Addendum 3 to
Quality Assurance Project Plan: Washington State Surface Water Monitoring Program for Pesticides in Salmonid Habitat for Two Index Watersheds

April 2009

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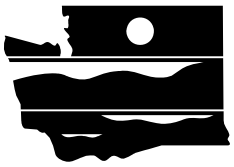

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Addendum

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Quality Assurance Project Plan: Washington State Surface Water Monitoring Program for Pesticides in Salmonid Habitat for Two Index Watersheds

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DEPARTMENT OF ECOLOGY

Environmental Assessment Program

April 6, 2009

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Washington State Department of Agriculture

THROUGH: Dale Norton, Unit Supervisor, Environmental Assessment Program
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FROM: Debby Sargeant, Environmental Assessment Program
Paul D. Anderson, Environmental Assessment Program

SUBJECT: **ADDENDUM TO QUALITY ASSURANCE PROJECT PLAN FOR Washington State Surface Water Monitoring Program for Pesticides in Salmonid Habitat in Two Index Watersheds**

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Purpose of this Addendum

The purpose of this addendum is to:

1. Document monitoring site changes for 2007-2009.
2. Include data quality objectives for conventional parameters measured using field meters.
3. Document increased quality assurance for 2009 laboratory samples.

1. Changes in Monitoring Site Locations

Skagit-Samish Watershed

In February of 2007, the upstream sampling site on the Samish River (SR-2) was removed from the sampling schedule due to lack of detections in the 2006 sampling year. This removal allowed for the addition of an upstream site on Big Ditch (BD-2) in 2007. It is located near the boundary between agricultural land use and the urban/residential land use. The purpose of this site is to determine if there is a difference in pesticide detection patterns between agricultural and urban/residential land uses on Big Ditch. Sampling at this site followed the procedures from the original Quality Assurance (QA) Project Plan and addendums (Johnson and Cowles, 2003; Burke and Anderson, 2006; Dugger et al., 2007).

Figure 1 shows the location of the removed upstream Samish River site and the new upstream Big Ditch site. Table 1 has the exact location and a description of the upstream Big Ditch site.

Cedar-Sammamish Watershed

Starting in the 2009 sampling season, the upstream sampling site on Thornton Creek (TC-1) will be discontinued. In past years, the upstream site was sampled every other week. Weekly sampling at the downstream site on Thornton Creek (TC-3) will continue through the 2007-2009 biennium. At the end of the 2007-2009 biennium, sampling at the downstream Thornton Creek site may also be discontinued. The decision to discontinue the downstream sampling site will be based solely on availability of funds. Figure 2 shows the location of the Thornton Creek sites in the Cedar-Sammamish watershed.

Green-Duwamish Watershed

In place of the upstream Thornton Creek station, a site on Longfellow Creek (LC-1) in the Green-Duwamish watershed will be established. This site was selected collaboratively with the U.S. Fish and Wildlife Service (USFWS) and the National Oceanic and Atmospheric Administration – National Marine Fisheries Service (NOAA – Fisheries). The site will be located upstream of the culvert under the 12th Fairway on the West Seattle Golf Course. Figure 3 shows the location of the Longfellow Creek sampling site in the Green-Duwamish watershed.

Table 1 has the exact location and a description of the Longfellow Creek sampling site. Sampling at this site will follow procedures from the original QA Project Plan and subsequent QA Project Plan addendums (Johnson and Cowles, 2003; Burke and Anderson, 2006, Dugger et al., 2007).

Longfellow Creek is the subject of an intensive investigation into pre-spawning mortality in salmonid populations. The USFWS and NOAA – Fisheries have a research station on Longfellow Creek located on the West Seattle Golf Course. Ecology's sampling site will be located upstream from the research station and will provide additional data on pesticides in surface waters of an urban stream. By having more than one urban location, a more accurate assessment of urban pesticide use and their effects on endangered salmonids can be made. In addition to this, the monitoring program will be able to share data with the USFWS and NOAA – Fisheries for ongoing research projects on pre-spawning mortality.

Table 1. Sampling Locations and Descriptions for Big Ditch 2, Longfellow Creek, and Thornton Creek 1.1.

Site Name	Site ID	Latitude	Longitude	Location Description
Big Ditch 2	BD-2	48.3887	122.3329	Upstream of the bridge on Eleanor Lane.
Longfellow Creek 1	LC-1	47.5625	122.3670	Upstream of the culvert under the 12th Fairway on the West Seattle Golf Course.
Thornton Creek 1.1	TC-1.1	47.7082	122.2897	NE 110th Street upstream of the pedestrian footbridge.

Datum = NAD 83 HARN

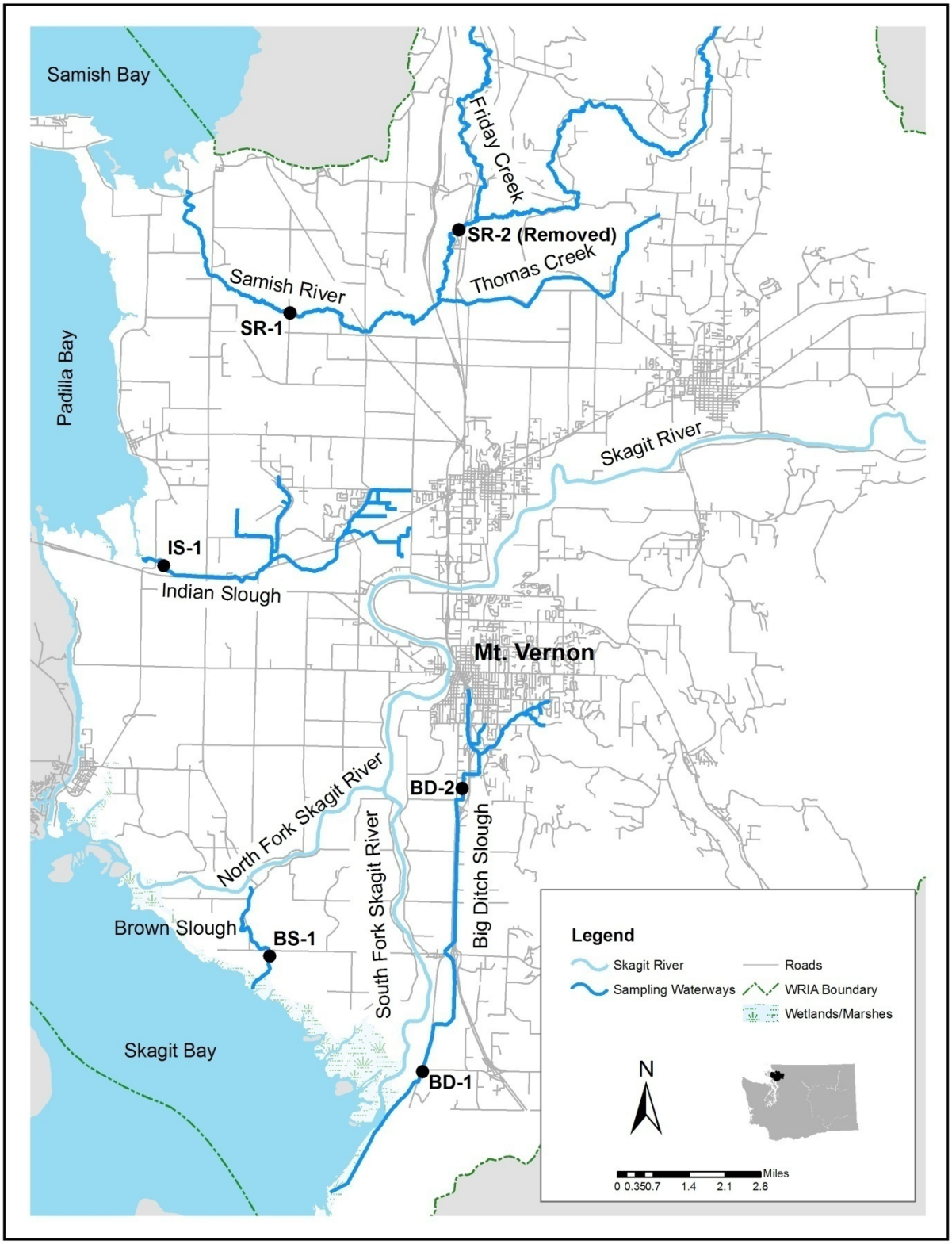

Figure 1. Sampling Locations in the Lower Skagit-Samish Watershed.

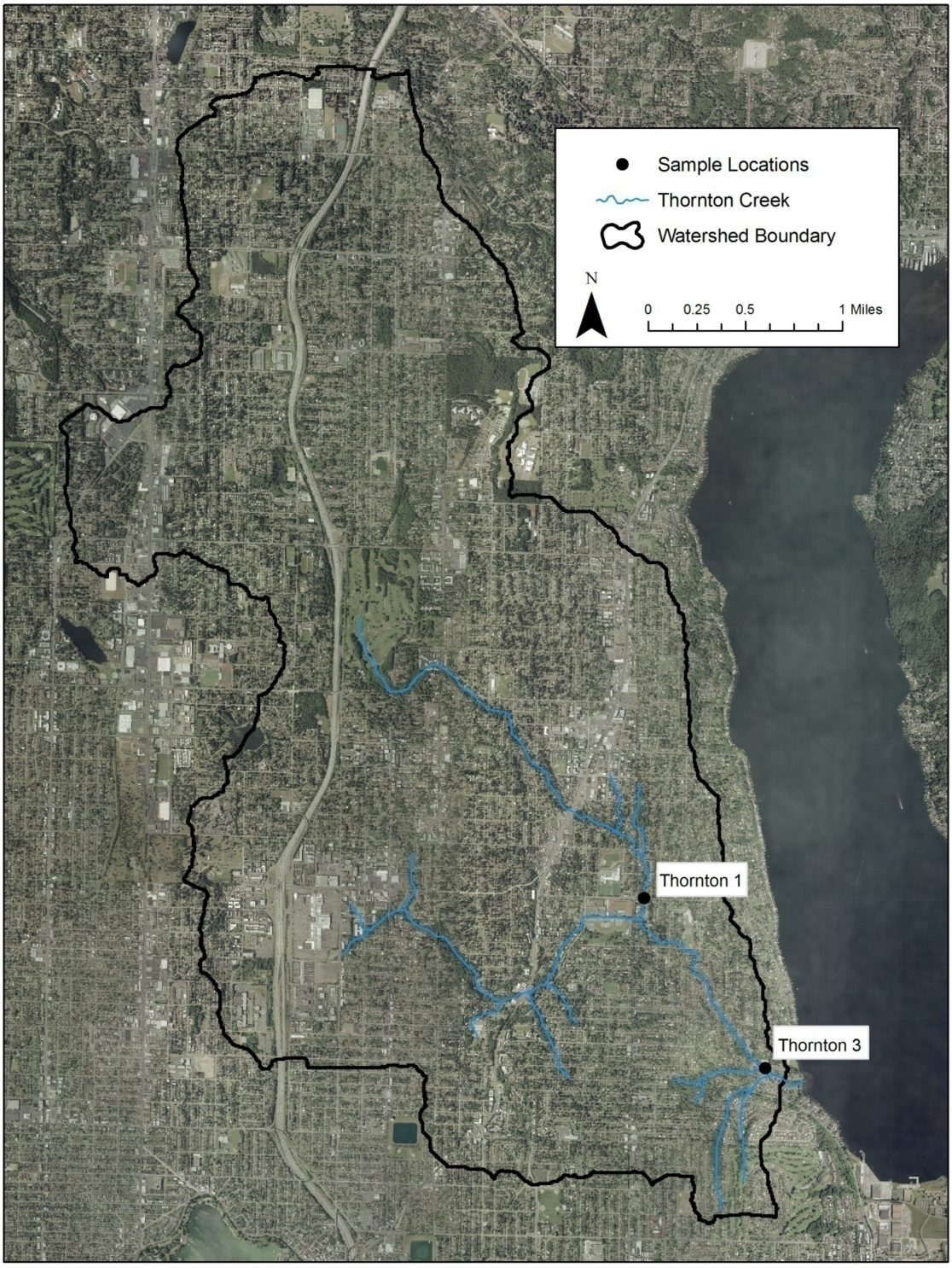

Figure 2. Sampling Locations in the Thornton Creek Watershed.

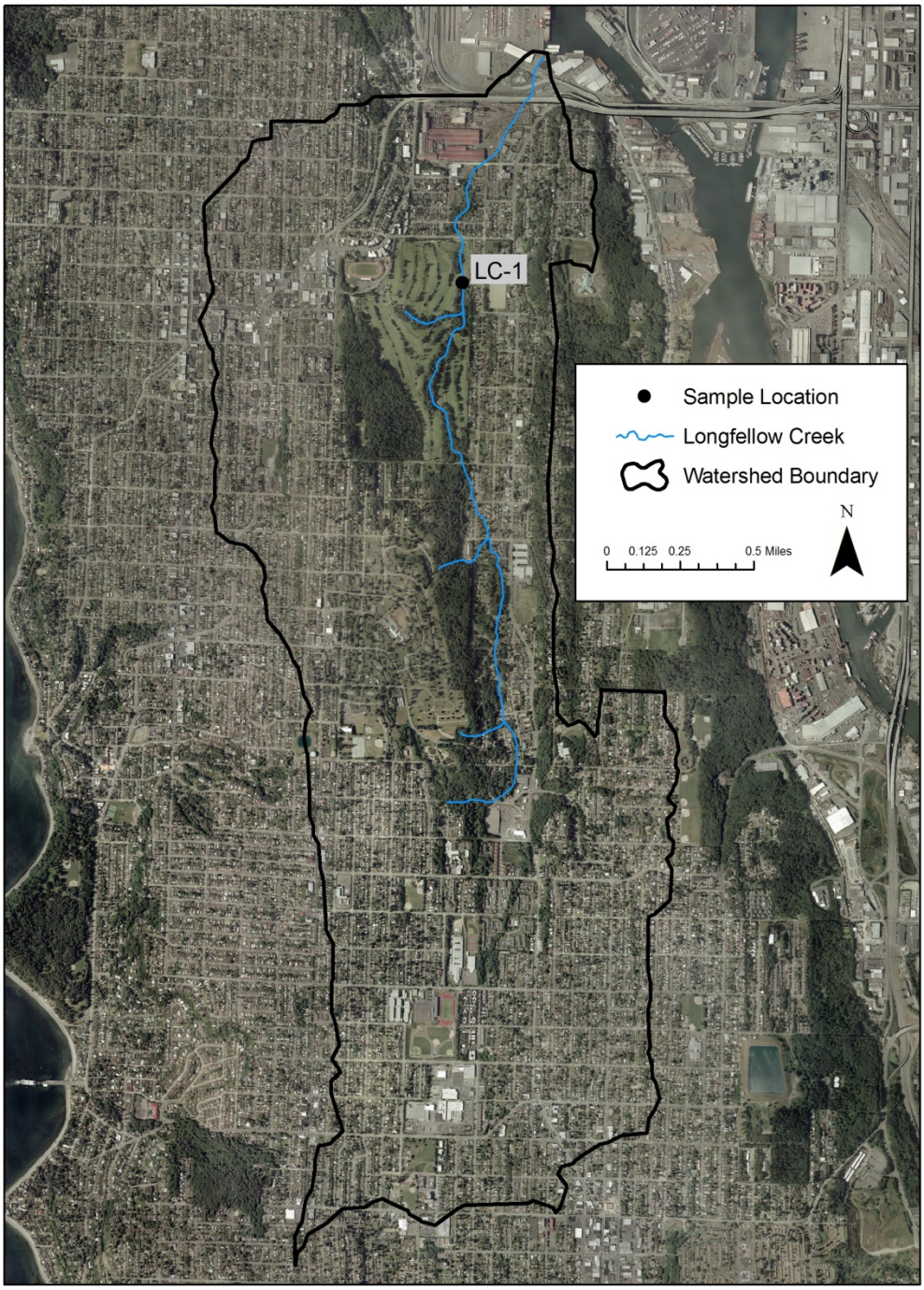

Figure 3. Sampling Location for Longfellow Creek.

2. Field Meter Data Quality Objectives

When the original QA Project Plan was written, numerical field meter quality objectives for conventional parameters were not included because they were considered to be ancillary. As the monitoring program evolved over the last six years, conventional parameters have become a larger part of understanding the effect of pesticides on salmonids and understanding the fate and transport of pesticides. While the original QA Project Plan does not include numerical quality objectives for field meters measuring conventional parameters, quality data were still obtained through daily calibrations and meter checks.

Continuous or instantaneous meter measurements collected at each sampling site will conform to the measurement quality objectives summarized in Table 2.

Table 2. Measurement Quality Objectives for Conventional Parameters Measured by Field Meters or Determined by a Standard Method.

Parameter	Method/Equipment	Field Replicate MQO	Reporting Limits
Discharge Volume	Marsh-McBirney Flow-Mate Flowmeter	10% RSD	0.1 ft/s
Water Temperature	Hydrolab MiniSonde®	±0.2° C	0.1° C
Conductivity	Hydrolab MiniSonde®	10% RSD	0.1 µmhos/cm
pH	Hydrolab MiniSonde®	10% RSD	0.1 s.u.
Dissolved Oxygen	Hydrolab MiniSonde®	10 % RSD	0.1 mg/L
Dissolved Oxygen	SM4500OC	±0.2 mg/L	0.1 mg/L

MQO – measurement quality objective
RSD – relative standard deviation
s.u. – standard units

All conventional parameters will be measured in the field using a Hydrolab MiniSonde®, a meter with equivalent measurement capabilities (a Marsh-McBirney® or similar Flowmeter), or by collecting samples for Winkler titration. Conventional parameters measured in the field will be replicated once per sample day. For dissolved oxygen, two Winkler samples will be collected per day: one Winkler at the beginning of the sampling day and one at the end. The location of the replicate measurements will be rotated through all sample sites. Precision for replicates will be expressed as percent relative standard deviation (RSD).

Any meter used to measure conventional parameters will be calibrated before use and post checked at the end of each day, using conductivity/pH buffer solutions and the air saturation calibration method for dissolved oxygen. Temperature will not be included in this procedure because it is factory calibrated. To check for drift in temperature calibration, field meters will be compared to a National Institute of Standards and Technology (NIST) thermometer at the beginning and the end of each sampling season.

All calibration and post-check data will be recorded on a calibration sheet kept with the field meters or in the sampling vehicle. Post-check values will be assessed for acceptance, qualification, or rejection based on the data quality objectives for field meter post checks summarized in Table 3. These post-check values were taken from an Ecology QA Project Plan written by Mathieu and Sargeant, 2008.

Table 3. Data Quality Objectives for Hydrolab or Other Field Meter Post Checks (Mathieu and Sargeant, 2008).

Parameter	Units	Accept	Qualify	Reject
pH	standard units	≤ ± 0.25	> ± 0.25 and ≤ ± 0.5	> ± 0.5
Conductivity[1]	µmhos/cm	≤ ± 5%	> ± 5% and ≤ ± 15%	> ± 15%
Dissolved Oxygen[2]	% saturation	≤ ± 5%	> ± 5% and ≤ ± 15%	> ± 10%

[1]Criteria expressed as a percentage of readings; for example, buffer = 100.2 µmhos/cm and hydrolab = 98.7 µmhos/cm; (100.2-98.7)100.2 = 1.49% variation, which would fall into the acceptable data criteria of less than 5%.
[2]When Winkler data are available, they will be used to evaluate acceptability of data in lieu of percent saturation criteria. Reference: Mathieu and Sargeant, 2008

3. Quality Assurance and Quality Control Changes for Laboratory Analysis

The quality assurance and quality control (QA/QC) protocol for all watersheds employs diverse application of blanks, replicates, surrogates, laboratory control samples, and matrix spike/matrix spike duplicates (MS/MSD). Laboratory surrogate, blank, replicate, and control samples are analyzed as the laboratory component of QA/QC. Field blanks, replicates, and MS/MSDs integrate field and laboratory components (Burke and Anderson, 2006).

In the initial phase of the project, a large portion of the budget was allocated toward QA/QC. Currently, QA/QC is approximately 17% of the budget. The QA/QC is planned so that at each site the following QA/QC samples are obtained during the sample season:

- One blank each of total suspended solids, herbicides, carbamates, and pesticide.
- One MS/MSD (2 samples) each of herbicides, carbamates, and pesticide.
- Two replicates each of total suspended solids, herbicides, carbamates, and pesticide analyzed by Gas Chromatography/Mass Spectrometry.

Through the end of June 2009, additional QA/QC money is available. Additional QA/QC money will be directed toward the Wenatchee watershed. In the Wenatchee watershed, additional QA/QC is needed to address concerns about endosulfan detections. Samples collected in the Wenatchee watershed during 2007 and 2008 had detections of endosulfan in the Wenatchee River and Brender Creek. Some detections of endosulfan were above the Washington State acute water quality criteria of 0.22 µg/L. Additional replicate and blank samples were added to these sites during peak detection periods to further evaluate site conditions and address concerns about the endosulfan detections.

Table 4 shows the proposed schedule for project deliverables.

Table 4. Proposed schedule for completing field and laboratory work, data entry into EIM, and reports.

Environmental Information System (EIM) Data Set	
EIM Data Engineer	Paul Anderson
EIM User Study ID	DSAR0004
EIM Study Name	Pesticides in Salmonid-Bearing Streams, Year 7
EIM Completion Due	April 30, 2007
Final Report	
Author Lead	Debby Sargeant
Schedule	
Draft Due to Supervisor	January 31, 2010
Draft Due to Client/Peer Reviewer	February 28, 2010
Draft Due to External Reviewer	March 31, 2010
Final Report Due	April 30, 2010

References

Burke, C. and P. Anderson, 2006. Addendum to the Quality Assurance Project Plan for Surface Water Monitoring Program of Pesticides in Salmonid-Bearing Streams: Addition of Skagit-Samish Watersheds, and Extension of Program Through June 2009. Washington State Department of Ecology, Olympia, WA. Publication No. 03-03-104ADD. www.ecy.wa.gov/biblio/0303104add.html.

Dugger, D., P. Anderson, and, C. Burke, 2007. Addendum to Quality Assurance Project Plan: Surface Water Monitoring Program for Pesticides in Salmonid Bearing Streams: Addition of Wenatchee and Entiat Watersheds in the Upper Columbia Basin. Washington State Department of Ecology, Olympia, WA. Publication No. 03-03-104ADD2. www.ecy.wa.gov/biblio/0303104add2.html

Johnson, A. and J. Cowles, 2003. Quality Assurance Project Plan: Washington State Surface Water Monitoring Program for Pesticides in Salmonid Habitat for Two Index Watersheds: A Study for the Washington State Department of Agriculture Conducted by the Washington State Department of Ecology. Washington State Department of Ecology, Olympia, WA. Publication No. 03-03-104. www.ecy.wa.gov/biblio/0303104.html.

Mathieu, N. and D. Sargeant, 2008. Quality Assurance Project Plan: Drayton Harbor Watershed Fecal Coliform Total Maximum Daily Load: Phase 1 Water Quality Study Design. Washington State Department of Ecology, Olympia, WA. Publication No. 08-03-105. www.ecy.wa.gov/biblio/0803105.html.