

Module 2 ~ A Fish Tale (UE/MS/HS)

Vocabulary – Careers in Florida’s Freshwater Environments



The following occupations are shown in the *Careers in Florida’s Freshwater Environments* DVD. Remember: these are just some of the possible careers you can have; we only had time to show you a few. The sky, the lakes, and the rivers are the limit!

Aquaculture means to grow things in water. Many kinds of fish, shrimp, crayfish and aquatic plants are grown commercially for food, aquariums, ornamental ponds and for the restoration industry (for restocking fish or revegetating wetlands, lakes and rivers). Plants can be grown from seed, from root stock, or from plant cells (tissue culture or cloning). Many aquaculturists are self-employed or work for small companies.

Aquatic Plant Managers manage aquatic plants growing in our lakes, rivers and wetlands. Excessive growth of exotic plants can prevent our native aquatic plants and animals from growing and can prevent people from enjoying their rivers and lakes. Aquatic weeds may be controlled using **biological control** methods (herbivorous (plant-eating) fish and insects, pathogens (diseases)), **mechanical control** (cutting and harvesting machines), or **chemical control** (spraying herbicides from boats, helicopters, airplanes, or from land). Aquatic plant managers are hired by many cities and counties, as well as the five water management districts and more than 100 special taxing districts in Florida. The Florida Department of Environmental Protection has a Bureau of Aquatic Plant Management in Tallahassee with regional offices throughout the state. Managers also are hired by many private lake management companies.

Aquatic Plant Nurseries – see **Aquaculture**.

Biological illustrators are artists who draw scientifically correct pictures of plants and animals. Some artists draw free-hand and some use computers to create graphic art.

Biologists are people who understand the science of living organisms, how they live, grow and reproduce. Biology is a broad term that includes zoology (animals) and botany (plants). Biologists are hired by national, state and local parks, nature preserves, wildlife sanctuaries, and environmental protection agencies. They study and protect and sometimes educate the public about natural systems such as lakes, rivers, and wetlands. A college degree usually is required to have a career as a biologist.

Botanists study and identify plants (botany). Each plant species has only one scientific name, which is Latin, and this name is used by botanists throughout the world. For example, the Latin name for water hyacinth is *Eichhornia crassipes*. Plant identification in turn enables us to identify ecosystems where only certain plants grow, such as wetlands. Botanists can work in herbariums, which are collections of dried plant specimens similar to a library. They also can work in museums or in botanical gardens, which are gardens used for the culture and study of plants collected and grown for scientific and display purposes. Botanists also are hired by environmental consulting firms, government agencies, and universities and colleges. Botanists have a college degree.

Chemists study and analyze the chemical properties of substances such as soil and water. They can detect changes in these substances, for example, when pollution degrades the water in a lake. Chemists frequently work in a laboratory where highly specialized equipment is used to measure and analyze substances. Chemists have college degrees. They are hired by universities, consulting firms, private companies, and government agencies.

Computer Specialists are needed to set up and use computers to create maps and graphs, analyze information, produce publications, and much, much more. Some people learn to use computers on their own while others earn degrees in computer science. In today’s world, it is difficult to find any type of career that does not involve computer use because computers are . . . ubiquitous (look it up! ☺).

Ecologists study the interrelationships of organisms and their environments. For example, whereas a biologist might study fish reproduction, an ecologist might study how fish, aquatic plants and water chemistry affect each other within a lake. Ecologists usually have a college degree. They are hired by environmental consulting firms, parks and recreation departments, universities, and government agencies.

Entomologists study insects. They might study insects to understand how they pollinate plants or to understand how they reproduce. Some perform research on how to *control* insect pests that infest houses or food crops or the environment (see Mosquito Control). Some perform research on how to *use* plant-eating insects to control weeds (see Aquatic Plant Managers-Biological Control). Entomologists usually have a college degree. They are hired by universities, museums, government agencies, and pest control firms.

Extension Agents (also called County or Agricultural Agents) are university experts hired to provide information to the public, primarily in the areas of agriculture and home economics. They give lectures, demonstrations, and assist people in solving problems. They have college degrees and are hired by universities.

Fisheries biologists study fish populations – how they grow, eat and reproduce. Many things such as habitat and water quality affect fisheries. It is important that these things be understood so that our fish populations can be protected. Universities and government agencies hire fisheries biologists. A college degree usually is required.

Graphic Artists are hired by almost every type of company and agency, as well as museum, colleges and universities. They are needed to create illustrations for publications, signs, and educational displays. Some artists draw free-hand and some use computers to create graphic art.

Information specialists help manage the vast amounts of information available to help people locate particular information and to present information in useful formats such as websites, booklets, posters, etc. They work at universities, in libraries, at government agencies and for private companies. A college degree may or may not be required. (Also see Librarians.)

Laboratory technicians work in different kinds of laboratories performing various functions in the fields of chemistry and biology. Sometimes they assist in performing experiments using chemical or animals. Sometimes they take samples from the field and measure and analyze substances, for example, nitrogen and phosphorus (nutrients) in lake water, to determine the water quality or health of a lake. Laboratory technicians often work for universities, government agencies, and private companies.

Law enforcement personnel are needed in the environmental field to enforce the laws protecting our natural areas and wildlife. The state and national park services, the Florida Fish and Wildlife Conservation Commission, the Florida Department of Environmental Protection and other agencies hire law enforcement personnel.

Librarians work in public and school libraries, private companies, and government agencies, keeping track of and adding to the collections of books, journals, maps, photographs and other materials. They help people find information both within and outside of the library. Librarians also are Information Specialists but they usually have a college degree in Library Science.



Florida Invasive Plant Education Initiative • <http://plants.ifas.ufl.edu/education>
A Collaboration of the UF/IFAS Center for Aquatic and Invasive Plants
and the Florida Fish and Wildlife Conservation Commission / Invasive Plant Management Section

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(Careers DVD vocabulary continued)

Map makers use a variety of methods to make maps of land, water, vegetation and more. Modern methods such as satellite imagery, GPS (Global Positioning System), and GIS (Geographic Information System) join the traditional ground surveys as tools of map making. Computers are used extensively in map making. Map makers are hired by government agencies and private companies.

Mosquito control is an important job in Florida due to our wet subtropical climate that allows rampant mosquito growth. Mosquito control personnel monitor mosquito populations and use insecticides when necessary to control them. Since mosquitoes need wet areas to breed, mosquito control personnel sometimes drain wet areas and control water levels in canals and other water bodies. (Also see **Entomologists**.)

Park rangers work in national and state parks. Most rangers have backgrounds in biology so that they can manage and protect and, in some cases, restore our parks. They also provide information to visitors about the plants and animals and ecosystems in the park. Rangers are hired by the National Park Service and the Florida Division of Recreation and Parks. Local parks and tourist attractions often hire “naturalists” or “environmental education specialists” to provide information to visitors. College may or may not be required to be a park ranger.

Photographers take pictures! (You knew that!) Pictures are needed for books, magazines, brochures, presentations (at a park visitor center, for example). Look around you – pictures are on almost everything you see, from cereal boxes to posters to calendars to textbooks. Photographers often use computers to enhance and manipulate photographs. Many photographers work on their own (freelance). Others work for companies, government agencies, or universities. And don't forget *National Geographic* magazine, which employs some of the best photographers in the business.

Pilots fly airplanes and helicopters. Pilots are hired to fly scientists or park rangers or managers over certain areas so they can look at and count plants or animals that they are studying (this is called surveying). For example, scientists are flown over Florida waters to count endangered manatees. Bird species often are counted from airplanes, as are exotic trees such as *Melaleuca* invading the Florida Everglades. Pilots also fly airplanes and helicopters which carry pesticides that are sprayed from the air. For example, they fly over food crops or aquatic weed infestations to apply pesticides. Pilots are hired by government agencies, private companies, universities, and farms.

Planners help plan and operate our cities, counties and states. They plan new roads, new neighborhoods, new schools, new parks, electricity, gas and water. Planners are hired by government agencies. Universities offer degrees in Urban and Regional Planning.

Public relations (PR) personnel work for private companies and government agencies to improve the relationship between the public and the company or agency they represent. This job requires good communications skills! PR people often work in media such as television and video, or with printed materials such as brochures and newsletters. College degrees can be earned in the field of public relations and communication.

Recreation is another word for playing. It includes camping, fishing, swimming, bicycling, hiking, boating, rock-climbing and more. Recreation experts are hired by parks, nature centers and tourist attractions to operate recreation facilities and/or plan recreation events. Universities offer degrees in Recreation, Parks and Tourism.

Regulators are similar to planners. They help administer the rules needed to govern the use of natural resources such as public land and water, and they also enforce the rules. Regulators are hired by government agencies.

Restoration involved “restoring” lakes, rivers and wetlands by replanting native plants where they used to grow before human disturbance. It also can involve improving water quality and restocking fish. Restoration is carried out by government agencies and by private companies. Increasingly, aquatic and wetland plants for restoration are purchased from aquatic plant nurseries (see **Aquaculture**). A college degree is not necessarily required to work in the restoration field, but a green thumb is!

Teachers, as you know, teach. They teach students from kindergarten to senior high school, community college to university level. The *Careers* video stresses the importance of science teachers because many careers in Florida's freshwater environments require knowledge of the sciences. The sciences include botany (plants), zoology (animals), entomology (insects), chemistry and others. Teachers have college degrees.

Tour guides/Fishing guides are people who take us on tours of natural areas such as lakes and rivers, or who find good fishing spots for people who want to catch fish. You may have gone on a tour at a tourist attraction such as Silver Springs where people view the beautiful springs from glass-bottomed boats. Or you may have gone on a fishing trip where the guide was paid to take you out to good fishing spots. Guides are often self-employed or are employed by small companies. Many of them enjoy their jobs because they like being out in beautiful natural areas of Florida every day. They become guides to share their knowledge and appreciation of Florida.

Toxicologists are scientists who study the effects of toxic substances on living organisms, for example, the effects of mercury on fish. They are hired by private companies and government agencies. College degrees are required for toxicologists.

Veterinarians are doctors trained to treat diseases and injuries of animals. In the *Careers* video, we feature a veterinarian who specializes in the diagnoses and treatments of fish. She works for the University of Florida in the Department of Fisheries and Aquatic Sciences. An advanced college degree is required to become a veterinarian.

Video producers are hired by all types of companies, government agencies and schools. Video programs are needed to teach students, inform the public, and entertain all of us. There are many different jobs in video production such as scriptwriter, camera person or videographer, director, producer, editor, and sound and light technicians. Some productions have large crews (one person or more for each job) and some have small crews (a few people perform several different jobs).

Wastewater treatment engineers and technicians are hired by public utilities to protect our fresh water from contamination. This means that wastewater is cleansed and purified before it is returned to the environment. Engineers figure out how to build and operate treatment plants and technicians carry out the treatment process.

Wildlife biologists study how animals live, grow and reproduce. **Wildlife ecologists** study how animals fit into their ecosystem and how they are affected by environmental conditions. Biologists and ecologists are hired by government agencies such as the Florida Fish and Wildlife Conservation Commission, the Florida Department of Environmental Protection, the U.S. Fish and Wildlife Service, the state and national park services, and many others. They usually have college degrees.

Writers are needed to write for magazines, newspapers, newsletters, school textbooks, scripts for movies, television and videos (for example, the *Careers* script and the material you are reading right now). Some writers are freelance, meaning they work for different people, job by job. Others work for companies, universities, book publishers, television networks, public relations firms, government agencies, newspapers, and more. Writers are needed almost everywhere.



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