STANDARD OPERATING PROCEDURE FOR THE COLLECTION OF ZOOPLANKTON AND PHYTOPLANKTON SAMPLES IN LAKES

1.0 Introduction

The purpose of this document is to provide a simplified, step-by-step outline of the field and laboratory procedures used by the Water Quality Programs Division of the Oklahoma Water Resources Board (OWRB) for the collection of zooplankton and phytoplankton in lakes and reservoirs. The basic sampling procedures that will be discussed in this document involve water quality sampling, methods and equipment. All documents needed for, including chain of custody forms for both the OWRB and Oklahoma State University, or other contracted laboratory can be found at the end of this document.

2.0 Definitions/Terms

3.0 Safety

Upon reaching the sampling location, site safety determinations should be made before proceeding. Please refer to the OWRB safety manual for information on boat safety, trailering and working from boats. Zooplankton sampling requires Ethanol as a preservation solution; please refer to the MSDS for safety precautions, as it is flammable.

4.0 Quality of the Measurement

When sampling for all programs, Quality Assurance/Quality Control (QA/QC) samples will be routinely collected to assure that environmental samples meet the Data Quality Objectives (DQO's) that are outlined in the controlling Quality Assurance Project Plan (QAPP). QA/QC sampling is designed to control each step of the sampling process. Duplicate samples are collected to ensure that composite samples are properly processed. Replicate samples may be collected to ensure that the sampling methodology employed is collecting a representative sample. Spike or known samples may be submitted to test the efficacy of the analytical laboratory.

5.0 Personnel and Equipment

Principle investigators for the OWRB are required to have degrees and/or experience with biological or other applicable sciences. Principle investigators are defined as crew leaders, and this designation may be made upon the leader of a multi- or a one-person crew. Training is required for all SOPs dealing with water quality and quantity collections and measurements as well as habitat assessments and biological collections. In-house training will be conducted for the use of all meters and digital titrators used for water quality or quantity measurements. Investigators must be familiar with OWRB SOP document and all training will follow the methods outlined in that document. Extra training will be provided when new SOPs are developed. Training of field crews will be done through dry run

exercises in the laboratory to familiarize field crews with sample collection, sample preservation, instrument operation, calibration, and maintenance. In addition, when new personnel are hired or new methods developed, qualified staff will train on sample collection, measurement, and field analysis methods through side-by-side field trips. These trips will familiarize staff with SOP requirements. When training is considered adequate, a qualified staff member will check field staff for adherence to SOPs.

5.1 Collection Equipment

Collections for zooplankton will be made using a 243-µm mesh Wisconsin–style plankton net with a 12.5 cm opening. When collecting samples, an additional clean 100 mL sample bottle labeled for zooplankton should be included.

Collections for phytoplankton will be made using a surface grab technique. A clean 100 mL sample bottle labeled for phytoplankton will be used.

6.0 Collection of Samples

Collection of Zooplankton Sample

- Record the lake ID, date, length of tow, and initials on the sample label.
- Prior to each use, carefully clean and thoroughly rinse the interior of the plankton nets and buckets with DI water.
- Collections will be made using a 243-µm mesh Wisconsin-style plankton net with a 12.5 cm opening and a 125 mL collection bottle.
- Carefully inspect the nets and buckets for holes or tears.
- Attach the collection bucket (243-µm) to the “cod” end of the net and secure.
- Attach the bridled end of the plankton net to a ¼” calibrated line with markings every 1.0 m, with the first mark being 1.0 m from the mouth of the net.
- Carefully and slowly lower the net in a constant upright position over the side of the boat. To prime the net and bucket, submerse the body of the net without water going over the mouth three times with short quick tugs.
- Identify the true depth with the sonde and round to nearest 0.5 m above the lake bottom. Lower the net until the tow rope mark representing that depth is at the water line.
- Retrieve the net by pulling back to the surface at a steady constant rate without stopping (0.3 m or 1 ft per second).
- Once at the surface submerse the body of the net without water going over the mouth three times with short quick tugs to help rinse contents into the collection bucket.
- Complete the rinsing of the net contents by spraying water against the outside of the net with a squirt bottle or similar tool.
- Holding the collection bucket in a vertical position, carefully remove the bucket from the net.

- Concentrate the contents of the collection bucket by swirling the bucket without spilling the contents. Excess lake water will filter out of the bucket from the screened sides.

Collection of Phytoplankton Sample

- Record the lake ID, date, length of tow, and initials on the sample label.
- Collections will be made with a surface grab and a 125 mL amber collection bottle.
- It is important to prime the sample bottle three times by rinsing the containers out with sample water before filling (fill the container with a little sample water, shake it, and pour the water out).
- Completely immerse the sample container nozzle down (0.5 meters – approximately an elbow length below the surface) and slowly allowing sample container to fill. Try to avoid aerating the sample (i.e. don't allow water to "bubble" into the container). Bring the bottle to vertical under water and cap.

6.1 Sample Processing

Water collected for zooplankton analysis will be processed while in the field.

- Using small volumes of DI water from a squirt bottle to rinse the contents of the mesh net bucket into the polyethylene jar. Rinse bucket with DI water three to four times or until the majority of zooplankton have been removed. Drain the remaining filtrate into the sample container. Fill the jar of zooplankton to the shoulder (~80 mL or a little more than half full) with 95% ethanol.
- In some cases, the volume of zooplankton collected in bucket may exceed jar size. Do not try to force the entire sample into a single bottle or the preservative will not function properly and the sample may be lost. In such cases, use a second bottle to preserve the additional amount of sample. Create an additional label reflecting the same information as the label for the first vial and add the information "Jar 2 of 2."

Water collected for phytoplankton analysis will also be processed while in the field.

- While wearing Nitrile gloves de-cap bottle and carefully add 2 mL's of Lugol's Iodine Solution.
- Carefully re-cap bottle, ensuring that no sample escapes and invert bottle to mix Lugol's Iodine.
- Place on ice for storage.
- Upon returning to the lab, samples will be logged in on the Zooplankton and Phytoplankton Chains of Custody, respectively, and stored in a designated cool, dry area.

The Zoo- and Phyto- plankton log sheet is located at:
S:\Monitoring\LAKES\FORMS&LABELS\ZOOPHYTOCUSTODYtemplate.

7.0 Forms

7.1 Chains of Custody

Chains of custody are documents turned into the analytical laboratory for each group of samples collected. These forms are used for several purposes. They act as a legal

document to show proper delivery of samples occurred and they make a general list of the parameters that should be analyzed. Chains of custody are available other parameters such as inorganics, metals, and organics panels. They are a data sheet and should be treated as such. Therefore, they should include the date and time for each sample collected and must be legible and complete. They should also be signed and dated by field and laboratory receiving personnel at the time of delivery. To avoid confusion and loss of data, a new chain of custody should be used for each group of samples. An example is located at the end of this document. For guidance on proper procedure to complete the chains of custody, refer to your supervisor and or FTE. Chains of custody can be found at: *S:\Monitoring\LAKES\FORMS&LABELS\ZOOPHYTOCUSTODYtemplate* .

8.0 Data Storage

All completed paper copies of forms and data sheets should be maintained with the appropriate station notebook. The data from the field notes and laboratory data sheets should be either entered into or uploaded to the Water Quality Database. Each sample should be maintained electronically in the database under a unique sample number.

9.0 References

American Public Health Association, et. al. Standard Methods for the Examination of Water and Wastewater (22nd ed.). Port City Press, Baltimore, MD., 2013

USEPA Survey of the Nation's Lakes, Field Operations Manual 22-March-2012.

OKLAHOMA WATER RESOURCES BOARD **OWRB ZOOPLANKTON CHAIN OF CUSTODY RECORD**

PROJECT: Beneficial Use Monitoring Program - LAKES Zooplankton Collection

Sample Date Range:

Preservation: ALCOHOL **Net:** 243 um Wisconsin Net, 12.5 cm opening

Sample Number	Date Collected	Time Collected	Site Location	Number of Containers	Length of tow (m)	Collector Initials		Date Processed	Initials	Remarks
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OKLAHOMA WATER RESOURCES BOARD **OWRB ZOOPLANKTON CHAIN OF CUSTODY RECORD**

PROJECT: Beneficial Use Monitoring Program - LAKES Zooplankton Collection

Sample Date Range:

Preservation: ALCOHOL **Net:** 243 um Wisconsin Net, 12.5 cm opening

Sample Number	Date Collected	Time Collected	Site Location	Number of Containers	Length of tow (m)	Collector Initials		Date Processed	Initials	Remarks
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Relinquished By:	Date:	REMARKS:
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