SPOKANE COUNTY
WATER RESOURCES

Quality Assurance Project Plan
for
Secondary Data Collection and Analysis

as required for the

Bi-State Non-Point Source Study for Spokane River Total Maximum Daily Load (TMDL): To investigate non-point source phosphorus loading within the Spokane River and Lake Spokane watershed.

September 2007

A.1. Approval Sheet

Approved Date: 8/30/07
Rob Lindsay, Spokane County Water Resources Manager

Approved Date: 8/30/07
Ben Brattebo, Project Manager

Approved Date: 8/30/07
Mike Hermanson, Quality Assurance Manager

Don Martin Date: 9-21-2007
Don Martin, EPA Grant Technical Advisor, Region 10

Date: 9/26-2007
Sue Ennis, EPA Project Officer, Region 10

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Date:
Don Martin, EPA Grant Technical Advisor, Region 10

Date:
Sue Ennes, EPA Project Officer, Region 10

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Group A: Project Management Elements

A.3. Distribution List

Spokane County will provide this plan to the following individuals, agencies, or consultants:

- EPA Region 10
  - Sue Ennes, EPA Grant Project Officer: Approval authority for this QAPP
  - Don Martin, EPA Grant Technical Advisor
  - QA Office
- Technical Consultant
  - We will provide this QAPP to the selected technical consultant for use during contract negotiations and study.

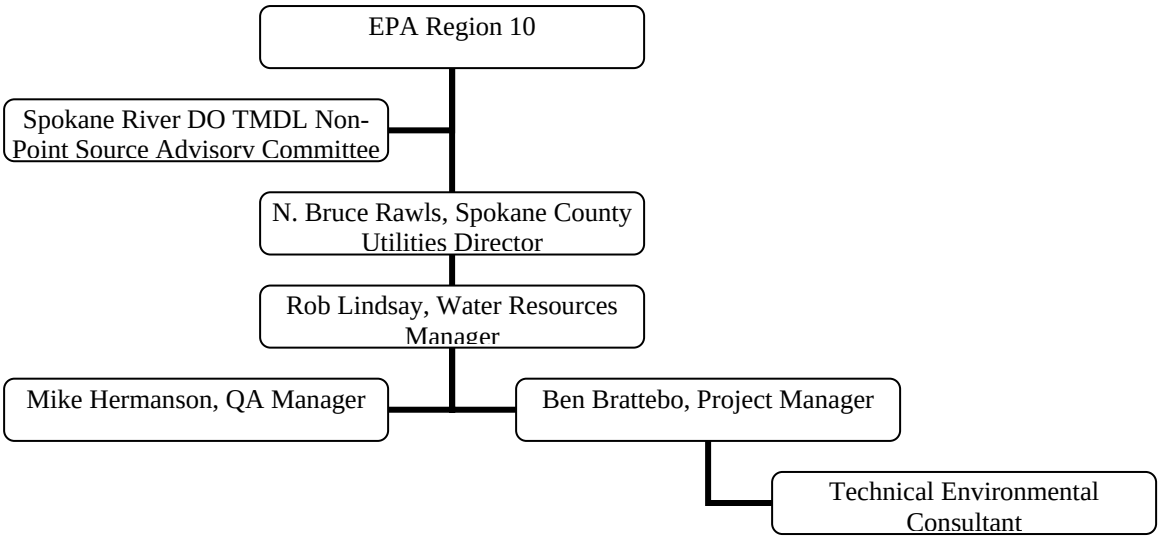
A.4. Project/Task Organization

The following Spokane County Utilities employees are involved in this study:

Spokane County Utilities Director	*N. Bruce Rawls*
Water Resources Manager	*Rob Lindsay*
Project Manager, Water Resources Specialist	*Ben Brattebo*
Water Resources Quality Assurance Manager	*Mike Hermanson*
Water Resources Administrative Assistant	*Lauri Clift*
Spokane County GIS Specialist	*Bea Lackaff*

The following organizations and consultants are involved in this study:

Spokane River DO TMDL Non-point Source Advisory Committee	*Regional members*
Technical Environmental Consultant	*Contracted by Spokane County Utilities*



Bruce Rawls and Rob Lindsay are Spokane County oversight for this study.

Ben Brattebo is the Project Manager (PM) for this study. He is responsible for the following tasks:

- Day-to-day operations and final completion of the study;
- Secondary data identification and collection;
- Consultant oversight during data analysis;
- Review of study products;
- Prepare project quality assurance (QA) documents; and
- Maintenance of all project documents including QA documents.

Mike Hermanson is the Quality Assurance Manager for Spokane County Water Resources. He is responsible for review of QA documents for this study. He is not involved in day-to-day operations of this study or in data collection and analysis.

The Spokane River Dissolved Oxygen (DO) Total Maximum Daily Load (TMDL) Non-point Source (NPS) Advisory Committee is made up of regional water resources stake-holders. The committee will provide direction to the Project Manager and technical consultant during this study.

A technical environmental consultant will be hired for this project. The project manager will oversee their work. They will follow the requirements detailed in this QAPP. Their key tasks are:

- Assist with secondary data collection, as necessary;
- Organize, tabulate, and review secondary data;
- Evaluate data quality based on standards outlined in this QAPP;
- Assess and prioritize non-point source loads based on secondary data; and
- Summarize existing studies and available existing data including:
    - Summarize adequacy of existing studies and existing data
    - Rank known non-point sources
    - Identify and recommend data collection efforts.

A.5. Problem Definition/Background

This study is the first phase of a three phase effort to address (NPS) phosphorus inputs to the Spokane River and Lake Spokane. The phases are:

1. Identify and quantify NPSs of phosphorus;
2. Identify best management practices (BMPs) to address the NPSs and evaluate the cost-effectiveness and longevity of the identified BMPs; and
3. Prepare an implementation plan for reduction of NPS based on the selected BMPs.

The Spokane River and Lake Spokane are listed on the State of Washington 303 (d) list for impairment of dissolved oxygen (DO). Modeling indicates that the main cause of the DO depletion is excess algae in the water bodies. The algae growth is primarily caused by excessive nutrients, with phosphorus being the growth limiting nutrient.

The Spokane River DO TMDL process has established a phosphorus discharge target of 10 µg/L for municipal wastewater treatment plants. The low phosphorus concentration is expected to help reduce excessive algal productivity that causes DO concentrations to fall below the water quality standard. *The Foundational Concepts for the Spokane River DO TMDL (Foundational Concepts)* will guide TMDL implementation. Meeting the phosphorus target will require a combination of improved point source wastewater treatment technology and reduced NPS pollutant loads.

Wastewater treatment technology currently cannot reliably meet the phosphorus concentration target of 10 µg/L. The difference between what current technology can achieve and the waste load target is referred to as "the Delta." The *Foundational Concepts* requires that National Pollutant Discharge Elimination System (NPDES) permit holders that discharge to the Spokane River develop a Delta Elimination Plan, and states that they may participate in a regional NPS program. If that participation demonstrates NPS phosphorus load reductions to the river, NPDES permit holders will be recognized as contributing toward achieving phosphorus waste load targets. As such, this Bi-State NPS study is a necessary first step towards demonstrating NPS phosphorus load reductions.

The study area of the Phase 1 NPS study includes the watersheds associated with Coeur d'Alene Lake, the Spokane River, Hangman/Latah Creek, Little Spokane River, and Lake Spokane. The study area is shown on the attached Figure 1. As the NPS study progresses, the Phase 1 study area may be revised as appropriate.

The secondary data collection and analysis effort will result in one technical memo which will:

- Summarize existing studies and available existing data;
- Summarize adequacy of existing studies and existing data;
- Rank non-point sources; and
- Identify recommendations for early action data collection efforts.

A.6. Project/Task Description

The study covered under this QAPP will work entirely with secondary data. It will involve collection, evaluation, and analysis of existing data. Any additional primary data collection efforts will be addresses by subsequent quality assurance documents

This secondary data study will be made up of three broad tasks. The study area is all areas drained by the Spokane River and Lake Spokane watershed (figure 1)

Task 1. Compilation of existing data, data evaluation, data gap identification, and pursuit of early action data collection efforts

- Task 1a. Identify potential NPSs; Develop list and identify sources for existing/available data & NPS studies: Potential NPSs include, but may not be limited to:
    - Agricultural activities in the Hangman/Latah Creek watershed in Idaho and Washington;
    - Agricultural and residential activities in the Little Spokane River watershed;

- Agricultural, residential and other development activities in the Coeur d'Alene Lake watershed and along the Spokane River in Idaho;
- In-direct stormwater disposal, examples include but are not limited to drywells, swales, and other areas where stormwater infiltration occurs,
- Spokane Valley Rathdrum Prairie Aquifer – Spokane River interaction,
- On-site domestic waste disposal systems;
- Residential lawn fertilizers;
- Large woody debris on the bottom of Lake Coeur d'Alene and throughout the Coeur d'Alene watershed.

- Task 1b. Collect and evaluate data from available NPS data and NPS studies:
  - Evaluate collected data consistent with the Washington State Water Quality Data Act and Washington Department of Ecology Credible Data Policy (WQP Policy 1-11). Identify credible and non-credible data. Identify potential NPSs with little or no existing credible data necessary to quantify NPS loads and the impacts of BMPs (data gaps).
- Task 1 Action Items:
  - Conduct meetings with agency staff to identify known and potential sources/problems;
  - Hold a public workshop/meeting to inform stakeholders and broaden information base for source/problem identification;
  - Collect, tabulate, and evaluate data; and
  - Tabulate data gaps.

Task 2. Assess and prioritize relative contribution of NPSs

- Task 2a. Prioritize identified potential phosphorus loading sources based on existing credible data and professional judgment.
- Task 2b. Identify early action data collection efforts to address high-priority sources with inadequate credible data (data gaps).
- Task 2c. Technical Memo 1—Summarize existing studies and available existing data; summarize adequacy of existing studies and existing data; ranking of sources; identification of and recommendations for early action data collection efforts.
- Task 2 Action Items:
  - Conduct meetings between agency and consultant staff to review adequacy of data sets;
  - Review of identified early action items by staff to assure concurrence; and
  - Hold a public workshop/meeting to inform stakeholders.

Task 3. Develop a priority for studies to fill data gaps; develop scope(s) for early action data collection studies deemed feasible under available budget, conduct early action data studies:

- Task 3a. Develop scope(s) for early action data collection studies;
- Task 3b. To the extent funding is available, initiate early action data collection studies; and
- Task 3c. Prioritize remaining data gap completion actions.
- Task 3d. Technical Memo 2 – Prepare report of results of early action studies, recommendations, and prioritization for future studies
- Task 3 Action Items:

- Establish work groups of agency/citizens/consultants with knowledge of data gaps/sources/problems;
- Conduct work groups meetings to develop study plans;
- Acquire contractor services for early action data collection studies deemed fundable in Phase 1. Early action items preliminarily identified by the Advisory Group include phosphorus loading to Lake Spokane from on-site waste disposal systems and phosphorus release from sediments;
- Prepare Quality Assurance Project Plan(s) for early action studies; and
- Hold public workshop/meeting to inform stakeholders.

Project Schedule

Task	Estimated Completion Date
1. Data Compilation and gap identification, including: - electronic study library; and - data set of electronic and hard copy data	December 31, 2007
2. Assess and prioritize non-point sources - complete Technical Memo 1	February 29, 2008
3. Develop study plans, collect data - complete Technical Memo 2	December 31, 2008

A.7. Quality Objectives and Criteria

Work under this QAPP will not generate any direct environmental data measurements. Additional QA documents will be prepared after we develop study plans in Task 3.

The goal for this study is to collect and analyze all existing secondary data representing non-point source phosphorus loading within the Spokane River and Lake Spokane watershed.

The secondary data collected in this study will be reviewed for quality. The primary standards for quality review are the Washington State Water Quality Data Act (WQDA) and Washington Department of Ecology Credible Data Policy (WQP Policy 1-11).

According to WQP Policy 1-11, generally, data are considered credible data if:

- Appropriate quality assurance and quality control procedures were followed and documented in collecting and analyzing water quality samples;
- The samples or measurements are representative of water quality conditions at the time the data were collected;
- The data consist of an adequate number of samples based on the objectives of the sampling, the nature of the water in question, and the parameters being analyzed; and
- Sampling and laboratory analysis conform to methods and protocols generally acceptable in the scientific community as appropriate for use in assessing the condition of the water.

Also, according to WQP Policy 1-11, Ecology may consider that the following data are also credible and relevant to an impaired water identification or TMDL decision, if the sample

analysis was performed by a laboratory meeting the criteria of Section 6 or according to applicable field procedures.

- The data were collected before August 31, 1993 with sufficient QA documentation commensurate with commonly accepted practices at the time.
- The data were collected before September 30, 2002 according to a QA Project Plan approvable according to the guidelines existing at the time.
- The data were collected as part of an ongoing monitoring effort by a governmental agency and the data collection yielded results of comparable quality to data collected according to this policy.
- The water quality data were or are collected under the terms of an NPDES permit, permit application, or a compliance order issued by Ecology or EPA, a consent decree signed by Ecology or EPA, or a sampling program approved by Ecology or EPA under MTCA or CERCLA, and the data collection yielded results of comparable quality to data collected according to this policy.
- Data may be excluded from data sets or be assigned a level of credibility different from associated data as determined by Ecology in accordance with the WQDA

Data of unknown/non-verifiable quality will be considered suspect. It will be included in data library but marked as non-credible. We will attempt to contact the original author to question them on data quality indicators.

A.8. Special Training/Certification

All researchers working on the portion of the study addressed by this QAPP will have prior knowledge of water quality and quantity related issues by education and/or professional work experience. The consultant hired will be selected largely based on their experience working on water quality projects. There will be no additional training required.

A.9. Documents and Records

The Project Manager will maintain all project documents. The Project Manager will also create an electronic library of all secondary data sources. Staff will provide the data to the consultant for analysis.

Electronic format is preferred for data and studies. If the electronic format is not available, the hard-copy will be collected. All electronic documents will be maintained on the Spokane County computer network. The network is regularly backed up by the County Information Systems Department.

Spokane County will maintain electronic and print versions of all project deliverables. Spokane County will also maintain any other documents produced during the data collection and analysis.

All project deliverables, Technical Memos 1 and 2 and the electronic study library, will be provided to interested parties. Specifically, during the development of deliverables, the Project Manager will provide draft copies to EPA Region 10, Washington State Department of Ecology, Idaho Department of Environmental Quality, the Spokane River DO TMDL NPS Advisory

Committee, and other interested parties for evaluation and comment. Also, all final deliverables will be provided to the above-mentioned agencies and groups.

All documents will be maintained for at least three years following the end of the grant period.

Group B: Data Generation and Acquisition Elements

B.1. Sampling Process Design (Experimental Design)
This section is not applicable.

B.2. Sampling Methods
This section is not applicable.

B.3. Sample Handling and Custody
This section is not applicable.

B.4. Analytical Methods
This section is not applicable.

B.5. Quality Control
This section is not applicable.

B.6. Instrument/Equipment Testing, Inspection, and Maintenance
This section is not applicable.

B.7. Instrument/Equipment Calibration and Frequency
This section is not applicable.

B.8. Inspection/Acceptance of Supplies and Consumables
This section is not applicable.

B.9. Non-direct Measurements

Secondary data for this study may include:

- Stream flow measurements;
- Surface water quality (concentration);
    - Phosphorus, total and soluble reactive
    - Total suspended solids
    - Chlorophyll *a*
    - Sample collection location (latitude/longitude)
- Stream constituent load estimates;
- Groundwater quality and elevation; and
- Spatial data
    - Land use and land cover data
    - Septic tank density

- Surface and subsurface geology.

Data may be obtained from many sources including but not limited to:

- Federal agencies
  - Environmental Protection Agency
  - United States Geological Survey
  - United States Forest Service
- State agencies
  - Washington State Departments of Ecology and Health
  - Idaho Departments of Environmental Quality and Water Resources
- Local government
  - Cities (Spokane, Spokane Valley, Coeur d'Alene, Post Falls, etc)
  - Counties (Spokane, Stevens, Kootenai, etc)
  - Health districts (Spokane Regional, Panhandle Health)
  - Conservation districts
- Indian Tribes
  - Coeur d'Alene Tribe
  - Spokane Tribe of Indians
- Universities
  - Eastern Washington University
  - Washington State University
- Published and unpublished studies

The Project Manager will use several techniques to locate pertinent data, including but not limited to:

- Contact agencies and organizations to locate studies and data bases;
- Conduct literature searches at local universities to find published studies and theses;
- Review bibliographies from know studies to discover additional studies;
- Hold one public meeting to solicit information from interested community residents; and
- Discuss data sources with members of the Spokane River DO TMDL Non-point Source Advisory Committee.

Secondary data will be analyzed for quality based on criteria listed in Section A.7 of this document. The credible data will be used to quantify known non-point source phosphorus loading in the Spokane River and Lake Spokane watershed. The credible data will also be used to help determine where data gaps exist in our knowledge of the non-point source loading.

All data sources will be compiled in a library including:

- Authors
- Title
- Time period
- Study location
- Study focus
- Data quality indicators

The library will be created in a Microsoft Excel spreadsheet to allow easy access by study staff, agencies, and interested parties.

B.10. Data Management

The Project Manager will maintain all study data and information. Every attempt will be made to gather data electronically to avoid having to recreate data sets. All data will be maintained electronically on Spokane County computer network.

Group C: Assessment and Oversight Elements

C.1. Assessments and Response Actions

The Project Manager (PM) will work with the technical consultant to assess project progress. Determining data quality is a key step in this study and will be a central focus of the work. The PM will have the authority to stop consultant work if it does not meet data quality requirements.

Technical Memo 1 will outline the results of the data collection and analysis. The consultant will present the Memo to the Spokane River DO TMDL Non-point Source Advisory Committee for comment. If at that time, work is not acceptable, the PM will work with the consultant to resolve any issue.

C.2. Reports to Management

The Project Manager will make updates/changes to this QAPP as necessary and review it annually. Any changes will be communicated to the all parties identified on the distribution list (Section A.3)

Group D: Data Validation and Usability Elements

D.1. Data Review, Verification, and Validation

Determination of secondary data quality will be based on Washington State water quality data criteria outlined in Section A.7 of this document. Professional judgment will also be used to determine if the data are reasonable given known variations including seasonal, hydrologic, and land use changes.

D.2. Verification and Validation Methods

The data collected throughout the study will be compared between sets to determine if it is consistent given known variations including seasonal, hydrologic, and land use changes.

D.3. Reconciliation with User Requirements

The product of this study will be technical memos that quantify known non-point source phosphorus loading in the area and a list of possible data gaps. The results will be presented to

an advisory committee for review. That advisory committee and stake holders will have an opportunity to comment on the results.

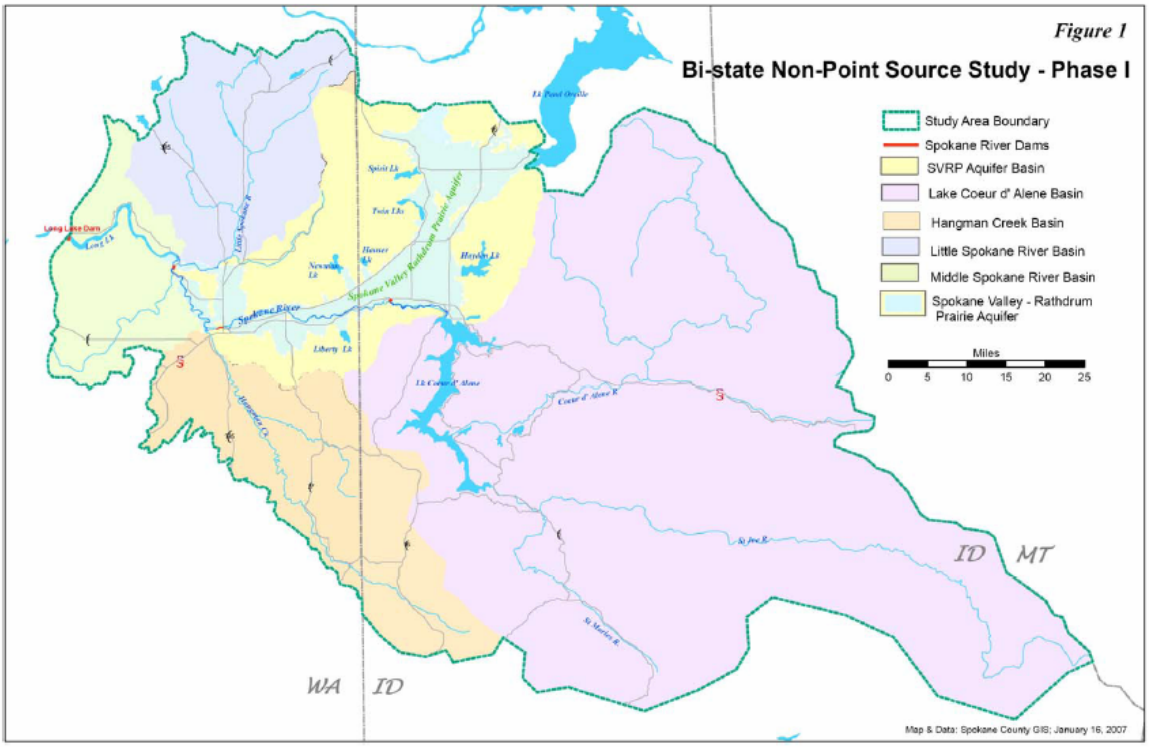


Figure 1
Bi-state Non-Point Source Study - Phase I
Study Area Boundary
Spokane River Dams
SVRP Aquifer Basin
Lake Coeur d' Alene Basin
Hangman Creek Basin
Little Spokane River Basin
Middle Spokane River Basin
Spokane Valley - Rathdrum Prairie Aquifer
Miles
0 5 10 15 20 25
WA
ID
ID
MT
Map & Data: Spokane County GIS; January 16, 2007