coverings of electrical and telecommunication cables (EPA, 2003). EPA banned both chemicals in 1987. Aldrin degrades in the environment to form Dieldrin, and as a result, the pesticides are considered "linked" together for the purposes of this document (Agency for Toxic Substances and Disease Registry [ATSDR], 2011). Aldrin and Dieldrin cause human liver toxicity and are classed as probable carcinogens by EPA's IRIS program (EPA, 2017d). Aldrin and/or Dieldrin impair waterbodies in basins due to past agricultural activities.

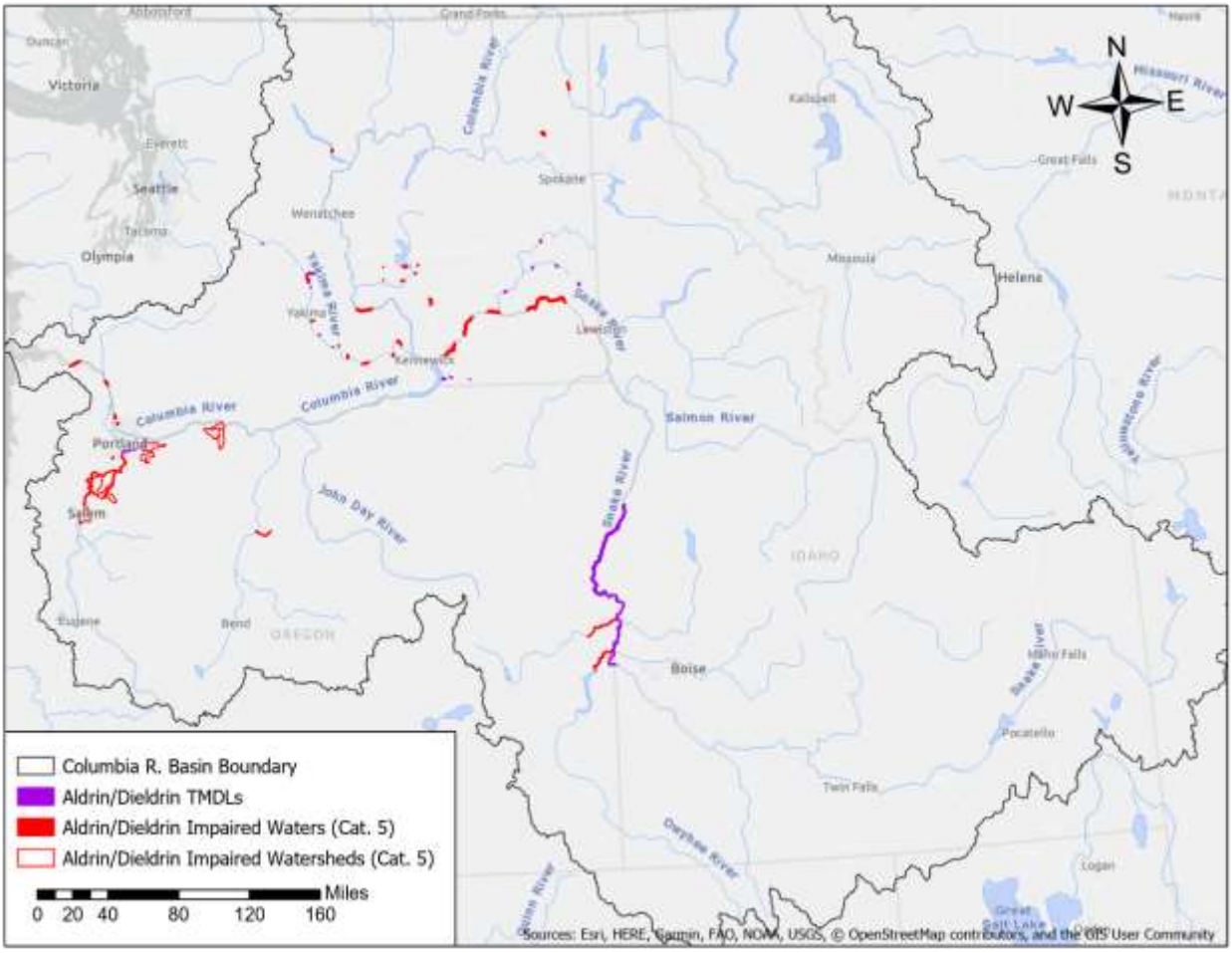


Figure 8. Aldrin and/or Dieldrin impaired waters in the Columbia River Basin. The extent of the TMDL for Dieldrin in the Columbia Slough watershed is not shown. The map is not authoritative and should be used for reference purposes only. The map is not to be used for legal purposes. Impaired waterbody segments have been slightly enlarged to improve their visibility and are not to scale.

Impairments on the mainstem Columbia River include the reach upstream of the Saddle Mountain National Wildlife Refuge and several reaches in the lower Columbia upstream and downstream of Longview, WA. There is a TMDL covering Dieldrin within the Snake River – Hells Canyon reach.

In Washington, Aldrin and/or Dieldrin impair rivers in the following watersheds: Pend Oreille River, Colville River, Lake Chelan, Palouse River, Crab Creek, Upper Columbia-Priest Rapids, Yakima River,

Lower Columbia-Clatskanie. In Oregon, the pesticide and/or its breakdown product impairs waters in the Owyhee, Malheur, Deschutes, Hood, Sandy, and Willamette River basins. There are two TMDLs for Dieldrin in the Willamette River watershed for the Columbia Slough (not shown)[5] and Lower Willamette River subbasin (Figure 8). No Aldrin or Dieldrin category 5 impairments have been identified in Idaho or Montana's portion of the Basin.

Table 8. Watersheds with Aldrin and/or Dieldrin impaired waters.

State	Location of impaired waters without a TMDL (Category 5)	Location of EPA-approved TMDLs (Category 4a)
Idaho	None	Snake River – Hells Canyon watershed
Montana	None	None
Oregon	Mainstem Columbia and Snake Rivers; Owyhee, Malheur, Deschutes, Hood, Sandy, and Willamette River watersheds	Snake River – Hells Canyon and Willamette River watersheds
Washington	Mainstem Columbia and Snake Rivers; Upper Columbia-Priest Rapids, Lower Columbia-Clatskanie, Pend Oreille, Colville, Lake Chelan, Palouse, Crab Creek, Yakima River watersheds	Palouse, Walla Walla, and Yakima River watersheds

Chlorpyrifos

Chlorpyrifos is a current-use organophosphate insecticide used since 1965 to control a variety of pests, including mites and ticks. The chemical is applied to agricultural crops including fruit and nut trees, Brussel sprouts, broccoli, cauliflower, and other row crops. Additionally, the insecticide is applied for non-agricultural purposes including on golf courses, turf, and found in non-structural wood treatments such as utility poles or fence posts. Chlorpyrifos is also registered as a mosquito adulticide and for use in roach and ant bait stations (EPA, 2019c). The pesticide affects the nervous system of insects by inhibiting acetylcholinesterase, a key enzyme associated with regulating nerve impulses. Chlorpyrifos may also affect human nervous system function (ATSDR, 1997). Regulatory restrictions, including a statewide ban in California beginning in 2021 and an expected ban of the chemical in the European Union, are projected to reduce demand for the pesticide. The world's largest producer of Chlorpyrifos, Corteva, announced in February 2020 the company would no longer produce the chemical by the end of the year, citing declining sales (Polansek, 2020).

[5] There was never a 303(d) listing for Dieldrin in the Columbia Slough watershed. The TMDL was developed as a preventative TMDL before any listing occurred (Becky Anthony [Water Quality Assessment Lead, Oregon Department of Environmental Quality], personal communication, May 5, 2020).

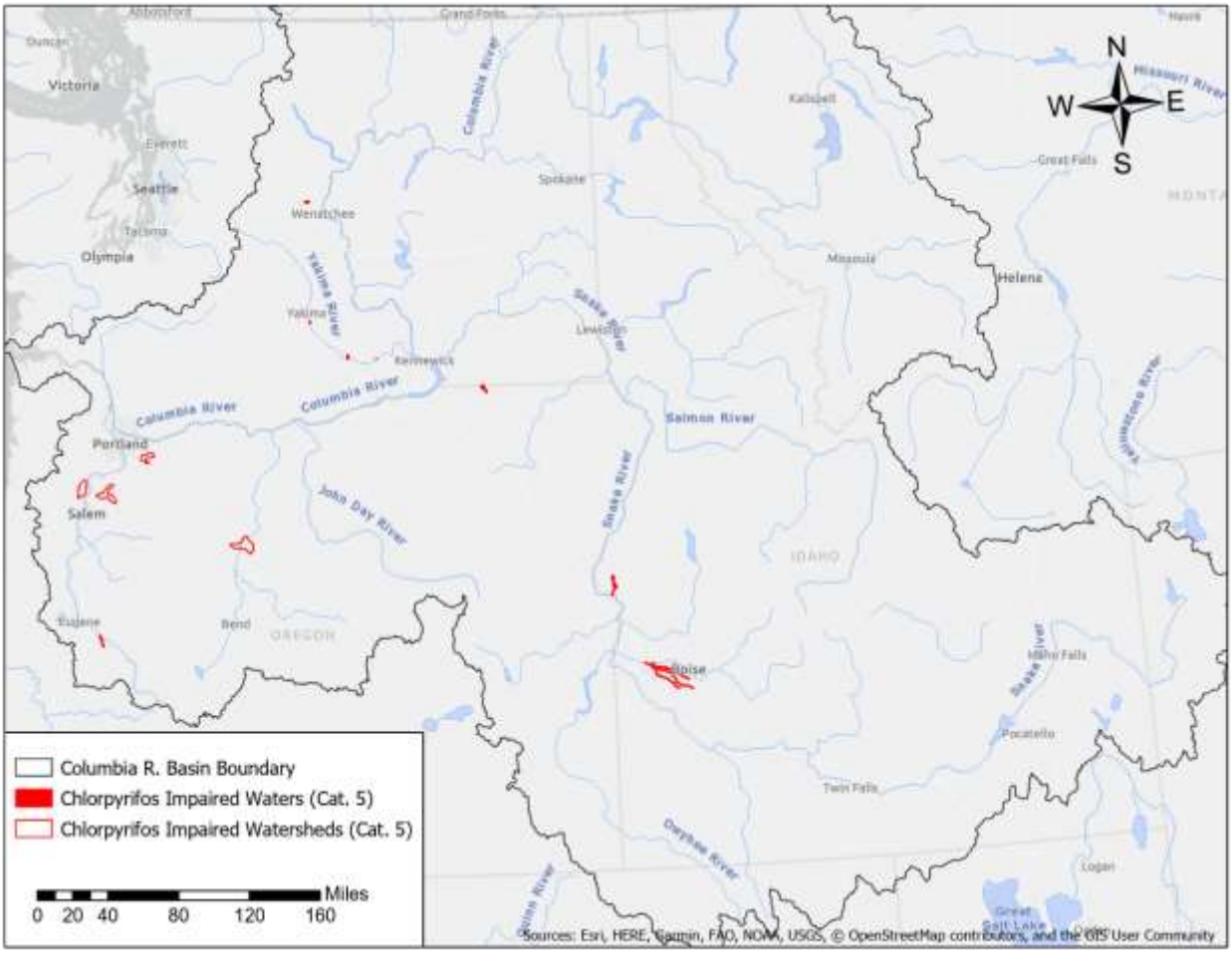


Figure 9. Chlorpyrifos impaired waters in the Columbia River Basin. The map is not authoritative and should be used for reference purposes only. The map is not to be used for legal purposes. Impaired waterbody segments have been slightly enlarged to improve their visibility and are not to scale.

Chlorpyrifos impairments are have been identified in agricultural basins and near urban centers. In Idaho, elevated concentrations of Chlorpyrifos impair designated uses on tributaries in the Lower Boise River watershed and in a tributary to Brownlee Reservoir (Figure 9). Oregon has category 5 listed chlorpyrifos-impaired streams in the Walla Walla, Deschutes, and Willamette River basins. In Washington State, Chlorpyrifos impairments affect the Wenatchee and Yakima River basins. There are no identified impairments in the state of Montana.

Table 9. Watersheds with Chlorpyrifos impaired waters.

State	Location of impaired waters without a TMDL (Category 5)	Location of EPA-approved TMDLs (Category 4a)
Idaho	Lower Boise River and Brownlee Reservoir watersheds	None
Montana	None	None
Oregon	Walla Walla, Deschutes, and Willamette River watersheds	None
Washington	Wenatchee and Yakima River watersheds	None

Dichlorodiphenyltrichloroethane (DDT)

DDT is an organochlorine compound that was widely used to address insect-borne diseases and to control agricultural and household pests beginning in the 1940s. DDT-type chemicals primarily act on the peripheral nervous system by affecting sodium channels in nerve cells (Coates, 1990). The chemical persists in the environment and accumulates in fatty tissues. The compound causes predatory birds to lay eggs with thinner shells, decreasing the viability of their offspring. In the soil DDT breaks down into metabolites including dichlorodiphenyldichloroethylene (DDE) and dichlorodiphenyldichloroethane (DDD). In 1972, EPA banned the chemical for use in the U.S. due to its adverse impacts to wildlife and potential human health risks (EPA, 2019d). EPA's IRIS program classifies DDT as having liver toxicity and as a carcinogen and classifies DDT's metabolites, DDE and DDD, as carcinogens (EPA, 2017e). The following overview of 303(d) listings in the Basin does not differentiate between DDT and its breakdown products – hereafter "DDT" refers to all three compounds. DDT impairs surface waterbodies in basins with significant historic agricultural activities in Oregon and Washington.

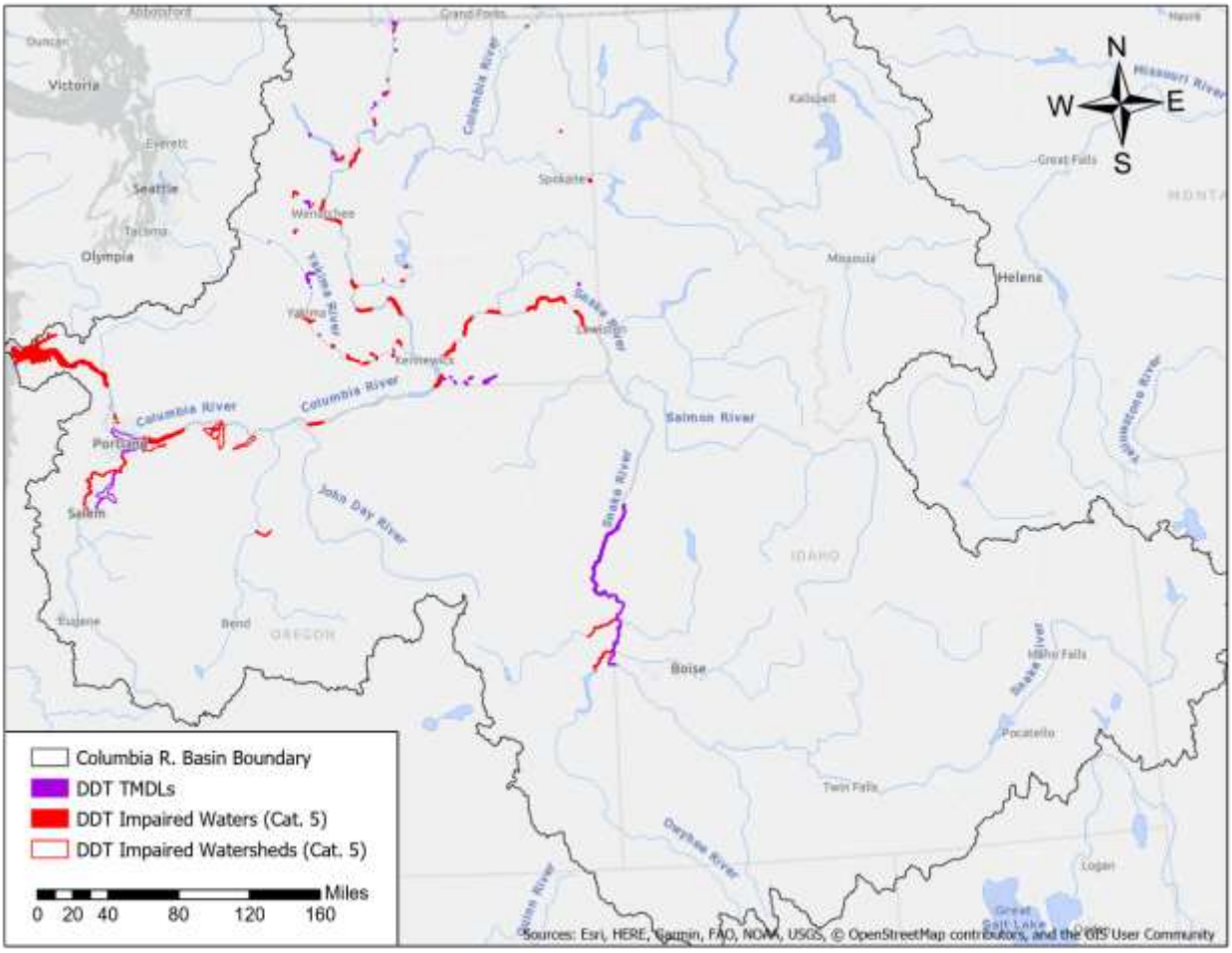


Figure 10. DDT impaired waters in the Columbia River Basin. The map is not authoritative and should be used for reference purposes only. The map is not to be used for legal purposes. Impaired waterbody segments have been slightly enlarged to improve their visibility and are not to scale.

The mainstem Columbia and Snake Rivers have multiple reaches impaired by DDT. Impairments on the Columbia cover: small portions of Lake Roosevelt and Lake Entiat; reaches above and below the City of Wenatchee, WA; the reach upstream of the mouth of Crab Creek; reaches bracketing the Saddle

Mountain National Wildlife Refuge; and portions of Lake Wallula and Lake Umatilla. DDT impairs the lower Columbia River between Bonneville Dam and the Sandy River confluence and from Kalama, WA to the mouth of the Estuary. Oregon and Idaho jointly issued a TMDL covering DDT impairments within the Hells Canyon complex. Between Lewiston, ID, and the confluence with the Columbia, the Snake River has multiple segments with identified category 5 impairments for DDT.

Oregon watersheds with category 5 DDT impairments include the Owyhee, Malheur, Deschutes, Hood[6], and Willamette River basins (Figure 10). There are three DDT TMDLs in the Willamette Basin: in the Columbia Slough, Lower Willamette River subbasin, and the Molalla-Pudding subbasins. In Washington, there are category 5 DDT impaired waters in the following tributary basins: Crab Creek, Colville River, Okanogan River, Spokane River, Rock Creek, Walla Walla River, Yakima River, Wenatchee River, Lake Chelan watershed, and the Upper Columbia-Priest Rapids and -Entiat watersheds. TMDLs for DDT have been developed in the Lake Chelan, and Lower Okanagan, Walla Walla, Wenatchee, and Yakima River watersheds. There are no identified category 5 DDT impairments in Idaho or Montana's portion of the Basin.

Table 10. Watersheds with DDT impaired waters.

State	Location of impaired waters without a TMDL (Category 5)	Location of EPA-approved TMDLs (Category 4a)
Idaho	None	Snake River – Hells Canyon watershed
Montana	None	None
Oregon	Mainstem Columbia and Snake Rivers; Owyhee, Malheur, Deschutes, Hood, and Willamette River watersheds	Willamette River watershed
Washington	Mainstem Columbia and Snake Rivers; Crab Creek, Lake Chelan, Upper Columbia-Priest Rapids and -Entiat, Colville, Okanogan, Spokane, Rock Creek, Walla Walla, Yakima, and Wenatchee River watersheds	Lake Chelan, Lower Okanogan, Walla Walla, Wenatchee, and Yakima River watersheds

Persistent Organic Pollutants

Polycyclic Aromatic Hydrocarbons (PAHs)

PAHs are a group of over 100 different chemicals that are formed during combustion processes, in particular the incomplete burning of coal, oil and gas, garbage, or other organic substances like tobacco or charbroiled meat (Northwest Power and Conservation Council and Columbia River Toxics Reduction Working Group, 2018). Some PAHs are manufactured. Most PAHs do not dissolve easily in water and bind to solid particles that settle to the bottom of rivers and lakes. Major sources of PAHs in the air include volcanic eruptions, motor vehicle exhaust, wood smoke, and municipal trash incineration facilities (ATSDR, 1996). In 2018, the Northwest Power and Conservation Council and Columbia River Toxics Reduction Working Group developed a StoryMap of available PAH data in water and soil sediment in the Basin. Visit the Northwest Power and Conservation Council's website to view the map. The major PAH toxic effect of concern is that certain PAHs are carcinogenic to humans. EPA's IRIS

[6] Includes Threemile Creek that drains the east flank of Mt. Hood and discharges directly into the Columbia River near The Dalles, OR.

program has recently updated the toxicity information for a key carcinogenic PAH, benzo[a]pyrene (EPA, 2017c).

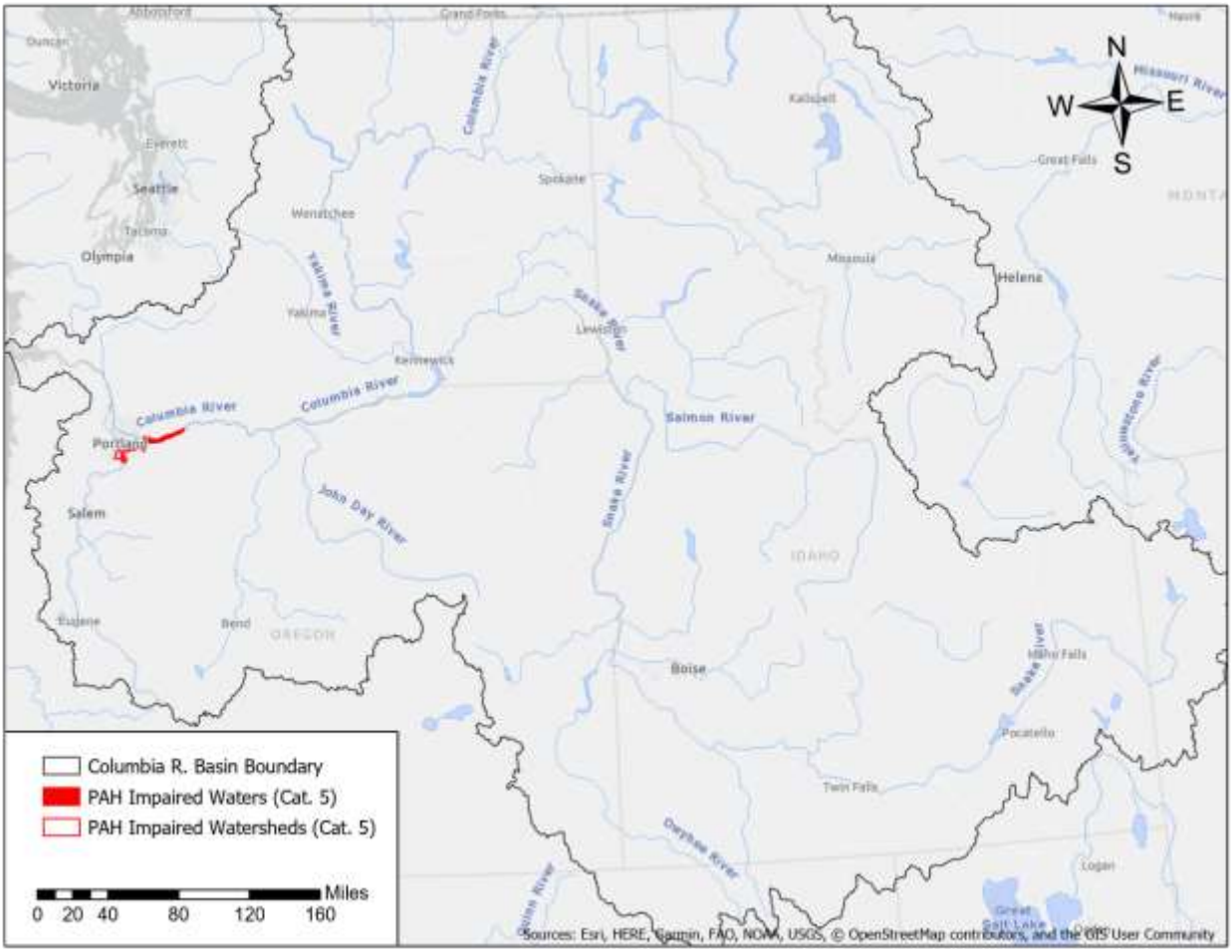


Figure 11. PAH impaired waters in the Columbia River Basin. The map is not authoritative and should be used for reference purposes only. The map is not to be used for legal purposes. Impaired waterbody segments have been slightly enlarged to improve their visibility and are not to scale.

The mainstem Columbia River from McCord Creek to the mouth of the Willamette River is impaired for PAHs. In addition, waters (or tributary watersheds) in the Willamette River Basin are impaired for the following specific PAH compounds: Benz(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene 3,4, and Benzo(k)fluoranthene (Figure 11).

Table 11. Watersheds with waters impaired by PAHs.

State	Location of impaired waters without a TMDL (Category 5)	Location of EPA-approved TMDLs (Category 4a)
Idaho	None	None
Montana	None	None
Oregon	Mainstem Columbia River; Willamette River watershed	None
Washington	None	None

Polychlorinated Biphenyls (PCBs)

PCBs are a group of 209 man-made organic chemicals consisting of carbon, hydrogen and chlorine atoms. PCBs belong to a broad family of chemicals known as chlorinated hydrocarbons. PCBs have a range of toxicity and vary in consistency from thin, light-colored liquids to yellow or black waxy solids. EPA's IRIS program classifies PCBs as having both cancer and non-cancer toxicity (EPA, 2017f). Between 1929 and 1979 PCBs were manufactured domestically. Commercial PCB mixtures made by the Monsanto corporation were known as Aroclors. Each Aroclor was identified by a number identifying the percentage of chlorine in the mixture. Higher chlorination is generally associated with greater toxicity. For example, Aroclor 1254 is 54% chlorine by weight adversely and is known to affect the human immune system (EPA, 2017a). In 1979, the U.S. banned the manufacturing of PCBs. PCBs do not readily break down in the environment and can remain for long periods cycling between the air, water and soil. The chemicals can be carried long distances and have been found in snow and seawater in areas far from where they were released into the environment. Legacy PCBs may be present in products and materials produced before the 1979 PCB ban including in transformers and other electrical equipment, oil, fluorescent lights, and other products (EPA, 2019h). More recently, there have also been concerns about non-legacy PCBs that may arise as manufacturing by-products (Rodenburg et al., 2015).

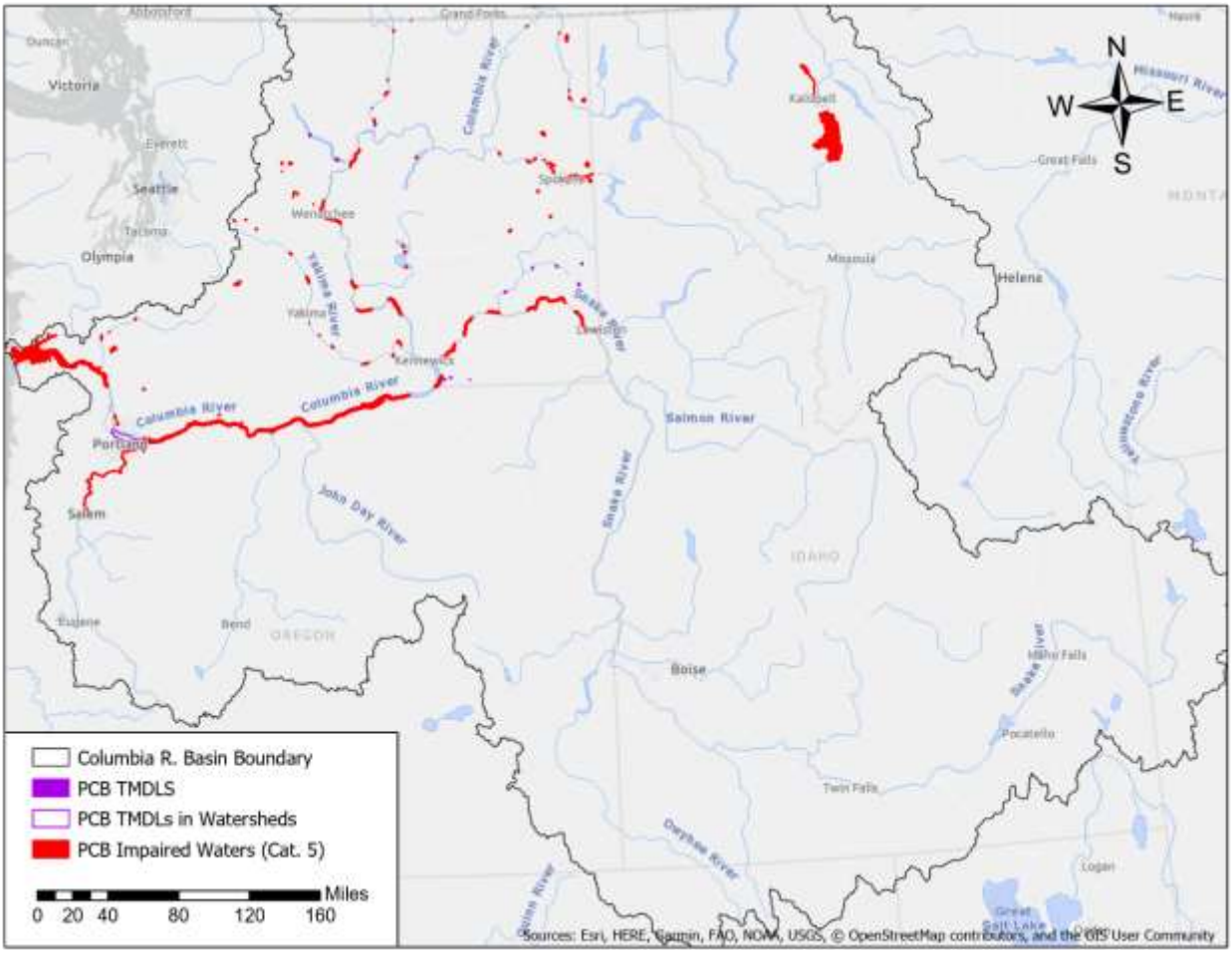


Figure 12. PCB impaired waters in the Columbia River Basin. The map is not authoritative and should be used for reference purposes only. The map is not to be used for legal purposes. Impaired waterbody segments have been slightly enlarged to improve their visibility and are not to scale.

The mainstem Columbia River has identified category 5 impairments in the following locations: portions of Lake Roosevelt and Lake Entiat; reaches above and below the City of Wenatchee, WA; the reach upstream of the mouth of Crab Creek; reaches bracketing the Saddle Mountain National Wildlife Refuge; a portion of Lake Wallula above McNary Dam; the entire length of lower Columbia River between McNary Dam and the Sandy River confluence; and the estuary below Kalama, WA.

The following Washington watersheds have category 5 impaired waters: Pend Oreille River, Colville River, Spokane River, Rock Creek, Palouse River, Crab Creek, Upper Columbia-Entiat, Banks Lake, Okanogan River, Lake Chelan, Wenatchee River, Yakima River, Cowlitz River, and Lower Columbia-Clatskanie (Figure 12). Washington has developed PCB TMDLs in the Lake Chelan, Lower Okanogan River, Palouse River, and Walla Walla River watersheds. Oregon has identified a category 5 PCB impairment on the lower Willamette River and a PCB TMDL covers the Columbia Slough in the Willamette River watershed. In Montana's Flathead River watershed, Whitefish Lake and River, and Flathead Lake are impaired by PCBs.

Table 12. Watersheds with waters impaired by PCBs.

State	Location of impaired waters without a TMDL (Category 5)	Location of EPA-approved TMDLs (Category 4a)
Idaho	None	None
Montana	Flathead River	None
Oregon	Mainstem Columbia River; Willamette River	Columbia Slough
Washington	Mainstem Columbia River; Pend Oreille River, Colville River, Spokane River, Rock Creek, Palouse River, Crab Creek, Upper Columbia-Entiat, Banks Lake, Okanogan River, Lake Chelan, Wenatchee River, Yakima River, Cowlitz River, Lower Columbia-Clatskanie watersheds	Lake Chelan, Lower Okanogan River, Palouse River, Walla Walla River watersheds

Total Maximum Daily Loads for Toxic Contaminants

In total, 31 TMDLs that address at least one toxic contaminant have been developed and approved by EPA in the Columbia River Basin. A TMDL specifies the maximum amount of a pollutant that can enter a waterbody so that the waterbody will meet, and continue to meet, water quality standards. All contributing sources of the pollutants (point and nonpoint sources) are identified, and they are allocated a portion of the allowable load that usually contemplates a reduction in their pollution discharge in order to help solve the problem (EPA, 2018b). For more information on TMDLs, refer to EPA's website[7]. The following section includes all toxics-related TMDLs and associated implementation plans within the Basin. Appendix B provides a table that identifies the toxic pollutants covered by the TMDLs.

Implementing a TMDL involves applying pollution control practices to reduce the pollutant loads to the extent determined necessary in the TMDL. These practices usually consist of point source control permits and/or non-point source control best management practices (BMPs) (EPA, 2018a). Although states are not explicitly required under CWA Section 303(d) to develop TMDL implementation plans, many states develop implementation plans. EPA is not required to and does not approve TMDL implementation plans.

TMDL implementation plans, which may be referred to as "Water Quality Improvement Plans" or "Watershed Restoration Plans," may provide additional information on what point and nonpoint sources contribute to the impairment and how those sources are being controlled, or should be controlled, in the future (EPA, 2018b). This could include identification of a range of potential management measures and practices that might be feasible for addressing the main loading sources in the watershed (EPA, 2008).

While implementation plans are specific to the watersheds and pollutants for which they are develop, many pollutant sources and potential pollution control actions to address toxics are similar across the basin. In Montana, the majority of toxics TMDLs are for metals and were developed to address waters impaired by historic mining practices. As a result, the implementation plans primarily focus on reclamation/restoration of abandoned mine sites, mine waste clean-up, and source assessment or

[7] URL: https://www.epa.gov/tmdl/overview-total-maximum-daily-loads-tmdls

monitoring. For organochlorine pesticides, such as DDT, implementation plans focus on keeping sediment from entering the waterways through agricultural and urban best management practices, such as cover crops, conservation tillage, more efficient irrigation methods, riparian buffers, and green infrastructure. Refer to implementation plans for site-and-parameter specific actions.

Idaho

Lower Clark Fork River Watershed:

Table 13. Toxic pollutants with approved TMDLs in the Lower Clark Fork River watershed.

Toxic Contaminant	Date of EPA-Approved TMDL
Cadmium	2007
Copper	
Zinc	

For specific information on the location and extent of toxics-impairments, refer to the Lower Clark Fork River Subbasin Assessment and Total Maximum Daily Loads[8]. In 2014, the Lower Clark Fork River Subbasin 17010213 Agricultural TMDL Implementation Plan[9] was developed, but it does not address toxics.

Portneuf River Watershed:

In 2001, EPA approved a TMDL for oil and grease in the Portneuf River watershed. For specific information on the location and extent of the impairment(s), refer to the Portneuf River TMDL[10]. The Portneuf River TMDL Implementation Plan, released in 2003, does not address the oil and grease impairment. In 2010, EPA approved a revision to the original TMDL. Refer to the updated TMDL, the Portneuf River TMDL Revision and Addendum[11], for updated information and context related to the oil and grease impairment.

Snake River – Hells Canyon Watershed[12]:

Table 14. Toxic pollutants with approved TMDLs in the Snake River – Hells Canyon watershed.

Toxic Contaminant	Date of EPA-Approved TMDL
DDD	2004
DDE	
DDT	
Dieldrin	

For specific information on the location and extent of toxics-impairments, refer to the Snake River – Hells Canyon Total Maximum Daily Load[13]. The implementation plans for Oregon and Idaho are detailed

[8] Document URL: https://www.deq.idaho.gov/media/453494-_water_data_reports_surface_water_tmdls_clark_fork_lower_clark_fork_lower_entire.pdf

[9] Document URL: https://www.deq.idaho.gov/media/60176892/lower-clark-fork-river-agricultural-tmdl-implementation-plan.pdf

[10] Document URL: https://www.deq.idaho.gov/media/464480-_water_data_reports_surface_water_tmdls_portneuf_river_portneuf_river_entire.pdf

[11] Document URL: https://www.deq.idaho.gov/media/464542-_water_data_reports_surface_water_tmdls_portneuf_river_portneuf_river_revision_addendum_final.pdf

[12] Idaho and Oregon jointly developed the Snake River – Hells Canyon TMDL. The table and accompanying text are also included in the list of Oregon's TMDLs.

[13] Document URL: https://www.deq.idaho.gov/media/454498-snake_river_hells_canyon_entire.pdf

in the TMDL. Actions to address the pesticide impairments are focused on sediment management. Specifically, public awareness campaigns, erosion control and reduction measures, implementation of agricultural best management practices, and riparian area management, including revegetation and streambank stability efforts.

Upper Coeur d'Alene River Watershed:

Table 15. Toxic pollutants with approved TMDLs in the Upper Coeur d'Alene River watershed.

Toxic Contaminant	Date of EPA-Approved TMDL
Cadmium	2002
Lead	
Zinc	

For specific information on the location and extent of the toxics-related impairments, refer to the Subbasin Assessment and Total Maximum Daily Loads of the North Fork Coeur d'Alene River[14]. The Implementation Plan has not been released as of May 2020.

Upper Snake River Watershed:

Table 16. Toxic pollutants with approved TMDLs in the Upper Snake River watershed.

Toxic Contaminant	Date of EPA-Approved TMDL
Mercury	2002

For specific information on the location and extent of the mercury impairment, refer to the Salmon Falls Creek Subbasin Assessment and Total Maximum Daily Loads[15]. The Salmon Falls Creek Subbasin Agricultural TMDL Implementation Plan HUC 17040213[16] does not address the mercury impairment in the watershed.

Montana

Bitterroot River Watershed:

Table 17. Toxic pollutants with approved TMDLs in the Bitterroot River watershed.

Toxic Contaminant	Date of EPA-Approved TMDL
Aluminum	2014
Lead	

For specific information on the location and extent of the toxics-related impairments, refer to the Final – Bitterroot Watershed Total Maximum Daily Loads and Water Quality Improvement Plan[17]. The Implementation Plan does not identify specific actions to address the aluminum and lead pollution because the sources of the contamination are unclear. Therefore, the document calls for additional monitoring actions, including investigations into abandoned mines and waste disposal sites, a review of a wastewater treatment plant's effluent data, streambank sediment sampling above and below automobile rip-rap sections of the stream, and soil and bedrock sampling to understand background loads.

[14] Document URL: https://www.deq.idaho.gov/media/453947-water_data_reports_surface_water_tmdls_cda_river_nf_cda_river_nf_entire.pdf

[15] Document URL: https://www.deq.idaho.gov/media/463815-salmon_falls_creek_entire.pdf

[16] Document URL: https://www.deq.idaho.gov/media/1117962/salmon-falls-creek-sba-ag-tmdl-implementation-plan.pdf

[17] Document URL: http://deq.mt.gov/Portals/112/water/wqpb/CWAIC/TMDL/C05-TMDL-04a.pdf

Blackfoot Headwaters TMDL Planning Area:

Table 18. Toxic pollutants with approved TMDLs in the Blackfoot Headwaters planning area.

Toxic Contaminant	Date of EPA-Approved TMDL
Aluminum	2003
Cadmium	
Copper	
Iron	
Lead	
Manganese	
Zinc	

For specific information on the location and extent of the toxics-related impairments, refer to the Water Quality Restoration Plan for Metals in the Blackfoot Headwaters TMDL Planning Area[18]. In 2014, the Blackfoot River Watershed Restoration Plan was released. The document covers the four TMDL planning areas within the watershed (Blackfoot Headwaters, Middle Blackfoot, Nevada Creek, and Lower Blackfoot Planning Areas). Specific potential restoration projects to address toxics include mine waste clean-up efforts at the Mike Horse mine and community outreach and education related to mine clean up.

Clark Fork – Drummond Planning Area:

Table 19. Toxic pollutants with approved TMDLs in the Clark Fork — Drummond planning area.

Toxic Contaminant	Date of EPA-Approved TMDL
Aluminum	2013
Antimony	
Arsenic	
Cadmium	
Copper	
Iron	
Lead	
Mercury	
Zinc	

For specific information on the location and extent of the toxics-related impairments, refer to the Bonita – Superior Metals TMDLs[19] document.

[18] Document URL: http://deq.mt.gov/Portals/112/water/wqpb/CWAIC/TMDL/C03-TMDL-01a.pdf
[19] Document URL: http://deq.mt.gov/Portals/112/water/wqpb/CWAIC/TMDL/C02-TMDL-03a.pdf

Clark Fork River & Silver Bow Creek Planning Area:

Table 20. Toxic pollutants with approved TMDLs in the Clark Fork and Silver Bow Creek planning area.

Toxic Contaminant	Date of EPA-Approved TMDL
Arsenic	2014
Cadmium	
Copper	
Iron	
Lead	
Mercury	
Zinc	

For specific information on the location and extent of the toxics-related impairments, refer to the Final – Silver Bow Creek and Clark Fork River Metal TMDLs[20].

Flint Creek Watershed:

Table 21. Toxic pollutants with approved TMDLs in the Flint Creek watershed.

Toxic Contaminant	Date of EPA-Approved TMDL
Antimony	2012, 2015*
Arsenic	2012
Cadmium	
Copper	
Iron	
Lead	
Mercury	
Zinc	

* In 2015, the Antimony TMDL was developed for Douglas Creek after the metal-impairment was added to the state's 2014 303(d) list based on new data collected between 2007-2011.

For specific information on the location and extent of the toxics-related impairments, refer to the Flint Creek Planning Area Sediment and Metals TMDLs and Framework Water Quality Improvement Plan[21] and its Addendum[22]. In 2014, the Granite Headwaters Watershed Group released the Flint Creek Watershed Restoration Plan. Projects to address metals in the watershed include additional monitoring, source assessment for mercury, and remediation projects for point and non-point sources, including at Black Pine Mine and Combination Mine and Mill sites, and the replacement of the City of Phillipsburg's existing wastewater treatment lagoons.

[20] Document URL: http://deq.mt.gov/Portals/112/Water/WQPB/TMDL/PDF/SilverBowCFRMetals/C01-TMDL-05a.pdf

[21] Document URL: http://deq.mt.gov/Portals/112/water/wqpb/CWAIC/TMDL/C02-TMDL-01a.pdf

[22] Document URL: http://deq.mt.gov/Portals/112/water/wqpb/CWAIC/TMDL/C02-TMDL-01a-a.pdf

Kootenai – Fisher Project Area TMDLs:

Table 22. Toxic pollutants with approved TMDLs in the Kootenai – Fisher Project Area.

Toxic Contaminant	Date of EPA-Approved TMDL
Arsenic	2014
Cadmium	
Copper	
Lead	
Zinc	

For specific information on the location and extent of the toxics-related impairments, refer to the Kootenai – Fisher Project Area Metals, Nutrients, Sediment, and Temperature TMDLs and Water Quality Improvement Plan[23]. The Kootenai River Basin Watershed Restoration Plan, released by the Kootenai River Network in 2015, identifies actions to address metal contamination including monitoring the effectiveness of past clean-up efforts, evaluating the feasibility of cleaning up remaining in-stream, streambank, and floodplain mine tailings below the Snowshoe Creek site, and reclaiming the mine audit, mill site, and road at the Troy Mine.

Little Blackfoot River TMDL Planning Area:

Table 23. Toxic pollutants with approved TMDLs in the Little Blackfoot planning area.

Toxic Contaminant	Date of EPA-Approved TMDL
Aluminum	2014*
Arsenic	2011
Beryllium	
Cadmium	
Copper	
Cyanide	
Iron	
Lead	
Mercury	
Zinc	2011, 2014*

* In 2013, Montana DEQ reassessed streams in the Little Blackfoot River TMDL planning area and, based on new data, developed TMDLs for 9 aluminum impairments and one zinc impairment.

For specific information on the location and extent of the toxics-related impairments, refer to the Little Blackfoot River Watershed TDMLs and Framework Water Quality Improvement Plan[24] and its Addendum[25]. Trout Unlimited released the Little Blackfoot River Watershed Restoration Plan in 2016. The document identifies management measures to address nonpoint sources of metals impairments, including the consolidation and removal of mine tailings, phytostabilization[26], capping, closure of hazardous mine openings, revegetation, streambank stabilization, mine drainage neutralization with lime amendments, and passive treatment of audit drainage. Recently completed or ongoing projects include the reclamation of Ontario, Monarch, Tramway, Lilly Orphan Boy and Telegraph mines.

[23] Document URL: http://deq.mt.gov/Portals/112/water/wqpb/CWAIC/TMDL/K01-TMDL-04a.pdf
[24] Document URL: https://deq.mt.gov/Portals/112/water/wqpb/CWAIC/TMDL/C01-TMDL-03a.pdf
[25] Document URL: https://deq.mt.gov/Portals/112/water/wqpb/CWAIC/TMDL/C01-TMDL-03a-a.pdf
[26] Phytostabilization is the use of certain plant species to immobilize contaminants in the soil and ground water through absorption and accumulation by roots, adsorption onto roots, or precipitation within the root zone.

Middle Blackfoot-Nevada Creek Planning Area:

Table 24. Toxic pollutants with approved TMDLs in the Middle Blackfoot-Nevada Creek planning area.

Toxic Contaminant	Date of EPA-Approved TMDL
Aluminum	2008
Arsenic	2008, 2014*
Copper	2008
Iron	2008, 2014*
Lead	2008

***** High levels of uncertainty due to incomplete assessments and insufficient datasets caused Montana DEQ to not address multiple impairments in the original 2008 TMDL; one new impairment was identified after the document's publication. In 2014, Montana DEQ developed an Addendum to the 2008 TMDL.

For specific information on the location and extent of the toxics-related impairments, refer to the Middle Blackfoot-Nevada Creek Total Maximum Daily Loads and Water Quality Improvement Plan[27] and its Addendum[28]. The Blackfoot River Watershed Restoration Plan covers the four TMDL planning areas within the watershed (Blackfoot Headwaters, Middle Blackfoot, Nevada Creek, and Lower Blackfoot Planning Areas). Specific potential restoration projects to address toxics include mine waste clean-up efforts at the Mike Horse mine and community outreach and education related to mine clean up.

Ninemile TMDL Planning Area:

Table 25. Toxic pollutants with approved TMDLs in the Ninemile planning area.

Toxic Contaminant	Date of EPA-Approved TMDL
Copper	2005
Lead	
Mercury	
Zinc	

For specific information on the location and extent of the toxics-related impairments, refer to the Water Quality Restoration Plan and total Maximum Daily Loads for the Ninemile Planning Area[29] document. Released by Trout Unlimited in 2013, The Watershed Restoration Plan for the Ninemile Creek TMDL Planning Area identifies the ongoing or completed mine reclamation projects, primarily focused on sedimentation issues caused by stream channelization following historic placer mining activities. Completed reclamation projects include Kennedy Creek, Joe Waylett Mine, Mattie V Creek, Little McCormick Creek, and Eustache Creek.

[27] Document URL: http://deq.mt.gov/Portals/112/water/wqpb/CWAIC/TMDL/C03-TMDL-02a.pdf
[28] Document URL: http://deq.mt.gov/Portals/112/water/wqpb/CWAIC/TMDL/C03-TMDL-02a-a.pdf
[29] Document URL: http://deq.mt.gov/Portals/112/water/wqpb/CWAIC/TMDL/C04-TMDL-01a.pdf

Prospect Creek TMDL Planning Area:

Table 26. Toxic pollutants with approved TMDLs in the Prospect Creek planning area.

Toxic Contaminant	Date of EPA-Approved TMDL
Antimony	2006
Arsenic	
Lead	
Zinc	

For specific information on the location and extent of the toxics-related impairments, refer to the Total Maximum Daily Loads for Metals in Prospect Creek Watershed: Sanders County, Montana[30] document. The Lower Clark Fork Watershed Restoration Group published the Lower Clark Fork Tributary Watershed Restoration Plan in 2019. The document identifies mining reclamation, riparian restoration, education and outreach filtration, maintenance of in-stream flows, and road management as restoration strategies to address metals contamination.

Rock Creek TMDL Planning Area:

Table 27. Toxic pollutants with approved TMDLs in the Rock Creek planning area.

Toxic Contaminant	Date of EPA-Approved TMDL
Aluminum	2013
Arsenic	
Copper	
Iron	
Lead	
Mercury	

For specific information on the location and extent of the toxics-related impairments, refer to the Rock Creek Watershed Total Maximum Daily Loads and Water Quality Improvement Plans[31]. The Water Quality Improvement Plan identifies mining as the principal human-caused source of excess metals loading. There are 6 sites on the Montana Department of Environmental Quality's Abandoned Hard Rock Mine Priority List that are considered to have significant human health or safety issues. The goal is the metals restoration strategy are to prevent metals from waste rock and tailings from migrating into surface or groundwater, reduce or eliminate concentrated runoff that delivers metal-laden sediment to surface waters and to identify, prioritize, and select reclamation and restoration options based on source assessment and risk analysis.

[30] Document URL: http://deq.mt.gov/Portals/112/water/wqpb/CWAIC/TMDL/C13-TMDL-02a.pdf
[31] Document URL: http://deq.mt.gov/Portals/112/water/wqpb/CWAIC/TMDL/C02-TMDL-02a.pdf

Thompson Project TMDL Planning Area:

Table 28. Toxic pollutants with approved TMDLs in the Thompson Project planning area.

Toxic Contaminant	Date of EPA-Approved TMDL
Aluminum	2014
Cadmium	
Copper	
Zinc	

For specific information on the location and extent of the toxics-related impairments, refer to the Thompson Project Area Metals, Nutrients, Sediment, and Temperature TMDLs and Water Quality Improvement Plan[32]. The Water Quality Improvement Plan identifies mining as the principal human-caused source of metal contamination. The monitoring plan includes actions to further characterize impairment conditions and loading sources. Reclamation activities of historic mining disturbances, removal of old buildings, closure of hazardous mine openings, and filling of caved stopes[33] at the Hog Heaven site have been completed.

Upper Clark Fork River TMDL Planning Area:

Table 29. Toxic pollutants with approved TMDLs in the Upper Clark Fork planning area.

Toxic Contaminant	Date of EPA-Approved TMDL
Arsenic	2010
Cadmium	
Copper	
Cyanide	
Iron	
Lead	
Selenium	
Sulfate	2014
Zinc	2010

For specific information on the location and extent of the toxics-related impairments, refer to The Upper Clark Fork River Tributaries Sediment, Metals, and Temperature TMDLs and Framework for Water Quality Restoration[34] and its Addendum[35]. In 2012, the Watershed Restoration Coalition released the Watershed Restoration Plan for the Upper Clark Fork River Tributaries. A key objective of the Watershed Restoration Plan is the removal of concentrated sources of metals from the floodplain in the lower drainage. This work is primarily driven by federal Superfund activities.

[32] Document URL: http://deq.mt.gov/Portals/112/water/wqpb/CWAIC/TMDL/C13-TMDL-04a.pdf

[33] Usually steplike excavations underground for the removal of ore that is formed as the ore is mined in successive layers (Merriam-Webster, n.d.)

[34] Document URL: http://deq.mt.gov/Portals/112/water/wqpb/CWAIC/TMDL/C01-TMDL-02a.pdf

[35] Document URL: http://deq.mt.gov/Portals/112/water/wqpb/CWAIC/TMDL/C01-TMDL-02a-a.pdf

Oregon

Snake River – Hells Canyon Watershed[36]:

Table 30. Toxic pollutants with approved TMDLs in the Snake River -- Hells Canyon watershed.

Toxic Contaminant	Date of EPA-Approved TMDL
DDD	2004
DDE	
DDT	
Dieldrin	

For specific information on the location and extent of toxics-impairments, refer to the Snake River – Hells Canyon Total Maximum Daily Load[37]. The implementation plans for Oregon and Idaho are detailed in the TMDL. Actions to address the pesticide impairments are focused on sediment management. Specifically, public awareness campaigns, erosion control and reduction measures, implementation of agricultural best management practices, and riparian area management, including revegetation and streambank stability efforts.

Willamette River Watershed:

Table 31. Toxic pollutants with approved TMDLs in the Willamette River watershed.

Toxic Contaminant	Date of EPA-Approved TMDL
Columbia Slough TMDL	
2,3,7,8 TCDD (Dioxin)	1998
DDE/DDT	
Dieldrin	
Lead*	
PCBs	
Molalla-Pudding Subbasin TMDL	
Chlordane	2008
DDT	
Dieldrin	
Iron	
Willamette Basin TMDL	
DDT	2006
Dieldrin	
Mercury	2006, 2019

* Water quality data indicates that the Columbia Slough is now attaining the water quality standards for lead. The Columbia Slough is classified as category 2 (attaining water quality standards) in the 2018/2020 Integrated Report.

For specific information on the location and extent of the toxics-related impairments, refer to the Columbia Slough Total Maximum Daily Load (TMDLs) for: Chlorophyll *a*, Dissolved Oxygen, pH, Phosphorus, Bacteria, DDE/DDT, PCBs, Pb, Dieldrin and 2,3,7,8 TCDD[38]. The TMDL includes an implementation strategy that identifies stormwater as the largest contributor of PCBs to the Slough and

[36] Idaho and Oregon jointly developed the Snake River – Hells Canyon TMDL. The table and accompanying text are also included in the list of Idaho's TMDLs.

[37] Document URL: https://www.deq.idaho.gov/media/454498-snake_river_hells_canyon_entire.pdf

[38] Document URL: https://www.oregon.gov/deq/FilterDocs/columbiasloughtmdl.pdf

contributes pesticides as well. The implementation strategy focuses on BMP implementation to control erosion and monitoring to evaluate the effectiveness of the BMPs.

For specific information on the location and extent of the toxics-related impairments developed in the Molalla-Pudding subbasin, refer to the Molalla-Pudding Subbasin TMDL & WQMP[39]. The Water Quality Management Plan focuses on reducing pesticides and iron by reducing sediment deliveries to streams by protecting riparian areas, erosion and stormwater control, and low impact development.

In 2006, Oregon developed a TMDL to cover toxic impairments in the Willamette River watershed. For specific information on the location and extent of the toxic impairments, refer to the Willamette Basin Total Maximum Daily Loads[40]. In 2012, a lawsuit was filed challenging the mercury TMDL. As a result, Oregon Department of Environmental Quality submitted the Revised Willamette Basin Mercury TMDL in November 2019. EPA disapproved the Revised Willamette Basin Mercury TMDL submitted by Oregon on November 29, 2019. Under the Clean Water Act, when EPA disapproves a TMDL, EPA must issue a new TMDL within 30 days. EPA released its Total Maximum Daily Load (TMDL) for Mercury in the Willamette Basin, Oregon[41] on December 30, 2019. The public comment period on EPA's revised mercury TMDL closed on February 4, 2020. As of May 2020, EPA is considering the received comments. EPA's Total Maximum Daily Load (TMDL) for Mercury in the Willamette Basin, Oregon is currently in effect for CWA purposes.

Washington

Lake Chelan Watershed:

Table 32. Toxic pollutants with approved TMDLs in the Lake Chelan watershed.

Toxic Contaminant	Date of EPA-Approved TMDL
DDT	2006
PCBs	

For specific information on the location and extent of the toxics-related impairments, refer to the Lake Chelan Watershed DDT and PCB Total Maximum Daily Load: Water Quality Improvement Report[42]. In 2008, the Lake Chelan DDT and PCB TMDL Water Quality Implementation Plan[43] was released. The plan seeks to prevent contaminated soils from entering surface waters by preventing erosion, safely disposing unused pesticides, and monitoring trends in fish tissue concentration and contaminant loading from tributaries. Specific actions identified to achieve these objectives include irrigation and stormwater BMPs, riparian vegetation buffers, participating in the Washington State Department of Agriculture's (WSDA) Pesticide Pick up Program and recommendations for constructed wetlands to reduce DDT loading from tributaries.

[39] Document available for download at the following URL: https://www.oregon.gov/deq/wq/tmdls/Pages/TMDLs-Willamette-Basin.aspx
[40] Document URL: https://www.oregon.gov/deq/wq/tmdls/Pages/TMDLs-Willamette-Basin.aspx
[41] Document URL: https://www.epa.gov/sites/production/files/2019-12/documents/tmdl-willamette-mercury-12-30-2019.pdf
[42] Document URL: https://fortress.wa.gov/ecy/publications/documents/0610022.pdf
[43] Document URL: https://fortress.wa.gov/ecy/publications/documents/0810048.pdf

Lower Okanogan River Watershed:

Table 33. Toxic pollutants with approved TMDLs in the Lower Okanogan River watershed.

Toxic Contaminant	Date of EPA-Approved TMDL
DDD	2004
DDE	
DDT	
PCBs	

For specific information on the location and extent of the toxics-related impairments, refer to the Lower Okanogan River Basin DDT and PCBs Total Maximum Daily Load[44]. In 2008, the Lower Okanogan DDT PCB Water Quality Implementation Plan (Detailed Implementation Plan) was published. The Implementation Plan outlines actions to be taken to reduce the movement of contaminants into surface waters. Specific actions include participation in WSDA's pesticide collection and disposal program, the efficient delivery of irrigation water and implementation of agricultural BMPs to reduce erosion, and monitoring of point-source discharges and fish tissues.

Similkameen River Watershed:

In 2004, Washington Ecology developed a TMDL for arsenic in the Similkameen River. For specific information on the location and extent of impairments, refer to the Lower Similkameen River Arsenic Total Maximum Daily Load: Submittal Report for Joint Issuance[45]. The TMDL identified historic mining practices as the primary human-caused nonpoint source of arsenic. In 2005, the Lower Similkameen River Arsenic Total Maximum Daily Load (Water Cleanup Plan) was released. No direct actions were identified to address the contaminated sediments; there is a trend of increasing water quality in the river. The document prescribes periodic monitoring, monitoring of high-flow events, and the investigation of impacts from recreational suction dredging to address legacy loads of arsenic in the Similkameen River.

Palouse River Watershed:

Table 34. Toxic pollutants with approved TMDLs in the Palouse River watershed.

Toxic Contaminant	Date of EPA-Approved TMDL
Dieldrin	2007
PCBs	

For specific information on the location and extent of the toxics-related impairments, refer to the Palouse River Chlorinated Pesticide and PCB Total Maximum Daily Load: Water Quality Improvement Report and Implementation Plan[46]. The Implementation Plan focuses on the natural attenuation of historic contamination and on keeping soil in place to reduce the transport of Dieldrin and PCBs into surface waterbodies. Specific actions include the adoption of agricultural and stormwater BMPs and increased monitoring of fish tissue data to ensure concentrations of the contaminants continue their downward trend in the watershed.

[44] Document URL: https://fortress.wa.gov/ecy/publications/documents/0410043.pdf
[45] Document URL: https://fortress.wa.gov/ecy/publications/documents/0310074.pdf
[46] Document URL: https://fortress.wa.gov/ecy/publications/documents/0703018.pdf

Spokane River Watershed:

Table 35. Toxic pollutants with approved TMDLs in the Spokane River watershed.

Toxic Contaminant	Date of EPA-Approved TMDL
Cadmium	1999
Lead	
Zinc	

For specific information on the location and extent of the toxics-related impairments, refer to the Spokane River Dissolved Metals Total Maximum Daily Load[47]. An Implementation Plan was not developed to address the excess dissolved metals in the Spokane River watershed.

Walla Walla River Watershed:

Table 36. Toxic pollutants with approved TMDLs in the Walla Walla River watershed.

Toxic Contaminant	Date of EPA-Approved TMDL
Chlordane	2006
DDT	
DDE	
DDD	
t-DDT	
Dieldrin	
Heptachlor Epoxide	
Hexachlorobenzene	
Toxaphene	
Total PCBs	

For specific information on the location and extent of the toxics-related impairments, refer to the Walla Walla River Chlorinated Pesticides and PCBs Total Maximum Daily Load (Water Cleanup Plan)[48]. Released in 2008, the Implementation Plan primarily focuses on actions to reduce erosion to address excess loads of chlorinated pesticides and PCBs in the watershed. Specific actions include the installation of riparian buffers and large woody debris to reduce rates of streambank erosion, pasture fence setbacks, wetland restoration, street sweeping and other stormwater BMPs, household hazardous waste collection events, the use of less toxic herbicides near surface waterways, and education and outreach activities.

Wenatchee River Watershed:

Table 37. Toxic pollutants with approved TMDLs in the Wenatchee River watershed.

Toxic Contaminant	Date of EPA-Approved TMDL
DDD	2007
DDE	
DDT	

For specific information on the location and extent of the toxics-related impairments, refer to the Mission Creek Watershed DDT Total Maximum Daily Load: Water Quality Improvement Report. The implementation strategy included in the TMDL to address DDT and its breakdown products focuses on

[47] Document URL: https://fortress.wa.gov/ecy/publications/documents/9949.pdf
[48] Document URL: https://fortress.wa.gov/ecy/publications/documents/0510079.pdf

additional monitoring, irrigation and stormwater BMPs to reduce soil erosion, participation in the WSDA's Waste Pesticide Program, and education and outreach assistance.

Yakima River Watershed:

Table 38. Toxic pollutants with approved TMDLs in the Yakima River watershed.

Toxic Contaminant	Date of EPA-Approved TMDL
Lower Yakima River Watershed TMDL	
DDT	1998
Upper Yakima River Watershed TMDL	
DDE	2002
DDT	
Dieldrin	

For specific information on the location and extent of the toxics-related impairments, refer to the Lower Yakima River Suspended Sediment and DDT TMDL[49] and the Upper Yakima River Suspended Sediment, Turbidity, and Organochlorine Pesticide TMDL[50]. An Implementation Plan was not developed for the Lower Yakima River DDT TMDL. For the Upper Yakima River Organochlorine Pesticide TMDL, the Implementation Plan focuses on reducing erosion of contaminated soils. Specific recommended actions include the agricultural BMPs including sedimentation/settling pond; vegetative filter strips; upgraded irrigation methods; the application of a binding agent, polyacrylamide, to remove suspended soil particles from irrigation water; conservation tillage; and the use of straw mulch to prevent the movement of soil.

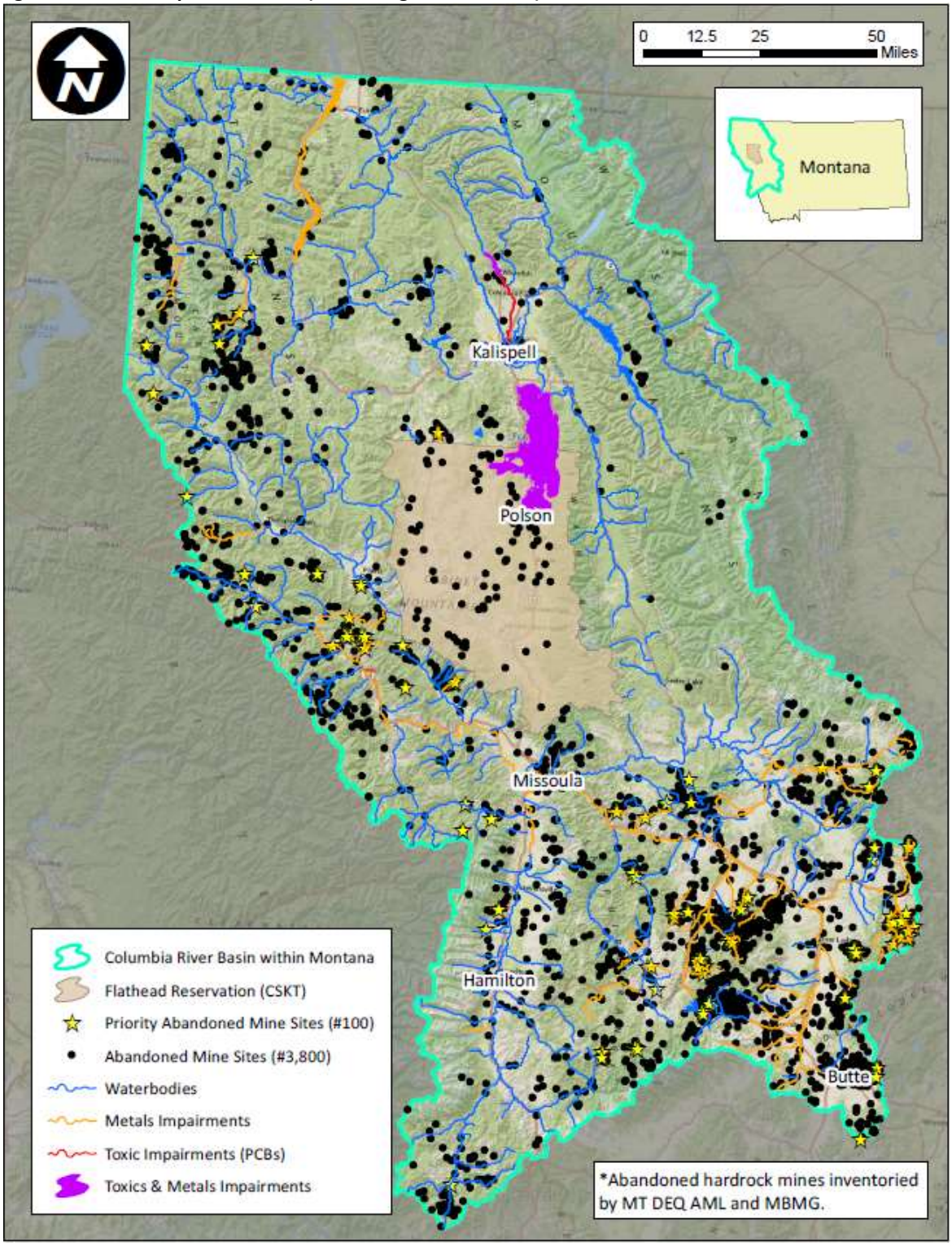
Columbia River Basin TMDLs

In 1991, the EPA developed a TMDL for Dioxin for the entire Columbia River Basin. For specific information on the location and extent of the toxics-related impairments, refer to the Total Maximum Daily Loading (TMDL) to Limit Discharges of 2,3,7,8-TCDD (Dioxin) to the Columbia River Basin[51]. The TMDL identified chlorine-bleaching pulp mills as a major source of Dioxin. The TMDL established wasteload allocations for the mills. No implementation plan was developed for the TMDL.

[49] Document URL: https://fortress.wa.gov/ecy/publications/documents/9810202.pdf
[50] Document URL: https://fortress.wa.gov/ecy/publications/documents/0210047.pdf
[51] Document URL: https://nepis.epa.gov/Exe/ZyPDF.cgi/9100YR95.PDF?Dockey=9100YR95.PDF

Appendix A. Category 5 Toxics-Impaired Waters in Western Montana

Figure 13. Toxics-impaired waters (both categories 4a and 5) and abandoned mines in western Montana.



Source: U.S. EPA Region 8

Appendix B. Toxics TMDLs in the Columbia River Basin

Table 39. Toxics TMDLs in the Columbia River Basin

State	Year	TMDL	Pollutant																							
			Aluminum	Antimony	Arsenic	Beryllium	Cadmium	Chlordane	Copper	Cyanide	DDD	DDE	DDT	Dieldrin	Dioxin	Heptachlor Expoxide	Hexachlorobenze	Iron	Lead	Manganese	Mercury	Oil & Grease	PCBs	Selenium	Sulfate	Toxaphene	Zinc
ID	2007	Lower Clark Fork R.					x		x																		x
ID	2001	Portneuf R.																				x					
ID	2004	Snake R. – Hells Canyon									x	x	x	x													
ID	2002	Upper Coeur d'Alene R.					x												x								x
ID	2002	Upper Snake R.																			x						
MT	2014	Bitterroot R.	x																x								
MT	2003	Blackfoot Headwaters	x				x		x									x	x	x							x
MT	2013	Clark Fork – Drummond	x	x	x		x		x									x	x		x						x
MT	2014	Clark Fork – Silver Bow Cr.			x		x		x									x	x		x						x
MT	2012/2015	Flint Creek		x	x		x		x									x	x		x						x
MT	2014	Kootenai – Fisher			x		x		x										x								x
MT	2011/ 2014	Little Blackfoot R.	x		x	x	x		x	x								x	x		x						x
MT	2008/2014	Middle Blackfoot-Nevada Cr.	x		x				x									x	x								
MT	2005	Ninemile							x										x		x						x
MT	2006	Propsect Cr.		x	x														x								x
MT	2013	Rock Cr.	x		x				x									x	x		x						

State	Year	TMDL	Pollutant																								
			Aluminum	Antimony	Arsenic	Beryllium	Cadmium	Chlordane	Copper	Cyanide	DDD	DDE	DDT	Dieldrin	Dioxin	Heptachlor Expoxide	Hexachlorobenze	Iron	Lead	Manganese	Mercury	Oil & Grease	PCBs	Selenium	Sulfate	Toxapheme	Zinc
MT	2014	Thompson Project	x				x		x																		x
MT	2010/2014	Upper Clark Fork R.			x		x		x	x								x	x					x	x		x
OR	2004	Snake R. – Hells Canyon									x	x	x	x													
OR	1998	Columbia Slough										x	x		x				x				x				
OR	2008	Molalla-Pudding Subbasin						x					x	x				x									
OR	2006/2019	Willamette Basin											x	x							x						
WA	2006	Lake Chelan											x										x				
WA	2004	Lower Okanogan R.									x	x	x										x				
WA	2004	Similkameen R.			x																						
WA	2007	Palouse R.												x									x				
WA	1999	Spokane R.					x												x								x
WA	2006	Walla Walla R.									x	x	x	x		x	x						x			x	
WA	2007	Wenatchee R.									x	x	x														
WA	1998	Lower Yakima R.											x														
WA	2002	Upper Yakima R.										x	x	x													
--	1991	Columbia R. Basin													x												

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