

# **STANDARD OPERATING PROCEDURE FOR THE COLLECTION OF WATER QUALITY SAMPLES IN LAKES**

## **1.0 Introduction**

The purpose of this document is to provide a simplified, step-by-step outline of the field sampling procedures used by the Water Quality Programs Division of the Oklahoma Water Resources Board (OWRB) for the Lakes section of the Beneficial Use Monitoring Program. Only the basic techniques for sampling will be outlined in this document; an experienced staff member will conduct further training on an as-needed basis explaining other, more complex techniques. All documents pertaining to lakes sampling, including chain of custody forms for Oklahoma Department of Environmental Quality (ODEQ), data sheets, checklists, are included in Appendix A along with a network location so they can be easily accessed.

## **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.

## **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. Blanks are collected to ensure that field personnel are properly cleaning the plastics and glassware used in field sampling. 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.

## **4.1 Types of Samples**

Samples are collected to test various DQO's precision, accuracy, and representativeness. Following is a short description of each kind of sample. Samples are submitted to the analytical laboratory with other trip samples.

- **Lab Blank Sample:** A laboratory blank sample is collected to ensure that laboratory cleaning methods are adequate and are not contaminating samples. Reagent grade water should always be used to collect these samples. Submitted on a regular schedule.
- **Field Blank Sample:** A field blank sample is collected to ensure that field cleaning methods are adequate and are not cross-contaminating samples. Reagent grade water should always be used to collect these samples. Submitted on a regular schedule.
- **Analytical Blank Sample:** An analytical blank sample is submitted to control the methods of the analytical laboratory. Reagent grade water should always be used to collect these samples. Submitted on a regular schedule.
- **Duplicate Sample:** A duplicate sample is collected to control the sample splitting method. This sample ensures that composite samples are being collected appropriately. Submitted on a regular schedule.
- **Replicate Sample:** A replicate sample is collected to control the general sampling methodology that is being employed. This sample ensures that a representative sample is being collected. Submitted on a regular schedule for some types of samples. Replicate samples may also be submitted to verify the accuracy of analytical results.
- **Spike Sample:** A spike sample is a known stock solution diluted by environmental sample. - Submit as required.
- **Known Sample:** A known sample is a known stock solution diluted in the laboratory with reagent grade water. - Submit as required.

The Oklahoma Department of Environmental Quality (ODEQ) can provide ampule stock solutions for spike or known samples, or under certain circumstances, these samples may be purchased through a laboratory supplier. Consult a supervisor to determine where to acquire stock solutions. When preparing QC spike and known samples, **record everything you do!** It is essential that all steps of the process be adequately documented.

## 4.2 Preparation of Samples

### 4.2.1 Inorganic Chemistry, Metals, Chlorophyll, and Field QA/QC Samples

**Quality Assurance/Quality Control (QA/QC)** – Samples will also be collected to verify the precision of the analyzing lab and sample collection methods. Surface water (at the dam site) is collected into a churn sample splitter to “split” the sample into environmental and duplicate samples. Specific procedures for the churn splitter are described in section 6.1 of this document.

#### **Analytical Blank Sample**

- One sample is collected for each sampling week, when noted as needed by the project quality assurance plan or deemed necessary by the project manager.
- The sample is collected from reagent grade water provided by the analytical laboratory.

- The sample will include 1-liter bottles for ice preservation, sulfuric acid preservation, chlorophyll, and field parameters (turbidity, hardness, alkalinity, ortho-phosphorus and ammonia), one 250 mL bottle for total recoverable metals and one 75 mL dissolved metals sample, both preserved with nitric acid,
- Label with a "31" in the QA code.

#### **Laboratory Blank Sample**

- One sample is collected for each sampling week, when noted as needed by the project quality assurance plan or deemed necessary by the project manager.
- The sample is collected by running reagent grade water through all plasticware that will be used in the field during a particular sampling week.
- The sample will include 1-liter bottles for ice preservation, sulfuric acid preservation, chlorophyll, and field parameters (turbidity, hardness, alkalinity, ortho-phosphorus and ammonia). During metals sampling, one 250 mL bottle for total recoverable metals and one 75 mL dissolved metals sample will be added and run through the Van Dorn, both preserved with nitric acid,
- Label with a "32" in the QA code.

#### **Field Blank Sample**

- One sample is collected for each sampling trip, when noted as needed by the project quality assurance plan or deemed necessary by the project manager.
- The sample is collected by running reagent grade water through any plasticware that is used at more than one station. Normally, this will only be the churn splitter. Water should be aliquotted in a manner that is consistent with normal sampling procedures.
- The sample will include 1-liter bottles for ice preservation, sulfuric acid preservation, chlorophyll, and field parameters (turbidity, hardness, alkalinity, ortho-phosphorus and ammonia). During metals sampling, one 250 mL bottle for total recoverable metals and one 75 mL dissolved metals sample will be added and run through the Van Dorn, both preserved with nitric acid.
- Label with a "33" in the QA code.

#### **Duplicate Sample**

- At least one sample is collected for each lake/project, when noted as needed by the project quality assurance plan or deemed necessary by the project manager.
- The sample is collected by using a "churn splitter" to divide water from one sample site into two separate samples.
- The sample will include 1-liter bottles for ice preservation (if analyzed for chlorides and sulfates), sulfuric acid preservation, chlorophyll, and field parameters (turbidity, hardness, alkalinity, ortho-phosphorus and

ammonia). During metals sampling, one 250 mL bottle for total recoverable metals and one 75 mL dissolved metals sample will be added and run through the Van Dorn, both preserved with nitric acid.

- Label one sample set with an “11” (environmental sample) and the other sample set with a “21” (duplicate sample set) for the QA code.

### **Replicate Sample**

- At least one sample is collected for each lake/project when noted as needed by the project quality assurance plan or deemed necessary by project manager.
- The sample is collected by repeating the exact sampling process collecting two independent sample sets.
- The sample will include 1-liter bottles for ice preservation (if analyzed for chlorides and sulfates), sulfuric acid preservation, chlorophyll, and field parameters (turbidity, hardness, alkalinity, ortho-phosphorus and ammonia). During metals sampling, one 250 mL bottle for total recoverable metals and one 75 mL dissolved metals sample will be added and run through the Van Dorn, both preserved with nitric acid.
- Label one sample set with a “12” (environmental sample) and the other sample set with a “22” (replicate sample) in the QA code.

### **4.2.2 Bacteria QA/QC Samples**

Bacteria collections require all designated QA/QC samples described in 4.21 of this document with the exception of the analytical or field blank as no plastic ware is reused.

## **5.0 Personnel and Equipment**

### **5.1 Personnel**

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.

In all instances, the collection of water quality samples from lakes requires a two-person field crew.

## 5.2 Equipment

A checklist listing the equipment needed for collection of water quality samples from lakes and reservoirs is located in Appendix A at the end of this document.

## 6.0 Sample Collection

### 6.1 General Sampling Methodology –

To locate a sample site, rely on information from the supervising FTE, maps, and landmarks. Once the approximate site is located, it is important to find the thalweg or “old” river channel. Sample sites should be located in the thalweg as this is generally the deepest area of a particular section of the lake and is less influenced by shoreline areas. The thalweg can be located by driving across the lake and noting the point on the depth finder where the bottom rapidly drops off and then rises. Be sure to document the sampling location on the head unit or field sheet.

Quality assurance/quality control (QA/QC) samples will also be taken at the dam site to verify the precision of the analyzing lab and sample collection methods. Surface water is collected via a surface grab, taken at 0.5m depth (approximately an elbow length below the surface).. Four or six sample containers will be collected, determined by the samples being analyzed for chlorides and sulfates or not. Two “acid” (notated on bottle in red) and, if applicable, two “ice” (notated on bottle in blue) are analyzed for general chemistry purposes. The remaining two are for chlorophyll analysis and sample water for the field panel. Each type of bottle will have an environmental sample and a replicate sample, labeled with the QA codes 11 and 22.

**6.2 Sample collection:** Water samples are collected at each site to be tested for chemical composition. The supervising FTE will provide specific instructions on the number of samples and depths at which samples are to be taken. It is important to **prime the sample bottles 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). Surface samples are collected by completely immersing the sample containers 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). **It is important to completely fill sample containers leaving no room for air in the container.**

Sub-surface samples are collected using a Van Dorn. Specific instruction on using this piece of equipment will be provide by the supervising FTE. Record the collection depth of the bottom sample on the appropriate data sheet. The data sheet is located under the filename: *S:/Monitoring/Lakes/Forms&Labels/Bump Lakes Field Data Sheet*

When collecting water samples at any depth, it is important to collect all necessary 1-liter containers of the **same** sample. One of the containers will be preserved with concentrated sulfuric acid (H<sub>2</sub>SO<sub>4</sub>) and all will be placed on ice. Immediately, or upon returning to the dock, add the pre-measured vial containing 2ml of sulfuric acid into the sample container designated to be preserved with acid. Be mindful of weather conditions, such as wind, when determining to add acid on the boat or at the dock. The ODEQ laboratory supplies a new stock of the screw-capped 2ml plastic vials of sulfuric acid as needed (approximately 1ml per 1 Liter of sample water should be sufficient to properly preserve the sample water). Once the acid has been added and the acid vials have been discarded in the appropriate container, all samples should be placed on ice for transport to the analyzing lab. It is vital that the samples be stored on ice at approximately 4°C until they reach the lab to ensure preservation of the samples.

## 7.0 Types of Water Quality Samples

### Inorganic Panel

The inorganic panel is processed through an analytical laboratory for a nitrogen series, phosphorus series, and certain minerals. A solids series may also be included in this panel. Because these samples are normally processed for both a nitrogen and phosphorus series, they typically have a 48-hour hold time and must be returned to the laboratory within that holding time. Surface samples are collected by completely immersing the sample containers (0.5 meters - approximately an elbow length below the surface) and allowing them to fill. Avoid aerating the sample (i.e., don't allow water to "bubble" into the container). This is accomplished by lowering the bottle in the lake with the nozzle down, allowing water to slowly fill the bottle. It is important to **prime the sample bottles three times** by rinsing the containers out with native water before filling (fill the container with a little sample water, shake it, and pour the water out). **It is important to completely fill sample containers leaving no room for air in the container.**

### Field Panel

Field staff process the field panel for turbidity, hardness, alkalinity and ortho-phosphorus. Unless otherwise described in a project quality assurance plan, these samples are collected and processed at the site. They may also be split into a small polyethylene sample bottle or the 1 liter collection bottle used during sampling, for later testing as long as they still meet the time requirements.

Completed samples should be void of air. If samples are collected for processing at a later time, the sample is preserved on ice at 4°C. Because alkalinity, ortho phosphorus, and turbidity have a 24-hour hold time, samples must be processed within a 24 hour time period and must be brought to ambient temperature before analyzed. Processing of these samples is described in corresponding SOP's. (OWRB, 2005a; OWRB, 2005b)

### **Metals Panel**

The metals panel is processed through an analytical laboratory for metals included in the Oklahoma Water Quality Standards (OWQS) and various other minerals depending on the project (OWRB, 2012). Each sample is collected at 0.5 meters from the lake bottom using a Van Dorn sampler. To avoid contamination, samplers should follow the clean hands/dirty hands methodology described in Section 2.2 of USEPA methodology (USEPA, 2000) Open ends of Van Dorn, temporarily securing the cords to the top, with the side valves closed. Drop the Van Dorn on a marked tow line to a depth 0.5 meters above the littoral substrate. Pause; allowing the water to flow through the device, drop the messenger and raise the Van Dorn to the surface. Once in the boat, open the valve to **prime the collection (not the filtrate) bottles three times** by rinsing the containers out with native water before filling (fill the container with a little sample water, shake it, and pour the water out). Water should be transferred directly from the Van Dorn to the containers. Avoid aerating the sample when transferring it to the sample containers. Dissolved metals containers are 100mL collection bottles and total metals containers are 250 mL collection bottles. For the dissolved metals samples, 75 mL of sample water is filtered, in the field, into a clean but not primed 100 mL bottle using a 0.45 um FlipMate and hand pump. Total metals bottles are collected directly from the valve of the Van Dorn. The dissolved metal samples are preserved with seven (7) drops of nitric acid (HNO<sub>3</sub>), and the total metal samples are preserved with twenty (20) drops within six hours of collection. Rinse the Van Dorn in between each site with DI water three times and place in bag and case to minimize possible contamination. Prime the Van Dorn with native water upon arrival at each site. Record the depth the samples were taken at on the appropriate data sheet. The data sheet is located under the filename: *S:/Monitoring/Lakes/Forms&Labels/Bump Lakes Field Data Sheet*. Samples are stored on ice at approximately 4°C until they reach the lab. In areas of low hardness, less than 150 ppm, a more sensitive analytical method is used to process samples. These water bodies have been flagged in advance so that ODEQ can run the proper method. The chain of custody for metals samples is obtained from ODEQ and located in Appendix A.

### **Bacteria Panel**

The bacteria panel is processed through an analytical laboratory for E. Coli and Enterococci. Unless otherwise described in a project quality assurance plan, these samples are collected in 100 mL sterile sample bottles with a surface grab

at a depth of 0.5 meters. A QA/QC replicate sample is also collected for each project. The samples are preserved on ice at 4°C and delivered to the lab with 24 hours of collection. The chain of custody for these samples is obtained from ODEQ and is located in Appendix A.

### **Chlorophyll Panel**

The procedure for the processing of chlorophyll samples can be found in the Chlorophyll a Collection SOP (OWRB, 2005c)

### **Field Observations**

The time, air temperature, wind direction, wind speed, percent cloud cover, wave condition, precipitation, barometric pressure and site depth (as measured by the multi parameter sonde) should be recorded on the data sheet. The initial surface YSI reading will also be recorded to be entered into the Water Quality Database. If recording on a paper field sheet, this data will be transferred to the network, upon returning from the field and the paper data sheet will be filed appropriately.

Secchi disk readings are recorded at each site and used as an indicator of water clarity and determination of the photic zone. This is accomplished by lowering the measured and marked disk into the water on the shaded site of the boat without wearing sunglasses. Lower the secchi disk straight down until it just disappears from sight and grasp the chain at the water line, thus marking the disappearance depth. The disk is then raised until it reappears, again grasping the chain at the water line, thus marking the reappearance depth. The true secchi disk depth is one half the distance between these two depths and is recorded to the nearest centimeter on the field sheet.

## **8.0 Forms**

**See Appendix A for examples of forms discussed in this document**

### **8.1 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 for inorganic, 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 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 lake/project. For guidance on proper procedure to complete the chains of custody, refer to your supervisor and/or FTE. All samples are pre-logged in advance of sampling and a chain of custody document is

generated by the ODEQ. The chain of custody is emailed to the project manager prior to the sampling trip(s). If bacteria or extracted chlorophyll samples are to be turned in at a later date a new chain is generated and turned in with those samples,

### **9.0 Data Storage**

All completed paper copies of forms and data sheets should be maintained with the appropriate 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 project number.

### **10.0 References**

American Public Health Association, et. al. *Standard Methods for the Examination of Water and Wastewater*, 22nd edition. Baltimore, MD: Port City Press, 2013. Print.

Cole, Gerald. *Textbook of Limnology*, 4th edition. Illinois: Waveland, 1994. Print.

Kent State University-Department of Biological Sciences. "Secchi disk Procedures Used in Several State Programs" The Secchi Dip-In, 2009. Web. August 29, 2013.

Oklahoma Department of Environmental Quality. *Continuing Planning Process*. 2012 edition. Unpublished.

Oklahoma Water Resources Board. *Oklahoma Water Quality Standards*. OAC 785:45. Oklahoma City, OK, 2012. Print.

Oklahoma Water Resources Board. *Standard Operating Procedure for the Collection of Chlorophyll-a Samples in Lakes*. Oklahoma City, OK, 2005. Print

Oklahoma Water Resources Board. *Standard Operating Procedure for the Measurement of Hardness and Alkalinity in Lakes*. Oklahoma City, OK, 2005. Print.

Oklahoma Water Resources Board. *Standard Operating Procedure for the Measurement of Turbidity in Lakes*. Oklahoma City, OK, 2005. Print.

U.S. Environmental Protection Agency. *Sampling Ambient Water for Trace Metals at EPA Water Quality Criteria Levels*. Washington D.C..1996. Print.

# APPENDIX A

# Bump Lakes Field Data Sheet

Oklahoma Water Resources Board

Reservoir Name: \_\_\_\_\_

Date: \_\_\_\_\_

Collectors: \_\_\_\_\_

Quarter: \_\_\_\_\_

Lake Elevation: \_\_\_\_\_

1(33) Time: \_\_\_\_\_

## General Information

Site #	Time (24 Hr)	Site Depth (m)	Bottom Sample (m)	Air Temp (°C)	Wind (Direction/Speed) *	Wave Condition **	Barometric Pressure (mmHg)	Cloud Cover (%)	Precipitation (Fog, Rain, Sleet, Snow)	Secchi Disk (cm)
1(11)										
1(22)										
2										
3										
4										
5										
6										
7										
8										
9										
10										

\* N=0 NE=45 E=90 SE=135 S=180 SW=225 W=270 NW=315  
 \*\* 1=Frozen 2=Calm 3=Ripple 4=Small 5=Moderate 6=White Cap 7=Oceanic

## Surface Readings

Site #	1	2	3	4	5	6	7	8	9	10
Time (24 Hr)										
Depth (m)										
Water Temp (°C)										
D/O (mg/L)										
D/O (%)										
pH										
Conductivity (µS/cm)										
Salinity (g/L)										
TDS (mg/L)										
ORP (mV)										

(Field Chemistry on Back)  
**Bump Lakes Field Data Sheet**  
 Oklahoma Water Resources Board

Reservoir Name: \_\_\_\_\_

Date: \_\_\_\_\_

Collectors: \_\_\_\_\_

Quarter: \_\_\_\_\_

<b>Field Chemistry</b>					
Site #	Total Alkalinity (mg/L)	Total Hardness (mg/L)	Turbidity (NTU)	Ortho Phosphate (mg/L)	Chlorophyll Filtered Amount (mL)
1(11)					
1(22)					
1(33)					
2					
3					
4					
5					
6					
7					
8					
9					
10					

**Samplers Comments**

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

	Initials	Date
Field Completed	_____	_____
Electronic Form Entered	_____	_____



**STATE ENVIRONMENTAL LABORATORY SERVICES DIVISION**  
**OWRB CHAIN OF CUSTODY**  
 General Inquiries: 1-866-412-3057



PROJECT INFORMATION		
<b>Contact Name:</b> JULIE CHAMBERS	<b>Samplers (Print Names):</b>	<b>Project Number:</b>
<b>Trip Name:</b> BIRCH		

SAMPLE INFORMATION										TESTING REQUIRED			
Sample #	Description (Station ID)	QA Code	Date Collected (MD/Y)	Time Collected (Circle AM/PM)	Collection Type <sup>1</sup>	Sample Depth (Meters)	Sample Matrix <sup>2</sup>	Container <sup>3</sup>	# of Containers	Bacteria Suite	Nutrients - Main	Ammonia	Chlorophyll
001	Birch (121300030040-01s)	11		AM	SRF	0.5	SW	B3	1				X
002	Birch (121300030040-01s)	11		AM	SRF	0.5	SW	A1	1		X		
003	Birch (121300030040-01s)	11		AM	SRF	0.5	SW	C5	2	X			
AQ	Birch (121300030040-01s)	11		AM	BOT		SW	K6	1	Total Metals - Pb Hg Se			
AQ	Birch (121300030040-01s)	11		AM	BOT		SW	D6	1	Dissolved Metals - Pb Cd Cu Ag Zn			
004	Birch (121300030040-01s)	21		AM	SRF	0.5	SW	B3	1				X
005	Birch (121300030040-01s)	21		AM	SRF	0.5	SW	A1	1		X		
006	Birch (121300030040-01s)	21		AM	SRF	0.5	SW	C5	2	X			
AQ	Birch (121300030040-01s)	21		AM	BOT		SW	K6	1	Total Metals - Pb Hg Se			
AQ	Birch (121300030040-01s)	21		AM	BOT		SW	D6	1	Dissolved Metals - Pb Cd Cu Ag Zn			

**SAMPLER'S COMMENTS**

Ag = Silver, As = Arsenic, Cd = Cadmium, Cr = Chromium, Cu = Copper, Hg = Mercury, Ni = Nickel, Pb = Lead, Se = Selenium, Tl = Thallium, Zn = Zinc, Ca = Calcium, Fe = Iron, Mg = Magnesium, Mn = Manganese, Na = Sodium, K = Potassium

**SAMPLE RECEIVING COMMENTS**

**CHAIN OF CUSTODY RECORD MUST BE SIGNED**

\*\*\* SEE PAGE 3 FOR CHAIN OF CUSTODY RECORD \*\*\*

PROJECT INFORMATION									
<b>Contact Name:</b> JULIE CHAMBERS							<b>Samplers (Print Names):</b>		<b>Project Number:</b>
<b>Trip Name:</b> BIRCH									

SAMPLE INFORMATION										TESTING REQUIRED			
Sample #	Description (Station ID)	QA Code	Date Collected (M/D/Y)	Time Collected (Circle AM/PM)	Collection Type <sup>1</sup>	Sample Depth (Meters)	Sample Matrix <sup>2</sup>	Container <sup>3</sup>	# of Containers	Bacteria Suite	Nutrients - Main	Ammonia	Chlorophyll
014	Birch (121300030040-04)	10		AM PM	SRF	0.5	SW	B3	1				X
015	Birch (121300030040-04)	10		AM PM	SRF	0.5	SW	A1	1		X		
016	Birch (121300030040-04)	10		AM PM	SRF	0.5	SW	C5	2	X			
AQ	Birch (121300030040-04)	10		AM PM	BOT		SW	K6	1	Total Metals - Pb Hg Se			
AQ	Birch (121300030040-04)	10		AM PM	BOT		SW	D6	1	Dissolved Metals - Pb Cd Cu Ag Zn			
017	Birch (121300030040-05)	10		AM PM	SRF	0.5	SW	C5	2	X			
AQ	Birch (121300030040-05)	10		AM PM	BOT		SW	K6	1	Total Metals - Pb Hg Se			
AQ	Birch (121300030040-05)	10		AM PM	BOT		SW	D6	1	Dissolved Metals - Pb Cd Cu Ag Zn			

<sup>1</sup> Collection Type: BOT = Bottom  
SRF = Surface

<sup>2</sup> Sample Matrix: SW = Surface Water

<sup>3</sup> Container Type: A1 = 1L Clear Plastic Bottle, Preserved with Sulfuric Acid to pH < 2  
B3 = 12mL Clear Glass Test Tube, Acetone Extract with Magnesium Carbonate  
C5 = 120 mL Clear Plastic Bottle, Sodium Thiosulfate  
D6 = 125mL Clear Plastic Bottle, Preserved with HNO3 to pH < 2  
I3 = 250mL Amber Glass Bottle, Preserved with Sulfuric Acid to pH < 2  
K6 = 250mL Clear Plastic Bottle, Preserved with HNO3 to pH < 2

**SAMPLER'S COMMENTS**  
Ag = Silver, As = Arsenic, Cd = Cadmium, Cr = Chromium, Cu = Copper, Hg = Mercury, Ni = Nickel, Pb = Lead, Se = Selenium, Tl = Thallium, Zn = Zinc, Ca = Calcium, Fe = Iron, Mg = Magnesium, Mn = Manganese, Na = Sodium, K = Potassium

**SAMPLE RECEIVING COMMENTS**

Temperature: \_\_\_\_\_

CHAIN OF CUSTODY RECORD MUST BE SIGNED			
Relinquished By (Sampler):	Agency:	Date/Time:	<input type="checkbox"/> Hand delivered <input type="checkbox"/> Courier (Mail, UPS, FedEx, etc.)
Received By:			
Relinquished By:	Agency:	Date/Time:	<input type="checkbox"/> Hand delivered <input type="checkbox"/> Courier (Mail, UPS, FedEx, etc.)
Received By:			

<b>LAKE WATER QUALITY SAMPLING (BUMP)</b>	
	1 Liter sample bottles for each lake (1 acid and 1 Chlorophyll bottle for each site, 1 ice if a CS lake) Zoo- and Phyto- plankton 125mL bottles (labeled with site numbers on lid) Summer sampling: BacT bottles with barcode (12 per lake) July and August: two extra 1L bottles per site labeled Bottom Sample acid and ice Dissolved and total metals bottle set ups (6 per lake)
	1 Cooler per lake + coolers of ice
	Sonde (Calibrated), cord reel, extra batteries, YSI Handheld (if Broken Bow, Grand or Texoma - 100m cable)
	Acid kit stocked w/ plenty of sulfuric acid and waste container, <b>Be sure to have GLOVES</b>
	Van Dorn sampler (acid washed), hand pump, and nitric acid <b>Be sure to have GLOVES</b>
	Secchi disk
	Lugol's Kit (Lugol's Iodine, pipettes and gloves)
	Ortho-P kit with colorimeter, KimWipes and DI squirt bottle(with an extra box of poppers if needed)
	Turbidimeter with Kim wipes, standards, extra vials and log book
	Churn-splitter (blanked and in plastic bag)
	DI water (One gallon per lake)
	Clipboard with field datasheets, lake maps with marked test sites, DEQ chains and portable GPS
	Pencils, sharpies, and wax pencil
	Atmospheric Data Center (Sherpa) with Barometric Pressure Conversion Chart (In Clip Board)
	Zooplankton kit with Tow Rope (net, bucket, DI squirt bottle, Ethanol, wax pencil)
	Boat Bag (Boat Keys, gas card, boat plug, GPS system with depth finder)
	Life jackets (1 per person)
	Trolling motor battery and battery pack (if taking 10ft jon)
	Tools and Road Map (Should be in our trucks, make sure before leaving)
	Camera (If available)
	Rain Gear and/or Car Hearts if necessary
	Long vinyl gloves and seal skin gloves (Winter and algal sampling)
	Truck Keys (With lot keys, gas card, and record book)
	<b><u>FOR OVERNIGHT TRIPS ONLY</u></b>
	Overnight kits; stocked (DI water; filters; filter apparatus-Erlenmeyer flask, tube, hand pump; clamp; filter base; filter cup; forceps; spatula; sharpie; foil; graduated cylinder)
	Alkalinity Kit; stocked
	Hardness Kit: stocked

### Check-list for hitching and hauling boats

	Description	Comments
	Check Tires- look for uneven wear, check (bump) for loose bearings- if bearings are loose- take boat to J&I for repairs	
	Check tie-downs front and back- make sure boat is snug against trailer	
	Make sure transome saver is in place	
	Check spare- does it have air?	
	Check battery- "bump" engine to see if it turns over ( <b>Caution- don't start and let run</b> )	
	Hook up lights and make sure trailer lights & blinkers work	
	Cross chains when hitching	
	Put first aid kit (from truck) and tool box in boat	
	Check oil (should be at least 3/4) and gas - should also have extra oil on-board	
	Test fire extinguishers/shake to mix	

### Check-list for unhitching boats

	Description	Comments
	Unplug lights- secure wires on truck and boat where they won't drag or be pinched	
	Block tires (in front of jack-wheel)	
	Put everything (anchor, paddles, battery, life jackets, boat tool box) in portable building. Put first-aid kit back in truck	
	Double check to make sure boat plug has been pulled	
	Leave boats at an angle (especially in winter) to let water run out	
	Cover (during fall and winter or other periods of little use)	
	Put keys, plug, and book back in the bag	

If problems occur, **record** them in the book, fix what you can, and let someone know what has been done. If possible, take a different boat until repairs can be made.