

The evolution, behavior and ecology of the Giant Trevally -  
*Caranx ignobilis* - in the Western Indian Ocean

1 Description of Research Work

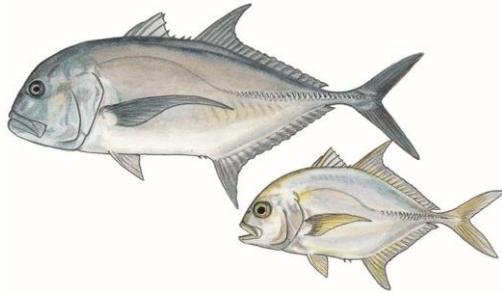


Figure 2: Giant kingfish, *Caranx ignobilis*. Illustration © SAIAB by Elaine Heemstra from *Coastal Fishes of Southern Africa* by Phil and Elaine Heemstra

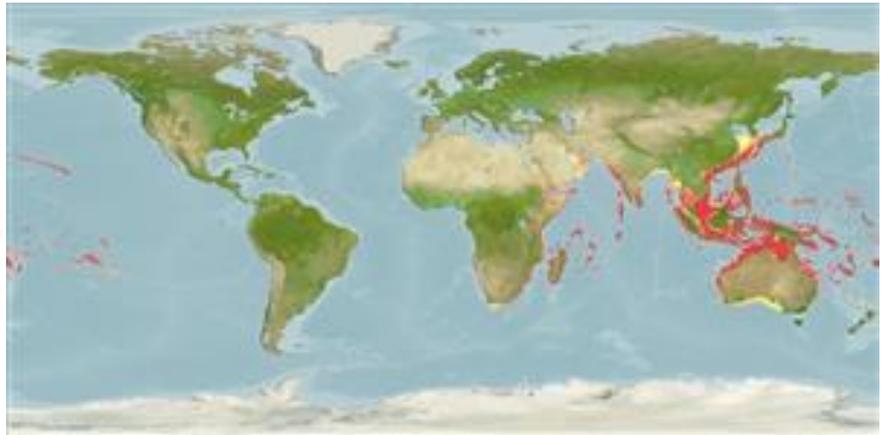
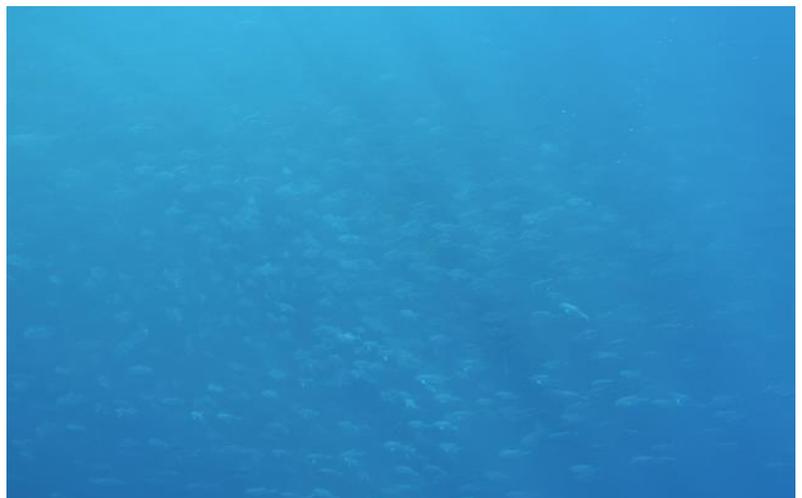


Figure 1: Map showing the range (in red) of the Giant Trevally  
Image from FishBase.org

The Giant Trevally (*Caranx ignobilis*), better known in South Africa by its common name, the Giant kingfish, is considered an iconic top predator on coral and rocky reefs across the Indo-Pacific and is heavily targeted by recreational, commercial and artisanal fisheries. *C. ignobilis* has been overfished in the most-studied part of its range (Hawaii, USA), which raises concern for its status in less-studied areas, including the Western Indian Ocean (WIO), where significant knowledge gaps concerning basic aspects of Giant Trevally biology remain.

This project, which was initiated in 2015, aims to determine aspects of the Giant Trevally's evolution, ecology and behavior through studies on genetic structure, spatiotemporal variation in trophic level, and movement patterns.

Determining the amount of genetic diversity and patterns of gene flow amongst populations of Giant Trevallies in the WIO can give an indication of stock health and patterns of connectivity. Preliminary results using mitochondrial DNA



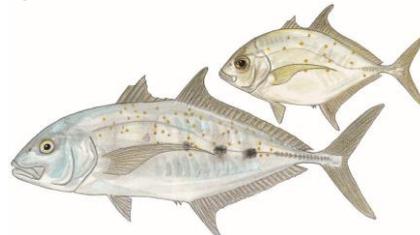
An aggregation of Giant Trevallies (*Caranx ignobilis*) off the coast of Mozambique  
Photo - Jessica Glass

indicate a moderately high level of genetic connectivity between Giant Trevally populations sampled from Australia, Seychelles, and Saudi Arabia. This is intriguing, given recent research in Hawaii that has suggested small home range sizes (<30 km) for adult Giant Trevallies

By tracking individuals with acoustic tags, we will be able to record the size of their home ranges in the WIO and potentially identify important habitat areas for spawning, feeding, and development. Movement data, in combination with an estimate of trophic position using stable isotope analysis, will be compared with results from genetic analyses to paint a clearer picture of this species' ecology throughout its range.

Future analyses will include molecular markers suitable for modeling fine-scale genetic processes. This project fits into a broader research plan that includes a phylogenetic evaluation of the family Carangidae to understand long-term processes shaping the evolution of this group. Furthermore, in partnership with the Seychelles Fishing Authority, additional species of Carangids (e.g. *Carangoides fulvoguttatus*, *Carangoides gymnostethus*) will be analyzed for genetic and trophic variability throughout the Seychelles.

Yellowspotted kingfish, *Carangoides fulvoguttatus*. Illustration © SAIAB by Elaine Heemstra from *Coastal Fishes of Southern Africa* by Phil and Elaine Heemstra



Acoustic transmitters are used to track fish movements - Photo from Paul Cowley SAIAB



Diver inspecting receivers on the OTN line off the South Africa-Mozambique border - Photo Ryan Daly

## 2 Expected Impacts

Giant Trevallies are an important species for recreational angling charters in many countries bordering the Western Indian Ocean, including South Africa.

These nations rely heavily on income from marine tourism to support their economies, creating the immediate need to answer fundamental questions about the biology of targeted fish species. In the case of the Giant Trevally, research needs to be conducted on this important reef species in the Western Indian Ocean in order to ensure that overfishing is not occurring. This research will aid fisheries managers and is relevant to marine spatial planning



Giant Trevally tagged and ready to be released in Mozambique. Photo by Rhett Bennett.

initiatives, including designating areas to conserve for reproduction, feeding and development. Research results will be published in the form of scientific papers and management recommendations, as well as disseminated to stakeholder groups including recreational fishing charter companies. Results will inform both sustainable development and sustainable tourism, providing employment and food security for coastal communities.

### 3 Research team

This research presents a strong partnership between the National Research Foundation and the National Science Foundation, and unique collaboration between SAIAB and Yale University.



[Jessica Glass](#) is a PhD student at Yale working with SAIAB scientists [Professor Paul Cowley](#) and [Dr Gavin Gouws](#) while on a visiting fellowship offered jointly by the National Science Foundation's Graduate Research Opportunities Worldwide (GROW) programme and the US Agency for International Development (USAID) Research and Innovation Fellowship.

Jessica is advised by [Dr. Thomas Near](#) at Yale University.

Other collaborators include the Seychelles Fishing Authority and the management authority of the Ponta do Ouro Partial Protected Marine Reserve in Mozambique.

Links:

- [Yale University](#)
- [National Science Foundation's Graduate Research Opportunities Worldwide \(GROW\) programme](#)
- [US Agency for International Development \(USAID\) Research and Innovation Fellowship](#)
- [Seychelles Fishing Authority](#)
- [Ponta do Ouro Partial Protected Marine Reserve in Mozambique](#)