

You're a *what?*

Limnologist

Growing up in northern Illinois, Carla Cáceres spent a lot of time on Lake Michigan. “I was fascinated by the lake,” she says. “I love the water.”

Carla turned her love of water into a career in limnology. Limnologists are scientists who study the characteristics of freshwater systems such as lakes, rivers, streams, ponds, and wetlands. They also study nonoceanic saltwater, such as the Great Salt Lake.

The job title limnologist applies to workers in many occupations who are trained in different scientific fields. As Carla says, “Limnology is really broad, so within limnology we often specialize.” For example, limnologists might study the plants or animals that live in a body of water, the chemical properties of the water, or the physics of water movement.

A limnologist's area of specialization usually determines his or her specific occupational title. Environmental scientists, ecologists, fisheries biologists, natural resources specialists, and biogeochemists—all can be limnologists. What they share is a common focus on inland water systems. And when they work together on projects, each contributes his or her specialized knowledge.

Carla is an ecologist who studies several species of zooplankton in lakes and ponds in Michigan and Illinois. She works with scientists from the Illinois Natural History Survey, a research organization that monitors lake conditions. Limnologists' goals often relate to maintaining natural ecosystems or to understanding the potential impact of an activity, such as building houses in a wetland area. “It's easier to manage a system if you understand it,” says Carla.

One objective of her research is to determine why the fish population in the Great Lakes is declining. “We look at what's going on in the food web that's affecting the fish population,” she says. Because she understands the life-forms in the water and their relationships with each other, she can help to determine which organisms, if any, are causing the decrease in fish.

Limnologists work both in the field and in the laboratory. In the field, limnologists spend time outside—on a rowboat, for example, or wading or diving in the body of water that they're studying. Most enjoy this hands-on work, but there is also plenty to do indoors.


In the lab, limnologists conduct experiments, make and test hypotheses, and compare their results with those of previous studies. They might develop techniques or instruments that will help them test their assumptions. And they use computers to analyze the data that they get from their experiments and to make predictions by means of statistical models.

Carla occasionally goes to lakes and ponds to take measurements and collect water samples. She then brings the samples back to the lab, where she looks at them under a microscope. She also puts the samples in beakers and makes changes to the water—for example, giving an invasive species of zooplankton different things to eat—to see how the species reacts and how the overall conditions are affected.

“You can't always introduce something into a whole body of water, and you can't kill off an entire species,” says Carla. Instead, limnologists test some of their predictions by doing computer simulations. For example,

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Carla might use computer models to determine whether a change in the water will lead to a corresponding change in the fish population.

Limnologists also write reports, scientific papers, and research proposals; keep current on developments in their field; and present their findings to others. In addition, limnologists often must apply for grants to fund their projects.

Many limnologists teach in colleges and universities. In addition to working with scientists at the research organization, Carla is an associate professor who instructs students in limnology, environmental biology, and ecology. Along with writing lesson plans, teaching, and grading students' work, limnology professors plan and conduct laboratory experiments with their students.

Limnologists must sometimes perform their job duties near the water systems that they study. As a result, they may need to live near a body of water or travel frequently—or both.

Limnologists work for Federal and State governments, academic institutions, and in the private sector, such as for an environmental consulting firm. In the Federal Government, a limnologist might work for the U.S. Geological Survey, Environmental Protection Agency, Fish and Wildlife Service, National Park Service, Bureau of Land Management, or Army Corps of Engineers. In both government and the private sector, the job title limnologist is used less often than occupational titles—such as hydrologist or chemist—that match the worker's area of specialization.

No matter where they are employed, these water workers are usually analytical and like solving problems. Communication skills are important for writing and presenting research, and classes in statistics or computer programming are helpful in analyzing test results.

In high school, students can start to prepare for a limnology career by getting a well-rounded education, especially in the sciences, English, and mathematics.

“Keep taking math,” Carla advises, “because it is not until later that it becomes clear how you'll use it and how important it is.”

Most limnologists have at least a bachelor's degree, usually in a core science, such as biology or chemistry. The major chosen generally determines the type of work a limnologist will do, as well as his or her occupational title. Some limnologists have a master's degree or a Ph.D. A Ph.D. is required for most teaching positions at colleges and universities.

Volunteering in aquatic science can give students helpful exposure to the work. Laboratory experience, such as helping a professor with a research project or participating in a summer research program, can increase students' knowledge of the subject.

Competition for limnology jobs can be tight because of the occupation's popularity and dependence on funding. Those who have knowledge in a broad range of scientific disciplines might be able to adapt better to changing job market conditions.

The U.S. Bureau of Labor Statistics (BLS) does not collect wage data specifically on limnologists but does collect wage data on many occupations in which limnologists can work. For example, BLS data show that in May 2007, hydrologists earned a median annual wage of \$68,140, zoologists and wildlife biologists earned a median wage of \$55,100, and chemists earned a median wage of \$63,490. Postsecondary biological science teachers—the occupational title for college biology professors—earned a median annual wage of \$71,780. A median wage means that half of all workers in the occupation made more than that amount and half made less.

But for many limnologists, the work's value is greater than a paycheck. “We're not in it for the money,” Carla says. “A lot of people are in it for the same reason I am: because we love the water. I'm doing exactly what I want to do. I feel really fortunate that I get up in the morning and love going to work.”

