Funding Strategies

## Spokane River Regional Toxics Task Force

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# SRRTTF Funding Strategies

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SRRTTF

Funding Strategies

# SRRTTF Vision Statement for the first five years:

*The Regional Toxics Task Force works collaboratively to (1) characterize the sources of toxics in the Spokane River and (2)identify and implement appropriate actions needed to make measurable progress towards meeting applicable water quality standards for the State of Washington, State of Idaho, and The Spokane Tribe of Indians and in the interests of public and environmental health.*

# SRRTTF Funding Strategies Purpose Statement

**To:** Coordinate and support the Spokane River Regional Toxics Task Force (SRRTTF) in providing consistent and predictable funding needed to accomplish the actions that will result in toxics reductions for the Spokane River.

**In a way that:**

* Is strategic, holistic, and forward thinking and compliments the vision and purpose of the SRRTTF.
* Serves as a clearing house that identifies tracks, evaluates, prioritizes, and communicates funding opportunities in a timely manner.
* Responds to the technical and administrative needs of the SRRTTF.
* Leverages the value of monetary and in-kind contributions provided by SRRTTF members.
* Partners with outside organizations on opportunities that are of mutual benefit.

## Strategic Direction

### Identify Needs

The SRRTTF Vision Statement and *2016 Comprehensive Plan to Reduce PCBs in the Spokane River* will serve as fundamental guidelines for identifying Task Force needs.

### Identify Potential Funding Sources

The SRRTTF will identify, evaluate, and pursue funding sources based on the ability of those sources to meet the Task Force needs.

* Task Force members direct funding of activities
* Task Force members in-kind funding[[1]](#footnote-1)
* Agency direct funding of Task Force activities
* Agency in-kind funding
* Agency projects in support of effort
* Grants to nonprofit organizations in support of effort
	+ Government (State, Federal)
	+ Foundations
* Grants to Universities/Academia in support of effort
	+ EPA Science to Achieve Results
	+ P3 Award Program
* Professional organizations
	+ ACS Green Chemistry Institute Grants
	+ Water Environment Research Foundation Grants
	+ Water Environment Federation (WEF)
	+ National Association of Clean Water Agencies
* Partnerships with research centers
	+ Center for Sustainable Materials (University of Oregon)
	+ Center for Environmental Research and Outreach (CEREO)
	+ Water Environment Research Foundation
* Partnerships with current and/or former toxics producers/suppliers
* Donations/Gifts

### Reach Out to Potential Funding Organizations and Partners

Use the diverse strengths and professional networks of the individual partners of the organization to identify, communicate with, and engage potential funding organizations and partners.

### Align SRRTTF Needs with the Funding Source Purpose and Mission

When communicating with the potential funding source, the SRRTTF will identify how the needs of the Task Force align with the purpose and mission of the funding organization.

### Prioritize Funding Requests and Maximize Return on Effort

The SRRTTF will evaluate funding opportunities, identify strategy, and prioritize response based on

* Funding opportunity fulfills short term vs. long term need
* Ability of Task Force to access funding (level of effort needed)
* Match of the funder’s mission with the Task Force mission
* Amount of funding available
* Competitiveness of funding opportunity

## SRRTTF Funding Strategy Work Group Structure

A Funding Work Group will be organized to execute the duties required by the SRRTTF Funding Strategy. The Funding Work Group will include a variety of key SRRTTF members or supporting staff with knowledge of funding strategies, grant opportunities, grant writing and other facets essential to execute the SRRTTF funding strategy. Examples of responsibilities, tasks and roles include:

* Actively engage in tracking and evaluating funding opportunities on behalf of the SRRTTF
* Assign specific tasks to help position the SRRTTF for funding and collaboration opportunities (e.g., networking with University researchers, communication with legislators)
* Write and submit grant applications
* Develop public education approaches that can be incorporated into funding applications or implemented through in-kind efforts and/or collaboration with others

Appendices

# Introduction

The purpose of these Appendices is to facilitate Steps 1 and 2 of the Funding strategy. The Task Force work is ongoing. Priorities and projects may change as more information is collected. Therefore, these Appendices are expected to be “living documents,” subject to change as the needs of the Task Force changes.

Step 1, “Identify Needs,” is represented by a range of projects that are of interest to the SRRTTF. To develop the list, the Task Force created a set of projects based on perceived needs. Additional needs have been added to the original list as a result of the *2016 Comprehensive Plan to Reduce Polychlorinated Biphenyls (PCBs) in the Spokane River* (the “Comprehensive Plan”)*.* The Task Force did not prioritize the basic list and order of the projects in these appendices is not an indication of funding priority or Task Force preference.

Step 2, “Identify Funding Sources,” is represented by the list of possible funding and partnership organizations. By identifying potential funding sources and partnerships in advance, the Task Force can be prepared to respond quickly should opportunities arise. The list of potential funding sources and partners are suggestions since all partnerships are encouraged.

The organization of the Appendices follows the a logical progression of source characterization (Appendix A), identification of targeted Control Actions or Best Management Practices for the Spokane River (Appendix B), the Strategic Actions needed to achieve Task Force goals (Appendix C), broader actions needed to achieve success on a watershed basis that can also be useful in other watersheds (Appendix D), and activities that are needed to assess progress (Appendix E).

The projects are broken into discrete but related activities. This optimizes flexibility with respect to finding funding and/or sponsor organizations. By identifying the discrete needs, the Task Force can more closely with the funding organizations during the planning and budgeting process.

If a project has a connection or dependency on another project, it is noted under “Related Activities.”

# Appendices Reference Chart

| **Title** | **Partner Organizations** | **Funding Options** | **Related to:** |
| --- | --- | --- | --- |
| Appendix A: Toxics Source Characterization |  |  |  |
| A1. Identify Existing PCB Sources, Loads, and Sinks in the Spokane River Watershed: Data Gaps Analysis***NEW******Section 6.3 of the Comprehensive Plan, “Studies to Address Data Gaps”*** | *Funded by*Spokane River Stewardship PartnersDepartment of Ecology  | **FUNDED FY 2013;** *Implemented as Phase 1a (Tasks 2, 4, 5 and 6) of the LimnoTech Work Plan.* **COMPLETE 6/30/2013** | A2, A3, A4, A5, A6 |
| A2. Ensure Quality of Source Characterization Activities*Implemented as Phase 1a (Tasks 3) of the LimnoTech Work Plan.* | *Funded by*Spokane River Stewardship PartnersDepartment of Ecology  | **FUNDED FY 2013****COMPLETE 6/30/2013** | A1, A3, A4, A5, A6  |
| A3. Identify the Appropriate Source Characterization Modeling Tool for the Spokane River Watershed*Implemented as Phase 1b, Task 7 of the LimnoTech Work Plan.* | *Funded by*Department of Ecology  | **FUNDED FY 2014****TO BE COMPLETED 9/30/2013** | A1, A2, A7, A4, A5, A6  |

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| **Title** | **Partner Organizations** | **Funding Options** | **Related to:** |
| A4. Understand the Fate and Transport of PCB in the Watershed | Spokane River Stewardship PartnersDepartment of Ecology Idaho Dept. of Environmental QualityEnvironmental Protection Agency | **FUNDED FY ???****COMPLETED ???** | A1, A2, A3, A7, A5, A6  |
| A5. Collect Watershed Data Phase 1*Implemented as Phase 1b (Tasks 8 and 9) of the LimnoTech Work Plan.* | Department of Ecology  | **FUNDED FY 2014****COMPLETE 6/30/2013** | A1, A2, A3, A4, A6  |
| A6. Collect Watershed Data Phase 2*Implemented as Phase 2 of the LimnoTech Work Plan* | Spokane River Stewardship PartnersDepartment of Ecology Idaho Dept. of Environmental QualityEnvironmental Protection Agency | **FUNDED FY ???****COMPLETED ???** | A1, A2, A3, A4, A5  |
| A7. Understand the Role of Atmospheric Deposition as a Source to the Spokane River from global, regional, and local sources.Initiated by Department of Ecology, Environmental Assessment Program 2016 | Department of Ecology Idaho Dept. of Environmental QualityEnvironmental Protection AgencySpokane Regional Clean Air AgencyAcademia | **FUNDED FY 2016-2017****ESTIMATED COMPLETION DATE ???** | A3, A4  |

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| **Title** | **Partner Organizations** | **Funding Options** | **Related to:** |
| A8. Identify List of “Inadvertently Produced” PCBs***NEW******Control Action 5.8 of the Comprehensive Plan, “PCB Product Testing”*** | Environmental Protection AgencyDepartment of EcologyUniversities and Research OrganizationsChemical Manufacturers and Trade Organizations | Environmental Protection AgencyDepartment of EcologyNon-profit organizations and Foundations | A9, A10, A11 |
| A9. Product List of Consumer Products that May Contain PCB | Municipal and industrial dischargers Department of Ecology Environmental Protection Agency Chemical Manufacturers and Trade Organizations | Partner OrganizationsDepartment of Ecology Environmental Protection AgencyChemical Manufacturers and Trade Organizations | A8, A10, A11, *C4, D1, D2,* D3 |
| A10. PCB in Caulks***NEW: Future Control Action “6.2.2 Survey Schools and Public Buildings”*** | Environmental Protection AgencyDepartment of Ecology Spokane Regional Health DistrictLocal School Districts | Partner Organizations Department of Ecology Environmental Protection Agency | A10, A11 |
| A11. Chemical Action Plan for PCB  | Department of Ecology  | **FUNDED FY 2013 – 2014****COMPLETE 2015** | A8, A9, A10 |
| A.12 Identification of PCB Sources Associated with Fish Hatchery/Aquaculture Permits***NEW: Control Action 5.1.4 Fish Hatchery/Aquaculture Permits*** |  |  |  |
| A.13 Identification of Sites of Concern for Contaminated Groundwater***NEW: Control Action 5.14, ”Sites of Concern for Contaminated Groundwater”*** |  |  |  |

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| **Appendix B: Identification of Best Management Practices** |  |  |  |
| **Title** | **Partner Organizations** | **Funding Options** | **Related to:** |
| B1. Identification of Best Management Practices for Reducing PCB Sources | Spokane River Stewardship PartnersDepartment of Ecology Idaho Department of Environmental QualityEnvironmental Protection AgencyScientific Organizations/AcademiaOther Watersheds (Delaware basin, Duwamish, Puget Sound, Portland Harbor, etc.) | **COMPLETE 2016** | A1, A2 , A3, A4, A5, A6  |
| B2. Research: Biochar Treatment Technology | Department of Ecology Idaho Dept. of Environmental QualityEnvironmental Protection AgencyWashington State UniversityAcademiaTreatment Technology Suppliers/ExpertsOther Watersheds | Spokane River Stewardship PartnersDepartment of Ecology Environmental Protection AgencyPartner Organization in-kind contributionsAcademiaTreatment Technology Suppliers/Experts (Pilot testing of technologies and/or in-kind services). | D9 |

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| **Title** | **Partner Organizations** | **Funding Options** | **Related to:** |
| B3. Research: Algae Treatment Technology | Spokane River Stewardship PartnersDepartment of Ecology Idaho Dept. of Environmental QualityEnvironmental Protection AgencyAcademiaTreatment Technology Suppliers/ExpertsOther Watersheds | Inland Empire Paper - Spokane River Stewardship PartnersDepartment of Ecology Environmental Protection AgencyPartner Organization in-kind contributionsAcademiaTreatment Technology Suppliers/Experts (For pilot testing of technologies and/or in-kind services) | D10 |
| B4. Best Management Practice: Demolition standards***NEW: Control Action 5.13 of the Comprehensive Plan, “Building Demolition and Renovation Control”*** | Department of Ecology Idaho Dept. of Environmental QualityEnvironmental Protection AgencySpokane Regional Clean Air AgencyVarious Contracting/Construction/Environmental Mitigation Organizations | Department of Ecology Environmental Protection AgencyPartner Organization in-kind contributions | A10 |
| B5. Best Management Practice: Stormwater Treatment and Infiltration***NEW: Control Action 5.12, “Emerging End of Pipe Stormwater Technologies”***  | Spokane River Stewardship Partners Department of Ecology Idaho Dept. of Environmental QualityEnvironmental Protection Agency | Spokane River Stewardship Partners Department of Ecology Environmental Protection AgencyPartner Organization in-kind contributions | D9 City of Spokane Integrated Plan |

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| **Title** | **Partner Organizations** | **Funding Options** | **Related to:** |
| B6. Enhanced Treatment at Wastewater Treatment Facilities***NEW: Control Action 5.1, “Wastewater Treatment”*** | Spokane River Stewardship Partners Department of Ecology Idaho Department of Environmental QualityEnvironmental Protection Agency | Spokane River Stewardship Partners Ecology State Revolving Fund | *Next Level of Treatment*D10 |
| B7. Urban Waters Initiative *Implemented, ongoing.****NEW: Future Control Action 6.2.8, “Stormwater Source Tracing”*** | Department of EcologySpokane Regional Health District.Spokane River ForumSpokane Aquifer Joint Board | **FUNDED FY Pre2012 - 2017** |  |
| B8. PCB-Free Motor Oil | Department of EcologySpokane Regional Health District.Spokane River Forum | Department of EcologyEnvironmental Protection AgencySmall Business grants and loans | C4 |
| B9. PCB-Free Personal Care Products | Department of EcologyThe Lands Council | Department of EcologyEnvironmental Protection AgencyFoundation Grants | A8, A9, C4 |

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| **Appendix C: Implementation-- Strategic Actions** |  |  |  |
| **Title** | **Partner Organizations** | **Funding Options** | **Related to:** |
| C1. Facilitation of the Spokane River Regional Toxics Task Force | Spokane River Stewardship PartnersDepartment of Ecology Idaho Dept. of Environmental QualityEnvironmental Protection AgencyOther Regulatory Agencies (SDOH, DOT, etc.)Conservation Groups  | Spokane River Stewardship PartnersDepartment of Ecology Environmental Protection AgencyPartner Organization in-kind contributions |  |
| C2. Evaluation of Regulatory Barriers to PCB Source Reduction | Department of Ecology Idaho Dept. of Environmental QualityEnvironmental Protection Agency | Department of Ecology Idaho Dept. of Environmental QualityEnvironmental Protection Agency | A9,C4, D1  |
| C3. Agency Messaging | Department of Ecology Idaho Dept. of Environmental QualityEnvironmental Protection Agency | Department of Ecology Idaho Dept. of Environmental QualityEnvironmental Protection Agency | A9,C4, D1  |
| C4. Education and Outreach***NEW: Control Action 5.9, “Waste Disposal Assistance”******NEW: Control Action 6.2.1, “Education on Septic Disposal”*** | Spokane River Stewardship PartnersDepartment of Ecology Idaho Dept. of Environmental QualityEnvironmental Protection AgencyHealth Departments | City of Spokane and Spokane River Stewardship PartnersDepartment of Ecology Environmental Protection AgencyPartner Organization in-kind contributions | A9, C3, D1  |

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| **Title** | **Partner Organizations** | **Funding Options** | **Related to:** |
| C5. Integrated Clean Water Planning***NEW: Control Action 5.3.2, “City of Spokane’s Integrated Clean Water Plan”*** | City of SpokaneWashington and Idaho Municipal Dischargers and Stormwater AgenciesDepartment of Ecology Idaho Dept. of Environmental QualityEnvironmental Protection Agency | City of SpokaneDepartment of Ecology Environmental Protection AgencyPartner Organization in-kind contributions | B5  |
| C6. Align PCB Standards between Environmental Programs | Spokane River Stewardship PartnersDepartment of Ecology Idaho Dept. of Environmental QualityEnvironmental Protection Agency | Spokane River Stewardship PartnersDepartment of Ecology Environmental Protection AgencyPartner Organization in kind contributions | A2, A5, A6  |

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| **Appendix D: Implementation: Watershed Actions** |  |  |  |
| D1. Consumer Choice Education and Labeling | Spokane River Stewardship PartnersDepartment of Ecology Idaho Dept. of Environmental QualityEnvironmental Protection Agency | The Comprehensive Plan identified a “PCB Product Labeling Law” as not considered for future implementation. | A9, C3, C4 |
| D2. Green Purchasing: Agency Programs***NEW: Control Action 5.6, “Purchasing Standards”*** | Department of Ecology | Spokane River Stewardship PartnersDepartment of Ecology Environmental Protection AgencyPartner Organization in-kind contributions | A8, A9, C4, D1  |
| D3. Toxic Substances Control Act Regulatory Reform***NEW: Control Action 5.10, “Regulatory Rulemaking”*** | Spokane River Stewardship PartnersDepartment of Ecology Idaho Dept. of Environmental QualityEnvironmental Protection Agency | Spokane River Stewardship PartnersDepartment of Ecology Environmental Protection AgencyPartner Organization in-kind contributions | A8, A9 , A10, A11, D4, D5, D6  |

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| **Title** | **Partner Organizations** | **Funding Options** | **Related to:** |
| D4. Green Chemistry: PCB Free Pigments***NEW: Control Action 5.7, “Support of Green Chemistry Alternatives”*** | Spokane River Stewardship PartnersDepartment of Ecology Idaho Dept. of Environmental QualityEnvironmental Protection Agency | Inland Empire Paper - Spokane River Stewardship PartnersDepartment of Ecology Environmental Protection AgencyPartner Organization in-kind contributions | D5 |
| D5. Elimination of PCB from Pigments***NEW: Control Action 5.10, “Regulatory Rulemaking”*** | Inland Empire Paper Co. - Spokane River Stewardship PartnersDepartment of Ecology Idaho Dept. of Environmental QualityEnvironmental Protection AgencyOther stakeholder organizations Chemical/Pigment Manufacturers  | Spokane River Stewardship PartnersDepartment of Ecology Environmental Protection AgencyPartner Organization in-kind contributionsChemical/Pigment Manufacturers (In kind to find PCB-free alternatives) | D3, D5, D6  |
| D6. Elimination of PCB from other sources | Spokane River Stewardship PartnersDepartment of Ecology Idaho Dept. of Environmental QualityEnvironmental Protection AgencyOther stakeholder organizations Chemical/Pigment Manufacturers | Spokane River Stewardship PartnersDepartment of Ecology Environmental Protection AgencyPartner Organization in-kind contributionsChemical/Pigment Manufacturers | A8, A9, A10, A11, D4, D3, D6, D5  |

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| **Title** | **Partner Organizations** | **Funding Options** | **Related to:** |
| D7. Align Analytical Methodologies | Spokane River Stewardship PartnersDepartment of Ecology Idaho Dept. of Environmental QualityEnvironmental Protection Agency  | Spokane River Stewardship PartnersDepartment of Ecology Environmental Protection AgencyPartner Organization in-kind contributions | C2, C6, A2, A5, A6  |
| D8. Align PCB Standards between Environmental Programs | Spokane River Stewardship PartnersDepartment of Ecology Idaho Dept. of Environmental QualityEnvironmental Protection Agency | Spokane River Stewardship PartnersDepartment of Ecology Environmental Protection AgencyPartner Organization in-kind contributions | C2, C6, A2, A5, A6  |
| D9. Identify Potential Research for Stormwater Abatement/Treatment Technologies***NEW: Future Control Action 6.2.4, “Emerging Wastewater Technology”*** | Spokane River Stewardship PartnersDepartment of Ecology Idaho Dept. of Environmental QualityEnvironmental Protection AgencyResponsible Source ContributorsAcademiaScientific and Trade OrganizationsWater Environment Federation | Spokane River Stewardship PartnersDepartment of Ecology Environmental Protection AgencyPartner Organization in-kind contributionsWater Environment Research Foundation Grants | C4, B5  |

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| **Title** | **Partner Organizations** | **Funding Options** | **Related to:** |
| D10. Identify Potential Research for Wastewater Treatment/Abatement Technologies | Spokane River Stewardship PartnersDepartment of Ecology Idaho Dept. of Environmental QualityEnvironmental Protection AgencyResponsible Source ContributorsAcademiaScientific and Trade OrganizationsWater Environment Federation | Spokane River Stewardship PartnersDepartment of Ecology Environmental Protection AgencyWater Environment Research Foundation GrantsPartner Organization in-kind contributions | C5, B6 |
| D11. Remediate Known Contaminated Sites***NEW: Control Action 5.2 “Remediate Known Contaminated Sites”*** |  |  |  |
| D12. Stormwater Controls***\*Currently Funded by MS4 Permittees\*******NEW: Control Action 5.3.1“Stormwater Controls”*** |  |  |  |
| D13. Low Impact Development Ordinance***NEW: Control Action 5.4, “Low Impact Development Ordinance”*** |  |  |  |
| D14. Accelerated Sewer Construction***NEW: Future Control Action 6.2.3, “Accelerated Sewer Construction”*** |  |  |  |

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| **Title** | **Partner Organizations** | **Funding Options** | **Related to:** |
| D15. Manage PCB Sources***NEW: Future Control Action 6.2.5, “Survey of Local Electrical Equipment”******NEW: Future Control Action 6.2.6, “Leak Prevention/Detection in Electrical Equipment”******NEW: Future Control Action 6.2.7, “Regulation of Waste Disposal”******NEW: Future Control Action 6.2.10, “PCB Identification during Inspections”*** |  |  |  |
| D16. Removal of Carp from Lake Spokane***NEW: Future Control Action 6.2.9, “Removal of Carp from Lake Spokane*** | Washington State Department of EcologyWashington State Department of HealthAvista | Department of EcologyAvista |  |
| D17. Street Sweeping***NEW: Existing Control Action 5.5, “Street Sweeping”******\*Funded by Municipalities and Agencies\**** | City of SpokaneCity of Post FallsCity of Spokane ValleyCity of Coeur d’AleneSpokane CountyWashington Department of Transportation | City of SpokaneCity of Post FallsCity of Spokane ValleyCity of Coeur d’AleneSpokane CountyWashington Department of Transportation |  |

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| **Appendix E: Assessment of Progress** |  |  |  |
| E1. Environmental Assessment and Toxics Monitoring | Spokane River Stewardship PartnersDepartment of Ecology Idaho Dept. of Environmental QualityEnvironmental Protection AgencyOther stakeholders | Department of Ecology Environmental Protection AgencyPartner Organization in-kind contributions | A2, A3, A7, A4, A5, A6  |
| E2. Toxics Management Plans: Implementation***NEW: Control Action 5.1, “Wastewater Treatment”*** | Spokane River Stewardship PartnersDepartment of Ecology Idaho Dept. of Environmental QualityEnvironmental Protection Agency | Spokane River Stewardship PartnersPartner Organization in-kind contributions | A9, A10, A11, B1, B4, B5, C2, C3, C4, C5, D1, D2, D6, D9, D10, E1 |
| E3. Municipal and Industrial NPDES Wastewater Discharge Solutions***NEW: Control Action 5.1, “Wastewater Treatment”*** | Spokane River Stewardship PartnersDepartment of Ecology Idaho Dept. of Environmental QualityEnvironmental Protection Agency | Spokane River Stewardship PartnersOther stakeholders | D10  |
| E4. Compliance with PCB Regulations***NEW: Control Action 5.11, “Compliance with PCB Regulations”******NEW: Future Control Action 6.2..11, “Compliance with PCB Regulations”*** |  |  |  |
| E5. Implementation Effectiveness Assessment***NEW: Control Action 6.1, “Implementation Effectiveness Assessment”*** |  |  |  |

Appendix A: Toxics Source Characterization

Where are the toxics (PCBs and dioxins) coming from, how do they move through the environment, and how do they enter the river?

### A1. Identify Existing PCB Sources, Loads, and Sinks in the Spokane River Watershed: Data Gaps Analysis

***\*Currently Funded by members of the SRSP and the Department of Ecology\****

*Problem Statement:* The Spokane River has been the subject of toxics investigations for more than 20 years. The most recent assessment of the river noted that approximately half of the PCB inputs to the Spokane River are unaccounted for and the movement of PCBs through the Spokane River Watershed is not well-understood. Since 2012 the SRRTTF has engaged in a number of studies intended to address the data gaps. The Comprehensive Plan[[2]](#footnote-2) contains a summary of the findings and Section 6.3 recommends additional studies to address data gaps.

#### Key Data Gaps from the Comprehensive Plan

Key data gaps identified by the Task Force correspond to bioaccumulation of PCBs in fish and assessment of sediment PCB concentrations. Measured water column PCB concentrations in the Spokane River are currently at levels similar to, and often below, the listed water quality standard. Fish tissue concentrations, however, remain well above target levels.

There is also a commonly held assumption that legacy bottom sediments are not a significant contributor to PCB impairment of the Spokane River because: 1) The River is viewed as sediment-poor, with many non-depositional zones, and 2) Remediation activities have been conducted at areas of known legacy sediment contamination. This assumption may not be accurate, however, as there are known areas of sediment deposition in impounded sections of the river that have not been sufficiently sampled to provide a clear understanding of sediment PCB contributions. Furthermore, assessment of congener patterns in PCB sources, bottom sediments, and fish may provide insight on the sources most responsible for existing fish tissue levels.

#### Proposed Study Plan

The Task Force intends to address these key data gaps in a three step process, consisting of: 1) Screening-level mining of existing data, 2) Formatting of data, 3) More rigorous assessment. Results of the screening analyses will inform understanding of the importance of water column vs. sediment sources in contributing to fish tissue contamination, and likely sources of PCBs to sediments and fish. These high-level results will also help target areas where more rigorous assessment is needed. Rigorous assessment of PCB congener patterns require the data to be stored in a particular format that is different from the format currently used to store the data. The second phase of work will consist of compiling and formatting all relevant data into a database into the required format. The final phase of work will consist of the implementation of more rigorous studies that are identified as part of the screening level assessment. Details regarding the specific scope and schedule for this work will be developed by the Task Force’s Technical Track Work Group.

*Partner Organizations:*

Spokane River Stewardship Partners

Department of Ecology

Idaho Department of Environmental Quality

Environmental Protection Agency

Responsible Source Contributors

Academia

Scientific and Trade Organizations

*Funded by:*

Spokane River Stewardship Partners

Department of Ecology

Academia

Scientific and Trade Organizations

Partner Organization in-kind contributions

*Related Activities: A2, A3, A4, A5 and A6 .*

A2. Ensure Quality of Source Characterization Activities

***\*Currently Funded by members of the SRSP and the Department of Ecology\****

*Problem Statement:* The SRRTTF desires to have accurate, precise, and comparable data for evaluation of the sources of toxics (PCB and dioxin) in the Spokane River. LimnoTech, Inc. has been hired by the SRRTTF as an independent consultant to assist with the source characterization. A Quality Assurance Project Plan and Sampling Analysis Plan have been prepared and is used to ensure data quality for source characterization activities.

*Partner Organizations:*

Spokane River Stewardship Partners

Department of Ecology

Idaho Department of Environmental Quality

Environmental Protection Agency

Academia

Scientific and Trade Organizations

*Funded by:*

Spokane River Stewardship Partners

Department of Ecology

Partner Organization in-kind contributions

Academia

Scientific and Trade Organizations

*Related Activities: A1 , A3 , A4 , A5 and A6*

### A3. Identify the Appropriate Source Characterization Modeling Tool for the Spokane River Watershed

*Problem Statement:* Water quality modeling can be a cost effective tool that leads to an understanding of how toxic substances behave in the watershed. Water quality models have been used to simulate the major physical, chemical, and biological processes that occur in a system. LimnoTech, Inc., as an independent consultant to the SRRTTF, identified the modeling tool that was used to evaluate the watershed (Task 7, Phase 1b of the [Technical Consultant Work Plan](http://srrttf.org/?page_id=1632)).

*Partner Organizations:*

Spokane River Stewardship Partners

Department of Ecology

Idaho Department of Environmental Quality

Environmental Protection Agency

*Funded by:*

Spokane River Stewardship Partners

Department of Ecology

Partner Organization in-kind contributions

*Related Activities: A1, A2 , A7 , A4 , A5 and A6*

### A4. Understand the Fate and Transport of PCB in the Watershed

*Problem Statement:* There is an incomplete understanding about how PCB enters and moves through the Spokane River watershed. LimnoTech, Inc., as an independent consultant to the SRRTTF applied the selected water quality model in order to describe the sources and sinks of PCB in the watershed. (Phase 3 of the [Technical Consultant Work Plan](http://srrttf.org/?page_id=1632)).

*Partner Organizations:*

Spokane River Stewardship Partners

Department of Ecology

Idaho Department of Environmental Quality

Environmental Protection Agency

*Potential funding sources:*

Spokane River Stewardship Partners

Department of Ecology

Idaho Department of Environmental Quality

Environmental Protection Agency

Partner Organization in-kind contributions

*Related Activities: A1, A2, A3, A7, A5 and A6*

### A5. Collect Watershed Data Phase 1

*Problem Statement:* The Spokane River has been the subject of toxics investigations for more than 20 years. The most recent assessment of the river noted that approximately half of the PCB inputs to the Spokane River are unaccounted for and the movement of PCB through the Spokane River Watershed is not well-understood. In order to characterize the inputs of PCBs and dioxins to the Spokane River, LimnoTech, Inc., developed a data collection strategy, the Quality Assurance Project Plan and Sampling Analysis Plan for the Spokane River studies (Tasks 8 and 9, Phase 1b and of the [Technical Consultant Work Plan](http://srrttf.org/?page_id=1632)).

*Partner Organizations:*

Spokane River Stewardship Partners

Department of Ecology

Idaho Department of Environmental Quality

Environmental Protection Agency

*Potential funding sources:*

Spokane River Stewardship Partners

Department of Ecology

Environmental Protection Agency

Partner Organization in-kind contributions

*Related Activities: A1, A2, A3, A4, A6*

### A6. Collect Watershed Data Phase 2

*Problem Statement:* The Spokane River has been the subject of toxics investigations for more than 20 years. The most recent assessment of the river noted that approximately half of the PCB inputs to the Spokane River are unaccounted for and the movement of PCB through the Spokane River Watershed is not well-understood. The SRRTTF desires to collect the necessary data needed to characterize the inputs of PCBs and dioxins to the Spokane River. This involves the collection of data in the Spokane Watershed in accordance with SRRTTF’s data collection strategy, and approved Quality Assurance Project Plan(s). (Phase 2 of the [Technical Consultant Work Plan](http://srrttf.org/?page_id=1632))

*Partner Organizations:*

Spokane River Stewardship Partners

Department of Ecology

Idaho Department of Environmental Quality

Environmental Protection Agency

*Potential funding sources:*

Spokane River Stewardship Partners

Department of Ecology

Environmental Protection Agency

Partner Organization in-kind contributions

*Related Activities: A1, A2, A3, A4, A5*

### A7. Understand the Role of Atmospheric Deposition as a Source to the Spokane River from global, regional, and local sources.

*Problem Statement:* The Department of Ecology conducted a literature search identifying the potential for atmospheric deposition of PCB to the watershed. Environmental studies in the watershed have also shown correlations with snow, rainfall, stormwater, and seasonal relationships. These sources (global, regional, and local) are not well understood. In 2016-2017 the Ecology’s Environmental Assessment Program initiated an atmospheric deposition study in order to gain a better understanding of the quantity and composition of atmospheric PCB deposition.

*Partner Organizations:*

Department of Ecology

Idaho Department of Environmental Quality

Environmental Protection Agency

Spokane Regional Clean Air Agency

Academia

*Potential Funding Sources:*

Department of Ecology

Environmental Protection Agency

Partner Organization in-kind contributions

Academia

*Related Activities: A3, A4*

### A8. Identify List of “Inadvertently Produced” PCBs

*Problem Statement:* In 40 Code of Federal Regulations (CFR) , Part 761.3, the regulation states that “inadvertently produced” PCBs may be present in a manufacture process at an average concentration of 25 ppm up to 50 ppm maximum. This amount is 781,250,000 times greater than EPA’s Human Health Water Quality Criteria (HHWQC) of 64 pg/L (parts per quadrillion). A 1983 publication by USEPA cites a report from Versar, Inc. stating that there are more than 200 chemical processes that can result in the production of “inadvertently produced” PCBs. Appendix A in the publication provides a general list of the chemical intermediates which could contain PCB. It does not, however, contain a list of the 200 chemical processes. Consumer products and other sources containing these allowable inadvertently produced PCBs are entering the environment through many different mechanisms (municipal wastewater, stormwater, paper recycling, ambient distribution and deposition). Further information is needed to identify the relevancy of this list and prioritize processes, chemicals, and products that could be contributing PCB to the environment.

*Partner Organizations:*

Environmental Protection Agency

Department of Ecology

Universities and Research Organizations

Chemical Manufacturers and Trade Organizations

*Potential funding sources:*

Environmental Protection Agency

Department of Ecology

Non-profit organizations and Foundations

*Related Activities: A9, A10, A11*

### A9. Product List of Consumer Products that May Contain PCB

*Problem Statement:* Literature review and preliminary work done by SRRTTF participants have identified that PCB may be present in consumer products that are routinely purchased through retail outlets and used in the Spokane watershed. Disposal of these products through the sanitary sewer or storm drain system is a conduit for introduction of PCB to the river. More information is needed to identify and quantify the levels of PCB in commonly used products. This information can be used for source assessment, development of Best Management Practices, consumer choice campaigns, health education, and support of the Toxics Substances Control Act regulatory reform.

The Comprehensive Plan identifies the following actions that have been taken since 2012:

* PCBs in Municipal Products (City of Spokane): More than 40 product samples were collected and analyzed for PCBs using EPA Method 1668C. The majority of the samples were composed of roadway, pipe, and vehicle maintenance products. Because PCBs are also ubiquitously detected in sanitary wastewater samples, five personal care products were sampled as well. PCBs were detected in 39 of the 41 product samples, with a wide range of congener patterns. PCB-11 was one of the most frequently detected congeners. Because it is generally found in pigments and not found in Aroclor mixes, pigments are likely a common source of inadvertently produced PCBs in the products sampled.
* PCBs in General Consumer Products: Ecology evaluated the presence of PCBs in general consumer products, with particular emphasis placed on products likely to be contaminated with PCBs due to the inadvertent production of PCBs in the manufacturing process (e.g., paints, newspapers, glossy magazines, cereal boxes, and yellow plastic bags). Sixty-eight products were tested for PCBs. PCB-11 was found in a wide range of product types and at measurable concentrations, indicating that consumer products are a continuing source of PCB contamination and that generation of PCB-11 is mostly an unregulated source of PCB contamination.
* Hydroseed Pilot Project: In response to high levels of PCBs in Hydroseed identified during initial product testing by the City of Spokane (2015a), the Task Force undertook a Hydroseed Analysis and Reformulation PCB Removal Pilot Project. The purpose of this study was to confirm the elevated levels observed from the City’s original analysis and to identify specific component(s) that may be contributing to these elevated levels. Results from this analysis are intended to be used to assist manufacturers of Hydroseed to develop specifications and/or reformulations with reduced levels of PCBs.

Control Action 5.8 identifies that the Task Force will provide additional support to existing Product Testing efforts as follows:

* Provide guidance and feedback to Ecology, including comments on the forthcoming PCB product testing report.
* Support Ecology in its development of a centralized clearinghouse containing PCB product testing information.
* Conduct public education on products containing PCBs.

*Partner Organizations:*

Municipal and industrial dischargers

Department of Ecology

Environmental Protection Agency

Chemical Manufacturers and Trade Organizations

*Potential funding sources:*

Partner Organizations

Department of Ecology

Environmental Protection Agency

Chemical Manufacturers and Trade Organizations

*Related Activities: A8, A10, A11, C4, D1, D2, D5*

### A10. PCB in Caulks

*Problem Statement:* In recent years, EPA has learned that caulk containing potentially harmful levels of PCBs was used in many buildings, including schools, in the 1950s through the 1970s. Most schools and buildings built after 1979 do not show significant levels of PCBs in caulk. On September 25, 2009, EPA announced new guidance for school administrators and building managers with important information about managing PCBs in caulk and tools to help minimize possible exposure. More information is needed in the Spokane watershed regarding the presence of PCBs in caulk in schools, public buildings, and buildings undergoing demolition. Through [EPA PCB Regional Coordinators](http://www.epa.gov/epawaste/hazard/tsd/pcbs/pubs/coordin.htm), the Agency plans to assist communities in identifying potential problems and, if necessary, developing plans for PCB testing and removal.

#### Future Control Action: Survey Schools and Public Buildings

Control Action 6.2.2 consists of programs designed to survey PCB-containing materials in schools/public buildings and enact a program to dispose of them properly or implement encapsulation.

*Partner Organizations:*

Environmental Protection Agency

Department of Ecology

Spokane Regional Health District

Local School Districts

*Potential funding sources:*

Partner Organizations

Department of Ecology

Environmental Protection Agency

*Related Activities: A10, A11*

### A11. Chemical Action Plan for PCB

***\*Funded by Department of Ecology\****

*Problem Statement:* Persistent, bioaccumulative toxics (PBTs) are a distinct group of chemicals that threaten the health of people and the environment. PCB is an example of a PBT. PBTs are considered the "worst of the worst" and raise special challenges for our society and the environment because:

* They remain in the environment for a long time without breaking down (persistent).
* Animals and people accumulate PBTs in their bodies. As these chemicals move up the food chain, they increase in concentration, and linger for generations in people and the environment (bioaccumulate).
* Exposure to PBTs has been linked to a wide range of toxic effects in fish, wildlife, and humans, including effects on the nervous system, reproductive and developmental problems, immune-response suppression, cancer, and endocrine disruption (toxic).
* PBTs can travel long distances and generally move easily between air, water and land, spanning boundaries of programs, geography, and generations.

The PBT Initiative focuses on one toxic substance at a time through the development of a Chemical Action Plan. A Chemical Action Plan (CAP) is a comprehensive plan to identify, characterize and evaluate all uses and releases of a specific PBT, a group of PBTs or metals of concern. A CAP is a plan, not legislation or a rule. It recommends actions to protect human health and the environment. Some of the recommendations may lead to new legislation or rules. These would go through the normal legislative or rulemaking process.

The Department of Ecology completed a PCB CAP in 2015, in collaboration with other agencies and experts representing various businesses, agricultural and advocacy sectors.

*Partner Organizations:*

Municipal and industrial dischargers

Department of Ecology

Environmental Protection Agency

*Funded by:*

Department of Ecology

*Related Activities: A8, A9, A10*

### A.12 Identification of PCB Sources Associated with Fish Hatchery/Aquaculture Permits

*Problem Statement:* Two general NPDES permits apply to facilities located in the Spokane River watershed, the Upland Fin- Fish Hatching and Rearing General Permit, and the general NPDES permit (WAG130000) for Federal Aquaculture Facilities and Aquaculture Facilities located in Indian Country.

Upland Fin-Fish Hatching and Rearing General Permit: The general NPDES permit (WAG137007), Upland Fin-Fish Hatching and Rearing General Permit, has an effective date of April 1, 2016, and an expiration date of March 31, 2021. This permit applies to upland aquaculture facilities or operations that discharge fish rearing water to a surface water body or a system that drains to a surface water body, which meet specific coverage requirements described in the permit. This permit applies to the Washington Department of Fish and Wildlife’s Spokane Fish Hatchery, which discharges to the Little Spokane River. The permit also applies to the Troutlodge hatchery in Soap Lake, which provides fish to be stocked in the Spokane River.

The permit describes PCB Reduction Activities and BMPs to eliminate, to the maximum extent possible, the release of PCBs from any known sources in the facility, including paint, caulk, or feed that come in contact with water. New and existing facilities have different timelines, but the same requirements. These requirements are summarized below.

The permittee must assess the facility for the presence of paint or caulk manufactured prior to 1980, and evaluate if any of these sources come in contact with water and could contribute to a discharge of PCBs to surface waters. A copy of the assessment report must be submitted to Ecology and include information regarding pre-1980 caulk and paint usage and location in the facility, amounts of stored caulk or paint at the facility, and PCB material removed from hatchery use but still on-site. The permittee must then submit a plan that is consistent with USEPA guidance for the proper removal and disposal of all pre-1980 paint and caulk that comes in contact with water or occurs as waste on-site, and also submit documentation to Ecology. The paint and caulk removal plan may contain documentation that paint or caulk onsite does not contain PCBs as an alternative to their removal, or has no chance of coming in contact with water and being discharged to surface water.

The Permittee is required to use any available product testing data to preferentially purchase paint, caulk, and construction materials with the lowest practicable total PCB concentration.

The permittee must develop, implement, and submit a plan to Ecology to reduce PCBs in the facility discharge from fish feed and feeding activities. The plan must contain purchasing procedures that give preference for fish food that contains the lowest amount of PCBs that is economically and practically feasible, fish feeding practices that minimize the discharge of unconsumed food, and methods to reduce and remove accumulated fish feed regularly to keep feed out of the discharge. Additionally, permittees must request PCB content information from fish food suppliers and include this in the Best Management Practices Plan. State-run facilities must comply with RCW 39.26.280(2) that prohibits a state agency of knowingly purchasing products containing PCBs above quantitation levels unless it is not cost-effective or feasible to do so.

Within the site-specific Pollution Prevention Plan, which is submitted to Ecology, permittees must address ongoing PCB reduction activities as they relate to food, construction, and operational and equipment purchases, including paint and caulk.

NPDES permit (WAG130000) for Federal Aquaculture Facilities and Aquaculture Facilities located in Indian Country: The general NPDES permit (WAG130000) for Federal Aquaculture Facilities and Aquaculture Facilities located in Indian Country has permit requirements related to PCBs. Within the Spokane watershed, this permit applies to the Ford State Fish Hatchery and Spokane Tribal Hatchery. Some requirements apply to all permittees, and a subset applies only to permittees that discharge to waters in WRIA 54 (Lower Spokane) and WRIA 57 (Middle Spokane). These are generally described below.

All facilities that discharge to waters in the Lower Spokane and Middle Spokane watersheds must:

* Monitor their effluent for PCB congeners. This currently applies to the Ford State Fish Hatchery and Spokane Tribal Hatchery. Total concentration of dioxin-like PCB congeners and a complete congener analysis must be reported.
* Use any available product testing data to preferentially purchase paint and caulk with the lowest practicable total PCB concentrations.
* Facilities in the Spokane River area must also request PCB content information from fish food suppliers and include documentation of that request in their files.

All facilities must develop and implement a BMP plan (and annually review the plan) that meets specific requirements, including the following that apply to PCBs:

* Implement procedures to eliminate the release of PCBs from any known sources in the facility.
* Implement purchasing procedures that give preference for fish food that contains the lowest amount of PCBs that is economically and practically feasible.

*Partner Organizations:*

*Funded by:*

*Related Activities:*

### A.13 Identification of Sites of Concern for Contaminated Groundwater

Ecology has identified and initiated remediation activities on several sites believed to be contributing PCBs to the Spokane River. Activities conducted on behalf of the Task Force have identified the potential for additional sites of potential concern; specifically:

* Assessment of groundwater PCB data collected up-gradient of the known Kaiser groundwater contamination indicates the potential for a significant groundwater loading source independent of the Kaiser remediation.
* Homolog-specific mass balance analyses conducted with the 2015 and 2016 synoptic river survey data indicate the potential presence of a groundwater PCB loading source entering the river downstream of the Trent Avenue Bridge.
* Cleanup targets for many TCP sites are based on levels necessary to protect groundwater as a drinking water supply (adjusted for the Practical Quantitation Limit), and are not necessarily protective of river water quality standards. For example, the groundwater cleanup target concentration at the City Parcel and GE sites (0.1 ug/L) is approximately 600 times higher than the river water quality standard of 170 pg/l. Given that sites that have received No Further Action (NFA) designation may still contain groundwater PCB concentrations orders of magnitude higher than safe river concentrations, these sites have the potential to contribute to water quality standard violations in the Spokane River. Marti and Maggi (2015) identified 23 TCP sites with confirmed releases of PCBs to soil and/or groundwater that may merit further investigation in terms of potential to contribute problematic levels of PCBs to the Spokane River. There is also an EPA Superfund site consisting of a former oil recycling facility in Kootenai County, Idaho, near Rathdrum, where PCBs were a contaminant. Post-removal (1991) concentrations of PCBs (Aroclor 1260) in surface soil samples were generally non-detect, but there was one detection at 0.075 mg/kg.

Because these additional sites have the potential to cause or contribute to PCB impairment of the Spokane River, it is important to: 1) Determine whether they have the potential to be significant contributors of PCBs, and 2) Develop a plan for additional follow-up actions related to any source determined to be a potential contributor.

*Partner Organizations:*

*Funded by:*

*Related Activities:*

Appendix B

# Identification of Best Management Practices

What actions are needed to reduce the inputs of PCB and dioxins to the Spokane River?

### B1: Identification of Best Management Practices for Reducing PCB Sources

*Problem Statement:* The identification and implementation of Best Management Practices (BMPs) can be effective in reducing the input of PCBs to the river. BMPs, which are source-specific, can be identified from scientific literature. We may also identify inputs of PCB to the river that have not been fully investigated by the scientific community. A range of BMPs are needed and the SRRTTF may be on the leading edge with respect to BMP development. The needed BMPs can vary in the cost of implementation and expected pollutant removal efficiency. Modeling can be used to simulate a range of combinations of BMPs, and determine which specific mix of BMPs is required to meet pollutant targets. Based on modeling results, the specific mix of BMPs can be identified and included in a comprehensive source reduction plan.

In 2016 LimnoTech, Inc. completed the Comprehensive Plan, which was approved by the SRRTTF. The plan summarizes the sources of PCBs in the Spokane River, identifies potential Control Actions, and recommends an implementation plan for measures to reduce PCBs in the Spokane River watershed. (Phase 4 of the Technical Consultant Work Plan)

*Partner Organizations:*

Spokane River Stewardship Partners

Department of Ecology

Idaho Department of Environmental Quality

Environmental Protection Agency

Scientific Organizations/Academia

Other Watersheds (Delaware basin, Duwamish, Puget Sound, Portland Harbor, etc.)

*Potential funding sources:*

Spokane River Stewardship Partners

Department of Ecology

Environmental Protection Agency

Partner Organization in-kind contributions

*Related Activities: A1, A2, A3 , A4 , A5, A6*

### B2. Research: Biochar Treatment Technology

*Problem Statement:* PCBs have been identified in urban stormwater runoff has been identified as a source of PCB. Unless PCBs are removed from the stormwater, the PCBs continue to remain in the environment. Biochar has been identified as a waste product that can be put to use in stormwater treatment. Further research is needed to find ways to use biochar in the treatment of stormwater, for removal and potential destruction of PCBs.

*Partner Organizations:*

Department of Ecology

Idaho Department of Environmental Quality

Environmental Protection Agency

Washington State University

Academia

Treatment Technology Suppliers/Experts

Other Watersheds

*Potential funding sources:*

Spokane River Stewardship Partners

Department of Ecology

Environmental Protection Agency

Partner Organization in-kind contributions

Academia

Treatment Technology Suppliers/Experts (Pilot testing of technologies and/or in-kind services).

*Related Activities:* D9

### B3: Research: Algae Treatment Technology

*Problem Statement:* Industrial and municipal wastewater require treatment to remove PCB. Algae can potentially be used to remove both PCB and phosphorus from wastewater. Further research is needed to identify how this technology can be used to reduce the loading of PCB to the Spokane River.

*Partner Organizations:*

Spokane River Stewardship Partners

Department of Ecology

Idaho Department of Environmental Quality

Environmental Protection Agency

Academia

Treatment Technology Suppliers/Experts

Other Watersheds

*Potential funding sources:*

Inland Empire Paper - Spokane River Stewardship Partners

Department of Ecology

Environmental Protection Agency

Partner Organization in-kind contributions

Academia

Treatment Technology Suppliers/Experts (For pilot testing of technologies and/or in-kind services)

*Related Activities:* D10.

### B4. Best Management Practice: Demolition standards

*Problem Statement:* PCB has been identified as a contaminant in concrete and caulk. The introduction of PCB to the environment can be mitigated by implementing best management practices for demolition. Once Best Management Practices have been identified for this PCB source, a combination of technical, regulatory, and local ordinances can be used to implement them within the Spokane watershed.

The Comprehensive Plan contains Control Action 5.13 “Building Demolition and Renovation Control” which provides educational materials that inform contractors of proper methods of management of PCB‐containing materials and waste during building demolition and renovation.

The San Francisco Estuary Institute (SFEI) conducted a study to estimate the total content of PCBs in caulk in buildings throughout the Bay Area and the potential load of PCBs from demolition and remodeling sources to San Francisco Bay (Klosterhaus et al., 2011). A companion project was led by the San Francisco Estuary Project (SFEP) and focused on how to reduce this load of PCBs (SFEP, 2011). They developed descriptions of several different management practices for managing PCBs in caulk during building demolition or remodeling, related to:

* Building Occupant Notification: communication of health and safety goals prior to beginning a project
* Worker Training: proper identification, handling and disposal of PCB-contaminated materials
* Personal Protective Equipment (PPE): protection of human health and limit the spread of contaminated materials
* Work Area Containment: prevention of the spread of contaminated dust
* Tools and Equipment: selection of appropriate tools that minimize dust generation
* Demolition: includes dust management, discharge of wastewater, and removal of other hazardous materials
* Site Erosion and Sediment Controls
* Work Area Housekeeping and End of Project
* Transport and Disposal

Control Action 5.13 identifies that the Task Force will:

1. Adapt the SFEP document to make it suitable for use as a guidance document for Spokane-area building contractors.

2. Work with relevant local government agencies responsible for permitting to ensure that the guidance document be distributed as part of all building permits related to building demolition and renovation.

*Partner Organizations:*

Department of Ecology

Idaho Department of Environmental Quality

Environmental Protection Agency

Spokane Regional Clean Air Agency

Various Contracting/Construction/Environmental Mitigation Organizations

*Potential funding sources:*

Department of Ecology

Environmental Protection Agency

Partner Organization in kind contributions

*Related Activities:* A10, B7, C4

### B5. Best Management Practice: Stormwater Treatment and Infiltration

*Problem Statement:* PCBs have been identified as a contaminant in stormwater. Municipal separate storm sewer systems (MS4s) convey stormwater to the Spokane River. One potential BMP to prevent PCBs from entering the river through stormwater is through treatment and infiltration. Many treatment technologies exist, including media filtration and other proprietary devices, low impact development, and conventional treatment.

The Comprehensive Plan contains Control Action 5.12: Emerging End of Pipe Stormwater Technologies

#### Existing Actions:

The Lands Council has begun an innovative mycology project that uses a native species of fungi, called white rot fungi, to break down persistent PCBs from stormwater. Because PCBs are chemically similar to the wood that these fungi naturally eat, the fungi can break down these chemicals without experiencing toxic effects. White rot fungi have been shown to break down PCBs under laboratory conditions, and The Lands Council is seeking to test this utility on a much larger scale in the field to identify the potential for WRF to be used to prevent PCBs from entering the Spokane River. If successful, this novel method could have broad implications for cost‐effective cleanup at contaminated sites. The Lands Council currently has a contract with the City of Spokane for an initial mycoremediation experiment, which is looking at ‘fungal treatment’ of vactor waste on a small scale. This experiment is ongoing, with results expected in early spring of 2017.

#### New Actions:

The existing experiment could be considered Phase 1 of a larger study. Specific activities to be conducted in upcoming phases will depend upon results of Phase 1. The Task Force will review Phase 1 findings and identify and/or support additional phases of research projects that meet Task Force goals. The specific nature of this support will be determined after Phase 1, and could include identification of grant opportunities, support to the Lands Council of pursuit of these grant opportunities, and/or other funding.

*Partner Organizations:*

Spokane River Stewardship Partners

Department of Ecology

Idaho Department of Environmental Quality

Environmental Protection Agency

*Potential Funding Sources:*

Spokane River Stewardship Partners

Department of Ecology

Environmental Protection Agency

Partner Organization in-kind contributions

*Related Activities:* D9,City of Spokane Integrated Plan

### B6. Enhanced Treatment at Wastewater Treatment Facilities

*Problem Statement:* PCBs have been identified as a contaminant in municipal wastewater. Several municipalities discharge treated effluent to the Spokane River. Dischargers have continually upgraded treatment plants over the past several decades to reduce pollutants entering the Spokane River through effluent. The Dissolved Oxygen TMDL on the Spokane River set strict wasteload allocations for phosphorus, CBOD, and ammonia, prompting wastewater treatment facilities to install sophisticated treatment technologies to meet these criteria. These technologies will also greatly reduce the concentration of PCBs in effluent. Spokane County’s new facility was designed to meet the DO TMDL wasteload allocations and consequently also has very low PCB concentrations. Enhanced treatment facilities are currently in the design phase in other municipalities and are anticipated to have a similar PCB reduction.

The Comprehensive Plan’s Control Action 5.1 consists of managing municipal and industrial NPDES permits regulate discharges from wastewater and industrial facilities in Washington and Idaho. The Washington and Idaho (EPA) NPDES permits require most wastewater facilities discharging to the Spokane River to develop and install treatment systems to reduce nutrient loading that will concurrently result in reductions of PCB loading. Additional permit requirements that relate to the monitoring and reduction of PCB loads are described for the following categories of permits: Idaho Municipal Permits, Washington Municipal Permits, Washington Industrial Permits.

*Partner Organizations:*

Spokane River Stewardship Partners

Department of Ecology

Idaho Department of Environmental Quality

Environmental Protection Agency

*Potential Funding Sources:*

Spokane River Stewardship Partners

*Related Activities: D10*

###  B7. Urban Waters Initiative

*Problem Statement:* The ecology of urban waters poses special challenges due to concentrated human activity over a long period of time. The typical urban environment exposes these waters – including their shores and sediments (mud at the bottom of the waterway) – to many sources of pollution. These sources include industry, businesses, municipal wastewater, stormwater, spills, marinas, septic systems and many other sources. In addition, the big urban populations next to these waters add pollution from households, ranging from cleaners to paints, to motor oil.

These pollutants cause many problems for urban waters: dirty shorelines and beaches; contamination of fish habitat; and toxic substances entering the food chain. Cleanups are expensive to business and taxpayers and polluted areas often cannot be used for development, industry or recreation. Pollutants have cycled through the environment over time making cleanup complicated and extend over decades.

The Washington Department of Ecology developed the Urban Waters Initiative to focus on the special environmental challenges faced by urban water bodies. The initiative gives a boost to ongoing efforts to find and control pollution sources before they enter these waters. The aim is to prevent contamination or re-contamination of waterways and lend additional resources to cleanup and research where needed. Re-contamination occurs when a polluted waterway that has already been cleaned up starts becoming polluted again.

The Spokane River Urban Waters Team is a cross-program unit within Ecology designed to fill knowledge gaps about the pollutants and then take action quickly and efficiently. The Urban Waters Team works with local utilities, industry, and the Spokane River Regional Toxics Task Force to assist with focusing source tracking, cleanup, and long term prevention efforts.

The Urban Waters Team also partners with the Spokane Regional Health District through the Local Source Control Partnership to tackle the business outreach branch of work. The Local Source Control specialists work with small businesses to identify and prevent pollution from reaching the river through sediment, storm drains, and combined sewers. In particular, the team is looking for pollutants that contain lead and other heavy metals, polychlorinated biphenyls (PCBs), PBDEs (flame retardants), dioxins and furans.

During visits to businesses specialists from the Urban Waters Team pay particular attention to the following practices:

* Industrial processes that generate wastewater
* Pretreatment of wastewater
* Hazardous and solid waste disposal
* Activities that are at high risk for generating pollution
* Spill prevention
* Maintenance of stormwater structures and registration of drywells
* Maintenance practices that take place outside
* Management of wash water
* Outdoor storage of products and waste

The Spokane Regional Health District works closely with The Spokane River Forum and Spokane Aquifer Joint Board to offer the EnviroStars business incentive program which recognizes businesses that have implemented practices and policies to properly manage hazardous waste and conserve resources.

A clean river is good for the community and good for business. Working together as a community, we will ensure that future generations have enough clean water to sustain a healthy lifestyle and economy.

#### Stormwater Source Testing

The Comprehensive Plan contains Future Control Action 6.2.8 that involves Ecology’s Urban Waters Initiative. A team of Ecology staff and specialists from the Spokane Regional Health District have sampled water and visited businesses along the river to identify sources of toxic chemicals, including PCBs. These studies are designed to identify potential hot spots (i.e., areas contributing an inordinately high amount of PCBs) that could be controlled in the future. This action consists of considering these source tracing activities to identify significant sources of PCBs to the Spokane stormwater system.

*Partner Organizations:*

Department of Ecology

Spokane Regional Health District.

*Funded by:*

Department of Ecology

Environmental Protection Agency

*Related Activities: B4*

### B8. PCB-Free Motor Oil

*Problem Statement:* Consumer motor oil can contain PCB. PCB in motor oil can reach the river through stormwater from improper disposal practices and from vehicles leaks and drips. Another source of PCB to the river is in motor oil used in 2-cycle engines, such as outboard motors. The use of PCB-free oil can be encouraged through market incentives, consumer education, and best management practices.

*Partner Organizations:*

Department of Ecology

Spokane Regional Health District.

Spokane River Forum

*Potential Funding Sources:*

Department of Ecology

Environmental Protection Agency

### B9. PCB-Free Personal Care Products

*Problem Statement:* Problem Statement:  Recently, manufacturing by-product PCBs have been identified in wastewater, sediments, and air in numerous locations. They have also been positively identified in testing of new products colored with such pigments, so it is clear these PCBs are not occurring as a result of legacy commercial mixtures. What is emerging is an increasingly complex picture of the prevalence of nonlegacy PCBs alongside the persisting environmental presence of legacy PCBs, and a concurrent and likewise complex picture of how PCBs can affect human health at very low levels of exposure. Health care products such as toothpaste, sunscreen, and even some foods containing pigments such as titanium dioxide may contain PCB's.  Chlorinated pigments are the likely source of the PCB's. More information is needed about the presence and extent of PCB's in these products.

*Partner Organizations:*

Department of Ecology

The Lands Council

*Potential Funding Sources:*

Department of Ecology

Environmental Protection Agency

Foundation Grants

Appendix C

# Implementation: Strategic Actions

What programmatic actions are needed to achieve reductions of PCB and dioxins to the river?

### C1. Facilitation of the Spokane River Regional Toxics Task Force

*Problem Statement:* The Spokane River Regional Toxics Task Force is an organization that is administered under a Memorandum of Agreement. A diverse set of organizations participate on the Task Force. Organizations that have a water discharge permit to the river are required to participate in the Task Force. Resources are needed to facilitate the meetings and activities of the organization, maintain communications, document Task Force activities, and maintain the public website.

*Partner Organizations:*

Spokane River Stewardship Partners

Department of Ecology

Idaho Department of Environmental Quality

Environmental Protection Agency

Other Regulatory Agencies (SDOH, DOT, etc.)

Conservation Groups

*Potential funding sources:*

Spokane River Stewardship Partners

Department of Ecology

Environmental Protection Agency

Partner Organization in-kind contributions

### C2. Evaluation of Regulatory Barriers to PCB Source Reduction

*Problem Statement:* PCB is regulated by a variety of agencies with differing and conflicting regulatory standards. Some regulatory standards at the state and federal level are not as stringent as the water quality standards. As a result, they can be barriers to achieving source reduction. Efforts are needed to identify and remove these barriers.

*Partner Organizations:*

Department of Ecology

Idaho Department of Environmental Quality

Environmental Protection Agency

*Potential funding sources:*

Department of Ecology

Environmental Protection Agency

Partner Organization in-kind contributions

Conservations Groups

Business and Industry

### C3. Agency Messaging

*Problem Statement:* State and federal agencies play an important role in the public message surrounding PCB. The manner in which PCB is presented on many websites does not include the topic of inadvertently produced PCB. As a result, the misleading message is that PCB is a “legacy” pollutant that results from the mismanagement of PCB wastes. A concerted effort is needed to modify the public information.

*Partner Organizations:*

Department of Ecology

Idaho Department of Environmental Quality

Environmental Protection Agency

*Potential funding sources:*

Department of Ecology

Idaho Department of Environmental Quality

Environmental Protection Agency

*Related Activities: A9 ,C4, D1*

### C4. Education and Outreach

*Problem Statement:* PCBs are ubiquitous in the environment. Education and outreach is needed to inform consumers about the presence of PCB in products that are used and disposed of in the watershed. A variety of education and outreach tools can be created depending on the desired message and target audience: health education, consumer education, etc. Education and outreach tools could include brochures, workshops, videos, TV commercials.

The Comprehensive Plan’s Control Action 5.9, Waste Disposal Assistance targets consumers and businesses that generate small quantities of PCBs.

#### Existing Actions

Several voluntary programs currently exist to assist consumers and businesses in properly disposing waste materials. The Spokane River Forum sponsors a Waste Directory (http://spokaneriver.net/wastedirectory/) that provides information describing which waste products may contain PCBs, as well as providing information on proper methods for disposing these materials. Spokane EnviroStars (http://spokaneenvirostars.org/) is a voluntary program that certifies local small businesses having practices and policies in place demonstrating proper management and reduction of hazardous and other waste.

In addition, the State of Washington has established a Mercury-Containing Lights Product Stewardship Program (Chapter 173-910 WAC) to collect and properly dispose of mercury-containing lights. While this program is currently targeted towards control of mercury, it could be adapted to also consider PCB-containing wastes. The States of Washington (http://www.ecy.wa.gov/programs/swfa/eproductrecycle/) and Idaho (http://www.deq.idaho.gov/waste-mgmt-remediation/hazardous-waste/electronic-waste/) also support programs to recycle electronic waste, which could address PCBs in small capacitors.

#### New Actions

* The Task Force will provide additional support to existing Waste Disposal Assistance efforts as follows:
* Provide recommendation to implementing organizations on how they can better control PCB-containing wastes
* Raise public awareness on how to identify and dispose of PCB-containing items

#### Future Actions

* Education on Septic Disposal. This Control Action is designed to educate on-site septic system owners located over the aquifer recharge area on proper disposal of wastes (e.g., not “down the drain”) and on the environmental and functional benefits of regular tank pumping.

*Partner Organizations:*

Spokane River Stewardship Partners

Department of Ecology

Idaho Department of Environmental Quality

Environmental Protection Agency

Health Departments

*Potential funding sources:*

City of Spokane and Spokane River Stewardship Partners

Department of Ecology: Section 319 Grants

Environmental Protection Agency

Partner Organization in-kind contributions

*Related Activities: A9, B4, C3, D1*

### C5. Integrated Clean Water Planning

*Problem Statement:* The reduction of sources of PCB should be in concert with local watershed planning efforts. Best Management Practices and engineering solutions need to be incorporated into integrated watershed plans.

The Comprehensive Plan identifies C5 as an existing effort that will reduce PCB loads to the Spokane River:

* The Cochran basin project “focuses on reducing the discharge of stormwater through infiltration, potentially using centralized bioinfiltration facilities located either near the TJ Meenach Bridge and/or near the existing Downriver Disc Golf Course. Estimated to cost $34 million, it will include an infiltration pond, piping, disc golf infiltration, near river biofiltration, and 1.25 MG storage tank. Estimated average load of PCBs removed in the treatment layer of the facility is 4.688 g/yr and estimated PCB load diverted (pollutants that are not removed in the facility and enter the vadose zone) is 0.29 g/yr. (City of Spokane, 2014)
* Section 6.2 of the plan describes the City’s “Long-Term Approach to Reduce Stormwater Pollution” and focuses on the implementation of green infrastructure (GI) to intercept stormwater before reaching the combined sewer system. “Because of the multiple benefits provided by GI, the City of Spokane has adopted a long‐term approach to implementing GI by coupling these improvements with other public infrastructure projects, and by encouraging use of its LID ordinance on private projects” (City of Spokane 2014).
* The City is also working to reduce or eliminate CSOs for their 20 NPDES‐permitted outfalls, and has a performance standard that it is required to meet by 2017. Of the 20 outfalls, six have been addressed through implementation of CSO storage facilities. Additional efforts to control CSOs include elimination of one outfall and construction of storage tanks at three other outfalls. Additional CSO construction activities are scheduled for 2017 (City of Spokane 2014).

*Partner Organizations:*

City of Spokane

Washington and Idaho Municipal Dischargers and Stormwater Agencies

Department of Ecology

Idaho Department of Environmental Quality

Environmental Protection Agency

*Potential funding sources:*

City of Spokane

Department of Ecology

Environmental Protection Agency

Partner Organization in-kind contributions

*Related Activities: B5*

### C6. Align PCB Standards between Environmental Programs

*Problem Statement:* PCB in the environment is regulated by a variety of regulatory programs, all with a specific set of PCB standards. Different methodologies are used to detect PCB in the forms of Aroclors, homologs, and congeners. These methodologies are then used to interpret compliance with PCB requirements. A better understanding is needed of PCB standards and program-specific methodologies and how they relate to the water quality goal for the Spokane River.

*Partner Organizations:*

Spokane River Stewardship Partners

Department of Ecology

Idaho Department of Environmental Quality

Environmental Protection Agency

*Potential funding sources:*

Spokane River Stewardship Partners

Department of Ecology

Environmental Protection Agency

Partner Organization in-kind contributions

*Related Activities: A2, A5, A6*

Appendix D

### Implementation: Watershed Actions.

What actions can be taken that will reduce PCB and dioxin inputs to the Spokane River that will also be effective in other watersheds?

### D1. Consumer Choice Education and Labeling

*Problem Statement:* Most consumers are not aware that PCB-containing products are still sold and routinely used. In addition, most consumers are unaware of the impact their purchasing decisions have on the environment, in particular the Spokane River. The current regulations for managing PCB under the Toxic Substances Control Act and the solid waste regulations are inadequate at protecting the river and those relying on the fish in the river. The most effective way to control PCB pollution is to reduce the inputs of PCB at the source. Unless steps are taken to reduce PCB at the source, the economy of the local region could be impacted by expensive end-of-pipe treatments for municipal facilities and loss of economic competitiveness for local recycling businesses. Consumer awareness and market incentives can be created through the development of a “PCB Free” label program that can be adopted for use within the watershed.

The Comprehensive Plan identified a “PCB Product Labeling Law” as not considered for future implementation.

*Partner Organizations:*

Spokane River Stewardship Partners

Department of Ecology

Idaho Department of Environmental Quality

Environmental Protection Agency

*Potential funding sources:*

Spokane River Stewardship Partners (education)

Department of Ecology

Environmental Protection Agency

Partner Organization in-kind contributions

*Related Activities: A9, C3, C4*

### D2. Green Purchasing: Agency Programs

*Problem Statement* Since government purchasing represents 20% of Gross Domestic Product and multi-year contracts, government bidding processes are a great opportunity to push manufacturers and vendors to provide safer products and disclose product ingredients. This demand for green products can lead to better pricing and supply. For example, government purchasing has driven down the price of 100% recycled content office paper significantly.

Green purchasing (EPP), also known as environmentally preferable or sustainable purchasing, is the procurement of goods and services that cause less harm to humans and the environment than competing goods and services that serve the same purpose. This comparison may consider raw materials acquisition, production, manufacturing, packaging, distribution, reuse, operation, maintenance or disposal of the product or service.

Work is needed to

1. Identify PCB-free purchase options
2. Educate agency and program buyers

Incorporate PCB-free products into green purchasing programs.

The Comprehensive Plan identified Control Action 5.6, Purchasing Standards as an ongoing activity.

The State of Washington enacted legislation in 2014 that directed the Washington Department of Enterprise Services to “establish purchasing and procurement policies that provide a preference for products and products in packaging that does not contain polychlorinated biphenyls” (RCW 39.26.280). The legislation also precluded other State agencies from knowingly purchasing “products or products in packaging containing polychlorinated biphenyls above the practical quantification limit except when it is not cost-effective or technically feasible to do so.” This legislation was adopted, in part, as a result of Task Force efforts to discourage use of products containing PCBs. In June of 2014, the City of Spokane enacted a similar municipal ordinance providing a preference in City purchases for products and products in packaging that do not contain PCBs. Spokane County passed an almost identical resolution (#2014-1022) in December 2014. Implementation of the municipal ordinances should reduce the introduction of materials containing PCBs, and also facilitate the development of an economic market with reduced amounts of PCBs (EPA, 2015).

The Comprehensive Plan also identified Control Action 5.10.2 as a new action relating to reduction of PCBs in due to diarylide yellow pigments in road paint. Paint manufacturers providing road paint to transportation agencies are currently required to use pigments compliant with a strictly controlled “color box.” These color box requirements can only be met through the use of PCB-containing diarylide pigments. The Task Force will seek to attain State/federal level changes to color box requirements for road paints, allowing the use of PCB-free (or essentially PCB-free) pigments in these paints.

*Partner Organizations:*

Department of Ecology

Washington Department of Transportation

Department of Enterprise Services

Pigment Manufacturers

*Potential funding sources:*

Spokane River Stewardship Partners

Department of Ecology

Environmental Protection Agency

Partner Organization in-kind contributions

*Related Activities:* A8, A9, C3, D1

### D3. Toxic Substances Control Act Regulatory Reform

In 40 Code of Federal Regulations (CFR), Part 761.3, the regulation states that “inadvertently produced” PCBs may be present in a manufacture process at an average concentration of 25 ppm up to 50 ppm maximum. This amount is 781,250,000 times greater than EPA’s Human Health Water Quality Criteria (HHWQC) of 64 pg/L (parts per quadrillion). Consumer products and other sources containing these allowable inadvertently produced PCBs are entering the environment through many different mechanisms (municipal wastewater, stormwater, paper recycling, ambient distribution and deposition). TSCA regulatory reform is needed to eliminate the production of products that could be contributing PCB to the environment.

The Comprehensive Plan contains Control Action 5.10 Regulatory Rulemaking. This Control Action consists of regulatory reform of Federal TSCA and FDA’s food packaging regulations to: 1) revisit currently allowed concentration of PCBs in chemical processes; 2) eliminate or reduce the creation of inadvertently generated PCBs; and 3) reassess the current use authorizations for PCBs.

The Task Force and individual members have had continuing engagement with State and federal agencies to lobby for reform of existing regulations, including providing evaluation and comment on rulemaking activities.

*Partner Organizations:*

Spokane River Stewardship Partners

The Lands Council

Department of Ecology

Idaho Department of Environmental Quality

Environmental Protection Agency

*Potential funding sources:*

Spokane River Stewardship Partners

Department of Ecology

Environmental Protection Agency

Partner Organization in-kind contributions

*Related Activities:* A8, A9, A10, A11, D4, D5 , D4

### D4. Green Chemistry: PCB Free Pigments

*Problem Statement:* Diaryl (yellow, red, orange) and phthalocyanine (green, blue) pigments can contain PCB as a manufacturing by-product. The production of yellow pigment alone results in 1.5 million tons a year of PCB being introduced to the global environment. Alternative methods of synthesis are needed to produce PCB-free pigments. The use of green chemistry principles are needed to avoid creating replacement chemicals that are also toxic.

The Comprehensive Plan identifies Control Action 5.7, Support of Green Chemistry Alternatives as a means to to reduce inadvertent PCB production through the development of alternative (non-chlorinated) products or products with reduced levels of PCBs.

#### Existing Actions

The Washington State Department of Ecology provides a range of technical support and expertise to educators (http://www.ecy.wa.gov/greenchemistry/edumain.html) looking to incorporate green chemistry into teaching materials, manufacturers looking to understand the potential impacts of the ingredients (http://www.ecy.wa.gov/greenchemistry/chazassess.html) in their products, and to the general public who want to know which are safer choices (http://www.ecy.wa.gov/greenchemistry/saferchoice.html) for products such as the EPA “Safer Choice” label. Ecology also provides training and other educational resources about safer chemical alternatives and green chemistry (http://www.ecy.wa.gov/programs/hwtr/shoptalkonline/current\_issue/story\_three.html).

Ecology has partnered with Northwest Green Chemistry (http://www.northwestgreenchemistry.org/) on some of these information resources and tools, including organization of a session called "Green Chemistry Design for a Rainbow of Colorants," at the Green Chemistry and Engineering Conference held in Portland (OR) on June 2016. EPA also supports Green Chemistry, via funding of research and support of activities such as the Presidential Green Chemistry Challenge (<https://www.epa.gov/greenchemistry>).

#### New Actions

The Task Force will provide additional support to existing Green Chemistry efforts as follows:

* Provide guidance and feedback to Ecology related to current and potential ongoing Green Chemistry efforts
* Assist Ecology in its Green Chemistry efforts to contact other parties, including EPA and universities, to provide feedback on existing efforts and/or solicit participation in future Green Chemistry efforts.

*Partner Organizations:*

Spokane River Stewardship Partners

Department of Ecology

Idaho Department of Environmental Quality

Environmental Protection Agency

*Potential funding sources:*

Inland Empire Paper - Spokane River Stewardship Partners

Department of Ecology

Environmental Protection Agency

Partner Organization in-kind contributions

*Related Activities: D3*

### D5. Elimination of PCB from Pigments

*Problem Statement:* The Environmental Protection Agency rules allow for PCB to be present as a inadvertently produced by-product of manufacture. Diaryl (yellow, red, orange) and phthalocyanine (green, blue) pigments can contain PCB. The production of pigments alone results PCB being introduced to the global environment. A regulatory incentive is needed to produce PCB-free pigments.

The Comprehensive Plan contains Control Action 5.10 Regulatory Rulemaking. This Control Action consists of regulatory reform of Federal TSCA and FDA’s food packaging regulations to: 1) revisit currently allowed concentration of PCBs in chemical processes; 2) eliminate or reduce the creation of inadvertently generated PCBs; and 3) reassess the current use authorizations for PCBs.

The Task Force and individual members have had continuing engagement with State and federal agencies to lobby for reform of existing regulations, including providing evaluation and comment on rulemaking activities.

*Partner Organizations:*

Inland Empire Paper Co. - Spokane River Stewardship Partners

Department of Ecology

Idaho Department of Environmental Quality

Environmental Protection Agency

Other stakeholder organizations

Chemical/Pigment Manufacturers

*Potential funding sources:*

Spokane River Stewardship Partners

Department of Ecology

Environmental Protection Agency

Partner Organization in-kind contributions

Chemical/Pigment Manufacturers (In kind to find PCB-free alternatives)

*Related Activities:* D3, D5, D6

### D6. Elimination of PCB from other sources

*Problem Statement:* The Environmental Protection Agency rules allow for PCB to be present as a inadvertently produced by-product of manufacture. In 1982, the EPA identified that there are more than 200 industrial processes that produce PCB. EPA’s information from that era is in summary format with little detail as to how and where these products are produced, what the residual PCBs are, and whether they are introduced to the environment through normal use. More research is needed to identify former, current, and potential future sources of inadvertently produced PCBs, their use and fate in the environment.

*Partner Organizations:*

Spokane River Stewardship Partners

Department of Ecology

Idaho Department of Environmental Quality

Environmental Protection Agency

Other stakeholder organizations

Chemical/Pigment Manufacturers

*Potential funding sources:*

Spokane River Stewardship Partners

Department of Ecology

Environmental Protection Agency

Partner Organization in-kind contributions

Chemical/Pigment Manufacturers

*Related Activities:* A8, A9, A10, A11, D4, D3, D6, D5

### D7. Align Analytical Methodologies

*Problem Statement:* There are a variety of analytical methodologies that can be used to measure PCBs in the environment. Different methodologies have different uses for the purposes of detecting PCBs in the forms of Aroclors, homologs, and congeners. A better understanding is needed of these methods, and how they relate to the water quality goal for the Spokane River.

*Partner Organizations:*

Spokane River Stewardship Partners

Department of Ecology

Idaho Department of Environmental Quality

Environmental Protection Agency

*Potential funding sources:*

Spokane River Stewardship Partners

Department of Ecology

Environmental Protection Agency

Partner Organization in-kind contributions

*Related Activities: C2, D8, A2, A5, A6*

### D8. Align PCB Standards between Environmental Programs

*Problem Statement:* PCB in the environment is regulated by a variety of regulatory programs, all with a specific set of PCB standards. Different methodologies are used to detect PCB in the forms of Aroclors, homologs, and congeners. These methodologies are then used to interpret compliance with PCB requirements. A better understanding is needed of PCB standards and program-specific methodologies and how they relate to the water quality goal for the Spokane River.

*Partner Organizations:*

Spokane River Stewardship Partners

Department of Ecology

Idaho Department of Environmental Quality

Environmental Protection Agency

*Potential funding sources:*

Spokane River Stewardship Partners

Department of Ecology

Environmental Protection Agency

Partner Organization in-kind contributions

*Related Activities: C2, D8, A2, A5, A6*

### D9. Identify Potential Research for Stormwater Abatement/Treatment Technologies

*Problem Statement:* Industrial and municipal stormwater require treatment to remove PCB. Research is needed to identify cost effective stormwater abatement and treatment technologies.

The Comprehensive Plan Future Control Action 6.2.4 consists of regular outreach to researchers/contractors in the field of wastewater treatment to stay abreast of potential new technologies for PCB removal.

*Partner Organizations:*

Spokane River Stewardship Partners

Department of Ecology

Idaho Department of Environmental Quality

Environmental Protection Agency

Responsible Source Contributors

Academia

Scientific and Trade Organizations

Water Environment Federation

*Potential funding sources:*

Spokane River Stewardship Partners

Department of Ecology

Environmental Protection Agency

Partner Organization in-kind contributions

Water Environment Research Foundation Grants

*Related Activities: C5, B5*

### D10. Identify Potential Research for Wastewater Treatment/Abatement Technologies

*Problem Statement:* Industrial and municipal wastewater require treatment to remove PCB. Research is needed to identify cost effective stormwater abatement and treatment technologies.

The Comprehensive Plan identifies Control Action 6.2.4 Emerging Wastewater Technology as a future action. This control action consists of regular outreach to researchers/contractors in the field of wastewater treatment to stay abreast of potential new technologies for PCB removal.

*Partner Organizations:*

Spokane River Stewardship Partners

Department of Ecology

Idaho Department of Environmental Quality

Environmental Protection Agency

Responsible Source Contributors

Academia

Scientific and Trade Organizations

Water Environment Federation

*Potential funding sources:*

Spokane River Stewardship Partners

Department of Ecology

Environmental Protection Agency

Water Environment Research Foundation Grants

Partner Organization in-kind contributions

*Related Activities: C5, B6*

### D11. Remediate Known Contaminated Sites

*Problem Statement:* Ecology’s Toxics Cleanup Program (TCP) is responsible for overseeing the remediation of known contaminated sites, working under regulatory authority from Washington’s Model Toxics Control Act (MTCA). Four contaminated sites with potential to contribute PCBs to the Spokane River are in various stages of remediation.

#### Spokane River Upriver Dam and Donkey Island

Historical discharges of PCBs to the Spokane River upstream of the Upriver Dam and Donkey Island led to contamination of river sediments. Two PCB deposits in river-bottom sediments were investigated and cleaned up from 2003 to 2007 in accordance with a consent decree Ecology entered into with Avista. The remedy involved the removal and containment of PCB-contaminated sediments. Due to the design of the selected remedy to cap contaminated sediments in place, PCBs remain in sediments at concentrations exceeding the selected cleanup level for the site. Post-remediation surface and subsurface sediment sampling were required to be performed as part of the Cleanup Action Plan. Surface grab samples were collected from material on top of the cap, and subsurface sediment profile cores were collected from the cap extending into the material below the cap. In addition, a bathymetric survey was conducted prior to each sampling event to evaluate cap thickness and help select locations for the surface and subsurface sediment samples. Avista completed the scheduled monitoring of the engineered cap during Year 2 (2008) and Year 4 (2010) following cap construction. Bathymetric comparisons, visual observations, and chemical analyses performed during the monitoring events verified the integrity and protectiveness of the cap, including through a 25-year flood event.

Ecology has determined, based upon review of the collected data, that: 1) the cleanup remedy implemented at the Site is currently protective of human health and the environment; and 2) monitoring of the effectiveness of the remedial action and the integrity of the cap should continue in the future at a rate of once every five years to ensure long-term protectiveness. It is noted that there were some other smaller identified sediment deposits not remediated, since the PCB concentrations of these deposits are lower than 48 ug/Kg, which Ecology recently described as the “most stringent sediment value protective of human health and the environment,” including surface water standards. These sediments are not a significant source of concern.

#### General Electric Co.

The General Electric Co. site is approximately 1200 feet south of the Spokane River in Spokane, and less than two acres in size. The site was used by General Electric to operate a transformer service shop from 1961 to 1980. Oils containing PCBs were released to soils during service operations. Investigations in the mid to late 1980s confirmed the presence of PCBs in soils and groundwater. Cleanup actions began in 1991. Remedies accepted as complete in 1999 included vitrification, removal, containment, groundwater monitoring, and institutional controls. Institutional controls include fencing the General Electric property, inspecting and maintaining an asphalt cap, and recording of restrictive covenants. Cleanup is now considered complete and monitoring continues to ensure protection of human health and the environment. Periodic reviews have been conducted in 2003, 2008, and 2013, and have included the evaluation of groundwater data, inspection of the reports on the asphalt cap, and existing institutional controls. The most recent review concludes that the site cleanup continues to be protective of human health and the environment. Groundwater monitoring in seven of eight monitoring wells is in compliance with specified cleanup levels of 0.1 ug/l, with concentrations at the remaining well observed at up to 0.21 ug/l (Ecology, 2013). As discussed in the Future Actions section below, these cleanup levels are more than 500 times larger than the current PCB water quality criterion.

#### City Parcel

The City Parcel site covers just over half an acre. Spokane Transformer, Inc., repaired and recycled transformers at the site from 1961 through 1979. In 1979, the site was sold to City Parcel, Inc., a package delivery service. Soil samples collected between 1976 and 1997 consistently contained PCB contamination at concentrations exceeding both residential and industrial standards. Groundwater has been sampled multiple times, and no contamination was detected after 2002. Ecology conducted a state-funded feasibility study and developed a cleanup action plan in 2004 that included removing the building, contaminated soil, all drain lines and dry wells and an underground storage tank. In 2009, the building was demolished, and contaminated debris were removed. Contaminated soil was also excavated and disposed off-site at this time. Soil samples taken following this revealed PCB contamination along the northern and western fence lines surrounding the property. The fence on the northern edge was removed, and PCB-contaminated soil was excavated and backfilled with clean soil in 2014. Similar work to clean up the contamination on the western boundary of the property was completed in 2015. Ecology will conduct periodic reviews at least every five years to ensure that site uses continue to protect human health and the environment (Ecology web site).

The Kaiser Aluminum Fabricated Products facility had in the past used hydraulic oils containing high concentrations of PCBs for aluminum casting operations. Kaiser’s past use and storage of PCB-contaminated oils contaminated the soil and underlying groundwater with PCBs. Since 2005, Kaiser has conducted a series of investigation and cleanup activities for soil and groundwater under the authority and requirements of Ecology’s cleanup regulations, the state’s MTCA. In 2012, Ecology issued an Amended Agreed Order requiring excavation of shallow soils and capping of deeper soil to address PCB contamination; these actions have been completed, resulting in the removal of 540 tons of soil that contained elevated levels of PCBs. The 2012 order also required Kaiser to initiate a PCB groundwater treatment pilot study by October 30, 2015. The contamination of groundwater underlying the Kaiser facility is primarily associated with the Casting Area of the facility, with PCB levels exceeding 500,000 pg/L. After completion of this pilot study, Ecology will issue a cleanup action plan that will specify the actions that Kaiser must take to remediate the PCB-contaminated groundwater. Cleanup levels in the plan will likely be guided by applicable surface water quality standards, although contribution from up-gradient PCB sources (discussed subsequently in Section 5.14) may be a confounding factor. Ecology estimates that this groundwater treatment system will be operational by 2020.

*Partner Organizations:*

*Funded by:*

*Related Activities:*

### D12. Stormwater Controls

***\*Currently Funded by MS4 Permittees\****

*Problem Statement:* The Washington communities of the City of Spokane, City of Spokane Valley and Spokane County are covered under the Eastern Washington general MS4 Phase 2 stormwater permit. This permit has an effective date of August 1, 2014, and expires July 31, 2019. Washington State Department of Transportation (DOT) has a separate MS4 permit that was effective as of August 1, 2013. The Idaho communities and highway districts (City of Post Falls, City of Coeur d’Alene, Post Falls Highway District, Lakes Highway District, and Idaho Transportation Department, District 1) will all be covered under the forthcoming general permit for all regulated MS4s in Idaho. The preliminary draft permit and fact sheet were issued in April 2016.

The Eastern Washington general permit requires permittees to allow Low Impact Development (LID) stormwater management techniques in new development and redevelopment projects, where feasible. Second, the permit features new requirements for permittees to cooperatively develop and conduct Ecology‐approved studies to assess effectiveness of permit‐required stormwater management program activities and “best management practices” (City of Spokane, 2014). Other components of existing MS4 permits that will lead to reduction of PCBs in stormwater include (from Ecology, 2012):

* All new development and redevelopment projects meeting a specified threshold must preserve natural drainage systems to the extent possible at the site.
* Stormwater collection and conveyance system, including catch basins, stormwater sewer pipes, open channels, culverts, structural stormwater controls, and structural runoff treatment and/or flow control facilities. The Operation and Maintenance (O&M) Plan shall address, but is not limited to, regular inspections, cleaning, proper disposal of waste removed from the system in accordance with street waste disposal requirements, and record-keeping. No later than 180 days prior to the expiration date of this permit, Permittees shall implement catch basin cleaning, stormwater system maintenance, scheduled structural BMP inspections and maintenance, and pollution prevention/good housekeeping practices. Decant water shall be disposed of in accordance with street waste disposal requirements.
* The O&M Plan shall address, for roads, highways, and parking lots, deicing, anti-icing, and snow removal practices; snow disposal areas and runoff from snow storage areas; material (e.g., salt, sand, or other chemical) storage areas; and all-season BMPs to reduce road and parking lot debris and other pollutants from entering the MS4. No later than 180 days prior to the expiration date of this permit, Permittees shall implement all pollution prevention/good housekeeping practices established in the O&M Plan for all roads, highways, and parking lots with more than 5,000 square feet of pollutant generating impervious surface that are owned, operated, or maintained by the Permittee.
* A minimum of 95% of all known stormwater treatment and flow control facilities (except catch basins) owned, operated or maintained by the Permittee shall be inspected at least once every two years before the expiration date of this permit, with problem facilities identified during inspections to be inspected more frequently.
* All catch basins and inlets owned or operated by the Permittee shall be inspected at least once by December 31, 2018, and every two years thereafter. Catch basins must be cleaned if the inspection indicates cleaning is needed to comply with maintenance standards.
* The Idaho general MS4 permit (EPA, 2016) lists low-impact development as a topic to consider when permittees are developing their education and outreach programs. More specific to PCBs, there is required monitoring of stormwater discharges and catch basin sediments for PCBs at least twice per year for the Idaho permittees in the Spokane River watershed listed above. Permittees must report the total concentration of dioxin-like PCB congeners and use EPA method 1668C for analysis. Two or more permittees may cooperate to conduct any of the required monitoring.

*Partner Organizations:*

*Funded by:*

*Related Activities:*

**D13. Low Impact Development Ordinance**

***\*Currently Funded by the City of Spokane\****

*Problem Statement:* Low-impact development (LID) describes a land planning and engineering design approach to manage stormwater runoff. LID uses on-site natural features to replicate the predevelopment hydrologic regime of watersheds through infiltrating, filtering, storing, evaporating, and detaining runoff close to its source. By reducing runoff volume, implementation of LID will ultimately lead to reduction in stormwater PCB load. The City of Spokane enacted a low-impact development ordinance in 2013 as part of the requirements of a consent decree entered into with the Spokane Riverkeeper as part of commitments made to improve water quality. It does not have any firm requirements, but simply encourages the use of these stormwater practices: “Low-impact development is encouraged for site development and redevelopment” (ORD C35021 Section 11). The ordinance also officially adopts the Eastern Washington Low Impact Development Guidance Manual as a technical reference for developers. There is a financial incentive for developers, as they will be granted a 10% discount on their stormwater fee for implementing LID practices into new or redeveloped projects.

*Partner Organizations:*

*Funded by:*

*Related Activities:*

**D14. Accelerated Sewer Construction**

*Problem Statement:* Future Control Action 6.2.3 consists of acceleration of sewer construction to replace septic systems. Spokane County has completed its mandatory septic tank elimination program for septic tanks within the Urban Growth Area (UGA) in areas that have sewer available, requiring connection within a year of notification and enforcement through the Prosecutor’s office. There is currently no planned effort to eliminate every septic system within the UGA, due to reasons such as:

* Installation of sewers in low-density areas is not cost-effective.
* Certain land uses are exempt by state law from the requirement to connect to sewer, even when available (e.g., manufactured home parks).

There are still areas in Kootenai County where septic tanks located over identified Critical Aquifer Recharge Areas could theoretically be connected to sewers.

*Partner Organizations:*

*Funded by:*

*Related Activities:*

**D15. Manage PCB Sources**

*Problem Statement: The Comprehensive Plan lists future control actions for managing PCB sources:*

#### Survey of Local Electrical Equipment

Future Control Action 6.2.5 would conduct a survey of local utilities and other owners of electrical equipment to document the presence/amount of PCBs in transformers. Identify PCB-containing equipment (nominal 1 ppm concentration) that has a reasonable pathway to the river, if spilled, and target for removal.

#### Leak Prevention/Detection in Electrical Equipment

Future Control Action 6.2.6 consists of implementation of State and/or local ordinance to require a leak prevention/detection system for any PCB-containing transformer or capacitor.

#### Regulation of Waste Disposal

Future Control Action 6.2.7 consists of programs designed to review local/regional laws regulating waste disposal (including used oil burning) and illegal dumping, and revise as necessary (e.g., enforcing fines/other penalties for improperly disposing of PCBs.)

#### PCB Identification during Inspections

Future Control Action 6.2.10 consists of identifying PCB-containing materials as part of other regular inspections (e.g., building permits, IDDE, facility inspections). It involves training inspectors to identify materials and what to do next (safe disposal, encapsulation, etc.).

*Partner Organizations:*

*Funded by:*

*Related Activities:*

### D16. Removal of Carp from Lake Spokane

*Problem Statement.* Carp in the lake are known to be contaminated with PCBs, and removing them would prevent further cycling in the watershed. In 2015 Department of Ecology issued a report documenting the levels of PCBs in carp in the lake.

The Comprehensive Plan Control Action 6.2.9 Involves removing carp from Lake Spokane.

*Partner Organizations:*

Washington State Department of Ecology

Washington State Department of Health

Avista

*Funded by:*

Department of Ecology

Avista

*Related Activities:*

#### D17. Street Sweeping

***\*Funded by Municipalities and Agencies\****

*Problem Statement:* Street sweeping is designed to remove debris and particulate matter from street surfaces for subsequent disposal, thus preventing these materials from being washed into the stormwater system during wet weather and delivered to the river. Because PCBs are strongly associated with particulate material, street sweeping can reduce PCB loading from stormwater. Several communities in the Spokane River watershed conduct regular street sweeping.

The Comprehensive Plan describes Control Action 5.5 as an existing action.

The City of Spokane primarily conducts street sweeping during summer through fall with a priority on arterial roads, followed by residential areas. The downtown business district is swept every other Thursday morning. To pick up the heavy and fine debris and dust, each crew has a mechanical broom, regenerative air broom, a street flusher and a hauling truck. Street sweeping in Spokane Valley is done by a contractor with frequency determined by specified priority areas. Highest priority areas are authorized to be swept twice a month. Priority two areas are authorized to be swept once during the month. All other areas will be authorized by the City as determined necessary. The Contractor uses regenerative air type sweepers for arterial sweeping. Sweeping along curbs is done using a high‐efficiency vacuum sweeper. Residential streets in Coeur d’Alene are swept an average of four times yearly and all arterials are swept twice monthly. Two sweepers are employed at a time and they work from spring to fall. Street sweeping in Post Falls is accomplished by rotating the sections of City four days a week from May through September. Liberty Lake cleans arterial roads once monthly and residential roads twice yearly. Spokane County conducts street sweeping in the spring and early summer to remove the gravel that has been applied to icy roads. Street sweeping waste is disposed of either through transfer to decant facilities or transport to landfill.

*Partner Organizations:*

City of Spokane

City of Post Falls

City of Spokane Valley

City of Coeur d’Alene

Spokane County

Washington Department of Transportation

*Funded by:*

City of Spokane

City of Post Falls

City of Spokane Valley

City of Coeur d’Alene

Spokane County

Washington Department of Transportation

*Related Activities:*

Appendix E

# Assessment of Progress

What activities will be performed to assess the progress of toxics reductions?

### E1. Environmental Assessment and Toxics Monitoring

*Problem Statement:* Ongoing Environmental Assessment and toxics monitoring is needed to assess the quality of the water in the Spokane River and the progress made in toxics reduction.

*Partner Organizations:*

Spokane River Stewardship Partners

Department of Ecology

Idaho Department of Environmental Quality

Environmental Protection Agency

Other stakeholders

*Potential funding sources:*

Department of Ecology

Environmental Protection Agency

Partner Organization in-kind contributions

*Related Activities: A2, A3, A7, A4, A5, A6*

### E2. Toxics Management Plans: Implementation

*Problem Statement:* Organizations that hold wastewater permits for the Spokane River are required to prepare and implement Toxics Management Plans. The plans are one tool in the overall strategy to achieve the water quality goals. The Toxics Management Plans identify specific actions that can be taken by the permit holders to identify the sources of PCBs in the wastewater systems, and potentially to reduce toxics to the Spokane River. These actions may be done by individual organizations or collaboratively as part of the Task Force efforts.

The Comprehensive Plan’s Control Action 5.1 consists of managing municipal and industrial NPDES permits regulate discharges from wastewater and industrial facilities in Washington and Idaho. The Washington and Idaho (EPA) NPDES permits require most wastewater facilities discharging to the Spokane River to develop and install treatment systems to reduce nutrient loading that will concurrently result in reductions of PCB loading. Additional permit requirements that relate to the monitoring and reduction of PCB loads are described for the following categories of permits: Idaho Municipal Permits, Washington Municipal Permits, Washington Industrial Permits.

*Partner Organizations:*

Spokane River Stewardship Partners

Department of Ecology

Idaho Department of Environmental Quality

Environmental Protection Agency

*Potential funding sources:*

Spokane River Stewardship Partners

Partner Organization in-kind contributions

*Related Activities: A9, A10, A11, B1, B4, B5, C2, C3, C4, C5, D1, D2, D6, D9, D10, E1*

### E3. Municipal and Industrial NPDES Wastewater Discharge Solutions

*Problem Statement:* Recognizing that end of pipe solutions are not technically possible today, such solutions are a piece of the equation which are needed to achieve the PCB water quality goal in the Spokane River. Organizations that have wastewater permits are required to install enhanced treatment technology to meet dissolved oxygen TMDL waste load allocations. These treatment technologies also have the benefit of reducing PCB concentrations in wastewater effluent.

The Comprehensive Plan’s Control Action 5.1 consists of managing municipal and industrial NPDES permits regulate discharges from wastewater and industrial facilities in Washington and Idaho. The Washington and Idaho (EPA) NPDES permits require most wastewater facilities discharging to the Spokane River to develop and install treatment systems to reduce nutrient loading that will concurrently result in reductions of PCB loading. Additional permit requirements that relate to the monitoring and reduction of PCB loads are described for the following categories of permits: Idaho Municipal Permits, Washington Municipal Permits, Washington Industrial Permits.

*Partner Organizations:*

Spokane River Stewardship Partners

Department of Ecology

Idaho Department of Environmental Quality

Environmental Protection Agency

*Potential funding sources:*

Spokane River Stewardship Partners

Other stakeholders

*Related Activities: D10*

### E4. Compliance with PCB Regulations

*Problem Statement:* Stricter accountability for compliance with existing rules and enforcement of existing TSCA rules ensure that imported and manufactured products are complying with allowable PCB levels, and enforcement of rules related to used oil burning.

The Comprehensive Plan’s Control Action 5.11 contains the following:

#### Existing Actions

The Task Force and individual members have had continuing engagement with State and federal agencies providing comments related to draft NPDES permits (e.g., the recent general hatchery permit), Clean Water Act compliance activities, and waterbody assessments such as 303(d) lists.

#### New Actions

Ecology’s Environmental Assessment Program is currently undertaking a study that will provide information on atmospheric transport of PCBs. The Task Force will review results of this study when it becomes available to assess the need for regulatory control of atmospheric PCB sources such as used oil burning.

The Comprehensive Plan also contains Future Control Action 6.2.11:

Requires stricter accountability for compliance with existing rules, specifically enforcement of existing TSCA rules to ensure imported and manufactured products are complying with allowable PCB levels.

*Partner Organizations:*

*Funded by:*

*Related Activities:*

### E5. Implementation Effectiveness Assessment

*Problem Statement:* The Comprehensive Plan contains an Implementation Plan with effectiveness metrics specific to each Control Action, designed to assess whether each action is being implemented and performing as planned. The effectiveness of the Task Force’s implementation of Control Actions will be assessed through the preparation of an annual Implementation Review Summary. The report will determine the extent to which each individual milestone listed in this section was attained, and will provide flexibility to adapt strategies, phase out actions that are not working, and phase in new Control Actions as appropriate.

In addition to the annual Implementation Review Summary, the Task Force will also conduct a broader implementation effectiveness assessment (Implementation Assessment Report) within five years designed to review all available data to assess:

* PCB loading to the Spokane River from the primary delivery mechanisms, and changes in loading over the evaluation period.
* Spokane River PCB concentrations, and changes in concentration over the evaluation period.

PCB loading in the five-year Implementation Assessment Report will be evaluated for the primary delivery mechanisms described previously as follows. PCB loading from wastewater treatment plants will be assessed via review of all effluent monitoring data collected by each plant as part of its NPDES permit requirements. Groundwater loading near Kaiser will be assessed via review of data collected by Kaiser as part of its ongoing remediation efforts. Stormwater/CSO loading will be assessed via review of post-implementation performance data to be collected by the City of Spokane as part of its Integrated Clean Water Plan. Changes in loading from Lake Coeur d’Alene will be assessed via review of observed Spokane River PCB concentrations in Idaho being collected as a requirement of NPDES permits in Idaho.

In-river concentrations will be assessed via review of long-term river monitoring data to be collected by the Task Force and/or Ecology. Statistical tests will be applied as appropriate to determine if statistically significant reductions have occurred in loads and in-river concentrations. In addition to assessment of the change in River concentrations, river concentrations will also be compared to existing water quality standards.

The above assessment will be conducted five years after the issuance of this Comprehensive Plan. If PCB loads and/or concentrations are not decreasing, the Task Force may identify, evaluate, and select new Control Actions (or modify existing Control Actions) in an adaptive manner to ensure that reductions occur in the future. It is expected that the implementation effectiveness assessment will be repeated on a five-year basis.

*Partner Organizations:*

*Funded by:*

*Related Activities:*

1. **Federal Definition for grant applications:** Third party in-kind contributions may be in the form of real property, equipment, supplies and other expendable property, and the value of goods and services directly benefiting and specifically identifiable to the project or program. [↑](#footnote-ref-1)
2. http://srrttf.org/wp-content/uploads/2016/04/2016\_Comp\_Plan\_Final\_Approved.pdf [↑](#footnote-ref-2)