



Lineage

Annual Distribution of the Catseye

1. Literature sources were searched for distributional information on *Turbo smaragdus* Gmelin, 1791. *T. smaragdus* has sometimes been incorrectly referred to as *T. smaragda*, *Lunella smaragdus* and *L. smaragda*.

- a. General texts on the ecology of the New Zealand seashore were reviewed for distributional information. These indicated that this species is common around the North, South, and Stewart Islands.
- b. Using the keywords **turbo smaragda** or **t smaragda** or **smaragdus** and **lunella smaragda** or **l smaragda** or **smaragdus**, extracts were made from Aquatic Sciences and Fisheries Abstracts (all records at 27 July 2003). Using the keywords **catseye** or **cats eye** or **turbo** or **Lunella** or **smaragda** or **smaragdus**, extracts were made from NIWAcat (all records, as at 27 July 2003). Using the keywords **turbo smaragda** and **turbo smaragdus**, extracts were made from Google (all records, as at 17 August 2003). Relevant publications were obtained and used to help estimate recent and current distributions.
- c. Using subject indices for 1986–2002, *Seafood New Zealand* was checked for articles dealing with catseye distribution and research. None was useful in extending the distribution of the species.
- d. *New Zealand Fishing News*, 1998–2000 inclusive, was checked for articles dealing with catseye to help estimate presence/absence. There were none.
- e. Using the keywords (anywhere or global) **whelk and thesis** or **turbo and thesis** (University of Auckland, Auckland University of Technology, Massey University, Victoria University of Wellington, and University of Canterbury), **whelk or turbo and thesis** (Waikato University), and **whelk or turbo or smaragda and thesis** (University of Otago) library catalogues were checked between 7 July and 12 August 2003, and relevant theses obtained and examined.

2. Ministry of Fisheries electronic databases.

The recreational fishing database **rec_data** was checked on 18 August 2003, with no records from beyond mainland New Zealand. No other Ministry of Fisheries databases were checked because this species is not commercially taken and none other was thought to contain any useful information on the distribution of the catseye.

3. Museum holdings.

Holdings of *T. smaragdus* in the following museums were examined. Other museum holdings were not investigated because it was considered that they would not add anything to the record. Data were used to help estimate presence/absence.

- a. NIWA Greta Point. The **AllSeaBio** database was examined for records on 23 July 2003, with no specimens beyond North, South or Stewart Islands. Additions made to the collection since about 1995 have not been loaded onto this database; in a search on 22 August 2003, no specimens of *T. smaragdus*, identified to species level and shelved, were found.
- b. Museum of New Zealand Te Papa Tongarewa (**Te Kahui**) records of this species based on voucher specimens held in their collection were not available for examination. However, this layer was certified by Bruce Marshall, Collection Manager of Molluscs, Museum of New Zealand Te Papa Tongarewa.

4. Summary.

The catseye *T. smaragdus* is an endemic intertidal and low subtidal species, adults of which are found around the North, South, and Stewart Islands in both sheltered and exposed rocky shores (Morton & Miller 1968, Walsby 1977, Powell 1979, Dickie 1982, Walsby & Morton 1982, Cometti & Morton 1985, Robinson 1992). It lives from about midtide level down to about 3 m, on both hard and soft substrates, including seaweeds (Robinson 1992). The catseye reaches maturity at about 20 mm shell diameter (Walsby & Morton 1982, Robinson 1992). Because this benthic species has no known directed movements, the seasonal distributions are the same as this annual one.

Little has been published on this species. The scarcity of detailed abundance and distribution data mean that any hotspots of distribution are poorly defined; although the bulk of the references suggest that the species is more abundant in the north of the North Island than elsewhere, this was not the opinion of the reviewer of this layer. The 90% and 100% distributions as presently determined essentially overlap. Because of the conspicuous intertidal habitat of this species, its absence from the Chatham Islands and the subantarctic islands is confirmed. Its presence at other offshore islands around mainland New Zealand and Stewart Island is assumed, with the exception of the Three Kings Islands. Museum of New Zealand Te Papa Tongarewa has no specimens from the Three Kings Islands and so it is assumed that *T. smaragdus* does not live there.

The above information on the distribution of *T. smaragdus*, derived mostly from general accounts in the literature, was provided to an expert scientist who integrated this information with their expert opinion to produce hand-drawn distributional zones hand onto a large-scale map of New Zealand. Rocky shores, the habitat of this species, were distinguished from sand and mud shores, at a scale consistent with the scale of the template map.

The rounded lines were then digitised and imported into a GIS software package as layers. The areas of each distribution class were calculated and the layers were linked to attribute and metadata files. The map, because of its scale, cannot be taken to accurately define the local distribution of this species. For example, the distribution line does not go into complex water systems such as the Marlborough Sounds, yet the catseye does, even as far as the most sheltered inner areas (eg., Stephenson 1978).

5. References.

The following publications were the key references and/or the ones most useful in describing the recent/current annual distribution of the catseye *T. smaragdus*. The list is not intended to be an exhaustive bibliography of publications about this species.

Cometti, R.; Morton, J. (1985). Margins of the sea. Exploring New Zealand's coastline. Hodder & Stoughton, Auckland.

Dickie, B.N. (1982). Aspects of the ecology of three species of *Cellana* in the Wellington area. Unpublished MSc (Hons) thesis, Victoria University of Wellington.

Morton, J.; Miller, M. (1968). The New Zealand sea shore. Collins Auckland.

Powell, A.W.B. (1979). New Zealand mollusca. Marine, land and freshwater shells. Collins Auckland.

Robinson, L.J. (1992). Population and reproductive ecology of *Turbo smaragdus* in the Kaikoura region. Unpublished MSc thesis, University of Canterbury.

Schiel, D.R. (1984). Poor Knights Islands marine reserve survey. *Leigh Laboratory Bulletin* 15.

Stephenson, R.L. (1978). The intertidal benthic macrofauna and shellfish heavy metal content of Waikawa Bay, Marlborough Sounds, New Zealand. *Mauri Ora* 6: 57-68.

Walsby, J.R. (1977). Population variations in the grazing turbinid *Lunella smaragda* (Mollusca: Gastropoda). *New Zealand Journal of Marine and Freshwater Research* 11: 211-238.

Walsby, J.; Morton, J. (1982). Cape Rodney to Okakari Point Marine Reserve marine molluscs. Part 1. Chitons, limpets & topshells & pulmonates. *Leigh Laboratory Bulletin* 4.

2007 Update.

A Google search (***Turbo smaragdus***) on 7 September 2007, and searches of Seafood New Zealand (September 2005 to August 2007) and New Zealand Fishing News for 2006, did not yield any information that extended or altered the above distributions.

An examination on 17 September 2007 of the **specify** database of the NIWA National Invertebrate Collection for any new (post-July 2005) collections and any new (post-July 2005) identifications of old material did not lead to any extension or change to the distribution map. Similarly, there have been no further, formally identified shelvings of material in the Te Papa collections that extended or altered the distribution (Bruce Marshall, Curator of Molluscs, Museum of New Zealand Te Papa Tongarewa, pers. comm.).

The above was discussed and confirmed with Bruce Marshall on 18 September 2007. Because of its scale, the distribution map cannot be taken to accurately define the local distribution of this species.

2010 Update.

A Google search (***Turbo smaragdus***) on 6 September 2010, and searches of Seafood New Zealand (September 2007 to September 2010) and New Zealand Fishing News (October 2009 to October 2010), did not yield any information that extended or altered the above distributions.

An examination on 12 September 2010 of the **specify** database of the NIWA National Invertebrate Collection for any new (post-August 2007) collections and any new (post-August 2007) identifications of old material did not lead to any extension or change to the distribution map. Because of its scale, the distribution map cannot be taken to accurately define the local distribution of this species.