FLORIDA DEPARTMENT OF Environmental Protection

Bob Martinez Center
2600 Blair Stone Road
Tallahassee, FL 32399-2400

Ron DeSantis
Governor

Jeanette Nuñez
Lt. Governor

Shawn Hamilton
Secretary

VIA EMAIL
Read receipt requested

December 7, 2021

Sheri A. Huelster, Senior Project Scientist
Cardno, Inc.
3905 Crescent Park Drive
Riverview, FL 33578
Email: Sheri.Huelster@cardno.com

Re: Final Audit Report for Stream Condition Index Audit of Cardno, Inc.

Dear Ms. Huelster,

We transmitted the subject final audit report on July 13, 2021. We recently found an error in the transmittal letter and are therefore issuing this corrected letter. No changes have been made to the audit report or the conclusions of the audit. We apologize for any inconvenience.

Thank you for responding to the preliminary audit report for this Stream Condition Index (SCI) Audit. The Florida Department of Environmental Protection (department) has reviewed your response and determined that the SCI data produced by Cardno do meet the department's data quality objectives.

Attached is the final audit report detailing the audit procedure and the department's recommendation for usability of the data. The final audit report will also be posted on the department's website at https://floridadep.gov/dear/florida-dep-laboratory/content/fdep-biological-and-audit-report-search.The details of the department's review are provided in the audit findings table. As noted in the report, the department's Aquatic Ecology and Quality Assurance Section has determined that your invertebrate taxonomy analysis procedures do meet the data quality objectives for SCI data, and recommends that the data may be used for DEP related purposes. The usability of the audited data for other purposes must be determined separately according to applicable requirements in rule 62-160.670, 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 Cardno, 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
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 December 7, 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.

Ashley Phillips 12/07/2021

Clerk Date

Final Audit Report

Cardno

SCI Laboratory Audit



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

July 2021

STREAM CONDITION INDEX LAB AUDIT REPORT

Scope of Audit

In 2015, the Department of Environmental Protection (DEP or department) conducted an audit of Cardno's Stream Condition Index (SCI) sample processing protocols in support of permit modifications at Fort Meade and South Pasture Mines and to inform waterbody assessments for the Peace and Alafia Rivers. The results of the 2015 audit found that Cardno's macroinvertebrate taxonomy lab procedures complied with DEP SOP SCI 2000 for sample sorting, taxonomic identification, and index calculation with a few minor deficiencies. Since that time, Cardno has provided macroinvertebrate results to the department in support of a variety of projects requiring SCI samples. In January of 2021, DEP decided to conduct a records audit and requested SCI-related records from Cardno Project Scientist, Sheri Huelster. DEP received the majority of the records on January 5, 2021, and the remaining records were provided February 8, 2021. This audit only assessed items that could be evaluated via laboratory records provided by Cardno. This audit covers the scope of samples that Cardno processed for DEP-related projects between 2015 and 2020. Table 1 lists the dates of collection, Sample ID, waterbody, and project name for each sample that was reviewed as part of this audit.

All samples were collected and sorted by Cardno staff. Cardno has one in-house taxonomist (Richard Cantrell) who, according to Cardno protocols, conducts taxonomic identification for samples with 15 or fewer individuals in the family Chironomidae (Diptera). However, in a follow-up phone call, Ms. Huelster indicated that all Chironomidae are either identified or verified by Dr. Epler, who is recognized as an expert in the Chironomidae family (along with several other taxonomic groups). As this was not indicated on the taxonomic QC protocols provided to DEP, this detail should be added to the protocol for future reference, especially given that the majority of samples reviewed met this criterion. Once the taxonomic identifications were completed, benchsheets were returned to Cardno where metric and final SCI scores were calculated.

Records Evaluated:

- List of the taxonomic keys most commonly consulted in the lab (requested the ten [minimum] most relied upon; online references acceptable if regularly consulted)
- List of taxa in the lab's specimen reference collection, including the verifying taxonomists' names
- Sorting efficiency tracking records for employees associated with requested samples
- Taxonomic quality control tracking records for employees 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. Stream Condition Index samples reviewed as part of this audit.

Sample Date	Sample ID	Waterbody	Project Name
11/10/2015	With-Down	Withlacoochee River	Madison Blue Springs
7/7/2016	Tal-PP-Down	Suwannee River	Pilgrim's Pride NNC
10/2/2017	Chicken Branch 53	Chicken Branch	BFT Leon
11/29/2018	BC-2R	Black Creek	BFT Leon
12/12/2019	PRMP-10	Peace River	Peace River Monitoring Program
3/25/2020	MS-2	Munson Slough	BFT Leon

Summary of Findings and Acceptance of Corrective Actions
A preliminary audit report was sent to Cardno on March 19, 2021, and Cardno provided responses to the preliminary report on April 30, 2021 (Table 2). A follow-up preliminary report was sent to Cardno on June 16, 2021, and Cardno responded with additional responses on July 7, 2021. DEP found that Cardno's responses and proposed corrective actions were acceptable and their procedures follow DEP SOP SCI 2000, as discussed below.

Lab Quality System: Individual records were provided to the auditor for Mr. Cantrell and Dr. Epler for the pertinent identification keys and reference collections.

Mr. Cantrell and Dr. Epler maintain copies of pertinent taxonomic identification keys. However, Dr. Epler's initial list included North American keys for dragonflies and damselflies, but did not list the Florida specific keys, which are preferred. Dr. Epler replied that when Dr. Ken Tenneson's new key for Florida odonate larvae becomes available, it will be referenced. The identification manual was made available on the DEP website in January 2021. Thus, DEP recommends that it be used for all future odonate identifications.

Both Mr. Cantrell and Dr. Epler's reference collections are extensive and up to date. There were, however, several taxa that were not included in the reference collections that were included in samples reviewed as part of this audit. Further, only a small portion of the specimens have been verified by extramural experts. While DEP recognizes the extensive backgrounds and expertise of Mr. Cantrell and Dr. Epler, an externally verified reference collection of commonly occurring Florida taxa is a critical element of a lab's quality system. DEP encourages the taxonomists identifying samples for Cardno to continue adding specimens verified by external experts to their reference collections.

Sample Sorting and Identification Process: Overall, Cardno is properly following DEP SOPs for sample sorting and identification with a few minor exceptions that have been resolved as a result of this audit. Documentation was provided for all items listed in SCI 2110. It should be noted that there were several samples that had the same sample ID but were collected on

different dates. As a corrective action, Cardno will make sure to create a unique sample ID with the site name and date of collection for samples submitted to DEP.

For all samples, the total number of invertebrates sorted, as reported on the sorting benchsheets, was not the same as the final total number of invertebrates sorted. For example, the columns “Number of Inverts Picked” and “QA/QC #Inverts Found” do not equal “Final Total Inverts Picked.” After a discussion with Ms. Huelster, it was determined that she performs an additional check of each sample replicate after the QC check. As a corrective action, an additional column will be included on the benchsheet and a narrative will be added to their sorting QA/QC protocols explaining this additional check. It should also be noted that, in most of the samples the auditor reviewed, the total number of specimens sorted was not equivalent to the number of specimens identified. Cardno sorters and taxonomists will make sure to add notes to the benchsheets indicating why numbers differ (*e.g*. terrestrial organism or incomplete specimen).

The total number of organisms exceeded the required target of 150 ± 10 for two samples. In sample BC-2R, the first replicate had 166 organisms picked from the sample, which is more than the required 150 ± 10. However, Cardno’s responses indicated that BC-2R had incomplete specimens and the actual total used for analysis was 159. Cardno will provide notes in the future when incomplete specimens change the number of individuals used for analysis. Also, one of the replicates from MS-2 exceeded the required 150 ± 10 after identifications were completed. In MS-2, a “random between” query and a random number generator were used to reduce the number of organisms to the target (150 ± 10). After further explanation from Ms. Huestler, DEP determined that their reducing method is acceptable for achieving the target number of individuals.

The “Total Number” column on the taxonomic benchsheets is often not filled out for all taxa. DEP recommends that, if this column is included in the taxonomic benchsheet, the column be filled out for all taxa for consistency. Furthermore, in the Chicken Branch sample, the total number of slides used was not documented on the taxonomic benchsheet. In response to this finding, Cardno will make sure to include the number of slides used to mount specimens on all taxonomic benchsheets.

Sample Sorting QC: Cardno’s sample sorting protocols were thorough and the documentation was clear. No deficiencies were found for sample sorting QC. Quality control checks were conducted regularly, often on all aliquots sorted. The sorting efficiency calculation was conducted per DEP SOPs and sorting efficiency was tracked for each analyst. Cumulative sorting efficiencies were 95% or greater for experienced analysts. In cases where sorting efficiencies were below 95%, the employees were within their training period and had all their samples checked and received consultation regarding missing invertebrates.

Taxonomic Identification QC**:** Mr. Cantrell and Dr. Epler conduct taxonomic QC checks for each other. When discrepancies occur, they consult each other until they agree upon an identification. DEP acknowledges this as acceptable, but recommends Cardno add to their written protocols that if a consensus cannot be reached between Mr. Cantrell and Dr. Epler, that an extramural expert be consulted. In response to the preliminary audit report, additional information was provided to DEP on April 30, 2021, about the total number of samples identified by each taxonomist in order to determine if 5% of samples for each taxonomist had a QC check performed. According to the information provided, Mr. Cantrell had no samples with a QC check in 2016, 2017, and 2019. Additionally, Dr. Epler had no samples checked in 2019. According to DEP SOP SCI 2220 Section 3 and Cardno’s internal taxonomy QA/QC procedure, Dr. Epler

must have one (1) sample or 5% of samples checked for taxonomic accuracy each year, whichever is greater. Mr. Cantrell must have one (1) sample QA/QC'd for any year in which he identifies at least one sample. As a corrective action, after the first sample of the calendar year is processed by either taxonomist (Epler or Cantrell), that sample will be QA'd. In the event that either taxonomist processes more than 20 samples, the 21st sample will also be QC'd.

Cardno's taxonomic benchsheets indicated that slides were not always used for taxa in which mounting is recommended. However, DEP recognizes that it is not always necessary to mount every specimen mentioned in DEP SOP SCI 2100 Section 3.3.2.7. if the taxonomist had extensive experience.

There was no notation as to why some specimens were not identified to the lowest practical taxonomic level per DEP SOPs. This could affect SCI scores as some specimens require lower taxonomic identifications to be included in SCI metric calculations. DEP requires Cardno taxonomists to verify that each taxon is identified to the lowest taxonomic level per DEP SOPs, or if specimens cannot be identified to the appropriate taxonomic level (***e.g***. too small), that a brief comment on the taxonomic benchsheet be provided. In response to this finding, Cardno added a statement to the bottom of the taxonomy benchsheet, "All specimens have been identified to lowest practical taxonomic level based on the condition of the specimens provided." DEP acknowledges this corrective action as acceptable.

Cumulative correct identification rates were over 95% for each taxonomist, however, cumulative corrective ID rate calculations were not calculated correctly. For example, there were occasions where Mr. Cantrell's identification rates exceeded 100%, which is not possible. DEP recommends using the formulas below:

$$Correct\ ID\ rate = 100 * 1 - \frac{|taxonomist\ total - agreed\ upon\ total|}{agreed\ upon\ total}$$

$$Cumulative\ ID\ rate = 100 * 1 - \frac{|sum\ taxonomist\ total - sum\ agreed\ upon\ total|}{sum\ agreed\ upon\ total}$$

Metric and Index Calculation**:** All samples were correctly assigned to the correct SCI region. However, there were instances where taxa were incorrectly assigned to the various metric categories which ultimately altered the final SCI scores between 1 and 3 points. Cardno has revised their sample taxonomy lists in response to this audit to ensure taxa are assigned to the correct metric category. Other than the few incorrectly assigned taxa, which have since been corrected, metric scores and the final SCI scores were calculated correctly.

Data Usability Recommendation

Based on the results of this audit, the Aquatic Ecology and Quality Assurance Section has determined that the SCI data produced by Cardno meets the department's data quality objectives with the recommendations noted in the text and Table 2. DEP recommends that the data may be used for DEP related 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 Cardno and Cardno response to audit findings.

SOP Reference	Sample ID	Audit Finding	Cardno Response	Corrective Action and Implementation Date*	DEP Comments
SCI 2100 section 3.3.2.4	All samples	Dr. John Epler's provided list of taxonomic keys do not include several of the groups identified in his reference collection. Additionally, Dr. Epler's keys for dragonflies and damselflies are for North America instead of Florida specific keys, which are preferred.	All taxonomic keys in Dr. Epler's library were not listed, just those commonly used. His full list of taxonomic keys includes all groups identified in his reference collection. The available FL keys for odonates are copies of the keys in the references listed for North America. Some portions of the FDEP publications of the Florida specific keys are not up-to-date and not as accurate as the references listed. When Dr. Tenneson's new keys for FL odonate larvae become available, they will be referenced.	Cardno will use the most up-to-date and accurate references available. When Dr. Tenneson's new keys for FL odonate larvae become available, they will be referenced.	Dr. Tenneson's new keys are available and are posted on DEP's website here. This corrective action is acceptable and considered complete.
SCI 2200 section 1	All samples	Reference collections for both Dr. Epler and Mr. Cantrell are missing specimens from key taxonomic groups often identified in Cardno samples such as (but not limited to); non-Chironomid Diptera, Oligocheata, and Gastropoda. The majority of specimens in Mr. Cantrell's reference collection (~87%) are not verified by an extramural expert. It is unclear whether Dr. Epler uses extramural experts for taxonomic groups for which he is not an expert.	**Dr. Epler Response**: I would have to see a listing of which specimens are "missing" from the "key taxonomic groups" mentioned in order to respond. Regarding my use of experts to help with identification/verification - in the Excel file originally provided (2_Epler_Reference_List) listing the specimens, there is a column "Determined" that lists the "identifier". **Mr. Cantrell Response**: Reference specimens have been sent to outside experts only when the identification was not absolute to me or when the specimen might have been of interest to the outside expert due to range or to rarity. I did not put the chironomid slide specimens into the reference collection list; this will be corrected.	**Epler**: If FDEP will provide a list of missing taxa, they can be added if necessary. **Cantrell**: If necessary, we will have the other reference specimens secondarily confirmed to the degree that at least one specimen for each taxon is so identified.	DEP only searched the reference lists for taxa identified in the samples for this audit. Missing specimens from Dr. Epler's reference collection include, but are not limited to, *Cernotina* sp., *Gammarus tigrinus*, and *Tipula* sp. Going forward taxonomists should continue to build their reference collections when they come across specimens not currently in the collection. DEP recognizes Dr. Epler is considered an expert on multiple taxonomic groups. However, it is good laboratory practice for the taxonomist to have groups in which they are not considered an expert in to be verified by an extramural expert and thus should be implemented going forward. The responses and corrective actions are acceptable and considered complete.

SOP Reference	Sample ID	Audit Finding	Cardno Response	Corrective Action and Implementation Date*	DEP Comments
SCI 2100 sections 3.1.2.8-3.1.2.16	BC-2R, MS-2	Total number of organisms sorted exceeded the required target (150 ± 10).	MS-2 was reduced with random total of 157. Specimens for analysis were reduced accordingly. BC-2R had four incomplete specimens identified by taxonomist. Those were not used in final analysis or totals. The total used for analysis was 159.	MS-2: Random total and random specimen selection carried out for both samples. Documentation provided (***Attachment 1***). BC-2R: Cardno taxonomists will include that note on bench sheet about specimen quality instead of email in the future.	The responses and corrective actions for both samples are acceptable and is considered complete.
SCI 2100 section 3.1.2.12	MS-2	The number of specimens in the sample was reduced improperly. Each taxon should have an equal opportunity of being removed thereby reducing any potential bias.	Each taxon had an equal opportunity of being removed. A “random between” query was used to get new final total of 157. Then all specimens were listed, assigned a random number, and sorted from least to greatest. The highest 7 values belonged to *Hyalella azetca* and those specimens were removed from analysis.	Worksheet described listing, sorting and reduction included as ***Attachment 1***.	DEP approves of the method used for reducing described here and acknowledges that no corrective action is necessary.
SCI 2110	All samples	On the sorting benchsheet, the total number of invertebrates sorted was not the same as final total invertebrates sorted.	Cardno staff doing the QA not only reviews aliquots for missing inverts, but also does a review on the specimens picked by the sorter. For newer staff, specimens they counted as invertebrates may have been incorrect, or did not meet the SOP for completeness (missing head or partial specimen for worms), and therefore were not counted by staff doing QA.	Cardno added an additional column to benchsheet that more clearly identifies this step of QA. Notes describing discrepancies between picker total and final total will also be added to the benchsheet. New benchsheet created 4/8/2021 and now in use in Cardno lab (included as ***Attachment 2***).	DEP discussed this finding with Cardno via phone call. Cardno will add verbiage to their sorting protocols to clarify what the QA/QC columns indicate on the revised benchsheet. This corrective action is acceptable and considered complete.

SOP Reference	Sample ID	Audit Finding	Cardno Response	Corrective Action and Implementation Date*	DEP Comments
SCI 2100 and SCI 2110	All samples	Total number of organisms identified for each sample did not match the final total of invertebrates sorted. No explanation was provided for this discrepancy.	The four main reasons for non-matching totals are that: **1.** Invert picker was not sure if complete specimen, but counted and included in vial. It was found to be missing a head or incomplete by taxonomist so not counted. **Taxonomist total lower than picker.** **2.** Picker thought a specimen was aquatic worm, and counted as part of total. Taxonomist did not identify as worm (vegetation or other) and added no notes. **Taxonomist total lower than picker.** **3.** When picker placed larger specimen in vial, smaller specimens (generally midges) were tangled/caught within. Taxonomist was able to ID these additional specimens. **Taxonomist total higher than picker.** **4.** Picker was not sure if invertebrate considered aquatic or benthic so included, did not count, but added note. If taxonomist determined terrestrial added note, but did not verify when aquatic. **Taxonomist total higher than picker.**	Cardno created new lab benchsheet to more easily add up columns to a final total. It is now in use in the lab. Cardno staff will make sure to have all notes on number of specimens that were added and unsure if aquatic and counted/not counted. Staff will also include number of specimens that were added but not counted to notes if unsure if complete. Taxonomist will add notes on incomplete specimens or non-aquatic species. Taxonomist will also verify that questionable aquatic were actually aquatic in addition to noting terrestrial specimens.	The benchsheet Cardno referred to in the previous column is the sorting bencheet mentioned in the previous finding. The response and corrective actions are acceptable and considered complete.

SOP Reference	Sample ID	Audit Finding	Cardno Response	Corrective Action and Implementation Date*	DEP Comments
SCI 2100 section 3.3.2.7	BC-2R, MS-2, Chicken Branch 53, Tal-PP-Down	Slides were not always used for Oligocheates, Chironomidae, and Acariformes or Trombidiformes. Specifically, Oligocheates *Megascolecidae* sp. and *Eclipidrilus* sp in BC-2R, *Arrenurus* sp. in MS-2, *Dicrotendipes modestus* in Chicken Branch, and all Acari specimens in PP-Down.	**Dr. Epler Response**: Slides were not necessary for identification of the taxa listed. Adult mites are easily identified using a dissecting scope, as are larger oligochaetes and many taxa of Chironomidae (such as Dicrotendipes modestus). See Epler 2001. **Mr. Cantrell Response**: Slides are used for the vast majority of the taxa listed. I can identify a very small number of Chironomid species without mounting.	Cardno does not believe a corrective action is required.	DEP recognizes that with extensive experience it is not always necessary to mount every specimen required per DEP SOPs. DEP acknowledges that no corrective action is required. This response is acceptable and considered complete.
SCI 2110	Chicken Branch 53	The number of slides used to mount specimens was not recorded on the taxonomic benchsheet. There is a place provided on the benchsheet for this information, but it was left blank.	The total number of individuals identified through mounting was listed on the bench sheet for the Chicken Branch sample. Mr. Cantrell puts a single specimen per slide, so 85 slides for Vial 1 and 68 slides for Vial 2.	As of now, Cardno taxonomists will make sure to include that number on all taxonomy benchsheets.	This corrective action is acceptable and considered complete.
SCI 2110	All samples	In the files provided, the auditor could not locate where total number of taxa was recorded for each sample replicate.	The total taxa was included as part of the metric calculations. The header from the Vial Average Tab was copied over for individual vials. For the individual vials, the column headers have been updated and the column with the label “Total Taxa by Date” provides the required information.	Cardno updated the spreadsheet with the SCI calculations to reflect the correct column headers. This file is provided as ***Attachment 7***.	DEP acknowledges that it was part of the original submission. This response is acceptable and considered complete.
SCI 2110	With-Down, Tal-PP-Down, PRMP-10, MS-2	Samples collected on different dates and recorded as separate samples have the same sample ID. All samples must have a unique sample ID.	Our internal databases use a similar sample ID as there are queries tied to the ID and would not work/output the correct data if each sample had a unique ID. The sample differentiation is made between sample dates.	Cardno will make sure to create a combined SampleID-Date identifier to be clearer in the future for all documentation provided to FDEP.	This corrective action is acceptable and considered complete.

SOP Reference	Sample ID	Audit Finding	Cardno Response	Corrective Action and Implementation Date*	DEP Comments
Section SCI 2100 section 3.3.2.4 and SCI 2230	BC-2R, MS-2, Tal-PP-Down, PRMP-10	Some taxa were not identified to the lowest practical taxonomic level per SCI 2230. Specifically, Cambaridae and Hydropsychidae in BC-2R, Decapoda in MS-2, Anisoptera and Cambaridae in Tal-PP-Down, and Gomphidae and Unionidae in PRMP-10.	**Dr. Epler Response**: The specimens were identified to the lowest practical taxonomic level; individuals were too small/immature/incorrect sex or damaged to identify further than family level. **Mr. Cantrell Response**: All specimens were identified to lowest practical taxonomic level for the specimen(s) under review. There are several reasons that identification of a specimen cannot (should not) be taken to lower classification. These include: the SCI sampling, preservation and sorting process frequently damages individual specimens to the point that lowest classification is not possible or is only a guess based on known fauna, early instar or immature forms do not fit most keys which are typically developed for mature or almost mature forms and finally some specimens just do not fit keys and are either known species with some characters that extend beyond the range assigned in the description or are perhaps new species.	Cardno added a statement to the bottom of the taxonomy benchsheet “All specimens have been identified to lowest practical taxonomic level based on the condition of the specimens provided”. The revised benchsheet is provided as ***Attachment 3***.	This corrective action is acceptable and considered complete.

SOP Reference	Sample ID	Audit Finding	Cardno Response	Corrective Action and Implementation Date*	DEP Comments
SCI 2220 section 3	All samples	Auditor could not determine how many total samples each taxonomist identified and thus could not determine if 5% of samples for each taxonomist had a QC check performed.	In the original file provided to FDEP for samples to select for QA, all the samples processed by the Cardno lab for each year were provided but the taxonomist doing the identification was not noted. The spreadsheet has been updated with the taxonomist for each sample. Revised Cardno Response: QA/QC for samples processed by Dr. Epler in 2019 were inadvertently not performed. QA/QC was done on a sample in 2019 by Mr. Cantrell, but it was for a sample processed by Dr. Epler in 2018. This resulted in the omission of QA/QC for Dr. Epler's samples in 2019. To remedy this omission, Cardno will be sending one of the samples processed by Dr. Epler in 2019 to Mr. Cantrell for QA. Cardno will then update the cumulative ID rates for 2015-2019 and send back to FDEP upon completion. Due to infrequent sample processing by Mr. Cantrell, one to two samples annually, his sample QA/QC was missed in 2016, 2017, and 2019. A 2020 sample processed by Mr. Cantrell has already undergone QA/QC and the cumulative ID rate can be updated to reflect that process. To make sure QA of at least one sample is not missed in the future, after the first sample is processed by Mr. Cantrell in a calendar year, it will be QA/QC'd by Dr. Epler or other approved taxonomist.	A revised version of the file of all samples processed is provided with taxonomist for each sample indicated (***Attachment 4***). Starting now, Cardno will track the taxonomist identifying each sample in the same location as list of samples analyzed. Revised CA: Cardno will send one sample processed by Dr. John Epler from 2019 to Mr. Cantrell to QA. Starting in 2021, after the first sample of the calendar year is processed by either taxonomist (Epler or Cantrell), that sample will be QA'd. Once sample 21 is processed by either taxonomist in a calendar year, it will be sent for QA.	According to information provided from the revised file, R. Cantrell had no samples QA/QC'd in 2016, 2017, and 2019. Additionally, Epler had no samples QA/QC'd in 2019. According to Cardno's internal taxonomy QA/QC procedure and the FDEP SOPs, 1 sample per year or 5%, whichever is greater, must be QA/QC'd per taxonomist. Revised DEP Comment: The revised response and corrective action are acceptable and is considered complete.

SOP Reference	Sample ID	Audit Finding	Cardno Response	Corrective Action and Implementation Date*	DEP Comments
SCI 2220	All samples	All Chironomidae are either identified or verified by Dr. Epler who is recognized as an expert in the Chironomidae family. However, this was not indicated on the taxonomic QC protocols provided to DEP and should be added for future reference.	The Cardno Taxonomic ID QC Procedure document has been updated to reflect this procedure.	Cardno has provided a revised document with this submittal as ***Attachment 8***.	This corrective action is acceptable and considered complete.
SCI 2220 section 2	All samples	Incorrect calculation was used for cumulative correct ID rate.	The initial calculation provided by FDEP in the preliminary audit report document was incorrect. The calculation should be: **Correct ID rate** = 100 * 1 – |taxonomist total – agreed upon total| / agreed upon total For the cumulative ID rate, Cardno used the following calculation: **Cumulative ID rate** = 100 * 1 – |sum taxonomist total – sum agreed upon total| / sum agreed upon total Calculation has been revised in spreadsheet and the updated spreadsheet is provided.	Cardno has provided a revised spreadsheet with the correct calculations with this submittal as ***Attachment 5***.	The Cumulative ID rate calculation Cardno provided in their response is correct and considered acceptable. This finding is considered complete.
SCI 2221	All samples	Taxonomic QC sample analysis was performed but the dates were missing from records.	They were unintentionally left off of the Excel file. The QC dates have been added to a revised version of the spreadsheets.	Cardno is providing revised QC sample analysis files for each taxonomist that includes original identification and QC dates (***Attachments 6A and 6B***).	This corrective action is acceptable and considered complete.

SOP Reference	Sample ID	Audit Finding	Cardno Response	Corrective Action and Implementation Date*	DEP Comments
SCI 2100 section 5.1-5.5	MS-2, Chicken Branch, PP-Down, PRMP-10	Some taxa were incorrectly assigned to the various metric categories. Specifically, , *Branchiodrilus hortensis,* was not labelled as filter feeder in MS-2, *Macromia* was incorrectly labeled as a clinger in Chicken Branch, *Macromia* was incorrectly labelled as a clinger and *Isonychia* was incorrectly labelled as a 100% filter feeder in Tal-PP-Down (correct assignment is 50% filter feeder), and *Cernotina* sp. was incorrectly labelled as filter feeder in PRMP-10. These errors altered the final SCI scores for those aliquots.	The family Macromiidae was removed from clinger taxonomy list but sample list not revised. The filter feeder taxonomy list was revised to exclude *Isonychia* but not the sample list. Per a conversation with Joy Jackson on 4/21/21 and a subsequent follow-up email on 4/26/21, the family *Cernotina* was part of (Polycentropodidae) should be updated to "unspecified" for feeding group. Only the genus *Cyrnellus* should be classified as a 100% filter feeder.	The sample taxonomy lists were all revised based on FDEP metric taxonomy lists (manually done as query adds not removes metric identifiers). An updated sheet with the SCI calculations is provided as ***Attachment 7***. Cardno will regularly check the FDEP website for taxonomy updates and then update databases as necessary.	The corrective actions are acceptable and considered complete.

*All corrective actions were implemented upon receipt of Cardno's responses to the preliminary report, July 7, 2021, unless otherwise noted in Table 2.