



Lineage

Annual distribution of Basking Shark

FD0170_1; FD0171_1; FD0172_1; FD0173_1; FD0174_1

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.
 - 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. Research bottom trawl records: **fish_comm** database. This database is a groomed version of the research trawl database **trawl**. All records from 2 September 1978 to 30 September 2005 were extracted on 19 May 2006.
 - e. 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.
 - f. Databases of commercial tuna longline catches (**TLCER**), observer records from tuna longlines (**I_line**), Russian trawl surveys (**trawl**), 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 - a. Unpublished electronic bibliography of New Zealand fishes compiled by L. J. Paul and held on a NIWA computer.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. Francis and Duffy (2002) reviewed the distribution of basking sharks around New Zealand; many of their records came from the scientific observer database **obs**, and from unpublished sources such as newspaper articles and personal communications.

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 rig were TCEPR, CELR, and obs databases, and a distributional review by Francis and Duffy (2002).
- c. Basking sharks are found world-wide in temperate seas, except in the Indian Ocean (Last and Stevens 1994, Compagno 2001). Around New Zealand, they are most abundant from Hawke Bay and New Plymouth south to Auckland Islands (latitudinal range 39–51 °S) (Francis and Duffy 2002). Most sharks are seen in coastal waters, or over the continental slope, but records from the central Tasman Sea and South Pacific Ocean east of New Zealand indicate that they extend into oceanic waters (Yatsu 1995, Sharples et al. 1991). Drift net captures from the central South Pacific spanned latitudes 30–54 °S (Yatsu 1995). The oceanic distribution of this species is poorly known, and may be constrained by oceanic fronts and water temperature; the straight-line boundaries of the 100% and unknown distribution classes defining the approximate latitudinal range of the species, rather than actual distributional limits. Depth records indicate a depth range of 0–900 m. Sharks in the open ocean swim over depths much greater than this, but it is not known if they descend deeper than 900 m. Basking sharks have also been recorded from brackish Lake Ellesmere (Francis and Duffy 2002).

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.

- Compagno, L.J.V. (2001). Sharks of the world. An annotated and illustrated catalogue of shark species known to date. *FAO Species Catalogue for Fishery Purposes No. 1, Vol. 2*. 269 p.
- Francis, M.P.; Duffy, C. (2002). Distribution, seasonal abundance and bycatch of basking sharks (*Cetorhinus maximus*) in New Zealand, with observations on their winter habitat. *Marine Biology* 140: 831-842.
- Last, P.R.; Stevens, J.D. (1994). Sharks and rays of Australia. CSIRO, Hobart. 513 p.
- Sharples, P.; Bailey, K.; Williams, P.; Allan, A. (1991). Report of observer activity on board JAMARC driftnet vessel R. V. *Shinhoyo Maru* fishing for albacore in the South Pacific Ocean. *Tuna and Billfish Assessment Programme Technical Report 24*. p.
- Yatsu, A. (1995). Zoogeography of the epipelagic fishes in the South Pacific Ocean and the Pacific sector of the Subantarctic, with special reference to the ecological role of slender tuna, *Allothunnus fallai*. *Bulletin of the National Research Institute of Far Seas Fisheries* 32. 145 p.