

Algoma University Animal Care Committee	
AU #0036 Fish electroimmobilization using fish handling gloves (adapted from Carleton University's SOP FAR-18)	
Issue date: March 18, 2025	Last revised: March/2025

1. Purpose

This protocol incorporates ways to minimize stress on fish when using electric gloves as an immobilization tool. Overall, the use of electrical currents to induce immobilization in fishes requires that users are aware of the physiological and behavioural consequences of electrical induction, and that any user can safely operate the device.

Immobilization techniques that do not involve the use of chemical anesthetics are valuable tools that can reduce physical damage and stress during fisheries research and aquaculture practices (e.g., handling, sorting, techniques requiring manipulation such as surgery or tissue collection), stock assessment (e.g., enumeration of fish, collection of aging structures), and experimental procedures (e.g., telemetry tag implantation).

Electric fish handling gloves (Smith-Root Inc., Vancouver, WA, USA) represent an immobilization technique that offers an alternative to chemical anesthetics such as MS-222 and clove oil. Fish handling gloves can be used in both laboratory and field settings. Conductive gloves or electrode straps which come into contact with the fish are used to pass levels of manually-adjustable electric current through the body of the fish. Wires connect the power source to the conductive insulated gloves. The use of fish handling gloves for immobilization provides the researcher with an immobilization tool that offers quick induction and recovery periods, no chemical residues, and allows for an immediate release of the fish following treatment.

2. Policy

CCAC guidelines and regulations

3. Responsibility

It is the responsibility of the Principal Investigator to ensure that this SOP is followed and that those handling fish are appropriately trained to do so.

4. Training Required

Animal Research Ethics

Handling/training in the relevant species

Methodology training in the relevant technique and species

Safety training with the equipment

5. Materials Required

Electric handling gloves – Smith-Root gloves

Operating manual

6. Procedures

Safety considerations: The maximal output rating (25mA, 32V) is generally safe for human contact, although the gloves isolate the operator from electric current by using insulated rubber linesman's gloves beneath the electric gloves. At no point should current be felt by the operator, and if this does occur, use of the device should stop immediately until adequate insulation is made possible

1. Handling protocol consists of holding the fish with conductive gloves around the caudal peduncle and posterior to the opercular cover on the dorsal side, as per recommendations of the electric FHG manufacturer. The glove serving as the anode (positive electrode, red lead) goes over the head/opercular cover area while the glove serving as the cathode (negative electrode, black lead) goes around the caudal peduncle.

2. Smith-Root gloves power settings are set to deliver a current of 4 mA, the lowest power setting initially.

6.3.1 Higher settings (including 6.3, 10, 16, and 25 mA) can be successively used if required to provide effective immobilization (as per the manufacturer's guidelines)

3. Fish are typically held in a padded, V-shaped sampling trough with heads submerged in water to allow gill ventilation. Alternative handling locations are possible as long as the fish remains in contact with water. Fish must remain in contact with the electric gloves throughout the duration of the procedure (typical range is from 0.5-4 minutes).

4. Recovery procedures are not required. Following release from contact with the electric gloves, fish are able to engage in volitional locomotion with negligible behavioural impairments immediately. However, it is recommended that fish be placed initially in a holding tank after contact with the electric gloves for up to 1 minute to monitor for any impairment.

5. Gloves should be cleaned with fresh water prior to use and between each fish. At this time, gloves will also be inspected for any damage and replaced if necessary.

7. References (if applicable)

Reid, C. H., Vandergoot, C. S., Midwood, J. D., Stevens, E. D., Bowker, J., & Cooke, S. J. (2019). On the electroimmobilization of fishes for research and practice: opportunities, challenges, and research needs. *Fisheries*, 44(12), 576-585.

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<http://www.smith-root.com/support/downloads/fish-handling-gloves-manual>

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REVISION HISTORY		
Revision #	Revision Date	Summary of Changes
1	March 18, 2025	Submitted for review. Comments regarding glove inspection prior to use were addressed.