

Electrofishing and Managing Pennsylvania's Trout

by Robert Weber

Last summer, the Commission electrofished tiny Lyman Run in Potter County. After two days of seeing many trout that were less than 11 inches, imagine our surprise when a 22-inch brown trout popped up from seemingly nowhere!

On another survey, we electrofished a formerly degraded trout stream in northern Pennsylvania. In just one pool we captured 30 brown trout over 14 inches long, and six of those trout were between 20 and 24 inches long!

Last August, we surveyed a section of Cedar Run, Tioga County. The spectators who observed hooted and hollered in disbelief as they saw trout after trout in the 18- to 20-inch size coming to our nets in one long, deep pool.

People who watch electrofishing operations are almost always surprised by how many fish are actually present in a particular

stream stretch. I often wish that I had a dollar for every angler who observes an electrofishing survey and walks away shaking his head in disbelief of how many fish are actually in a stream or stream section.

On one occasion an angler confidently told us that we would catch only brook trout in a particular stream because that's all he ever caught there. When we finished electrofishing, our sample revealed that 90 percent of our catch were brown trout. I can't recall ever seeing a jaw hang that low. Many spectators are also surprised to learn how many different species of fish are actually present in their favorite streams.

Electrofishing is the Commission's primary trout stream sampling method. The information gathered this way forms the basis for most of our current-and future-trout stream regulations.

Preferred sampling method

Electrofishing is the most preferred method for sampling trout in our streams. Sampling trout with electrofishing gear is efficient, quick and relatively safe if properly conducted by trained personnel.

Commission biologists use two types and three different methods of electrofishing. The type and method depend on the size of the water and the water's ability to conduct electric current.

We use either AC or DC current operated from either a johnboat, towed boat or backpack unit. The DC current works best in waters with a high potential to conduct electricity (hard waters and limestone streams). AC current is most effective in waters with a lower potential to conduct electricity (soft waters and free-stone streams). Where appropriate, DC current is the most preferred type of current because it has the least potential to harm individual fish.

In addition, the Commission uses the type of electrofishing unit that best matches the size of the water we are sampling. For example, it's difficult to obtain smallmouth bass abundance data from the Susquehanna River using small backpack-mounted electrofishing gear. A johnboat-mounted electrofishing unit is more suitable for this type of waterway.

Kinds of information collected

The type of data we collect assists fish-



Cedar Run,
Tioga County

photo: Art Michaels

eries managers in describing a fish community by its species composition, estimates of abundance and dynamic rates (reproduction, growth and mortality). Consider more specifically the kind of information electrofishing helps us gather:

- Species occurrence.** Electrofishing is used to identify which species are present in a particular stream.

- Catch per unit of effort.** A relative index of fish abundance in a stream. This index can be compared with indices from other streams or from previous samples to reveal long-term trends in fish abundance. This information is usually expressed as the number of trout caught for each hour of electrofishing.

- Population estimate.** Using electrofishing, fisheries managers can compute, with some certainty, how many fish are present in a portion of a stream. In fact, for trout management almost all management decisions are based on knowing the abundance of the current trout population. For example, deciding how many trout to stock in a particular stream is based largely on how many wild trout are already present there. If excellent numbers of wild trout are present, there is no need to stock. However, if the stream supports very few wild fish, then the stream is probably a good candidate for stocked trout management. In addition, population estimates are used when a management change has occurred, such as a change in regulations. Fisheries managers often monitor trout population abundance to see what effects, if any, a change in regulations had on a trout population.

- Population dynamics.** A large part of knowing what is going on with a trout population is understanding the basic life processes of the population. These processes include reproductive rate, growth rate and mortality rate. Most of this data can be collected only by taking specific measurements from as many fish in the population as possible. Growth and mortality rates are routinely computed by taking scale samples of individual fish in the population along with length and weight information from those same fish. Electrofishing lets fisheries biologists

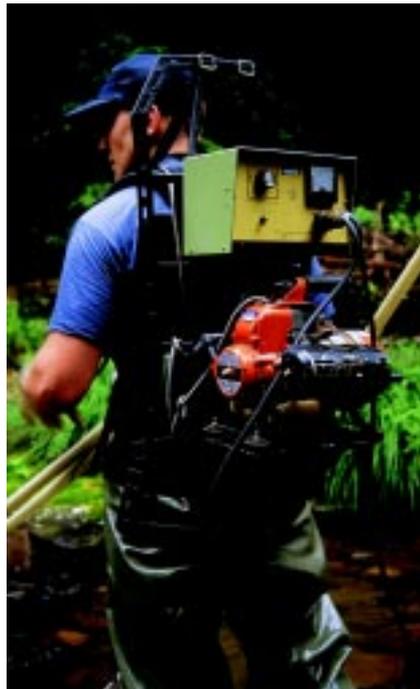


capture large numbers of fish in a short period of time, thus making these measurements much easier to obtain.

Even though I have not seen any cost-effective comparisons of electrofishing, I would be willing to predict that based on the amount of data collected in a short amount of time, sampling with electrofishing is the most cost-effective method of gathering scientific information on fish.

Who electrofishes?

In the Fish & Boat Commission, the area fisheries managers and their staff do the



(Top photo) A stream electrofishing crew includes two people carrying probes, and netters. The current for electrofishing streams often comes from a gas-powered backpack unit (bottom photo).

majority of the electrofishing work. All personnel in the Fisheries Management Division have been thoroughly trained in electrofishing procedures and safety considerations. Electrofishing is obviously a very dangerous operation and could cause serious injury to the operators and to the fish if the work is not done properly. No one should use the procedure without proper, certified training.

Outside the Commission, electrofishing is used mostly by people associated with university research and private consultants who are working with fish populations. Electrofishing is not a legal method to catch fish unless you have a valid scientific collector's permit issued by the Commission.

Electrofishing can be used year-round. However, the majority of the Commission's electrofishing work is performed between March and October. Outside of those times, water levels and temperatures reduce the effectiveness of electrofishing on both the fish and the electrofishing operators.

Many waterways are sampled with electrofishing either annually or biennially. Most of this work is done to evaluate how a population is responding to a management change over time, such as a regulation change. The Coldwater and Warmwater Units, along with the area fisheries managers, perform most of the annual monitoring work.

On most occasions, when population estimates are conducted, a portion of the stream is sampled on consecutive days to complete a single sample. Sometimes biologists sample more than one area of a stream this way. Rarely, except under very specific circumstances, are streams sampled more than one time per year. Sampling a fishery with any type of gear is inherently disruptive to the sampled population. Excessive disruptions could lead to increased stress levels of individual fish, and ultimately could affect the population as a whole.

The Fisheries Management Division produces survey schedules each year. These schedules can be obtained by contacting the area fisheries management offices or the Fisheries Management Division

(814-359-5110). These schedules are tentative because of weather and water flow conditions. It is best to contact the appropriate area fisheries manager for his current survey plans. The list of area fisheries managers with addresses and phone numbers appears in the sidebar.

Probably the most difficult aspect of electrofishing is a growing public perception that electrofishing kills most of the fish exposed. This is untrue. Some streams have been exposed to electrofishing in the same locations annually for 15 years. If electrofishing mortality were excessive, these fisheries would not support the outstanding populations that are continually present.

If done improperly, electrofishing can cause severe injury and even mortality. Then again, so can fishing, if done improperly. When using electrofishing, probably fewer than five percent of the fish captured will die, and some of this mortality is from the handling of the fish after they are captured. Our fisheries managers and the staff are very concerned and take appropriate measures when the well-being of the fish is threatened. It would not be in our best interests to cause excessive mortality to the same fish we are trying to manage.

After a survey

Fisheries biologists and technicians collect, tally and review the data. Occasionally, fisheries biologist aides under the direction of the biologist or technician will participate in the data analysis process.

On a technical level, the fisheries biologist and fisheries technician review the data. Following the completion of a survey, the information is entered into a computerized database. From there the data is compiled into tabular form, management narratives (reports) are written, and management plans are developed based on the data and narratives.

All regulations that are part of Fisheries Management plans have been developed with data collected by some sort of electrofishing sampling. Our current resource-based stocking categories were designed in part on trout population abundance classifications, which were developed using electrofishing data. It would be most difficult to develop sound management plans without the use of data collected by electrofishing techniques. 🪿

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A large trout in this stream sampling tried to eat a smaller trout (left). When the eaten fish was extracted, both fish were weighed and measured (above). Who says big trout don't go for big bait?

More Unusual Electrofishing Discoveries

- One early spring, while electrofishing on a major river, we captured nine muskellunge in one night, and all were over 30 inches long. We saw but could not capture another seven or so muskies of similar size. In my six previous years with the Commission, I have seen only about six muskies while electrofishing.
- In southeast PA near Philadelphia we were electrofishing a previously unsurveyed stream and found thousands of small blue crabs, all less than two inches wide.
- We occasionally find wild "tiger trout," a naturally occurring hybrid between brook trout and brown trout.
- We captured two very large brown trout that were using a discarded shopping cart for overhead cover.
- We recently found an abundance of brown trout in the formerly degraded Lackawanna River, Lackawanna County.
- We captured an 11-inch wild brook trout in a headwater stream about two feet across.

Commission Fisheries Management Areas

- Area 1.** Area Fisheries Manager Craig Billingsley, P.O. Box 127, Linesville, PA 16424-0127; phone: 814-683-4451.
- Area 2.** Area Fisheries Manager Ronald D. Lee, P.O. Box 458, Tionesta, PA 16353-0458; phone: 814-755-3890.
- Area 3.** Area Fisheries Manager Bruce A. Hollender, 450 Robinson Lane, Bellefonte, PA 16823-9620; phone: 814-359-5118.
- Area 4.** Area Fisheries Manager Robert E. Moase, Box 88, Sweet Valley, PA 18656-0088; phone: 717-477-5717.
- Area 5.** Area Fisheries Manager David A. Arnold, Bushkill, PA 18324; phone: 717-588-6388.
- Area 6.** Area Fisheries Manager Michael L. Kaufmann, P.O. Box 356, Revere, PA 18953-0356; phone: 610-847-2442.
- Area 7.** Area Fisheries Manager Lawrence L. Jackson, 195 Lebo Road, Carlisle, PA 17013-9362; phone: 717-486-3710.
- Area 8.** Area Fisheries Manager Richard D. Lorson, 236 Lake Road, Somerset, PA 15501-1644; phone: 814-445-3454.