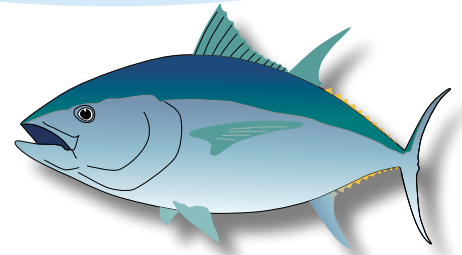


**FACILITY 8: Australian Acoustic Tagging and Monitoring System (AATAMS)**

Movements of Australia’s large pelagic fish species are being affected by overfishing, climate change, and shifting ocean conditions. Until recently it has been difficult to monitor their movements, as tagged fish had to be re-caught to obtain the data. This meant relying on fishermen landing tagged fish and reporting the tags. New acoustic tag technology means that fish movements can now be tracked around the coast in real-time.



**New acoustic tag technology**

Acoustic tags used by AATAMS are coded transmitters that use a single frequency, 69 kHz; a coding scheme called R64K, and are manufactured by VEMCO in Canada. Coded tags emit a series of pings called a pulse train which contains ID and error checking information. This allows the user to individually track multiple fish. The single frequency used in all tags allows all receivers within AATAMS and other users in Australia and elsewhere to detect all R64K tags. AATAMS acts as a central depository for tag IDs in the Australian region.

These coded tags come in a variety of sizes, power outputs, battery life (200 days to 10 years) and sensor options including ID only, depth, temperature or combinations of all three and can be mounted internally or externally.

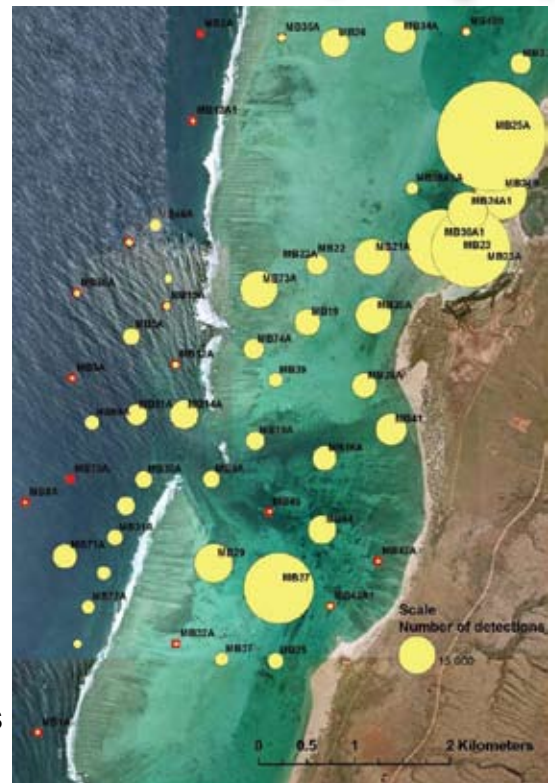
Underwater acoustic receivers have been deployed in curtains or arrays across the shelf in key locations around Australia. When a fish swims past the curtain, the tag number is identified and any sensor information logged. The logging of tag numbers can then be related to a database of the species and individuals tagged to determine movements.

**The tag data**

Currently AATAMS collects 2 streams of data. Firstly the meta-data which consist of information recorded during each deployment and recovery. This data is manually recorded by an AATAMS technical officer or individual researcher. This includes information such as receiver location and time of deployment.

The second type of data is recorded electronically from the acoustic receivers themselves. This data, referred to as the product data, includes two data products:

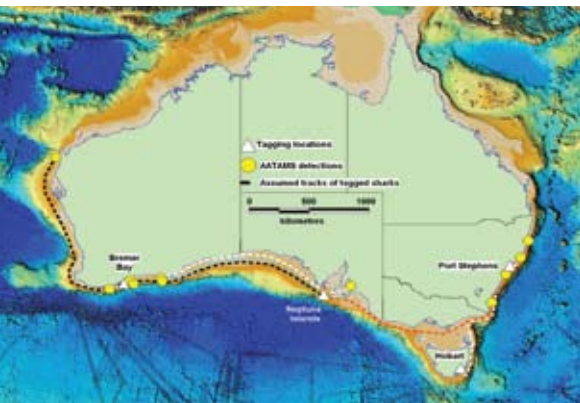
1. The header information which is a record of the receiver itself including information such as battery life and the total amounts of tag detections on each individual acoustic receiver.
2. The individual tag detection; this data consists of real time detection records of individual species tagged by researchers. In order to make sense of these detections,



*Figure 2. Data collected at Mangrove Bay, CSIRO 2009. Size of yellow circles = number of hits at acoustic receiver.*

researchers record the individual species information and refer back to this information post tagging. This information is entered into the AATAMS data base allowing animals to be identified by different receivers Australia wide. This information will often include the tagged species, sex, location of capture and length of an animal.

This information allows individual animals to be detected and tracked around Australia. Figure 1 displays individual sharks tracked throughout Australia using AATAMS data.



*Figure 1. Tracks of a series of tagged sharks that have been detected CSIRO 2009.*

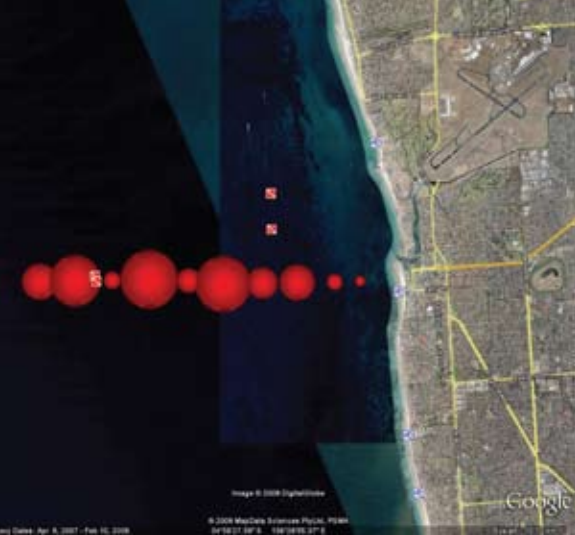


Figure 3. Detections of a tagged white shark off the Adelaide metropolitan coast in August-September CSIRO 2008.

### Applications of data

The new real time data will provide an understanding of the distance and speed at which migratory species travel, whether environmental factors affect their migratory instincts, and the sort of habitats selected by species for stopping over. This sort of information will lead to better management of Australia's fisheries, resources and marine protected areas.

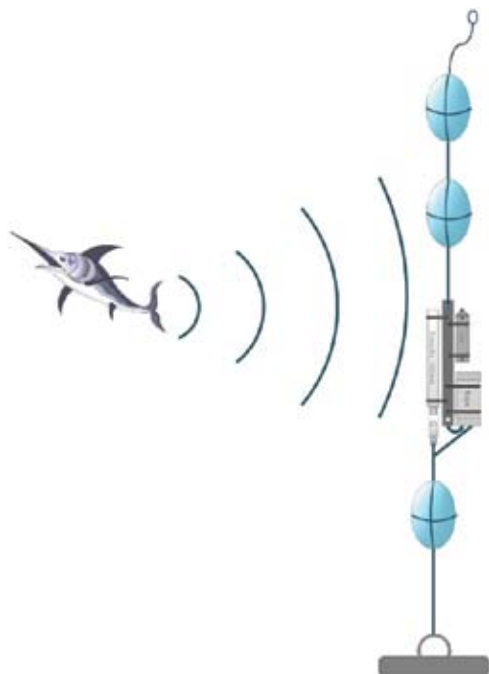


Figure 4. Diagram of an acoustic receiver installation.

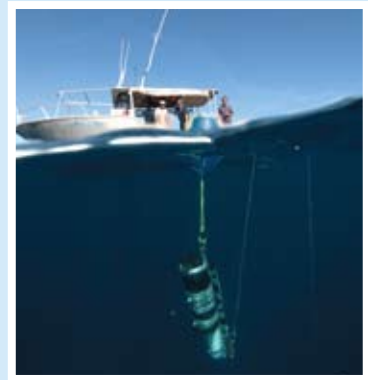
### Focus and priorities

Four permanent acoustic tracking arrays have been installed by AATAMS:

1. Off Ningaloo Reef in WA to study species hierarchies and food chains, as well as issues in relation to management of Ningaloo Marine Park;
2. On the southern coasts off Adelaide and the Bonney Coast to study long-range movements of tuna and white sharks;
3. Off the NSW coast, focusing on the effects of the East Australian Current on marine species and their habitats;
4. Off Perth in Southern WA to study the movements of white sharks and fisheries movements.

### Partners

- Australian Institute of Marine Science
- CSIRO Marine and Atmospheric Research
- James Cook University
- Macquarie University
- New South Wales Department of Primary Industries
- Ocean Tracking Network
- Department of Primary Industries, Victoria
- Sydney Institute of Marine Science
- South Australian Research and Development Institute
- Tasmanian Aquaculture and Fisheries Institute
- Department of Fisheries Western Australia



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www.imos.org.au

### More information

IMOS Australian Acoustic Tagging and Monitoring System

<http://imos.org.au/aatams.html>

Ocean Tracking Network

<http://oceantrackingnetwork.org>