Lower Similkameen River Arsenic Total Maximum Daily Load (Water Cleanup Plan)

Detailed Implementation Plan

October 2005
Publication Number 05-10-074

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Water Quality Program

October 2005
Publication Number 05-10-074

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Abstract

The Similkameen River is an international river that flows from the Cascade Mountains along the international border between British Columbia and Washington State to the Okanogan River at the city of Oroville. The Washington State Department of Ecology (Ecology) conducted a Total Maximum Daily Load (TMDL) evaluation to address 303(d) listings for arsenic in Washington's portion of the Similkameen River. The major source of arsenic appears to be a legacy resulting from historical mining activities upstream of the town of Nighthawk, Washington.

The greatest amount of arsenic loading identified by the TMDL evaluation was in the vicinity of Palmer Creek. This loading likely stems from periodic flooding and sediment deposit by the Similkameen River and subsequent re-suspension of contaminated sediments. It was determined that natural conditions in the Similkameen River naturally exceed the United States Environmental Protection Agency (EPA) arsenic criteria high in the watershed, above the major mining activities in the watershed. Under these circumstances, natural conditions constitute the water quality criteria. Because arsenic levels naturally exceed criteria, the loading capacity for the river is set equal to the natural background concentration of arsenic.

Seasonal water quality targets are 0.4 – 0.6 µg/L total recoverable arsenic, and estimates are provided for the load reductions needed in British Columbia and Washington State to meet the targets. The targets make no allowance for the downstream increase in arsenic concentrations that might occur naturally as the Similkameen River flows through British Columbia and Washington. If new data or analysis can provide a reliable estimate of what that increase would be, the numerical targets should be revised upward accordingly.

Assessment of available data indicates a downward trend in arsenic concentrations in the Similkameen River. This trend in improving water quality should continue provided new sources of arsenic are not introduced to the watershed. The TMDL relies on this downward trend to reach the water quality targets. Additional monitoring through implementation of the TMDL should determine if the trend continues.

The TMDL implementation plan requires monitoring arsenic in the Similkameen River. The plan recommends: 1) monitoring arsenic loading in the Similkameen River to further define the long term changes in the legacy load of arsenic, 2) requiring arsenic monitoring at the Oroville municipal waste water treatment plant, and 3) monitoring the Similkameen River at Oroville during a significant high water event to characterize arsenic and sediment movement in the high water conditions.

Introduction

This detailed implementation plan (DIP) provides direction to assure that arsenic concentrations in the Similkameen River continue to decline and to insure that increases in arsenic concentrations are addressed appropriately. The Washington State Department of Ecology (Ecology) began an assessment of the 1996 and 1998 303(d) listings for arsenic contamination in Washington's portion of the Similkameen Watershed. The purpose of the investigation was to determine the sources and quantity of arsenic in the river and provide direction to address the impairment of water quality.

The Similkameen River originates in the Cascade Mountains along the international border between British Columbia and Washington State. It flows north out of Manning Provincial Park, and then it turns south to cross the border and meet the Okanogan River at Oroville, Washington (Figure 1). The river flows more than 70 miles from its beginning to the confluence with the Okanogan River. It crosses the international boundary into Washington 27 river miles from the Okanogan River. The climate is semi-arid over much of the basin. Mining, forestry, agriculture, and recreation are the major land-use activities.

The Similkameen drainage has a rich history of mining, although there are no active large scale operations in the watershed at the time of this report. Mining activities have occurred throughout the watershed and have left mine tailings and other impacts of past operations evident in the watershed. Notable among these are the mining operations in the vicinity of Hedly, B.C. and the Kaaba, Texas mine near Nighthawk in Washington State.

Downstream of the U.S – Canadian border, the Similkameen River flows through arid sagebrush terrain typical of north-central Washington. Approximately six miles below the border, the river meets the Palmer Lake outlet, sometimes called Palmer Creek. A unique hydrologic feature of their confluence occurs during the spring when high flows in the Similkameen River can cause Palmer Creek to reverse direction and the river flows into the lake. Other than Palmer Lake, Washington, tributaries to the Similkameen River are dry most of the year except at higher elevations.

The city of Oroville's municipal wastewater treatment plant is the only National Pollution Discharge Elimination System (NPDES) permitted facility in the river reach addressed by this TMDL. The discharge from the treatment plant contributes a negligible amount of arsenic for which a waste load allocation is set in the TMDL.

Table 1. Water Body Identification Numbers for Water Bodies Addressed in this Similkameen River Arsenic TMDL

Water Body Name	New Water Body ID Number	Old Water Body ID Number	Included in 1996 303(d) List for arsenic	Included in 1998 303(d) List for arsenic
Similkameen River	ND93YL	WA-49-1030	No	Yes
Palmer Creek	LE24CF	-NA-	No	No

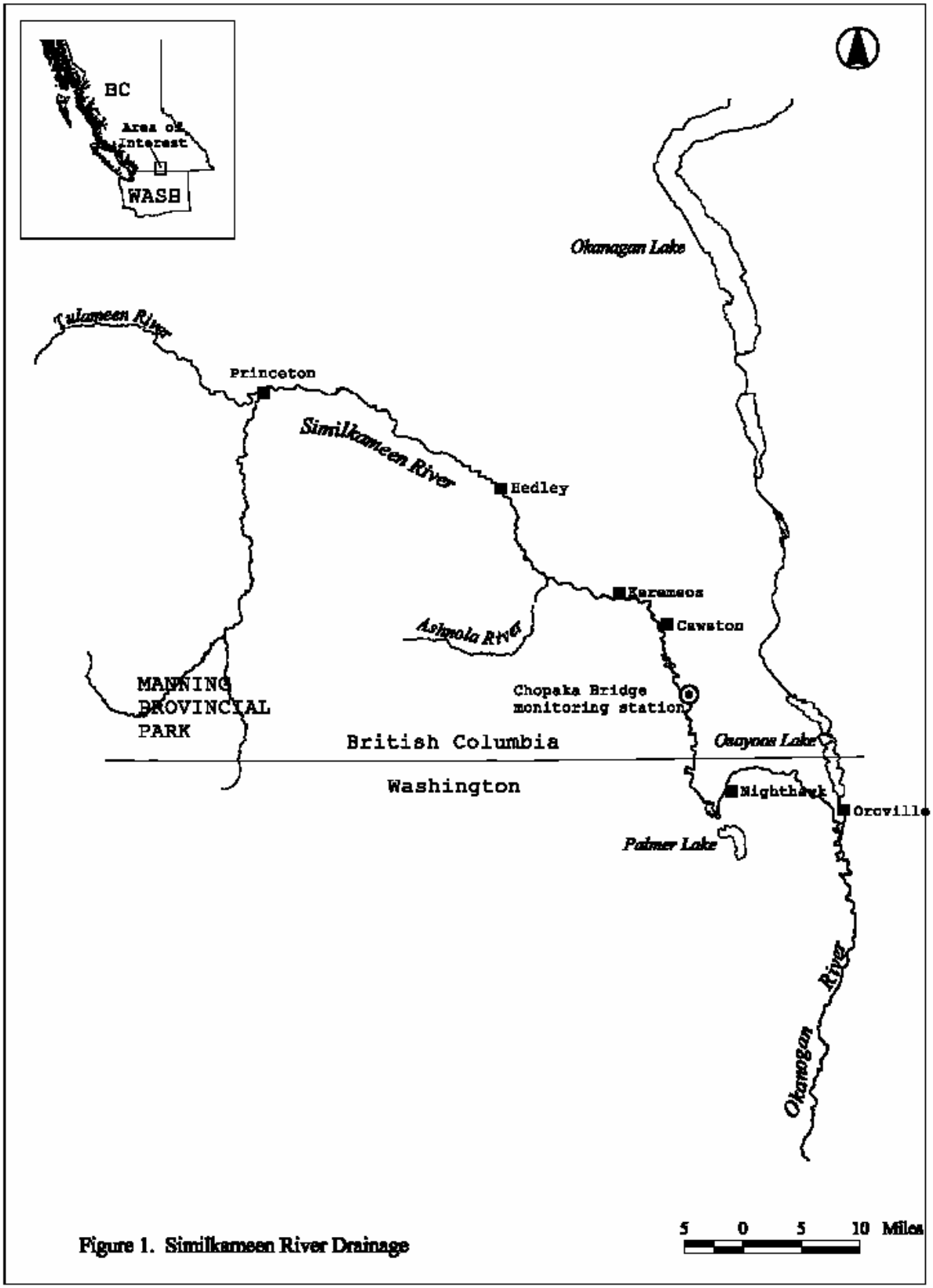

Figure 1. Similkameen River Drainage

Approach

The historic nature of the mining activities that contributed arsenic laden mine tailings to the Similkameen River and the lack of any other identifiable sources classifies the current contamination loading as a legacy load. The sites primarily responsible for tailings lost to the river ceased operations long ago. This history of contamination has also provided the river with a long time frame to redistribute the tailings in the sediments of the lower reaches of the Similkameen River. No feasible direct actions were identified by the TMDL to address the contaminated sediments in Washington's section of the Similkameen River. Therefore, the Similkameen River Arsenic TMDL relies on the attenuation of arsenic to achieve the water quality goals.

Assessment of available data indicates a downward trend in arsenic concentrations in the Similkameen River (Figure 2). The downward trend in arsenic concentrations is evidence of attenuation of the historic contamination. This trend in improving water quality should continue provided new sources of arsenic are not introduced to the watershed. Additional monitoring through implementation of the TMDL should determine if the trend continues.

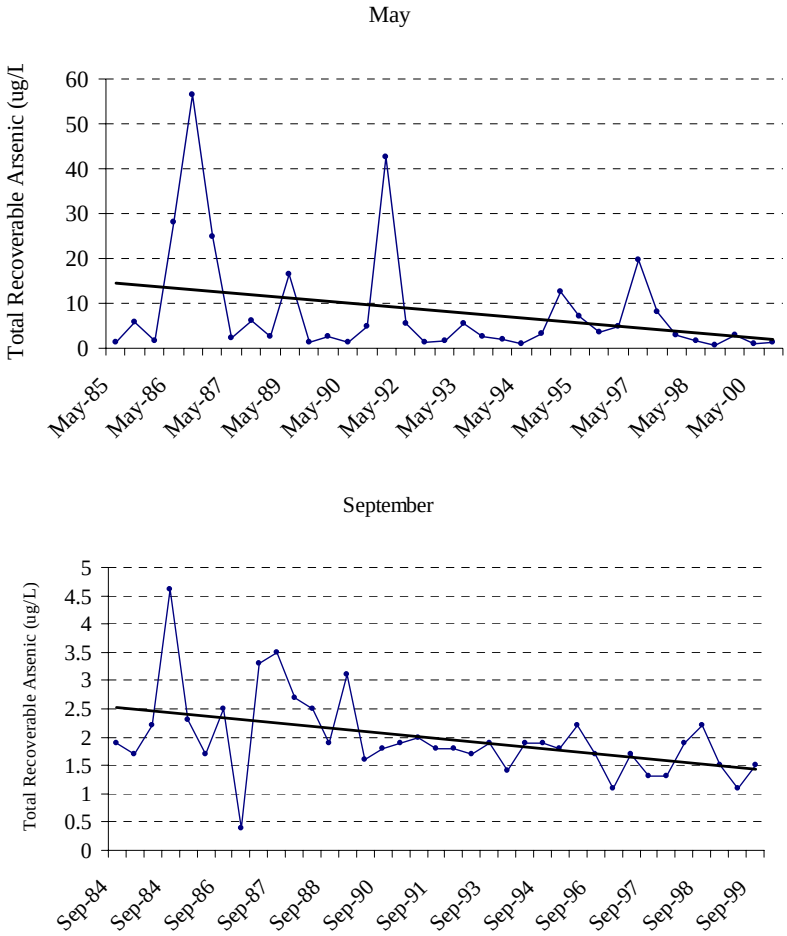

Figure 2. May and September Arsenic Data for Chopaka Bridge, B.C. (with linear regression)

Actions taken pursuant to this TMDL DIP fall into two categories: 1) actions taken in accordance with a law or legal agreement and 2) monitoring activities. Actions taken in accordance with a law or legal agreement, if applicable, will be completed within the time frame prescribed by the law or legal agreement. This consists primarily of developing and implementing NPDES permits to assure that newly permitted sources do not compromise the integrity of this TMDL. Monitoring programs are not necessary every year, but it is important to document changes and variability in the Similkameen River's arsenic concentrations on a regular basis.

The Similkameen River Arsenic TMDL and this DIP are not new regulations, but a description of arsenic sources and a list of activities that can assure that the trend of improving water quality continues. These actions are voluntary related to this TMDL, but may be required by federal, state, county, or city laws.

Ecology used existing data and conducted field work between May 2000 and February 2002 to document the Similkameen River's water quality conditions. After review by the Okanogan Watershed Implementation Committee and the Colville Confederated Tribes, Ecology published the TMDL technical report: *A Total Maximum Daily Load Evaluation for Arsenic in the Similkameen River*. The technical report identified historic mining practices in the upper watershed as a primary source of arsenic loading causing high arsenic values in the Similkameen River. The technical report also recognized the existence of natural and human actions that contribute to elevated arsenic values in the water. The summary implementation strategy (SIS) summarized a strategy to monitor the water quality to improve our understanding of this watershed, explore the legacy of arsenic contamination, and provide adaptive management strategies for long term improvement of water quality in the watershed

The overall approach of this TMDL is to monitor the concentrations of arsenic in the river to verify that the downward trend in arsenic concentration identified in the TMDL technical report continues.

Pollution Sources and Organizations Responsible for Reductions

Pollution Sources

The Similkameen River Arsenic TMDL identified the nonpoint source of historic mining practices and naturally occurring arsenic as the primary sources of arsenic contamination in the Similkameen River. The technical assessment showed that naturally occurring arsenic concentrations in the Similkameen River violate the water quality standards up river from the town of Princeton, B.C. This is above the mining activities in the watershed. The technical assessment also acknowledges that natural sources of arsenic probably contribute additional arsenic below Princeton, but sufficient data do not exist to separate the natural loading of arsenic from the legacy loading from historic mining activities.

Nonpoint contributions of arsenic to the Similkameen River appear to occur over the length of the river. The largest nonpoint impact is in the vicinity of Palmer Creek, a depositional reach of the river with braided river channels and active river banks. Mine tailings discharged or lost to the Similkameen River over the past century leave a legacy of arsenic enrichment in the sediment deposits. Natural processes now control the release of arsenic from the river sediments. The reach of river from the U.S.-1Canadian boundary to the entrance of the canyon near Nighthawk is dominated by sediment deposits and contributes the largest load of arsenic to the river.

At the time of this DIP, the NPDES permitted municipal waste water treatment plant at Oroville was the only point source recognized in the reach of the river being addressed by the TMDL. The discharge from the Oroville waste water treatment plant does contain arsenic. The city of Oroville's drinking water source, while it is well below the standard in the federal Safe Drinking Water Act for arsenic in drinking water sources, contributes the arsenic found in Oroville's waste water treatment plant discharge. In other words, there is no increase in arsenic concentrations between the source of domestic water for Oroville and the discharge of treated wastewater at the wastewater treatment plant.

Nonpoint Sources

Due to the legacy nature of arsenic in the Similkameen River, direct actions to address nonpoint contributions are limited to monitoring of the river system. Monitoring will provide the means for Ecology to address potential new loads and implement adaptive management as more is learned of the dynamic cycles that continue to load arsenic to the river from sediments deposited in the flood plane. The Washington State Department of Ecology will maintain the responsibility of monitoring the Similkameen River's water quality. This responsibility includes investigating signs of increases in the arsenic contamination and addressing potential new sources of arsenic.

Point Sources

The city of Oroville is responsible for operation and maintenance of the municipal wastewater treatment plant within the limitations contained in the facility's NPDES permit. The NPDES permit will include limitations in the permit that will implement the TMDL waste load allocations for arsenic.

The city of Oroville's drinking water is of good quality and meets the arsenic standards set in the federal Safe Drinking Water Act. The city of Oroville's wastewater treatment plant's contribution of arsenic to the Similkameen River is controlled by the water the plant receives from the municipal water supply system.

The waste load allocation for the city of Oroville is set at 19 grams per day. This is the amount of arsenic the plant could discharge when operating at the design capacity of the wastewater treatment system and the regulatory limits for the domestic drinking water quality set by the Safe Drinking Water Act. Providing that the city's wastewater treatment capacity does not change and the source of domestic water stays in compliance with the regulatory standards for arsenic in drinking water, the city will be in compliance with the TMDL. The city will need to consider the limitations for arsenic in its NPDES discharge permit when making changes to its municipal drinking water and/or wastewater systems. Increasing system capacity and changes to the quality of the municipal drinking water supply would create the potential for the city's wastewater treatment plant discharge to exceed the TMDL waste load allocation.

Table 2. Waste Load Allocation

Waste Load Allocation			
Discharger	**NPDES Permit No.**	**Pollutant**	**Daily Load Allocation**
Oroville WWTP	WA-002239-0	Arsenic	19 grams / day

Management Roles, Activities, and Schedules

The Washington State Department of Ecology will maintain the responsibility for monitoring and maintaining records for the arsenic concentrations in the Similkameen River. Ecology maintains a long-term ambient water quality monitoring station for the Similkameen River in Oroville. Ecology staff members collect water quality samples and data monthly at the monitoring station. The long-term monitoring program collected water samples to support the TMDL technical assessment. This additional task for the Ecology staff collecting the water is relatively easy to accomplish.

River dynamics and the characteristics of arsenic entrained in the sediments of the river result in a large movement of arsenic with high water or flooding events. Monitoring a high flow event will improve the understanding of the relationship of arsenic concentrations to changing flow conditions. The Department of Ecology will maintain responsibility for the monitoring of arsenic during a high flow event that would have an average recurrence of ten years. A high flow event for the Similkameen River that could be expected to occur once every ten years would have a flow volume of 27,030 cubic feet per second (cfs) at Ecology's water quality monitoring station 49B070, Similkameen River at Oroville. Ecology is seeking a local partner in the efforts to obtain representative samples during a high flow event. The local partner would help monitor river flow forecasts for potentially qualifying flows and provide an opportunity for a local representative to collect the necessary samples at the bridge over the Similkameen River at Oroville for shipment to Ecology's designated lab facility.

Table 3. Management Roles, Activities and Schedule Year Beginning 2005

Entity	Responsibilities To Be Met	1	2	3	4	5	6	7	8	9	10	Beyond 10 Years
Ecology	Periodic monitoring of the Similkameen River, monthly monitoring for a year repeated on every 5th year.					X					X	X
Ecology, local	Monitor during high water events that would be expected to recur on a 10 year interval (flow of 27,030 CFS or greater).	X	X	X	X	X	X	X	X	X	X	X
Ecology	Periodic monitoring of the Palmer Creek, repeated on every 10th year.										X	
City of Oroville	Monitoring arsenic in wastewater treatment plant discharge in accordance with NPDES permit requirements.	X	X	X	X	X	X	X	X	X	X	X
Ecology	Field investigation of impacts from recreational suction dredging.	X										
Ecology, WDOH	Arsenic assessment in fish tissue for fish in Palmer Lake.			X								

Ecology conducted a field investigation of impacts from recreational suction dredge mining in the summer of 2004. The final report, *Effects of Small-Scale Gold Dredging on Arsenic, Copper, Lead, and Zinc Concentrations in the Similkameen River* by Art Johnson was published in March 2005.

The field study was conducted to determine if small-scale gold dredges operating in the Similkameen River exacerbate current exceedances of the human health criteria for arsenic or result in violations of aquatic life criteria for arsenic, copper, lead, and zinc. Dredge effluents were analyzed and discharge plumes were sampled for this study. Results showed that the metals concentrations discharged from small-scale gold dredges are not a significant toxicity concern for aquatic life in the Similkameen River. Although this activity will exacerbate exceedances of arsenic human health criteria in the immediate vicinity of the dredge, it would take very large numbers of dredges to effect a ten percent change in the river's total arsenic levels, even at low-flow conditions.

Measuring Progress Toward Goals

The overarching goal of this TMDL is the reduction of arsenic loads being carried by the Similkameen River. With the primary source of arsenic being the sediments within the river system, the attainment of the goal will depend greatly on the continuation of declining concentrations documented by the technical assessment.

Measuring progress toward goals will be accomplished through the monitoring program included in the implementation section of this DIP. The primary source of contamination is associated with historic mining activities. This legacy of contamination requires long-term monitoring and trend analysis. Trend analysis will be conducted after completion of each periodic monitoring set from the bridge over the Similkameen River at Oroville. The first sampling set has been requested to begin in October 2005. This periodic sampling is planned to recur every five years, coinciding with Ecology's five-year cycle for scoping water quality projects in the Okanogan watershed.

The *Lower Similkameen River Arsenic Total Maximum Daily Load Submittal Report* set the targets presented in Table 3 for the Similkameen River. At the current rate of improvement, it is anticipated that these targets will be met by the year 2015.

Table 4. Proposed Targets for Total Recoverable Arsenic in the Similkameen River

Month	Target Concentration (µg/L)
May	0.6
June	0.6
April & July	0.5
August - March	0.4

Effectiveness Monitoring Plan

The Similkameen River Arsenic TMDL addresses a legacy loading of arsenic from more than a century of mining. There are no active upland mining operations with permitted discharges to the Similkameen River. The legacy loading of arsenic to the river is associated with the sediments in the river and in the adjoining flood planes. Addressing arsenic contamination or sediments enriched with arsenic from mine tailings leaves no available direct actions due to the distances the materials have been transported, its distribution in the watershed, and the intermingling of contaminants with natural sources. Implementation becomes an exercise in careful monitoring of the river system over time to address the legacy loads in the Similkameen River.

Monitoring is the primary activity of implementation. Effectiveness monitoring becomes a component of the implementation activity. Effectiveness monitoring evaluates whether the desired effect or goal will be met through the attenuation processes within the watershed. Success is measured against the desired future conditions. Effectiveness monitoring will try to answer these questions:

- Has the declining trend in arsenic concentration in the Similkameen River continued?
- Will the declining trend in arsenic concentration meet the goals set by the TMDL?

This type of monitoring is designed to assess the potential impacts of river channel changes and identify impacts from sources of arsenic that may be addressed directly

The TMDL promotes two long-term and repeating general monitoring procedures with supplementation by four specific monitoring events in the summary implementation strategy. The DIP supports these monitoring procedures and recommends that they continue in the Similkameen River Watershed.

Long Term Periodic Monitoring

Ambient water quality monitoring is routinely conducted by Ecology's Environmental Assessment Program. Monitoring the ambient water quality levels of arsenic in the Similkameen River will be included in the long-term monitoring. This periodic water quality monitoring is the backbone of the TMDL. The TMDL relies on a continuing decline of arsenic in the river that was documented in the technical assessment. This monitoring and the subsequent trend analysis may reveal unexpected changes to the arsenic levels in the Similkameen River. Unexpected rises in the concentration of arsenic in the river will require investigation for potential new sources in the Similkameen River and Palmer Creek watersheds. Each newly identified new source will need to be addressed through an adaptive management process to identify methods to achieve the water quality goals of this TMDL.

Monitoring arsenic in the discharge of the Oroville municipal wastewater treatment is recommended by this TMDL. The specifics for monitoring of the wastewater treatment plant will be determined with the next cycle for the re-issuance of the facility's NPDES permit.

Supplemental Monitoring Activities

High Flow Event Monitoring:
High flow event monitoring to assess the changes in river loading during extraordinary flow conditions is a recommended supplemental sampling activity. The technical assessment report data show the arsenic concentrations spikes occur on rising flows in the river. This phenomenon is known as hysteresis and is interpreted as the result of initial transport of stored materials within the stream channel, or the initial flush of mobile materials from riparian or terrestrial sources. The compounding conditions of high flow and high concentrations have the ability to move significant amounts of arsenic through the river system.

Ecology is seeking a better understanding of this relationship of changing water levels and the arsenic loading in the Similkameen River. The TMDL specifies that a high water event will be monitored to measure the river levels and arsenic concentrations throughout the event.

Monitoring Palmer Creek:
Palmer Creek was identified as a source of arsenic loading to the Similkameen River during the TMDL technical Study (Johnson 2002). Palmer Creek drains Palmer Lake into the Similkameen

River most of the year. The elevation of Palmer Creek and Palmer Lake allows the Similkameen River to back into the creek and lake at times when the Similkameen River has large increases in flow. Typically, this occurs during the spring rapid snowmelt in the upper Similkameen and Palmer Creek area. The Similkameen River and Palmer Creek share the floodplain north of Palmer Lake where the sediments that are deposited influence both water bodies. Periodic monitoring of Palmer Creek's contribution of arsenic to the Similkameen is needed to determine if its contribution of arsenic is diminishing at the same rate or a rate similar to that of the Similkameen River. Monitoring Palmer Creek needs to be accomplished during a low-flow period for the Similkameen River to minimize the potential influence of Similkameen River water on Palmer Creek at the time of sampling.

Fish Tissue Monitoring:

Fish tissue monitoring in the Similkameen River and Palmer Lake is needed to assess the impacts of the elevated arsenic concentrations on aquatic life. Monitoring for the accumulation of arsenic in fish tissue is also needed to compare the tissue to the National Toxics Rule (NTR) fish tissue criterion for inorganic arsenic.

Field Investigation of Impacts from Recreational Suction Dredging:

The Similkameen River TMDL focuses on sediments in the river system as a continuing source of arsenic loading. The activities of small scale suction dredge miners are a concern as their activities were seen as potentially moving additional arsenic from the sediments to the river. Ecology undertook a field investigation of the effects of small scale suction dredge mining in the mining season of July 1 to September 30, 2004.

The report *Effects of Small-Scale Gold Dredging on Arsenic, Copper, Lead, and Zinc Concentrations in the Similkameen River* (Johnson 2005) documents Ecology's investigation. The report concludes that the suction dredge operations will exacerbate the exceedances of the arsenic human health criteria that already occur, but it would take very large numbers of dredges to effect a ten percent change in the river's arsenic levels, even at low-flow conditions.

Adaptive Management Response and Investigations

Adaptive Approach

If planned implementation activities are not producing expected results, Ecology or other entities may choose or be mandated to perform additional studies to identify the significant sources of arsenic input to the river system. If the causes can be determined and the remedies are required by law or legal agreement, then additional implementation measures may be needed. If the causes cannot be determined, or if the causes are found to be naturally occurring, then the TMDL targets may need to be revised. Re-evaluation of this TMDL is anticipated to occur at five to ten-year intervals. If the downward trend in arsenic concentration does not show a continuing decline, then the TMDL may be modified as a result.

Investigate Potential Alternate Sources

If the monitoring activities in this DIP show arsenic concentrations in the Similkameen River increase suddenly or do not improve over the long term, investigations for alternate sources will be initiated. The form that additional investigation takes will be determined by the data that reveal the need for additional investigation.

Enforcement

The process of TMDL development raises many questions about how the Department of Ecology enforces Washington State's water quality rules and regulations. The Water Pollution Control Act (chapter 90.48 RCW) provides broad authority to issue permits and regulations and prohibits all discharges to water. The act declares that it is the policy of the state to maintain the highest possible standards to ensure the purity of all waters of the state and to require the use of all known, available, and reasonable means to prevent and control water pollution. The act defines waters of the state and pollution. Furthermore, it authorizes the Department of Ecology to control and prevent pollution, to make and enforce rules including water quality standards. The act also designates Ecology as the state water pollution control agency for all the purposes of the federal Clean Water Act. Under this statute, Ecology is authorized to administer wastewater disposal permits and to require prior approval of plans and methods of operation of sewage or other disposal systems.

The regulation and enforcement for the discharges of arsenic within the lower Similkameen River will occur primarily through the NPDES permitting process. The existing NPDES permit for the city of Oroville's municipal wastewater treatment plant will have waste load allocations from the TMDL incorporated in the next permitting cycle. New or proposed NPDES permits within the Similkameen watershed will be evaluated for potential impacts of arsenic loading before being issued.

Reasonable Assurances

During the development of the Similkameen River Arsenic TMDL, available data for water quality throughout the watershed were collected and evaluated. The mass balance approach to the TMDL and the quantity of data have left questions regarding the amount of the natural arsenic contribution in the watershed. The conservative assumptions used in the technical evaluation (Johnson 2002) burdens the anthropogenic sources with the potential natural loading below Princeton. Additional data on natural contribution could raise the TMDL target higher than has currently been set.

The single NPDES permitted source to discharge to the river, Oroville WWTP, has been found to be an insignificant contributor to the arsenic loading. The conditions used to determine the potential impact of the WWTP have been incorporated in the current NPDES permit. Monitoring the discharge water will be a condition of the NPDES permit and monitoring the source of the municipal water is currently being accomplished under the drinking water system regulations administered by the Washington State Department of Health.

Each of these conservative measures will assure the Similkameen Watershed will be monitored and protected from activities that would threaten the water quality while the legacy loading is mitigated through time and nature.

Public Involvement

A summary of public involvement activities will be included with the final publication of this document.

Funding Opportunities

The Washington State Department of Ecology maintains the responsibility for the monitoring activities under this TMDL. Periodic, long-term monitoring can be achieved in the routine operation of the department.

References

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Peterschmidt, Mark, January 2004. *Lower Similkameen River Arsenic Total Maximum Daily Load Submittal Report for Joint Issuance*. Washington Department of Ecology, Olympia, Washington. Publication Number 03-10-074 http://www.ecy.wa.gov/biblio/0310074.html

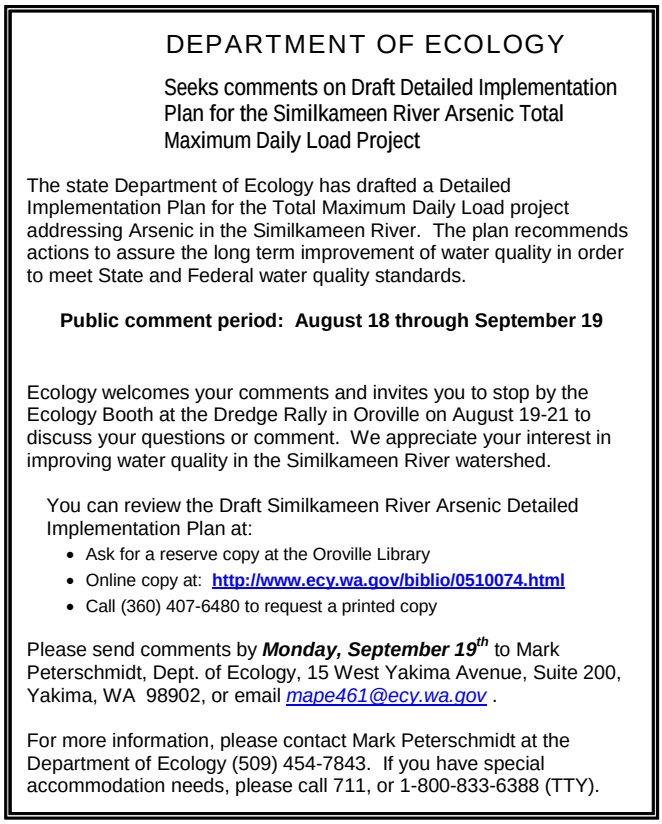
Safe Drinking Water Act

Appendix A

Response to Public Comments On the Similkameen Arsenic TMDL Draft Detailed Implementation Plan

The Washington State Department of Ecology advertised the public comment period for the Similkameen Arsenic TMDL Draft Detailed Implementation Plan (DIP) in the Okanogan Chronicle Newspaper. The advertisement of the public comment period also included posting on the Washington State Department of Ecology's public events list on the internet. Ecology staff presented the DIP and provided copies of the DIP to the public at the North West Miners Rally held in Oroville, Washington on August 19 and 20, 2005.

Ecology received no comments on the Similkameen Arsenic TMDL Draft Detailed Implementation Plan.



DEPARTMENT OF ECOLOGY

Seeks comments on Draft Detailed Implementation Plan for the Similkameen River Arsenic Total Maximum Daily Load Project

The state Department of Ecology has drafted a Detailed Implementation Plan for the Total Maximum Daily Load project addressing Arsenic in the Similkameen River. The plan recommends actions to assure the long term improvement of water quality in order to meet State and Federal water quality standards.

Public comment period: August 18 through September 19

Ecology welcomes your comments and invites you to stop by the Ecology Booth at the Dredge Rally in Oroville on August 19-21 to discuss your questions or comment. We appreciate your interest in improving water quality in the Similkameen River watershed.

You can review the Draft Similkameen River Arsenic Detailed Implementation Plan at:

- Ask for a reserve copy at the Oroville Library
- Online copy at: **http://www.ecy.wa.gov/biblio/0510074.html**
- Call (360) 407-6480 to request a printed copy

Please send comments by ***Monday, September 19th*** to Mark Peterschmidt, Dept. of Ecology, 15 West Yakima Avenue, Suite 200, Yakima, WA 98902, or email *mape461@ecy.wa.gov* .

For more information, please contact Mark Peterschmidt at the Department of Ecology (509) 454-7843. If you have special accommodation needs, please call 711, or 1-800-833-6388 (TTY).

Figure A-1. Newspaper Display Advertisement for the Detailed Implementation Plan Public Comment Period.

Appendix B

Tracking Table for Implementation Activities

Year	Activity	Brief Description	Date Completed
2005	Dredge mining impact study	Study the effects of small scale gold dredging on the arsenic concentrations in the Similkameen River.	March 2005
2007	Fish tissue study for arsenic	Sampling of fish from the Similkameen River, Palmer Lake, and Palmer Creek for comparison with tissue to the NTR fish tissue criterion for inorganic arsenic.	
Any	Monitor high flow event	Monitoring the change of arsenic concentration in the Similkameen River through the changing water levels when peak flow is predicted to be greater than 27,030 cubic feet per second.	
Every fifth year 2005, to 2055	Monthly monitoring at the Oroville Bridge over the Similkameen	Add arsenic sampling and analysis to the ambient water quality studies conducted at the Oroville Bridge. Sampling monthly every fifth year to monitor long term arsenic reductions.	
Every tenth year 2010, to 2050	Monitoring Palmer Creek arsenic	Sampling arsenic contributions from Palmer Creek to the Similkameen River at the Chopaka road bridge. Section 35, T 40 N, R 25 EWM.	
Every year	Monitoring Oroville WWTP discharge	Monitoring arsenic concentrations in the Oroville wastewater treatment plant discharge as required by the NPDES permit.	