



DEPARTMENT OF
ECOLOGY
State of Washington

Addendum 4 to Quality Assurance Project Plan

Washington State Surface Water Monitoring Program for Pesticides in Salmonid Habitat for Two Index Watersheds

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Publication Information

Addendum

This addendum is an addition to an original Quality Assurance Project Plan. The addendum is not a correction (errata) to the original plan.

This addendum is available on the Department of Ecology's website at www.ecy.wa.gov/biblio/0303104Addendum4.html

Ecology's Activity Tracker Code for this study is 03-501.

Original Publication

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

Publication No. 03-03-104

The Quality Assurance Project Plan is available on the Department of Ecology's website at www.ecy.wa.gov/biblio/03031104.html

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DEPARTMENT OF ECOLOGY
Environmental Assessment Program

February 23, 2011

TO: Jim Cowles, Washington State Department of Agriculture

THROUGH: Dale Norton, Unit Supervisor, Environmental Assessment Program
Will Kendra, Section Manager, Environmental Assessment Program

FROM: 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 for Two Index Watersheds

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Ecology's current standard operating procedure (SOP) EAP003 *Sampling of Pesticides in Surface Waters* (Anderson and Sargeant, 2010) calls for the use of a United States Geological Survey (USGS) DH-81 depth-integrating sampler in water between one and four feet deep. The use of the DH-81 depth-integrating sampler is premised on the partitioning of pesticides at different depths in the water column. At depths less than or equal to one foot the SOP allows for the use of grab samples. The goal of this study is to evaluate the need to collect depth-integrated samples.

To determine if there is a statistically significant difference between the DH-81 samples and the grab samples, a side-by-side replicate study will be conducted at three sites. These three sites currently use the DH-81 to collect samples. Side-by-side samples will be collected at the three sites for seven weeks. The samples will be analyzed for the monitoring project's standard suite of pesticides (Sargeant et al., 2011).

If there is a significant difference between the sample results for the DH-81 and the grab samples, the use of the DH-81 will be continued. If no significant difference is found between the collection methods, a recommendation will be made to discontinue use of the DH-81 after the 2011 sampling season. Ecology SOP EAP003 will also be updated to reflect this change in collection method.

cc: Kirk Cook, Washington State Department of Agriculture
Debby Sargeant, Project Manager, Environmental Assessment Program
Evan Newell, Eastern Washington Field Lead, Environmental Assessment Program
Bill Kammin, Ecology Quality Assurance Officer
Stuart Magoon, Director, Manchester Environmental Laboratory

Schedule and Deliverables

Table 1. Proposed schedule for completing field and laboratory work, data entry into EIM, and a technical memo.

Field and laboratory work	Due date	Lead staff
Field work completed	June 2011	Paul D. Anderson
Laboratory analyses completed	July 2011	
Environmental Information System (EIM) database		
EIM user study ID	DSAR0008	
Product	Due date	Lead staff
EIM data loaded	November 2011	Paul D. Anderson
EIM quality assurance	December 2011	Evan Newell
EIM complete	January 2012	Paul D. Anderson
Technical Memo		
Author lead / support staff	Debby Sargeant / Paul D. Anderson	
Schedule		
Draft due to supervisor	August 2011	
Draft due to client/peer reviewer	September 2011	
Final (all reviews done) due to publications coordinator	October 2011	
Final report due on web	November 2011	

In lieu of a technical report, the main deliverable for this study will be a technical memo. The technical memo will describe the results of the study, summarize findings, and provide recommendations.

Budget

The total laboratory cost for the project is estimated at \$17,535. Table 2 details the break-down of the projected cost. Cost estimates include a 50% discount for MEL.

Table 2. Estimated laboratory costs*.

Parameter	Number of Samples	Price per Sample (\$)	Total Price (\$)
Pesticides	21	441	9,261
Herbicides	21	202	4,242
Carbamates - low level	21	192	4,032
Totals	63	835	17,535

*Costs include 50% discount for MEL.

Quality Objectives

Quality objectives for this study are to obtain data of sufficient quality and quantity so that the data can be used to: (1) meet the objectives and data quality requirements of the Surface Water Monitoring Program for Pesticides in Salmonid-Bearing Streams (Johnson and Cowles, 2003; Burke and Anderson, 2006; Dugger et al., 2007; Anderson and Sargeant, 2009) and (2) determine if there is a statistically significant difference between depth-integrated samples collected with a DH-81 and hand-collected grab samples. These objectives will be achieved through careful planning, sampling, and adherence to the procedures described in the Quality Assurance Project Plan and all associated addendums.

Laboratory

Ecology's Manchester Environmental Laboratory (MEL) will perform the chemical analysis for this study. MEL is expected to meet all the quality control requirements of the analytical methods described in Johnson and Cowles, 2003; Burke and Anderson, 2006; Dugger et al., 2007; and Anderson and Sargeant, 2009.

Sampling Design

To determine if there is a significant difference between depth-integrated and hand-collected grab samples, a side-by-side comparison will be made. In order to fully capture any differences, all pesticide parameters that are normally collected at each site with the DH-81 will also be collected by grab sample. In essence the samples will be replicates collected by different methods.

Three sites where the DH-81 is routinely used were chosen for study. Two sites (Lower Big Ditch and Indian Slough) are located in the Skagit-Samish watershed resource inventory area (WRIA) 3 and one site (Marion Drain) is located in the Lower Yakima WRIA 37. Detailed location information can be found in Sargeant et al., 2010.

To collect enough data to make statistical comparison, the three sites will be sampled once each week for seven weeks. Samples will be collected during regularly scheduled sampling events from the last week of April 2011 through the second week of June 2011. The seven-week period was chosen based upon past detection patterns. In the past this time period has shown increased detections of the target pesticide groups. Increasing the likelihood of detection will optimize the ability of this study to have detections to compare. The sampling will yield 21 samples for each pesticide parameter group. Detailed information on pesticide parameter groups can be found in Sargeant et al., 2010.

Sampling Procedures

All surface water samples will be collected by a USGS DH-81 depth-integrating sampler and by hand-compositing grab samples from quarter point transects as close as possible in time. Techniques and equipment will be consistent with Ecology SOP EAP003 *Sampling of Pesticides in Surface Waters* (Anderson and Sargeant, 2010).

The DH-81 and grab samples will be collected simultaneously. This will require two field staff to collect samples, each using a different method. This method of collection will allow for obtaining as close to the same water from each sampling type as possible. Using the same water is extremely important to accurately assess the two sampling methods.

Quality Control Procedures

To assess the quality of the data, the field and laboratory quality control samples for the regularly scheduled samples will be used. These samples include field replicates and blanks, matrix spike/matrix spike duplicates, laboratory control samples, method blanks, laboratory duplicates and surrogate spikes. Detailed information on field and laboratory quality control procedures is described in Johnson and Cowles, 2003; Burke and Anderson, 2006; Dugger et al., 2007; and Anderson and Sargeant, 2009.

Data Analysis

A paired t-test (parametric) or a paired Prentice-Wilcoxon (nonparametric) test will be used to determine if a statistically significant difference exists between the DH-81 depth-integrated sampling method and the hand-collected grab sample method. The parametric test will be used if the data are in a normal distribution and the nonparametric test will be used if the data are non-normal or skewed. It is likely that the nonparametric test will be used because most environmental data are skewed (Helsel, 2005). Censored and uncensored data will be used in the statistical test.

References

- Anderson, P. and D. Sargeant, 2009. Addendum 3 to Quality Assurance Project Plan: Washington State Surface Water Monitoring Program for Pesticides in Salmonid Habitat for Two Index Watersheds. Washington State Department of Ecology, Olympia, WA. Publication No. 03-03-104ADD3. www.ecy.wa.gov/biblio/0303104ADD3.html
- Anderson, P. and D. Sargeant, 2010. Environmental Assessment Program Standard Operating Procedure for Sampling of Pesticides in Surface Waters, Version 2.0. Washington State Department of Ecology, Olympia, WA. SOP Number EAP003. www.ecy.wa.gov/programs/eap/quality.html
- Burke, C. and P. Anderson, 2006. Addendum to the Quality Assurance Project Plan for Surface Water Monitoring Program for 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 Pesticide 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
- Helsel, D. R., 2005. Nondetects and Data Analysis: Statistics for Censored Environmental Data. John Wiley & Sons, Inc., Hoboken, NJ.
- Johnson, A. and Cowles, 2003. Quality Assurance Project Plan: Washington State Surface Water Monitoring Program for Pesticides in Salmonid Habitat for Two Index Watersheds. Washington State Department of Ecology, Olympia, WA. Publication No. 03-03-104. www.ecy.wa.gov/biblio/0303104.html
- Sargeant, D., D. Dugger, E. Newell, P. Anderson, and J. Cowles, 2010. Surface Water Monitoring Program for Pesticides in Salmonid-Bearing Streams: 2006-2008 Triennial Report. Washington State Department of Ecology, Olympia, WA. Publication No. 10-03-008. www.ecy.wa.gov/biblio/1003008.html
- Sargeant, D., D. Dugger, E. Newell, P. Anderson, 2011. Surface Water Monitoring Program for Pesticides in Salmonid-Bearing Streams: 2009 Data Summary. Washington State Department of Ecology, Olympia, WA. Publication No. 11-03-004. www.ecy.wa.gov/biblio/1103004.html