# The Ocean Tracking Network: a new era for marine scientists?

**Could you start by telling us a bit about your background?**

I grew up in Nova Scotia outside the town of Wolfville. After completing a B.A. degree at Acadia University I worked for several years as a scuba diver and biological consultant. In 1993, I returned to university completing my BSc at the University of New Brunswick in Fredericton, a Masters at Acadia University, followed by a PhD. at Dalhousie University. During my doctorate I worked on Atlantic bluefin tuna stock structure under the supervision of Dr. Barbra Block of Stanford University, and Dr. Ron O'Dor and Ransom Myers of Dalhousie. Following the completion of my PhD in 2005, I was awarded a National Science and Engineering Research Council Industrial Research and Development Post-Doctoral Fellowship with AMIRIX Systems Ltd. in Halifax, Nova Scotia. During my post-doc Ron O'Dor - the Senior Scientist for the Census of Marine Life - and I wrote the International Joint Venture Fund proposal for the Ocean Tracking Network (OTN). After we won the competition for this $35M grant, I began working at Dalhousie in the Office of the Dean of Science as the Director of Research for the OTN.

**What is the Ocean Tracking Network and how will it work?**

The OTN is a global network of marine animal trackers and oceanographers. We will tag marine animals with tiny transmitters so that their movements can be tracked for as long as 20 years by acoustic receivers placed at 800-metre intervals along the ocean floor in invisible 'listening lines.' As the animal swims over a line, it is recorded and the data is then uploaded to a central database, resulting in current and reliable global records that can be analysed and applied to many different environmental research efforts.

To track changes of the ocean properties, OTN listening lines will also include sophisticated physical environment sensors that measure the ocean's temperature, depth, salinity, currents, chemistry and other properties.

The data we collect will allow us to study how these animals use the environment, determine changes in distribution, movement and behaviour due to changing oceanic conditions and eventually predict the effect of climate change on marine animals. This will allow us to adopt management regimes that will allow us to conserve and sustain our marine resources.

**Greenland shark tagged by researchers from the Greenland Shark and Elasmobranch Education and Research Group (GEERG) in the St. Lawrence Estuary, Canada**

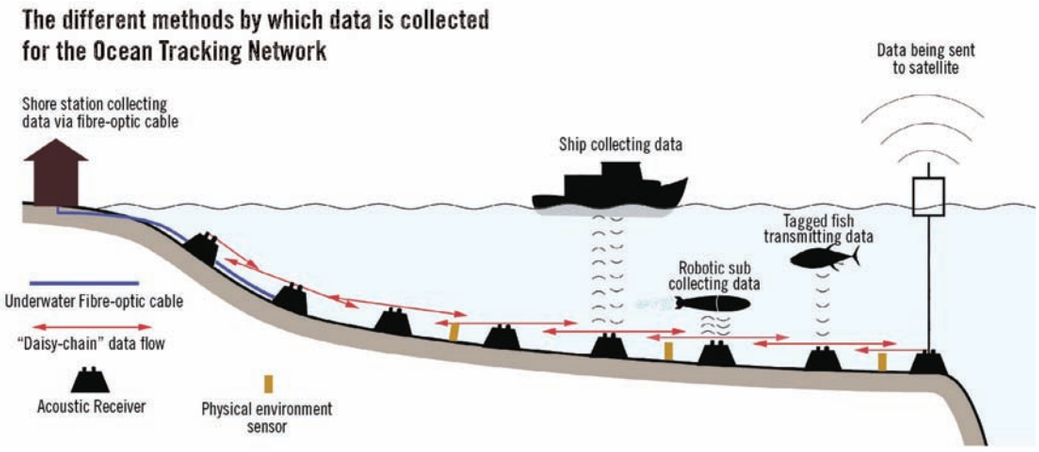
Photo credit: Dr. Chris Harvey-Clark, GEERG.

**Dr Mike Stokesbury**

Imagine being able to follow the day-to-day movements of fish, like the mighty Atlantic bluefin tuna, around the world's oceans. It may sound like a marine scientist's dream but it looks set to become a reality with the Ocean Tracking Network. *The Marine Scientist* spoke to the project's director, **Dr Mike Stokesbury** to find out more

**Which species will the network track?**

The OTN will track many species, basically individuals from the size of a salmon smolt (approx. 12 cm) to large whales. As we move toward an ecosystem based management regime for marine resources we need to define how animals interact in the wild. It is important to not only generate knowledge about a specific species in isolation, but to add to that knowledge, information about other animals that a species may interact with, and information on the environment in which they live.




**Will the electronic tags be small enough to be used to track smaller pelagic species that have traditionally been difficult to follow?**

Yes, the tags can be small, as little as 7 mm in diameter. But even though we are using tiny tags there is still a problem with some pelagic species, such as American herring, in that they do not stand up well to catch and release. The animals need to be able to survive being caught, operated on and released - and herring often don't.

**How many listening devices will be needed, how will they transmit the data they collect and how long will they last before they need to be replaced?**

We are placing approximately 1,500 acoustic receivers in 30 arrays around the world. Acoustic tracking of animals is already taking place in at least 56 countries, so in many places, for example Australia, we are placing an infrastructure that will help to expand an already existing network of acoustic receivers.

There are 3 types of acoustic receivers: bottom mounted receivers that transfer data over an acoustic modem; receivers that have to be retrieved and transfer data over Bluetooth; and receivers that transfer data to the ARGOS satellite system. Future developments will see receivers that may transfer data over a modem to oceanic gliders, and some receivers that will transfer data over an acoustic modem to each other therefore allowing receivers to "daisy chain" information along a line to be brought on shore via a cable system such as VENUS or NEPTUNE. This will give us real-time data.

**How will the data collected differ from data collected via satellite tracking tags?**

Some of our tags will be satellite tracking tags. However satellite tracking tags require the animal to be at the surface for periods of time to record and transfer data. Many of the animals we will track stay submerged so satellite tags are not as useful. Also, acoustic tags are much cheaper than satellite tags and this will allow researchers to tag many more animals for the same price. This is very important to examine movement corridors, stock structure and to quantify behaviour.

**Will you be able to use the listening stations to monitor increases or decreases in background ocean noise?**

No, the acoustic receivers we use do not monitor background noise. They are very specific to the 69 kHz frequency at which the tags transmit.

**The project is being hailed as 'the ocean's Internet' - will the data be posted on to your website and perhaps onto Google Earth, and will researchers be able to access the raw data online?**

Yes, although some tracking data will need to be held for a small portion of time to allow researchers to publish their data and protect student projects etc. Eventually, usually within 2 years, all data will be made public and accessible through a portal at Dalhousie University. One of the main benefits of the OTN is that people will have open access to quality controlled, standardised data from all over the world, to get a truly global perspective on animal movement

**Murray Scotney of Canada's Department of Fisheries and Oceans, and Mike Stokesbury of Dalhousie Univeristy deploying an acoustic listening station on the Halifax Line in waters off Nova Scotia**

Photo credit: Daniel Jackson, Dalhousie University

and behaviour and how they use the oceans.

**Can countries that are not currently involved in the project still join in?**

Yes, we predict that as successful projects demonstrate the value of the OTN, more and more countries and scientists will join in.

**Do you think the Ocean Tracking Network is going to be a permanent fixture of the world's oceans or is it likely that the cost will mean it is limited to the project's lifetime?**

We view the OTN as a semi-permanent system. At some point technology will advance and some of the currently cutting-edge technology that we employ will be outdated. However, we hope that the OTN will also evolve with technological advances and will continue to produce new knowledge critical to our understanding of the oceans and the animals that they support.

**Which species are you most excited about being able to track?**

I am very excited about tracking many species, however the two closest to my heart are Atlantic salmon and Atlantic bluefin tuna. Both are highly migratory and for both species new knowledge of migration routes, seasonality, areas of mortality and oceanic distribution is critical for the long term sustainability of their populations.

**Mike Stokesbury and Aaron Spares of Dalhousie University, and Captain Dennis Cameron deploy a pop-up satellite tag on an Atlantic bluefin tuna off Port Hood, Nova Scotia as part of the Tag-A-Giant program**

Photo Credit: Tag-A-Giant

**Edmund Halfyard, a PhD Student at Dalhousie University inserting a VEMCO coded-acoustic tag in an Atlantic salmon smolt.**

Photo credit: Stephan Kirchhoff, Dalhousie University

**If you could have a meal with the marine scientist you most admire, who would it be?**

That is a tough one. I would have to say my brother Dr. Kevin Stokesbury, who works at the School for Marine Science and Technology (SMAST) at the University of Massachusetts.

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