



Harvesting Ocean Data to Improve Our Understanding of Marine Ecosystems and Their Impact

Oceans are at the heart of our global ecosystem. Home to more than 80 percent of all life on our planet, these massive bodies of water help to cleanse the air we breathe, support important food sources, drive weather patterns, generate energy, enable transportation and, in many ways, underpin our economy. Although oceans cover three-quarters of the earth's surface, we know comparatively very little about them and their impact on our world.

On the coast of Nova Scotia, a team of researchers from Dalhousie University aim to equip scientists with the resources required to improve our ocean knowledge. They share a common goal: to create a well-connected, collaborative research community that can readily access, analyze and apply ocean data to preserve our natural resources, protect marine wildlife and improve the sustainability of our planet.

With critical support from CANARIE, computer scientists, together with marine biologists and oceanographers from the Ocean Tracking Network (OTN) based at Dalhousie University, are developing an E-Research Platform for Ocean Knowledge Management (POKM). This online environment enables a virtual scientific community to communicate, analyze and share the massive amounts of data generated by instruments that observe and monitor our oceans. POKM will also allow researchers to quickly and effectively share this information with collaborators across Canada and around the world.

“We want to create a collection of data that can be easily sourced, analyzed, and exchanged by researchers,” says Dr. Raza Abidi, the Principal Investigator of POKM and Professor of Computer Science at Dalhousie University. “POKM creates opportunities for scientists to observe trends and draw on these services to support their investigations. This can lead to important findings about our changing ecosystem.”

Leveraging advanced networking capability provided by CANARIE and the Atlantic Organization of Research Networks (ACORN-Nova Scotia), and \$1.7 million from CANARIE's Network-Enabled Platforms (NEP) program, POKM provides an effective way to acquire and process very large volumes of data, and make it available to the national or international research community. “We rely on the CANARIE Network to manipulate ocean information, that sometimes exceed hundreds of gigabytes, and move it around the world in real time,” says Dr. Abidi.

POKM supports many different areas of ocean science. For example, when studying the migration and behavior of marine animals, radio frequency identification (RFID) tracking tags are employed extensively by ocean scientists. They gather huge amounts of data about animal behaviors every 30 seconds—including mating, migration and movement—that improve our understanding of marine ecosystems.

As a Marine Biologist at Dalhousie and Senior Project Manager of the OTN, Dr. Mike Stokesbury works with this information on a daily basis. He is one of the researchers who is test driving the platform. “POKM creates a seamless way for scientists to navigate and work with this data. It is establishing a blueprint for the conduct of ocean research, and is creating a common language for our interdisciplinary community,” he says. “This enables us to work more effectively together and accelerate discovery.”

Highly adaptable, POKM also provides researchers with a series of ‘on demand’ services that work together to address their specific research needs. This allows scientists to perform multiple experiments with the same data. “It's much like Lego™,” says Dr. Abidi. “You can combine the same pieces in different ways to create completely new processes.” POKM provides new capability that promises to unleash the imaginations of our scientists, as they address key sustainability challenges such as global warming, the extinction of marine species and the preservation of our natural resources.