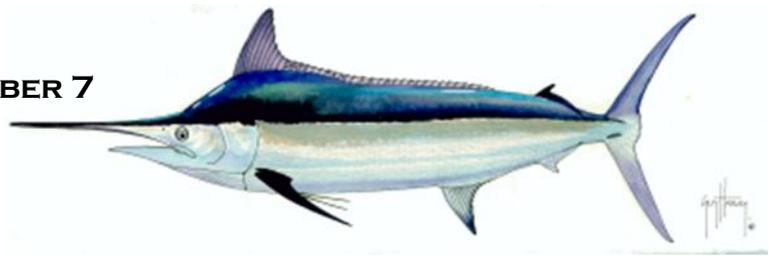


# BLACK MARLIN BULLETIN NUMBER 7

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## Attention all Billfish Anglers Billfish research projects

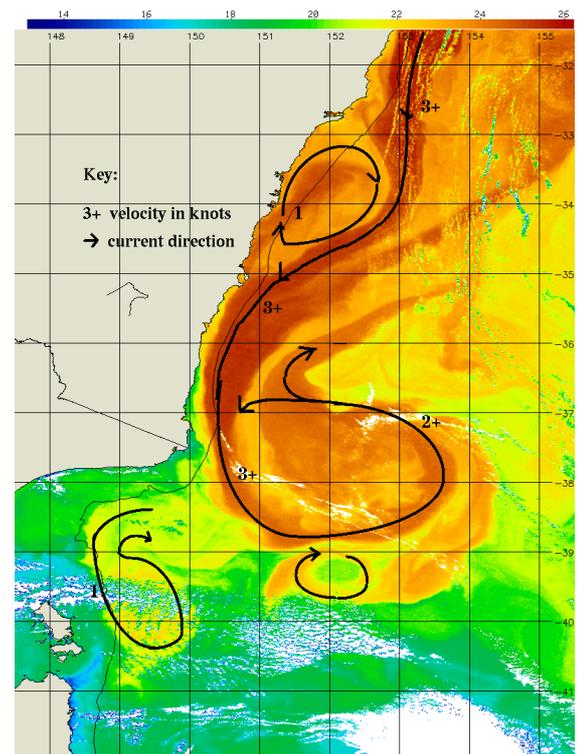
It has been over a year since the last newsletter which saw us finish up our population genetics research on black marlin in the central Indo-Pacific. We have reactivated the popular black marlin bulletin to provide anglers with an update on some more great research which has just been published, current research that is underway and a shout out to some members of the recreational fishing community who are helping make this all possible.

### Black marlin - On The Move

Nick Hill is a research student from James Cook University and an avid sports fisher out of Townsville and the Gold Coast who has been looking at the tag release data from black marlin in conjunction with environmental factors to uncover what is driving their movements. He undertook spatial habitat modelling using the tag release data in combination with SST, Chlorophyll-a, sea surface height anomaly, current magnitude and current direction to investigate how the extent and distribution of suitable habitat for black marlin varied monthly, seasonally and annually from 1998-2013.

Chlorophyll and sea surface height were found to be the main factors that explained the distribution of black marlin habitat, highlighting the importance of features such as currents and eddies in driving their movements. Interestingly, the El Niño Southern Oscillation was also found to be a drive factor, with suitable habitat throughout the south-west Pacific shifting up to 300km further south during La Nina years. This shift has not been identified before and is likely due to the complex way in which the east Australian current reacts to El Niño events in close proximity to Australia's coastline, with the shift also appearing to respond to climate change driven shifts in the oceanography of the south-west Pacific. This extension of suitable habitat was shown to be expanding at its southern edge quicker than it is contracting at its northern edge.

The results indicate that suitable black marlin habitat may be expanding, however, it is not yet known if black marlin are altering their distribution in response to these shifts. It also raises the question of what effects these changes may have on other species, such as striped marlin, whose suitable habitat may consequently be compressing as warmer water continues to push south.



A shot of the East Australian Current pushing south during La Nina years

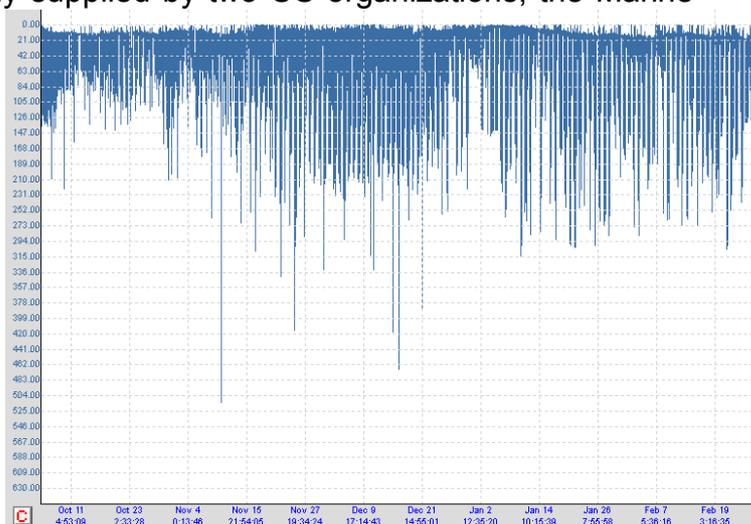
## Current Research

### 1. Global population genetics and effective population size of black marlin

After we were able to identify three populations in the central Indo-Pacific for black marlin, the research has now shifted into phase two which is looking at the genetic population structure for black marlin throughout its entire range of the Indian and Pacific oceans. To achieve this we are being assisted from recreational anglers from the west coast of Central America to the east coast of Africa (the latter with the assistance of the African Billfish Foundation). The study will collect genetic samples from fish markets in Taiwan, Indonesia, Vietnam, Ecuador, Mexico, India and Sri Lanka as well as from recreational anglers in Panama, Costa Rica, Kenya, Mozambique and expanding on some current collections in Australia (Weipa Billfish Club). This research will aim to help shape the boundaries for management of black marlin stocks throughout the Indo-Pacific. It is anticipated that the result of this study will not only identify how many population of black marlin exist, but where the spawning grounds for each population exists.

### 2. Investigating vertical habitat use of black marlin using satellite tagging data

This research will analyse pop-up satellite tagging data derived from previously deployed pop-up satellite tags (PSATs) placed on black marlin in Australia by game fishermen and fisheries researchers. These data have been generously supplied by two US organizations, the Marine Science Conservation Institute, and Stanford University/IGFA. The majority of the data derives from about 130 black marlin tagged with PSATs off Australia's east coast. The analysis will aim to identify critical environmental cues which influence the ecology of black marlin and their vertical habitat use. By doing so it will provide a better understanding of vertical habitat and how the vertical diving behaviour is influenced by seasonal, spatial and diurnal changes. We also aim to investigate the variation in vertical movements and behaviour between juvenile, sub-adult and adult fish.



### 3. The contribution of game fishing through citizen science – Review

We will be exploring the current contributions of the game fishing community to research on marine fishes as a prime example of citizen science. This study aims to highlight the utility of the game fishing community as a collaborative resource for researchers working on recreationally valuable species. We will be using Bluewater magazine as well as online media to try and identify the full spectrum of research projects that recreational offshore anglers have been and are currently involved in. The outcome of this research will formally recognise the contribution of game fishing to the scientific community and where future research areas might lie.

#### 4. Global genetics of striped marlin and sailfish

Researchers from the Virginia Institute of Marine Science (USA) are currently undertaking population genetics research on striped marlin and sailfish. These projects are set up very similarly to our black marlin genetics study and aim to determine how many stocks of these species are present throughout Australian waters and the greater Indo-Pacific region. One of the hard-to-access areas is currently collecting striped marlin samples from the west coast of Australia due to the low numbers of them that frequent the area. If you catch striped marlin in Western Australia or know someone who does and are keen to help please let me know at Samuel.Williams5@uq.net.au

#### Research ambassadors

Conducting research on pelagic fish is not a cheap task, especially when undertaking costly genetics or tagging studies, and although in-kind support (sample collection or boat time) goes a long way we are unable to undertake these research programs without some financial support. To finish of this edition of the black marlin bulletin we would like to make special mention of Michael and Christine Kirby, the Game Fishing Association of Australia and the Queensland Game Fishing Association who have each donated funding to support our current research.

Michael Kirby is an active member of the Sydney Game Fishing Club and supporter of marine research through his family trust (The Kirby Foundation), however the donation made to our research was a personal contribution which came after winning the Port Hacking 100 tournament. Michael landed the largest marlin of the tournament (a blue marlin weighing 265.5 kg) which saw him collect the \$50,000 winnings. As the winnings were the result of landing a marlin, Michael decided to donate a significant proportion of the prize money to support billfish research. The Game Fishing Association of Australia then decided to match Michael's contribution and the Queensland Game Fishing Association also made a substantial donation. Through this marine stewardship from personal donation and support such as this we are now able to undertake this valuable research which will hopefully contribute towards the sustainability of sports fishing resources. We once again thank them for their support.

