



## **Introduction to Aquatic Ecology:**

### **Why Include Aquatic Ecology Activities in 4-H Sportfishing?**

by Carl Richardson

It goes without saying that sportfishing activities will be the focus of your club activities. This leaders' manual, and your own experiences will guide you in planning these activities. Such activities will likely include casting practice, tying flies and building lures, taking fishing trips and keeping a fishing journal. All these examples have obvious connections to sportfishing and youth development. However, there is a set of knowledge and skills that you as an angler and leader will unknowingly drawn on when leading your group in any activity. Do you know what that is? It's your knowledge about aquatic ecology!

#### **What is Aquatic Ecology?**

Aquatic ecology is the study of aquatic organisms, the ways they interact, the places they live, and the things they do. While the field of aquatic ecology is extensive, there are a handful of key concepts, terms and ideas that are most important to fishing. Those key concepts are listed at the end of this introduction. They are taught and reinforced through the activities in this section.

#### **Don't be Intimidated**

You don't have to be an expert on this subject to lead activities on aquatic ecology. Each activity includes basic background information on the concepts in the activity. There are also additional references & resources listed in each activity. You can consult these resources before, during and after the activity, to increase your knowledge or clarify some points.

However, you probably know a lot about the subject, but just don't realize it. Listed below are some questions that all anglers wrestle with, especially as they try to mentor youth just starting to fish! Most often the answers to these questions can be found in your knowledge of the ecology of the places you fish and the fish you chase.

***Fishing Question: Which lure or bait do I use to catch fish?***

**Answer:** With so many choices of artificial lures and natural baits, this choice can be a difficult one. The answer may be based on experience with something that works. However, the choice can be made more easily with a little knowledge about what the fish you are after eats.

**Example:** You know that largemouth bass love to eat crayfish, so you choose a lure that imitates a crayfish.

**Aquatic Ecology Concept (s) (for definitions of these terms see the glossary at the end of this section) :** Food chains, food webs, life cycles, lake ecology

***Fishing Question: Where should I fish to catch (insert your favorite fish here)?***

**Answer:** Selecting a place to fish—whether lake, stream, bay or ocean, is one of the first choices we make as anglers. Most often we pick a place depending on what we want to catch, because we know it lives there. Once again, that is based on your aquatic ecology knowledge!

**Aquatic Ecology Concept (s):** habitat needs, adaptations, life cycles

**Examples:** You want to catch trout and/or salmon so you have to fish cold streams, rivers or lakes. You want to catch flounder so you fish back bays and saltwater estuaries.

***Fishing Question: Where is the best place on this (lake, stream, bay, or ocean)?***

**Answer:** Once you know the fish you are chasing lives in a particular waterway, where do you start fishing? You draw on your knowledge of the specific needs and preferences of the fish you are seeking.

**Aquatic Ecology Concepts:** life cycles, habitat needs of fish and the things they eat, habitat components, seasonal movements.

***Fishing Question: We have been fishing in this spot for more than an hour but all we catch are little ones. Why?***

**Answer:** The place you are fishing doesn't have any places for big fish or the food they eat to hide. Maybe this water doesn't have any big fish in it—just for that reason. Or maybe all the little fish get eaten before they get big. The biggest fish (such as stripers and bluefish) are schooled together—so it's time to find another school.

**Example:** Big trout and salmon are found in some of the biggest and deepest holes, or near lots of overhead cover like trees and roots.

**Aquatic Ecology Concept:** life cycles, habitat needs, predator-prey interactions, adaptations, populations.

***Fishing Question: The fishing on this lake was great last year, now it is terrible. What happened?***

**Answer:** Many factors influence fish populations. Maybe human activities changed the water temperature and the fish you are after prefer cold water. Perhaps weather conditions caused changes in the spawning season, or low survival of young.

**Aquatic Ecology Concept:** habitat needs, limiting factors, watersheds.

**Need More Convincing?**

As you can see from the examples, whether you realize it or not, aquatic ecology is an important tool in your tackle box. Understanding about fish, the places they live and the things they eat is just as important as learning to cast or tie knots. Check around, the anglers that enjoy fishing the most are just as knowledgeable about their fish as they are about their gear and tackle! Do you want your youth to enjoy fishing and make it a life long sport? Then teach them some basic aquatic ecology concepts by using the activities in this section!

### **Stewardship of Aquatic Resources**

Another important reason to include activities which build on aquatic ecology knowledge is to ensure the future of fishing. One of the examples mentions a fishing spot that was impacted by human activity. Are there any things your youth do in their every day lives that also impact the places they fish? Could your 4-H youth do anything to improve and protect the places they fish? Youth come up with the answers to these questions in some of the activities you will lead them through. When we change our actions in an attempt to protect (or improve) our environment, it's called stewardship. Stewardship of our aquatic resources is critical to the future of fishing.

### **Aquatic Ecology is a Fishing Skill, so Teach it That Way!**

As a leader, will you tie on every hook or lure? No way, you will lead members through activities where they can learn to tie their own knots! When you teach them knots will you only talk to them and explain how to tie knots? No, each person will likely practice (and practice), teach others and do other hands-on activities to learn how to tie knots. You will need to teach aquatic ecology in the same manner through hands-on activities. The activities in this section use real field/outdoor experiences, models, games, demonstrations and simulations to teach and reinforce important aquatic ecology concepts and ideas. Each activity includes a glossary, important background information for you and youth and step by step instructions for each hands-on activity. Rarely will you be in front of your club just talking to them about these important concepts but at least if you want them to learn best you won't be! While this would be the easiest way for you, it's certainly not the best way. After all, we know that 4-H is all about providing youth an opportunity to learn by doing! When they learn they grow. When they grow, they become better prepared to deal with the world in which they live.

That is exactly why this section of the handbook was prepared. You will find lesson plans for hands-on activities designed to teach specific concepts. These activities or those they were adapted from have been used by educators around the country to teach those same concepts. These lessons are designed to help you create good learning opportunities for your youth. You don't need to be an expert in fisheries or education to create these situations just use this section as your guide.

### **How This Section is Organized**

This section of the manual is divided up into three parts:

- I. All About Fish
- II. Fish the Places They Live.
- III. People and Fish

Each section has several units which focus on specific concepts.

I. All About Fish

- A. Basic biology and ecology
- B. Sorting, Classification and identification

II. Fish and the Places They Live

- A. Water and the water cycle
- B. Watersheds
- C. Habitats
- D. Communities

III. People and Fish

Each unit has one or more activities which introduce, reinforce or build on specific concepts. The names of each activity are highlighted and italicized.

I. All About Fish

- A. Basic biology and ecology

*Activity: Fish Prints*

- B. Sorting, Classification and identification

*Activity: Fashion a Fish, Getting to Know Your Local Fish*

II. Fish and the Places They Live

- A. Water and the water cycle

*Activity: Kitchen Table Watercycle, Water We Eating*

- B. Watersheds

*Activity: Build a Watershed, Dissect a River*

- C. Habitats

*Activity: Water, Water Everywhere, Map That Habitat*

- D. Communities

*Activity: Go Fish, Aquatic Adventures, Aquatic Charades*

III. People and Fish

*Activity: Tragedy of the Commons, Estimating Fish Populations.*

All the activities include some basic background information, a list of other references or resources for you and youth, a lesson plan for a hands-on activity or demonstration, evaluation questions, extensions to take the activity even further and where appropriate connections to other parts of the 4-H curriculum.