

MARIO ESPINOZA

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PhD candidate 2013 to 2015

**School of Earth and Environmental Sciences
NERP (National Environmental Research
Program)**

Endeavour Award

NSW fishery department

**Australian Animal Tagging and Monitoring
System (AATAMS)**

AIMS@JCU

Supervised by:

Dr. Colin Simpfendorfer (JCU)

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Dr. Andrew Tobin (JCU)

**Movements, habitat use and trophic ecology
of reef-associated sharks**

In 2005, Mario completed his BSc at the University of Costa Rica (UCR), throughout which he was involved in projects with the Centro de Investigación en Ciencias del Mar y Limnología; The Mote Marine Laboratory; and The Great Lakes Institute of Environmental Research. In 2006, he was awarded with a Fulbright Scholarship to complete a MSc at California State University, investigating how elasmobranchs used newly restored estuarine habitats. Mario returned to UCR as a researcher, looking at the distribution, diversity, reproduction and feeding ecology of elasmobranchs associated with the commercial trawling fishery of Costa Rica.

Recent studies have reported large declines of reef-associated sharks in the Caribbean and the Indo-Pacific region, adding to global concern. Marine protected areas (MPAs) have become a common tool in the management of coral reefs. The effectiveness of MPAs for the protection of sharks will depend on their mobility, with sharks displaying a higher degree of reef association benefiting more. Therefore, a better understanding of the spatial ecology and behaviour of reef-associated sharks is imperative for successful management. Additionally, detailed information of the feeding ecology of reef-associated sharks is essential in understanding connectivity and energy links within and across ecosystems and will increase understanding of the role sharks play in coral reef systems.

Mario's current research will examine the movements, site fidelity, habitat use and trophic ecology of reef-associated sharks.



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Since April 2012, Mario has tagged grey reef, silvertip, blacktip and bull sharks with acoustic transmitters. He is using an array of 56 underwater listening stations to monitor their movements and habitat use in the central Great Barrier Reef. Collaborative efforts with the AATAMS have extended the tracking range to include the entire coast of Queensland and New South Wales. Mario has found that:

- Reef resident species like grey reef sharks spend most of their time on a single reef.
- Other shark species like silvertips and bull sharks are more mobile and typically have large home ranges; however, some individuals spend up to 40% of their time in or near reefs. ,
- Female bull sharks often move between offshore reef environments and inshore coastal habitats, possibly for breeding.
- Some Bull sharks migrate between Sydney, Brisbane and Townsville, travelling up to 2200 km along the coast in winter. Although the reason for this is still unclear, temperature change may be a factor.

Publications

- Clarke, T.M., Espinoza, M. & Wehrtmann, I.S., *In press*. Elasmobranch bycatch associated with the shrimp-trawling fishery, Pacific of Costa Rica, Central America. *Aquatic living resources*.
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- Espinoza, M., Heupel, M.R. & Simpfendorfer, C.A., 2013. Predicting MPA utilization for reef-associated sharks: an individual-based simulation approach. In *9th Indo-Pacific Fish Conference. Okinawa, Japan, June 24-28*. Okinawa, Japan.
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Publications cont.

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- Mario Espinoza Mendiola, 2008. Sondeo ecologico rapido de las comunidades de peces tropicales en un area de explotacion minera en Costa Rica (Rapid ecological assessment of tropical fish communities in a gold mine area of Costa Rica). *Revista de Biología Tropical*, 56(4), pp.1971–1990.
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