



Macroinvertebrate to Species

Single-Award Event

Specifications

The State of Tennessee is seeking a multi-year contract of three (3) years + two (2) renewal options for a total of sixty (60) months for Macroinvertebrate Species Level Analysis. This contract is for analytical service to be performed for species level biota found in water samples collected from sources within the state of Tennessee.

Definitions

Arthropods: a diverse group of invertebrate animals that include lobsters, crabs, spiders, mites, insects, centipedes, and millipedes. They have a segmented body, jointed limbs, and a chitinous shell. Arthropods make up about 75% of all animals on Earth and play important roles in ecosystems as pollinators, nutrient recyclers, scavengers, and food for other animals.

Chain of Custody: The chronological documentation or paper trail that records the sequence of custody, control transfer analysis, and disposition of materials, including physical or electronic evidence.

Chironomidae: a group of non-biting midges (flies) and bloodworms with a global distribution, both aquatic larvae and pupae are identified.

Clean Water Act: The primary federal law in the United States governing water pollution.

Central Time (CT): a standard time zone that is six hours behind Coordinated Universal Time. It is used in parts of North and South America, including Canada, the United States, and Mexico, as well as some areas in the Eastern Pacific Ocean and Caribbean islands.

Culicidae: family of small flies consisting of 3,600 species. AKA, mosquitoes.

Division of Laboratory Services (DLS): Provides high quality analytical services of clinical and environmental testing and to achieve the Mission of the Tennessee State Department of Health.

Environmental Protection Agency (EPA): independent agency of the United States government tasked with environmental protection matters. The role of the agency is to conduct

environmental assessments, research, and education. An additional role of the agency is to maintain and enforce national standards under a variety of environmental laws, in consultation with state, tribal, and local governments.

Ephemeroptera, Plecoptera, Trichoptera (EPT): three orders of aquatic insects commonly found in the benthic macroinvertebrate community. Commonly known as mayflies, stoneflies, and caddisflies.

Gerridae: family of insects in the order Hemiptera, commonly known as water striders, water skaters, water scooters, water bugs, pond skaters, water skippers, water gliders, water skimmers or puddle flies.

Gyrinidae: Water beetles, comprising the family Gyrinidae that usually swim on the surface of the water if undisturbed, though they swim underwater when threatened.

Laboratory Information Management System (LIMS): software that manages laboratory samples and the associated data, thus standardizing operations by maintaining and automating workflows, managing tests, and handling reporting procedures.

Macroinvertebrate: any animal lacking a backbone and large enough to see without the aid of a microscope.

Measured Quality Objective (MQO): goals related to the value of products, services and processes. These come from the International Organization for Standardization (ISO) quality management systems, which is a set of guidelines to help organizations meet their customers' needs and requirements.

Oligochaeta: a subclass of soft-bodied animals in the phylum Annelida, we only look at aquatic specimens for identifications.

Percent Difference in Enumeration (PDE): quantifies the consistency of specimen counts in samples and is determined by calculating a comparison of results from two independent laboratories or taxonomists.

Percent Taxonomic Disagreement (PTD): quantifies the sample-based precision of taxonomic identifications by comparing target level taxonomic results from two (2) independent taxonomists.

Percent Taxonomic Completeness (PTC): the percentage of individuals in a sample that are identified to the specified target level.

Quality Assurance: Any systematic process used to determine if a product or service meet quality standards.

Quality Control (QC): a system of maintaining standards in manufactured products or services by testing a sample of the output against the specification.

Semi Quantitative Single Habitat Macroinvertebrates (SQSH): sampling technique designed to

collect a representative macroinvertebrate sample in streams/creeks/rivers.

Semi Quantitative Single Habitat Macroinvertebrates bank (SQB): sampling technique designed to collect a representative macroinvertebrate sample in streams/creek/rivers from areas of roots along banks.

Semi Quantitative Single Habitat Macroinvertebrates kick (SQK): sampling technique designed to collect a representative macroinvertebrate sample in streams/creek/rivers from riffle areas.

Society of Freshwater Science: an international organization whose members study freshwater organisms, biotic communities, physical processes that affect ecosystem function, linkages between freshwater ecosystems and surrounding landscapes, habitat and water quality assessment, conservation, and restoration.

Standard Operating Procedure (SOP): a set of written instructions that outline the steps required to complete a task or process in a consistent way.

Taxon: A collection of one or more populations of organisms.

Taxonomic Certification: documented knowledge and skill in specialized areas of taxonomy.

Tennessee Department of Health (TDH): the primary agency of state government in Tennessee responsible for public health. Its workforce provides a variety of direct and indirect services to residents and visitors in all 95 counties of the state.

Veliidae: family of gregarious predatory insects in the suborder Heteroptera. They are commonly known as riffle bugs, small water striders, or broad-shouldered water striders because the segment immediately behind the head is wider than the rest of the abdomen.

Standard Requirements

1. Vendor shall limit staff to US-based (onshore) resources only.
2. No sample requests from the Tennessee Department of Health Division of Laboratory Services (TDH-DLS) shall be subcontracted.
 - a. If, at any point, the vendor is unable to meet the sample analysis requirements set forth in the contract, the vendor must communicate this fact to the TDH-DLS within one (1) week via email.

Minimum requirements (Macro to Species):

A. Specifications

1. The vendor shall identify one hundred fifty-six (156). Semi quantitative single

habitat Macroinvertebrate (SQSH) (SEMN) samples at the Species level plus sixteen (16) Quality control checks. (10% sorting QC, 10% Taxonomic QC).

- a. These numbers represent the maximum number of samples over the initial three (3) years of the contract.
2. The vendor shall identify seven hundred ninety-two (792) Qualitative Habitat (QH) (SEMN) Samples at the Species level plus 80 Quality control checks. (10% taxonomic QC).
 - a. These numbers represent the maximum number of samples over the initial three (3) years of the contract.
3. The vendor shall identify for species level subsample to three hundred (300)+/- 10% (270 to 330) organisms following TDH-DLS SOP 133336.10052 Macroinvertebrate.
 - a. This total number of organisms is for the semi quantitative samples.
 - b. The qualitative habitats (QH) must be identified in their entirety, no matter how many are in the sample.
4. Vendor must maintain a copy of the chain of custody for all samples.
5. Vendor agrees that any provided sample data is subject to legal review.
6. Vendor must identify each organism in subsample to the species level.
7. The vendor shall complete a taxa list that must include a count of each taxon in subsample SQSH and QH.
 - a. Some genera are no longer accepted as aquatic (such a Gyrinidae, Gerridae, Veliidae, and Culicidae).
8. Vendor must sort subsample organisms from debris using a dissecting microscope.
9. Vendor must record the entire number of grids/total grids subsampled for the SQSH samples.
10. Vendor must create an Excel taxa list for each sample with numbers of organisms per taxon, and header, based on the template provided by TDH DLS.
 - a. The vendor shall ensure that the following Information is included in each header:
 - i. TDH log number
 - ii. Station ID
 - iii. Sample type
 - iv. Sampler initials
 - v. Date sampled

- vi. Analysts name or initials.
- 11. The vendor shall ensure that the taxonomic staff and/or supervisor must be available via email, phone or in-person visits during standard business hours (7:00 AM – 5:00 PM CT) Monday through Friday for resolutions as needed.
- 12. The vendor shall ensure that at least one staff member of the contracted laboratory should have the taxonomic certification in the EPT, chironomids, and general arthropods tests from the Society for Freshwater Science (SFS) and provide this documentation.
- 13. The vendor shall ensure that all Oligochaeta and Chironomidae found in the sort must be identified to species.
 - a. Do not subsample any organisms including chironomids and oligochaetes further.
 - b. Identify each organism in the two- hundred seventy to three-hundred thirty (270 to 330) organism subsample (SQSH) and QH.
- 14. Vendor must keep any new species in a separately labeled vial for possible future verification.
 - a. Sample vial must include a label with the following information:
 - i. Family/genus/species name
 - ii. Date collected
 - iii. Site ID
 - iv. Samplers' initials
 - v. Taxonomist's initials
 - vi. TDH log number.
- 15. The vendor is responsible for returning all samples to the TDH-DLS.
 - a. Samples must be labeled with the following information:
 - i. Station ID
 - ii. Date of collection
 - iii. Sampler's initials
 - iv. TDH log number
 - v. Analyst's initials
 - b. Including all remaining sample debris, sorted debris, and organisms identified in the sample (to include slides and non-mounted organisms).

A. Quality Assurance

- 1. The vendor must conduct internal quality control checks for sorting efficiency of ninety percent (90%) or higher).

2. Taxonomic identification following the MQO guidelines found in the TDH SOP 133336.10052 Macroinvertebrate in "Appendix 13" (adopted from the Society of Freshwater Science). On ten percent (10%) randomly selected samples by the vendor. Including:
 - a. Percent Difference in Enumeration (PDE),
 - b. Percent Taxonomic Disagreement (PTD), and
 - c. Percent Taxonomic Completeness (PTC)
3. Vendor must include name and credentials of analysts when sending specimen for verification. The vendor must ensure that quality control logs be submitted with each batch of sample results, in excel format.
4. Submitted QC will include QC comparisons.
5. All levels of the QC must pass.
6. The QC's must be completed before reporting sample results including all corrections.
7. The vendor will ensure that all samples are to be done in the order that TDH-DLS stipulates on the chain of custody.

B. Special Instructions

1. Results shall be completed in the form of Excel taxa lists.
2. Copies of the original bench sheets, and results completed in the form of Excel taxa list must be emailed to: **Carrie.Perry@TN.Gov**
3. All identified organisms will be boxed by the vendor and sent back to the TDH - DLS at the address below.
4. Vendor is responsible for all shipping and handling charges incurred.
5. TDH - DLS Samples are preserved using ethanol which is a class three (3) flammable liquid.

6. Vendor shall report sample results within thirty to sixty (30-60) days of receipt of sample.

C. Location & Contact:

1. All shipments shall be sent to:

Carrie Perry, Aquatic Biology Manager
Tennessee Department of Health, Division of Laboratory Services
630 Hart Lane
Nashville, TN 37216.
Carrie.Perry@TN.Gov