***Purpose:*** This procedure describes the steps to complete field sampling for the Carp Removal & Phosphorus Cycling DNR project including field measurements and collection of samples for laboratory analyses.

***Materials Required:***

* Cooler with ice for sample preservation
* Field data sheets
* Waterproof marker
* Labeled field Sampling Bottles
* Van Dorn
* Secchi disk with metered tape
* Wisconsin net with calibrated rope
* Squirt bottle with deionized water
* Sample preservation kit

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Parameter** | **Sample Depth** | **Sample Bottle** | **Preservative** | **Sample Storage Container** |
| Total Nitrogen (TN) | 0.5 m | 1 L Surface | H2SO4 |  |
| Total Suspended Solids (TSS) | 0.5 m | 500 mL Surface | Filtration | Dried filter |
| 0.5 m above sediments | 1 L Bottom | Filtration | Dried filter |
| Total Phosphorus (TP) | 0.5 m | 1 L Surface | H2SO4 |  |
| 0.5 m above sediments | 1 L Bottom | H2SO4 |  |
| Soluble Reactive Phosphorus (SRP) | 0.5 m | 1 L Surface | H2SO4 |  |
| 0.5 m above sediments | 1 L Bottom | H2SO4 |  |
| Chlorophyll (Chl) | 0.5 m | 500 mL Surface | Filtration | Frozen filter |
| Phycocyanin (Phyco) | 0.5 m | 500 mL Surface | Filtration | Frozen filter |
| Zooplankton (Zoop) | 0.5 m above sediments | 125 mL clear | 10% Formalin | 125 mL clear Nalgene |

***SAMPLE STATIONS***

|  |  |  |
| --- | --- | --- |
| **Lake** | **Latitude** | **Longitude** |
| Blue Lake | 42.04415792 | -96.15928042 |
| Center Lake | 43.413355 | -95.137000 |
| Five Island Lake | 43.14529073 | -94.65831672 |
| North Twin Lake | 42.47573625 | -94.63881754 |
| Silver Lake | 43.43924677 | -95.33695717 |
| Storm Lake | 42.62160569 | -95.20409014 |

1. **OBTAIN FIELD MEASUREMENTS**
   1. **Bottle Preparation & Data Sheet**
      1. Record the Sampling Date, Sampling Time, Samplers’ Initials, and Sampling Depth on the sample label and Field Data Sheet. All affixed labels must be covered in a piece of 2” clear packing tape to preserve the label’s condition during transport.
      2. Fill out the Field Data Sheet (also functioning as the Chain of Custody form) completely. If required data cannot be attained for the data sheet, record the reason in the notes section.
   2. **Secchi Depth**
      1. Secchi depth measurements must be made at the anchor, on the shady side of the boat, and without the technician wearing sunglasses.
      2. Lower the Secchi disk into the water.
      3. Record the depth at which the pattern disappears (“Secchi Lower”).
      4. Lower the Secchi disk farther and then slowly raise the disk. Record the depth at which the pattern reappears (“Secchi Raise”).
   3. **Water Samples for Nutrients, TSS, pigments**
      1. Open the Van Dorn sampler and rinse 3 times with water from the lake.
      2. *SURFACE SAMPLE:* Lower the opened Van Dorn sampler to 0.5 m and release the messenger to take a sample from that depth.
      3. Rinse the 1 L amber sample bottle for the surface sample three times with water from the Van Dorn.
      4. Fill the 1 L amber surface sample bottle by pouring water from the Van Dorn to the base of the neck. Be sure to record the sampling depth on the bottles.
      5. *BOTTOM SAMPLE:* Repeat 1.3.2-1.3.4 with water from 0.5 m above the surface of the sediments in the lake. Use the 500 mL amber sample bottle for the bottom water sample. Be sure to record the sample depth!
   4. **Zooplankton**
      1. The zooplankton sample will be collected from 1 m off from the sediments to the surface with a maximum depth of 9 m.
      2. Inspect the Wisconsin net for holes or tears. The Wisconsin nets are very fragile. Store the nets in the cases when not in use. Leave the storage cases open during the evenings to allow the nets to dry.
      3. Rinse the Wisconsin net three times with lake water from the opposite side of the boat where the sample will be collected.
         1. Open the clamp on the tubing from the bottom of the filter cup.
         2. Lower the Wisconsin net into the water without submerging the top lip of the sampler (Do NOT allow the lake water to enter through the top of the net).
         3. Pull the net out of the water and allow it to drain.
      4. Close the clamp on the tubing from the bottom of the filter cup.
      5. Slowly lower the Wisconsin net to the pre-determined depth.
      6. Raise the Wisconsin net through the water column at approximately 0.5 m per second.
      7. Unscrew the filter cup from the net. Wash the zooplankton into the pre-labeled sample bottle using the squirt bottle of deionized water. Fill the bottle approximately halfway (~60 mL) with sample water.
      8. Record the zooplankton sampling depth (m) on the Field Data Sheet and on the sample bottle label.
2. **PRESERVE & STORE SAMPLES**
   1. **Zooplankton**
      1. All zooplankton sample bottles need to be preserved with 10% Formalin solution upon return to shore. The formalin solution should be refrigerated for storage.
      2. While wearing nitrile gloves, fill the 125 mL zooplankton sample bottle with equal parts 10% Formalin solution to sample (60 mL sample water + ~60 mL Formalin = ~120 mL total).
      3. Cap the bottle tightly and gently invert several times to mix the sample and preservative.
   2. **Nutrients / TSS,** **Nutrients / Pigment samples**
      1. Place all sample bottles in evidence bag and then into the cooler.
      2. All sample bottles must be kept on ice and cool until delivered to the ISULL within 24 hours of collection.
3. **PREVENT THE SPREAD OF INVASIVE SPECIES**
   1. Lakes with known aquatic invasive species infestations will be scheduled for sampling at the end of the week if possible.
   2. Disinfect and wash all equipment thoroughly
      1. Pull drain plugs on the boat to drain all water.
      2. Inspect the boat, motor, and trailer for possible contaminants including plant material, animals, and/or mud. Remove any contaminants prior to leaving the lake.
      3. Use a weed sprayer to disinfect the boat and equipment, away from the lake. Use campground wash station (if available) and bleach solution prepared daily. The disinfectant solution is 1 fl oz (30 mL) of household bleach per 2 gallons of water.
      4. Soak other sampling equipment in a bucket of disinfectant solution. Rinse all equipment thoroughly after soaking for 5 minutes.
4. **SAMPLE SHIPPING**