



## Annual distribution of banded giant stargazer lineage

**FD0070\_1; FD0071\_1; FD0072\_2; FD0073\_2; FD0074\_2**

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 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. Banded stargazer were confused with giant stargazer until at least 1995 when the species was first recorded in CELR data. Some mis-identifications are likely still occurring.
  - b. 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. Banded stargazer were confused with giant stargazer in early records (prior to the 1990's). Observers have recorded some banded giant stargazers in recent years but it is possible that some mis-identifications is still occurring.
  - c. 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. Data were used to estimate total catch, proportion of tows that caught the species, and catch rate (kilograms per kilometre towed) in 0.25 degree rectangles. Banded giant stargazer were first observed on research surveys in 1986 but not recognised and recorded as distinct from giant stargazer until 1993.
  - 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. No data were available.
  - e. Databases of commercial trawl (**TCEPR**), tuna longline catches (**TLCER**), observer records from tuna longlines (**I\_line**), recreational fishing (**rec\_data**), Russian research data (**trawl**), 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.

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 banded giant stargazer were fish\_comm and obs databases.
  - c. Banded giant stargazer have not yet been assigned a species name and may be endemic to New Zealand. Furthermore, banded giant stargazers may be a complex of two or more species (C. Paulin, Museum of New Zealand, pers. comm.). Therefore the distribution of these fishes requires confirmation after the taxonomy of the group is clarified. Banded giant stargazers are most abundant in restricted areas on the Stewart and Snares islands shelf, but are also found near the Chatham Islands and on Verman Bank. Records from scientific observers of banded stargazer to the north of Mernoo Bank have not been confirmed by research surveys. It is not known if they occur in Foveaux Strait but the depth is probably too shallow. The known depth range is 75–320 m.
  - d. Data from CELR, obs, and fish\_comm databases were examined for seasonal variations in distribution, but none were found. This may be because banded stargazer are primarily a bycatch species. Spawning locations have been identified throughout the Puysegur–Stewart–Snares area in February–March (Hurst et al. 2000).

## 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.

Anderson, O.F.; Bagley, N.W.; Hurst, R.J.; Francis, M.P.; Clark, M.R.; McMillan, P.J. (1998). Atlas of New Zealand fish and squid distributions from research bottom trawls. *NIWA Technical Report 42*. 303 p.

Hurst, R.J.; Stevenson, M.L.; Bagley, N.W.; Griggs, L.H.; Morrison, M.A.; Francis, M.P. (2000). Areas of importance for spawning, pupping or egg-laying, and juveniles of New Zealand coastal fish. *Final Research Report for Ministry of Fisheries Research Project ENV1999/03, Objective 1*. 302 p.