



Spring distribution of southern bluefin tuna lineage

Spring, for the purposes of NABIS, is defined as being the months of October, November and December. 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).

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 September 2005 were extracted on 17 October 2005. 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. Southern bluefin tuna are not usually caught by trawl so records are almost certainly the result of accidental captures during setting or retrieving gear.
 - b. Commercial fishing returns (smaller vessels): **CELR** database. All records from 1 October 1989 to 30 June 2003 were extracted on 15–17 July 2003. Data were used to estimate mean annual catch in statistical areas. Information from statistical areas 1–10 was down-weighted because of likely mis-recording of Fishstock instead of statistical area. Only the top five species caught are reported on these forms so information on the absence of a species is not available.
 - c. Scientific observer records from larger vessels: **obs** database. All records from 1 March 1990 to 30 September 2005 and stored in the new data format were extracted on 20 October 2005. 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.
 - d. Tuna longline fishing returns: **TLCER**. All records were extracted on 17 May 2006. 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.
 - e. Scientific observer records from tuna longline vessels: **L_line** database. All records between 1 October 1992 and 30 September 2005 were extracted on 9 December 2005. Data were used to estimate catch rate (number per 1000 hooks) 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.
 - f. 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.

- g. Databases of research bottom trawl records (**fish_comm**), recreational fishing records (**rec_data**), aerial sightings (**aer_sight**), and records from Russian trawl surveys (**trawl**) were not used because they had no or very few records.
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 southern bluefin tuna were TLCER, CELR, and I_line databases.
 - c. Southern bluefin tuna occur in the Southern Hemisphere in tropical to cold temperate waters. In the New Zealand region, they occur from north of the Three Kings Islands to south of the Auckland Islands. The known depth range of southern bluefin tuna is 0–500 m.
 - d. Data from TLCER, CELR, and I_line databases were examined for seasonal variations in distribution. Southern bluefin tuna move into New Zealand waters from the south-west in summer. They rapidly spread through the EEZ to reach their maximum northwards extent in the autumn. Since the catch of southern bluefin tuna is governed by a competitive quota, little fishing takes place after June, and hence its distribution in periods other than autumn is poorly determined.
 - e. During spring the species is found is off the north-east coast of the North Island to 39 °S.

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.

Carocci, F.; Majkowski, J. (1996). Pacific tuna and billfishes, atlas of commercial catches. FAO, Rome. 9 p, 28 maps.

Collette, B.B; Nauen, C.E. (1983). FAO Species Catalogue, Volume 2. Scombrids of the world. *FAO Fisheries Synopsis 125(2)*. 137 p.

Uddstrom, M.J.; Oien, N.A. (1999). On the use of high-resolution satellite data to describe the spatial and temporal variability of sea surface temperatures in the New Zealand region. *Journal of Geophysical Research. Oceans 104 C9*: 20729-20751.