

Methods for Monitoring Fish Communities of Buffalo National River and Ozark National Scenic Riverways in the Ozark Plateaus of Arkansas and Missouri, Version 2.0

Standard Operating Procedure (SOP) 8: Equipment Maintenance and Storage, Version 1.1

Revision History Log:

Previous version number	Revision date	Author	Changes made	Reason for change	New version number
1.0	12/14/2016	Dodd	Additional information on storage, inspection, and maintenance of equipment before and after field season	Not in version 1.0	1.1

Routine equipment maintenance will be necessary to maximize the life of water quality and fish sampling equipment. Poorly maintained equipment will adversely affect equipment performance, which will decrease accuracy of water quality readings and efficiency of fish sampling equipment. This will introduce variability into the dataset. After all fieldwork for a field season is completed, effort to store sampling equipment properly will result in fewer equipment problems at the beginning of the next field season. This SOP describes general maintenance of water quality and electrofishing equipment. More detailed maintenance of water quality meters is in SOP 4.

Water Quality and Velocity Meters

Many maintenance and storage functions for water quality and velocity meters are instrument specific so it is important to consult the user's manual or the HTLN lab guide (for water quality meters see SOP 4). Cleaning and occasional replacement of membranes (for the dissolved-oxygen meter), sensors, and electrodes is required after extended use or whenever deposits or contaminants appear on the probe. Changing the membrane also includes changing electrolyte fluid within the probe. Generally a clean, lint-free cloth and distilled water can be used to clean deposits from the membrane or sensor. For the velocity meter, fine grit sandpaper can be used to remove debris from the sensor. Consult the manual for specific grit size to be used.

Generally, for long-term storage, meters should be protected from dust and excessive heat or cold, and the cable and probe/sensor should be stored dry and free of dirt in the manufacturer's recommended storage container. For long-term storage, all batteries should be removed from the

meters. Meters will be stored in the Aquatic Program Laboratory located on the Missouri State University campus in Springfield, Missouri.

Fish Sampling Equipment

Equipment for fish sampling generally can be classified into one of three categories: mechanical equipment, electronic equipment, and manual equipment. Each category involves varying degrees of maintenance.

Mechanical equipment (generators, outboard motors) should be maintained according to manufacturer's instructions and stored in a shed. Maintenance of the generator motor is similar to the maintenance required by other small gasoline engines. Outboard motors are commercially available as two-stroke and four-stroke designs. For generators and outboard motors, oil and filters must be changed at the end of each field season and spark plugs should be checked and changed, if needed. Carburetion problems (gumming or poor ignition) can be avoided by using gasoline meeting minimum octane requirements and that has been stored for short periods (2 or 3 months maximum). For long-term storage (> 3 months), gasoline stabilizer must be used in generators and in gas tanks for outboards to prevent condensation and water contamination. Gasoline should be drained from the gas lines in boat motors if they will not be used for more than a few months. If generators and boat motors will not be used for an extended time (> 3 months), the motors should be run at least once every 3-4 months for a minimum of 15 minutes. The manufacturer's operational manuals for the specific motor type should be consulted to determine appropriate maintenance procedures and service schedules. All manuals should be kept in the Aquatic Program Laboratory at Missouri State University in Springfield, Missouri so that all personnel responsible for operation can access maintenance information.

Electronic equipment and associated batteries will be stored in a secure, dry location at the Aquatic Program Laboratory. Electrofishing pulsators are very durable and require very little maintenance; however, some pulsators may have fuses or circuit breakers for surge protection. Reviewing the operating manual and having replacement fuses or circuit breakers on hand will reduce downtime in the field. Corrosion or tarnishing of electrodes can reduce electrical conductance from the electrofishing boat, barge, or backpack to the water. Electrodes should be inspected prior to each sampling event and at the end of the field season. Stainless-steel electrodes (anodes and cathodes) can be reconditioned using emery cloth, steel wool, or fine-grained sandpaper. Aluminum anodes on some backpack electrofishing units are better cleaned with sandpaper or a small file. Over extended time (several years), electrical connections at junction boxes and other connections will sometimes begin to corrode. This corrosion results in a poor connection and can result in a reduction of electrofishing power. Connections should be inspected before and after each electrofishing season and serviced when necessary.

Electrofishing batteries for backpack units should be charged as soon as possible after sampling is completed. Electrofishing battery chargers capable of a trickle charge, having an automatic shutoff (once the battery is charged), and a voltage tester are preferred and can be purchased from manufacturers of electrofishing gear. Battery voltage should be tested before each sampling effort to

be certain that the battery is capable of carrying a full charge. If a battery is not capable of carrying a full charge, time spent electrofishing will be decreased and the battery may need to be replaced.

Manual equipment (nets, gloves, waders, buckets, and safety equipment, for example) should be stored in the Aquatic Program Laboratory or in a storage shed. Nets, seines, waders, and personal floatation devices also require maintenance. Nets and seines should be cleaned with a bleach solution or liquid soap solution to prevent spread of invasive species and allowed to dry before extended storage to prevent moisture damage. Nets and seines should be inspected regularly for tears in the mesh and replaced or repaired. The life of waders and personal floatation devices also will be prolonged if stored in a cool, dark, dry area. Waders stored for an extended period are susceptible to dry rot. Rubber conditioners can be applied to boots to prevent deterioration. Personal floatation devices (Coast Guard approved Type III) used for fish sampling should be inspected for rotting or torn sections each time they are used. Inflatable preservers that use carbon dioxide cartridges for inflation must have the carbon dioxide cartridges replaced periodically and according to manufacturer's instructions.

For electrofishing boats that use the boat hull as the cathode and are painted, electrical currents are concentrated in areas where the aluminum is exposed (the paint has been accidentally scratched, for example). In this situation, boat hulls are susceptible to electrolysis, which can result in aluminum pitting and, eventually, leaking. Electrolysis can be controlled by using a boat with the bottom of the hull unpainted, attaching a zinc plate to the hull, or by using cathode droppers independent of the hull. If leaks do occur, welding compounds can be used to patch the boat hull.