

## **Lotic AIM Macroinvertebrate and Water Quality Submission Protocol**

### **Overview**

Please submit all AIM macroinvertebrate and water quality samples to the BLM/USU National Aquatic Monitoring Center (NAMC) following the protocols below. It is standard process when submitting physical samples of any kind to have a chain-of-custody form to track who was responsible for the samples and to facilitate identification of error sources should they occur. Lotic AIM has two chain-of custody tracking forms that must be completed: 1) the WaterQualityMacroinvert layer on the Field Webmap containing all samples collected with the delivery data and notes confirming sample condition; 2) a paper sheet to be taped to one of the boxes of samples with the following info: the person responsible for the samples at each stage in the process; the date they transferred them to someone else in the process; their phone number; and the total number of boxes to be delivered.

### **General process to submit water quality and macroinvertebrate samples to NAMC:**

1. The crew should:
  - a. Ensure all Suvery123 data has been submitted.
  - b. Alert their manager that samples are ready for submission.
2. The crew manager should (See section A for more detailed instructions):
  - a. Go into AGOL and export all macroinvertebrate and water quality data directly from the service.
  - b. Place this file on Teams.
3. The crew should (See section B for more detailed instructions):
  - a. Verify all jars are properly labeled and follow the macroinvertebrate and water quality labeling procedures listed in the TR 1735-2.
  - b. Verify that the number of all jars match what was recorded in Survey123.
  - c. Record results and notes from 3a and 3b in the Teams Spreadsheet.
  - d. Pack samples in boxes or coolers and tape a paper chain of custody tracking form on the box/cooler.
4. The crew manager should (See section C for more detailed instructions):
  - a. Transcribe all notes from the document on Teams back to the WaterQualityMacroinvert layer on the Webmap.
5. Determine the delivery method and deliver samples to the BLM/USU NAMC (See section D for details). Samples may be shipped or driven with each intermediate person signing the paper chain of custody form with the samples along the way.

### **Section A: Saving the tracking spreadsheet to teams**

1. Crew managers should locate the “WaterQualityMacroinvert” Hosted Feature Service in the Lotic AIM AGOL group, export the data to Excel, and subset the data for the crew.
2. Export the data
  - a. Go to the “Content” section of the AGOL group and find the “BLM\_Natl\_Lotic\_2021\_Service” and open this by clicking the blue title.
  - b. Open the WaterQualityMacroinvert layer from the list.
  - c. Select “Export Data” and export to “Excel” then change the title and the tag to sometime easily recognizable, then click download.
3. In the downloaded Excel document

- a. Filter by project.
- b. Copy/paste all of the text including header as values into a new tab.
- c. If making multiple deliveries throughout the season, filter out previously submitted samples (i.e., “Bugs\_WQ\_Submission\_Date” is blank).
4. In the new tab
  - a. Delete all of the columns except for PointID, EvaluationID, Water Quality Date, Number of Jars and Number of WQ Jars.
  - b. Save the document and upload it to its associated project folder on Teams.
  - c. Inform crew that it has been uploaded

### **Section B: Verifying samples and preparing for delivery**

1. Ensure that all sample preservation and identification protocols have been followed:
  - a. Macroinvertebrate jars filled with ½ or less of material and filled to the top with 95% ethanol.
  - b. Water quality jars filled ½ way and frozen.
  - c. Label placed on exterior of jar and for macroinvertebrate samples on the inside of the jar as well. Labels must contain:
    - i. Date
    - ii. Stream name
    - iii. AIM PointID
    - iv. State
    - v. Number of jars (for macroinvertebrates only, e.g. “1 of 3”)
    - vi. Sample Type (water quality only). Most reaches will only have an original, for reaches with original, duplicate, and blank samples verify that there is only one sample of each type (i.e., blank, duplicate, and original)!
2. Prepare jars for transport:
  - a. Ensure that all lids are tightly sealed. For macroinvertebrate samples, wrap electrical tape around jar-lid interface to secure lids and reduce leakage.
  - b. Bundle multi-jar samples into single cluster and bind together with electrical tape. This greatly reduces time spent on sample inventory at end of season and mitigates error. When taping do not cover the labels, you will have to check those later, and it is best not to unbundle them.
3. The crew should locate the excel file that manager uploaded to Teams in their project folder.
  - a. If the crew is able to edit Excel documents, do so directly in Teams.
  - b. If the crew cannot edit Excel files, they must download the file and use other software (e.g., Google Sheets). Re-upload the file to Teams after editing.
4. The crew should locate the first PointID on list and find the associated bundle of macroinvertebrate and water quality sample jars.
  - a. Verify that the PointID, Date, and number of Jars (or sample type) recorded in excel matches the physical jars. Re-bundle jars if needed. Relabel any jar where your number of jars do not match. See next step for PointID or Date issues.
  - b. In the spreadsheet, note discrepancies such as samples that do not match, had different dates or that had extra/missing jars. All label errors should be caught in this step by the crew members.

- c. Work through the list of PointIDs in the spreadsheet until everything has been reviewed and signed off on.
5. When finished working through the list:
  - a. Transfer all bundled macroinvertebrate and water quality jars into a box or cooler as appropriate. Water quality samples should be kept frozen at all times after returning from field including during inventory and transport.
  - b. Securely tape box or cooler so that it cannot be accidentally opened during transport. This will also serve as a tamper proof seal.
  - c. Clearly label the box (e.g., macroinvertebrate box 1 of 2 for NAMC, Water quality box 1 of 3 for NAMC).
  - d. Securely tape a piece of paper to the box/cooler to use as a chain of custody form. Write your name, phone number, number of boxes, and date you handed them off. If samples are being handed off to intermediaries, every individual person that touches the box during transport should record this information.

### **Section C: Transcribing excel information into the webmap**

1. The crew manager must transcribe the information from the crew's Excel file into the webmap. NAMC will use the "WaterQualityMacroinvert" Hosted Feature Service as their official record of what is being submitted. If the crew recorded that they collected 5 macroinvertebrate jars at a site but could only find 4 of the 5 when inventorying, this information must be recorded in the Hosted Feature Service itself.
  - a. Locate the spreadsheet for samples that the crew is submitting to NAMC.
  - b. Go to the Data Review Dashboard and maximize the embedded "Data Review Webmap".
  - c. Enter the first PointID on the list into the search bar in the upper right corner of the map and hit enter. This will take one to the associated Point on the map.
  - d. In the Related Tables dropdown, select "WaterQualityMacroinvert". In the attribute table at the bottom of the window, copy/paste over into the Bugs\_WQ\_Submission\_Notes text field the crews comments. If everything matched perfectly and no comment is needed, simply say, "All good".
  - e. Next record the date in the Bugs\_WQ\_Submission\_Date field. This clearly indicates that the jars have been reviewed and are ready for delivery.
  - f. Work through the list until every record in the spreadsheet has been copied over to the "WaterQualityMacroinvert" Hosted Feature Service.
2. At this point in time, any user should be able to filter the "WaterQualityMacroinvert" Hosted Feature Service and see exactly what date all macroinvertebrate and water quality samples were submitted to the lab.

### **Section D: Shipping or delivering samples**

1. Determine if samples will be driven or shipped to NAMC:
  - a. If certified and registered to ship Hazardous Materials, samples may be shipped. Macroinvertebrate samples must be shipped in ethanol. Water quality samples must be shipped with dry ice to remain frozen and preferably overnighted. Follow all carrier specific instructions for shipping Hazardous Material. Ship samples and any additional information concerning the samples to:

BLM/USU National Aquatic Monitoring Center  
Department of Watershed Sciences  
Utah State University  
5210 Old Main Hill  
Logan, UT 84322-5210

2. If shipping is not possible or desired, samples may be driven and dropped off at NAMC.
  - a. Please use the above address and deliver samples to Biology and Natural Resources (BNR) room 160 on campus.
  - b. Please provide NAMC with a minimum of 2 days advanced notice of delivery ([Andrew.Caudillo@usu.edu](mailto:Andrew.Caudillo@usu.edu)).
  - c. NAMC can accept submissions Monday through Friday from 8am – 5pm.
  - d. Exceptions to days and hours are sometimes possible given enough notice.