

The Ultimate Guide to Backpack Electrofishing

Have you ever wondered how resource professionals determine whether a restoration project is successful? Or how to salvage fish from a project site before the excavators are brought in?

Maybe you have seen those people out in the field with the ghost buster looking backpacks on and wondered what the heck they were doing.

Electrofishing or electro-shocking, is one of the most effective tools we have for monitoring fish populations.

You will likely either be helping out with or leading electrofishing surveys at some point in your career. If you get involved with **river restoration** work, you will be spending more time than you think around these E fishers. Its a super effective and relatively easy method for estimating fish abundance.

Next time you meet with a fisheries biologist, I want you to know as much about the **electrofisher** so you can be ready to take the lead and gain experience with its use. I'm going to give you a few tips on using an electrofisher first then take you through the basics so you're ready to go for your next fish survey.



Tips on Electrofishing

1. Wear gloves to avoid getting shocked
2. Make sure to put the cover over the battery on.
3. Review how the preset settings work
4. Test the safety features
5. use polarized glasses
6. use an ultralight battery

7. Keep moving as you shock
8. Say “off” to the user before you stick your hand in the water
9. change the bucket water or use an aerator
10. make a survey plan ahead of time
11. don't use the anode as a walking stick
12. the cathode gets frayed and sharp with time (use duct tape – of course)
13. Clear communication between operator and netting crew
14. Clear communication between operator and bucket person – fish health
15. Don't touch boulders instream while the shocker is on

What is Electrofishing

Electrofishing is essentially a method of putting an electrical field into the water so fish are stunned long enough for samplers to net them up. It's an effective method to determine species distribution and population estimate information. Both Boat and **backpack electrofishers** are commonly used. I will be discussing the backpack electrofisher style today.

Does the Electrofisher shock really hurt? The zap is most clearly compared to an electric fence, although there are different levels, based on water variables.

As the person using the electrofisher pushes the on button, an electrical field is placed into the water. When fish are within the field, the fish muscles essentially undergo a contraction (stunning) that allows them to float up to the surface of the water. Note, fish without a gas bladder will need to be sampled by holding the net on the bottom of stream for collection in flowing streams. Pools are a little more challenging. You will have to use a sweeping technique to catch fish.

Note: Make sure to wear rubber gloves to protect yourself from touching the cathode.

Setting up the Electrofisher

Smith Root has somewhat of a corner on the market. I have used the Smith Root backpack electrofisher since day one. Here is their [newest version](#). The LR-24 adds new features and safety to the backpack fisher. They also have a super light [lithium battery](#), that is half the weight and holds 10x the charge.

There's not much to the setup. Plug the **anode** (the pole) and **cathode** (tail) into the respective docking slots on the main unit, plug in the battery and latch the cover. The unit will not work without the cover on the device. This is one of the most common issues that Smith Root deals with.

That's it. Head to the start of your survey and begin surveying.

How to use it

You first need to determine which settings to use for your stream reach. These settings will be based on the conductivity and temperature among other things. The LR-24 has an automatic setting which records current stream variables, then determines the voltage and frequency to



use.

You first need to push down and turn the big red button on the top. This will power up the unit. In order to determine the preset for your stream, follow these brief

instructions:

1. Press the Menu button, then press the up arrow button, then press enter
2. Follow the prompts on the screen for the rest of the setup
3. This will include placing the anode and cathode in the stream and pressing the power anode switch.
4. Once you have the preset value, you can adjust as need during your survey based on the effects to the fish.
5. Water temperature will affect the recovery of fish so monitor fish recovery closely.

Single Pass Electrofishing

Once you have the unit setup, it's usually better to start at the downstream end of your habitat unit in wadeable streams. You have about a 2 meter area of electrical current influence. Outside of this 2 meter area, fish will just swim away. Focus on each 1-2 meter area. When ready place your cathode into the stream, then your cathode, tell your netters that you are turning on the electrical current by saying "ON" and push the button.

This [video quickly](#) shows the technique. Keep working your way slowly upstream, never staying in one spot too long. Fish can get trapped behind rocks or undercuts and you might not see them. If you stay in one spot with the power on for too long you could be unknowingly killing fish. Once you turn (stun) a fish, have the person with the net quickly net the fish and put them in the bucket.

Make sure to monitor the fish closely for recovery. If the fish don't turn back over after a few minutes, you may need to reduce settings. If you have mortalities, you should reduce your voltage settings. Try turning down the volts one notch and see if that helps. You can also use an aerator to

o detail here. The technique I

Most common problems

I have found the Smith Root models to be pretty durable but there are a few things to be aware of.

Here's a link from Smith Root on the [most common problems](#). Like any piece of equipment, as long as you take care of your equipment and routinely service, you should be ok.

Training and Safety

There are inherent risks in putting an electrical current into the water. No surprise there, right?

It probably isn't as dangerous as you may think but let me describe a few tips that will help clarify.

There is a tilt system in the Smith Root shocker, that shuts off the unit if you fall sideways. This is a hassle much of the time, because the unit shuts off when we bend over to reach that next habitat unit.

It also has an emergency stop switch, an immersion stop sensor, and a anode out of water sensor.

There are a number of courses out there to get trained, including this [online course](#) from NWETC.

Like most things, getting the field experience is the best way to learn the skill. You might check in with your local fisheries biologist to see if you can volunteer on one of their projects. Check our [watershed case study map](#) to see if there are other groups in your area doing similar work.

There are plenty of [guidelines out there](#), but NMFS will cover you for ESA listed species.

Other gear needed

- waders and wading boots
- polarized glasses
- hat with brim
- bucket
- aquarium nets
- aerator
- measuring board
- camera
- extra battery

Conclusion

Read this article first to get familiar with the tool and techniques. Then reach out to local fisheries

offices to see if you can get some time on the shocker. If you are developing a restoration project, determine if shocking would be helpful to benefit your project. Check out this link for other [monitoring](#) and [assessment](#) tools.

Fish sampling is a necessary part of implementing instream restoration projects. In order to do greater good for fish species, there may be short term impacts. **Electrofishing** is one way to quickly sample fish and is super effective. Click on the link below to get a PDF Copy of this article.

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