



## Lineage

### Annual distribution of garfish

**FD0670\_1; FD0671\_1; FD0672\_1; FD0673\_1; FD0674\_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. A few records of garfish (species code GAR) are considered erroneous because of their unlikely capture by trawl gear some distance from shore; they might be mis-identifications of the saury (*Scomberesox saurus*), or coding errors (TAR, GUR, etc.).
  - 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. Garfish are recorded from most coastal regions. Higher catches are reported from the north-east of the North Island, which probably reflects higher abundance but will also represent relatively more targeted fishing. The few gaps (no catch in a statistical area) probably represent no targeted fishing, rather than absence. No catches are recorded from the Fiordland region.
  - 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. A single record of garfish from 400 m near Cape Kidnappers is considered unreliable.
  - d. Recreational fishing database: **rec\_data**. All records were extracted on 24 July 2003. Data were used to determine the presence of a species in a variety of statistical reporting areas. More garfish records occurred in the north, but this mainly reflects fishing activity.
  - 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. Garfish records were

predominantly from northern and central New Zealand, but also the Chatham Islands.

- f. Databases of research bottom trawl records (**fish\_comm**), commercial tuna longline catches (**TLCER**), observer records from tuna longlines (**I\_line**), and aerial sightings (**aer\_sight**) were not used as they contained no records of this species, or the number of records was too small to provide useful additional distributional information. Records from Russian trawl surveys (**trawl**) were not used because species identification is regarded as unreliable, and garfish a highly unlikely species to be caught.
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 garfish were the CELR database and published records.
    - c. Garfish are endemic to New Zealand (Collette 1974). They have been recorded around most of the mainland coast, from North Cape to Stewart Island. It is not known whether they are present along the Fiordland coast; the coastline here is mainly rocky, with a steeply-sloping seafloor, giving little suitable sandy seafloor habitat. There is little commercial or recreational fishing in this area, and limited scientific collecting. Some very localised populations are possible. Garfish are present around Chatham Island and in the lagoon (Roberts 1991, C. D. Paulin pers. comm.). Garfish are generally restricted to water shallower than 20 m, and to sheltered bays, harbours, and large estuaries. Reported captures further offshore cannot be verified and are probably erroneous.

## 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.

Ayling, A.M.; Cox, G.J. (1984). Collins guide to the sea fishes of New Zealand. Collins, Auckland. Revised edition. 343 p.

Collette, B.B. (1974). The garfishes (Hemiramphidae) of Australia and New Zealand. *Records of the Australian Museum* 29(2): 11-105.

Francis, M.P. (1991). Coastal fishes of New Zealand. An identification guide. Reed Books, Auckland. 103 p. Third edition.

NIWA (2001). Garfish. pp. 53–58 In: Establishing potential area boundaries and indicative TACs for selected non-QMS species. Report to the Ministry of Fisheries for Project MOF2000/03G.

Paul, L.J. (2000). New Zealand fishes. Identification, natural history & fisheries. Reed Books, Auckland. Revised edition. 253 p.

Roberts, C.D. (1991). Fishes of the Chatham Islands, New Zealand: a trawl survey and summary of the ichthyofauna. *New Zealand Journal of Marine and Freshwater Research* 25: 1-19.

Thompson, S. (1981). Fish of the Marine Reserve – a guide to the identification and biology of common coastal fish of north-eastern New Zealand. University of Auckland, Leigh Laboratory Bulletin 3. 364 p.