



Lineage

Winter distribution of black marlin

1. Electronic databases were used to generate initial maps of species distribution.
 - a. Commercial fishing returns (larger vessels): **TCEPR** database. All records from 1 October 1989 to 30 June 2003 were extracted on 16 July 2003. Data were used to estimate mean annual catch and catch rate (kilograms per kilometre towed) in 0.25 degree rectangles. Only the top five species caught are reported on these forms so information on the absence of a species is not available.
 - b. Scientific observer records from larger vessels: **obs** database. All records from 1 March 1990 to 30 June 2003 and stored in the new data format were extracted on 28 July 2003. Data were used to estimate mean annual catch and catch rate (kilograms per kilometre towed), and proportion of tows that caught the species, in 0.25 degree rectangles.
 - c. Tuna longline fishing returns: **TLCER**. All records were extracted on 17 July 2003. Data were used to estimate mean annual catch and catch rate (kilograms per hook) in 0.25 degree rectangles. However, the latitudes and longitudes used were for the set start position, and because longline length is often greater than 140 km, the resolution of the data is about 1 degree square.
 - d. Museum of New Zealand Te Papa records of this species based on voucher specimens held in their collection were searched for distributional information that added to the distributional ranges determined from other databases.
 - e. Databases of inshore commercial fishing (**CELR**), groomed research trawls (**fish_comm**), Russian trawl surveys (**trawl**), observer records from tuna longliners (**I_line**), recreational fishing (**rec_data**), and aerial sightings (**aer_sight**) were not used as they contained no records of this species.
2. Literature sources were searched for distributional information that added to the distributional ranges determined from databases.
 - a. Unpublished electronic bibliography of New Zealand fishes compiled by L. J. Paul and held on a NIWA computer.
 - b. Aquatic Sciences and Fisheries Abstracts.
 - c. *New Zealand Professional Fisherman* and *Seafood New Zealand* for 1986–2002.
 - d. *New Zealand Fishing News* for 1998–2002.
 - e. Scientific papers, unpublished reports and university theses available to the expert who prepared the distributional layers.
3. Other sources.
 - a. Nil.

4. Summary

- a. Maps generated from the electronic databases were provided to an expert scientist who integrated this information with other information from the literature, and expert opinion, and produced hand-drawn distributional zones on a template map containing depth contours at 250 m, 500 m, and 1000 m. These maps were then digitised and imported into a GIS software package as layers. The areas of the zones were calculated, and the layers were linked to attribute and metadata files.
- b. The primary sources of distributional data for black marlin were the TLCER database, and literature.
- c. Black marlin are distributed throughout tropical and subtropical waters of the Pacific and Indian oceans, and occasionally enter temperate waters. The latitudinal range extends to 45 °S in the western South Pacific. It is an epipelagic and oceanic species usually found above waters the thermocline at temperatures of 15–30 °C. They are often found close to land and coral reefs. Tagging studies show that black marlin undergo long migrations, including seasonal north-south migrations. The black marlin found in New Zealand are part of the Pacific Ocean stock. Of the marlins found in New Zealand, black marlin is the least abundant. They occur mostly around the North Island and Kermadec Islands region. There are a few New Zealand records south of about 41 °S (Cape Foulwind on the west coast, Cape Campbell on the east coast) in the TCEPR, obs, and TLCER databases, but these require confirmation. Black marlin spend most of their time in surface waters, with occasional short dives to depths of about 200 m.
- d. Black marlin may be confused with blue marlin, and possibly striped marlin.
- e. In winter, black marlin occur only in northern waters, with most fish in the Kermadec Islands – Colville Ridge area, and the highest abundance around 26–29 °S.
- f. Winter, for the purposes of NABIS, is defined as being the months of July, August and September. This definition is based on research regarding the spatial and temporal variability of sea surface temperature in the New Zealand region (Uddstrom and Oien 1999).

5. References

The following sources provided useful information on the distribution of this species. This is not an exhaustive list of all references to the species.

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