Port of Wellington

Baseline survey for non-indigenous marine species
(Research Project ZBS2000/04)

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Executive summary

This report describes the results of a December 2001 survey to provide a baseline inventory of native, non indigenous and cryptogenic marine species within the Port of Wellington.

- The survey is part of a nationwide investigation of native and non-native marine biodiversity in 13 international shipping ports and three marinas of first entry for yachts entering New Zealand from overseas.

- Sampling methods used in these surveys were based on protocols developed by the Australian Centre for Research on Introduced Marine Pests (CRIMP) for baseline surveys of non-indigenous species in ports. Modifications were made to the CRIMP protocols for use in New Zealand port conditions.

- A wide range of sampling techniques was used to collect marine organisms from habitats within the Port of Wellington. Fouling assemblages were scraped from hard substrata by divers, benthic assemblages were sampled using a sled and benthic grabs, and a gravity corer was used to sample for dinoflagellate cysts. Mobile predators and scavengers were sampled using baited fish, crab, starfish and shrimp traps.

- The distribution of sampling effort in the Port of Wellington was designed to maximise the chances of detecting non-indigenous species and concentrated on high-risk locations and habitats where non-indigenous species were most likely to be found.

- Organisms collected during the survey were sent to local and international taxonomic experts for identification.

- A total of 336 species or higher taxa was identified from the Wellington Port survey. They consisted of 227 native species, 14 non-indigenous species, 26 cryptogenic species (those whose geographic origins are uncertain) and 69 species indeterminata (taxa for which there is insufficient taxonomic or systematic information available to allow identification to species level).

- Sixteen species have not previously been described from New Zealand waters. Four of these were newly discovered non-indigenous species (a polychaete worm, *Spirobranchus polytrema*, a hydroid, *Eudendrium capillare*, a crab, *Cancer gibbosulus*, and an ascidian, *Cnemidocarpa* sp.). The remaining 12 species do not correspond with existing descriptions from New Zealand or overseas and may be new to science.

- The 14 non-indigenous organisms described from the Port of Wellington included representatives of eight phyla. The non-indigenous species detected (ordered alphabetically by phylum, class, order, family, genus and species) were: (Annelida) *Dipolydora armata, Polydora hoplura*, *Spirobranchus polytrema*, (Bryozoa) *Bugula flabellata, Cryptosula pallasiana, Cyclicopora longipora, Watersipora subtorquata*, (Cnidaria) *Eudenrium capillare*, (Crustacea) *Cancer gibbosulus*, (Mollusca) *Theora lubrica*, (Phycophyta) *Undaria pinnatifida, Griffithsia crassiuscula,* (Porifera) *Halisarca dujardini*, (Urochordata) *Cnemidocarpa sp*.

- The only species from the Port of Wellington on the New Zealand register of unwanted organisms is the Asian kelp, *Undaria pinnatifida*. This alga is known to now have a wide distribution in southern and eastern New Zealand.

- Most non-indigenous species located in the Port are likely to have been introduced to New Zealand accidentally by international shipping or through domestic translocation or spread from other locations in New Zealand.

- Approximately 64 % (nine of 14 species) of NIS in the Port of Wellington are likely to have been introduced in hull fouling assemblages, 7 % (one species) via ballast water and 29 % (four species) could have been introduced by either ballast water or hull fouling vectors.

The predominance of hull fouling species in the introduced biota of the Port of Wellington (as opposed to ballast water introductions) is consistent with findings from similar port baseline studies overseas

Introduction

Introduced (non-indigenous) plants and animals are now recognised as one of the most serious threats to the natural ecology of biological systems worldwide (Wilcove et al 1998, Mack et al 2000). Growing international trade and trans-continental travel mean that humans now intentionally and unintentionally transport a wide range of species outside their natural biogeographic ranges to regions where they did not previously occur. A proportion of these species are capable of causing serious harm to native biodiversity, industries and human health. Recent studies suggest that coastal marine environments may be among the most heavily invaded ecosystems, as a consequence of the long history of transport of marine species by international shipping (Carlton and Geller 1993, Grosholz 2002). Ocean-going vessels transport marine species in ballast water, in sea chests and other recesses in the hull structure, and as fouling communities attached to submerged parts of their hulls (Carlton 1985, 1999, AMOG Consulting 2002, Coutts et al 2003). These shipping transport mechanisms have enabled hundreds of marine species to spread worldwide and establish populations in shipping ports and coastal environments outside their natural range (Cohen and Carlton 1995, Hewitt et al 1999, Eldredge and Carlton 2002, Leppäkoski et al 2002).

Biosecurity[1] is important to all New Zealanders. New Zealand's geographic isolation makes it particularly vulnerable to marine introductions because more than 95% of its trade in commodities is transported by shipping, with several thousand international vessels arriving and departing from more than 13 ports and recreational boat marinas of first entry (Inglis 2001). The country's geographic remoteness also means that its marine biota and ecosystems have evolved in relative isolation from other coastal ecosystems. New Zealand's marine biota is as unique and distinctive as its terrestrial biota, with large numbers of native marine species occurring nowhere else in the world.

The numbers, identity, distribution and impacts of non-indigenous species in New Zealand's marine environments are poorly known. A recent review of existing records suggested that by 1998, at least 148 species had been deliberately or accidentally introduced to New Zealand's coastal waters, with around 90 % of these establishing permanent populations (Cranfield et al 1998). To manage the risk from these and other non-indigenous species, better information is needed on the current diversity and distribution of species present within New Zealand.

BIOLOGICAL BASELINE SURVEYS FOR NON-INDIGENOUS MARINE SPECIES

In 1997, the International Maritime Organisation (IMO) released guidelines for ballast water management (Resolution A868-20) encouraging countries to undertake biological surveys of port environments for potentially harmful non-indigenous aquatic species. As part of its comprehensive five-year Biodiversity Strategy package on conservation, environment, fisheries, and biosecurity released in 2000, the New Zealand Government funded a national series of baseline surveys. These surveys aimed to determine the identity, prevalence and distribution of native, cryptogenic and non-indigenous species in New Zealand's major shipping ports and other high risk points of entry. The government department responsible for biosecurity in the marine environment at the time, the New Zealand Ministry of Fisheries (MFish), commissioned NIWA to undertake biological baseline surveys in 13 ports and three marinas that are first ports of entry for vessels entering New Zealand from overseas (Fig. 1). Marine biosecurity functions are now vested in Biosecurity New Zealand.

[1] Biosecurity is the management of risks posed by introduced species to environmental, economic, social, and cultural values.

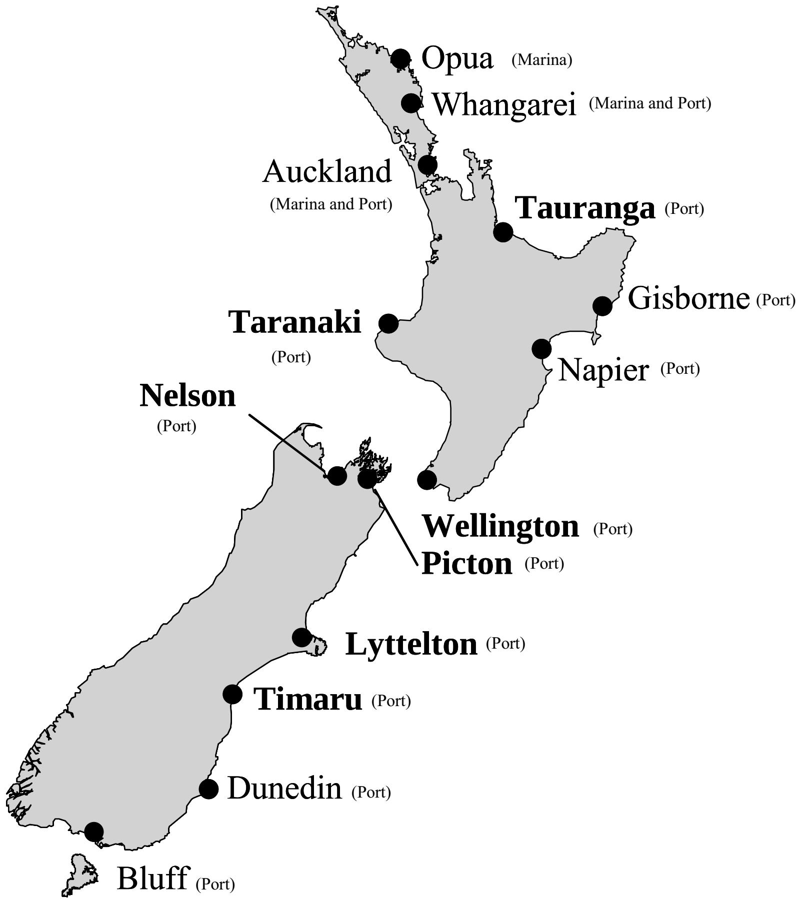

Figure 1: Commercial shipping ports in New Zealand where baseline non-indigenous species surveys have been conducted. Group 1 ports surveyed in the summer of 2001/2002 are indicated in bold and group 2 ports surveyed in the summer of 2002/2003 are indicated in plain font. Marinas were also surveyed for NIS in Auckland, Opua and Whangarei in 2002/2003.

The port surveys have two principal objectives:

i. To provide a baseline assessment of native, non-indigenous and cryptogenic[2] species, and
ii. To determine the distribution and relative abundance of a limited number of target species in shipping ports and other high risk points of entry for non-indigenous marine species.

The surveys will form a baseline for future monitoring of new incursions by non-indigenous marine species in port environments nationwide, and will assist international risk profiling of problem species through the sharing of information with other shipping nations.

This report summarises the results of the Port of Wellington survey and provides an inventory of species detected in the Port. It identifies and categorises native, introduced ("non-indigenous") and cryptogenic species. Organisms that could not be identified to species level are also listed as species indeterminata.

[2] "Cryptogenic:" species are species whose geographic origins are uncertain (Carlton 1996).

DESCRIPTION OF THE PORT OF WELLINGTON

The Port of Wellington (known commercially as CentrePort) is located on the western side of Port Nicholson, a natural deepwater harbour, at the southern tip of New Zealand's North Island (41° 16'S. 174° 51'E; Fig. 1).

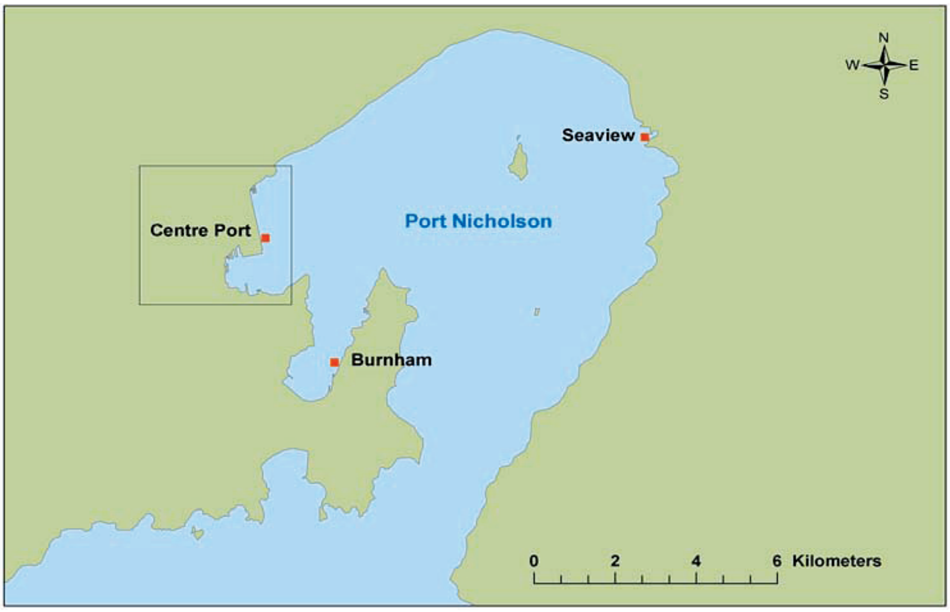

Figure 2: Port Nicholson overview map. Insert indicates area of CentrePort map (see Figure 3).

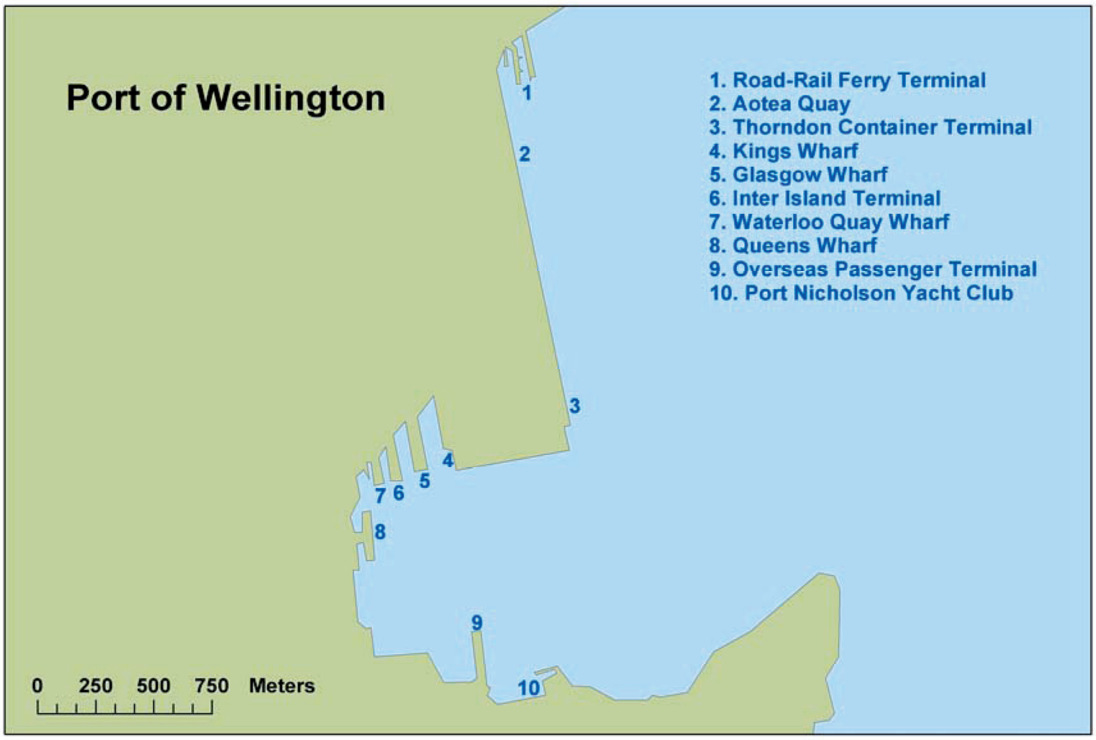

Figure 3: Port of Wellington map (CentrePort).

PORT OPERATION AND SHIPPING MOVEMENTS

Wellington harbour was first discovered in approximately 900 A.D. by Polynesian voyagers, Kupe and Ngahue, and went through a variety of colonisation phases by Māori (Neilson, 1970; Ballara, 1990). The first development of wharf structures occurred in 1862 at Queen's Wharf and the Wellington Harbour Board constituted in 1880. Coastal shipping trade (e.g. flour, cereals, meat and cheese) burgeoned in the 1880's and the first cargo of frozen meat was shipped in 1883. In 1932, the Thorndon Reclamation Scheme was completed which gave an extra 29 ha of land for railways development. In 1940, 33 vessels berthed at the wharves with a total GRT of 226,810. In 1962, the NZ Railways Wellington/Picton service came into operation. In 1967, the Hutt reclamation comprising 54 ha was completed for industrial purposes such as an oil tank farm. In the late 1960's containerised shipping trade was instigated. In 1990, the exporting of timber from Wellington commenced. In 1998, Port Wellington was relaunched under the name of CentrePort Wellington (www.centreport.co.nz).

The main commercial operation of the Port of Wellington is currently conducted by CentrePort Ltd, at three sites: CentrePort, Seaview Wharf and Burnham Wharf. Located within one kilometre of SH1 and the main Wellington railhead, CentrePort is well located to service both import and export business in the central New Zealand region. CentrePort extends from the Interisland Ferry Terminal in the north to the Overseas Terminal in the south (Figs. 2 and 3). Most major Port activity is centred around the Aotea Quay Wharf, and the Thorndon Container Terminal Wharf at its southern end. Other smaller wharves found within CentrePort are Kings Wharf, Glasgow Wharf, the Interisland Terminal Wharf, Waterloo Quay Wharf, Queens Wharf and the Overseas Terminal. Berths here are primarily used for smaller fishing and commercial vessels. Three coastal freight services, with associated passenger services, currently operate through CentrePort, offering around 4,500 combined annual sailings: The Interisland Line, Pacifica and Strait Shipping. Berth construction is predominantly concrete deck on a mixture of Australian hardwood and concrete piles. Berthage facilities at the Port are summarised in Table 1.

The Seaview Wharf is located at the top northeast of the harbour and is Wellington's main import terminal for bulk petroleum. The wharf can handle tankers up to 50,000 DWT, with no length restrictions. Bulk storage facilities are associated with the wharf on nearby land. Berth construction is concrete deck on steel piles. The upper portion of the steel piles from the waterline up, have been wrapped in Denso-tape (Petroleum-pasted) to prevent corrosion.

Burnham Wharf is situated near Wellington Airport at the southern end of Evans Bay. This wharf handles bitumen and aviation fuel imports. Bulk storage facilities are associated with the wharf. Berth construction is concrete deck on concrete piles with a concrete retaining wall. Alongside Burnham Wharf are a small jetty with an associated hazardous waste incinerator facility (now disused), and Miramar Wharf, which acts as a servicing wharf for RV *Tangaroa* and temporary berth for other vessels, as well as being used by amateur fishers.

A total of 9.331 million tonnes of cargo moved through the Port of Wellington in the year ending June 30th 2002, and there were 5,028 ship visits at the Port during this time. Major imports include bananas, cars, cement, manufactured goods, paper, petroleum products, soda ash and steel. Major exports include manufactured goods, dairy products, fish, logs, timber products, wool and scrap steel (www.centreport.co.nz). In 2004, the total cargo tonnage had increased to 10.33 million tonnes and a total of 77,000 TEU were handled which was a 23% increase in the latter on the previous year, and there were 5,026 ship visits. General cargoes (including household goods, manufactured goods and raw materials) were the main types of containerised cargo transported, with laundry powder and tyres the biggest growth cargoes.

Containers exported from CentrePort were discharged at 60 international ports in 23 countries, with import container cargo originating from 70 international ports in 26 countries (www.centreport.co.nz). The port has MAF inspection and quarantine, and customs clearance facilities.

There are four recreational marinas within Wellington Harbour: Evans Bay, Clyde Quay, Chaffers, and Seaview. Evans Bay Marina has 150 wooden pile berths for boats 8-20 m in length. Clyde Boat Harbour/Marina has 75 fore and aft wooden pole moorings for vessels 7-17 m in length. Chaffers Marina has approximately 180 floating concrete pier/wooden pile berths for vessels up to 20 m in length. Seaview Marina has 131 floating concrete pier/wooden pile berths and 22 wooden pole moorings for vessels up to 20 m in length.

Initial analyses of shipping arrivals to the Port of Wellington showed that most commercial vessels visiting the port arrive from Australia (72 %), followed by NW Pacific (15 %), S Pacific (5 %) and other New Zealand ports (Inglis 2001). More recent analyses of shipping arrivals to the Port of Wellington (Campbell 2004) show that there was a combined total of 99 international ship visits during 2002/2003 (78 merchant, 10 fishing, 9 pleasure, and 2 passenger vessels) with essentially the same source country proportions as in Inglis (2001). In 2000, there were 30 registered fishing vessels in Port Nicholson (Sinner et al 2000).

Vessels unable to be berthed immediately in the port may anchor inside the port to the north of Aotea Quay and adjacent to the motorway; exposure to strong southerly swells outside the harbour entrance prevents anchorage outside the harbour. Pilotage is compulsory on vessels over 500 GRT unless the Master holds a current pilot exemption certificate, and the vessel does not exceed 145 m in length or 8,000 GRT (www.centreport.co.nz).

Vessels are expected to comply with the Voluntary Controls on the Discharge of Ballast Water in New Zealand (www.fish.govt.nz/sustainability/biosecurity/); vessels are requested to exchange ballast water in mid-ocean (away from coastal influences) en route to New Zealand and discharge only the exchanged water while in port. A total volume of 14,536 m^3 of ballast water was discharged in the Port of Wellington in 1999, with the largest country-of-origin volumes of 7,371 m^3 from Japan, 3,117 m^3 from Australia, 763 m^3 from South Korea, and 2,937 m^3 unspecified (Inglis 2001). There is no on-going maintenance dredging.

In terms of future development, CentrePort Wellington is positioning itself toward significant further volume growth with the purchase of two new quayside container cranes, aimed at further improving container-handling services and infrastructure. The necessary coastal permits to proceed with a proposed dredging programme in vessel berths and at the harbour entrance have also been obtained. Dredging of the vessel berths (Aotea, Burnham, Seaview, and Thorndon) will involve around 21,000 m^3 with spoil disposal in deep water off Somes Island. Dredging of the channel entrance to ensure consistency of the 12.4 m water depth at the entrance will involve around 250,000 m^3 with spoil disposal in Fitzroy Bay. There is also a current emphasis on increasing productivity and efficiency within the Port of Wellington.

PHYSICAL ENVIRONMENT OF WELLINGTON HARBOUR

Port Nicholson is topographically partially isolated from oceanic influences (Booth 1975). Tidal movement in Port Nicholson is minimal, with a tidal range of 0.9 m and 1.2 m for neap and spring tides, respectively. Poor mixing rates mean that any given body of water within the harbour has a residence time of at least ten days (Northcote 1998). CentrePort experiences restricted tidal circulation patterns (Stoffers et al 1986; Barnett et al 1990), with bottom currents averaging a speed of 0.015 m/s (Northcote 1998). Mean monthly sea-surface temperatures range seasonally between 10.5 ^{O}C and 18.5 ^{O}C, with some stratification observed during summer and winter (Booth 1975). Harbour sediments may be grouped into three broad categories: beach deposits, basinal mud deposits and entrance sand and gravel (Carter and Moore 1992). Within the CentrePort, the sediment consists of mud and fine sand (Northcote 1998). Habitats in the harbour are diverse, ranging from exposed rocky reefs to a sheltered estuary.

EXISTING BIOLOGICAL INFORMATION

Many biological and physical studies have been previously undertaken in Port Nicholson (see Pedersen 1974; Northcote 1998, Wear and Haddon 1992 for comprehensive bibliographies), but there are few published data available for the area encompassing CentrePort itself and the flora and fauna found therein. Much of the early work (pre-1995) published on the marine life of Port Nicholson and environs is systematic or taxonomic in nature, and describes and classifies species, new species records and revises taxonomic groups. Later work has related to the environmental impacts of proposed development projects (Wear and Haddon 1992).

Brickell Moss Rankine and Hill (1975) reported on the effects on the fauna and flora of the proposed development of the Thorndon Container Terminal, as part of an environmental impact report. The area was said to contain 'no unique aquatic life' nor species which 'would not be expected to occur in such a location'. However, no species lists or more detailed information was provided.

Stoffers et al (1986) examined the contaminant content of Port Nicholson sediments, in particular concentrations of heavy metals. They noted that sediments within the Port were strongly contaminated with high values of lead, zinc and copper, probably derived from antifouling paint fragments of vessels residing in the port. The metal concentrations were found to be highest adjacent to the wharves and at the southern end of the wharf complex where the Thorndon Container Terminal is located. They note that earlier oceanographic studies of CentrePort have indicated that the area suffers from restricted tidal circulation patterns, which may facilitate the build up of contaminants there.

Hay and Luckens (1987) reported on the discovery of the non-indigenous Asian kelp *Undaria pinnatifida*, growing in the CentrePort. The kelp was found growing subtidally on steep breakwaters and walls, where it formed a dense, continuous forest of sporophytes at heights of up to 1.3 metres tall. It was also recorded growing over a 4 km stretch of the Port Nicholson shoreline, in sheltered and exposed habitats, and on many different types of substrate such as ropes, boulders and in gravel. This was the first record of its occurrence in the Southern Hemisphere. Any attempts at removal were thought to be ultimately futile, with successful eradication requiring the complete elimination of gametophytes. The Port of Wellington is in the optimal temperature zone for this macroalga (Sinner et al 2000).

Northcote (1998) reviewed all the scientific and technical studies of Port Nicholson to 1997. The study provides a comprehensive assessment of all aspects of the harbour environment including geology, hydrology and ecology. Extensive species lists of all phyla recorded from the harbour were included.

Taylor and MacKenzie (2001) tested the Port of Wellington for the presence of the toxic blooming dinoflagellate *Gymnodinium catenatum*, and detected both resting cysts (sediment samples) and motile cells (phytoplankton samples).

Survey methods

SURVEY METHOD DEVELOPMENT

The sampling methods used in this survey were based on the CSIRO Centre for Research on Introduced Marine Pests (CRIMP) protocols developed for baseline port surveys in Australia (Hewitt and Martin 1996, 2001). CRIMP protocols have been adopted as a standard by the International Maritime Organisation's Global Ballast Water Management Programme (GloBallast). Variations of these protocols are being applied to port surveys in many other nations. A group of New Zealand marine scientists reviewed the CRIMP protocols and conducted a workshop in September 2001 to assess their feasibility for surveys in this country (Gust *et al.* 2001). A number of recommendations for modifications to the protocols ensued from the workshop and were implemented in surveys throughout New Zealand. The modifications were intended to ensure cost effective and efficient collection of baseline species data for New Zealand ports and marinas. The modifications made to the CRIMP protocols and reasons for the changes are summarised in Table 2. Further details are provided in Gust *et al.* (2001).

Baseline survey protocols are intended to sample a variety of habitats within ports, including epibenthic fouling communities on hard substrata, soft-sediment communities, mobile invertebrates and fishes, and dinoflagellates. Below, we describe the methods and sampling effort used for the Wellington survey. The survey was undertaken between November 20th and December 17th, 2001. Most sampling was concentrated on six main berths: Burnham Wharf, Thorndon Container Wharf 2, Aotea Quays 3 and 6, Kings Wharf and the Overseas Passenger Terminal. Additional trapping and opportunistic sampling was conducted at four other locations within the Port of Wellington. A summary of sampling effort within the port is provided in Tables 3 a, b.

DIVER OBSERVATIONS AND COLLECTIONS ON WHARF PILES

Fouling assemblages were sampled on four pilings at each berth. Selected pilings were separated by 10 – 15 m and comprised two pilings on the outer face of the berth and, where possible, two inner pilings beneath the berth (Gust *et al.* 2001). On each piling, four quadrats (40 cm x 25 cm) were fixed to the outer surface of the pile at water depths of approximately -0.5 m, -1.5 m, -3.0 m and -7 m. A diver descended slowly down the outer surface of each pile and filmed a vertical transect from approximately high water to the base of the pile, using a digital video camera in an underwater housing. On reaching the sea floor, the diver then ascended slowly and captured high-resolution still images of each quadrat using the photo capture mechanism on the video camera. Because of limited visibility, four overlapping still images, each covering approximately ¼ of the area of the quadrat were taken for each quadrat. A second diver then removed fouling organisms from the piling by scraping the organisms inside each quadrat into a 1-mm mesh collection bag, attached to the base of the quadrat (Fig. 4). Once scraping was completed, the sample bag was sealed and returned to the laboratory for processing. The second diver also made a visual search of each piling for potential invasive species and collected samples of large conspicuous organisms not represented in quadrats. Opportunistic visual searches were also made of breakwalls and rock facings within the commercial port area. Divers swam vertical profiles of the structures and collected specimens that could not be identified reliably in the field.

BENTHIC FAUNA

Benthic infauna was sampled using a Shipek grab sampler deployed from a research vessel moored adjacent to the berth (Fig. 5), with samples collected from within 5 m of the edge of the berth. The Shipek grab removes a sediment sample of ~3 *l* and covers an area of approximately 0.04 m^2 on the seafloor to a depth of about 10 cm. It is designed to sample unconsolidated sediments ranging from fine muds and sands to hard-packed clays and small cobbles. Because of the strong torsion springs and single, rotating scoop action, the Shipek grab is generally more efficient at retaining samples intact than conventional VanVeen or Smith McIntyre grabs with double jaws (Fenwick *pers obs*). Three grab samples were taken at haphazard locations along each sampled berth. Sediment samples were washed through a 1-mm mesh sieve and animals retained on the sieve were returned to the field laboratory for sorting and preservation.

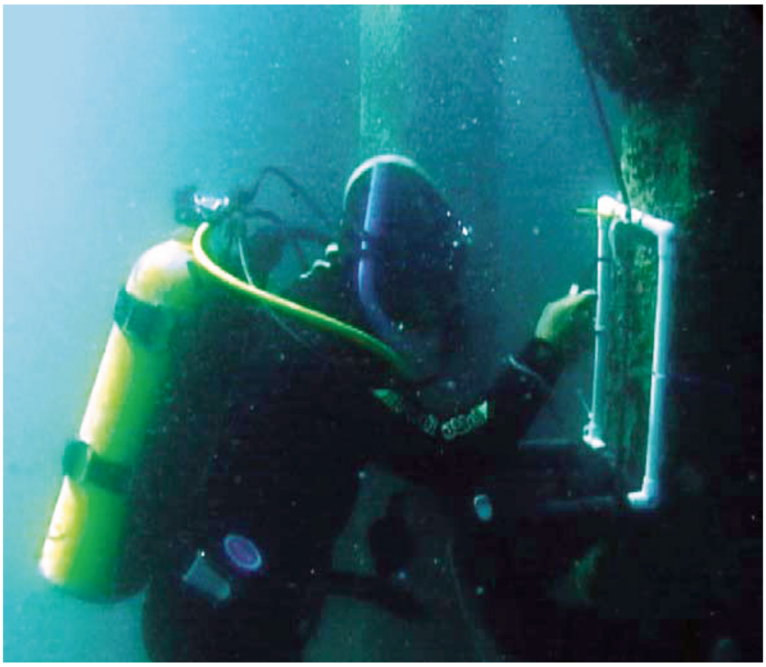

Figure 4: Diver sampling organisms on pier piles.

Figure 5: Shipek grab sampler: releasing benthic sample into bucket

EPIBENTHOS

Larger benthic organisms were sampled using an Ocklemann sled (hereafter referred to as a "sled"). The sled is approximately one meter long with an entrance width of ~0.7 m x 0.2 m. A short yoke of heavy chain connects the sled to a tow line (Fig. 6). The mouth of the sled partially digs into the sediment and collects organisms in the surface layers to a depth of a few centimetres. Runners on each side of the sled prevent it from sinking completely into the sediment so that shallow burrowing organisms and small, epibenthic fauna pass into the exposed mouth. Sediment and other material that enters the sled is passed through a mesh basket that retains organisms larger than about 2 mm. Sleds were towed for a standard time of two minutes at approximately two knots. During this time, the sled typically traversed between 80 – 100 m of seafloor before being retrieved. Two to three sled tows were completed adjacent to each sampled berth within the port, and the entire contents were sorted.

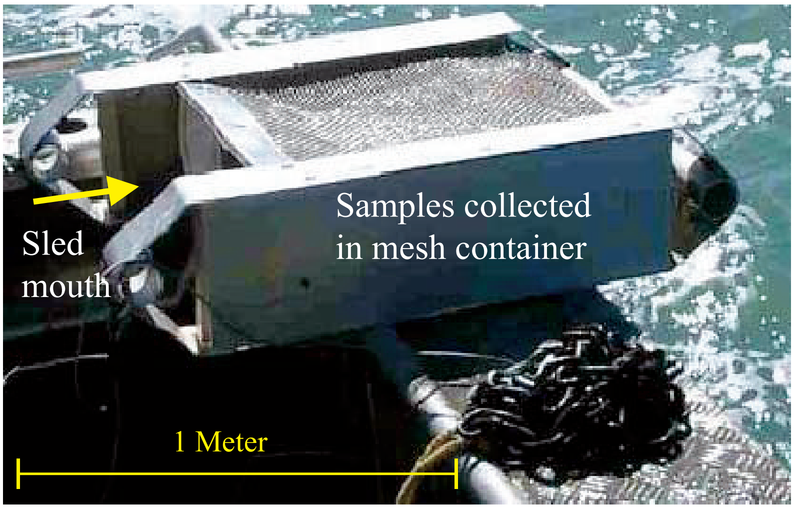

Figure 6: Benthic sled

SEDIMENT SAMPLING FOR CYST-FORMING SPECIES

A TFO gravity corer (hereafter referred to as a "javelin corer") was used to take small sediment cores for dinoflagellate cysts (Fig. 7). The corer consists of a 1.0-m long x 1.5-cm diameter hollow stainless steel shaft with a detachable 0.5-m long head (total length = 1.5 m). Directional fins on the shaft ensure that the javelin travels vertically through the water so that the point of the sampler makes first contact with the seafloor. The detachable tip of the javelin is weighted and tapered to ensure rapid penetration of unconsolidated sediments to a depth of 20 to 30 cm. A thin (1.2 cm diameter) sediment core is retained in a perspex tube within the hollow spearhead. In muddy sediments, the corer preserves the vertical structure of the sediments and fine flocculant material on the sediment surface more effectively than hand-held coring devices (Matsuoka and Fukuyo 2000). The javelin corer is deployed and retrieved from a small research vessel. Cyst sample sites were not constrained to the berths sampled by pile scraping and trapping techniques. Sampling focused on high sedimentation areas within the Port and avoided areas subject to strong tidal flow. On retrieval, the perspex tube was removed from the spearhead and the top 5 cm of sediment retained for analysis. Sediment samples were kept on ice and refrigerated prior to culturing. Culture procedures generally followed those described by Hewitt and Martin (2001).

MOBILE EPIBENTHOS

Benthic scavengers and fishes were sampled using a variety of baited trap designs described below.

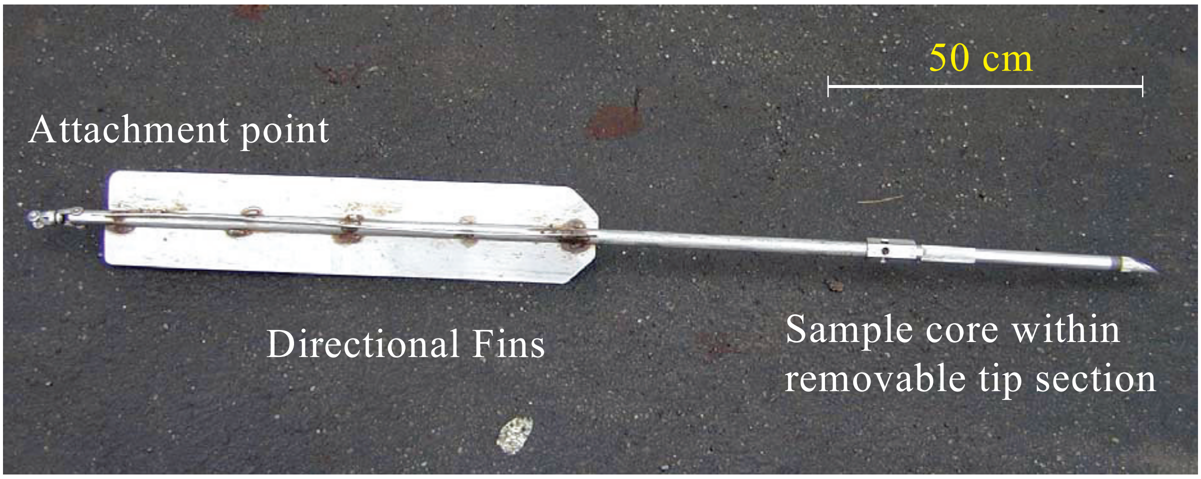

Figure 7: Javelin corer

Opera house fish traps

Opera house fish traps (1.2 m long x 0.8 m wide x 0.6 m high) were used to sample fishes and other bentho-pelagic scavengers (Fig. 8). These traps were covered in 1-cm^2 mesh netting and had entrances on each end consisting of 0.25 m long tunnels that tapered in diameter from 40 to 14 cm. The trap was baited with two dead pilchards (*Sardinops neopilchardus*) held in plastic mesh suspended in the centre of the trap. Two trap lines, each containing two opera house traps were set for a period of 1 hour at each site before retrieval. Previous studies have shown opera house traps to be more effective than other types of fish trap and that consistent catches are achieved with soak times of 20 to 50 minutes (Ferrell et al 1994; Thrush et al 2002).

Box traps

Fukui-designed box traps (63 cm x 42 cm x 20 cm) with a 1.3-cm mesh netting were used to sample mobile crabs and other small epibenthic scavengers (Fig. 8). A central mesh bait holder containing two dead pilchards was secured inside the trap. Organisms attracted to the bait enter the traps through slits in inward sloping panels at each end. Two trap lines, each containing two box traps, were set on the sea floor at each site and left to soak overnight before retrieval.

Starfish traps

Starfish traps designed by Whayman-Holdsworth were used to catch asteroids and other large benthic scavengers (Fig. 8). These are circular hoop traps with a basal diameter of 100 cm and an opening on the top of 60 cm diameter. The sides and bottom of the trap are covered with 26-mm mesh and a plastic, screw-top bait holder is secured in the centre of the trap entrance (Andrews et al 1996). Each trap was baited with two dead pilchards. Two trap lines, each with two starfish traps were set on the sea floor at each site and left to soak overnight before retrieval.

Shrimp traps

Shrimp traps were used to sample small, mobile crustaceans. They consisted of a 15 cm plastic cylinder with a 5-cm diameter screw top lid in which a funnel had been fitted. The funnel had a 20-cm entrance that tapered in diameter to 1 cm. The entrance was covered with 1-cm plastic mesh to prevent larger animals from entering and becoming trapped in the funnel entrance. Each trap was baited with a single dead pilchard. Two trap lines, each containing two scavenger traps, were set on the sea floor at each site and left to soak overnight before retrieval.

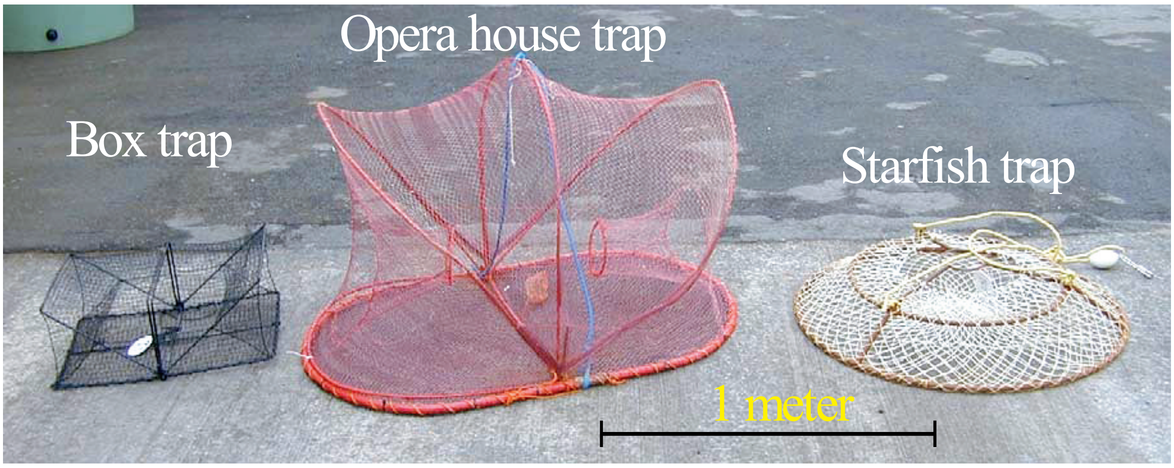

Figure 8: Trap types deployed in the port.

SAMPLING EFFORT

A summary of sampling effort within the Port of Wellington is provided in Tables 3 a,b. We particularly focused sampling effort on hard substrata within ports (such as pier piles and wharves) where invasive species are likely to be found (Hewitt and Martin 2001), and increased the number of quadrats sampled on each pile relative to the CRIMP protocols, as well as sampling both shaded and unshaded piles. The distribution of effort within ports aimed to maximise spatial coverage and represent the diversity of active berthing sites within the area. Total sampling effort was constrained by the costs of processing and identifying specimens obtained during the survey.

The spatial distribution of sampling effort for each of the sample methods in the Port of Wellington is indicated in the following figures: diver pile scrapings (Fig. 9), benthic sledding (Fig. 10), box, starfish and shrimp trapping (Fig. 11), opera house fish trapping (Fig. 12), shipek grab sampling (Fig. 13) and javelin cyst coring (Fig. 14). Sampling effort was varied between ports and marinas on the basis of risk assessments (Inglis 2001) to maximise the search efficiency for NIS nationwide. Sampling effort in each of the thirteen Ports and three marinas surveyed over two summers is summarised in Table 3c.

SORTING AND IDENTIFICATION OF SPECIMENS

Each sample collected in the diver pile scrapings, benthic sleds, box, starfish and shrimp traps, opera house fish traps, shipek grabs and javelin cores was allocated a unique code on waterproof labels and transported to a nearby field laboratory where it was sorted by a team into broad taxonomic groups (e.g. ascidians, barnacles, sponges etc.). These groups were then preserved and individually labelled. Details of the preservation techniques varied for many of the major taxonomic groups collected, and the protocols adopted and preservative solutions used are indicated in Table 4. Specimens were subsequently sent to over 25 taxonomic experts (Appendix 1) for identification to species or lowest taxonomic unit (LTU). We also sought information from each taxonomist on the known biogeography of each species within New Zealand and overseas. Species lists compiled for each port were compared with the marine species listed on the New Zealand register of unwanted organisms under the Biosecurity Act 1993 (Table 5a) and the marine pest list produced by the Australian Ballast Water Management Advisory Council (Table 5b).

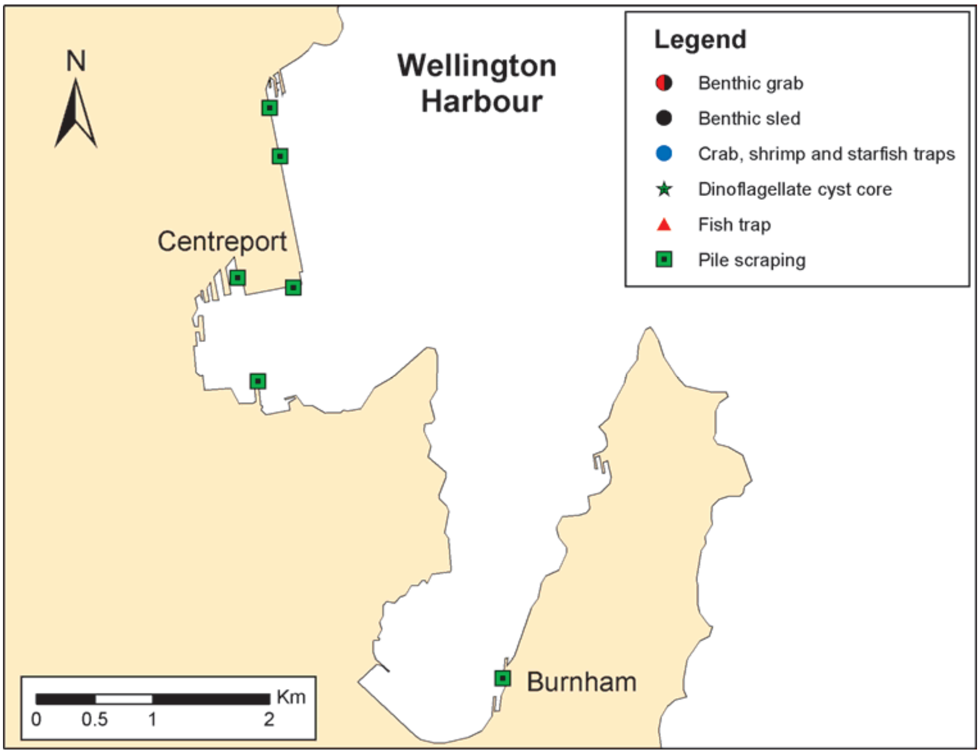

Figure 9: Diver pile scraping sites

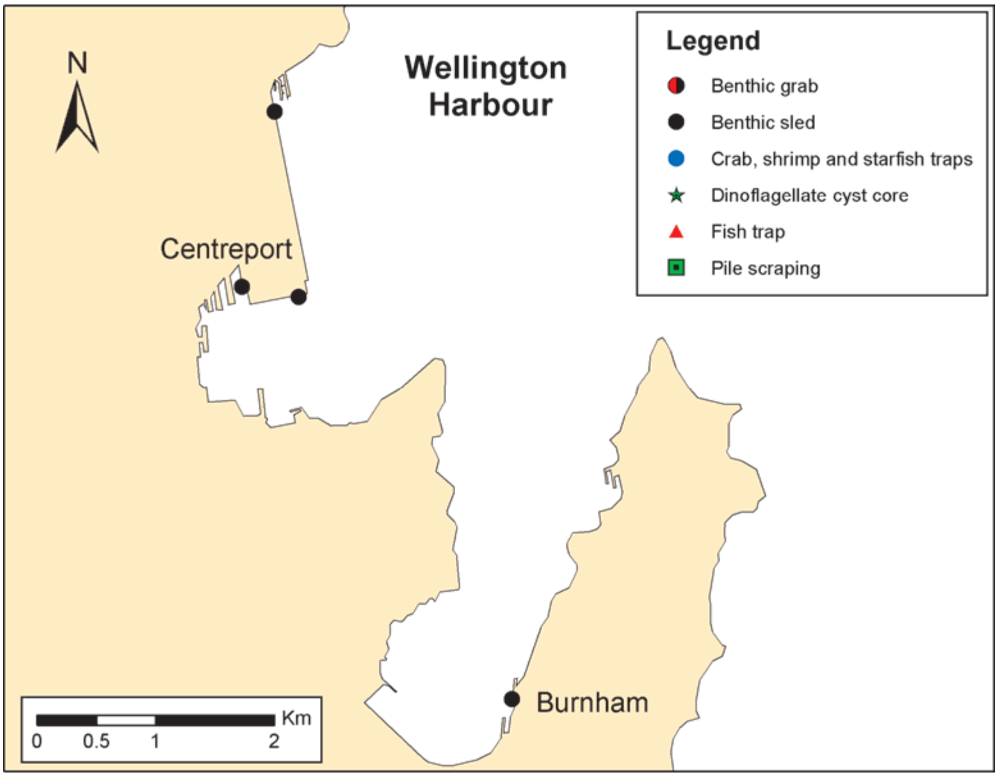

Figure 10: Benthic sled sites

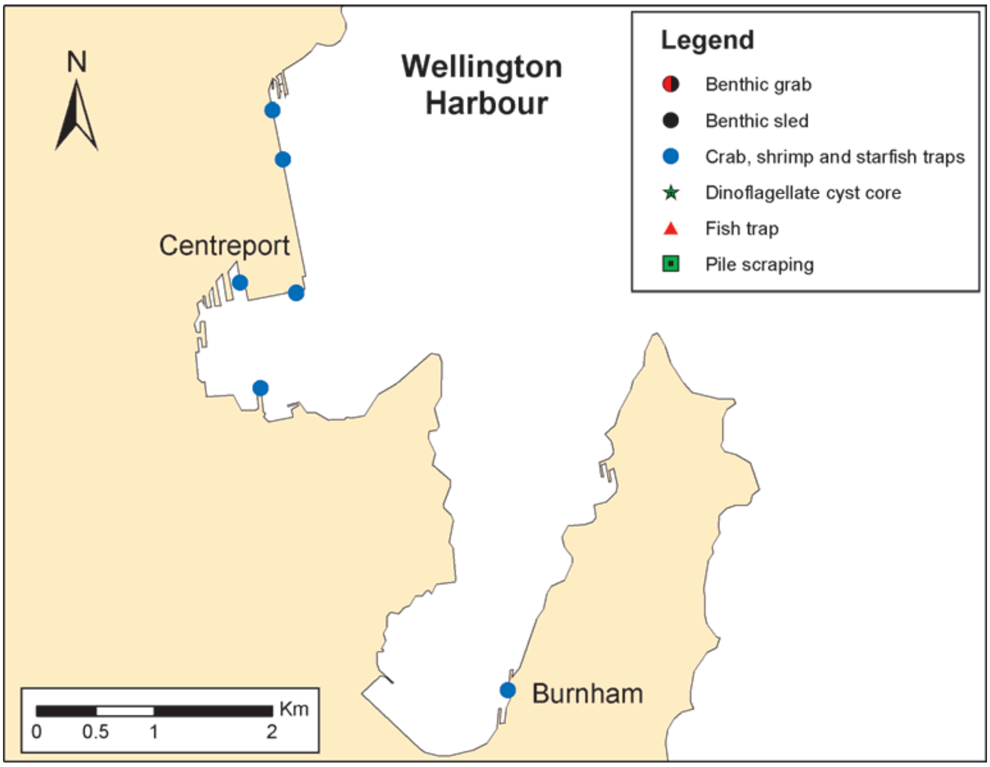

Figure 11: Sites trapped using box (crab), shrimp and starfish traps

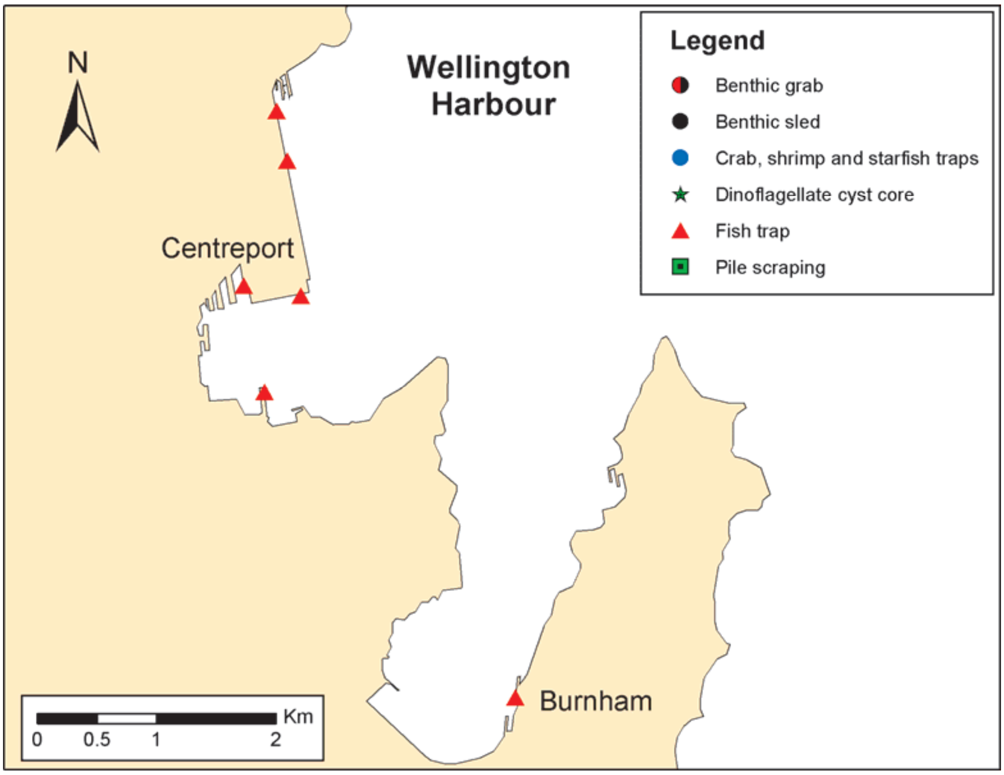

Figure 12: Opera house trapping sites

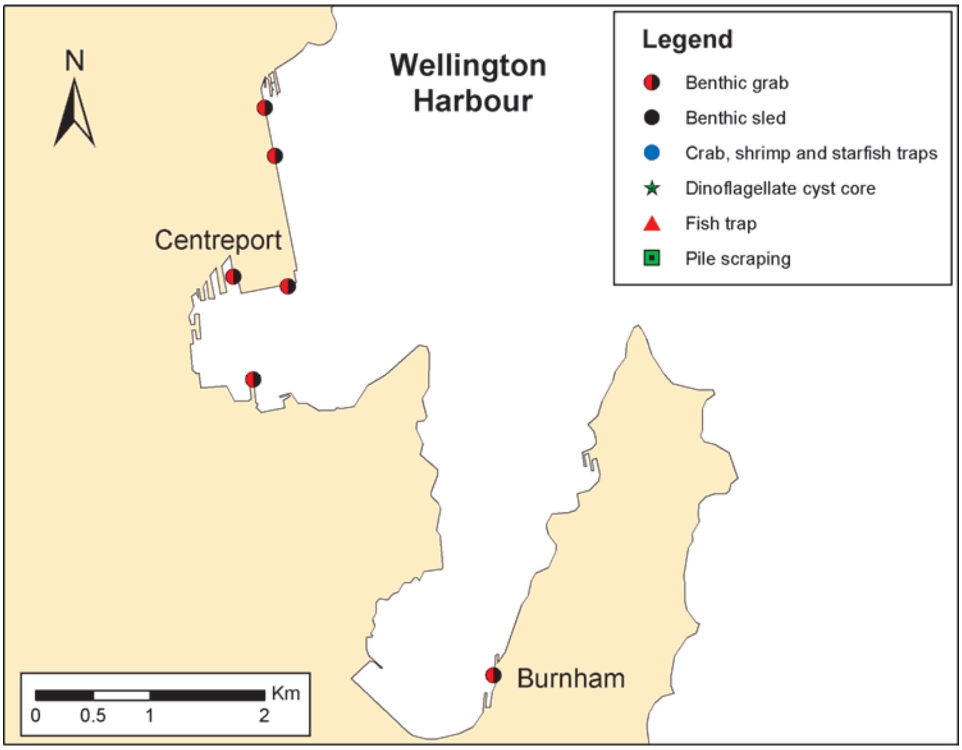

Figure 13: Shipek benthic grab sites

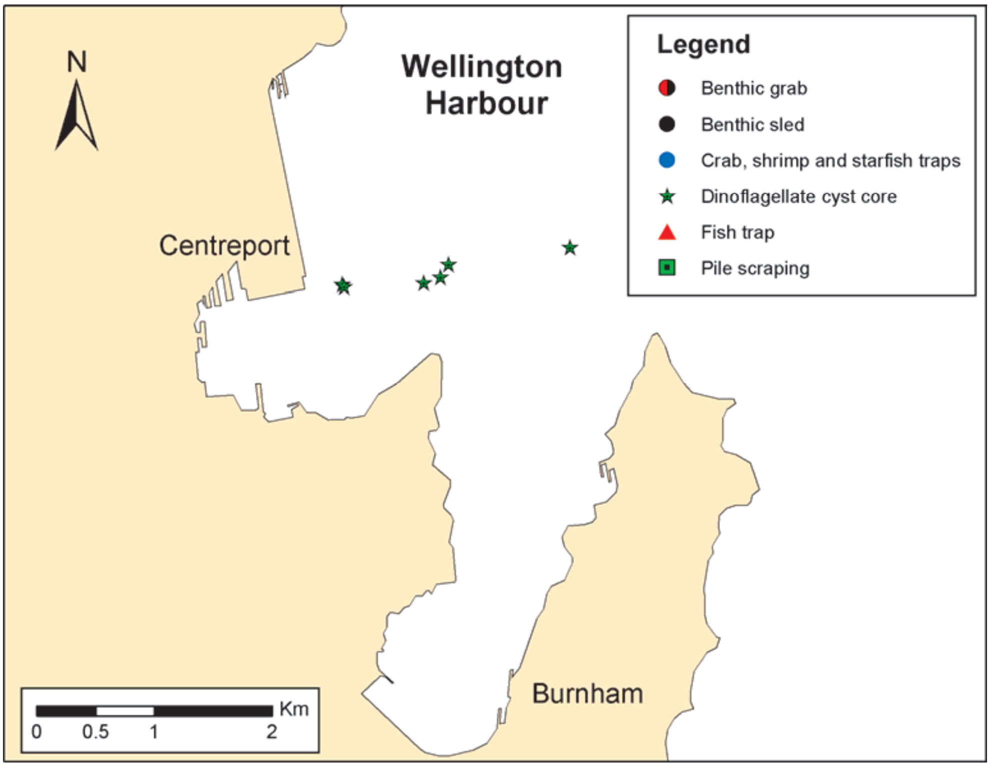

Figure 14: Javelin core sites

DEFINITIONS OF SPECIES CATEGORIES

Each species recovered during the survey was classified into one of four categories that reflected its known or suspected geographic origin. To do this we used the experience of taxonomic experts and reviewed published literature and unpublished reports to collate information on the species' biogeography.

Patterns of species distribution and diversity in the oceans are complex and still poorly understood (Warwick 1996). Worldwide, many species still remain undescribed or undiscovered and their biogeography is incomplete. These gaps in global marine taxonomy and biogeography make it difficult to reliably determine the true range and origin of many species. The four categories we used reflect this uncertainty. Species that were not demonstrably native or non-indigenous were classified as "cryptogenic" (sensu Carlton 1996). Cryptogenesis can arise because the species was spread globally by humans before scientific descriptions of marine flora and fauna began in earnest (i.e. historical introductions). Alternatively the species may have been discovered relatively recently and there is insufficient biogeographic information to determine its native range. We have used two categories of cryptogenesis to distinguish these different sources of uncertainty. In addition, a fifth category ("species indeterminata") was used for specimens that could not be identified to species-level. Formal definitions for each category are given below.

Native species

Native species are endemic to the New Zealand biogeographical region and have not been introduced to coastal waters by human mediated transport.

Non-indigenous species (NIS)

Non-indigenous species (NIS) are known or suspected to have been introduced to New Zealand as a result of human activities. They were determined using a series of questions posed by Chapman and Carlton (1991, 1994) as a guide; as exemplified by Cranfield et al (1998).

1. Has the species suddenly appeared locally where it has not been found before?
2. Has the species spread subsequently?
3. Is the species' distribution associated with human mechanisms of dispersal?
4. Is the species associated with, or dependent on, other non-indigenous species?
5. Is the species prevalent in, or restricted to, new or artificial environments?
6. Is the species' distribution restricted compared to natives?

The worldwide distribution of the species was tested by a further three criteria:

7. Does the species have a disjunctive worldwide distribution?
8. Are dispersal mechanisms of the species inadequate to reach New Zealand, and is passive dispersal in ocean currents unlikely to bridge ocean gaps to reach New Zealand?
9. Is the species isolated from the genetically and morphologically most similar species elsewhere in the world?

In this report we distinguish two categories of NIS. "NIS" refers to non-indigenous species previously recorded from New Zealand waters, and "NIS (new)" refers to non-indigenous species first discovered in New Zealand waters during this project.

Cryptogenic species Category 1

Species previously recorded from New Zealand whose identity as either native or non-indigenous is ambiguous. In many cases this status may have resulted from their spread around the world in the era of sailing vessels prior to scientific survey (Chapman and Carlton 1991, Carlton 1992), such that it is no longer possible to determine their original native distribution. Also included in this category are newly described species that exhibited invasive behaviour in New Zealand (Criteria 1 and 2 above), but for which there are no known records outside the New Zealand region.

Cryptogenic species Category 2

Species that have recently been discovered but for which there is insufficient systematic or biogeographic information to determine whether New Zealand lies within their native range. This category includes previously undescribed species that are new to New Zealand and/or science.

Species indeterminate

Specimens that could not be reliably identified to species level. This group includes: (1) organisms that were damaged or juvenile and lacked morphological characteristics necessary for identification, and (2) taxa for which there is not sufficient taxonomic or systematic information available to allow identification to species level.

Survey results

A total of 336 species or higher taxa were identified from the Wellington Port survey. This collection consisted of 227 native (Table 6), 26 cryptogenic (Table 7), 14 non-indigenous species (Table 8) and 69 species indeterminata (Table 9, Fig. 15). The biota included a diverse array of organisms from 12 phyla (Fig. 16). Sixteen species from the Port of Wellington had not previously been described from New Zealand waters. These included four non-indigenous species (the crab *Cancer gibbosulus*, the ascidian *Cnemidocarpa* sp., the hydroid *Eudendrium capillare*, and the polychaete worm *Spirobranchus polytrema*) and 12 species that are thought to be new to science (Table 7). For general descriptions of the main groups of organisms (Phyla) encountered during this study refer to Appendix 2.

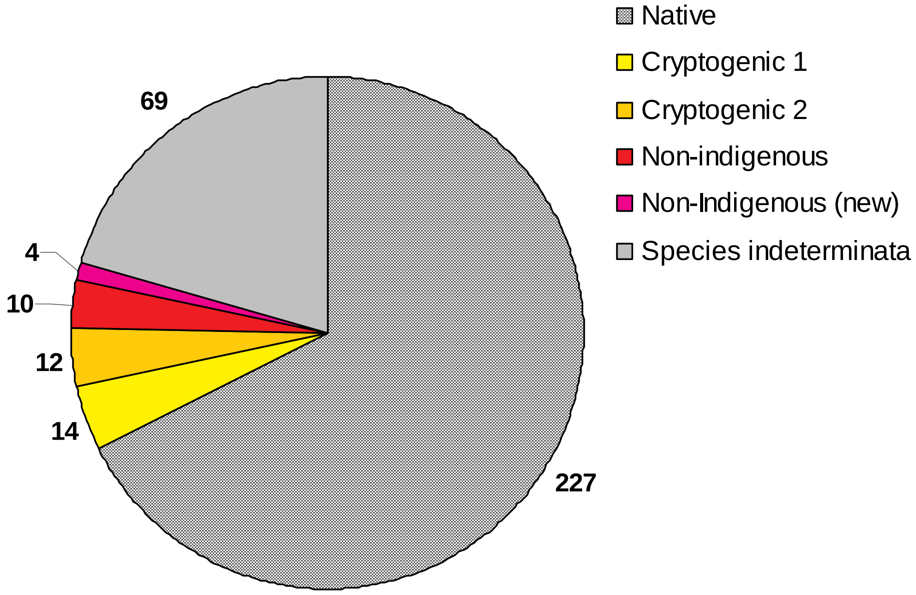

Figure 15: Diversity of marine species sampled in the Port of Wellington. Values indicate the number of species in native, cryptogenic, non-indigenous and species indeterminata categories.

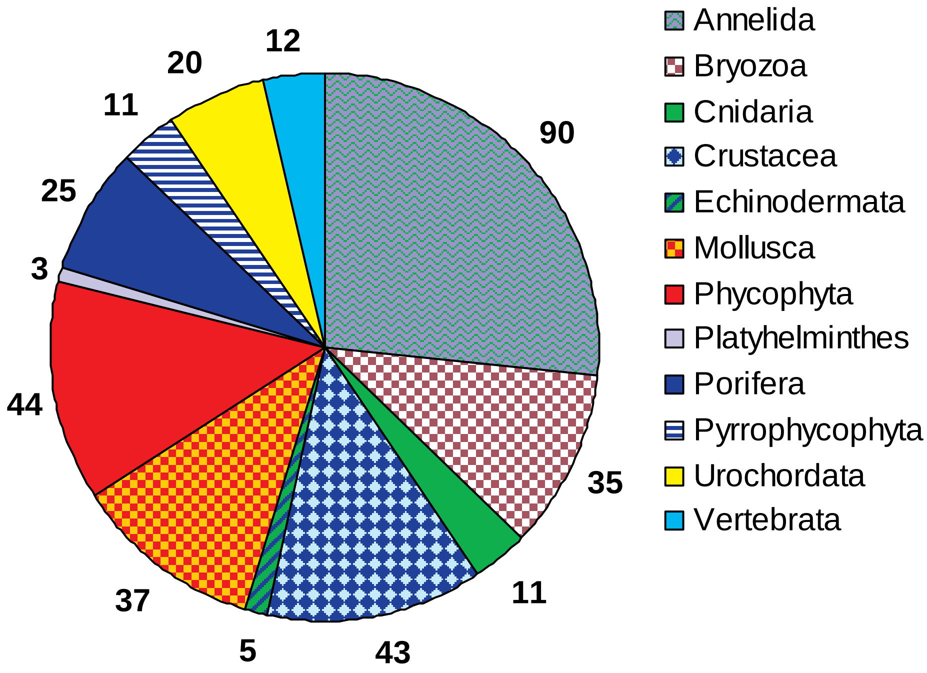

Figure 16: Marine Phyla sampled in the Port of Wellington. Values indicate the number of species in each of the major taxonomic groups.

NATIVE SPECIES

A total of 227 native species was identified from the Port of Wellington. Native species represent 68 % of all species identified from this location (Table 6) and included highly diverse assemblages of annelids (90 species), algae (44 species), crustaceans (43 species), molluscs (37 species), bryozoans (35 species), porifera (25 species), urochordates (20 species), vertebrates (12 species), dinoflagellates and cnidarians (11 species in each group). A number of other less diverse phyla including echinoderms and platyhelminthes were also sampled from the Port (Table 6).

CRYPTOGENIC SPECIES

Twenty-six cryptogenic species were discovered in the Port of Wellington. Cryptogenic species represent 7.8 % of all species or higher taxa identified from the Port. The cryptogenic organisms identified included 14 Category 1 and 12 Category 2 species as defined in Section 2.8 above. These organisms included two bryozoans, one cnidarian, two crustaceans, one mollusc, 15 sponges, one dinoflagellate and four ascidians species (Table 7). Several of the Category 1 cryptogenic species (the ascidians *Astereocarpa cerea*, *Botrylloides leachii* and *Corella eumyota*) have been present in New Zealand for more than 100 years but have distributions outside New Zealand that suggest non-native origins (Cranfield et al. 1998).

NON-INDIGENOUS SPECIES

Fourteen non-indigenous species (NIS) were recorded from the Port of Wellington (Table 8). NIS represent 4.2 % of all identified species from this location. Four of these species, the annelid worm *Spirobranchus polytrema*, the crab *Cancer gibbosulus*, the hydroid *Eudendrium capillare* and the ascidian *Cnemidocarpa sp*., were not previously known from New Zealand. NIS included three annelid worms, four bryozoans, one cnidarian, one crustacean, one mollusc, two phycophytes, one poriferan and one urochordate. A list of Chapman and Carlton's (1994) criteria (see Section 2.9.2) that were met by the non-indigenous species sampled in this survey is given in Appendix 3. Below we summarise available information on the biology of each of these species, providing images where available, and indicate what is known about their distribution, habitat preferences and impacts. This information was sourced from published literature, the taxonomists listed in Appendix 1 and from regional databases on non-indigenous marine species in Australia (National Introduced Marine Pest Information System; http://www.crimp.marine.csiro.au/nimpis) and the USA (National Exotic Marine and Estuarine Species Information System; http://invasions.si.edu/nemesis). Distribution maps for each NIS in the port are composites of multiple replicate samples. Where overlayed presence and absence symbols occur on the map, this indicates the NIS was found in at least one, but not all replicates at that GPS location. NIS are presented below by phyla in the same order as Table 8.

***Spirobranchus polytrema* (Philippi, 1844)**

No image available.

Spirobranchus polytrema is a widely distributed serpulid tubeworm, with a recorded distribution from Australia, Lord Howe Island, Solomon Islands, Sri Lanka, Japan, the Indo-west Pacific and the Mediterranean. The type specimen for this species was recorded from the Mediterranean, but there is continued uncertainty over the synonomy of Mediterranean and Indo-Pacific forms of this species complex.

S. polytrema is most commonly found along the continental shelf, intertidal, rock bottom, and sublittoral habitats, and on the underside of stones around the low water mark (www.deh.gov.au/cgi-bin/abrs/fauna/). Its impacts are unknown. During the port baseline surveys, *S. polytrema* was recorded from the ports of Wellington, Napier and Dunedin (Table 10). In the Port of Wellington this species occurred in pile scrape samples from the Road-Rail Terminal, Aotea Quay, and Kings Wharf (Fig. 17).

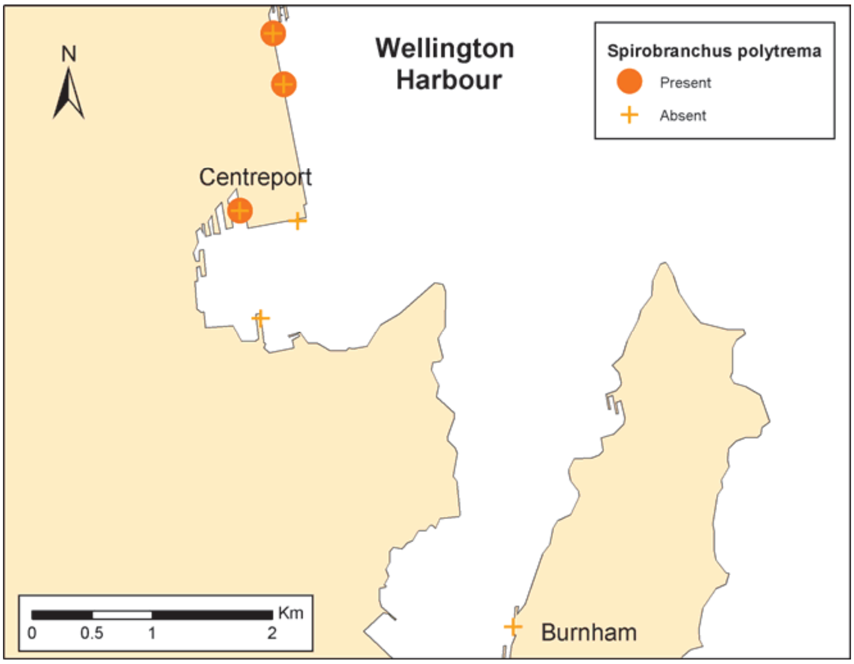

Figure 17: *Spirobranchus polytrema* distribution in the Port of Wellington

***Dipolydora armata* (Langerhans, 1880)**

No image available.

Dipolydora armata is a small (up to 8 mm) burrowing spionid polychaete worm. It is a cosmopolitan species known from both temperate and tropical waters including the Mediterranean, Belize, Brazil, Taiwan, and Vietnam. It can burrow into calcareous substrata such as corals, calcareous hydrozoans, coralline algae and bivalves. Adult worms have a mixed feeding mode (suspension feeding and deposit feeding). The life history of the species includes a period of asexual reproduction by fragmentation beginning soon after settlement, and once mature, individuals probably reproduce only sexually and can breed over an extended period, with larvae developing entirely inside egg capsules. Its impacts are associated with burrowing behaviour, for instance this species can weaken millepore corals by boring in high densities at the bases of branches and weakening the corals' structure. It could also act as a pest in temperate waters where it may burrow into oysters and other bivalves. Considerable damage can be caused by infestations of polydorid worms on shellfish beds (Lewis 1998).

D. armata has been present in New Zealand since at least 1900 and is known from Otago and Wellington Harbours and the Marlborough Sounds (Cranfield *et al.* 1998). During the port baseline surveys it was recored from Picton and Wellington Harbours. In the Port of Wellington this species occurred in pile scrape samples taken from Aotea Quay and the Thorndon Container Terminal (Fig. 18).

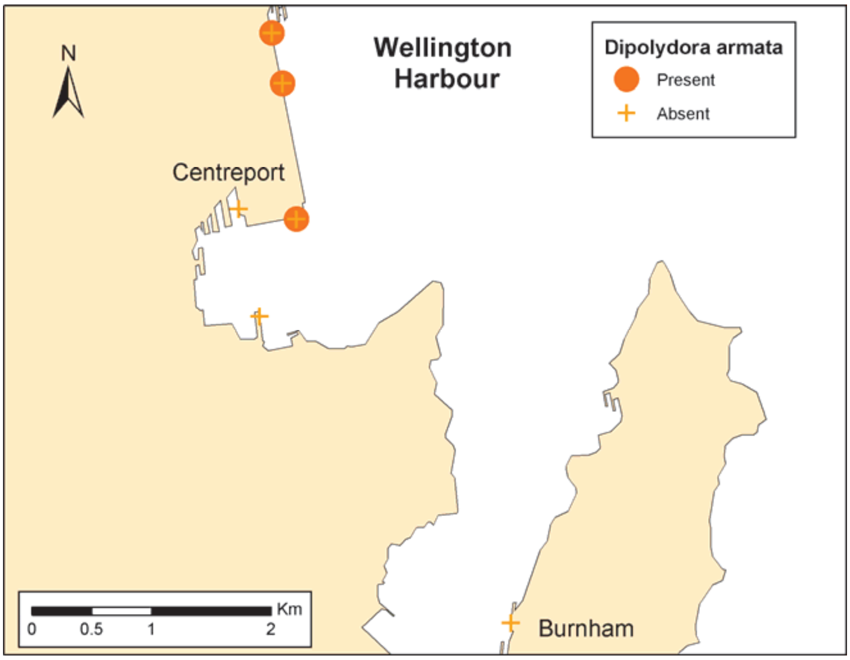

Figure 18: *Dipolydora armata* distribution in the Port of Wellington

Polydora hoplura **(Claparède, 1870)**

No image available.

Polydora hoplura is a spionid polychaete worm that bores into the shells of molluscs. It is a common pest of shellfish mariculture as its burrows cause blisters in the shells of farmed oysters, mussels and abalone (Pregenzer 1983, Handley 1995, Lleonart et al. 2003). The type specimen for this species was recorded from the Gulf of Naples, Italy (Claparède, E. 1870). Its native range is thought to be the Atlantic coast of Europe and the Mediterranean (Cranfield et al. 1998). *P. hoplura* has also been recorded from South Africa, South Eastern Australia (Bass Strait and Victoria, Central East Coast, Southern Gulf Coast, and Tasmania; Australian Faunal Directory 2005) and New Zealand where it is thought to have been introduced. It is not known when *P. hoplura* first arrived in New Zealand. In Europe and New Zealand, *P. hoplura* is often associated with shells of the introduced Pacific oyster *Crassostrea gigas* (Handley 1995).

Polydora hoplura had previously been recorded from Wellington and the Marlborough Sounds (Cranfield et al. 1998) and was recorded from Whangarei, Tauranga, Wellington, Picton, and Dunedin during the baseline port surveys (Table 10). In the Port of Wellington this species occurred in pile scrape samples taken at Aotea Quay, Kings Wharf, the Overseas Passenger Terminal, Thorndon Container Terminal and Burnham Wharf (Fig. 19).

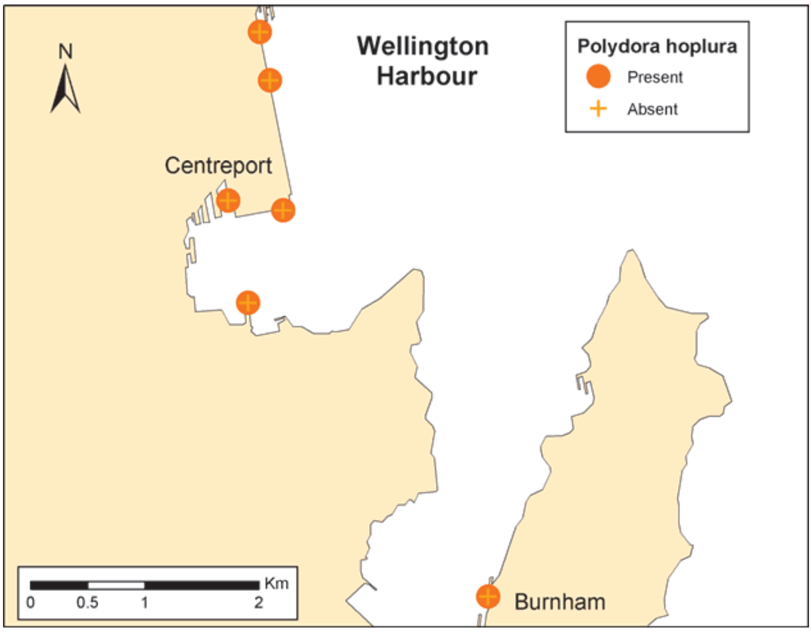

Figure 19: ***Polydora hoplura*** **distribution in the Port of Wellington**

Bugula flabellata **(Thompson in Gray, 1847)**

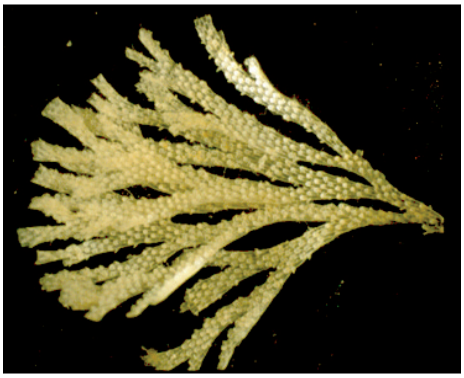

Image and information: NIMPIS (2002a)

Bugula flabellata is an erect bryozoan with broad, flat branches. It is a colonial organism and consists of numerous 'zooids' connected to one another. It is pale pink and can grow to about 4 cm high and attaches to hard surfaces such as rocks, pilings and pontoons or the shells of other marine organisms. It is often found growing with other erect bryozoan species such as *B. neritina* or growing on encrusting bryozoans. Vertical, shaded, sub-littoral rock surfaces also form substrata for this species. It has been recorded down to 35 m. *Bugula flabellata* is native to the British Isles and North Sea and has been introduced to Chile, Florida and the Caribbean and the northern east and west coasts of the USA, as well as Australia and New Zealand. It is cryptogenic on the Atlantic coasts of Spain, Portugal and France. *Bugula* *flabellata* is a major fouling bryozoan in ports and harbours, particularly on vessel hulls, pilings and pontoons and has also been reported from offshore oil platforms. There have been no recorded impacts from *B. flabellata*. During the current baseline surveys it was recorded from Opua marina, Whangarei, Auckland, Tauranga, Napier, Taranaki, Wellington, Picton, Nelson, Lyttelton, Timaru, Dunedin and Bluff. In the Port of Wellington *B. flabellata* occurred in benthic sled samples from Waterloo Quay Wharf and the Thorndon Container Terminal Breakwall, in a starfish trap sample from Thorndon Container Terminal Breakwall, and in pile scrape samples from Aotea Quay, Burnham Wharf, Kings Wharf, the Overseas Passenger Terminal, Thorndon Container Terminal and Waterloo Quay Wharf (Fig. 20, Table 10).

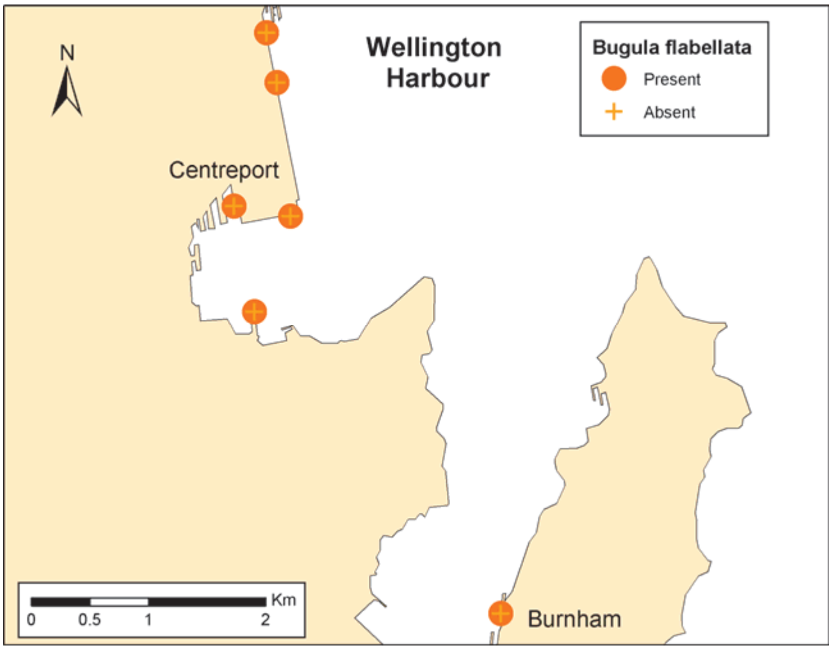

Figure 20: ***Bugula flabellata* distribution in the Port of Wellington**

Cryptosula pallasiana (von Moll, 1803)

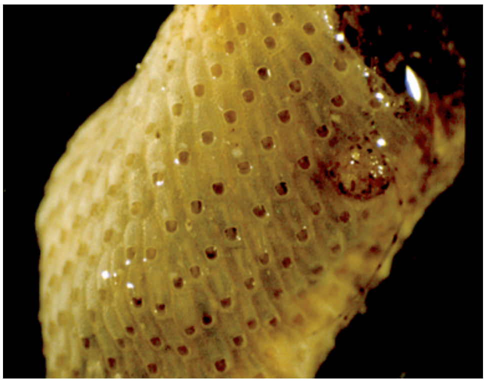

Image and information: NIMPIS (2002b)

Cryptosula pallasiana is an encrusting bryozoan, white-pink with orange crusts. The colonies sometimes rise into frills towards the edges. Zooids are hexagonal in shape, measuring on average 0.8 mm in length and 0.4 mm in width. The frontal surface of the zooid is heavily calcified, and has large pores set into it. Colonies may sometimes appear to have a beaded surface due to zooids having a suboral umbo (ridge). The aperture is bellshaped, and occasionally sub-oral avicularia (defensive structures) are present. There are no ovicells (reproductive structures) or spines present on the colony. *Cryptosula pallasiana* is native to Florida, the east coast of Mexico and the northeast Atlantic. It has been introduced to the northwest coast of the USA, the Japanese Sea, Australia and New Zealand. It is cryptogenic in the Mediterranean.

Cryptosula pallasiana is a common fouling organism on a wide variety of substrata. Typical habitats include seagrasses, drift algae, oyster reef, artificial structures such as piers and breakwaters, man-made debris, rock, shells, ascidians, glass and vessel hulls. It has been reported from depths of up to 35 m. There have been no recorded impacts of *Cryptosula pallasiana* throughout its introduced range. However, in the USA, it has been noted as one of the most competitive fouling organisms in ports and harbours it occurs in. Within Australia, colonies generally do not reach a large size or cover large areas of substrata. *C. pallasiana* is known from all New Zealand ports (Gordon and Mawatari 1992). During the baseline port surveys, it was found in the ports of Whangarei, Gisborne, Taranaki, Wellington, Nelson, Lyttelton and Dunedin. In the Port of Wellington this species occurred in pile scrape samples taken from Aotea Quay and the Thorndon Container Terminal (Fig. 21).

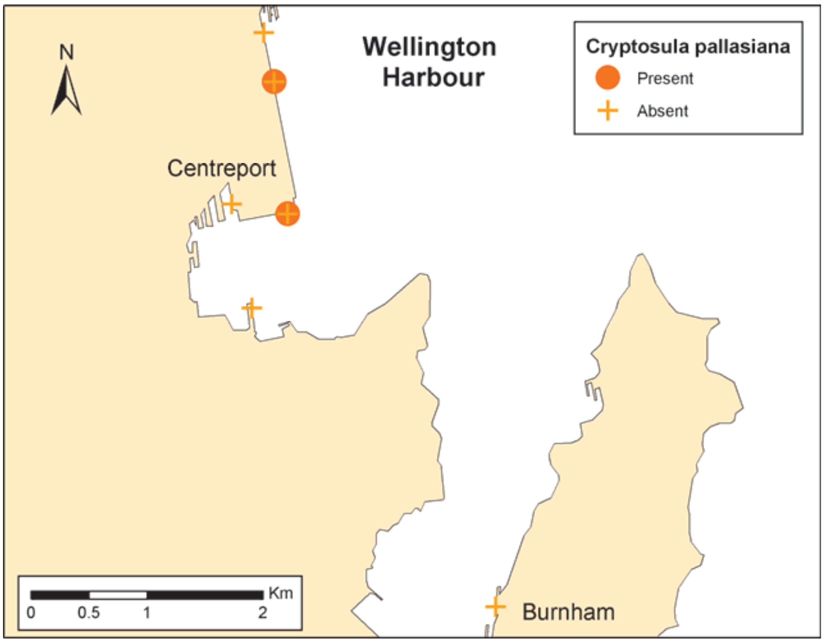

Figure 21: *Cryptosula pallasiana* distribution in the Port of Wellington

Cyclicopora longipora (MacGillivray, 1882)

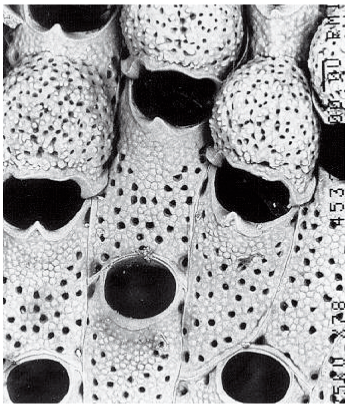

Image: RMIT University, Australia.

Cyclicopora longipora is a bryozoan in the family Cyclicoporidae. The type locality for this species is Port Phillip Heads, Victoria, Australia (MacGillivray, 1882), but it is common throughout southern Australia and has also been recorded from the northeast Pacific (Bock

1982). It is an encrusting species that is commonly found growing on shells, rocks and other bryozoans. During the baseline port surveys, *C. longipora* was recovered only from Wellington harbour. In the Port of Wellington this species occurred in sled samples taken from the Thorndon Container Terminal, and in pile scrapings taken from Aotea Quay, the Thorndon Container Terminal, Kings Wharf and the Overseas Passenger Terminal (Fig. 22).

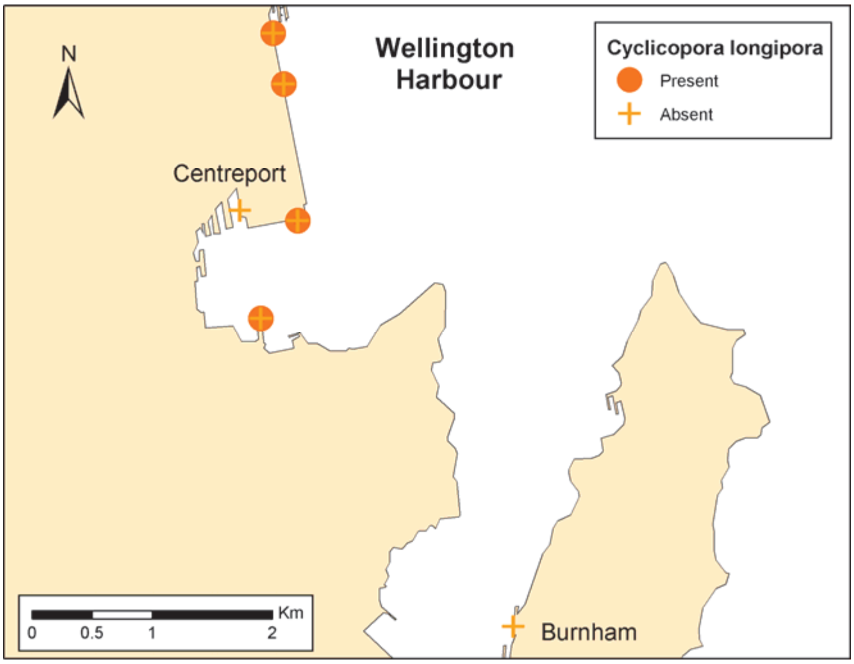

Figure 22: *Cyclicopora longipora* distribution

***Watersipora subtorquata* (d'Orbigny, 1842)**

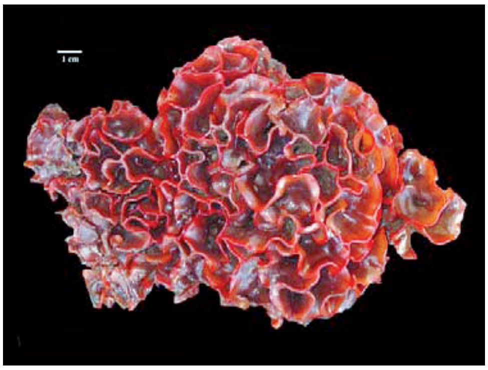

Image: California Academy of Sciences.
Information: Gordon and Matawari (1992)

Watersipora subtorquata is a loosely encrusting bryozoan capable of forming single or multiple layer colonies. The colonies are usually dark red-brown, with a black centre and a thin, bright red margin. The operculum is dark, with a darker mushroom shaped area centrally. *Watersipora subtorquata* has no spines, avicularia (defensive structures) or ovicells (reproductive structures). The native range of the species is unknown, but is thought to include the wider Caribbean and South Atlantic. The type specimen was described from Rio de Janeiro, Brazil (Gordon and Matawari 1992). It also occurs in the north-western Pacific, Torres Strait and north-eastern and southern Australia. It is an important marine fouling species in ports and harbours. It occurs on vessel hulls, pilings and pontoons. This species can also be found attached to rocks and seaweeds. It forms substantial colonies on these surfaces, typically around the low water mark. *Watersipora subtorquata* is also an abundant fouling organism and is resistant to a range of antifouling toxins. It can therefore spread rapidly on vessel hulls and provide an area for other species to settle onto which can adversely impact on vessel maintenance and speed, as fouling assemblages can build up on the hull. During the baseline port surveys, *W. subtorquata* was recorded from Opua marina, Whangarei harbour, Gulf Harbour marina, Tauranga, Gisborne, Napier, Taranaki, Wellington, Picton, Nelson, Lyttelton, Timaru, Dunedin and Bluff. In the Port of Wellington this species occurred in pile scrapings taken from Aotea Quay, Burnham Wharf, Kings wharf, the Overseas Passenger Terminal and Thorndon Container Terminal (Fig. 23).

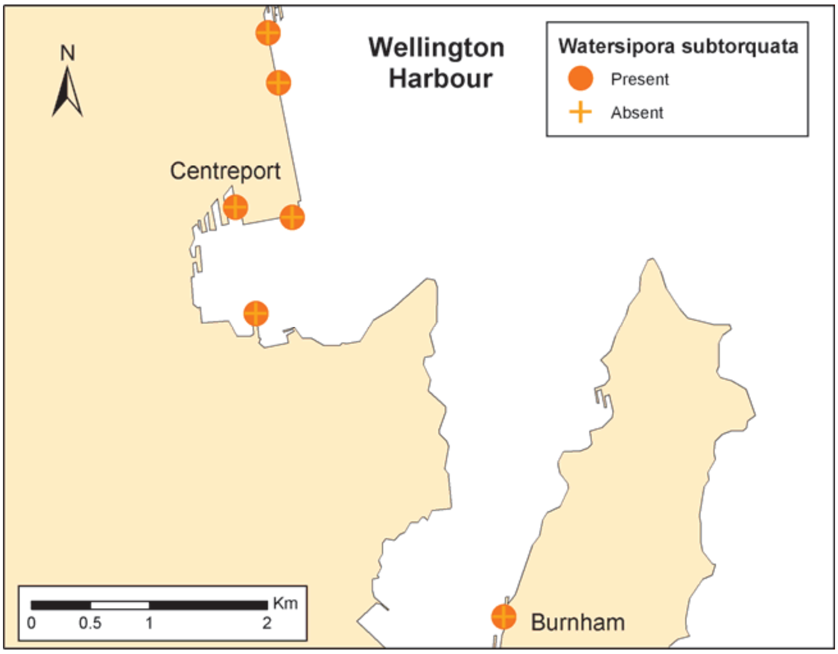

Figure 23: *Watersipora subtorquata* distribution

***Eudendrium capillare* (Alder, 1856)**

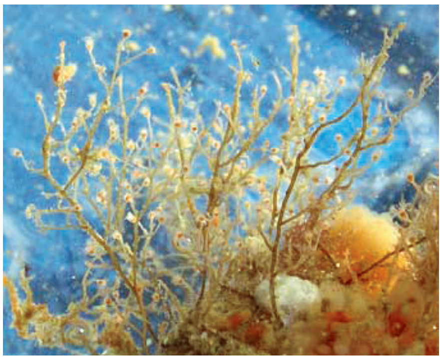

Image: http://www.unige.ch

Eudendrium capillare is an athecate hydroid in the family Eudendriidae. It has a cosmopolitan distribution and is known from the Western Atlantic, Eastern Atlantic, Indian Ocean, Western Pacific, Eastern Pacific, Bermudas, and Brazil. It is also common in southern Australia (J. Watson, Hydrozoan Research Laboratory, pers. comm.). During the baseline port surveys, it was recorded from Tauranga, Taranaki and Wellington. These are the first known records of its presence in New Zealand. In the Port of Wellington this species occurred in pile scrape samples taken from Aotea Quay, the Thorndon Container Terminal and the Overseas Passenger Terminal (Fig. 24).

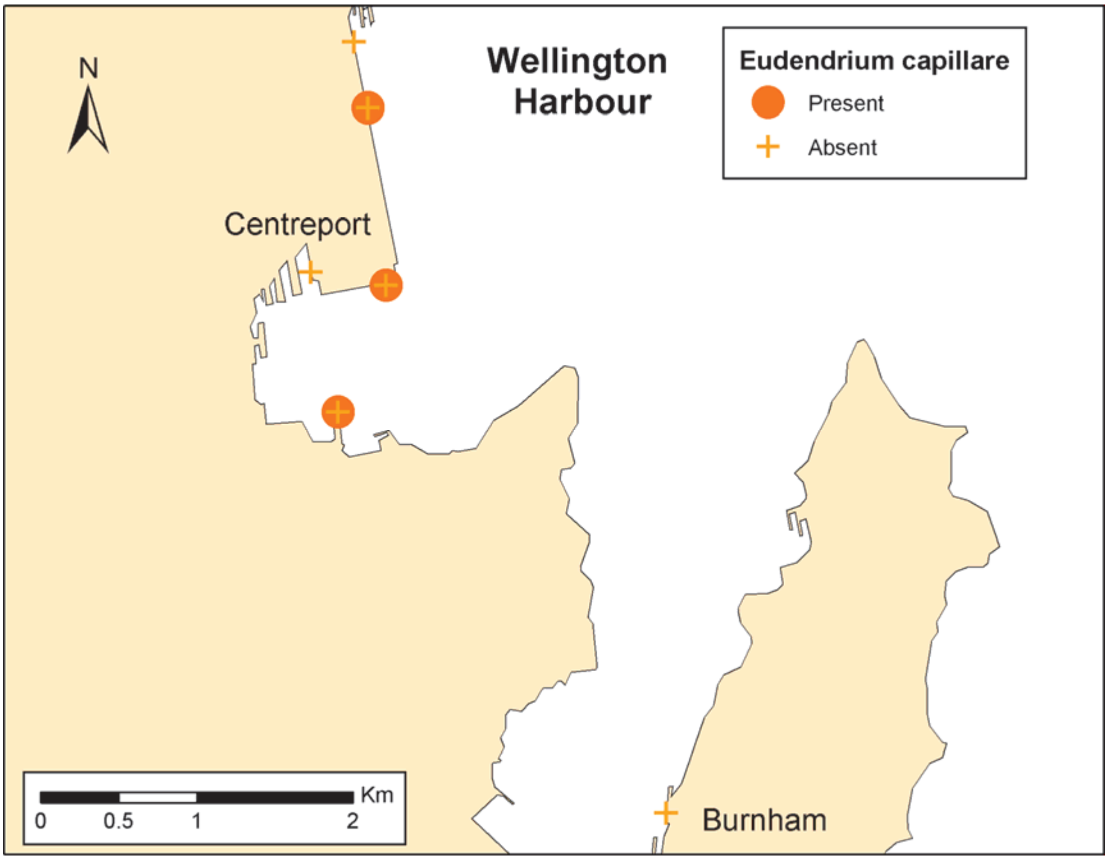

Figure 24: ***Eudendrium capillare*** **distribution in the Port of Wellington**

Cancer gibbosulus **(de Haan, 1835)**

Image: Colin McClay.
Information: Sakai (1965)

Cancer gibbosulus is a mottled, oval shaped cancer crab with a carapace width of up to 20 mm. It is native to Japan, Korea and northern China (Liaodong Peninsular) where it is usually found on muddy sand or broken shell and sandy bottoms (Ai-Yun and Si-Liang 1991). *Cancer gibbosulus* is a new record in New Zealand waters and has no known documented impacts. During the baseline port surveys, *C. gibbosulus* was recorded from Wellington, Lyttelton and Timaru. These are the first known records of its presence in New Zealand. In the Port of Wellington this species occurred in pile scrape samples taken from Aotea Quay (Fig. 25).

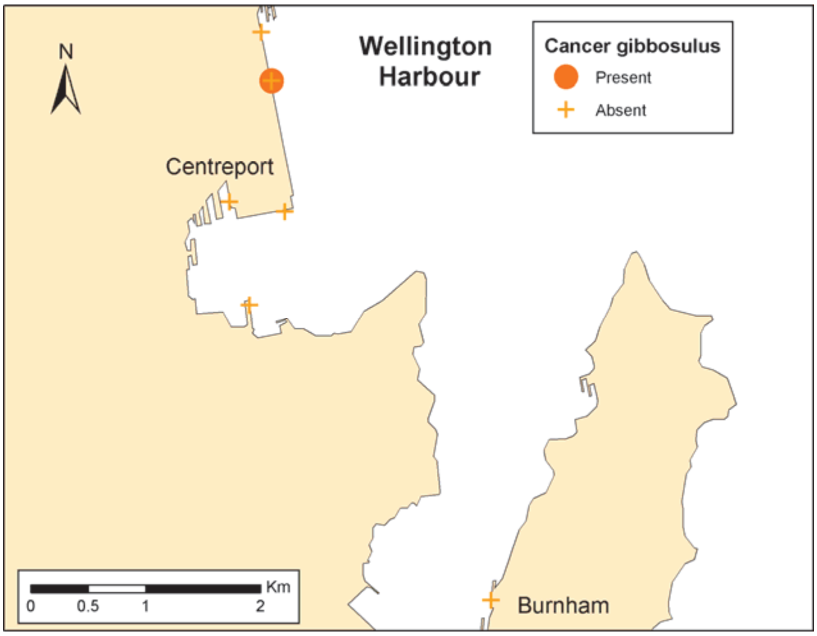

Figure 25: ***Cancer gibbosulus*** **distribution in the Port of Wellington**

Theora lubrica **(Gould, 1861)**

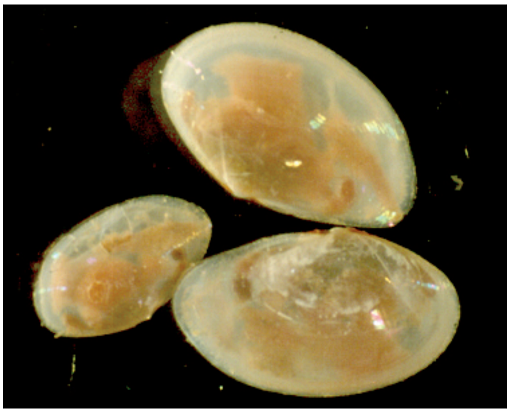

Image and information: NIMPIS (2002c)

Theora lubrica is a small bivalve with an almost transparent shell. The shell is very thin, elongated and has fine concentric ridges. *T. lubrica* grows to about 15 mm in size, and is characterised by a fine elongate rib extending obliquely across the internal surface of the shell. *Theora lubrica* is native to the Japanese and China Seas. It has been introduced to the west coast of the USA, Australia and New Zealand. *Theora lubrica* typically lives in muddy sediments from the low tide mark to 50 m, however it has been found at 100 m. In many localities, *T. lubrica* is an indicator species for eutrophic and anoxic areas. *T. lubrica* has been present in New Zealand since at least 1971. It occurs in estuaries of the north-east coast of the North Island, including the Bay of Islands, Whangarei Harbour, Waitemata Harbour, Wellington and Pelorus Sound. During the port baseline surveys, it was recovered from Opua, Whangarei port and marina, Gulf Harbour marina, Auckland, Gisborne, Napier, Taranaki, Wellington, Nelson, and Lyttelton. In the Port of Wellington this species occurred in benthic sled samples taken from Burnham Wharf and Thorndon Container Terminal (Fig. 26).

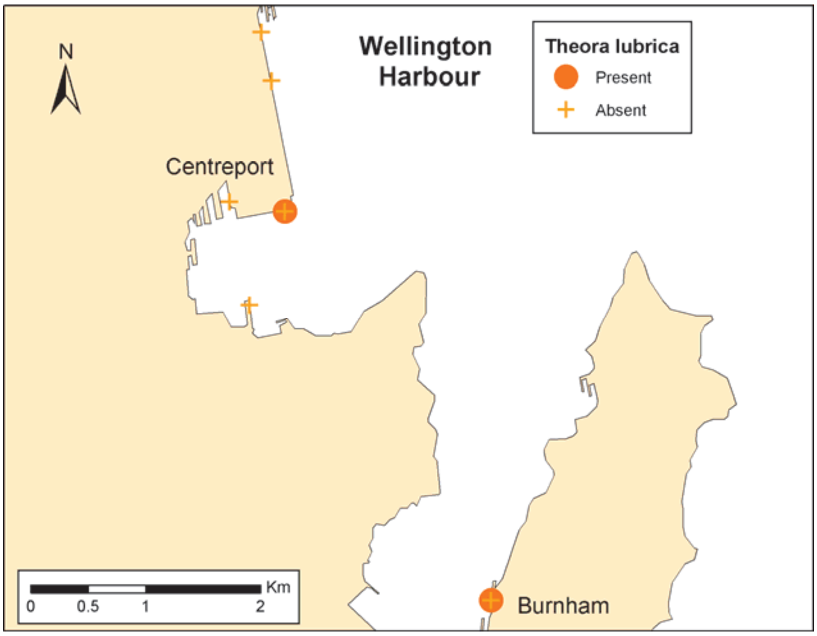

Figure 26: *Theora lubrica* distribution in the Port of Wellington

Undaria pinnatifida (Harvey) Suringer, 1873

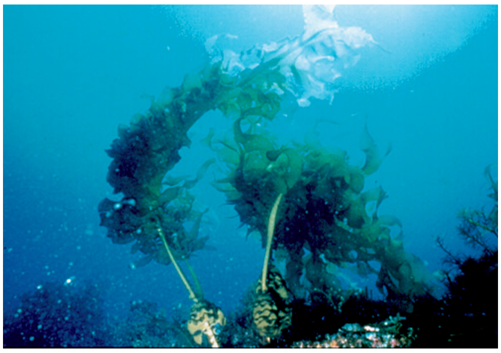

Image and information: NIMPIS (2002d); Fletcher and Farrell (1999)

Undaria pinnatifida is a brown seaweed that can reach an overall length of 1-3 metres. It is an annual species with two separate life stages; it has a large, "macroscopic" stage, usually present through the late winter to early summer months, and small, "microscopic" stage, present during the colder months. The macroscopic stage is golden-brown in colour, with a lighter coloured stipe with leaf-like extensions at the beginning of the blade and develops a distinctive convoluted structure called the "sporophyll" at the base during the reproductive season. It is this sporophyll that makes *Undaria* easily distinguishable from native New Zealand kelp species such as *Ecklonia radiata*. It is native to the Japan Sea and the northwest Pacific coasts of Japan and Korea and has been introduced to the Mediterranean and Atlantic coasts of France, Spain and Italy, the south coast of England, and parts of the coastline of Tasmania and Victoria (Australia), southern California and Argentina. It is cryptogenic on the coast of China.

Undaria pinnatifida is an opportunistic alga that has the ability to rapidly colonise disturbed or new surfaces. It grows from the intertidal zone down to the subtidal zone to a depth of 15-20 metres, particularly in sheltered reef areas subject to oceanic influence. It does not tend to become established successfully in areas with high wave action, exposure and abundant local vegetation. *Undaria pinnatifida* is highly invasive, grows rapidly and has the potential to overgrow and exclude native algal species. The effects on the marine communities it invades are not yet well understood, although its presence may alter the food resources of herbivores that would normally consume native species. In areas of Tasmania (Australia) it has become very common, growing in large numbers in areas where sea urchins have depleted stocks of native algae. It can also become a problem for marine farms by increasing labour costs due to fouling problems. *U. pinnatifida* is known to occur in a range of ports and marinas throughout eastern New Zealand, from Gisborne to Stewart Island. In the Port of Wellington U. pinnatifida was recorded in benthic sled samples from Aotea Quay and Kings Wharf, from a starfish trap recovered from Thorndon Container Terminal, and from pile scrape samples and diver observations taken from Aotea Quay, Burnham Wharf, Kings Wharf, the Overseas Passenger Terminal and Thorndon Container Terminal (Fig. 27).

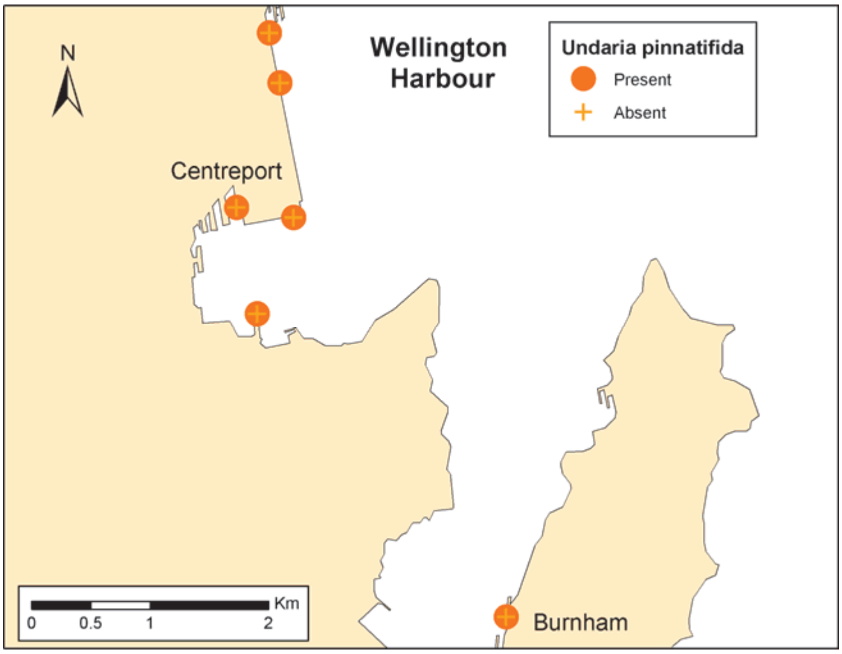

Figure 27: ***Undaria pinnatifida* distribution in the Port of Wellington**

***Griffithsia crassiuscula* (C.Agardh 1824)**

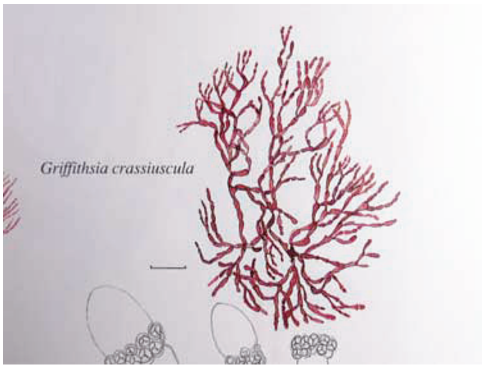

Image and information: Adams (1994)

Griffithsia crassiuscula is a small filamentous red alga. Plants are up to 10 cm high, dichotomously branched, with holdfasts of copious rhizoids. This species is bright rosy red to pink and of a turgid texture. Its native origin is thought to be southern Australia. *Griffithsia crassiuscula* is found subtidally and is mainly epiphytic on other algae and shells, but can also be found on rocks and pebbles. It has no known impacts. During the port baseline surveys, *G. crassicuscula* was recorded from Taranaki, Wellington, Picton, Lyttelton, Timaru and Bluff. In the Port of Wellington it occurred in benthic sled samples taken near the Thorndon Terminal breakwall, in starfish traps recovered from Thorndon Container Terminal and in pile scrape samples from Aotea Quay, Burnham Wharf, the Overseas Passenger Terminal and Throndon Container Terminal (Fig. 28).

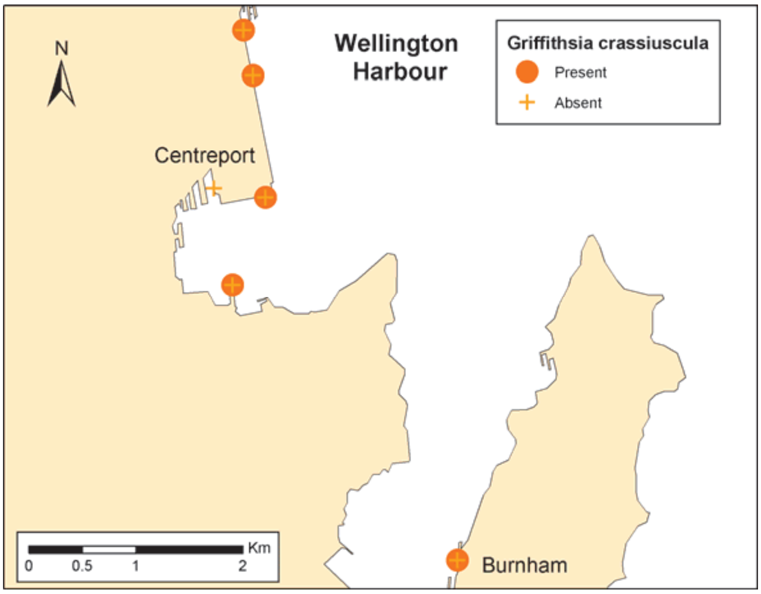

Figure 28: ***Griffithsia crassiuscula*** **distribution**

Halisarca dujardini **(Johnston, 1842)**

No image available.

Halisarca dujardini is an encrusting cold-water sponge. It is a cosmopolitan species with a wide distribution that includes the Arctic and Antarctic, the Subantarctic Islands, Australia, New Zealand, Chile, England, the Atlantic and the Mediterranean. It occurs from the shallow subtidal to a depth of 450 m. It has no known impacts. During the port baseline surveys *H. dujardini* was recorded from Auckland, Taranaki, Picton, Dunedin and Bluff. In the Port of Wellington this species occurred in benthic sled samples taken from Thorndon Container Terminal and in pile scrapes taken from Aotea Quay, the Overseas Passenger Terminal, the Rail/Ferry Terminal and Thorndon Container Terminal (Fig. 29).

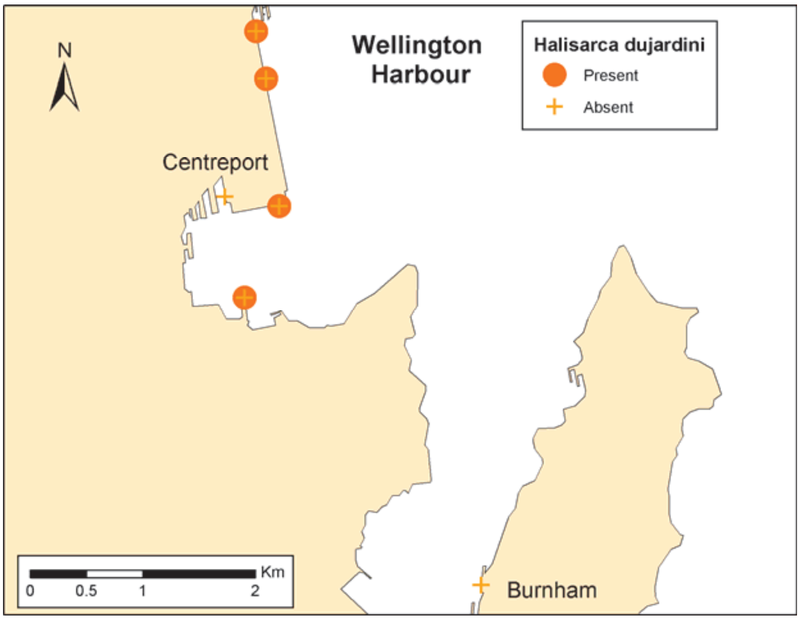

Figure 29: ***Halisarca dujardini*** **distribution in the Port of Wellington**

***Cnemidocarpa* sp. (Kott, 1952)**

No image available.

This ascidian is in the family Styelidae. It appears to be a new species that is closely related to *C. nisiotus*, but varies from this species in gonad structure, the number of branchial tentacles and shape of rectal opening. It is not similar to any species described in Australia, Japan or South Africa. Its native distribution, habitat preferences and impacts are unknown. Specimens matching this description were also recovered from Gulf Harbour marina, Auckland, Tauranga, Gisborne, Taranaki, Picton, Lyttelton and Timaru during the port baseline surveys. In the Port of Wellington this species occurred in benthic sled samples taken from Waterloo Quay, and in pile scrape samples taken from Aotea Quay, Kings Wharf, the Overseas Passenger Terminal, and Thorndon Container Terminal (Fig. 30).

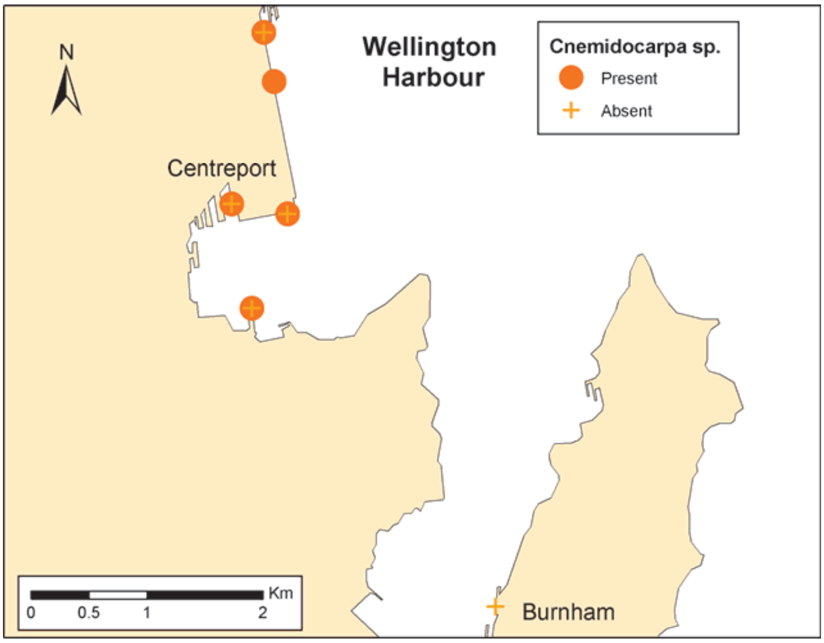

Figure 30: *Cnemidocarpa* sp distribution in the Port of Wellington

SPECIES INDETERMINATA

Sixty-nine organisms from the Port of Wellington were classified as species indeterminata. If each of these organisms is considered a species of unresolved identity, then together they represent 22.5 % of all species collected from this survey (Fig 15). Species indeterminata from the Port of Wellington included 32 annelid worms, two bryozoans, five cnidarians, eight crustaceans, one echinoderm, 16 phycophytes, three platyhelminthes, one ascidian and one fish (Table 9).

NOTIFIABLE AND UNWANTED SPECIES

Of the non-indigenous species identified from the Port of Wellington, only the Asian seaweed, *Undaria pinnatifida*, is currently listed as an unwanted species on either the New Zealand register of unwanted organisms (Table 5a). Cysts of the toxic dinoflagellate, *Gymnodinium catenatum*, were also recorded from Wellington Harbour. *G. catenatum* is one of four toxic dinoflagellates listed on the ABWMAC Australian list of marine pest species (Table 5b).

PREVIOUSLY UNDESCRIBED SPECIES IN NEW ZEALAND

Sixteen species from the Port of Wellington were previously undescribed from New Zealand waters. These species are classified either as Category 2 cryptogenic species in Table 7, or are marked as new records in the non-indigenous species list (Table 8). The non-indigenous species found in the Port of Wellington that are new records for New Zealand waters included the annelid *Spirobranchus polytrema* (see section 3.3.1 above), the hydroid *Eudendrium capillare* (see section 3.3.8 above), the crab *Cancer gibbosulus* (see section 3.3.9 above) and the ascidian *Cnemidocarpa* sp. (see section 3.3.14 above). Previously undescribed cryptogenic species included two crustaceans (an amphipod, *Meridiolembos* sp. aff. *acherontis*, and a portunid crab, *Nectocarcinus* sp. nova), and ten sponges (*Adocia* n. sp. 1, *Chalinula* n. sp. 1, *Dactylia* n. sp. 1, *Dysidea* n. sp. 1, *Euryspongia* n. sp. 1, *Halichondria* n. sp. 1, *Halichondria* n. sp. 2, *Haliclona* n. sp. 1, *Haliclona* n. sp. 2, *Haliclona* n. sp. 3; Table 7). The portunid and sponges do not correspond with existing species descriptions from New Zealand or overseas and may be new to science.

CYST-FORMING SPECIES

Cysts of eleven species of dinoflagellate (Pyrrophycophyta) were collected during this survey. These included ten native species (Table 6) and one cryptogenic species (*Gymnodinium catenatum*; cryptogenic category 1 Table 7). Motile forms of two of the species (*Lingulodinium polyedrum* and *Gymnodinium catenatum*) are known to produce toxins. *L. polyedrum* can potentially cause diarrhetic shellfish poisoning, whilst *G. catenatum* toxins cause Paralytic Shellfish Poisoning (PSP). Both species may be a significant public health hazard. Blooms can cause problems for aquaculture and recreational harvesting of shellfish.

POSSIBLE VECTORS FOR THE INTRODUCTION OF NON-INDIGENOUS SPECIES TO THE PORT

The non-indigenous species located in the Port of Wellington are thought to have arrived in New Zealand via international shipping. Table 8 indicates the possible vectors for the introduction of each NIS into the Port. Likely vectors of introduction are largely derived from Cranfield et al (1998) and expert opinion. They indicate that approximately 7 % (one of the 14 NIS) probably arrived via ballast water, 64 % (nine species) probably were introduced to New Zealand waters via hull fouling, and 29 % (four species) could have arrived via either of these mechanisms.

COMPARISON WITH OTHER PORTS

Sixteen locations (13 ports and three marinas) were surveyed during the summers of 2001/2002 and 2002/2003 (Fig. 1). The total number of species identified in these surveys varied from 336 in the Port of Wellington to 56 in Whangarei Town Basin Marina (Fig. 31a). The number of species recorded in each location reflects sampling effort (Table 3c) and local patterns of marine biodiversity within the ports and marinas. Sampling effort alone (expressed as the total number of registered samples in each port), accounted for significant proportions of variation in the numbers of native (Linear regression; $F_{1,14} = 33.14$, $P < 0.001$, $R^2 = 0.703$), Cryptogenic 1 ($F_{1,14} = 5.94$, $P = 0.029$, $R^2 = 0.298$) and Cryptogenic 2 ($F_{1,14} = 7.37$, $P = 0.017$, $R^2 = 0.345$) species recorded in the different locations. However differing sampling effort between locations did not explain differences in the numbers of NIS found there ($F_{1,14} = 0.77$, $P = 0.394$, $R^2 = 0.052$). When we allow for differences in sampling effort between locations, the Port of Wellington had an average number of native and NIS relative to the other ports and marinas surveyed, but slightly lower numbers of cryptogenic category 1 and 2 species (Fig 32). Largest numbers of NIS were reported from the ports of Lyttelton and Whangarei, but significantly more Cryptogenic 1 species were recorded in Whangarei Port than in other surveyed locations (Fig 32c, Studentised residual = 3.87).

Native organisms represented over 60 % of the species diversity sampled in each surveyed location, with a minimum contribution of 61 % in the Port of Lyttelton and a maximum of 68.5 % in Picton (Fig. 31b). Species indeterminata organisms represented between 10.6 %

and 25.2 % of the sampled diversity in each location. Non-indigenous and category one and two cryptogenic species were present in each port and marina, although their relative contributions differed between locations (Fig. 31b). In the Port of Wellington, NIS comprised 4.2 % of the total sampled diversity (Fig. 31b), which ranked it second lowest in percentage composition of NIS from the sixteen locations surveyed.

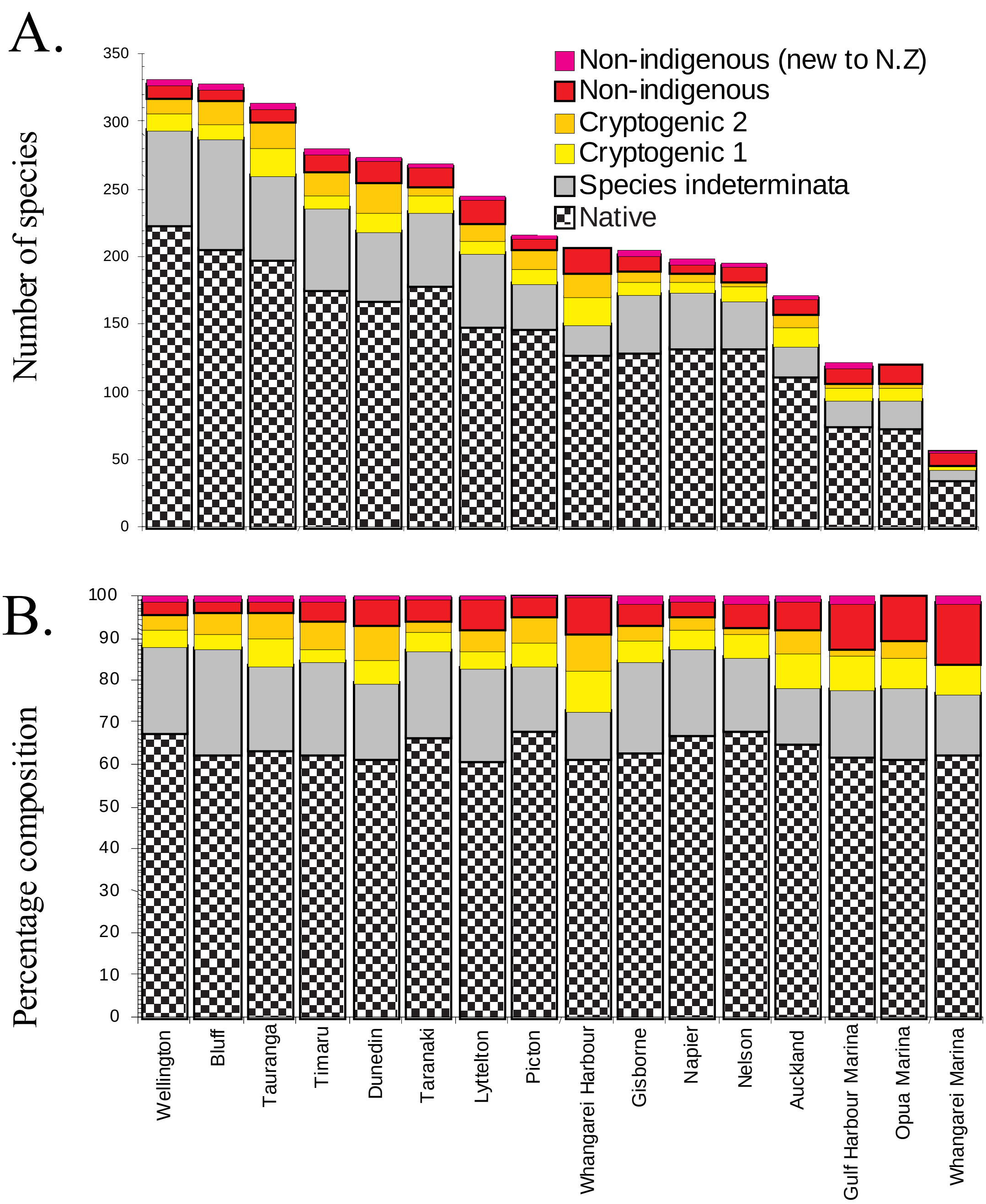

Figure 31: **Differences in (a) the number of species, and (b) the relative proportions of non-indigenous, cryptogenic, species indeterminata and native categories among the sixteen locations sampled over the summers of 2001 – 2002, and 2002-2003. Locations are presented in order of decreasing species diversity sampled.**

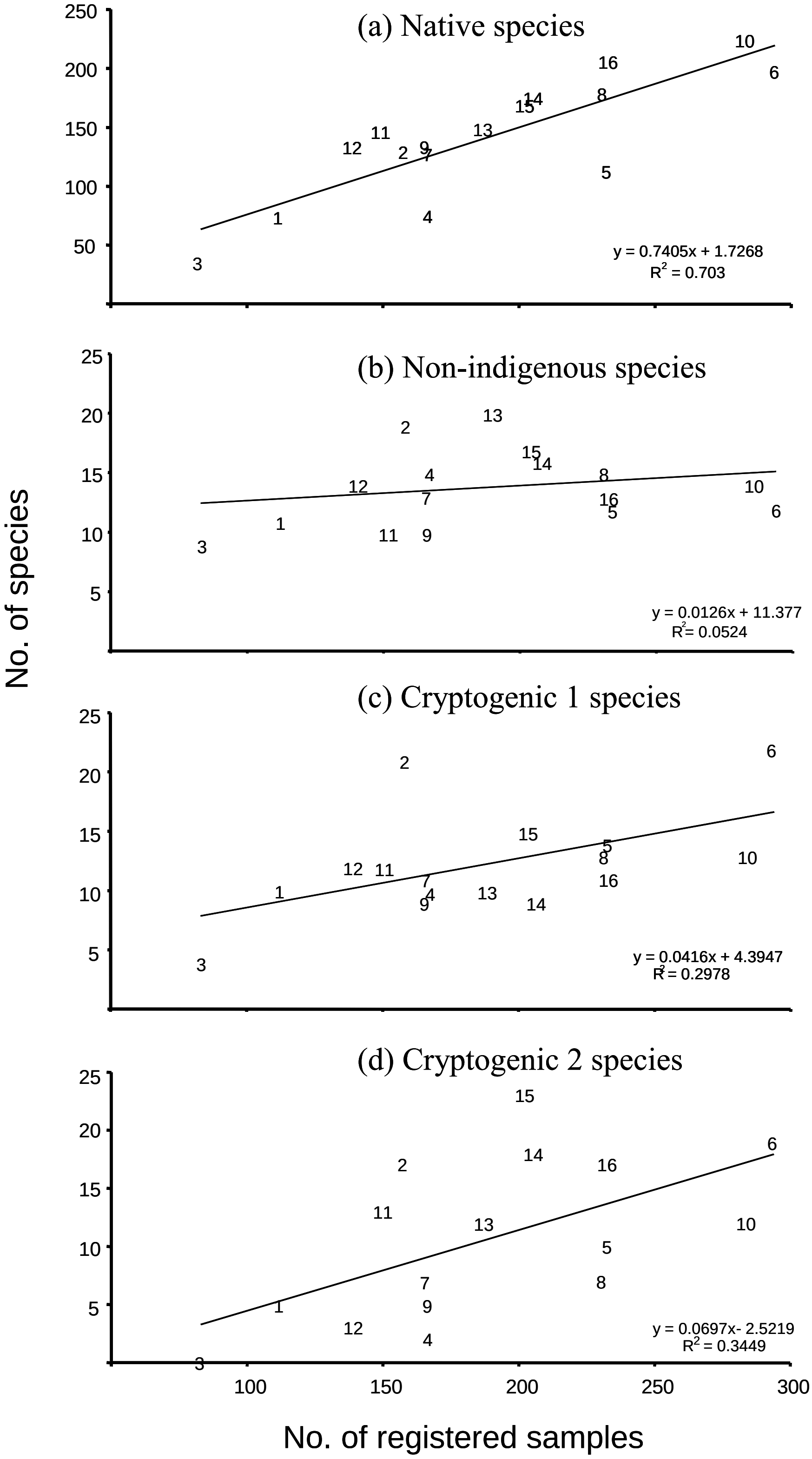

Figure 32. Linear regression equations relating numbers of species detected to sample effort at the 16 locations surveyed nation-wide. Location codes are as follows; 1 = Opua, 2 = Whangarei port, 3 = Whangarei marina, 4 = Gulf Harbour marina, 5 = Auckland port, 6 = Tauranga port, 7 = Gisborne port, 8 = Taranaki port, 9 = Napier Port, 10 = Wellington port, 11 = Picton port, 12 = Nelson port, 13 = Lyttelton port, 14 = Timaru port, 15 = Dunedin port, 16 = Bluff port.

Assessment of the risk of new introductions to the port

Many NIS introduced to New Zealand ports, through hull fouling, ships' sea chests, or ballast water discharge, do not survive to establish self-sustaining local populations. Those that do often come from coastlines that have similar marine environments to New Zealand. For example, approximately 80% of the marine NIS known to be present within New Zealand are native to temperate coastlines of Europe, the North West Pacific, and southern Australia (Cranfield et al. 1998).

Commercial shipping arrivals in the Port of Wellington from overseas are reasonably frequent. In 1999, the Port of Wellington received a total of 114 visits of international commercial vessels, which was the sixth largest number out of New Zealand's 18 commercial ports for that year (Inglis 2001). However, between 2002 and 2003, Wellington received only 79 international commercial vessel arrivals (New Zealand Customs Service, unpublished data). Most of these vessels (72 %) arrived from Australia and ports in the NW Pacific (11 %); only 5 %, 3 %, 1.5 % and 1.5 % of international arrivals originated from ports in the South Pacific, East Asian Sea, SE Pacific and Carribean, respectively. The Port of Wellington receives a below-average amount of ballast water (international origin) annually compared to other New Zealand ports; in 1999 it ranked eleventh (14,536 m^3) out of 15 ports that were analysed (Inglis 2001). Corresponding with the vessel arrival data, the majority of ballast water discharged in Wellington originates from Australia (21 %) and Japan (51 %). The reason for the relatively low volume of ballast water discharge in Wellington compared to other locations is that this port is used for importing goods from overseas rather than exporting goods. In contrast, for example, the Port of Tauranga is primarily an export facility with a high volume of annual ballast water discharge (Inglis 2001). Data for ship arrivals and ballast water discharge suggest that the majority of potential NIS inoculations through hull fouling, sea chests or ballast water arrive from the temperate regions of the northwestern Pacific, environments which are broadly compatible with those around Wellington. Shipping from these regions presents an on-going risk of introduction of new NIS to the Port of Wellington.

Assessment of translocation risk for introduced species found in the port

The Port of Wellington is connected directly to the ports of Picton, Nelson, Lyttelton, Gisborne, New Plymouth and, indirectly, to most other domestic ports throughout mainland New Zealand (Dodgshun et al. 2004). Although many of the non-indigenous species found in the Wellington port survey have been recorded previously in New Zealand, there were three notable exceptions. The ascidian *Cnemidocarpa* sp. was first described from New Zealand waters during these port surveys, and was found to be present in Auckland, Gisborne, Gulf Harbour Marina, Nelson, Picton, Tauranga, Taranaki, Timaru and Wellington. Little is currently known about this species, however it appears to now be widely spread through New Zealand's shipping ports where it may be competing with native fauna for space in fouling assemblages. The Asian crab, *Cancer gibbosulus* was also unknown from New Zealand waters prior to the surveys, but has now been discovered in Timaru and Lyttelton ports in addition to the record from the Port of Wellington. There is no information on the risks posed by this species to New Zealand's native ecosystems and species. New Zealand has an indigenous (but much larger) species of cancer crab, *Cancer novaezelandiae*, which is common in the Port of Wellington and throughout southern New Zealand.

The highly invasive alga, *Undaria pinnatifida*, has been present in New Zealand since at least 1987 (Cranfield et al 1998). It was first discovered in Wellington, and has since been spread through shipping and other vectors to 11 of the 16 ports and marinas surveyed during the baseline surveys (the exceptions being Opua, Whangarei Port and Marina, Gulf Harbour Marina and Tauranga Port), although a control programme in Bluff Harbour has subsequently removed populations established there. Nevertheless, vessels departing from Wellington after having spent time at berth within the port may pose a significant risk of spreading this species to ports or other locations within New Zealand that remain uninfested. The risk of translocation of *U. pinnatifida* and other fouling species is highest for slow-moving vessels, such as yachts and barges, and vessels that have long residence times in port. In Wellington, cargo and bulk (including fuel) carriers, recreational craft, and seasonal fishing vessels that are laid up for significant periods of time pose a particular risk for the spread of these species.

Management of existing non-indigenous species in the port

Most of the NIS detected in this survey, with the exception of the crab *Cancer gibbosulus*, appear to be well established in the port. It is unclear whether a viable population of *C. gibbosulus* has established in Wellington, since this crab was found in only one of the locations sampled during the survey. Similarly, this species was recorded in only one and three samples in the other ports in which it was found (Lyttelton and Timaru, respectively). Further surveys, targeting this species, are necessary to determine the true extent of its population in each port.

For most marine NIS, eradication by physical removal or chemical treatment is not yet a cost-effective option. Many of the species recorded in Wellington are widespread and local population controls are unlikely to be effective. Management should be directed toward preventing spread of species established in Wellington Harbour to locations where they do not presently occur. Such management will require better understanding of the frequency of movements by vessels of different types from Wellington to other domestic and international locations and improved procedures for hull maintenance and domestic ballast transfer by vessels leaving this port.

Prevention of new introductions

Interception of unwanted species transported by shipping is best achieved offshore, through control and treatment of ships destined for Wellington from high-risk locations elsewhere in New Zealand or overseas. Under the Biosecurity Act (1993), the New Zealand Government has developed an Import Health Standard for ballast water that requires large ships to exchange foreign coastal ballast water with oceanic water prior to entering New Zealand, unless exempted on safety grounds. This procedure ("ballast exchange") does not remove all risk, but does reduce the abundance and diversity of coastal species that may be discharged with ballast. Ballast exchange requirements do not currently apply to ballast water that is uptaken domestically. Globally, shipping nations are moving toward implementing the International Convention for the Control and Management of Ships Ballast Water & Sediments that was recently adopted by the International Maritime Organisation (IMO). By 2016 all merchant vessels will be required to meet discharge standards for ballast water that are stipulated within the agreement.

Options are currently lacking, however, for effective in-situ treatment of biofouling and sea-chests. Biosecurity New Zealand has recently embarked on a national survey of hull fouling on vessels entering New Zealand from overseas. The study will characterise risks from this pathway (including high risk source regions and vessel types) and identify predictors of risk that may be used to manage problem vessels. Shipping companies and vessel owners can reduce the risk of transporting NIS in hull fouling or sea chests through regular maintenance and antifouling of their vessels.

Overseas studies have suggested that changes in trade routes can herald an influx of new NIS from regions that have not traditionally had major shipping links with the country or port (Carlton 1987). The growing number of baseline port surveys internationally and an associated increase in published literature on marine NIS means that information is becoming available that will allow more robust risk assessments to be carried out for new shipping routes. We recommend that port companies consider undertaking such assessments for their ports when new import or export markets are forecast to develop. The assessment would allow potential problem species to be identified and appropriate management and monitoring requirements to be put in place.

Conclusions and recommendations

The national biological baseline surveys have significantly increased our understanding of the identity, prevalence and distribution of introduced species in New Zealand's shipping ports. They represent a first step towards a comprehensive assessment of the risks posed to native coastal marine ecosystems from non-indigenous marine species. Although measures are being taken by the New Zealand government to reduce the rate of new incursions, foreign species are likely to continue being introduced to New Zealand waters by shipping, especially considering the lack of management options for hull fouling introductions. There is a need for continued monitoring of marine NIS in port environments to allow for (1) early detection and control of harmful or potentially harmful non-indigenous species, (2) to provide on-going evaluation of the efficacy of management activities, and (3) to allow trading partners to be notified of species that may be potentially harmful. Baseline inventories, like this one, facilitate the second and third of these two purposes. They become outdated when new introductions occur and, therefore, should be repeated on a regular basis to ensure they remain current. Hewitt and Martin (2001) recommend an interval of three to five years between repeat surveys.

The predominance of hull fouling as a likely introduction vector for NIS encountered in the Port of Wellington (probably responsible for 64 % of the NIS introductions) is consistent with previous findings from a range of overseas locations. For instance, Hewitt et al (1999) attributed the introduction of 77 % of the 99 NIS encountered in Port Phillip Bay (Australia) to hull fouling, and only 20 % to ballast water. Similarly, 61 % of the 348 marine and brackish water NIS established in the Hawaiian Islands are thought to have arrived on ships' hulls, but only 5 % in ballast water (Eldredge and Carlton 2002). However, ballast water is thought to be responsible for the introduction of 30 % of the 212 marine NIS established in San Fransisco Bay (USA), compared to 34 % for hull fouling (Cohen and Carlton 1995). The high percentages of NIS thought to have been introduced by hull fouling in Australasia may reflect the fact that hull fouling has a far longer history (~200 years) as an introduction vector than ballast water (~40 years) (Hewitt et al 1999). However, the fact that some of New Zealand and Australia's most recent marine NIS introductions (e.g. *Undaria pinnatifida*, *Codium fragile sp. tomentosoides*) have been facilitated by hull fouling suggests that it has remained an important transport mechanism (Cranfield et al 1998; Hewitt et al 1999).

Non-indigenous marine species can have a range of adverse impacts through interactions with native organisms. For instance, NIS can cause ecological impacts through competition, predator-prey interactions, hybridisation, parasitism or toxicity and can modify the physical environment through altering habitat structure (Ruiz et al 1999; Ricciardi 2001). Assessing the impact of a NIS in a given location ideally requires information on a range of factors, including the mechanism of their impact and their local abundance and distribution (Parker et al 1999). To predict or quantify NIS impacts over larger areas or longer time scales requires additional information on the species' seasonality, population size and mechanisms of dispersal (Mack et al 2000). Further studies are needed to establish the abundance and potential impacts of the non-indigenous species encountered in this port to determine the threat they represent to New Zealand's native ecosystems.

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Tables

Table 1: Berthage facilities in the Port of Wellington.

Berth	Berth No.	Purpose	Construction	Length of berth (m)	Maximum least depth (m)
Queens Wharf	1	Fishing and commercial vessels	Concrete deck/wood piles	224	8.3
Waterloo Quay	2	Fishing and commercial vessels	Concrete deck/wood piles	99	7
Interisland Wharf	2	Fishing and commercial vessels	Concrete deck/wood piles	150	7.8
	3		Concrete deck/wood piles	213	9.3
Glasgow wharf	1	Fishing and commercial vessels	Concrete deck/wood piles	84	4.7
	2		Concrete deck/wood piles	218	9.3
	3		Concrete deck/wood piles	240	9.3
Kings Wharf	2	Fishing and commercial vessels	Wood deck/wood piles	251	9.4
Thorndon Container Wharf	1	Cargo import and export - logs, containers, cars etc	Concrete deck/concrete piles	293	11.9
	2		Concrete deck/concrete piles	293	11.6
Aotea Quay	1	Cargo import and export - logs, containers, cars etc	Concrete deck/concrete piles	183	10.6
	2		Concrete deck/concrete piles	183	9.9
	3		Concrete deck/concrete piles	183	10.1
	4		Concrete deck/concrete piles	183	10.4
	5		Concrete deck/concrete piles	182	9.2
	6		Concrete deck/concrete piles	201	9.3
Seaview		Bulk petroleum	Concrete deck/steel piles	250	11.1
Burnham Wharf		Bitumen and aviation fuel imports	Concrete deck/concrete piles	257	9.1
Miramar	East	Bitumen and aviation fuel imports	Concrete deck/wood piles	170	5.9
	West		Concrete deck/wood piles	170	9.6
Overseas Terminal			Concrete deck/wood piles	259	10.1
Taranaki St Breastwork			Concrete deck/wood piles	233	8.4
Taranaki St Terminal			Concrete deck/wood piles	152	8.3

Table 2: Comparison of survey methods used in this study with the CRIMP protocols (Hewitt and Martin 2001), indicating modifications made to the protocols following recommendations from a workshop of New Zealand scientists. Full details of the workshop recommendations can be found in Gust et al. (2001).

	CRIMP Protocol		NIWA Method		
Taxa sampled	Survey method	Sample procedure	Survey method	Sample procedure	Notes
Dinoflagellate cysts	Small hand core	Cores taken by divers from locations where sediment deposition occurs	TFO Gravity core ("javelin" core)	Cores taken from locations where sediment deposition occurs	Use of the javelin core eliminated the need to expose divers to unnecessary hazards (poor visibility, snags, boat movements, repetitive dives > 10 m). It is a method recommended by the WESTPAC/IOC Harmful Algal Bloom project for dinoflagellate cyst collection (Matsuoka and Fukuyo 2000)
Benthic infauna	Large core	3 cores close to (0 m) and 3 cores away (50 m) from each berth	Shipek benthic grab	3 cores within 10 m of each sampled berth and at sites in the port basin	Use of the benthic grab eliminated need to expose divers to unnecessary hazards (poor visibility, snags, boat movements, repetitive dives > 10 m).
Dinoflagellates	20µm plankton net	Horizontal and vertical net tows	Not sampled	Not sampled	Plankton assemblages spatially and temporally variable, time-consuming and difficult to identify to species. Workshop recommended using resources to sample other taxa more comprehensively
Zooplankton and/ phytoplankton	100 µm plankton net	Vertical net tow	Not sampled	Not sampled	Plankton assemblages spatially and temporally variable, time-consuming and difficult to identify to species. Workshop recommended using resources to sample other taxa more comprehensively
Crab/shrimp	Baited traps	3 traps of each kind left overnight at each site	Baited traps	4 traps (2 line x 2 traps) of each kind left overnight at each site	
Macrobiota	Qualitative visual survey	Visual searches of wharves & breakwaters for target species	Qualitative visual survey	Visual searches of wharves & breakwaters for target species	

Taxa sampled	CRIMP Protocol Survey method	 Sample procedure	NIWA Method Survey method	 Sample procedure	Notes
Sedentary / encrusting biota	Quadrat scraping	0.10 m^2 quadrats sampled at -0.5 m, -3.0 m and -7.0 m on 3 outer piles per berth	Quadrat scraping	0.10 m^2 quadrats sampled at -0.5 m, -1.5 m, -3.0 m and -7 m on 2 inner and 2 outer piles per berth	Workshop recommended extra quadrat in high diversity algal zone (-1.5 m) and to sample inner pilings for shade tolerant species
Sedentary / encrusting biota	Video / photo transect	Video transect of pile/rockwall facing. Still images taken of the three 0.10 m^2 quadrats	Video / photo transect	Video transect of pile/rockwall facing. Still images taken of the four 0.10 m^2 quadrats	
Mobile epifauna	Beam trawl or benthic sled	1 x 100 m or timed trawl at each site	Benthic sled	2 x 100 m (or 2 min.) tows at each site	
Fish	Poison station	Divers & snorkelers collect fish from poison stations	Opera house fish traps	4 traps (2 lines x 2 traps) left for min. 1 hr at each site	Poor capture rates anticipated from poison stations because of low visibility in NZ ports. Some poisons also an OS&H risk to personnel and may require resource consent.
Fish/mobile epifauna	Beach seine	25 m seine haul on sand or mud flat sites	Opera house fish traps / Whayman Holdsworth starfish traps	4 traps (2 lines x 2 traps) of left at each site (Whayman Holdworth starfish traps left overnight)	Few NZ ports have suitable intertidal areas to beach seine.

Table 3a: Summary of the Port of Wellington sampling effort.

Sample method	Number of shipping berths sampled	Number of replicate samples taken
Benthic Sled Tows	7[a]	13
Benthic Grab (Shipek)	6	18
Box traps	7[a]	28
Diver quadrat scraping	6	98
Opera house fish traps	7[a]	34
Starfish traps	7[a]	28
Shrimp traps	7[a]	28
Javelin cores	N/A	6

[a] indicates shipping berths and additional locations

Table 3b: Pile scraping sampling effort in the Port of Wellington. Number of replicate quadrats scraped on Outer (unshaded) and Inner (shaded) pier piles at four depths. Pile materials scraped are indicated. Miscellaneous samples are opportunistic additional specimens collected from piles outside of the scraped quadrat areas.

Sample Depth (M)	Outer Piles	Inner Piles
0.5	12	12
1.5	12	12
3.5	12	12
7	11	7
Miscellaneous	3	5

Table 3c: Summary of sampling effort in Ports and Marinas surveyed during the austral summers of 2001-2002 (shown in bold type), and 2002-2003 (shown in plain type). The number of shipping berths sampled is indicated, along with the total numbers of samples taken (in brackets).

Survey Location	Benthic sled tows	Benthic grabs	Box traps	Diver quadrat scraping	Opera house traps	Starfish traps	Shrimp traps	Javelin cores
Port of Lyttelton	5 (10)	5 (15)	6 (20)	5 (77)	5 (20)	6 (20)	6 (19)	(8)
Port of Nelson	4 (8)	1 (2) *	4 (16)	4 (55)	4 (16)	4 (16)	4 (16)	(8)
Port of Picton	3 (6)	*	3 (18)	3 (53)	3 (16)	3 (24)	3 (24)	(6)
Port of Taranaki	6 (12)	6 (21)	7 (25)	4 (66)	6 (24)	6 (24)	6 (24)	(14)
Port of Tauranga	6 (18)	6 (28)	8 (32)	6 (107)	6 (25)	7 (28)	7 (28)	(8)
Port of Timaru	6 (12)	4 (14)	5 (20)	4 (58)	5 (20)	5 (20)	5 (20)	(8)
Port of Wellington	7 (13)	6 (18)	7 (28)	6 (98)	7 (34)	7 (28)	7 (28)	(6)
Port of Auckland	6 (12)	6 (18)	6 (24)	6 (101)	6 (24)	6 (24)	5 (20)	(10)
Port of Bluff	6 (21)	7 (21)	7 (29)	5 (75)	6 (24)	7 (28)	7 (24)	(12)
Dunedin Harbour	5 (10)	5 (15)	5 (20)	5 (75)	5 (20)	5 (20)	5 (18)	(9)
Port of Gisborne	5 (10)	6 (18)	5 (20)	4 (50)	5 (20)	5 (20)	5 (20)	(8)
Gulf Harbour Marina	(17)	4 (12)	4 (16)	4 (66)	4 (16)	4 (16)	4 (16)	(8)
Port of Napier	5 (10)	5 (15)	5 (18)	4 (59)	5 (20)	5 (18)	5 (18)	(8)
Opua Marina	(10)	4 (12)	4 (12)	4 (46)	4 (8)	4 (8)	4 (8)	(8)
Whangarei Marina	3 (6)	2 (6)	2 (8)	4 (33)	2 (8)	2 (8)	2 (8)	(6)
Whangarei Harbour	4 (9)	4 (12)	4 (16)	4 (65)	4 (16)	4 (16)	4 (16)	(7)

*** Shipek grab malfunctioned in the Ports of Nelson and Picton**

Table 4: Preservatives used for the major taxonomic groups of organisms collected during the port survey. [1] indicates photographs were taken before preservation, and [2] indicates they were relaxed in magnesium chloride or menthol prior to preservation.

5 % Formalin solution	10 % Formalin solution	70 % Ethanol solution	Air dried
Phycophyta	Asteroidea	Alcyonacea [2]	Bryozoa
	Brachiopoda	Ascidiacea [1, 2]	
	Crustacea (large)	Crustacea (small)	
	Ctenophora [1]	Holothuria [1, 2]	
	Echinoidea	Mollusca (with shell)	
	Hydrozoa	Mollusca [1, 2] (without shell)	
	Nudibranchia [1]	Platyhelminthes [1]	
	Ophiuroidea	Porifera [1]	
	Polychaeta	Zoantharia [1, 2]	
	Scleractinia		
	Scyphozoa [1, 2]		
	Vertebrata [1] (pisces)		

Table 5a: Marine pest species listed on the New Zealand register of Unwanted Organisms under the Biosecurity Act 1993.

Phylum	Class/Order	Genus and Species
Annelida	Polychaeta	*Sabella spallanzanii*
Arthropoda	Decapoda	*Carcinus maenas*
Arthropoda	Decapoda	*Eriocheir sinensis*
Echinodermata	Asteroidea	*Asterias amurensis*
Mollusca	Bivalvia	*Potamocorbula amurensis*
Phycophyta	Chlorophyta	*Caulerpa taxifolia*
Phycophyta	Phaeophyceae	*Undaria pinnatifida*

Table 5b: Marine pest species listed on the Australian Ballast Water Management Advisory Council's (ABWMAC) schedule of non-indigenous pest species.

Phylum	Class/Order	Genus and Species
Annelida	Polychaeta	*Sabella spallanzanii*
Arthropoda	Decapoda	*Carcinus maenas*
Echinodermata	Asteroidea	*Asterias amurensis*
Mollusca	Bivalvia	*Corbula gibba*
Mollusca	Bivalvia	*Crassostrea gigas*
Mollusca	Bivalvia	*Musculista senhousia*
Phycophyta	Dinophyceae	*Alexandrium catenella*
Phycophyta	Dinophyceae	*Alexandrium minutum*
Phycophyta	Dinophyceae	*Alexandrium tamarense*
Phycophyta	Dinophyceae	*Gymnodinium catenatum*

Table 6: Native species recorded from the Port of Wellington survey.

Phylum, Class	Order	Family	Genus and species
Annelida			
Polychaeta	Eunicida	Dorvilleidae	*Dorvillea australiensis*
Polychaeta	Eunicida	Dorvilleidae	*Schistomeringos loveni*
Polychaeta	Eunicida	Eunicidae	*Eunice australis*
Polychaeta	Eunicida	Lumbrineridae	*Abyssoninoe galatheae*
Polychaeta	Eunicida	Lumbrineridae	*Lumbricalus aotearoae*
Polychaeta	Eunicida	Lumbrineridae	*Lumbrineris sphaerocephala*
Polychaeta	Eunicida	Onuphidae	*Onuphis aucklandensis*
Polychaeta	Phyllodocida	Aphroditidae	*Aphrodita talpa*
Polychaeta	Phyllodocida	Glyceridae	*Glycera lamelliformis*
Polychaeta	Phyllodocida	Glyceridae	*Hemipodus simplex*
Polychaeta	Phyllodocida	Goniadidae	*Glycinde dorsalis*
Polychaeta	Phyllodocida	Nephtyidae	*Aglaophamus verrilli*
Polychaeta	Phyllodocida	Nereididae	*Neanthes kerguelensis*
Polychaeta	Phyllodocida	Nereididae	*Nereis falcaria*
Polychaeta	Phyllodocida	Nereididae	*Perinereis amblyodonta*
Polychaeta	Phyllodocida	Nereididae	*Perinereis camiguinoides*
Polychaeta	Phyllodocida	Phyllodocidae	*Eteone platycephala*
Polychaeta	Phyllodocida	Phyllodocidae	*Eulalia capensis*
Polychaeta	Phyllodocida	Phyllodocidae	*Pterocirrus brevicornis*
Polychaeta	Phyllodocida	Polynoidae	*Lepidastheniella comma*
Polychaeta	Phyllodocida	Polynoidae	*Lepidonotus jacksoni*
Polychaeta	Phyllodocida	Polynoidae	*Lepidonotus polychromus*
Polychaeta	Phyllodocida	Polynoidae	*Ophiodromus angustifrons*
Polychaeta	Phyllodocida	Sigalionidae	*Labiosthenolepis laevis*
Polychaeta	Phyllodocida	Syllidae	*Haplosyllis spongicola*
Polychaeta	Sabellida	Oweniidae	*Owenia petersenae*
Polychaeta	Sabellida	Sabellidae	*Megalomma suspiciens*
Polychaeta	Sabellida	Sabellidae	*Pseudopotamilla laciniosa*
Polychaeta	Sabellida	Serpulidae	*Galeolaria hystrix*
Polychaeta	Sabellida	Serpulidae	*Spirobranchus cariniferus*
Polychaeta	Scolecida	Maldanidae	*Asychis trifilosus*
Polychaeta	Scolecida	Maldanidae	*Maldane theodori*
Polychaeta	Scolecida	Opheliidae	*Armandia maculata*
Polychaeta	Scolecida	Orbiniidae	*Phylo novazealandiae*
Polychaeta	Scolecida	Orbiniidae	*Proscoloplos bondi*
Polychaeta	Scolecida	Orbiniidae	*Scoloplos cylindrifer*
Polychaeta	Scolecida	Orbiniidae	*Scoloplos simplex*
Polychaeta	Scolecida	Scalibregmatidae	*Hyboscolex longiseta*
Polychaeta	Spionida	Spionidae	*Boccardia acus*
Polychaeta	Spionida	Spionidae	*Boccardia chilensis*

Phylum, Class	Order	Family	Genus and species
Polychaeta	Spionida	Spionidae	*Boccardia knoxi*
Polychaeta	Spionida	Spionidae	*Boccardia lamellata*
Polychaeta	Spionida	Spionidae	*Carazziella quadricirrata*
Polychaeta	Terebellida	Acrocirridae	*Acrocirrus trisectus*
Polychaeta	Terebellida	Cirratulidae	*Dodecaceria berkeleyi*
Polychaeta	Terebellida	Cirratulidae	*Protocirrineris nuchalis*
Polychaeta	Terebellida	Cirratulidae	*Timarete anchylochaetus*
Polychaeta	Terebellida	Flabelligeridae	*Flabelligera affinis*
Polychaeta	Terebellida	Flabelligeridae	*Pherusa parmata*
Polychaeta	Terebellida	Pectinariidae	*Pectinaria australis*
Polychaeta	Terebellida	Terebellidae	*Nicolea armilla*
Polychaeta	Terebellida	Terebellidae	*Pista pegma*
Polychaeta	Terebellida	Terebellidae	*Pseudopista rostrata*
Polychaeta	Terebellida	Terebellidae	*Streblosoma toddae*
Polychaeta	Terebellida	Trichobranchidae	*Terebellides narribri*
Bryozoa			
Gymnolaemata	Cheilostomata	Aeteidae	*Aetea ligulata*
Gymnolaemata	Cheilostomata	Aeteidae	*Aetea truncata*
Gymnolaemata	Cheilostomata	Arachnopusiidae	*Arachnopusia unicornis*
Gymnolaemata	Cheilostomata	Beaniidae	*Beania discodermiae*
Gymnolaemata	Cheilostomata	Beaniidae	*Beania n. sp. [whitten]*
Gymnolaemata	Cheilostomata	Bitectiporidae	*Bitectipora rostrata*
Gymnolaemata	Cheilostomata	Buffonellodidae	*Buffonellodes rhomboidale*
Gymnolaemata	Cheilostomata	Calloporidae	*Crassimarginatella fossa*
Gymnolaemata	Cheilostomata	Candidae	*Caberea rostrata*
Gymnolaemata	Cheilostomata	Candidae	*Scrupocellaria ornithorhyncus*
Gymnolaemata	Cheilostomata	Chaperiidae	*Chaperia granulosa*
Gymnolaemata	Cheilostomata	Chaperiidae	*Chaperiopsis cervicornis*
Gymnolaemata	Cheilostomata	Chaperiidae	*Chaperiopsis rubida*
Gymnolaemata	Cheilostomata	Crepidacanthidae	*Crepidacantha crinispina*
Gymnolaemata	Cheilostomata	Electridae	*Villicharixa strigosa*
Gymnolaemata	Cheilostomata	Eurystomellidae	*Eurystomella biperforata*
Gymnolaemata	Cheilostomata	Eurystomellidae	*Eurystomella foraminigera*
Gymnolaemata	Cheilostomata	Hippothoidae	*Celleporella tongima*
Gymnolaemata	Cheilostomata	Hippothoidae	*Hippothoa flagellum*
Gymnolaemata	Cheilostomata	Microporellidae	*Fenestrulina thyreophora*
Gymnolaemata	Cheilostomata	Microporellidae	*Microporella agonistes*
Gymnolaemata	Cheilostomata	Microporellidae	*Microporella speculum*
Gymnolaemata	Cheilostomata	Romancheinidae	*Escharoides angela*
Gymnolaemata	Cheilostomata	Romancheinidae	*Exochella conjuncta*
Gymnolaemata	Cheilostomata	Smittinidae	*Smittina rosacea*
Gymnolaemata	Cheilostomata	Steginoporellidae	*Steginoporella magnifica*

Phylum, Class	Order	Family	Genus and species
Stenolaemata	Cyclostomata	Tubuliporidae	*Tubulipora cf. connata*
Cnidaria			
Anthozoa	Actiniaria	Aiptasiomorphidae	*Aiptasiomorpha minima*
Anthozoa	Actiniaria	Diadumenidae	*Diadumene neozelandica*
Hydrozoa	Hydroida	Campanulariidae	*Obelia geniculata*
Hydrozoa	Hydroida	Sertulariidae	*Sertularella robusta*
Crustacea			
Cirripedia	Thoracica	Balanidae	*Austrominius modestus*
Cirripedia	Thoracica	Chthamalidae	*Chaemosipho columna*
Malacostraca	Amphipoda	Ampeliscidae	*Ampelisca chiltoni*
Malacostraca	Amphipoda	Aoridae	*Aora typica*
Malacostraca	Amphipoda	Aoridae	*Haplocheira barbimana*
Malacostraca	Amphipoda	Dexaminidae	*Paradexamine pacifica*
Malacostraca	Amphipoda	Eusiridae	*Gondogeneia danai*
Malacostraca	Amphipoda	Leucothoidae	*Leucothoe trailli*
Malacostraca	Amphipoda	Lysianassidae	*Parawaldeckia vesca*
Malacostraca	Amphipoda	Melitidae	*Melita inaequistylis*
Malacostraca	Anomura	Paguidae	*Pagurus traversi*
Malacostraca	Anomura	Paguridae	*Diacanthurus spinulimanus*
Malacostraca	Anomura	Paguridae	*Lophopagurus (L.) thompsoni*
Malacostraca	Anomura	Porcellanidae	*Petrolisthes elongatus*
Malacostraca	Anomura	Porcellanidae	*Petrolisthes novaezelandiae*
Malacostraca	Brachyura	Cancridae	*Cancer novaezelandiae*
Malacostraca	Brachyura	Hymenosomatidae	*Halicarcinus cookii*
Malacostraca	Brachyura	Hymenosomatidae	*Halicarcinus innominatus*
Malacostraca	Brachyura	Hymenosomatidae	*Halicarcinus varius*
Malacostraca	Brachyura	Majidae	*Leptomithrax longipes*
Malacostraca	Brachyura	Majidae	*Notomithrax minor*
Malacostraca	Brachyura	Majidae	*Notomithrax peronii*
Malacostraca	Brachyura	Majidae	*Notomithrax ursus*
Malacostraca	Brachyura	Ocypodidae	*Macrophthalmus hirtipes*
Malacostraca	Brachyura	Pinnotheridae	*Pinnotheres novaezelandiae*
Malacostraca	Brachyura	Portunidae	*Nectocarcinus antarcticus*
Malacostraca	Brachyura	Xanthidae	*Pilumnus lumpinus*
Malacostraca	Brachyura	Xanthidae	*Pilumnus novaezelandiae*
Malacostraca	Caridea	Alpheidae	*Betaeopsis aequimanus*
Malacostraca	Caridea	Crangonidae	*Pontophilus australis*
Malacostraca	Caridea	Hippolytidae	*Hippolyte bifidirostris*
Malacostraca	Isopoda	Cirolanidae	*Natatolana rossi*

Phylum, Class	Order	Family	Genus and species
Echinodermata			
Asteroidea	Valvatida	Asterinidae	*Patiriella regularis*
Echinoidea	Spatangoida	Loveniidae	*Echinocardium cordatum*
Holothuroidea	Apodida	Synaptidae	*Rynkatorpa uncinata*
Holothuroidea	Aspidochirotida	Stichopodidae	*Stichopus mollis*
Mollusca			
Bivalvia	Arcoida	Arcidae	*Barbatia novaezelandiae*
Bivalvia	Myoida	Corbulidae	*Corbula zelandica*
Bivalvia	Myoida	Hiatellidae	*Hiatella arctica*
Bivalvia	Mytiloida	Mytilidae	*Aulacomya atra maoriana*
Bivalvia	Mytiloida	Mytilidae	*Modiolarca impacta*
Bivalvia	Mytiloida	Mytilidae	*Modiolus areolatus*
Bivalvia	Mytiloida	Mytilidae	*Perna canaliculus*
Bivalvia	Ostreoida	Anomiidae	*Pododesmus zelandicus*
Bivalvia	Ostreoida	Ostreidae	*Ostrea chilensis*
Bivalvia	Pholadomyoida	Thraciidae	*Thracia vitrea*
Bivalvia	Pterioida	Pectinidae	*Pecten novaezelandiae*
Bivalvia	Pterioida	Pectinidae	*Talochlamys zelandiae*
Bivalvia	Veneroida	Cardiidae	*Pratulum pulchellum*
Bivalvia	Veneroida	Lasaeidae	*Arthritica bifurca*
Bivalvia	Veneroida	Lasaeidae	*Borniola reniformis*
Bivalvia	Veneroida	Semelidae	*Leptomya retiaria*
Bivalvia	Veneroida	Veneridae	*Dosinia greyi*
Bivalvia	Veneroida	Veneridae	*Dosinia lambata*
Bivalvia	Veneroida	Veneridae	*Tawera spissa*
Gastropoda	Littorinimorpha	Calyptraeidae	*Sigapatella tenuis*
Gastropoda	Neogastropoda	Muricidae	*Xymene plebeius*
Gastropoda	Neogastropoda	Muricidae	*Xymene pusillus*
Gastropoda	Vetigastropoda	Fissurellidae	*Tugali suteri*
Gastropoda	Vetigastropoda	Trochidae	*Cantharidus purpureus*
Gastropoda	Vetigastropoda	Trochidae	*Melagraphia aethiops*
Gastropoda	Vetigastropoda	Trochidae	*Trochus tiaratus*
Gastropoda	Vetigastropoda	Trochidae	*Trochus viridus*
Gastropoda	Vetigastropoda	Turbinidae	*Turbo smaragdus*
Polyplacophora	Acanthochitonina	Acanthochitonidae	*Acanthochitona violacea*
Polyplacophora	Acanthochitonina	Acanthochitonidae	*Acanthochitona zelandica*
Polyplacophora	Acanthochitonina	Acanthochitonidae	*Cryptoconchus porosus*
Polyplacophora	Ischnochitonina	Chitonidae	*Onithochiton neglectus*
Polyplacophora	Ischnochitonina	Chitonidae	*Rhyssoplax aerea*
Polyplacophora	Ischnochitonina	Mopaliidae	*Plaxiphora caelata*
Polyplacophora	Ischnochitonina	Mopaliidae	*Plaxiphora obtecta*

Phylum, Class	Order	Family	Genus and species
Phycophyta			
Phaeophyceae	Ectocarpales	Scytothamnaceae	*Scytothamnus australis*
Phaeophyceae	Ectocarpales	Splachnidiaceae	*Splachnidium rugosum*
Rhodophyceae	Ceramiales	Ceramiaceae	*Antithamnionella adnata*
Rhodophyceae	Ceramiales	Ceramiaceae	*Callithamnion consanguineum*
Rhodophyceae	Ceramiales	Ceramiaceae	*Ceramium apiculatum*
Rhodophyceae	Ceramiales	Ceramiaceae	*Ceramium flaccidum*
Rhodophyceae	Ceramiales	Ceramiaceae	*Medeiothamnion lyallii*
Rhodophyceae	Ceramiales	Delesseriaceae	*Acrosorium decumbens*
Rhodophyceae	Ceramiales	Delesseriaceae	*Erythroglossum undulatissimum*
Rhodophyceae	Ceramiales	Delesseriaceae	*Hymenena variolosa*
Rhodophyceae	Ceramiales	Delesseriaceae	*Myriogramme denticulata*
Rhodophyceae	Ceramiales	Delesseriaceae	*Phycodrys quercifolia*
Rhodophyceae	Ceramiales	Delesseriaceae	*Schizoseris dichotoma*
Rhodophyceae	Ceramiales	Delesseriaceae	*Schizoseris griffithsia*
Rhodophyceae	Ceramiales	Rhodomelaceae	*Cladhymenia oblongifolia*
Rhodophyceae	Ceramiales	Rhodomelaceae	*Polysiphonia strictissima*
Rhodophyceae	Gigartinales	Cystocloniaceae	*Rhodophyllis centrocarpa*
Rhodophyceae	Gigartinales	Gigartinaceae	*Gigartina atropurpurea*
Rhodophyceae	Gigartinales	Gigartinaceae	*Gigartina decipiens*
Rhodophyceae	Gigartinales	Kallymeniaceae	*Callophyllis variegata*
Rhodophyceae	Rhodymeniales	Faucheaceae	*Gloiocladia saccata*
Rhodophyceae	Rhodymeniales	Rhodomeniaceae	*Rhodymenia leptophylla*
Ulvophyceae	Cladophorales	Cladophoraceae	*Cladophora feredayi*
Ulvophyceae	Codiales	Codiaceae	*Codium dichotomum*
Ulvophyceae	Codiales	Codiaceae	*Codium fragile*
Ulvophyceae	Ulvales	Ulvaceae	*Ulva spathulata*
Porifera			
Demospongiae	Dictyoceratida	Irciniidae	*Ircinia akaroa*
Demospongiae	Haplosclerida	Chalinidae	*Haliclona cf. isodictyale*
Demospongiae	Haplosclerida	Chalinidae	*Haliclona cf. punctata*
Demospongiae	Haplosclerida	Chalinidae	*Haliclona glabra*
Demospongiae	Poecilosclerida	Crellidae	*Crella (Pytheas) affinis*
Demospongiae	Poecilosclerida	Hymedesmiidae	*Phorbas fulva*
Demospongiae	Poecilosclerida	Microcionidae	*Clathria (Microciona) dendyi*
Demospongiae	Poecilosclerida	Microcionidae	*Ophlitospongia reticulata*
Demospongiae	Poecilosclerida	Mycalidae	*Mycale (Carmia) tasmani*
Pyrrophycophyta			
Dinophyceae	Gymnodiniales	Polykrikaceae	*Polykrikos schwartzii*
Dinophyceae	Peridiniales	Gonyaulacaceae	*Gonyaulax grindleyi*
Dinophyceae	Peridiniales	Gonyaulacaceae	*Gonyaulax scrippsae*

Phylum, Class	Order	Family	Genus and species
Dinophyceae	Peridiniales	Gonyaulacaceae	*Gonyaulax spinifera*
Dinophyceae	Peridiniales	Peridiniaceae	*Lingulodinium polyedrum*
Dinophyceae	Peridiniales	Peridiniaceae	*Protoperidinium conicum*
Dinophyceae	Peridiniales	Peridiniaceae	*Protoperidinium conicum cf. conicoides*
Dinophyceae	Peridiniales	Peridiniaceae	*Protoperidinium pentagonum*
Dinophyceae	Peridiniales	Peridiniaceae	*Protoperidinium sp.*
Dinophyceae	Peridiniales	Peridiniaceae	*Scrippsiella trochoidea*
Urochordata			
Ascidiacea	Stolidobranchia	Molgulidae	*Molgula mortenseni*
Ascidiacea	Stolidobranchia	Pyuridae	*Microcosmus australis*
Ascidiacea	Stolidobranchia	Pyuridae	*Pyura cancellata*
Ascidiacea	Stolidobranchia	Pyuridae	*Pyura pachydermatina*
Ascidiacea	Stolidobranchia	Pyuridae	*Pyura picta*
Ascidiacea	Stolidobranchia	Pyuridae	*Pyura pulla*
Ascidiacea	Stolidobranchia	Pyuridae	*Pyura rugata*
Ascidiacea	Stolidobranchia	Pyuridae	*Pyura subuculata*
Ascidiacea	Stolidobranchia	Styelidae	*Asterocarpa coerulea*
Ascidiacea	Stolidobranchia	Styelidae	*Cnemidocarpa bicornuta*
Ascidiacea	Stolidobranchia	Styelidae	*Cnemidocarpa nisiotus*
Ascidiacea	Stolidobranchia	Styelidae	*Cnemidocarpa otagoensis*
Ascidiacea	Stolidobranchia	Styelidae	*Cnemidocarpa regalis*
Ascidiacea	Stolidobranchia	Styelidae	*Pyura trita*
Vertebrata			
Actinopterygii	Gadiformes	Moridae	*Pseudophycis bachus*
Actinopterygii	Mugiliformes	Mugilidae	*Parapercis colias*
Actinopterygii	Perciformes	Carangidae	*Caranx georgianus*
Actinopterygii	Perciformes	Cheilodactylidae	*Nemadactylus macropterus*
Actinopterygii	Perciformes	Gobiesocidae	*Dellichthys morelandi*
Actinopterygii	Perciformes	Labridae	*Notolabrus celidotus*
Actinopterygii	Perciformes	Labridae	*Notolabrus miles*
Actinopterygii	Perciformes	Plesiopidae	*Acanthoclinus fuscus*
Actinopterygii	Perciformes	Trypterigiidae	*Grahamina capito*
Actinopterygii	Perciformes	Trypterigiidae	*Grahamina gymnota*
Actinopterygii	Pleuronectiformes	Pleuronectidae	*Peltorhamphus latus*

Table 7: Cryptogenic marine species recorded from the Port of Wellington survey. Category 1 cryptogenic species (C1); Category 2 cryptogenic species (C2). Refer to section 2.9 for definitions.

Phylum, Class	Order	Family	Genus and species	
Bryozoa				
Gymnolaemata	Cheilostomata	Phidoloporidae	*Rhynchozoon larreyi*	C1
Gymnolaemata	Cheilostomata	Scrupariidae	*Scruparia ambigua*	C1
Cnidaria				
Hydrozoa	Hydroida	Campanulariidae	*Obelia dichotoma*	C1
Crustacea				
Malacostraca	Amphipoda	Corophiidae	*Meridiolembos sp. aff. acherontis*	C2
Malacostraca	Brachyura	Portunidae	*Nectocarcinus sp. nova*	C2
Mollusca				
Bivalvia	Mytiloida	Mytilidae	*Mytilus galloprovincialis*	C1
Porifera				
Demospongiae	Dendroceratida	Darwinellidae	*Darwinella cf. gardineri*	C1
Demospongiae	Dictyoceratida	Dysideidae	*Dysidea n. sp. 1*	C2
Demospongiae	Dictyoceratida	Dysideidae	*Euryspongia n. sp. 1*	C2
Demospongiae	Halichondrida	Halichondriidae	*Halichondria n. sp. 1*	C2
Demospongiae	Halichondrida	Halichondriidae	*Halichondria n. sp. 2*	C2
Demospongiae	Halichondrida	Halichondriidae	*Halichondria panicea*	C1
Demospongiae	Haplosclerida	Callyspongiidae	*Callyspongia diffusa*	C1
Demospongiae	Haplosclerida	Callyspongiidae	*Dactylia n. sp. 1*	C2
Demospongiae	Haplosclerida	Chalinidae	*Adocia n. sp. 1*	C2
Demospongiae	Haplosclerida	Chalinidae	*Chalinula n. sp. 1*	C2
Demospongiae	Haplosclerida	Chalinidae	*Haliclona n. sp. 1*	C2
Demospongiae	Haplosclerida	Chalinidae	*Haliclona n. sp. 2*	C2
Demospongiae	Haplosclerida	Chalinidae	*Haliclona n. sp. 3*	C2
Demospongiae	Homosclerophorida	Plakinidae	*Plakina trilopha*	C1
Demospongiae	Poecilosclerida	Ancinoiidae	*Crella (Pytheas) incrustans*	C1
Pyrrophycophyta				
Dinophyceae	Gymnodiniales	Gymnodiniacea	*Gymnodinium catenatum*	C1
Urochordata				
Ascidiacea	Phlebobranchia	Rhodosomatidae	*Corella eumyota*	C1
Ascidiacea	Stolidobranchia	Botryllinae	*Botrylliodes leachii*	C1
Ascidiacea	Stolidobranchia	Styelidae	*Asterocarpa cerea*	C1
Ascidiacea	Stolidobranchia	Styelidae	*Styela plicata*	C1

Table 8: Non-indigenous marine species recorded from the Port of Wellington survey. Likely vectors of introduction are largely derived from Cranfield et al (1998), where H = Hull fouling and B = Ballast water transport. Novel NIS not listed in Cranfield et al (1998) or previously encountered by taxonomic experts in New Zealand waters are marked as New Records (NR). For these species and others for which information is scarce, we provide dates of first detection rather than probable dates of introduction.

Phylum, Class	Order	Family	Genus and species	Probable means of introduction	Date of introduction or detection (d)
Annelida					
Polychaeta	Sabellida	Serpulidae	*Spirobranchus polytrema* **(NR)**	H	Nov. 2001 [d]
Polychaeta	Spionida	Spionidae	*Dipolydora armata*	H	~1900
Polychaeta	Spionida	Spionidae	*Polydora hoplura*	H	Unknown [1]
Bryozoa					
Gymnolaemata	Cheilostomata	Bugulidae	*Bugula flabellata*	H	Pre-1949
Gymnolaemata	Cheilostomata	Cryptosulidae	*Cryptosula pallasiana*	H	1890s
Gymnolaemata	Cheilostomata	Cyclicoporidae	*Cyclicopora longipora*	H	Unknown [1]
Gymnolaemata	Cheilostomata	Watersiporidae	*Watersipora subtorquata*	H or B	Pre-1982
Cnidaria					
Hydrozoa	Hydroida	Eudendriidae	*Eudendrium capillare* **(NR)**	H[1]	Nov. 2001 [d]
Crustacea					
Malacostraca	Brachyura	Cancridae	*Cancer gibbosulus* **(NR)**	H or B	Nov. 2001 [d]
Mollusca					
Bivalvia	Veneroida	Semelidae	*Theora lubrica*	B	1971
Phycophyta					
Phaeophyceae	Laminariales	Alariaceae	*Undaria pinnatifida*	H or B	Pre-1987
Rhodophyceae	Ceramiales	Ceramiaceae	*Griffithsia crassiuscula*	H	Pre-1954
Porifera					
Demospongiae	Halisarcida	Halisarcidae	*Halisarca dujardini*	H or B	Pre-1973
Urochordata					
Ascidiacea	Stolidobranchia	Styelidae	*Cnemidocarpa sp.* **(NR)**	H	Dec. 2001 [d]

[1] Date of introduction currently unknown but species had been encountered in New Zealand prior to the present survey.

Table 9: Species indeterminata recorded from the Port of Wellington survey. This group includes: (1) organisms that were damaged or juvenile and lacked crucial morphological characteristics, and (2) taxa for which there is not sufficient taxonomic or systematic information available to allow positive identification to species level.

Phylum, Class	Order	Family	Genus and species
Annelida			
Polychaeta	Phyllodocida	Glyceridae	*Glycera Indet*
Polychaeta	Phyllodocida	Nereididae	*Neanthes Neanthes-A*
Polychaeta	Phyllodocida	Nereididae	*Nereididae indet*
Polychaeta	Phyllodocida	Nereididae	*Platynereis Platynereis_australis_group*
Polychaeta	Phyllodocida	Phyllodocidae	*Eulalia Eulalia-NIWA-2*
Polychaeta	Phyllodocida	Phyllodocidae	*Phyllodocidae Indet*
Polychaeta	Phyllodocida	Phyllodocidae	*Pirakia Pirakia-A*
Polychaeta	Phyllodocida	Polynoidae	*Harmothoinae Indet*
Polychaeta	Phyllodocida	Polynoidae	*Lepidonotus Lepidonotus-A*
Polychaeta	Phyllodocida	Polynoidae	*Polynoidae indet*
Polychaeta	Phyllodocida	Syllidae	*Autolytin-unknown Indet*
Polychaeta	Phyllodocida	Syllidae	*Eusyllin-unknown Eusyllin-unknown-A*
Polychaeta	Phyllodocida	Syllidae	*Eusyllis Eusyllis-A*
Polychaeta	Phyllodocida	Syllidae	*Eusyllis Eusyllis-C*
Polychaeta	Phyllodocida	Syllidae	*Syllidae Indet*
Polychaeta	Sabellida	Sabellidae	*Pseudopotamilla Pseudopotamilla-A*
Polychaeta	Sabellida	Sabellidae	*Sabellidae Indet*
Polychaeta	Sabellida	Serpulidae	*Galeolaria Galeolaria-A*
Polychaeta	Sabellida	Serpulidae	*Serpula Serpula-C*
Polychaeta	Sabellida	Serpulidae	*Serpulidae Indet*
Polychaeta	Sabellida	Serpulidae	*Spirobranchus Indet*
Polychaeta	Sabellida	Serpulidae	*Spirorbinae Indet*
Polychaeta	Scolecida	Capitellidae	*Notomastus Indet*
Polychaeta	Scolecida	Maldanidae	*Euclymene Indet*
Polychaeta	Spionida	Chaetopteridae	*Chaetopteridae Indet*
Polychaeta	Spionida	Spionidae	*Boccardia Indet*
Polychaeta	Spionida	Spionidae	*Paraprionospio Paraprionospio-A [pinnata]*
Polychaeta	Spionida	Spionidae	*Polydora Indet*
Polychaeta	Terebellida	Cirratulidae	*Chaetozone Indet*
Polychaeta	Terebellida	Cirratulidae	*Cirratulus Cirratulus-A*
Polychaeta	Terebellida	Terebellidae	*Terebellidae Indet*
Polychaeta			*Not_Lepidonotinae Indet*
Bryozoa			
Gymnolaemata	Cheilostomata	Aeteidae	*Aetea ?australis*
Gymnolaemata	Cheilostomata	Hippothoidae	*Celleporella sp.*
Cnidaria			
Anthozoa	Actiniaria	Sagartiidae	*Anthothoe sp.*

Phylum, Class	Order	Family	Genus and species
Anthozoa	Actiniaria		*Acontiaria sp.*
Hydrozoa	Hydroida	Bougainvilliidae	*Bougainvillia ?muscus*
Hydrozoa	Hydroida	Lafoeidae	*Filellum sp. indeterminate*
Scyphozoa			*Scyphozoa sp.*
Crustacea			
Malacostraca	Amphipoda	Isaeidae	*Gammaropsis sp. 1*
Malacostraca	Amphipoda	Stenothoidae	*Stenothoe sp. 1*
Malacostraca	Brachyura	Majidae	*Notomithrax sp.*
Malacostraca	Decapoda		*Shrimp sp.*
Malacostraca	Isopoda	Janiridae	*Iathrippa ?longicauda*
Malacostraca	Isopoda	Pseudojaniridae	*Schottea sp*
Malacostraca	Isopoda	Sphaeromatidae	*Joeropsis ?neozelanica*
Malacostraca	Mysida	Mysidae	*Heteromysis or Mysidetes sp.*
Echinodermata			
Asteroidea	Valvatida	Asterinidae	*Patiriella sp.*
Phycophyta			
Phaeophyceae	Scytosiphonales	Scytosiphonaceae	*Colpomenia sp.*
Phaeophyceae			*Brown fragment*
Rhodophyceae	Acrochaetiales	Acrochaetiaceae	*Audouinella sp.*
Rhodophyceae	Bangiales	Bangiaceae	*Porphyra sp.*
Rhodophyceae	Ceramiales	Ceramiaceae	*Ceramium sp.*
Rhodophyceae	Ceramiales	Ceramiaceae	*Griffithsia sp.*
Rhodophyceae	Ceramiales	Delesseriaceae	*Erythroglossum sp.*
Rhodophyceae	Ceramiales	Delesseriaceae	*Myriogramme denticulata?*
Rhodophyceae	Ceramiales	Delesseriaceae	*Myriogramme sp.*
Rhodophyceae	Ceramiales	Delesseriaceae	*Phycodrys sp.*
Rhodophyceae	Ceramiales	Delesseriaceae	*Valeriemaya sp.*
Rhodophyceae	Ceramiales	Rhodomelaceae	*Polysiphonia sp.*
Rhodophyceae	Corallinales	Corallinaceae	*Non-geniculate coralline*
Rhodophyceae	Rhodymeniales	Rhodomeniaceae	*Rhodymenia sp.*
Ulvophyceae	Ulvales	Ulvaceae	*Enteromorpha sp.*
Ulvophyceae	Ulvales	Ulvaceae	*Ulva sp.*
Platyhelminthes			
Turbellaria	Polycladida	Stylochidae	*Enterogonia sp.*
Turbellaria	Polycladida	Stylochidae	*Planocera? Sp.*
Turbellaria	Polycladida		*Indet genus indet sp.*
Urochordata			
Ascidiacea	Aplousobranchia	Didemnidae	*Didemnum sp.*
Vertebrata			
Actinopterygii	Perciformes	Trypterigiidae	*Forsterygion sp. post larva*

Table 10: Non-indigenous marine organisms recorded from the Port of Wellington survey and the techniques used to capture each species. Species distributions throughout the port and in other ports and marinas around New Zealand are indicated.

Genus and species	Capture techniques in the Port of Wellington	Locations detected in the Port of Wellington	Detected in other locations surveyed in ZBS2000_04
Spirobranchus polytrema	Pile scrape	Road-Rail Terminal, Aotea Quay;Kings Wharf See Fig 17	Dunedin, Napier
Dipolydora armata	Pile scrape	Aotea Quay; Thorndon Container Terminal See Fig 18	Picton
Polydora hoplura	Pile scrape	Aotea Quay; Burnham Wharf; Kings Wharf; Overseas Passenger Terminal; Thorndon Container Terminal See Fig 19	Dunedin, Nelson, Picton, Tauranga, Whangarei Harbour
Bugula flabellata	Benthic sled, Pile scrape, Starfish trap	Aotea Quay; Burnham Wharf; Kings Wharf; Overseas Passenger Terminal; Thorndon Container Terminal; Waterloo Quay Wharf See Fig 20	Auckland, Bluff, Dunedin, Lyttleton, Napier, Nelson, Opua, Picton, Taranaki, Tauranga, Timaru, Whangarei Harbour
Cryptosula pallasiana	Pile scrape	Aotea Quay; Thorndon Container Terminal See Fig 21	Dunedin, Gisborne, Lyttleton, Nelson, Taranaki, Whangarei Harbour
Cyclicopora longipora	Benthic sled, Pile scrape	Aotea Quay; Burnham Wharf; Kings Wharf; Overseas Passenger Terminal; Thorndon Container Terminal See Fig 22	None
Watersipora subtorquata	Pile scrape	Aotea Quay; Burnham Wharf; Kings Wharf; Overseas Passenger Terminal; Thorndon Container Terminal See Fig 23	Bluff, Dunedin, Gisborne, Gulf Harbour Marina, Lyttleton, Napier, Nelson, Opua, Picton, Taranaki, Tauranga, Timaru, Whangarei Harbour
Eudendrium capillare	Pile scrape	Aotea Quay; Overseas Passenger Terminal; Thorndon Container Terminal See Fig 24	Taranaki, Tauranga
Cancer gibbosulus	Pile scrape	Aotea Quay See Fig 25	Lyttleton, Timaru

Genus and species	Capture techniques in the Port of Wellington	Locations detected in the Port of Wellington	Detected in other locations surveyed in ZBS2000_04
Theora lubrica	Benthic sled	Burnham Wharf; Thorndon Container TerminalSee Fig 26	Auckland, Gisborne, Gulf Harbour Marina, Lyttleton, Napier, Nelson, Opua, Taranaki, Whangarei Harbour, Whangarei Marina
Undaria pinnatifida	Benthic sled, Pile scrape, Starfish trap	Aotea Quay; Burnham Wharf; Kings Wharf; Overseas Passenger Terminal; Thorndon Container Terminal See Fig 27	Dunedin, Gisborne, Lyttleton, Napier, Picton, Timaru
Griffithsia crassiuscula	Benthic sled, Pile scrape, Starfish trap	Aotea Quay; Burnham Wharf; Overseas Passenger Terminal; Thorndon Container Terminal See Fig 28	Bluff, Lyttleton, Picton, Taranaki, Timaru
Halisarca dujardini	Benthic sled, Pile scrape	Aotea Quay; Overseas Passenger Terminal; Thorndon Container Terminal, Rail/Ferry Terminal See Fig 29	Auckland, Bluff, Dunedin, Picton, Taranaki
Cnemidocarpa sp.	Benthic sled, Pile scrape	Aotea Quay; Kings Wharf; Overseas Passenger Terminal; Thorndon Container Terminal; Waterloo Quay Wharf See Fig 30	Auckland, Gisborne, Gulf Harbour Marina, Lyttleton, Nelson, Picton, Taranaki, Tauranga, Timaru

Appendices

Appendix 1: Specialists engaged to identify specimens obtained from the New Zealand port surveys

Phylum	Class	Specialist	Institution
Annelida	Polychaeta	Geoff Read, Jeff Forman	NIWA Greta Point
Bryozoa	Gymnolaemata	Dennis Gordon	NIWA Greta Point
Chelicerata	Pycnogonida	David Staples	Melbourne Museum, Victoria, Australia
Cnidaria	Anthozoa	Adorian Ardelean	West University of Timisoara, Timisoara, 1900, Romania
Cnidaria	Hydrozoa	Jan Watson	Hydrozoan Research Laboratory, Clifton Springs, Victoria, Australia
Crustacea	Amphipoda	Graham Fenwick	NIWA Christchurch
Crustacea	Cirripedia	Graham Fenwick, Isla Fitridge John Buckeridge[1]	NIWA Christchurch and [1]Auckland University of Technology
Crustacea	Decapoda	Colin McLay[1] Graham Fenwick, Nick Gust	[1]University of Canterbury and NIWA Christchurch
Crustacea	Isopoda	Niel Bruce	NIWA Greta Point
Crustacea	Mysidacea	Fukuoka Kouki	National Science Museum, Tokyo
Echinodermata	Asteroidea	Don McKnight	NIWA Greta Point
Echinodermata	Echinoidea	Don McKnight	NIWA Greta Point
Echinodermata	Holothuroidea	Niki Davey	NIWA Nelson
Echinodermata	Ophiuroidea	Don McKnight, Helen Rotman	NIWA Greta Point
Echiura	Echiuroidea	Geoff Read	NIWA Greta Point
Mollusca	Bivalvia. Cephalopoda, Gastropoda, Polyplacophora	Bruce Marshall	Museum of NZ Te Papa Tongarewa
Nemertea	Anopla, Enopla	Geoff Read	NIWA Greta Point
Phycophyta	Phaeophyceae, Rhodophyceae, Ulvophyceae	Wendy Nelson, Kate Neill	NIWA Greta Point
Platyhelminthes	Turbellaria	Sean Handley	NIWA Nelson
Porifera	Demospongiae, Calcarea	Michelle Kelly-Shanks	NIWA Auckland
Priapula	Priapulidae	Geoff Read	NIWA Greta Point
Pyrrophycophyta	Dinophyceae	Hoe Chang, Rob Stewart	NIWA Greta Point
Urochordata	Ascidiacea	Mike Page, Anna Bradley Patricia Kott[1]	NIWA Nelson and [1]Queensland Museum
Vertebrata	Osteichthyes	Clive Roberts, Andrew Stewart	Museum of NZ Te Papa Tongarewa

Appendix 2: Generic descriptions of representative groups of the main marine phyla collected during sampling

Phylum Annelida

Polychaetes: The polychaetes are the largest group of marine worms and are closely related to the earthworms and leeches found on land. Polychaetes are widely distributed in the marine environment and are commonly found under stones and rocks, buried in the sediment or attached to submerged natural and artificial surfaces including rocks, pilings, ropes and the shells or carapaces of other species. All polychaete worms have visible legs or bristles. Many species live in tubes secreted by the body or assembled from debris and sediments, while others are free-living. Depending on species, polychaetes feed by filtering small food particles from the water or by preying upon smaller creatures.

Phylum Bryozoa

Bryozoans: This group of organisms is also referred to as 'moss animals' or 'lace corals'. Bryozoans are sessile and live attached to submerged natural and artificial surfaces including rocks, pilings, ropes and the shells or carapaces of other species. They are all colonial, with individual colonies consisting of hundreds of individual 'zooids'. Bryozoans can have encrusting growth forms that are sheet-like and approximately 1 mm thick, or can form erect or branching structures several centimetres high. Bryozoans feed by filtering small food particles from the water column, and colonies grow by producing additional zooids.

Phylum Chelicerata

Pycnogonids: The pycnogonids, or sea spiders, are a group within the Arthropoda, and closely related to land spiders. They are commonly encountered living among sponges, hydroids and bryozoans on the seafloor. They range in size from a few mm to many cm and superficially resemble spiders found on land.

Phylum Cnidaria

Hydroids: Hydroids can easily be mistaken for erect and branching bryozoans. They are also sessile organisms that live attached to submerged natural and artificial surfaces including rocks, pilings, ropes and the shells or carapaces of other species. All hydroids are colonial, with individual colonies consisting of hundreds of individual 'polyps'. Like bryozoans, they feed by filtering small food particles from the water column.

Phylum Crustacea

Crustaceans: The crustaceans represent one of the sea's most diverse groups of organisms, well known examples include shrimps, crabs and lobsters. Most crustaceans are motile (capable of movement) although there are also a variety of sessile species (e.g. barnacles). All crustaceans are protected by an external carapace, and most can be recognised by having two pairs of antennae.

Phylum Echinodermata

Echinoderms: This phylum contains a range of predominantly motile organisms – sea stars, brittle stars, sea urchins, sea cucumbers, sand dollars, feather stars and sea lilies. Echinoderms feed by filtering small food particles from the water column or by extracting food particles from sediment grains or rock surfaces.

Phylum Mollusca

Molluscs: The molluscs are a highly diverse group of marine animals characterised by the presence of an external or internal shell. This phyla includes the bivalves (organisms with hinged shells e.g. mussels, oysters, etc), gastropods (marine snails, e.g. winkles, limpets, topshells), chitons, sea slugs and sea hares, as well as the cephalopods (squid, cuttlefish and octopus).

Phylum Phycophyta

Algae: These are the marine plants. Several types were encountered during our survey. Large *macroalgae* were sampled that live attached to submerged natural and artificial surfaces including rocks, pilings, ropes and the shells or carapaces of other species. These include the green algae (phylum Ulvophyceae), red algae (phylum Rhodophyceae) and brown algae (phylum Phaecophyceae). We also encountered microscopic algal species called *dinoflagellates* (phylum Pyrrophycophyta), single-celled algae that live in the water column or within the sediments.

Phylum Porifera

Sponges: Sponges are very simple colonial organisms that live attached to submerged natural and artificial surfaces including rocks, pilings, ropes and the shells or carapaces of other species. They vary greatly in colour and shape, and include sheet-like encrusting forms, branching forms and tubular forms. Sponge surfaces have thousands of small pores to through which water is drawn into the colony, where small food particles are filtered out before the water is again expelled through one or several other holes.

Phylum Pyrrophycophyta

Dinoflagellates: Dinoflagellates are a large group of unicellular algae common in marine plankton. About half of all dinoflagellates are capable of photosynthesis and some are symbionts, living inside organisms such as jellyfish and corals. Some dinoflagellates are phosphorescent and can be responsible for the phosphorescence visible at night in the sea. The phenomenon known as red tide occurs when the rapid reproduction of certain dinoflagellate species results in large brownish red algal blooms. Some dinoflagellates are highly toxic and can kill fish and shellfish, or poison humans that eat these infected organisms.

Phylum Urochordata

Ascidians: This group of organisms is sometimes referred to as ‘sea squirts’. Adult ascidians are sessile (permanently attached to the substrate) organisms that live on submerged natural and artificial surfaces including rocks, pilings, ropes and the shells or carapaces of other species. Ascidians can occur as individuals (solitary ascidians) or merged together into colonies (colonial ascidians). They are soft-bodied and have a rubbery or jelly-like outer coating (test). They feed by pumping water into the body through an inhalant siphon. Inside the body, food particles are filtered out of the water, which is then expelled through an exhalant siphon. Ascidians reproduce via swimming larvae (ascidian tadpoles) that retain a notochord, which explains why these animals are included in the phylum Chordata along with vertebrates.

Phylum Vertebrata

Fishes: Fishes are an extremely diverse group of the verterbrates familiar to most people. Approximately 200 families of fish are represented in New Zealand waters ranging from tropical and subtropical groups in the north to subantarctic groups in the south. Fishes can be classified according to their depth preferences. Fish that live on or near the sea floor are considered demersal while those living in the upper water column are termed pelagics.

Appendix 3: Criteria for assigning non-indigenous status to species sampled from the Port of Wellington.

List of Chapman and Carlton's (1994) nine criteria (C1 – C9) for assigning non-indigenous species status that were met by the non-indigenous species sampled in the Port of Timaru. Criteria that apply to each species are indicated by (+). Cranfield et al's (1998) analysis was used for species previously known from New Zealand waters. For non-indigenous species that were first detected during the present study, criteria were assigned using advice from the taxonomists that identified them. Refer to footnote for a full description of C1 – C9.

Phylum and species	C1	C2	C3	C4	C5	C6	C7	C8	C9
Annelida									
Spirobranchus polytrema	+		+		+				+
Dipolydora armata			+		+	+	+	+	
Polydora hoplura			+		+	+	+	+	+
Bryozoa									
Bugula flabellata	+	+	+		+	+	+	+	+
Cryptosula pallasiana	+	+	+		+	+	+	+	+
Cyclicopora longipora	+		+		+	+		+	+
Watersipora subtorquata	+	+	+		+	+	+	+	+
Cnidaria									
Eudendrium capillare	+		+		+			+	+
Crustacea									
Cancer gibbosulus	+		+				+	+	+
Mollusca									
Theora lubrica	+	+			+	+	+	+	+
Phycophyta									
Undaria pinnatifida	+	+	+		+	+	+	+	+
Griffithsia crassiuscula	+	+				+		+	+
Porifera									
Halisarca dujardini	+		+	+		+	+	+	+
Urochordata									
Cnemidocarpa sp.	+		+		+			+	

Criterion 1: Has the species suddenly appeared locally where it has not been found before?
Criterion 2: Has the species spread subsequently?
Criterion 3: Is the species' distribution associated with human mechanisms of dispersal?
Criterion 4: Is the species associated with, or dependent on, other introduced species?
Criterion 5: Is the species prevalent in, or restricted to, new or artificial environments?
Criterion 6: Is the species' distribution restricted compared to natives?
Criterion 7: Does the species have a disjunct worldwide distribution?
Criterion 8: Are dispersal mechanisms of the species inadequate to reach New Zealand, and is passive dispersal in ocean currents unlikely to bridge ocean gaps to reach New Zealand?
Criterion 9: Is the species isolated from the genetically and morphologically most similar species elsewhere in the world?

Appendix 4. Geographic locations of the sample sites in the port of Wellington

Site	Eastings	Northings	NZ Latitude	NZ Longitude	Survey Method	No. of sample units
AQ3	2659763	5991319	-41.27282	174.78760	BGRB	3
AQ3	2659763	5991319	-41.27282	174.78760	CRBTP	4
AQ3	2659763	5991319	-41.27282	174.78760	FSHTP	4
AQ3	2659763	5991319	-41.27282	174.78760	PSC	15
AQ3	2659763	5991319	-41.27282	174.78760	SHRTP	4
AQ3	2659763	5991319	-41.27282	174.78760	STFTP	4
AQ6	2659672	5991742	-41.26903	174.78641	BGRB	3
AQ6	2659672	5991742	-41.26903	174.78641	BSLD	2
AQ6	2659672	5991742	-41.26903	174.78641	CRBTP	4
AQ6	2659672	5991742	-41.26903	174.78641	FSHTP	6
AQ6	2659672	5991742	-41.26903	174.78641	PSC	17
AQ6	2659672	5991742	-41.26903	174.78641	SHRTP	4
AQ6	2659672	5991742	-41.26903	174.78641	STFTP	4
BURN	2661677	5986777	-41.31336	174.81156	BGRB	4
BURN	2661677	5986777	-41.31336	174.81156	BSLD	2
BURN	2661677	5986777	-41.31336	174.81156	CRBTP	4
BURN	2661677	5986777	-41.31336	174.81156	FSHTP	4
BURN	2661677	5986777	-41.31336	174.81156	PSC	17
BURN	2661677	5986777	-41.31336	174.81156	SHRTP	4
BURN	2661677	5986777	-41.31336	174.81156	STFTP	4
KINGS	2659396	5990259	-41.28243	174.78348	BGRB	3
KINGS	2659396	5990259	-41.28243	174.78348	BSLD	2
KINGS	2659396	5990259	-41.28243	174.78348	CRBTP	4
KINGS	2659396	5990259	-41.28243	174.78348	FSHTP	4
KINGS	2659396	5990259	-41.28243	174.78348	PSC	16
KINGS	2659396	5990259	-41.28243	174.78348	SHRTP	4
KINGS	2659396	5990259	-41.28243	174.78348	STFTP	4
MID BAY	2662202	5990565	-41.27916	174.81689	CYST	1
MID BAY	2660960	5990259	-41.28214	174.80214	CYST	1
MID BAY	2661100	5990310	-41.28166	174.80380	CYST	1
MID BAY	2661170	5990420	-41.28065	174.80461	CYST	1
OPT	2659572	5989360	-41.29049	174.78580	BGRB	2
OPT	2659572	5989360	-41.29049	174.78580	CRBTP	4
OPT	2659572	5989360	-41.29049	174.78580	FSHTP	4
OPT	2659572	5989360	-41.29049	174.78580	PSC	16
OPT	2659572	5989360	-41.29049	174.78580	SHRTP	4
OPT	2659572	5989360	-41.29049	174.78580	STFTP	4
TBW2	2659878	5990175	-41.28310	174.78925	BSLD	1
TBW2	2659878	5990175	-41.28310	174.78925	CRBTP	4
TBW2	2660280	5990250	-41.28235	174.79403	CYST	1
TBW2	2660265	5990230	-41.28253	174.79386	CYST	1
TBW2	2659878	5990175	-41.28310	174.78925	FSHTP	8
TBW2	2659878	5990175	-41.28310	174.78925	SHRTP	4
TBW2	2659878	5990175	-41.28310	174.78925	STFTP	4
TBW2	2659878	5990175	-41.28310	174.78925	VISS	2
TCW1	2659878	5990175	-41.28310	174.78925	BSLD	2
TCW2	2659878	5990175	-41.28310	174.78925	BGRB	3
TCW2	2659878	5990175	-41.28310	174.78925	BSLD	2
TCW2	2659878	5990175	-41.28310	174.78925	CRBTP	4

Site	Eastings	Northings	NZ Latitude	NZ Longitude	Survey Method	No. of sample units
TCW2	2659878	5990175	-41.28310	174.78925	FSHTP	4
TCW2	2659878	5990175	-41.28310	174.78925	PSC	17
TCW2	2659878	5990175	-41.28310	174.78925	SHRTP	4
TCW2	2659878	5990175	-41.28310	174.78925	STFTP	4
TCW2	2659878	5990175	-41.28310	174.78925	VISS	1
WTLOO	2659396	5990259	-41.28243	174.78348	BSLD	2

*Survey methods: PSC = pile scrape, BSLD = benthic sled, BGRB = benthic grab, CYST = dinoflagellate cyst core, CRBTP = crab trap, FSHTP = fish trap, STFTP = starfish trap, SHRTP = shrimp trap, VISS = visual.

Appendix 5a. Results from the diver collections and pile scrapings

					Berth code	AQ3															AQ6										
					Pile replicate	1							2								1									2	
					Pile position	IN				OUT			IN				OUT				IN				OUT					IN	
Class	Orders	Family	Genus	Species	*Status	1	2	3	MISC	1	2	3	1	2	3	4	1	2	3	4	1	2	3	MISC	1	2	3	4	MISC	1	2
Actinopterygii	Perciformes	Gobiesocidae	*Dellichthys*	*morelandi*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Actinopterygii	Perciformes	Trypterigiidae	*Forsterygion*	*sp. post larva*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Anthozoa	Actiniaria	Aiptasiomorphidae	*Aiptasiomorpha*	*minima*	N	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Anthozoa	Actiniaria	Diadumenidae	*Diadumene*	*neozelandica*	N	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Anthozoa	Actiniaria	Sagartiidae	*Anthothoe*	*sp.*	SI	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Anthozoa	Actiniaria		*Acontiaria*	*sp.*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ascidiacea	Aplousobranchia	Didemnidae	*Didemnum*	*sp.*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ascidiacea	Phlebobranchia	Rhodosomatidae	*Corella*	*eumyota*	C1	0	1	1	0	0	1	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	1
Ascidiacea	Stolidobranchia	Botryllinae	*Botrylliodes*	*leachii*	C1	0	1	1	1	0	0	0	0	0	1	0	0	1	1	0	0	0	0	0	0	1	0	0	0	1	0
Ascidiacea	Stolidobranchia	Molgulidae	*Molgula*	*mortenseni*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ascidiacea	Stolidobranchia	Pyuridae	*Pyura*	*rugata*	N	1	1	1	1	0	1	0	0	0	0	0	0	0	0	0	1	0	1	0	0	1	0	0	0	1	1
Ascidiacea	Stolidobranchia	Pyuridae	*Pyura*	*cancellata*	N	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1	0
Ascidiacea	Stolidobranchia	Pyuridae	*Pyura*	*subuculata*	N	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	1	0
Ascidiacea	Stolidobranchia	Pyuridae	*Pyura*	*picta*	N	1	0	0	0	0	0	0	0	0	1	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Ascidiacea	Stolidobranchia	Pyuridae	*Pyura*	*pulla*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ascidiacea	Stolidobranchia	Pyuridae	*Pyura*	*pachydermatina*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Ascidiacea	Stolidobranchia	Styelidae	*Cnemidocarpa*	*nisiotus*	N	0	0	1	0	0	0	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1	1	0	1	1
Ascidiacea	Stolidobranchia	Styelidae	*Asterocarpa*	*cerea*	C1	0	1	1	0	0	0	0	0	0	1	0	0	1	1	0	1	0	0	0	1	0	1	0	0	0	0
Ascidiacea	Stolidobranchia	Styelidae	*Cnemidocarpa*	*bicornuta*	N	0	0	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ascidiacea	Stolidobranchia	Styelidae	*Cnemidocarpa*	*sp.*	A	0	0	1	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	1	0	0	0
Ascidiacea	Stolidobranchia	Styelidae	*Cnemidocarpa*	*regalis*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ascidiacea	Stolidobranchia	Styelidae	*Cnemidocarpa*	*otagoensis*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ascidiacea	Stolidobranchia	Styelidae	*Styela*	*plicata*	C1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ascidiacea	Stolidobranchia	Styelidae	*Asterocarpa*	*coerulea*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Ascidiacea	Stolidobranchia	Styelidae	*Pyura*	*trita*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Asteroidea	Valvatida	Asterinidae	*Patiriella*	*regularis*	N	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Asteroidea	Valvatida	Asterinidae	*Patiriella*	*sp.*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bivalvia	Myoida	Hiatellidae	*Hiatella*	*arctica*	N	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
Bivalvia	Mytiloida	Mytilidae	*Aulacomya*	*atra maoriana*	N	1	1	1	1	0	0	0	1	1	1	0	1	1	1	0	1	0	1	0	0	0	0	1	0	0	1
Bivalvia	Mytiloida	Mytilidae	*Mytilus*	*galloprovincialis*	C1	1	1	0	0	1	0	0	1	1	0	0	1	1	0	0	1	0	1	0	1	1	1	0	0	0	1
Bivalvia	Mytiloida	Mytilidae	*Perna*	*canaliculus*	N	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	1	0	0	0	0	0	0
Bivalvia	Mytiloida	Mytilidae	*Modiolarca*	*impacta*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	1	0	0	0	0
Bivalvia	Ostreoida	Anomiidae	*Pododesmus*	*zelandicus*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Bivalvia	Ostreoida	Ostreidae	*Ostrea*	*chilensis*	N	1	1	1	0	0	0	0	0	1	1	0	0	0	0	0	1	0	1	0	0	1	1	0	0	0	0
Bivalvia	Pterioida	Pectinidae	*Talochlamys*	*zelandiae*	N	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Bivalvia	Veneroida	Lasaeidae	*Borniola*	*reniformis*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bivalvia	Veneroida	Semelidae	*Leptomya*	*retiaria*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Crustacea	Anomura	Paguidae	*Pagurus*	*traversi*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Crustacea	Anomura	Porcellanidae	*Petrolisthes*	*elongatus*	N	1	1	1	1	0	0	0	1	1	0	1	1	1	0	0	1	0	1	0	0	0	0	1	0	1	0
Crustacea	Anomura	Porcellanidae	*Petrolisthes*	*novaezelandiae*	N	0	0	0	0	0	0	0	0	1	0	1	0	1	1	0	0	0	0	0	1	0	1	1	0	0	1
Crustacea	Brachyura	Cancridae	*Cancer*	*gibbosulus*	A	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Crustacea	Brachyura	Hymenosomatidae	*Halicarcinus*	*innominatus*	N	1	0	0	0	0	1	0	1	1	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Crustacea	Brachyura	Hymenosomatidae	*Halicarcinus*	*varius*	N	0	0	0	0	1	1	1	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	1	0	0	0
Crustacea	Brachyura	Hymenosomatidae	*Halicarcinus*	*cookii*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Crustacea	Brachyura	Majidae	*Notomithrax*	*minor*	N	1	0	1	0	0	1	0	1	1	0	0	0	0	1	0	1	0	1	0	1	1	1	0	0	1	0
Crustacea	Brachyura	Majidae	*Notomithrax*	*peronii*	N	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Crustacea	Brachyura	Majidae	*Notomithrax*	*ursus*	N	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Crustacea	Brachyura	Majidae	*Notomithrax*	*sp.*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Crustacea	Brachyura	Pinnotheridae	*Pinnotheres*	*novaezelandiae*	N	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Crustacea	Brachyura	Xanthidae	*Pilumnus*	*lumpinus*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Crustacea	Brachyura	Xanthidae	*Pilumnus*	*novaezelandiae*	N	0	1	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Crustacea	Caridea	Alpheidae	*Betaeopsis*	*aequimanus*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Crustacea	Caridea	Hippolytidae	*Hippolyte*	*bifidirostris*	N	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Crustacea	Thoracica	Balanidae	*Austrominius*	*modestus*	N	0	1	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	1	0
Crustacea	Thoracica	Chthamalidae	*Chaemosipho*	*columna*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Demospongiae	Dendroceratida	Darwinellidae	*Darwinella*	*cf. gardineri (rust red with spongin triacts)*	C1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Demospongiae	Dictyoceratida	Dysideidae	*Euryspongia*	*n. sp. 1 (soft spikey tan cushion)*	C2	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Demospongiae	Dictyoceratida	Dysideidae	*Dysidea*	*n. sp. 1 (erect cactus)*	C2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

*Status: A = non-indigenous (highlighted by shading), C1 = cryptogenic category 1, C2 = cryptogenic category 2, N = native, SI = species indeterminata. See text for details.

Appendix 5a. Results from the diver collections and pile scrapings

					Berth code	AQ3															AQ6										
					Pile replicate	1							2								1									2	
					Pile position	IN				OUT			IN				OUT				IN				OUT					IN	
Class	Orders	Family	Genus	Species	*Status	1	2	3	MISC	1	2	3	1	2	3	4	1	2	3	4	1	2	3	MISC	1	2	3	4	MISC	1	2
Demospongiae	Dictyoceratida	Irciniidae	*Ircinia*	*akaroa*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Demospongiae	Halichondrida	Halichondriidae	*Halichondria*	*panicea*	C1	0	1	1	0	0	0	0	0	1	1	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0
Demospongiae	Halichondrida	Halichondriidae	*Halichondria*	*n. sp. 1 (knubby oxeas 290-380)*	C2	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	1	0	0	0	0	0
Demospongiae	Halisarcida	Halisarcidae	*Halisarca*	*dujardini*	A	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	1	0
Demospongiae	Haplosclerida	Callyspongiidae	*Callyspongia*	*diffusa*	C1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Demospongiae	Haplosclerida	Chalinidae	*Haliclona*	*cf. punctata*	N	1	0	0	0	0	1	0	1	1	0	0	1	0	1	0	0	0	1	0	1	0	0	0	0	0	0
Demospongiae	Haplosclerida	Chalinidae	*Haliclona*	*glabra*	N	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0
Demospongiae	Haplosclerida	Chalinidae	*Haliclona*	*cf. isodictyale*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Demospongiae	Homosclerophorida	Plakinidae	*Plakina*	*trilopha*	C1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Demospongiae	Poecilosclerida	Ancinoiidae	*Crella (Pytheas)*	*incrustans*	C1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Demospongiae	Poecilosclerida	Crellidae	*Crella (Pytheas)*	*affinis*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Demospongiae	Poecilosclerida	Hymedesmiidae	*Phorbas*	*fulva*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0
Demospongiae	Poecilosclerida	Microcionidae	*Clathria (Microciona)*	*dendyi*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Demospongiae	Poecilosclerida	Microcionidae	*Ophlitospongia*	*reticulata*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Demospongiae	Poecilosclerida	Mycalidae	*Mycale (Carmia)*	*tasmani*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0
Gastropoda	Vetigastropoda	Fissurellidae	*Tugali*	*suteri*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gastropoda	Vetigastropoda	Trochidae	*Trochus*	*tiaratus*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gymnolaemata	Cheilostomata	Aeteidae	*Aetea*	*?australis*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Gymnolaemata	Cheilostomata	Beaniidae	*Beania*	*n. sp. [whitten]*	N	1	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0
Gymnolaemata	Cheilostomata	Beaniidae	*Beania*	*discodermiae*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Gymnolaemata	Cheilostomata	Bitectiporidae	*Bitectipora*	*rostrata*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gymnolaemata	Cheilostomata	Bugulidae	*Bugula*	*flabellata*	A	0	0	1	0	0	0	1	0	0	0	0	0	0	1	1	0	1	1	0	1	0	1	1	0	0	0
Gymnolaemata	Cheilostomata	Calloporidae	*Crassimarginatella*	*fossa*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gymnolaemata	Cheilostomata	Candidae	*Caberea*	*rostrata*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gymnolaemata	Cheilostomata	Candidae	*Scrupocellaria*	*ornithorhyncus*	N	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gymnolaemata	Cheilostomata	Chaperiidae	*Chaperia*	*granulosa*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gymnolaemata	Cheilostomata	Crepidacanthidae	*Crepidacantha*	*crinispina*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gymnolaemata	Cheilostomata	Cryptosulidae	*Cryptosula*	*pallasiana*	A	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gymnolaemata	Cheilostomata	Cyclicoporidae	*Cyclicopora*	*longipora*	A	0	1	0	0	0	1	0	0	1	0	0	0	1	1	0	0	0	1	0	1	0	0	1	0	0	0
Gymnolaemata	Cheilostomata	Eurystomellidae	*Eurystomella*	*foraminigera*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gymnolaemata	Cheilostomata	Hippothoidae	*Celleporella*	*tongima*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gymnolaemata	Cheilostomata	Hippothoidae	*Celleporella*	*sp.*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Gymnolaemata	Cheilostomata	Hippothoidae	*Hippothoa*	*flagellum*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gymnolaemata	Cheilostomata	Microporellidae	*Microporella*	*speculum*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gymnolaemata	Cheilostomata	Microporellidae	*Microporella*	*agonistes*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gymnolaemata	Cheilostomata	Romancheinidae	*Escharoides*	*angela*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gymnolaemata	Cheilostomata	Scrupariidae	*Scruparia*	*ambigua*	C1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gymnolaemata	Cheilostomata	Smittinidae	*Smittina*	*rosacea*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gymnolaemata	Cheilostomata	Watersiporidae	*Watersipora*	*subtorquata*	A	0	0	0	0	0	1	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	1	0	0	0
Hydrozoa	Hydroida	Bougainvilliidae	*Bougainvillia*	*?muscus*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hydrozoa	Hydroida	Campanulariidae	*Obelia*	*dichotoma*	C1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hydrozoa	Hydroida	Campanulariidae	*Obelia*	*geniculata*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Hydrozoa	Hydroida	Eudendriidae	*Eudendrium*	*capillare*	A	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hydrozoa	Hydroida	Lafoeidae	*Filellum*	*sp. indeterminate*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hydrozoa	Hydroida	Sertulariidae	*Sertularella*	*robusta*	N	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Malacostraca	Amphipoda	Aoridae	*Aora*	*typica*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Malacostraca	Amphipoda	Aoridae	*Haplocheira*	*barbimana*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Malacostraca	Amphipoda	Corophiidae	*Meridiolembos*	*sp.*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Malacostraca	Amphipoda	Dexaminidae	*Paradexamine*	*pacifica*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Malacostraca	Amphipoda	Eusiridae	*Gondogeneia*	*danai*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Malacostraca	Amphipoda	Isaeidae	*Gammaropsis*	*sp. 1*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Malacostraca	Amphipoda	Leucothoidae	*Leucothoe*	*trailli*	N	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	1
Malacostraca	Amphipoda	Lysianassidae	*Parawaldeckia*	*vesca*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Malacostraca	Amphipoda	Melitidae	*Melita*	*inaequistylis*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Malacostraca	Amphipoda	Stenothoidae	*Stenothoe*	*sp. 1*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Malacostraca	Isopoda	Janiridae	*Iathrippa*	*?longicauda*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Malacostraca	Isopoda	Pseudojaniridae	*Schottea*	*sp*	SI	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Malacostraca	Isopoda	Sphaeromatidae	*Joeropsis*	*?neozelanica*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

*Status: A = non-indigenous (highlighted by shading), C1 = cryptogenic category 1, C2 = cryptogenic category 2, N = native, SI = species indeterminata. See text for details.

Appendix 5a. Results from the diver collections and pile scrapings

Berth code						AQ3																			AQ6														
Pile replicate						1							2												1											2	
Pile position						IN				OUT			IN				OUT				IN				OUT					IN	
Class	Orders	Family	Genus	Species	*Status	1	2	3	MISC	1	2	3	1	2	3	4	1	2	3	4	1	2	3	MISC	1	2	3	4	MISC	1	2
Malacostraca	Mysida	Mysidae	*Heteromysis or Mysidetes*	*sp.*	SI	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phaeophyceae	Ectocarpales	Scytothamnaceae	*Scytothamnus*	*australis*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phaeophyceae	Laminariales	Alariaceae	*Undaria*	*pinnatifida*	A	0	0	0	0	1	1	1	0	0	0	0	1	1	1	0	0	0	0	0	1	1	1	0	0	0	0
Polychaeta	Eunicida	Dorvilleidae	*Dorvillea*	*australiensis*	N	0	1	1	0	0	0	0	0	1	1	0	0	1	0	0	0	1	1	0	1	0	1	0	0	0	1
Polychaeta	Eunicida	Dorvilleidae	*Schistomeringos*	*loveni*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Eunicida	Eunicidae	*Eunice*	*australis*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0
Polychaeta	Eunicida	Lumbrineridae	*Lumbrineris*	*sphaerocephala*	N	0	0	1	0	0	0	0	1	0	0	0	0	1	1	0	0	1	0	0	1	1	1	1	0	0	1
Polychaeta	Eunicida	Lumbrineridae	*Lumbricalus*	*aotearoae*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Phyllodocida	Hesionidae	*Ophiodromus*	*angustifrons*	N	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Polychaeta	Phyllodocida	Nereididae	*Neanthes*	*kerguelensis*	N	0	1	1	0	0	1	0	0	0	1	0	0	1	1	1	0	0	0	0	0	0	1	0	0	0	0
Polychaeta	Phyllodocida	Nereididae	*Platynereis*	*Platynereis_australis_group*	SI	0	0	0	0	1	1	0	0	1	0	0	1	1	1	0	0	0	0	1	1	1	0	0	0	1	1
Polychaeta	Phyllodocida	Nereididae	*Nereis*	*falcaria*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0
Polychaeta	Phyllodocida	Nereididae	*Perinereis*	*camiguinoides*	N	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Phyllodocida	Nereididae	*Nereididae*	*indet*	SI	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Phyllodocida	Nereididae	*Neanthes*	*Neanthes-A*	SI	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Phyllodocida	Nereididae	*Perinereis*	*amblyodonta*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Phyllodocida	Phyllodocidae	*Pirakia*	*Pirakia-A*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Polychaeta	Phyllodocida	Phyllodocidae	*Eulalia*	*Eulalia-NIWA-2*	SI	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Polychaeta	Phyllodocida	Phyllodocidae	*Pterocirrus*	*brevicornis*	N	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Polychaeta	Phyllodocida	Phyllodocidae	*Phyllodocidae*	*Indet*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Polychaeta	Phyllodocida	Phyllodocidae	*Eulalia*	*capensis*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Polychaeta	Phyllodocida	Polynoidae	*Lepidonotus*	*polychromus*	N	1	1	1	0	0	1	0	1	1	1	0	1	0	0	0	1	1	1	0	1	1	1	0	0	1	0
Polychaeta	Phyllodocida	Polynoidae	*Lepidonotus*	*jacksoni*	N	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Phyllodocida	Polynoidae	*Lepidastheniella*	*comma*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Phyllodocida	Polynoidae	*Harmothoinae*	*Indet*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Phyllodocida	Polynoidae	*Lepidonotus*	*Lepidonotus-A*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Phyllodocida	Polynoidae	*Polynoidae*	*indet*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Phyllodocida	Sigalionidae	*Labiosthenolepis*	*laevis*	N	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Phyllodocida	Syllidae	*Eusyllin-unknown*	*Eusyllin-unknown-A*	SI	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Polychaeta	Phyllodocida	Syllidae	*Haplosyllis*	*spongicola*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Phyllodocida	Syllidae	*Eusyllis*	*Eusyllis-A*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Phyllodocida	Syllidae	*Autolytin-unknown*	*Indet*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Polychaeta	Phyllodocida	Syllidae	*Eusyllis*	*Eusyllis-C*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Polychaeta	Phyllodocida	Syllidae	*Syllidae*	*Indet*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Sabellida	Sabellidae	*Megalomma*	*suspiciens*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0
Polychaeta	Sabellida	Sabellidae	*Sabellidae*	*Indet*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Polychaeta	Sabellida	Sabellidae	*Pseudopotamilla*	*laciniosa*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Sabellida	Sabellidae	*Pseudopotamilla*	*Pseudopotamilla-A*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Sabellida	Serpulidae	*Galeolaria*	*hystrix*	N	0	0	1	0	0	0	0	0	0	1	0	0	0	1	0	1	0	1	0	0	0	1	0	0	1	1
Polychaeta	Sabellida	Serpulidae	*Serpula*	*Serpula-C*	SI	0	1	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	1	0	0	0	0	0	0	0	1
Polychaeta	Sabellida	Serpulidae	*Spirobranchus*	*Indet*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Sabellida	Serpulidae	*Serpulidae*	*Indet*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Polychaeta	Sabellida	Serpulidae	*Spirobranchus*	*cariniferus*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Polychaeta	Sabellida	Serpulidae	*Spirobranchus*	*polytrema*	A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0
Polychaeta	Sabellida	Serpulidae	*Spirorbinae*	*Indet*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Sabellida	Serpulidae	*Galeolaria*	*Galeolaria-A*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Scolecida	Opheliidae	*Armandia*	*maculata*	N	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Scolecida	Orbiniidae	*Proscoloplos*	*bondi*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Scolecida	Orbiniidae	*Scoloplos*	*cylindrifer*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Scolecida	Scalibregmatidae	*Hyboscolex*	*longiseta*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Spionida	Chaetopteridae	*Chaetopteridae*	*Indet*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Spionida	Spionidae	*Polydora*	*hoplura*	A	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Spionida	Spionidae	*Boccardia*	*chilensis*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Spionida	Spionidae	*Boccardia*	*knoxi*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Polychaeta	Spionida	Spionidae	*Boccardia*	*lamellata*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Spionida	Spionidae	*Dipolydora*	*armata*	A	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Spionida	Spionidae	*Polydora*	*Indet*	SI	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Polychaeta	Spionida	Spionidae	*Boccardia*	*Indet*	SI	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

*Status: A = non-indigenous (highlighted by shading), C1 = cryptogenic category 1, C2 = cryptogenic category 2, N = native, SI = species indeterminata. See text for details.

Appendix 5a. Results from the diver collections and pile scrapings

					Berth code	AQ3															AQ6										
					Pile replicate	1							2								1									2	
					Pile position	IN				OUT			IN				OUT				IN				OUT					IN	
Class	Orders	Family	Genus	Species	*Status	1	2	3	MISC	1	2	3	1	2	3	4	1	2	3	4	1	2	3	MISC	1	2	3	4	MISC	1	2
Polychaeta	Spionida	Spionidae	*Boccardia*	*acus*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Spionida	Spionidae	*Carazziella*	*quadricirrata*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Terebellida	Acrocirridae	*Acrocirrus*	*trisectus*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Terebellida	Cirratulidae	*Dodecaceria*	*berkeleyi*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Terebellida	Cirratulidae	*Cirratulus*	*Cirratulus-A*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Terebellida	Cirratulidae	*Protocirrineris*	*nuchalis*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Terebellida	Cirratulidae	*Timarete*	*anchylochaetus*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Terebellida	Flabelligeridae	*Flabelligera*	*affinis*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Terebellida	Flabelligeridae	*Pherusa*	*parmata*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Terebellida	Terebellidae	*Pseudopista*	*rostrata*	N	0	0	1	1	0	0	0	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Terebellida	Terebellidae	*Nicolea*	*armilla*	N	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Polychaeta	Terebellida	Terebellidae	*Streblosoma*	*toddae*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Terebellida	Terebellidae	*Terebellidae*	*Indet*	SI	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Terebellida	Terebellidae	*Pista*	*pegma*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta			*Not_Lepidonotinae*	*Indet*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Polyplacophora	Acanthochitonina	Acanthochitonidae	*Cryptoconchus*	*porosus*	N	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0
Polyplacophora	Acanthochitonina	Acanthochitonidae	*Acanthochitona*	*zelandica*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polyplacophora	Acanthochitonina	Acanthochitonidae	*Acanthochitona*	*violacea*	N	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polyplacophora	Ischnochitonina	Chitonidae	*Rhyssoplax*	*aerea*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polyplacophora	Ischnochitonina	Chitonidae	*Onithochiton*	*neglectus*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polyplacophora	Ischnochitonina	Mopaliidae	*Plaxiphora*	*caelata*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polyplacophora	Ischnochitonina	Mopaliidae	*Plaxiphora*	*obtecta*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodophyceae	Acrochaetiales	Acrochaetiaceae	*Audouinella*	*sp.*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Rhodophyceae	Bangiales	Bangiaceae	*Porphyra*	*sp.*	SI	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodophyceae	Ceramiales	Ceramiaceae	*Griffithsia*	*crassiuscula*	A	0	0	0	0	0	0	1	0	1	1	0	1	1	1	0	1	1	1	0	0	1	1	0	1	1	0
Rhodophyceae	Ceramiales	Ceramiaceae	*Ceramium*	*apiculatum*	N	0	0	0	0	1	1	0	0	0	0	0	1	1	1	0	0	0	0	0	1	0	0	0	1	0	0
Rhodophyceae	Ceramiales	Ceramiaceae	*Griffithsia*	*sp.*	SI	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodophyceae	Ceramiales	Ceramiaceae	*Ceramium*	*flaccidum*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodophyceae	Ceramiales	Ceramiaceae	*Medeiothamnion*	*lyallii*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodophyceae	Ceramiales	Ceramiaceae	*Ceramium*	*sp.*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodophyceae	Ceramiales	Ceramiaceae	*Antithamnionella*	*adnata*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodophyceae	Ceramiales	Ceramiaceae	*Callithamnion*	*consanguineum*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Rhodophyceae	Ceramiales	Deleseriaceae	*Phycodrys*	*quercifolia*	N	0	1	1	0	0	0	0	0	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	1	1	0
Rhodophyceae	Ceramiales	Deleseriaceae	*Schizoseris*	*griffithsia*	N	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Rhodophyceae	Ceramiales	Deleseriaceae	*Myriogramme*	*denticulata*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodophyceae	Ceramiales	Deleseriaceae	*Acrosorium*	*decumbens*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodophyceae	Ceramiales	Deleseriaceae	*Hymenena*	*variolosa*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodophyceae	Ceramiales	Deleseriaceae	*Myriogramme*	*sp.*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodophyceae	Ceramiales	Delesseriaceae	*Schizoseris*	*dichotoma*	N	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0
Rhodophyceae	Ceramiales	Delesseriaceae	*Valeriemaya*	*sp.*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodophyceae	Ceramiales	Delesseriaceae	*Erythroglossum*	*sp.*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodophyceae	Ceramiales	Delesseriaceae	*Erythroglossum*	*undulatissimum*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodophyceae	Ceramiales	Delesseriaceae	*Phycodrys*	*sp.*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodophyceae	Ceramiales	Rhodomelaceae	*Polysiphonia*	*sp.*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodophyceae	Ceramiales	Rhodomelaceae	*Cladhymenia*	*oblongifolia*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodophyceae	Corallinales	Corallinaceae	*Non-geniculate*	*coralline*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodophyceae	Gigartinales	Cystocloniaceae	*Rhodophyllis*	*centrocarpa*	N	0	0	0	0	0	0	0	0	1	0	0	0	1	1	0	1	1	0	0	1	0	1	0	0	0	0
Rhodophyceae	Gigartinales	Gigartinaceae	*Gigartina*	*atropurpurea*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodophyceae	Gigartinales	Kallymeniaceae	*Callophyllis*	*variegata*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodophyceae	Rhodymeniales	Faucheaceae	*Gloiocladia*	*saccata*	N	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Rhodophyceae	Rhodymeniales	Rhodomeniaceae	*Rhodymenia*	*sp.*	SI	0	0	0	0	1	0	1	0	0	0	0	0	1	0	0	1	0	0	0	1	1	0	0	0	1	0
Rhodophyceae	Rhodymeniales	Rhodomeniaceae	*Rhodymenia*	*leptophylla*	N	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Turbellaria	Polycladida	Stylochidae	*Planocera?*	*sp.*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Turbellaria	Polycladida	Stylochidae	*Enterogonia*	*sp.*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Turbellaria	Polycladida		*Indet genus*	*indet sp.*	SI	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ulvophyceae	Cladophorales	Cladophoraceae	*Cladophora*	*feredayi*	N	0	0	0	0	1	1	0	0	0	0	0	0	1	1	0	0	1	0	0	1	1	1	0	0	0	0
Ulvophyceae	Ulvales	Ulvaceae	*Ulva*	*sp.*	SI	0	0	0	0	1	1	1	0	0	0	0	1	1	0	0	0	0	0	0	1	0	1	0	1	0	0
Ulvophyceae	Ulvales	Ulvaceae	*Enteromorpha*	*sp.*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

*Status: A = non-indigenous (highlighted by shading), C1 = cryptogenic category 1, C2 = cryptogenic category 2, N = native, SI = species indeterminata. See text for details.

Appendix 5a. Results from the diver collections and pile scrapings

					Berth code							BURN																	KINGS	
					Pile replicate							1								2									1	
					Pile position			OUT				IN				OUT				IN				OUT					IN	
Class	Orders	Family	Genus	Species	*Status	3	4	1	2	3	4	1	2	3	MISC	1	2	3	4	1	2	3	MISC	1	2	3	4	MISC	1	2
Actinopterygii	Perciformes	Gobiesocidae	*Dellichthys*	*morelandi*	N	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Actinopterygii	Perciformes	Trypterigiidae	*Forsterygion*	*sp. post larva*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Anthozoa	Actiniaria	Aiptasiomorphidae	*Aiptasiomorpha*	*minima*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Anthozoa	Actiniaria	Diadumenidae	*Diadumene*	*neozelandica*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Anthozoa	Actiniaria	Sagartiidae	*Anthothoe*	*sp.*	SI	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Anthozoa	Actiniaria		*Acontiaria*	*sp.*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ascidiacea	Aplousobranchia	Didemnidae	*Didemnum*	*sp.*	SI	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0
Ascidiacea	Phlebobranchia	Rhodosomatidae	*Corella*	*eumyota*	C1	1	0	0	0	1	1	1	1	1	0	1	1	0	0	1	1	1	1	1	0	1	0	0	1	0
Ascidiacea	Stolidobranchia	Botryllinae	*Botrylliodes*	*leachii*	C1	1	0	0	1	1	1	0	1	0	1	1	0	0	1	1	0	0	1	1	0	1	1	1	0	1
Ascidiacea	Stolidobranchia	Molgulidae	*Molgula*	*mortenseni*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Ascidiacea	Stolidobranchia	Pyuridae	*Pyura*	*rugata*	N	0	0	0	1	0	0	0	1	1	0	1	1	0	0	0	1	1	0	1	1	0	0	0	0	0
Ascidiacea	Stolidobranchia	Pyuridae	*Pyura*	*cancellata*	N	0	0	0	0	0	0	1	0	0	0	0	1	0	0	1	1	1	0	1	1	1	0	0	1	0
Ascidiacea	Stolidobranchia	Pyuridae	*Pyura*	*subuculata*	N	0	0	0	0	1	0	1	0	0	0	1	0	0	0	0	1	1	0	0	1	0	0	0	0	0
Ascidiacea	Stolidobranchia	Pyuridae	*Pyura*	*picta*	N	0	0	0	0	0	0	0	1	0	0	1	0	1	0	1	0	0	0	0	0	1	0	0	0	0
Ascidiacea	Stolidobranchia	Pyuridae	*Pyura*	*pulla*	N	0	0	0	0	0	1	1	0	0	0	0	0	0	1	0	1	0	0	0	0	0	1	0	1	0
Ascidiacea	Stolidobranchia	Pyuridae	*Pyura*	*pachydermatina*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ascidiacea	Stolidobranchia	Styelidae	*Cnemidocarpa*	*nisiotus*	N	0	0	0	1	1	1	0	1	0	0	0	1	1	1	0	1	1	0	0	1	1	1	0	0	1
Ascidiacea	Stolidobranchia	Styelidae	*Asterocarpa*	*cerea*	C1	1	0	0	1	0	1	1	1	0	0	1	0	0	1	0	1	0	0	0	0	0	1	0	0	0
Ascidiacea	Stolidobranchia	Styelidae	*Cnemidocarpa*	*bicornuta*	N	1	0	0	0	1	1	0	1	1	0	0	0	0	1	0	0	1	0	1	1	1	1	0	0	0
Ascidiacea	Stolidobranchia	Styelidae	*Cnemidocarpa*	*sp.*	A	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ascidiacea	Stolidobranchia	Styelidae	*Cnemidocarpa*	*regalis*	N	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Ascidiacea	Stolidobranchia	Styelidae	*Cnemidocarpa*	*otagoensis*	N	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ascidiacea	Stolidobranchia	Styelidae	*Styela*	*plicata*	C1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Ascidiacea	Stolidobranchia	Styelidae	*Asterocarpa*	*coerulea*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ascidiacea	Stolidobranchia	Styelidae	*Pyura*	*trita*	N	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Asteroidea	Valvatida	Asterinidae	*Patiriella*	*regularis*	N	0	0	0	0	0	0	1	1	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Asteroidea	Valvatida	Asterinidae	*Patiriella*	*sp.*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Bivalvia	Myoida	Hiatellidae	*Hiatella*	*arctica*	N	1	0	0	0	1	1	1	1	0	0	0	1	1	1	0	1	1	0	0	0	0	1	0	1	0
Bivalvia	Mytiloida	Mytilidae	*Aulacomya*	*atra maoriana*	N	1	0	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	0	1	1	1	0	0	1	0
Bivalvia	Mytiloida	Mytilidae	*Mytilus*	*galloprovincialis*	C1	1	0	1	1	1	1	1	0	0	0	0	1	1	1	1	1	1	1	1	1	0	1	0	1	0
Bivalvia	Mytiloida	Mytilidae	*Perna*	*canaliculus*	N	0	0	0	0	1	1	0	0	0	0	0	1	0	0	1	0	0	0	1	0	0	0	0	0	0
Bivalvia	Mytiloida	Mytilidae	*Modiolarca*	*impacta*	N	0	0	0	0	0	0	0	0	1	0	0	0	1	1	0	1	0	0	0	0	0	1	0	0	0
Bivalvia	Ostreoida	Anomiidae	*Pododesmus*	*zelandicus*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	1	0
Bivalvia	Ostreoida	Ostreidae	*Ostrea*	*chilensis*	N	0	0	0	0	1	1	1	1	1	0	1	1	1	1	1	1	1	0	1	1	1	1	0	1	0
Bivalvia	Pterioida	Pectinidae	*Talochlamys*	*zelandiae*	N	1	0	0	0	0	0	0	0	1	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0
Bivalvia	Veneroida	Lasaeidae	*Borniola*	*reniformis*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bivalvia	Veneroida	Semelidae	*Leptomya*	*retiaria*	N	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Crustacea	Anomura	Paguidae	*Pagurus*	*traversi*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Crustacea	Anomura	Porcellanidae	*Petrolisthes*	*elongatus*	N	1	0	1	1	1	1	1	1	0	0	1	1	0	1	1	1	1	0	1	1	1	0	0	1	0
Crustacea	Anomura	Porcellanidae	*Petrolisthes*	*novaezelandiae*	N	1	0	0	1	1	0	1	1	1	0	1	1	1	1	0	1	1	1	1	1	1	1	0	1	0
Crustacea	Brachyura	Cancridae	*Cancer*	*gibbosulus*	A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Crustacea	Brachyura	Hymenosomatidae	*Halicarcinus*	*innominatus*	N	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0
Crustacea	Brachyura	Hymenosomatidae	*Halicarcinus*	*varius*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Crustacea	Brachyura	Hymenosomatidae	*Halicarcinus*	*cookii*	N	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Crustacea	Brachyura	Majidae	*Notomithrax*	*minor*	N	0	0	0	1	1	1	0	0	1	0	1	1	1	1	1	0	0	0	1	1	1	0	0	0	0
Crustacea	Brachyura	Majidae	*Notomithrax*	*peronii*	N	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Crustacea	Brachyura	Majidae	*Notomithrax*	*ursus*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Crustacea	Brachyura	Majidae	*Notomithrax*	*sp.*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Crustacea	Brachyura	Pinnotheridae	*Pinnotheres*	*novaezelandiae*	N	0	0	0	0	0	0	0	1	1	0	1	1	0	0	1	0	1	0	1	0	0	0	0	0	0
Crustacea	Brachyura	Xanthidae	*Pilumnus*	*lumpinus*	N	1	0	0	0	0	0	1	1	1	0	1	1	1	0	0	0	1	0	0	0	0	0	1	0	0
Crustacea	Brachyura	Xanthidae	*Pilumnus*	*novaezelandiae*	N	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	1
Crustacea	Caridea	Alpheidae	*Betaeopsis*	*aequimanus*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Crustacea	Caridea	Hippolytidae	*Hippolyte*	*bifidirostris*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Crustacea	Thoracica	Balanidae	*Austrominius*	*modestus*	N	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Crustacea	Thoracica	Chthamalidae	*Chaemosipho*	*columna*	N	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Demospongiae	Dendroceratida	Darwinellidae	*Darwinella*	*cf. gardineri (rust red with spongin triacts)*	C1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Demospongiae	Dictyoceratida	Dysideidae	*Euryspongia*	*n. sp. 1 (soft spikey tan cushion)*	C2	0	0	0	0	0	0	1	0	0	0	1	1	1	0	0	1	1	0	0	1	1	0	1	0	0
Demospongiae	Dictyoceratida	Dysideidae	*Dysidea*	*n. sp. 1 (erect cactus)*	C2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

*Status: A = non-indigenous (highlighted by shading), C1 = cryptogenic category 1, C2 = cryptogenic category 2, N = native, SI = species indeterminata. See text for details.

Appendix 5a. Results from the diver collections and pile scrapings

					Berth code						BURN																		KINGS	
					Pile replicate							1									2									1
					Pile position			OUT				IN				OUT				IN				OUT					IN	
Class	Orders	Family	Genus	Species	*Status	3	4	1	2	3	4	1	2	3	MISC	1	2	3	4	1	2	3	MISC	1	2	3	4	MISC	1	2
Demospongiae	Dictyoceratida	Irciniidae	*Ircinia*	*akaroa*	N	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Demospongiae	Halichondrida	Halichondriidae	*Halichondria*	*panicea*	C1	1	0	0	0	1	0	1	0	0	1	0	0	1	0	0	1	0	0	0	1	1	0	1	0	0
Demospongiae	Halichondrida	Halichondriidae	*Halichondria*	*n. sp. 1 (knubby oxeas 290-380)*	C2	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Demospongiae	Halisarcida	Halisarcidae	*Halisarca*	*dujardini*	A	1	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Demospongiae	Haplosclerida	Callyspongiidae	*Callyspongia*	*diffusa*	C1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Demospongiae	Haplosclerida	Chalinidae	*Haliclona*	*cf. punctata*	N	0	0	1	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	1	0
Demospongiae	Haplosclerida	Chalinidae	*Haliclona*	*glabra*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Demospongiae	Haplosclerida	Chalinidae	*Haliclona*	*cf. isodictyale*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Demospongiae	Homosclerophorida	Plakinidae	*Plakina*	*trilopha*	C1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0
Demospongiae	Poecilosclerida	Ancinoiidae	*Crella (Pytheas)*	*incrustans*	C1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Demospongiae	Poecilosclerida	Crellidae	*Crella (Pytheas)*	*affinis*	N	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	1	0	0
Demospongiae	Poecilosclerida	Hymedesmiidae	*Phorbas*	*fulva*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Demospongiae	Poecilosclerida	Microcionidae	*Clathria (Microciona)*	*dendyi*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Demospongiae	Poecilosclerida	Microcionidae	*Ophlitospongia*	*reticulata*	N	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Demospongiae	Poecilosclerida	Mycalidae	*Mycale (Carmia)*	*tasmani*	N	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1	0	0	0	0	0	0	1	0
Gastropoda	Vetigastropoda	Fissurellidae	*Tugali*	*suteri*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0
Gastropoda	Vetigastropoda	Trochidae	*Trochus*	*tiaratus*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Gymnolaemata	Cheilostomata	Aeteidae	*Aetea*	*?australis*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gymnolaemata	Cheilostomata	Beaniidae	*Beania*	*n. sp. [whitten]*	N	0	0	0	1	1	0	1	1	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Gymnolaemata	Cheilostomata	Beaniidae	*Beania*	*discodermiae*	N	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gymnolaemata	Cheilostomata	Bitectiporidae	*Bitectipora*	*rostrata*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Gymnolaemata	Cheilostomata	Bugulidae	*Bugula*	*flabellata*	A	1	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	1
Gymnolaemata	Cheilostomata	Calloporidae	*Crassimarginatella*	*fossa*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gymnolaemata	Cheilostomata	Candidae	*Caberea*	*rostrata*	N	0	0	0	0	0	0	0	1	0	0	1	1	1	1	1	1	1	1	0	1	1	1	0	0	0
Gymnolaemata	Cheilostomata	Candidae	*Scrupocellaria*	*ornithorhyncus*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gymnolaemata	Cheilostomata	Chaperiidae	*Chaperia*	*granulosa*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Gymnolaemata	Cheilostomata	Crepidacanthidae	*Crepidacantha*	*crinispina*	N	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Gymnolaemata	Cheilostomata	Cryptosulidae	*Cryptosula*	*pallasiana*	A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gymnolaemata	Cheilostomata	Cyclicoporidae	*Cyclicopora*	*longipora*	A	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gymnolaemata	Cheilostomata	Eurystomellidae	*Eurystomella*	*foraminigera*	N	0	0	0	0	0	0	1	0	1	0	1	0	1	0	0	0	1	0	1	1	1	0	0	0	0
Gymnolaemata	Cheilostomata	Hippothoidae	*Celleporella*	*tongima*	N	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	1	1	0	0	0	0	0
Gymnolaemata	Cheilostomata	Hippothoidae	*Celleporella*	*sp.*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gymnolaemata	Cheilostomata	Hippothoidae	*Hippothoa*	*flagellum*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Gymnolaemata	Cheilostomata	Microporellidae	*Microporella*	*speculum*	N	0	0	0	0	0	0	1	0	1	0	1	0	0	0	1	0	1	0	1	0	0	0	0	0	0
Gymnolaemata	Cheilostomata	Microporellidae	*Microporella*	*agonistes*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gymnolaemata	Cheilostomata	Romancheinidae	*Escharoides*	*angela*	N	0	0	0	0	0	0	1	0	0	0	1	0	1	1	0	0	1	0	1	1	0	0	0	0	0
Gymnolaemata	Cheilostomata	Scrupariidae	*Scruparia*	*ambigua*	C1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Gymnolaemata	Cheilostomata	Smittinidae	*Smittina*	*rosacea*	N	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0
Gymnolaemata	Cheilostomata	Watersiporidae	*Watersipora*	*subtorquata*	A	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hydrozoa	Hydroida	Bougainvilliidae	*Bougainvillia*	*?muscus*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hydrozoa	Hydroida	Campanulariidae	*Obelia*	*dichotoma*	C1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hydrozoa	Hydroida	Campanulariidae	*Obelia*	*geniculata*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hydrozoa	Hydroida	Eudendriidae	*Eudendrium*	*capillare*	A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hydrozoa	Hydroida	Lafoeidae	*Filellum*	*sp. indeterminate*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Hydrozoa	Hydroida	Sertulariidae	*Sertularella*	*robusta*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Malacostraca	Amphipoda	Aoridae	*Aora*	*typica*	N	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Malacostraca	Amphipoda	Aoridae	*Haplocheira*	*barbimana*	N	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Malacostraca	Amphipoda	Corophiidae	*Meridiolembos*	*sp.*	SI	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Malacostraca	Amphipoda	Dexaminidae	*Paradexamine*	*pacifica*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Malacostraca	Amphipoda	Eusiridae	*Gondogeneia*	*danai*	N	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Malacostraca	Amphipoda	Isaeidae	*Gammaropsis*	*sp. 1*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Malacostraca	Amphipoda	Leucothoidae	*Leucothoe*	*trailli*	N	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0
Malacostraca	Amphipoda	Lysianassidae	*Parawaldeckia*	*vesca*	N	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Malacostraca	Amphipoda	Melitidae	*Melita*	*inaequistylis*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Malacostraca	Amphipoda	Stenothoidae	*Stenothoe*	*sp. 1*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Malacostraca	Isopoda	Janiridae	*Iathrippa*	*?longicauda*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Malacostraca	Isopoda	Pseudojaniridae	*Schottea*	*sp*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Malacostraca	Isopoda	Sphaeromatidae	*Joeropsis*	*?neozelanica*	SI	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0

*Status: A = non-indigenous (highlighted by shading), C1 = cryptogenic category 1, C2 = cryptogenic category 2, N = native, SI = species indeterminata. See text for details.

Appendix 5a. Results from the diver collections and pile scrapings

					Berth code			BURN																					KINGS	
					Pile replicate							1								2										1
					Pile position			OUT				IN				OUT				IN				OUT					IN	
Class	Orders	Family	Genus	Species	*Status	3	4	1	2	3	4	1	2	3	MISC	1	2	3	4	1	2	3	MISC	1	2	3	4	MISC	1	2
Malacostraca	Mysida	Mysidae	*Heteromysis or Mysidetes*	*sp.*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phaeophyceae	Ectocarpales	Scytothamnaceae	*Scytothamnus*	*australis*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Phaeophyceae	Laminariales	Alariaceae	*Undaria*	*pinnatifida*	A	0	0	0	1	0	0	0	0	0	0	1	1	0	0	1	0	0	0	1	1	1	0	0	0	0
Polychaeta	Eunicida	Dorvilleidae	*Dorvillea*	*australiensis*	N	0	0	0	0	1	1	0	1	0	0	1	1	1	1	0	1	1	0	1	1	1	1	0	1	0
Polychaeta	Eunicida	Dorvilleidae	*Schistomeringos*	*loveni*	N	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Eunicida	Eunicidae	*Eunice*	*australis*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Polychaeta	Eunicida	Lumbrineridae	*Lumbrineris*	*sphaerocephala*	N	0	0	0	1	1	1	1	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	1
Polychaeta	Eunicida	Lumbrineridae	*Lumbricalus*	*aotearoae*	N	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Phyllodocida	Hesionidae	*Ophiodromus*	*angustifrons*	N	0	0	0	0	1	1	1	1	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0
Polychaeta	Phyllodocida	Nereididae	*Neanthes*	*kerguelensis*	N	1	0	0	1	0	1	0	0	1	1	0	0	1	1	0	0	1	0	1	1	0	1	0	1	1
Polychaeta	Phyllodocida	Nereididae	*Platynereis*	*Platynereis_australis_group*	SI	0	0	1	1	0	1	1	0	1	0	1	1	1	0	1	0	0	0	1	1	1	0	0	0	1
Polychaeta	Phyllodocida	Nereididae	*Nereis*	*falcaria*	N	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Polychaeta	Phyllodocida	Nereididae	*Perinereis*	*camiguinoides*	N	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Phyllodocida	Nereididae	*Nereididae*	*indet*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Polychaeta	Phyllodocida	Nereididae	*Neanthes*	*Neanthes-A*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Phyllodocida	Nereididae	*Perinereis*	*amblyodonta*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Phyllodocida	Phyllodocidae	*Pirakia*	*Pirakia-A*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	1	0	0	0
Polychaeta	Phyllodocida	Phyllodocidae	*Eulalia*	*Eulalia-NIWA-2*	SI	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0
Polychaeta	Phyllodocida	Phyllodocidae	*Pterocirrus*	*brevicornis*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0
Polychaeta	Phyllodocida	Phyllodocidae	*Phyllodocidae*	*Indet*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Phyllodocida	Phyllodocidae	*Eulalia*	*capensis*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Polychaeta	Phyllodocida	Polynoidae	*Lepidonotus*	*polychromus*	N	1	0	0	0	1	1	1	1	1	0	1	1	1	1	1	1	1	0	0	1	1	0	0	1	0
Polychaeta	Phyllodocida	Polynoidae	*Lepidonotus*	*jacksoni*	N	0	0	0	0	0	0	1	1	0	0	1	0	1	0	1	1	1	0	1	1	0	0	0	0	0
Polychaeta	Phyllodocida	Polynoidae	*Lepidastheniella*	*comma*	N	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Polychaeta	Phyllodocida	Polynoidae	*Harmothoinae*	*Indet*	SI	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Phyllodocida	Polynoidae	*Lepidonotus*	*Lepidonotus-A*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Phyllodocida	Polynoidae	*Polynoidae*	*indet*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Phyllodocida	Sigalionidae	*Labiosthenolepis*	*laevis*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Phyllodocida	Syllidae	*Eusyllin-unknown*	*Eusyllin-unknown-A*	SI	0	0	0	0	1	0	1	1	0	0	1	1	1	0	1	0	1	0	0	0	0	0	0	0	0
Polychaeta	Phyllodocida	Syllidae	*Haplosyllis*	*spongicola*	N	0	0	0	0	0	0	1	1	0	0	1	1	1	0	1	1	1	0	1	0	0	0	0	0	0
Polychaeta	Phyllodocida	Syllidae	*Eusyllis*	*Eusyllis-A*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1	0	0	0	0	0
Polychaeta	Phyllodocida	Syllidae	*Autolytin-unknown*	*Indet*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Phyllodocida	Syllidae	*Eusyllis*	*Eusyllis-C*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Phyllodocida	Syllidae	*Syllidae*	*Indet*	SI	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Sabellida	Sabellidae	*Megalomma*	*suspiciens*	N	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	1	0	0	1	0	0	0	0	0
Polychaeta	Sabellida	Sabellidae	*Sabellidae*	*Indet*	SI	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0
Polychaeta	Sabellida	Sabellidae	*Pseudopotamilla*	*laciniosa*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Sabellida	Sabellidae	*Pseudopotamilla*	*Pseudopotamilla-A*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Sabellida	Serpulidae	*Galeolaria*	*hystrix*	N	1	0	0	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	0	0	1	1	0	1	0
Polychaeta	Sabellida	Serpulidae	*Serpula*	*Serpula-C*	SI	0	0	0	0	0	0	1	0	0	0	0	1	0	0	1	0	0	0	0	1	0	0	0	1	1
Polychaeta	Sabellida	Serpulidae	*Spirobranchus*	*Indet*	SI	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	1	0
Polychaeta	Sabellida	Serpulidae	*Serpulidae*	*Indet*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Polychaeta	Sabellida	Serpulidae	*Spirobranchus*	*cariniferus*	N	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Sabellida	Serpulidae	*Spirobranchus*	*polytrema*	A	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Sabellida	Serpulidae	*Spirorbinae*	*Indet*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Polychaeta	Sabellida	Serpulidae	*Galeolaria*	*Galeolaria-A*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Polychaeta	Scolecida	Opheliidae	*Armandia*	*maculata*	N	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Scolecida	Orbiniidae	*Proscoloplos*	*bondi*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Scolecida	Orbiniidae	*Scoloplos*	*cylindrifer*	N	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Scolecida	Scalibregmatidae	*Hyboscolex*	*longiseta*	N	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Spionida	Chaetopteridae	*Chaetopteridae*	*Indet*	SI	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Spionida	Spionidae	*Polydora*	*hoplura*	A	0	0	0	0	0	1	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	1	0
Polychaeta	Spionida	Spionidae	*Boccardia*	*chilensis*	N	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0
Polychaeta	Spionida	Spionidae	*Boccardia*	*knoxi*	N	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Spionida	Spionidae	*Boccardia*	*lamellata*	N	0	0	0	0	0	1	0	1	0	0	0	1	0	1	0	0	0	0	0	0	0	1	0	0	0
Polychaeta	Spionida	Spionidae	*Dipolydora*	*armata*	A	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Spionida	Spionidae	*Polydora*	*Indet*	SI	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Polychaeta	Spionida	Spionidae	*Boccardia*	*Indet*	SI	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

*Status: A = non-indigenous (highlighted by shading), C1 = cryptogenic category 1, C2 = cryptogenic category 2, N = native, SI = species indeterminata. See text for details.

Appendix 5a. Results from the diver collections and pile scrapings

				Berth code	BURN																									KINGS
				Pile replicate								1									2									1
				Pile position			OUT				IN				OUT				IN				OUT						IN	
Class	Orders	Family	Genus	Species	*Status	3	4	1	2	3	4	1	2	3	MISC	1	2	3	4	1	2	3	MISC	1	2	3	4	MISC	1	2
Polychaeta	Spionida	Spionidae	*Boccardia*	*acus*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Spionida	Spionidae	*Carazziella*	*quadricirrata*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Terebellida	Acrocirridae	*Acrocirrus*	*trisectus*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Terebellida	Cirratulidae	*Dodecaceria*	*berkeleyi*	N	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0
Polychaeta	Terebellida	Cirratulidae	*Cirratulus*	*Cirratulus-A*	SI	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Polychaeta	Terebellida	Cirratulidae	*Protocirrineris*	*nuchalis*	N	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Terebellida	Cirratulidae	*Timarete*	*anchylochaetus*	N	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Terebellida	Flabelligeridae	*Flabelligera*	*affinis*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Terebellida	Flabelligeridae	*Pherusa*	*parmata*	N	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Terebellida	Terebellidae	*Pseudopista*	*rostrata*	N	1	0	0	1	1	0	1	1	1	0	1	1	1	1	0	1	1	0	0	0	1	1	0	0	0
Polychaeta	Terebellida	Terebellidae	*Nicolea*	*armilla*	N	0	0	0	0	0	1	1	1	1	0	0	0	1	0	1	1	1	0	1	0	1	1	0	1	0
Polychaeta	Terebellida	Terebellidae	*Streblosoma*	*toddae*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	1	1	0	0	0
Polychaeta	Terebellida	Terebellidae	*Terebellidae*	*Indet*	SI	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Polychaeta	Terebellida	Terebellidae	*Pista*	*pegma*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Polychaeta			*Not_Lepidonotinae*	*Indet*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polyplacophora	Acanthochitonina	Acanthochitonidae	*Cryptoconchus*	*porosus*	N	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Polyplacophora	Acanthochitonina	Acanthochitonidae	*Acanthochitona*	*zelandica*	N	0	0	0	0	0	0	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Polyplacophora	Acanthochitonina	Acanthochitonidae	*Acanthochitona*	*violacea*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Polyplacophora	Ischnochitonina	Chitonidae	*Rhyssoplax*	*aerea*	N	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Polyplacophora	Ischnochitonina	Chitonidae	*Onithochiton*	*neglectus*	N	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polyplacophora	Ischnochitonina	Mopaliidae	*Plaxiphora*	*caelata*	N	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polyplacophora	Ischnochitonina	Mopaliidae	*Plaxiphora*	*obtecta*	N	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodophyceae	Acrochaetiales	Acrochaetiaceae	*Audouinella*	*sp.*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodophyceae	Bangiales	Bangiaceae	*Porphyra*	*sp.*	SI	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodophyceae	Ceramiales	Ceramiaceae	*Griffithsia*	*crassiuscula*	A	1	0	0	1	1	0	1	1	0	0	1	1	1	0	1	1	1	0	1	1	1	0	0	0	0
Rhodophyceae	Ceramiales	Ceramiaceae	*Ceramium*	*apiculatum*	N	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodophyceae	Ceramiales	Ceramiaceae	*Griffithsia*	*sp.*	SI	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodophyceae	Ceramiales	Ceramiaceae	*Ceramium*	*flaccidum*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodophyceae	Ceramiales	Ceramiaceae	*Medeiothamnion*	*lyallii*	N	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	1	0	0	0	0
Rhodophyceae	Ceramiales	Ceramiaceae	*Ceramium*	*sp.*	SI	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodophyceae	Ceramiales	Ceramiaceae	*Antithamnionella*	*adnata*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodophyceae	Ceramiales	Ceramiaceae	*Callithamnion*	*consanguineum*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodophyceae	Ceramiales	Deleseriaceae	*Phycodrys*	*quercifolia*	N	1	0	0	0	0	1	1	0	0	0	0	0	0	0	1	0	1	0	1	0	1	1	0	0	0
Rhodophyceae	Ceramiales	Deleseriaceae	*Schizoseris*	*griffithsia*	N	0	0	0	0	0	0	1	1	0	0	1	0	0	1	0	0	0	0	1	1	1	0	0	0	0
Rhodophyceae	Ceramiales	Deleseriaceae	*Myriogramme*	*denticulata*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodophyceae	Ceramiales	Deleseriaceae	*Acrosorium*	*decumbens*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Rhodophyceae	Ceramiales	Deleseriaceae	*Hymenena*	*variolosa*	N	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodophyceae	Ceramiales	Deleseriaceae	*Myriogramme*	*sp.*	SI	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodophyceae	Ceramiales	Delesseriaceae	*Schizoseris*	*dichotoma*	N	0	0	0	1	0	1	0	0	0	0	0	1	1	0	0	0	0	0	1	1	0	0	0	0	0
Rhodophyceae	Ceramiales	Delesseriaceae	*Valeriemaya*	*sp.*	SI	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Rhodophyceae	Ceramiales	Delesseriaceae	*Erythroglossum*	*sp.*	SI	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodophyceae	Ceramiales	Delesseriaceae	*Erythroglossum*	*undulatissimum*	N	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodophyceae	Ceramiales	Delesseriaceae	*Phycodrys*	*sp.*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Rhodophyceae	Ceramiales	Rhodomelaceae	*Polysiphonia*	*sp.*	SI	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodophyceae	Ceramiales	Rhodomelaceae	*Cladhymenia*	*oblongifolia*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Rhodophyceae	Corallinales	Corallinaceae	*Non-geniculate*	*coralline*	SI	0	0	0	0	0	0	1	1	0	0	0	1	1	0	1	1	0	0	0	0	1	0	0	0	0
Rhodophyceae	Gigartinales	Cystocloniaceae	*Rhodophyllis*	*centrocarpa*	N	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodophyceae	Gigartinales	Gigartinaceae	*Gigartina*	*atropurpurea*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Rhodophyceae	Gigartinales	Kallymeniaceae	*Callophyllis*	*variegata*	N	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodophyceae	Rhodymeniales	Faucheaceae	*Gloiocladia*	*saccata*	N	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodophyceae	Rhodymeniales	Rhodomeniaceae	*Rhodymenia*	*sp.*	SI	1	0	0	0	0	0	1	1	0	0	1	1	1	1	1	0	1	0	1	1	0	0	0	0	0
Rhodophyceae	Rhodymeniales	Rhodomeniaceae	*Rhodymenia*	*leptophylla*	N	0	0	0	1	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Turbellaria	Polycladida	Stylochidae	*Planocera?*	*sp.*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Turbellaria	Polycladida	Stylochidae	*Enterogonia*	*sp.*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Turbellaria	Polycladida		*Indet genus*	*indet sp.*	SI	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Ulvophyceae	Cladophorales	Cladophoraceae	*Cladophora*	*feredayi*	N	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ulvophyceae	Ulvales	Ulvaceae	*Ulva*	*sp.*	SI	1	0	1	1	1	0	0	0	0	0	1	0	0	0	1	0	0	0	0	1	0	0	1	0	0
Ulvophyceae	Ulvales	Ulvaceae	*Enteromorpha*	*sp.*	SI	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

*Status: A = non-indigenous (highlighted by shading), C1 = cryptogenic category 1, C2 = cryptogenic category 2, N = native, SI = species indeterminata. See text for details.

Appendix 5a. Results from the diver collections and pile scrapings

					Berth code											OPT																			
					Pile replicate			2								1								2											
					Pile position			OUT				IN				OUT				IN				OUT				IN				OUT			
Class	Orders	Family	Genus	Species	*Status	3	4	1	2	3	4	1	2	3	MISC	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Actinopterygii	Perciformes	Gobiesocidae	*Dellichthys*	*morelandi*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Actinopterygii	Perciformes	Trypterigiidae	*Forsterygion*	*sp. post larva*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Anthozoa	Actiniaria	Aiptasiomorphidae	*Aiptasiomorpha*	*minima*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Anthozoa	Actiniaria	Diadumenidae	*Diadumene*	*neozelandica*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Anthozoa	Actiniaria	Sagartiidae	*Anthothoe*	*sp.*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Anthozoa	Actiniaria		*Acontiaria*	*sp.*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ascidiacea	Aplousobranchia	Didemnidae	*Didemnum*	*sp.*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ascidiacea	Phlebobranchia	Rhodosomatidae	*Corella*	*eumyota*	C1	1	0	0	1	0	0	0	1	1	0	0	1	0	0	0	1	0	0	0	1	0	0	0	0	0	0	1	0	1	0
Ascidiacea	Stolidobranchia	Botryllinae	*Botrylliodes*	*leachii*	C1	0	1	1	1	0	0	1	1	0	0	0	0	0	0	1	1	1	1	1	1	0	1	0	1	1	0	1	0	0	1
Ascidiacea	Stolidobranchia	Molgulidae	*Molgula*	*mortenseni*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ascidiacea	Stolidobranchia	Pyuridae	*Pyura*	*rugata*	N	1	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0
Ascidiacea	Stolidobranchia	Pyuridae	*Pyura*	*cancellata*	N	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0	0
Ascidiacea	Stolidobranchia	Pyuridae	*Pyura*	*subuculata*	N	1	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ascidiacea	Stolidobranchia	Pyuridae	*Pyura*	*picta*	N	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	1	1	0	0	0	0	0
Ascidiacea	Stolidobranchia	Pyuridae	*Pyura*	*pulla*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0
Ascidiacea	Stolidobranchia	Pyuridae	*Pyura*	*pachydermatina*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ascidiacea	Stolidobranchia	Styelidae	*Cnemidocarpa*	*nisiotus*	N	1	0	0	0	0	0	1	0	1	1	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	1
Ascidiacea	Stolidobranchia	Styelidae	*Asterocarpa*	*cerea*	C1	1	0	0	0	1	0	0	0	1	0	0	0	0	1	0	1	1	0	0	0	1	0	0	0	1	0	1	1	1	0
Ascidiacea	Stolidobranchia	Styelidae	*Cnemidocarpa*	*bicornuta*	N	1	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	1	0	1	1	0	1	0	0	0	1	0	1
Ascidiacea	Stolidobranchia	Styelidae	*Cnemidocarpa*	*sp.*	A	0	0	0	1	0	0	1	1	1	0	0	0	0	0	1	1	1	1	0	1	0	1	0	0	1	0	0	0	0	0
Ascidiacea	Stolidobranchia	Styelidae	*Cnemidocarpa*	*regalis*	N	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	1	0	1	1
Ascidiacea	Stolidobranchia	Styelidae	*Cnemidocarpa*	*otagoensis*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0
Ascidiacea	Stolidobranchia	Styelidae	*Styela*	*plicata*	C1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ascidiacea	Stolidobranchia	Styelidae	*Asterocarpa*	*coerulea*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ascidiacea	Stolidobranchia	Styelidae	*Pyura*	*trita*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Asteroidea	Valvatida	Asterinidae	*Patiriella*	*regularis*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0	1	1	1	0	0	0	0	0	0	1
Asteroidea	Valvatida	Asterinidae	*Patiriella*	*sp.*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bivalvia	Myoida	Hiatellidae	*Hiatella*	*arctica*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	1	0	1	1
Bivalvia	Mytiloida	Mytilidae	*Aulacomya*	*atra maoriana*	N	1	0	0	0	0	0	1	1	1	0	0	1	0	0	1	1	1	0	1	1	1	1	0	1	1	0	1	1	1	1
Bivalvia	Mytiloida	Mytilidae	*Mytilus*	*galloprovincialis*	C1	1	0	1	1	1	0	1	1	1	0	0	0	0	1	1	1	1	1	1	0	1	1	1	1	1	0	1	1	1	1
Bivalvia	Mytiloida	Mytilidae	*Perna*	*canaliculus*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0	1	1	1	0	0	1	0	0	1
Bivalvia	Mytiloida	Mytilidae	*Modiolarca*	*impacta*	N	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0	0	1	1	1
Bivalvia	Ostreoida	Anomiidae	*Pododesmus*	*zelandicus*	N	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0
Bivalvia	Ostreoida	Ostreidae	*Ostrea*	*chilensis*	N	1	0	1	1	1	0	1	1	1	0	0	0	0	1	0	1	1	1	0	0	1	1	0	1	1	0	0	0	1	1
Bivalvia	Pterioida	Pectinidae	*Talochlamys*	*zelandiae*	N	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	1	0	0	0	0	0	0
Bivalvia	Veneroida	Lasaeidae	*Borniola*	*reniformis*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Bivalvia	Veneroida	Semelidae	*Leptomya*	*retiaria*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Crustacea	Anomura	Paguidae	*Pagurus*	*traversi*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Crustacea	Anomura	Porcellanidae	*Petrolisthes*	*elongatus*	N	1	0	0	1	0	0	1	1	1	0	1	0	1	1	1	1	1	0	1	1	1	1	1	0	1	0	1	1	1	1
Crustacea	Anomura	Porcellanidae	*Petrolisthes*	*novaezelandiae*	N	1	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	1	0	1	1	1	1	0	1	1	0	1	1	1	1
Crustacea	Brachyura	Cancridae	*Cancer*	*gibbosulus*	A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Crustacea	Brachyura	Hymenosomatidae	*Halicarcinus*	*innominatus*	N	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	1	1	0	1	1	1	0	0	0	0	0	1	1	0	1
Crustacea	Brachyura	Hymenosomatidae	*Halicarcinus*	*varius*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Crustacea	Brachyura	Hymenosomatidae	*Halicarcinus*	*cookii*	N	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Crustacea	Brachyura	Majidae	*Notomithrax*	*minor*	N	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	1	1	0	0	1	0	0	0	0	0	1
Crustacea	Brachyura	Majidae	*Notomithrax*	*peronii*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Crustacea	Brachyura	Majidae	*Notomithrax*	*ursus*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Crustacea	Brachyura	Majidae	*Notomithrax*	*sp.*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Crustacea	Brachyura	Pinnotheridae	*Pinnotheres*	*novaezelandiae*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Crustacea	Brachyura	Xanthidae	*Pilumnus*	*lumpinus*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	1	0	0	0	0	0	0	0	0
Crustacea	Brachyura	Xanthidae	*Pilumnus*	*novaezelandiae*	N	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Crustacea	Caridea	Alpheidae	*Betaeopsis*	*aequimanus*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Crustacea	Caridea	Hippolytidae	*Hippolyte*	*bifidirostris*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Crustacea	Thoracica	Balanidae	*Austrominius*	*modestus*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Crustacea	Thoracica	Chthamalidae	*Chaemosipho*	*columna*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Demospongiae	Dendroceratida	Darwinellidae	*Darwinella*	*cf. gardineri (rust red with spongin triacts)*	C1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Demospongiae	Dictyoceratida	Dysideidae	*Euryspongia*	*n. sp. 1 (soft spikey tan cushion)*	C2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Demospongiae	Dictyoceratida	Dysideidae	*Dysidea*	*n. sp. 1 (erect cactus)*	C2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

*Status: A = non-indigenous (highlighted by shading), C1 = cryptogenic category 1, C2 = cryptogenic category 2, N = native, SI = species indeterminata. See text for details.

Appendix 5a. Results from the diver collections and pile scrapings

					Berth code											OPT																			
					Pile replicate			2												1								2							
					Pile position			OUT				IN				OUT				IN				OUT				IN				OUT			
Class	Orders	Family	Genus	Species	*Status	3	4	1	2	3	4	1	2	3	MISC	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Demospongiae	Dictyoceratida	Irciniidae	*Ircinia*	*akaroa*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Demospongiae	Halichondrida	Halichondriidae	*Halichondria*	*panicea*	C1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Demospongiae	Halichondrida	Halichondriidae	*Halichondria*	*n. sp. 1 (knubby oxeas 290-380)*	C2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1	0	0	1	0	0	0	1	1	0	0
Demospongiae	Halisarcida	Halisarcidae	*Halisarca*	*dujardini*	A	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	1	0	1	1	0	0	0	0	1
Demospongiae	Haplosclerida	Callyspongiidae	*Callyspongia*	*diffusa*	C1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0
Demospongiae	Haplosclerida	Chalinidae	*Haliclona*	*cf. punctata*	N	1	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	1	0	1	0	0	0	0	0
Demospongiae	Haplosclerida	Chalinidae	*Haliclona*	*glabra*	N	1	1	0	1	0	0	1	0	1	0	0	1	0	1	1	0	0	0	0	0	0	0	1	1	0	0	0	1	0	0
Demospongiae	Haplosclerida	Chalinidae	*Haliclona*	*cf. isodictyale*	N	0	0	1	0	1	1	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Demospongiae	Homosclerophorida	Plakinidae	*Plakina*	*trilopha*	C1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Demospongiae	Poecilosclerida	Ancinoiidae	*Crella (Pytheas)*	*incrustans*	C1	1	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Demospongiae	Poecilosclerida	Crellidae	*Crella (Pytheas)*	*affinis*	N	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	1	1	0	0	0	1	0
Demospongiae	Poecilosclerida	Hymedesmiidae	*Phorbas*	*fulva*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Demospongiae	Poecilosclerida	Microcionidae	*Clathria (Microciona)*	*dendyi*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Demospongiae	Poecilosclerida	Microcionidae	*Ophlitospongia*	*reticulata*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Demospongiae	Poecilosclerida	Mycalidae	*Mycale (Carmia)*	*tasmani*	N	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Gastropoda	Vetigastropoda	Fissurellidae	*Tugali*	*suteri*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gastropoda	Vetigastropoda	Trochidae	*Trochus*	*tiaratus*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gymnolaemata	Cheilostomata	Aeteidae	*Aetea*	*?australis*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0
Gymnolaemata	Cheilostomata	Beaniidae	*Beania*	*n. sp. [whitten]*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1
Gymnolaemata	Cheilostomata	Beaniidae	*Beania*	*discodermiae*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Gymnolaemata	Cheilostomata	Bitectiporidae	*Bitectipora*	*rostrata*	N	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Gymnolaemata	Cheilostomata	Bugulidae	*Bugula*	*flabellata*	A	1	0	1	1	1	0	0	1	1	0	1	1	1	0	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0
Gymnolaemata	Cheilostomata	Calloporidae	*Crassimarginatella*	*fossa*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gymnolaemata	Cheilostomata	Candidae	*Caberea*	*rostrata*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gymnolaemata	Cheilostomata	Candidae	*Scrupocellaria*	*ornithorhyncus*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gymnolaemata	Cheilostomata	Chaperiidae	*Chaperia*	*granulosa*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gymnolaemata	Cheilostomata	Crepidacanthidae	*Crepidacantha*	*crinispina*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gymnolaemata	Cheilostomata	Cryptosulidae	*Cryptosula*	*pallasiana*	A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gymnolaemata	Cheilostomata	Cyclicoporidae	*Cyclicopora*	*longipora*	A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	1	1	1	0	0	1	0	1	0	1	1
Gymnolaemata	Cheilostomata	Eurystomellidae	*Eurystomella*	*foraminigera*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gymnolaemata	Cheilostomata	Hippothoidae	*Celleporella*	*tongima*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Gymnolaemata	Cheilostomata	Hippothoidae	*Celleporella*	*sp.*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gymnolaemata	Cheilostomata	Hippothoidae	*Hippothoa*	*flagellum*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gymnolaemata	Cheilostomata	Microporellidae	*Microporella*	*speculum*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gymnolaemata	Cheilostomata	Microporellidae	*Microporella*	*agonistes*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Gymnolaemata	Cheilostomata	Romancheinidae	*Escharoides*	*angela*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	1	0	0	0	0	0	0	1
Gymnolaemata	Cheilostomata	Scrupariidae	*Scruparia*	*ambigua*	C1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gymnolaemata	Cheilostomata	Smittinidae	*Smittina*	*rosacea*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gymnolaemata	Cheilostomata	Watersiporidae	*Watersipora*	*subtorquata*	A	0	0	0	1	1	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	1
Hydrozoa	Hydroida	Bougainvilliidae	*Bougainvillia*	*?muscus*	SI	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hydrozoa	Hydroida	Campanulariidae	*Obelia*	*dichotoma*	C1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hydrozoa	Hydroida	Campanulariidae	*Obelia*	*geniculata*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hydrozoa	Hydroida	Eudendriidae	*Eudendrium*	*capillare*	A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0
Hydrozoa	Hydroida	Lafoeidae	*Filellum*	*sp. indeterminate*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hydrozoa	Hydroida	Sertulariidae	*Sertularella*	*robusta*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	1	0	0	0
Malacostraca	Amphipoda	Aoridae	*Aora*	*typica*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Malacostraca	Amphipoda	Aoridae	*Haplocheira*	*barbimana*	N	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Malacostraca	Amphipoda	Corophiidae	*Meridiolembos*	*sp.*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Malacostraca	Amphipoda	Dexaminidae	*Paradexamine*	*pacifica*	N	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Malacostraca	Amphipoda	Eusiridae	*Gondogeneia*	*danai*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Malacostraca	Amphipoda	Isaeidae	*Gammaropsis*	*sp. 1*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Malacostraca	Amphipoda	Leucothoidae	*Leucothoe*	*trailli*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Malacostraca	Amphipoda	Lysianassidae	*Parawaldeckia*	*vesca*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Malacostraca	Amphipoda	Melitidae	*Melita*	*inaequistylis*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Malacostraca	Amphipoda	Stenothoidae	*Stenothoe*	*sp. 1*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Malacostraca	Isopoda	Janiridae	*Iathrippa*	*?longicauda*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Malacostraca	Isopoda	Pseudojaniridae	*Schottea*	*sp*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Malacostraca	Isopoda	Sphaeromatidae	*Joeropsis*	*?neozelanica*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

*Status: A = non-indigenous (highlighted by shading), C1 = cryptogenic category 1, C2 = cryptogenic category 2, N = native, SI = species indeterminata. See text for details.

Appendix 5a. Results from the diver collections and pile scrapings

Class	Orders	Family	Genus	Species	*Status																														
					Berth code													OPT																	
					Pile replicate			2										1								2									
					Pile position			OUT				IN				OUT				IN				OUT				IN				OUT			
					*Status	3	4	1	2	3	4	1	2	3	MISC	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Malacostraca	Mysida	Mysidae	*Heteromysis or Mysidetes*	*sp.*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phaeophyceae	Ectocarpales	Scytothamnaceae	*Scytothamnus*	*australis*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phaeophyceae	Laminariales	Alariaceae	*Undaria*	*pinnatifida*	A	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	1	1	1	0	0	0	0	0	1	1	1	1
Polychaeta	Eunicida	Dorvilleidae	*Dorvillea*	*australiensis*	N	1	0	1	1	1	0	0	1	0	0	0	1	0	0	0	1	1	0	0	1	0	1	0	1	1	0	1	1	1	1
Polychaeta	Eunicida	Dorvilleidae	*Schistomeringos*	*loveni*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Eunicida	Eunicidae	*Eunice*	*australis*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Eunicida	Lumbrineridae	*Lumbrineris*	*sphaerocephala*	N	0	0	0	0	0	0	1	0	1	0	0	0	0	0	1	1	0	0	0	0	1	0	0	0	0	0	0	0	1	0
Polychaeta	Eunicida	Lumbrineridae	*Lumbricalus*	*aotearoae*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Phyllodocida	Hesionidae	*Ophiodromus*	*angustifrons*	N	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	1	1	1	0	0	1	0	1	0	0	0
Polychaeta	Phyllodocida	Nereididae	*Neanthes*	*kerguelensis*	N	1	0	1	1	0	0	1	1	0	0	0	0	0	1	1	1	1	0	0	0	0	1	1	1	1	0	0	0	0	1
Polychaeta	Phyllodocida	Nereididae	*Platynereis*	*Platynereis_australis_group*	SI	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	1	0	0
Polychaeta	Phyllodocida	Nereididae	*Nereis*	*falcaria*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Phyllodocida	Nereididae	*Perinereis*	*camiguinoides*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Phyllodocida	Nereididae	*Nereididae*	*indet*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Phyllodocida	Nereididae	*Neanthes*	*Neanthes-A*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Phyllodocida	Nereididae	*Perinereis*	*amblyodonta*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Phyllodocida	Phyllodocidae	*Pirakia*	*Pirakia-A*	N	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	1	1	0	0
Polychaeta	Phyllodocida	Phyllodocidae	*Eulalia*	*Eulalia-NIWA-2*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Polychaeta	Phyllodocida	Phyllodocidae	*Pterocirrus*	*brevicornis*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Polychaeta	Phyllodocida	Phyllodocidae	*Phyllodocidae*	*Indet*	SI	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Polychaeta	Phyllodocida	Phyllodocidae	*Eulalia*	*capensis*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Phyllodocida	Polynoidae	*Lepidonotus*	*polychromus*	N	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	1	1	0	1	1	1	1	1	1	1	0	1	0	0	1
Polychaeta	Phyllodocida	Polynoidae	*Lepidonotus*	*jacksoni*	N	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	1	0	0	1	1	1	0	0	1	1	0	1	0	0	0
Polychaeta	Phyllodocida	Polynoidae	*Lepidastheniella*	*comma*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	1
Polychaeta	Phyllodocida	Polynoidae	*Harmothoinae*	*Indet*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Phyllodocida	Polynoidae	*Lepidonotus*	*Lepidonotus-A*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Polychaeta	Phyllodocida	Polynoidae	*Polynoidae*	*indet*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Polychaeta	Phyllodocida	Sigalionidae	*Labiosthenolepis*	*laevis*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Phyllodocida	Syllidae	*Eusyllin-unknown*	*Eusyllin-unknown-A*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Phyllodocida	Syllidae	*Haplosyllis*	*spongicola*	N	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Phyllodocida	Syllidae	*Eusyllis*	*Eusyllis-A*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Phyllodocida	Syllidae	*Autolytin-unknown*	*Indet*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Phyllodocida	Syllidae	*Eusyllis*	*Eusyllis-C*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Phyllodocida	Syllidae	*Syllidae*	*Indet*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Sabellida	Sabellidae	*Megalomma*	*suspiciens*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Polychaeta	Sabellida	Sabellidae	*Sabellidae*	*Indet*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Sabellida	Sabellidae	*Pseudopotamilla*	*laciniosa*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Polychaeta	Sabellida	Sabellidae	*Pseudopotamilla*	*Pseudopotamilla-A*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Sabellida	Serpulidae	*Galeolaria*	*hystrix*	N	1	0	0	1	0	0	1	1	1	0	0	0	0	0	1	1	1	0	0	1	1	0	0	1	1	0	1	1	1	0
Polychaeta	Sabellida	Serpulidae	*Serpula*	*Serpula-C*	SI	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1	0	0	1	1	0	0	0	0	1	0	0
Polychaeta	Sabellida	Serpulidae	*Spirobranchus*	*Indet*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Sabellida	Serpulidae	*Serpulidae*	*Indet*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Sabellida	Serpulidae	*Spirobranchus*	*cariniferus*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Sabellida	Serpulidae	*Spirobranchus*	*polytrema*	A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Sabellida	Serpulidae	*Spirorbinae*	*Indet*	SI	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Sabellida	Serpulidae	*Galeolaria*	*Galeolaria-A*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Scolecida	Opheliidae	*Armandia*	*maculata*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Polychaeta	Scolecida	Orbiniidae	*Proscoloplos*	*bondi*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Scolecida	Orbiniidae	*Scoloplos*	*cylindrifer*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Scolecida	Scalibregmatidae	*Hyboscolex*	*longiseta*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Spionida	Chaetopteridae	*Chaetopteridae*	*Indet*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Spionida	Spionidae	*Polydora*	*hoplura*	A	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Polychaeta	Spionida	Spionidae	*Boccardia*	*chilensis*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Spionida	Spionidae	*Boccardia*	*knoxi*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0
Polychaeta	Spionida	Spionidae	*Boccardia*	*lamellata*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Spionida	Spionidae	*Dipolydora*	*armata*	A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Spionida	Spionidae	*Polydora*	*Indet*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Spionida	Spionidae	*Boccardia*	*Indet*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

*Status: A = non-indigenous (highlighted by shading), C1 = cryptogenic category 1, C2 = cryptogenic category 2, N = native, SI = species indeterminata. See text for details.

Appendix 5a. Results from the diver collections and pile scrapings

					Berth code											OPT																			
					Pile replicate							2								1								2							
					Pile position			OUT				IN				OUT				IN				OUT				IN				OUT			
Class	Orders	Family	Genus	Species	*Status	3	4	1	2	3	4	1	2	3	MISC	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Polychaeta	Spionida	Spionidae	*Boccardia*	*acus*	N	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Polychaeta	Spionida	Spionidae	*Carazziella*	*quadricirrata*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Terebellida	Acrocirridae	*Acrocirrus*	*trisectus*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Polychaeta	Terebellida	Cirratulidae	*Dodecaceria*	*berkeleyi*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Terebellida	Cirratulidae	*Cirratulus*	*Cirratulus-A*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Terebellida	Cirratulidae	*Protocirrineris*	*nuchalis*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Terebellida	Cirratulidae	*Timarete*	*anchylochaetus*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Polychaeta	Terebellida	Flabelligeridae	*Flabelligera*	*affinis*	N	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Polychaeta	Terebellida	Flabelligeridae	*Pherusa*	*parmata*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Terebellida	Terebellidae	*Pseudopista*	*rostrata*	N	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0	1	1	0	0	1	0	1	1	1	1
Polychaeta	Terebellida	Terebellidae	*Nicolea*	*armilla*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	1	1	0	0	0	1	0	1	1	1	1
Polychaeta	Terebellida	Terebellidae	*Streblosoma*	*toddae*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
Polychaeta	Terebellida	Terebellidae	*Terebellidae*	*Indet*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Terebellida	Terebellidae	*Pista*	*pegma*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta			*Not_Lepidonotinae*	*Indet*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polyplacophora	Acanthochitonina	Acanthochitonidae	*Cryptoconchus*	*porosus*	N	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Polyplacophora	Acanthochitonina	Acanthochitonidae	*Acanthochitona*	*zelandica*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polyplacophora	Acanthochitonina	Acanthochitonidae	*Acanthochitona*	*violacea*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polyplacophora	Ischnochitonina	Chitonidae	*Rhyssoplax*	*aerea*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polyplacophora	Ischnochitonina	Chitonidae	*Onithochiton*	*neglectus*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polyplacophora	Ischnochitonina	Mopaliidae	*Plaxiphora*	*caelata*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polyplacophora	Ischnochitonina	Mopaliidae	*Plaxiphora*	*obtecta*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodophyceae	Acrochaetiales	Acrochaetiaceae	*Audouinella*	*sp.*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodophyceae	Bangiales	Bangiaceae	*Porphyra*	*sp.*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodophyceae	Ceramiales	Ceramiaceae	*Griffithsia*	*crassiuscula*	A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Rhodophyceae	Ceramiales	Ceramiaceae	*Ceramium*	*apiculatum*	N	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodophyceae	Ceramiales	Ceramiaceae	*Griffithsia*	*sp.*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodophyceae	Ceramiales	Ceramiaceae	*Ceramium*	*flaccidum*	N	0	0	0	0	1	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodophyceae	Ceramiales	Ceramiaceae	*Medeiothamnion*	*lyallii*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodophyceae	Ceramiales	Ceramiaceae	*Ceramium*	*sp.*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Rhodophyceae	Ceramiales	Ceramiaceae	*Antithamnionella*	*adnata*	N	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodophyceae	Ceramiales	Ceramiaceae	*Callithamnion*	*consanguineum*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodophyceae	Ceramiales	Deleseriaceae	*Phycodrys*	*quercifolia*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Rhodophyceae	Ceramiales	Deleseriaceae	*Schizoseris*	*griffithsia*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	1	1	0	0
Rhodophyceae	Ceramiales	Deleseriaceae	*Myriogramme*	*denticulata*	N	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	1	0	1	0	0	0	0	0	1	0	0
Rhodophyceae	Ceramiales	Deleseriaceae	*Acrosorium*	*decumbens*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodophyceae	Ceramiales	Deleseriaceae	*Hymenena*	*variolosa*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodophyceae	Ceramiales	Deleseriaceae	*Myriogramme*	*sp.*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodophyceae	Ceramiales	Delesseriaceae	*Schizoseris*	*dichotoma*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Rhodophyceae	Ceramiales	Delesseriaceae	*Valeriemaya*	*sp.*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodophyceae	Ceramiales	Delesseriaceae	*Erythroglossum*	*sp.*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Rhodophyceae	Ceramiales	Delesseriaceae	*Erythroglossum*	*undulatissimum*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodophyceae	Ceramiales	Delesseriaceae	*Phycodrys*	*sp.*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodophyceae	Ceramiales	Rhodomelaceae	*Polysiphonia*	*sp.*	SI	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodophyceae	Ceramiales	Rhodomelaceae	*Cladhymenia*	*oblongifolia*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodophyceae	Corallinales	Corallinaceae	*Non-geniculate*	*coralline*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Rhodophyceae	Gigartinales	Cystocloniaceae	*Rhodophyllis*	*centrocarpa*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodophyceae	Gigartinales	Gigartinaceae	*Gigartina*	*atropurpurea*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodophyceae	Gigartinales	Kallymeniaceae	*Callophyllis*	*variegata*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodophyceae	Rhodymeniales	Faucheaceae	*Gloiocladia*	*saccata*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodophyceae	Rhodymeniales	Rhodomeniaceae	*Rhodymenia*	*sp.*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Rhodophyceae	Rhodymeniales	Rhodomeniaceae	*Rhodymenia*	*leptophylla*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	1	0	0
Turbellaria	Polycladida	Stylochidae	*Planocera?*	*sp.*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Turbellaria	Polycladida	Stylochidae	*Enterogonia*	*sp.*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Turbellaria	Polycladida		*Indet genus*	*indet sp.*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ulvophyceae	Cladophorales	Cladophoraceae	*Cladophora*	*feredayi*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ulvophyceae	Ulvales	Ulvaceae	*Ulva*	*sp.*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	1	1	0	0
Ulvophyceae	Ulvales	Ulvaceae	*Enteromorpha*	*sp.*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

*Status: A = non-indigenous (highlighted by shading), C1 = cryptogenic category 1, C2 = cryptogenic category 2, N = native, SI = species indeterminata. See text for details.

Appendix 5a. Results from the diver collections and pile scrapings

				Berth code	TCW2																	
				Pile replicate	1									2								
				Pile position	IN				OUT					IN				OUT				
Class	Orders	Family	Genus	Species	*Status	1	2	3	4	1	2	3	4	MISC	1	2	3	4	1	2	3	4
Actinopterygii	Perciformes	Gobiesocidae	*Dellichthys*	*morelandi*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Actinopterygii	Perciformes	Trypterigiidae	*Forsterygion*	*sp. post larva*	SI	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0
Anthozoa	Actiniaria	Aiptasiomorphidae	*Aiptasiomorpha*	*minima*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Anthozoa	Actiniaria	Diadumenidae	*Diadumene*	*neozelandica*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Anthozoa	Actiniaria	Sagartiidae	*Anthothoe*	*sp.*	SI	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0
Anthozoa	Actiniaria		*Acontiaria*	*sp.*	SI	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ascidiacea	Aplousobranchia	Didemnidae	*Didemnum*	*sp.*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ascidiacea	Phlebobranchia	Rhodosomatidae	*Corella*	*eumyota*	C1	0	0	0	0	1	0	1	1	0	0	0	1	1	1	0	0	0
Ascidiacea	Stolidobranchia	Botryllinae	*Botrylliodes*	*leachii*	C1	0	0	1	0	1	1	1	1	1	0	1	0	1	1	1	1	0
Ascidiacea	Stolidobranchia	Molgulidae	*Molgula*	*mortenseni*	N	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0
Ascidiacea	Stolidobranchia	Pyuridae	*Pyura*	*rugata*	N	0	0	0	0	0	0	0	0	1	1	0	0	1	0	0	0	0
Ascidiacea	Stolidobranchia	Pyuridae	*Pyura*	*cancellata*	N	0	1	0	0	1	1	0	1	0	0	0	1	0	0	1	0	0
Ascidiacea	Stolidobranchia	Pyuridae	*Pyura*	*subuculata*	N	0	0	1	0	0	0	0	0	0	1	1	1	0	0	0	0	0
Ascidiacea	Stolidobranchia	Pyuridae	*Pyura*	*picta*	N	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ascidiacea	Stolidobranchia	Pyuridae	*Pyura*	*pulla*	N	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0
Ascidiacea	Stolidobranchia	Pyuridae	*Pyura*	*pachydermatina*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ascidiacea	Stolidobranchia	Styelidae	*Cnemidocarpa*	*nisiotus*	N	0	1	1	1	1	0	1	1	0	0	0	1	1	0	0	0	0
Ascidiacea	Stolidobranchia	Styelidae	*Asterocarpa*	*cerea*	C1	0	0	1	0	0	1	1	1	0	0	1	1	1	0	0	0	0
Ascidiacea	Stolidobranchia	Styelidae	*Cnemidocarpa*	*bicornuta*	N	0	0	1	1	0	1	0	1	0	0	1	0	1	0	0	0	0
Ascidiacea	Stolidobranchia	Styelidae	*Cnemidocarpa*	*sp.*	A	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0
Ascidiacea	Stolidobranchia	Styelidae	*Cnemidocarpa*	*regalis*	N	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Ascidiacea	Stolidobranchia	Styelidae	*Cnemidocarpa*	*otagoensis*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ascidiacea	Stolidobranchia	Styelidae	*Styela*	*plicata*	C1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ascidiacea	Stolidobranchia	Styelidae	*Asterocarpa*	*coerulea*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ascidiacea	Stolidobranchia	Styelidae	*Pyura*	*trita*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Asteroidea	Valvatida	Asterinidae	*Patiriella*	*regularis*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Asteroidea	Valvatida	Asterinidae	*Patiriella*	*sp.*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bivalvia	Myoida	Hiatellidae	*Hiatella*	*arctica*	N	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Bivalvia	Mytiloida	Mytilidae	*Aulacomya*	*atra maoriana*	N	1	1	1	1	1	1	1	1	1	1	0	1	1	0	0	0	1
Bivalvia	Mytiloida	Mytilidae	*Mytilus*	*galloprovincialis*	C1	1	1	1	0	1	1	0	1	1	1	0	1	1	0	0	0	0
Bivalvia	Mytiloida	Mytilidae	*Perna*	*canaliculus*	N	1	0	0	0	1	0	1	1	0	1	1	0	0	0	0	0	0
Bivalvia	Mytiloida	Mytilidae	*Modiolarca*	*impacta*	N	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0
Bivalvia	Ostreoida	Anomiidae	*Pododesmus*	*zelandicus*	N	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Bivalvia	Ostreoida	Ostreidae	*Ostrea*	*chilensis*	N	0	1	1	1	0	0	1	1	0	1	0	1	1	0	0	0	0
Bivalvia	Pterioida	Pectinidae	*Talochlamys*	*zelandiae*	N	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Bivalvia	Veneroida	Lasaeidae	*Borniola*	*reniformis*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bivalvia	Veneroida	Semelidae	*Leptomya*	*retiaria*	N	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Crustacea	Anomura	Paguidae	*Pagurus*	*traversi*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Crustacea	Anomura	Porcellanidae	*Petrolisthes*	*elongatus*	N	1	1	1	1	1	1	1	1	0	1	0	1	1	1	0	0	0
Crustacea	Anomura	Porcellanidae	*Petrolisthes*	*novaezelandiae*	N	0	0	1	1	0	1	0	1	0	0	0	1	1	1	0	0	0
Crustacea	Brachyura	Cancridae	*Cancer*	*gibbosulus*	A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Crustacea	Brachyura	Hymenosomatidae	*Halicarcinus*	*innominatus*	N	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0
Crustacea	Brachyura	Hymenosomatidae	*Halicarcinus*	*varius*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0
Crustacea	Brachyura	Hymenosomatidae	*Halicarcinus*	*cookii*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Crustacea	Brachyura	Majidae	*Notomithrax*	*minor*	N	0	1	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0
Crustacea	Brachyura	Majidae	*Notomithrax*	*peronii*	N	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Crustacea	Brachyura	Majidae	*Notomithrax*	*ursus*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Crustacea	Brachyura	Majidae	*Notomithrax*	*sp.*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Crustacea	Brachyura	Pinnotheridae	*Pinnotheres*	*novaezelandiae*	N	1	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0
Crustacea	Brachyura	Xanthidae	*Pilumnus*	*lumpinus*	N	0	0	0	1	0	1	0	0	0	0	1	0	1	0	1	0	0
Crustacea	Brachyura	Xanthidae	*Pilumnus*	*novaezelandiae*	N	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Crustacea	Caridea	Alpheidae	*Betaeopsis*	*aequimanus*	N	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Crustacea	Caridea	Hippolytidae	*Hippolyte*	*bifidirostris*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Crustacea	Thoracica	Balanidae	*Austrominius*	*modestus*	N	1	0	0	0	0	0	0	1	0	0	1	1	0	1	0	0	0
Crustacea	Thoracica	Chthamalidae	*Chaemosipho*	*columna*	N	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Demospongiae	Dendroceratida	Darwinellidae	*Darwinella*	*cf. gardineri (rust red with spongin triacts)*	C1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Demospongiae	Dictyoceratida	Dysideidae	*Euryspongia*	*n. sp. 1 (soft spikey tan cushion)*	C2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Demospongiae	Dictyoceratida	Dysideidae	*Dysidea*	*n. sp. 1 (erect cactus)*	C2	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0

*Status: A = non-indigenous (highlighted by shading), C1 = cryptogenic category 1, C2 = cryptogenic category 2, N = native, SI = species indeterminata. See text for details.

Appendix 5a. Results from the diver collections and pile scrapings

				Berth code	TCW2																	
				Pile replicate	1									2								
				Pile position	IN				OUT					IN				OUT				
Class	Orders	Family	Genus	Species	*Status	1	2	3	4	1	2	3	4	MISC	1	2	3	4	1	2	3	4
Demospongiae	Dictyoceratida	Irciniidae	*Ircinia*	*akaroa*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Demospongiae	Halichondrida	Halichondriidae	*Halichondria*	*panicea*	C1	0	1	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Demospongiae	Halichondrida	Halichondriidae	*Halichondria*	*n. sp. 1 (knubby oxeas 290-380)*	C2	0	0	0	1	1	1	0	0	0	0	0	0	0	1	0	1	1
Demospongiae	Halisarcida	Halisarcidae	*Halisarca*	*dujardini*	A	0	0	0	0	0	1	1	1	0	1	1	0	1	0	0	0	1
Demospongiae	Haplosclerida	Callyspongiidae	*Callyspongia*	*diffusa*	C1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Demospongiae	Haplosclerida	Chalinidae	*Haliclona*	*cf. punctata*	N	1	0	0	0	0	1	0	0	0	1	1	0	1	1	1	0	0
Demospongiae	Haplosclerida	Chalinidae	*Haliclona*	*glabra*	N	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0
Demospongiae	Haplosclerida	Chalinidae	*Haliclona*	*cf. isodictyale*	N	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
Demospongiae	Homosclerophorida	Plakinidae	*Plakina*	*trilopha*	C1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Demospongiae	Poecilosclerida	Ancinoiidae	*Crella (Pytheas)*	*incrustans*	C1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Demospongiae	Poecilosclerida	Crellidae	*Crella (Pytheas)*	*affinis*	N	0	0	1	0	0	0	0	0	1	0	1	0	0	0	0	0	0
Demospongiae	Poecilosclerida	Hymedesmiidae	*Phorbas*	*fulva*	N	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0
Demospongiae	Poecilosclerida	Microcionidae	*Clathria (Microciona)*	*dendyi*	N	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Demospongiae	Poecilosclerida	Microcionidae	*Ophlitospongia*	*reticulata*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Demospongiae	Poecilosclerida	Mycalidae	*Mycale (Carmia)*	*tasmani*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gastropoda	Vetigastropoda	Fissurellidae	*Tugali*	*suteri*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gastropoda	Vetigastropoda	Trochidae	*Trochus*	*tiaratus*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gymnolaemata	Cheilostomata	Aeteidae	*Aetea*	*?australis*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gymnolaemata	Cheilostomata	Beaniidae	*Beania*	*n. sp. [whitten]*	N	0	0	0	0	0	0	1	0	0	1	1	0	0	0	0	0	0
Gymnolaemata	Cheilostomata	Beaniidae	*Beania*	*discodermiae*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gymnolaemata	Cheilostomata	Bitectiporidae	*Bitectipora*	*rostrata*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gymnolaemata	Cheilostomata	Bugulidae	*Bugula*	*flabellata*	A	0	0	1	0	0	0	1	1	0	0	1	1	0	1	1	1	1
Gymnolaemata	Cheilostomata	Calloporidae	*Crassimarginatella*	*fossa*	N	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gymnolaemata	Cheilostomata	Candidae	*Caberea*	*rostrata*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gymnolaemata	Cheilostomata	Candidae	*Scrupocellaria*	*ornithorhyncus*	N	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gymnolaemata	Cheilostomata	Chaperiidae	*Chaperia*	*granulosa*	N	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gymnolaemata	Cheilostomata	Crepidacanthidae	*Crepidacantha*	*crinispina*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gymnolaemata	Cheilostomata	Cryptosulidae	*Cryptosula*	*pallasiana*	A	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gymnolaemata	Cheilostomata	Cyclicoporidae	*Cyclicopora*	*longipora*	A	0	1	1	0	0	0	1	1	0	0	1	1	1	1	1	1	1
Gymnolaemata	Cheilostomata	Eurystomellidae	*Eurystomella*	*foraminigera*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gymnolaemata	Cheilostomata	Hippothoidae	*Celleporella*	*tongima*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gymnolaemata	Cheilostomata	Hippothoidae	*Celleporella*	*sp.*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gymnolaemata	Cheilostomata	Hippothoidae	*Hippothoa*	*flagellum*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gymnolaemata	Cheilostomata	Microporellidae	*Microporella*	*speculum*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gymnolaemata	Cheilostomata	Microporellidae	*Microporella*	*agonistes*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gymnolaemata	Cheilostomata	Romancheinidae	*Escharoides*	*angela*	N	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0
Gymnolaemata	Cheilostomata	Scrupariidae	*Scruparia*	*ambigua*	C1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gymnolaemata	Cheilostomata	Smittinidae	*Smittina*	*rosacea*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gymnolaemata	Cheilostomata	Watersiporidae	*Watersipora*	*subtorquata*	A	0	1	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1
Hydrozoa	Hydroida	Bougainvilliidae	*Bougainvillia*	*?muscus*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hydrozoa	Hydroida	Campanulariidae	*Obelia*	*dichotoma*	C1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hydrozoa	Hydroida	Campanulariidae	*Obelia*	*geniculata*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hydrozoa	Hydroida	Eudendriidae	*Eudendrium*	*capillare*	A	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Hydrozoa	Hydroida	Lafoeidae	*Filellum*	*sp. indeterminate*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hydrozoa	Hydroida	Sertulariidae	*Sertularella*	*robusta*	N	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Malacostraca	Amphipoda	Aoridae	*Aora*	*typica*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Malacostraca	Amphipoda	Aoridae	*Haplocheira*	*barbimana*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Malacostraca	Amphipoda	Corophiidae	*Meridiolembos*	*sp.*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Malacostraca	Amphipoda	Dexaminidae	*Paradexamine*	*pacifica*	N	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Malacostraca	Amphipoda	Eusiridae	*Gondogeneia*	*danai*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Malacostraca	Amphipoda	Isaeidae	*Gammaropsis*	*sp. 1*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Malacostraca	Amphipoda	Leucothoidae	*Leucothoe*	*trailli*	N	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Malacostraca	Amphipoda	Lysianassidae	*Parawaldeckia*	*vesca*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Malacostraca	Amphipoda	Melitidae	*Melita*	*inaequistylis*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Malacostraca	Amphipoda	Stenothoidae	*Stenothoe*	*sp. 1*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Malacostraca	Isopoda	Janiridae	*Iathrippa*	*?longicauda*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Malacostraca	Isopoda	Pseudojaniridae	*Schottea*	*sp*	SI	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Malacostraca	Isopoda	Sphaeromatidae	*Joeropsis*	*?neozelanica*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

*Status: A = non-indigenous (highlighted by shading), C1 = cryptogenic category 1, C2 = cryptogenic category 2, N = native, SI = species indeterminata. See text for details.

Appendix 5a. Results from the diver collections and pile scrapings

					Berth code	TCW2																
					Pile replicate	1									2							
					Pile position	IN				OUT					IN				OUT			
Class	Orders	Family	Genus	Species	*Status	1	2	3	4	1	2	3	4	MISC	1	2	3	4	1	2	3	4
Malacostraca	Mysida	Mysidae	*Heteromysis or Mysidetes*	*sp.*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phaeophyceae	Ectocarpales	Scytothamnaceae	*Scytothamnus*	*australis*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phaeophyceae	Laminariales	Alariaceae	*Undaria*	*pinnatifida*	A	0	0	0	0	1	1	1	0	0	0	0	0	0	1	0	1	0
Polychaeta	Eunicida	Dorvilleidae	*Dorvillea*	*australiensis*	N	1	1	1	0	0	0	0	1	0	1	0	1	1	0	0	0	1
Polychaeta	Eunicida	Dorvilleidae	*Schistomeringos*	*loveni*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Eunicida	Eunicidae	*Eunice*	*australis*	N	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Eunicida	Lumbrineridae	*Lumbrineris*	*sphaerocephala*	N	0	0	1	1	0	1	0	0	0	1	0	1	0	0	1	0	1
Polychaeta	Eunicida	Lumbrineridae	*Lumbricalus*	*aotearoae*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Phyllodocida	Hesionidae	*Ophiodromus*	*angustifrons*	N	0	0	1	1	0	1	0	1	0	0	0	0	0	1	0	0	1
Polychaeta	Phyllodocida	Nereididae	*Neanthes*	*kerguelensis*	N	0	0	0	1	0	0	0	1	0	0	1	0	1	0	0	0	1
Polychaeta	Phyllodocida	Nereididae	*Platynereis*	*Platynereis_australis_group*	SI	0	0	0	0	0	1	0	0	0	0	0	0	0	1	1	0	0
Polychaeta	Phyllodocida	Nereididae	*Nereis*	*falcaria*	N	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Polychaeta	Phyllodocida	Nereididae	*Perinereis*	*camiguinoides*	N	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0
Polychaeta	Phyllodocida	Nereididae	*Nereididae*	*indet*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Polychaeta	Phyllodocida	Nereididae	*Neanthes*	*Neanthes-A*	SI	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Polychaeta	Phyllodocida	Nereididae	*Perinereis*	*amblyodonta*	N	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Phyllodocida	Phyllodocidae	*Pirakia*	*Pirakia-A*	N	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Polychaeta	Phyllodocida	Phyllodocidae	*Eulalia*	*Eulalia-NIWA-2*	SI	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0
Polychaeta	Phyllodocida	Phyllodocidae	*Pterocirrus*	*brevicornis*	N	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Polychaeta	Phyllodocida	Phyllodocidae	*Phyllodocidae*	*Indet*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Phyllodocida	Phyllodocidae	*Eulalia*	*capensis*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Phyllodocida	Polynoidae	*Lepidonotus*	*polychromus*	N	0	0	1	1	1	1	0	0	0	1	1	0	0	1	1	0	0
Polychaeta	Phyllodocida	Polynoidae	*Lepidonotus*	*jacksoni*	N	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Phyllodocida	Polynoidae	*Lepidastheniella*	*comma*	N	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Polychaeta	Phyllodocida	Polynoidae	*Harmothoinae*	*Indet*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Phyllodocida	Polynoidae	*Lepidonotus*	*Lepidonotus-A*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Phyllodocida	Polynoidae	*Polynoidae*	*indet*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Phyllodocida	Sigalionidae	*Labiosthenolepis*	*laevis*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Phyllodocida	Syllidae	*Eusyllin-unknown*	*Eusyllin-unknown-A*	SI	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0
Polychaeta	Phyllodocida	Syllidae	*Haplosyllis*	*spongicola*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Phyllodocida	Syllidae	*Eusyllis*	*Eusyllis-A*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Phyllodocida	Syllidae	*Autolytin-unknown*	*Indet*	SI	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Phyllodocida	Syllidae	*Eusyllis*	*Eusyllis-C*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Phyllodocida	Syllidae	*Syllidae*	*Indet*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Sabellida	Sabellidae	*Megalomma*	*suspiciens*	N	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Polychaeta	Sabellida	Sabellidae	*Sabellidae*	*Indet*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Sabellida	Sabellidae	*Pseudopotamilla*	*laciniosa*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Sabellida	Sabellidae	*Pseudopotamilla*	*Pseudopotamilla-A*	SI	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Sabellida	Serpulidae	*Galeolaria*	*hystrix*	N	0	0	1	0	0	0	0	1	0	0	1	1	0	0	0	0	0
Polychaeta	Sabellida	Serpulidae	*Serpula*	*Serpula-C*	SI	1	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Polychaeta	Sabellida	Serpulidae	*Spirobranchus*	*Indet*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Sabellida	Serpulidae	*Serpulidae*	*Indet*	SI	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Polychaeta	Sabellida	Serpulidae	*Spirobranchus*	*cariniferus*	N	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Sabellida	Serpulidae	*Spirobranchus*	*polytrema*	A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Sabellida	Serpulidae	*Spirorbinae*	*Indet*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Sabellida	Serpulidae	*Galeolaria*	*Galeolaria-A*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Scolecida	Opheliidae	*Armandia*	*maculata*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Scolecida	Orbiniidae	*Proscoloplos*	*bondi*	N	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Polychaeta	Scolecida	Orbiniidae	*Scoloplos*	*cylindrifer*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Scolecida	Scalibregmatidae	*Hyboscolex*	*longiseta*	N	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Spionida	Chaetopteridae	*Chaetopteridae*	*Indet*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Spionida	Spionidae	*Polydora*	*hoplura*	A	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Polychaeta	Spionida	Spionidae	*Boccardia*	*chilensis*	N	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Polychaeta	Spionida	Spionidae	*Boccardia*	*knoxi*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Spionida	Spionidae	*Boccardia*	*lamellata*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Spionida	Spionidae	*Dipolydora*	*armata*	A	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Spionida	Spionidae	*Polydora*	*Indet*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Spionida	Spionidae	*Boccardia*	*Indet*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

*Status: A = non-indigenous (highlighted by shading), C1 = cryptogenic category 1, C2 = cryptogenic category 2, N = native, SI = species indeterminata. See text for details.

Appendix 5a. Results from the diver collections and pile scrapings

					Berth code	TCW2																
					Pile replicate	1									2							
					Pile position	IN				OUT					IN				OUT			
Class	Orders	Family	Genus	Species	*Status	1	2	3	4	1	2	3	4	MISC	1	2	3	4	1	2	3	4
Polychaeta	Spionida	Spionidae	*Boccardia*	*acus*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Spionida	Spionidae	*Carazziella*	*quadricirrata*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Terebellida	Acrocirridae	*Acrocirrus*	*trisectus*	N	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0
Polychaeta	Terebellida	Cirratulidae	*Dodecaceria*	*berkeleyi*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Terebellida	Cirratulidae	*Cirratulus*	*Cirratulus-A*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Terebellida	Cirratulidae	*Protocirrineris*	*nuchalis*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Terebellida	Cirratulidae	*Timarete*	*anchylochaetus*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Terebellida	Flabelligeridae	*Flabelligera*	*affinis*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Terebellida	Flabelligeridae	*Pherusa*	*parmata*	N	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Polychaeta	Terebellida	Terebellidae	*Pseudopista*	*rostrata*	N	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0
Polychaeta	Terebellida	Terebellidae	*Nicolea*	*armilla*	N	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0
Polychaeta	Terebellida	Terebellidae	*Streblosoma*	*toddae*	N	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0
Polychaeta	Terebellida	Terebellidae	*Terebellidae*	*Indet*	SI	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Polychaeta	Terebellida	Terebellidae	*Pista*	*pegma*	N	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0
Polychaeta			*Not_Lepidonotinae*	*Indet*	SI	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polyplacophora	Acanthochitonina	Acanthochitonidae	*Cryptoconchus*	*porosus*	N	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Polyplacophora	Acanthochitonina	Acanthochitonidae	*Acanthochitona*	*zelandica*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polyplacophora	Acanthochitonina	Acanthochitonidae	*Acanthochitona*	*violacea*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polyplacophora	Ischnochitonina	Chitonidae	*Rhyssoplax*	*aerea*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polyplacophora	Ischnochitonina	Chitonidae	*Onithochiton*	*neglectus*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polyplacophora	Ischnochitonina	Mopaliidae	*Plaxiphora*	*caelata*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polyplacophora	Ischnochitonina	Mopaliidae	*Plaxiphora*	*obtecta*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodophyceae	Acrochaetiales	Acrochaetiaceae	*Audouinella*	*sp.*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodophyceae	Bangiales	Bangiaceae	*Porphyra*	*sp.*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodophyceae	Ceramiales	Ceramiaceae	*Griffithsia*	*crassiuscula*	A	0	0	0	0	1	1	1	0	0	0	0	0	0	0	1	0	0
Rhodophyceae	Ceramiales	Ceramiaceae	*Ceramium*	*apiculatum*	N	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Rhodophyceae	Ceramiales	Ceramiaceae	*Griffithsia*	*sp.*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodophyceae	Ceramiales	Ceramiaceae	*Ceramium*	*flaccidum*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodophyceae	Ceramiales	Ceramiaceae	*Medeiothamnion*	*lyallii*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodophyceae	Ceramiales	Ceramiaceae	*Ceramium*	*sp.*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodophyceae	Ceramiales	Ceramiaceae	*Antithamnionella*	*adnata*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodophyceae	Ceramiales	Ceramiaceae	*Callithamnion*	*consanguineum*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodophyceae	Ceramiales	Deleseriaceae	*Phycodrys*	*quercifolia*	N	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Rhodophyceae	Ceramiales	Deleseriaceae	*Schizoseris*	*griffithsia*	N	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0
Rhodophyceae	Ceramiales	Deleseriaceae	*Myriogramme*	*denticulata*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodophyceae	Ceramiales	Deleseriaceae	*Acrosorium*	*decumbens*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodophyceae	Ceramiales	Deleseriaceae	*Hymenena*	*variolosa*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodophyceae	Ceramiales	Deleseriaceae	*Myriogramme*	*sp.*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodophyceae	Ceramiales	Delesseriaceae	*Schizoseris*	*dichotoma*	N	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Rhodophyceae	Ceramiales	Delesseriaceae	*Valeriemaya*	*sp.*	SI	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Rhodophyceae	Ceramiales	Delesseriaceae	*Erythroglossum*	*sp.*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodophyceae	Ceramiales	Delesseriaceae	*Erythroglossum*	*undulatissimum*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodophyceae	Ceramiales	Delesseriaceae	*Phycodrys*	*sp.*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodophyceae	Ceramiales	Rhodomelaceae	*Polysiphonia*	*sp.*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodophyceae	Ceramiales	Rhodomelaceae	*Cladhymenia*	*oblongifolia*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodophyceae	Corallinales	Corallinaceae	*Non-geniculate*	*coralline*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodophyceae	Gigartinales	Cystocloniaceae	*Rhodophyllis*	*centrocarpa*	N	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0
Rhodophyceae	Gigartinales	Gigartinaceae	*Gigartina*	*atropurpurea*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodophyceae	Gigartinales	Kallymeniaceae	*Callophyllis*	*variegata*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodophyceae	Rhodymeniales	Faucheaceae	*Gloiocladia*	*saccata*	N	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Rhodophyceae	Rhodymeniales	Rhodomeniaceae	*Rhodymenia*	*sp.*	SI	0	0	0	0	0	1	1	0	0	0	1	1	0	0	0	0	0
Rhodophyceae	Rhodymeniales	Rhodomeniaceae	*Rhodymenia*	*leptophylla*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0
Turbellaria	Polycladida	Stylochidae	*Planocera?*	*sp.*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Turbellaria	Polycladida	Stylochidae	*Enterogonia*	*sp.*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Turbellaria	Polycladida		*Indet genus*	*indet sp.*	SI	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Ulvophyceae	Cladophorales	Cladophoraceae	*Cladophora*	*feredayi*	N	0	0	0	0	0	1	1	0	0	0	0	0	0	0	1	0	0
Ulvophyceae	Ulvales	Ulvaceae	*Ulva*	*sp.*	SI	0	0	0	0	1	1	1	1	0	1	0	0	0	0	0	0	0
Ulvophyceae	Ulvales	Ulvaceae	*Enteromorpha*	*sp.*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

*Status: A = non-indigenous (highlighted by shading), C1 = cryptogenic category 1, C2 = cryptogenic category 2, N = native, SI = species indeterminata. See text for details.

Appendix 5b. Results from the benthic grab samples.

					Berth code	AQ3			AQ6			BURN				KINGS			OPT		TCW2		
Class	Order	Family	Genus	Species	*Status	1	2	3	1	2	3	1	2	3	4	1	2	3	1	2	1	2	3
Ascidiacea	Stolidobranchia	Styelidae	*Cnemidocarpa*	*nisiotus*	N	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bivalvia	Myoida	Corbulidae	*Corbula*	*zelandica*	N	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Bivalvia	Veneroida	Veneridae	*Tawera*	*spissa*	N	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0
Crustacea	Brachyura	Hymenosomatidae	*Halicarcinus*	*varius*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Crustacea	Brachyura	Ocypodidae	*Macrophthalmus*	*hirtipes*	N	0	0	1	0	0	0	0	0	0	0	0	0	0	1	1	1	0	1
Gastropoda	Neogastropoda	Muricidae	*Xymene*	*plebeius*	N	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gymnolaemata	Cheilostomata	Electridae	*Villicharixa*	*strigosa*	N	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Gymnolaemata	Cheilostomata	Eurystomellidae	*Eurystomella*	*biperforata*	N	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Gymnolaemata	Cheilostomata	Romancheinidae	*Exochella*	*conjuncta*	N	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Malacostraca	Isopoda	Cirolanidae	*Natatolana*	*rossi*	N	0	0	1	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0
Polychaeta	Eunicida	Lumbrineridae	*Lumbricalus*	*aotearoae*	N	0	0	1	0	1	1	1	1	1	0	0	0	0	1	0	1	0	0
Polychaeta	Phyllodocida	Glyceridae	*Glycera*	*Indet*	SI	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Phyllodocida	Glyceridae	*Glycera*	*lamelliformis*	N	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Phyllodocida	Goniadidae	*Glycinde*	*dorsalis*	N	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Phyllodocida	Hesionidae	*Ophiodromus*	*angustifrons*	N	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Phyllodocida	Nephtyidae	*Aglaophamus*	*verrilli*	N	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Polychaeta	Phyllodocida	Sigalionidae	*Labiosthenolepis*	*laevis*	N	0	0	0	0	0	0	1	0	0	0	0	0	1	0	1	0	0	0
Polychaeta	Sabellida	Oweniidae	*Owenia*	*petersenae*	N	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Polychaeta	Scolecida	Capitellidae	*Notomastus*	*Indet*	SI	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0
Polychaeta	Scolecida	Maldanidae	*Euclymene*	*Indet*	SI	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Polychaeta	Scolecida	Orbiniidae	*Phylo*	*novazealandiae*	N	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Scolecida	Orbiniidae	*Scoloplos*	*simplex*	N	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Polychaeta	Spionida	Spionidae	*Paraprionospio*	*Paraprionospio-A [pinnata]*	SI	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Terebellida	Cirratulidae	*Chaetozone*	*Indet*	SI	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0
Polychaeta	Terebellida	Pectinariidae	*Pectinaria*	*australis*	N	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Terebellida	Trichobranchidae	*Terebellides*	*narribri*	N	0	0	0	0	0	0	1	0	0	0	1	0	0	0	1	0	0	0

*Status: A = non-indigenous (highlighted by shading), N = native, C1 = cryptogenic category 1, C2 = cryptogenic category 2, SI = species indeterminata. See text for details.

Appendix 5c. Results from the benthic sled samples.

					Berth code	AQ6		BURN		KINGS		TBW2	TCW1		TCW2		WTLOO	
Class	Order	Family	Genus	Species	*Status	1	2	1	2	1	2	1	1	2	1	2	1	2
Actinopterygii	Perciformes	Trypterigiidae	*Forsterygion*	*sp. post larva*	SI	1	0	0	0	0	0	0	0	1	1	1	0	1
Ascidiacea	Phlebobranchia	Rhodosomatidae	*Corella*	*eumyota*	C1	0	0	0	0	0	0	0	0	1	0	0	0	0
Ascidiacea	Stolidobranchia	Pyuridae	*Microcosmus*	*australis*	N	0	0	0	0	0	0	0	1	0	0	0	0	0
Ascidiacea	Stolidobranchia	Styelidae	*Cnemidocarpa*	*bicornuta*	N	0	0	0	0	0	0	0	1	0	0	0	1	1
Ascidiacea	Stolidobranchia	Styelidae	*Asterocarpa*	*cerea*	C1	0	0	0	0	0	0	0	0	0	0	0	1	0
Ascidiacea	Stolidobranchia	Styelidae	*Cnemidocarpa*	*sp.*	A	0	0	0	0	0	0	0	0	0	0	0	1	0
Asteroidea	Valvatida	Asterinidae	*Patiriella*	*regularis*	N	0	0	1	0	0	0	0	1	0	0	0	1	1
Bivalvia	Pholadomyoida	Thraciidae	*Thracia*	*vitrea*	N	0	0	1	0	0	0	1	0	1	0	0	0	0
Bivalvia	Veneroida	Cardiidae	*Pratulum*	*pulchellum*	N	1	0	0	0	1	1	0	1	0	0	1	1	0
Bivalvia	Veneroida	Lasaeidae	*Arthritica*	*bifurca*	N	0	0	0	0	0	0	1	0	0	0	0	0	0
Bivalvia	Veneroida	Semelidae	*Theora*	*lubrica*	A	0	0	1	0	0	0	1	1	1	0	0	0	0
Bivalvia	Veneroida	Veneridae	*Tawera*	*spissa*	N	1	0	0	0	1	0	0	0	0	0	1	1	0
Bivalvia	Veneroida	Veneridae	*Dosinia*	*greyi*	N	0	0	1	0	0	0	0	0	0	0	0	0	0
Bivalvia	Veneroida	Veneridae	*Dosinia*	*lambata*	N	0	0	1	0	0	0	0	0	0	0	0	0	0
Crustacea	Anomura	Paguridae	*Diacanthurus*	*spinulimanus*	N	1	0	0	0	0	0	0	0	0	0	0	0	0
Crustacea	Anomura	Porcellanidae	*Petrolisthes*	*novaezelandiae*	N	1	0	0	0	0	0	0	0	0	0	0	0	1
Crustacea	Brachyura	Majidae	*Notomithrax*	*minor*	N	0	0	0	0	0	0	0	1	0	0	0	1	1
Crustacea	Brachyura	Ocypodidae	*Macrophthalmus*	*hirtipes*	N	1	0	0	0	1	1	1	1	1	0	0	0	1
Crustacea	Brachyura	Portunidae	*Nectocarcinus*	*antarcticus*	N	0	0	0	0	0	0	0	0	0	1	0	0	0
Crustacea	Brachyura	Portunidae	*Nectocarcinus*	*sp. nova*	C2	0	0	0	0	0	0	0	0	0	0	1	0	0
Crustacea	Caridea	Crangonidae	*Pontophilus*	*australis*	N	1	0	0	0	0	0	0	0	0	0	0	0	0
Demospongiae	Halisarcida	Halisarcidae	*Halisarca*	*dujardini*	A	0	0	0	0	0	0	0	1	0	0	0	0	0
Demospongiae	Poecilosclerida	Hymedesmiidae	*Phorbas*	*fulva*	N	0	0	0	0	0	0	0	0	0	1	0	0	0
Demospongiae	Poecilosclerida	Mycalidae	*Mycale (Carmia)*	*tasmani*	N	0	0	0	0	0	0	0	0	0	0	0	1	0
Echinoidea	Spatangoida	Loveniidae	*Echinocardium*	*cordatum*	N	0	0	1	0	0	0	0	0	0	0	0	0	0
Gastropoda	Littorinimorpha	Calyptraeidae	*Sigapatella*	*tenuis*	N	0	0	0	0	0	0	1	1	0	0	0	0	0
Gastropoda	Neogastropoda	Muricidae	*Xymene*	*plebeius*	N	1	0	1	0	0	1	1	0	0	0	0	1	0
Gastropoda	Neogastropoda	Muricidae	*Xymene*	*pusillus*	N	1	0	0	0	0	0	0	0	0	0	0	0	0
Gastropoda	Vetigastropoda	Trochidae	*Cantharidus*	*purpureus*	N	0	0	1	0	0	0	0	0	0	0	0	0	0
Gastropoda	Vetigastropoda	Trochidae	*Trochus*	*tiaratus*	N	1	0	0	0	0	0	0	0	0	0	0	0	0
Gymnolaemata	Cheilostomata	Aeteidae	*Aetea*	*ligulata*	N	1	0	0	0	0	0	0	0	1	0	0	0	0
Gymnolaemata	Cheilostomata	Aeteidae	*Aetea*	*?australis*	SI	0	1	0	0	0	0	0	0	0	0	0	0	0
Gymnolaemata	Cheilostomata	Aeteidae	*Aetea*	*truncata*	N	0	0	0	0	0	0	0	0	0	0	1	0	0
Gymnolaemata	Cheilostomata	Arachnopusiidae	*Arachnopusia*	*unicornis*	N	0	0	0	0	0	0	0	0	0	0	1	0	0
Gymnolaemata	Cheilostomata	Bitectiporidae	*Bitectipora*	*rostrata*	N	0	0	0	0	0	0	0	0	1	0	1	0	0
Gymnolaemata	Cheilostomata	Buffonellodidae	*Buffonellodes*	*rhomboidale*	N	0	0	0	0	0	0	0	0	0	0	1	0	0
Gymnolaemata	Cheilostomata	Bugulidae	*Bugula*	*flabellata*	A	0	0	0	0	0	0	1	0	0	0	0	0	1
Gymnolaemata	Cheilostomata	Candidae	*Caberea*	*rostrata*	N	0	0	0	0	0	0	0	0	0	1	0	0	0
Gymnolaemata	Cheilostomata	Chaperiidae	*Chaperiopsis*	*cervicornis*	N	1	1	0	0	0	0	0	0	1	0	1	0	0
Gymnolaemata	Cheilostomata	Chaperiidae	*Chaperiopsis*	*rubida*	N	1	0	0	0	0	0	0	0	0	0	1	0	0
Gymnolaemata	Cheilostomata	Cyclicoporidae	*Cyclicopora*	*longipora*	A	0	0	0	0	0	0	0	0	0	0	1	0	0
Gymnolaemata	Cheilostomata	Electridae	*Villicharixa*	*strigosa*	N	0	0	0	0	0	0	0	0	0	0	1	0	0
Gymnolaemata	Cheilostomata	Hippothoidae	*Celleporella*	*tongima*	N	0	0	0	0	0	0	0	0	0	0	1	0	0
Gymnolaemata	Cheilostomata	Hippothoidae	*Hippothoa*	*flagellum*	N	0	0	0	0	0	0	0	0	0	0	1	0	0
Gymnolaemata	Cheilostomata	Microporellidae	*Microporella*	*speculum*	N	1	0	0	0	0	0	0	0	0	0	1	0	0
Gymnolaemata	Cheilostomata	Microporellidae	*Fenestrulina*	*thyreophora*	N	1	0	0	0	0	0	0	0	0	0	0	0	0
Gymnolaemata	Cheilostomata	Phidoloporidae	*Rhynchozoon*	*larreyi*	C1	0	0	0	0	0	0	0	0	1	0	1	0	0
Gymnolaemata	Cheilostomata	Romancheinidae	*Exochella*	*conjuncta*	N	1	0	0	0	0	0	0	0	0	0	1	0	0
Gymnolaemata	Cheilostomata	Steginoporellidae	*Steginoporella*	*magnifica*	N	1	1	0	0	0	0	0	1	1	0	1	0	0
Holothuroidea	Apodida	Synaptidae	*Rynkatorpa*	*uncinata*	N	0	0	1	0	0	0	0	0	1	0	0	0	0
Malacostraca	Amphipoda	Ampeliscidae	*Ampelisca*	*chiltoni*	N	0	0	0	0	0	0	1	0	0	0	0	0	0
Malacostraca	Isopoda	Cirolanidae	*Natatolana*	*rossi*	N	0	0	0	0	0	0	0	0	0	0	1	0	0
Phaeophyceae	Laminariales	Alariaceae	*Undaria*	*pinnatifida*	A	1	0	0	0	1	0	0	0	0	0	0	0	0
Phaeophyceae			*Brown*	*fragment*	SI	0	0	0	0	0	0	0	0	1	0	0	0	0
Polychaeta	Eunicida	Lumbrineridae	*Abyssoninoe*	*galatheae*	N	0	0	0	0	0	0	1	0	1	0	0	0	0
Polychaeta	Eunicida	Onuphidae	*Onuphis*	*aucklandensis*	N	0	0	0	0	0	0	0	0	1	0	0	0	0

*Status: A = non-indigenous (highlighted by shading), N = native, C! = cryptogenic category 1, C2 = cryptogenic category 2, SI = species indeterminata. See text for details.

Appendix 5c. Results from the benthic sled samples.

Class	Order	Family	Genus	Species	Berth code	AQ6		BURN		KINGS		TBW2	TCW1		TCW2		WTLOO	
					*Status	1	2	1	2	1	2	1	1	2	1	2	1	2
Polychaeta	Phyllodocida	Aphroditidae	*Aphrodita*	*talpa*	N	0	0	0	0	1	0	0	0	0	0	0	0	0
Polychaeta	Phyllodocida	Glyceridae	*Glycera*	*lamelliformis*	N	1	0	0	0	0	0	0	1	1	0	0	0	0
Polychaeta	Phyllodocida	Glyceridae	*Hemipodus*	*simplex*	N	0	0	0	0	0	0	0	0	0	0	1	0	0
Polychaeta	Phyllodocida	Nephtyidae	*Aglaophamus*	*verrilli*	N	0	0	0	1	0	0	1	0	1	0	0	0	0
Polychaeta	Phyllodocida	Nereididae	*Neanthes*	*kerguelensis*	N	0	0	0	0	0	0	0	0	1	0	0	0	0
Polychaeta	Phyllodocida	Phyllodocidae	*Eteone*	*platycephala*	N	0	0	0	0	0	0	0	0	1	0	0	0	0
Polychaeta	Phyllodocida	Polynoidae	*Lepidonotus*	*polychromus*	N	1	0	0	0	0	0	0	0	0	0	0	0	1
Polychaeta	Phyllodocida	Sigalionidae	*Labiosthenolepis*	*laevis*	N	1	0	0	1	1	1	1	1	1	0	0	0	1
Polychaeta	Sabellida	Serpulidae	*Serpulidae*	*Indet*	SI	0	0	0	0	0	0	0	0	1	0	0	0	0
Polychaeta	Scolecida	Maldanidae	*Asychis*	*trifilosus*	N	0	0	0	1	0	0	0	0	1	0	0	0	0
Polychaeta	Scolecida	Maldanidae	*Maldane*	*theodori*	N	0	0	0	0	0	0	0	1	1	0	0	0	0
Polychaeta	Scolecida	Maldanidae	*Euclymene*	*Indet*	SI	0	0	0	0	1	0	0	0	0	0	0	0	0
Polychaeta	Scolecida	Orbiniidae	*Phylo*	*novazealandiae*	N	1	0	0	0	0	0	0	1	0	0	0	0	0
Polychaeta	Spionida	Spionidae	*Paraprionospio*	*Paraprionospio-A [pinnata]*	SI	0	0	0	0	0	0	0	1	1	0	0	0	0
Polychaeta	Terebellida	Pectinariidae	*Pectinaria*	*australis*	N	0	0	0	0	0	0	1	0	0	0	0	0	0
Polychaeta	Terebellida	Terebellidae	*Terebellidae*	*Indet*	SI	0	0	0	0	0	0	0	0	0	0	0	0	1
Polychaeta	Terebellida	Trichobranchidae	*Terebellides*	*narribri*	N	0	0	0	1	0	0	1	1	1	0	0	0	0
Polychaeta			*Not_Lepidonotinae*	*Indet*	SI	0	0	0	0	0	0	0	0	1	0	0	0	0
Polyplacophora	Acanthochitonina	Acanthochitonidae	*Cryptoconchus*	*porosus*	N	0	0	0	0	0	0	0	0	0	0	0	0	1
Rhodophyceae	Ceramiales	Ceramiaceae	*Griffithsia*	*crassiuscula*	A	0	0	0	0	0	0	1	0	0	0	0	0	0
Rhodophyceae	Ceramiales	Deleseriaceae	*Myriogramme*	*denticulata*	N	0	0	0	0	0	0	0	0	0	0	0	0	1
Rhodophyceae	Ceramiales	Delesseriaceae	*Valeriemaya*	*sp.*	SI	0	0	0	0	0	0	0	0	0	0	1	0	0
Rhodophyceae	Ceramiales	Rhodomelaceae	*Polysiphonia*	*strictissima*	N	0	0	0	0	1	0	0	0	0	0	0	0	0
Rhodophyceae	Gigartinales	Cystocloniaceae	*Rhodophyllis*	*centrocarpa*	N	1	0	0	0	0	0	0	0	0	0	0	0	0
Rhodophyceae	Rhodymeniales	Rhodomeniaceae	*Rhodymenia*	*sp.*	SI	0	0	0	0	0	0	1	0	0	0	0	0	0
Stenolaemata	Cyclostomata	Tubuliporidae	*Tubulipora*	*cf. connata*	N	0	0	0	0	0	0	0	0	0	0	1	0	0
Ulvophyceae	Cladophorales	Cladophoraceae	*Cladophora*	*feredayi*	N	1	0	0	0	0	0	0	0	0	0	1	0	0
Ulvophyceae	Ulvales	Ulvaceae	*Ulva*	*sp.*	SI	0	0	0	0	0	0	0	0	1	0	0	0	0

*Status: A = non-indigenous (highlighted by shading), N = native, C! = cryptogenic category 1, C2 = cryptogenic category 2, SI = species indeterminata. See text for details.

Appendix 5d. Results from the dinoflagellate cyst core samples.

				Berth code	MID BAY				TBW2	
Class	Order	Family	Genus	Species	*Status	1	2	3	4	1	2
Dinophyceae	Gymnodiniales	Gymnodiniacea	*Gymnodinium*	*catenatum*	C1	1	0	0	0	1	0
Dinophyceae	Peridiniales	Gonyaulacaceae	*Gonyaulax*	*grindleyi*	N	0	1	0	0	1	0
Dinophyceae	Peridiniales	Gonyaulacaceae	*Gonyaulax*	*spinifera*	N	1	0	0	1	0	0
Dinophyceae	Peridiniales	Peridiniaceae	*Protoperidinium*	*conicum*	N	0	0	0	1	1	1
Dinophyceae	Peridiniales	Peridiniaceae	*Protoperidinium*	*sp.*	N	0	0	0	1	1	1
Dinophyceae	Peridiniales	Peridiniaceae	*Lingulodinium*	*polyedrum*	N	0	1	0	0	0	1
Dinophyceae	Peridiniales	Peridiniaceae	*Scrippsiella*	*trochoidea*	N	1	0	1	0	0	0
Dinophyceae	Peridiniales	Peridiniaceae	*Protoperidinium conicum*	*cf. conicoides*	N	0	0	0	0	0	1

*Status: A = non-indigenous (highlighted by shading), N = native, C1 = cryptogenic category 1, C2 = cryptogenic category 2, SI = species indeterminata. See text for details.

Appendix 5e. Results from the fish trap samples.

					Berth code	AQ3				AQ6						BURN				KINGS				OPT				TBW2								TCW2			
					Line No.	1		2		1		2		3		1		2		1		2		1		2		1		2		3		4		1		2	
Class	Order	Family	Genus	Species	*Status	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
Actinopterygii	Gadiformes	Moridae	*Pseudophycis*	*bachus*	N	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	1	0	0	0	0
Actinopterygii	Mugiliformes	Mugilidae	*Parapercis*	*colias*	N	1	1	1	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0
Actinopterygii	Perciformes	Carangidae	*Caranx*	*georgianus*	N	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0
Actinopterygii	Perciformes	Cheilodactylidae	*Nemadactylus*	*macropterus*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	1	0	1	1	0	0
Actinopterygii	Perciformes	Labridae	*Notolabrus*	*celidotus*	N	1	1	1	1	0	1	0	1	1	1	1	1	0	0	1	1	1	1	0	1	1	1	0	1	1	1	1	0	1	1	1	1	1	1
Actinopterygii	Perciformes	Labridae	*Notolabrus*	*miles*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Actinopterygii	Perciformes	Trypterigiidae	*Grahamina*	*gymnota*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
Actinopterygii	Perciformes	Trypterigiidae	*Grahamina*	*capito*	N	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Actinopterygii	Pleuronectiformes	Pleuronectidae	*Peltorhamphus*	*latus*	N	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Asteroidea	Valvatida	Asterinidae	*Patiriella*	*regularis*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	1	0	0	0	0
Crustacea	Anomura	Paguridae	*Diacanthurus*	*spinulimanus*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Crustacea	Brachyura	Majidae	*Notomithrax*	*sp.*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	0	0	0	0
Crustacea	Brachyura	Majidae	*Notomithrax*	*ursus*	N	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Crustacea	Brachyura	Majidae	*Notomithrax*	*peronii*	N	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Crustacea	Brachyura	Ocypodidae	*Macrophthalmus*	*hirtipes*	N	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

*Status: A = non-indigenous (highlighted by shading), N = native, C1 = cryptogenic category 1, C2 = cryptogenic category 2, SI = species indeterminata. See text for details.

Appendix 5f. Results from the crab trap samples.

					Berth code	AQ3				AQ6				BURN				KINGS				OPT				TBW2				TCW2				
					Line no.	1		2		1		2		1		2		1		2		1		2		1		2		1		2		
Class	Order	Family	Genus	Species	*Status	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	Total
Actinopterygii	Gadiformes	Moridae	*Pseudophycis*	*bachus*	N	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	1	0	0	0	0	0	1	0	0	0	1	0	0	6
Actinopterygii	Mugiliformes	Mugilidae	*Parapercis*	*colias*	N	1	0	1	0	0	0	1	1	0	0	0	1	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	7
Actinopterygii	Perciformes	Labridae	*Notolabrus*	*celidotus*	N	1	1	0	1	1	0	1	1	0	1	1	1	1	1	1	1	0	1	0	0	1	1	1	0	0	1	1	0	19
Actinopterygii	Perciformes	Plesiopidae	*Acanthoclinus*	*fuscus*	N	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Actinopterygii	Perciformes	Trypterigiidae	*Grahamina*	*capito*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	2
Actinopterygii	Perciformes	Trypterigiidae	*Grahamina*	*gymnota*	N	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Asteroidea	Valvatida	Asterinidae	*Patiriella*	*regularis*	N	0	0	0	0	0	0	0	0	1	1	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	1	0	0	6
Crustacea	Anomura	Paguridae	*Diacanthurus*	*spinulimanus*	N	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Crustacea	Anomura	Paguridae	*Lophopagurus (L.)*	*thompsoni*	N	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Crustacea	Brachyura	Cancridae	*Cancer*	*novaezelandiae*	N	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Crustacea	Brachyura	Majidae	*Notomithrax*	*sp.*	SI	0	0	0	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	4
Crustacea	Brachyura	Majidae	*Notomithrax*	*minor*	N	0	1	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
Crustacea	Brachyura	Majidae	*Notomithrax*	*peronii*	N	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Crustacea	Brachyura	Majidae	*Notomithrax*	*ursus*	N	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1

*Status: A = non-indigenous (highlighted by shading), N = native, C1 = cryptogenic category 1, C2 = cryptogenic category 2, SI = species indeterminata. See text for details.

Appendix 5g. Results from the starfish trap samples.

					Berth code	AQ3				AQ6				BURN				KINGS				OPT				TBW2				TCW2			
					Line No.	1		2		1		2		1		2		1		2		1		2		1		2		1		2	
Class	Order	Family	Genus	Species	*Status	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
Ascidiacea	Stolidobranchia	Pyuridae	*Pyura*	*rugata*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Ascidiacea	Stolidobranchia	Styelidae	*Asterocarpa*	*cerea*	C1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Ascidiacea	Stolidobranchia	Styelidae	*Cnemidocarpa*	*bicornuta*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Ascidiacea	Stolidobranchia	Styelidae	*Styela*	*plicata*	C1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Asteroidea	Valvatida	Asterinidae	*Patiriella*	*regularis*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Bivalvia	Mytiloida	Mytilidae	*Modiolus*	*areolatus*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Bivalvia	Mytiloida	Mytilidae	*Mytilus*	*galloprovincialis*	C1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bivalvia	Ostreoida	Anomiidae	*Pododesmus*	*zelandicus*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Bivalvia	Ostreoida	Ostreidae	*Ostrea*	*chilensis*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0
Bivalvia	Pterioida	Pectinidae	*Talochlamys*	*zelandiae*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Crustacea	Anomura	Paguridae	*Diacanthurus*	*spinulimanus*	N	1	1	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	1	1
Crustacea	Anomura	Porcellanidae	*Petrolisthes*	*novaezelandiae*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Crustacea	Brachyura	Majidae	*Notomithrax*	*sp.*	SI	1	1	0	1	1	1	1	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Crustacea	Brachyura	Majidae	*Notomithrax*	*minor*	N	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Crustacea	Brachyura	Majidae	*Leptomithrax*	*longipes*	N	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Crustacea	Brachyura	Majidae	*Notomithrax*	*peronii*	N	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Crustacea	Brachyura	Majidae	*Notomithrax*	*ursus*	N	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gymnolaemata	Cheilostomata	Bugulidae	*Bugula*	*flabellata*	A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Gymnolaemata	Cheilostomata	Steginoporellidae	*Steginoporella*	*magnifica*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Malacostraca	Isopoda	Cirolanidae	*Natatolana*	*rossi*	N	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phaeophyceae	Laminariales	Alariaceae	*Undaria*	*pinnatifida*	A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Polychaeta	Phyllodocida	Nereididae	*Neanthes*	*kerguelensis*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Polychaeta	Sabellida	Serpulidae	*Spirobranchus*	*polytrema*	A	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodophyceae	Ceramiales	Ceramiaceae	*Griffithsia*	*crassiuscula*	A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1
Rhodophyceae	Ceramiales	Ceramiaceae	*Ceramium*	*apiculatum*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Rhodophyceae	Ceramiales	Deleseriaceae	*Phycodrys*	*quercifolia*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Rhodophyceae	Ceramiales	Deleseriaceae	*Schizoseris*	*griffithsia*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Rhodophyceae	Gigartinales	Cystocloniaceae	*Rhodophyllis*	*centrocarpa*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
Rhodophyceae	Rhodymeniales	Faucheaceae	*Gloiocladia*	*saccata*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Scyphozoa			*Scyphozoa*	*sp.*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Ulvophyceae	Ulvales	Ulvaceae	*Ulva*	*spathulata*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0

*Status: A = non-indigenous (highlighted by shading), N = native, C1 = cryptogenic category 1, C2 = cryptogenic category 2, SI = species indeterminata. See text for details.

Appendix 5h. Results from the shrimp trap samples.

					Berth code	AQ3				AQ6				BURN				KINGS				OPT				TBW2				TCW2			
					Line No.	1		2		1		2		1		2		1		2		1		2		1		2		1		2	
Class	Order	Family	Genus	Species	*Status	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
Malacostraca	Isopoda	Cirolanidae	*Natatolana*	*rossi*	N	1	1	1	1	1	0	1	1	0	1	0	0	0	1	0	0	1	0	0	0	1	1	1	0	1	1	1	1
Crustacea	Brachyura	Majidae	*Notomithrax*	*peronii*	N	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

*Status: A = non-indigenous (highlighted by shading), N = native, C1 = cryptogenic category 1, C2 = cryptogenic category 2, SI = species indeterminata. See text for details.

Appendix 5i. Results from visual shoreline surveys.

					Berth code	TBW2		TCW2
Class	Order	Family	Genus	Species	*Status	1	1	1
Ulvophyceae	Ulvales	Ulvaceae	*Ulva*	*sp.*	SI	1	1	0
Asteroidea	Valvatida	Asterinidae	*Patiriella*	*regularis*	N	1	1	0
Asteroidea	Valvatida	Asterinidae	*Patiriella*	*sp.*	SI	1	1	0
Bryopsidophyceae	Bryopsidales	Codiaceae	*Codium*	*dichotomum*	N	1	1	0
Gastropoda	Vetigastropoda	Turbinidae	*Turbo*	*smaragdus*	N	1	1	0
Rhodophyceae	Ceramiales	Deleseriaceae	*Myriogramme*	*denticulata*	N	1	1	0
Rhodophyceae	Ceramiales	Rhodomelaceae	*Polysiphonia*	*strictissima*	N	1	1	0
Rhodophyceae	Gigartinales	Gigartinaceae	*Gigartina*	*decipiens*	N	1	1	0
Ascidiacea	Stolidobranchia	Pyuridae	*Pyura*	*pulla*	N	1	0	0
Ascidiacea	Stolidobranchia	Styelidae	*Cnemidocarpa*	*sp.*	A	1	0	0
Bivalvia	Arcoida	Arcidae	*Barbatia*	*novaezelandiae*	N	1	0	0
Bivalvia	Mytiloida	Mytilidae	*Aulacomya*	*atra maoriana*	N	1	0	0
Bivalvia	Mytiloida	Mytilidae	*Mytilus*	*galloprovincialis*	C1	1	0	0
Bivalvia	Mytiloida	Mytilidae	*Perna*	*canaliculus*	N	1	0	0
Bivalvia	Ostreoida	Anomiidae	*Pododesmus*	*zelandicus*	N	1	0	0
Bivalvia	Ostreoida	Ostreidae	*Ostrea*	*chilensis*	N	1	0	0
Bivalvia	Pterioida	Pectinidae	*Pecten*	*novaezelandiae*	N	1	0	0
Crustacea	Anomura	Paguridae	*Diacanthurus*	*spinulimanus*	N	1	0	0
Crustacea	Brachyura	Pinnotheridae	*Pinnotheres*	*novaezelandiae*	N	1	0	0
Gastropoda	Vetigastropoda	Trochidae	*Melagraphia*	*aethiops*	N	1	0	0
Gastropoda	Vetigastropoda	Trochidae	*Trochus*	*viridus*	N	1	0	0
Gymnolaemata	Cheilostomata	Aeteidae	*Aetea*	*?australis*	SI	1	0	0
Gymnolaemata	Cheilostomata	Beaniidae	*Beania*	*n. sp. [whitten]*	N	1	0	0
Gymnolaemata	Cheilostomata	Bugulidae	*Bugula*	*flabellata*	A	1	0	0
Gymnolaemata	Cheilostomata	Cyclicoporidae	*Cyclicopora*	*longipora*	A	1	0	0
Gymnolaemata	Cheilostomata	Eurystomellidae	*Eurystomella*	*foraminigera*	N	1	0	0
Gymnolaemata	Cheilostomata	Microporellidae	*Fenestrulina*	*thyreophora*	N	1	0	0
Gymnolaemata	Cheilostomata	Phidoloporidae	*Rhynchozoon*	*larreyi*	C1	1	0	0
Gymnolaemata	Cheilostomata	Steginoporellidae	*Steginoporella*	*magnifica*	N	1	0	0
Holothuroidea	Aspidochirotida	Stichopodidae	*Stichopus*	*mollis*	N	1	0	0
Phaeophyceae	Ectocarpales	Scytosiphonaceae	*Colpomenia*	*sp.*	SI	1	0	0
Phaeophyceae	Ectocarpales	Scytothamnaceae	*Scytothamnus*	*australis*	N	1	0	0
Phaeophyceae	Ectocarpales	Splachnidiaceae	*Splachnidium*	*rugosum*	N	1	0	0
Polychaeta	Phyllodocida	Phyllodocidae	*Pirakia*	*Pirakia-A*	N	1	0	0
Polychaeta	Sabellida	Serpulidae	*Galeolaria*	*hystrix*	N	1	0	0
Rhodophyceae	Acrochaetiales	Acrochaetiaceae	*Audouinella*	*sp.*	SI	0	1	0
Rhodophyceae	Ceramiales	Ceramiaceae	*Ceramium*	*apiculatum*	N	1	0	0
Rhodophyceae	Gigartinales	Gigartinaceae	*Gigartina*	*atropurpurea*	N	0	1	0
Ulvophyceae	Codiales	Codiaceae	*Codium*	*fragile*	N	0	1	0

*Status: A = non-indigenous (highlighted by shading), N = native, C1 = cryptogenic category 1, C2 = cryptogenic category 2, SI = species indeterminata. See text for details.

Addendum

After completing these reports we were advised of changes in the identification of one species. The ascidian *Cnemidocarpa sp*. refered to in this report as a new introduction to New Zealand has been revised to *Cnemidocarpa nisiotus* (status: native).