



At Home on the Water

Protecting Freshwater Streams

Being on the water is second nature to Dr. Dalal Hanna. She first developed a love for water during summer camp canoe trips as a child. Since then, she has paddled 7,000 kilometers across Canada and on countless lakes and rivers in the country's boreal forests. Today, she has built her passion into a career as a freshwater ecologist and leader of the Watershed Stewardship Research Collaborative at Carleton University located in Ottawa, Canada.

"I really care about the health of streams because they're the lifeline of fresh waters all around the world," Hanna says. "Without them we wouldn't have rivers and lakes. We wouldn't have enough water to drink. We wouldn't have habitat for fishes to grow up in."

Hanna is especially interested in understanding how human use of land affects freshwater habitats. Timber harvesting is a major industry in Canada and can have significant impacts on water quality and biodiversity.

To better understand how timber harvesting affects water quality in Canadian streams, Hanna and a team of researchers are collecting environmental DNA (eDNA) and water quality data from 100 streams across the country. eDNA is genetic material that is released from an organism into the environment. It comes from sources such as shed skin or mucous. eDNA helps scientists identify the species that live in each stream without having to capture them.

The collected data will help scientists better understand how stream biodiversity and water quality recover after timber harvests. One of the main goals of Hanna's research is to gather data to help inform freshwater conservation policy.

Hanna shares her love of paddling with young women to foster their understanding of freshwater science and inspire them to become water protectors. Riparia, a charitable organization she co-founded, hosts free paddling trips, during which young women learn how to monitor water quality and identify organisms in freshwater habitats. On these trips, participants build their outdoor skills, deepen their connection with fresh waters, and acquire the tools necessary to move forward in their lives as water protectors. ■

Thinking Critically

Scientific Knowledge How might stream monitoring data be used in making decisions about protecting freshwater habitats?



Top Monitoring freshwater streams throughout Canada is a key part of Hanna's research.

Bottom left Hanna uses a net to sample aquatic organisms. **Bottom right** Hanna uses a microscope to identify aquatic organisms.

 Watch our interview with Hanna, and learn more about her career and research.