

# QUALITY ASSURANCE PROJECT PLAN

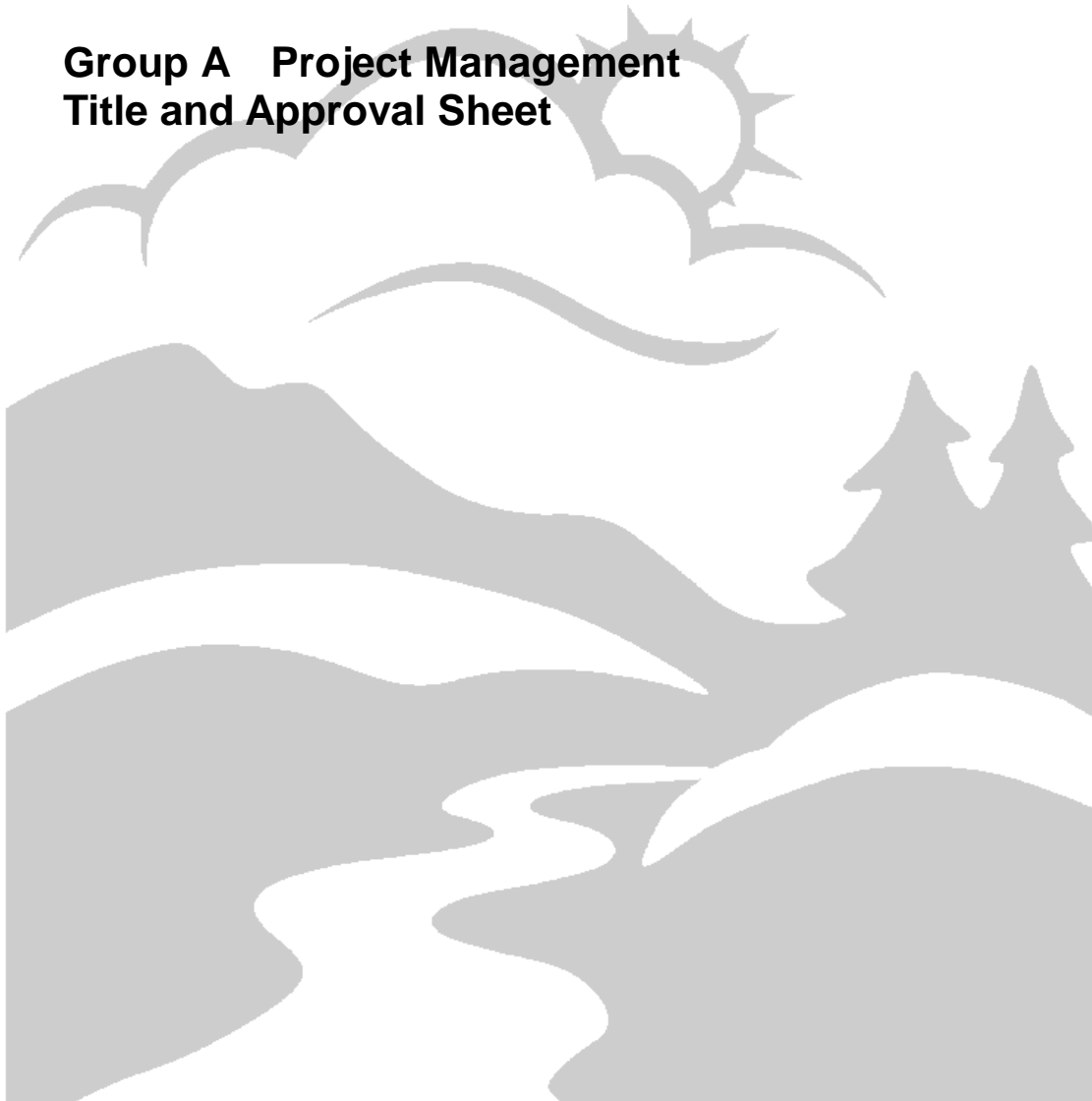
## Statewide Toxics Monitoring Program



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Assessment  
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### Group A Project Management Title and Approval Sheet



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Date

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Date

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Date

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## Signed Copy on File at DEQ

**All documents referenced in this Quality Assurance Project Plan are available upon request from the Oregon Department of Environmental Quality (ODEQ) Laboratory. Please contact either the Project Coordinator or the Quality Assurance Officer to request specific documents.**

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## A2 Distribution List

The following DEQ staff will be apprised (via e-mail, verbal or written communication) of all modifications made to the most current version of this Quality Assurance Project Plan (QAPP). Final analytical reports generated by the ODEQ Laboratory and Environmental Assessment Division (LEAD) or third party laboratories will be faxed, e-mailed and/or mailed to the Project Coordinator and Data Coordinator at a minimum. Final DEQ LEAD generated reports will also be distributed to specific individuals identified in the "Report Recipients" field included on Project-related Chain of Custody (COC) forms.

Monitoring toxic pollutants in Oregon's aquatic environments is an on-going Agency priority. Revisions to this QAPP are likely and modifications shall be approved by the document's designated signatories. As prescribed by the laboratory's document control procedures, the signed QAPP will be on-file with DEQ LEAD. The Quality Assurance Officer (QAO) will update posted network versions as the plan is revised on the Agency's internal website (<http://qnetstage/lab/qms/documents.asp>).

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**Table 1 – Distribution List**

Name	Phone	Email
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DEQ personnel will charge time and expenditures related to this project to a designated Q-Time account. Since Q-time accounts are periodically reassigned along with the on-going nature of the Agency's toxics monitoring work, any staff planning to charge to the Q-time account designated to track DEQ Toxics Monitoring Program is advised to contact the Project Coordinator or Section Manager for the proper fund code. Data will be tracked by basin specific sub-projects numbers. See Appendix B for list of sub-projects by basin and media.

## A3 Project/Task Organization

The members of the project team are responsible for ensuring that all aspects of the project are planned and executed in accordance to established DEQ quality assurance (QA) and quality control requirements. The key roles listed below include program administration, planning, sample collection, data generation, verification/validation and reporting.

**The DEQ Laboratory and Environmental Assessment Division (LEAD) Administrator and LEAD Section Managers** based on input from internal and external stakeholders, establish

operational monitoring framework, set program objectives and priorities; supervise staff, and manage program workloads/budgets. Managers contribute to project development, planning and documentation; LEAD Administrator and Section Managers work cross-programmatically to facilitate availability of equipment, logistical support and qualified personnel to conduct statewide monitoring for toxics in Oregon’s waters and aquatic organisms. Together, they ensure laboratory procedures and field-collections conform to established safety and data quality guidelines

**The Quality Assurance Officer** will be responsible for reviewing and approving all Quality Assurance Project Plans (QAPPs) and assisting the Project Coordinator on decisions regarding data acceptability.

**Project Coordinator** works with Section Manager and stakeholders to develop and implement a statewide, watershed-based program of monitoring Oregon’s waters and aquatic organisms for the presence of toxic pollutants and communicate program findings with internal/external stakeholders. The Project Coordinator ensures project monitoring strategies are current and align with established agency priorities, QA/QC protocols are maintained throughout the sample collection and preparation processes, field records are reviewed for accuracy and that identified problems/deviations from established procedures are properly documented and addressed through effective communication and corrective actions.

**Data Coordinator** contributes to the development of accurate project-level QA documents, reviews laboratory and field/laboratory data records for accuracy and completeness. The Data Coordinator communicates findings of reviews with participating field/analytical staff and managers.

**Sample Coordinator** will verify samples were logged into LIMS appropriately, ensure analytical report files are complete, and review Data Quality Level validation codes.

**Sample Custodian** will ensure project and QC samples are logged into LIMS appropriately.

**Table 2 – Project/Task Responsibilities**

Name	Project Title/Responsibility
Lori Pillsbury	Project Coordinator
Aaron Borisenko	Water Quality Monitoring Section Manager
Sarah Rockwell	Data Coordinator
Shannon Swantek	Sample Coordinator
Heather Cayton	Sample Custodian
Raeann Haynes	Technical Services Section Manager (Interim)
Lori Pillsbury	Toxics Lead Worker
Brian Boling	Organic Section Manager
Raeann Haynes	Inorganic Section Manager
Scott Hoatson	Quality Assurance Officer

## A4 Problem Definition/Background

Until recently, Oregon lacked a statewide, systematic monitoring program to quantify the

presence of toxics pollutants in its surface waters and freshwater aquatic biota, identify their sources (where possible) and to inform reduction strategies. This document describes the quality assurance project plan for the Toxics Monitoring Program (TMP) which was initiated in 2008. The purpose of the TMP is to document the status (distribution and intensity), measure trends (changes through time), and guide reduction efforts of toxic pollutants in surface waters and aquatic biota.

The term “toxic pollutant” generally refers to substances, primarily of anthropogenic origin, which are produced or are by-products of industrial, municipal, or agricultural processes whose physical and chemical characteristics have been demonstrated to impair the normal functioning of biological systems at low exposure levels. Adverse effects of resulting from exposure to toxic pollutants include reduced survival, impaired development, genetic damage, tumor promotion or diminished reproductive success.

The manufacture, use and release of toxic pollutants are regulated under a number of federal and state statutes. However the volume, complexity, and ubiquity of local, regional and global sources of toxic pollutants, combined with significant spatial and temporal information gaps have resulted in increased public concern regarding the presence and potential impacts of these pollutants on environmental quality and human health. The public has consistently expressed a high level of concern regarding the presence of toxic pollutants in the Nation’s waters.

Toxic pollutants are generated by a wide variety of man-made and natural processes. Environmental pollutants can be discharged from a variety of discrete “point-sources” ranging from industrial facilities to municipal waste water treatment plants. Toxic pollutants can also enter the environment from “non-point” sources such as runoff from impervious surfaces like roads, roofs and parking lots. Pesticides and fertilizer applied in urban and agricultural settings can be transported to surface waters by run-off of precipitation or irrigation. Under some conditions, naturally-occurring metals can be released by erosion or combustion and concentrated beyond background concentrations by human activity such as by burning fossil fuels or discharge of mining leachate. Volatile organic contaminants are transported by local, regional and global atmospheric processes. So-called “legacy contaminants” can also be released from disturbed sediments resulting from natural or anthropogenic processes.

DEQ is developing an agency-wide, comprehensive multi-media toxics reduction strategy to reduce the levels of these contaminants in Oregon’s environment. DEQ needs reliable, consistently-collected, and sustained toxics monitoring data to help focus the agency’s efforts towards reducing environmental toxics and assess the efficacy of its efforts through time.

## **A5 Project Task/Description**

To be a leader in restoring, maintaining and enhancing the quality of Oregon’s air, land, and water resources, DEQ needs reliable, consistently-collected, long-term, multi-media information regarding the status and trends of toxic pollutants in the State. DEQ plans and implements targeted, multi-media monitoring for selected environmental contaminants in all of the State’s basins on a rotating schedule. Factors such as human health concerns, ecological considerations, hydrologic or land use features are taken into account during the selection of monitoring locations and media-specific analytical targets in each basin. To optimize the relevance of this information, DEQ consults with agency staff and external stakeholders in the selection of these sites and seeks opportunities for collaboration and partnerships.

Programmatic priorities include:

- Targeting toxic pollutants likely to be in present in Oregon’s surface waters or fresh-water aquatic organisms that pose the greatest threat to human and environmental health.
- Assessing toxic pollutant concentrations in multiple mediums including water, fish tissue, sediment and passive accumulative samplers (i.e., semi-permeable membrane devices

(SPMDs) and/or passive organic contaminant Integrative samplers (POCIS).

- Determining (where possible) potential local sources and assessing threats posed to human and environmental health of identified toxic pollutants.

At this time, analytical targets that the TMP proposes to measure and track in appropriate media over time include the following chemical classes:

- Semi volatile organic chemicals (SVOCs)
- Poly-chlorinated biphenyls (PCBs),
- Poly-brominated diphenyl ethers (PBDEs),
- Dioxins and furans
- Heavy metals,
- Current-use and legacy pesticides,
- Contaminants of emerging concern (i.e., pharmaceuticals, personal care products, and plasticizers).

The analytical targets measured by the TMP may be periodically revised in light of relevant distribution, fate or effects information. For instance, persistent priority pollutants detected in wastewater may be measured in appropriate matrices (e.g. water, fish tissue, sediment or passive samplers). Alternatively, rarely-detected pollutants may be eliminated from future monitoring efforts. Should the measured concentrations of toxic pollutants exceed established water quality criteria or exceed “safe” levels (as determined by recent and/or relevant research for those substances for which criteria are not available), DEQ will work internally, with other state agencies and with stakeholders to reduce the levels of toxic pollutants and implement pollution prevention strategies to achieve reductions in environmental concentrations.

The ultimate spatial scope of the TMP includes all of Oregon’s major river basins. Media specific (i.e. surface water, aquatic organisms, passive accumulators, sediment) Sampling and Analysis Plans (SAPs) will specify the nature of toxic pollutant monitoring conducted in selected basins during monitoring cycles. Individual SAPs will identify the media of interest, sample collection stations and schedules, pollutants to be measured on each sample, limits of quantitation, and the rationale underlying sampling decisions. SAPs may not be constrained to major river basins and may be used to describe data collection efforts at other spatial scales. Each SAP will cite this plan and comply with the Quality Objectives described herein.

## **A6 Quality Objectives and Criteria**

The ODEQ Laboratory document control procedures ensure the most recently approved Quality Systems documents are available for implementation. These documents are available through the Agency’s internal “Q-Net” portal at (<http://deq05/Lab/qms/documents.asp>). Specific Quality Systems documents cited in this QAPP contain a hyperlink to the controlled document for ease of reference. Individuals interested in reviewing documents referenced herein who do not have access to the department’s internal network may obtain copies by contacting the Project Coordinator.

Samples collected for laboratory analysis will be analyzed following standard DEQ protocol as described in the Laboratory Quality Manual ([DEQ91-LAB-0006-LQM](#)) and the Laboratory’s analytical SOPs. Procedures for collecting Water Quality samples and conducting field analyses are described in the Watershed Assessment Section Mode of Operations Manual (MOMs: [DEQ03-LAB-0036-SOP](#)).

Environmental data is assumed to be acceptable for use when associated QC data is within established control limits. It is therefore important to define appropriate QC data and how to interpret the QC data as it applies to the reported environmental data.

To establish relationships between environmental data and QC data, EPA’s Guidance for the



Data Quality Objectives Process (QA/G-4, EPA 2006) was used. As the title implies this document is intended to provide guidance for establishing a plan for data collection efforts and for developing an appropriate data collection design to support decision making, i.e. develop acceptance or performance criteria for the quality of the data collected and for the quality of the decision.

The QA/G-4 guidance document defines two sources of error Statistical Sampling Error (Field Variability) and Measurement Error (Measurement Variability), which contribute partially to the total error.

- Sampling (field) error – This error is influenced by the inherent variability of the contaminant over space and time, the sample collection design, and the number of samples. It is usually impractical to measure the entire space, and limited sampling may miss some features of the natural variation of the measurement. Sampling design error occurs when the data collection design does not capture the complete variability within the environment, to the extent appropriate for making conclusions. Sampling design error can lead to random error (i.e., variability or imprecision) and systematic error (bias) in estimates of contaminant concentrations.
- Measurement error – This error is influenced by imperfections in the measurement and analysis system. Random and systematic measurement errors are introduced in the measurement process during physical sample collection, sample handling, sample preparation, sample analysis, data reduction, transmission, and storage.

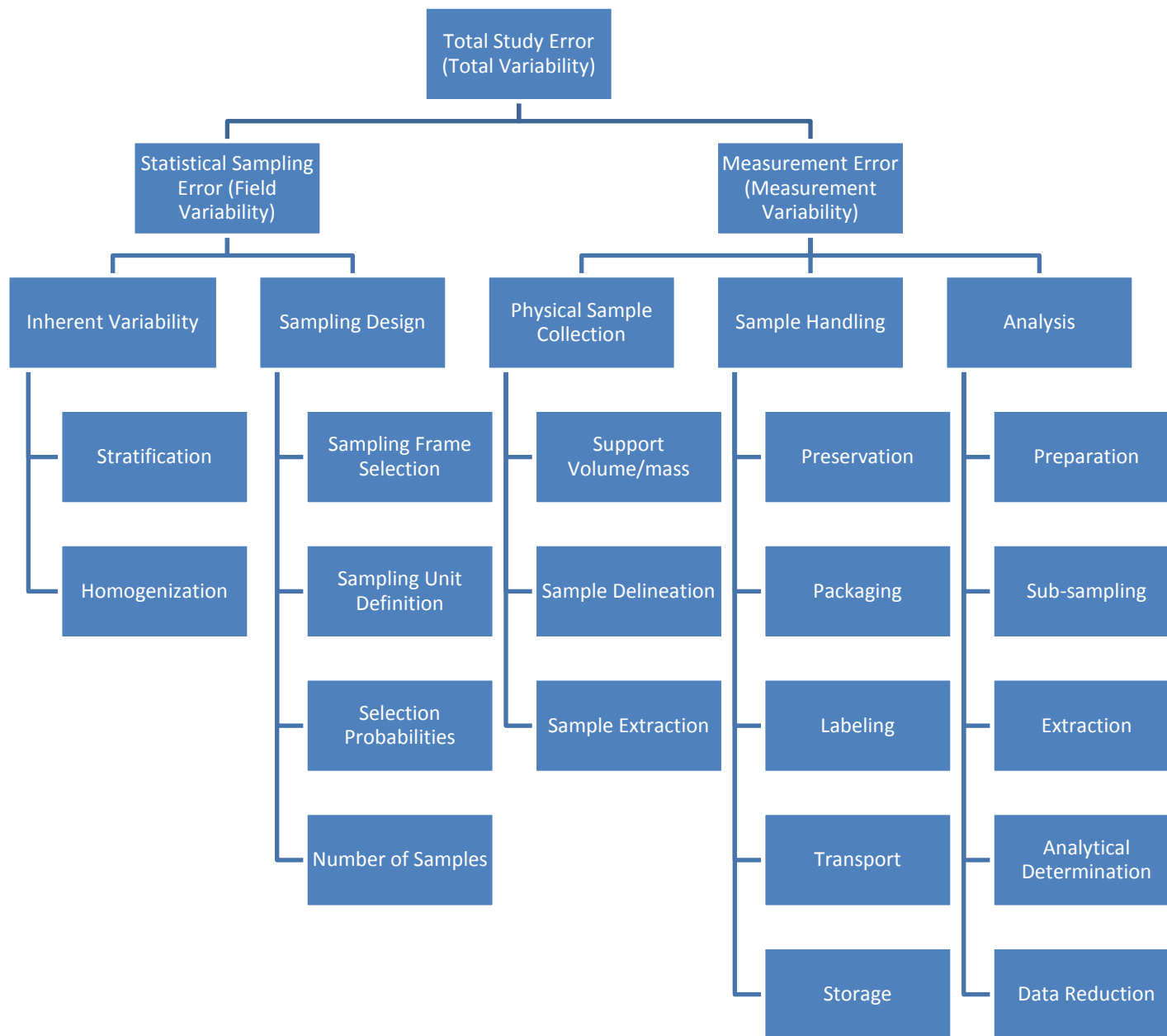


Figure 1 – Sources of Error

Figure 1 illustrates where errors can occur in procedural steps used for generating environmental data. During many of these procedural steps, QC measurements can be taken or QC samples can be introduced into the process thereby making it possible to estimate the error attributable to a specific protocol. With each procedural step that a QC element can be implemented, environmental data will be batched with the QC result in which the samples or data were processed. Section B5 will further define the QC batches to be used for this project. With the knowledge of an unacceptable error in the QC measurement, environmental samples within the QC batch are either reprocessed after improvements are made to minimize the observed error, or the environmental data will be flagged as not meeting the quality control standard. Often it is physically impossible to reprocess samples or it is not cost effective, in which case data must be flagged in a manner that ensures the data user is aware of the data quality anomaly.

Specific QA Objectives for this project are:

- Collect a sufficient number of samples, sample duplicates, and field blanks to evaluate the sampling and measurement error.
- Analyze a sufficient number of QC Standards, blanks and duplicate samples in the Laboratory environment to effectively evaluate results against numerical QA goals established for precision and accuracy.
- Implement sampling techniques in such a manner that the analytical results are representative of the media and conditions being sampled.

Data quality shall be evaluated through the use of the traditional Data Quality Indicators:

- Precision
- Accuracy/Bias
- Sensitivity
- Representativeness
- Comparability
- Completeness

Basin/media-specific SAPs will describe the parameters to be measured and will stipulate precision, accuracy, and sensitivity control limits including levels of quantitation for each analytical parameters. Table 4 lists field parameters likely to be included in SAPs along with the LEAD's Limit of Quantitation (LOQ), which is the lowest value the LEAD will report to unless otherwise stipulated in the SAP.

Only sample results with Data Quality Levels of "A" or "B" will be used for this project.

### **A6-1 Precision**

Precision shall be estimated by measuring the variability of duplicate measurements. The best estimate of precision for the overall monitoring program is the comparison of duplicate samples collected in the field. The variability in the results obtained from field duplicate samples is the sum of the sampling and analytical variability (measurement uncertainty). In general the control limit for duplicate samples collected in the field are +/-30% RPD for samples >5 times the Limit of Quantitation (LOQ) or +/- 2 times the LOQ for the difference between replicates when the concentrations are <5 times the LOQ. This precision criteria may be re-evaluated once a sufficient number of data points are collected for analytes of interest. These criteria apply to field duplicates only in the case of water sampling. Otherwise, in any other sampling media, the precision criteria apply to lab duplicates. Any changes will be reflected in the Sampling and

Analysis Plan.

## **A6-2 Accuracy/Bias**

Accuracy is a measure of the error between reported test results and the true sample concentration. It shall be estimated by measuring the bias of Measurement Error, even though bias is due to both systematic error in sampling and measurement variability.

Systematic error attributable to sampling design shall be minimized and be considered acceptable by following the procedures in described in section B1.

All instruments shall be calibrated using appropriate reference materials. The accuracy of these materials is to be documented and maintained by the laboratory. The instrument's response to the reference material (initial calibration) shall also be documented and fall within method control limits. Immediately following the initial calibration a second source standard will be used to verify the accuracy of the calibration reference material.

The Laboratory Control Samples (LCS) prepared with each batch of samples will be used to estimate accuracy and where applicable matrix spikes will be used in conjunction with the LCS.

## **A6-3 Sensitivity**

This project requires analytical data based on OAR 340-041-0053 *Table 20: Water Quality Toxic Criteria Summary* standards, it may therefore necessary to report data below the laboratories Limit of Quantitation (LOQ) for a few parameters. A value less than the laboratory's LOQ will be flagged with a J to indicate the results as an estimate. The data quality level (DQL) will remain as A+ if there are no other QC related issues associated with the result.

Blanks must be less than the Limit of Quantitation for each analyte listed in the applicable Sampling and Analysis Plan (SAP). Laboratory Method Blanks (MB) will be prepared along with each LCS. The MB will be used to assess the sensitivity of the method. If corrective action measures fail to resolve MB errors, results batched with the MB will have the DQL set to "B"..

## **A6-4 Significant Figures**

The DEQ Laboratory & Environmental Assessment Division's policy on rounding, decimal places, and significant figures for reporting analytical data is:

- 1) The report results to 3 significant figures with the following caveats
  - a) We will not report results to more decimal places than the LOQ.
  - b) If the results are to be reported to the LOD and the results are between the LOD and the LOQ, do not exceed the number of decimal places in the LOD (still report 3 significant figures where possible).
- 2) Results having trailing 5's are rounded to the even number (e.g. 2.555 = 2.56; 2.545 = 2.54).
- 3) All results will be rounded according to the rules and then compared to the LOQ (or whatever the reporting level is).

Project deviations from this policy are described in section B10.

## **A6-5 Representativeness**

Representativeness is a qualitative term that should be evaluated to determine whether in situ and other measurements are made and physical samples collected in such a manner that the

resulting data appropriately reflect the media and phenomenon measured or studied.<sup>1</sup> The intent of this project is to quantify chemical, biological, and physical parameters in the ambient environment.

Representativeness is controlled by using well defined sampling and sample handling SOPs. Sampling procedures are designed so that results are representative of the matrix being sampled. Sample handling protocols for storage, preservation and transportation have been developed to preserve the representativeness of the collected samples. Proper documentation will establish that protocols have been followed and sample identification and sample integrity assured. If it is determined that sample integrity has been compromised data the DQL will be set to "B".

Samples that are not representative of the population often occur in judgmental sampling because not all the units of the population have equal or known selection probabilities<sup>2</sup>. The rationale for selecting sampling stations is described in section B1 below.

The location of the sample will be referenced to latitude and longitude using a GPS. Samples will be collected at or near the center of the stream channel where the water is well mixed and representative of the ambient conditions. The date and time range measurements are made and physical samples collected will be recorded with every sample. All efforts will be made to confirm the accuracy of this sample meta-data.

Since special or unusual sample conditions might affect the accuracy of an analysis, it is helpful to have information about the sample matrix. Results of such matrix tests may give additional insight into the representativeness of the analyses. Tests describing the sample matrix may be requested on a site-specific basis. When appropriate, other QA tools such as ion balance reports, solid balances, conductivity-dissolved solid comparisons, etc., will be used to establish the representativeness of the data.

Quality analytical measurements with poor field duplicate precision may point to sampling problems or heterogeneous samples and thus not representative of ambient conditions. To ensure the representative data quality indicator is correct, field duplicates must be collected within 15 minutes and 15 meters of each other, where the sample matrix is assumed to be homogeneous. Evaluation of field duplicate, lab duplicate, and accuracy data will provide information if there is error in the hypothesis that the sample is homogeneous. If field duplicate data exceeds precision limits but lab duplicate and accuracy data is acceptable, the sampling design may be in error and the data may not represent the environmental conditions for which it was collected. If field duplicate data indicates Representativeness is acceptable, data users may assume other project data meet Representativeness objectives.

If it is determined the field duplicate data is heterogeneous within a fifteen minute period or fifteen foot radius, the subproject/project station data will have a DQL of "B" and the data user should use their professional judgment to determine if other project data meets their data quality needs.

If station data is not indicative of the streams normal ambient conditions and the variances are attributable to anomalous environmental conditions, the project station data will be assigned a DQL of "F".

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<sup>1</sup> USEPA 1998. EPA GUIDANCE FOR QUALITY ASSURANCE PROJECT PLANS EPA QA/G-5, pp 76.

<sup>2</sup> *ibid*, pp 94.

## **A6-6 Comparability**

To ensure data will be comparable to similar environmental data, the DEQ will use documented procedures for sampling, sample handling, and sample analysis, which are written to comply with nationally accepted methods. Coordination with other agencies is emphasized to ensure that data are comparable. The DEQ laboratory will follow the analytical methods cited in the appropriate SAP to measure water chemistry and the sampling procedures described in the ODEQ Laboratory MOMs Manual.

## **A6-7 Completeness**

It is expected that samples will be collected from all sites described in the Sampling and Analysis Plan (SAP) unless seasonal-related events or safety issues prevent sampling. The Project Coordinator may authorize re-sampling to obtain more information of qualified data.

## **A6-8 Modeling Approach**

Data from this project will be used for assessment purposes and no modeling is expected.

## **A7 Special Training and Certification**

Laboratory services not available through DEQ's LEAD may be subcontracted according to the State's established contractual price agreements. If required services are not available through the state's contracted laboratories, services may be acquired through other means. The Project Coordinator, with assistance from the QAO will approve all subcontracted work described in the SAP. Contractual agreements may require laboratories to become ORELAP accredited. To review the accreditation status of candidate laboratories, refer to the ORELAP web page (<http://www.deq.state.or.us/lab/orelap/orelap.htm>)

## **A8 Documentation and Records**

### **A8-1 Analytical Reports**

Analytical reports will contain sufficient information to unambiguously link sample collection information to the group of analytical parameters.

Third party laboratories will send their Analytical Report along with their subcontracted data to the Project Coordinator within 45 days of the completion of each sampling event. These data, including all QA/QC data results, will be delivered both electronically and in paper form.

The Project Coordinator will enter third party data by hand or download it into the DEQ's LIMS database. Once any third party data is entered into LIMS, the Project Coordinator will review and approve data for further processing or reporting.

Electronic versions of the final laboratory analytical reports will be e-mailed to the Distribution List specified in Section A3 in a Portable Document Format (PDF). An original hard copy of the final analytical report with the supporting QC documentation and field forms will be kept on file at the DEQ Laboratory. After the final analytical report has been released, the analytical results will be transferred to the Laboratory Analytical Storage and Retrieval Database (LASAR), which is available to the public at <http://www.deq.state.or.us/lab/lasar.htm>

## **A8-2 Sample Receipt and Log-in Procedures**

Separate field data sheets (Appendix A) will be maintained for each sampling event.

All samples logged-in to DEQ's laboratory will receive the Field Sampling form with the following information: sampling location, LASAR ID number, date sampled, time sampled, sampler, weather condition, fund code, DEQ subproject code, data report recipient, sampling point description, container number, equipment ID numbers, test(s) requested, and contact with whom samples were split (if any). The following information will be required for LASAR ID creation: Site name, latitude, longitude, river mile, 3<sup>rd</sup> and 4<sup>th</sup> field HUC, county, and DEQ basin.

Please note that the third party laboratories will in general follow similar procedures below. However, specific documentation and custody procedures will be as per their protocol.

The laboratory receiving the samples will verify the information contained on the custody form and check to make certain that samples meet appropriate handling and preservation requirements by:

- Matching actual sample container #'s with those listed on the custody form;
- Checking that appropriate containers were used for the analytes requested;
- Testing pH to determine whether samples requiring acid or base preservation were preserved correctly;
- Consulting technical personnel when field observations raise concern to ensure tests requested are appropriate;
- Consulting this QA Project Plan for to ensure that all tests requested are assigned.

Samples improperly documented, preserved, or exceeding holding time are either rejected by the sample coordinator for analysis, or analyzed and the result reported as an "*estimate*." The sampler is notified and re-sampling is recommended.

The contractor will use laboratory approved sampling forms to be used for tracking the samples and relinquishing sample custody. The DEQ sample coordinator will receive a copy of the custody forms and enter the sampling event into the DEQ's Laboratory Information Management System (LIMS).

The DEQ LIMS maintains the history to changes to data in LIMS from log-in through sample release and archival. All biographical information contained on the custody form is entered into LIMS at the time of log-in. Each set of containers collected at a station constitutes a "sample," and each "sample" is linked to the sampling event batch. The DEQ LIMS sample ID numbers are unique. The ID number consists of the sampling event number concatenated with the container number. The sample coordinator assigns the appropriate tests during log-in. LIMS creates analysis records for each sample and test assigned.

The contract laboratories must maintain an unequivocal link between the custody form, their LIMS database, and analytical reports.

Raw analytical data records must be maintained, which will include the following information, in ink:

- Date of analysis
- Analyst
- Identification of blanks, standards, and controls
- LIMS ID numbers, sample number, treatment such as dilutions, analyte additions, or special calculations and associated information
- Unusual observations

- All instrument readings and final results (including units) may be maintained as electronic data.

### **A8-3 Field Notes**

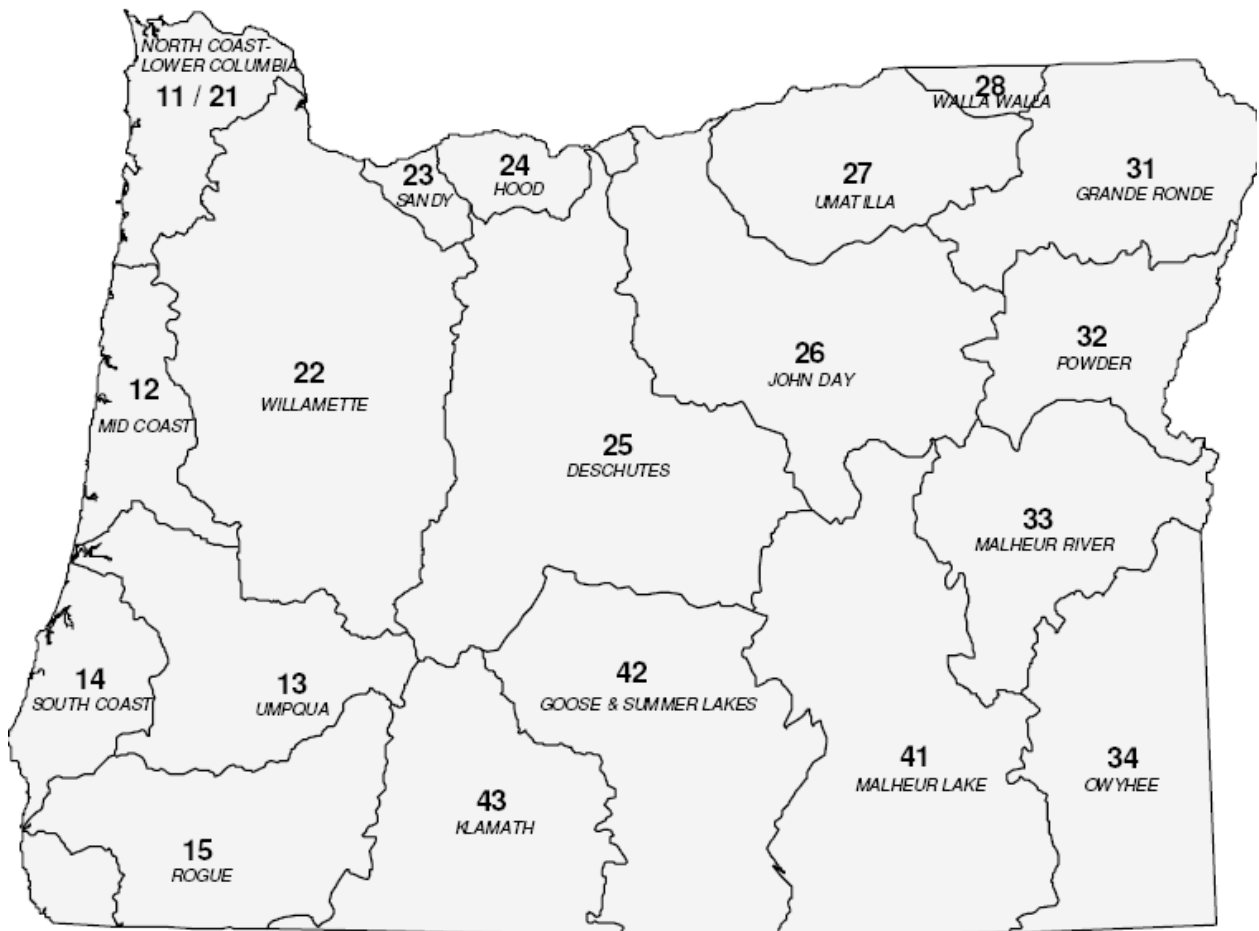
The sampling teams will record significant events, observations, and site conditions during field sampling events onto the “Events Comments” section of the COC document associated with the sampling site. Recorded information would include any environmental conditions including precipitation, extreme temperatures, wind, surface water flow rates/level, cloud cover, on-going activities (i.e., road construction/repair) or other physical conditions which might provide rationale for qualifying field data measured at the site or analytical results for samples collected at the site. Entering pertinent site observations onto the COC document will ensure they are maintained as part of the permanent sampling event record.



## Group B Data Generation and Acquisition

### B1 Sampling Process Design

The flow of surface water has been categorized according to the hierarchical relationships between delineated and interconnected drainages of various sizes (see Figure 2).



**Figure 2.– Oregon Basin Index Map**

Media-specific Sampling and Analysis Plans (SAPs) will document monitoring details associated with monitoring for toxic pollutants. Typically, toxics monitoring will be planned and implemented at the basin scale. The SAPs will describe media of interest, analytical targets, sampling schedule and rationale for selecting monitoring locations. Monitoring locations may be selected according to considerations such as area drained, discharge, 303d listings, locations of drinking water withdrawals, homogenous upstream land uses, inputs from point and non-point pollutant sources, in addition to geological, hydrological, topographic or biological factors. Monitoring sites may be located in tributaries or the main stem.

## B2 Sampling Methods

Field sampling will follow standard DEQ protocols described in the ODEQ Laboratory Mode of Operations Manual (MOMs) ([DEQ03-LAB-0036-SOP](#)). Sampling protocols vary by sampling media. Anticipated deviation from standard DEQ media specific sampling protocols, will be documented in the media/basin specific SAP. Where site locations safely allow, samples will be collected from the center of the main channel, at a depth of one meter or half the total depth, whichever is greater. Sampling frequency is based upon hydrological considerations, resources, priorities; and statistical needs for trending, determining central tendency, and data distribution characteristics.

Sample preservation methods and holding times are summarized in the basin specific / media specific Sampling and Analysis Plans (SAPs).

## B3 Sample Handling and Custody Procedures

Samples for laboratory analysis will be preserved as identified in the Sampling and Analysis Plan and held on ice. Routine ODEQ sample custody protocols will be followed. Refer to the ODEQ laboratory's Sample Receiving SOP ([DEQ06-LAB-0054-SOP](#)).

## B4 Analytical Methods

Due to dynamic technical (changes in use/rate, introduction of new chemicals, lower detection limits) and programmatic (emerging threats, budgets) considerations, it is impractical to specify the exact analytical targets or detection limits that will ultimately be monitored by DEQ's Toxics Monitoring Program. The target list is likely to be periodically revised with emerging chemicals of concern being added and rarely detected chemicals being removed. Based on their known or suspected toxicity to humans or aquatic organisms, the following *classes* of chemicals may be monitored:

- Volatile and semi volatile organic chemicals (VOCs and SVOCs),
- Poly-aromatic hydrocarbons (PAHs),
- Poly-chlorinated biphenyls (PCBs),
- Poly-brominated diphenyl ethers (PBDEs),
- Dioxins and furans,
- Heavy metals,
- Current-use and legacy pesticides
- Contaminants of emerging concern (i.e., pharmaceuticals, personal care products)

Media-specific levels of quantitation, reporting units and analytical methods are stipulated in the basin/media specific SAP associated with the implementation of each monitoring cycle/network executed under this QAPP.

Analytical SOPs will be available on request from all data generating organizations involved with this project. The laboratories' analytical SOPs must cite the methods identified in the relevant basin/media specific SAP. Field analytical methods can be found in the Watershed Assessment Mode of Operations Manual MOMs ([DEQ03-LAB-0036-SOP](#)).

## B5 Quality Control

With each procedural step that a QC element can be implemented, environmental data will be batched with the QC result in which the samples or data were processed. With the knowledge of an unacceptable error in the QC measurement, environmental samples within the QC batch are either reprocessed after improvements are made to minimize the observed error, or the

environmental data will be flagged as not meeting the quality control standard. If more than one of the same QC is performed in the batch only the environmental data preceding the failed QC is qualified. Batch QC control limits for field measured parameters are summarized in the applicable SAP.

### **B5-1 Quality Management Plan:**

As noted in section A6 above, quality documents are controlled. One such document is the Quality Management Plan (QMP) itself ([DEQ03-LAB-0006-QMP](#)). . With the approval of the QMP, EPA has granted the ODEQ laboratory QA section the authority to approve QAPPs, which EPA requires for all projects they fund.

This project will comply with the policy and procedures outlined in the QMP.

### **B5-2 Quality Assurance Project Plan:**

This QAPP complies with the agency's QMP. Changes to the QMP that affect the procedures for writing a QAPP may require revisions to this plan. This QAPP should be reviewed with the next revision of the QMP.

The Data Coordinator will flag environmental data collected without a Quality Assurance Project Plan or Sampling and Analysis Plan as "B" data. The Data Coordinator will review QC summary data at the end of the project and flag project data, if insufficient QC data is collected or there are apparent systematic errors.

### **B5-3 Survey:**

The grouping of all the samples collected for a project during specific time period is called a Survey. A survey for this project consists of each seasonal collection for all basins identified in the SAP. The Survey often extends over the entire project; however there may be circumstances where the Survey may be broken up into smaller sampling events (by sampling team, shorter time periods, etc) and should be defined in the Sampling and Analysis Plan as the Survey Batch. Typically, multiple teams are utilized for sample collection. For this project, all samples collected by a sampling team from sites located in targeted basins within the same sampling excursion will constitute the survey batch. As such each survey batch may include samples from multiple sampling events and will include multiple sampling cases.

#### **Field Blanks**

For water collections, each sampling team will collect at least one blank (equipment and/or transfer blank) at least every two days or 10% of the samples in the survey batch whichever is more frequent, preferably on alternating days. Blank samples are not collected for sediment or fish.

If laboratory corrective action cannot rectify apparent blank contamination, associated data collected by that sampling team for the survey batch will be assigned a data quality level (DQL) of "B" in LASAR.

Similarly, if the blank(s) are not collected during the survey batch all associated environmental sample data collected by the sampling team within the survey batch will be assigned a DQL of "B" in LASAR

**Note:** The above actions only apply where analytes are found to be present in the samples. Analytical results of < LOD/LOQ are unaffected and will maintain a DQL of "A+."

#### **Field Duplicates**

For water collections, each sampling team will collect at least one duplicate set of samples at least every two days or 10% of the samples in the survey batch whichever is more frequent, preferably on alternating days. Field duplicates are not collected for other media (precision is based on laboratory duplicates).

If laboratory corrective action cannot rectify apparent duplicate precision error, affected analytes in the field primary and field duplicate samples will be assigned a data quality level (DQL) of "B" data in LASAR.

If the Project Coordinator determines that the duplicate precision reflects sampling conditions or procedures at other sample sites within the survey batch, data from those sites also may be determined to have a DQL of "B".

If the field duplicates are not collected during the survey batch all associated data collected by the sampling team within the survey batch will be assigned a DQL of "B" in LASAR.

Quality Control samples may include equipment, transfer, transport, and lab retained blanks with each sampling event. The laboratory may hold the transfer, transport, and lab retained blanks without analysis until after the equipment blank data is reviewed. If the equipment blank exceeds the control limits, the laboratory will analyze the transfer, transport, and lab retained blanks when they are available to assess the source of the error. With the information available the laboratory will advise the QAO and Project Coordinator and assist in the development of quality improvement strategies. If there appears to be no problem with the equipment blank, the Project Coordinator will advise the assessment team to not collect the transfer, transport, and lab retained blanks during subsequent surveys.

The control limits for analytes are specified in the Sampling and Analysis Plans (SAPs) and are based on lab duplicates and lab blanks. It is anticipated that field blanks and duplicate sample QC measurements (Survey control limits) will exceed set limits more frequently than similar laboratory controls. Control limits may be adjusted in future revisions of this QAPP or basin specific SAPs. In the mean time the equipment blank control limits are equal to that of the method blank (B5-13) and the duplicate sample control limits are equal to the laboratory replicate control limits (B5-16).

The Data Coordinator will assign affected environmental a DQL of "B", if equipment blank or field duplicate data fail to meet control limits.

#### **B5-4 Sampling Event:**

The DEQ Laboratory defines a "Sampling Event" as a group of samples collected and/or shipped at the end of the day by an individual sampling team. The group of samples collected from the targeted basins will require multiple collection teams over multiple days, i.e. multiple Sampling Events. During a sampling event multiple coolers may be filled with samples and transported to the laboratory. The Sample Custodian will attempt to log the samples into LIMS under the same Sampling Event ID number.

The Sample Custodian will randomly select a sample from each Sampling Event, which will be used to repeat field parameters in the laboratory. If the difference between the field and laboratory measurements exceeds the precision control limits set in the basin/media specific SAPs the laboratory will repeat all of the field parameters within the Sampling Event. The laboratory analyst will E-mail the Project Coordinator of the corrective action, who will assess the error and determine if the field/lab variance is attributable to factors other than the accuracy of the field parameter. If appropriate, the Project Coordinator will ensure the QC status is set to "B" for all results when the Data Approval Report (DAR) is approved.

### **B5-5 Location:**

All environmental data generated from samples collected at a station may be flagged based on observations made by the sampling team and supporting data. The sampling station should appear to be indicative of normal homogeneous ambient conditions. Access to the sample location within the stream should not be impaired. The sampling team will note on their field sheet if an obstacle prevents collecting the sample at the specified location and time. Collection of samples should occur as close as possible (optimally within roughly 15 feet of the specified location of the designated LASAR station). Site conditions requiring that sampling take place at a site nearby the designated LASAR ID will be documented in the sampling log book and noted on the COC form. Analytical data not collected as scheduled due to unforeseen circumstances will be cancelled and assigned a DQL of "D".

### **B5-6 Collection:**

The sample team will collect samples using the techniques described in section B2. If circumstances dictate other sampling techniques the sampling team will make the note on their field form. For techniques that are considered equivalent the data will not be flagged. If, however, the technique is not equivalent the Project Coordinator will assign environmental results a DQL of "B" in LASAR.

### **B5-7 Transport Container:**

The sampling team will pack the collected samples and the field forms into coolers. The cooler temperature will be checked at the time of sample receipt. If the temperature does not fall between 0° – 10° C and the samples were not received on ice, all measurements requiring thermal preservation will assign a DQL of "B" in LASAR.

If the required information recorded on the field forms cannot be read, the Data Coordinator will assign a DQL of "B" in LASAR to all data relating to the misinformation.

### **B5-8 Bottle/Filter/Probe:**

During sample receipt the Sample Custodian will examine each container. If a container is damaged, mislabeled, or an inappropriate container was used for the requested analysis; the Data Coordinator will assign all analytical results to be obtained from the container a DQL of "B" in LASAR.

### **B5-9 Receipt:**

The Sample Custodian must document their inspection of the samples integrity upon receipt. Technical Services will verify that sample receipt documentation is complete, data are qualified where appropriate, and the proper analyses are assigned. Personnel reviewing the Sample Custodian's work will sign for their review and assign a DQL of "B" in LASAR to results if corrective action does not resolve the integrity of the sample.

### **B5-10 Storage:**

The Sample Custodian will transfer samples requiring refrigeration into refrigerators. Technical Services will record the temperature of the refrigerators daily. All analytical data that is measured from samples stored in a faulty refrigerator will be assigned a DQL of "B" in LASAR.

### **B5-11 Work-list:**

The Organic, Inorganic, and the field monitoring Sections of the laboratory will assign staff to peer review data records. Peer review shall verify that calibrations, sample data reduction, and data reporting were accurate. Personnel reviewing the analyst's work will sign for their review and will assign the DQL of "B" in LASAR, if corrective action does not resolve data integrity errors. This process provides assurances that data is of known quality. The QAO will audit peer review data packets. .

### **B5-12 Sub-sample:**

Occasionally heterogeneous samples must be split into new containers after receipt at the laboratory. For this project samples containing mixed media should not be split into different containers without first homogenizing the sample. If it is determined during the peer review that the sample was mishandled the analytical results may be assigned a DQL of "B" in LASAR. If this happens, the data coordinator should note the reason for the DQL in the case narrative.

### **B5-13 Preparation Batch:**

The preparation batch is defined as the environmental samples that are prepared and/or analyzed together by the same personnel, using the same process and lot(s) of reagents. A preparation batch is composed of one to twenty matrix defined environmental samples with a maximum time of 24 hours between the start of processing of the first sample and the completion of the last sample. An analyst may prepare more than twenty samples during the day; however each group of twenty samples must be identified as a unique batch.

At least one method blank will be prepared with each preparation batch. A method blank is a "clean" water sample (e.g. containing no analyte of concern), which is processed through all the analytical protocols. If the concentration of a targeted analyte in the blank is above the LOQ and is greater than 1/10 of the amount measured in the sample, the analyte will be assigned a DQL of "B" in LASAR.

The laboratory will also prepare a Laboratory Control Sample (LCS) with each preparation batch. The LCS is defined as sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes. It is generally used to establish intra-laboratory or analyst specific precision and bias or to assess the performance of all or a portion of the measurement system. If the LCS fails to meet the laboratories control limit and samples cannot be re-analyzed, flag all environmental data within the preparation batch. Where possible, the LCS should be traceable to NIST, however standard reference materials may be used as well. The LCS's are typically mid-range in the calibration curve and used to assess the accuracy of the analysis. Control limits are based on historical data, or limits published in the method. If the LCS fails to meet control limits, the analyst will assign a DQL of "B" in LASAR to all parameter results within the preparation batch.

### **B5-14 Calibration:**

All measurement systems must be calibrated meeting specific requirements. Calibration requirements are divided into three parts:

- 1) requirements for analytical **support equipment**,
- 2) requirements for **standardizing the test method titrant**, and
- 3) requirements for **instrument calibration**, which is further divided into

- a) initial instrument calibration and
- b) continuing instrument calibration verification

**Support Equipment:** Since support equipment is calibrated quarterly or annually as required by current standards, it is possible for analytical data to be reported using inaccurate support equipment for quite some time after data is reported. Should the calibration of support equipment fail to meet control limits, all analytical data generated with the piece equipment prior to the failed calibration up to the last acceptable calibration shall be as assigned a DQL of "B".

**Titration Standardization:** Dissolved oxygen and alkalinity titrants must be calibrated using primary reference standards. Each batch of sodium thiosulfate used for dissolved oxygen will be standardized with a primary potassium bi-iodate standard and each batch of 0.02 N sulfuric standard used for alkalinity shall be standardized using a 0.05 N calcium carbonate primary standard. The calibration batch ID will be recorded on the titrant bottle and transcribed to the field sampling event sheet to ensure results are traceable to NIST.

**Instrument Calibration:** Immediately following the initial "instrument calibration" an Initial Calibration Verification sample (ICV) must be analyzed to verify the accuracy of the calibration standards. If the ICV fails to meet control limits, the analyst must determine the significance of the error and assign a DQL of "B" or "C" to all analytical results within the calibration batch.

The lowest calibration standard used will be equal to the laboratory's Limit of Quantitation (LOQ). As noted in section A6-3, some project target levels analytes are less than the laboratory's LOQ. Such analytes are to be reported to the laboratory's Limit of Detection (LOD). If the datum is greater than the projects target level and less than the laboratory's LOQ will be flagged as an estimate. If the analyte is less than the LOD, it will be reported as less than the LOD.

### **B5-15 Analytical Batch:**

The analytical batch is defined as a group of environmental samples that is composed of prepared environmental samples (extracts, digestates or concentrates) which are analyzed together as a group. If there are no preparation steps the analytical batch definition is the same as the preparation batch definition.

A high to mid-range calibration standard is to be used for a continuing calibration verification (CCV) standard. A CCV is analyzed at the beginning and, depending on the analytical method, at the end of the analytical batch and throughout the batch at a frequency of 5% of the samples. The CCV is used to verify that the initial calibration is still valid and to assess calibration drift. A CCV sample should be run at a concentration that represents the bulk of the samples tested and/or represents regulated levels. The CCV must fall within method specified control limits all data reported with a trailing CCV that fails to meet the control limit are to be flagged. Each CCV may have different control limits. If the CCV fails to meet control limits, the analyst will rerun the affected samples or assign a DQL of "B" to the reported analytical results in the Analytical Batch.

### **B5-16 Analyte QC:**

Each laboratory will replicate the analysis of an environmental sample with every analytical batch of twenty samples. If the laboratory's control limit is exceeded the sample result must be flagged. When analytes are not detected in the environmental samples and it is feasible to perform a matrix spike, the laboratory will prepare matrix spike/matrix spike duplicate samples to estimate analytical precision.

Matrix spikes are to be analyzed at the frequency of one in every twenty environmental samples. The method-specific criteria for spike recovery are provided in basin/media specific SAPs. Spike recoveries are used to determine the analytical accuracy of the test method. For metals analyses, every sample observed to exhibit matrix interference is to be analyzed using "Standard Additions" method. Sample dilution may be used to minimize interference. ICP and ICPMS methods require the use of an interference check standard, which ensures that corrections for interferences are made.

## **B6 Instrument/Equipment Testing, Inspection, and Maintenance**

All analytical equipment will be maintained and inspected in accordance with the procedure's test method SOPs. All DEQ test method SOPs are controlled documents and are available on Q-net at <http://deq05/lab/qms/documents.asp>. Field parameter SOPs are outlined in DEQ MOMs manual.

The laboratories will keep maintenance logs on all analytical equipment. Laboratories are expected to conduct routine maintenance procedures and follow the manufacturer's advice. Personnel conducting peer review will find it helpful to use maintenance logs during corrective action procedures.

## **B7 Instrument Calibration and Frequency**

All analytical equipment will be calibrated in accordance with the procedures test method SOPs. Field parameter SOPs are outlined in DEQ MOMs manual.

If instruments cannot be calibrated as required, the analyst will qualify data as appropriate (refer to section B5-14).

## **B8 Inspection/Acceptance of Supplies and Consumables**

The analyst will be responsible for maintaining records of traceability for all reagents and standards. The procedure used to maintain traceability is described in the Laboratory Quality Manual ([DEQ91-LAB-0006-LQM](#)). The analyst must validate the usability of standards and reagents upon receipt and when expiration dates are exceeded.

## **B9 Non-direct Measurements**

Historical data may be collected and compiled for use. No additional acceptance criteria will be required for this data and will not be further qualified by DEQ staff.

River flows may be obtained from USGS gauging stations.

## **B10 Data Management**

Data management will be provided through the DEQ LIMS and LASAR databases.

Separate field data sheets will be maintained for each sampling event. Information recorded on data sheets is to include Project name, sample location identification, data and time of sampling events, water body name, basin name, LASAR numbers, general weather conditions, and names of field staff, time of each sample or measurement, results and equipment ID numbers. All data are to be entered into the DEQ Laboratory Analytical Storage And Retrieval (LASAR) database.



DEQ Laboratory technical services staff will input field data and third party data into the DEQ LIMS and LASAR databases. Technical services will enter data as it is received and will not correct errors. The Project Coordinator will verify and correct data transcribed into LIMS, ensuring data meet LEAD reporting policies. Refer to the LEAD's Quality Manual ([DEQ91-LAB-0006-LQM](#)).

Final reports from third party laboratories will be faxed/emailed and mailed to the Project Coordinator. Final Reports from the DEQ Laboratory will also be emailed to the Project Coordinator.

## Group C Assessment and Oversight

### C1 Assessment and Response Actions

Surveillance and data management will be performed once a month to ensure data being collected will meet the needs of the project. Information collected during this project is intended to meet the needs of section A6.

All results of the individual assessments will be compiled and managed by the Sample Coordinator.

Response actions will be developed as data becomes available. Any stop work orders or change in project scope will come from the Project Coordinator. Corrective actions will be documented as addendums to this QAPP/SAP.

### C2 Reports to Management

Reports will be sent to the personnel listed in Table for approval and/or review. Technical Services will file all Table reports and records together, with the exception of the LIMS Status Report. Technical Services may make these reports available to the public upon request.

**Table 5 – Laboratory Reports**

	<i>Division Administrator</i>	<i>QAO</i>	<i>Watershed Assessment Manager</i>	<i>Data Coordinator</i>	<i>Project Coordinator</i>	<i>Technical Services Manager</i>	<i>Sample coordinator</i>	<i>Inorganic Manager</i>	<i>Organic Manager</i>
Project Summary Report	✓	✓	✓	✓	✓				
Official Analytical Report	✓	✓		✓	✓		✓		
Analytical QC Summaries	✓	✓					✓	✓	✓
Original Field Data Records	✓	✓		✓	✓		✓		
<a href="#">Sample Receipt Checklist</a>	✓	✓					✓		
<a href="#">Sample Preservation Summary</a>	✓	✓					✓	✓	✓
<a href="#">Laboratory Audit of Field Measurements</a>	✓	✓					✓	✓	

	<i>Division Administrator</i>	<i>QAO</i>	<i>Watershed Assessment Manager</i>	<i>Data Coordinator</i>	<i>Project Coordinator</i>	<i>Technical Services Manager</i>	<i>Sample coordinator</i>	<i>Inorganic Manager</i>	<i>Organic Manager</i>
Field vs. Laboratory Analysis comparisons	✓	✓					✓		
Laboratory Analysis of Field Duplicates	✓	✓					✓		
Parameter Batch QC summaries	✓	✓					✓	✓	✓
<a href="#">Solids Balance/QC Form</a>	✓	✓					✓	✓	
<a href="#">Ion Balance Report</a>	✓	✓					✓	✓	
<a href="#">Technical Corrective Action</a>	✓	✓					✓	✓	✓
Data Approval Report (DAR)			✓	✓	✓		✓	✓	✓
LIMS Status Tracking	✓	✓	✓			✓	✓	✓	✓

## Group D Data Validation and Usability

Data quality levels defined in Table 6, are stored in LIMS and LASAR to simplify database queries related to the quality of the data. Data not meeting Data Quality Indicator control limits will receive a DQL other than “A”. If a QC measure fails to meet control limits, personnel evaluating the QC must qualify all results associated with the control. The DQL will be set to “B” or the analyst may also report or “void” the results and set the DQL to “C”. Comments will be linked to the results explaining QC failures.

If the QAO determines the data does not meet the data quality objectives described in section A6 the DQL of all affected results will be adjusted to the appropriate code defined in Table 6.

**Table 6 – Current LIMS QC Data Quality Levels**

DQL	Definition	Description
A+	DEQ data of known quality.	Data of known and acceptable quality. Presented by DEQ meeting current QC limits as established by the Laboratory's Quality Systems Manual.
A	Non-DEQ data of known quality.	Data of known and acceptable quality. Submitted by entities outside of DEQ meeting current QC limits for external data as established by the DEQ Laboratory.
B	Data of suspect Quality.	Data may not meet established QC but is within marginal acceptance criteria or data value may be accurate, however controls used to measure Data Quality Objective elements failed i.e. batch failed to meet blank QC limit. (Equivalent to EPA validation flag of J)

DQL	Definition	Description
C	Data of unacceptable quality.	Values are typically discarded (Void) due to analytical failure. Results may be still reported if they provide a positive qualitative identification. (Equivalent to EPA validation flag of R)
D	No sample collected or no reportable results.	Typically due to sampling failure, however sample was scheduled and resources were expended attempting to collect the sample.
E	Data of unknown quality.	Insufficient QA/QC information is available, data could be valid however there is no evidence to prove either way (Educational Only, Very Questionable or Poor QA/QC).
F	Exceptional Event.	Data may be of "A" quality but not representative of sampling conditions as required by the project plan or heterogeneous with respect to typical environmental sample of the same matrix.

Data with DQLs of "A+", "A" and "B" data may be used for this project.

## D1 Data Review, Verification and Validation

The Project Coordinator, the QA Officer and the Data Coordinator will determine if the data collected meets the QA Plan objectives. The Data Coordinator will review all data resulting from this project as data becomes available. Questionable data will be brought to the Project and QA Coordinators. Decisions to accept, qualify or reject data will be made by the Project Coordinator/Basin Coordinator, QA Officer and Data Coordinator.

The Data Coordinator will verify all parameters requested were reported and that data were reported to the requested target levels and with the appropriate units. If data are reported incorrectly, the Data Coordinator will be responsible for ensuring corrections to the database are made.

## D2 Verification and Validation Methods

The data review process will be monitored through the use LIMS sample status codes. The analyst will enter, review analytical data, and flag results not meeting test method Standard Operating Procedure (SOP) defined QC standards (B5-12 through B5-16). A second qualified analyst will review B5-12 through B5-16 QC batch data and sign off on data in LIMS as having been reviewed. Documentation of the peer review will be maintained using an Analytical Data Review Checklist ([DEQ07-LAB-0055-TMPL](#)) developed for each method.

The inorganic and organic laboratory sections will review data grouped together in the same sampling event (B5-4) as it relates to the test results reported by their section. This level of review will include the review of the peer review checklist (B5-11), inter-parameter comparisons, history comparisons, LIMS comments, laboratory QC checks on field measurements, correspondences with sampling teams, and compliance with QAPP requirements B5-11 through B5-16 and limits stipulated in the basin/media-specific SAPs.

The Project Coordinator will review Sampling Event batch data (B5-4) in LIMS and ensure that field data was transcribed and qualified correctly in LIMS. During this review the Data Coordinator will ensure batch data described in B5-4 through B5-10 meets control limits and that samples were flagged with appropriate data qualifiers and corresponding results were assigned the appropriate DQL.

The Project Coordinator must approve LIMS data to verify B5-3 QC elements are met and reset

DQL's if necessary. This validation process will be documented through the LIMS DAR process.

Once all data is completed through the LIMS DAR process, the LIMS sampling event will be released into LASAR. The Project Coordinator will receive an email notice of its availability and will print a paper copy of the data and proofread it against the original field data sheets. Errors in data entry will be corrected at that time. Outliers and inconsistencies will be flagged for further review or be discarded. Data quality problems will be discussed as they occur and in the final report to data users.

### **D3 Reconciliation with User Requirements**

As soon as possible after each sampling event, calculations and determinations for precision, completeness, and accuracy will be made and corrective action implemented if needed. If data quality indicators do not meet the project's specifications, data may be discarded and re-sampling may occur. The cause of the failure will be evaluated. If the cause is found to be equipment failure, calibration and/or maintenance techniques will be reassessed and improved. If the problem is found to be sampling team error, team members will be retrained. Any limitations on data use will be detailed in both interim and final reports, and other documentation as needed. If failure to meet project specifications is found to be unrelated to equipment, methods, or sample error, specifications may be revised for the next sampling season. Revisions will be submitted to the QA section of the DEQ Laboratory for review and/or approval.

Corrective action is initiated whenever an "out of control" condition is identified (e.g. either control limits or holding time has been exceeded). The analyst is responsible for initiating corrective action, which generally consists of:

- Analytical system recalibrated or verified and analysis repeated, if holding time permits.
- Documentation of "out of control" condition and corrective action taken in an Incident Report, which is reviewed by the section manager and QA officer, who investigate the "out of control" condition, along with the analyst, and decide on a course of corrective action.
- If corrective action procedures do not rectify "out of control" conditions the analytical data may be reported as an estimate and the LIMS QC status will be set to "B". A comment explaining the "B" flag must be attached to all "B" data.

If time for reanalysis exceeds the allowable holding time for the analyte, the following procedure is followed:

- Sampler is notified and resampling is requested, or
- If resampling is not feasible, and the particular analytical results are not critical, initial analytical results are flagged and reported as an "estimate", indicating all QC criteria have not been met.

Data identified as violating the data quality objective criteria will be reviewed by the QA officer, the appropriate Laboratory Manager (organic or inorganic), and the Data Coordinator and a recommendation will be made to the Project Coordinator. The Project Coordinator and QA Officer will make a decision on the suitability and use of the data. If data is used that do not meet project data quality objectives, the reason for inclusion will be noted in the project file. Situations requiring corrective action for sample collection will be dealt with immediately, such as equipment malfunction. Sample collection events requiring corrective action that cannot occur immediately will be considered a long-term corrective action. The corrective actions will

be detailed in the field sampling notebook and reviewed by the Project Coordinator.

If corrective action procedures do not mitigate the error, associated environmental data must be flagged. Table 6 lists the DQLs used in LASAR. For this project "B" data is acceptable for use.

## **Appendix A Field Data Forms**

Electronic Field Data Sheet associated with this Sampling and Analysis Plan is located at [DEQ06-LAB-0054-FORM](#).

**Appendix B Basin / Media Specific Sub-Project Information**

Sampling Sub-Projects for Toxics Monitoring Program

Basin	Sub-Project Name	Sub-Project Number by Matrix		
		Water	Fish	Sediment
Deschutes	TMP-Water-Deschutes	2120		
	TMP-Fish-Deschutes		2121	
	TMP-Sediment-Deschutes			2158
Goose & Summer Lakes	TMP-Water-Goose Summer Lakes	2128		
	TMP-Fish-Goose Summer Lakes		2129	
	TMP-Sediment Goose Summer Lakes			2159
Grande Ronde	TMP-Water-Grande Ronde	2104		
	TMP-Fish-Grande Ronde		2105	
	TMP-Sediment-Grande Ronde			2150
Hood	TMP-Water-Hood	2116		
	TMP-Fish-Hood		2117	
	TMP-Sediment-Hood			2160
John Day	TMP-Water-John Day	2114		
	TMP-Fish-John Day		2115	
	TMP-Sediment-John Day			2161
Klamath	TMP-Water-Klamath	2100		
	TMP-Fish-Klamath		2101	
	TMP-Sediment-Klamath			2139
Malheur	TMP-Water-Malheur	2108		
	TMP-Fish-Malheur		2109	
	TMP-Sediment-Malheur			2143
Malheur Lake	TMP-Water-Malheur Lake	2130		
	TMP-Fish-Malheur Lake		2131	
	TMP-Sediment-Malheur Lake			2162
Mid Coast	TMP-Water-Mid Coast	2124		
	TMP-Fish-Mid Coast		2125	
	TMP-Sediment-Mid Coast			2163
North Coast	TMP-Water-North Coast	2122		
	TMP-Fish-North Coast		2123	
	TMP-Sediment-North Coast			2164
Owyhee	TMP-Water-Owyhee	2110		
	TMP-Fish-Owyhee		2111	
	TMP-Sediment-Owyhee			2144
Powder	TMP-Water-Powder	2106		
	TMP-Fish-Powder		2107	
	TMP-Sediment-Powder			2142

Basin	Sub-Project Name	Sub-Project Number by Matrix		
		Water	Fish	Sediment
Rogue	TMP-Water-Rogue	2096		
	TMP-Fish-Rogue		2097	
	TMP-Sediment-Rogue			2141
Sandy	TMP-Water-Sandy	2118		
	TMP-Fish-Sandy		2119	
	TMP-Sediment-Sandy			2165
South Coast	TMP-Water-South Coast	2126		
	TMP-Fish-South Coast		2127	
	TMP-Sediment-South Coast			2166
Umatilla	TMP-Water-Umatilla	2102		
	TMP-Fish-Umatilla		2103	
	TMP-Sediment-Umatilla			2145
Umpqua	TMP-Water-Umpqua	2098		
	TMP-Fish-Umpqua		2099	
	TMP-Sediment-Umpqua			2140
Walla Walla	TMP-Water-Walla Walla	2112		
	TMP-Fish-Walla Walla		2113	
	TMP-Sediment-Walla Walla			2149
Willamette	TMP-Water-Willamette	2026		
	TMP-Fish-Willamette		2094	
	TMP-Sediment-Willamette			2167



## Appendix C Revision History

Revision	Date	Changes	Editor
		Original plan was not submitted to QA.	
2.0		Created QAPP using Work Plan as guidance.	
		Substantial revisions from earlier version/template. Changed basin map. Moved analyte tables to basin/media specific SAPs. Rewrote section B5-3 Sample Survey to better define a survey and survey batch. Separated blank and field duplicate requirements and qualification into separate paragraphs and clarified DQL effects on failed QC. Added references to Data Quality levels (DQLs) throughout document replacing references to QC flagging and QC codes.	
3.0	9/28/2011	Rewrote section A8-3 to better reflect field practices.	J. Coyle.
4.0	8/23/2012	Clarified corrective actions and DQLs for various QC parameters. Generally updated to reflect current practice mostly editorial.	L. Pillsbury
4.1	9/5/2012	Corrected Typos	S. Hoatson