

ELECTROFISHING GUIDELINES

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Abstract--The purpose of these guidelines is to provide a structure that will enable electrofishing crews to safely and efficiently perform their work duties. Minnesota DNR employees have not had a serious injury during electrofishing operations and these guidelines were developed to ensure that there will not be any serious injuries in the future. The recent increase in the amount and use of electrofishing gear has created the need to develop statewide safety guidelines for acquisition, care, and operation of electrofishing gear. It also provides opportunities to work toward standardization of gear and techniques.

These guidelines are separated into 4 sections: 1) standards for acquisition of each type of gear; 2) personal protection equipment necessary for safe electrofishing; 3) training required; and 4) safe operational procedures.

- The following general statements summarize the attached safety guidelines:
- Any electrofishing gear not purchased from a commercial vendor **must** conform to published instructions and meet electrical codes and be safe (Novotny and Priegel 1971; Novotny and Priegel 1974);
- All electrofishing equipment must receive regular maintenance and inspection;
- DNR electrofishing participants must be certified in CPR, first aid, and electrofishing; and
- All electrofishing activities must be conducted in conformance with established safety procedures.

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Equipment Guidelines

I. Boom Electrofishing Boats

A. Boat

1. Boat equipment must comply with all Coast Guard and Minnesota DNR boat and water safety regulations.
2. The boat must be large enough and have sufficient flotation to provide for adequate freeboard when being operated.
3. The boat layout should be as simple as possible while providing adequate work space.
4. Boat shockers are routinely used at night. All electrofishing boats must be equipped with night navigation lights: A 20 point red/green light on the bow and a 360° white stern light.
5. The boat must be equipped with a hip high safety rail around three sides of the bow netting area. The material must be heavy enough and rigid enough to support a side thrust of at least 200 pounds (3/4" steel pipe, 1-1/2" heavy wall aluminum pipe or equivalent). **Warning:** Do not wrap the safety rail with electrical tape.
6. The work area and floor must be covered with non-skid material and sloped to allow drainage.

B. Generator

1. The generator should be a gasoline powered 115-230 volt AC or DC unit. Check with manufacturer to match the size of the generator to your application.
2. The generator must be muffled and/or housed so that the noise level of the unit is reduced to 85 dB (OSHA standard).
3. The generator exhaust must be piped away from operating personnel. The piping should be surrounded by rigid screen to reduce the chance of someone being burned by touching a hot exhaust pipe. The screening should be painted yellow to indicate it is a potential hazard area.
4. A grounding strap must be used to ground the generator to the hull (if aluminum boat) thereby preventing any accumulation of static electricity in the generator frame.
5. Electric generators designed for commercial or domestic use may have a neutral (internal) ground. Any internal ground **must** be disconnected from the generator. **Warning:** Do not use a generator with the neutral ground removed for any application other than electrofishing. Newer generators may have isolation transformers and can be used for both electrofishing and other applications.

C. Controls

1. All controls must be within easy reach of the operator.
2. All units must have an emergency shutdown switch which immediately cuts off the high voltage to the electrodes. This switch must be easily accessible to all personnel.
3. All electrofishing boats must contain at least two safety switches which break the high voltage circuit. All switches must be low voltage (not to exceed 24v). At least one safety switch should be a foot operated "dead man" switch operated from the front work deck. The "dead man" switch must be reachable by either dipper and require constant positive pressure to activate the high voltage circuit. The "dead man" switch must be attached to the low voltage control circuit by weatherproof devices. An operator "dead man" switch is mandatory on all new boom shockers and is strongly recommended for all existing units.

4. All power control circuits must be of low voltage (less than 24 volts).
- D. Electrodes
- The booms must be non-conductive (e.g. fiberglass). **Warning:** Plastic- or fiberglass-wrapped aluminum booms are not acceptable.
- E. Wiring
1. All wires in the high voltage circuit must have an insulation rating higher than the maximum potential voltage of the unit. The wires must be of a standard type and of size appropriate for the maximum voltage and current of the circuit in which they are used, per National Electrical Code Association (NECA) standards. All wiring must conform to standard color coding for their application.
 2. All electrically conductive equipment in the boat including gas cans (non-conductive safety gas cans are preferable), metal tool boxes, generator housing, etc., must be grounded to the boat.
 3. All wires will be enclosed in raceways or liquid tight conduit except that a heavy duty rubber cord may be used when greater flexibility is required.
 4. Splicing of wires is not permitted. All connections must be made in weatherproof (if switches) or watertight boxes (weatherproof and watertight per NECA standards). Wire connections must be made with appropriate size plastic wire nuts, per NECA standards.
 5. Low voltage (24v maximum) light circuits are mandatory.
 6. All branch circuits must be equipped with a fuse or circuit breaker enclosed in a weatherproof enclosure per NECA standards.
 7. All wiring devices (connectors, receptacles, boxes, etc.) must be of appropriate size for the maximum voltage and current in the circuit in which they are used. Connectors and receptacles should be of corrosion resistant materials and should be of a locking style. Receptacles should have rainproof covers per NECA standards.
- F. Color Coding of Hazards
1. Red color is used for fire extinguishers, danger areas (gas cans or other flammable liquids) and warning signs.
 2. Orange color is used to indicate dangerous areas on exposed machinery -- pulleys, gears, etc.
 3. Yellow color is used to indicate potentially dangerous areas -- hot pipes, sharp points or edges, etc.
 4. Green color is used to identify all non-fire fighting safety gear -- first aid kits, etc.
- G. Auxiliary Equipment
1. Dip nets must have nonconductive handles which are long enough to avoid hand contact with the water. Dip nets must not be used as electrodes. **Warning:** Plastic- or fiberglass-wrapped aluminum handles are not acceptable.
 2. All wet cell batteries must be encased in a non-conductive, acid proof case which is properly vented.
 3. A minimum of one (1A 10B C) fire extinguisher is required. The fire extinguisher must be mounted in a holder at a location which is convenient to the operator, yet outside areas of potential fire hazard.

4. All electrofishing boats must carry an instruction and operation manual which includes instructions for cable hook ups and operational safety guidelines. The manual should be contained in clear waterproof plastic and should be boat specific.
5. Each unit will be equipped with a log book containing daily check lists: date, time and extent of use; maintenance records; and a list of who operated the unit.

II. Generator Powered Stream Electrofishing Units

- A. Generator powered electrofishing units must meet standards of commercially available gear.
- B. Barge
 1. The craft used to transport the generator must be large enough and buoyant enough to maintain adequate freeboard during operations.
 2. The craft, towing strap, pack frame or push bar, must be made of non-conductive materials.
 3. A pack frame when used as an aid to towing the craft, must be lightweight and have adjustable shoulder straps and hip belt.
 4. It is useful to equip the craft with handles to assist in moving it through shallow riffles and over other obstructions.
- C. Generator
 1. The generator should be a gasoline powered 115-230 volt AC unit capable of producing DC output. Check with the manufacturer to match the size of generator with the electrofishing application.
 2. The generator must be muffled or housed to limit the noise level to 85 dB for an 8 hour period per OSHA standards. The engine exhaust should be directed away from the participants. Any exhaust piping should be covered by rigid screening. The screening should be painted yellow.
 3. The generator must have some mechanism to control the power output, a throttle to control rpms, a rheostat or pulsator, step up/down transformers, etc.
- D. Controls
 1. All high voltage circuits must be controlled by a low voltage relay switch system. An emergency shut down switch that shuts off high voltage to all electrodes must be in place. The relay should be attached to the generator by a non-rigid connection so that the vibration of the generator will not cause damage to the relay switch unit. A generator kill switch is also recommended.
 2. All portable hand-held electrodes must be equipped with a low voltage, electrically insulated waterproof switch. All switches in hand-held electrodes must be wired in electrical series.
 3. The high voltage circuit should be equipped with an ammeter to indicate the operating amperage.
- E. Electrodes
 1. Anode must be electrically insulated from the rest of the system.
 2. Handles of hand-held electrodes must be made of non-conductive material.
Warning: Plastic- or fiberglass-wrapped aluminum handles are not acceptable.
 3. Hand-held electrodes shall not be used as dip nets.

4. Electrodes should be connected to the relay-control box by flexible, heavy rubber electrical cord and multi-strand wire of a sufficient gauge and insulation for the maximum potential voltage and current in the high voltage circuit. Any wiring devices used in connecting hand-held electrodes to the heavy rubber cord must be weatherproof and be of proper size for the maximum potential current in the high voltage circuit. It is recommended that the cord be contained in a spring-loaded reel which is attached to the barge. For stream electrofishing, electrodes must have off/on switches or pressure switches.

F. Wiring

1. Wires must conform to NECA specifications for the maximum voltage and current in the circuit in which they are used.
2. No splicing of wires is permitted. All connections must be secured with proper sized (per NECA standards) plastic wire nuts in a weather tight (if a switch) or watertight box (weatherproof and watertight per NECA standards).
3. All electrical devices used (receptacles, connectors, etc.) must conform to NECA specifications for the maximum potential voltage and current in the circuit in which they are employed. Devices must be made of corrosion resistant materials and be of a locking style. Switches must have weatherproof covers and receptacles must have rainproof covers, per NECA standards.
4. The relay-control box must be in a weatherproof junction box with weatherproof cover, per NECA standards.

G. Color Coding of Hazards

1. Red color is used for fire extinguishers, gas cans and warning signs.
2. Orange color is used to indicate dangerous areas on exposed machinery.
3. Yellow color is used to indicate potentially dangerous areas -- hot pipes, sharp points or edges, etc.

H. Auxiliary Equipment

1. Dip nets must have handles that are non-conductive. **Warning:** Plastic- or fiberglass-wrapped aluminum handles are not acceptable. The handles must be strong enough and rigid enough to assist with a person's balance.
2. A unit specific operation manual, if available must be present at all operations.

III. Back Pack Electrofishing Units

- A. Back pack electrofishing units must meet standards of commercially available gear.

B. Power Source

1. Battery
The battery must be of a sealed unit, gel type design.
2. Generator
Commercially available units must have a tilt kill switch.

C. Controls

- 1 The unit should be equipped with an ammeter to indicate the amperage in the high voltage circuit when the unit is in operation.

- 2 The unit must be equipped with an indicator light which is activated when the high voltage circuit is activated.
- 3 Each electrode must be equipped with a low voltage, electrically insulated waterproof switch. All electrode switches must be wired in electrical series.
- 4 The control box must contain a master switch which will shut off all power from the transformer unit.

D. Electrodes

1. Electrode handles must be non-conductive e.g. fiberglass. **Warning:** Plastic- or fiberglass-wrapped aluminum handles are not acceptable
2. Electrodes must be connected to the relay-transformer unit with heavy rubber electric cord of a size large enough to handle the maximum potential voltage and current of the unit, per NECA standards. Any electrical devices used in connecting the hand-held electrodes with the transformer/control unit should be made of corrosion resistant materials and be of a waterproof locking style.
3. Hand-held electrodes shall not be used as dip nets.

E. Wiring

The wires used must be of proper size and have sufficient insulation for the maximum potential voltage and current of the unit.

F. Pack Frame

1. The frame must be lightweight and adjustable, with shoulder straps and hip belt each equipped with a quick release mechanism.
2. The frame must be constructed of non-conductive material.

G. Auxiliary Equipment

1. Dip nets must have handles that are non-conductive. **Warning:** Plastic- or fiberglass-wrapped aluminum handles are not acceptable. The handles must be strong enough and rigid enough to assist with a person's balance.
2. A Unit specific operation manual must be present at all operations.

Personal Protection Equipment

Electrofishing can be dangerous. At least two people have died and over 400 people have been injured during electrofishing operations in the United States in the last 20 years.

There are four serious safety concerns about electrofishing activities: 1) drowning; 2) electrocution; 3) hearing loss; and 4) personal injury. The use of proper personal protective gear can significantly reduce chances of injury.

The following personal protection devices will be used in all electrofishing operations:

A. Gloves and boots

1. Gloves - must be worn by all participants during all electrofishing operations. All gloves must be rubber or PVC, dry inside and free of leaks. Extra gloves should be available. Neoprene gloves are not approved
2. Boots - All personnel involved in all electrofishing operations will wear hip boots or chest high waders. Neoprene boots are approved.

- B. Ear protection - Ear plugs or ear muffs will be made available to all participants during electrofishing operations where a gas powered generator is employed. In some operations where the generator is very loud, the use of voice-activated protective headsets may be useful to aid in communication between participants.
- C. Personal Flotation Device - An approved PFD shall be worn by all participants during all boat electrofishing operations. The use of approved PFDs in stream shocking operations will be at the discretion of the crew leader. Approved PFDs will be made available to any participants who wish to use them during any stream electrofishing operation.
- D. Eye protection - Under most daylight conditions, the wearing of polarized lens glasses is recommended to increase in-water visibility and improve the efficiency of fish capture.
- E. First aid kit - A 10 unit or larger first aid kit will be available during all electrofishing operations.
- F. Nomex fire fighting shirts will be worn while carrying a gas powered back-pack generator. These shirts are available from Field Services.

Training

All personnel who use or who are expected to use electrofishing gear will receive certification in cardio-pulmonary resuscitation (CPR), basic first aid, and proper, safe electrofishing techniques. All full time fisheries personnel must complete the Minnesota DNR or U.S. Fish and Wildlife Service electrofishing training once to become a certified electrofishing operator.

Operational Procedures

I. Inspections and Maintenance

The Area Fisheries Supervisor/Senior Research Biologist/Unit Leader is responsible for insuring that all safety checks are completed and for designating a (one) crew leader. The designated crew leader is responsible for all electrofishing activities for the day assigned.

Annual inspection - Every electrofishing unit must be inspected by a certified electrofishing operator at least once a year, before spring operations begin. The inspector will complete the inspection checklist. Copies of the checklist will be maintained in the Area Fisheries Station files and in the electrofishing unit log (see Appendix 1-3).

Daily inspection - The crew leader is responsible for the safe operating condition of the equipment. The inspection must be done by a certified electrofishing operator before the operation has begun. An inspection report can (optional) be filled out and kept in the electrofishing log (see Appendix 4-6).

Maintenance - All mechanical components must be maintained according to the manufacturer's instructions.

Repairs - All repairs, updates, modifications, etc. must conform to OSHA and NECA standards. It is strongly recommended that commercially purchased electrical components be repaired or altered by the manufacturer or his designated repair vendor.

II. Operation Safety Guidelines

The Area Fisheries Supervisor/Senior Research Biologist/Unit Leader is responsible for insuring that all safety guidelines are followed and for designating a (one) crew leader. The designated crew leader is responsible for all electrofishing activities for the day assigned.

- A. All electrofishing operations require at least two Fisheries personnel, one of which is the crew leader.
 - 1. The crew leader must be a certified electrofishing operator;
 - 2. Two people on the crew must be certified in CPR and first-aid.
- B. Electrofishing must not be attempted during periods of heavy precipitation and/or during electrical storms.
- C. Personal flotation devices must be worn at all times during boat electrofishing operations.
- D. The crew leader shall brief all participants on safety procedure before the operation is started.
- E. Uniform hand signals (see Appendix 7) for communication will be used by all participants.
- F. Excess gear should be kept to a minimum. Work areas should be kept clear and good housekeeping habits followed.
- G. The generator may be refueled only when the unit is off and cool.
- H. Electrodes should not be touched at any time during the operation.
- I. No one should reach into the water at any time during the operation. If something falls into the water, turn off the output power and then retrieve the object.
- J. No one should become overly fatigued - plan regular rest stops.

III. Use of Volunteers and Interns

- A. Volunteers (Refer to Appendix 8) - May be used to assist and to observe electrofishing operations. They can not be used in place of the "standard" base crew. The crew leader must have the volunteer(s) complete the "DNR Volunteer Agreement", and conform to the "Minnesota DNR Volunteer Guidelines." The crew leader is responsible for the volunteers.
- B. Interns - Can be integrated into work crews after being certified in CPR and First Aid, and having been instructed by certified electrofishing personnel. Interns can not serve as a crew leader. The crew leader is responsible for the interns.

References

- Novotny, D. W., and G. R. Priegel. 1971. A guideline for portable direct current electrofishing systems. Wisconsin Department of Natural Resources, Technical Bulletin 51, Madison.
- Novotny, D. W., and G. R. Priegel. 1974. Electrofishing boats. Improved designs and operational guidelines to increase the effectiveness of boom shockers. Wisconsin Department of Natural Resources, Technical Bulletin 73, Madison.

Appendix 1. Annual electrofisher boat safety inspection checklist.

Boat Inv. # _____ Registration # _____

Boat Model/make _____ Length _____

Discipline/unit _____ Location _____

Inspection Date _____ Inspected by _____

Log Book: Up to date Yes ___ No ___

Inventory Complete Yes ___ No ___

BOAT

- ___ 1. Hull integrity
- ___ 2. Painted areas intact - correct colors
- ___ 3. Safety railing intact and sturdy
- ___ 4. Non-skid footing
- ___ 5. Wiring okay - connections secure, etc.
- ___ 6. Adequate connectors and adequate interlocking (integral with hull)
- ___ 7. All metal equipment in boat electrically bonded/connected to hull (check with volt/ohm meter)
- ___ 8. Lighting properly protected - navigational lights working
- ___ 9. Batteries properly enclosed and vented
- ___ 10. Regulation fuel containers
- ___ 11. Boat clean - equipment neatly stored
- ___ 12. Decals, numbers, names - intact, legible
- ___ 13. Oars or paddles present and in good condition
- ___ 14. Anchor and bailer present

BOAT MOTOR

- ___ 1. Servicing up to date
- ___ 2. Components working properly
- ___ 3. Auxiliary motor working (where applicable)
- ___ 4. Proper venting of exhaust
- ___ 5. No gasoline leaks
- ___ 6. Bilge blower operating (where applicable)

GENERATOR

- ___ 1. Servicing up to date
- ___ 2. Muffler okay - properly piped, screened and color coded
- ___ 3. Internal ground removed (check with volt/ohm meter)
- ___ 4. Emergency shut off working
- ___ 5. Output voltage checked

ELECTROFISHER

- ___ 1. Controls and gauges operational
- ___ 2. Booms made of non-conductive material
- ___ 3. Adequate mechanical protection of wiring
- ___ 4. Adequate connectors and interlocking
- ___ 5. Operator's safety switch working
- ___ 6. "KILL SWITCH" working
- ___ 7. "Deadman" switches working
- ___ 8. Wiring to electrodes in good condition
- ___ 9. Electrodes in good condition

ANCILLARY EQUIPMENT

- ___ 1. Annual inspection completed
- ___ 2. Fire extinguisher present - fully charged - correct type
- ___ 3. First aid kit present - fully replenished
- ___ 4. Inspect protective hand and head gear
- ___ 5. Safety gas containers - regulation style
- ___ 6. Dip net handles made of non-conductive material

Appendix 2. Annual stream electrofisher safety inspection checklist.

Unit Inv. # _____

Make _____

Model _____

Discipline _____

Location _____

Inspection Date _____

Inspected by _____

Log Book: Up to date Yes__ No__

Manual Present: Yes__ No__

Inventory Complete Yes__ No__

CRAFT

- ___ 1. Hull integrity
- ___ 2. All metal equipment grounded to craft
- ___ 3. Towing strap/pack frame/push bar in good condition

GENERATOR/ALTERNATOR

- ___ 1. Electrical connections secure and protected
- ___ 2. Mountings secure
- ___ 3. Exhaust directed away from operator - properly screened and color coded
- ___ 4. Generator should be grounded to the frame
- ___ 5. All metal components grounded to generator frame
- ___ 6. Engine serviced to date/oil change
- ___ 7. Internal ground removed
- ___ 8. Check output voltage

ELECTROFISHER

- ___ 1. Controls and gauges operational
- ___ 2. Adequate mechanical protection of wiring
- ___ 3. Adequate connectors and interlocking
- ___ 4. Operator's safety switch working
- ___ 5. "KILL SWITCH" working
- ___ 6. Anode switches working
- ___ 7. Wiring to anodes in good condition
- ___ 8. Anodes in good condition - attached to handle securely
- ___ 9. Anode handles of non-conductive material
- ___ 10. Cathode plate clean - connection secure

ANCILLARY EQUIPMENT

- 1. Annual inspection completed
- 2. Fire extinguisher present - fully charged - correct type
- 3. First aid kit present - fully replenished
- 4. Inspect protective hand and head gear
- 5. Safety gas containers - regulation style
- 6. Dip net handles made of non-conductive material

Appendix 3. Annual back pack electrofisher safety inspection checklist.

Unit Inv. # _____

Make _____

Model _____

Owner/Operator _____

Location _____

Inspection Date _____

Inspected by _____

Log Book: Up to date Yes__ No__

Manual Present: Yes__ No__

ELECTROFISHER

- ___ 1. Controls and gauges operational
- ___ 2. Adequate protection of wiring
- ___ 3. Adequate connectors and interlocking
- ___ 4. "KILL SWITCH" working
- ___ 5. Switches on electrodes working
- ___ 6. Wiring in good condition
- ___ 7. Electrodes in good condition, and clean
- ___ 8. Electrode handles of non-conductive material
- ___ 9. Cathode clean and secured tightly
- ___ 10. Back pack frame in good condition and non-conductive
- ___ 11. Quick release mechanism of back pack frame working
- ___ 12. High voltage light working

GENERATOR/ALTERNATOR (where applicable)

- ___ 1. Electrical connections secure and protected
- ___ 2. Mountings secure
- ___ 3. Exhaust directed away from operator - if applicable
- ___ 4. The frame is non-conductive
- ___ 5. Engine serviced to date/oil changed - if applicable
- ___ 6. Engine clean and no oil or gas leaks - if applicable
- ___ 7. Check output voltage

ANCILLARY EQUIPMENT

- ___ 1. Annual inspection completed
- ___ 2. Inspect protective hand gear
- ___ 3. Dip net handles made of non-conductive material
- ___ 4. First aid kit - fully replenished, and carried by a different crew member in a backpack
- ___ 5. Safety gas containers - regulation style -
- ___ 6. Fire extinguisher must be present when using a gas powered generator which is the correct type and fully charged, and carried by a different crew member.

Appendix 4. Daily electrofisher boat field check sheet.

Boat Inv. # _____ Date _____

Time _____ Location _____

Crew Leader _____

Crew Members _____

Log Book: Up to date Yes___ No___ Manual Present: Yes___ No___

BOAT

- ___ 1. Hull integrity
- ___ 2. Safety railings intact and sturdy
- ___ 3. Decks clean, free of excess water/bilges dry
- ___ 4. Adequate mechanical protection of wiring
- ___ 5. Adequate connectors and interlocking (integral with hull)
- ___ 6. All metal equipment in boat electrically bonded to hull (checked with volt/ohm meter)
- ___ 7. Batteries fully charged - properly enclosed and vented
- ___ 8. Communication gear working (where applicable)
- ___ 9. Boat clean, equipment neatly stored
- ___ 10. Auxiliary motor present and working (where applicable)
- ___ 11. Oars/paddles present
- ___ 12. Anchors/balers present
- ___ 13. Night navigation lights working

GENERATOR

- ___ 1. Electrical connections secure
- ___ 2. Mounting secure
- ___ 3. Frame grounded

ELECTROFISHER

- ___ 1. Controls and gauges operational
- ___ 2. Adequate mechanical protection of wiring
- ___ 3. Adequate connectors and interlocking
- ___ 4. High voltage flashing light working
- ___ 5. All safety switches working
- ___ 6. "KILL SWITCH" working
- ___ 7. Operators safety switch working

ANCILLARY EQUIPMENT

- ___ 1. Fire extinguisher fully charged
- ___ 2. First aid kit present and full
- ___ 3. Enough personal safety gear present - gloves, boots, ear protection, PFDs reflective clothing

Appendix 5. Daily stream electrofisher boat field check sheet.

Unit Inv. # _____ Date _____

Time _____ Location _____

Crew Leader _____

Crew Members _____

Log Book: Up to date Yes__ No__

Manual Present: Yes__ No__

GENERATOR/ALTERNATOR

- ___ 1. Electrical connections secure and protected
- ___ 2. Mountings secure
- ___ 3. Exhaust directed away from operator
- ___ 4. Frame properly grounded
- ___ 5. Unit electrically bonded/connected to frame

ELECTROFISHER

- ___ 1. Controls and gauges operational
- ___ 2. Adequate mechanical protection of wiring
- ___ 3. Adequate connectors and interlocking
- ___ 4. "KILL SWITCH" working
- ___ 5. Anode switches working
- ___ 6. Wiring to anodes in good condition
- ___ 7. Anodes in good condition - attached to handle securely
- ___ 8. No screens or nets attached to anode hoops
- ___ 9. Anode handles of non-conductive material
- ___ 10. Cathode plate clean - connection secure
- ___ 11. Anode cables unwound from coil - connections tight

ADDITIONAL EQUIPMENT

- ___ 1. Fire extinguisher fully charged
- ___ 2. First aid kit full
- ___ 3. Enough personal safety equipment present - gloves, boots, ear protection, PFDs (as necessary), polarizing sunglasses

Appendix 6. Daily back pack electrofisher field check list.

Unit Inv. # _____ Date _____

Time _____ Location _____

Crew Leader _____

Crew Members _____

Log Book: Up to date Yes___ No___

Manual Present: Yes___ No___

BATTERY

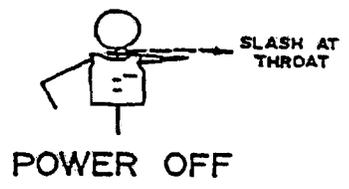
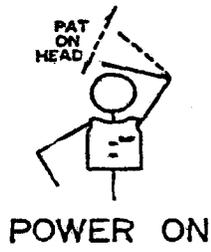
- ___ 1. Clean and fully charged
- ___ 2. Terminals clean and tight

ELECTROFISHER

- ___ 1. Controls and gauges operational
- ___ 2. Adequate protection of wiring
- ___ 3. Adequate connectors and interlocking
- ___ 4. Visible voltage light working
- ___ 5. "KILL SWITCH" working
- ___ 6. Electrode switch working
- ___ 7. Wiring to anode in good condition
- ___ 8. Wiring to anode in good condition
- ___ 9. Electrodes in good condition - fastened securely

ADDITIONAL EQUIPMENT

- ___ 1. Fire extinguisher charged (if applicable)
- ___ 2. First aid kit full
- ___ 3. Personal safety gear - gloves, boots, PFDs (as needed), polarizing sunglasses



EVERYONE ACKNOWLEDGE SIGNAL
BEFORE POWER APPLIED

SIGNAL GIVEN; POWER KILLED;
OPERATOR ACKNOWLEDGE SIGNAL

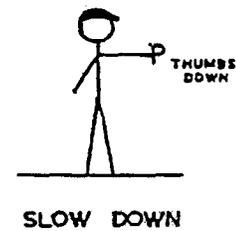
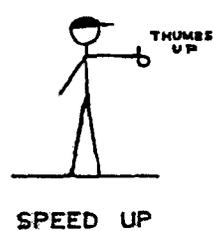
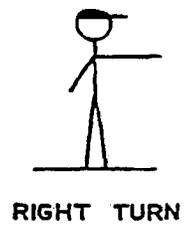
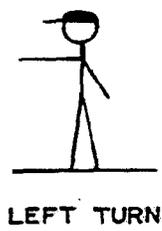


Figure 1. Electrofishing hand signals.

Minnesota DNR Volunteer Guidelines

- General** A volunteer project is a non-compensated activity or assistance provided by an individual
- Definition** or a group of individuals to accomplish a DNR-identified need.
- Allowable Projects**
1. Volunteers may be used in all parts of DNR projects management and operation.
 2. All levels and types of skills may be used. A volunteer may perform any type of non-restricted work, provided it is work which supplements--not supplants--paid staff; and provided it is work which:
 - a. Would not get done at the time because of funding and/or personnel limitations;
 - b. Creates new projects or service;
 - c. Fills gaps in existing projects or services; and
 - d. Does not cause a layoff, or shorten an employee's work hours.
 3. The DNR Bureau of Human Resources should be consulted when questions arise regarding labor relations.
- Restricted Projects**
1. No volunteer should be required to perform any type of work which he/she does not feel comfortable doing, or does not willingly agree to do.
 2. No volunteer should be assigned to work for which he/she is not physically capable.
 3. Volunteers may assist in certain law monitoring and regulation functions (i.e. reporting poachers, violations, etc.) but must not be assigned duties which would place them in a life-threatening situation. Volunteers may not issue citations or carry firearms.
- Workers' Compensation**
1. A person accepted as a volunteer for the Department of Natural Resources is considered an "employee" for Workers' Compensation.
 2. See Minnesota Statutes 84.089 on "Volunteers in Natural Resources Program" and S176.011, Subdivision 9, for exact wording on Workers' Compensation.
 3. Each unit using volunteers is financially responsible for its own Workers' Compensation claims.
 4. "Notice of Enrollment in a Certified Managed Care Plan for Workers' Compensation Injuries and Illness" will be provided to each volunteer to read.
- Court Ordered Community Service** Individuals working under the Sentence to Service (STS) Program or court ordered community service programs are NOT considered DNR volunteers. The Minnesota Department of Corrections is responsible for these people's Workers Compensation. Contact your DNR Region Administrator for the name of your regional STS Coordinator, or call John McLagen, STS Director, MN Dept. of Corrections, St. Paul, (651) 642-0335.
- Campground Hosts**
1. Campground Host programs are administered separately by the Divisions of Forestry, and Parks and Recreation, see their application forms for details.
 2. Individuals accepted as Campground Hosts are considered DNR volunteers.

- Safety**
1. Volunteers must observe the same safety precautions and use the same safety equipment as employees.
 2. Volunteers must not be assigned to hazardous work conditions unless the particular volunteer has special training and qualifications to perform such work.
- Vehicles**
- When authorized by a supervisor, volunteers may drive state vehicles, while on state business, provided they have a valid driver's license. Volunteers may operate state equipment under the same rules and conditions as employees. Volunteers operating or riding in any vehicle, while on state business, are subject to the same seat belt requirements as are employees.
- When driving state-owned vehicles, gasoline must be obtained from self-serve gasoline pumps at stations which will accept state credit cards.
- People using their own personal vehicle on state business must carry their own personal auto insurance.
- Equipment**
- Volunteers assigned to operate machinery or equipment (such as chain saws, power tools, specialized equipment, or vehicles) must have first demonstrated their proficiency in operation of that equipment to the satisfaction of the responsible supervisor. All applicable age and licensing restrictions and regulations related to the operation of machinery or equipment must be adhered to.
- Use of Personal Property**
- Volunteers should use state-owned equipment and property in volunteer work, rather than their own personal property.
- Reimbursement**
- Reimbursing the expenses of volunteers (meals, mileage, lodging, etc.) is at the discretion of the division/bureau based on their budget. Reimbursement conditions should be discussed with the volunteer.
- Questions**
- Persons with questions on volunteer-related matters should consult DNR Volunteer Programs, 500 Lafayette Road, St. Paul, MN 55155-4036 (651) 297-1449 or (651) 297-3618 (Fax).



NA-03754-04 (REV 6/98)

DNR VOLUNTEER AGREEMENT

DNR Staff: Attach a copy of Volunteer Application with this agreement to officially "register" your volunteers for liability coverage. Keep these in your file. Provide a copy of "Notice of Enrollment in a Certified Managed Care Plan for Workers' Compensation Injuries and Illness" to volunteer.

Volunteer's Name		Volunteer's Address:	
Type of Project		Volunteer Job Title	
Specific Location of Work Site (if different than supervisor's address below)			
Purpose			
Duties			
Qualifications Desired (education, skill, experience)			
Division/Bureau/Unit	Region	Name of Supervisor/Contact Person	Title
Supervisor's Address (number and street, RFD, Box number, city state, zip code)			Telephone number ()

Time Commitment: Negotiable? Yes No Dates of Project: From : _____ to _____

Minimum volunteer time commitment acceptable for this project: _____ Weekdays Evenings Weekends

Training Available? Yes No Reimbursement for Expenses: Mileage: Yes No Meals: Yes No

HARASSMENT: The Minnesota Department of Natural Resources (DNR) has adopted a statement of policy against harassment. The policy includes the procedures for reporting and resolving issues brought to the attention of the DNR. This policy statement can be found in the Minnesota DNR Affirmative Action Plan, July, 1993.

INTELLECTUAL PROPERTY RIGHTS: All right, title, and interest in all intellectual property which may be conceived or originate, either individually or jointly by others, and which arises out of the performance of my activities with the DNR, will be the property of the State of Minnesota and are hereby assigned to the State. I also agree, upon request of the State to execute all papers and perform all other acts necessary to assist the State to obtain and register copyrights and patents on such materials. Works of authorship created by me in the performance of my activities with the DNR shall be considered "works made for hire" as defined in the U.S. Copyright Act.

I have read, understand and agree to abide by these policies. If I am unable to meet my time commitment to this volunteer project I will contact my supervisor.

Volunteer's Signature	Date
If under 18 years, parent/guardian must approve and sign Parent/Guardian's Signature	Date

Minnesota Department of Natural Resources-Volunteer Programs
500 Lafayette Road, St. Paul, MN 55155-4036.
(651) 297-1449 or (651) 297-3618 FAX



NA-00103-03

VOLUNTEER REIMBURSEMENT REPORT

Print or Type

Name	Last	First	M	Telephone Number (include area code)
Address (number and street, RFD, box number, City, State, and Zip Code)				
Volunteer Classification Position			Social Security Number (optional)	

EVENT				EXPENSES			
Date	Project or Activity	Miles	Miscellaneous Expenses (A) Item	Amount	Parking (B)	Fares (C)	Sub-totals (A thru C)
Totals							

I declare under the penalties of perjury that this claim is just and correct

Volunteer's Signature	Date
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DEPARTMENT SUPERVISOR TO COMPLETE THE FOLLOWING

DOC TYPE					DATE/VOUCHER NO.				
P1					/				
VENDOR CODE					DOCUMENT TOTAL				
LINE	FUND	AGCY	ORG	APPR	ACTV	OBJ	RPTG	PROJ/JOB#	
SUBORG			REFERENCE DOC: PO#			INVOICE			

Total Expenses from Above \$ _____
 Number of Miles: _____ @ _____ per mile
 \$ _____
 TOTAL AMOUNT TO BE PAID \$ _____

APPROVED: Based on knowledge of the need for travel and expense, and on a compliance with all applicable travel regulations.

Supervisor's Signature	Date
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**Notice of Enrollment in a Certified Managed Care Plan
for Workers' Compensation Injuries and Illness**

Under Minnesota Rule 5218.0250, the Minnesota Department of Employee Relations/Employee Insurance Division provides this notice to inform you that:

Effective January 1, 1998, your employer (the State of Minnesota) enrolled with **Comprehensive Managed Care (CMC)**, a certified workers' compensation managed care plan which provides state employees and covered volunteers with all necessary medical treatment for work-related injuries and illness.

If injured in the course of your work, you may receive treatment from a medical doctor, chiropractor, podiatrist, osteopath, or dentist; if the treatment is available within the community and is appropriate for the injury or illness. As a state employee or covered volunteer, you must receive such treatment from a health care provider who is a member of CMC's plan, except in the following circumstances: you have already established a treating relationship with a nonparticipating provider (who maintains your medical records)* prior to the work-related injury; or if you require emergency treatment; or if your place of employment and residence are beyond the mileage parameters set forth in part 5218.0100, subp. 1.F.(7). Furthermore, if you sustained your work related injury prior to the State's enrollment with CMC, you may continue to receive treatment from a non-participating provider until you change doctors.

You may access care for a work-related injury or illness by going to a clinic or health care provider from CMC's network; or by asking you agency's Workers' Compensation Coordinator to share CMC's provider directory with you; or by calling CMC's 24-hour Nurse Phone Line at 612-456-1950 or 800-486-2913. You may also contact CMC's Nurse Phone Line if you have questions about managed care for workers' compensation; or direct such inquiries to the State Workers' Compensation Program at 651-296-6521. You may also see your agency's Workers' Compensation Coordinator for information or assistance.

Additional information may be obtained by calling the Minnesota Department of Labor and Industry (DOLI) in St. Paul at 651-296-6107 or 800-342-5354. In Duluth, call DOLI at 218-723-4670 or 800-365-4584.

*In accordance with part 5218, subparts 1 and 2, except that if you later change doctors you must then choose a doctor who participates in CMC's plan.

Employee Insurance Division/Workers' Compensation

PO Box 64081, St. Paul, MN 55164-0081, (651) 296-6521 • TTY (651) 297-7959

• *An equal opportunity employer*

ACKNOWLEDGMENTS

Jeff Gorton wrote the first version of this document. This version was updated by the members of the Electrofishing Committee: Huon Newburg, chair, Mark Ebbers, former chair, Jim Wolters, Doug Thompson, Deb Sewell, Mike McNerny, Bill Thorn, Mark Stopyro, Alan Anderson, Dave McCormack, and Jim Stewart. Ronald D. Payer, Steve Hirsch, Paul J. Wingate, and Charles Anderson provided comments and editorial assistance. The committee wishes to thank Vicky Schiller and Brenda Black for their clerical assistance.

Edited by:

P.J. Wingate, Fisheries Research Manager