Water Quality Planning Bureau

Montana EQuIS Water Quality Exchange Guidance Manual

Data Management Section
Water Quality Planning Bureau
Planning, Prevention and Assistance Division

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3.2	5/15/2018	Jolene McQuillan	Updated DEQ logo

Acronyms		
File Extensions	.txt	Text File
	.xls	Excel Spreadsheet
	.zip	Compressed File
Acronyms	DEQ	Montana Department of Environmental Quality
	EDD	Electronic Data Deliverable
	EDP	EQuIS Data Processor
	EPA	Environmental Protection Agency
	FTS	File Transfer Service
	MT-eWQX	Montana EQuIS Water Quality Exchange
	SAP	Sampling and Analysis Plan
	STORET	Storage and Retrieval Database
	WQPB	Water Quality Planning Bureau
	WQX	Water Quality Exchange

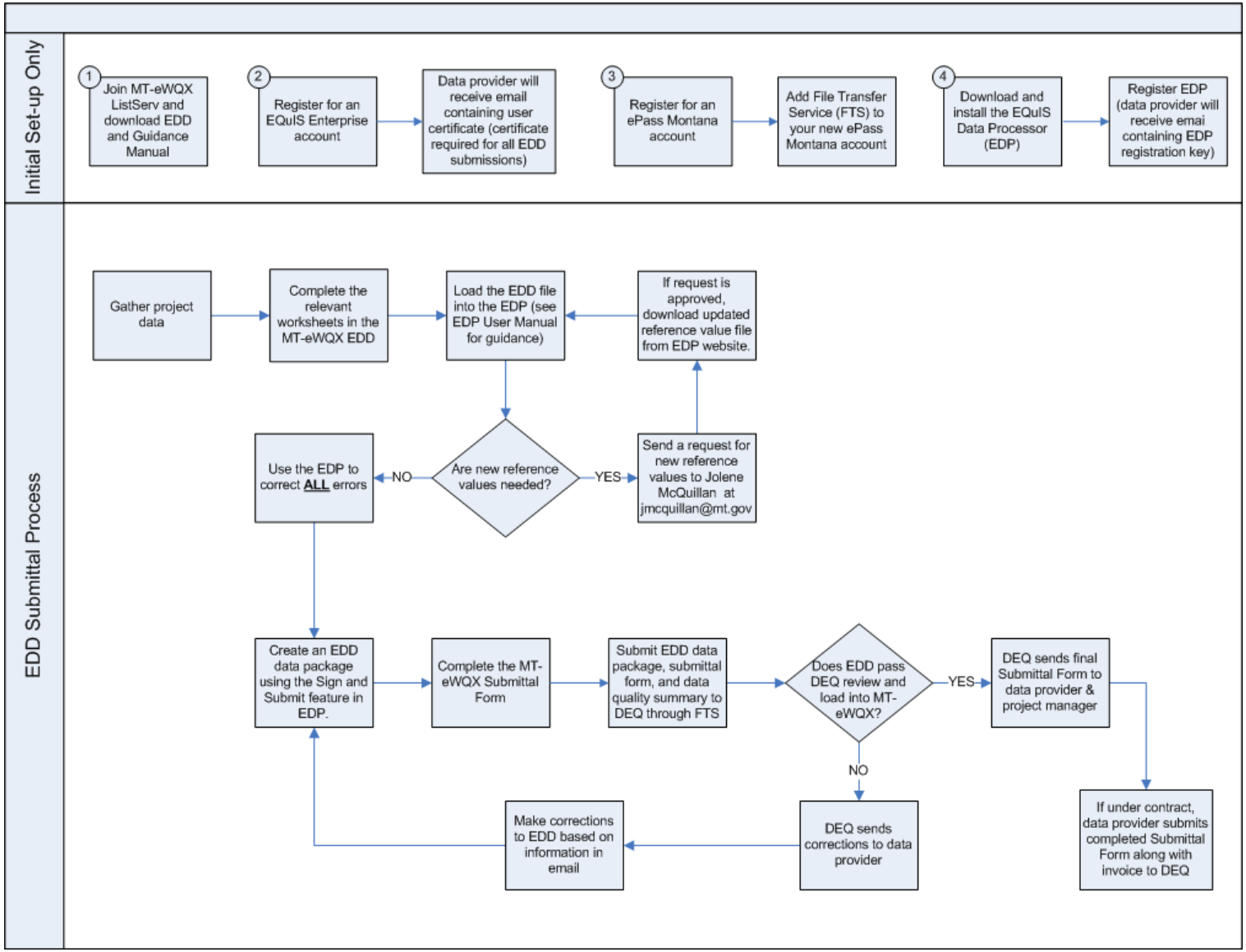
1.0 General Information

The purpose of this guidance manual is to provide detailed instructions on how to report environmental data electronically to the Montana Department of Environmental Quality (DEQ). Data submitted to DEQ will be stored in the Montana EQuIS Water Quality Exchange (MT-eWQX) database. MT-eWQX replaces the Environmental Protection Agency's (EPA) distributed STORET system, and is DEQ's main repository for water quality monitoring data. Data submitted to MT-eWQX is sent to EPA's National STORET Warehouse, which fulfills the STORET/WQX requirement of environmental monitoring projects funded by federal monies, such as 319 grants or 106 funds.

This manual describes both the procedural and formatting requirements you need to know to submit your Electronic Data Deliverable (EDD) to MT-eWQX. The first section, Initial Set-up, covers the initial steps that need to taken to get established in our database to submit data to MT-eWQX. The next section, EDD Development, focuses on formatting EDDs. It covers general reporting requirements and includes tables that describe each EDD worksheet in detail. The next section covers EDD validation and focuses on the EQuIS Data Processor (EDP), which each data provider will be required to use prior to submitting an EDD. The final section covers the EDD submittal process. This section introduces the MT-eWQX Submittal Form and the data package required for each submittal to MT-eWQX. An overview of the EDD submittal process is shown in Figure 1-1.

All MT-eWQX materials referenced in this guidance manual are available from DEQ's MT-eWQX Support website located at http://deq.mt.gov/wqinfo/datamgmt/MTEWQX.mcpx.

Figure 1-1 Electronic Data Deliverable (EDD) Submittal Process



2.0 Initial Set-up

The 4 steps at the top of Figure 1-1 are required for initial set-up only. These are important steps that will register you with the MT-eWQX system and save you time when you're ready to validate and submit your EDDs.

2.1 Join MT-eWQX ListServ

It is important to stay informed about MT-eWQX. Sign-up for the ListServ and receive important updates about MT-eWQX, including when updated reference value lists are posted, anticipated outages for maintenance, or training opportunities. To register for the MT-eWQX ListServ:

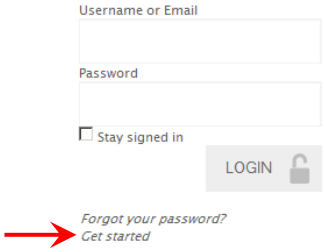
1. Click the 'MT-eWQX ListServ' link on DEQ's MT-eWQX Support website.
2. Enter your name and email address and select 'Submit Query'.
3. Verify the box is checked on the next screen and select 'Submit Query'.
4. You should receive an email with a link to confirm your subscription. Click on the link in the email to confirm your subscription.

2.2 Register for an EQuIS Enterprise Account

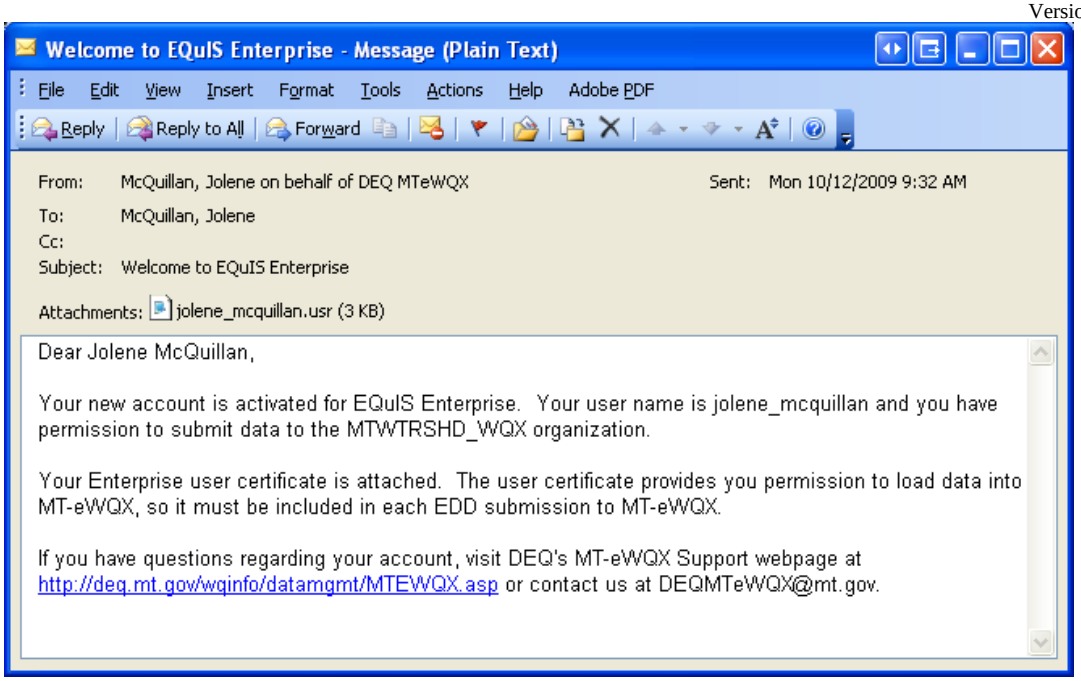
EQuIS Enterprise is a web application that tracks EDDs submitted to MT-eWQX. It is necessary to create an Enterprise user account in order to receive your user certificate, which assigns the correct permissions to the MT-eWQX database.

To request an EQuIS Enterprise account:

1. Go to EQuIS Enterprise at http://svcalt.mt.gov/deq/equis/.
2. Select 'Get Started'.



3. Enter the following:
   a. Email Address
   b. Password: Create your own password. Password must be between 6 and 30 characters long, contain at least one uppercase letter, one lowercase letter, and one number.
      i. If you forget your password in the future, you can select 'Forgot your password?' on the EQuIS Enterprise homepage, enter your email address, and a new password will be sent to your email.
   c. First Name
   d. Last Name
   e. Remark: Enter the Organization ID you're requesting access to (additional information about organizations can be found in Section 5.1)
4. Select 'Register'. A notification about your request will be sent to the MT-eWQX Data Manager.
5. After your account is registered, you'll receive a confirmation email from DEQ that contains your Enterprise user certificate.



2.2.1 User Certificate

A user certificate is emailed after an Enterprise user account has been registered and activated by DEQ. The user certificate provides the data provider permission to load data into MT-eWQX, so it must be included in each EDD submission to MT-eWQX. If the Sign and Submit feature in EDP is used to create the EDD data package, the user certificate will be automatically included. Your user certificate should be saved on your computer for easy access if its needed.

2.3 Register for an ePass Montana Account

When you're ready to submit data to MT-eWQX, you must use the State of Montana's File Transfer Service (FTS). The FTS allows for easy transfer of large electronic files to and from customers of state government. The FTS is accessed via ePass Montana, the state's single login service.

If you do not yet have an ePass Montana account, you must create one.

1. Go to www.epass.mt.gov.
2. Select 'Login" under the ePass Montana Login section.
3. Select 'Create an Account'. Enter all required information including a username and password. Please note: State of Montana employees, do not create an ePass Montana account, login with your state network login credentials.
4. After setting up your account, you will be taken to your customizable ePass page.
5. Add File Transfer Service to your new ePass Montana account.
6. Enter the activation code that was emailed to you, or select the link in the email to validate your email address.
7. After your account is activated, you'll have full access to the FTS.

2.4 Download and Install the EQuIS Data Processor (EDP)

The EQuIS Data Processor (EDP) is a standalone application that must be used by data providers to check their EDD files prior to submission to MT-eWQX. The EDP performs a series of formatting checks on the EDD and then identifies any records that have errors.

To use the EDP application, the following four steps must be completed in the order shown:

1. Download and install the EDP application
2. Download the Montana DEQ Format
3. Download the Montana DEQ Reference Values
4. Register the EDP Application

Detailed guidance for the above four steps can be found in Section 2.0 of the EDP Guidance Manual available from the MT-eWQX Support website.

3.0 EDD Development

Environmental monitoring data must be submitted to MT-eWQX in a specific format. Data providers are required to download the MT-eWQX EDD and populate it with their project's data. On its most basic level, the MT-eWQX EDD is an Excel spreadsheet that contains a series of worksheets that allow data providers to report monitoring data to DEQ. The EDD is comprised of the following worksheets:

- **Project** – Describe a particular study or data collection effort.
- **Monitoring Locations** – Describes locations where samples and field measurements were collected.
- **Alternate Monitoring Locations** – Associates alternate IDs to the primary monitoring location.
- **Activity** – Describe activities conducted at monitoring locations.
- **Result** – Results of measurements collected in the field and samples analyzed in a laboratory.
- **Attached Documents** – Allows for multiple documents to be attached to projects, monitoring locations, activities, and results.
- **Biological/Habitat Index** – Allows for reporting of habitat and biological indices as a representation of water quality conditions.
- **Biological/Habitat Metric** – Allows for reporting of metric results associated with biological indices or habitat assessments.

3.1 General EDD Reporting Requirements

Each worksheet must be reported exactly as defined in the following sections. Any deviations will result in errors during the EDP or FTS submission process described in the following sections. It's best to include all your data in one EDD, which greatly helps when using the EDP for error-checking.

3.1.1 Data Management Formats

Data providers may manage their data in any acceptable software tool for editing and formatting data such as a spreadsheet or database, however, when the data is submitted to DEQ it must follow the MT-eWQX format described in this manual. The MT-eWQX EDD format is provided as an Excel spreadsheet ready for data entry on DEQ's MT-eWQX Support website. Users of other spreadsheet or database software can either use the provided EDD for data entry or define the EDD in their own data management tool.

3.1.2 Valid Values

Valid values, also known as reference or domain values, govern the contents of some fields in the EDD. In other words, some fields may only be populated with data that exactly matches a value listed in the MT-eWQX list of valid values. The complete list of valid values is provided in the MT-eWQX Appendices document located on DEQ's MT-eWQX Support website. The tables in Section 3.2 below, indicate which fields require a valid value.

If data providers cannot find a value in the MT-eWQX Appendices document, they can request an addition to the valid value list by sending a Valid Value Request to DEQ's Water Quality Data Manager, Jolene McQuillan. In the email, data providers should include the field name in which the new value should be added, the proposed value name, and a brief description of the meaning of the value. If accepted, DEQ will update the appropriate reference value table and notify the data provider when an updated version of the reference value file has been posted to the EDP Download webpage. This updated reference value file will allow the EDP to recognize the new value as valid.

3.2 EDD Format Descriptions

This section contains tables that define the file structures for each EDD worksheet. Data providers are responsible for enforcing the requirements listed in each table. The EDP, which is described in Section 4, will assist in checking each EDD for these requirements. Any deviations from this format will result in errors during the EDP validation process.

The format description tables contain 5 key elements:

- **Column #:** Indicates column placement in the worksheet. It is important to not remove any columns or change the order of the columns in the EDD.
- **Column Name:** Name of the data element and column in the EDD.
- **Data Type:** Indicates what data type is required for the field. Table 2-1 describes the various data types used in the format description tables.

- **Required?:** Indicates if the data element is required, conditional, or optional. DEQ expects all fields marked as "Required" to be filled in. Fields marked as "Conditional" are required if certain business rules are met. These rules are included in the Description column. Fields marked "Optional" are not required, but data should be reported if available. When a field is not required and no data is available, the field should be left blank.
- **Description:** Provides a description of the data element and any business rules if applicable.

Table 3-1 Data Type Descriptions

Type	Description	Comments
Date	Date format is MM/DD/YYYY.	Example: 03/20/2009
Decimal	Stores decimal numbers.	Decimal precision indicated in parentheses in Data Type column.
Boolean	Indicates yes or no. Enter either Y or N.	
Integer	Whole number.	
Text	Stores characters and numbers.	Length restrictions are indicated in parentheses in Data Type column.
Time	Time is 24-hour (military) HH:MM format.	Example: "16:30"
Valid Value	Requires a valid value from that data elements valid value list (complete lists in MT-eWQX Appendix document).	

3.2.1 Project

The project worksheet is used to establish new projects in MT-eWQX. If the Project ID is already established in MT-eWQX, you do not need to resubmit it. Projects describe a particular study or data collection effort, so new projects are usually created based on Sampling and Analysis Plans (SAPs).

Table 3-2 Project Format Description

Column #	Column Name	Data Type	Required?	Description
1	Project ID	Text (35)	Required	Unique identifier for a specific data collection effort.
2	Project Name	Text (120)	Required	Name assigned to the project.
3	Project Description	Text (1999)	Required	Description, which may include the project purpose or objectives.
4	Project Plan Approved Indicator	Valid Value	Required	Indicates whether a project plan has been approved for the project.
5	Project Plan Approval Agency	Valid Value	Conditional	Required if Project Plan Approved is "Y". Authority that approved plan.

3.2.2 Monitoring Locations

This worksheet is used to establish new monitoring locations, also known as stations. Stations describe locations were samples and field measurements are collected. The coordinates for the station are collected from the initial site for the sampling event, which is usually the middle transect ("F" site) in the reach. Before establishing new stations, query your organization and identify if your station needs to be established. If the station has already been established in your organization, you can use the established Station ID and do not need to resubmit it.

When creating new Station IDs, it is best to follow a standard naming convention. An example of a naming convention is the Project ID (or an abbreviation of the Project ID) followed by the Site ID, which is usually included in the project's SAP. For example, if Beaver Creek was sampled as part of a Lower Yellowstone project (LYELS), the Station ID might be LYELS-BEVR01. When new stations are submitted to MT-eWQX, the Station IDs will be reviewed to make sure they are appropriate.

Table 3-3 Monitoring Location Format Description

Column #	Column Name	Data Type	Required?	Description
1	Station ID	Text (20)	Required	Unique identifier for a specific monitoring location.

Table 3-3 Monitoring Location Format Description				
Column #	**Column Name**	**Data Type**	**Required?**	**Description**
2	Station Name	Text (80)	Required	Name of waterbody including brief location description such as "near mouth".
3	Station Description	Text (255)	Optional	Additional description of station.
4	Assessment Unit Code	Text (50)	Optional	Assessment Unit Code associated with stream reach where site is located.
5	Travel Directions	Text (255)	Optional	Directions on how to locate station.
6	Station Type	Valid Value	Required	Type of monitoring location.
7	Station Establishment Date	Date	Optional	Date station was established.
8	Latitude	Decimal (12)	Required	Latitude in decimal degrees.
9	Longitude	Decimal (14)	Required	Longitude in decimal degrees.
10	Geopositioning Method	Valid Value	Required	Method used to determine the lat/long.
11	Geopositioning Datum	Valid Value	Required	Datum used to determine the lat/long. MT DEQ standard is NAD83.
12	Map Scale	Integer	Conditional	Required if Geopositioning Method is "INTERPOLATION-MAP". Number that represents the proportional distance on the ground for one unit on the map.
13	Elevation	Text (12)	Optional	Ground elevation of location.
14	Elevation Unit	Valid Value	Conditional	Required if Elevation is reported. Units used in measuring. Use 'ft' or 'm'.
15	Elevation Method	Valid Value	Conditional	Required if Elevation is reported. Method used to determine elevation.
16	Elevation Datum	Valid Value	Conditional	Required if Elevation is reported. Datum used to determine elevation.
17	State	Valid Value	Required	State where station is located.
18	County	Valid Value	Required	County name where station is located.
19	HUC 8-digit	Valid Value	Required	8-digit USGS Hydrologic Unit Code where station is located.
20	HUC 12-digit	Valid Value	Optional	12-digit USGS Hydrologic Unit Code where station is located.
21	Well Type	Valid Value	Conditional	Required if Aquifer Name or Formation Type is reported. Identifies the well type.
22	Well Aquifer Name	Text (20)	Optional	Name of aquifer well is in.
23	Well Formation Type	Valid Value	Optional	Name of primary formation well is in.
24	Well Hole Depth	Numeric (12)	Optional	Depth of well hole.
25	Well Hole Depth Unit	Valid Value	Conditional	Required if Hole Depth is reported. Units used in measuring. Use 'ft' or 'm'.

3.2.3 Alternate Monitoring Locations

This worksheet is used to associate alternate monitoring locations to an established station. This is useful when sampling occurs at an established station in another organization. This worksheet requires that the Station ID also be entered in the Stations worksheet. If you would like to associate alternate Station IDs with established stations, fill out the worksheet and submit to the MT-eWQX Data Manager separately.

Table 3-4 Alternate Monitoring Location Format Description				
Column #	**Column Name**	**Data Type**	**Required?**	**Description**
1	Station ID	Text (20)	Required	Unique identifier for a specific monitoring location.

Table 3-4 Alternate Monitoring Location Format Description				
Column #	**Column Name**	**Data Type**	**Required?**	**Description**
2	Alternate Station ID	Text (35)	Required	Alternate unique identifier used to identify the station.
3	Alternate Station Source	Text (120)	Required	Identifies the source that created/defined the Alternate Station ID, such as USGS, FWP, USEPA, etc.

3.2.4 Activity

This worksheet is used to enter activities conducted at monitoring locations. Typical activities include collecting field measurements, collecting water and biological samples, or conducting habitat assessments. Activities should only be submitted to MT-eWQX if all the associated results are reported in the Result, Index, or Metric section of the same EDD.

The Activity ID is one of the most important fields because it associates the metadata entered into the Activity worksheet to the associated results in the Result worksheet. Within the Organization ID you're loading data into, the Activity ID must be unique for each Activity Type, Medium, Date/Time, Sample Collection Method, and Depth. Use the following naming convention to assist in making your Activity IDs unique: [Station ID]_[Activity Date]_[Activity Type]. Use an abbreviation of the Station ID if it's too long for the 35 character maximum. For example, BEAVR01_07212008_F-MSR/OBS would be the Activity ID for field measurements collected at BEAVR01 on 7/21/2008. In the case where multiple samples are collected at a site, a medium abbreviation or sequential number will need to be added to the end of the Activity ID. For example, BEAVR01_07212008_S-R would be the Activity ID for a water sample and BEAVR01_07212008_S-R_C would be the Activity ID for a chlorophyll a sample collected at the same site.

Table 3-5 Activity Format Description				
Column #	**Column Name**	**Data Type**	**Required?**	**Description**
1	Project ID	Text (35)	Required	Unique identifier for a specific data collection effort.
2	Station ID	Text (20)	Conditional	Required for most Activity Types. Refer to the Activity Type valid value list for activities that do not require a Station ID. Unique identifier for a specific monitoring location.
3	Activity ID	Text (35)	Required	Unique identifier that groups together measurements, observations, or samples collected at the same date, time, place, and in the same medium.
4	Activity Type	Valid Value	Required	Type of activity.
5	Activity Group ID	Text (20)	Optional	Unique identifier that groups activities within an organization together.
6	Activity Group Name	Text (50)	Optional	Name associated with Activity Group.
7	Activity Group Type	Valid Value	Conditional	Required if Activity Group ID is reported. Identifies the type of activity grouping.
8	Medium	Valid Value	Required	Environmental medium where measurements or sample was collected.
9	Medium Subdivision	Valid Value	Required	Subdivision of environmental medium.
10	Activity Start Date	Date	Required	Date measurements were taken.
11	Activity Start Time	Time	Required	Time measurements were taken.
12	Activity Start Time Zone	Valid Value	Required	Time zone where measurements were taken. Use 'MST' or 'MDT'.
13	Sample Collection Method ID	Valid Value	Conditional	Required for some Activity Types. Refer to Activity Type valid value list for activities that require a Sample Collection Method. Unique identifier of method used to collect sample.

Table 3-5 Activity Format Description				
Column #	**Column Name**	**Data Type**	**Required?**	**Description**
14	Sample Collection Equipment Name	Valid Value	Conditional	Required if Sample Collection Method ID is reported. Name of equipment used to collect sample.
15	Activity Conducting Organization	Valid Value	Required	Name of organization or entity conducting the activity.
16	Personnel	Text (100)	Required	Name(s) of personnel conducting the activity. Format [First Name] [Last Name] with a slash (/) between multiple individuals.
17	Activity Comment	Text (2000)	Conditional	Required if Sample_Collection_Method_ID is "CHLPHL-CMP". Comments associated with the activity
18	Activity Relative Depth	Valid Value	Optional	Approximate location within water column where measurement occurred.
19	Activity Depth	Numeric	Optional	Depth from surface to where activity measurements were taken.
20	Activity Depth Units	Valid Value	Conditional	Required if Activity Depth is reported. Units used in measuring. Use 'ft' or 'm'.
21	Activity Upper Depth	Numeric	Conditional	Required if Activity Type is "Sample-Integrated Vertical Profile". May not exist if Activity Depth is reported. Upper vertical location of a vertical profile.
22	Activity Upper Depth Units	Valid Value	Conditional	Required if Activity Upper Depth is reported. Units used in measuring. Use 'ft' or 'm'.
23	Activity Lower Depth	Numeric	Conditional	Required if Activity Upper Depth is reported. Lower vertical location of a vertical profile.
24	Activity Lower Depth Units	Valid Value	Conditional	Required if Activity Lower Depth is reported. Units used in measuring. Use 'ft' or 'm'.
25	Assemblage	Valid Value	Conditional	Required if Medium is "Biological". Assemblage of organisms collected.
26	Biological Collection Reach Length	Numeric	Optional	Length of reach used for biological collection.
27	Biological Collection Reach Length Unit	Valid Value	Conditional	Required if Biological Collection Reach Length is reported. Units used in measuring. Use 'ft' or 'm'.

3.2.5 Result

This worksheet is used to enter results of field measurements and samples analyzed in a laboratory. Results should only be submitted to MT-eWQX if the associated activity is reported in the Activity section of the same EDD. DEQ approved laboratories have been provided the MT-eWQX format and should be expected to meet the MT-eWQX requirements by the end of 2009.

Table 3-6 Result Format Description				
Column #	**Column Name**	**Data Type**	**Required?**	**Description**
1	Activity ID	Text (35)	Required	Unique identifier that groups together measurements, observations, or samples collected at the same date, time, place, and in the same medium.

Table 3-6 Result Format Description				
Column #	**Column Name**	**Data Type**	**Required?**	**Description**
2	Data Logger Line ID	Text (15)	Conditional	Required if Activity Type is "F-DL" or "QC-DL". Unique line identifier from a data logger result file. Normally a date/time format or enter "1".
3	Biological Intent	Valid Value	Conditional	Required if any of the Biological fields are reported. Intent of biological monitoring. If Medium is "Tissue", Intent must also be "Tissue".
4	Biological Taxonomic Name	Valid Value	Conditional	Required if Biological Intent is reported. Name of organism sampled.
5	Biological Unidentified Species Name	Text (120)	Optional	Number or name of unidentified species. Must be used with a valid genus name in Taxonomic Name field.
6	Biological Tissue Anatomy Name	Valid Value	Conditional	Required if Medium or Biological Intent is "Tissue". Name of the anatomy from which a tissue sample was taken.
7	Characteristic ID	Valid Value	Required	Unique identifier of characteristic that was measured. Identifiers will be CAS, TSN, or other unique ID.
8	Characteristic Name	Valid Value	Required	Name of the characteristic that was measured.
9	Method Speciation Name	Valid Value	Optional	Identifies the chemical speciation in which the measured result is expressed. Common for nutrients.
10	Sample Fraction	Valid Value	Required	Some Characteristics require a valid Sample Fraction. Refer to the Characteristic valid value list. If a valid Sample Fraction is not required, 'NA' can be used. Fraction of sample associated with results.
11	Result Detection Condition	Valid Value	Conditional	Required if Result Value is not reported. Textual descriptor that explains why there is no result measure value reported. 'Not Detected' is the most common reason.
12	Result Value	Text (20) <u>or</u> Valid Value	Conditional	Required if Result Detection Condition is not reported. Reportable value of measurement. Result Value must match a Choice List valid value if the Characteristic Name ends with the phrase "choice list".
13	Result Value Unit	Valid Value	Conditional	Required if Result Value is a non-text result. Units used in measuring.
14	Result Qualifier	Valid Value	Optional	Identifies any qualifying issues that affect the result.
15	Value Type	Valid Value	Required	Indicates type of value reported.
16	Method Detection Limit Value	Text (20)	Optional	Value of method detection limit that was used for analysis.
17	Lower Reporting Limit Value	Text (12)	Conditional	Required if Activity Type requires an Analtyical Method or if Result_Detection_Condition is "Not Detected". Not required is Biological_Intent is reported. Lower reporting value.
18	Detection Limit Unit	Valid Value	Conditional	Required if Lower_Reporting_Limit or Method_Deteciton_Limit are reported. Units used in measuring.

Table 3-6 Result Format Description				
Column #	**Column Name**	**Data Type**	**Required?**	**Description**
19	Laboratory Name	Valid Value	Conditional	Required if Activity Type requires an Analytical Method. Refer to Activity Type valid value list for activities that require an Analytical Method. Unique ID of laboratory responsible for result.
20	Lab Sample Prep Method ID	Valid Value	Optional	Unique identifier of method used by lab to prep sample.
21	Analytical Method ID	Valid Value	Conditional	Some Activity Types require a valid Analytical Method. Refer to the Activity Type valid value list. If a valid Analytical Method is not required, 'NA' can be used. Unique identifier of method used to obtain a result.
22	Analysis Start Date	Date	Required	Date when analysis began. For field measurements, this would be the same as Activity Start Date.
23	Analysis Start Time	Time	Required	Time when analysis began. For field measurements, this would be the same as Activity Start Time.
24	Analysis Start Time Zone	Valid Value	Required	Time zone when analysis began. Use 'MST' or 'MDT'.
25	Laboratory Batch ID	Text (20)	Optional	Batch ID assigned by lab.
26	Laboratory Sample ID	Text (20)	Optional	Sample ID assigned by lab.
27	Laboratory Comment Code	Valid Value	Optional	Remarks provided by the lab.
28	Result Sampling Point	Text (12)	Optional	Sampling point associated with result. If samples are associated with a stream transect, record transect here.
29	Result Depth Height Measure	Text (12)	Optional	Depth from surface to where result measurement was taken.
30	Result Depth Height Measure Unit	Valid Value	Conditional	Required if Result Depth Height Measure is reported. Units used in measuring. Use 'ft' or 'm'.
31	Statistic Type	Valid Value	Optional	Statistical method used to calculate derived results.
32	Weight Basis	Valid Value	Optional	Name that represents the form of the sample associated with the result. Commonly used for 'Weight' results.
33	Particle Size Basis	Text (15)	Conditional	Required if Characteristic ID is like "PARTICLE*". Particle size class associated with Particle Size results.
34	Precision Value	Text (50)	Optional	Precision associated with result.
35	Dilution Factor	Numeric	Optional	Overall dilution of the substance analyzed.
36	Result Comment	Text (2000)	Optional	Comments associated with the result.
37	Result File Name	Text (255)	Optional	Complete file name, including extension, of document associated with this result.

3.2.6 Attached Documents

This worksheet allows for multiple documents to be attached to projects, monitoring locations, and activities. Use the Result worksheet to associate documents to results. **The project's Quality Assurance Project Plan (QAPP) and/or Sampling and Analysis Plan (SAP) are added to this worksheet.**

Table 3-7 Attached Documents Format Description				
Column #	**Column Name**	**Data Type**	**Required?**	**Description**
1	File Name	Text (255)	Required	Complete file name, including file extension.
2	File Extension	Valid Value	Required	File extension (such as .pdf or .jpg).
3	File Type	Valid Value	Required	Data type file is associated with.
4	File Type ID	Text (50)	Required	Unique identifier file is associated with.
5	File Date	Date	Optional	Date file was last modified.
6	File Title	Text (255)	Optional	Title of file.
7	File Author	Text (255)	Optional	Author of file.
8	File Comment	Text (2000)	Optional	Comments associated with the file.
9	File Publisher	Text (64)	Optional	Publisher of file.

3.2.7 Biological/Habitat Index

This worksheet allows for reporting of habitat and biological indices as a representation of water quality conditions.

Table 3-8 Biological/Habitat Index Format Description				
Column #	**Column Name**	**Data Type**	**Required?**	**Description**
1	Station ID	Text (20)	Required	Unique identifier for a specific monitoring location.
2	Index ID	Text (35)	Required	Unique identifier used to identify the index record (similar to Activity ID).
3	Index Type ID	Valid Value	Required	Unique identifier for index used to obtain score.
4	Index Score	Text (10)	Required	Score for the index.
5	Index Qualifier	Text (5)	Optional	Code used to identify qualifying issues that affect the index score.
6	Index Comment	Text (2000)	Optional	Comments associated with the index.
7	Index Calculated Date	Date	Required	Date the Index Score was calculated.

3.2.8 Biological/Habitat Metric

This worksheet allows for reporting of metric results associated with biological indices or habitat assessments.

Table 3-9 Biological/Habitat Metric Format Description				
Column #	**Column Name**	**Data Type**	**Required?**	**Description**
1	Activity ID	Text (35)	Required	Unique identifier that groups together measurements, observations, or samples that is associated with the reported metric.
2	Metric Type ID	Valid Value	Required	Unique identifier for metric used to obtain score.
3	Metric Score	Text (10)	Required	Scaled or calculated score for the metric.
4	Metric Value	Text (12)	Optional	Raw value for the metric.
5	Metric Value Unit	Valid Value	Conditional	Units used in measuring.
6	Metric Comment	Text (2000)	Optional	Comments associated with metric.
7	Index ID	Text (35)	Optional	Unique identifier used to identify an index that is associated with the reported metric. An index can be associated with multiple metrics.

3.3 Data Logger Results

Data logger results can be entered into MT-eWQX by uploading a text file instead of entering individual results. To enter data logger results into the MT-eWQX EDD:

1. Use the MT-eWQX Data Logger Template available on the MT-eWQX Support webpage to format your data logger results.
2. Save the "Final" worksheet in the template as a tab-delimited text file.
3. In the EDD, create one Activity for each data logger. To distinguish is as a data logger activity, the Activity Type should be "F-DL".
4. In the Result worksheet, enter one row for each Activity ID. The result should be the first results in the data logger file. Key fields in the Result worksheet to populate are:
    a. Data_Logger_Line_ID: 1
    b. Result Comment: "See attached text file for complete data logger results."
5. Populate the "Result File Name" field in the Result worksheet with the complete data logger text file name.
6. When ready to submit your data, include all the text files in your .zip file that contains your EDD and submittal form.
    a. On the MT-eWQX Data Submittal Form, the "Results (data loggers)" box should be checked in the Type of Data Submitted section.

3.4 Habitat Assessment Forms

Habitat assessment forms can be submitted to MT-eWQX by uploading an electronic version of the form. To enter habitat assessments into the MT-eWQX EDD:

1. Create one Activity for each habitat form. Key fields to distinguish it as a habitat activity are:
    a. Activity Type: F-HA (This activity type does NOT require a Sample Collection Method.)
    b. Medium: Habitat
    c. Medium Subdivision: NA
2. In the Attached Documents worksheet, enter the habitat form file information. Required fields are:
    a. File Name: Enter the complete habitat file name, including file extension (PDF is the preferred file type, although other file types will be accepted).
    b. File Extension: Enter the file extension, usually ".pdf".
    c. File Type: Activity_ID
    d. File Type ID: Enter the Activity ID created for the habitat form in the Activity worksheet.
3. When ready to submit your data, include all the habitat documents in your .zip file that contains your EDD and submittal form.
    a. On the MT-eWQX Data Submittal Form, the "Activities (habitat forms)" box should be checked in the Type of Data Submitted section.

4.0 EDD Validation

To ensure accurate data is being migrated into MT-eWQX, data providers are required to check their data prior to submittal. There are two main data checks that must occur, first a quality control step that reviews the raw data and then a validation step that verifies the EDD is formatted correctly.

4.1 Quality Control

Prior to import, all location metadata should be verified for correct latitude and longitudes that fall on the water body, as well as correct county and HUC. The raw analytical data should go through a complete quality control process to verify the EDD matches the hardcopy results and appropriate result qualifiers have been added. The minimum QC requirements to follow are:

1. Perform a QC data overview and check for obvious errors.
2. Are reported values within reason for each method?
3. Ensure reported values have the same number of decimal places as the detection limit and limit the result to three significant figures.
4. Ensure analytical units are correct.
5. Ensure detection limits are correct and reported.
6. Ensure correct analytical methods are reported.
7. Ensure analysis dates are reported.
8. Ensure results less than the detection limit reported as Not Detected. Exception is when lab uses J-flag reporting for results between the MDL and detection limit (reporting limit).
9. Check for holding time exceedance. Use H-flag for exceedances.
10. Calculate Field Duplicate precision (RPD's). J-flag associated samples with exceedances.
11. Determine if Field Blanks are reported =/> the detection limit (reporting limit). B-flag associated data that is =/< 10x the blank hit.
12. Compare lab reports to reported data.
    a. Ensure Lab Sample IDs match the Activity IDs
    b. Compare reported results with EDD results.
13. Review lab generated QC. Flag appropriate data if lab controls are exceeded.

For questions involving quality assurance and quality control of your raw data, contact Jolene McQuillan at (406) 247-4436 or jmcquillan@mt.gov.

4.2 The EQuIS Data Processor

After all the appropriate worksheets in the MT-eWQX EDD have been populated with data, the EDD is ready for data validation using the EQuIS Data Processor (EDP). The EDP is a standalone application that must be used by data providers to check their EDD files prior to submission to ensure they are formatted as described in this guidance manual. If the EDP detects errors, the errors will be identified and can be corrected directly within the EDP. After the errors are corrected, the EDP must be re-run to ensure that no errors remain. An EDD must have a clean validation from the EDP prior to submission to MT-eWQX.

Information on using the EDP can be found within the EDP Guidance Manual available from the MT-eWQX Support website.

5.0 EDD Submittal Process

After an EDD has passed through the EDP application error-free, it is ready to be submitted to MT-eWQX. In order to submit an EDD, the EDD must be in a compressed file format and an External MT-eWQX Submittal Form must be completed. Figure 5-1 on page 25 details the actions external data providers and DEQ are responsible for when submitting and processing an EDD.

5.1 Organizations

Before data is submitted to MT-eWQX, it is important to know what organization the data is being submitted to. Organization is a high-level grouping of data within MT-eWQX and is a concept that is also used for querying data at the National STORET Warehouse. Montana DEQ has eight organizations that external data providers frequently submit data to:

- **Montana Bureau of Mines and Geology (MBMG_WQX):** This organization is for data collected and stored by the Montana Bureau of Mines and Geology.
- **Montana Pollutant Discharge Elimination System (MDEQ_MPDEQ_WQX):** This organization is for data associated with MPDES permits.
- **Montana DEQ – Remediation (MDEQ_REM_WQX):** This organization is for data collected under the direction of Montana DEQ's Remediation Division.
- **PPL Corporation (MONT_PPL_WQX):** This organization is for data collected by PPL Montana.
- **Montana NorthWestern Energy (MTNWE):** This organization is for data collected and managed by NorthWestern Energy.
- **Montana Volunteer Water Quality Monitoring (MTVOLWQM_WQX):** This organization is for data collected by volunteer organizations, groups, or individuals.
- **Montana Watershed Data (MTWTRSHD_WQX):** This organization is for data collected externally from DEQ, but using grant monies such as 319 or 106 or managed under a DEQ approved QAPP/SAP.
- **Tri-State Water Quality Council (TSWQC_WQX):** This organization is for data collected under the direction of the Tri-State Water Quality Council.

5.2 The Data Package

After an EDD has passed through the EDP with no errors, the data provider is ready to create the final data package. The data package is a single .zip file that consists of the EDD, any attached documents referenced in the EDD, and the data provider's user certificate. The easiest way to create the EDD data package is use the Sign and Submit feature in EDP, although data packages can also be created manually.

Detailed guidance for creating a data package can be found in Sections 3.7 of the EDP Guidance Manual available from the MT-eWQX Support website.

5.3 External MT-eWQX Submittal Form

The External MT-eWQX Submittal Form is available from the MT-eWQX Support webpage and <u>must</u> be submitted along with each EDD to MT-eWQX. The submittal form includes information about the data submitter and about the data being submitted. The submittal form also verifies that proper quality control was followed. After the data in the EDD has been successfully migrated to MT-eWQX, DEQ will send the completed form back to the data provider as proof of submittal. The final submittal form acts as the contract deliverable.

To complete the form, select the 'MT-eWQX Data Submittal Form' link under Step 3 on the MT-eWQX Support website. The form is a pdf form, so enter your information directly into the form. Save the file to your computer where you can access it for the next step, submitting your EDD to MT-eWQX.

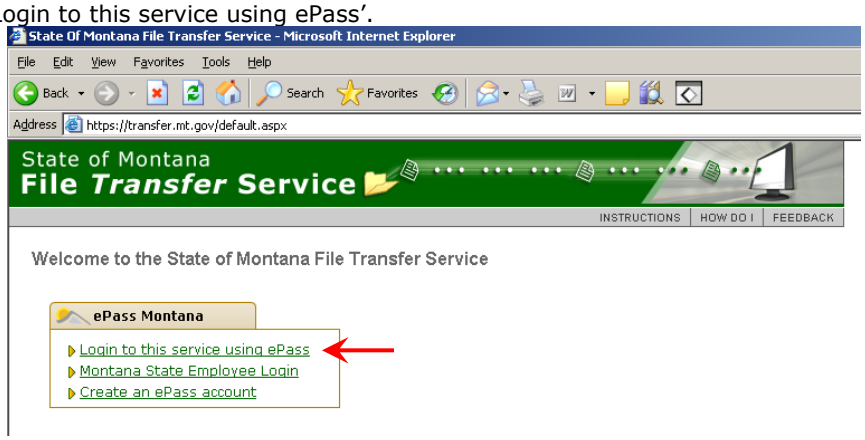
5.4 Submitting EDDs to MT-eWQX (State of Montana's File Transfer Service)

The data package, submittal form, and data quality summary (per project manager) must be submitted to MT-eWQX through the State of Montana's File Transfer Service (FTS). The FTS allows for easy transfer of large electronic files to and from customers of state government. The FTS is accessed via ePass Montana, the state's single login service. Instructions for registering for ePass Montana can be found in Section 2.3.

To submit an EDD to MT-eWQX:

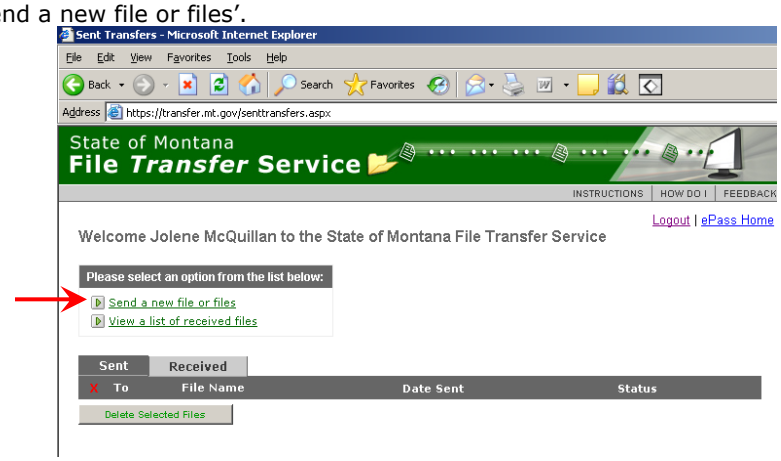
1. From the MT-eWQX Support website, select the 'SUBMIT EDD' link under Step 3.

2. Select 'Login to this service using ePass'.

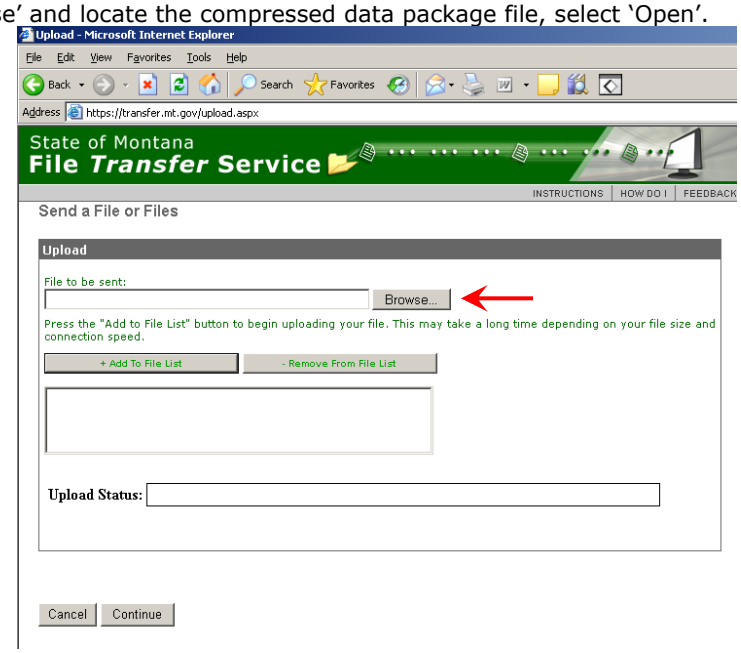


3. Enter your ePass Montana username and password. Select 'Login'. (If you're not taken directly to the File Transfer Service, you may need to select File Transfer Service from your ePass Montana account first.)

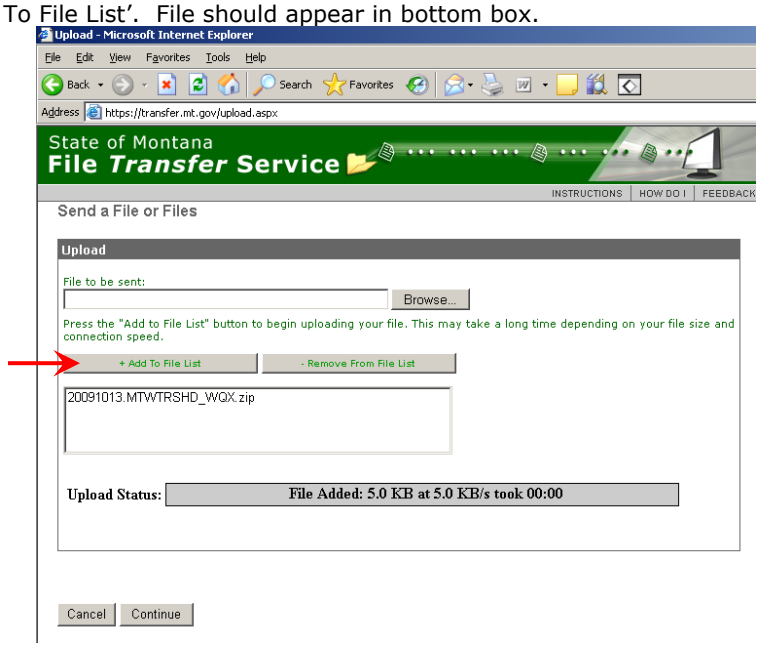
4. Select 'Send a new file or files'.



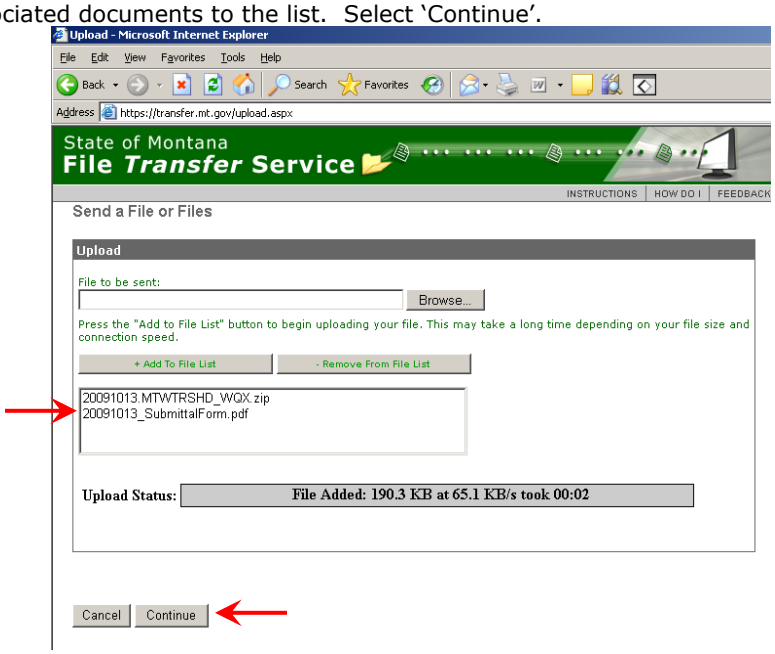
5. Select 'Browse' and locate the compressed data package file, select 'Open'.



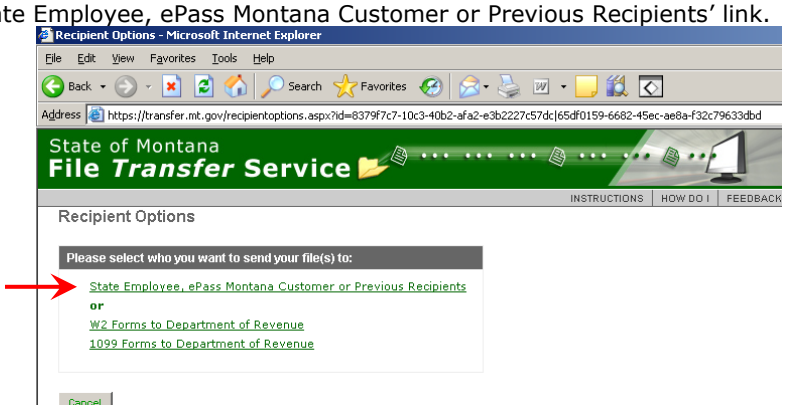
6. Select 'Add To File List'. File should appear in bottom box.



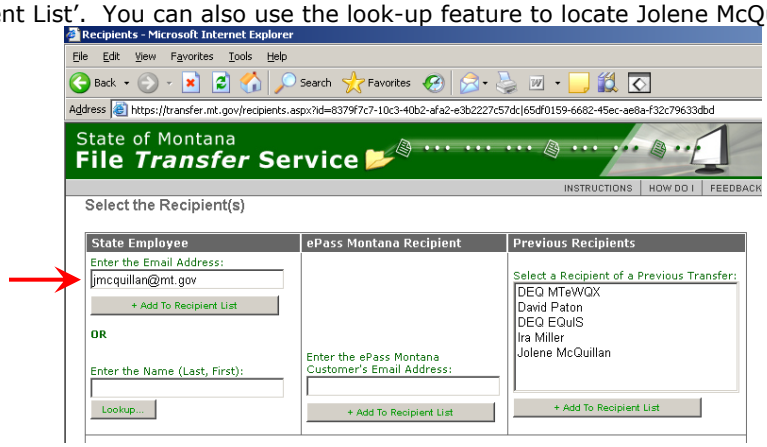
7. Repeat steps 5 and 6 to add the External MT-eWQX Submittal Form, data quality summary, and any other associated documents to the list. Select 'Continue'.



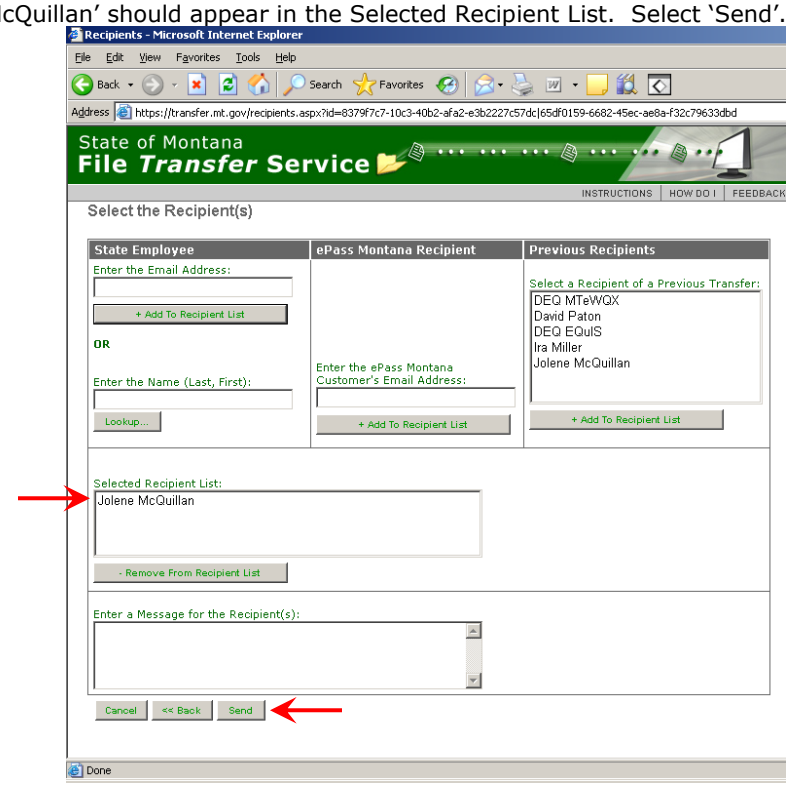
8. Select 'State Employee, ePass Montana Customer or Previous Recipients' link.



9. In the State Employee section, enter jmcquillan@mt.gov in the email address box and select 'Add To Recipient List'. You can also use the look-up feature to locate Jolene McQuillan's name.

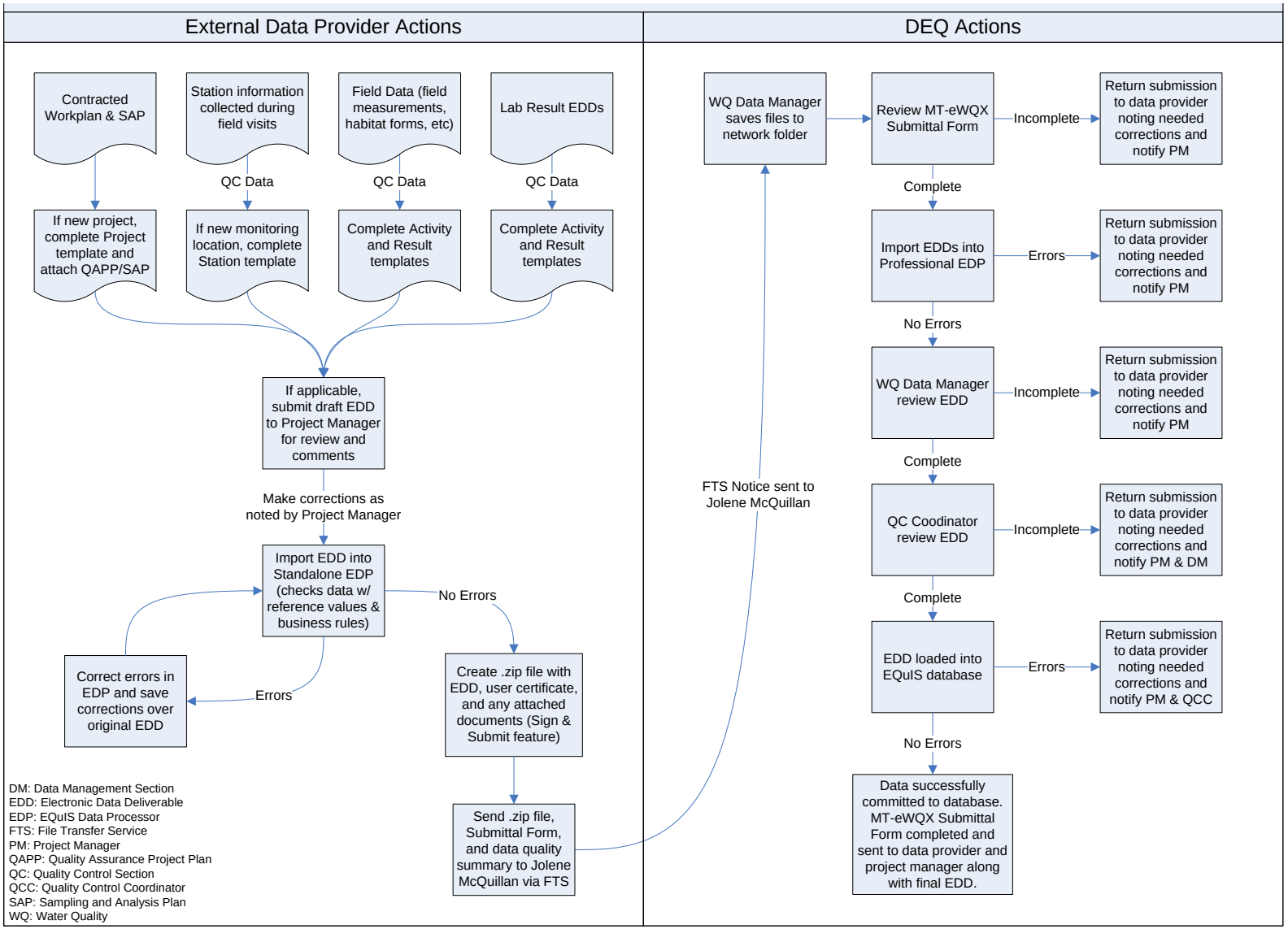


10. 'Jolene McQuillan' should appear in the Selected Recipient List. Select 'Send'.



After you send your data package through the FTS, the Water Quality Data Manager will import your EDD into the EDP application. If the EDD was checked in the EDP prior to submission, there should be no errors and the data should load into MT-eWQX successfully. The data provider will receive an email confirming successful import into the database and the final MT-eWQX Data Submittal Form will be attached. The submittal form is proof the data was loaded into MT-eWQX and must be part of your contract deliverable. If there were errors upon import into MT-eWQX, the data provider will receive an email indicating what needs to be corrected. The errors will need to be corrected and the EDD will need to be resubmitted.

Figure 5-1 External Data Provider and DEQ Actions for Submitting an EDD



Appendix A: MT-eWQX Valid Values for MTWTRSHD_WQX

The information contained in this appendix applies strictly to the MT-eWQX Organization ID MTWTRSHD_WQX. Other organization IDs may require different organization-specific valid values.

This appendix provides required values for specific MT-eWQX data entry fields in accordance with DEQ approved Sampling and Analysis Plans (SAPs) and their associated Analyte Checklists. This appendix does not provide valid values for all MT-eWQX data entry fields. For complete directions on the MT-eWQX data entry and upload process, refer to the MT-eWQX Support webpage at: http://deq.mt.gov/Water/WQINFO/datamgmt/mtewqx.

The values provided in this appendix are consistent with the parameters and analytical methods provided in the Analyte Checklist of the respective DEQ approved SAP. If differing analytical methods are used, data from laboratory analytical reports may require different MT-eWQX valid values. It is the responsibility of the Contractor to upload correct, QAed laboratory data to MT-eWQX. Data uploaded to MT-eWQX must be consistent with the laboratory analytical reports and electronic data deliverables (EDDs).

Field Measurements

Characteristic ID	Characteristic Name	Medium	Sample Fraction	Result Value	Value Type	Analytical Method ID	Analysis Start
BAR-PRESSURE	Barometric pressure	Air	NA	<value>	Actual	NA	Enter the Activity Start Date and Start Time
TEMP-A	Temperature, air	Air	NA	<value>	Actual	NA	
TEMP-W	Temperature, water	Water	NA	<value>	Actual	NA	
PH	pH	Water	NA	<value>	Actual	NA	
SC	Specific conductance	Water	NA	<value>	Actual	NA	
DO	Dissolved oxygen (DO)	Water	NA	<value>	Actual	NA	
DO-SAT	Dissolved oxygen saturation	Water	NA	<value>	Actual	NA	
TURB	Turbidity	Water	NA	<value>	Actual	NA	
RBP-TURB	RBP Turbidity Code (choice list)	Water	NA	Clear Slight Turb Turbid Opaque	Estimated	NA	
FLOW	Flow	Water	NA	<value>	Actual → Estimated → Estimated → Estimated →	FLOW-METER-MTWTRSHD FLOW-EST-MTWTRSHD FLOW-GAGE-MTWTRSHD FLOW-FLOAT-MTWTRSHD	

- If the FLOW-FLOAT-MTWTRSHD method is used, enter "Float Method" in the Activity Comments field.
- When flow is not measured due to a dry streambed, enter the following:
  - Result Value and Units = 0 ft3/sec
  - Value Type = Estimated
  - Analytical Method ID = FLOW-EST-MTWTRSHD
  - Both Activity Comments and Result Comments = Dry channel

Water Chemistry Samples

Lab Parameter	Characteristic ID	Characteristic Name	Method Speciation	Sample Fraction	Preferred Analytical Method ID	Value Type
Water Sample – Bacteria						
E. Coli	ECOLI	Escherichia coli		NA	9223-B	Actual
Total Coliform	TOTAL-COLIF	Total Coliform		Total	9223-B	
Water Sample – Common Ions and Physical Parameters						
Total Suspended Solids (TSS)	TSS	Total suspended solids		NA	2540-D	Actual
Total Dissolved Solids (TDS)	TDS	Total dissolved solids		NA	2540-C	
Volatile Suspended Solids (VSS)	TVS	Total volatile solids		NA	2540-E	
Sediment Concentration (SSC)	SSC	Suspended Sediment Concentration (SSC)		NA	D3977	
Total Alkalinity	TOTAL-ALK	Alkalinity, total	as CaCO3	NA	2320-B	
Bicarbonate	71-52-3	Bicarbonate	as HCO3	Total	2320-B	
Carbonate	3812-32-6	Carbonate	as CO3	Total	2320-B	
Sulfate	14808-79-8	Sulfate		Total	300.0	
Chloride	16887-00-6	Chloride		Total	300.0	
Sulfide	18496-25-8	Sulfide		NA	4500-S2(D)	
Turbidity	TURB	Turbidity		NA	180.1/2130	
Water Sample – Calculated Results						
Hardness as $CaCO_3$	HARD-CA-MG	Hardness, Ca, Mg	as CaCO3	NA	2340B	Calculated
Sodium Absorption Ratio (SAR)	SAR	Sodium adsorption ratio [(Na)/(sq root of 1/2 Ca + Mg)]		NA	SAR-CALC-MTWTRSHD	
Water Sample - Nutrients						
Total Persulfate Nitrogen (TPN)	TN	Total nitrogen, mixed forms	as N	Unfiltered	4500-N-C	Actual
Dissolved Orthophosphate as P (SRP)	14265-44-2	Orthophosphate	as P	Field Filt Lab Filter	365.1	
Total Phosphorus as P	TP	Total Phosphorus, mixed forms	as P	Unfiltered	365.1	
Nitrate-Nitrite as N	NN	Nitrate + Nitrite	as N	Unfiltered Field Filt Lab Filter	353.2	
Total Ammonia as N	7664-41-7	Ammonia	as N	Unfiltered Field Filt Lab Filter	350.1	
Total Kjeldahl Nitrogen as N	TKN	Total Kjeldahl nitrogen (Organic N & NH3)	as N	Unfiltered	351.2	
Water Sample – Dissolved Metals (0.45 um filtered)						
Aluminum	7429-90-5	Aluminum		Dissolved	200.7	Actual
Antimony	7440-36-0	Antimony			200.8	
Arsenic	7440-38-2	Arsenic			200.8	
Barium	7440-39-3	Barium			200.7	
Beryllium	7440-41-7	Beryllium		Dissolved	200.7	

Lab Parameter	Characteristic ID	Characteristic Name	Method Speciation	Sample Fraction	Preferred Analytical Method ID	Value Type
Boron	7440-42-8	Boron			200.7	
Cadmium	7440-43-9	Cadmium			200.8	
Chromium	7440-47-3	Chromium			200.8	
Copper	7440-50-8	Copper			200.8	
Iron	7439-89-6	Iron			200.7	
Lead	7439-92-1	Lead			200.8	
Manganese	7439-96-5	Manganese			200.7	
Nickel	7440-02-0	Nickel			200.7	
Silver	7440-22-4	Silver			200.8	
Thallium	7440-28-0	Thallium			200.8	
Uranium, Natural	7440-61-1	Uranium-238			200.8	
Zinc	7440-66-6	Zinc			200.7	
Water Sample – Total Recoverable Metals						
Antimony	7440-36-0	Antimony			200.8	
Arsenic	7440-38-2	Arsenic			200.8	
Barium	7440-39-3	Barium			200.7	
Beryllium	7440-41-7	Beryllium			200.7	
Boron	7440-42-8	Boron			200.7	
Cadmium	7440-43-9	Cadmium			200.8	
Calcium	7440-70-2	Calcium			200.7	
Chromium	7440-47-3	Chromium			200.8	
Copper	7440-50-8	Copper			200.8	
Iron	7439-89-6	Iron			200.7	
Lead	7439-92-1	Lead		Total Recv	200.8	
Magnesium	7439-95-4	Magnesium			200.7	
Manganese	7439-96-5	Manganese			200.7	
Nickel	7440-02-0	Nickel			200.7	Actual
Potassium	K	Potassium			200.7	
Selenium	7782-49-2	Selenium			200.8	
Silver	7440-22-4	Silver			200.8	
Sodium	7440-23-5	Sodium			200.7	
Thallium	7440-28-0	Thallium			200.8	
Uranium, Natural	7440-61-1	Uranium-238			200.8	
Zinc	7440-66-6	Zinc			200.7	
Sum of anions	ANION-SUM	Sum of anions		Total	1050(A)-MTWTRSHD	
Sum of cations	CATION-SUM	Sum of cations		Total	1050(A)-MTWTRSHD	
Anion/cation Ratio	ACRATIO	Anion/cation ratio		Total	1030-E	
Water Sample – Total Metals						

Lab Parameter	Characteristic ID	Characteristic Name	Method Speciation	Sample Fraction	Preferred Analytical Method ID	Value Type
Mercury	7439-97-6	Mercury		Total	245.1	Actual
Mercury, ultra low-level	7439-97-6	Mercury			245.7 or 1631	
Water Sample – Non-metals						
Biochemical Oxygen Demand (BOD)	BOD	Biochemical oxygen demand, standard conditions		NA	5210-B	Actual
Carbonaceous Biochemical Oxygen Demand (CBOD)	CBOD	Carbonaceous biochemical oxygen demand, standard conditions		NA	405.1/5210-B	
Dissolved Organic Carbon (DOC)	ORGANIC-C	Organic carbon		Dissolved	5310-B (or C)	
Total Organic Carbon (TOC)	ORGANIC-C	Organic carbon		Total	5310-C	
Bromide	24959-67-9	Bromide		Total	300.0	
Fluoride, Electrode	16984-48-8	Fluoride		Total	4500-F-C	
Formaldehyde	50-00-0	Formaldehyde		Total	3500	
Methane	74-82-8	Methane		Total	8015M-MTWTRSHD	
Water Sample – Radiochemistry						
Gross Alpha Radioactivity	12587-46-1	Alpha particle		NA	900	Actual
Gross Beta Radioactivity	12587-47-2	Beta particle		NA	900	
Water Sample – Volatile Organics						
Benzene	71-43-2	Benzene		Total	602/8021B/ 524.2	Actual
Ethylbenzene	100-41-4	Ethylbenzene				
Toluene	108-88-3	Toluene				
Xylene	1330-20-7	Xylene				
Water Sample – Semi-volatile Organics						
PAH	130498-29-2	Polycyclic aromatic hydrocarbons		Total	625/8270C	Actual
Water Sample – Other Organics						
Methanol	67-56-1	Methanol		Total	8015B	Actual

Sediment Chemistry Samples

Lab Parameter	Characteristic ID	Characteristic Name	Method Speciation	Sample Fraction	Preferred Analytical Method ID	Value Type
Sediment Sample – Total Metals						
Mercury	7439-97-6	Mercury		Total	7471B	Actual
Sediment Sample – Total Recoverable Metals						
Arsenic	7440-38-2	Arsenic		Total Recv	200.8	Actual
Cadmium	7440-43-9	Cadmium			200.8	
Chromium	7440-47-3	Chromium			200.8	
Copper	7440-50-8	Copper			200.8	
Iron	7439-89-6	Iron			200.7	

Lab Parameter	Characteristic ID	Characteristic Name	Method Speciation	Sample Fraction	Preferred Analytical Method ID	Value Type
Lead	7439-92-1	Lead			200.8	
Zinc	7440-66-6	Zinc			200.7	

Chlorophyll-a Samples

Ash Free Dry Weight							
Characteristic ID	**Characteristic Name**	**Medium**	**Sample Collection Method**	**Sample Fraction**	**Value Type**	**Analytical Method**	**Weight Basis**
Weighted Average (NOTE: Include weighted average for all sites, even if only one collection method was used.)							
WEIGHT	Weight	Same as chl-a	Same as chl-a	Organic	Calculated	CHLPHL-CALC-MTWTRSHD	Ash-free Dry
• Result Comment = "Weighted Average" • Exclude core weights from weighted average calculation.							
One Collection Technique Composited or Individual Samples Not Composited							
WEIGHT	Weight	Same as chl-a	Same as chl-a	Organic	Actual	10300-C	Ash-free Dry

Chlorophyll-a						
Characteristic ID	**Characteristic Name**	**Medium**	**Sample Collection Method**	**Activity/Result Comment**	**Value Type**	**Analytical Method**
Weighted Average (NOTE: Include weighted average for all sites, even if only one collection method was used.)						
CHL-A-CP	Chlorophyll a, corrected for pheophytin	Other	CHLPHL-CMP	Enter # of transects and # of samples associated with each method. Examples below.	Calculated	CHLPHL-CALC-MTWTRSHD
• Result Comment = "Weighted Average" • Include both the calculated value of the weighted average for the entire site along with the individual composite sample result values. • Example Activity Comment: "11 transects sampled: 10 templates, 1 core"						
One Collection Technique Composited or Individual Samples Not Composited						
CHL-A-CP	Chlorophyll a, corrected for pheophytin	Other –or- Sediment	See valid values below	If composited, enter # of samples composited.	Actual	10200-H
▪ Sample Collection Method Valid Values: ○ Template = CHLPHL-1; Template Composite = CHLPHL-1-C ○ Hoop = HOOP; Hoop Composite = HOOP-C ○ Core = SED-CORE; Core Composite = SED-CORE-C						
Visually Estimated Chlorophyll-a						
CHL-A-UP	Chlorophyll a, uncorrected for pheophytin	Other	Leave this blank	"Visual estimation; photos taken."	Estimated	CHLPHL-VISU-MTWTRSHD
• Activity Type = "F-MSR/OBS" • Result Detection Condition = Not Reported • Lower Reporting Limit = 50 (Detection Limit Units = mg/m2)						