



Annual distribution of blue moki lineage

FD0390_1; FD0391_1; FD0392_1; FD0393_1; FD0394_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. Records of blue moki (species code MOK) from depths greater than 250 m are probable mis-codings of hoki (species code HOK), and were ignored (blue moki has never been recorded deeper than 231 m in research trawl tows).
 - 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 blue moki (species code MOK) from the southern and eastern edges of the Campbell Plateau are probable mis-codings of hoki (species code HOK), and were ignored (blue moki has not been recorded from these areas in research trawl tows).
 - 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 few records of blue moki (species code MOK) from depths greater than 250 m are probable mis-codings of hoki (species code HOK), and were ignored (blue moki has never been recorded deeper than 231 m in research trawl tows).
 - 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.
 - e. 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.

- f. 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.
 - g. Databases of commercial tuna longline catches (**TLCER**), observer records from tuna longlines (**I_line**), Russian trawl surveys (**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 blue moki were TCEPR, CELR, and fish_comm databases.
 - c. Blue moki is mainly found in New Zealand, although it is occasionally recorded from south-eastern Australia. In New Zealand, blue moki occurs throughout mainland waters from the Three Kings Islands to the southern edge of the Snares Shelf, and at the Chatham Islands. There is a single record of blue moki from the southern end of the Kermadec Island chain (Francis et al. 1987), but this requires verification; it is not known if the species occurs elsewhere in the Kermadecs. Blue moki are also found in small numbers at the Auckland Islands (Kingsford et al. 1989; Museum of New Zealand specimen). The known depth range of blue moki is 0–231 m.
 - d. Data from TCEPR, CELR, obs, and fish_comm databases were examined for seasonal variations in distribution, but none were found. Adult blue moki make spawning migrations between Kaikoura and Gisborne each year. Failure to detect seasonal

variations in blue moki distribution is likely due the seasonal abundance peaks overlapping more than one of the seasons used in this analysis, the low spatial resolution of the CELR data (statistical area only), which represent most of the commercial catch, and the fact that research trawl surveys on the fish_comm database are usually carried out at the same time of the year in each region.

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.

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Hardy, G.S.; Grace, R.V.; Francis, M.P. (1987). Fishes observed at the Three Kings Islands, northern New Zealand. *Records of the Auckland Institute and Museum* 24: 243-250.

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Paulin, C.; Roberts, C. (1992). The rockpool fishes of New Zealand. Museum of New Zealand Te Papa Tongarewa. 177 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.

Waite, E.R. (1911). Scientific results of the New Zealand Government trawling expedition, 1907. Pisces. Part II. *Records of the Canterbury Museum* 1: 157-272.