



DEPARTMENT OF
ECOLOGY
State of Washington

Addendum 2 to Quality Assurance Project Plan

Effectiveness Monitoring of Water Stargrass Harvesting Operations, lower Yakima River



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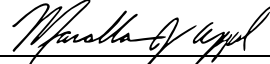




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Addendum 2 to Quality Assurance Project Plan

Effectiveness Monitoring of Water Stargrass Mowing Operations in the lower Yakima River

by Marcella Appel, Benton Conservation District
Published August 2023

Approved by:

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Signature:  Scott Tarbutton, QAPP Coordinator, Office of Columbia River, Department of Ecology	Date: 8/22/2023
Signature:  Kevin Haydon, Project Manager, Office of Columbia River, Department of Ecology	Date: 8/22/2023

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Note: The numbered headings in this document correspond to the headings in the original QAPP. Only relevant sections are included here; therefore, some numbered headings may be missing.

2.0 Abstract

The primary goal of this work is to collect temperature, dissolved oxygen, and streamflow velocity data at two pilot treatment locations before and after harvesting of aquatic biomass. Treatments of the pilot locations will occur during the 2021 - 2023 growing seasons in late spring to early fall which also coincides with irrigation season, baseflow conditions, and salmon migration. In addition, two nearby control (unharvested) areas will be monitored to help evaluate harvesting effectiveness. We anticipate harvesting up to one acre of aquatic biomass at each of the two harvesting locations on the mainstem lower Yakima, near Benton City, WA. This project is funded by the Department of Ecology, as part of the Yakima Basin Integrated plan through winter of 2024.

4.0 Project Description

4.2 Project objectives

The additional objectives of this study included in this QAPP addendum are to:

- Evaluate changes in the cross-sectional average velocity within each APE pre-and post-harvesting using established relationships between river discharge and channel area
- Evaluate relationships between water velocity and water column depth at 6 locations within each APE pre- and post-harvesting using a wading rod and flow meter
- Calculate cross-sectional streamflow velocities for each APE in 2021 to evaluate the USGS gage station as a proxy for discharge at the APE sites for harvesting operations in 2022 and 2023.

4.3 Information needed and sources

We will use historical (2018 -2020) and current data from the USGS Surface-Water Data for Washington (<https://waterdata.usgs.gov/wa/nwis/rt>) at the Kiona Gage at Benton City, WA and data collected by the Department of Ecology, Environmental Assessment Program in 2023 at Kiona. These data will help inform how the in-stream temperature and DO conditions for the project monitoring years compare to previous recently evaluated water years of 2018 – 2020.

4.4 Tasks required

Outlined below are the main tasks for this QAPP addendum:

- Conduct continuous water quality monitoring of stream temperature and DO within two harvested locations on the Yakima River (Figure 3, Section 7.2) from June – September 2021- 2023. This task will be accomplished by:
 - Placing two loggers that measure both DO and temperature directly upstream and downstream within each APE, as feasible, for a total of 4 deployed loggers. Loggers will be placed as close to possible within the center of the channel, assuming depth and flows are safely wadable.
 - Loggers will be deployed at least 4 weeks prior to harvesting operations and will remain in place a minimum of 4 weeks post harvesting to evaluate effectiveness.
- Conduct continuous water quality monitoring of stream temperature and DO at one control location in the Yakima River (Figure 3, Section 7.2) from June – September 2021 – 2023. This location will be located downstream of the harvesting operations outside of the area of potential effect. This task will be accomplished by:
 - Deploying two loggers that measure both DO and temperature within a cross-section of the mainstem Yakima River.
 - Loggers will be deployed and remain in place for the same duration as the loggers deployed at each APE.

5.0 Organization and Schedule

5.1 Key individuals and their responsibilities

Table 2 shows the responsibilities of those who will be involved in this project.

Table 2. Organization of project staff and responsibilities.

Staff	Title	Responsibilities
Marcella Appel Benton Conservation District Phone: 509-786-6000	Water Resources Project Manager	Clarifies scope of the project. Responsible for field work planning, technical coordination, project design coordination, and project oversight. Will coordinate field results and evaluation, and upload data to EIM. Will complete grant reporting budgeting and communication with Ecology.
Mark Nielson Benton Conservation District Phone: 509-786-6000	District Manager	Responsible for Water Stargrass Harvesting Operations and coordination of related activities. Signatory on QAPP and provides project and work updates to the BCD board. Oversight of Water Resource Project Manager.
Patty Sherman Benton Conservation District Phone: 509-416-0440	Bookkeeper	Responsible for maintaining payroll and vouchers, and submission of quarterly PRPR within EAGL.
Thomas Sexton Benton Conservation District Phone: 509-736-6000	Resource Conservationist	Responsible for organizing harvesting staff, machine operation and maintenance, evaluation of harvesting logistics and data analysis support.
Sarah Roley Washington State University – Tricities (WSU-TC) Phone: 509-372-7449	Associate Professor, School of the Environment	PhD advisor for WSU-TC student conducting field work. She will provide coordination and input on field work, oversight of results and analysis and help ensure project deliverables are met.
Aaron Pelly Washington State University – Tricities (WSU-TC)	WSU-TC PhD student	Conducts field operations, quality assurance, and maintenance of equipment. Responsible for interfacing and communicating with both BCD and WSU-TC. Will interpret and provide analysis in written report.
Scott Tarbutton Department of Ecology Phone: 509-867-6534	OCR QAPP Coordinator	Reviews the QAPP addendum and recommends the final QAPP for approval.
Kevin Haydon Department of Ecology Phone: 509-823-6947	OCR Project Manager	Coordination of QAPP addendum completion. Coordinate with project staff on budgets, timelines, and deliverables.

5.4 Proposed project schedule

The additional proposed project schedule and lead staff for each task is provided in Table 3.

Table 3. Schedule for completing field and project work.

Task	Due date	Lead staff
Harvesting of aquatic plant material	August – September 2023	Thomas Sexton BCD
Continuous Monitoring of DO, Temperature and stage	June 2023 – September 2023	Aaron Pelly WSU-TC
Data Processing	October 2023 – January 2024	Aaron Pelly WSU-TC
Upload Data to EIM	January 2024	Marcella Appel BCD
Quarterly PRPR Reports	Quarterly during grant lifetime	Marcella Appel BCD
Final Project Reporting to Ecology	February 2024	Marcella Appel BCD

7.0 Study Design

7.1 Study boundaries

The boundaries for work described in this QAPP addendum will be within the Yakima River at Benton City, WA. The upstream monitoring boundary will be the USGS Kiona Gauge near USGS RM 30, located near the Benton City Bridge. The lower boundary will be located upstream of the Benton City Railroad Bridge, at approximately USGS RM 28.5. Two harvested areas, called the Areas of Potential Effect (APE), will be harvested between the upstream and downstream boundaries. Each APE is anticipated to be roughly one acre in size. Figure 3 shows the anticipated study boundaries and monitoring areas.

We will begin monitoring at the downstream control and the two APE locations (Figure 3) starting in June 2023, after the river levels drop to near baseflow conditions. These sites will be continuously monitored for DO and Temperature using deployed loggers (Figure 3). We will continue monitoring these sites until September 2023. This period coincides with baseflow conditions, the water stargrass growing season, and adult salmonid migration. The upstream gage at Kiona has been operational since March of 2021 and will continue monitoring the upstream boundary location for the duration of this project period.

Cross-sectional discharge measurements were collected at each APE in 2021. These measurements were used to compare discharge within the unharvested APE to the USGS Kiona gage station. Discharge will not change through plant removal because the same volume of water will still enter from the upstream location (there are no diversions or influents between the USGS Kiona gage and APEs).

We will follow the QA/QC protocols as outlined within the original QAPP. Equipment will be checked and maintained regularly, with regularly scheduled field checks to ensure monitoring accuracy.

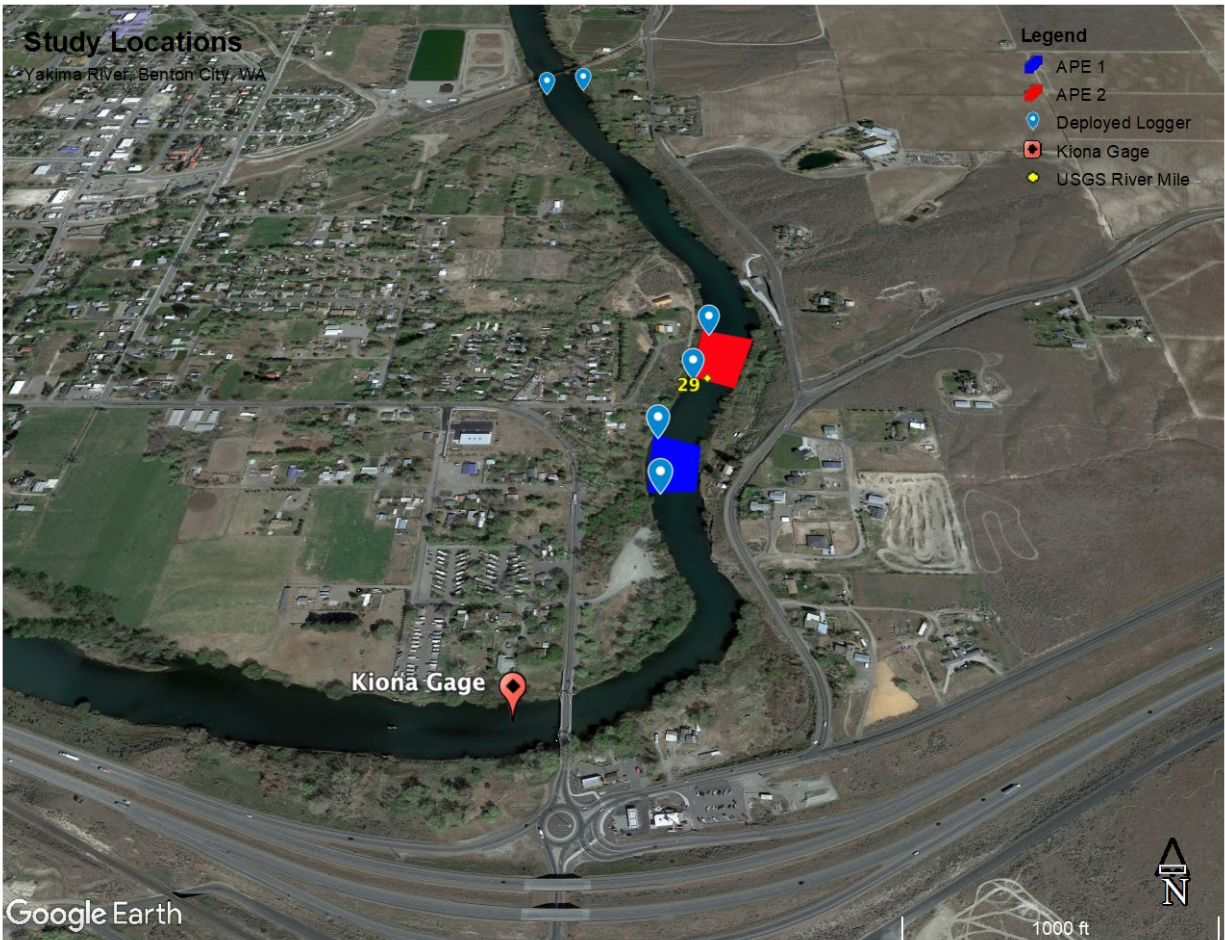


Figure 3. Map showing study location boundaries of work covered by this QAPP addendum