



photo-Brian McFall



photo-Steve Kepler

Division of Environmental Services Fisheries Biologist Heather Smiles examining aquatic macroinvertebrates.

The Pennsylvania Fish & Boat Commission's Fisheries Biologists:

Who are they and what do they do?

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Bureau of Hatcheries' Fisheries Biologist Coja Yamashita (bottom) and Fisheries Technician Pat Weiss (top) in the Pathology Lab at the Benner Spring Fish Research Station.

According to Webster, biology is defined as “the study of living things and their vital processes.” As there are many living things in this world, the field of biology is very broad. For example, those who study biology (biologists) can work in many specialized areas. Botanists are biologists who study plants, zoologists study animals, entomologists study insects, malacologists study mussels, herpetologists study reptiles and amphibians, and ichthyologists study fish. Within these categories, biologists can be even more specialized by studying perhaps one or two types or species of organisms, such as coldwater or warmwater fish, or various biological processes such as genetics (the study of heredity and genes). Pennsylvania Fish & Boat Commission (PFBC) employs a staff of approximately 40 fisheries biologists. Our staff have varied biological backgrounds and levels of training that can include ichthyology, entomology, physiology (study of the mechanical, physical and biochemical processes of living organisms), genetics, anatomy (study of the structure of living things such as skeletal, muscle and nerve systems), fisheries management, fish culture, chemistry, mathematics and statistics.

Besides the university training of PFBC fisheries biologists (typically involving either a bachelor's or master's degree),

many PFBC biologists have many years of on the job training, working in the field and in the laboratory. This training is important when one considers the roles our biologists play in protecting, conserving and enhancing the aquatic resources of our great state. And, protection of our aquatic resources is typically not just a job for staff but a passion, born out of a lifelong interest in living resources, including fishing and boating as a way of experiencing them. In other words, our fisheries biologists are hard at work protecting the very resources that they recreate in themselves. This not only benefits them personally but also their clientele of more than 1 million anglers who fish in Pennsylvania.

So, what is the specific role of our biologists? Generally, this can be broken down into the following categories: fisheries managers, habitat managers, environmental protection specialists and those who specialize in various aspects of culturing fish.

Our fisheries managers are at the forefront of understanding and managing the fisheries of Pennsylvania. They monitor the water quality and physical habitat of our lakes and streams, determine the condition of the fisheries and develop plans to manage these fisheries. Possible management options include



(Left to right) Division of Fisheries Management Biologists John Frederick, Bob Weber and Tom Greene sampling trout by electrofishing.

photo-Dave Miko

fish stocking, application of existing or new regulations, and habitat protection or improvement projects. This is challenging work when one considers that PFBC has fisheries management responsibility for thousands of miles of flowing water and hundreds of lakes and ponds, and every stream and lake is unique. For example, consider Pennsylvania's waters of Lake Erie compared to a small pond. A stocking formula that works well on one body of water may not work well on another body of water. The same holds true for regulations. Since every body of water is unique, every management plan could likewise be unique. However, this type of management can become so complex, especially with respect to regulations, that most anglers wouldn't understand it. Many people, including those within our agency, ask for simpler management. We often hear the request to "make the regulation summary book smaller." Staff attempt to walk the fine line of implementing plans that are tailored specifically to a given body of water while minimizing the number of different regulations and stocking prescriptions our waters receive. As one of our commissioners is fond of saying, "Fisheries management isn't rocket science. It's harder."

In the area of habitat management, PFBC biologists work to understand how physical habitat interacts with flowing or standing water to benefit fish and other aquatic life. This includes understanding water depths, water velocities, substrate types and cover types that various species and the various life stages of these species prefer. Mimicking these conditions with artificial substrates or other types of physical habitat manipulation is challenging, and there's little substitute for learning these processes through much time in the field, coupled with knowledge of the scientific literature on the subject.

Commission biologists working in the area of environmental protection typically specialize in a given area of study but apply that knowledge statewide. We have

biologists that specialize in instream flow protection, which involves determining how much the natural flows of a stream can be altered by such things as municipal or industrial water withdrawals or hydropower release regimes without harming the aquatic resources that are usually adapted to do best under natural flow conditions. Other biologists specialize in understanding how mining, gas and oil drilling, and road construction can impact aquatic resources. Some specialize in the protection of rare species. Our biologists know their fields of expertise well and are typically consulted by biologists or engineers in other agencies, such as the Pennsylvania Department of Environmental Protection or the United States Army Corps of Engineers, for recommendations on how to condition permits in a way that the environmental impacts of permitting are avoided, minimized or mitigated. From time to time, these recommendations can be challenged by way of legal appeals of permit decisions. Commission staff have a good track record of defending their decisions and expertise in legal proceedings.

As for fish culture practices, our biologists work hard to understand such things as the effects of the type of fish food on growth, how to raise certain species that are particularly challenging and how to mark fish to study the relative benefits of one stocking practice compared to another. Our biologists also work to keep fish healthy by diagnosing diseases, which can be a serious problem in a hatchery setting and prescribing treatment options when necessary.

The field of biology—the study of life—is an exciting and rewarding career for those who have the opportunity to practice it. Often, our biologists are asked the question, "How do you get a job like that?" The answer is a good education, perseverance in pursuing the job (there's lots of competition), a passion for the resource and a good work ethic. The Pennsylvania Fish & Boat Commission is blessed to have many staff that fit this mold, working hard to protect, conserve and enhance the resources of our great state. □