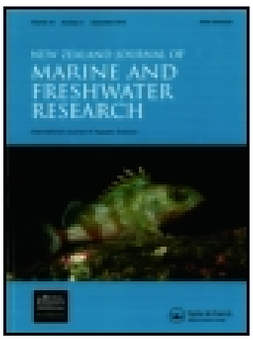

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Conservation status of New Zealand marine invertebrates, 2009

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A re-evaluation of the threat status of New Zealand's marine invertebrates was undertaken in 2009, following earlier review of New Zealand's Threat Classification System and subsequent refinement of the national criteria for classifying threat of extinction to New Zealand's flora and fauna. Sufficient information was available to enable 295 marine invertebrate taxa to be fully evaluated and assigned to a national threat category. The 10 taxa at most risk of extinction ('nationally critical') were the giant seep clam *Calyptogena* sp., the primitive acorn barnacle *Chionelasmus crosnieri*, O'Shea's vent barnacle *Volcanolepas osheai*, the stalked barnacle *Ibla idiotica*, the four-blotched umbrella octopus *Cirroctopus hochbergi*, the roughy umbrella octopus *Opisthoteuthis chathamensis*, the giant squid *Idioteuthis cordiformis*, the large-egged polychaete *Boccardiella magniovata* and two gravel maggots, *Smeagol climoi* and *Smeagol manneringi*. The key threatening processes identified for marine invertebrates were fishing and land-use associated impacts such as sedimentation. We identified no taxa that had improved in threat status as a result of past or ongoing conservation management action, nor any taxa that had worsened in threat status because of known changes in their distribution, abundance or rate of population decline. We evaluated a small fraction of New Zealand's marine invertebrate fauna for their threat status. Many taxa remain 'data deficient' or unlisted. In addition to the most threatened taxa, we recommend these taxa and their habitats as priorities for further survey and monitoring.

Keywords: New Zealand; threatened marine invertebrates; conservation status; threat classification

Introduction

Most marine species are thought to be more resilient to extinction than terrestrial species because of their large effective population sizes, often over broad ranges (Carlton et al. 1991, McKinney 1998). However, marine species with particular characteristics, such as slow growth rate, low adult mobility and small geographic range, are vulnerable to extirpation and extinction, with several examples of recent extinctions and near-extinctions (Roberts & Hawkins 1999). The first documented extinction of a marine invertebrate was of the eelgrass limpet, *Lottia alveus*, which became extinct following a disease outbreak that wiped out its eelgrass habitat (Carlton et al. 1991). A number of other marine invertebrates are thought to have become extinct in recent history (Carlton 1993; Carlton et al. 1999).

A species' risk of extinction can be a critical consideration in its management, not only at a species level, but at a habitat and ecosystem level. Listing a species by its level of threat of extinction can help highlight where management action and associated resources need to be focussed (Nielsen & Kenchington

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2001; Joseph et al. 2008) and inform consideration of decisions such as habitat protection and resource utilisation (Roberts et al. 2003a, 2003b). Ongoing assessments of changes in species' threatened status can also provide a way of measuring the effectiveness of conservation management. However, as any conservation management action may have substantial impacts on economic activities (particularly in the marine environment), accurate identification of species at risk of extinction is an important issue (Powles et al. 2000).

The IUCN Red List of Threatened Species (IUCN 2010) identifies and documents those species most in need of conservation attention if global extinction rates are to be reduced, and provides a global index of the state of change of biodiversity. In 2002, to complement the world view provided by the Red List, New Zealand developed a Threat Classification System focussed at the national level (Molloy et al. 2002). This system provided a process and criteria for assessing the threat status of New Zealand's flora and fauna and provided a more sensitive classification for taxa with naturally restricted distributions and small numbers as a result of insular rarity. Hitchmough (2002) presented the results of applying that system to a range of taxa. An update of the list was undertaken in 2005 (Hitchmough et al. 2007), which documented changes in the threat status of species and added new species to the list.

Internationally, marine species have received less attention than their terrestrial counterparts, both in terms of assessments of their threat status and associated management responses. Just 5% of the species listed on the IUCN Red List are marine species and of these, few are invertebrate taxa (IUCN 2010). There have been few attempts to collate information on the conservation of marine invertebrates for particular regions (but see Ponder et al. 2002). However, their importance for fisheries, tourism, ecosystem services and as the major component of biodiversity in the marine environment highlights the need for appropriate conservation management.

Although all marine mammals, most seabirds and two marine fish are fully protected in New Zealand waters, the only protected marine invertebrates are black corals (all antipatharian species) and all species of 'red coral' (Stylasteridae), which are protected under the Wildlife Act 1953. Despite their legal protection, bycatch of these species does occur across some regions, primarily as a result of bottom trawling and dredging (Probert et al. 1997; Clark & O'Driscoll 2003; Consalvey et al. 2006). Further, some localised coral populations are vulnerable to other damage associated with human activities, such as scuba diving (Miller et al. 2004). There is also some confusion over what species comprise the legally-protected 'red corals' (Consalvey et al. 2006). Many other marine invertebrates are at risk from human activities including pollution, habitat loss or modification, collection, disturbance and fisheries bycatch. Marine invertebrates also support important recreational, commercial and customary fisheries in New Zealand and in 2007, four of the 10 marine species with the highest export dollar value were invertebrates—arrow squid, paua (abalone), green-lipped mussel and rock lobster (Ministry of Fisheries 2009). Some areas that support particularly sensitive, at risk or ecologically important marine invertebrate communities have received protection from fishing and other threats in New Zealand (Anon 2001; Grange et al. 2003).

For some taxa, it is possible confidently to list and assess the risk of extinction of all species known to exist in New Zealand (e.g. marine mammals, terrestrial birds), but the task is large for many groups, including the marine invertebrates. For example, over 3000 marine mollusc species and subspecies are known from New Zealand waters, of which more than a third remain undescribed (Spencer et al. 2009) and the threat list for marine invertebrates completed in 2005 was known to be incomplete

(Hitchmough et al. 2007). In 2007, a review of New Zealand's Threat Classification System (Molloy et al. 2002) was undertaken, which resulted in a new manual for classifying New Zealand's flora and fauna according to their threat of extinction (Townsend et al. 2008). As part of the implementation of this revised system, we re-evaluated the threat status of New Zealand marine invertebrates in 2009. This paper reports the results of these assessments.

Methods

Our starting list for re-evaluation of the conservation status of New Zealand marine invertebrates was the result of the previous listing process (Hitchmough et al. 2007), which included 285 taxa from a range of phyla. A call for submissions on the list was made via the Department of Conservation website (http://www.doc.govt.nz/) in December 2008 and via contact with the New Zealand Marine Sciences Society. Submissions closed on 22 March 2009.

In May 2009, a range of experts on New Zealand marine invertebrates was contacted by the Department of Conservation and invited to be part of an expert panel to be convened to undertake the re-evaluation process. The role of the expert panel members was to provide knowledge on their particular field of expertise at the threat classification list meeting, to answer queries on listing decisions reached, and to consult with peers to bring as much information as possible to the meetings (Townsend et al. 2008).

A one-day workshop was held in June 2009, and taxa were placed into risk categories based on the criteria provided by Townsend et al. (2008), submissions received, advice from invited panel members that were unable to attend the meeting, panel knowledge and referral to recent publications relating to taxonomic and population status information (e.g. Tracey et al. 2005; Consalvey et al. 2006; Gordon 2009). Where there was doubt, we referred our provisional assessments to the relevant experts subsequent to the workshop.

The categories used in our evaluation (Fig. 1) are as defined in Townsend et al. (2008) and are specific to the New Zealand region:

1. Extinct;
2. Threatened [including Nationally Critical (NC), Nationally Endangered (NE) and Nationally Vulnerable (NV)];
3. At Risk [including Declining (Dec), Recovering (Rec), Relict (Rel) and Naturally Uncommon (NU)];
4. Not Threatened (NT);
5. Non-resident Native [including Coloniser (Col), Migrant, and Vagrant)];
6. Introduced and Naturalised (self-sustaining populations exist in the wild);
7. Data Deficient.

Taxa were also classified using one or more of the following criteria (depending on the category): total number of mature individuals; ongoing or predicted population trend (because of existing threats); total number of populations; number of mature individuals in the largest population; area of occupancy of the total population. A series of 'qualifiers' was also available (e.g. data poor, one location, secure overseas) to enable additional information on each taxon to be captured and considered (Townsend et al. 2008). The list includes both endemic and non-endemic taxa, but where a non-endemic taxon is listed, our assessment of its threatened status is based on the New Zealand population(s) only. Scientific names for all taxa are given in Appendix 1, and follow the New Zealand Inventory of Biodiversity (Gordon 2009) or subsequent taxonomic revisions as noted by the expert panel. The list includes both taxonomically determinate and taxonomically indeterminate taxa. Taxonomically determinate taxa are those that are legitimately and effectively published and generally accepted by relevant experts as distinct; taxonomically indeterminate taxa are

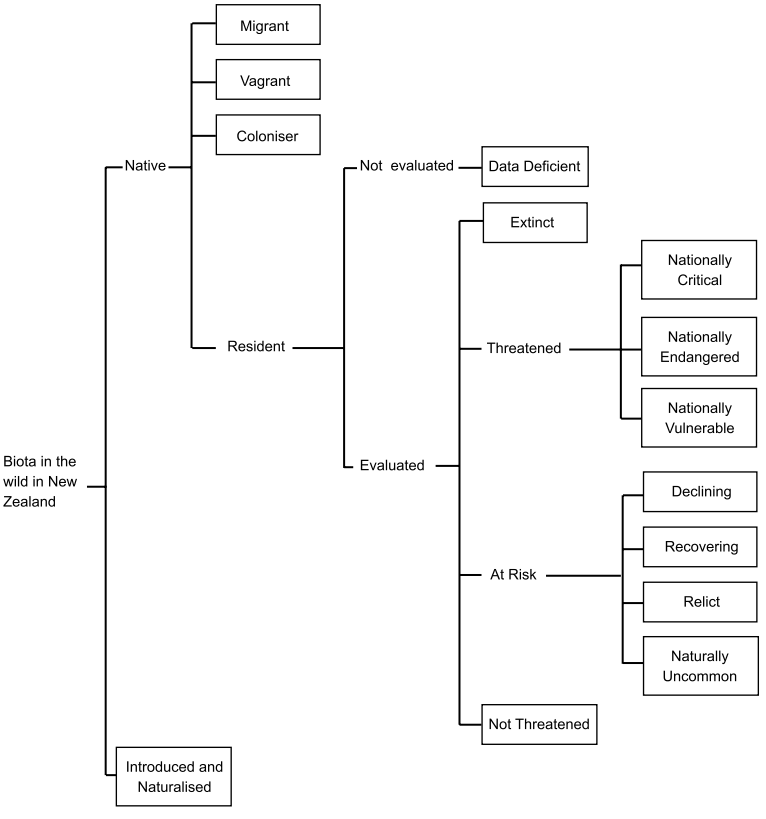

Fig. 1 The structure of the New Zealand Threat Classification System (Townsend et al. 2008), reproduced with permission of the Department of Conservation.

legitimately and effectively published but not generally accepted as distinct, or are entities yet to be furnished with a formal name (Townsend et al. 2008).

Results

A total of 311 (2.7%) of the 11544 known New Zealand marine invertebrate species (Gordon 2009) were considered during the threat classification process, including four annelids, 21 arthropods, one brachiopod, seven bryozoans, 39 cnidarians, four echinoderms, one sponge and 234 molluscs (Tables 1 and 2; complete list in Appendix 1). Of these, 12 taxa were considered 'data deficient' and were not evaluated for their threat status. Four species [three limpets: *Micropilina* sp. C (NMNZ M.171275), *Actinoleuca campbelli bountyensis* Powell, 1956, and *Notoacmea scapha* (Suter, 1907); and one shrimp *Chorocaris* sp. (NIWA specimen, coll. 2001)] were removed from the revised list because of recent taxonomic revisions. The remaining 295 taxa were evaluated and assigned to the relevant threat category. The vast majority of taxa evaluated were endemic to New Zealand waters and included a number of endemic genera. In accordance with recent taxonomic revisions, 18 taxa (two crabs, two barnacles and 14 molluscs) were renamed in the list. Of the 295 taxa we evaluated, plus the 12 'data deficient' taxa, 91 remained taxonomically indeterminate.

Some 26 taxa were added to the previous list, including 12 isidids (bamboo corals), nine paragorgiids (bubblegum corals), one

Table 1 Number of taxa evaluated and assigned to threat categories defined by Townsend et al. (2008).

		Threatened			At risk				
Phylum	Total	NC	NE	NV	Dec	Rec	Rel	NU	NT
Porifera	1	0	0	0	0	0	0	1	0
Cnidaria	37	0	0	14	0	0	0	23	0
Mollusca	226	6	0	2	7	0	0	203	8
Brachiopoda	1	0	1	0	0	0	0	0	0
Bryozoa	7	0	0	3	0	0	0	1	3
Annelida	2	1	1	0	0	0	0	0	0
Echinodermata	2	0	0	0	1	0	0	1	0
Arthropoda	19	3	0	2	0	0	0	14	0
Total	295	10	2	21	8	0	0	243	11

An additional 12 taxa were considered 'data deficient' and were therefore not evaluated. Abbreviations: NC, Nationally critical; NE, Nationally endangered; NV, Nationally vulnerable; Dec, Declining; Rec, Recovering; Rel, Relict; NU, Naturally uncommon; NT, Not threatened.

coralliid (precious coral), three vent shrimps (*Alvinocaris alexander*, *Lebbeus wera* and *Nautilocaris saintlaurentae*) and the king crab, *Paralomis hirtella*. For several cnidarian taxa, listings were made at the genus level (and therefore may include more than one species) to reflect difficulties in identification and the large number of undescribed but apparently endemic and in some cases, threatened species. For example, red coral, *Errina novazealandica* was changed to *Errina* spp. to reflect difficulties in identification of these species. Several deepwater corals were also listed at the genus level, including the precious corals, *Corallium*, and many of the bamboo corals.

Threatened taxa

We placed 33 taxa in the 'threatened' category (Table 1). In 2004, there were 11 'nationally critical' marine invertebrates, based on the previous classification system. Under the new criteria, 10 taxa were listed as being at most risk of extinction. This list included seven species previously listed as 'nationally critical', plus three additional taxa: the squid *Idioteuthis cordiformis*, and two gravel maggots, *Smeagol climoi* and *Smeagol manneringi*. The status of four taxa previously listed in 2004 as 'nationally critical' was changed (the octopus *Opisthoteuthis mero* was relisted as 'nationally vulnerable'; the echinoid *Porterpygus kieri* was relisted as 'data deficient'; the polychaete *Spio aequalis* was relisted as 'nationally endangered'; and the seadaisy *Xyloplax medusiformis* was relisted as 'data deficient').

Two taxa were listed as 'nationally endangered'—the polychaete *Spio aequalis* (previously listed as 'nationally critical') and the brachiopod *Pumilus antiquatus*. A total of 21 taxa were listed as 'nationally vulnerable' and all were assigned to this category because of their patterns of decline as a result of existing threats. Most of the taxa in this category were deepwater corals.

The following 10 taxa have been listed as 'nationally critical' and are the marine invertebrates known to be at most risk of extinction in New Zealand waters:

Giant seep clam, Calyptogena *spp.*

The genus *Calyptogena* comprises highly specialised bivalves that live in symbiosis with sulphur-oxidising bacteria in habitats such as hydrothermal vents (Krylova & Sahling 2006). *Calyptogena* spp. have been found in methane seeps from Cape Palliser to Castlepoint offshore of the southeast North Island coast. The small spatial area of these species' highly

Table 2 Number of marine invertebrate taxa evaluated and assigned to threat categories, or listed as data deficient, as a percentage of the total known New Zealand species diversity in the coastal and marine environment (from Gordon 2009).

Taxon	Species diversity	% of taxa evaluated	% of taxa data deficient	% of taxa yet to be considered
Porifera	724	0.1	0	99.9
Ctenophora	19			100
Cnidaria*	1112	3.3	0.2	96.5
Platyhelminthes	324			100
Dicyemida	6			100
Gastrotricha	4			100
Gnathifera	44			100
Mollusca	3593	6.3	0.1	93.6
Brachiopoda	38	2.6	0	97.4
Phoronida	3			100
Bryozoa	953			100
Kamptozoa	12			100
Sipuncula	26			100
Echiura	7			100
Annelida	792	0.3	0.3	99.5
Orthonectida	1			100
Nemertea	29			100
Echinodermata	623	0.3	0.3	99.4
Hemichordata	7			100
Tunicata	192			100
Chaetognatha	15			100
Tardigrada	5			100
Arthropoda	2820	0.7	0.0	99.3
Kinorhyncha	17			100
Loricifera	1			100
Priapulida	3			100
Nematoda	173			100
Nematomorpha	1			100
Total	11544	2.6	0.1	97.3

Groups with no known marine species are excluded. Blank entries indicate 'zero' values. *Percentages are underestimates, because of listing of several taxa at the genus level.

specialised habitat placed them in the 'nationally critical' category.

Primitive acorn barnacle, Chionelasmus crosnieri *(Buckeridge, 1998)*

Chionelasmus crosnieri was formerly listed as *C. darwini*, but has been relisted as *C. crosnieri*, in accordance with Buckeridge's (1998) revision. In New Zealand, this species is known only from an area at around 500 m depth, on the Kermadec Ridge (Foster 1981), and is one of the most primitive living acorn barnacles. The small area of its known habitat placed it in the 'nationally critical' category.

Four-blotched umbrella octopus, Cirroctopus hochbergi *O'Shea, 2000*

Recorded only from New Zealand, *C. hochbergi* has been captured from several locations at depths between 700 and 1350 m and in

association with seamounts, cold seep and vent habitats (O'Shea 1999). Its probable small population size and ongoing pattern of decline because of fishing impacts placed this species in the 'nationally critical' category.

Stalked barnacle, Ibla idiotica *Batham, 1945*

Although historically found at several sites on the Otago Peninsula, the small—the female is 2.0–3.5 mm and the male 0.4 mm in maximum dimension (Batham 1945)—stalked barnacle *I. idiotica* appears to have vanished from the intertidal and may now be restricted to a few subtidal pockets. This pattern of decline placed this species in the 'nationally critical' category.

Giant squid, Idioteuthis cordiformis *(Chun, 1908)*

The giant, or whip-lash squid, *I. cordiformis*, is known from several seamounts in the New Zealand region, including on the Chatham Rise and in the Bay of Plenty. Its ongoing or predicted decline because of fishing impacts placed this species in the 'nationally critical' category.

Roughy umbrella octopus, Opisthoteuthis chathamensis *O'Shea, 2000*

Recorded only from New Zealand, this octopus species has been captured from soft sediment habitat at depths between 900 and 1438 m off East Cape and the Chatham Rise (O'Shea 1999). Taken as bycatch in the deepwater trawl fishery, this species has not been recorded since 1999. The apparent pattern of decline in this species placed it in the 'nationally critical' category.

Gravel maggot, Smeagol climoi *Tillier & Ponder, 1993*

Previously listed as 'range restricted' under the 2002 criteria (Molloy et al. 2002), the pulmonate gastropod *S. climoi* has been recorded only on the gravel beaches of Wellington's South Coast (Tillier & Ponder 1992). All five species of *Smeagol* are restricted to the upper littoral of very small areas of gravel or cobble beaches in New Zealand and southeastern Australia, with each species having a very small geographic distribution (Ponder et al. 2002). *S. climoi*'s highly restricted range placed it in the 'nationally critical' category.

Gravel maggot, Smeagol manneringi *Climo, 1981*

As with *S. climoi*, *S. manneringi* was also listed as 'range restricted' under the 2002 criteria. This species is found only on Kaikoura gravel beaches, and this highly restricted range placed it in the 'nationally critical' category.

O'Shea's vent barnacle, Volcanolepas osheai *(Buckeridge, 2000)*

Known only from the Brothers Caldera, northeast of the North Island, at depths between 1200 and 1700 m, this stalked barnacle species is the only hydrothermal vent-associated barnacle known from New Zealand waters (Buckeridge 2000). It is one of two species in the genus *Volcanolepas* (Southward & Jones 2003). Its apparent highly restricted distribution and single population placed this species in the 'nationally critical' category.

Large-egged polychaete, Boccardiella magniovata *(Read, 1975)*

An intertidal estuarine species, *B. magniovata* has been recorded from several locations but is nowhere abundant. Sites where this species has been found previously are being increasingly modified through urbanisation and a search in 2002 of its type locality revealed no individuals of this species (G. Read, personal communication). The few populations, apparent small population sizes and pattern of decline because of anthropogenic threats placed this endemic species in the 'nationally critical' category.

At risk taxa

A total of 251 taxa were placed in the 'at risk' category, with most (243) being listed as 'naturally uncommon' (Table 1). These are taxa whose distributions are naturally confined to specific substrates, habitats or geographic areas, or taxa that occur within naturally small and widely scattered populations. This includes a large number of species with distributions restricted to particular islands (e.g. *Calliostoma* spp.), and species associated with particular habitats, such as seamounts. The remaining eight taxa were classified as 'declining', within the 'at risk' category.

Other categories

Some 12 taxa were listed as being 'data deficient', where information relating to them was so poor that an assessment of threat status could not be made (Townsend et al. 2008). This included two annelids, one arthropod, two cnidarians, two echinoderms and five molluscs.

A further 11 taxa (three bryozoans and eight molluscs) were evaluated but did not fit any of the other categories and were listed as 'not threatened'.

Discussion

Some 33 'threatened' and 251 'at risk' marine invertebrates were identified through our threat classification process, which involved the assessment of 295 taxa. It is known that marine taxa generally have much smaller percentages of threatened species, but also many more undescribed and unrecorded species than do terrestrial or freshwater plants or vertebrates (McKinney 1999; Regnier et al. 2009). This is certainly the case for New Zealand marine invertebrates, where just a small fraction of the fauna has been surveyed and described to date (Gordon 2009). Unlike New Zealand birds and terrestrial plants, where all taxa can be evaluated for their threat status (Miskelly et al. 2008; de Lange et al. 2009), this is currently an unachievable task for marine invertebrates, where many of the taxa remain unknown and undescribed.

There are, therefore, several sources of bias in relation to the list of threatened marine invertebrates presented here. While some phyla and geographic areas are relatively well studied in New Zealand waters, there are substantial gaps in our knowledge, which prevent us from not only knowing more about species' distribution and abundance, but about their existence and identity. A huge number of marine species in New Zealand remain undiscovered and undescribed, and many habitats, such as those in depths beyond the continental shelf, remain largely unsurveyed. In addition, available taxonomic and ecological expertise is inconsistent among marine phyla and habitats, resulting in some taxa receiving more attention than others. Nearly a third of the marine invertebrate taxa we evaluated remain taxonomically indeterminate. Taxonomic resolution is seen as vital for furthering conservation management of these species (de Lange et al. 2009).

Much of the data available on marine species distribution and abundance has been derived from fisheries surveys and museum collections. Although such data can be very useful for assessing biodiversity (e.g. Ponder et al. 2000; Beaumont et al. 2008), the geographic distribution of sampling effort and the sampling methodology employed often prevents reliable description or even estimation of a species' actual distribution and abundance. Our evaluations have been based on the best available information, which is incomplete for many taxa.

Edgar et al. (2005) suggested that population declines for marine species at risk of extinction will go largely unnoticed, because of the 'hidden' nature of their environment and the lack of quantitative data on species distribution and abundance. Priorities for the collection of demographic data should therefore be not only on the species at most risk of extinction, but also on the 'data deficient' taxa (McKinney 1999; Townsend et al. 2008). It is likely that the vast majority of marine

invertebrate species not evaluated here (which can be a large percentage of the known diversity; Table 2) would be listed as 'data deficient', but this would highlight particular taxa and geographical areas where survey effort should be directed. We also consider that there is a strong likelihood that many marine invertebrates listed as 'data deficient' would be relisted as 'threatened' or 'at risk' if sufficient data were available to allow their evaluation.

A range of marine habitats are under ongoing risk of loss or degradation, through human activities such as reclamation, destructive fishing methods and sedimentation. It may therefore also be important to survey and monitor species associated with habitats known to be particularly vulnerable, as the loss of some habitats may result in the loss of associated fauna, including marine invertebrates. Seagrasses and seamounts are examples of vulnerable habitats that may support threatened dependent marine invertebrate species (O'Hara 2002; Hughes et al. 2009).

The threat status of several species appeared to have improved since the last listing process. These apparent improvements were related to changes in the evaluation criteria or to changes in knowledge of a taxon. For example, two species, the octopus *Opisthoteuthis mero* and polychaete *Spio aequalis*, 'improved' since the 2004 listing process (Hitchmough et al. 2007). Previously listed as 'nationally critical' under the old criteria (Molloy et al. 2002), *O. mero* was relisted as 'nationally vulnerable' and *S. aequalis* was relisted as 'nationally endangered'. The change in classification of the former was related to the change in the classification criteria, and the change of the latter was related to the discovery of several new populations of that species.

Although management action such as the implementation of marine protected areas and benthic protected areas has been undertaken since the last marine invertebrate threat listing process (e.g. Ministry of Fisheries 2007), we know of no instance where any recovery or slowing in the rate of decline of a taxon as a whole has been documented in response to management. However, a lack of monitoring may explain this lack of documentation in some areas (deepwater habitats for example), and it is also likely that individual populations of some taxa have responded to management through the removal of threatening processes such as fishing (Clark & O'Driscoll 2003).

We could identify no taxon that was 'recovering' following a decline in population abundance, or that could be considered a 'relict' (Townsend et al. 2008). The particular characteristics of marine invertebrate species (e.g. dispersal mechanisms, body size) and lack of completeness of the list, also excluded the 'migrant', 'vagrant', 'coloniser' and 'introduced and naturalised' categories.

Two species formerly listed as 'nationally critical' (each with the qualifier 'data poor') were relisted as 'data deficient' under our evaluation process. We considered that there were too little data available (e.g. on population size or distribution) for the echinoid *Porterpygus kieri* and the seadaisy *Xyloplax medusiformis* to enable an adequate assessment of their threat status. As 'data deficient' species, these species remain priorities for future collection of population information.

A range of known threatening processes continue to act upon many of the marine invertebrates listed during our evaluation process, and are consistent with the threats that continue to be identified worldwide. The activities we noted as being key threatening processes for the majority of taxa thought to be in decline were the impacts of fishing (including bycatch or habitat loss), and land use/coastal development-associated impacts such as sedimentation. Some species were also noted to be at risk from shell collectors and traders, but such threats are usually considered much less significant than either fishing or coastal development, which can affect the survival of even some relatively common taxa (Ponder & Grayson 1998; Morrison et al. 2009). Management of these effects may result in the improvement in the threat status of some

species we have listed, but ongoing monitoring would be required to assess fully the magnitude of any such improvement.

Marine invertebrates have been suggested to be vulnerable to the effects of climate change and associated effects such as sea level rise, climate warming and acidification (Harvell et al. 2002; Orr et al. 2005; Przeslawski et al. 2008). A number of taxa we have listed as being threatened or at risk, such as the deepwater corals and other calcified taxa, have been suggested to be particularly vulnerable to the effects of ocean acidification (Turley et al. 2007; Smith 2009). Evaluation of these species' population status provides a baseline for the long-term assessment of the potential impacts of such environmental change.

Encouragingly, no taxa listed in 2004 (Hitchmough et al. 2007) were relisted here in a more threatened category as a result of an actual change in the distribution and abundance of the taxon, or an increase in the rate of decline in abundance. The vast majority of taxa that appeared to worsen in their threat status were actually relisted in a more threatened category as a result of the change in criteria between 2002 (Molloy et al. 2002) and 2008 (Townsend et al. 2008), or an increase in knowledge of the taxa. The marine slugs, or gravel maggots *S. climoi* and *S. manneringi* are two examples of 'nationally critical' species, with highly restricted distributions. *Smeagol hilaris* has recently been listed as a critically endangered species in New South Wales, Australia, for the same reasons as the two conspecifics listed here (Fisheries Scientific Committee 2009). The list of threatened New Zealand marine invertebrates includes a large number of narrow-range endemics, which are known to be at particular risk of extinction as a result of their vulnerability to small-scale threatening processes such as stormwater discharges, pollution or urbanisation (Ponder et al. 2002). Often, legal protection of their geographic range through the establishment of a marine protected area, or other such management action, may do little to protect such species. *Smeagol climoi* and *S. manneringi* were previously listed as 'range restricted' (Hitchmough et al. 2007) but revision of the classification criteria (Townsend et al. 2008) has ensured that such narrow-range endemic species with no predicted pattern of decline or history of human influence are highlighted as being at the highest risk of extinction.

The results of this threat listing process provide guidance for marine conservation management in New Zealand and also highlight key areas where further monitoring and research is required. As found in several international threat listing processes, a general lack of knowledge of population distribution and abundance, as well as life history characteristics, is an important issue to address to allow the threat classification of marine invertebrates (Gardenfors 2001; Miller et al. 2007). Additionally, the management of key threatening processes and the responses of marine invertebrate populations to such management are important areas of future research. As noted by Ponder et al. (2002) for Australia, our lack of knowledge in these areas may have serious consequences for marine ecosystems. Although international studies have reported difficulty in applying some threat classification criteria to marine species (Miller et al. 2007), we have shown that the New Zealand criteria can be successfully applied to marine species, and may be suited to other countries with similar requirements, geography and ecological characteristics (Townsend et al. 2008).

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Appendix 1: Threat rankings for marine invertebrates.

The following is a list of all marine invertebrate taxa we assessed according to Townsend et al. (2008). Taxa are grouped by threat category, then alphabetically by scientific name. * denotes an addition to this list (c.f. Hitchmough et al. 2007). Townsend et al. (2008) provided further detail regarding the qualifiers, which are abbreviated as: CD, Conservation Dependent; DP, Data Poor; De, Designated; EF, Extreme Fluctuations; EW, Extinct in the Wild; Inc, Increasing; IE, Island Endemic; OL, One Location; PD, Partial Decline; RF, Recruitment Failure; RR, Range Restricted; SO, Secure Overseas; Sp, Sparse; St, Stable; TO, Threatened Overseas.

Threatened

Nationally critical

Criteria for nationally critical: A, very small population (natural or unnatural); B, small population (natural or unnatural) with a high ongoing or predicted decline; C, population (irrespective or size or number of subpopulations) with a very high ongoing or predicted decline (>70%).

Scientific name	Phylum	Criteria	Qualifier(s)
Calyptogena spp. (NZOI)	Mollusca	A(3)	DP, OL
Chionelasmus crosnieri (Buckeridge, 1998)	Arthropoda	A(3)	RR, SO
Cirroctopus hochbergi O'Shea, 2000	Mollusca	B (1/1)	DP
Ibla idiotica Batham, 1945	Arthropoda	C	
Idioteuthis cordiformis (Chun, 1908)	Mollusca	C	SO
Opisthoteuthis chathamensis O'Shea, 2000	Mollusca	C	
Smeagol climoi Tillier & Ponder, 1993	Mollusca	A(3)	DP, OL
Smeagol manneringi Climo 1981	Mollusca	A(3)	DP, OL
Volcanolepas osheai (Buckeridge, 2000)	Arthropoda	A(3)	OL
Boccardiella magniovata (Read, 1975)	Annelida	B (2/1)	

Nationally endangered

Criteria for nationally endangered: A, small population (natural or unnatural) that has a low to high ongoing or predicted decline; B, small stable population (unnatural); C, moderate population and high ongoing or predicted decline.

Scientific name	Phylum	Criteria	Qualifer(s)
Pumilus antiquatus Atkins, 1958	Brachiopoda	A (3/1)	
Spio aequalis Ehlers, 1904	Annelida	A (1/1)	Dp, RR, Sp

Nationally vulnerable

Criteria for nationally vulnerable: A, small, increasing population (unnatural); B, moderate, stable population (unnatural); C, moderate population, with population trend that is declining; D, moderate to large population and moderate to high ongoing or predicted decline; E, large population and high ongoing or predicted decline.

Scientific name	Phylum	Criteria	Qualifier(s)
Calvetia osheai Taylor & Gordon, 2003	Bryozoa	C (3/1)	RR
Cancellus laticoxa Forest & McLaughlan, 2000	Arthropoda	C (3/1)	OL
**Chathamisis bayeri* Grant, 1976	Cnidaria	D (3/1)	DP, RR
Chitinolepas spiritsensis Buckeridge & Newman, 2006	Arthropoda	C (3/1)	DP
**Circinisis circinata* Grant, 1976	Cnidaria	D (3/1)	DP, OL
**Echinisis* spp.	Cnidaria	D (3/1)	DP, OL, SO
Enallopsammia cf. *maranzelleri* Zibrowius, 1973	Cnidaria	D (3/1)	PD, SO, Sp
Iridogorgia spp.	Cnidaria	D (3/1)	
Madrepora oculata Linnaeus, 1758	Cnidaria	D (1/1)	SO
Metallogorgia cf. *melanotrichos*	Cnidaria	D (3/1)	SO
**Mopsea elongata* Roule, 1908	Cnidaria	D (3/1)	DP, SO, Sp
Octopus kaharoa O'Shea, 2000	Mollusca	E (2/1)	
Opisthoteuthis mero O'Shea, 2000	Mollusca	E (2/1)	
**Paragorgia alisonae* Sanchez, 2005	Cnidaria	D (3/1)	DP, Sp
**Paragorgia aotearoa* Sanchez, 2005	Cnidaria	D (3/1)	DP, OL
**Paragorgia wahine* Sanchez, 2005	Cnidaria	D (3/1)	DP, OL
**Peltastisis* spp.	Cnidaria	D (3/1)	OL
**Primnoisis* spp.	Cnidaria	D (3/1)	RR, SO
**Sibogagorgia dennisgordoni* Sanchez, 2005	Cnidaria	D (3/1)	DP, OL
Spiritopora perplexa Taylor & Gordon, 2003	Bryozoa	C (3/1)	RR
Steginoporella perplexa Livingstone, 1929	Bryozoa	C (3/1)	RR

At risk

Declining

Criteria for declining: A, moderate to large population and low ongoing or predicted decline; B, large population and low to moderate ongoing or predicted decline; C, very large population and low to high ongoing or predicted decline.

Scientific name	Phylum	Criteria	Qualifier(s)
Alcithoe benthicola (Dell, 1963)	Mollusca	B (2/1)	
Alcithoe davegibbsi Hart, 2000	Mollusca	C (2/1)	OL
Alcithoe fissurata (Dell, 1963)	Mollusca	C (2/1)	
Alcithoe larochei Marwick, 1926	Mollusca	C (2/1)	
Bathymodiolus tangaroa Cosel & Marshall, 2003	Mollusca	A (2/1)	RR
Calliostoma turnerarum (Powell, 1964)	Mollusca	C (2/1)	
Cellana flava (Hutton, 1873)	Mollusca	A (2/1)	RR
Gorgonocephalus dolichodactylus Döderlein, 1911	Echinodermata	C (2/1)	SO

Recovering

Criteria for recovering: A, moderate population; B, moderate to large population.

No taxa listed in this category.

Relict

No taxa listed in this category.

Naturally uncommon

Scientific name	Phylum	Qualifier(s)
Abra sp. (NMNZ M.225609)	Mollusca	DP, RR
**Acanella* spp.	Cnidaria	DP, SO, Sp
Alcyonidium n. sp. 1 Leigh Reserve	Bryozoa	DP, OL
Alvania kermadecensis (Oliver, 1915)	Mollusca	RR
**Alvinocaris alexander* Ahyong, 2009	Arthropoda	RR
Alvinocaris longirostris Kikuchi & Ohta, 1995	Arthropoda	RR
Alvinocaris niwa Webber, 2004	Arthropoda	RR
Amaea sp. (NZOI TAN107/233)	Mollusca	DP, RR, SO?
Amygdalum sp. (NMNZ M.147338)	Mollusca	DP, SO?, Sp
Anabathron sp. aff. *ovatus* (Powell, 1927) (NMNZ M.227089)	Mollusca	RR
Ancistrobasis sp. (NZOI TAN107/232)	Mollusca	DP, RR
Annulobalcis marshalli Warén, 1981	Mollusca	RR
Antipathella fiordensis (Grange, 1990)	Cnidaria	RR
Antipathes n. sp.	Cnidaria	RR
Archiminolia dawsoni (B.A. Marshall, 1979)	Mollusca	DP, RR
Archiminolia hurleyi (B.A. Marshall, 1979)	Mollusca	DP, RR
Archiminolia tenuiseptum B.A. Marshall, 2000	Mollusca	DP, RR
Argalista sp. A (NMNZ M.148551)	Mollusca	RR
Argalista sp. B (NMNZ M.148552)	Mollusca	RR
Asterophila sp. Warén & Lewis, 1994	Mollusca	DP, RR
Balanophyllia chnous Squires, 1962	Cnidaria	RR
Bathyfautor rapuhia B.A. Marshall, 1996	Mollusca	RR
Bathymophila valentia B.A. Marshall, 2000	Mollusca	RR
Bellomitra sp. (NZOI TAN107/127)	Mollusca	DP, RR
Benthocardiella obliquata bountyensis Powell, 1934	Mollusca	DP, RR
Benthocardiella sp. A (NMNZ M.148673)	Mollusca	RR
Benthocardiella sp. B (NMNZ M.148674)	Mollusca	RR
Benthocardiella sp. C (NMNZ M.148675)	Mollusca	RR
Benthocardiella sp. D (NMNZ M.148676)	Mollusca	RR
Brookula stibarochila (Iredale, 1912)	Mollusca	RR
Caecum maori Pizzini & Raines, 2006	Mollusca	RR
Calliostoma antipodense B.A. Marshall, 1996	Mollusca	RR
Calliostoma benthicola (Dell, 1950)	Mollusca	RR
Calliostoma consobrinum (Powell, 1958)	Mollusca	RR
Calliostoma eminens B.A. Marshall, 1996	Mollusca	RR
Calliostoma gendalli B.A. Marshall, 1980	Mollusca	RR
Calliostoma gibbsorum B.A. Marshall, 1996	Mollusca	RR
Calliostoma jamiesoni B.A. Marshall, 1996	Mollusca	RR
Calliostoma peregrinum B.A. Marshall, 1996	Mollusca	RR
Calliostoma sp. (NZOI TAN107/233)	Mollusca	RR
Calliostoma xanthos B.A. Marshall, 1996	Mollusca	RR
Calliotropis crystalophorus B.A. Marshall, 1980	Mollusca	DP, RR
Calliotropis sp. A (NMNZ M.152747)	Mollusca	DP, RR
Calliotropis sp. B (NMNZ M.152735)	Mollusca	DP, RR
Cantharidus burchorum B.A. Marshall, 1999	Mollusca	RR
Cantrainea sp. A (NZOI TAN107/323)	Mollusca	DP, RR
Cantrainea sp. B (NZOI TAN107/323)	Mollusca	DP, RR
Cantrainea sp. C (NZOI TAN107/235)	Mollusca	DP, RR

Carditella sp. (NMNZ M.20766)	Mollusca	RR
Carinastele coronata B.A. Marshall, 1989	Mollusca	DP, RR
Carinastele jugosa B.A. Marshall, 1989	Mollusca	DP, RR
Carinastele kristelleae B.A. Marshall, 1989	Mollusca	RR
Cellana craticulata (Suter, 1905)	Mollusca	RR
Cellana strigilis bollonsi Powell, 1955 E	Mollusca	RR
Cellana strigilis flemingi Powell, 1955 E	Mollusca	RR
Cellana strigilis oliveri Powell, 1955 E	Mollusca	RR
Chiton themeropis (Iredale, 1914)	Mollusca	RR
Cirsonella laxa Powell, 1938	Mollusca	RR
Cirsonella maoria (Powell, 1937)	Mollusca	RR
Cirsonella paradoxa Powell, 1938	Mollusca	RR
Clanculus atypicus Iredale, 1913	Mollusca	RR
Clathrosepta sp. (NZOI U608)	Mollusca	DP, RR
Coenocyathus brooki Cairns, 1995	Cnidaria	RR
Cominella quoyana griseicalx Willan, 1979	Mollusca	RR
Cominella regalis Willan, 1979	Mollusca	RR
Conchocele sp. (NMNZ M.28418)	Mollusca	RR
Condylocuna sp. A (NMNZ M.144652)	Mollusca	RR
Condylocuna sp. B (NMNZ M.144656)	Mollusca	RR
Condylocuna sp. C (NMNZ M.144657)	Mollusca	RR
Condylocuna sp. D (NMNZ M.144658)	Mollusca	RR
Hirtomurex tangaroa B.A. Marshall & Oliverio, 2009	Mollusca	RR
**Corallium* spp.	Cnidaria	Sp
Dilemma inexpectatum (Crozier, 1967)	Mollusca	RR
Cornisepta festiva (Crozier, 1966)	Mollusca	RR
Cranopsis sp. (NZOI TAN107.323)	Mollusca	RR
Crateritheca novaezelandiae (Thompson, 1879)	Cnidaria	RR
Crosseola favosa Powell, 1938	Mollusca	RR
Crosseola intertexta Powell, 1938	Mollusca	RR
Cyamiomactra sp. A (NMNZ M.60854)	Mollusca	RR
Cyamiomactra sp. B (NMNZ M.33947)	Mollusca	RR
Cyclochlamys pileolus Dijkstra & B.A. Marshall, 2008	Mollusca	DP, RR
Cyclopecten fluctuosus Dijkstra & B.A. Marshall, 2008	Mollusca	DP, RR
Cyclopecten horridus Dijkstra, 1995	Mollusca	DP, RR
Danilia sp. (NZOI U599)	Mollusca	DP, RR
Ciclopecten fluctuatus (Bavay, 1905)	Mollusca	DP, RR
Diodora bollonsi (Oliver, 1915)	Mollusca	RR
Discotectonica acutissima (G.B. Sowerby III, 1914) (NZOI TAN107/122)	Mollusca	DP, RR, SO
Eatoniella (E.) iredalei (Oliver, 1915)	Mollusca	RR
Elamena momona Melrose, 1975	Arthropoda	Sp
Eosipho sp. (NMNZ M.150056)	Mollusca	DP, RR
Errina spp.	Cnidaria	Sp
Etrema hedleyi (Oliver, 1915)	Mollusca	RR
Eurygonias hyalacanthus Farquhar, 1913	Echinodermata	Sp RR
Falcatoflabellum raoulensis Cairns, 1995	Cnidaria	RR
Fautrix candida B.A. Marshall, 1996	Mollusca	RR
Fictonoba oliveri (Powell, 1927)	Mollusca	RR
Fissurellidae sp. (NMNZ M.118002)	Mollusca	RR
Fissurisepta manawatawhia Powell, 1938	Mollusca	RR
Fissurisepta sp. (NMNZ M.138467)	Mollusca	RR
Fuscapex ophioacanthicola Warén, 1981	Mollusca	OL, DP, RR
Fusceulima goodingi Warén, 1981	Mollusca	OL, DP, RR
Gandalfus puia McLay 2007	Arthropoda	RR
Gigantidas gladius Cosel & B.A. Marshall, 2003	Mollusca	RR
Gonaxia sp. (NZOI)	Cnidaria	OL, RR

Granata sp. (NMNZ M.148566)	Mollusca	RR
Graphis sculpturata (Oliver, 1915)	Mollusca	RR
Grippina acherontis B.A. Marshall, 2002	Mollusca	OL, RR
Halimena aotearoa Melrose, 1975	Arthropoda	Sp,
Haloceras sp. 1 (NZOI U573)	Mollusca	OL, DP, RR
Haloceras sp. 2 (M.147782)	Mollusca	OL, DP, RR
Haloceras sp. 3 (NZOI P941)	Mollusca	OL, DP, RR
Hamacuna sp. A (NMNZ M.143347)	Mollusca	RR
Hamacuna sp. B (NMNZ M.149015)	Mollusca	RR
Herpetopoma pruinosa B.A. Marshall, 1980	Mollusca	RR
Herpetopoma sp. (NZOI TAN107/233)	Mollusca	RR
Hexaplex puniceus Oliver, 1916	Mollusca	RR
Hunkydora rakiura B.A. Marshall, 2002	Mollusca	RR
Iredalea subtropicalis Oliver, 1916	Mollusca	RR
Kaiparapelta sp. (NMNZ M.137534)	Mollusca	DP, RR
Kapala sp. (NZOI TAN107/136)	Mollusca	DP, RR
**Keratoisis* spp.	Cnidaria	DP, Sp
Kermia benhami Oliver, 1916	Mollusca	RR
Kidderia sp. (NMNZ M.134975)	Mollusca	RR
Laevilitorina antipodum (Filhol, 1880)	Mollusca	RR
Laevilitorina bifasciata Suter, 1914	Mollusca	RR
Laevilitorina delli (Powell, 1955)	Mollusca	RR
**Lebbeus wera* Ahyong, 2009	Arthropoda	OL
Lepetopsidae sp. (NMNZ M.158228)	Mollusca	RR
**Lepidisis* spp.	Cnidaria	DP, Sp
Leptochiton norfolcensis subtropicalis (Iredale, 1914)	Mollusca	RR
Leptomithrax tuberculatus mortenseni Bennett, 1964	Arthropoda	RR
Leptothyra benthicola B.A. Marshall, 1980	Mollusca	RR
Leptothyra kermadecensis B.A. Marshall, 1980	Mollusca	RR
Lienardia roseocincta (Oliver, 1915)	Mollusca	RR
Lillipathes lillei (Totton, 1923)	Cnidaria	S?O, RR
Lissodendoryx sp. (yellow slimy)	Porifera	RR
Lissotesta conoidea Powell, 1938	Mollusca	RR
Lutraria bruuni Powell, 1967	Mollusca	OL, DP, RR
Margarella antipoda hinemoa Powell, 1956	Mollusca	RR
Margarella sp. A (NMNZ M.59506)	Mollusca	RR
Margarella sp. B (NMNZ M.131607)	Mollusca	RR
Meiocardia sp. (NZOI T256)	Mollusca	DP, SO? RR
Melanella kermadecensis Oliver, 1916	Mollusca	RR
Melanella luminosa B.A. Marshall, 1997	Mollusca	RR
Melanella perplexa Oliver, 1916	Mollusca	RR
Melanella spinosa Oliver, 1916	Mollusca	RR
Merelina sp. A (NMNZ M.148669)	Mollusca	RR
Merelina sp. B (NMNZ M.148670)	Mollusca	RR
Merelina sp. C (NMNZ M.148671)	Mollusca	RR
Merelina sp. D (NMNZ M.148668)	Mollusca	RR
Metaxia kermadecensis B.A. Marshall, 1978	Mollusca	RR
Micrelenchus festivus B.A. Marshall, 1999	Mollusca	RR
Micropilina rakiura B.A. Marshall, 1999	Mollusca	RR
Micropilina tangaroa B.A. Marshall, 1991	Mollusca	DP, RR
**Minuisis* spp.	Cnidaria	DP, Sp
Mitrella sp. A (NZOI TAN107/233)	Mollusca	DP, RR
Mitrella sp. B (NZOI TAN107/323)	Mollusca	DP, RR
Mitromorpha expeditionis Oliver, 1916	Mollusca	RR
Monilea incerta Iredale, 1913	Mollusca	RR
Munditia anomala Powell, 1941	Mollusca	RR

Munditia aupouria Powell, 1938	Mollusca	RR
Munditia delicatula Powell, 1941	Mollusca	RR
Munditia echinata Powell, 1938	Mollusca	RR
Munditia manawatawhia Powell, 1938	Mollusca	RR
Munditia suteri (Mestayer, 1919)	Mollusca	RR
Mursia microspina Davie & Short, 1989	Arthropoda	RR, SO
Mysella sp. (NMNZ M.51502)	Mollusca	RR
Mysella tellinula (Odhner, 1924)	Mollusca	RR
Nassarius sp. (NZOI TAN107/218)	Mollusca	RR
**Nautilocaris saintlaurentae* Komai & Segonzac, 2006	Arthropoda	SO
Nemertesia elongata Totton, 1930	Cnidaria	RR
Niso sp. (NZOI TAN107/225)	Mollusca	DP, RR
Notopoides latus Henderson, 1888	Arthropoda	OL
Oculina virgosa Squires, 1958	Cnidaria	RR
Olgasolaris sp.(NZOI TAN107/228)	Mollusca	DP, RR
Onithochiton oliveri (Iredale, 1914)	Mollusca	RR
Ophieulima fuscoapicata Warén, 1981	Mollusca	OL, DP
Oxyperas belliana (Oliver, 1915)	Mollusca	RR
**Paragorgia arborea* (Linnaeus, 1758)	Cnidaria	DP, SO, Sp
**Paragorgia kaupeka* Sanchez, 2005	Cnidaria	DP, RR
**Paragorgia maunga* Sanchez, 2005	Cnidaria	DP, RR
**Paragorgia whero* Sanchez, 2005	Cnidaria	DP, Sp
**Paralomis hirtella* Macpherson & Saint Laurent, 1997	Arthropoda	SO
Patella kermadecensis (Pilsbry, 1894)	Mollusca	RR
Patinigera terroris (Filhol, 1880)	Mollusca	RR
Pectunculina sp. (NMNZ M.225313)	Mollusca	DP, RR
Peltospiridae sp. A (NZOI Z9504)	Mollusca	DP, RR
Peltospiridae sp. B (NZOI Z9504)	Mollusca	DP, RR
Peltospiridae sp. C (NZOI Z9504)	Mollusca	DP, RR
Perrierina sp. (NMNZ M.96189)	Mollusca	RR
Philanisus fasciatus Riek, 1976	Arthropoda	OL
Philorene texturata Oliver, 1916	Mollusca	RR
Phymorhynchus sp. (NZOI KAH11/21)	Mollusca	DP
Pleuromeris sp. (NMNZ M.148741)	Mollusca	RR
Profundisepta sp. A (NMNZ M.148575)	Mollusca	RR
Profundisepta sp. B (NMNZ M.138462)	Mollusca	RR
Pronucula kermadecensis Oliver, 1916	Mollusca	RR
Pteria avicula (Holten, 1802)	Mollusca	DP, SO, RR
Pteria sp. (NMNZ M.158247)	Mollusca	RR
Punctifera ophiomoerae Warén, 1981	Mollusca	OL, DP
Puncturella sp. (NZOI U601)	Mollusca	DP, RR
Purpurocardia reinga (Powell, 1933)	Mollusca	RR
Pusillina wallacei (Oliver, 1915)	Mollusca	RR
Pyramidelloides suteri (Oliver, 1915)	Mollusca	RR
Rastodens electra (Oliver, 1915)	Mollusca	RR
Rhyssoplax exasperata Iredale, 1915	Mollusca	RR
Rimulanax sp. (NMNZ M.225598)	Mollusca	DP, RR
Rokopella capulus B.A. Marshall, 2006	Mollusca	DP
Ruapukea carolus Dell, 1953	Mollusca	DP, RR
Scissurella fairchildi Powell, 1934	Mollusca	RR
**Sclerisis* spp.	Cnidaria	DP, OL
Selastele kopua (B.A. Marshall, 1995)	Mollusca	RR
Selastele limatulum (B.A. Marshall, 1995)	Mollusca	RR
Selastele onustum (Odhner, 1924)	Mollusca	RR
Serrata raoulica B.A. Marshall, 2004	Mollusca	RR
Serrata sp. A (NMNZ M.227078)	Mollusca	RR

**Sibogagorgia tautahi* Sanchez, 2005	Cnidaria	DP, OL
Sinezona pacifica (Oliver, 1915)	Mollusca	RR
Skeneoides sp. (NMNZ M.148557)	Mollusca	OL
Solariella sp. A (NZOI TAN107/233)	Mollusca	DP, RR
Solariella sp. B (NZOI TAN107/225)	Mollusca	DP, RR
Solariella sp. C (NZOI W672)	Mollusca	DP, RR
Solatisonax aff. *alleryi* (Seguenza, 1876) (NZOI TAN107/053)	Mollusca	DP, RR
Solecurtus sp. (NMNZ M.225439)	Mollusca	DP, RR
Sphenotrochus squiresi Cairns, 1995	Cnidaria	RR
Spondylus raoulensis Oliver, 1916	Mollusca	RR
Stilapex sp. (NMNZ M.232084)	Mollusca	OL
Stilifer sp. (NMNZ M.150057)	Mollusca	OL, DP
Stomatella oliveri (Iredale, 1912)	Mollusca	RR
Sundaya exquisita Oliver, 1916	Mollusca	RR
Suterilla imperforata Fukuda, Ponder & B.A. Marshall, 2006	Mollusca	RR
Talabrica sp. (NMNZ M.137651)	Mollusca	RR
Tectus royanus (Iredale, 1912)	Mollusca	RR
Tegulaplax sp. (NZOI TAN107/235)	Mollusca	DP, RR
Thoristella polychroma B.A. Marshall, 1999	Mollusca	RR
Thysanodonta sp. (NMNZ M.152736)	Mollusca	DP, RR
Trophon subtropicalis Iredale, 1913	Mollusca	RR
Tugali sp. (NMNZ M.36012)	Mollusca	RR
Turbinellid sp. (NZOI TAN107/134)	Mollusca	DP, RR
Xenograpsus ngatama McLay, 2007	Arthropoda	RR, SO
Zafra fuscolineata Oliver, 1915	Mollusca	RR
Zafra kermadecensis Oliver, 1915	Mollusca	RR
Zygoceras tropidophora Warén & Bouchet, 1991	Mollusca	OL, DP, SO

Other categories

Introduced and naturalised

No taxa listed in this category.

Migrant

No taxa listed in this category.

Vagrant

No taxa listed in this category.

Coloniser

No taxa listed in this category.

Data deficient

Scientific name	Phylum	Qualifier(s)
Antipathes fruticosa Gray, 1857	Cnidaria	
Bathysquilla microps (Manning, 1961)	Arthropoda	SO
Cyclopecten kermadecensis (E.A. Smith, 1885)	Mollusca	OL
Hartmanonuphis pectinata (Knox & Hicks, 1973)	Annelida	
**Isidella* spp.	Cnidaria	OL
Micropilina reinga B.A. Marshall, 2006	Mollusca	RR, OL
Micropilina wareni B.A. Marshall, 2006	Mollusca	RR, OL
Porterpygus kieri Baker, 1984	Echinodermata	

Scoletoma lynnei (Knox, 1951)	Annelida	
Spondylus ostreoides E.A. Smith, 1886	Mollusca	OL
Vema occidua B.A. Marshall, 2006	Mollusca	OL
Xyloplax medusiformis Baker, Rowe & Clark, 1987	Echinodermata	

Extinct

No taxa listed in this category.

Not threatened

Scientific Name	Phylum	Qualifier(s)
Alcithoe flemingi Dell, 1978	Mollusca	
Alcithoe lutea (Watson, 1882)	Mollusca	
Astraea heliotropium (Martyn, 1784)	Mollusca	
Celleporaria agglutinans (Hutton, 1873)	Bryozoa	
Cinctipora elegans Hutton, 1873	Bryozoa	
Cyclochlamys transenna (Suter, 1913)	Mollusca	
Hippomenella vellicata (Hutton, 1873)	Bryozoa	
Notoacmea badia Oliver, 1927	Mollusca	
Notoacmea helmsi (E.A. Smith, 1894)	Mollusca	
Provocator mirabilis (Finlay, 1926)	Mollusca	
Sinepecten segonzaci Schein, 2006	Mollusca	SO