



## Lineage

### Spring Distribution of Yellowfin Tuna

1. Electronic databases were used to generate initial maps of species distribution.
  - a. 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. All records of yellowfin tuna were south of the extreme range indicated by other sources, and were probable mis-identifications of mis-codings, so they were ignored.
  - b. 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.
  - c. Scientific observer records from tuna longline vessels: **I\_line** database. All records between 1 October 1992 and 30 September 2002 were extracted on 11 August 2003. 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.
  - 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 research bottom trawl records (**fish\_comm**), commercial fishing returns from larger vessels (**TCEPR**) and from smaller vessels (**CELR**), Russian trawl surveys (**trawl**), and aerial sightings (**aer\_sight**) were searched but contained no records of catches of yellowfin tuna. Recreational fishing records (**rec\_data**) were considered not used as they duplicated information in other databases.
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  - a. Unpublished electronic bibliography of New Zealand fishes compiled by L. J. Paul and held on a NIWA computer.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 their expert opinion to produce 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 yellowfin tuna were TLCER and I\_line databases.
- c. Yellowfin tuna occurs worldwide in tropical and subtropical waters, except in the Mediterranean Sea. In the New Zealand region, it occurs from tropical waters in the north to about 38 °S off the west coast and 41 °S off the east coast of the North Island. The known depth range of yellowfin tuna is 0–300 m in the Pacific Ocean.
- d. Data from TLCER and I\_line databases were examined for seasonal variations in distribution. Juvenile yellowfin tuna are primarily found in tropical waters. Most yellowfin tuna found in New Zealand waters are adults larger than 100 cm fork length. They migrate southwards in summer, then return northward as surface waters cool, reaching their northernmost extent in winter.
- e. In spring, most yellowfin tuna occur of 34.5 °S off the west coast and north of 37.5 °S off the east coast of the North Island. Hotspots occur over the continental slope along the northeast North Island coast.
- f. 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).

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.

Boggs, C. H. (1992). Depth, capture time, and hooked longevity of longline-caught pelagic fish: timing bites of fish with chips. *Fishery Bulletin* 90: 642-658.

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.