

Washington Department of Ecology

Project Work Plan Memo

February 21, 2017

TO: Karin Baldwin, Client Lead, Eastern Regional Office Water Quality Section
David Knight, Unit Supervisor, ERO-WQ
Jim Bellatty, Section Manager, ERO-WQ

THROUGH: Jim Ross, Unit Supervisor, Environmental Assessment Program, ERO
Tom Mackie, Section Manager, EAP, Eastern Operations Section

FROM: Paul J. Pickett, Project Manager, EAP, Eastern Operations Section

SUBJECT: Project Work Plan: Lake Spokane "Measuring Improvement" Literature Search

Tracker Code: 16-021

Problem Description

The Spokane River and Lake Spokane dissolved oxygen total maximum daily load (DO TMDL) approved in 2011 used the CE-QUAL-W2 model to evaluate dissolved oxygen in the river and reservoir under a variety of conditions. The Department of Ecology (Ecology) found that conditions in the riverine and lacustrine portions of Lake Spokane (the reservoir created by Long Lake Dam) did not meet the water quality standards for DO, with the segment in front of Long Lake Dam having the most impairment. The source of the impairment was found to be nutrients from point and non-point sources.

By 2020, a variety of point and nonpoint implementation actions will occur. From 2021-2023, Ecology anticipates conducting a 10-year assessment of the Spokane River and Lake Spokane to determine progress toward meeting the DO TMDL allocations.

However, stakeholders have expressed interest in exploring alternatives in addition to the CE-QUAL-W2 model to assess the progress of implementing the DO TMDL. Therefore, Ecology's Eastern Regional Office Water Quality Section (ERO-WQ) would like the Environmental Assessment Program (EAP) to conduct a literature search.

Study Purpose

The purpose of the literature search is to identify and evaluate alternative methods or analyses that could be used to measure improvements in water quality, reservoir health, and support for aquatic life in Lake Spokane. The search focuses on dissolved oxygen levels in the lake and on lake ecosystem processes related to dissolved oxygen, including both internal processes and external influences. The search will evaluate academic research and applied science used in

systems similar to Lake Spokane and the Spokane River.

Study Objectives

- Identify and summarize scientific literature which documents ways to assess reservoir water quality and aquatic habitat health, focusing on processes related to the DO impairments addressed by the DO TMDL.
- Analyze and evaluate the identified literature in terms of:
 - The technical applicability of methods as indicators for DO TMDL implementation targets and for related factors such as trophic status and ecological structure
 - The ability of methods to characterize trends and rates of recovery
 - The policy and regulatory context of the method, its endpoint or success measures, and how these are similar to or different than the DO TMDL.
- Identify and recommend the most feasible and useful methods that can inform the DO TMDL 10-year assessment.

Scope-of-Work

- Conduct a literature search to meet project objectives.
 - Possible areas to explore include:
 - Alternative ways to characterize ambient measurements and model results of Lake Spokane dissolved oxygen
 - Simplified modeling or analysis methods for DO and other related water quality parameters
 - Metrics for the biological communities in the reservoir aquatic ecosystem which interact with DO in the system, such as phytoplankton, zooplankton, fish, and other aquatic species
 - Metrics that link external influences, including upstream water quality, other tributaries, and weather conditions, to lake DO and related water quality
 - Tools to evaluate the quantity and quality of data needed and the variability of metrics
 - Equilibrium indicators and other tools to evaluate the rate of ecosystem recovery
 - Indicators for DO levels in the context of overall ecosystem health
 - Possible sources of relevant information include:
 - Articles published in peer-reviewed journals
 - Academic and professional text books on limnology and aquatic ecology
 - Publications and other information from government agencies, such as the U.S. Environmental Protection Agency, U.S. Geological Survey, and other federal and state agencies
 - Biological, empirical, and chemical data analysis methods from historic studies of Lake Spokane and the Spokane River
 - Information from Washington, Idaho, Oregon, and other states regarding TMDLs and other projects in lake and reservoirs which address DO problems.
- Work with ERO-WQ and EAP staff to ensure that the results of the search are relevant,

useful, and consistent with policies established by Ecology's Water Quality Program.

- Work with external stakeholders through the DO TMDL Advisory Committee and Monitoring Work Group to obtain local knowledge and input, including: agenda items at meetings to provide project status updates and to present and discuss results; and providing opportunities for review and comments on project documents.
- Communicate study results through a published report and presentations to local stakeholders.

Schedule

Product

Final Report	
Product lead and support staff	Paul Pickett
Schedule:	
Supervisor and Client Draft review begins	July 2017
Internal Policy Review Draft review begins	August 2017
External Draft review begins	October 2017
Final report published	December 2017

cc: Carol Smith
Melissa McCall (for Activity Tracker)