



DEPARTMENT OF
ECOLOGY
State of Washington

AMENDMENT NO. 1

TO

CONTRACT NO. C1800009

BETWEEN THE

STATE OF WASHINGTON DEPARTMENT OF ECOLOGY

AND

STATE OF WASHINGTON DEPARTMENT OF FISH AND WILDLIFE

*PROJECT TITLE: Puget Sound Marine Mussel Contaminant Monitoring in the Urban Nearshore
Environment*

PURPOSE: To amend the Agreement between the state of Washington, Department of Ecology, hereinafter referred to as "ECOLOGY," and the state of Washington Department of Fish and Wildlife, hereinafter referred to as "WDFW" or "CONTRACTOR."

WHEREAS, one more round of mussel monitoring survey is needed, therefore, additional time, work and funds are added.

IT IS MUTUALLY AGREED the Agreement is amended as follows:

- 1) The period of performance is extended from June 30, 2019 to August 31, 2021.
- 2) Total compensation is increased by \$279,858, from \$285,693 to \$565,551.
- 3) The target completion dates in following tasks in the existing statement of work (SOW) are amended to read as follows:
 - Deliverable 14.1: Draft WDFW agency report on 2017/18 SAM mussel monitoring survey for review by Ecology and/or SAM staff
 - Target Completion Date: January 31, 2020
 - Percent of Estimated Cost:65%
 - Deliverable 14.2: Final WDFW agency report and draft SAM fact sheet on 2017/2018 SAM mussel monitoring survey
 - Target Completion Date: February 28, 2020
 - Percent of Estimated Cost:65%
 - Deliverable 14.3. Three presentations. Communicate results of the combined effort 2015/16 and 2017/18 to the public, in the form of oral presentations to Stormwater Work Group and Toxics Work Group, to local volunteer groups or at conference or symposia as opportunities arise.
 - Target Completion Date: February 28, 2020
 - Percent of Estimated Cost:65%

- 4) The additional scope of work and budget (SOW) is added as Appendix B (attached) that describes additional tasks and budget for 2019-2020 survey.

All other terms and conditions of the original Agreement including any other amendments remain in full force and effect, except as expressly provided by this Amendment.

This Amendment is signed by persons who represent that they have the authority to execute this Amendment and bind their respective organizations to this Amendment.

This Amendment is effective on the signature date of Ecology.

IN WITNESS WHEREOF, the parties below, having read this Amendment in its entirety, including any attachments, do agree in each and every particular as indicated by their below signatures.

State of Washington
Department of Ecology

State of Washington
Department of Fish and Wildlife

By: Polly Zehm 6/27/19
Signature Date

By: Jeffrey R. Hugdahl 6/19/19
Signature Date

Polly Zehm

Jeffrey R. Hugdahl

Jeffrey R. Hugdahl
Contracts and Purchasing Manager

Deputy Director

Title: Contracts and Purchasing Manager

Approved as to form only.
Assistant Attorney General

APPENDIX B
STATEMENT OF WORK AND BUDGET: 2019-20 Survey

Project Background: Puget Sound Marine Mussel Contaminant Monitoring in the Urban Nearshore Environment.

SAM status and trends monitoring follows a probabilistic sample design such that data gathered can be summarized across the Puget Sound ecoregion. In the winter of 2017/18, the Washington Department of Fish and Wildlife's (WDFW) Toxics-focused Biological Observing System (TBIOS) monitored forty (40) marine nearshore sites that are adjacent to Puget Sound's Urban Growth Areas (UGAs), as part of the second SAM survey to assess the status of contaminants in the Puget Sound nearshore using transplanted mussels. These same forty (40) sites will be monitored in the winter of 2019/20 by WDFW's TBIOS team. Contaminants to be assessed include polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyl (PCBs), polybrominated diphenyl ethers (PBDEs), a range of chlorinated pesticides and metals.

The objectives of this project are to:

- Evaluate the range of chemical contamination in UGA shoreline biota, using blue mussels (*Mytilus* spp.) as the primary indicator organism, from 40 sites.
- Measure the magnitude of contamination in mussels from the 40 sites and compare them to previous findings in 2015/16 and 2017/18 surveys.
- Provide recommendations for future status and trends monitoring with mussels to answer questions about stormwater management.

This statement of work (SOW) describes the third round of mussel monitoring that will be conducted by WDFW from July 1, 2019 through August 31, 2021 and defines the activities and products that will be delivered to the SAM Coordinator at the Washington State Department of Ecology. This SOW describes the work to be completed for each task, the deliverables to be submitted upon completion of each task, and the total estimated cost and schedule per task.

Task 1: Amendment to Quality Assurance Project Plan (QAPP)

WDFW will develop an amendment to the QAPP for Status and Trends Monitoring of Marine Nearshore Mussels for the Regional Stormwater Monitoring Program and Pierce County. The amendment will include the schedule for the 2019/20 SAM Mussel Monitoring effort and will include any changes in procedures for site confirmation, field and laboratory activities, and analytical procedures gleaned from lessons learned from the 2017/18 SAM Mussel Monitoring effort.

Deliverable 1.1. Draft QAPP amendment.

- Target Completion Date: July 31, 2019
- Percent of Estimated Cost: 80%

Deliverable 1.2. Final QAPP amendment for SAM mussel monitoring.

- Target Completion Date: August 31, 2019

- Percent of Estimate Cost: 20%

Task 1 Estimated Cost: \$4,800

Task 2 – Recruit and Organize Volunteers

WDFW will contact regional groups that have worked with WDFW in the past in an attempt to recruit them to assist with the 2019/20 SAM Mussel Monitoring effort. WDFW will offer reimbursements to volunteers for costs associated with participation in the SAM survey (e.g. ferry tickets, parking fees, gas mileage, etc.). Volunteers may visit potential nearshore monitoring sites to verify their safety and feasibility for use in the SAM program (see Task 3), assist with mussel preparation in advance of deployment (see Task 5), deploy and retrieve mussel cages (see Tasks 6 and 7), and assist with processing mussels at the Marine Resources Lab after cage retrieval (see Task 8). WDFW will maintain contact with the volunteer groups throughout the study period to answer questions, verify their commitment to participate, provide feedback, register them in the WDFW volunteer tracking system, and manage efforts at every step of the 2019/20 SAM Mussel Monitoring effort.

Deliverable 2.1. List of volunteer groups that plan to participate in mussel monitoring and the sites for which each group will be responsible.

- Target Completion Date: September 30, 2019
- Percent of Estimated Cost: 90%

Deliverable 2.2. Account of reimbursements made to WDFW volunteers for mussel monitoring.

- Target Completion Date: April 30, 2020
- Percent of Estimated Cost: 10%

Task 2 Estimated Cost: \$29,961

Task 3 – Confirm Sites and Obtain Permits, Memorandum of Understanding (MOU), Permissions

WDFW will visit the same 41 sites that were visited during the 2017/18 SAM Mussel Monitoring effort. One extra site was visited to cover a potential lost cage. Forty (40) of the 41 sites visited in 2017/18 had mussel cages successfully retrieved. Therefore, we assume the same sites will continue to meet our qualifications, and deliverable 3.2 will be considered complete (delivered September 30, 2017). In the event a site(s) is later deemed unsuitable, WDFW will evaluate and confirm a potential replacement site(s) according to the qualifications outlined in the QAPP and resubmit deliverable 3.2.

WDFW will obtain a Hydraulic Project Approval (HPA) and a Shellfish Transfer Permit for the 2019/20 SAM Mussel Monitoring effort. WDFW will attempt to obtain a MOU with the

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Washington Department of Natural Resources to access State-Owned Aquatic Lands for all SAM mussel monitoring activities.

In addition, WDFW will obtain permission from individual property owners/tenants (ports of Seattle, Tacoma, Port Angeles, the U.S. Navy, tribes, state parks, and residential property owners) to access each SAM site.

Deliverable 3.1. PDF of all permits and MOUs necessary to gain access to and place a mussel cage on confirmed SAM mussel monitoring sites.

- Target Completion Date: August 31, 2019

Deliverable 3.2. Spreadsheet of "Location Data" submitted to EIM if new or different locations than from the 2017/18 effort are visited.

- Target Completion Date: September 30, 2019

Task 3 Estimated Cost: \$9,600

Task 4 – Equipment and Supplies Procurement and Assembly

WDFW will procure and own all the equipment for mussel deployment (e.g. mussel cages, anchors, fastening devices, etc.) and supplies for the laboratory processing (e.g. solvents, scalpels, weighing pans, gloves, etc.) necessary to complete mussel monitoring at 41 SAM sites. WDFW will also obtain the mussels to be transplanted for the monitoring. WDFW will assemble and distribute all the equipment and supplies necessary for the deployment and retrieval phases of the monitoring.

Deliverable 4. List of equipment/supplies ordered and procured by WDFW in support of the 2019/20 SAM Mussel Monitoring effort.

- Target Completion Date: September 30, 2019

Task 4 Estimated Cost: \$16,433

Task 5 – Preparation of Mussels

WDFW will obtain mussels (*Mytilus* spp.) from a local shellfish aquaculture facility in the Puget Sound. WDFW and volunteers will measure and sort enough mussels to accommodate a minimum of 64 mussels per cage for 41 SAM monitoring sites, three baseline (i.e. starting condition) samples, and one reference site. Mussels used for the 2019/20 SAM Mussel Monitoring effort will be measured and selected to fall within a uniform size range, and they will be placed into aquaculture bags in groups in preparation for deployment. Bagged mussels will rest for a brief period, likely at the aquaculture source, before they are deployed to cages at the monitoring sites.

Deliverable 5. Email confirmation that all mussels necessary for deployment are prepared and resting.

- Target Completion Date: October 30, 2019

Task 5 Estimated Cost: \$17,821

Task 6 - Deployment of Cages

WDFW staff and volunteers will deploy bagged mussels (see Task 5) in anti-predator, wire mesh cages to the 41 confirmed (see Task 3) SAM mussel monitoring sites during evening low tides following the approved QAPP and QAPP amendment. Mussel cages will be anchored into the substrate and/or secured to fixed objects in the intertidal environment at each site at approximately zero to -1.5 feet mean lower low water (MLLW). As part of this effort, WDFW staff will spend several evenings at the aquaculture facility handing out bagged mussels, cages, and deployment kits to all volunteers participating in the SAM mussel monitoring. In addition, environmental data specific to each SAM mussel monitoring site will be recorded at the time of deployment on a Deployment Datasheet and photos of each deployed cage and its surroundings will be collected.

Deliverable 6. PDF of completed Deployment Datasheets from all SAM mussel monitoring sites.

- Target Completion Date: December 31, 2019

Task 6 Estimated Cost: \$10,856

Task 7 - Retrieval of Cages

During a series of evening low tides in 2019 approximately 90 days after deployment, WDFW staff and volunteers will revisit the 41 SAM mussel monitoring sites and retrieve all remaining mussel cages. Mussel cages and all anchoring devices will be removed from the substrate so that nothing is left behind. Mussel bags will be removed from each cage and transported in coolers on ice overnight to the WDFW Marine Resources Lab in Olympia, WA. As part of this effort WDFW staff will send out retrieval kits in advance to all the participating volunteers and will make several trips to collection points across the north and central Puget Sound to facilitate delivery from volunteers. In addition, environmental data specific to each SAM mussel monitoring site will be recorded at the time of retrieval on a Retrieval Datasheet and photos of each retrieved cage and its surroundings will be collected.

Deliverable 7. PDF of completed Retrieval Datasheets from all SAM mussel monitoring sites.

- Target Completion Date: March 31, 2020

Task 7 Estimated Cost: \$10,856

Task 8 - Processing of Mussels

WDFW staff and volunteers will process retrieved mussels at the Marine Resources Lab in Olympia, WA. Laboratory mussel processing will include, 1) an assessment of mortality in each mussel cage, 2) determination of condition index for a subset of mussels, and 3) compositing of a subset of the mussels (i.e. soft tissue only) for chemical analysis.

Deliverable 8. PDFs of datasheets with biological metrics for all mussels processed for SAM mussel monitoring.

- Target Completion Date: April 30, 2020

Task 8 Estimated Cost: \$18,874

Task 9 - Chemical Analysis and Sample Tracking

Upon completion of mussel processing, WDFW staff will deliver mussel composite samples for chemical analyses to the contracted analytical laboratories and track progress on analysis. Chemical contaminants to be analyzed will include polychlorinated biphenyls (PCBs), polybrominated diphenylethers (PBDEs), polycyclic aromatic hydrocarbons (PAHs), a range of organochlorine pesticides including dichlorodiphenyltrichloroethane compounds (DDTs), and a suite of metals including mercury, lead, arsenic, copper, cadmium. Tissue lipid content and percent solids will also be measured or estimated.

Deliverable 9. Copies of invoices for chemical analysis of SAM mussel samples.

- Target Completion Date: October 31, 2020

Task 9 Estimated Cost: \$82,747

Task 10 - Data Quality Assurance and Quality Control (QA/QC) check

WDFW staff will evaluate quality assurance metrics and track quality control measures to ensure high quality data is received from the analytical laboratories. Error checking and data validation procedures will be performed on all chemistry data received from the labs.

Deliverable 10. Spreadsheet of QA/QC checked chemistry data.

- Target Completion Date: December 31, 2020

Task 10 Estimated Cost: \$9,885

Task 11 - Data Digitization and Entry into Ecology's Environmental Information Management (EIM) Database

WDFW staff will ensure all data collected during the deployment and retrieval phases and all biological data from mussel processing are digitized and error-checked. In addition, WDFW

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staff will submit all relevant sample, biological, and chemistry data from the 2019/20 SAM Mussel Monitoring effort to Ecology's EIM database.

Deliverable 11. Word document describing the SAM mussel monitoring study, and spreadsheets of sample, measurement, and results data submitted to EIM.

- Target Completion Date: December 31, 2020

Task 11 Estimated Cost: \$5,990

Task 12 – Data Analysis and Report Outline

WDFW staff will analyze chemical and biological data from the 2019/20 SAM Mussel Monitoring effort to determine the extent and magnitude of chemical contamination of mussels in UGAs of the Puget Sound. Summary statistics and maps will be produced for individual or groups of chemicals, depending on the analyte. WDFW staff will produce an outline of the planned report based on the analysis described above. In addition, WDFW staff will provide a progress report, in the form of an oral presentation, to the Stormwater Work Group (SWG) in the summer of 2020.

Deliverable 12.1. Progress report (oral presentation) to SWG.

- Target Completion Date: July 30, 2020
- Percent of Estimated Cost: 10%

Deliverable 12.2. Outline of WDFW agency report on 2019/20 SAM Mussel Monitoring effort.

- Target Completion Date: January 31, 2021
- Percent of Estimated Cost: 90%

Task 12 Estimated Cost: \$29,044

Task 13 – Report and Review

WDFW staff will provide a summary report on the chemical, biological and geographic data from the 2019/20 SAM Mussel Monitoring effort. This report will include an assessment of the extent and magnitude of chemical contamination of mussels in UGAs of the Puget Sound, tables and graphs with summary statistics, maps of contaminant distributions, and recommendations for refining future rounds of SAM mussel monitoring. In addition, SAM mussel monitoring results will be compared with results from the 2015/16 and 2017/18 SAM Mussel Monitoring efforts, and with WDFW's "[Toxic Contaminants in Puget Sound's Nearshore Biota: A Large-Scale Synoptic Survey Using Transplanted Mussels \(*Mytilus trossulus*\)](#)" project, where appropriate. The format will be a WDFW agency report.

Deliverable 13.1. Draft WDFW agency report on 2019/20 SAM mussel monitoring survey for review by Ecology and/or SAM staff.

- Target Completion Date: April 30, 2021
- Percent of Estimated Cost: 65%

Deliverable 13.2. Final WDFW agency report on 2019/20 SAM mussel monitoring survey.

- Target Completion Date: June 30, 2021
- Percent of Estimated Cost: 20%

Deliverable 13.3. Three Presentations. Communicate results of the combined effort of the 2015/16, 2017/18, and 2019/20 surveys in the form of an oral presentation to the Stormwater Work Group or Toxics Work Group, at conference or symposia, and to local volunteer groups as opportunities arise.

- Target Completion Date: June 30, 2021
- Percent of Estimated Cost: 15%

Task 13 Estimated Cost: \$32,991

Total Project Budget for 2019-2020 Survey

Total project costs are \$279,858. This includes salaries and benefits, travel, supplies, lab analysis, 10% contingency, and WDFW indirect (30.29%).

Item	Description	Amount
Task 1	QAPP Amendment	\$4,800
Task 2	Recruit & Organize Volunteers	\$29,961
Task 3	Confirm Sites and Obtain Permits & Permissions	\$9,600
Task 4	Equipment Procurement/Assembly	\$16,433
Task 5	Preparation of Mussels	\$17,821
Task 6	Deployment of Cages	\$10,856
Task 7	Retrieval of Cages	\$10,856
Task 8	Processing of Mussels	\$18,874
Task 9	Chemical Analysis/Sample Tracking	\$82,747
Task 10	Data QA/QC Check	\$9,885
Task 11	Data Keying & Entry (EIM)	\$5,990
Task 12	Data Analysis and Report Outline	\$29,044
Task 13	Report for Review	\$32,991
	Total Project Cost	\$279,858

