# FLORIDA DEPARTMENT OF Environmental Protection

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VIA EMAIL
*Read receipt requested*

December 10, 2021

Amelia Rankin, Environmental Manager, Biology Program
Florida Department of Environmental Protection
2600 Blair Stone Rd.
Tallahassee, FL 32399
Email: Amelia.Rankin@FloridaDEP.gov

**Re: Final Audit Report for Macroinvertebrate Audit of DEP Laboratory**

Dear Ms. Rankin,

Thank you for responding to the preliminary audit report for this Macroinvertebrate Audit. The Aquatic Ecology and Quality Assurance Section (AEQAS) within the Department of Environmental Protection (DEP or department) has reviewed your response and determined that the macroinvertebrate data produced by DEP Laboratory Biology Program meet DEP's data quality objectives.

Attached is the final audit report detailing the audit procedure and AEQAS's recommendation for usability of the data. The final audit report will also be posted on the DEP's website at https://floridadep.gov/dear/florida-dep-laboratory/content/fdep-biological-and-audit-report-search. The details of AEQAS's review are provided in the audit findings table. As noted in the report, AEQAS has determined that your invertebrate taxonomy analysis procedures meet the data quality objectives for macroinvertebrate data and recommends that the data be used in support of waterbody assessments, point source evaluations, and other DEP purposes. The usability of the audited data for other purposes must be determined separately according to applicable requirements in Rule 62-160.670, Florida Administrative Code (F.A.C.).

Under Chapter 120 of the Florida Statutes, you and any other person whose substantial interests are affected by the department's agency action may challenge the attached final audit report, including the corrective actions and the data usability analysis. The process to challenge any portion of this agency action is described below in the Notice of Rights section.

If you have any questions or concerns about this final audit report, please feel free to contact Sarah Noble at (850) 245-8533 or Jennifer Piacente at (850) 245-8073.

## Notice of Rights

This action is final and effective on the date mailed (via e-mail) unless a sufficient petition for an administrative hearing is timely filed under Sections 120.569 and 120.57 of the Florida Statutes as provided below. If a sufficient petition for an administrative hearing is timely filed, this agency action becomes only proposed agency action, subject to the result of the administrative review process. Therefore, on the filing of a timely and sufficient petition, this action will not be final and effective until further order of the department. Because an administrative hearing may result in the reversal or substantial modification of this action, the petitioner is advised not to proceed until the deadlines noted below for filing a petition for an administrative hearing or request for an extension of time have expired. Mediation is not available.

A person whose substantial interests are affected by the department's action may petition for an administrative proceeding (hearing) under Sections 120.569 and 120.57 of the Florida Statutes. The petition must contain the information set forth below and must be filed (received by the clerk) in the Office of General Counsel of the department at 3900 Commonwealth Boulevard, Mail Station 35, Tallahassee, Florida 32399-3000. The petitioner shall also mail a copy of the petition to the DEP Biology Program, at the address indicated above, at the time of filing.

Under Rule 62-110.106(4), F.A.C., a person whose substantial interests are affected by the department's action may also request an extension of time to file a petition for an administrative hearing. The department may, for good cause shown, grant the request for an extension of time. Requests for extension of time must be filed with the Office of General Counsel of the department at 3900 Commonwealth Boulevard, Mail Station 35, Tallahassee, Florida 32399-3000, before the applicable deadline. A timely request for extension of time shall toll the running of the time period for filing a petition until the request is acted upon. If a request is filed late, the department may still grant it upon a motion by the requesting party showing that the failure to file a request for an extension of time before the deadline was the result of excusable neglect.

If a timely and sufficient petition for an administrative hearing is filed, other persons whose substantial interests will be affected by the outcome of the administrative process have the right to petition to intervene in the proceeding. Intervention will be permitted only at the discretion of the presiding officer upon the filing of a motion in compliance with Rule 28-106.205, F.A.C.

In accordance with Rules 28-106.111(2) and 62-110.106(3)(a), F.A.C., petitions for an administrative hearing by the petitioner must be filed within 21 days of receipt of this written notice. Petitions filed by any persons who were not entitled to written notice under Section 120.60(3) of the Florida Statutes must be filed within 21 days of publication of the notice, if published, or within 21 days of receipt of the written notice, whichever occurs first. Under Section 120.60(3) of the Florida Statutes, however, any person who has asked the department for notice of agency action may file a petition within 21 days of receipt of such notice, regardless of the date of publication.

The failure of any person to file a petition for an administrative hearing within the appropriate time period shall constitute a waiver of that person's right to request an administrative determination (hearing) under sections 120.569 and 120.57 of the Florida Statutes.

A petition that disputes the material facts on which the department's action is based must contain the following information: (a) The name and address of each agency affected and each agency's file or identification number, if known; (b) The name, address, and telephone number of the petitioner; the name, address, and telephone number of the petitioner's representative, if any, which shall be the address for service purposes during the course of the proceeding; and an explanation of how the petitioner's substantial interests are or will be affected by the agency determination; (c) A statement of when and how the petitioner received notice of the agency decision; (d) A statement of all disputed issues of material fact. If there are none, the petition must so indicate; (e) A concise statement of the ultimate facts alleged, including the specific facts that the petitioner contends warrant reversal or modification of the agency's proposed action; (f) A statement of the specific rules or statutes that the petitioner contends require reversal or modification of the agency's proposed action, including an explanation of how the alleged facts relate to the specific rules or statutes; and (g) A statement of the relief sought by the petitioner, stating precisely the action that the petitioner wishes the agency to take with respect to the agency's proposed action.

A petition that does not dispute the material facts on which the department's action is based shall state that no such facts are in dispute and otherwise shall contain the same information as set forth above, as required by Rule 28-106.301, F.A.C. Under paragraphs 120.569(2)(c) and (d) of the Florida Statutes, a petition for administrative hearing must be dismissed by the agency if the petition does not substantially comply with the above requirements or is untimely filed.

This agency action constitutes an order of the department. Subject to the provisions of paragraph 120.68(7)(a) of the Florida Statutes, which may require a remand for an administrative hearing, the applicant has the right to seek judicial review of the order under Section 120.68 of the Florida Statutes, by the filing of a notice of appeal under Rule 9.110 of the Florida Rules of Appellate Procedure with the Clerk of the department in the Office of General Counsel, 3900 Commonwealth Boulevard, Mail Station 35, Tallahassee, Florida, 32399-3000; and by filing a copy of the notice of appeal accompanied by the applicable filing fees with the appropriate district court of appeal. The notice of appeal must be filed within 30 days from the date when the final order is filed with the Clerk of the Department.

Executed in Tallahassee, Florida.

STATE OF FLORIDA DEPARTMENT
OF ENVIRONMENTAL PROTECTION

David Whiting, Deputy Director
Division of Environmental Assessment and Restoration
2600 Blair Stone Road
Tallahassee, FL 32399
Tel No.: (850) 245-8191

Attachments:
Final Audit Report

Copies furnished to:

Kenneth Hayman, DEP Office of General Counsel
Cheryl Swanson, DEP Biology Program
Kevin O'Donnell, DEP Watershed Assessment Section
File

CERTIFICATE OF SERVICE

The undersigned duly designated deputy clerk hereby certifies that this agency action, including all copies, was e-mailed before the close of business on 12/10/, 2021, to the above listed persons.

FILING AND ACKNOWLEDGMENT

FILED, on this date, pursuant to 120.52(7)
Florida Statutes, with the designated Department Clerk,
receipt of which is hereby acknowledged.

Clerk

12/10/2021
Date

# Final Audit Report

# DEP Laboratory

## Macroinvertebrate Laboratory Audit

**Aquatic Ecology and Quality Assurance Section**
**Water Quality Standards Program**
**Division of Environmental Assessment and Restoration**
**Florida Department of Environmental Protection**

**December 2021**

# MACROINVERTEBRATE IDENTIFICATION LAB AUDIT REPORT

## Scope of Audit

In 2013, the Florida Department of Environmental Protection's (DEP or department) Aquatic Ecology and Quality Assurance Section (AEQAS) conducted an audit of DEP Laboratory Biology Program's macroinvertebrate sample processing protocols to provide assurance that sample processing and index calculation protocols were being followed per DEP SOP SCI 2000. The 2013 audit discerned that DEP Laboratory procedures complied with DEP SOP SCI 2000 for sample sorting, taxonomic identification, and index calculation. DEP Laboratory has continued to provide macroinvertebrate results to DEP in support of a variety of projects requiring Stream Condition Index (SCI), Wetland Condition Index (WCI), and Artificial Substrate (Hester-Dendy) samples. In April of 2021, AEQAS requested records from the DEP Laboratory for the current audit and received all requested records on May 4th, 2021. This audit only assessed items that can be evaluated via laboratory records provided by DEP Laboratory. This current audit covers the scope of samples that DEP Laboratory processed for DEP-related projects between 2014 and 2020. Table 1 lists the dates of analysis, the sample IDs, sampling locations, projects, and the types of samples that were reviewed as part of this audit.

All samples were sorted and identified by DEP Laboratory staff. Completed benchsheets are entered into the DEP Statewide Biological Database (SBIO), where taxa lists are collapsed appropriately, and metric and final scores are calculated. Some audit findings are unique to individual samples while other findings and comments pertain to the overall laboratory protocols for the handling and processing of macroinvertebrate samples.

## Records Evaluated:

- List of the taxonomic keys most commonly consulted in the lab (requested a minimum of the ten most relied upon; online references are acceptable if regularly consulted)
- List of taxa in the lab's specimen reference collection, including the verifying taxonomists' names
- Sorting efficiency records for analysts associated with requested samples
- Taxonomic Quality Control (QC) records for analysts associated with requested samples
- Brief description of lab protocols for precautionary and corrective measures taken if sorting efficiency or taxonomic QC results fail to meet the required targets
- All raw bench sheets associated with requested samples
- Final taxonomic list used to calculate metrics (where applicable), indicating which taxa were used in each metric
- Raw metric and index calculation data and final metric and index scores for each replicate (where applicable)

Table 1. Samples reviewed as part of the DEP Laboratory macroinvertebrate laboratory records audit conducted by AEQAS, December 2021.

| Analysis Date | Sample ID | Sampling Location | Project | Sample Type |
|---|---|---|---|---|
| 5/2/2014 | 1581213 | C14-1 | South Florida Canals | Stream Condition Index |
| 3/9/2015 | 1661035 | Silver Spring | Algal Experimental | Hester-Dendy |
| 3/21/2016 | 1777767 | Duke Control abv Canal | Fifth Year Bioassessments | Stream Condition Index |
| 9/25/2017 | 1919727 | Watermelon Pond | Wetlands Development | Wetland Condition Index |
| 5/3/2018 | 1966674 | Lake Lena @ Thomhill | TMDL Studies | Stream Condition Index |
| 5/28/2019 | 2067941 | Panther CR JHN Riley | Ecoreg Reference Streams | Stream Condition Index |
| 11/6/2020 | 2201648 | Davenport CR at SR 545 Bridge | Ecoreg Reference Streams | Stream Condition Index |

**Findings**

A preliminary audit report was sent to DEP Laboratory on July 28, 2021 and DEP Laboratory provided responses to the preliminary report on September 15, 2021 (Table 2). AEQAS found that DEP Laboratory's responses and proposed corrective actions were acceptable and their procedures follow DEP SOP SCI 2000, as discussed below.

Lab Quality System: DEP Laboratory maintains copies of pertinent, Florida-specific taxonomic identification keys. The DEP Laboratory's reference collection is thorough and well-organized. There were, however, some taxa that were not included in the reference collection that were identified in samples reviewed as part of this audit. DEP Laboratory is in the process of updating their reference collection to include missing taxa. Furthermore, while the reference collection is thorough, approximately 40% of the reference collection still requires verification. An externally verified reference collection of commonly occurring Florida taxa is a critical element of a lab's quality system. AEQAS encourages the DEP Laboratory to continue to have specimens verified by external experts as time allows. This can be achieved informally through meetings, workshops, or as a professional courtesy among taxonomists.

Sample Sorting and Identification Process: Overall, DEP Laboratory is properly following DEP SOPs for sample sorting and identification with a few exceptions as summarized below.

In the SCI sample, 1966674, both replicates were subsampled in order to achieve the target number of individuals (150 $\pm$ 10) resulting in a final count of 160 individuals for each replicate. While DEP Laboratory's subsampling procedures are appropriate, when the number of individuals removed during sub sorting were subtracted from the original number of individuals subsampled, it did not equal 160 for either replicate indicating documentation was missing for specimens removed from the sample or that the original count from preparation was incorrect. Documentation or notation was not provided for why these numbers were different (*e.g.*, organism lost, terrestrial organism, incomplete specimens, incorrect starting count). DEP Laboratory acknowledged that the benchsheet comments for this sample were not clear and agreed to provide clear annotations and footnotes for sub sorting on the benchsheets.

DEP Laboratory benchsheets indicate when specimens are mounted on slides and there were several instances in which aquatic mites and midges were not mounted. Mounting is required to identify these taxa per DEP SOP SCI 2100 Section 3.3.2.7. However, AEQAS recognizes that with extensive experience it may not always be necessary to mount every specimen as required in DEP SOPs.

Documentation was available for the majority of items listed in SCI 2110. However, some items were missing and are noted in Table 2. DEP Laboratory acknowledged these instances as oversights and has reminded employees to review benchsheets for completeness as data are entered.

Sample Sorting QC: DEP Laboratory's sample sorting protocols are thorough. Proficient analysts have every sample checked by another proficient analyst by checking 1 out of every 10 dishes from the sample. However, DEP Laboratory was not continuously tracking cumulative sorting efficiency. Although it appears cumulative sorting was maintained above the 95% requirement, DEP SOP SCI 2210 requires cumulative sorting efficiency be calculated to ensure appropriate precautionary measures are taken if a single-analyst cumulative sorting efficiency falls below 95%. DEP Laboratory's internal SOP requires cumulative sorting efficiency is tracked monthly. DEP Laboratory acknowledged that not continuously tracking cumulative sorting efficiency was an oversight and will track cumulative sorting efficiency monthly per their internal SOPs to ensure sorting efficiency for all analysts remain above the 95% requirement.

All sample sorting quality control documentation is provided for the majority of analysts. However, for one analyst (L. Homann), documentation required for sample sorting quality control such as total organisms sorted, QC organisms sorted, and sorting efficiency was missing. DEP Laboratory has acknowledged this as an oversight and will ensure sorting QC is tracked for all analysts in the future.

Taxonomic Identification QC**:** Some taxa (primarily dragonflies, damselflies, and mayflies) were not always identified to the lowest practical taxonomic level per SCI 2230. This could affect SCI scores as some specimens require lower taxonomic identifications to be included in SCI metric calculations. DEP requires taxonomists verify that each taxon is identified to the lowest taxonomic level per DEP SOPs. However, documentation explaining why specimens are not identified to lowest practical taxonomic level per Table SCI 2230-1 is not required per DEP SOP's. DEP Laboratory has an internal SOP (SOP IZ-06) that requires such documentation. AEQAS prefers that DEP Laboratory follow their internal SOPs regarding this finding. AEQAS will also consider adding this documentation requirement to a future revision of SCI 2100.

Between 2014-2015, less than 5% of samples identified had a QC check performed for all taxonomists. In 2017-2018, only 4% of samples identified by L. Homann had an associated QC check. On December 15, 2020, DEP Laboratory updated their internal SOPs to ensure samples are QC'ed at regular and consistent intervals to ensure the minimum 5% is reached. Furthermore, in 2017-2018, based on the records provided, there were no QC checks associated with samples identified by J. Burtchett. DEP Laboratory clarified that J. Burtchett resigned prior to completing her training, during which all samples were checked by a senior taxonomist.

Cumulative correct identification rates were over 95% for almost all taxonomists for each 12-month period since the 2013-2014 fiscal year. However, one taxonomist (J. Burtchett) had a 92.4% cumulative ID rate for taxa in 2017-2018. According to the DEP Laboratory's written QC procedures, the analyst would have gone back into training status, but this was not indicated in the QC records provided. In DEP Laboratory's responses, it was noted that J. Burchett resigned before completing her training. Since the analyst was still considered to be in training, all samples identified by J. Burchett were checked by senior taxonomists. AEQAS suggests these situations be documented in the future.

Metric and Index Calculation**:** All samples were correctly assigned to the appropriate SCI region. Taxa lists for all samples are uploaded into SBIO where taxa are assigned to appropriate metrics categories. SCI and metric scores are also calculated in SBIO.

**Data Usability Recommendation**

Based on the results of this audit, the AEQAS has determined that the macroinvertebrate data produced by DEP Laboratory meets the department's data quality objectives with the recommendations noted in the text and Table 2. AEQAS recommends that the data may be used for waterbody assessments, point source evaluations, and other DEP purposes upon the full acceptance and implementation of the required corrective actions. The usability of audited data for other purposes must be determined separately according to applicable requirements in Rule 62-160.670, Florida Administrative Code.

Table 2. Audit findings of deficiency and/or requests for additional information for the Laboratory Records Audit of selected macroinvertebrate sample data produced by DEP Laboratory and DEP Laboratory responses to audit findings.

| SOP Reference | Sample ID | Audit Finding | DEP Laboratory Response | Corrective Action and Implementation Date* | AEQAS Comments |
|---|---|---|---|---|---|
| SCI 2200 Section 1 | All samples | Reference collection is missing specimens often identified in DEP Laboratory samples such as, but not limited to; Enchytaeidae, *Menetus*, *Labiobaetis propiquus*, *Oxyethira*, *Palpomyia/bezzia*, *Ochlerotatus*, *Kribodorum perpulchrum*, and *Tanytarsus sepp*.<br><br>DEP Laboratory needs to continue to acquire verifications from external experts for specimens in the reference collection. Approximately 40% of DEP Laboratory's reference collection has not been verified by experts. | *Kribodorum* sp. and *Tanytarsus* sp. are mounted on slides and are not stored with the rest of the reference collection.<br><br>The addition of Enchytaeidae, *Menetus*, *Labiobaetis propiquus*, *Oxyethira*, *Palpomyia/bezzia*, and *Ochlerotatus* to the reference collection was overlooked.<br><br>Biology is unclear how the 40% value was obtained. The reference collection list includes duplicate vials of the same individuals, so dividing the number of rows indicating expert verification by the total number of rows would not be appropriate.<br><br>SOP SCI 2200 section 1, says to "establish and maintain a current reference collection with specimens verified by an expert with specific training in macroinvertebrate taxonomy" and "retain extramural experts with specific training in macroinvertebrate taxonomy."<br><br>Per SOP SCI 2100, newly encountered taxa are retained for the reference collection. Encountering new taxa is rare and most new taxa are able to be identified by internal experts, with over 20 years of experience each.<br><br>Due to infrequency of use and retirement of experts, contracts to retain external verifications were dropped. Purchase Orders can be set up as needed.<br><br>As of the 2013 audit, it was acceptable for internal verification, depending on the level of identification difficulty. If there is any level of uncertainty about the identification of an organism, then an external expert should be used for verification. | The reference collection has been updated to include all of the listed taxa except for the Diptera. Diptera is still in progress.<br><br>Biology proposes to continue to operate per the 2013 audit resolution. Verification is acceptable by in-house experts, depending on the level of identification difficulty. If there is any level of uncertainty about the identification of an organism, then an external expert will be used for verification, assuming one can be found.<br><br>Due to infrequency of use and retirement of experts, contracts to retain external verifications were dropped. Purchase Orders can be set up as needed. | DEP Laboratory will add *Kribodorum* sp. and *Tanytarsus* sp. to their reference list. AEQAS recommends that a comment is associated with these specimens indicating they are not stored with the reference collection.<br><br>DEP Laboratory may continue to operate per the 2013 audit resolution. However, to ensure a robust QA system, AEQAS encourages all laboratories to have specimens externally verified as time allows. This can be achieved informally through meetings, workshops, or as a professional courtesy among taxonomists.<br><br>This finding is considered complete. |

| SOP Reference | Sample ID | Audit Finding | DEP Laboratory Response | Corrective Action and Implementation Date* | AEQAS Comments |
|---|---|---|---|---|---|
| SCI 2211 Section 2 | 2067941 | Documentation for sample sorting QC such as total organisms sorted, QC organisms sorted, and sorting efficiency is missing for all samples sorted by L. Homann and for some samples sorted by K. Dwinell. This includes a sample reviewed as a part of this audit (2067941). | Sorting and sorting QC should have been documented (L. Homann).<br><br>Lack of documentation of sorting QC for K. Dwinell was an oversight. | Invertebrate Taxonomy staff will track sorting QC per IZ-40. | The corrective action is acceptable and considered complete. |
| SCI 2100 Section 3.3.2.4 | All samples | Some taxa (primarily dragonflies, damselflies, and mayflies) were not identified to the lowest practical taxonomic level per SCI 2230 and no comments were provided as to why they were left at a higher level. | SCI 2100 Section 3.3.2.4 does not require documentation of a reason for not identifying an organism down to the expected taxonomic level (Table 2230-1). Furthermore, as samples are QCed, any discrepancies in the acceptable level of taxonomic identification will be found.<br><br>Per lab SOP IZ-06, taxa are unable to be identified to a lower taxonomic level due to one of three reasons: head only, organism too small, and organism damaged. The reason should be noted on the benchsheet. Comments were not included on benchsheet as it is inefficient to repeatedly write the reason why an organism was not identified to lower taxonomic level. | SOP IZ-06 will be modified to reflect that the comment will not be added to the benchsheet. | AEQAS believes this information is important to assess taxonomist abilities and to ensure the issue is not systematic. After discussion with DEP Laboratory on 10/15/2021, it was decided that their internal SOP will not be modified.<br><br>AEQAS will also consider adding this documentation requirement to a future revision of SOP SCI 2100.<br><br>This finding is considered complete. |

| SOP Reference | Sample ID | Audit Finding | DEP Laboratory Response | Corrective Action and Implementation Date* | AEQAS Comments |
|---|---|---|---|---|---|
| SCI 2100 Section 4 | 1777767 | Chironomidae taxa were not collapsed correctly. | Taxa collapsing is done by SBIO, not by hand. | Joy Jackson contacted the SBIO Manager. The collapsing procedure is correct, and no corrective action is needed. | This response is acceptable and considered complete. |
| SCI 2220 Section 3 | 1661035, 1919727, 1966674 | In 2014-2015, less than 5% of samples identified were QC'd for all taxonomists. In 2017-2018, only 4% of samples identified by L. Homann were QC'd. In 2017-2018, percent samples QC'd for J. Burtchett was not provided. | A cumulative % QCed is being maintained at 5% or more, but older records may not indicate as such. The DEP Laboratory taxonomists randomly select one of every 20 samples analyzed for QC by another analyst, so that process ensures that 5% of samples receive QC check.<br><br>Historically, the calculation used # samples ID'd to date and # of QC's to date. Due to fluctuating sample loads and the place within the 20-sample cycle, the % QC may not calculate to 5%.<br><br>J. Burtchett resigned before completing her IDOP; therefore, she was unable to QC samples. | On December 15, 2020, DEP SOP IZ-13 was modified to ensure samples are QCed at regular and consistent intervals. Furthermore, Taxonomists are expected to have at least one sample per quarter QCed regardless of whether they reach 20 samples. This ensures a minimum 5% of samples are QCed and that the length of time between identification and QC is reduced. This also ensures samples are continuing to be QCed during periods of low sample volume.<br>The supervisor reviews the QC values at minimum, on a quarterly basis.<br><br>No further corrective actions are needed. | The response is acceptable and considered complete. |

| SOP Reference | Sample ID | Audit Finding | DEP Laboratory Response | Corrective Action and Implementation Date* | AEQAS Comments |
|---|---|---|---|---|---|
| SCI 2210 Section 2 | All samples | Cumulative sorting efficiency is not tracked for any analysts and thus, precautionary measures are not taken if a single-analyst cumulative sorting efficiency falls below 95%. | Sorting QC is tracked. Calculations are performed by manager at the end of a 12-month period. | Cumulative sorting efficiency will be tracked monthly, per IZ-40. | The corrective action is acceptable and considered complete. |
| SCI 2220 Section 2 | All samples | In Q1 of the 2017-2018, analyst J. Burtchett had a 92.4% cumulative ID rate for taxa, which was below the required 95%. According to written QC procedures, the analyst would have gone back into training status, however, there was no corrective action specified in the QC records. Furthermore, there were samples where the correct ID rate for taxa or individuals was below 95%, but no corrective action was indicated. | J. Burtchett resigned before she successfully completed her IDOP. She was still considered to be in-training for the samples she identified. Her samples were checked by senior taxonomists.<br><br>We recognize that there is nothing on the benchsheet to document that the sample was correctly identified by a senior analyst. | The name of the senior analyst ensuring correct identifications will be recorded as the analyst for new taxonomists that are in-training. | The corrective action is acceptable and considered complete. |

| SOP Reference | Sample ID | Audit Finding | DEP Laboratory Response | Corrective Action and Implementation Date* | AEQAS Comments |
|---|---|---|---|---|---|
| SCI 2100 and SCI 2110 | All samples | Total number of organisms identified did not match total organisms sorted. Furthermore, for sample 1966674, when the number of individuals removed during sub sorting were subtracted from the original number of individuals subsampled, it did not equal 160 for either replicate indicating documentation was missing for specimens potentially removed from the sample. No explanation was provided for these discrepancies. | It is expected that there should be a sufficient number of organisms picked to reach the minimum number of appropriate organisms required for the SCI calculation.<br><br>For the sample benchsheet noted, it is assumed by the auditor that the person sorting the sample did not make a mistake in counting. It is possible that the prep person actually sorted 161 or 162 organisms, hence the calculation discrepancy.<br><br>We recognize that the benchsheet comments for this sample were not clear. | Clear annotations and footnotes will be included on the benchsheets. | The corrective action is acceptable and considered complete. |
| SCI 2110 | 1581213, 1661035 | Number of slides used for mounting not documented. | These two specific samples were analyzed before the previous 2013 audit corrections were implemented, October 31, 2013. | On 4/28/15, benchsheets were modified to include a place to record the number of slides. No corrective action needed. | AEQAS now understands that corrective actions specific to this finding from the 2013 audit were not implemented until 4/28/15 which was after these samples were analyzed.<br><br>The response is acceptable and considered complete. |

| SOP Reference | Sample ID | Audit Finding | DEP Laboratory Response | Corrective Action and Implementation Date* | AEQAS Comments |
|---|---|---|---|---|---|
| SCI 2110 | 1919727 | The SCI benchsheet associated with the WCI sample, 1919727, should have documentation on the benchsheet indicating the data is experimental or non-standard. | The data is entered correctly into SBIO under the "WETLANDS DEVELOPMENT" survey.<br><br>Benchsheets are printed directly from LIMS based on how samples were scheduled and submitted by the customer. It is not the responsibility of the Lab staff to know or write comments on the benchsheet about intended data use by the customer. | No corrective action needed. | This response acceptable and considered complete. |
| SCI 2110 | 1581213, 1661035 | Number of taxa identified for each aliquot recorded on benchsheet was after collapsing procedure. Taxa recorded on benchsheet should be prior to collapsing procedure. | These two specific samples were analyzed before the previous 2013 audit corrections were implemented, October 31, 2013. | On 4/28/15, benchsheets were modified to include a place to record pre-collapsed number of taxa. No corrective action needed. | AEQAS now understands that corrective actions specific to this finding from the 2013 audit were not implemented until 4/28/15 which was after these samples were analyzed.<br><br>The corrective action is acceptable and considered complete. |
| SCI 2100 Section 3.3 | 2067941, 1661035 | Several taxa names on benchsheets were illegible. The auditor could not verify that collapsing procedures were performed correctly. | Improving handwriting is an ongoing endeavor.<br><br>For these samples, the ID analyst participated in the two-person verification. This ensured correct SBIO entry. | We will continue to work on handwriting issues.<br><br>After verification, taxa collapsing is done by SBIO, not by hand. No corrective action needed. | The corrective action is acceptable and considered complete. |
| SCI 2110 | All samples | Total number of organisms sorted from each selected grid tray aliquot was not documented. | We believe this requirement to be a relic of the SCI development process. It was not noted as a deficiency on the previous audit. | We recommend removing this requirement from SCI 2110. | AEQAS recognizes this requirement is not critical and will consider this in future revisions of the SOP. |

| SOP Reference | Sample ID | Audit Finding | DEP Laboratory Response | Corrective Action and Implementation Date* | AEQAS Comments |
|---|---|---|---|---|---|
| | | | Both the DEP SOP SCI 2100 3.1.2 methods, specifically 3.1.2.9, and the Lab SOP IZ-02 instruct to keep a running tally. | If it is determined the per-grid documentation will be required, then we recommend this step be added to 3.1.2.9 and not appear solely in the documentation required bulleted list.<br><br>Per Lab SOP IZ-02, a laboratory counter is used to keep a running total of the number of organisms picked in the sample replicate. | This response is acceptable and considered complete. |
| SCI 2110 | 2201648 | Number of organisms sorted from sample, number of taxa identified/sorted from sample, and field sampler identification not documented. | There are spaces on the benchsheet for number of organisms sorted from sample and number of taxa identified/sorted from sample. These were overlooked when completing the benchsheet.<br><br>When provided, sampler identification information is entered into LIMS by Receiving staff and is displayed on the benchsheet. Sampler information is entered into SBIO during SBIO Visit creation. | Staff have been reminded to check benchsheets for completeness as data are entered into LIMS and SBIO, per Lab SOP BG-01.and BG-03<br><br>No corrective action is needed on behalf of the Taxonomy staff for sampler name appearing on benchsheets. | The corrective action is acceptable and considered complete. |

*All corrective actions were implemented upon receipt of DEP Laboratory's responses to the preliminary report, September 15, 2021, unless otherwise noted in Table 2. Nonetheless, any corrective actions that require benchsheets to be modified may take longer to implement.