

# Klamath Toxics Basin Summary

October 2019



State of Oregon  
Department of  
Environmental  
Quality

**Laboratory and  
Environmental  
Assessment Division**  
7202 NE Evergreen Pkwy.  
Suite 150  
Hillsboro, OR 97124

Phone: 503-693-5743  
Fax: 503-693-4999  
Contact: Dan Brown

[www.oregon.gov/DEQ](http://www.oregon.gov/DEQ)

DEQ is a leader in  
restoring, maintaining and  
enhancing the quality of  
Oregon's air, land and  
water.

DEQ19-LAB-0041-TR  
Version 1.3  
Last Updated: 10/17/19

This report prepared by:

Oregon Department of Environmental Quality  
7202 NE Evergreen Parkway, Suite 150

Hillsboro, OR 97124

[www.oregon.gov/deq](http://www.oregon.gov/deq)

Contact:  
Dan Brown  
503-693-5743

DEQ can provide documents in an alternate format or in a language other than English upon request. Call DEQ at 800-452-4011 or email [deqinfo@deq.state.or.us](mailto:deqinfo@deq.state.or.us).

## Executive summary

In 2015, the Oregon Department of Environmental Quality conducted water quality and sediment sampling of eight rivers and creeks in the Klamath Basin. Oregon Department of Fish and Wildlife staff assisted with collection of fish tissue samples from Upper Klamath Lake between 2014 and 2015. This sampling builds on previous water quality sampling DEQ conducted in 2011 in the basin. DEQ analyzed the samples for over 450 chemicals and detected 114 chemicals across all media. While most of the detected chemicals were within levels considered safe for aquatic life, wildlife and human health, others exceeded applicable state and federal water quality standards or benchmarks, including total PCBs, arsenic and diuron in water samples; DDT, total PCBs, and arsenic in sediment samples; and mercury in fish tissue samples. The Lost River at Highway 39 monitoring location (#10759) had the highest number of chemical detections. Exceedances of mercury in fish tissue samples could pose a health risk to anyone consuming bass from Upper Klamath Lake. The Oregon Health Authority has issued a statewide fish consumption guideline (<https://go.usa.gov/xyxSb>) for bass based on mercury concentrations.

## Introduction

In 2007, the Oregon Legislature funded the Oregon Department of Environmental Quality to begin the Statewide Water Quality Toxics Monitoring Program. To achieve the goals of the program, the DEQ Laboratory and Environmental Assessment Program developed a five-year monitoring plan. The initial phase of this plan followed a rotating basin approach to conduct reconnaissance sampling of the state's waters and was completed in 2013. DEQ made the water and tissue sampling results from this initial phase of sampling available in two separate statewide reports. The purpose of this summary is to combine the sampling results from all media types collected in the Klamath Basin during the initial phase of Toxics Monitoring Program sampling with the most recent phase, completed in 2015.

Throughout this summary, chemical concentrations are compared to media specific criteria, benchmarks or screening levels. Human health criteria for water quality are designed to protect people who use the water as a primary drinking water source or who eat 23 meals per month of fish or shellfish collected from these waterbodies. Aquatic life criteria apply to waterbodies where the protection of fish and aquatic life is a beneficial use as outlined by the Oregon Administrative Rules (<https://go.usa.gov/xyxSj>). EPA's aquatic life benchmarks apply to concentrations below which the chemical is not expected to harm aquatic life. Screening levels for chemicals in sediment estimate the likelihood that a chemical poses a threat to humans or wildlife as a result of eating fish, shellfish, or other aquatic organisms from a particular location (DEQ 2007). In all media, the lowest screening level was used to ensure a conservative report of exceedances across the basin.

In 2015, DEQ laboratory staff returned to the Klamath Basin and collected seasonal (May, August and November) water samples from ten locations (Table 1) compared to five locations sampled in 2011. Three of these locations were sampled during both studies. The new sampling locations in 2015 were included to expand the coverage and more accurately represent the current state of potential toxic chemicals within the basin. DEQ laboratory staff also collected sediment and tissue samples in 2011 and 2015. Sediment sampling was limited to two monitoring locations during the 2011, while all ten monitoring locations were sampled in 2015 (Figure 1). Results from these samples have not previously been reported. ODFW staff collected fish tissue samples from two location in Upper Klamath Lake between 2014 and 2015. A short, basin specific summary of tissue sampling results was included at the end of this report. For a full summary of the tissue sampling results view the Statewide Aquatic Tissue Toxics Assessment Report released in 2017 (<https://go.usa.gov/xyxSW>). Appendices A-C detail the detection results from both sampling efforts by media type.

**Table 1 – Klamath Basin sampling locations.**

Station	Site Code	Site Description	Matrices	Years Sampled
10759	K01	Lost River at Hwy 39 (Merrill)	Water and Sediment	2011, 2015
10763	K02	Klamath Strait at USBR Pump Station F	Water and Sediment	2011, 2015
10765	K03	Klamath River at Hwy 66 (Keno)	Water	2011
10768	K04	Link River at mouth (Klamath Falls)	Water	2011
10770	K05	Williamson River at Williamson River Store	Water and Sediment	2011, 2015
11232	K06	Wood River at Weed Rd	Water and Sediment	2015
11597	K07	Klamath River at Miller Island Boat Ramp	Water and Sediment	2015
21535	K08	Sprague River at Sprague River Rd	Water and Sediment	2015
30182	K09	Lost River at Anderson Rose Dam	Water and Sediment	2015
37868	K13	Upper Klamath Lake near Fish Banks	Tissue	2014
38097	K10	Sevenmile Creek (Wood River Valley)	Water and Sediment	2015
38098	K11	Lost River above Bonanza	Water and Sediment	2015
38099	K12	Spencer Creek at RM 0.6	Water and Sediment	2015
38113	K14	Upper Klamath Lake near Modoc Point	Tissue	2015

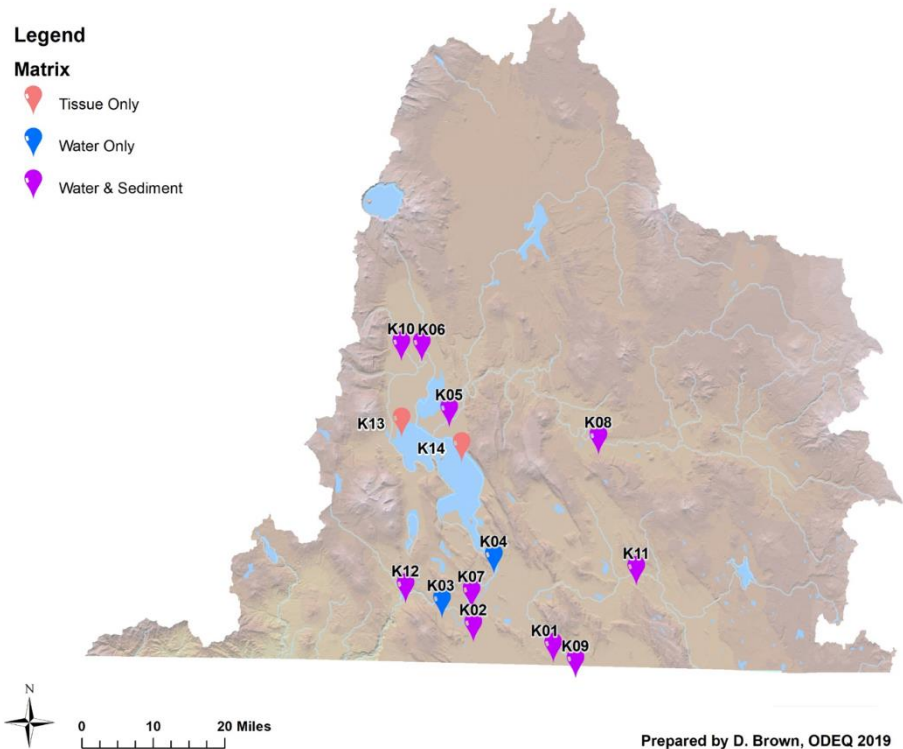
## Water sample results

### Seasonality

In order to capture seasonal use patterns and hydrologic differences, collection of water samples took place three times during the year. Figure 2 shows the unique number of chemical detected by chemical group in each of the seasonal events during both the 2011 and 2015 studies. This figure does not include plant and animal sterols. Detections for the four most common sterols occurred during each season in both studies.

As in 2011, metals were detected across all seasons. In addition, a higher number of unique metals were found during each season in 2015 than in 2011. Again, current use pesticides only occurred in samples collected during the spring and summer sampling events. Detections of consumer use products and their

constituents declined from 2011 to 2015. Individual detections of both combustion by-products and industrial chemicals occurred in 2015, but were not detected in 2011. Despite higher average monthly precipitation in 2015, than in 2011, the most likely reasons for the increase in detections is the increase in sampling locations and the addition of nearly 60 analytes not included in the previous analysis.

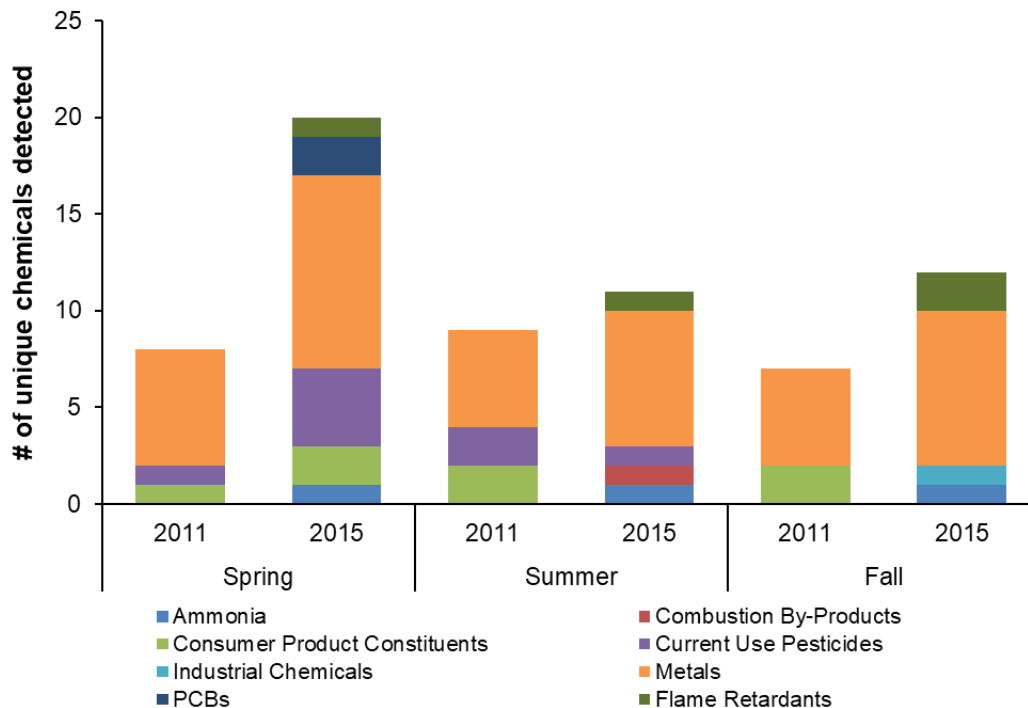


**Figure 1 – Map of the study area with monitoring locations by matrix. Visit the Water Quality Toxics Monitoring Program webpage for a map of the whole state (<https://go.usa.gov/xyxSK>)**

## Priority metals

Priority metals includes all metals for which Oregon has existing water quality criteria. These metals occur naturally and may be enriched by human activities. Because of this, detections of these metals are common in water. Ten priority metals were detected within the basin in 2015 compared to six in 2011. Samples from two sites on the Lost River (#10759 and #38098) had the highest number of metals detected (9). In addition, the only detections for copper or chromium in 2011 and 2015 occurred at monitoring locations in the Lost River (#10759, #30182, and #38098).

This area of the state is naturally high in arsenic. DEQ established a criterion for inorganic arsenic (2.1  $\mu\text{g/L}$ ) for the protection of human health in 2011. DEQ did not measure the inorganic form of arsenic in 2011, but found levels of total arsenic that indicated a potential concern for inorganic arsenic. During the 2015 study, inorganic arsenic was detected in 22 samples with 15 of those exceeding the criterion. The highest concentration (20.8  $\mu\text{g/L}$ ) was found at the Klamath Strait sampling location (#10763, Table 2). Detections occurred at 8 of the 10 monitoring locations sampled in 2015.



**Figure 2 – Seasonality of detections in the Klamath Basin by chemical group. Increase in detections between 2011 and 2015 may be partially attributed to the increase in sampling locations.**

## Pesticides

Pesticides are a broad class of chemicals that includes insecticides, herbicides and fungicides. Pesticides that are currently in use and those no longer in use (legacy) were included in this study. Legacy pesticides refer to chlorinated insecticides, such as DDT, that have been banned in the United States. Only a small number of legacy pesticides (22) were included in the 2011 analysis. More chemicals were included during the 2015 analysis and newly implemented analytical methods allowed for higher resolution detection. No legacy pesticides or their degradates were detected in Klamath Basin water column samples during the 2011 or 2015 studies.

**Table 2 – Maximum concentrations ( $\mu\text{g/L}$ ) of inorganic arsenic during the 2015 sampling (where detected). Red cells indicate concentrations that exceeded criteria.**

	iAs Conc.		
Lost River at Hwy 39 (Merrill)	7.44	6.2	Klamath River at Miller Island Boat Ramp
Klamath Strait at USBR Pump Station F	20.8	7.73	Lost River DS of Anderson-Rose Dam
Williamson River at Williamson River Store	1.64	1.9	Sevenmile Creek, Wood River Valley
Wood River at Weed Road	14.8	0.515	Lost River at Bonanza

Samples collected in 2011 contained two current use pesticides, diuron and oxamyl. Both pesticides were detected at concentrations below their EPA benchmarks (EPA, 2014). Only diuron was detected again in 2015. The detections occurred at three locations. In addition to diuron, 2,4-D, a commonly used herbicide, was detected at one location and glyphosate and one of its degradates, aminomethylphosphonic acid, were detected at two locations. Glyphosate, and its degradate, were added to the analysis for the 2015 sampling. Glyphosate is a commonly used herbicide sold under the trade name Roundup.

As in 2011, all of the 2015 current use pesticide detections occurred in either the spring or summer sampling efforts. A majority of the detections across studies occurred at the Lost River at Highway 39 (#10759) and Klamath Strait at USBR pump station (#10763) sites indicating consistent use near waterways or pathways for runoff to enter the system at these locations. Regardless of how these pesticides entered the waterway, none of the detections in 2015 exceeded the applicable EPA benchmark. However, persistent low-level detections and multiple chemicals at one sampling location may act additively in the environment resulting in impacts to the aquatic community.

### **Combustion by-products**

Combustion by-products include polycyclic aromatic hydrocarbons (PAHs) and are associated with the incomplete combustion of organic matter from automobiles, fossil fuels burning, woodstoves and cigarette smoke. They may enter the waterways as a result of air deposition or stormwater run-off from impervious surfaces, such as roads and parking lots. Detections of phenanthrene, a component of tar and diesel fuel, occurred at two Lost River locations (#10763 and #30182) during the summer sampling effort of 2015, at Hwy 39 and downstream of Anderson-Rose Dam (#30182). Currently, no water quality criterion for phenanthrene exists. No combustion by-product detections occurred during the 2011 sampling effort.

### **Consumer product constituents including pharmaceuticals**

Consumer product constituents include fragrances, pharmaceuticals, insect repellants, and other chemicals found in everyday household items, such as cleaning products, beauty products, clothing and medications. These constituents likely make their way into the water through wastewater discharges and septic systems. Currently, few consumer product constituents have water quality criteria or benchmarks.

Three compounds were detected in the Klamath Basin during the 2011 study. DEET, a common insect repellent, was detected during summer sampling at the Williamson River monitoring location (#10770). Estrone, a natural estrogen hormone, and diethylstilbesterol, a synthetic estrogen compound, occurred at only one site, the Klamath Strait at the USBR pump station location (#10763). In 2015, two chemicals not found in 2011 were detected. Sulfamethoxazole, an antibiotic, was detected in the Klamath River at the Miller Island Boat Ramp (#11597), and 17 $\alpha$ -ethynyl estradiol, another synthetic estrogen compound, was detected at the Sevenmile Creek monitoring location (#38097). No criteria or benchmarks in water exist for these chemicals.

### **Industrial chemicals and ammonia**

This group of analytes includes a selection of chemical intermediates used in the production of pesticides, pharmaceuticals, rubber, consumer products, etc. Isophorone was detected at the Lost River monitoring location above Bonanza (#38098) during the fall sampling effort in 2015. This chemical is primarily used as a solvent in inks and coatings, such as paints and lacquers. The concentration found in this study did not exceed the existing DEQ freshwater criterion for the protection of human health of 27  $\mu$ g/L. No industrial chemicals were detected during the 2011 study.

Ammonia is a naturally occurring compound commonly found in waste products. It is included as an industrial compound because of its use in fertilizers and dyes and may be extremely toxic to aquatic organisms. Its toxicity is dependent on pH and temperature and toxicity increases as pH and temperature increase. In 2015, ammonia detections occurred at six monitoring locations. The detections occurred across all seasons; however, none of the detections exceeded the current aquatic life criterion. Samples collected in 2011 were not analyzed for ammonia.

## **Flame retardants**

Polybrominated diphenyl ethers (PBDEs) are a group of flame retardants that were added to a variety of products such as laptops, automobiles, furniture and textiles. When these chemicals are released from products, they can enter the aquatic environment through air deposition, landfill leachate, and wastewater discharges. Three PBDEs were detected during the 2015 sampling effort. The Klamath Strait at USBR Pump Station F location (#10763) had the highest number of unique detections (2), while three other locations each had one detection. PBDEs do not currently have aquatic life or human health criteria, so these detections do not pose a threat to human or aquatic life. This chemical group was not included in the 2011 analysis, so no comparison can be made.

## **Polychlorinated biphenyls (PCBs)**

PCBs are a class of industrial chemicals historically used as electrical insulating fluid in transformers and capacitors. The manufacture and use of PCBs were banned or limited due to their ability to persist in the environment and toxicity to humans and wildlife. However, low levels (below 50ppm) in products are not regulated and PCBs can be inadvertent by-products of some manufacturing processes, such as those associated with colorants. The only PCB detections occurred at the Sprague River at Sprague River Road location (#21535) in 2015. While the individual PCBs detected at this location, PCB-110 and PCB-118, do not have aquatic life or human health criteria, total PCBs, measured as the sum of the congener concentrations, does. The total PCB concentration detected in the spring of 2015 was over the human health criteria for the consumption of water and organisms. No comparisons are made because this chemical group was not included in the 2011 analysis.

## **Plant and animal sterols**

The laboratory measured four plant and animal sterols in the Klamath Basin. All four of these sterols occur naturally in the environment but may also be enriched by humans and human activities. None of the sterols detected currently have a screening value. Additional work is required to fully evaluate this data and its implications and relationship to other contaminants.

The predominant source of the two plant sterols analyzed, beta-sitosterol and stigmastanol, is terrestrial plants. Other sources of these sterols may be industrial processes (wood pulping, food oils) and modern pharmaceutical supplements. Beta-sitosterol and stigmastanol were detected at all locations. Levels varied across the basin with the lowest levels detected at the Williamson River sampling location (#10770) and the highest levels detected at the Klamath Strait at USBR pump station location (#10763).

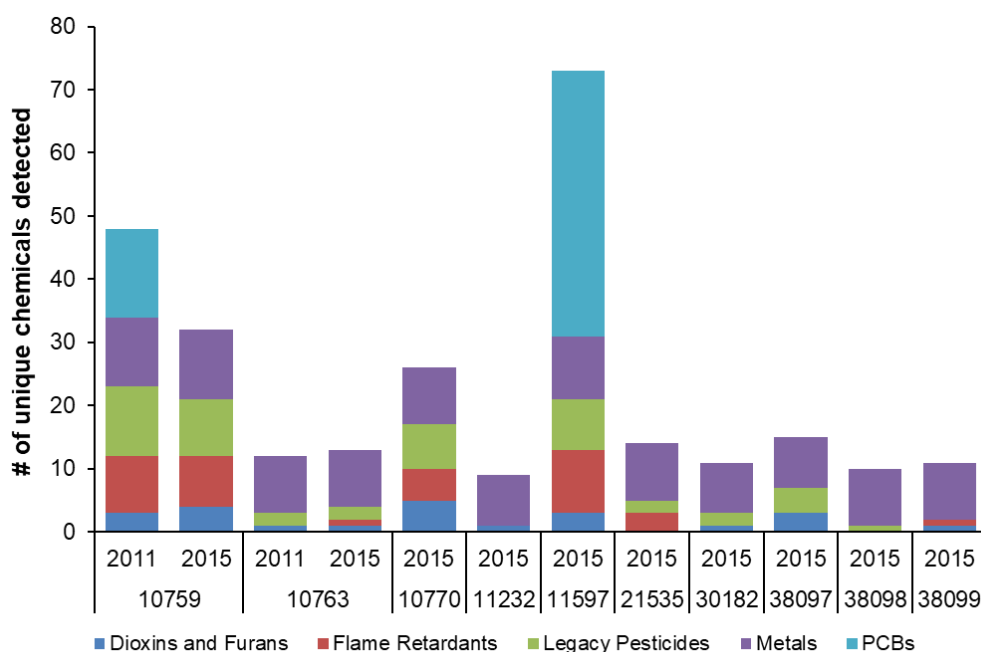
The laboratory also measured two animal sterols, cholesterol and coprostanol (both 100 percent detection where measured in both studies). As with the plant sterols, measured levels varied across the basin with the lowest levels detected at the Wood River location (#11232) and the highest levels detected at the Klamath Strait at USBR pump station site (#10763). While cholesterol is ubiquitous and found in a variety of different species, coprostanol is specific to fecal matter from humans and other mammals (i.e., cattle) as it is formed during digestion from cholesterol. The ratio of coprostanol to cholesterol may be used to evaluate contamination by human sewage. Ratios measured at all sites in this study were less than one, potentially indicating a biogenic source (i.e., livestock) of coprostanol.



## Sediment sample results

### Pesticides

Current use pesticides were not included in the analysis of sediment samples in 2011. In 2015, most current use pesticides included in the analysis were from the pyrethroid family. These pesticides are usually sold as wettable powders or granules under names like Talstar, Baygon or Temprid. Three non-pyrethroids, chlorpyrifos, oxyfluorfen and trifluralin, were also included. With the exception of pyrethroids, current use pesticides are less likely to accumulate in the environment than legacy pesticides, especially in sediment. However, no current use pesticides occurred in sediment samples during the 2015 studies despite detection in water samples. Eleven legacy pesticides were detected at the two locations sampled in 2011 while 13 legacy pesticides were detected at the 10 monitoring locations sampled in 2015. In both studies, the Lost River at Hwy 39 monitoring location (#10759) had the highest number of unique chemicals detected (Figure 3).



**Figure 3 – Number of unique chemicals detected at each monitoring location by chemical group and year sampled.**

DDT, or one of its degradates, was detected at 10 of 12 monitoring locations over both studies. The DDT (total) screening level, the total concentration of DDT and its degradates detected in a single sample, established by DEQ is 0.00033 mg/kg. This number represents the concentration at or below which chemicals would not be expected to accumulate in tissues of fish above levels acceptable for human consumption (DEQ, 2007). One monitoring location in 2011 and four in 2015 exceeded the DDT (total) screening level. A comparison of concentrations from the two sites sampled in both years show consistent results (Table 3), which when paired with the increase in exceedances in 2015 may indicate that DDT contamination is higher across the basin than previously thought. The highest concentration occurred at the Williamson River monitoring location (#10770), which is substantially higher than concentrations found elsewhere in the basin (Table 3). Dieldrin, an insecticide developed as an alternative to DDT, exceeded the established screening level at the only location where it was detected in 2011. Hexachlorobenzene, a fungicide used as a seed coating, was detected at one location during the 2015 study, but did not exceed the screening level.

## Priority metals

Priority metals were present in each sample collected during the 2011 and 2015 sampling efforts. The Lost River at Hwy 39 monitoring location (#10759) had the highest number of unique chemicals detected with 13, although 10 or more priority metals were detected at each monitoring location (Figure 3). Four of the metals detected have DEQ suggested background concentrations, rather than screening levels. For inorganic chemicals, such as arsenic, there are difficulties in associating concentrations in animals and fish with sediment concentrations, so background concentrations are used instead of screening levels (DEQ 2007). Arsenic, which is naturally elevated in this area of the state, was detected at all monitoring locations and exceeded the background concentration at the Williamson River location (#10770). None of the detections for cadmium, lead or mercury, the other metals for which background concentrations are used, exceeded those concentrations during the 2015 study.

**Table 3 – Maximum concentrations (ng/kg dry weight) of DDT (total) where detected in sediment. Red cells indicate concentrations that exceeded criterion.**

	DDT (total) concentration		
Lost River at Hwy 39 (#10759) – 2011	2399	3110	Klamath River at Miller Island Boat Ramp (#11597)
Lost River at Hwy 39 (#10759) – 2015	3454	43.3	Sprague River at Sprague River Road (#21535)
Klamath Strait at USBR Pump Station (#10763) – 2011	189.1	75.9	Lost River DS of Anderson-Rose Dam (#30182)
Klamath Strait at USBR Pump Station (#10763)– 2015	148.6	1796	Sevenmile Creek, Wood River Valley (#38097)
Williamson River at Williamson River Store (#10770)	13751	83.9	Lost River above Bonanza (#38098)

## Dioxins and furans

This chemical group includes 17 different chemicals produced as by-products of industrial activities and fossil fuel combustion from sources such as wood stoves and forest fires. These chemicals are known to persist in the environment, bioaccumulate in organisms, and are toxic to humans and wildlife. Five of the 17 chemicals in this group were detected during the 2011 or 2015 studies and all five were found at the Williamson River monitoring location (#10770) in 2015. Only one, 1,2,3,6,7,8-HxCDD, exceeded the DEQ screening level. This exceedance also occurred at the Williamson River monitoring location (#10770) in 2015.

## Flame retardants

Like dioxins and furans, these chemicals are known to persist in the environment and bioaccumulate in organisms. While DEQ does not have sediment screening levels for these compounds, the use of three PBDEs, penta-, octa-, and deca-, have been restricted by weight since 2009. PBDEs were detected at seven monitoring locations between the two studies. The highest number of congeners occurred at the Klamath River at Miller Island Boat Ramp monitoring location (#11597), but the highest total concentration of PBDEs occurred at the Lost River at Hwy 39 monitoring location (#10759). The presence of these compounds indicates a potential for impacts to the aquatic system and human health.

## **Polychlorinated biphenyls (PCBs)**

PCBs were detected at one monitoring location during both studies. Fourteen PCBs were detected at the Lost River at Hwy 39 location (#10759) in 2011, while 42 PCBs were found in the sample from the Klamath River at Miller Island Boat Ramp location (#11597) in 2015 (Figure 3). This is nearly 25% of the congeners identifiable by the method used to analyze for PCBs. Despite the high number of detections at these two monitoring locations, none of the detections exceeded existing screening levels.

## **Tissue sample results**

Tissue sample collection in the Klamath Basin occurred between August 2014 and March 2015 at two locations in Upper Klamath Lake, near Fish Banks (#37868) and near Modoc Point (#38113). Small fish (< 200 mm total length) were processed as whole body samples and were typically composited with fish of the same size and species. Large fish (> 200 mm total length) were filleted at the DEQ laboratory and only the skinless fillet was processed. In comparison with the rest of the state, tissue samples collected in the Klamath Basin contained fewer unique chemicals, fewer flame retardants, fewer PCBs, and had a lower rate of mercury exceedances than a majority of the other river basins. While the 13 different legacy pesticides detected in Upper Klamath Lake is somewhat alarming, none of the detections exceeded OHA fish consumption screening values for these compounds.

## **Replicate sampling**

A subset of the monitoring locations from the 2011 study were sampled again during the 2015 study in an attempt to help identify potential trends emerging within the basin. The selected sites represented the three major waterways within the basin. Concentrations in sediment samples remained relatively the same across all chemical groups. The biggest difference occurred in DDT concentrations, which generally declined while concentrations of its degradates increased. Given the transient nature of compounds in water, concentrations fluctuated between the two studies. However, the priority metals present in 2011 were all detected again in 2015 at comparable concentrations. One current use pesticide, diuron, occurred in samples from both years and in similar concentrations despite being detected in different seasons. Further sampling efforts at these locations will continue to build the knowledge base and allow for comparisons that are more meaningful.

## **Data gaps and summary**

Based on the number of unique chemicals detected and screening value exceedances found in both water and sediment samples, the Lost River at Hwy 39 monitoring location (#10759) is a potential area of interest, and to a lesser extent, the Williamson River and Klamath Strait monitoring locations. The exceedances of arsenic are likely attributable to the natural conditions of the Klamath Basin, while the exceedances of DDT are based on historical applications of the pesticide, as its use was banned in 1972. These chemicals are commonly found in concentrations at or near their criteria, as are dieldrin and mercury. The detection of a dioxin over its benchmark and total PCBs over its criteria however are uncommon. In many basins, the analysis of dioxins and furans is not complete, so the commonality of these detections may increase with time. The total PCBs concentration is also surprising because no PCBs were detected in the sediment sample collected at the Sprague River location (#21535). This could indicate a relatively new source of PCB pollutants to the waterway. Future monitoring in the basin should consider these locations and analytes when developing a sampling plan as well as work to address the current data gaps.

The number of unique chemicals detected increased in both water and sediment samples between 2011 and 2015. Two potential reasons for the increase are the higher number of monitoring locations sampled and the addition of a number of analytes to analysis in 2015. The list of new analytes included ammonia, inorganic arsenic, glyphosate and chemical groups such as PCBs, flame retardants and dioxins and furans in water samples. Missing from this analysis were consumer use products such as certain antibiotics, anti-depressants, and fragrances. To see the full list of compounds analyzed in Toxics Monitoring efforts across the state see Appendix A of the Statewide Water Quality Toxics Assessment Report (<https://go.usa.gov/xyxSW>).

## References

Oregon Department of Environmental Quality (DEQ), [Guidance for Assessing Bioaccumulative Chemicals of Concern in Sediment](#), 2007.

United States Environmental Protection Agency (EPA), Office of Pesticide Programs, [Aquatic Life Benchmarks](#), 2014.

Oregon Department of Environmental Quality (DEQ), [Statewide Aquatic Tissue Toxics Assessment Report](#), 2017.

# Appendices

## Screening Value Reference Key

---

*nsv*: No screening value has been assigned

1. Human Health Criteria: Water + Organism

2. Freshwater Chronic Criteria (CCC)

3. Saltwater Chronic Criteria (CCC)

4. Saltwater Acute Criteria (CMC)

<https://www.oregon.gov/deq/Rulemaking%20Docs/tables303140.pdf>

5. Freshwater Fish Acute Criteria

6. Freshwater Fish Chronic Criteria

7. Freshwater Invertebrates Acute Criteria

8. Freshwater Invertebrates Chronic Criteria

9. Freshwater Nonvascular Plants Acute Criteria

10. Freshwater Vascular Plants Acute Criteria

<https://www.epa.gov/pesticide-science-and-assessing-pesticide-risks/aquatic-life-benchmarks-and-ecological-risk>

11. Sediment Bioaccumulation Screening Level Value

<https://www.oregon.gov/deq/FilterDocs/GuidanceAssessingBioaccumulative.pdf>

12. OHA Fish Advisory Program Screening Level

<https://www.oregon.gov/oha/PH/HEALTHYENVIRONMENTS/RECREATION/FISHCONSUMPTION/Documents/fishscreeninglevels.pdf>

13. Human Health Criteria: Organism Only

<https://www.oregon.gov/deq/Rulemaking%20Docs/tables303140.pdf>

14. Acceptable Tissue Levels for Chemicals in Fish/Shellfish Consumed by Wildlife

<https://www.oregon.gov/deq/FilterDocs/GuidanceAssessingBioaccumulative.pdf>


\* Hardness dependent criteria

‡ pH and temperature dependent criteria

# This criteria applies to the total recoverable metal

§ This criteria applies to the dissolved concentration, and is therefore a conservative comparison

† This criteria applies to freshwater organisms

 Indicates sites at which at least one sample exceeded the screening value



State of Oregon  
Department of  
Environmental  
Quality

**Appendix A  
Water Sample Results**

**KLAMATH BASIN**

**Station ID and Description**

Samples collected in 2011  
and 2015

	Percent Detection	Number of samples over screening value	Station ID and Description				Screening Value (µg/L)	S.V. Reference
			K01 - Lost River at Hwy 39 (Merrill) - 2011 10759	K01 - Lost River at Hwy 39 (Merrill) - 2015 10759	K02 - Klamath Strait at USBR Pump Station F - 2011 10763	K02 - Klamath Strait at USBR Pump Station F - 2015 10763		
<b>Maximum Values (µg/L)</b>								
<b>Ammonia</b>								
Ammonia as N	43	0	—	206	—	1440	‡	2
<b>Combustion By-Products</b>								
Phenanthrene	4		—	0.00542	—	—	nsv	
<b>Consumer Product Constituents</b>								
17a-Ethynyl estradiol	3		—	—	—	—	nsv	
DEET	18		—	—	—	—	nsv	
Diethylstilbesterol	3		—	—	0.0004	—	nsv	
Estrone	3		—	—	0.008	—	nsv	
Sulfamethoxazole	2		—	—	—	—	nsv	
<b>Current Use Pesticides</b>								
2,4-D	2	0	—	—	—	0.1	100	1
Aminomethylphosphonic acid (AMPA)	10	0	—	65.8	—	246	249500	5
Diuron	13	4	0.21	5.71	0.0178	71.7	2.4	9
Glyphosate	3	0	2.15	—	—	604	11900	10
Oxamyl	2		—	—	—	—	27	8
<b>Flame Retardants</b>								
PBDE-206	3		—	—	—	0.00082	nsv	
PBDE-209	14		—	—	—	0.0244	nsv	
PBDE-47	3		—	—	—	—	nsv	
<b>Industrial Chemicals or Intermediates</b>								
Isophorone	3	0	—	—	—	—	12900	4
<b>PCBs</b>								
Total PCBs	3	1	—	—	—	—	6E-06	1
PCB-110	3		—	—	—	—	nsv	
PCB-118	3		—	—	—	—	nsv	
<b>Plant or animal sterols</b>								
beta-Sitosterol	100		1.72	1.86	4.11	6.1	nsv	
Cholesterol	100		3.26	4.53	6.17	10.2	nsv	
Coprostanol	100		0.146	0.206	0.26	0.259	nsv	
Stigmastanol	100		0.315	0.35	0.494	0.388	nsv	
<b>Priority Metals</b>								
<i>Dissolved</i>								
Aluminum	37		—	46.2	—	—	nsv	
Arsenic	93		5.45	8.17	17.3	22.8	nsv	
Barium	100		13.9	13.5	16.4	15.1	nsv	
Copper	4	0	—	—	—	—	*	2
Iron	48	0	—	58	150	153	1000 <sup>#</sup>	2
Manganese	100		45.4	26.2	49.1	106	nsv	
Nickel	22	0	1.1	1	1.1	1.69	*	2
Potassium	100		—	4410	—	9220	nsv	
Zinc	2	0	—	—	—	—	*	2



State of Oregon  
Department of  
Environmental  
Quality

**Appendix A  
Water Sample Results**

**KLAMATH BASIN**

**Station ID and Description**

Samples collected in 2011  
and 2015

Percent Detection

Number of samples  
over screening value

K01 - Lost River at  
Hwy 39 (Merrill) -  
2011  
10759

K01 - Lost River at  
Hwy 39 (Merrill) -  
2015  
10759

K02 - Klamath  
Strait at USBR  
Pump Station F -  
2011  
10763

K02 - Klamath  
Strait at USBR  
Pump Station F -  
2015  
10763

Screening Value (µg/L)

S.V. Reference

**Maximum Values (µg/L)**

**Priority Metals, continued**

*Total Inorganic*

Arsenic 100 15 — 7.44 — 20.8 2.1 1

*Total Recoverable*

Aluminum 100 — 677 — 212 *nsv*  
 Arsenic 93 5.56 8.11 18 24 *nsv*  
 Barium 100 0 14.8 14.7 19.3 18.2 1000 1  
 Chromium 2 0 — — — — 11<sup>§</sup> 2  
 Copper 7 0 1.8 1.82 — — \*<sup>§</sup> 2  
 Iron 100 0 630 627 370 348 1000 2  
 Manganese 100 10.9 52.6 157 133 *nsv*  
 Nickel 33 0 1.5 1.48 2.7 2.03 \*<sup>§</sup> 2  
 Potassium 100 — 4380 — 9870 *nsv*  
 Zinc 2 0 — 9.56 — — \*<sup>§</sup> 2

**Average Values**

**Standard Parameters (mg/L)**

Dissolved Organic Carbon 95 10.2 8.5 25.7 23.4  
 Sulfate 98 24.4 30.3 76.2 115.0  
 Total Organic Carbon 98 12.7 8.2 29.3 22.3  
 Total Solids 100 241.3 261.0 382.0 448.0  
 Total Suspended Solids 93 6.7 15.0 13.7 29.0

**Field Parameters**

Conductivity (µmhos/cm) 100 314 345 499 565  
 Dissolved Oxygen (mg/L) 100 8.4 11.1 8.4 8.9  
 pH (SU) 100 8.2 8.7 8.3 8.9  
 Temperature (°C) 100 13.3 19.6 14.3 21.5  
 Turbidity (NTU) 100 7 13 11 19



State of Oregon  
Department of  
Environmental  
Quality

**Appendix A  
Water Sample Results**

**KLAMATH BASIN**

**Station ID and Description**

Samples collected in 2011  
and 2015

K03 - Klamath River at Hwy 66 (Keno) - 2011	K04 - Link River at mouth (Klamath Falls) - 2011	K05 - Williamson R at Williamson River Store - 2011	K05 - Williamson R at Williamson R River Store - 2015
10765	10768	10770	10770

Screening Value (µg/L)

S.V. Reference

**Maximum Values (µg/L)**

<b>Ammonia</b>						
Ammonia as N	—	—	—	—	‡	2
<b>Combustion By-Products</b>						
Phenanthrene	—	—	—	—	<i>nsv</i>	
<b>Consumer Product Constituents</b>						
17a-Ethynyl estradiol	—	—	—	—	<i>nsv</i>	
DEET	—	—	0.0544	—	<i>nsv</i>	
Diethylstilbesterol	—	—	—	—	<i>nsv</i>	
Estrone	—	—	—	—	<i>nsv</i>	
Sulfamethoxazole	—	—	—	—	<i>nsv</i>	
<b>Current Use Pesticides</b>						
2,4-D	—	—	—	—	100	1
Aminomethylphosphonic acid (AMPA)	—	—	—	—	249500	5
Diuron	—	—	—	—	2.4	9
Glyphosate	—	—	—	—	11900	10
Oxamyl	—	—	—	—	27	8
<b>Flame Retardants</b>						
PBDE-206	—	—	—	—	<i>nsv</i>	
PBDE-209	—	—	—	—	<i>nsv</i>	
PBDE-47	—	—	—	—	<i>nsv</i>	
<b>Industrial Chemicals or Intermediates</b>						
Isophorone	—	—	—	—	12900	4
<b>PCBs</b>						
Total PCBs	—	—	—	—	0.0000064	1
PCB-110	—	—	—	—	<i>nsv</i>	
PCB-118	—	—	—	—	<i>nsv</i>	
<b>Plant or animal sterols</b>						
beta-Sitosterol	1.83	1.64	0.966	0.388	<i>nsv</i>	
Cholesterol	9.26	9.06	2.02	0.83	<i>nsv</i>	
Coprostanol	0.129	0.0961	0.028	0.028	<i>nsv</i>	
Stigmastanol	0.149	0.151	0.196	0.631	<i>nsv</i>	
<b>Priority Metals</b>						
<i>Dissolved</i>						
Aluminum	—	—	—	24.9	<i>nsv</i>	
Arsenic	6.33	6.17	1.8	1.86	<i>nsv</i>	
Barium	7	6.3	7.6	4.35	<i>nsv</i>	
Copper	—	—	—	—	*	2
Iron	—	—	—	68.8	1000 <sup>#</sup>	2
Manganese	13.4	18..1	6.4	8.85	<i>nsv</i>	
Nickel	—	—	—	—	*	2
Potassium	—	—	—	1780	<i>nsv</i>	
Zinc	—	—	—	—	*	2





State of Oregon  
Department of  
Environmental  
Quality

**Appendix A  
Water Sample Results**

**KLAMATH BASIN  
Station ID and Description**

Samples collected in 2011  
and 2015

K03 - Klamath River at Hwy 66 (Keno) - 2011	K04 - Link River at mouth (Klamath Falls) - 2011	K05 - Williamson R at Williamson River Store - 2011	K05 - Williamson R at Williamson R River Store - 2015
10765	10768	10770	10770

Screening Value (µg/L)

S.V. Reference

**Maximum Values (µg/L)**

**Priority Metals, continued**

*Total Inorganic*

Arsenic — — — 1.64 2.1 1

*Total Recoverable*

Aluminum — — — 65.8 *nsv*

Arsenic 6.53 6.34 1.79 1.88 *nsv*

Barium 7.9 7.9 11 4.69 1000 1

Chromium — — — — 11<sup>§</sup> 2

Copper — — — — \*<sup>§</sup> 2

Iron 400 440 730 126 1000 2

Manganese 46.8 35.2 18.1 14 *nsv*

Nickel — — — — \*<sup>§</sup> 2

Potassium — — — 1820 *nsv*

Zinc — — — — \*<sup>§</sup> 2

**Average Values**

**Standard Parameters (mg/L)**

Dissolved Organic Carbon 8.5 8.2 4.9 2.4

Sulfate 6.4 3.2 1.5 2.5

Total Organic Carbon 9.5 7.7 2.9 1.8

Total Solids 137.0 131.7 99.3 94.0

Total Suspended Solids 9.3 10.0 4.0 2.0

**Field Parameters**

Conductivity (µmhos/cm) 138 115 88 113

Dissolved Oxygen (mg/L) 7.2 9.3 9.6 10.4

pH (SU) 7.8 8.1 8.0 8.5

Temperature (°C) 12.9 13.2 11.7 17.5

Turbidity (NTU) 9 11 8 2



State of Oregon  
Department of  
Environmental  
Quality

**Appendix A  
Water Sample Results**

**KLAMATH BASIN**

**Station ID and Description**

Samples collected in 2011  
and 2015

K06 - Wood River at Weed Road - 2015	K07 - Klamath River at Miller Island Boat Ramp - 2015	K08 - Sprague R at Sprague River Rd - 2015	K09 - Lost River DS of Anderson-Rose Dam - 2015
11232	11597	21535	30182

Screening Value (µg/L)

S.V. Reference

**Maximum Values (µg/L)**

**Ammonia**

Ammonia as N — 788 — 139 † 2

**Combustion By-Products**

Phenanthrene — — — 0.00527 *nsv*

**Consumer Product Constituents**

17a-Ethynyl estradiol — — — — *nsv*

DEET — — — — *nsv*

Diethylstilbesterol — — — — *nsv*

Estrone — — — — *nsv*

Sulfamethoxazole — 0.0129 — — *nsv*

**Current Use Pesticides**

2,4-D — — — — 100 1

Aminomethylphosphonic acid (AMPA) — — — — 249500 5

Diuron — — — 5.68 2.4 9

Glyphosate — — — — 11900 10

Oxamyl — — — — 27 8

**Flame Retardants**

PBDE-206 — — — — *nsv*

PBDE-209 — — — — *nsv*

PBDE-47 — 0.00221 — — *nsv*

**Industrial Chemicals or Intermediates**

Isophorone — — — — 12900 4

**PCBs**

Total PCBs — — 0.00024 — 6E-06 1

PCB-110 — — 0.00013 — *nsv*

PCB-118 — — 0.00011 — *nsv*

**Plant or animal sterols**

beta-Sitosterol 0.256 4.25 0.772 4.47 *nsv*

Cholesterol 0.164 3.01 1.2 6.95 *nsv*

Coprostanol 0.0154 0.0582 0.058 0.167 *nsv*

Stigmastanol 0.043 0.175 0.165 0.319 *nsv*

**Priority Metals**

*Dissolved*

Aluminum — 80.1 35.8 55.9 *nsv*

Arsenic 14.5 9.13 0.48 7.88 *nsv*

Barium 2.82 6.81 9.22 12.1 *nsv*

Copper — — — — \* 2


Iron 78.3 91.3 110 64.2 1000<sup>#</sup> 2


Manganese 6.18 6.29 21.8 29 *nsv*


Nickel — — — — \* 2

Potassium 1970 2680 2250 4210 *nsv*

Zinc 8.78 — — — \* 2

 State of Oregon Department of Environmental Quality	Appendix A Water Sample Results		KLAMATH BASIN				
	Samples collected in 2011 and 2015	Station ID and Description				Screening Value (µg/L)	S.V. Reference
		K06 - Wood River at Weed Road - 2015 11232	K07 - Klamath River at Miller Island Boat Ramp - 2015 11597	K08 - Sprague R at Sprague River Rd - 2015 21535	K09 - Lost River DS of Anderson-Rose Dam - 2015 30182		
<b>Maximum Values (µg/L)</b>							
<b>Priority Metals, continued</b>							
<i>Total Inorganic</i>							
Arsenic	14.8	6.2	—	7.73	2.1	1	
<i>Total Recoverable</i>							
Aluminum	53.9	281	287	566	<i>nsv</i>		
Arsenic	14.1	8.97	0.5	8.16	<i>nsv</i>		
Barium	3.18	7.9	10.7	12.6	1000	1	
Chromium	—	—	—	—	11 <sup>§</sup>	2	
Copper	—	—	—	1.6	* <sup>§</sup>	2	
Iron	148	280	338	514	1000	2	
Manganese	7.92	25	30.4	62.3	<i>nsv</i>		
Nickel	—	—	—	1.23	* <sup>§</sup>	2	
Potassium	1990	2800	2360	4180	<i>nsv</i>		
Zinc	—	—	—	—	* <sup>§</sup>	2	
<b>Average Values</b>							
<b>Standard Parameters (mg/L)</b>							
Dissolved Organic Carbon	—	8.6	5.9	9.1			
Sulfate	4.9	7.4	1.5	28.1			
Total Organic Carbon	0.6	9.1	4.2	7.3			
Total Solids	96.0	156.0	104.0	241.0			
Total Suspended Solids	3.0	12.0	7.0	8.0			
<b>Field Parameters</b>							
Conductivity (µmhos/cm)	101	135	118	317			
Dissolved Oxygen (mg/L)	10.6	10.8	9.6	10.5			
pH (SU)	7.9	9.3	8.9	8.5			
Temperature (°C)	12.1	21.3	21.2	19.5			
Turbidity (NTU)	2	13	4	11			

 State of Oregon Department of Environmental Quality	Appendix A Water Sample Results		KLAMATH BASIN Station ID and Description					
	Samples collected in 2011 and 2015			K10 - Sevenmile Creek, at return canal - 2015	K11 - Lost River above Bonanza - 2015	K12 - Spencer Creek at RM 0.6 - 2015	Screening Value (µg/L)	S.V. Reference
				38097	38098	38099		
<b>Maximum Values (µg/L)</b>								
<b>Ammonia</b>								
Ammonia as N		24	18	—	‡	2		
<b>Combustion By-Products</b>								
Phenanthrene		—	—	—	<i>nsv</i>			
<b>Consumer Product Constituents</b>								
17a-Ethynyl estradiol		0.0107	—	—	<i>nsv</i>			
DEET		—	—	—	<i>nsv</i>			
Diethylstilbesterol		—	—	—	<i>nsv</i>			
Estrone		—	—	—	<i>nsv</i>			
Sulfamethoxazole		—	—	—	<i>nsv</i>			
<b>Current Use Pesticides</b>								
2,4-D		—	—	—	100	1		
Aminomethylphosphonic acid (AMPA)		—	—	—	249500	5		
Diuron		—	—	—	2.4	9		
Glyphosate		—	—	—	11900	10		
Oxamyl		—	—	—	27	8		
<b>Flame Retardants</b>								
PBDE-206		—	—	—	<i>nsv</i>			
PBDE-209		0.00382	—	0.00158	<i>nsv</i>			
PBDE-47		—	—	—	<i>nsv</i>			
<b>Industrial Chemicals or Intermediates</b>								
Isophorone		—	76.8	—	12900	4		
<b>PCBs</b>								
Total PCBs		—	—	—	6E-06	1		
PCB-110		—	—	—	<i>nsv</i>			
PCB-118		—	—	—	<i>nsv</i>			
<b>Plant or animal sterols</b>								
beta-Sitosterol		1.45	2.55	0.429	<i>nsv</i>			
Cholesterol		1.1	2.27	0.421	<i>nsv</i>			
Coprostanol		0.192	0.229	0.0166	<i>nsv</i>			
Stigmastanol		0.407	0.496	0.067	<i>nsv</i>			
<b>Priority Metals</b>								
<i>Dissolved</i>								
Aluminum		—	35.7	—	<i>nsv</i>			
Arsenic		1.52	0.94	—	<i>nsv</i>			
Barium		4.99	28.6	2.72	<i>nsv</i>			
Copper		—	1.54	—	*	2		
Iron		340	—	491	1000 <sup>#</sup>	2		
Manganese		56.3	17.3	3.14	<i>nsv</i>			
Nickel		—	1.21	—	*	2		
Potassium		2650	8590	420	<i>nsv</i>			
Zinc		—	—	—	*	2		

 State of Oregon Department of Environmental Quality	Appendix A Water Sample Results		KLAMATH BASIN Station ID and Description					
	Samples collected in 2011 and 2015			K10 - Sevenmile Creek, at return canal - 2015	K11 - Lost River above Bonanza - 2015	K12 - Spencer Creek at RM 0.6 - 2015	Screening Value (µg/L)	S.V. Reference
				38097	38098	38099		
<b>Maximum Values (µg/L)</b>								
<b>Priority Metals, continued</b>								
<i>Total Inorganic</i>								
Arsenic	1.9	0.515	—	2.1	1			
<i>Total Recoverable</i>								
Aluminum	55.6	940	72.5	<i>nsv</i>				
Arsenic	2	0.95	—	<i>nsv</i>				
Barium	5.71	29.4	2.82	1000	1			
Chromium	—	1.2	—	11 <sup>§</sup>	2			
Copper	—	2.26	—	* <sup>§</sup>	2			
Iron	670	816	561	1000	2			
Manganese	62.9	47.3	7.41	<i>nsv</i>				
Nickel	—	2.46	—	* <sup>§</sup>	2			
Potassium	2650	8480	440	<i>nsv</i>				
Zinc	—	—	—	* <sup>§</sup>	2			
<b>Average Values</b>								
<b>Standard Parameters (mg/L)</b>								
Dissolved Organic Carbon	7.6	12.6	2.7					
Sulfate	2.5	16.6	0.7					
Total Organic Carbon	7.3	9.4	2.3					
Total Solids	104.0	288.0	102.0					
Total Suspended Solids	2.0	4.0	2.0					
<b>Field Parameters</b>								
Conductivity (µmhos/cm)	99	431	123					
Dissolved Oxygen (mg/L)	9.2	11.7	10.9					
pH (SU)	7.4	9.3	8.4					
Temperature (°C)	13.1	19.5	19.1					
Turbidity (NTU)	4	11	3					



**Appendix B  
Sediment Sample Results**

Samples collected in May  
2011 and November 2015

**KLAMATH BASIN**

**Station ID and Description**

Percent Detection	Number of samples over screening value	Station ID and Description				Screening Value	S.V. Reference
		K01 - Lost River at Hwy 39 (Merrill) - 2011	K01 - Lost River at Hwy 39 (Merrill) - 2015	K02 - Klamath Strait at USBR Pump Station F -	K02 - Klamath Strait at USBR Pump Station F -		
		10759	10759	10763	10763		

**Max. Values (ng/kg dry)**

**Dioxins and Furans**

1,2,3,4,6,7,8-HpCDD	70	0	46.9	60.1	—	—	690	11
1,2,3,4,6,7,8-HpCDF	30	0	11.4	13.7	—	—	690	11
1,2,3,6,7,8-HxCDD	9	1	—	—	—	—	2.7	11
OCDD	100	0	354	364	19.6	32.6	23000	11
OCDF	67	0	—	40.7	—	—	23000	11

**Flame Retardants**

PBDE-100	45		69.4	66.4	—	—	<i>nsv</i>	
PBDE-153	25		36.5	32.7	—	—	<i>nsv</i>	
PBDE-154	25		36.5	33.2	—	—	<i>nsv</i>	
PBDE-17	25		16.8	—	—	—	<i>nsv</i>	
PBDE-209	50		951	1220	—	—	<i>nsv</i>	
PBDE-47	36		304	238	—	—	<i>nsv</i>	
PBDE-49	36		70.4	62.1	—	—	<i>nsv</i>	
PBDE-66	18		10.7	—	—	—	<i>nsv</i>	
PBDE-71	18		—	53.4	—	—	<i>nsv</i>	
PBDE-85	9		—	—	—	—	<i>nsv</i>	
PBDE-99	55		263	241	—	147	<i>nsv</i>	

**Legacy Pesticides**

BHC-technical (HCH)			—	—	—	—	<i>nsv</i>	
BHC-alpha	5		—	—	—	—	<i>nsv</i>	
BHC-gamma (Lindane)	5		—	—	—	—	<i>nsv</i>	
Chlordane			338.9	221.1	—	—	<i>nsv</i>	
alpha-Chlordane	25		73.4	60.3	—	—	<i>nsv</i>	
cis-Nonachlor	9		47.2	36.8	—	—	<i>nsv</i>	
Endrin+cis-Nonachlor	8		45.3	—	—	—	<i>nsv</i>	
gamma-Chlordane+trans-Nonachlor	25		173	124	—	—	<i>nsv</i>	
Dieldrin	5	1	22.2	—	—	—	8.1	11
Heptachlor epoxide	5		—	—	—	—	<i>nsv</i>	
Hexachlorobenzene	10	0	—	—	—	—	19000	11
Methoxychlor	5		—	—	—	—	<i>nsv</i>	
Total DDT		5	2399	3454	189.1	148.6	330	11
2,4'-DDD	23		183	138	—	—	<i>nsv</i>	
2,4'-DDE	14		43.9	34	—	—	<i>nsv</i>	
2,4'-DDT	14		25.9	46	—	—	<i>nsv</i>	
4,4'-DDD	50		617	1144	32.1	34.6	<i>nsv</i>	
4,4'-DDE	59		1150	1910	157	114	<i>nsv</i>	
4,4'-DDT	18		379	182	—	—	<i>nsv</i>	

**PCBs**

Total PCBs			307	—	—	—	48	11
PCB-101+113	17		26.8	—	—	—	<i>nsv</i>	
PCB-105	17	0	17	—	—	—	170	11
PCB-110	17		30.6	—	—	—	<i>nsv</i>	



State of Oregon  
Department of  
Environmental  
Quality

**Appendix B**  
**Sediment Sample Results**

**KLAMATH BASIN**

**Station ID and Description**

Samples collected  
between May 2011 and  
November 2015

Percent Detection	Number of samples over screening value	Station ID and Description				Screening Value	S.V. Reference
		K01 - Lost River at Hwy 39 (Merrill) - 2011 10759	K01 - Lost River at Hwy 39 (Merrill) - 2015 10759	K02 - Klamath Strait at USBR Pump Station F - 10763	K02 - Klamath Strait at USBR Pump Station F - 10763		

**Max. Values (ng/kg dry)**

**PCBs, continued**

PCB-118	17	0	35.7	—	—	—	120	11
PCB-128	8		—	—	—	—	<i>nsv</i>	
PCB-132+153	17		50.4	—	—	—	<i>nsv</i>	
PCB-138+163	17		40.3	—	—	—	<i>nsv</i>	
PCB-141	8		—	—	—	—	<i>nsv</i>	
PCB-146	8		—	—	—	—	<i>nsv</i>	
PCB-149	17		25.7	—	—	—	<i>nsv</i>	
PCB-151	8		—	—	—	—	<i>nsv</i>	
PCB-16+32	8		—	—	—	—	<i>nsv</i>	
PCB-17	8		—	—	—	—	<i>nsv</i>	
PCB-174	8		—	—	—	—	<i>nsv</i>	
PCB-18	17		5.51	—	—	—	<i>nsv</i>	
PCB-180+193	8		—	—	—	—	<i>nsv</i>	
PCB-187	8		—	—	—	—	<i>nsv</i>	
PCB-199	8		—	—	—	—	<i>nsv</i>	
PCB-20+21+33	8		—	—	—	—	<i>nsv</i>	
PCB-206	8		—	—	—	—	<i>nsv</i>	
PCB-209	17		18	—	—	—	<i>nsv</i>	
PCB-22	8		—	—	—	—	<i>nsv</i>	
PCB-26	8		—	—	—	—	<i>nsv</i>	
PCB-28	8		—	—	—	—	<i>nsv</i>	
PCB-31	17		8.09	—	—	—	<i>nsv</i>	
PCB-37	17		6.91	—	—	—	<i>nsv</i>	
PCB-42	8		—	—	—	—	<i>nsv</i>	
PCB-43+52	8		—	—	—	—	<i>nsv</i>	
PCB-44	8		—	—	—	—	<i>nsv</i>	
PCB-49	8		—	—	—	—	<i>nsv</i>	
PCB-56	8		—	—	—	—	<i>nsv</i>	
PCB-60	8		—	—	—	—	<i>nsv</i>	
PCB-64+68	8		—	—	—	—	<i>nsv</i>	
PCB-66	17		14.4	—	—	—	<i>nsv</i>	
PCB-70	17		15.2	—	—	—	<i>nsv</i>	
PCB-71	8		—	—	—	—	<i>nsv</i>	
PCB-74+76	8		—	—	—	—	<i>nsv</i>	
PCB-85	8		—	—	—	—	<i>nsv</i>	
PCB-89	8		—	—	—	—	<i>nsv</i>	
PCB-95+121	8		—	—	—	—	<i>nsv</i>	
PCB-97	8		—	—	—	—	<i>nsv</i>	
PCB-99	17		12.7	—	—	—	<i>nsv</i>	



State of Oregon  
Department of  
Environmental  
Quality

**Appendix B  
Sediment Sample Results**

**KLAMATH BASIN**

**Station ID and Description**

Samples collected  
between May 2011 and  
November 2015

	Percent Detection	Number of samples over screening value	Station ID and Description				Screening Value	S.V. Reference
			K01 - Lost River at Hwy 39 (Merrill) - 2011 10759	K01 - Lost River at Hwy 39 (Merrill) - 2015 10759	K02 - Klamath Strait at USBR Pump Station F - 10763	K02 - Klamath Strait at USBR Pump Station F - 10763		
			Max. Values (mg/kg dry)					
<b>Priority Metals (Total)</b>								
Aluminum	100		39200	32500	49200	37000	<i>nsv</i>	
Arsenic	100	1	3.3	3.03	3.7	6.22	7	11
Barium	100		291	291	103	88.8	<i>nsv</i>	
Cadmium	58	0	—	0.23	—	0.17	1	11
Chromium	100		29.7	31.2	28.2	22.9	<i>nsv</i>	
Cobalt	100		11.2	9.5	27.4	11.3	<i>nsv</i>	
Copper	100		21.3	22.1	63.4	49.3	<i>nsv</i>	
Lead	100	0	4.86	5.94	2.78	2.22	17	11
Manganese	100		485	383	461	352	<i>nsv</i>	
Mercury	33	0	0.03	0.042	0.02	—	0.07	11
Nickel	100		22.4	22.5	25.1	19.7	<i>nsv</i>	
Thallium	8		—	0.11	—	—	<i>nsv</i>	
Zinc	100		54.7	58.6	42.5	37.3	<i>nsv</i>	





**Appendix B  
Sediment Sample Results**

**KLAMATH BASIN  
Station ID and Description**

Samples collected in May 2011 and November 2015

K05 - Williamson R at Williamson River Store - 2015	K06 - Wood River at Weed Road - 2015	K07 - Klamath River at Miller Island Boat Ramp -	K08 - Sprague R at Sprague River Road - 2015	Screening Value	S. V. Reference
10770	11232	11597	21535		

**Max. Values (ng/kg dry)**

**Dioxins and Furans**

1,2,3,4,6,7,8-HpCDD	138	—	18.4	—	690	11
1,2,3,4,6,7,8-HpCDF	11.8	—	—	—	690	11
1,2,3,6,7,8-HxCDD	8.21	—	—	—	2.7	11
OCDD	794	26.7	165	—	23000	11
OCDF	14.6	—	13.5	—	23000	11

**Flame Retardants**

PBDE-100	50.8	—	108	27	<i>nsv</i>	
PBDE-153	—	—	68.5	—	<i>nsv</i>	
PBDE-154	—	—	63.8	—	<i>nsv</i>	
PBDE-17	—	—	—	—	<i>nsv</i>	
PBDE-209	217	—	509	240	<i>nsv</i>	
PBDE-47	227	—	379	—	<i>nsv</i>	
PBDE-49	17.7	—	116	—	<i>nsv</i>	
PBDE-66	—	—	11.4	—	<i>nsv</i>	
PBDE-71	—	—	97.4	—	<i>nsv</i>	
PBDE-85	—	—	18	—	<i>nsv</i>	
PBDE-99	219	—	509	130	<i>nsv</i>	

**Legacy Pesticides**

BHC-technical (HCH)	—	—	1021.2	—	<i>nsv</i>	
BHC-alpha	—	—	964	—	<i>nsv</i>	
BHC-gamma (Lindane)	—	—	57.2	—	<i>nsv</i>	
Chlordane	—	—	245.9	—	<i>nsv</i>	
alpha-Chlordane	—	—	99.9	—	<i>nsv</i>	
cis-Nonachlor	—	—	—	—	<i>nsv</i>	
Endrin+cis-Nonachlor	—	—	—	—	<i>nsv</i>	
gamma-Chlordane+trans-Nonachlor	—	—	146	—	<i>nsv</i>	
Dieldrin	—	—	—	—	8.1	11
Heptachlor epoxide	43.6	—	—	—	<i>nsv</i>	
Hexachlorobenzene	—	—	710	—	19000	11
Methoxychlor	—	—	—	503	<i>nsv</i>	
Total DDT	13751	—	3110	43.3	330	11
2,4'-DDD	537	—	335	—	<i>nsv</i>	
2,4'-DDE	54.1	—	—	—	<i>nsv</i>	
2,4'-DDT	100	—	—	—	<i>nsv</i>	
4,4'-DDD	3670	—	1880	—	<i>nsv</i>	
4,4'-DDE	8350	—	895	43.3	<i>nsv</i>	
4,4'-DDT	1040	—	—	—	<i>nsv</i>	

**PCBs**

Total PCBs	—	—	1409	—	48	11
PCB-101+113	—	—	79.2	—	<i>nsv</i>	
PCB-105	—	—	28.8	—	170	11
PCB-110	—	—	45.9	—	<i>nsv</i>	



State of Oregon  
Department of  
Environmental  
Quality

**Appendix B  
Sediment Sample Results**

**KLAMATH BASIN  
Station ID and Description**

Samples collected between  
May 2011 and November  
2015

K05 - Williamson R at Williamson River Store - 2015	K06 - Wood River at Weed Road - 2015	K07 - Klamath River at Miller Island Boat Ramp -	K08 - Sprague R at Sprague River Road - 2015
10770	11232	11597	21535

Screening Value

S. V. Reference

**Max. Values (ng/kg dry)**

**PCBs, continued**

PCB-118	—	—	65.5	—	120	11
PCB-128	—	—	14	—	<i>nsv</i>	
PCB-132+153	—	—	91.8	—	<i>nsv</i>	
PCB-138+163	—	—	74.9	—	<i>nsv</i>	
PCB-141	—	—	12.2	—	<i>nsv</i>	
PCB-146	—	—	11.5	—	<i>nsv</i>	
PCB-149	—	—	59.4	—	<i>nsv</i>	
PCB-151	—	—	15.1	—	<i>nsv</i>	
PCB-16+32	—	—	15.2	—	<i>nsv</i>	
PCB-17	—	—	10.8	—	<i>nsv</i>	
PCB-174	—	—	15.8	—	<i>nsv</i>	
PCB-18	—	—	28.9	—	<i>nsv</i>	
PCB-180+193	—	—	37	—	<i>nsv</i>	
PCB-187	—	—	27.9	—	<i>nsv</i>	
PCB-199	—	—	20.6	—	<i>nsv</i>	
PCB-20+21+33	—	—	20.6	—	<i>nsv</i>	
PCB-206	—	—	28.1	—	<i>nsv</i>	
PCB-209	—	—	65.2	—	<i>nsv</i>	
PCB-22	—	—	12.7	—	<i>nsv</i>	
PCB-26	—	—	5.91	—	<i>nsv</i>	
PCB-28	—	—	37.2	—	<i>nsv</i>	
PCB-31	—	—	33.9	—	<i>nsv</i>	
PCB-37	—	—	8.84	—	<i>nsv</i>	
PCB-42	—	—	13.8	—	<i>nsv</i>	
PCB-43+52	—	—	94.6	—	<i>nsv</i>	
PCB-44	—	—	56.9	—	<i>nsv</i>	
PCB-49	—	—	38.6	—	<i>nsv</i>	
PCB-56	—	—	16.8	—	<i>nsv</i>	
PCB-60	—	—	11.4	—	<i>nsv</i>	
PCB-64+68	—	—	22.7	—	<i>nsv</i>	
PCB-66	—	—	35.9	—	<i>nsv</i>	
PCB-70	—	—	68.3	—	<i>nsv</i>	
PCB-71	—	—	11.3	—	<i>nsv</i>	
PCB-74+76	—	—	25	—	<i>nsv</i>	
PCB-85	—	—	10.8	—	<i>nsv</i>	
PCB-89	—	—	14.2	—	<i>nsv</i>	
PCB-95+121	—	—	59	—	<i>nsv</i>	
PCB-97	—	—	27.8	—	<i>nsv</i>	
PCB-99	—	—	35.1	—	<i>nsv</i>	



**Appendix B  
Sediment Sample Results**

**KLAMATH BASIN  
Station ID and Description**

Samples collected between  
May 2011 and November  
2015

K05 - Williamson R at Williamson River Store - 2015	K06 - Wood River at Weed Road - 2015	K07 - Klamath River at Miller Island Boat Ramp -	K08 - Sprague R at Sprague River Road - 2015	Screening Value	S. V. Reference
10770	11232	11597	21535		

**Values in mg/kg dry weight**

**Priority Metals (Total)**

Aluminum	23400	30000	16600	30500	<i>nsv</i>	
Arsenic	1.17	10.6	4	0.78	7	11
Barium	145	53.9	96.7	226	<i>nsv</i>	
Cadmium	0.15	—	0.1	0.15	1	11
Chromium	53.2	13.2	18.8	32.8	<i>nsv</i>	
Cobalt	20.5	5.27	6.36	8.98	<i>nsv</i>	
Copper	18.6	11.6	20.6	14.5	<i>nsv</i>	
Lead	6.6	1.42	4.4	3.7	17	11
Manganese	532	140	150	270	<i>nsv</i>	
Mercury	—	—	0.043	—	0.07	11
Nickel	64	11.6	16.6	17.3	<i>nsv</i>	
Thallium	—	—	—	—	<i>nsv</i>	
Zinc	78	23.9	26.4	42	<i>nsv</i>	



State of Oregon  
Department of  
Environmental  
Quality

**Appendix B  
Sediment Sample Results**

**KLAMATH BASIN**

**Station ID and Description**

Samples collected in May  
2011 and November 2015

K09 - Lost River DS of Anderson-Rose Dam - 2015	K10 - Sevenmile Creek, at return canal - 2015	K11 - Lost River above Bonanza - 2015	K12 - Spencer Creek at RM 0.6 - 2015
30182	38097	38098	38099

Screening Value

S. V. Reference

**Max. Values (ng/kg dry)**

**Dioxins and Furans**

1,2,3,4,6,7,8-HpCDD	19.2	44.5	—	7.9	690	11
1,2,3,4,6,7,8-HpCDF	—	—	—	—	690	11
1,2,3,6,7,8-HxCDD	—	—	—	—	2.7	11
OCDD	—	288	—	—	23000	11
OCDF	—	18.3	—	—	23000	11

**Flame Retardants**

PBDE-100	—	—	—	—	<i>nsv</i>	
PBDE-153	—	—	—	—	<i>nsv</i>	
PBDE-154	—	—	—	—	<i>nsv</i>	
PBDE-17	—	—	—	—	<i>nsv</i>	
PBDE-209	—	—	—	234	<i>nsv</i>	
PBDE-47	—	—	—	—	<i>nsv</i>	
PBDE-49	—	—	—	—	<i>nsv</i>	
PBDE-66	—	—	—	—	<i>nsv</i>	
PBDE-71	—	—	—	—	<i>nsv</i>	
PBDE-85	—	—	—	—	<i>nsv</i>	
PBDE-99	—	—	—	—	<i>nsv</i>	

**Legacy Pesticides**

BHC-technical (HCH)	—	—	—	—	<i>nsv</i>	
BHC-alpha	—	—	—	—	<i>nsv</i>	
BHC-gamma (Lindane)	—	—	—	—	<i>nsv</i>	
Chlordane	—	—	—	—	<i>nsv</i>	
alpha-Chlordane	—	—	—	—	<i>nsv</i>	
cis-Nonachlor	—	—	—	—	<i>nsv</i>	
Endrin+cis-Nonachlor	—	—	—	—	<i>nsv</i>	
gamma-Chlordane+trans-Nonachlor	—	—	—	—	<i>nsv</i>	
Dieldrin	—	—	—	—	8.1	11
Heptachlor epoxide	—	—	—	—	<i>nsv</i>	
Hexachlorobenzene	—	—	—	—	19000	11
Methoxychlor	—	—	—	—	<i>nsv</i>	
Total DDT	75.9	1796	83.9	—	330	11
2,4'-DDD	—	77.8	—	—	<i>nsv</i>	
2,4'-DDE	—	—	—	—	<i>nsv</i>	
2,4'-DDT	—	—	—	—	<i>nsv</i>	
4,4'-DDD	24.5	488	—	—	<i>nsv</i>	
4,4'-DDE	51.4	1186	83.9	—	<i>nsv</i>	
4,4'-DDT	—	44.2	—	—	<i>nsv</i>	

**PCBs**

Total PCBs	—	—	—	—	48	11
PCB-101+113	—	—	—	—	<i>nsv</i>	
PCB-105	—	—	—	—	170	11
PCB-110	—	—	—	—	<i>nsv</i>	



State of Oregon  
Department of  
Environmental  
Quality

**Appendix B  
Sediment Sample Results**

**KLAMATH BASIN  
Station ID and Description**

Samples collected between  
May 2011 and November  
2015

K09 - Lost River DS of Anderson-Rose Dam - 2015	K10 - Sevenmile Creek, at return canal - 2015	K11 - Lost River above Bonanza - 2015	K12 - Spencer Creek at RM 0.6 - 2015	Screening Value	S. V. Reference
30182	38097	38098	38099		

**Max. Values (ng/kg dry)**

**PCBs, continued**

PCB-118	—	—	—	120	11
PCB-128	—	—	—	<i>nsv</i>	
PCB-132+153	—	—	—	<i>nsv</i>	
PCB-138+163	—	—	—	<i>nsv</i>	
PCB-141	—	—	—	<i>nsv</i>	
PCB-146	—	—	—	<i>nsv</i>	
PCB-149	—	—	—	<i>nsv</i>	
PCB-151	—	—	—	<i>nsv</i>	
PCB-16+32	—	—	—	<i>nsv</i>	
PCB-17	—	—	—	<i>nsv</i>	
PCB-174	—	—	—	<i>nsv</i>	
PCB-18	—	—	—	<i>nsv</i>	
PCB-180+193	—	—	—	<i>nsv</i>	
PCB-187	—	—	—	<i>nsv</i>	
PCB-199	—	—	—	<i>nsv</i>	
PCB-20+21+33	—	—	—	<i>nsv</i>	
PCB-206	—	—	—	<i>nsv</i>	
PCB-209	—	—	—	<i>nsv</i>	
PCB-22	—	—	—	<i>nsv</i>	
PCB-26	—	—	—	<i>nsv</i>	
PCB-28	—	—	—	<i>nsv</i>	
PCB-31	—	—	—	<i>nsv</i>	
PCB-37	—	—	—	<i>nsv</i>	
PCB-42	—	—	—	<i>nsv</i>	
PCB-43+52	—	—	—	<i>nsv</i>	
PCB-44	—	—	—	<i>nsv</i>	
PCB-49	—	—	—	<i>nsv</i>	
PCB-56	—	—	—	<i>nsv</i>	
PCB-60	—	—	—	<i>nsv</i>	
PCB-64+68	—	—	—	<i>nsv</i>	
PCB-66	—	—	—	<i>nsv</i>	
PCB-70	—	—	—	<i>nsv</i>	
PCB-71	—	—	—	<i>nsv</i>	
PCB-74+76	—	—	—	<i>nsv</i>	
PCB-85	—	—	—	<i>nsv</i>	
PCB-89	—	—	—	<i>nsv</i>	
PCB-95+121	—	—	—	<i>nsv</i>	
PCB-97	—	—	—	<i>nsv</i>	
PCB-99	—	—	—	<i>nsv</i>	



State of Oregon  
Department of  
Environmental  
Quality

**Appendix B  
Sediment Sample Results**

**KLAMATH BASIN**

**Station ID and Description**

Samples collected between  
May 2011 and November  
2015

K09 - Lost River DS of Anderson-Rose Dam - 2015	K10 - Sevenmile Creek, at return canal - 2015	K11 - Lost River above Bonanza - 2015	K12 - Spencer Creek at RM 0.6 - 2015	Screening Value	S.V. Reference
30182	38097	38098	38099		

**Values in mg/kg dry weight**

**Priority Metals (Total)**

Aluminum	21300	21300	34400	50700	<i>nsv</i>	
Arsenic	2.26	5.02	0.84	0.79	7	11
Barium	106	117	208	145	<i>nsv</i>	
Cadmium	—	—	0.13	0.2	1	11
Chromium	16.2	11	28.2	68.7	<i>nsv</i>	
Cobalt	7.48	6.07	8.17	21.4	<i>nsv</i>	
Copper	9.62	17.4	15.2	38.6	<i>nsv</i>	
Lead	2.07	2.98	3.5	13	17	11
Manganese	262	528	353	419	<i>nsv</i>	
Mercury	—	—	—	—	0.07	11
Nickel	12.9	10.9	19.7	82.8	<i>nsv</i>	
Thallium	—	—	—	—	<i>nsv</i>	
Zinc	26.2	42.6	34.1	60	<i>nsv</i>	



State of Oregon  
Department of  
Environmental  
Quality

**Appendix C  
Tissue Sample Results**

**KLAMATH BASIN**

**Station ID and Description**

Samples collected in 2014  
or 2015

Percent Detection

Number of samples  
over screening value

K13 - UKL near Fish Banks (Blue Chub) - 2014	K13 - UKL near Fish Banks (Brown Bullhead) - 2014	K13 - UKL near Fish Banks (Fathead Minnow) - 2014	K13 - UKL near Fish Banks (Pumpkinseed) - 2014
37868	37868	37868	37868

Screening Value

S.V. Reference

**Maximum Values (mg/kg)**

**Flame Retardants**

PBDE-100	38		0.0002	—	—	—	<i>nsv</i>	
PBDE-153	38	0	4.1E-05	—	—	—	0.2	12
PBDE-154	50		8.4E-05	—	—	—	<i>nsv</i>	
PBDE-209	14	0	—	—	—	—	16.3	12
PBDE-28	38		2.5E-05	—	—	—	<i>nsv</i>	
PBDE-47	50	0	0.00088	—	—	—	0.2	12
PBDE-49	25		—	—	—	—	<i>nsv</i>	
PBDE-66	13		—	—	—	—	<i>nsv</i>	
PBDE-99	38	0	0.00053	—	—	—	0.2	12

**Legacy Pesticides**

Aldrin	13		—	—	—	—	<i>nsv</i>	
Chlordane		0	0.0004	0.00018	0.00361	0.00017	1.2	12
alpha-Chlordane	100		8.3E-05	4.2E-05	0.00059	3.3E-05	<i>nsv</i>	
cis-Nonachlor	88		6.2E-05	3.4E-05	0.00046	3.2E-05	<i>nsv</i>	
Endrin+cis-Nonachlor	88		0.00011	3.8E-05	0.00083	4.5E-05	<i>nsv</i>	
gamma-Chlordane+trans-Nonachlor	100		0.00015	6.4E-05	0.00162	0.00006	<i>nsv</i>	
Oxychlordane	38		—	—	0.00012	—	<i>nsv</i>	
Dieldrin	100	0	0.00011	4.4E-05	0.00012	0.00003	0.1	12
Total Endosulfan		0	—	0.0002	0.00105	—	14	12
Endosulfan I	38		—	0.0002	0.0009	—	<i>nsv</i>	
Endosulfan II	25		—	—	0.00015	—	<i>nsv</i>	
Hexachlorobenzene	100	0	—	—	—	—	1.9	12
Total DDT		0	0.00167	0.00147	0.0014	0.00137	1.2	12
2,4'-DDD	75		2.6E-05	—	3.4E-05	1.2E-05	<i>nsv</i>	
2,4'-DDE	75		3.4E-05	1.1E-05	2.9E-05	—	<i>nsv</i>	
4,4'-DDD	100		0.00013	6.7E-05	0.00018	8.2E-05	<i>nsv</i>	
4,4'-DDE	100		0.00148	0.00139	0.00116	0.00128	<i>nsv</i>	

**PCBs**

Total PCB		0	0.00074	0.00042	—	0.00038	0.05	12
PCB-101+113	67		5.2E-05	—	—	2.2E-05	<i>nsv</i>	
PCB-105	50		—	9.2E-06	—	—	<i>nsv</i>	
PCB-110	83		5.1E-05	1.9E-05	—	2E-05	<i>nsv</i>	
PCB-118	83		5.2E-05	3.1E-05	—	2.7E-05	<i>nsv</i>	
PCB-128	50		—	1E-05	—	—	<i>nsv</i>	
PCB-132+153	100		0.00019	0.0001	—	0.0001	<i>nsv</i>	
PCB-138+163	83		0.00012	7.6E-05	—	6.1E-05	<i>nsv</i>	
PCB-139	50		—	—	—	2.2E-05	<i>nsv</i>	
PCB-141	33		—	—	—	—	<i>nsv</i>	
PCB-146	83		3.3E-05	2.1E-05	—	1.7E-05	<i>nsv</i>	
PCB-149	83		6.5E-05	1.9E-05	—	2.2E-05	<i>nsv</i>	
PCB-151	33		—	—	—	—	<i>nsv</i>	
PCB-170	67		2.4E-05	1.1E-05	—	—	<i>nsv</i>	



State of Oregon  
Department of  
Environmental  
Quality

**Appendix C  
Tissue Sample Results**

**KLAMATH BASIN**

**Station ID and Description**

Samples collected in 2014  
or 2015

Percent Detection

Number of samples  
over screening value

K13 - UKL near  
Fish Banks (Blue  
Chub) - 2014  
37868

K13 - UKL near  
Fish Banks (Brown  
Bullhead) - 2014  
37868

K13 - UKL near  
Fish Banks  
(Fathead Minnow) -  
2014  
37868

K13 - UKL near  
Fish Banks  
(Pumpkinseed) -  
2014  
37868

Screening Value

S.V. Reference

**Maximum Values (mg/kg)**

**PCBs, continued**

PCB-174	33	—	—	—	—	<i>nsv</i>
PCB-177	67	2E-05	1.2E-05	—	—	<i>nsv</i>
PCB-180+193	83	5.6E-05	4.1E-05	—	2.9E-05	<i>nsv</i>
PCB-183	83	2.2E-05	1.1E-05	—	9.9E-06	<i>nsv</i>
PCB-187	83	6.1E-05	4.5E-05	—	3.2E-05	<i>nsv</i>
PCB-209	17	—	—	—	—	<i>nsv</i>
PCB-28	33	—	—	—	—	<i>nsv</i>
PCB-31	17	—	—	—	—	<i>nsv</i>
PCB-43+52	17	—	—	—	—	<i>nsv</i>
PCB-44	17	—	—	—	—	<i>nsv</i>
PCB-66	33	—	—	—	—	<i>nsv</i>
PCB-70	17	—	—	—	—	<i>nsv</i>
PCB-97	17	—	—	—	—	<i>nsv</i>
PCB-99	67	—	1.8E-05	—	0.00002	<i>nsv</i>

**Priority Metals (Total)**

Arsenic	6	—	—	—	0.07	<i>nsv</i>		
Mercury	100	6	0.034	0.019	0.021	0.022	0.04	13





State of Oregon  
Department of  
Environmental  
Quality

Appendix C Tissue Sample Results		KLAMATH BASIN			Station ID and Description	
		Samples collected in 2014 or 2015				
		K13 - UKL near Fish Banks (Tui Chub) - 2014	K13 - UKL near Fish Banks (Yellow Perch) - 2014	K14 - UKL near Modoc Point (Trout) - 2015	Screening Value	S.V. Reference
		37868	37868	38113		
		Maximum Values (mg/kg)				
<b>Flame Retardants</b>						
PBDE-100		0.00015	—	9.7E-05	<i>nsv</i>	
PBDE-153		6.4E-05	—	3.7E-05	0.2	12
PBDE-154		7.1E-05	—	2.7E-05	<i>nsv</i>	
PBDE-209		—	—	0.00023	16.3	12
PBDE-28		—	—	9.7E-06	<i>nsv</i>	
PBDE-47		0.00052	—	0.00064	0.2	12
PBDE-49		—	—	3.5E-05	<i>nsv</i>	
PBDE-66		—	—	2.2E-05	<i>nsv</i>	
PBDE-99		0.00072	—	0.00045	0.2	12
<b>Legacy Pesticides</b>						
Aldrin		—	1.5E-05	—	<i>nsv</i>	
Chlordane		0.00073	0.00124	0.00051	1.2	12
alpha-Chlordane		0.00016	0.00026	0.00011	<i>nsv</i>	
cis-Nonachlor		0.00011	0.00017	7.7E-05	<i>nsv</i>	
Endrin+cis-Nonachlor		0.00011	0.00019	7.8E-05	<i>nsv</i>	
gamma-Chlordane+trans-Nonachlor		0.00035	0.00055	0.00022	<i>nsv</i>	
Oxychlordane		—	6.4E-05	2.4E-05	<i>nsv</i>	
Dieldrin		0.00012	0.00048	8.1E-05	0.1	12
Total Endosulfan		—	0.00013	—	14	12
Endosulfan I		—	6.1E-05	—	<i>nsv</i>	
Endosulfan II		—	6.9E-05	—	<i>nsv</i>	
Hexachlorobenzene		—	—	0.00014	1.9	12
Total DDT		0.00158	0.00186	0.00128	1.2	12
2,4'-DDD		2E-05	2.7E-05	3.1E-05	<i>nsv</i>	
2,4'-DDE		1.9E-05	3E-05	1.5E-05	<i>nsv</i>	
4,4'-DDD		0.00012	0.00017	0.00015	<i>nsv</i>	
4,4'-DDE		0.00142	0.00163	0.00108	<i>nsv</i>	
<b>PCBs</b>						
Total PCB		0.0007	0.00082	—	0.05	12
PCB-101+113		3E-05	3.8E-05	—	<i>nsv</i>	
PCB-105		1E-05	1.3E-05	—	<i>nsv</i>	
PCB-110		3.2E-05	4.6E-05	—	<i>nsv</i>	
PCB-118		3.3E-05	3.9E-05	—	<i>nsv</i>	
PCB-128		1.1E-05	1.3E-05	—	<i>nsv</i>	
PCB-132+153		0.00015	0.00015	—	<i>nsv</i>	
PCB-138+163		9.1E-05	9.9E-05	—	<i>nsv</i>	
PCB-139		4.3E-05	5.1E-05	—	<i>nsv</i>	
PCB-141		9.4E-06	1.2E-05	—	<i>nsv</i>	
PCB-146		2.6E-05	2.5E-05	—	<i>nsv</i>	
PCB-149		4.1E-05	5E-05	—	<i>nsv</i>	
PCB-151		1.1E-05	1.3E-05	—	<i>nsv</i>	
PCB-170		1.5E-05	1.4E-05	—	<i>nsv</i>	



State of Oregon  
Department of  
Environmental  
Quality

**Appendix C  
Tissue Sample Results**

**KLAMATH BASIN  
Station ID and Description**

Samples collected in 2014  
or 2015

K13 - UKL near Fish Banks (Tui Chub) - 2014	K13 - UKL near Fish Banks (Yellow Perch) - 2014	K14 - UKL near Modoc Point (Trout) - 2015
37868	37868	38113

Screening Value

S.V. Reference

**Maximum Values (mg/kg)**

**PCBs, continued**

PCB-174	1.6E-05	1.5E-05	—	<i>nsv</i>
PCB-177	1.8E-05	1.5E-05	—	<i>nsv</i>
PCB-180+193	5.5E-05	4.8E-05	—	<i>nsv</i>
PCB-183	1.7E-05	1.4E-05	—	<i>nsv</i>
PCB-187	5E-05	4.6E-05	—	<i>nsv</i>
PCB-209	—	—	—	<i>nsv</i>
PCB-28	4.8E-06	9.2E-06	—	<i>nsv</i>
PCB-31	—	5.9E-06	—	<i>nsv</i>
PCB-43+52	—	2.1E-05	—	<i>nsv</i>
PCB-44	—	1.2E-05	—	<i>nsv</i>
PCB-66	9.2E-06	1.6E-05	—	<i>nsv</i>
PCB-70	—	1.4E-05	—	<i>nsv</i>
PCB-97	—	1.1E-05	—	<i>nsv</i>
PCB-99	2.4E-05	3.1E-05	—	<i>nsv</i>

**Priority Metals (Total)**

Arsenic	—	—	—	<i>nsv</i>
Mercury	0.032	0.1	0.068	0.04

13