

# The Bull Shark Tagging Programme\*: an integrated approach to study bull shark behaviour and ecology in Fiji

Juerg M. Brunnschweiler

ETH Zurich, Raemistrasse 101, CH-8092 Zurich, Switzerland, E-mail: juerg@gluecklich.net

\* [www.leucas.net](http://www.leucas.net)

## Background

Bull sharks (*Carcharhinus leucas*) are widespread along the continental coasts of tropical and subtropical seas but also occur around remote island states far away from continental waters. They are often found close inshore in shallow water which makes them accessible for fishery-independent scientific study. The Bull Shark Tagging Programme uses the full spectrum of telemetry techniques, ranging from direct observation of bull sharks in their natural habitat to acoustic and satellite telemetry methods, as well as genetics and local ecological knowledge to study the species' biology, behaviour and ecology.



## The field site

The Shark Reef Marine Reserve in Fiji is an ecotourism project designed to protect a small reef patch and its fauna while preserving the livelihood of local communities.

Brunnschweiler J.M. (2010) The Shark Reef Marine Reserve: a marine tourism project in Fiji involving local communities. *Journal of Sustainable Tourism* 18: 29-42.



## Population parameters

Bull sharks and other shark species can be directly observed in the Shark Reef Marine Reserve throughout the year. Since 2003, more than 80 individual bull sharks have been identified using natural distinctive marks for individual recognition. These data form the backbone of the research into population dynamics, life cycles and inter- and intra-specific interactions.



## Movements

Horizontal and vertical movements of bull sharks are investigated using satellite and acoustic tags. To date, 14 pop-up satellite archival tags and ~80 acoustic tags have been attached to adult bull sharks in Fiji. Results indicate that bull sharks show some fidelity to specific coastal areas with only limited horizontal movements away from the tagging site after tag attachment. They spend most of their time below 20 m in water usually >26° C. The results highlight the importance of coastal inshore habitats for this charismatic species.

Brunnschweiler J.M., Queiroz N., Sims D.W. Oceans apart? Short-term movements and behaviour of adult bull sharks *Carcharhinus leucas* in Atlantic and Pacific Oceans determined from pop-off satellite archival tagging. *Journal of Fish Biology* (revised version under review).

Photographs by Lill Haugen, Douglas Seifert  
Valerie Taylor and Klaus Jost



## Local ecological knowledge and river habitats

Information about the presence, behaviour and ecology of species is often available from local people. The project aims at exploring the potential of local and traditional ecological knowledge to identify shark river habitats in Fiji, to learn how locals regard and use sharks, and to capture ancestral legends and myths that shed light on the relationship between local people and these animals.

Rasalato E., Maginnity V., Brunnschweiler J.M. (2010) Using local ecological knowledge to identify shark river habitats in Fiji (South Pacific). *Environmental Conservation* (in press).



## Shark feeding

One particularly important aspect of the project is the investigation of shark behaviour as a response to a tourist shark feeding dive in the Shark Reef Marine Reserve. An exhaustive database containing information from ~1000 dives is used to answer questions pertaining to the shark diving industry, namely the effects of the shark diving operators' activities on the animals and the optimum procedures one ought to adopt in order to ensure a maximum of safety.

## Acknowledgements

Gary Adksion is greatly acknowledged for his indispensable help in the field. Sincere thanks are given to Mike Neumann, Andrew Cumming and all the staff of Beqa Adventure Divers for their continuous and professional support.

