



Annual distribution of bass lineage

FD0180_1; FD0181_2; FD0182_2; FD0183_2; FD0184_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 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. Records of bass around the New Zealand mainland agree with other data sources; records from Puysegur Bank and the southern Snares Shelf are plausible (being in subtropical water) but are not well supported by other information – catches have been reported by observers, and there are two research trawl records, but misidentification (confusion with hapuku, *P. oxygeneios*) is possible.
 - 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. Records of bass extend around all but the south-eastern coast, and across the Chatham Rise. They are likely to be valid; the area of absence or sparse records (Stewart Island to Banks Peninsula) coincides with the coast most influenced by subantarctic water. Catch records from the Bounty Platform are, however, suspect, and have been excluded from the mapped distribution.
 - 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. Records of bass from Puysegur Bank and the Snares Shelf are plausible though unverified, and included in the total distribution.
 - 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. 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. Records

are sparse; they agree with other information for northern and central New Zealand, but show an apparent absence (in parallel with Museum of New Zealand records) south of Westland and the South Canterbury Bight.

- 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. Records extended from north-east of North Cape to central South Island.
 - f. NORFANZ voyage: **biods** database. Records from a research trawling and dredging survey of the Norfolk Ridge and Lord Howe Rise carried out in May–June 2003 were extracted on 9 January 2006.
 - g. Databases of commercial tuna longline catches (**TLCER**), observer records from tuna longlines (**l_line**), aerial sightings (**aer_sight**), and recreational fishing data (**rec_data**) 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 they were historic (pre 1987), and species identification is regarded as unreliable.
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 bass were TCEPR, CELR, and fish_comm databases.
 - c. Bass, as *Polyprion maeone*, was considered restricted to Australasia until the taxonomic review by Roberts (1986) showed it to be indistinguishable from the wreckfish, *P. americanus*, of the

North and South Atlantic Oceans. More recent work using genetic markers (e.g., Sedberry et al. 1996) suggests that the taxonomy of *Polyprion* is still unresolved. Ball et al. (2000) found South Atlantic *P. americanus* to differ significantly, possibly at a specific level, from Australasian *P. americanus*. However, the current distribution of *P. americanus* is Atlantic Ocean, Southern Indian Ocean (at islands and seamounts), southern Australia, and New Zealand.

- d. Within New Zealand, bass extend from the Kermadec Islands, the Wanganella Bank, and Lord Howe Rise to at least the central South Island based on identified specimens, and further south to the Snares Shelf and east to the Chatham Islands based on plausible fisheries catch records. Graham (1956) records the species from the Otago region in the early 1930s. Hotspots for bass exist along the north-eastern North Island. The known depth range of bass is 0–600 m, with plausible reports to 800 m. Adults occur at 100 m and deeper, juveniles are pelagic in surface waters.
- e. Interpretation of all commercial catch data is hampered by the fact that only one quarter of the groper (bass + hapuku) catch is recorded by species (Paul 2002a). Most bass catch records are in the **CELR** database, which has low spatial resolution (statistical areas). **TCEPR** records from the larger fishing vessels are of minor trawl bycatches, and their distribution is dependent on seasonal targeting patterns for other species. Research trawl surveys catch few bass.

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.

Anon. (1986). Proposed fishing restrictions: Kermadec Islands. *FishFed News April-May 1986*: 9–12.

Ball, A.O.; Sedberry, G.R.; Zatcoff, M.S.; Chapman, R.W.; Carlin, J.L. (2000). Population structure of the wreckfish *Polyprion americanus* determined with microsatellite genetic markers. *Marine Biology 137*: 1077–1090.

Clark, M.R. (1988). Records of fishes from the West Norfolk Ridge, north-west of New Zealand. *New Zealand Journal of Zoology 15*: 415-421.

Graham, D.H. (1956). A treasury of New Zealand fishes. Second edition. A.H. & A.W. Reed, Wellington. 424 p.

Paul, L.J. (2002a). A description of the New Zealand fisheries for the two groper species, hapuku (*Polyprion oxygeneios*) and bass (*P. americanus*). *New Zealand Fisheries Assessment Report 2002/13*. 47 p.

- Paul, L.J. (2002b). Can existing data describe the stock structure of the two New Zealand groper species, hapuku (*Polyprion oxygeneios*) and bass (*P. americanus*)? *New Zealand Fisheries Assessment Report 2002/14*. 24 p.
- Paul, L.J. (2002c). Can separate CPUE indices be developed for the two groper species, hapuku (*Polyprion oxygeneios*) and bass (*P. americanus*)? *New Zealand Fisheries Assessment Report 2002/15*. 24 p.
- Roberts, C.D. (1986). Systematics of the percomorph fish genus *Polyprion* Oken 1817. Unpublished PhD thesis, Victoria University of Wellington. 283 p.
- Sedberry, G.R.; Carlin, J.L.; Chapman, R.W.; Eleby, B. (1996). Population structure in the pan-oceanic wreckfish, *Polyprion americanus* (Teleostei: Polyprionidae), as indicated by mtDNA variation. *Journal of Fish Biology* 49 (Suppl. A): 318–329.