

Dedicated to the Memory of
Commissioner Enoch S. "Inky" Moore Jr.



PLAY

Spring
2013

Pennsylvania • League • of • Angling • Youth

by Andrew Fedor and Miranda Smith

Pennsylvania FSI: Fish Scene Investigation

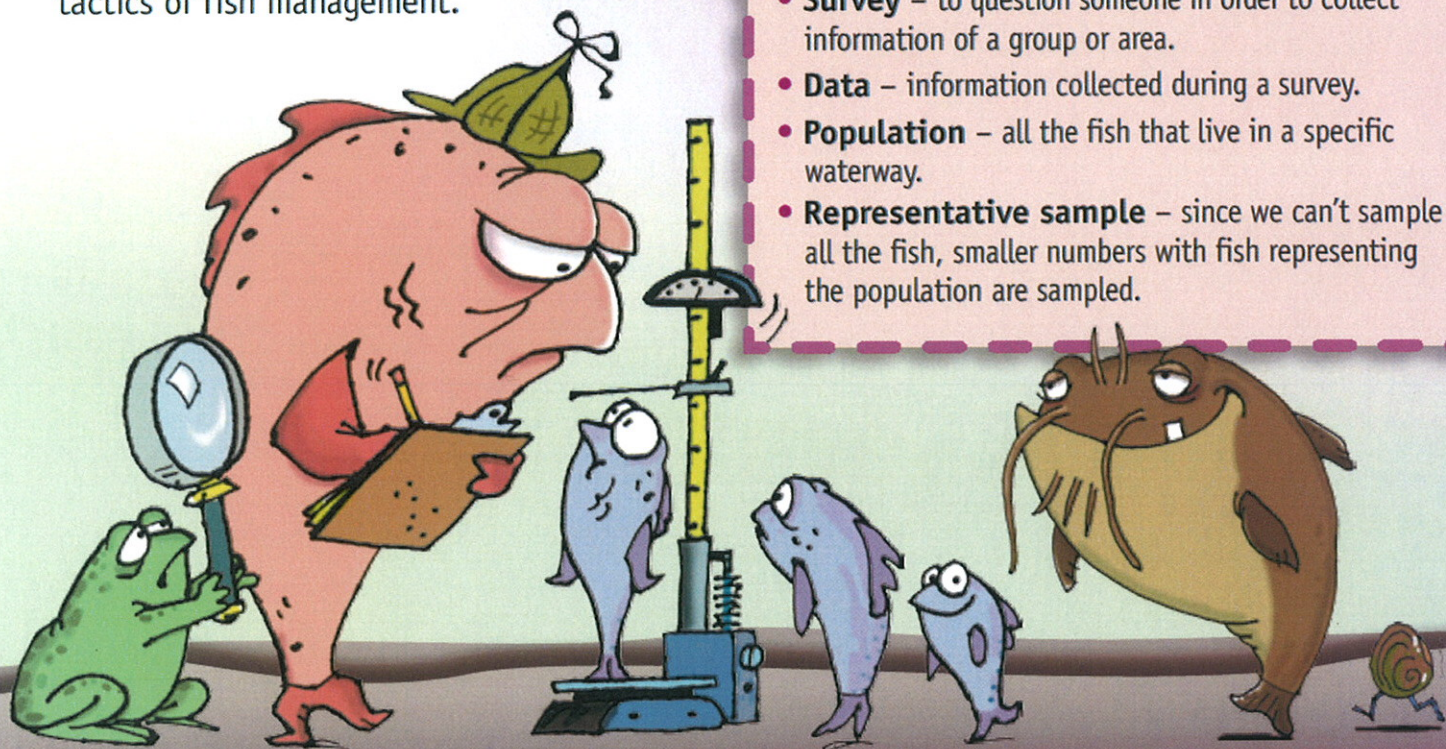
Have you ever wondered what species of fish live in a river, or if a lake is good for bass fishing? Have you noticed that some streams are stocked with trout while others are not?

Answers to these questions could help make you a better angler. The Pennsylvania Fish & Boat Commission (PFBC) is here to help. Think of the search for these answers as a Fish Scene Investigation (FSI). Our fisheries biologists need to learn more about Pennsylvania's fish **populations** before they can manage them.

Read this issue to discover more about the tactics of fish management.

Vocabulary *(Watch for these words!)*

- **Abundance** – number of fish captured in a survey.
- **Diversity** – variety of fish species present.
- **Scales** – protective plates on a fish's body.
- **Otoliths** – bone-like structures in the inner ears of some fishes that help with balance and detecting sound.
- **Aquatic Invasive Species** – a non-native species that takes over an aquatic ecosystem.
- **Survey** – to question someone in order to collect information of a group or area.
- **Data** – information collected during a survey.
- **Population** – all the fish that live in a specific waterway.
- **Representative sample** – since we can't sample all the fish, smaller numbers with fish representing the population are sampled.



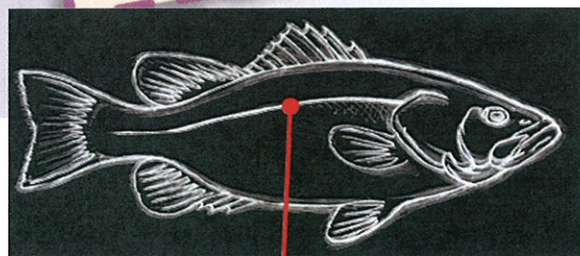
Collecting and Analyzing

- ✓ Date and time
- ✓ Location
- ✓ Effort
- ✓ Catch per effort (number of fish caught and time spent sampling)
- ✓ Water quality
- ✓ Water temperature
- ✓ **Abundance**
- ✓ **Diversity**
- ✓ Length (nose to tail)
- ✓ Weight
- ✓ **Scale** or **otolith** sample
- ✓ Origin (if it's a wild or stocked fish)

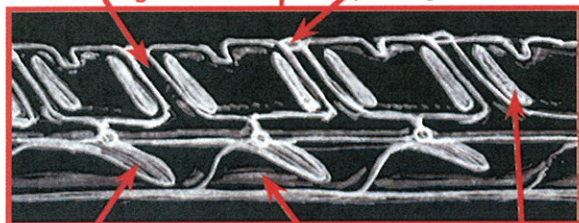
Collecting and Analyzing the Data

Our fisheries biologists must first gather information before they can manage fish **populations**. There are many rivers, lakes and streams in Pennsylvania. It's impossible for biologists to catch, count and learn about every fish in all of these waterways. In order to investigate a waterway, biologists have a few tricks up their sleeves.

Biologists will **survey** a waterway to catch a **representative sample** of all the fish living there. **Data** from the **survey** is collected, recorded and later analyzed. The analysis results in estimates of the **population**, **abundance** of certain species or size at that point in time. The estimates from that sampling are compared to estimates made when it was sampled before. This helps to show trends in the **population**.



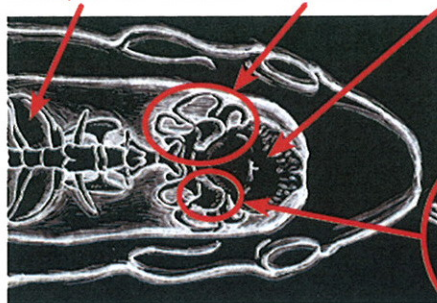
tube through scale pore of lateral line



hairs nerve scale

Inner Ear (view from top of head)

swim, or air bladder inner ear brain



Otolith



?

Tools of the Trade

Biologists use different types of tools and methods to survey our waterways. The selection of tools and methods used depend on the type of waterway (flowing or lakes and ponds), depth and fish species under investigation.



Commission biologists conduct a **survey**.

Tools of the trade: Electrofishing

Biologists may use electrofishing equipment to **survey** fish **populations**. This equipment can be used by a biologist wading in a stream or from a boat. An electrical current from a generator passes through electrodes in the water. Fish near the electrodes are actually attracted, like a paper clip to a magnet. Others are temporarily stunned. Biologists net the fish and later identify, count and measure the fish. Fish are then released unharmed.

For more information
on electrofishing, go to
[www.fishandboat.com/
education/catalog/
electrofishing.pdf](http://www.fishandboat.com/education/catalog/electrofishing.pdf).

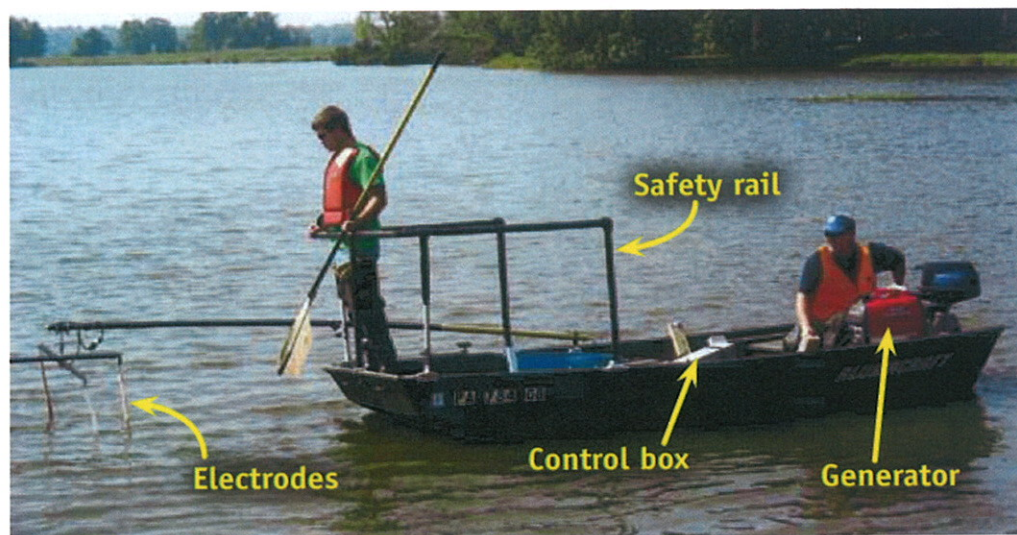
Backpack Electrofishing

Backpack electrofishing is used in streams and rivers. One biologist wears a special backpack that has a control box and either a generator or battery to produce the power. Then, the electricity is transmitted to the water with electrodes held by the biologists. One or more biologists collect the stunned fish with nets. They work their way upstream, capturing fish as they move through the water.



Boat Electrofishing

Boat electrofishing is used on larger rivers and lakes where wading would be difficult. One biologist operates the boat, control box and generator. The two electrodes are mounted from the front of the boat. Another biologist then stands on the bow (front) of the boat and nets the stunned fish.



Tools of the Trade: Nets and Surveys



Pennsylvania-style Trap Net

Pennsylvania-style Trap Net

A trap net is the tool biologists use the most to **survey** lakes and ponds. Trap nets are shaped like a funnel. A long section of the net, called the "lead," guides fish into a "trap" at the end, called the "pot." The entrance to the "pot" is small and shaped like a funnel. Fish enter through the wide end of the funnel and can't find their way out. Biologists use trap nets to sample muskellunge, walleyes, northern pike, catfish, yellow perch, bluegills, crappies and other panfish.



Pennsylvania-style Trap Net



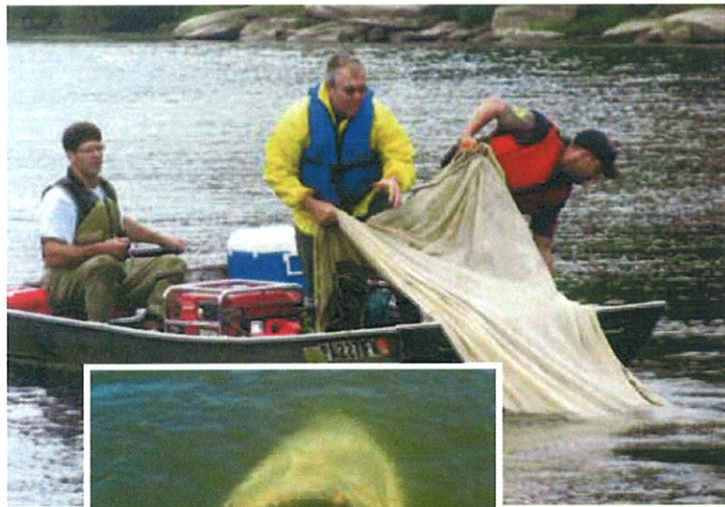
Hoop Net



Hoop Nets

Hoop nets are specialty nets primarily used to catch channel catfish. Biologists bait the hoop nets with a smelly cheese bait to attract catfish. Three hoop nets are tied end-to-end to make a set. Hoop nets also have netting inside that guides the fish into a pot.

www.fishandboat.com



Benthic Trawl



Benthic Trawl

Biologists use benthic trawling to sample small, bottom-dwelling fish species such as darters, chubs and madtoms. The funnel-shaped trawl net is attached to a boat that drags it along the bottom. Biologists have begun to use electrified benthic trawl nets. An electric current is used to stun the fish so that they move off the bottom and into the net. Benthic trawls are used in the deeper waters of large rivers and Lake Erie.



Gill Net



Gill net in water.

Gill Net

A gill net is a flat net that is set in the water. The size of the openings in the netting determines what size and type of fish can be captured. Fish swim into the net but can only fit partly through the opening. When the fish tries to back out, the net catches behind the gill cover and traps it. Biologists use gill nets to sample walleyes, yellow perch, trout and shad.

Creel Survey

Sometimes PFBC interviews anglers. This is called a creel **survey** or angler **survey**. Anglers are asked questions about the length of time they fished that day, the number and species of fish kept and released, fishing methods used and targeted species. We may also ask anglers questions about their age, where they live and how much money they spent on their fishing trip. In addition, the number of people fishing, both on the water and from the shore, will be counted.



Creel Survey

Decisions, Decisions

Biologists will examine all the data from the **survey**. This **data** will help the Commission make important decisions about managing fish species and the waterways.

Healthy Fish

The length and weight tells us many things about a fish—how well it's growing, if it gets enough food and if it has good habitat (place to live).

Biologists will also count the rings on **scales** and **otoliths**. New rings are added as a fish grows. From the inside, they provide useful information about the fish's age, growth rate and life history.

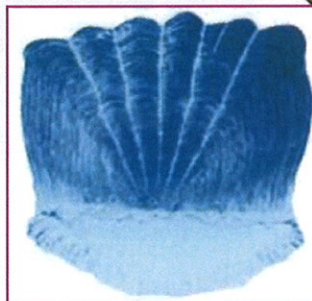
Biologists compare length, weight, growth rate and age to determine the fish's overall health.

Catching big, healthy fish is a good thing for anglers.

Healthy Diversity

The **diversity** of fish caught during a **survey** tells us if the habitat and water quality are good enough to support a variety of fish.

Catching different fish is more interesting to anglers than catching only one type of fish.

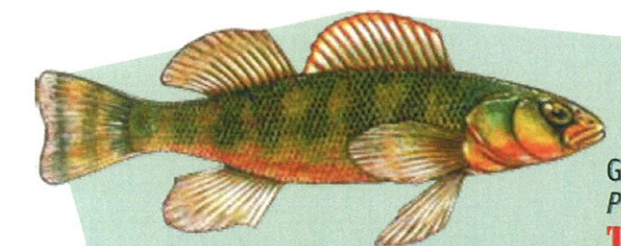
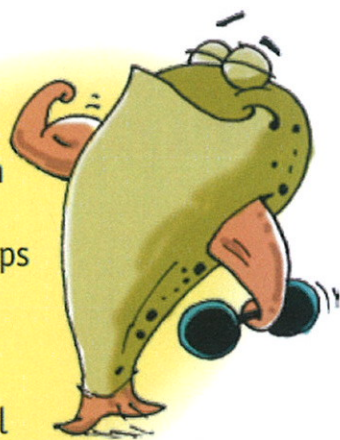


Magnified photographs of a **scale** (left) and an **otolith** from a walleye.

Healthy Populations

The number of fish (or sample) caught during the **survey** helps biologists estimate the total **population** in a waterway. **Data** is entered into special formulas that estimate the **population** size.

After all, it's fun catching more fish, right?



Gilt Darter
Percina evides
THREATENED



Atlantic Sturgeon
Acipenser oxyrinchus
ENDANGERED



Round Goby
Neogobius melanostomus
AQUATIC INVASIVE SPECIES

The End Result

All of this information is used to manage fish and create fishing regulations. Seasons, sizes, creel limits and fish stockings are guided by **surveys**.

Surveys can also tell us if a fish is threatened, endangered or even an **aquatic invasive species**.

All of this hard work ensures fun fishing for all anglers.



Pennsylvania League of Angling Youth
Pennsylvania Fish & Boat Commission
P.O. Box 67000
Harrisburg, PA 17106-7000

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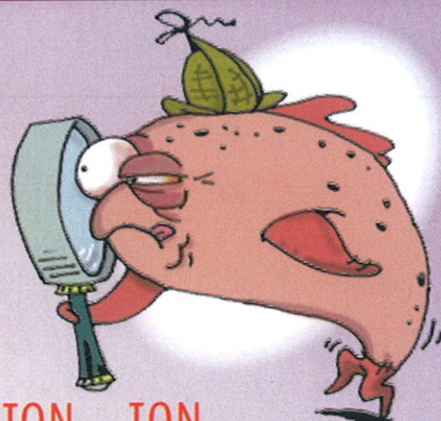
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FSI: Your Turn

PFBC biologists use many different methods to investigate the waterways and make an estimate of fish **populations**. Solve the "word equations" below to reveal some of the tools they use. The first one is done for you.



1. BROAD - RD + TRAVEL - RAVEL + ELECTION - ION
+ GROW - GW + CATFISH - CAT + SING - S = BOAT ELECTROFISHING

2. HOOT - T + PEN - E + LETS - L = _____

3. BENCH - CH + THIS - S + CAT - A + CRAWL - C = _____

4. GRILL - R + NEST - S = _____

5. CREEPY - PY + LOGS - OG + LURE - LE + VERY - R = _____

6. PAENTRY - ENY + APRON - RO + WEST - WS = _____

7. BLACK - L + PACKAGE - AGE + SELECTION - STION
+ TROUT - UT + FIST - T + THING - T = _____

Match each answer above to the **Fish Scene Investigation** below.

Fish Scene Investigation: Which survey tool is used for each investigation?

- Brook trout in a small creek = _____
- Channel catfish in a large river = _____
- Yellow perch in Lake Erie = _____
- Bottom-dwelling darters in a large river = _____
- Bluegills in a lake = _____
- Largemouth bass in a lake = BOAT ELECTROFISHING
- Number of anglers targeting walleye at a lake = _____



Benthic Trawl

ANSWERS: a. Backpack Electrofishing; b. Hoop Nets; c. Creel Survey; d. Benthic Trawl; e. PA Trap Net; f. Boat Electrofishing; g. Creel Survey

PLAY

Editor: Spring Gearhart

Design and Illustrations: Jeff Decker and Ted Walke

Photos: PFBC archives

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ANSWERS TO TOP OF PAGE:
1. Boat Electrofishing; 2. Hoop Nets; 3. Benthic Trawl;
4. Gill Net; 5. Creel Survey; 6. PA Trap Net;
7. Backpack Electrofishing.



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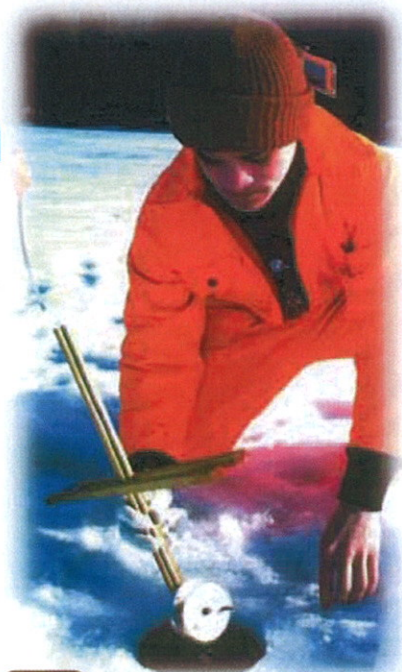
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