Tracking all over the world

Brendan Godley and Michael Coyne are changing the status quo when it comes to following marine animals.

Attaching a transmitter in Anguilla.

Peter Richardson, Marine Conservation Society

Marine animals that migrate, like turtles, whales and birds, can encounter many different threats. And because they move between international maritime jurisdictions they are both hard to protect and difficult to study. But these days, animals fitted with satellite transmitters can be followed from space, and, via the internet, data can be retrieved about their environments from anywhere in the world. Since the 1980s, researchers have used satellite transmitters more and more. At the end of 2004, there were more than 3000 animals with active tags, with over 1000 of these at sea.

But complex satellite tracking data can be difficult to use. It has to be downloaded, collated, filtered and then finally interpreted. And while there are huge opportunities to link data sets (for example, a turtle's swimming track might mean more combined with remote-sensing information about sea states, or fishing records), these present enormous technical and computing challenges. For a start, we need integrated and standardised tools and techniques for managing and analysing data.

So we set out to design tools for animal-tracking biologists, but which also let internet technology bring charismatic and often elusive animals really to life for ordinary people at home.

Our web-based Satellite Tracking and Analysis Tool (STAT) automates working with satellite-tracking data, including downloading data daily, updating maps and creating backups. It also links in information on water depths, sea surface temperatures, sea surface height, ocean currents, and chlorophyll concentrations, which all help us understand the behaviour and needs of elusive marine animals. STAT has a database of locations, and these data are automatically available for them all. We launched STAT in July 2003, and by January 2006 almost 1000 animals had been added to the system – that's more than 20 per cent of all tags on marine animals. And when we published details of STAT on the website of the journal *Marine Ecology Progress Series*, the article quickly became one of the site's most popular ever, downloaded over 2500 times in the first month.

Our public website www.seaturtle.org/tracking/ has recorded over 2.75 million visits. Teachers can register for educational resources. Anyone can subscribe to email alerts when tracking maps are updated. We've also attracted numerous articles in national and international radio, print and online news outlets.

We hope researchers will use STAT as a data clearinghouse, linked with efforts such as the Census of Marine Life's Ocean Biogeographic Information System and the Global Ocean Observing System. It is already catalysing collaboration among researchers, helping them make the most of their science.

Want to know more?

For an overview of animal tracking by satellite, see www.cls.fr/welcome_en.html. You can read more about our projects at www.seaturtle.org/tracking/ and if you're a researcher wanting to know how it all works, see www.int-res.com/abstracts/meps/v301/.
Information about the Census of Marine Life's Ocean Biogeographic Information System is available at seamap.env.duke.edu/about, and the Global Ocean Observing System at ioc.unesco.org/goos/.

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