



QA/QC REPORT FOR 2025 BITTERROOT MAINSTEM LONG-TERM NUTRIENT TRENDS MONITORING

QAPP ID: BRMMASQAPP-19

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ACRONYM LIST

Acronym	Definition
°C	degrees Celsius
µm	micrometer
BRPA	Bitterroot River Protection Association
COC	chain of custody
DEQ	Montana Department of Environmental Quality
FB	field blank
FD	field duplicate
LRL	lower reporting limit
MDL	method detection limit
mg/l	milligrams per liter
MS/MSD	matrix spike/matrix spike duplicate
NO ₂ +NO ₃ -N	nitrate+nitrite – nitrogen
NH ₃ +NH ₄ -N	total ammonia - nitrogen
pH	a figure expressing the acidity or alkalinity of a solution on a logarithmic scale on which 7 is neutral
QA/QC	quality assurance/quality control
QAPP	quality assurance project plan
QC	quality control
RPD	relative percent difference
SAP	sampling and analysis plan
SRP	soluble reactive phosphorus (orthophosphate)
TP	total phosphorus
TPN	total persulfate nitrogen
TSS	total suspended solids
UM	University of Montana lab

1.0 INTRODUCTION

A data quality control (QC) review has been completed on all data collected and submitted to Montana Department of Environmental Quality (DEQ) in 2025 for the Bitterroot Mainstem Nutrient Monitoring Program. Monitoring activities were performed by the Bitterroot River Protection Association (BRPA), Clark Fork Coalition (CFC), and DEQ personnel in accordance with the “*Bitterroot Mainstem Long-term Nutrient Trends Monitoring-Quality Assurance Project Plan (QAPP)*” (QAPP ID: BRMMASQAPP-19) and associated sampling and analysis plan (SAP). The scope of this QC evaluation was to evaluate documentation associated with sampling and measurement (i.e., field logbooks and site visit forms) and laboratory analytical results to verify data quality. This QC evaluation included a review of the data quality objectives and data quality indicators as outlined in the QAPP and an assessment of compliance with the DEQ Quality Assurance/Quality Control (QA/QC) process. The review also included:

- Review of field data sheets to verify calibration and to identify field notes that explain any deviations from the QAPP.
- Review of field notes and field data sheets for a data logic check and to identify any notes indicating deviations from the QAPP.
- Review of the sample delivery group to evaluate the overall quality of the data including reporting errors, data omissions, and suspect or anomalous values.

The QC review applies to the nutrient monitoring for the months of July through October conducted by the BRPA, and the benthic algae monitoring in August and September, conducted by CFC and BRPA.

2.0 FIELD COMPONENTS

FIELD DOCUMENTATION

The BRPA submitted monthly nutrient and algae field forms as part of their data deliverable. There were no field meter calibration logs provided. All the field forms were in a consistent format and contained all the relevant field metadata including station IDs, site coordinates, collection date, and personnel.

CHAIN OF CUSTODY FORMS

The BRPA submitted chain of custody (COC) forms for each monthly nutrient sampling date that included a relinquished signature by field personnel and lab signatures. The monthly nutrient samples were relinquished by field personnel one to two days after the samples were collected.

The algae field forms acted as the COC and were signed and dated by field personnel and lab manager. They were all submitted in a timely manner.

SAMPLE SITES

The monthly nutrient field forms included site name, descriptions, station IDs, and coordinates that matched locations specified in the QAPP. The site COMBITR04 was added to the SAP for 2020; this is the only site in the SAP where lab analysis is funded by the BRPA and not DEQ. The algae field forms included all the above information including site name.

FREQUENCY OF FIELD BLANKS AND FIELD DUPLICATES

At least one field blank (FB) sample and one duplicate sample were collected for each nutrient monitoring event. This frequency met the requirements outlined in the QAPP.

3.0 SAMPLE HANDLING

PRESERVATION

Preservation methods were reviewed for all sampling using the SAP, field forms, and lab reports. Table 3.1 summarizes the planned preservation methods and holding times.

Table 3.1: Sample Preservation Summary

Characteristic	SAP Preservation	Preservation from Field Forms	Hold Time
Total Nitrogen	Cool on ice in field (freeze if need be)	Cool on ice (<6°C)	28 days, 45 days if frozen
Total Phosphorus	H ₂ SO ₄ , cool on ice in field	H ₂ SO ₄ , cool on ice (<6°C)	28 days
Nitrate + Nitrite			
Ammonia			
Orthophosphate	Field filter 0.45 µm, freeze with dry ice	Filter, freeze	45 days frozen
Total Suspended Solids	Cool on ice in field	Cool on ice (<6°C)	7 days
Chlorophyll a	Prevent light exposure; cool on ice in field, freeze in lab	Freeze	90 days
Ash-free Dry Weight	Cool on ice in field; freeze in lab	Freeze	120 days

All of the coolers were hand delivered by BRPA personnel to CFC and CFC delivered samples to the lab. All coolers had solid ice and frozen samples. The coolers arrived with temperatures ranging from -8.7 °C to 5.8°C. Three coolers were above the 4.4°C required maximum temperature at 5.7°C, 5.8°C and 5.8°C.

All the frozen orthophosphate samples were thawed and tested within the two-day holding time for orthophosphate, so they were not flagged. Algae samples were frozen at -20°C, and analyzed within 90-days of collection, following procedure.

HOLDING TIMES

Analytical holding times (in days) were reviewed for Bitterroot River monthly and summer nutrient monitoring. Orthophosphate was received at the lab frozen, so the 45-day hold time was used for that analyte. Fifty-six of the samples “H” flagged for exceeding holding time were TSS. The 7-day holding time for TSS is for drinking water standards and typically isn’t met for this project.

Table 3.2: Sample “H” Flagged for Exceeding Holding Time

Activity ID	Characteristic Name	Lab Method	Sample Date	Analysis Date	Req. Hold Time	Actual Hold Time
BITR-C05BITTR03_08112025_QC-FB	Ammonia	350.1	8/11/2025	9/25/2025	28	45
BITR-C05BITTR03_08112025_QC-FD	Ammonia	350.1	8/11/2025	9/9/2025	28	29
BITR-C05BITTR03_08112025_S	Ammonia	350.1	8/11/2025	9/9/2025	28	29

BITR-C05BITTR06_08112025_S	Ammonia	350.1	8/11/2025	9/9/2025	28	29
COMBITR04_08112025_S	Ammonia	350.1	8/11/2025	9/9/2025	28	29
BITR-C05BITTR03_08112025_QC-FB	Nitrate + Nitrite	353.2	8/11/2025	9/12/2025	28	32
BITR-C05BITTR03_08112025_QC-FD	Nitrate + Nitrite	353.2	8/11/2025	9/9/2025	28	29
BITR-C05BITTR03_08112025_S	Nitrate + Nitrite	353.2	8/11/2025	9/9/2025	28	29
BITR-C05BITTR06_08112025_S	Nitrate + Nitrite	353.2	8/11/2025	9/9/2025	28	29
COMBITR04_08112025_S	Nitrate + Nitrite	353.2	8/11/2025	9/9/2025	28	29
BITR-C05BITTR03_08112025_QC-FB	Total nitrogen, mixed forms	4500-N-C	8/11/2025	9/9/2025	28	29
BITR-C05BITTR03_08112025_QC-FD	Total nitrogen, mixed forms	4500-N-C	8/11/2025	9/9/2025	28	29
BITR-C05BITTR03_08112025_S	Total nitrogen, mixed forms	4500-N-C	8/11/2025	9/9/2025	28	29
BITR-C05BITTR06_08112025_S	Total nitrogen, mixed forms	4500-N-C	8/11/2025	9/9/2025	28	29
COMBITR04_08112025_S	Total nitrogen, mixed forms	4500-N-C	8/11/2025	9/9/2025	28	29
BITR-C05BITTR03_08112025_QC-FD	Total Phosphorus, mixed forms	365.1	8/11/2025	9/9/2025	28	29
BITR-C05BITTR03_08112025_S	Total Phosphorus, mixed forms	365.1	8/11/2025	9/9/2025	28	29
BITR-C05BITTR06_08112025_S	Total Phosphorus, mixed forms	365.1	8/11/2025	9/9/2025	28	29
COMBITR04_08112025_S	Total Phosphorus, mixed forms	365.1	8/11/2025	9/9/2025	28	29
BITR-C05BITTR03_08112025_QC-FB	Total Phosphorus, mixed forms	365.1	8/11/2025	9/23/2025	28	43
COMBITR03_08262025_QC-FB	Nitrate + Nitrite	353.2	8/26/2025	9/26/2025	28	31
BITR-C05BITTR03_09082025_S	Nitrate + Nitrite	353.2	9/8/2025	10/9/2025	28	31
BITR-C05BITTR06_09082025_S	Nitrate + Nitrite	353.2	9/8/2025	10/9/2025	28	31
COMBITR04_09082025_QC-FB	Nitrate + Nitrite	353.2	9/8/2025	10/24/2025	28	46
COMBITR04_09082025_QC-FD	Nitrate + Nitrite	353.2	9/8/2025	10/9/2025	28	31
COMBITR04_09082025_S	Nitrate + Nitrite	353.2	9/8/2025	10/9/2025	28	31
BITR-C05BITTR03_09082025_S	Total Phosphorus, mixed forms	365.1	9/8/2025	10/7/2025	28	29
BITR-C05BITTR06_09082025_S	Total Phosphorus, mixed forms	365.1	9/8/2025	10/7/2025	28	29
COMBITR04_09082025_QC-FD	Total Phosphorus, mixed forms	365.1	9/8/2025	10/7/2025	28	29
COMBITR04_09082025_S	Total Phosphorus, mixed forms	365.1	9/8/2025	10/7/2025	28	29
COMBITR04_09082025_QC-FB	Total Phosphorus, mixed forms	365.1	9/8/2025	10/7/2025	28	29
BITR-C05BITRR24_09092025_S	Nitrate + Nitrite	353.2	9/9/2025	10/9/2025	28	30
COMBITR02_09092025_S	Nitrate + Nitrite	353.2	9/9/2025	10/9/2025	28	30
COMBITR03_09092025_S	Nitrate + Nitrite	353.2	9/9/2025	10/9/2025	28	30

BITR-C05BITRR24_09232025_QC-FB	Nitrate + Nitrite	353.2	9/23/2025	10/24/2025	28	31
BITR-C05BITRR24_10202025_S	Total Phosphorus, mixed forms	365.1	10/20/2025	11/19/2025	28	30
BITR-C05BITTR03_10202025_S	Total Phosphorus, mixed forms	365.1	10/20/2025	11/19/2025	28	30
BITR-C05BITTR06_10202025_S	Total Phosphorus, mixed forms	365.1	10/20/2025	11/19/2025	28	30
COMBITR02_10202025_S	Total Phosphorus, mixed forms	365.1	10/20/2025	11/19/2025	28	30
COMBITR03_10202025_S	Total Phosphorus, mixed forms	365.1	10/20/2025	11/19/2025	28	30
COMBITR04_10202025_S	Total Phosphorus, mixed forms	365.1	10/20/2025	11/19/2025	28	30
COMBITR02_10202025_QC-FB	Total Phosphorus, mixed forms	365.1	10/20/2025	11/19/2025	28	30
COMBITR02_10212025_QC-FD	Total Phosphorus, mixed forms	365.1	10/21/2025	11/19/2025	28	29
BITR-C05BITTR03_07212025_S	Total suspended solids	2540-D	7/21/2025	8/11/2025	7	21
BITR-C05BITTR06_07212025_S	Total suspended solids	2540-D	7/21/2025	8/11/2025	7	21
COMBITR04_07212025_S	Total suspended solids	2540-D	7/21/2025	8/11/2025	7	21
BITR-C05BITRR24_07222025_S	Total suspended solids	2540-D	7/22/2025	8/11/2025	7	20
COMBITR02_07222025_QC-FD	Total suspended solids	2540-D	7/22/2025	8/11/2025	7	20
COMBITR02_07222025_S	Total suspended solids	2540-D	7/22/2025	8/11/2025	7	20
COMBITR03_07222025_S	Total suspended solids	2540-D	7/22/2025	8/11/2025	7	20
COMBITR02_07222025_QC-FB	Total suspended solids	2540-D	7/22/2025	8/11/2025	7	20
BITR-C05BITTR03_08112025_QC-FB	Total suspended solids	2540-D	8/11/2025	9/8/2025	7	28
BITR-C05BITTR03_08112025_QC-FD	Total suspended solids	2540-D	8/11/2025	9/8/2025	7	28
BITR-C05BITTR03_08112025_S	Total suspended solids	2540-D	8/11/2025	9/8/2025	7	28
BITR-C05BITTR06_08112025_S	Total suspended solids	2540-D	8/11/2025	9/8/2025	7	28
COMBITR04_08112025_S	Total suspended solids	2540-D	8/11/2025	9/8/2025	7	28
BITR-C05BITRR24_08122025_S	Total suspended solids	2540-D	8/12/2025	9/8/2025	7	27
COMBITR02_08122025_S	Total suspended solids	2540-D	8/12/2025	9/8/2025	7	27
COMBITR03_08122025_S	Total suspended solids	2540-D	8/12/2025	9/8/2025	7	27

BITR-C05BITTR03_08252025_S	Total suspended solids	2540-D	8/25/2025	9/8/2025	7	14
COMBITR04_08252025_S	Total suspended solids	2540-D	8/25/2025	9/8/2025	7	14
COMBITR03_08262025_QC-FB	Total suspended solids	2540-D	8/26/2025	9/8/2025	7	13
BITR-C05BITRR24_08262025_S	Total suspended solids	2540-D	8/26/2025	9/8/2025	7	13
BITR-C05BITTR06_08252025_S	Total suspended solids	2540-D	8/26/2025	9/8/2025	7	13
COMBITR02_08262025_S	Total suspended solids	2540-D	8/26/2025	9/8/2025	7	13
COMBITR03_08262025_QC-FD	Total suspended solids	2540-D	8/26/2025	9/8/2025	7	13
COMBITR03_08262025_S	Total suspended solids	2540-D	8/26/2025	9/8/2025	7	13
COMBITR04_09082025_QC-FB	Total suspended solids	2540-D	9/8/2025	10/6/2025	7	28
BITR-C05BITTR03_09082025_S	Total suspended solids	2540-D	9/8/2025	10/6/2025	7	28
BITR-C05BITTR06_09082025_S	Total suspended solids	2540-D	9/8/2025	10/6/2025	7	28
COMBITR04_09082025_QC-FD	Total suspended solids	2540-D	9/8/2025	10/6/2025	7	28
COMBITR04_09082025_S	Total suspended solids	2540-D	9/8/2025	10/6/2025	7	28
BITR-C05BITRR24_09092025_S	Total suspended solids	2540-D	9/9/2025	10/6/2025	7	27
COMBITR02_09092025_S	Total suspended solids	2540-D	9/9/2025	10/6/2025	7	27
COMBITR03_09092025_S	Total suspended solids	2540-D	9/9/2025	10/6/2025	7	27
BITR-C05BITTR03_09222025_S	Total suspended solids	2540-D	9/22/2025	10/6/2025	7	14
BITR-C05BITTR06_09222025_S	Total suspended solids	2540-D	9/22/2025	10/6/2025	7	14
COMBITR04_09222025_S	Total suspended solids	2540-D	9/22/2025	10/6/2025	7	14
BITR-C05BITRR24_09232025_QC-FB	Total suspended solids	2540-D	9/23/2025	10/6/2025	7	13
BITR-C05BITRR24_09232025_QC-FD	Total suspended solids	2540-D	9/23/2025	10/6/2025	7	13
BITR-C05BITRR24_09232025_S	Total suspended solids	2540-D	9/23/2025	10/6/2025	7	13
COMBITR02_09232025_S	Total suspended solids	2540-D	9/23/2025	10/6/2025	7	13
COMBITR03_09232025_S	Total suspended solids	2540-D	9/23/2025	10/6/2025	7	13
BITR-C05BITTR03_10062025_QC-FB	Total suspended solids	2540-D	10/6/2025	10/20/2025	7	14

BITR-C05BITTR03_10062025_QC-FD	Total suspended solids	2540-D	10/6/2025	10/20/2025	7	14
BITR-C05BITTR03_10062025_S	Total suspended solids	2540-D	10/6/2025	10/20/2025	7	14
BITR-C05BITTR06_10062025_S	Total suspended solids	2540-D	10/6/2025	10/20/2025	7	14
COMBITR04_10062025_S	Total suspended solids	2540-D	10/6/2025	10/20/2025	7	14
COMBITR02_10072025_S	Total suspended solids	2540-D	10/7/2025	10/20/2025	7	13
BITR-C05BITRR24_10072025_S	Total suspended solids	2540-D	10/7/2025	10/20/2025	7	13
COMBITR03_10072025_S	Total suspended solids	2540-D	10/7/2025	10/20/2025	7	13
COMBITR02_10202025_QC-FB	Total suspended solids	2540-D	10/20/2025	11/11/2025	7	22
BITR-C05BITRR24_10202025_S	Total suspended solids	2540-D	10/20/2025	11/11/2025	7	22
BITR-C05BITTR03_10202025_S	Total suspended solids	2540-D	10/20/2025	11/11/2025	7	22
BITR-C05BITTR06_10202025_S	Total suspended solids	2540-D	10/20/2025	11/11/2025	7	22
COMBITR02_10202025_S	Total suspended solids	2540-D	10/20/2025	11/11/2025	7	22
COMBITR03_10202025_S	Total suspended solids	2540-D	10/20/2025	11/11/2025	7	22
COMBITR04_10202025_S	Total suspended solids	2540-D	10/20/2025	11/11/2025	7	22
COMBITR02_10212025_QC-FD	Total suspended solids	2540-D	10/21/2025	11/11/2025	7	21

4.0 ANALYSIS

REQUIRED ANALYTICAL METHODS

All requested parameters specified in the SAP were reported. All analyses were performed in accordance with the primary method as defined in the QAPP and SAP.

Table 4.1: Analytical Methods

Parameter	Method Reported	Method in QAPP/SAP
Total Phosphorus (TP)	EPA 365.1	EPA 365.1
Total Persulfate Nitrogen (TPN)	A4500 N-C	A4500-N-C
Nitrate + Nitrite-Nitrogen (NO ₂ +NO ₃ -N)	EPA 353.2	EPA 353.2
Total Ammonia-Nitrogen (NH ₃ +NH ₄ -N)	EPA 350.1	EPA 350.1
Orthophosphate (SRP)	EPA 365.1	EPA 365.1
Solids, Total Suspended (TSS) @ 105°C	A2540 D	A 2540 D
Chlorophyll- <i>a</i>	10200-H	A10200H
Ash-Free Dry Weight	10300-C	A10300C(5)

REQUIRED DETECTION LIMITS

The laboratory lower reporting limits (LRL) met the project-required detection limits defined in the QAPP and SAP for all parameters. The LRL is the required reporting limit based on detection limit project needs. The MDL is the method detection limit of the lab. Results are “J” flagged if the result is between the LRL and MDL and are considered estimates values.

Table 4.2: Results “J” flagged for results between the MDL and the LRL

Activity ID	Characteristic Name	Result Value (mg/l)	MDL (mg/l)	LRL (mg/l)
BITR-C05BITR06_10202025_S	Total suspended solids	2	0.5	4
BITR-C05BITR03_10202025_S	Total suspended solids	2	0.5	4
COMBITR04_10202025_S	Total suspended solids	2	0.5	4
BITR-C05BITR24_10202025_S	Total suspended solids	3	0.5	4
COMBITR03_10202025_S	Total suspended solids	2	0.5	4
COMBITR02_10202025_S	Total suspended solids	4	0.5	4
COMBITR02_10202025_QC-FB	Total Phosphorus, mixed forms	0.001	0.001	0.002
COMBITR03_10072025_S	Total suspended solids	3	0.5	4
BITR-C05BITR06_10062025_S	Total suspended solids	2	0.5	4
BITR-C05BITR03_10062025_S	Total suspended solids	3	0.5	4
BITR-C05BITR03_10062025_QC-FD	Total suspended solids	2	0.5	4
COMBITR04_10062025_S	Total suspended solids	2	0.5	4
BITR-C05BITR24_10072025_S	Total suspended solids	3	0.5	4
BITR-C05BITR06_09222025_S	Total suspended solids	2	0.5	4
BITR-C05BITR03_09222025_S	Total suspended solids	1	0.5	4
COMBITR04_09222025_S	Total suspended solids	2	0.5	4
COMBITR04_09222025_S	Ammonia	0.008	0.007	0.01
BITR-C05BITR24_09232025_S	Total suspended solids	3	0.5	4
BITR-C05BITR24_09232025_QC-FD	Total suspended solids	2	0.5	4
COMBITR03_09232025_S	Total suspended solids	3	0.5	4
COMBITR02_09232025_S	Total suspended solids	3	0.5	4
COMBITR04_09082025_QC-FB	Total Phosphorus, mixed forms	0.001	0.001	0.002
BITR-C05BITR24_09092025_S	Total suspended solids	2	0.5	4
COMBITR03_09092025_S	Total suspended solids	2	0.5	4
COMBITR02_09092025_S	Total suspended solids	3	0.5	4
BITR-C05BITR06_09082025_S	Total suspended solids	2	0.5	4
BITR-C05BITR03_09082025_S	Total suspended solids	2	0.5	4
COMBITR04_09082025_S	Total suspended solids	2	0.5	4
COMBITR04_09082025_QC-FD	Total suspended solids	3	0.5	4
BITR-C05BITR06_08112025_S	Total suspended solids	3	0.5	4
BITR-C05BITR03_08112025_S	Total suspended solids	3	0.5	4
BITR-C05BITR03_08112025_QC-FD	Total suspended solids	2	0.5	4
BITR-C05BITR03_08112025_QC-FB	Total Phosphorus, mixed forms	0.001	0.001	0.002
COMBITR04_08112025_S	Total suspended solids	4	0.5	4
COMBITR03_08122025_S	Total suspended solids	3	0.5	4
COMBITR03_08122025_S	Ammonia	0.008	0.007	0.01
COMBITR02_08122025_S	Total suspended solids	2	0.5	4
BITR-C05BITR06_08252025_S	Total suspended solids	3	0.5	4
COMBITR02_07082025_S	Total suspended solids	2	1	4
COMBITR04_9042025_C(6)	Weight	1	0.2	2

Activity ID	Characteristic Name	Result Value (mg/l)	MDL (mg/l)	LRL (mg/l)
BITR-C05BITRR24_9042025_C(1)	Weight	1.7	0.2	2
COMBITR03_9042025_C(1)	Weight	1.7	0.2	2
COMBITR03_9042025_C(7)	Weight	1	0.2	2
COMBITR02_9052025_C(1)	Weight	1.9	0.2	2
COMBITR02_9052025_C(2)	Weight	1	0.2	2
COMBITR02_9052025_C(5)	Weight	1	0.2	2
BITR-C05BITTR03_8052025_C(1)	Weight	1	0.2	2
COMBITR04_8052025_C(5)	Weight	1.6	0.2	2
COMBITR02_8072025_C(1)	Weight	1.9	0.2	2
COMBITR02_8072025_C(2)	Weight	1	0.2	2
COMBITR02_8072025_C(3)	Weight	0.4	0.2	2
COMBITR02_8072025_C(5)	Weight	1	0.2	2
COMBITR02_9052025_C(3)	Chlorophyll a, corrected for pheophytin	1	0.2	2
COMBITR02_9052025_C(5)	Chlorophyll a, corrected for pheophytin	1	0.2	2
COMBITR02_8072025_C(1)	Chlorophyll a, corrected for pheophytin	1	0.2	2
COMBITR02_8072025_C(3)	Chlorophyll a, corrected for pheophytin	1	0.2	2

FIELD BLANKS

B – Flags:

If an analyte is detected in a field blank at or above the LRL, all result values for samples associated with the blank that are less than or equal to 10 times the value detected in the blank are qualified with a “B” flag. Samples are considered associated with a field blank if they are the same analyte and collected during the same sampling trip as the blank. No results were “B” flagged for being associated with a field blank detection.

FIELD DUPLICATES

J – Flags:

As specified in the QAPP, field duplicate (FD) relative percent difference (RPD) should be less than 25% for duplicate results that are greater than 5 times the LRL. When RPD is exceeded, the field duplicate along with any associated results are “J” flagged. No results were “J” flagged for exceeding the RPD.

REJECTED

R - Flags: No results were rejected.

GENERAL QUALITY CHECKS

The results were reviewed to make sure the individual components were not more than the total. Total phosphorus was compared to orthophosphate, and total nitrogen was compared to nitrate+nitrite plus ammonia. Total phosphorus results were all greater than orthophosphate values. Total nitrogen results were greater than the combined nitrate+nitrite plus ammonia values. No results were “J” flagged for either comparison.

LABORATORY QC

Percent Recovery: The percent recovery for all lab samples, particularly the matrix spike and matrix spike duplicate (MS/MSD), should be within the low and high limits established by the QAPP. The QAPP states an initial accuracy goal of 10% will be established for water chemistry analyses. If an MS/MSD result is outside the limits (90% or 110%), the associated results are “J” flagged and include the comment “MS/MSD failed [high/low] (xx/xx%), expect [high/low] bias.” A result is considered associated if it is the same parameter and analyzed in the same lab batch as the MS/MSD. Thirteen results were flagged for MS/MSD outside of the limits.

Table 4.3: Results “J” Flagged for High MS/MSD, expect High Bias

Activity ID	Characteristic Name	Result Value (mg/l)	MS (%)	MSD (%)
BITR-C05BITR06_08252025_S	Total Phosphorus, mixed forms	0.009	111	112
BITR-C05BITR03_08252025_S	Total Phosphorus, mixed forms	0.012	111	112
COMBITR04_08252025_S	Total Phosphorus, mixed forms	0.059	111	112
BITR-C05BITR24_08262025_S	Total Phosphorus, mixed forms	0.011	111	112
COMBITR03_08262025_S	Total Phosphorus, mixed forms	0.016	111	112
COMBITR03_08262025_QC-FD	Total Phosphorus, mixed forms	0.016	111	112
COMBITR02_08262025_S	Total Phosphorus, mixed forms	0.012	111	112
COMBITR03_10072025_S	Total Phosphorus, mixed forms	0.016	112	113
BITR-C05BITR06_10062025_S	Total Phosphorus, mixed forms	0.008	112	113
BITR-C05BITR03_10062025_S	Total Phosphorus, mixed forms	0.009	112	113
BITR-C05BITR03_10062025_QC-FD	Total Phosphorus, mixed forms	0.009	112	113
COMBITR04_10062025_S	Total Phosphorus, mixed forms	0.021	112	113
BITR-C05BITR24_10072025_S	Total Phosphorus, mixed forms	0.01	112	113

5.0 QC SUMMARY

FLAGGED DATA

The overall project data had:

- 99 results were “H” flagged for exceeding the holding time (Table 3.2).
- 70 results “J” flagged for result value between the method detection limit (MDL) and lower reporting limit (LRL), meaning they are estimated values (Table 4.2).
- 13 results are flagged for MS/MSD failed high, expect high bias. (Table 4.3)

COMPLETENESS

The overall project sample completeness rate for sites included in the QAPP is 100%, well over the required 90% in the SAP. With 960 results and 182 results flagged, 19% of the results need to be used with caution.

6.0 CORRECTIVE ACTIONS

As a result of the QA/QC review, the following are corrective actions items for 2025:

- ISSUE: Some the sampling trips had issues where the time and site names on the COC and bottles didn't match.
 - ACTION: Each COC will be reviewed by the field team leader to ensure that the time recorded on the COC and sample bottles match exactly.
- ISSUE: Forty-three chemistry results (not including TSS) were submitted for analysis beyond the holding time. Eight results for TP in October were past hold because of Energy labs equipment issues.
 - ACTION: Samplers will provide a written rationale for the exceedance of the holding time, including steps to meet holding times for future sampling.