Spokane River Metals TMDL
WAG Review Draft April 2016 Strategy Paper

Introduction

This document outlines the strategy for development of metals TMDLs (cadmium, lead, and zinc) for the Spokane River using the Load Duration Approach as outlined by the EPA (2007). Currently there are no metals TMDLs for the Spokane River. Idaho's water quality standards limit the total load of a causative pollutant to remain constant or decrease within the watershed until a TMDL is developed (IDAPA 58.01.02.055.04). The City of Coeur d'Alene, the Hayden Area Regional Sewer Board, and the City of Post Falls' NPDES permits and their Clean Water Act Section 401 certification requires water quality-based effluent limits for lead, cadmium, and zinc to meet Idaho's water quality criteria at the end-of-pipe. No mixing zone may be authorized for cadmium, lead, or zinc. As such, any increase in the volume of wastewater discharged will increase the load of metals to the river, which is not allowed under Idaho's water quality standards. Metals TMDL development has been classified as high priority in Idaho's draft 2012 Integrated Report for the Spokane River. The TMDL will determine an upper limit on discharge of metals from both point and nonpoint sources to assure both the chronic and acute metals criteria are met in the river. An approved TMDL is necessary for the next NPDES permit cycle for the City of Coeur d'Alene, the Hayden Area Regional Sewer Board, and the City of Post Falls.

Background

Lead and silver mining began in the South Fork Coeur d'Alene River in 1885, when lead-bearing rock was discovered in the drainage. In the early mining operation, ore was sorted from waste rock by hand and shipped out to smelters. In later years, concentrators were established within the mining district and tailings were produced. In most cases, tailings were disposed directly in the stream channels. This practice resulted in extensive deposits of metals-contaminated sediments (lead, cadmium, zinc) along the bed, banks, and floodplain of the North and South Forks of the Coeur d'Alene River, the mainstem, the 11 lateral lakes, numerous wetlands along the lower Coeur d'Alene River, the lakebed of Coeur d'Alene Lake, and into the Spokane River. Annual precipitation and spring snowmelt runoff events continue to redistribute these contaminated sediments throughout the entire system. As a result, Idaho water quality standards for dissolved metals (cadmium, lead, zinc) are exceeded in affected surface waters in the Coeur d'Alene basin from the South Fork Coeur d'Alene River downstream through Coeur d'Alene Lake and into the Spokane River to the Idaho/Washington border. Lead and cadmium criteria exceedances in the Spokane River to the Idaho/Washington have also been observed. For a summary of historical data on the Spokane River refer to DEQ (2000b).

Except for cadmium, Idaho's Water Quality Standards for aquatic life for metals are the same as the national recommended aquatic life criteria for metals.   The standards establish Criterion Continuous Concentration (CCC), which is a 4-day average concentration of a toxic substance to ensure adequate protection of sensitive species of aquatic organisms from chronic toxicity. The CCC cannot be exceeded more than once every 3 years. The standards also establish a Criterion Maximum Concentration (CMC), the maximum instantaneous or 1-hour average concentration to protect aquatic organisms from acute toxicity. The CMC cannot be exceeded more than once every 3 years.

Idaho's aquatic life criteria for lead, cadmium, and zinc are expressed as a function of total hardness (mg/L as calcium carbonate), the metal's water effect ratio (WER), and multiplied by an appropriate dissolved conversion factor:

$$CMC = WER \times e^{(mA \times \ln(hardness) + bA)} \times Acute\ Conversion\ Factor$$

$$CCC = WER \times e^{(mc \times \ln(hardness) + bc)} \times Chronic\ Conversion\ Factor$$

The minimum hardness allowed for use in the equations is 25 mg/L for lead and zinc, and 10 mg/L for cadmium.

The Spokane River in Idaho from its headwaters to the Idaho/Washington border (AU 17010305PN003_04 and 17010305PN004_04) was listed in 1994 for metals impairment on Idaho's §303(d) list. In 2000, the *Total Maximum Daily Load for dissolved metals in Surface Waters of the Coeur d'Alene Basin* was approved by the EPA. In this TMDL, load allocations and load reductions were written for the metals-impaired surface waters in the Coeur d'Alene basin from the South Fork Coeur d'Alene River downstream through Coeur d'Alene Lake and into the Spokane River to the Idaho/Washington border. In 2000, however, a petition was filed for judicial review and for declaratory judgment claiming the TMDL was invalid for failure to comply with the formal rulemaking requirements under the Idaho Administrative Procedures Act procedure for rulemaking. The district judge ruled the TMDL was invalid for failure to comply with statutory guidelines. According to Idaho Code 39 36-11, DEQ must follow rulemaking provisions for any TMDLs for metals in the Coeur d'Alene River Basin, upstream from the headwaters of the Spokane River. The rulemaking provisions do not apply to the Spokane River from the headwaters at Coeur d'Alene Lake to the Idaho/Washington border; therefore, a DEQ is required to write a TDML for this water body.

Project Objectives

- The Spokane River TMDL project objectives are to:
- assemble existing data and information to write an accurate subbasin assessment;

- assemble existing data and collect additional data (if necessary) to understand dissolved metals (cadmium, lead, zinc) concentrations and the extent of exceedances of both the chronic and acute criteria at a variety of flow conditions along the river;
- determine existing metals loading at a variety of flow conditions in the river. This will be done by creating statistically meaningful load duration curves for the dissolved metals using methodology described in EPA (2005);
- discern loading from point and nonpoint sources of metals to the river;
- determine an upper limit on discharge of metals from both point and nonpoint sources that assure both the chronic and acute metals criteria are met in the river;
- calculate reasonable load allocations to point and nonpoint sources in the watershed;
- prepare a metals TMDL for the Spokane River;
- consult with a technical advisory group, the Upper Spokane Watershed Advisory Group and the Basin Advisory Group as defined by Idaho Code.

Existing Data and Data Gaps

To understand the extent of exceedances of metals criteria and existing metals loading in the Spokane River, existing metals (not including data from the Tribe) and flow data was assembled (Table 1). There is a robust flow and metals data-set for the headwaters of the Spokane River (at the outlet of Coeur d'Alene Lake) by DEQ and the Coeur d'Alene Tribe (under implementation of the Coeur d'Alene Lake Management Plan) and by USGS (under the Coeur d'Alene Basin Environmental Monitoring Program [BEMP]). However metals data below the Coeur d'Alene Lake outlet is sparse.

Analysis of existing water quality data within the last 5 years indicates exceedances of the Idaho water quality criteria for dissolved metals (cadmium, lead, zinc) from the headwaters of the Spokane River to the WA state line (Figure 1 – 3). However, insufficient data exists below the Coeur d'Alene Lake outlet to conduct a metals source characterization and create a statistically significant metals loading analysis for a TMDL. Therefore the intent of this project is to collect additional data to meet these data needs.

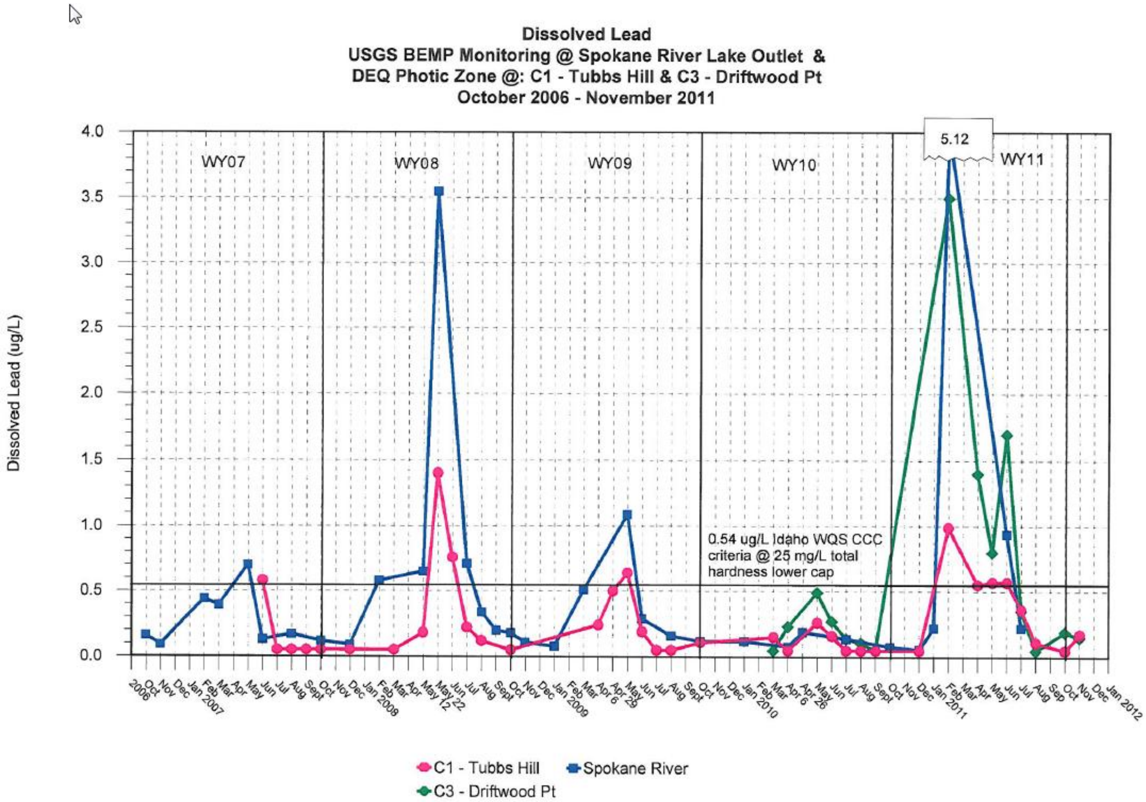

Figure 1. Dissolved lead concentrations in comparison to Idaho chronic water quality standard for lead. The blue line indicates data from the Spokane River at the Coeur d'Alene Lake outlet.

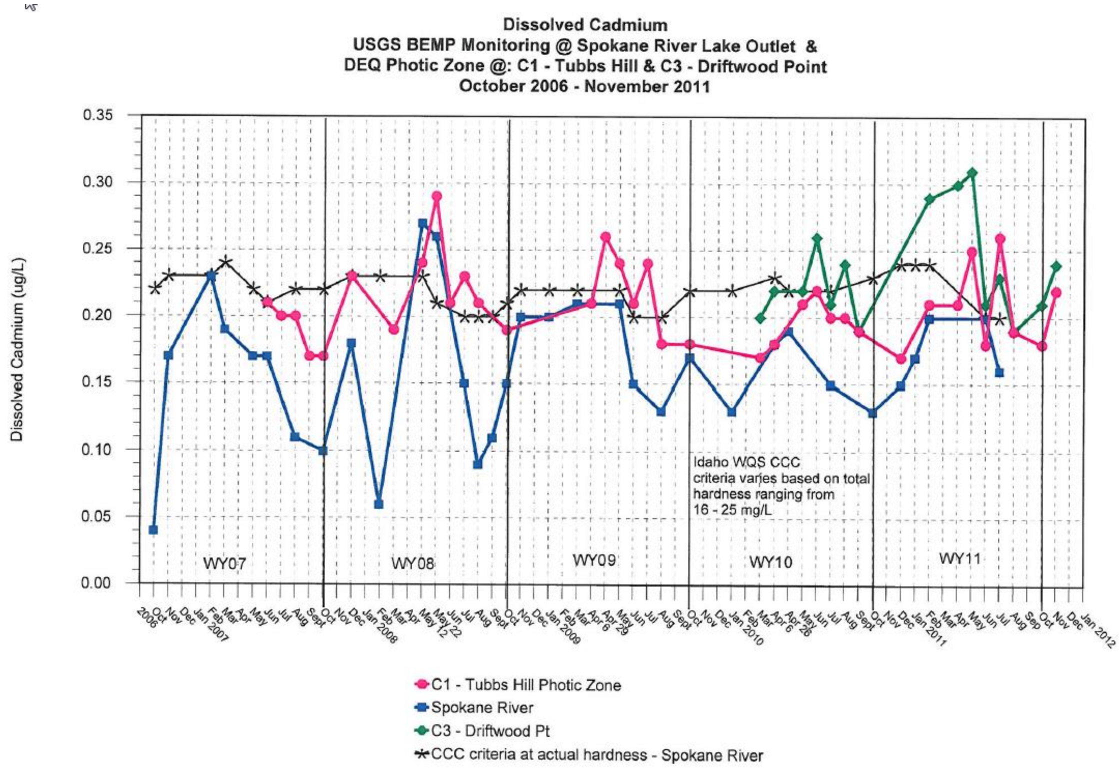

Figure 2. Dissolved lead concentrations in comparison to Idaho chronic water quality standard for cadmium. The blue line indicates data from the Spokane River at the Coeur d'Alene Lake outlet.

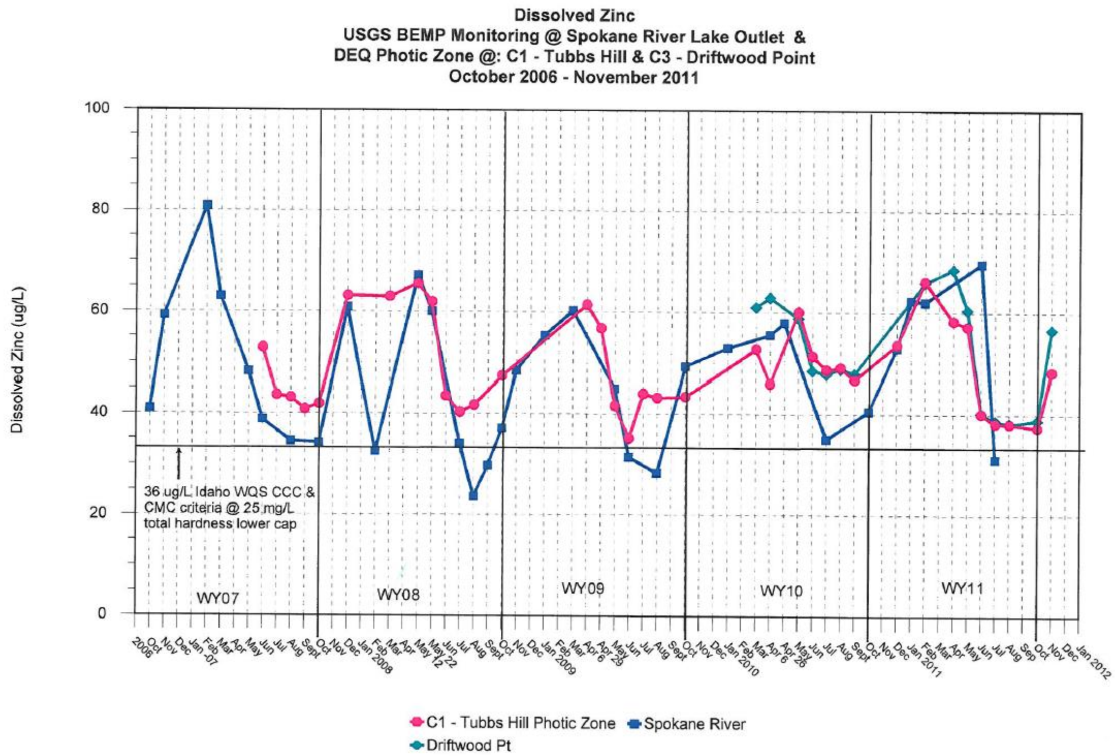

Figure 3. Dissolved lead concentrations in comparison to Idaho chronic water quality standard for lead.

Table 1. Existing flow and metals data collected on the Spokane River.

Type of Data	Location	Data Collection	Dates of Record
Flow	At Coeur d'Alene Lake outlet	USGS	Aug 2009 - present
Flow	At Post Falls	USGS	Jan 1978[1] - present
Flow	At Otis Orchard, WA	USGS	March 1948 - present
Pb, Cd, Zn	At Coeur d'Alene Lake outlet	USGS, DEQ, Coeur d'Alene Tribe	Oct 2005 - present
Pb, Cd, Zn	At WA state Line	USGS	Oct 2009 - Sept 2010

[1]Period of record for the Post Falls is from 1913 to present, but due to changes in dam operation, it was decided to use flow only from 1978 to present.

Monitoring Strategy

Monitoring under this project has been conducted to characterize loading from point and non-point sources to the Spokane River. This was through ambient water quality monitoring in the river and collection of data from point sources. Monitoring was conducted over a two-year period 2013-2015.

Because regular dissolved metals monitoring was already being conducted within Spokane River watershed, this study design included those efforts to meet the overall objectives of the monitoring program and the TMDL. Following DEQ guidelines, a Quality Assurance Project Plan (QAPP) was developed for this monitoring project. Under the QAPP, water quality samples were collected under the appropriate protocol for analysis of dissolved lead, cadmium, and zinc, and for hardness. An explanation of ambient and point-source monitoring locations and the general sampling regime are described below.

Ambient Water Quality Monitoring

Monitoring Locations

Ambient monitoring efforts were established to provide data to construct load duration curves in the TMDL analysis. Load duration curves are based on collection of a statistically significant number of water quality samples during different flow regimes to accurately represent the ambient metals concentrations in the river at various flows. Ambient water quality monitoring will be conducted at the headwaters of the Spokane River (at the outlet of Coeur d'Alene Lake) and near the Idaho state line. To meet the data needs of a load duration analysis, concurrent collection of flow data was necessary; therefore, monitoring will be conducted at sites in close proximity to existing USGS gaging stations. To minimize duplication and maximize resources, this project will attempt to partner with those of existing agencies already collecting data. Station locations, agencies involved in collection of data, and the GPS coordinates are listed in Table 2.

Table 2. Station location for dissolved metals monitoring in the Spokane River.

Station Name	Agency collecting data	Latitude	Longitude
Headwaters of Spokane River	DEQ, Coeur d'Alene Tribe, USGS	47°40'55.17"	116°47'54.79"
Upstream of Idaho State Line	DEQ	47°40'39"	117°00'13.32"

Sampling Regime

To determine the frequency in monitoring events, variability in flow in the river was evaluated using historical data from the USGS gaging stations. Flow was graphed by month using box and whisker plots (Figure 4 - 6). It was determined from the data that the most variability exists between January and July – particularly during the season of spring runoff.

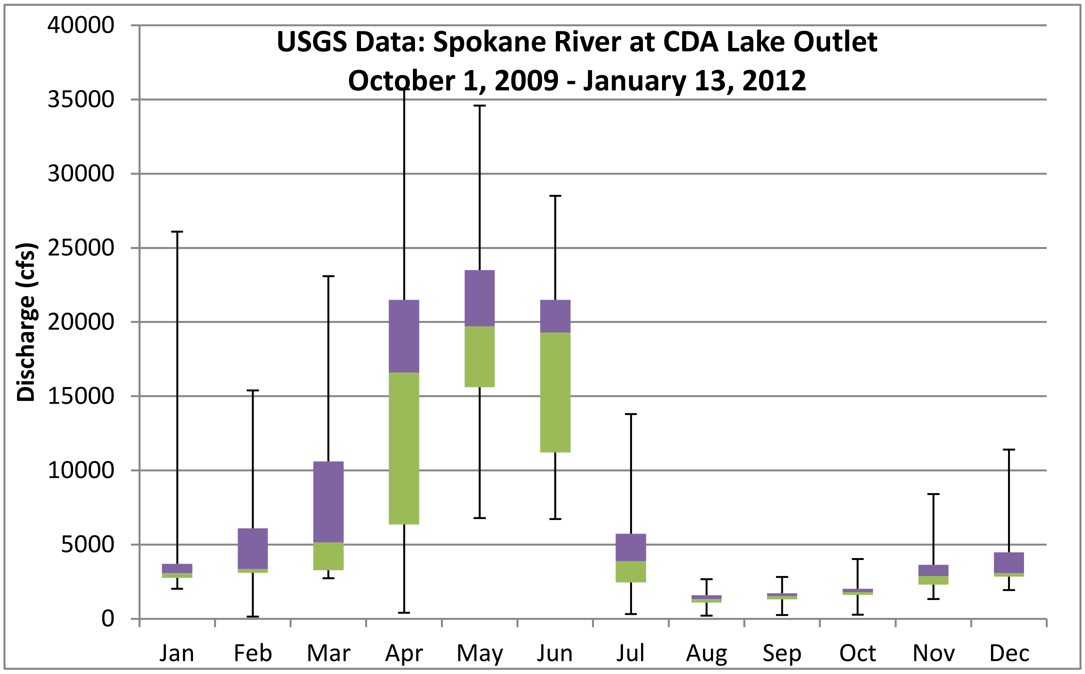

Figure 4. Flow data from the Spokane River at the Coeur d'Alene Lake outlet represented by box and whisker plots. The whiskers are the maximum and minimum data points, the top of the box is the 75th percentile, and the bottom of the box is the 25th percentile. The line in the middle of the box is the median.

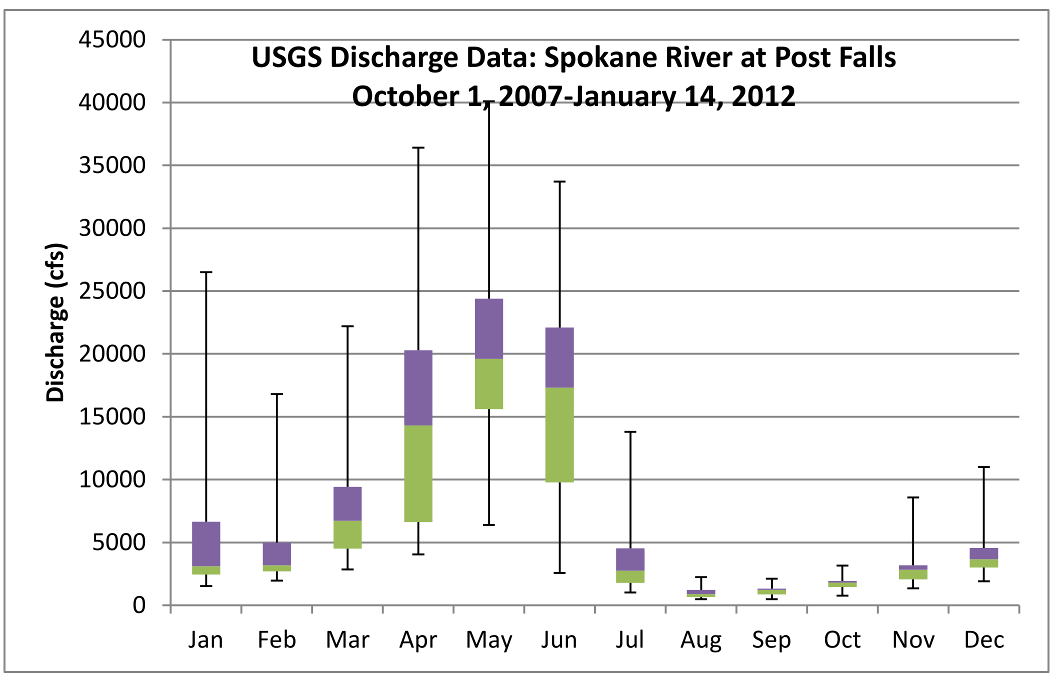

Figure 5. Flow data from the Spokane River at the Post Falls represented by box and whisker plots. . The whiskers are the maximum and minimum data points, the top of the box is the 75th percentile, and the bottom of the box is the 25th percentile. The line in the middle of the box is the median.

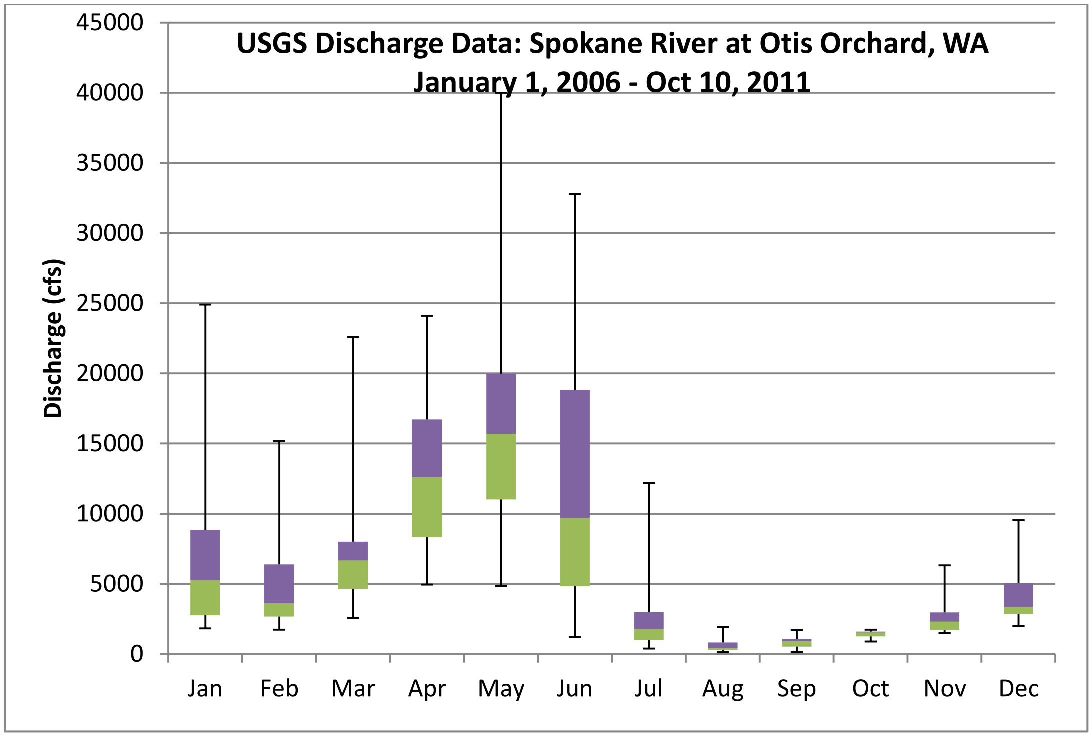

Figure 6. Flow data from the Spokane River at the WA state line (Otis Orchard, WA) represented by box and whisker plots. . The whiskers are the maximum and minimum data points, the top of the box is the 75th percentile, and the bottom of the box is the 25th percentile. The line in the middle of the box is the median.

Using the results of this analysis and others using the historical flow data (from 1978 to 2013), five flow regimes were determined on which a statistically representative sampling design were based (Table 3).

Table 3. Range of flows for different flow regimes in the Spokane River.

Flow Regime	Range of Flows (cfs)	Time Period
High Flows	Above 15,900	Mid-April to mid-June
Non-Regulated Flows	4,814 – 15,900	December to mid-July
Mid-Range Flows	2,460 – 4,814	Mid-June to end of July Nov – Mid March
Regulated Flows	1,040 – 2,460	July, Sept to mid-November
Low Flows	Less than 2,460	August to mid-September

Sampling Frequency: Trend Sites

The determination of the number of samples to take was vital to getting statistically significant representation of water quality conditions within each flow regime. In addition to variability in flow, there is tremendous variability between the particles in a sample, portions of a sample, and duplicates of samples. Therefore, as a rule of thumb, a sample size should be at least 50 if the distribution is skewed (Gilbert 1987). To obtain a sample size of 50 within each flow regime, a sample schedule was developed to get a sample size of 25 in each flow regime per year. Based on this assumption, the following monitoring schedule was proposed. This schedule was developed assuming flow would be similar to flows observed in 2010, as predicted in January 2013 by the Natural Resources Conservation Service (NRCS 2013):

Table 4. Spokane River TMDL monitoring schedule for state fiscal years 2014 and 2015.

Spokane River TMDL Monitoring Schedule			
Dates in both SFY 2014 and SFY 2015	**Frequency of Monitoring Events**	**Estimated Number of Monitoring Events**	**Number of QA Events**
July 1 - 15	3 events every 2 weeks	3	1
July 16-30	1 event per week, and every day Q<1,040	5	2
August 1-15	1 event per week, and every other day Q<1,040	2	1
August 16-31	every other day Q<1,040	6	2
September 1-15	no events	0	0
September 15-30	1 event per week	3	1
October	1 event per week	4	1
November 1-15	1 event per week	2	1
November 16-30	3 events every 2 weeks	3	1
December 1-15	3 events every 2 weeks	3	1
December 15-30	2 events every week	5	2
January	3 events every 2 weeks	7	2
February	3 events every 2 weeks	6	2
March	3 events every 2 weeks	6	2
April	2 events per week	9	3
May	2 events per week and every day Q>15,900	10	4
June	2 events per week and every day Q>15,900	11	4
	Annual Total	**85**	**30**
	Project Total	**170**	**60**

Point Source Water Quality Monitoring

Collection of data from point sources that directly discharge into the Spokane River will be to develop waste load allocations in the TMDL. Existing point sources that are regulated under National Pollutant Discharge Elimination System (NPDES) permits are:

1. City of Coeur d’Alene wastewater treatment plant (EPA 2007b),
2. City of Coeur d’Alene stormwater discharges (EPA 2008),
3. Hayden Area Regional Sewer Board wastewater treatment plant (EPA 2007c),
4. City of Post Falls wastewater treatment plant (EPA 2007d), and
5. City of Post Falls stormwater discharges (EPA 2008b).

Station locations and the GPS coordinates of the point source locations are listed in Table 5. The station descriptions are provided below.

Table 5. Station location for dissolved metals monitoring in the Spokane River.

Station Name	Station Type	Latitude	Longitude
CDA treatment plant	Source Characterization	47°40’56.19”	116°47’47.01”
HARSB treatment plant	Source Characterization	47° 41' 54''	116° 50' 03''
Post Falls treatment plant	Source Characterization	47° 42’ 30”	116° 58 ’10”
City of Coeur d’Alene stormwater outfall #1	Source Characterization	47°41’25.77”	116°48’23.69”
City of Post Falls 4th Ave Stormwater Outfall	Source Characterization	47°42’39.70”	116°57’11.72”

Dissolved metals monitoring is being conducted by the City of Coeur d’Alene, the Hayden Area Regional Sewer Board, and the City of Post Falls as a requirement under their National Pollutant Discharge Elimination System (NPDES) permits. This project has to partner’d with these monitoring efforts to meet the objectives of this project. Monthly data is collected from the end of pipe at each of the wastewater discharge facilities. These data are sufficient for loading analysis for these point sources.

Monitoring for total lead and total zinc is required under the Cities’ MS4 NPDES permits. As defined in the permits, at least one storm event should be monitored during March – April, May – June, July – August, September – October. Sampling is done by taking a grab sample within the first 30-60 minutes of storm events. A storm event may include rain or snow melt off. No monitoring is required if there are no storm events.

Data collected by DEQ in 2009 indicate the highest concentrations of pollutants in stormwater are during rain-on-snow events and on the ascending limb of the snowmelt hydrograph (DEQ 2010). The objectives for outfall monitoring under this project will be to collect samples for analysis of hardness, dissolved lead, cadmium, and zinc: 1) following 3 rain-on-snow events per year, 2) at least three times during snowmelt runoff, with at least one event on the ascending limb of the hydrograph and 3) up to 6 other times immediately following 0.1 inch of rainfall. To meet the objectives of this project, an attempt to coordinate monitoring activities with the Cities will be made.

City of Coeur d'Alene wastewater treatment facility:

The City of Coeur d'Alene operates a secondary treatment wastewater treatment plant. The current average design flow of the facility is 6.0 million gallons per day (mgd). The average flow rate from the facility is 3.2 mgd, and the maximum effluent flow rate is 4.62 mgd (EPA 2007b). The facility discharges to the Spokane River downstream of the outlet of Coeur d'Alene Lake approximately ½ mile upstream of US Highway 95 bridge (Figure 7).

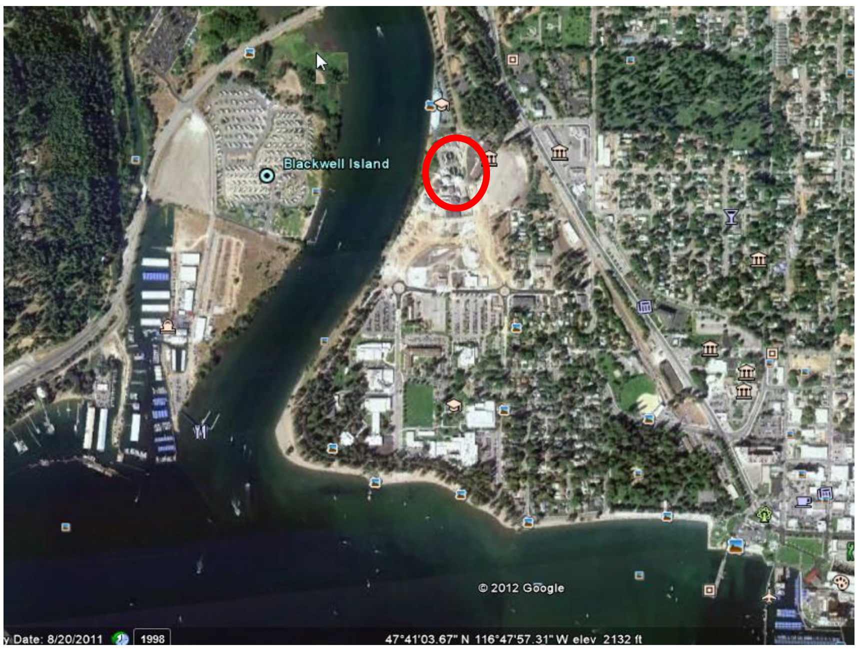

Figure 7. Aerial photo of the location of the City of Coeur d'Alene wastewater treatment plant.

Hayden Area Regional Sewer Board (HARSB) wastewater treatment facility:

Hayden Area Regional Sewer Board (HARSB) wastewater treatment facility transports treated effluent about 7 miles via underground pipeline, from the wastewater treatment plant to the Spokane River during the months of October through June. The outfall is located at approximately river mile 108.7. For the remainder of the year, the treated effluent has been transported, via underground pipeline, to a storage lagoon, then it is land applied using a pivot irrigation system. The current average design flow of the facility is 1.65 mgd. The average flow rate from the facility is 0.98 mgd, and the maximum effluent flow rate is 4.62 mgd (EPA 2007c).

City of Post Falls wastewater treatment facility:

The City of Post Falls operates at a current average design flow of the facility is 5.0 million gallons per day (mgd). The facility discharges to the Spokane River approximately 0.2 miles downstream of the Post Falls Dam and approximately 4.5 miles upstream of the Washington line at river mile 100.5 (Figure 8).

Figure 8. Aerial photo of the location of the City of Post Falls wastewater treatment plant.

City of Coeur d'Alene Stormwater outfall

The City of Coeur d'Alene has five storm water outfalls that discharge into the Spokane River. MS4s are designed to convey stormwater only, and are not part of a combined sewer system. Under the City's MS4 NPDES permit, they must monitor two outfalls. One monitored outfall drains the area to the north and south of I-90 primarily along Northwest Boulevard and discharges to the Spokane River (Figure 9). The drainage area for this outfall is approximately 222 acres. It is downstream of the City of Coeur d'Alene's wastewater treatment outfall. During high water conditions in the Spokane River, the MS4 outfall is submerged; however, stormwater can be monitored from a nearby manhole.

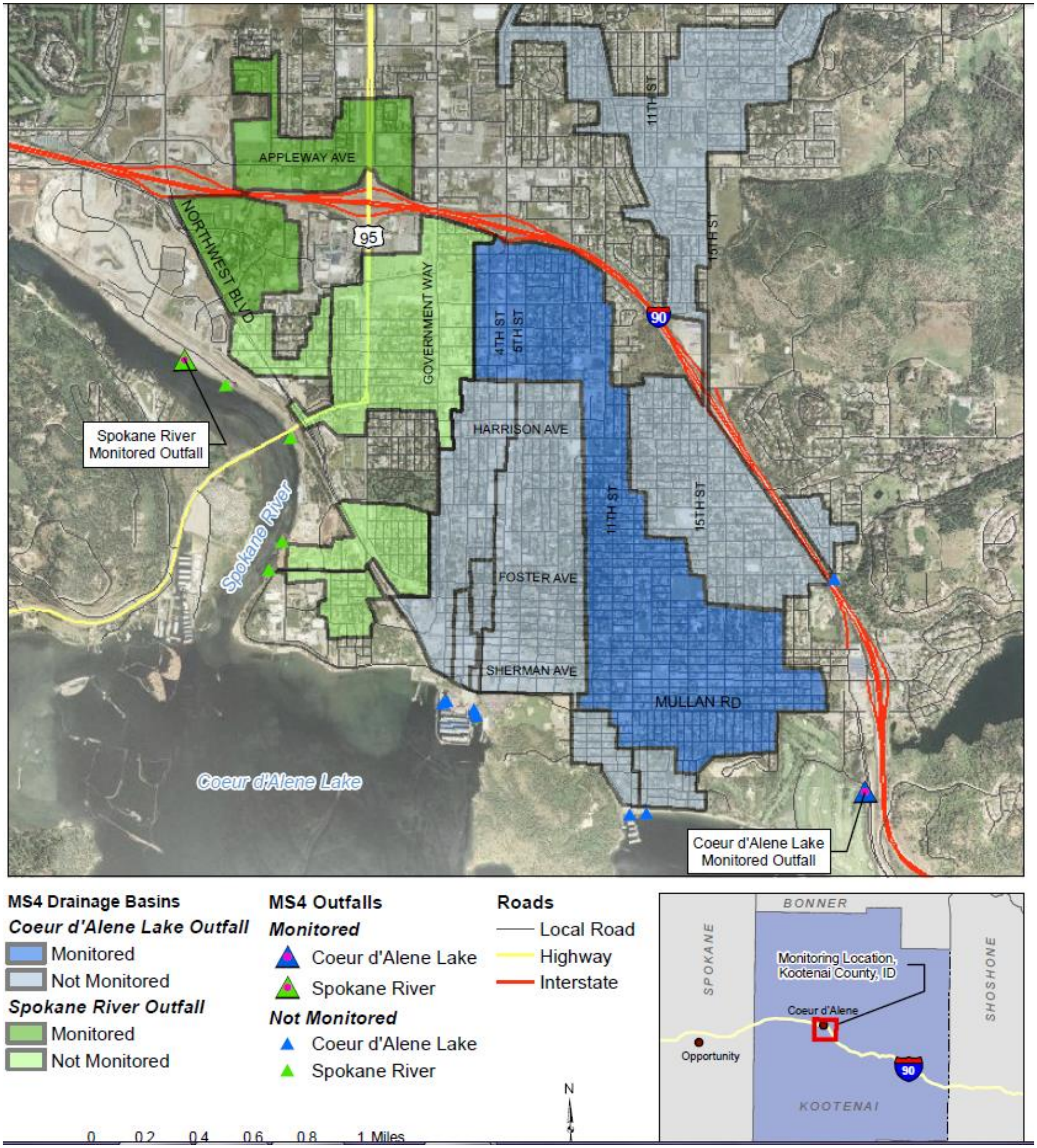

Figure 9, Location of City of stormwater outfalls of the City of Coeur d'Alene that discharge into the Spokane River.

City of Post Falls Stormwater outfall:

The City of Post Falls covers approximately 9,600 acres, of which 30 percent (2,994 acres) is impermeable surface area that contributes to runoff. Ninety-nine percent of the impervious-surface runoff is captured and treated by the City's storm water management system of swales and drywells. Only one percent (28.6 acres) of the impervious surface contributes to runoff that discharges into the Spokane River. The Post Falls MS4 discharges about 20 million gallons of storm water per year (City of Post Falls 2009). These storm water outfalls (Centennial Trail and 4th Avenue) are monitored under the City's MS4 NPDES discharge permit (Figure 10).

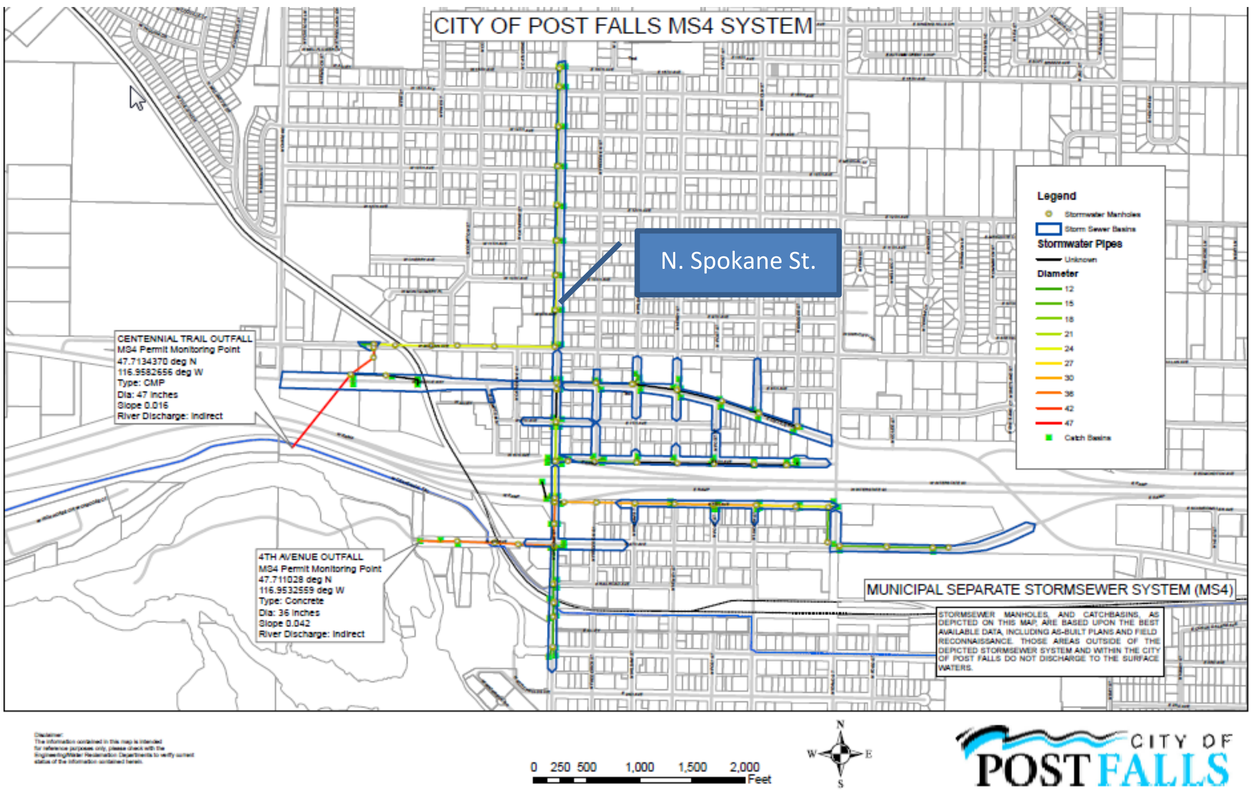

Figure 10. Location of the City of Post Falls stormwater outfalls that discharge (indirectly) into the Spokane River.

Water Column/Cross Section Homogeneity Evaluation

The USGS defines the national standards for collection of water quality samples in a flowing water body (USGS 1999). Unless a river is completely mixed, either the equal-width-increment (EWI) or equal-discharge-increment (EDI) sampling methods are required. If the section of river is well-mixed vertically and laterally with respect to concentrations of target analytes, the single vertical at centroid-of-flow (VCF) method is used (USGS 1999). DEQ believes the reaches of river at each of the monitoring locations are well-mixed vertically and laterally.

TMDL Development

Loading Analysis

A pollutant load is the total mass of a pollutant in a given volume of water that passes a cross-section of the river over a specific amount of time. As illustrated in Figure 11, this load can change due to variability in flow and/or chemical physical properties of the water. Therefore it is important to estimate accurate representation of the loading over variable flow regimes.

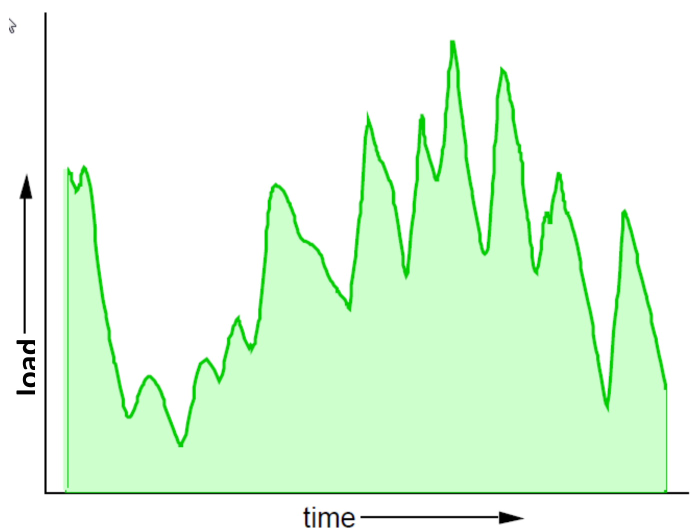

Figure 11. Example graph of metals load over time.

To estimate existing and allowable pollutant loads for a waterbody, there are two approaches. The first is to run a computer model to simulate conditions within the waterbody, and the second is to conduct a statistical analysis using existing flow and water quality data. Modeling can be time and resource intensive; therefore, a statistical analysis of flow and water quality data will be conducted. One of these statistical analyses used in calculating TMDLs for a waterbody is a load duration analysis. A load duration curve is a graphical representation of the river's assimilative capacity for a pollutant over the full range of flow conditions. Details completing a load duration analysis can be found in EPA (2007). The general steps to creating a load duration analysis for metals in the Spokane River are outlined below.

Flow Duration Curve

A flow duration curve is a graphical representation of the cumulative frequency of flows measured on a waterbody over the period of record. The curve specifies the percent of time that a given flow is met or exceeded using a flow duration interval. Figure 12 is an example of a flow duration curve for the Spokane River at the Coeur d'Alene Lake outlet using USGS data from 1978 to 2012. Flow data prior to 1978 was discarded from this analysis due to changes in dam operation which significantly changed downstream flow.

For this station, the highest observed flow is 43,200 cfs and the lowest observed flow is 210 cfs. The median flow is 3,290 cfs. The curve is broken into intervals that identify different flow regimes as identified earlier and represented in Table 3. Each of these intervals is targeted in the monitoring strategy to collect enough data to provide a statistical representation of each flow regime.

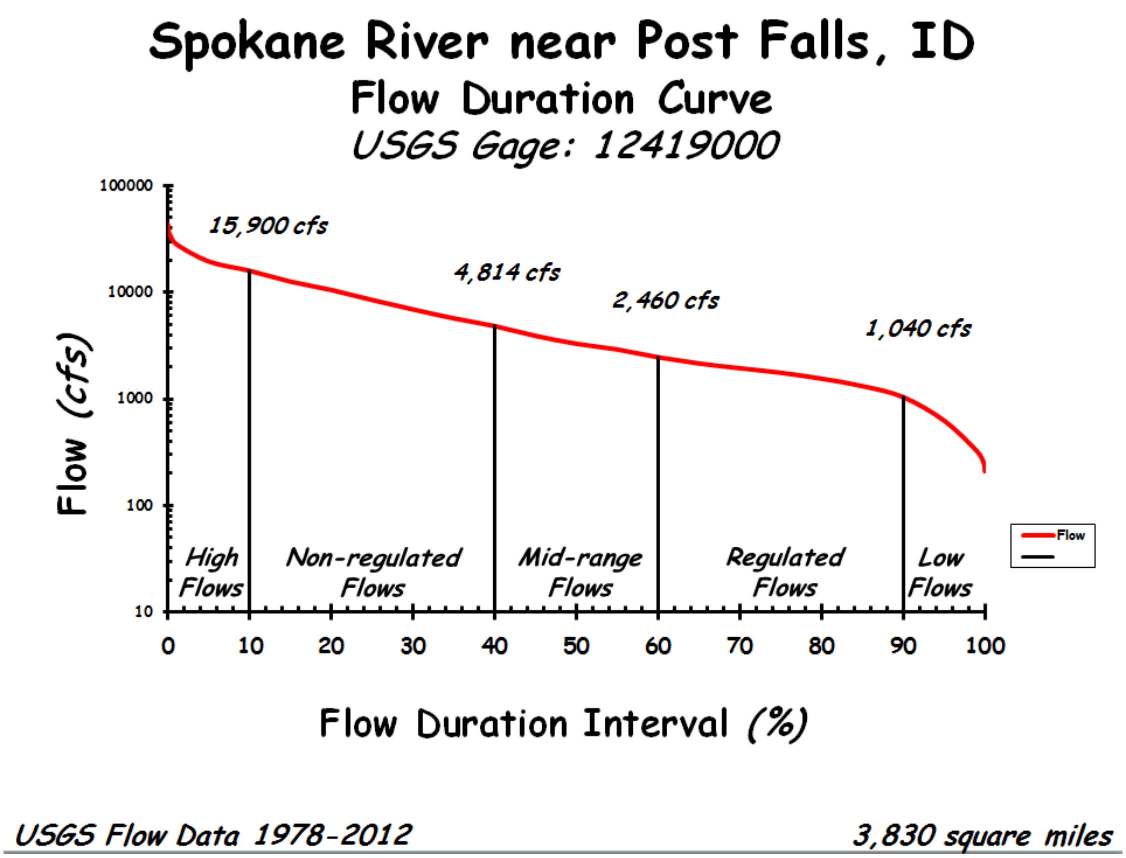

Figure 12. Flow duration curve for the Spokane River at the Coeur d'Alene Lake outlet, covering the period of record from August 2009 to present.

Setting Loading Targets

A load duration curve is a graphic representation of the river's assimilative capacity for a pollutant at a wide range of flow regimes. Loading targets are calculated by multiplying the numeric criteria for the specific metal (in kg/day) by the discharge in the river. The target is first plotted as a line on a load duration curve for each metal for both acute and chronic criteria, according to the relative condition of hardness. Then the metals data is plotted on the curve to determine whether loading in the river exceeds the target. Example load duration curves for metals against the acute (CMC) criteria using existing BEMP data at the Coeur d'Alene Lake outlet are in Figure 13, 14, and 15. In this example, metals criteria were exceeded for cadmium and zinc.

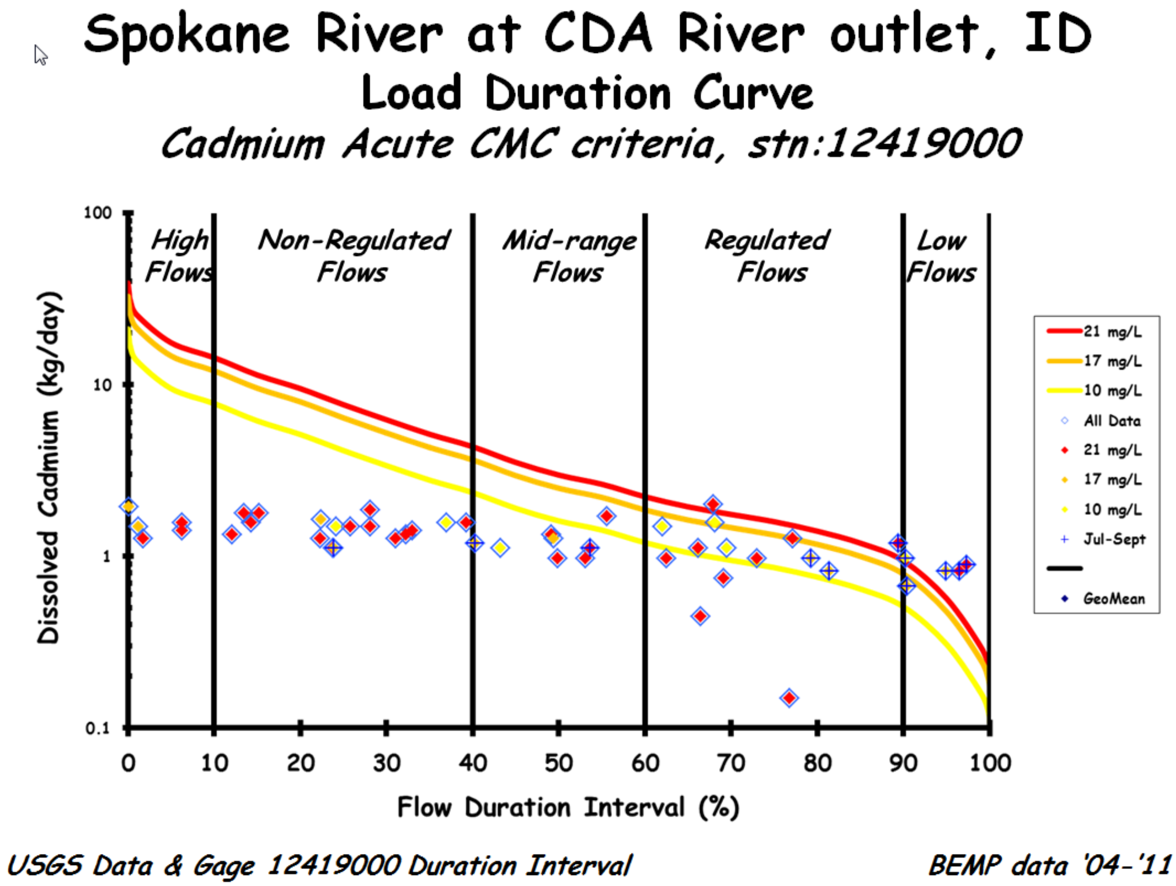

Figure 13. Load duration curve for cadmium at Idaho's acute (CMC) criteria. Colored lines represent the target load at hardness concentrations of 10, 17, and 21 mg/L.

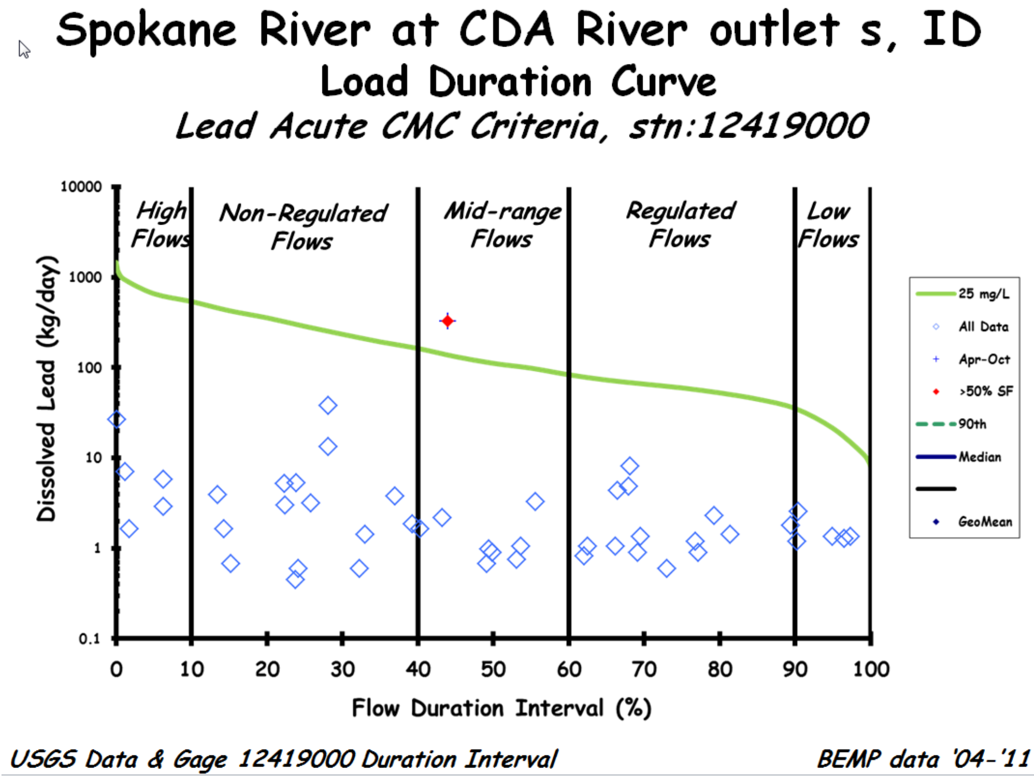

Figure 14. Load duration curve for lead at Idaho's acute (CMC) criteria. Existing data set shows hardness below 25 mg/L, as such, the curve is set at a hardness of the minimum hardness of 25 mg/L.

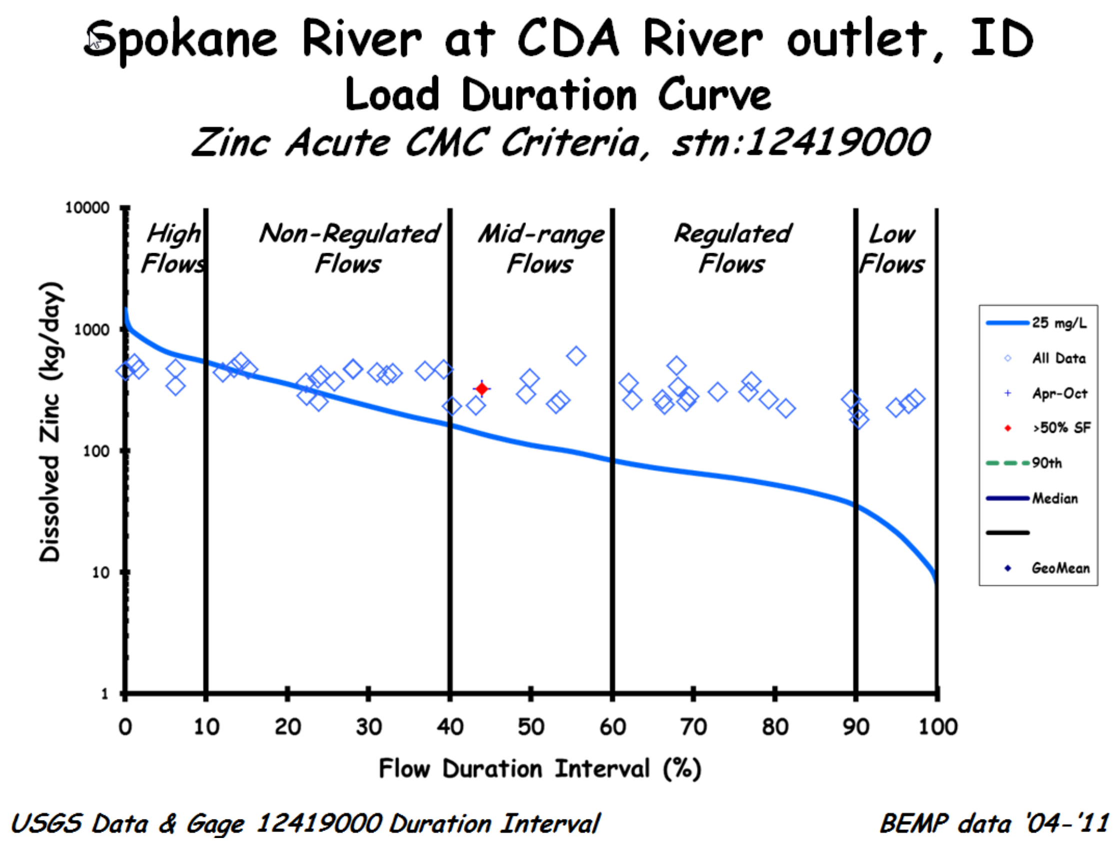

Figure 15. Load duration curve for zinc at Idaho's acute (CMC) criteria. Existing data set shows hardness below 25 mg/L, as such, the curve is set at a hardness of the minimum hardness of 25 mg/L.

Analysis of data on a load duration curve with respect to the chronic criteria (CCC) will not be done by plotting individual data points on a load duration graph. One data point does not represent a 4-day average concentration of the metals CCC as defined in Idaho's water quality standards. Therefore, the chronic condition will be represented by plotting box and whiskers to provide the percentiles of the entire dataset. Figure 16 is an example of a load duration curve using box and whisker plots that represent the 25th, median, and 75th percentiles of the data. The load duration curves in the TMDL will also include the 60th percentile which will represent the chronic condition in the river. The actual data is also plotted on Figure 16. Using this example, there appears to be loading CCC criteria exceedances in the regulated flow period.

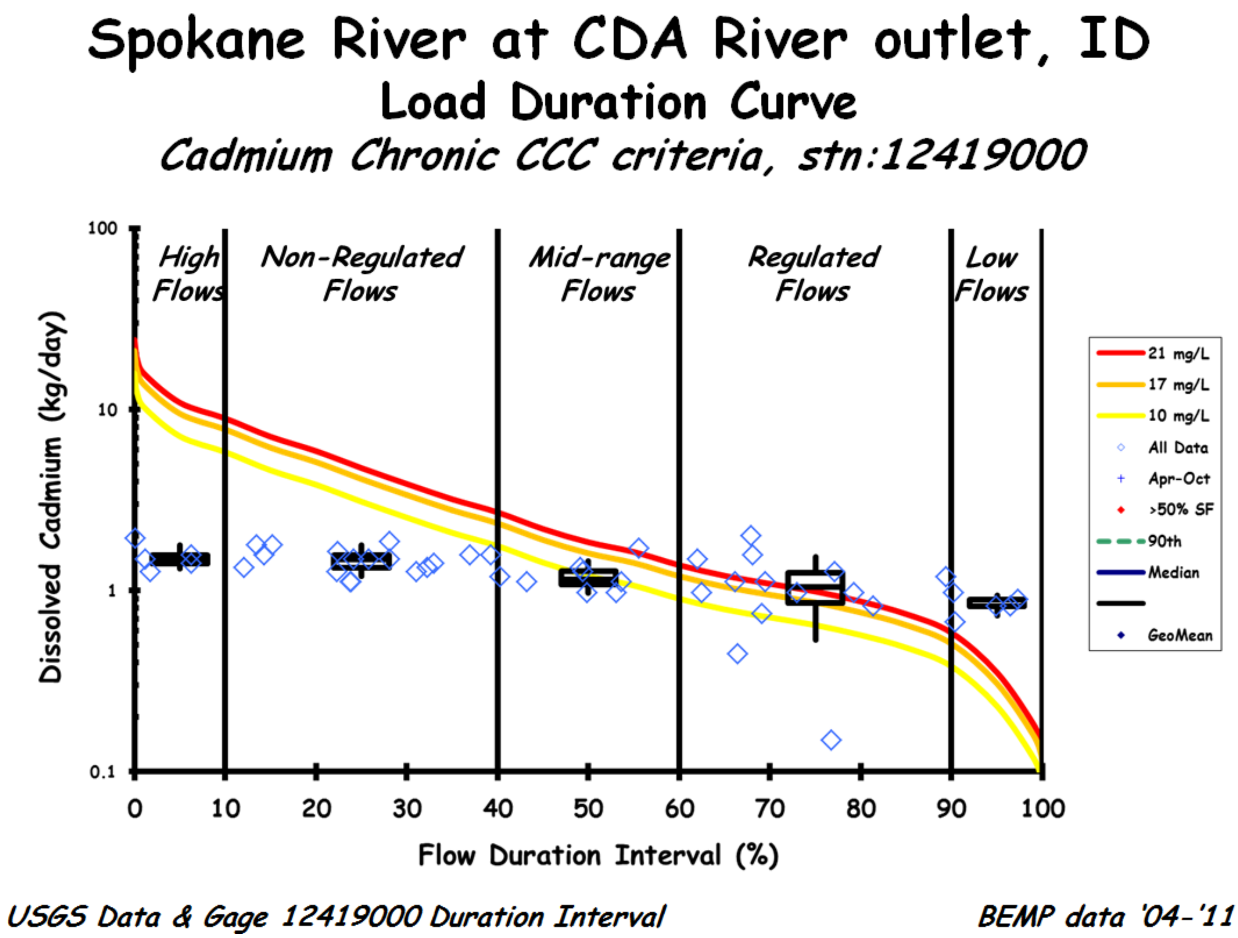

Figure 16. Load duration curve for cadmium at Idaho's chronic (CCC) criteria. Colored lines represent the target load at hardness concentrations of 10, 17, and 21 mg/L. Box and whisker plots represent the percentiles of the existing data set within the flow intervals.

Significance of Existing Data Sets

It is important to note the load duration curve examples provided above are based on an insufficient number of data points to provide statistical representation of the actual metal conditions in each of the flow intervals. As stated earlier, at least 50 data points must be represented for each of the flow intervals. Data collected under this project is intended to collect a statistically significant number of data *synaptically* at the outlet of Coeur d' Alene Lake and near the state line. Synaptic collection at the two sample locations is imperative to understand the water quality condition at that point in time for each of the sites.

TMDL Compliance and Load Allocations

Compliance and load allocations will be determined at the 5%, 25%, 50%, 75%, and 95% flow duration intervals. At each of the compliance duration intervals, loading from upstream of Spokane River and loading of the Spokane River near the state line will be evaluated. We are currently seeking legal consultation whether load allocations upstream of the Spokane River can be assigned based on the 2000 judicial review and declaratory judgment.

Stakeholder Consultation

Stakeholder consultation is not only required by law under the Idaho Water Quality Standards (IDAPA 58.01.02), but it is critical for TMDL approval and implementation. From the early stages through the development of the TMDL, a Technical Advisory Group (TAG) will meet, and DEQ will solicit their consultation. A list of potential TAG members is provided in Table 5. DEQ will also consult the Upper Spokane Watershed Advisory Group and the Panhandle Basin Advisory Group as defined in the Idaho Water Quality Standards.

Table 6. Spokane River metals TMDL Proposed Technical Advisory Group.

Organization	Area of Expertise	Name
City of Coeur d'Alene	Waste Water	Sid Fredrickson
		Dave Clark (?)
	Storm Water	Kim Harrington
City of Post Falls	Waste Water	Terry Werner
		Mike Neher
		Paul Klatt
	Storm Water	Richard Froehlich
		Adam Tate
Hayden Area Regional Sewer Board	Waste Water	Ken Windram
		Paul Klatt
DEQ	Administration	Dan Redline
		Tom Herron
	TMDL	Robert Steed
		Kristin Larson
	Water Quality Standards	Don Essig
EPA	TMDL	Martha Purvey
Kootenai County		Rusty Shephard
Panhandle BAG	Mining Representative	Bill Rust
Kootenai Environmental Alliance	Environmental	Adrienne Cronebaugh
AVISTA Utilities	Water Quality	Meghan Lunney
Coeur d'Alene Tribe	Water Quality	Scott Fields

Special Considerations

The WER in the metals criteria calculation was assigned a value of 1.0 in the National Toxics Rule (EPA 1992). A value of 1 means site water has the same effect on toxicity as in laboratory testing. WERs may be greater or less than 1, but are typically found to be greater than 1 (EPA 1992). DEQ will assume a WER of 1 in metals criteria calculations for this project, because accurately characterizing the WER for a waterbody requires a series of toxicity tests and establishing site-specific criteria for the Spokane River.

DEQ will also not be determining targets/loading criteria for human health for the consumption of zinc of 1) water and organisms, and 2) organisms only, as defined in Idaho Water Quality Standards (IDAPA 58.01.02.210 b & c). While zinc is the only metal with such criteria, it is three orders of magnitude larger than the acute and chronic criteria for aquatic life.

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