Port of Bluff

Baseline survey for non-indigenous marine species (Research Project ZBS 2000/04)

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Executive Summary

This report describes the results of a March 2003 survey to provide a baseline inventory of native, non-indigenous and cryptogenic marine species within the Port of Bluff.

- The survey is part of a nationwide investigation of native and non-indigenous 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 a range of habitats within the Port of Bluff. 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 Bluff 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 330 species or higher taxa was identified from the Port of Bluff survey. They consisted of 207 native species, 12 non-indigenous species, 28 cryptogenic species (those whose geographic origins are uncertain) and 83 species indeterminata (taxa for which there is insufficient taxonomic or systematic information available to allow identification to species level).

- Twenty species of marine organisms collected from the Port of Bluff have not previously been described from New Zealand waters; three of these were first New Zealand records of non-indigenous species (a hydroid, *Symplectoscyphus indivisus*; a crab, *Cancer amphioetus*; and a sponge, *Leucosolenia* cf. *discoveryi*). The other 17 species are considered cryptogenic and include 16 species of sponge that do not match existing species descriptions and which may be new to science.

- The 12 non-indigenous organisms described from the Port of Bluff included representatives of five phyla. The non-indigenous species detected (ordered alphabetically by phylum, class, order, family, genus and species) were: (Bryozoa) *Bugula flabellata, Watersipora subtorquata* (Cnidaria) *Symplectoscyphus indivisus* (Crustacea) *Cancer amphioetus* (Phycophyta) *Griffithsia crassiuscula, Polysiphonia brodiaei* (Porifera) *Grantessa intusarticulata, Leucosolenia* cf. *discoveryi, Stylotella agminata, Halisarca dujardini, Chondropsis topsentii, Psammoclema* cf. *crassum*

- No species detected from the Port of Bluff are on the New Zealand register of unwanted organisms. Cysts of the cryptogenic toxin-producing dinoflagellate, *Alexandrium* *catenella* were recovered from core samples taken in Bluff. *A. catenella* is one of four toxic dinoflagellate species on the Australian ABWMAC list of unwanted marine pests.

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

- Approximately 75% of NIS (nine of 12 species) in the Port of Bluff are likely to have been introduced in hull fouling assemblages, and 25 % 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 Bluff (as opposed to ballast water introductions) is consistent with findings from similar port baseline studies overseas.

Introducton

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.
The port surveys have two principal objectives:

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

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 Bluff 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.

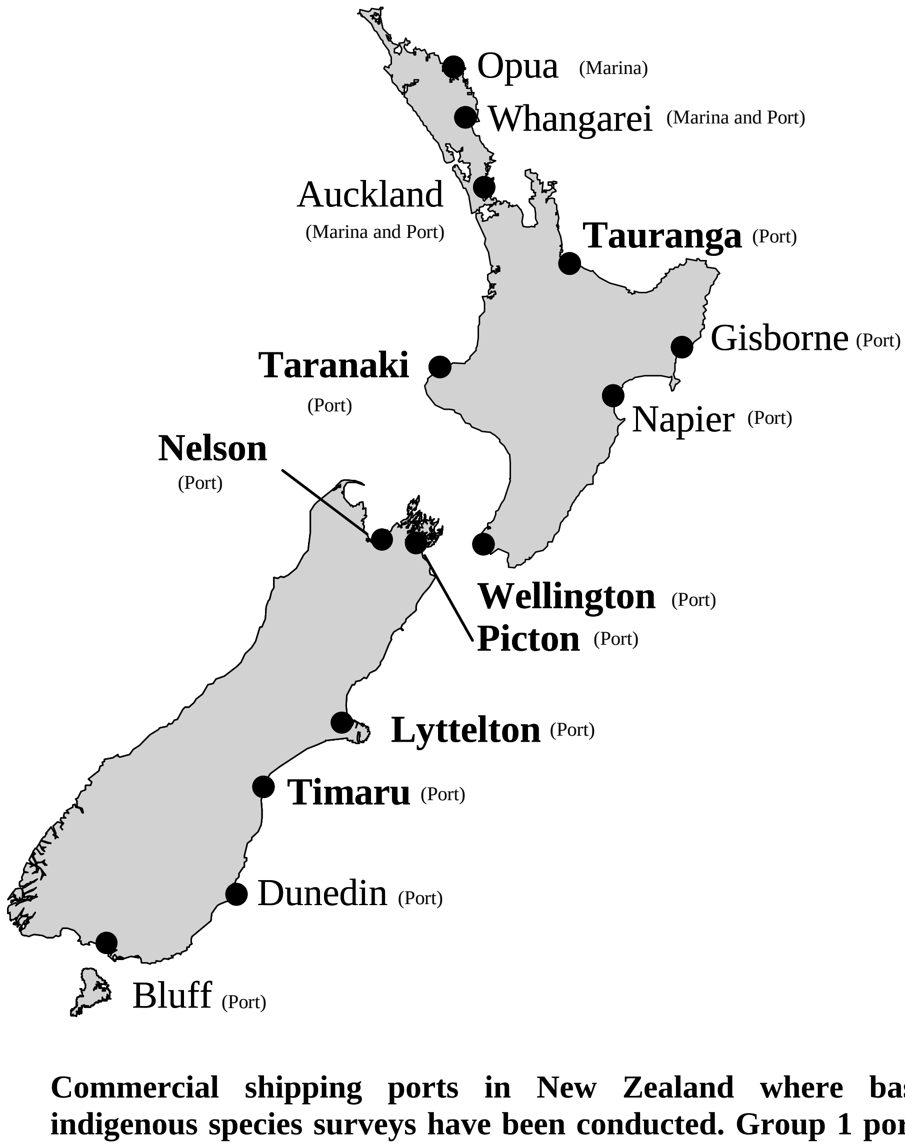

Figure 1: Commercial shipping ports in New Zealand where baseline non-indigenous species surveys have been conducted. Group 1 ports surveyed in the summer of 2001/2002 are indicated in bold and group 2 ports surveyed in the summer of 2002/2003 are indicated in plain font. Marinas were also surveyed for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

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

DESCRIPTION OF THE PORT OF BLUFF

The Port of Bluff (46°37'S, 168°18'E) is 27 km from Invercargill and is the most southern port of commercial significance in New Zealand (Fig 1). The Port of Bluff is located in the southwestern corner of the Bluff Harbour embayment, approximately 2 km from the harbour entrance (Fig 2). The Port consists of a series of 8 main berths along the eastern margin of the central island harbour. In addition to the island harbour berths, the Town Wharf provides berths for petroleum container vessels and Tiwai Wharf provides access to the aluminium smelter on the eastern side of Bluff Harbour (Fig 2). There are two approach channels to the port, the south channel has a minimum depth of 12.5 m and the northern channel has a minimum depth of 7.2m at mean low water spring tides. The harbour entrance channel has a length of 800 m and maximum width of 110 m (www.southport.co.nz).

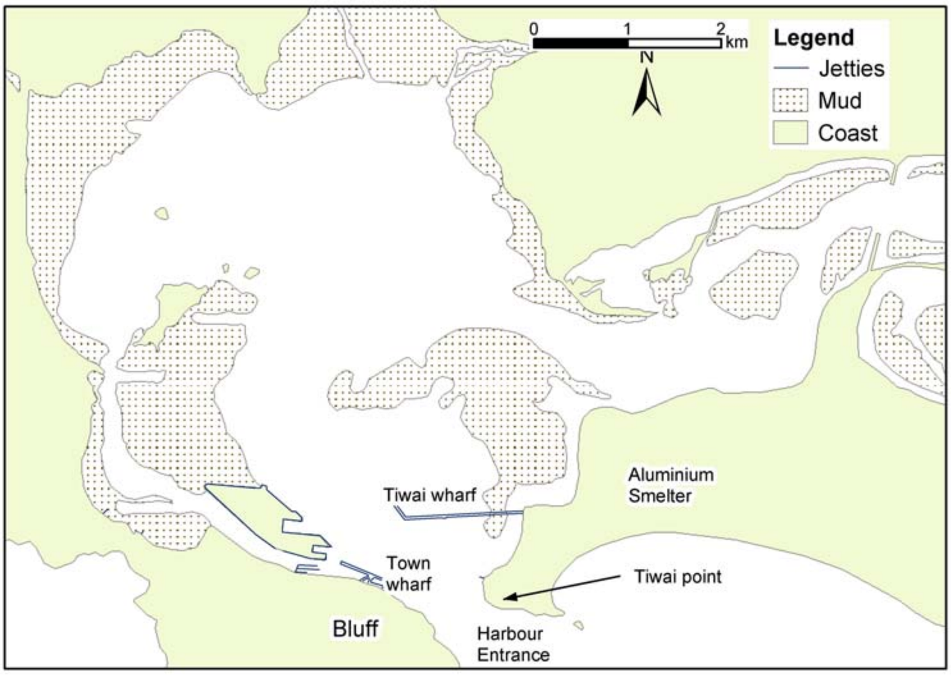

Figure 2: Bluff harbour map

PORT OPERATION AND SHIPPING MOVEMENTS

On 27 December 1822 the little sloop *Snapper* became the first deep-sea vessel to enter the natural port of Bluff. She came in search of flax but was soon followed by whalers and sealers. James Spencer established a trading post in Bluff in 1824 to supply visiting ships. He became Bluff's first European resident, and Bluff is now considered to be the oldest continuously occupied European settlement in New Zealand.

In 1836, John Jones established a whaling station at Stirling Point, and by 1839, had set up two more stations nearby. Bluff Harbour at this time was a haven for whaling ships taking both sperm and right whales (see McNab, 1975). The well-known and respected whaler Paddy Gilroy arrived at Bluff in 1837 and his ship the *Chance* was a feature of Foveaux Strait whaling for many years. The whaling station was to become the site of the port's first pilotage service. By then Bluff was a thriving port, and construction began on the Town Wharf in 1863. In the same year the railway to Invercargill was begun, but due to financial constraints was not completed until 1867. A major expansion of port facilities in Bluff began in 1952 when the decision was made to reclaim an area of shallow sandbanks and proceed with construction of what is now the Island Harbour. Officially opened on 3 December 1960, reclamation continued until 1982 when number eight berth was completed. Facilities on the

Island Harbour include tallow storage, grain silos, a loader for wood chips and other bulk cargoes, extensive cool stores and a 'Syncrolift ship-lift' which is New Zealand's biggest and has a capacity of over 1,000 tonnes, (www.southlandmuseum.com and www.bluff.co.nz/port/html).

The Port of Bluff (operated by South Port Ltd) currently handles a wide variety of cargo whose combined weight annually has exceeded 2 million tonnes for the last three years (www.southport.co.nz). Imports include alumina (>800,000 tonnes in the 2004 financial year) and other raw materials for the Tiwai Point aluminium smelter, petroleum products, fertilizer and paper pulp. Exports comprise aluminium, meat, dairy products, wool, tallow, forest products, fish and grain. In particular, the Port of Bluff is the most important forestry port in the far south of New Zealand.

The main berths are predominantly constructed of concrete relieving platforms with steel sheet piles, although the older berths 11 and 12 have wooden piles and the Tiwai berth has concrete piles. The Port has a total of 13 berths whose details are provided in Table 1. Tiwai Point aluminium smelter dominates the eastern side of the harbour, has its own purpose built wharf and produces over a quarter of a million tonnes of aluminium each year.

Recent analyses of shipping arrivals to the Port show that the Port of Bluff received 137 international ship visits during 2002/2003 (126 merchant, nine pleasure, and two passenger vessels). During this period, most commercial vessels entering the port arrived from Australia (84.2 %), the north-west Pacific (10.1 %), the south-east Pacific (1.9 %), the Arabian seas (1.3 %), and east Asian seas (1.3 %) (Campbell 2004). According to SouthPort NZ Ltd, shipping services currently servicing Bluff provides links to 26 ports in 12 other countries in addition to domestic links with other New Zealand ports (www.southport.co.nz). In 2000, there were 97 registered fishing vessels in Bluff Harbour (Sinner et al 2000).

Vessels unable to be berthed immediately in Bluff may anchor near to Dog Island (46°39'S, 168°25E'), to the southeast of the port entrance, where an automated lighthouse is stationed. This may occur with large vessels waiting to berth at the Tiwai berth, but is not a common occurrence (Russell Slaughter, SouthPort Ltd pers. comm.).

Vessels are expected to comply with the Voluntary Controls on the Discharge of Ballast Water in New Zealand (http://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. According to Inglis (2001), a total volume of 33,095 m^3 of ballast water was discharged in the Port of Bluff in 1999, with the largest country-of-origin volumes of 7,483 m^3 from Japan, 7,413 m^3 from Australia, 1,714 m^3 from China, and 16,207 m^3 unspecified.

Regular small-scale dredging is carried out to remove siltation from the berthing pockets and immediate berthing areas (8-10,000 m^3 per year). SouthPort Ltd is soon to undertake larger-scale maintenance dredging of the swing basin berths (30-40,000 m^3), which is normally conducted every 13-14 years. There is no dredging carried out at Tiwai Point, nor in the majority of the shipping channels due to the nature of the rocky bottom (Russell Slaughter, SouthPort Ltd pers. comm.).

Maximum draught is 9.7 m at ordinary high water and up to 10 m at high water spring tides. Low water maximum draught varies from 7 to 8 m at neap tides. For these draughts, maximum length of vessels is 198 m with a beam of 29 m. Vessels up to 225 m length and 34 m beam may enter at high water during daylight hours at a reduced draught.

The underlying granite rock seabed near the entrance of Bluff Harbour will not accommodate the increasingly large container vessels that now operate in the New Zealand market (www.southport.co.nz), so this restricts its expansion capacity to handle larger vessels. SouthPort Ltd is expanding its container handling capacity with the purchase of a new mobile crane container and container forklift, and further paving of container storage areas in anticipation of a substantial increase in container traffic. SouthPort Ltd has no immediate plans for berthing expansion or land reclamation (Russell Slaughter, SouthPort Ltd pers. comm.).

PHYSICAL ENVIRONMENT OF BLUFF HARBOUR

Bluff Harbour is a sheltered natural harbour of 5,500 ha that opens south into Foveaux Strait. There are two main arms to the harbour: Bluff Harbour proper (Fig 2), and Awarua Bay, which extends approximately 5 km to the east. Bluff harbour is a shallow inlet with water depths typically less than 5m. The mean tidal range is 1.5 m (neap tides) to 2.21 m (spring tides). The predominant sediment in the harbour is sand, with extensive flats exposed at low tide throughout the northern half of the harbour. Tidal flow in the entrance channel varies from four to five knots with ordinary tides and peaks of seven knots on high spring tides, limiting major shipping movements to slack water (www.southport.co.nz).

EXISTING BIOLOGICAL INFORMATION

There is little existing biological information available for Bluff Harbour. Most biological research around this area has focused instead on the commercially important oyster fishery nearby in Fouveaux Strait.

In a report prepared for the Southland Harbour Board on the main Ocean Beach channel reclamation, Beaton and Leitch (1977) attached reports from the Ministry of Fisheries and Southland Acclimatisation Society regarding the likely environmental impacts of the reclamation. Both appended reports described the marine topography, flora and fauna of the affected areas, highlighting the importance of the area as important habitat for birdlife, shellfish, crustaceans and fish.

Cameron (1998) reported on biota and sediment monitoring of dredging (within Bluff Harbour) and spoil disposal (outside the harbour), examining trace metal content of green lipped mussels used as biomonitors, and trace metal content in spoil. He found elevated sediment cadmium levels linked to port activities and that the mussels contained elevated copper and zinc concentrations in berthing areas.

Donald et al. (2004) examined two species of topshells from Bluff Harbour for Digenean parasites, whose presence was not detected. Taylor & MacKenzie (2001) also tested Bluff Harbour for the presence of the toxic blooming dinoflagellate *Gymnodinium catenatum*, and did not detect any resting cysts (sediment samples) or motile cells (phytoplankton samples).
Recently, some attention has specifically focused on non-indigenous species in Bluff Harbour. The invasive kelp *Undaria pinnatifida* was identified in Bluff Harbour in 1998, and this port is deemed in the optimal temperature zone for this macroalga (Forrest et al 2000, Sinner et al 2000). The *Undaria* eradication programme in nearby Stewart Island (initiated in 1997) was consequently extended to include Bluff Harbour in an effort to prevent reintroduction of *Undaria* to Stewart Island, and possible spread to Fiordland and the Subantartic Islands (Stuart and O'Callaghan 2000).

A restricted bathymetric survey was carried by Thales/NIWA around the grounded vessel *Tai Ping* to the limits of the Bluff Harbour in 2002 (Anon 2002). A more comprehensive bathymetric survey of the harbour was also conducted in 2002 for South Port NZ Ltd around the main berth areas, which confirmed the strong tidal streams (3-5 knots) in this harbour (Anon. 2003) observed by NIWA. In confidential client reports NIWA also carried out assessments of proposed marine farm sites in Bluff Harbour in 2001 (Grange and Carbines 2001, Ross and Image 2001) examining aspects such as benthic fauna composition, chlorophyll concentrations, sediment composition, water currents and temperature.

The Cawthron Institute have conducted a number of ecological surveys inside Bluff Harbour and Awarua Bay as part of Environment Southland's estuarine monitoring programme (Stevens and Clarke 2004, Robertson et al 2004a, b). These surveys mapped the intertidal vegetation and substrata, and sampled representative sites for infauna, epifauna, heavy metals, algae and sediment grain size.

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 Port of Bluff. The survey was undertaken between the 17th and 21st of March 2003. Most sampling was concentrated around five main berths: Tiwai Wharf and berths 3A, 7, 11 and 14 (Fig 3). A summary of sampling effort within the Port of Bluff is provided in Tables 3a,b.

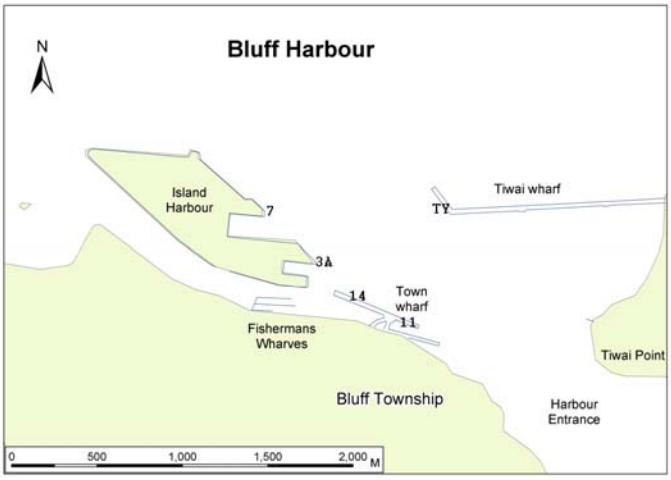

Figure 3: Port of Bluff with main sampling berth locations marked

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.

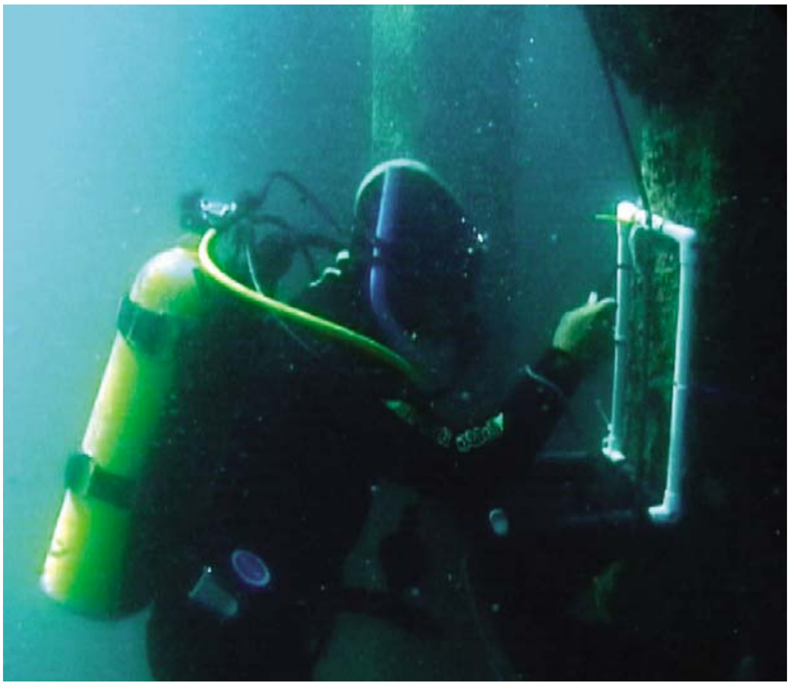

Figure 4: Diver sampling organisms on pier piles.

BENTHIC INFAUNA

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 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 two 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.

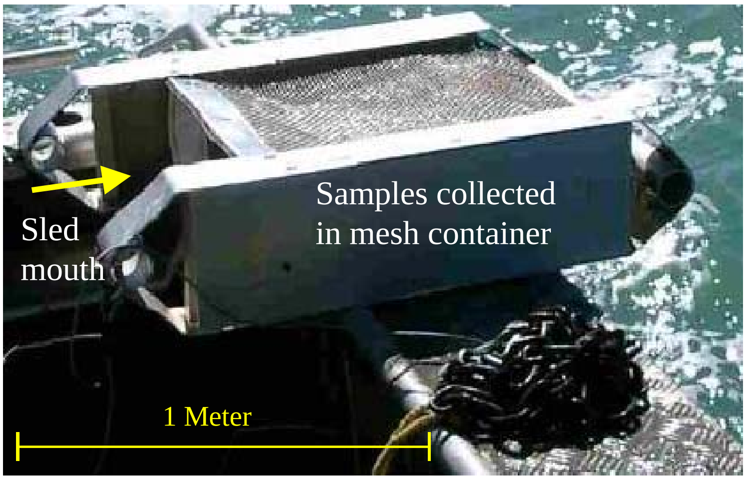

Figure 6: Benthic sled

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 m long x 1 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 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).

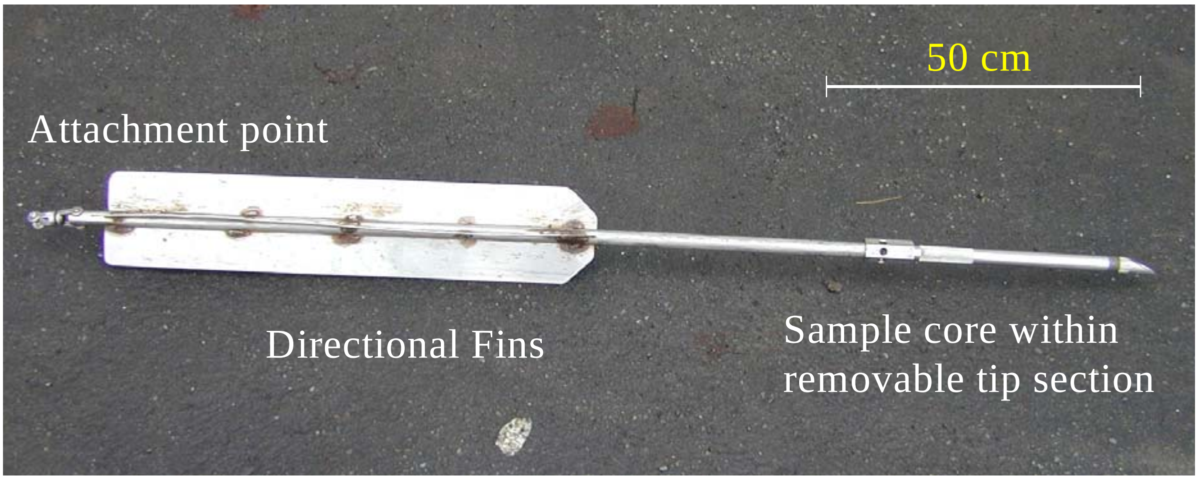

Figure 7: Javelin corer

MOBILE EPIBENTHOS

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

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 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.

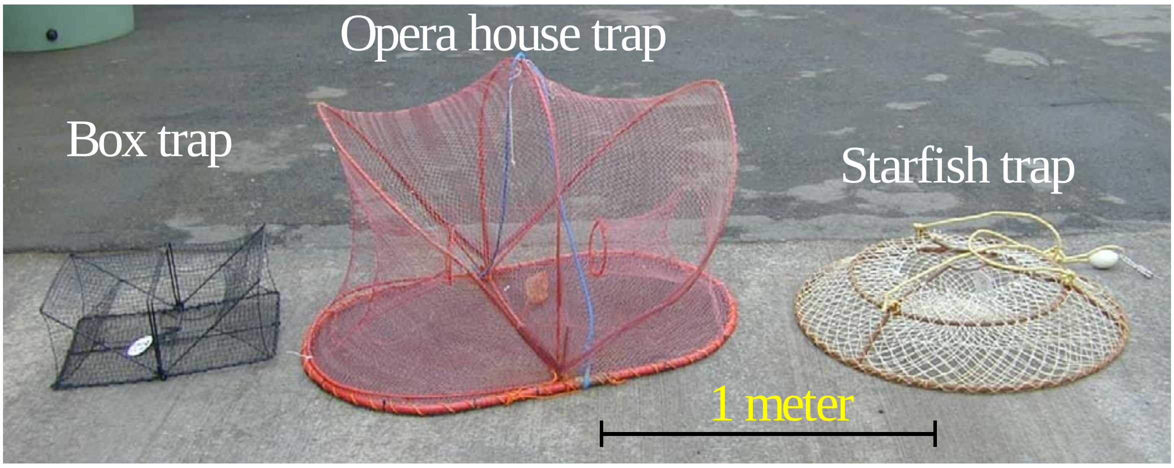

Figure 8: Trap types deployed in the port.

SAMPLING EFFORT

A summary of sampling effort within the Port of Bluff 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 Bluff is indicated in the following figures: diver pile scraping sites and dinoflagellate cyst core sites (Fig. 9), benthic sledding and benthic grab sites (Fig. 10), box, starfish and shrimp trapping sites and opera house fish trapping sites (Fig. 11). 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.

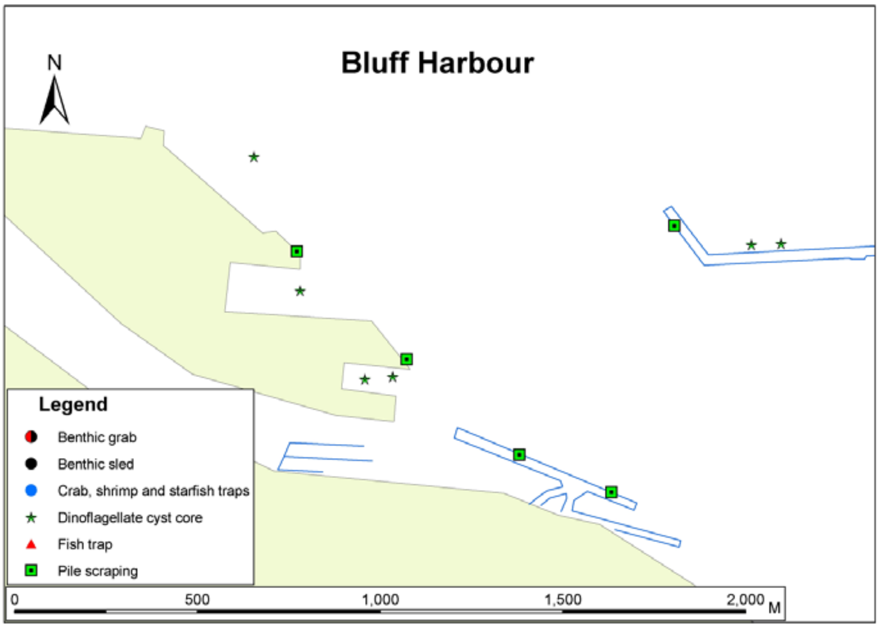

Figure 9: Diver pile scrape sites and dinoflagellate cyst sample sites

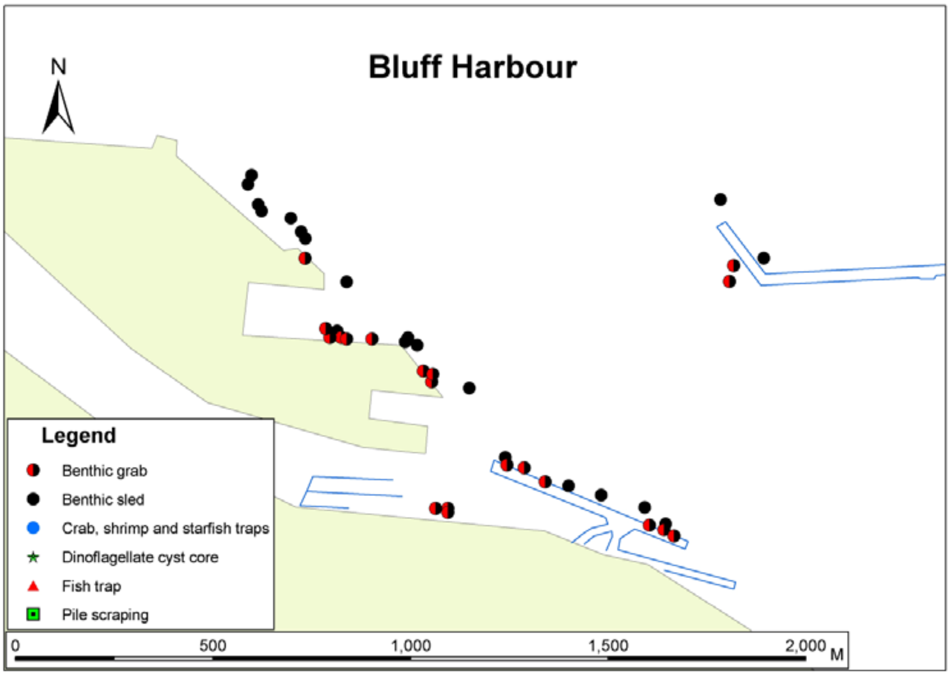

Figure 10: Benthic sled and benthic grab sites.

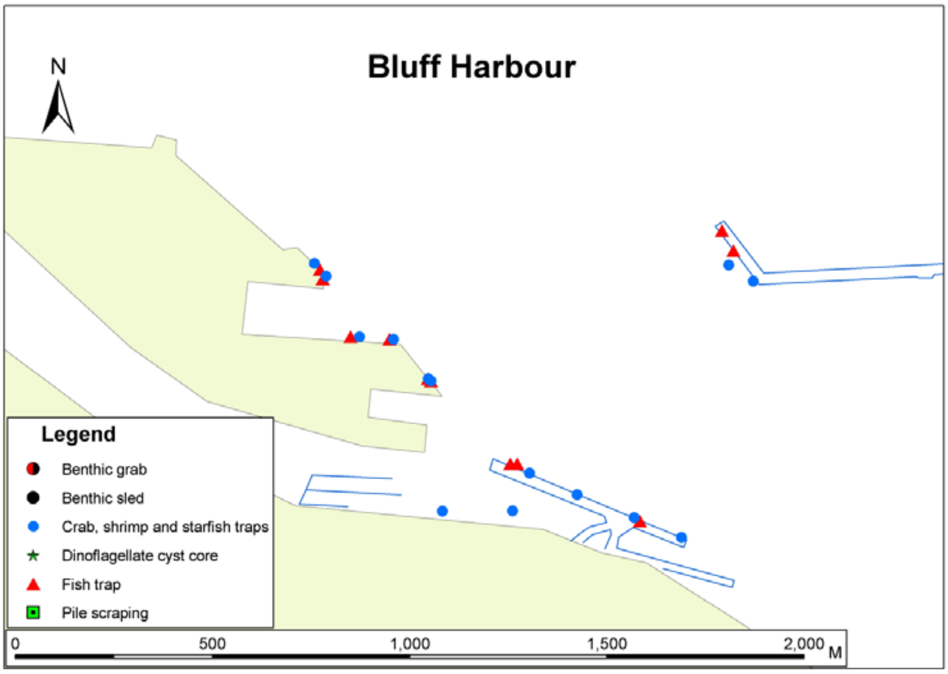

Figure 11: Sites trapped using box (crab), shrimp, starfish and opera house fish traps

SORTING AND IDENTIFYING 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 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).

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 known to be 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 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 indeterminata

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 330 species or higher taxa was identified from the Port of Bluff survey. This collection consisted of 207 native (Table 6), 28 cryptogenic (Table 7), 12 non-indigenous species (Table 8) and 83 species indeterminata (Table 9, Fig. 12). The biota included a diverse array of organisms from 11 Phyla, with Phycophyta and Crustacea being the two most diverse Phyla sampled (Fig. 13). Twenty species from the Port of Bluff had not previously been described from New Zealand waters. For general descriptions of the main groups of organisms (Phyla) encountered during this study refer to Appendix 2.

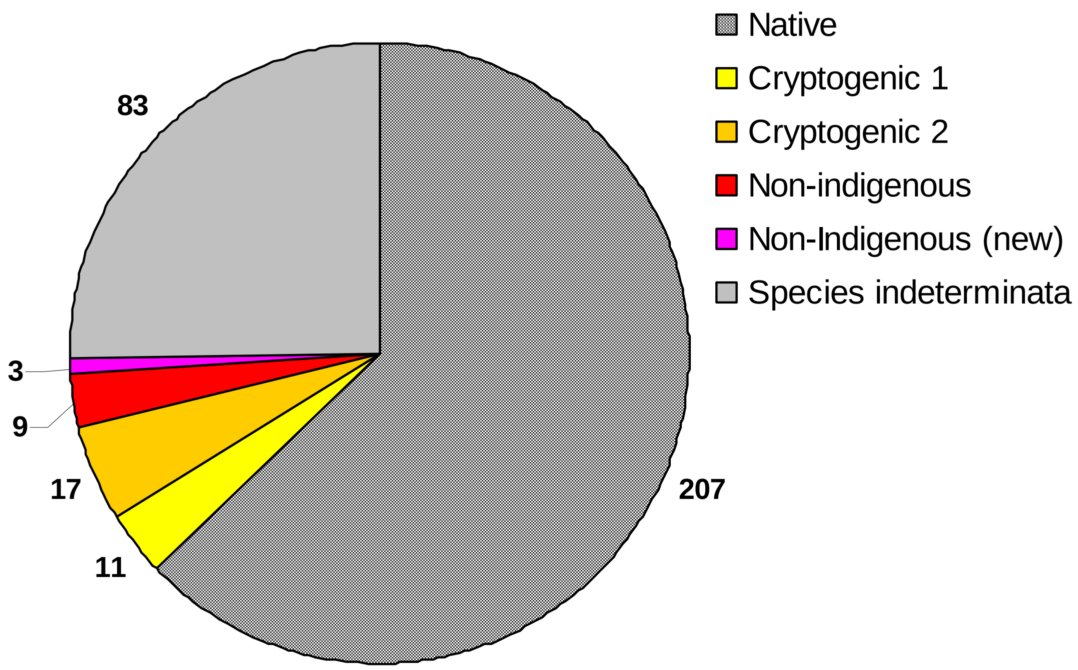

Figure 12: Diversity of marine species sampled in the Port of Bluff. Values indicate the number of species in native, cryptogenic, non-indigenous and species indeterminata categories.

NATIVE SPECIES

A total of 207 native species was identified from the Port of Bluff. Native species represented 62.7% of all species identified from this location (Table 6), and included highly diverse assemblages of phycophyta (57 species), crustaceans (42 species), annelids (23 species), molluscs (18 species), and urochordates (17 species). A number of other less diverse phyla including bryozoans, cnidarians, echinoderms, porifera, pyrrophycophyta and vertebrates (fish) were also sampled from the Port (Table 6).

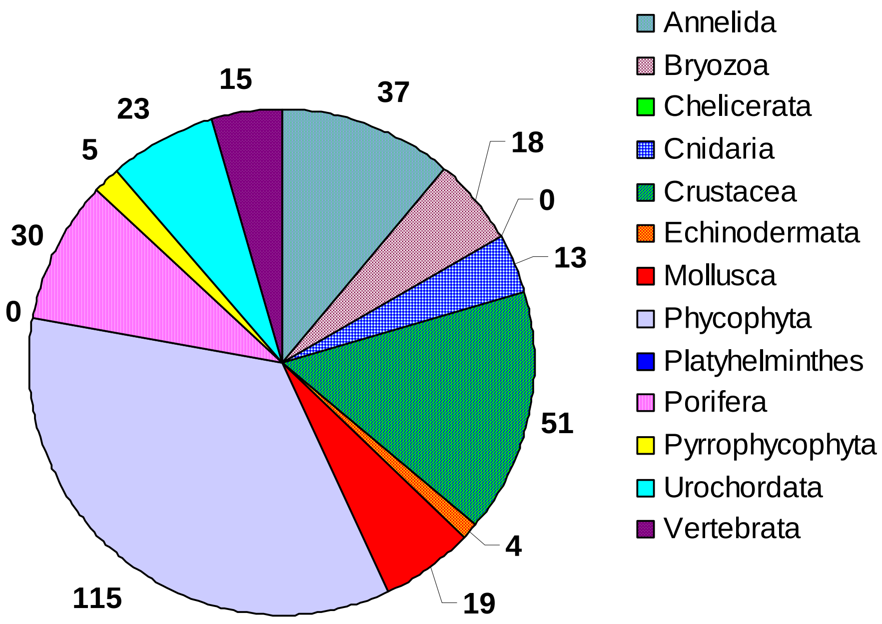

Figure 13: Marine Phyla sampled in the Port of Bluff. Values indicate the number of species in each of the major taxonomic groups.

CRYPTOGENIC SPECIES

Twenty-eight cryptogenic species were discovered in the Port of Bluff. Cryptogenic species represent 8.5 % of all species or higher taxa identified from the Port. The cryptogenic organisms identified included 11 Category 1 and 17 Category 2 species as defined in Section 2.8 above. These organisms included one bryozoan, two cnidarians, one crustacean, one mollusc, 17 sponges, one pyrrophycophyta and five ascidian species (Table 7). Some of the Category 1 cryptogenic species (e.g. *Plumularia setacea*, *Amphisbetia operculata*, *Aplidium phortax*, *Corella eumyota*, *Botrylliodes leachii* and *Asterocarpa cerea*) 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

Twelve non-indigenous marine species were recorded from the Port of Bluff (Table 8), which represents 3.6 % of all identified organisms from the Port. The NIS comprised two species of Bryozoa (*Bugula flabellata* and *Watersipora subtorquata*), one Cnidaria (*Symplectoscyphus indivisus*), one Crustacea (*Cancer amphioetus*), two Phycophyta (*Griffithsia crassiuscula* and *Polysiphonia brodiaei*) and six Porifera (*Chondropsis topsentii*, *Grantessa intusarticulata*, *Halisarca dujardini*, *Leucosolenia* cf. *discoveryi*, *Psammoclema* cf. *crassum*, *Stylotella agminata*). The field techniques used to capture each non-indigenous species, and their distributions within the Port of Bluff and around New Zealand are indicated in Table 10. 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 overlaid 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.

Bugula flabellata (Thompson in Gray, 1847)

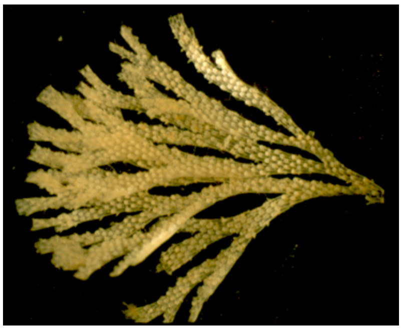

Image and information: NIMPIS (2002a)

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* has been present in New Zealand since at least 1949 and is present in most New Zealand ports. It is a dominant component of fouling assemblages 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 Bluff *B. flabellata* occurred in pile scrape samples taken from the No. 3A, 11, and 14 Wharves, and from benthic sled samples taken near the No. 11 Wharf (Fig. 14).

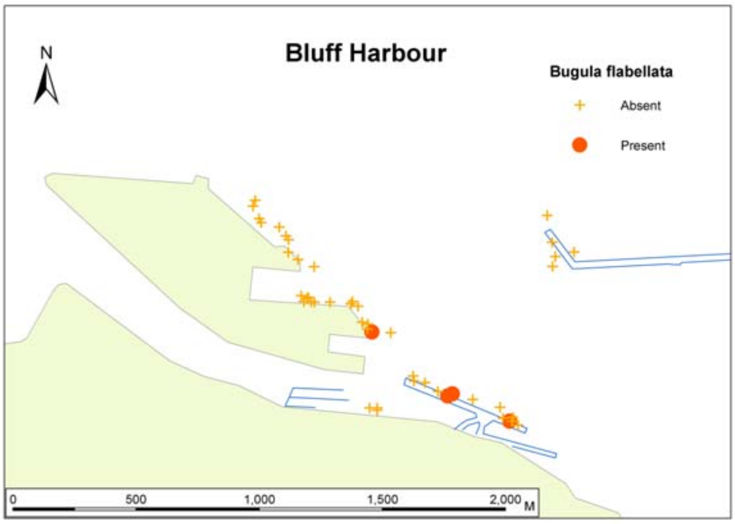

Figure 14: *Bugula flabellata* distribution in the Port of Bluff

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

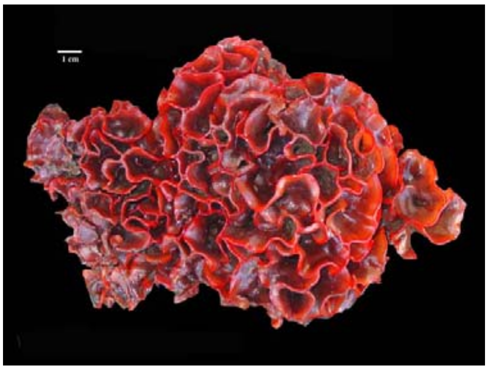

Image: California Academy of Sciences. Information: Gordon and Matawari (1992)

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 or ovicells. 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-west Pacific, Torres Strait and north-eastern and southern Australia.

W. subtorquata 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. They form 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.

W. subtorquata has been present in New Zealand since at least 1982 and is now present in most ports from Opua to Bluff (Gordon and Matawari 1992). In the Port of Bluff it occurred in pile scrape samples taken from the No. 7, 11, and 14 Wharves (Fig. 15).

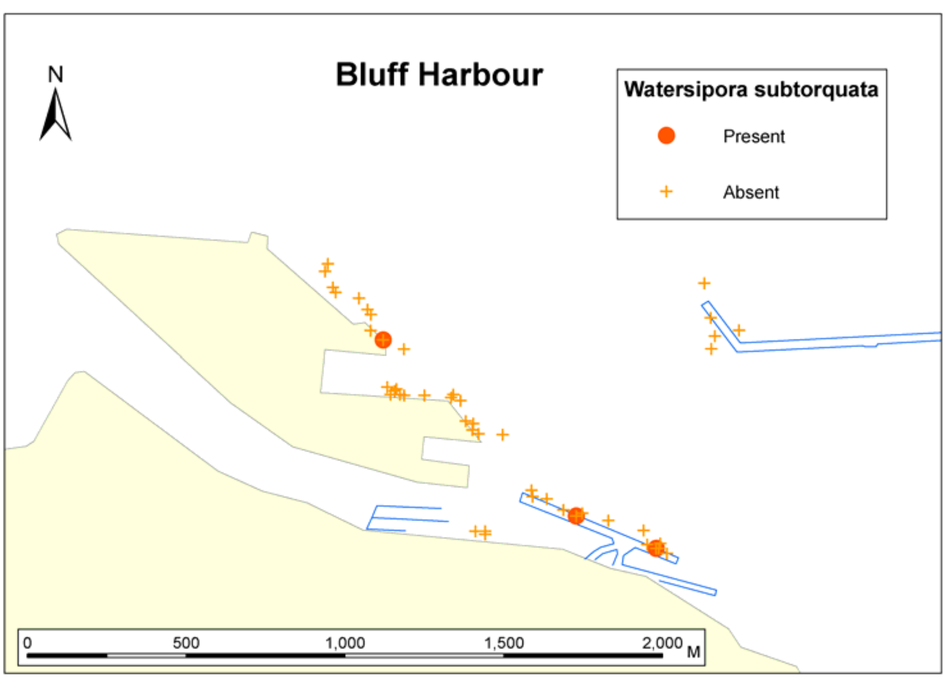

Figure 15: *Watersipora subtorquata* distribution in the Port of Bluff

Symplectoscyphus indivisus (Bale, 1882)

No image available.

Symplectoscyphlus indivisus is a small (5-20 mm high stems) hydroid native to south-east Australia. It forms luxuriant colonies, often bright yellow in colour, on a variety of algal and invertebrate substrata in sheltered coastal waters (Bock 1982). No information exists on impacts in its introduced range. During the port baseline surveys it was recorded only in Bluff, where it occurred in pile scrape samples taken from the No. 7 Wharf (Fig. 16).

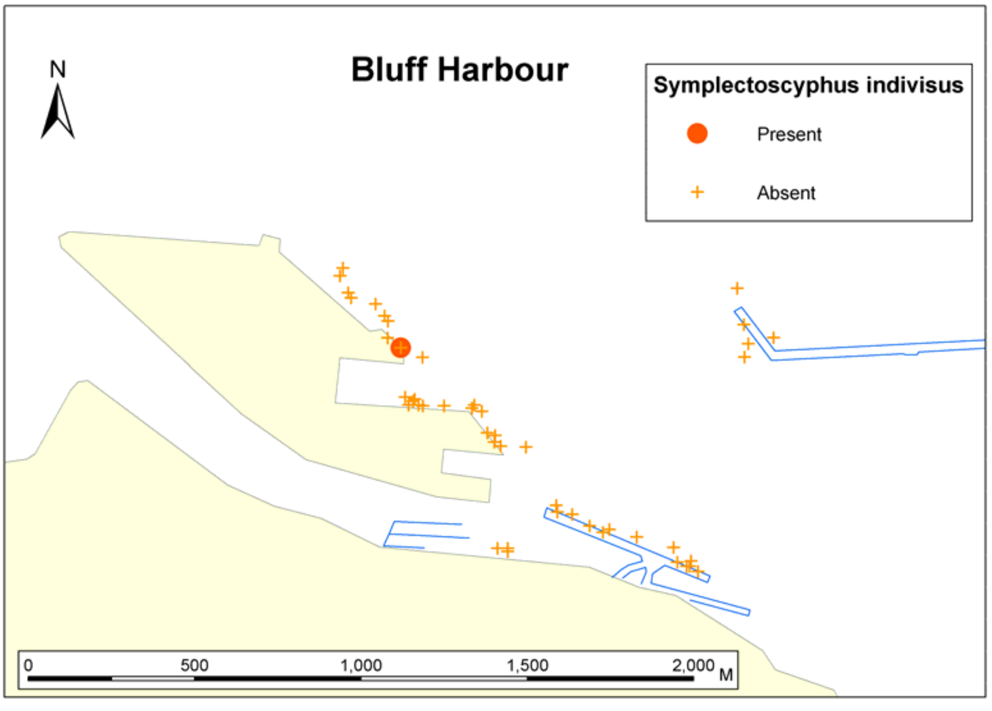

Figure 16: _Symplectoscyphus indivisus_ distribution in the Port of Bluff

Cancer amphioetus (Rathbun, 1898)

Image: Wei-Rung *et al.* (1999)
Information: Williams *et al.* (1989); Wei-Rung *et al.* (1999); Galysheva (2004)

Cancer amphioetus (bigtooth rock crab) is a small decapod in the family Cancridae. It is native to the north-west Pacific, including Taiwan, China and the Sea of Japan. It has also been recorded from California, but is reportedly uncommon there. In Taiwan, *C. amphioetus* has been recorded to depths between 200 to 260 m. Similarly, in the Gulf of California, is has been recorded in trawls taken from the continental shelf at 25-115 m depth (Hendrickx 1996). Little is known about its ecology or likely impacts in New Zealand. This species is a new record for New Zealand waters. During the port baseline surveys it was recorded in the ports of Gisborne and Bluff. In the Port of Bluff *C. amphioetus* occurred in pile scrape samples taken from the No. 11 and Tiwai Wharves (Fig. 17).

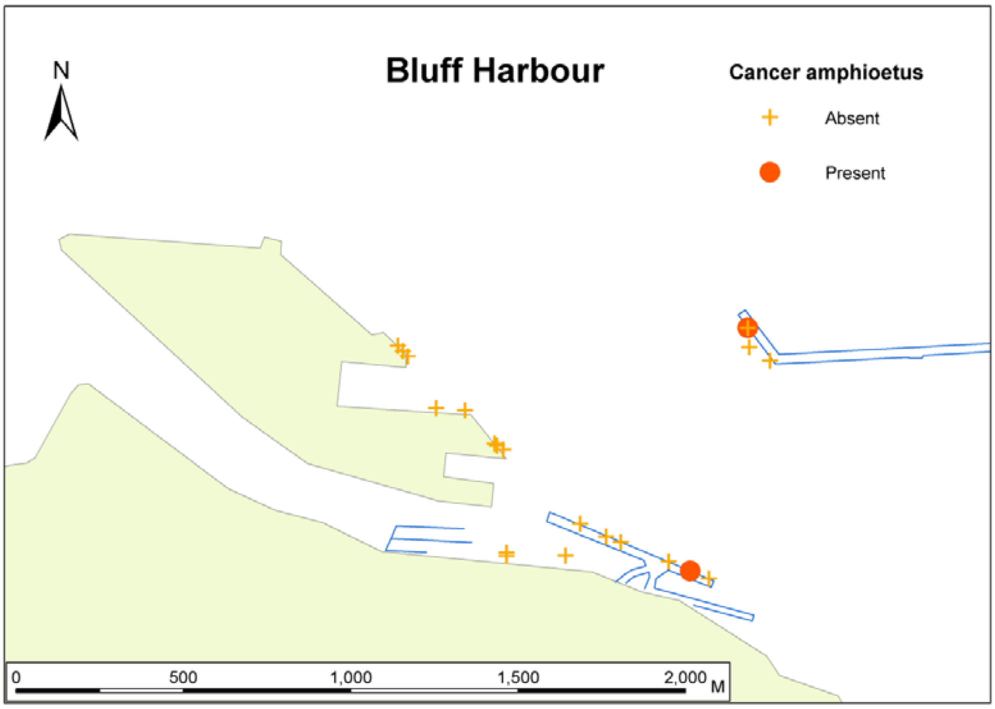

Figure 17: ***Cancer amphioetus*** **distribution in the Port of Bluff**

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

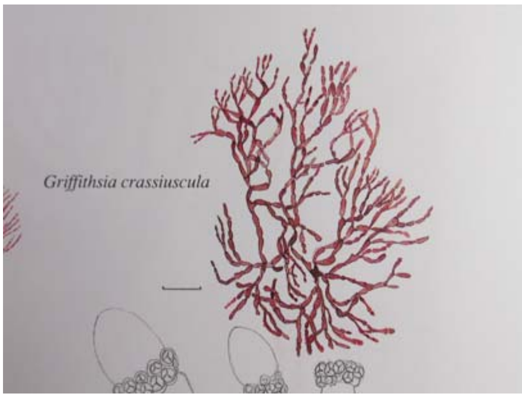

Image and information: Adams (1994)

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 Bluff, it occurred in pile scrape samples taken from the No. 3A, No. 7, and No. 11 Wharves (Fig. 18).

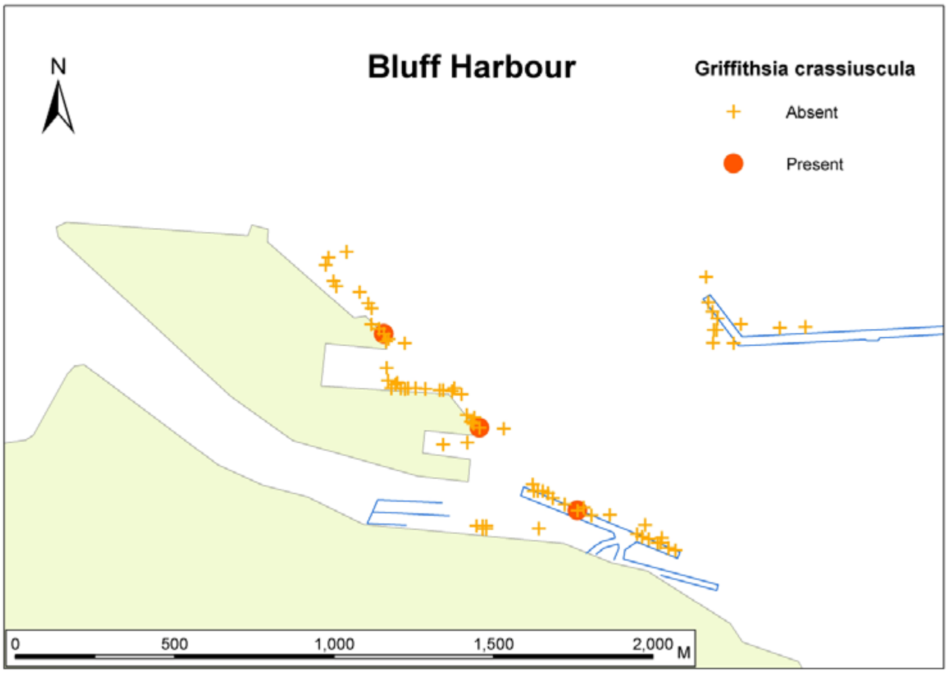

Figure 18: *Griffithsia crassiuscula* distribution in the Port of Bluff

Polysiphonia brodiaei **(Dillwyn Sprengel, 1827)**

Image and information: NIMPIS (2002b)

Polysiphonia brodiaei is a dark reddish brown alga, typically 4-12 cm high, but occasionally growing to 40 cm. It has many soft branches arising from one or several main stems that grow from a holdfast. *Polysiphonia brodiaei* is native to the Mediterranean and north-eastern Atlantic down to the equatorial coast of west Africa. It is introduced in New Zealand, southern Australia, the northeast and northwest coasts of the USA, and cryptogenic in Japan and Korea. *Polysiphonia brodiaei* is found in the subtidal zone just below low tide level where it colonises wooden structures, floating structures including ropes, buoys and vessels, and other fouling species, such as mussels. *Polysiphonia brodiaei* seems to prefer moderately exposed localities. In Australia, New Zealand and California, specimens have been collected mostly from port environments where the species is frequently found fouling the hulls of slow moving vessels, such as barges. It also occurs as nuisance fouling on ropes, buoys and other harbour structures such as pylons and boat ramps. Within New Zealand, *P. brodiaei* is known from Wellington, Lyttelton, Timaru, Stewart Island and George Sound (Cranfield *et al.* 1998). During the baseline port surveys, it was recorded from Lyttelton, Dunedin and Bluff. In the Port of Bluff, *P. broadiaei* occurred in pile scrape samples taken from the Tiwai Wharf (Fig. 19).

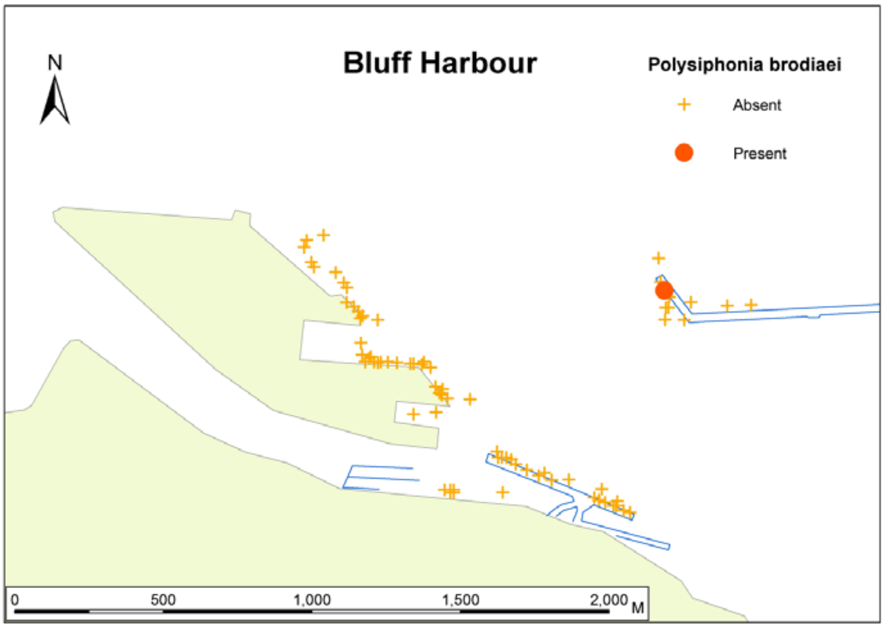

Figure 19: ***Polysiphonia brodiaei*** **distribution in the Port of Bluff**

Grantessa intusarticulata **(Carter, 1886)**

No image available.

Grantessa intusarticulata is a sponge in the family Heteropiidae. *Grantessa intusarticulata* (Carter) was described in 1886 from Port Phillip Heads, Victoria, but was first reported in New Zealand from Island Bay, Wellington in 1926. It can be a cryptic species and rapidly invades the pipes of aquaculture systems and other dark environments (M. Kelly Shanks, NIWA pers. comm.). During the port baseline surveys *G. intusarticulata* was recorded from Dunedin and Bluff. In the Port of Bluff it occurred in pile scrape samples taken from the No. 7 and No. 11 Wharves (Fig. 20).

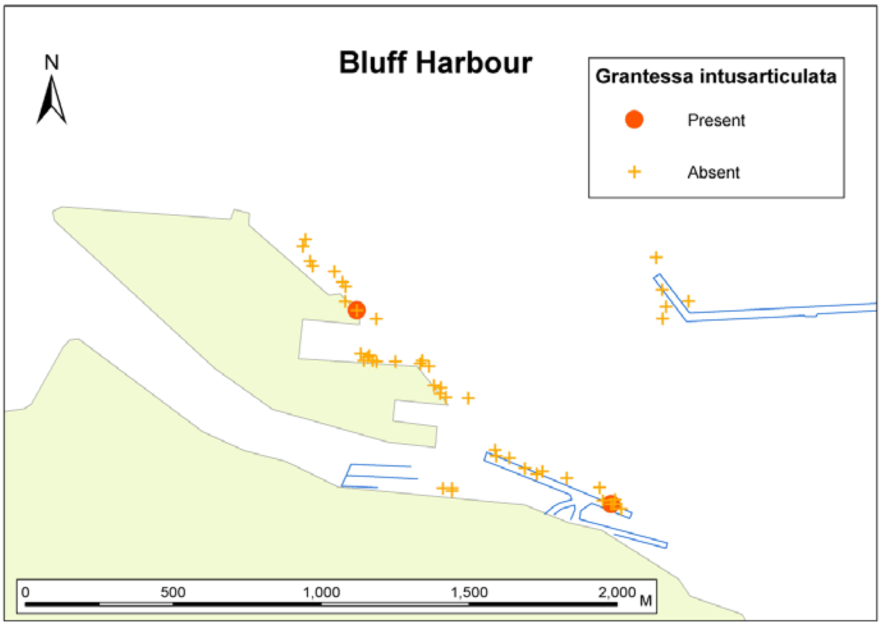

Figure 20: ***Grantessa intusarticulata*** **distribution in the Port of Bluff**

***Leucosolenia* cf. *discoveryi* (Jenkin, 1908)**

No image available.

Leucosolenia cf. *discoveryi* is a sponge in the class Calcarea. It was first described from Discovery Bay in the Antarctic and is common in Antarctica and the Australian sub-Antarctic islands. Like *Grantessa intusarticulata,* it can be a cryptic species and rapidly invades the pipes of aquaculture systems and other dark environments (M. Kelly Shanks, NIWA pers. comm.). During the port baseline surveys *Leucosolenia* cf. *discoveryi* was recorded from Dunedin and Bluff. In the Port of Bluff it occurred in pile scrape samples taken from the No. 3A, No. 7, No. 11, and No. 14 Wharves (Fig. 21).

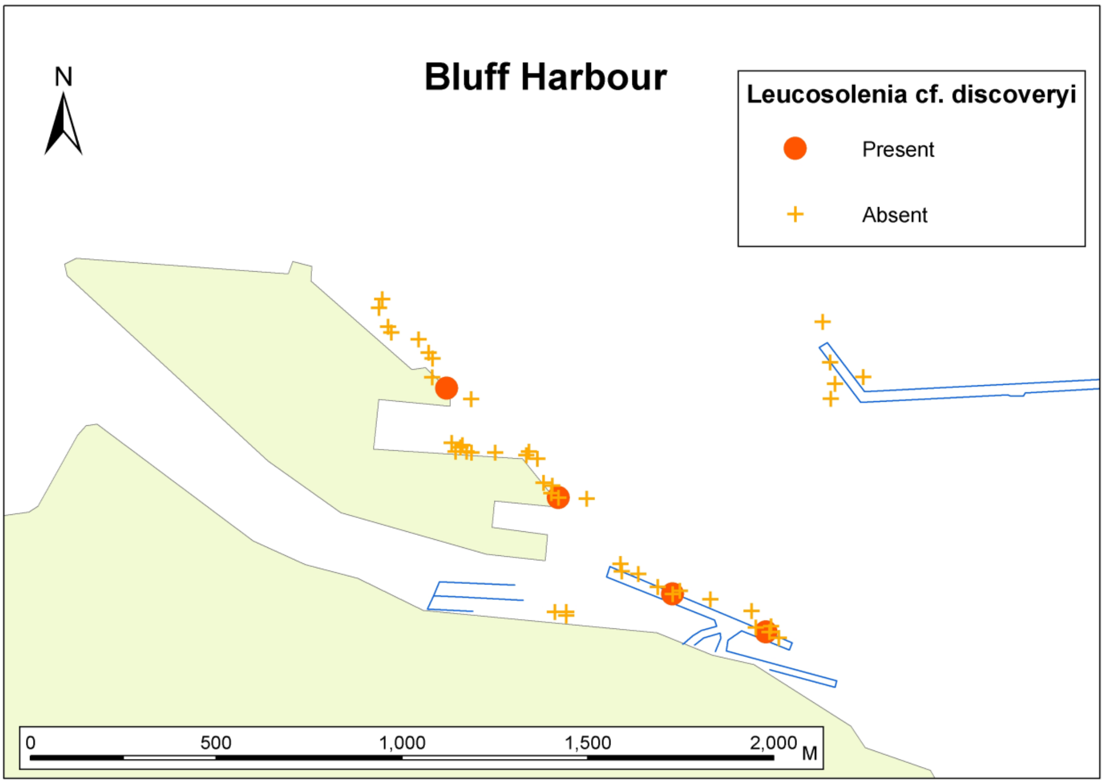

Figure 21: ***Leucosolenia* cf. *discoveryi* distribution in the Port of Bluff**

***Stylotella agminata* Ridley sensu Hallman (1914) by Brondsted (1923)**

No image available.

Stylotella agminata is a sponge in the family Dictyonellidae. The type specimen for this species was described from Sydney Harbour, Australia. Within New Zealand, it has been recorded from Perseverance Harbour and the Campbell Islands (M. Kelly Shanks, NIWA pers. comm.). In the Port of Bluff, *S. agminata* occurred in pile scrape samples taken from the Tiwai Wharf (Fig. 22).

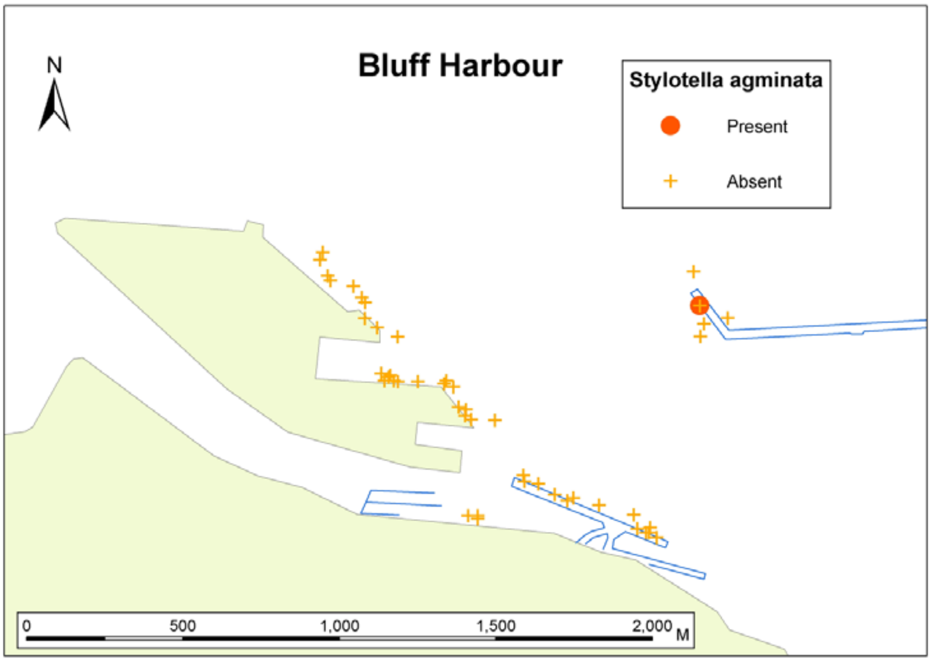

Figure 22: ***Stylotella agminata* distribution in the Port of Bluff**

***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 Bluff it occurred in pile scrape samples taken from the No. 3A, No. 11, and Tiwai Wharves (Fig. 23).

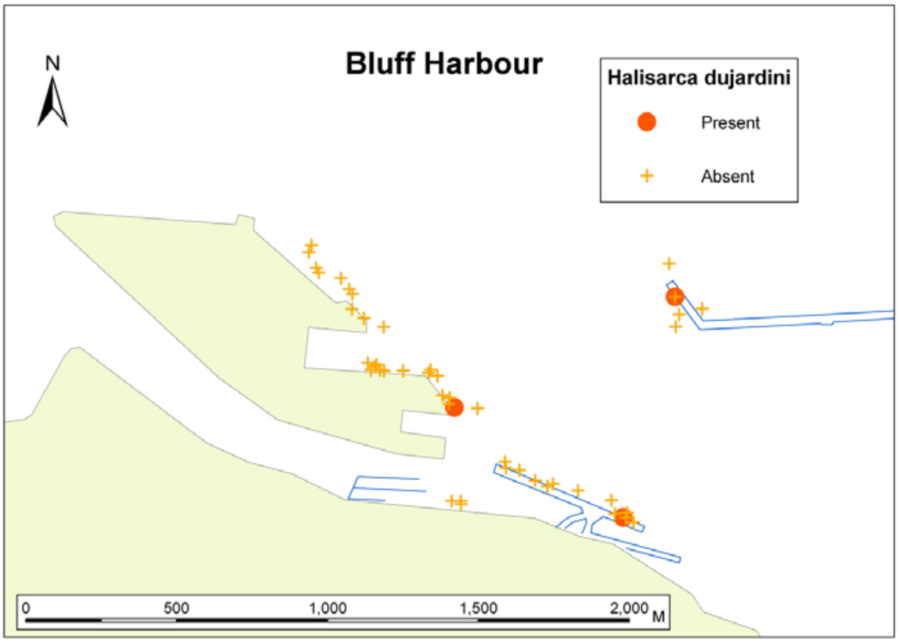

Figure 23: ***Halisarca dujardini* distribution in the Port of Bluff**

***Chondropsis topsentii* (Dendy, 1924 sensu Bergquist & Fromont, 1988)**
No image available.

Chondropsis topsentii is a sponge in the class Demospongiae. The type specimen for this species was described from Port Phillip Heads in southern Australia (Australian Faunal Directory 2005). In New Zealand, it has been recorded from Dunedin, Leigh, and Tokatu, at depths of between 2 – 20 m (M. Kelly Shanks, NIWA pers. comm.). In the Port of Bluff it occurred in pile scrape samples taken from the No. 3A, 7, 11, and Tiwai Wharves and in benthic sled samples taken near the No. 11 berth (Fig. 24).

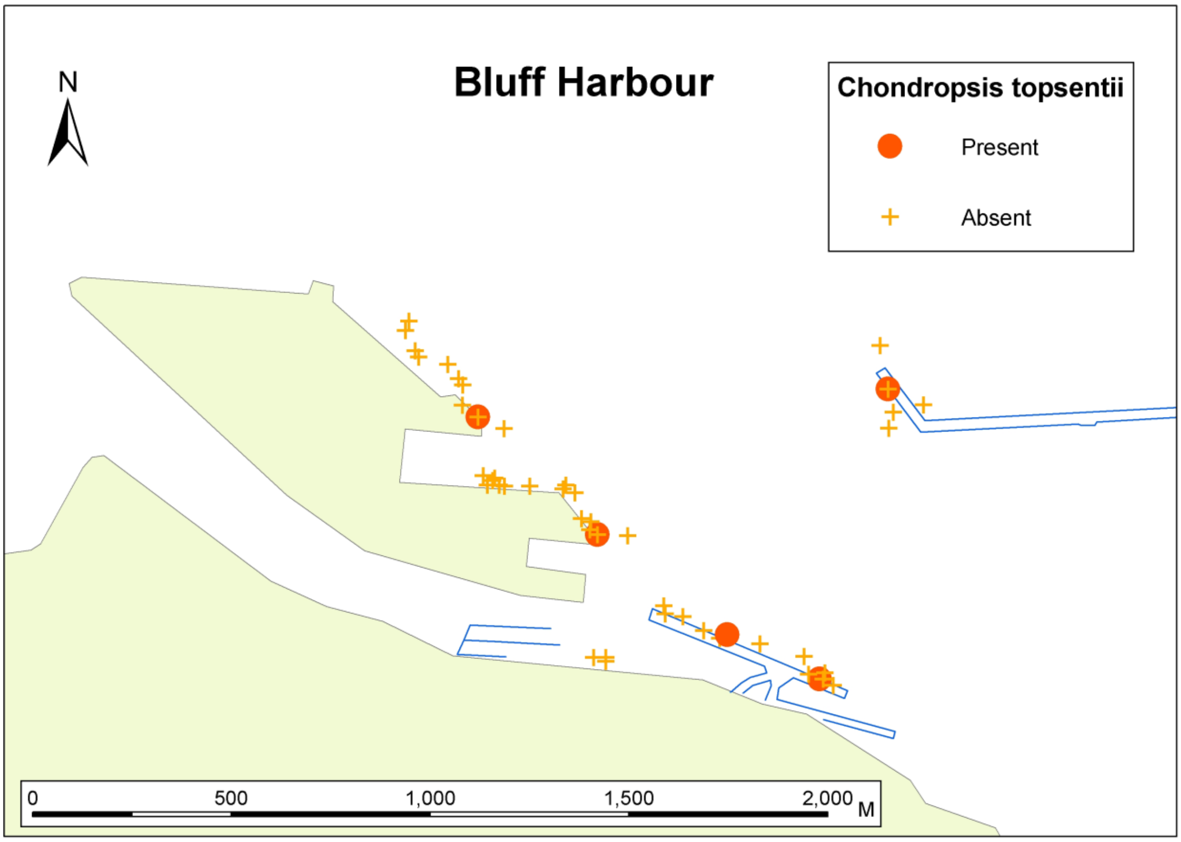

Figure 24: *Chondropsis topsentii* distribution in the Port of Bluff

***Psammoclema* cf. *crassum* (Carter, 1885 sensu Bergquist & Fromont, 1988)**
No image available.

Psammoclema cf. *crassum* is a sponge in the family Chondropsidae. The type specimen for this species was described from Port Phillip Heads in southern Australia. In New Zealand it has been reported from Port Chalmers (Dunedin) and Bluff. In the Port of Bluff *P.* cf. *crassum* occurred in pile scrape samples taken from the No. 3, No. 7, and No. 11 Wharves (Fig. 25).

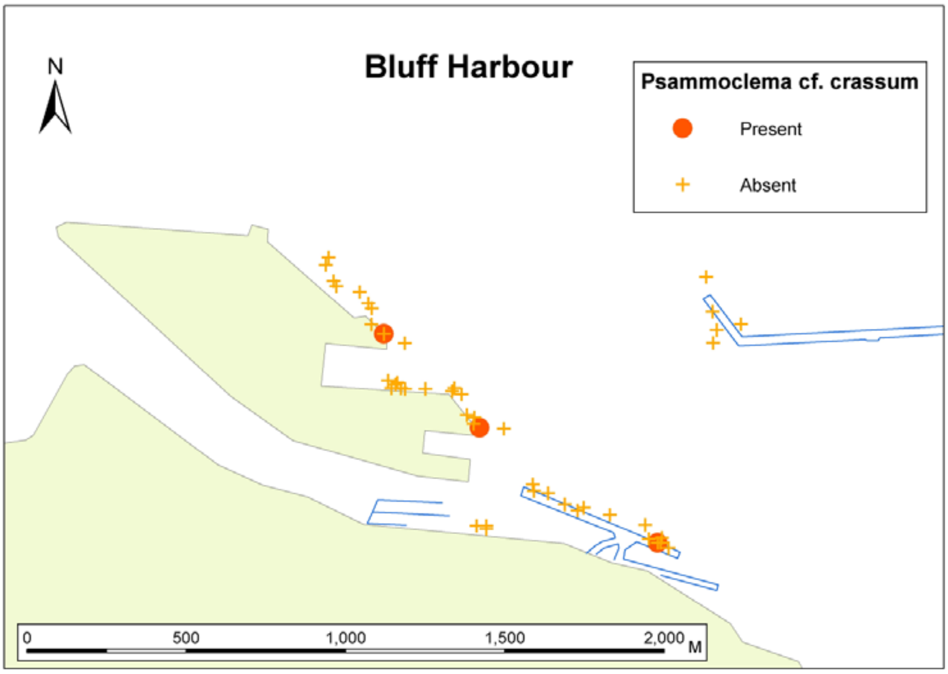

Figure 25: ***Psammoclema* cf. *crassum* distribution in the Port of Bluff**

SPECIES INDETERMINATA

Eighty-three organisms from the Port of Bluff were classified as species indeterminata. If each of these organisms is considered a species of unresolved identity, then together they represent 25.2 % of all species collected from this survey (Fig 12). Species indeterminata from the Port of Bluff included 14 Annelida, two Bryozoa, one Cnidaria, seven Crustacea, 56 Phycophyta, one Urochordata and two Vertebrates (Table 9).

NOTIFIABLE AND UNWANTED SPECIES

Of the twelve non-indigenous species identified from the Port of Bluff, none are currently listed as an Unwanted Organisms on either the New Zealand register (Table 5a) or the ABWMAC Australian list of pest species (Table 5b). Cysts of the cryptogenic, toxin-producing dinoflagellate *Alexandrium catenella* were detected in sediment cores taken from the Port of Bluff. *A. catenella* is one of four toxic dinoflagellate species listed on the Australian ABWMAC list of unwanted marine pests.

PREVIOUSLY UNDESCRIBED SPECIES IN NEW ZEALAND

Twenty species from the Port of Bluff were new records from New Zealand waters. Seventeen of these species are classified as Category 2 cryptogenic species in Table 7, and three are marked as new records in the non-indigenous species list (Table 8). The new records of cryptogenic species included one crustacean (an amphipod, *Conicistomatid* n. gen. et sp.) and 16 species of sponge (Table 7). The sponges do not match existing species descriptions from New Zealand or overseas and may be new to science. Three non-indigenous species had not previously been reported from New Zealand. They were the hydroid *Symplectoscyphus indivisus*, the crustacean *Cancer amphioetus*, and the sponge *Leucosolenia* cf. *discoveryi* (Table 8).

CYST-FORMING SPECIES

Cysts of five dinoflagellate species were collected during this survey. They are indicated as members of the Pyrrophycophyta in Tables 6 and 7. The dinoflagellates included two potentially harmful species: *Alexandrium catenella*, and *Lingulodinium polyedrum*. The motile form of *A. catenella* produces a toxin that can cause Paralytic Shellfish Poisoning (PSP) and is a significant public health problem, whilst that of *L. polyedrum* can potentially cause Diarrhetic Shellfish Poisoning (DSP). Blooms of both species may cause problems for aquaculture and recreational harvesting of shellfish.

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

The non-indigenous species located in the Port of Bluff are thought to have originally arrived in New Zealand via international shipping. Table 8 indicates the possible vectors for the introduction of each NIS. Likely vectors of introduction are largely derived from Cranfield et al. (1998) and indicate that approximately 75 % of species could have arrived via hull fouling. Ballast water transport is not considered the most probable mechanism of introduction for any NIS in the port, although 25 % of species could have arrived via either ballast water or hull fouling vectors.

The dominance of hull fouling as an introduction vector for NIS encountered in the Port of Bluff is consistent with previous findings from New Zealand (Cranfield et al. 1998) and 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, while only 5 % of introductions were linked to ballast water (Eldredge and Carlton 2002). 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 for the introduction of marine species (Cranfield et al. 1998; Hewitt et al. 1999).

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. 26a). The Port of Bluff had the second highest diversity of species (330 species) recorded from the 16 locations surveyed. However, 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 each location. However differences in sampling effort did not explain differences between locations in the numbers of NIS found ($F_{1,14}$ = 0.77, P = 0.394, R^2 = 0.052). When sampling effort was adjusted for, the port of Bluff had slightly lower than average numbers of NIS and Cryptogenic 1 species relative to the other ports and marinas surveyed, and a higher diversity of native species and Cryptogenic 2 species (Fig 27). Largest relative 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 36c, Studentised residual = 3.87).

Native organisms represented over 60 % of the species diversity sampled in each surveyed location, with a minimum contribution of 61.0 % in the Port of Lyttelton and a maximum of 68.5 % in Picton (Fig. 26b). Species indeterminata organisms represented between 10.6 % and 25.6 % of the sampled diversity in each location. Non-indigenous and Cryptogenic 1 and

2 species were present in each port and marina, although their relative contributions differed between locations (Fig. 26b). Non-indigenous species represented only 3.6 % of all identified species in Bluff; lowest percentage composition of NIS from the sixteen locations surveyed nationwide (Fig 26b).

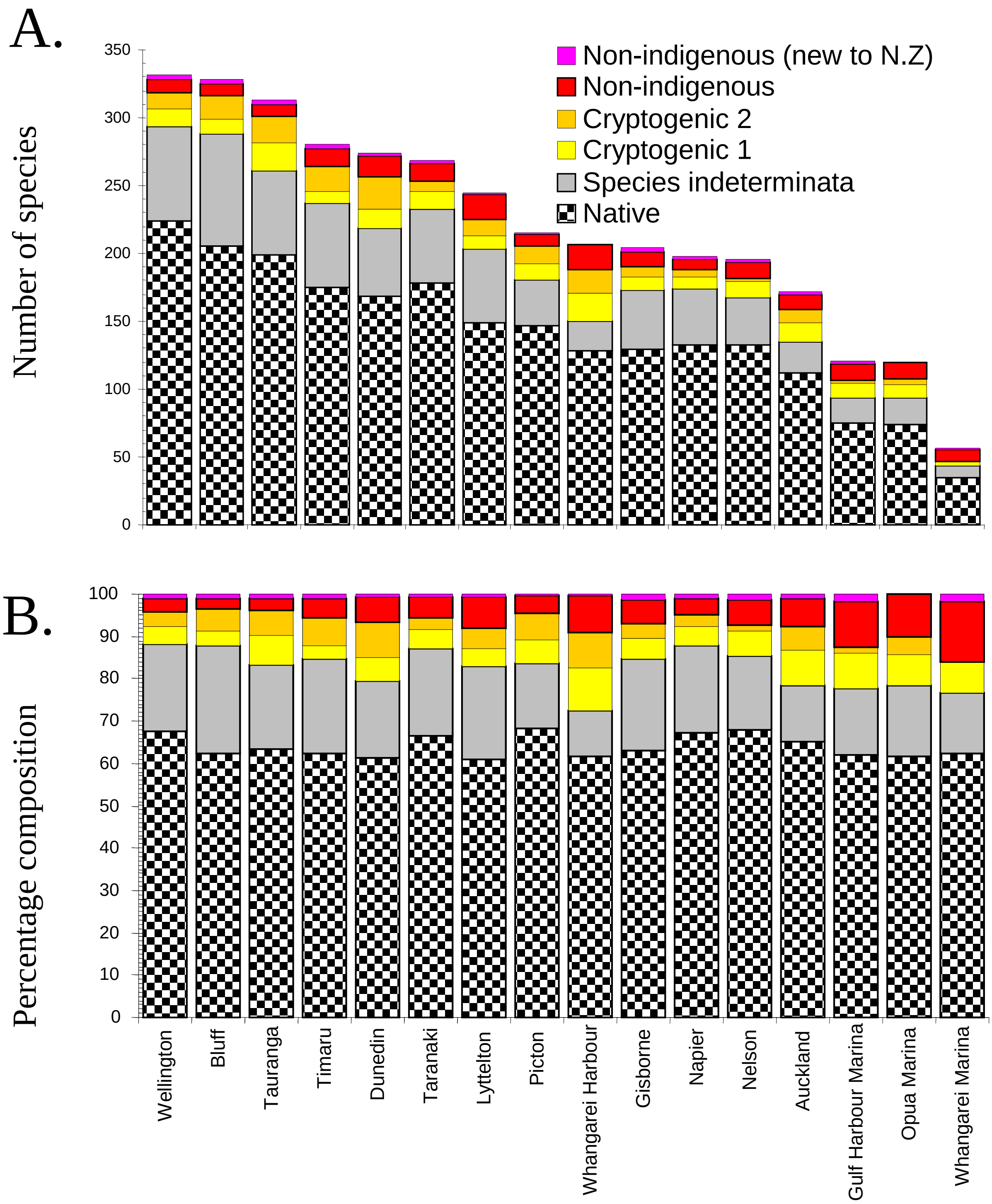

Figure 26: **Differences in (a) the number of species, and (b) the relative proportions of non-indigenous, cryptogenic, species indeterminata and native categories among the sixteen locations sampled over the summers of 2001 – 2002, and 2002-2003. Locations are presented in order of decreasing species diversity sampled.**

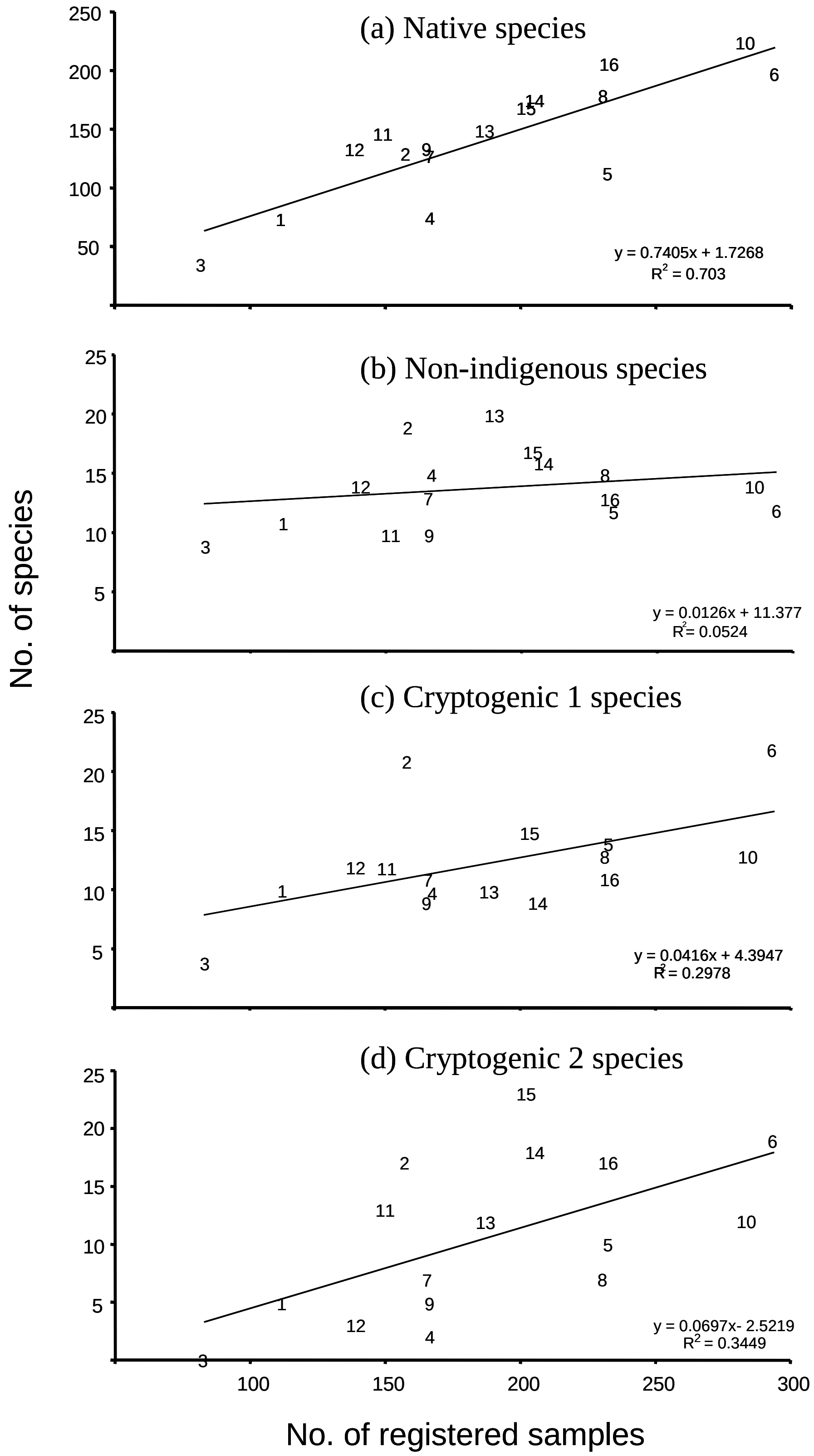

Figure 27: **Linear regression equations relating numbers of species detected to sample effort at the 16 locations surveyed nation-wide. Location codes are as follows; 1 = Opua Marina, 2 = Whangarei Port, 3 = Whangarei Marina, 4 = Gulf Harbour Marina, 5 = Auckland Port, 6 = Tauranga Port, 7 = Gisborne 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, probably 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 arriving in the Port of Bluff from overseas comes predominantly from Australia (84.2%) and the north-west Pacific (10.1%) (Campbell 2004). Both these regions have environments that are broadly compatible with those in Bluff Harbour. Shipping from these regions presents an on-going risk of introduction of new NIS to Bluff harbour through hull fouling or ballast water vectors. According to Inglis (2001), a total volume of 33,095 m^3 of ballast water was discharged in the Port of Bluff in 1999, with the largest country-of-origin volumes being 7,413 m^3 from Australia (22%), 7,483 m^3 from Japan (23%) and 16,207 m^3 (49%) from unspecified sources. It is notable that many of the NIS present in the Port of Bluff have geographic affinities with southern Australia and, in particular, Port Phillip Bay, where the Port of Bluff has historical and continuing trade relationships. Four of the seven marine species that are currently on the New Zealand register of unwanted species are present in Port Phillip Bay (i.e. *Carcinus maenas*, *Asterias amurensis*, *Sabella spallanzanii*, and *Undaria pinnatifida*). None of these species is currently established in the Port of Bluff.

Assessment of translocation risk for non-indigenous species found in the port

Bluff is connected directly to the ports of Dunedin, Timaru, Lyttelton and Napier by regular coastal shipping. The Port of Bluff is also indirectly connected to most other domestic ports throughout mainland New Zealand (Dodgshun et al. 2004). Although many of the non-indigenous species found in the Port of Bluff survey have been recorded previously in New Zealand, there were three notable exceptions; the hydroid *Symplectoscyphus indivisus*, the crustacean *Cancer amphioetus* and the sponge *Leucosolenia* cf. *discoveryi*. These species were all first described from New Zealand waters from the Port of Bluff survey. *Symplectoscyphus indivisus* is found in southern Australia and may be competing with native fauna in Bluff Harbour fouling assemblages. Although the crab, *Cancer amphioetus* was unknown from New Zealand waters prior to the surveys, it has now been discovered in Gisborne Port in addition to the record from Bluff (Table 10). 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 Bluff Harbour and throughout southern New Zealand. The sponge *Leucosolenia* cf. *discoveryi* was also unknown from New Zealand waters prior to the surveys, but has now been discovered in Dunedin Port in addition to the record from Bluff Port (Table 10). This species is common in Antarctica and the Australian Subantarctic islands but nothing is known about its impacts in New Zealand.

Three additional species of sponge found in the Port of Bluff (*Stylotella agminata*, *Chondropsis topsentii* and *Psammoclema* cf. *crassum)*, are also considered non-indigenous, and were not recorded elsewhere in New Zealand during these surveys. It is unclear what threat they represent to native organisms and communities in Bluff Harbour.

The highly invasive alga, *Undaria pinnatifida*, was present in Bluff Harbour in 1998, but local eradication attempts had removed this seaweed from the sites we examined during the March 2003 survey. It has been spread through shipping and other vectors to 12 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). 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. Coal barges, recreational craft, and seasonal fishing vessels that are laid up for significant periods of time pose a particular risk for the reintroduction of this species back into Bluff Harbour from other New Zealand ports infested with this algae.

The Port of Bluff acts as a major resupply port for vessels visiting Subantartic fishing grounds. Recent studies have shown that vessels travelling to the Southern Ocean do transport NIS as hull fouling and ballast (Lewis et al 2004), although there is limited information about their ability to establish there. Given the presence of twelve NIS and 28 cryptogenic species in the Port of Bluff, and the port's shipping connection to Southern Ocean destinations and Subantarctic islands, it presents a high risk of translocation of species to these sensitive environments.

Management of existing non-indigenous species in the port

Most of the NIS detected in this survey, with the exception of the crab *Cancer amphioetus* appear to be well established in the port. It is unclear whether a viable population of *C. amphioetus* has established in Bluff, since only two specimens were found during the survey. Only one other specimen of this species was recorded (from Gisborne) during the national port surveys. Further surveys, targeting this species, would be necessary to determine the true extent of its population in both of these ports.

For most marine NIS eradication by physical removal or chemical treatment is not yet a cost-effective option. Many of the species recorded in the Port of Bluff are widespread and local population controls are unlikely to be effective. Management should be directed toward preventing spread of potentially harmful species from Bluff Harbour to locations where they do not presently occur. This may be particularly relevant to species like the toxic dinoflagellate *Alexandrium catenella,* which is present in relatively few other locations in New Zealand. This dinoflagellate could be spread for instance to mussel farming areas on Stewart island by regular boating transport from Bluff harbour. During the port baseline surveys *A. catenella* was recorded only from Bluff and Whangarei Harbour. It has also been recorded from sites in the Bay of Plenty (MacKenzie et al. 1996). Transport of sediment, shellfish, or, during blooms, ballast water from the Port of Bluff could aid the spread of this species to other areas where it does not currently occur. Management of translocation risk could be aided by regular monitoring of phytoplankton populations and shellfish within the port.

Other species found only in the Port of Bluff, such as the sponges *Stylotella agminata, Chondropsis topsentii* and *Psammoclema* cf. *crassum,* or the hydroid *Symplectoscyphus indivisusi* are most likely to be transported to other locations as biofouling on ships, slow moving vessels, barges or submerged marine structures. Since none of these species have been detected in any other port or marinas surveyed nationwide, preventing their spread would reduce risk to native biodiversity. Such management will require better understanding of the frequency of movements by vessels of different types from the Port of Bluff 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 the Port of Bluff 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 taken on board by vessels operating 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 Bluff (probably responsible for 75% 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 Francisco 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 may be warranted to establish the abundance and potential impacts of the non-indigenous species encountered in this port to determine if management actions are necessary or possible.

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Tables

Table 1: Berthage facilities in the Port of Bluff.

Wharf	No of Berths	Purpose	Construction	Length of Berth (m)	Depth (m below chart datum)
No.1	1	Fishing wharf	Concrete platform/Steel sheet piles	160	7
No.2	1	Fishing wharf	Concrete platform/Steel sheet piles	190	7.7
No.2 Cross	1	Fishing wharf	Concrete platform/Steel sheet piles	70	6
No.3	1	Refrigerated products, bulk liquid cargo	Concrete platform/Steel sheet piles	213	9.7
No.3A	1	Bulk liquid cargo	Concrete platform/Steel sheet piles	153	9.2
No.4	1	Containers, logs, forest products	Concrete platform/Steel sheet piles	213	9.7
No.5	1	General cargo, specialized sheds for fibre board and dairy products	Concrete platform/Steel sheet piles	213	9.7
No. 6	1	Oil rig tenders, fishing vessels	Concrete platform/Steel sheet piles	135	7.7
No.7	1	Fishing vessels, general cargo	Concrete platform/Steel sheet piles	100	8
No.8	1	Woodchips, coal, grain	Concrete platform/Steel sheet piles	230	10.2
Town Wharf (No.11)	2	Petroleum products	Wood deck/wood piles	210	9.7
No.12	1	Bitumen	Wood deck/wood piles	183	8
Tiwai Wharf	1	Supply aluminium smelter with raw materials	Concrete deck/concrete piles	200	11

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	20um 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 um 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	

	CRIMP Protocol		NIWA Method		
Taxa sampled	Survey method	Sample procedure	Survey method	Sample procedure	Notes
Sedentary / encrusting biota	Quadrat scraping	0.10 m2 quadrats sampled at -0.5 m, -3.0 m and -7.0 m on 3 outer piles per berth	Quadrat scraping	0.10 m2 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 m2 quadrats	Video / photo transect	Video transect of pile/rockwall facing. Still images taken of the four 0.10 m2 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 Bluff sampling effort.

Sample method	Number of shipping berths sampled	Number of replicate samples taken
Benthic Sled Tows	6 (NB[1])	21
Benthic Grab (Shipek)	7	21
Box traps	7 (NB[2])	29
Diver quadrat scraping	5	75
Opera house fish traps	6	24
Starfish traps	7	28
Shrimp traps	7	24
Javelin cores	N/A	12

(NB[1]) Three additional sled tow sites sampled outside berths.
(NB[2]) One additional box trap site sampled outside berths.

Table 3b: Pile scraping sampling effort in the Port of Bluff. Number of replicate quadrats scraped on Outer (unshaded) and Inner (shaded) pier piles at four depths. Pile materials scraped are indicated.

Sample Depth (M)	Outer Piles	Inner Piles
0.5	4 concrete, 6 wood	2 concrete, 7 wood, 1 copper plate
1.5	4 concrete, 6 wood	2 concrete, 7 wood, 1 copper plate
3.5	4 concrete, 6 wood	2 concrete, 7 wood, 1 copper plate
7	4 concrete, 6 wood	2 concrete, 3 wood

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 grab	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 Bluff survey.

Phylum, Class	Order	Family	Genus and species
Annelida			
Polychaeta	Eunicida	Eunicidae	*Eunice australis*
Polychaeta	Eunicida	Lumbrineridae	*Lumbrineris sphaerocephala*
Polychaeta	Phyllodocida	Glyceridae	*Glycera benhami*
Polychaeta	Phyllodocida	Hesionidae	*Ophiodromus angustifrons*
Polychaeta	Phyllodocida	Nereididae	*Nereis falcaria*
Polychaeta	Phyllodocida	Nereididae	*Perinereis camiguinoides*
Polychaeta	Phyllodocida	Nereididae	*Perinereis pseudocamiguina*
Polychaeta	Phyllodocida	Phyllodocidae	*Pirakia Pirakia-A*
Polychaeta	Phyllodocida	Polynoidae	*Lepidonotus jacksoni*
Polychaeta	Phyllodocida	Polynoidae	*Lepidonotus polychromus*
Polychaeta	Sabellida	Sabellidae	*Branchiomma curta*
Polychaeta	Sabellida	Sabellidae	*Megalomma suspiciens*
Polychaeta	Sabellida	Serpulidae	*Filograna implexa*
Polychaeta	Sabellida	Serpulidae	*Galeolaria hystrix*
Polychaeta	Sabellida	Serpulidae	*Neovermilia sphaeropomatus*
Polychaeta	Sabellida	Serpulidae	*Romanchella perrieri*
Polychaeta	Scolecida	Opheliidae	*Armandia maculata*
Polychaeta	Spionida	Spionidae	*Prionospio multicristata*
Polychaeta	Terebellida	Cirratulidae	*Timarete anchylochaetus*
Polychaeta	Terebellida	Flabelligeridae	*Flabelligera affinis*
Polychaeta	Terebellida	Pectinariidae	*Pectinaria australis*
Polychaeta	Terebellida	Terebellidae	*Nicolea armilla*
Polychaeta	Terebellida	Terebellidae	*Streblosoma toddae*
Bryozoa			
Gymnolaemata	Cheilostomata	Beaniidae	*Beania discodermiae*
Gymnolaemata	Cheilostomata	Beaniidae	*Beania magellanica*
Gymnolaemata	Cheilostomata	Beaniidae	*Beania quadricornuta*
Gymnolaemata	Cheilostomata	Candidae	*Caberea n.sp. (cf. guntheri)*
Gymnolaemata	Cheilostomata	Candidae	*Caberea rostrata*

Phylum, Class	Order	Family	Genus and species
Gymnolaemata	Cheilostomata	Candidae	*Caberea zelandica*
Gymnolaemata	Cheilostomata	Candidae	*Emma rotunda*
Gymnolaemata	Cheilostomata	Candidae	*Scrupocellaria ornithorhyncus*
Gymnolaemata	Cheilostomata	Catenicellidae	*Orthoscuticella margaritacea*
Gymnolaemata	Cheilostomata	Celleporidae	*Galeopsis porcellanicus*
Gymnolaemata	Cheilostomata	Hippothoidae	*Celleporella delta*
Gymnolaemata	Cheilostomata	Hippothoidae	*Celleporella tongima*
Gymnolaemata	Cheilostomata	Schizoporellidae	*Chiastosella watersi*
Cnidaria			
Hydrozoa	Hydroida	Haleciidae	*Halecium corrugatissimum*
Hydrozoa	Hydroida	Plumulariidae	*Monotheca flexuosa*
Hydrozoa	Hydroida	Plumulariidae	*Plumularia brachiata*
Hydrozoa	Hydroida	Plumulariidae	*Plumularia setaceoides*
Hydrozoa	Hydroida	Plumulariidae	*Plumularia spirocladia*
Hydrozoa	Hydroida	Sertulariidae	*Amphisbetia fasciculata*
Hydrozoa	Hydroida	Sertulariidae	*Amphisbetia minima*
Hydrozoa	Hydroida	Sertulariidae	*Salacia bicalycula*
Hydrozoa	Hydroida	Sertulariidae	*Sertularella robusta*
Crustacea			
Cirripedia	Thoracica	Balanidae	*Austrominius modestus*
Cirripedia	Thoracica	Balanidae	*Notomegabalanus decorus*
Cirripedia	Thoracica	Chthamalidae	*Chaemosipho columna*
Cirripedia	Thoracica	Pachylasmidae	*Epopella plicata*
Malacostraca	Amphipoda	Amaryllidae	*Amaryllis macrophthalma*
Malacostraca	Amphipoda	Aoridae	*Aora maculata*
Malacostraca	Amphipoda	Aoridae	*Haplocheira barbimana*
Malacostraca	Amphipoda	Dexaminidae	*Paradexamine pacifica*
Malacostraca	Amphipoda	Hyalidae	*Hyale rubra*
Malacostraca	Amphipoda	Leucothoidae	*Leucothoe trailli*
Malacostraca	Amphipoda	Liljeborgiidae	*Liljeborgia akaroica*
Malacostraca	Amphipoda	Liljeborgiidae	*Liljeborgia hansoni*

Phylum, Class	Order	Family	Genus and species
Malacostraca	Amphipoda	Lysianassidae	*Parawaldeckia stephenseni*
Malacostraca	Amphipoda	Lysianassidae	*Parawaldeckia vesca*
Malacostraca	Amphipoda	Melitidae	*Ceradocopsis carnleyi*
Malacostraca	Amphipoda	Melitidae	*Mallacoota subcarinata*
Malacostraca	Amphipoda	Phoxocephalidae	*Torridoharpinia hurleyi*
Malacostraca	Anomura	Paguidae	*Pagurus traversi*
Malacostraca	Anomura	Paguridae	*Diacanthurus spinulimanus*
Malacostraca	Anomura	Paguridae	*Lophopagurus (A.) cooki*
Malacostraca	Anomura	Paguridae	*Lophopagurus (A.) cristatus*
Malacostraca	Anomura	Paguridae	*Lophopagurus (L.) thompsoni*
Malacostraca	Anomura	Porcellanidae	*Petrocheles spinosus*
Malacostraca	Brachyura	Cancridae	*Cancer novaezelandiae*
Malacostraca	Brachyura	Hymenosomatidae	*Elamena aff. producta*
Malacostraca	Brachyura	Hymenosomatidae	*Elamena momona*
Malacostraca	Brachyura	Hymenosomatidae	*Elamena sp. nov.*
Malacostraca	Brachyura	Hymenosomatidae	*Halicarcinus cookii*
Malacostraca	Brachyura	Hymenosomatidae	*Halicarcinus tongi*
Malacostraca	Brachyura	Hymenosomatidae	*Halicarcinus varius*
Malacostraca	Brachyura	Majidae	*Leptomithrax longimanus*
Malacostraca	Brachyura	Majidae	*Notomithrax minor*
Malacostraca	Brachyura	Majidae	*Notomithrax peronii*
Malacostraca	Brachyura	Ocypodidae	*Macrophthalmus hirtipes*
Malacostraca	Brachyura	Portunidae	*Nectocarcinus antarcticus*
Malacostraca	Caridea	Crangonidae	*Nauticaris marionis*
Malacostraca	Caridea	Crangonidae	*Pontophilus australis*
Malacostraca	Caridea	Crangonidae	*Pontophilus hamiltoni*
Malacostraca	Caridea	Hippolytidae	*Hippolyte multicolorata*
Malacostraca	Caridea	Palemonidae	*Periclimenes yaldwyni*
Malacostraca	Isopoda	Cirolanidae	*Natatolana rossi*
Malacostraca	Palinura	Palinuridae	*Jasus edwardsi*
Echinodermata			
Asteroidea	Forcipulata	Asteriidae	*Coscinasterias muricata*

Phylum, Class	Order	Family	Genus and species
Asteroidea	Valvatida	Asterinidae	*Patiriella mortenseni*
Asteroidea	Valvatida	Goniasteridae	*Pentagonaster pulchellus*
Holothuroidea	Aspidochirotida	Stichopodidae	*Stichopus mollis*
Mollusca			
Bivalvia	Mytiloida	Mytilidae	*Aulacomya maoriana*
Bivalvia	Mytiloida	Mytilidae	*Modiolarca impacta*
Bivalvia	Ostreoida	Ostreidae	*Ostrea chilensis*
Bivalvia	Pterioida	Pectinidae	*Talochlamys zelandiae*
Bivalvia	Veneroida	Veneridae	*Austrovenus stutchburyi*
Bivalvia	Veneroida	Veneridae	*Tawera spissa*
Cephalopoda	Octopoda	Octopodidae	*Octopus maorum*
Gastropoda	Basommatophora	Siphonariidae	*Siphonaria australis*
Gastropoda	Littorinimorpha	Calyptraeidae	*Sigapatella novaezelandiae*
Gastropoda	Neogastropoda	Volutidae	*Alcithoe arabica*
Gastropoda	Vetigastropoda	Fissurellidae	*Emarginula striatula*
Gastropoda	Vetigastropoda	Trochidae	*Micrelenchus huttonii*
Gastropoda	Vetigastropoda	Trochidae	*Micrelenchus tenebrosus*
Gastropoda	Vetigastropoda	Trochidae	*Trochus tiaratus*
Polyplacophora	Acanthochitonina	Acanthochitonidae	*Acanthochitona zelandica*
Polyplacophora	Acanthochitonina	Acanthochitonidae	*Cryptoconchus porosus*
Polyplacophora	Ischnochitonina	Chitonidae	*Rhyssoplax aerea*
Polyplacophora	Ischnochitonina	Mopaliidae	*Plaxiphora caelata*
Phycophyta			
Bryopsidophyceae	Bryopsidales	Bryopsidaceae	*Bryposis vestita*
Bryopsidophyceae	Halimediales	Caulerpaceae	*Caulerpa brownii*
Phaeophyceae	Desmarestiales	Desmarestiaceae	*Desmarestia ligulata*
Phaeophyceae	Dictyotales	Dictyotaceae	*Glossophora kunthii*
Phaeophyceae	Ectocarpales	incertae sedis	*Adenocystis utricularis*
Phaeophyceae	Ectocarpales	Myrionemataceae	*Myrionema strangulans*
Phaeophyceae	Ectocarpales	Scytosiphonaceae	*Scytosiphon lomentaria*
Phaeophyceae	Fucales	Cystoseiraceae	*Landsburgia quercifolia*

Phylum, Class	Order	Family	Genus and species
Phaeophyceae	Fucales	Sargassaceae	*Carpophyllum flexuosum*
Phaeophyceae	Fucales	Sargassaceae	*Sargassum sinclairii*
Phaeophyceae	Fucales	Seirococcaceae	*Marginariella boryana*
Phaeophyceae	Sphacelariales	Cladostephaceae	*Cladostephus spongiosus*
Rhodophyceae	Ceramiales	Ceramiaceae	*Anotrichium crinitum*
Rhodophyceae	Ceramiales	Ceramiaceae	*Antithamnion applicitum*
Rhodophyceae	Ceramiales	Ceramiaceae	*Antithamnionella adnata*
Rhodophyceae	Ceramiales	Ceramiaceae	*Ceramium apiculatum*
Rhodophyceae	Ceramiales	Ceramiaceae	*Ceramium flaccidum*
Rhodophyceae	Ceramiales	Ceramiaceae	*Ceramium rubrum*
Rhodophyceae	Ceramiales	Ceramiaceae	*Ceramium vestitum*
Rhodophyceae	Ceramiales	Ceramiaceae	*Dasyptilon pellucidum*
Rhodophyceae	Ceramiales	Ceramiaceae	*Griffithsia antarctica*
Rhodophyceae	Ceramiales	Ceramiaceae	*Lophothamnion hirtum*
Rhodophyceae	Ceramiales	Ceramiaceae	*Mediothamnion lyallii*
Rhodophyceae	Ceramiales	Dasyaceae	*Dasya collabens*
Rhodophyceae	Ceramiales	Dasyaceae	*Heterosiphonia concinna*
Rhodophyceae	Ceramiales	Dasyaceae	*Heterosiphonia squarrosa*
Rhodophyceae	Ceramiales	Dasyaceae	*Heterosiphonia tessellata*
Rhodophyceae	Ceramiales	Deleseriaceae	*Hymenena palmata*
Rhodophyceae	Ceramiales	Deleseriaceae	*Hymenena variolosa*
Rhodophyceae	Ceramiales	Deleseriaceae	*Laingia hookeri*
Rhodophyceae	Ceramiales	Deleseriaceae	*Phycodrys quercifolia*
Rhodophyceae	Ceramiales	Deleseriaceae	*Schizoseris dichotoma*
Rhodophyceae	Ceramiales	Deleseriaceae	*Schizoseris griffithsia*
Rhodophyceae	Ceramiales	Delesseriaceae	*Acrosorium venulosum*
Rhodophyceae	Ceramiales	Delesseriaceae	*Apoglossum oppositifolium*
Rhodophyceae	Ceramiales	Delesseriaceae	*Delesserian epiphytes*
Rhodophyceae	Ceramiales	Delesseriaceae	*Erythroglossum undulatissimum*
Rhodophyceae	Ceramiales	Rhodomelaceae	*Adamsiella angustifolia*
Rhodophyceae	Ceramiales	Rhodomelaceae	*Adamsiella chauvinii*
Rhodophyceae	Ceramiales	Rhodomelaceae	*Aphanocladia delicatula*
Rhodophyceae	Ceramiales	Rhodomelaceae	*Brongniartella australis*

Phylum, Class	Order	Family	Genus and species
Rhodophyceae	Ceramiales	Rhodomelaceae	*Echinothamnion hystrix*
Rhodophyceae	Ceramiales	Rhodomelaceae	*Echinothamnion lyallii*
Rhodophyceae	Ceramiales	Rhodomelaceae	*Polysiphonia abscissoides*
Rhodophyceae	Ceramiales	Rhodomelaceae	*Polysiphonia decipiens*
Rhodophyceae	Gigartinales	Cystocloniaceae	*Rhodophyllis centrocarpa*
Rhodophyceae	Gigartinales	Cystocloniaceae	*Rhodophyllis membranacea*
Rhodophyceae	Gigartinales	Gigartinaceae	*Sarcothalia livida*
Rhodophyceae	Gigartinales	Kallymeniaceae	*Callophyllis variegata*
Rhodophyceae	Gigartinales	Phyllophoraceae	*Stenogramme interrupta*
Rhodophyceae	Plocamiales	Plocamiaceae	*Plocamium angustum*
Rhodophyceae	Plocamiales	Plocamiaceae	*Plocamium cartilagineum*
Rhodophyceae	Plocamiales	Plocamiaceae	*Plocamium cirrhosum*
Rhodophyceae	Plocamiales	Plocamiaceae	*Plocamium leptophyllum*
Rhodophyceae	Plocamiales	Plocamiaceae	*Plocamium microcladioides*
Rhodophyceae	Rhodymeniales	Rhodymeniaceae	*Rhodymenia obtusa*
Ulvophyceae	Ulvales	Ulvaceae	*Ulva spathulata*
Porifera			
Calcarea	Leucosolenida	Sycettidae	*Sycon cf. ornatum*
Demospongiae	Dictyoceratida	Irciniidae	*Ircinia akaroa*
Demospongiae	Halichondrida	Halichondriidae	*Vosmaeria torquata*
Demospongiae	Haplosclerida	Callyspongiidae	*Callyspongia cf. bathami*
Demospongiae	Haplosclerida	Callyspongiidae	*Callyspongia stellata*
Demospongiae	Poecilosclerida	Mycalidae	*Mycale (Carmia) hentscheli*
Demospongiae	Poecilosclerida	Mycalidae	*Mycale (Carmia) tasmani*
Pyrrophycophyta			
Dinophyceae	Gymnodiniales	Gymnodiniacea	*Cochlodinium sp.*
Dinophyceae	Peridiniales	Peridiniaceae	*Lingulodinium polyedrum*
Dinophyceae	Peridiniales	Peridiniaceae	*Protoperidinium conicum cf. conicoides*
Dinophyceae	Peridiniales	Peridiniaceae	*Protoperidinium sp.*
Urochordata			

Phylum, Class	Order	Family	Genus and species
Ascidiacea	Aplousobranchia	Didemnidae	*Didemnum tuberatum*
Ascidiacea	Aplousobranchia	Didemnidae	*Lissoclinum notti*
Ascidiacea	Aplousobranchia	Holozoidae	*Hypsistozoa fasmeriana*
Ascidiacea	Aplousobranchia	Polyclinidae	*Aplidium adamsi*
Ascidiacea	Aplousobranchia	Polyclinidae	*Aplidium benhami*
Ascidiacea	Aplousobranchia	Polyclinidae	*Polyclinum sluteri*
Ascidiacea	Stolidobranchia	Molgulidae	*Molgula mortenseni*
Ascidiacea	Stolidobranchia	Pyuridae	*Pyura cancellata*
Ascidiacea	Stolidobranchia	Pyuridae	*Pyura carnea*
Ascidiacea	Stolidobranchia	Pyuridae	*Pyura lutea*
Ascidiacea	Stolidobranchia	Pyuridae	*Pyura pachydermatina*
Ascidiacea	Stolidobranchia	Pyuridae	*Pyura pulla*
Ascidiacea	Stolidobranchia	Pyuridae	*Pyura rugata*
Ascidiacea	Stolidobranchia	Pyuridae	*Pyura subuculata*
Ascidiacea	Stolidobranchia	Styelidae	*Cnemidocarpa bicornuta*
Ascidiacea	Stolidobranchia	Styelidae	*Cnemidocarpa nisiotus*
Ascidiacea	Stolidobranchia	Styelidae	*Cnemidocarpa regalis*
Vertebrata			
Actinopterygii	Anguilliformes	Congridae	*Conger verreauxi*
Actinopterygii	Mugiliformes	Mugilidae	*Parapercis colias*
Actinopterygii	Perciformes	Cheilodactylidae	*Nemadactylus macropterus*
Actinopterygii	Perciformes	Labridae	*Notolabrus celidotus*
Actinopterygii	Perciformes	Labridae	*Notolabrus miles*
Actinopterygii	Perciformes	Percophidae	*Hemerocoetes artus*
Actinopterygii	Perciformes	Plesiopidae	*Acanthoclinus fuscus*
Actinopterygii	Perciformes	Plesiopidae	*Acanthoclinus littoreus*
Actinopterygii	Perciformes	Trypterigiidae	*Apopterygion oculus*
Actinopterygii	Perciformes	Trypterigiidae	*Forsterygion varium*
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 Bluff 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	Scrupariidae	*Scruparia ambigua*	C1
Cnidaria				
Hydrozoa	Hydroida	Plumulariidae	*Plumularia setacea*	C1
Hydrozoa	Hydroida	Sertulariidae	*Amphisbetia operculata*	C1
Crustacea				
Malacostraca	Amphipoda	Lysianassidae	*Conicistomatid n. gen. et sp.*	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	*Dysidea n. sp. 2*	C2
Demospongiae	Dictyoceratida	Dysideidae	*Euryspongia n. sp. 4*	C2
Demospongiae	Halichondrida	Halichondriidae	*Halichondria n. sp. 8*	C2
Demospongiae	Haplosclerida	Callyspongiidae	*Callyspongia n. sp. 5*	C2
Demospongiae	Haplosclerida	Callyspongiidae	*Callyspongia n. sp. 6*	C2
Demospongiae	Haplosclerida	Callyspongiidae	*Siphonochalina n. sp. 1*	C2
Demospongiae	Haplosclerida	Chalinidae	*Adocia n. sp. 4*	C2
Demospongiae	Haplosclerida	Chalinidae	*Adocia n. sp. 5*	C2
Demospongiae	Haplosclerida	Chalinidae	*Chalinula n. sp. 1*	C2
Demospongiae	Haplosclerida	Chalinidae	*Chalinula n. sp. 2*	C2
Demospongiae	Haplosclerida	Chalinidae	*Haliclona n. sp. 3*	C2
Demospongiae	Haplosclerida	Chalinidae	*Haliclona n. sp. 11*	C2
Demospongiae	Haplosclerida	Chalinidae	*Haliclona n. sp. 12*	C2
Demospongiae	Poecilosclerida	Mycalidae	*Mycale (Carmia) n. sp. 1*	C2
Demospongiae	Poecilosclerida	Mycalidae	*Mycale (Carmia) n. sp. 3*	C2
Pyrrophycophyta				
Dinophyceae	Gonyaulacales	Gonyaulaceae	*Alexandrium cf.catenella*	C1
Urochordata				
Ascidiacea	Aplousobranchia	Didemnidae	*Didemnum incanum*	C1
Ascidiacea	Aplousobranchia	Polyclinidae	*Aplidium phortax*	C1
Ascidiacea	Phlebobranchia	Rhodosomatidae	*Corella eumyota*	C1
Ascidiacea	Stolidobranchia	Botryllinae	*Botrylliodes leachii*	C1
Ascidiacea	Stolidobranchia	Styelidae	*Asterocarpa cerea*	C1

Table 8: Non-indigenous marine species recorded from the Port of Bluff 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)
Bryozoa					
Gymnolaemata	Cheilostomata	Bugulidae	*Bugula flabellata*	H	Pre-1949
Gymnolaemata	Cheilostomata	Watersiporidae	*Watersipora subtorquata*	H or B	Pre-1982
Cnidaria					
Hydrozoa	Hydroida	Sertulariidae	*Symplectoscyphus indivisus* **(NR)**	H	Mar. 2003 [d]
Crustacea					
Malacostraca	Brachyura	Cancridae	*Cancer amphioetus* **(NR)**	H or B	Jan. 2003 [d]
Phycophyta					
Rhodophyceae	Ceramiales	Ceramiaceae	*Griffithsia crassiuscula*	H	Pre-1954
Rhodophyceae	Ceramiales	Rhodomelaceae	*Polysiphonia brodiaei*	H	Pre-1940
Porifera					
Calcarea	Leucosolenida	Heteropiidae	*Grantessa intusarticulata*	H	Unknown [1]
Calcarea	Leucosolenida	Leucosoleniidae	*Leucosolenia cf. discoveryi* **(NR)**	H	Feb. 2003 [d]
Demospongiae	Halichondrida	Dictyonellidae	*Stylotella agminata*	H	Unknown [1]
Demospongiae	Halisarcida	Halisarcidae	*Halisarca dujardini*	H or B	Pre-1973
Demospongiae	Poecilosclerida	Chondropsidae	*Chondropsis topsentii*	H	Unknown [1]
Demospongiae	Poecilosclerida	Chondropsidae	*Psammoclema cf. crassum*	H	Unknown [1]

[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 Bluff survey. This group includes: (1) organisms that were damaged or juvenile and lacked cruical 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	Eunicida	Eunicidae	*Eunice Eunice-A*
Polychaeta	Phyllodocida	Nereididae	*Neanthes Neanthes-A*
Polychaeta	Phyllodocida	Nereididae	*Platynereis Platynereis_australis_group*
Polychaeta	Phyllodocida	Phyllodocidae	*Eulalia Eulalia-NIWA-2*
Polychaeta	Phyllodocida	Polynoidae	*Lepidonotus Indet*
Polychaeta	Phyllodocida	Polynoidae	*Lepidonotus Lepidonotus-B*
Polychaeta	Phyllodocida	Syllidae	*Eusyllin-unknown Eusyllin-unknown-B*
Polychaeta	Phyllodocida	Syllidae	*Eusyllin-unknown Indet*
Polychaeta	Phyllodocida	Syllidae	*Eusyllis Eusyllis-A*
Polychaeta	Phyllodocida	Syllidae	*Typosyllis Typosyllis-A*
Polychaeta	Sabellida	Serpulidae	*Serpula Indet*
Polychaeta	Sabellida	Serpulidae	*Serpula Serpula-D*
Polychaeta	Terebellida	Cirratulidae	*Cirratulidae Indet*
Polychaeta	Terebellida	Terebellidae	*Lanassa Lanassa-A*
Bryozoa			
Gymnolaemata	Cheilostomata	Aeteidae	*Aetea ?australis*
Gymnolaemata	Cheilostomata	Microporidae	*Micropora sp. (cf. inarmata)*
Cnidaria			
Hydrozoa	Hydroida	Campanulariidae	*Clytia sp. 1*
Crustacea			
Malacostraca	Amphipoda	Ampeliscidae	*Ampelisca sp. C*
Malacostraca	Amphipoda	Aoridae	*Aoridae sp.*
Malacostraca	Amphipoda	Eusiridae	*Prostebbingia? levis*
Malacostraca	Amphipoda	Lysianassidae	*Parawaldeckia sp. C*
Malacostraca	Amphipoda	Lysianassidae	*Parawaldeckia sp. D*
Malacostraca	Caridea	Hippolytidae	*Hippolyte sp?*
Malacostraca	Isopoda	Sphaeromatidae	*Cilicaea sp.*

Phylum, Class	Order	Family	Genus and species
Phycophyta			
Alismatidae	Najadales	Zosteraceae	*Zostera sp.*
Bryopsidophyceae	Bryopsidales	Bryopsidaceae	*Bryopsis sp.*
Cladophorophyceae	Cladophorales	Cladophoraceae	*Cladophora sp.*
Phaeophyceae	Ectocarpales	Ectocarpaceae	*Ectocarpoid sp.*
Phaeophyceae			*Phaeophyceae sp.*
Rhodophyceae	Acrochaetiales	Acrochaetiaceae	*Audouinella sp.*
Rhodophyceae	Acrochaetiales	Acrochaetiaceae	*Audouinella sp.*
Rhodophyceae	Bangiales	Bangiaceae	*Bangia? sp.*
Rhodophyceae	Bangiales	Bangiaceae	*Porphyra sp.*
Rhodophyceae	Ceramiales	Ceramiaceae	*Acrothamnion sp.*
Rhodophyceae	Ceramiales	Ceramiaceae	*Antithamnion? sp.*
Rhodophyceae	Ceramiales	Ceramiaceae	*Antithamnionella ? sp.*
Rhodophyceae	Ceramiales	Ceramiaceae	*Callithamnion sp.*
Rhodophyceae	Ceramiales	Ceramiaceae	*Ceramiaceae indet*
Rhodophyceae	Ceramiales	Ceramiaceae	*Ceramium flaccidum ?*
Rhodophyceae	Ceramiales	Ceramiaceae	*Ceramium rubrum?*
Rhodophyceae	Ceramiales	Ceramiaceae	*Ceramium sp.*
Rhodophyceae	Ceramiales	Ceramiaceae	*Ceramium vestitum ?*
Rhodophyceae	Ceramiales	Ceramiaceae	*Griffithsia antarctica ?*
Rhodophyceae	Ceramiales	Ceramiaceae	*Griffithsia sp.*
Rhodophyceae	Ceramiales	Ceramiaceae	*Medeiothamnion lyallii ?*
Rhodophyceae	Ceramiales	Ceramiaceae	*Perithamnion ? sp.*
Rhodophyceae	Ceramiales	Ceramiaceae	*Perithamnion sp.*
Rhodophyceae	Ceramiales	Dasyaceae	*Dasyaceae indet*
Rhodophyceae	Ceramiales	Deleseriaceae	*Acrosorium sp.*
Rhodophyceae	Ceramiales	Deleseriaceae	*Hymenena curdieana ?*
Rhodophyceae	Ceramiales	Deleseriaceae	*Hymenena sp.*
Rhodophyceae	Ceramiales	Deleseriaceae	*Hymenena? sp.*
Rhodophyceae	Ceramiales	Deleseriaceae	*Myriogramme sp.*
Rhodophyceae	Ceramiales	Deleseriaceae	*Schizoseris sp.*
Rhodophyceae	Ceramiales	Deleseriaceae	*Schizoseris? sp.*
Rhodophyceae	Ceramiales	Delesseriaceae	*Acrosorium? sp.*
Rhodophyceae	Ceramiales	Delesseriaceae	*Delesseriaceae sp.*
Rhodophyceae	Ceramiales	Delesseriaceae	*Delesserian sp. A*

Phylum, Class	Order	Family	Genus and species
Rhodophyceae	Ceramiales	Delesseriaceae	*Delesserian sp. B*
Rhodophyceae	Ceramiales	Delesseriaceae	*Delesserian sp. C*
Rhodophyceae	Ceramiales	Rhodomelaceae	*Bostrychia sp.*
Rhodophyceae	Ceramiales	Rhodomelaceae	*Chondria? sp.*
Rhodophyceae	Ceramiales	Rhodomelaceae	*Echinothamnion sp.*
Rhodophyceae	Ceramiales	Rhodomelaceae	*Echinothamnion? sp.*
Rhodophyceae	Ceramiales	Rhodomelaceae	*Polysiphonia sp.*
Rhodophyceae	Ceramiales	Rhodomelaceae	*Pterosiphonia ? sp.*
Rhodophyceae	Corallinales	Corallinaceae	*Corallinales sp. (non-geniculate)*
Rhodophyceae	Gigartinales	Cystocloniaceae	*Rhodophyllis lacerata?*
Rhodophyceae	Gigartinales	Cystocloniaceae	*Rhodophyllis sp.*
Rhodophyceae	Gigartinales	Gigartinaceae	*Gigartinaceae? sp.*
Rhodophyceae	Gigartinales	Kallymeniaceae	*Callophyllis sp.*
Rhodophyceae	Gigartinales	Nemastomaceae	*Nemastoma? sp.*
Rhodophyceae	Plocamiales	Plocamiaceae	*Plocamium cartilagineum?*
Rhodophyceae	Plocamiales	Plocamiaceae	*Plocamium leptophyllum ?*
Rhodophyceae	Plocamiales	Plocamiaceae	*Plocamium sp.*
Rhodophyceae	Rhodymeniales	Lomentariaceae	*Lomentaria ? sp.*
Rhodophyceae	Rhodymeniales	Rhodymeniaceae	*Rhodymenia sp.*
Rhodophyceae			*Rhodophyceae sp.*
Ulvophyceae	Ulvales	Ulvaceae	*Enteromorpha sp.*
Ulvophyceae	Ulvales	Ulvaceae	*Ulva sp.*
Urochordata			
Ascidiacea	Aplousobranchia	Didemnidae	*Didemnum sp.*
Vertebrata			
Actinopterygii	Perciformes	Trypterigiidae	*Grahamina sp.*
Actinopterygii	Perciformes	Tripterygiidae	*Tripterygiidae sp.*

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

Genus and species	Capture technique	Locations detected in Port of Bluff	Detected in other locations surveyed in ZBS2000_04
Bugula flabellata	Benthic sled, Pile scrape	No. 3A Wharf; No. 11 Wharf, No. 14 Wharf (See Fig 14)	Auckland, Dunedin, Lyttleton, Napier, Nelson, Opua Marina, Picton, Taranaki, Tauranga, Timaru, Whangarei Harbour, Wellington
Watersipora subtorquata	Pile scrape	No. 7 Wharf; No. 11 Wharf; No. 14 Wharf (See Fig 15)	Dunedin, Gisborne, Gulf Harbour Marina, Lyttleton, Napier, Nelson, Opua Marina, Picton, Taranaki, Tauranga, Timaru, Whangarei Harbour, Wellington
Symplectoscyphus indivisus	Pile scrape	No. 7 Wharf (See Fig 16)	None
Cancer amphioetus	Pile scrape	No. 11 Wharf; Tiwai Wharf (See Fig 17)	Gisborne
Griffithsia crassiuscula	Pile scrape	No. 3A Wharf; No. 7 Wharf; No. 11 Wharf (See Fig 18)	Lyttleton, Picton, Taranaki, Timaru, Wellington
Polysiphonia brodiaei	Pile scrape	Tiwai wharf (See Fig 19)	Dunedin, Lyttleton
Grantessa intusarticulata	Pile scrape	No. 7 Wharf; No. 11 Wharf, (See Fig 20)	Dunedin
Leucosolenia cf. discoveryi	Pile scrape	No. 3A Wharf; No. 7 Wharf; No. 11 Wharf; No. 14 Wharf (See Fig 21)	Dunedin
Stylotella agminata	Pile scrape	Tiwai wharf (See Fig 22)	None
Halisarca dujardini	Pile scrape	No. 3A Wharf; No. 11 Wharf; Tiwai Wharf (See Fig 23)	Auckland, Dunedin, Picton, Taranaki, Wellington
Chondropsis topsentii	Benthic sled, Pile scrape	No. 3A Wharf; No. 7 Wharf, No. 11 Wharf; Tiawi Wharf (See Fig 24)	None
Psammoclema cf. crassum	Pile scrape	No. 3A Wharf; No. 7 Wharf,No. 11 Wharf (See Fig 25)	None

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 (Ulvophyceae), red algae (Rhodophyceae) and brown algae (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: 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 Bluff.

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
Bryozoa									
Bugula flabellata	+	+	+		+	+	+	+	+
Watersipora subtorquata	+	+	+		+	+	+	+	+
Cnidaria									
Symplectoscyphus indivisus	+		+		+			+	
Crustacea									
Cancer amphioetus	+		+					+	+
Phycophyta									
Griffithsia crassiuscula	+	+				+		+	+
Polysiphonia brodiaei	+	+	+		+	+	+	+	+
Porifera									
Grantessa intusarticulata	+		+		+		+	+	+
Leucosolenia cf. discoveryi	+		+		+	+		+	+
Stylotella agminata	+				+			+	+
Halisarca dujardini	+		+	+		+	+	+	+
Chondropsis topsentii	+		+		+	+		+	
Psammoclema cf. crassum	+		+		+	+		+	+

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 Bluff

Site	Eastings	Northings	NZ Latitude	NZ Longitude	Survey Method	No. of sample units
3	2152443	5391514	-46.59452	168.33561	BGRB	1
3	2152485	5391511	-46.59457	168.33617	BGRB	1
3	2152549	5391511	-46.59460	168.33700	BGRB	1
3	2152461	5391531	-46.59437	168.33586	BSLD	1
3	2152633	5391504	-46.59471	168.33808	BSLD	1
3	2152640	5391514	-46.59462	168.33818	BSLD	1
3	2152519	5391514	-46.59456	168.33661	CRBTP	2
3	2152605	5391508	-46.59466	168.33773	CRBTP	2
3	2152496	5391514	-46.59455	168.33630	FSHTP	2
3	2152595	5391508	-46.59465	168.33759	FSHTP	2
3	2152519	5391514	-46.59456	168.33661	SHRTP	1
3	2152605	5391508	-46.59466	168.33773	SHRTP	1
3	2152519	5391514	-46.59456	168.33661	STFTP	2
3	2152605	5391508	-46.59466	168.33773	STFTP	2
4	2152456	5391526	-46.59442	168.33580	BSLD	1
5	2152262	5391850	-46.59141	168.33350	BSLD	1
6	2152270	5391834	-46.59156	168.33360	BSLD	1
7	2152380	5391714	-46.59269	168.33494	BGRB	1
7	2152432	5391537	-46.59431	168.33550	BGRB	1
7	2152472	5391514	-46.59454	168.33600	BGRB	1
7	2152344	5391816	-46.59176	168.33455	BSLD	1
7	2152381	5391764	-46.59224	168.33500	BSLD	1
7	2152485	5391655	-46.59327	168.33626	BSLD	1
7	2152405	5391700	-46.59283	168.33526	CRBTP	2
7	2152434	5391668	-46.59313	168.33562	CRBTP	2
7	2152419	5391684	-46.59298	168.33543	FSHTP	2
7	2152426	5391661	-46.59319	168.33551	FSHTP	2
7	2152419	5391684	-46.59298	168.33543	PSC	15
7	2152405	5391700	-46.59283	168.33526	SHRTP	2
7	2152434	5391668	-46.59313	168.33562	SHRTP	2
7	2152405	5391700	-46.59283	168.33526	STFTP	2
7	2152434	5391668	-46.59313	168.33562	STFTP	2
8	2152236	5391901	-46.59094	168.33321	BSLD	1
8	2152245	5391924	-46.59074	168.33335	BSLD	1
8	2152370	5391781	-46.59209	168.33486	BSLD	1
11	2153250	5391041	-46.59918	168.34579	BGRB	1
11	2153287	5391029	-46.59931	168.34626	BGRB	1
11	2153312	5391013	-46.59946	168.34658	BGRB	1
11	2153046	5391140	-46.59819	168.34320	BSLD	1
11	2153214	5391057	-46.59902	168.34532	CRBTP	2
11	2153334	5391006	-46.59954	168.34685	CRBTP	2
11	2152918	5391192	-46.59766	168.34157	FSHTP	2
11	2153229	5391048	-46.59911	168.34552	FSHTP	2
11	2153278	5391029	-46.59930	168.34614	PSC	14
11	2153214	5391057	-46.59902	168.34532	SHRTP	2
11	2153334	5391006	-46.59954	168.34685	SHRTP	2
11	2153214	5391057	-46.59902	168.34532	STFTP	2
11	2153334	5391006	-46.59954	168.34685	STFTP	2
12	2153291	5391044	-46.59917	168.34631	BSLD	1

Site	Eastings	Northings	NZ Latitude	NZ Longitude	Survey Method	No. of sample units
14	2152890	5391192	-46.59764	168.34120	BGRB	1
14	2152934	5391185	-46.59773	168.34178	BGRB	1
14	2152987	5391150	-46.59807	168.34243	BGRB	1
14	2152949	5391169	-46.59788	168.34195	CRBTP	2
14	2153070	5391115	-46.59843	168.34350	CRBTP	2
14	2152901	5391192	-46.59765	168.34135	FSHTP	2
14	2152918	5391192	-46.59766	168.34157	FSHTP	2
14	2153027	5391131	-46.59826	168.34294	PSC	14
14	2152949	5391169	-46.59788	168.34195	SHRTP	2
14	2153070	5391115	-46.59843	168.34350	SHRTP	2
14	2152949	5391169	-46.59788	168.34195	STFTP	2
14	2153070	5391115	-46.59843	168.34350	STFTP	2
3A	2152679	5391430	-46.59540	168.33864	BGRB	1
3A	2152700	5391402	-46.59566	168.33888	BGRB	1
3A	2152703	5391422	-46.59548	168.33894	BGRB	1
3A	2152663	5391495	-46.59481	168.33846	BSLD	1
3A	2152795	5391387	-46.59584	168.34011	BSLD	1
3A	2152693	5391408	-46.59560	168.33880	CRBTP	2
3A	2152700	5391402	-46.59566	168.33888	CRBTP	2
3A	2152692	5391408	-46.59560	168.33878	FSHTP	2
3A	2152700	5391402	-46.59566	168.33888	FSHTP	2
3A	2152719	5391390	-46.59578	168.33912	PSC	16
3A	2152693	5391408	-46.59560	168.33880	SHRTP	1
3A	2152700	5391402	-46.59566	168.33888	SHRTP	1
3A	2152693	5391408	-46.59560	168.33880	STFTP	2
3A	2152700	5391402	-46.59566	168.33888	STFTP	2
BASIN 1 - 2 INNER	2152605	5391337	-46.59619	168.33760	CYST	2
BASIN 1 - 2 OUTER	2152681	5391344	-46.59617	168.33860	CYST	2
BASIN 3 - 6 INNER	2152302	5391942	-46.59061	168.33410	CYST	2
BASIN 3 - 6 OUTER	2152428	5391578	-46.59394	168.33546	CYST	2
BR	(blank)	(blank)	(blank)	(blank)	CRBTP	
BW	2152710	5391083	-46.59853	168.33878	BGRB	1
BW	2152741	5391073	-46.59863	168.33917	BGRB	1
BW	2152741	5391083	-46.59854	168.33918	BGRB	1
BW	2152729	5391073	-46.59863	168.33902	CRBTP	2
BW	2152906	5391074	-46.59871	168.34132	CRBTP	2
BW	2152729	5391073	-46.59863	168.33902	SHRTP	2
BW	2152906	5391074	-46.59871	168.34132	SHRTP	2
BW	2152729	5391073	-46.59863	168.33902	STFTP	1
BW	2152729	5391083	-46.59854	168.33903	STFTP	1
BW	2152906	5391074	-46.59871	168.34132	STFTP	2
OIL	2152886	5391212	-46.59746	168.34116	BSLD	1
OIL	2153128	5391117	-46.59844	168.34425	BSLD	1
OIL	2153238	5391086	-46.59877	168.34566	BSLD	1
TIWAI INNER	2153661	5391703	-46.59344	168.35163	CYST	2
TIWAI OUTER	2153742	5391706	-46.59346	168.35268	CYST	2
TY	2153452	5391656	-46.59376	168.34886	BGRB	2
TY	2153463	5391696	-46.59341	168.34904	BGRB	1
TY	2153430	5391863	-46.59189	168.34873	BSLD	1
TY	2153539	5391715	-46.59327	168.35005	BSLD	1
TY	2153454	5391696	-46.59340	168.34892	CRBTP	2

Site	Eastings	Northings	NZ Latitude	NZ Longitude	Survey Method	No. of sample units
TY	2153516	5391655	-46.59380	168.34970	CRBTP	2
TY	2153437	5391783	-46.59261	168.34877	FSHTP	2
TY	2153466	5391732	-46.59308	168.34910	FSHTP	2
TY	2153450	5391754	-46.59288	168.34892	PSC	16
TY	2153454	5391696	-46.59340	168.34892	SHRTP	2
TY	2153516	5391655	-46.59380	168.34970	SHRTP	2
TY	2153454	5391696	-46.59340	168.34892	STFTP	2
TY	2153516	5391655	-46.59380	168.34970	STFTP	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.

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

					Berth code	11														14											
					Pile replicate	1							2							1							2				
					Pile position	IN			OUT				IN			OUT				IN			OUT				IN			OUT	
Class	Orders	Family	Genus	Species	*Status	1	2	3	1	2	3	4	1	2	3	1	2	3	4	1	2	3	1	2	3	4	1	2	3	1	2
Actinopterygii	Perciformes	Plesiopidae	*Acanthoclinus*	*littoreus*	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
Actinopterygii	Perciformes	Plesiopidae	*Acanthoclinus*	*fuscus*	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*	*varium*	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	*Grahamina*	*capito*	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
Actinopterygii	Perciformes	Trypterigiidae	*Grahamina*	*sp.*	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
Alismatidae	Najadales	Zosteraceae	*Zostera*	*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	1	0	0	0	0	0
Ascidiacea	Aplousobranchia	Didemnidae	*Lissoclinum*	*notti*	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	Aplousobranchia	Didemnidae	*Didemnum*	*incanum*	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
Ascidiacea	Aplousobranchia	Holozoidae	*Hypsistozoa*	*fasmeriana*	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	Aplousobranchia	Polyclinidae	*Aplidium*	*adamsi*	N	0	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
Ascidiacea	Aplousobranchia	Polyclinidae	*Aplidium*	*phortax*	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
Ascidiacea	Aplousobranchia	Polyclinidae	*Aplidium*	*benhami*	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
Ascidiacea	Aplousobranchia	Polyclinidae	*Polyclinum*	*sluteri*	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	Phlebobranchia	Rhodosomatidae	*Corella*	*eumyota*	C1	0	0	0	0	1	1	1	0	0	1	0	1	1	1	0	0	1	0	0	1	1	0	0	1	0	0
Ascidiacea	Stolidobranchia	Botryllinae	*Botrylliodes*	*leachii*	C1	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
Ascidiacea	Stolidobranchia	Molgulidae	*Molgula*	*mortenseni*	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
Ascidiacea	Stolidobranchia	Pyuridae	*Pyura*	*cancellata*	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	1	0	0	0	0	0	0	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	1	0	0	0	0	0	0	0	0	0	0	0	0
Ascidiacea	Stolidobranchia	Pyuridae	*Pyura*	*lutea*	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	Pyuridae	*Pyura*	*carnea*	N	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
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	0	0	0	0	1
Ascidiacea	Stolidobranchia	Pyuridae	*Pyura*	*subuculata*	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
Ascidiacea	Stolidobranchia	Styelidae	*Asterocarpa*	*cerea*	C1	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
Ascidiacea	Stolidobranchia	Styelidae	*Cnemidocarpa*	*nisiotus*	N	0	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
Ascidiacea	Stolidobranchia	Styelidae	*Cnemidocarpa*	*bicornuta*	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
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
Asteroidea	Valvatida	Asterinidae	*Patiriella*	*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
Asteroidea	Valvatida	Goniasteridae	*Pentagonaster*	*pulchellus*	N	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	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	0	0	0	0	0	0	0	0	0	0	0	0	1
Bivalvia	Mytiloida	Mytilidae	*Aulacomya*	*maoriana*	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	Mytiloida	Mytilidae	*Mytilus*	*galloprovincialis*	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	1
Bivalvia	Ostreoida	Ostreidae	*Ostrea*	*chilensis*	N	0	1	0	0	1	1	1	0	1	1	0	1	0	1	0	0	0	0	0	1	1	0	0	0	0	1
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	0	0	0	0	0
Bryopsidophyceae	Bryopsidales	Bryopsidaceae	*Bryopsis*	*sp.*	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
Bryopsidophyceae	Bryopsidales	Bryopsidaceae	*Bryposis*	*vestita*	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
Bryopsidophyceae	Halimediales	Caulerpaceae	*Caulerpa*	*brownii*	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
Calcarea	Leucosolenida	Heteropiidae	*Grantessa*	*intusarticulata*	A	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
Calcarea	Leucosolenida	Leucosoleniidae	*Leucosolenia*	*cf. discoveryi*	A	0	0	0	0	0	0	1	0	0	1	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Calcarea	Leucosolenida	Sycettidae	*Sycon*	*cf. ornatum*	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
Cladophorophyceae	Cladophorales	Cladophoraceae	*Cladophora*	*sp.*	SI	0	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
Crustacea	Anomura	Porcellanidae	*Petrocheles*	*spinosus*	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
Crustacea	Brachyura	Cancridae	*Cancer*	*amphioetus*	A	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
Crustacea	Brachyura	Cancridae	*Cancer*	*novaezelandiae*	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
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	1	0	0
Crustacea	Brachyura	Hymenosomatidae	*Halicarcinus*	*tongi*	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*	*peronii*	N	0	0	0	0	1	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Crustacea	Brachyura	Majidae	*Notomithrax*	*minor*	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	Crangonidae	*Nauticaris*	*marionis*	N	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Crustacea	Caridea	Hippolytidae	*Hippolyte*	*multicolorata*	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*	*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	1	0
Crustacea	Caridea	Palemonidae	*Periclimenes*	*yaldwyni*	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	0
Crustacea	Thoracica	Balanidae	*Austrominius*	*modestus*	N	1	1	0	1	0	0	0	1	0	1	0	0	0	0	1	1	1	0	1	0	0	1	1	0	1	1

*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	11														14														
					Pile replicate	1							2							1							2							
					Pile position	IN			OUT				IN			OUT				IN			OUT				IN			OUT				
Class	Orders	Family	Genus	Species	*Status	1	2	3	1	2	3	4	1	2	3	1	2	3	4	1	2	3	1	2	3	4	1	2	3	1	2			
Crustacea	Thoracica	Balanidae	*Notomegabalanus*	*decorus*	N	0	1	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	Thoracica	Chthamalidae	*Chaemosipho*	*columna*	N	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0			
Crustacea	Thoracica	Pachylasmidae	*Epopella*	*plicata*	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			
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	*Dysidea*	*n. sp. 1 (erect cactus)*	C2	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	0			
Demospongiae	Dictyoceratida	Irciniidae	*Ircinia*	*akaroa*	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			
Demospongiae	Halichondrida	Dictyonellidae	*Stylotella*	*agminata*	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			
Demospongiae	Halichondrida	Halichondriidae	*Vosmaeria*	*torquata*	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*	*n. sp. 8 (fingery turrets)*	C2	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			
Demospongiae	Halisarcida	Halisarcidae	*Halisarca*	*dujardini*	A	0	0	0	0	0	1	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0			
Demospongiae	Haplosclerida	Callyspongiidae	*Callyspongia*	*stellata*	N	0	0	0	0	0	1	1	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0			
Demospongiae	Haplosclerida	Callyspongiidae	*Siphonochalina*	*n. sp. 1 (Bluff small chimney)*	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			
Demospongiae	Haplosclerida	Callyspongiidae	*Callyspongia*	*cf. bathami*	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	Haplosclerida	Chalinidae	*Adocia*	*n. sp. 5 (Bluff encrustor)*	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			
Demospongiae	Poecilosclerida	Chondropsidae	*Chondropsis*	*topsentii*	A	0	0	0	0	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0			
Demospongiae	Poecilosclerida	Chondropsidae	*Psammoclema*	*cf. crassum*	A	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			
Demospongiae	Poecilosclerida	Mycalidae	*Mycale (Carmia)*	*hentscheli*	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			
Demospongiae	Poecilosclerida	Mycalidae	*Mycale (Carmia)*	*tasmani*	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			
Gastropoda	Basommatophora	Siphonariidae	*Siphonaria*	*australis*	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			
Gastropoda	Littorinimorpha	Calyptraeidae	*Sigapatella*	*novaezelandiae*	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			
Gymnolaemata	Cheilostomata	Beaniidae	*Beania*	*discodermiae*	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			
Gymnolaemata	Cheilostomata	Beaniidae	*Beania*	*magellanica*	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	Beaniidae	*Beania*	*quadricornuta*	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			
Gymnolaemata	Cheilostomata	Bugulidae	*Bugula*	*flabellata*	A	0	0	1	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	1	1	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	*Caberea*	*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			
Gymnolaemata	Cheilostomata	Candidae	*Caberea*	*n.sp. (cf. guntheri)*	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	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0			
Gymnolaemata	Cheilostomata	Celleporidae	*Galeopsis*	*porcellanicus*	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			
Gymnolaemata	Cheilostomata	Hippothoidae	*Celleporella*	*delta*	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	Schizoporellidae	*Chiastosella*	*watersi*	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	1	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	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0			
Hydrozoa	Hydroida	Campanulariidae	*Clytia*	*sp. 1*	SI	0	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	Haleciidae	*Halecium*	*corrrugatissimum*	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			
Hydrozoa	Hydroida	Plumulariidae	*Monotheca*	*flexuosa*	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			
Hydrozoa	Hydroida	Plumulariidae	*Plumularia*	*brachiata*	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			
Hydrozoa	Hydroida	Plumulariidae	*Plumularia*	*setacea*	C1	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			
Hydrozoa	Hydroida	Plumulariidae	*Plumularia*	*setaceoides*	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			
Hydrozoa	Hydroida	Plumulariidae	*Plumularia*	*spirocladia*	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			
Hydrozoa	Hydroida	Sertulariidae	*Sertularella*	*robusta*	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			
Hydrozoa	Hydroida	Sertulariidae	*Amphisbetia*	*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			
Hydrozoa	Hydroida	Sertulariidae	*Salacia*	*bicalycula*	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			
Hydrozoa	Hydroida	Sertulariidae	*Symplectoscyphus*	*indivisus*	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			
Malacostraca	Amphipoda	Amaryllidae	*Amaryllis*	*macrophthalma*	N	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			
Malacostraca	Amphipoda	Aoridae	*Haplocheira*	*barbimana*	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			
Malacostraca	Amphipoda	Aoridae	*Aoridae*	*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	Aoridae	*Aora*	*maculata*	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			
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	Hyalidae	*Hyale*	*rubra*	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			
Malacostraca	Amphipoda	Leucothoidae	*Leucothoe*	*trailli*	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	Liljeborgiidae	*Liljeborgia*	*akaroica*	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			
Malacostraca	Amphipoda	Liljeborgiidae	*Liljeborgia*	*hansoni*	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			
Malacostraca	Amphipoda	Lysianassidae	*Parawaldeckia*	*stephenseni*	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			

*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	11														14											
					Pile replicate	1							2							1							2				
					Pile position	IN			OUT				IN			OUT				IN			OUT				IN			OUT	
Class	Orders	Family	Genus	Species	*Status	1	2	3	1	2	3	4	1	2	3	1	2	3	4	1	2	3	1	2	3	4	1	2	3	1	2
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	Lysianassidae	*Conicistomatid*	*n. gen. et sp.*	C2	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
Malacostraca	Amphipoda	Lysianassidae	*Parawaldeckia*	*sp. C*	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
Malacostraca	Amphipoda	Lysianassidae	*Parawaldeckia*	*sp. D*	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	Melitidae	*Mallacoota*	*subcarinata*	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	0
Malacostraca	Amphipoda	Melitidae	*Ceradocopsis*	*carnleyi*	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	Isopoda	Cirolanidae	*Natatolana*	*rossi*	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	Isopoda	Sphaeromatidae	*Cilicaea*	*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
Phaeophyceae	Desmarestiales	Desmarestiaceae	*Desmarestia*	*ligulata*	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	Dictyotales	Dictyotaceae	*Glossophora*	*kunthii*	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	Ectocarpales	Ectocarpaceae	*Ectocarpoid*	*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	0
Phaeophyceae	Ectocarpales	incertae sedis	*Adenocystis*	*utricularis*	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	Ectocarpales	Myrionemataceae	*Myrionema*	*strangulans*	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	Ectocarpales	Scytosiphonaceae	*Scytosiphon*	*lomentaria*	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
Phaeophyceae	Sphacelariales	Cladostephaceae	*Cladostephus*	*spongiosus*	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			*Phaeophyceae*	*sp.*	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
Polychaeta	Eunicida	Eunicidae	*Eunice*	*australis*	N	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	1
Polychaeta	Eunicida	Eunicidae	*Eunice*	*Eunice-A*	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	0	0
Polychaeta	Eunicida	Lumbrineridae	*Lumbrineris*	*sphaerocephala*	N	0	1	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Phyllodocida	Glyceridae	*Glycera*	*benhami*	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	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
Polychaeta	Phyllodocida	Nereididae	*Platynereis*	*Platynereis_australis_group*	SI	0	1	0	0	1	0	0	0	0	0	0	1	1	0	0	0	0	0	0	1	0	0	0	0	0	0
Polychaeta	Phyllodocida	Nereididae	*Nereis*	*falcaria*	N	0	0	0	0	1	1	1	0	0	1	0	0	1	1	0	0	0	0	0	0	1	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	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	1	0
Polychaeta	Phyllodocida	Nereididae	*Perinereis*	*pseudocamiguina*	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	0	0	0	0	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	0	0	0	0	0
Polychaeta	Phyllodocida	Polynoidae	*Lepidonotus*	*Lepidonotus-B*	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*	*polychromus*	N	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
Polychaeta	Phyllodocida	Polynoidae	*Lepidonotus*	*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*	*jacksoni*	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
Polychaeta	Phyllodocida	Syllidae	*Eusyllis*	*Eusyllis-A*	SI	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Polychaeta	Phyllodocida	Syllidae	*Eusyllin-unknown*	*Eusyllin-unknown-B*	SI	0	1	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	Syllidae	*Eusyllin-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
Polychaeta	Phyllodocida	Syllidae	*Typosyllis*	*Typosyllis-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	Sabellidae	*Megalomma*	*suspiciens*	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	0
Polychaeta	Sabellida	Sabellidae	*Branchiomma*	*curta*	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
Polychaeta	Sabellida	Serpulidae	*Galeolaria*	*hystrix*	N	0	1	0	0	1	1	1	0	1	0	0	1	1	1	0	0	1	0	0	0	0	0	0	0	0	0
Polychaeta	Sabellida	Serpulidae	*Neovermilia*	*sphaeropomatus*	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	Serpulidae	*Romanchella*	*perrieri*	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	Serpulidae	*Serpula*	*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	0
Polychaeta	Sabellida	Serpulidae	*Serpula*	*Serpula-D*	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	0
Polychaeta	Scolecida	Opheliidae	*Armandia*	*maculata*	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
Polychaeta	Terebellida	Cirratulidae	*Timarete*	*anchylochaetus*	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
Polychaeta	Terebellida	Flabelligeridae	*Flabelligera*	*affinis*	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	0
Polychaeta	Terebellida	Terebellidae	*Lanassa*	*Lanassa-A*	SI	0	0	0	0	0	1	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Terebellida	Terebellidae	*Nicolea*	*armilla*	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	Terebellida	Terebellidae	*Streblosoma*	*toddae*	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
Polyplacophora	Acanthochitonina	Acanthochitonidae	*Acanthochitona*	*zelandica*	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
Polyplacophora	Acanthochitonina	Acanthochitonidae	*Cryptoconchus*	*porosus*	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	*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	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
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

*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	11														14											
					Pile replicate	1							2							1							2				
					Pile position	IN			OUT				IN			OUT				IN			OUT				IN			OUT	
Class	Orders	Family	Genus	Species	*Status	1	2	3	1	2	3	4	1	2	3	1	2	3	4	1	2	3	1	2	3	4	1	2	3	1	2
Rhodophyceae	Bangiales	Bangiaceae	*Bangia*	*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	Bangiales	Bangiaceae	*Porphyra*	*sp.*	SI	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
Rhodophyceae	Ceramiales	Ceramiaceae	*Mediothamnion*	*lyallii*	N	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	1	0	1	0	0	0
Rhodophyceae	Ceramiales	Ceramiaceae	*Ceramium*	*sp.*	SI	1	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	1	0	0	1	1	1	0	0	0	1
Rhodophyceae	Ceramiales	Ceramiaceae	*Anotrichium*	*crinitum*	N	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	0
Rhodophyceae	Ceramiales	Ceramiaceae	*Griffithsia*	*antarctica*	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
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	1	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	1	0	0	0	0	0	0
Rhodophyceae	Ceramiales	Ceramiaceae	*Ceramium*	*vestitum*	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	*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
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	*Ceramium*	*rubrum*	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	*Dasyptilon*	*pellucidum*	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	*Lophothamnion*	*hirtum*	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	*Perithamnion*	*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	*Acrothamnion*	*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	*Antithamnion*	*applicitum*	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	*Antithamnion*	*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	*Callithamnion*	*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	*Ceramiaceae*	*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
Rhodophyceae	Ceramiales	Dasyaceae	*Heterosiphonia*	*concinna*	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	Dasyaceae	*Dasya*	*collabens*	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	Dasyaceae	*Dasyaceae*	*indet*	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	0
Rhodophyceae	Ceramiales	Dasyaceae	*Heterosiphonia*	*squarrosa*	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	*Phycodrys*	*quercifolia*	N	0	1	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Rhodophyceae	Ceramiales	Deleseriaceae	*Schizoseris*	*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	0
Rhodophyceae	Ceramiales	Deleseriaceae	*Schizoseris*	*dichotoma*	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
Rhodophyceae	Ceramiales	Deleseriaceae	*Hymenena*	*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	0
Rhodophyceae	Ceramiales	Deleseriaceae	*Myriogramme*	*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	0
Rhodophyceae	Ceramiales	Deleseriaceae	*Hymenena*	*curdieana ?*	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	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	*Laingia*	*hookeri*	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	*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
Rhodophyceae	Ceramiales	Delesseriaceae	*Delesserian*	*sp. 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
Rhodophyceae	Ceramiales	Delesseriaceae	*Delesseriaceae*	*sp.*	SI	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
Rhodophyceae	Ceramiales	Delesseriaceae	*Erythroglossum*	*undulatissimum*	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
Rhodophyceae	Ceramiales	Delesseriaceae	*Apoglossum*	*oppositifolium*	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	*Delesserian*	*sp. B*	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	*Delesserian*	*sp. 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
Rhodophyceae	Ceramiales	Delesseriaceae	*Delesserian*	*epiphytes*	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	Rhodomelaceae	*Polysiphonia*	*sp.*	SI	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0
Rhodophyceae	Ceramiales	Rhodomelaceae	*Bostrychia*	*sp.*	SI	1	0	0	0	0	0	0	1	0	0	0	0	0	0	1	1	0	1	0	0	0	1	0	0	1	0
Rhodophyceae	Ceramiales	Rhodomelaceae	*Polysiphonia*	*abscissoides*	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	Rhodomelaceae	*Adamsiella*	*chauvinii*	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
Rhodophyceae	Ceramiales	Rhodomelaceae	*Brongniartella*	*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
Rhodophyceae	Ceramiales	Rhodomelaceae	*Echinothamnion*	*hystrix*	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	Rhodomelaceae	*Echinothamnion*	*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	Rhodomelaceae	*Echinothamnion*	*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*	*brodiaei*	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
Rhodophyceae	Ceramiales	Rhodomelaceae	*Pterosiphonia ?*	*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	Gigartinales	Cystocloniaceae	*Rhodophyllis*	*sp.*	SI	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	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
Rhodophyceae	Gigartinales	Cystocloniaceae	*Rhodophyllis*	*lacerata?*	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
Rhodophyceae	Gigartinales	Gigartinaceae	*Sarcothalia*	*livida*	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	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	11														14											
					Pile replicate	1							2							1							2				
					Pile position	IN			OUT				IN			OUT				IN			OUT				IN			OUT	
Class	Orders	Family	Genus	Species	*Status	1	2	3	1	2	3	4	1	2	3	1	2	3	4	1	2	3	1	2	3	4	1	2	3	1	2
Rhodophyceae	Gigartinales	Gigartinaceae	*Gigartina*	*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	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	Gigartinales	Kallymeniaceae	*Callophyllis*	*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	Gigartinales	Nemastomaceae	*Nemastoma?*	*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	Plocamiales	Plocamiaceae	*Plocamium*	*cartilagineum*	N	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodophyceae	Plocamiales	Plocamiaceae	*Plocamium*	*sp.*	SI	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Rhodophyceae	Plocamiales	Plocamiaceae	*Plocamium*	*cirrhosum*	N	0	0	0	0	0	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodophyceae	Plocamiales	Plocamiaceae	*Plocamium*	*microcladioides*	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	0
Rhodophyceae	Plocamiales	Plocamiaceae	*Plocamium*	*leptophyllum*	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	Plocamiales	Plocamiaceae	*Plocamium*	*angustum*	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	Lomentariaceae	*Lomentaria*	*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	Rhodymeniales	Rhodymeniaceae	*Rhodymenia*	*sp.*	SI	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
Rhodophyceae	Rhodymeniales	Rhodymeniaceae	*Rhodymenia*	*obtusa*	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	0
Rhodophyceae			*Rhodophyceae*	*sp.*	SI	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
Ulvophyceae	Ulvales	Ulvaceae	*Enteromorpha*	*sp.*	SI	1	0	1	1	0	0	0	1	0	0	0	0	0	0	1	1	0	1	1	0	0	0	1	0	1	0
Ulvophyceae	Ulvales	Ulvaceae	*Ulva*	*sp.*	SI	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	1	1	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

*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			3A																7								
					Pile replicate			1								2								1								2
					Pile position			IN				OUT				IN				OUT				IN				OUT				IN
Class	Orders	Family	Genus	Species	*Status	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1
Actinopterygii	Perciformes	Plesiopidae	*Acanthoclinus*	*littoreus*	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
Actinopterygii	Perciformes	Plesiopidae	*Acanthoclinus*	*fuscus*	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
Actinopterygii	Perciformes	Trypterigiidae	*Forsterygion*	*varium*	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
Actinopterygii	Perciformes	Trypterigiidae	*Grahamina*	*capito*	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
Actinopterygii	Perciformes	Trypterigiidae	*Grahamina*	*sp.*	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
Alismatidae	Najadales	Zosteraceae	*Zostera*	*sp.*	SI	0	0	0	0	1	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	1
Ascidiacea	Aplousobranchia	Didemnidae	*Didemnum*	*sp.*	SI	0	0	0	0	1	1	0	0	0	0	0	1	1	1	0	0	1	1	0	0	1	1	0	1	1	1	0
Ascidiacea	Aplousobranchia	Didemnidae	*Lissoclinum*	*notti*	N	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	0	0
Ascidiacea	Aplousobranchia	Didemnidae	*Didemnum*	*incanum*	C1	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
Ascidiacea	Aplousobranchia	Holozoidae	*Hypsistozoa*	*fasmeriana*	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
Ascidiacea	Aplousobranchia	Polyclinidae	*Aplidium*	*adamsi*	N	0	0	0	0	0	1	0	0	0	1	0	0	0	1	0	0	1	1	0	0	0	0	0	1	1	0	0
Ascidiacea	Aplousobranchia	Polyclinidae	*Aplidium*	*phortax*	C1	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	Aplousobranchia	Polyclinidae	*Aplidium*	*benhami*	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
Ascidiacea	Aplousobranchia	Polyclinidae	*Polyclinum*	*sluteri*	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
Ascidiacea	Phlebobranchia	Rhodosomatidae	*Corella*	*eumyota*	C1	1	1	0	1	1	1	0	1	1	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1	0	0
Ascidiacea	Stolidobranchia	Botryllinae	*Botrylliodes*	*leachii*	C1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Ascidiacea	Stolidobranchia	Molgulidae	*Molgula*	*mortenseni*	N	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Ascidiacea	Stolidobranchia	Pyuridae	*Pyura*	*cancellata*	N	1	0	0	1	0	0	0	0	1	1	0	1	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0
Ascidiacea	Stolidobranchia	Pyuridae	*Pyura*	*pachydermatina*	N	0	0	0	1	0	0	0	0	1	0	0	1	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0
Ascidiacea	Stolidobranchia	Pyuridae	*Pyura*	*pulla*	N	1	0	0	0	0	1	0	0	0	1	0	1	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0
Ascidiacea	Stolidobranchia	Pyuridae	*Pyura*	*lutea*	N	0	0	0	0	0	0	0	0	1	1	0	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Ascidiacea	Stolidobranchia	Pyuridae	*Pyura*	*carnea*	N	1	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
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	0	0	0	0	0	0
Ascidiacea	Stolidobranchia	Pyuridae	*Pyura*	*subuculata*	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
Ascidiacea	Stolidobranchia	Styelidae	*Asterocarpa*	*cerea*	C1	0	0	0	1	0	1	0	0	1	1	0	1	1	1	0	0	0	1	0	0	1	0	0	0	0	0	0
Ascidiacea	Stolidobranchia	Styelidae	*Cnemidocarpa*	*nisiotus*	N	0	0	0	0	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	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	1	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	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Asteroidea	Valvatida	Asterinidae	*Patiriella*	*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
Asteroidea	Valvatida	Goniasteridae	*Pentagonaster*	*pulchellus*	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
Bivalvia	Mytiloida	Mytilidae	*Modiolarca*	*impacta*	N	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
Bivalvia	Mytiloida	Mytilidae	*Aulacomya*	*maoriana*	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
Bivalvia	Mytiloida	Mytilidae	*Mytilus*	*galloprovincialis*	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
Bivalvia	Ostreoida	Ostreidae	*Ostrea*	*chilensis*	N	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	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	0	0	0	0	0	0
Bryopsidophyceae	Bryopsidales	Bryopsidaceae	*Bryopsis*	*sp.*	SI	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
Bryopsidophyceae	Bryopsidales	Bryopsidaceae	*Bryposis*	*vestita*	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
Bryopsidophyceae	Halimediales	Caulerpaceae	*Caulerpa*	*brownii*	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
Calcarea	Leucosolenida	Heteropiidae	*Grantessa*	*intusarticulata*	A	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
Calcarea	Leucosolenida	Leucosoleniidae	*Leucosolenia*	*cf. discoveryi*	A	1	0	0	0	1	0	0	1	0	1	0	0	1	1	0	0	0	0	0	0	0	0	1	0	0	0	0
Calcarea	Leucosolenida	Sycettidae	*Sycon*	*cf. ornatum*	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
Cladophorophyceae	Cladophorales	Cladophoraceae	*Cladophora*	*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
Crustacea	Anomura	Porcellanidae	*Petrocheles*	*spinosus*	N	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Crustacea	Brachyura	Cancridae	*Cancer*	*amphioetus*	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
Crustacea	Brachyura	Cancridae	*Cancer*	*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	0
Crustacea	Brachyura	Hymenosomatidae	*Halicarcinus*	*cookii*	N	0	0	0	0	0	0	0	0	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Crustacea	Brachyura	Hymenosomatidae	*Halicarcinus*	*tongi*	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
Crustacea	Brachyura	Majidae	*Notomithrax*	*peronii*	N	1	0	0	0	1	0	0	0	1	0	0	1	1	0	0	1	0	1	0	1	0	0	0	0	0	0	0
Crustacea	Brachyura	Majidae	*Notomithrax*	*minor*	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
Crustacea	Caridea	Crangonidae	*Nauticaris*	*marionis*	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
Crustacea	Caridea	Hippolytidae	*Hippolyte*	*multicolorata*	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
Crustacea	Caridea	Hippolytidae	*Hippolyte*	*sp?*	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	0	0
Crustacea	Caridea	Palemonidae	*Periclimenes*	*yaldwyni*	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
Crustacea	Thoracica	Balanidae	*Austrominius*	*modestus*	N	0	0	1	1	0	0	1	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			3A																		7						
					Pile replicate			1						2												1						2
					Pile position			IN				OUT				IN				OUT				IN				OUT				IN
Class	Orders	Family	Genus	Species	*Status	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1
Crustacea	Thoracica	Balanidae	*Notomegabalanus*	*decorus*	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	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
Crustacea	Thoracica	Pachylasmidae	*Epopella*	*plicata*	N	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	1	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	1	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	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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
Demospongiae	Halichondrida	Dictyonellidae	*Stylotella*	*agminata*	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
Demospongiae	Halichondrida	Halichondriidae	*Vosmaeria*	*torquata*	N	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
Demospongiae	Halichondrida	Halichondriidae	*Halichondria*	*n. sp. 8 (fingery turrets)*	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
Demospongiae	Halisarcida	Halisarcidae	*Halisarca*	*dujardini*	A	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Demospongiae	Haplosclerida	Callyspongiidae	*Callyspongia*	*stellata*	N	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
Demospongiae	Haplosclerida	Callyspongiidae	*Siphonochalina*	*n. sp. 1 (Bluff small chimney)*	C2	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
Demospongiae	Haplosclerida	Callyspongiidae	*Callyspongia*	*cf. bathami*	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
Demospongiae	Haplosclerida	Chalinidae	*Adocia*	*n. sp. 5 (Bluff encrustor)*	C2	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	Chondropsidae	*Chondropsis*	*topsentii*	A	0	0	0	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Demospongiae	Poecilosclerida	Chondropsidae	*Psammoclema*	*cf. crassum*	A	0	0	0	0	0	0	0	0	0	1	0	0	1	1	0	0	1	0	0	0	0	0	0	1	0	0	0
Demospongiae	Poecilosclerida	Mycalidae	*Mycale (Carmia)*	*hentscheli*	N	1	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	Mycalidae	*Mycale (Carmia)*	*tasmani*	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
Gastropoda	Basommatophora	Siphonariidae	*Siphonaria*	*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
Gastropoda	Littorinimorpha	Calyptraeidae	*Sigapatella*	*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	0
Gymnolaemata	Cheilostomata	Beaniidae	*Beania*	*discodermiae*	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
Gymnolaemata	Cheilostomata	Beaniidae	*Beania*	*magellanica*	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
Gymnolaemata	Cheilostomata	Beaniidae	*Beania*	*quadricornuta*	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
Gymnolaemata	Cheilostomata	Bugulidae	*Bugula*	*flabellata*	A	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	0
Gymnolaemata	Cheilostomata	Candidae	*Caberea*	*rostrata*	N	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	0	0
Gymnolaemata	Cheilostomata	Candidae	*Caberea*	*zelandica*	N	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0
Gymnolaemata	Cheilostomata	Candidae	*Caberea*	*n.sp. (cf. guntheri)*	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	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
Gymnolaemata	Cheilostomata	Celleporidae	*Galeopsis*	*porcellanicus*	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	1	0	0
Gymnolaemata	Cheilostomata	Hippothoidae	*Celleporella*	*delta*	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
Gymnolaemata	Cheilostomata	Schizoporellidae	*Chiastosella*	*watersi*	N	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	1	0
Gymnolaemata	Cheilostomata	Scrupariidae	*Scruparia*	*ambigua*	C1	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
Gymnolaemata	Cheilostomata	Watersiporidae	*Watersipora*	*subtorquata*	A	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	0
Hydrozoa	Hydroida	Campanulariidae	*Clytia*	*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
Hydrozoa	Hydroida	Haleciidae	*Halecium*	*corrrugatissimum*	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
Hydrozoa	Hydroida	Plumulariidae	*Monotheca*	*flexuosa*	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
Hydrozoa	Hydroida	Plumulariidae	*Plumularia*	*brachiata*	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
Hydrozoa	Hydroida	Plumulariidae	*Plumularia*	*setacea*	C1	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
Hydrozoa	Hydroida	Plumulariidae	*Plumularia*	*setaceoides*	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
Hydrozoa	Hydroida	Plumulariidae	*Plumularia*	*spirocladia*	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
Hydrozoa	Hydroida	Sertulariidae	*Sertularella*	*robusta*	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
Hydrozoa	Hydroida	Sertulariidae	*Amphisbetia*	*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
Hydrozoa	Hydroida	Sertulariidae	*Salacia*	*bicalycula*	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
Hydrozoa	Hydroida	Sertulariidae	*Symplectoscyphus*	*indivisus*	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
Malacostraca	Amphipoda	Amaryllidae	*Amaryllis*	*macrophthalma*	N	0	0	0	0	1	0	0	0	0	1	0	1	1	1	0	0	0	1	0	0	0	0	0	1	0	0	0
Malacostraca	Amphipoda	Aoridae	*Haplocheira*	*barbimana*	N	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	1	1	0	0	1	0	0	0	0	0	0
Malacostraca	Amphipoda	Aoridae	*Aoridae*	*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
Malacostraca	Amphipoda	Aoridae	*Aora*	*maculata*	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
Malacostraca	Amphipoda	Dexaminidae	*Paradexamine*	*pacifica*	N	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0
Malacostraca	Amphipoda	Hyalidae	*Hyale*	*rubra*	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
Malacostraca	Amphipoda	Leucothoidae	*Leucothoe*	*traillii*	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
Malacostraca	Amphipoda	Liljeborgiidae	*Liljeborgia*	*akaroica*	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
Malacostraca	Amphipoda	Liljeborgiidae	*Liljeborgia*	*hansoni*	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
Malacostraca	Amphipoda	Lysianassidae	*Parawaldeckia*	*stephenseni*	N	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	1	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			3A																7								
					Pile replicate			1								2								1								2
					Pile position			IN				OUT				IN				OUT				IN				OUT				IN
Class	Orders	Family	Genus	Species	*Status	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	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	0
Malacostraca	Amphipoda	Lysianassidae	*Conicistomatid*	*n. gen. et sp.*	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
Malacostraca	Amphipoda	Lysianassidae	*Parawaldeckia*	*sp. 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
Malacostraca	Amphipoda	Lysianassidae	*Parawaldeckia*	*sp. D*	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	0
Malacostraca	Amphipoda	Melitidae	*Mallacoota*	*subcarinata*	N	0	0	0	0	1	0	0	0	1	1	0	1	0	1	0	0	0	1	0	0	0	0	0	1	1	0	0
Malacostraca	Amphipoda	Melitidae	*Ceradocopsis*	*carnleyi*	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
Malacostraca	Isopoda	Cirolanidae	*Natatolana*	*rossi*	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
Malacostraca	Isopoda	Sphaeromatidae	*Cilicaea*	*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	0	0
Phaeophyceae	Desmarestiales	Desmarestiaceae	*Desmarestia*	*ligulata*	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
Phaeophyceae	Dictyotales	Dictyotaceae	*Glossophora*	*kunthii*	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
Phaeophyceae	Ectocarpales	Ectocarpaceae	*Ectocarpoid*	*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
Phaeophyceae	Ectocarpales	incertae sedis	*Adenocystis*	*utricularis*	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	0	0
Phaeophyceae	Ectocarpales	Myrionemataceae	*Myrionema*	*strangulans*	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
Phaeophyceae	Ectocarpales	Scytosiphonaceae	*Scytosiphon*	*lomentaria*	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
Phaeophyceae	Sphacelariales	Cladostephaceae	*Cladostephus*	*spongiosus*	N	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	0	0
Phaeophyceae			*Phaeophyceae*	*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
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
Polychaeta	Eunicida	Eunicidae	*Eunice*	*Eunice-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
Polychaeta	Eunicida	Lumbrineridae	*Lumbrineris*	*sphaerocephala*	N	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0
Polychaeta	Phyllodocida	Glyceridae	*Glycera*	*benhami*	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
Polychaeta	Phyllodocida	Hesionidae	*Ophiodromus*	*angustifrons*	N	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0
Polychaeta	Phyllodocida	Nereididae	*Platynereis*	*Platynereis_australis_group*	SI	1	0	0	1	1	0	1	1	1	0	0	1	0	1	0	0	0	0	0	1	1	0	0	1	0	0	0
Polychaeta	Phyllodocida	Nereididae	*Nereis*	*falcaria*	N	0	0	0	0	0	1	0	0	1	1	0	1	0	0	0	1	1	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	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	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	Phyllodocida	Nereididae	*Perinereis*	*pseudocamiguina*	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
Polychaeta	Phyllodocida	Phyllodocidae	*Pirakia*	*Pirakia-A*	N	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	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	1	0	0	0	0	0	0	0	0	0	0
Polychaeta	Phyllodocida	Polynoidae	*Lepidonotus*	*Lepidonotus-B*	SI	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Phyllodocida	Polynoidae	*Lepidonotus*	*polychromus*	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
Polychaeta	Phyllodocida	Polynoidae	*Lepidonotus*	*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	1	0	0	0
Polychaeta	Phyllodocida	Polynoidae	*Lepidonotus*	*jacksoni*	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
Polychaeta	Phyllodocida	Syllidae	*Eusyllis*	*Eusyllis-A*	SI	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Polychaeta	Phyllodocida	Syllidae	*Eusyllin-unknown*	*Eusyllin-unknown-B*	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
Polychaeta	Phyllodocida	Syllidae	*Eusyllin-unknown*	*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	1	0	0
Polychaeta	Phyllodocida	Syllidae	*Typosyllis*	*Typosyllis-A*	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	0	0
Polychaeta	Sabellida	Sabellidae	*Megalomma*	*suspiciens*	N	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0
Polychaeta	Sabellida	Sabellidae	*Branchiomma*	*curta*	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
Polychaeta	Sabellida	Serpulidae	*Galeolaria*	*hystrix*	N	1	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	1	0
Polychaeta	Sabellida	Serpulidae	*Neovermilia*	*sphaeropomatus*	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
Polychaeta	Sabellida	Serpulidae	*Romanchella*	*perrieri*	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
Polychaeta	Sabellida	Serpulidae	*Serpula*	*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
Polychaeta	Sabellida	Serpulidae	*Serpula*	*Serpula-D*	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
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	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
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	0
Polychaeta	Terebellida	Terebellidae	*Lanassa*	*Lanassa-A*	SI	0	0	0	0	1	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	*Nicolea*	*armilla*	N	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
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	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
Polyplacophora	Acanthochitonina	Acanthochitonidae	*Cryptoconchus*	*porosus*	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
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
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	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	1

*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			3A																7									
				Pile replicate			1								2								1								2
				Pile position			IN				OUT				IN				OUT				IN				OUT				IN
Class	Orders	Family	Genus	Species	*Status	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1
Rhodophyceae	Bangiales	Bangiaceae	*Bangia*	*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	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
Rhodophyceae	Ceramiales	Ceramiaceae	*Mediothamnion*	*lyallii*	N	0	0	0	0	1	0	0	1	0	0	0	1	1	0	1	1	0	1	0	1	1	0	0	0	1	1	1
Rhodophyceae	Ceramiales	Ceramiaceae	*Ceramium*	*sp.*	SI	1	0	0	0	0	0	1	1	0	0	1	0	0	0	0	0	0	1	0	0	0	1	0	1	1	0	0
Rhodophyceae	Ceramiales	Ceramiaceae	*Anotrichium*	*crinitum*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	1	0	0	0	0	0	0
Rhodophyceae	Ceramiales	Ceramiaceae	*Griffithsia*	*antarctica*	N	0	0	0	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0
Rhodophyceae	Ceramiales	Ceramiaceae	*Ceramium*	*flaccidum*	N	1	0	0	0	0	0	0	0	1	1	0	0	0	0	1	1	0	1	0	0	0	0	0	0	0	0	0
Rhodophyceae	Ceramiales	Ceramiaceae	*Griffithsia*	*crassiuscula*	A	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Rhodophyceae	Ceramiales	Ceramiaceae	*Ceramium*	*vestitum*	N	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1	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	1	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	1	0	0	0	0
Rhodophyceae	Ceramiales	Ceramiaceae	*Ceramium*	*rubrum*	N	0	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
Rhodophyceae	Ceramiales	Ceramiaceae	*Dasyptilon*	*pellucidum*	N	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
Rhodophyceae	Ceramiales	Ceramiaceae	*Lophothamnion*	*hirtum*	N	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	0	0
Rhodophyceae	Ceramiales	Ceramiaceae	*Perithamnion*	*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	1	0	0
Rhodophyceae	Ceramiales	Ceramiaceae	*Acrothamnion*	*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	0
Rhodophyceae	Ceramiales	Ceramiaceae	*Antithamnion*	*applicitum*	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
Rhodophyceae	Ceramiales	Ceramiaceae	*Antithamnion*	*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	1	0	0
Rhodophyceae	Ceramiales	Ceramiaceae	*Callithamnion*	*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
Rhodophyceae	Ceramiales	Ceramiaceae	*Ceramiaceae*	*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	0	0
Rhodophyceae	Ceramiales	Dasyaceae	*Heterosiphonia*	*concinna*	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	0
Rhodophyceae	Ceramiales	Dasyaceae	*Dasya*	*collabens*	N	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Rhodophyceae	Ceramiales	Dasyaceae	*Dasyaceae*	*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
Rhodophyceae	Ceramiales	Dasyaceae	*Heterosiphonia*	*squarrosa*	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
Rhodophyceae	Ceramiales	Deleseriaceae	*Phycodrys*	*quercifolia*	N	1	0	0	0	0	0	0	1	1	1	0	1	1	1	0	0	0	1	0	0	1	1	0	1	1	0	0
Rhodophyceae	Ceramiales	Deleseriaceae	*Schizoseris*	*sp*	SI	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	1	0	0
Rhodophyceae	Ceramiales	Deleseriaceae	*Schizoseris*	*dichotoma*	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
Rhodophyceae	Ceramiales	Deleseriaceae	*Hymenena*	*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	0	0
Rhodophyceae	Ceramiales	Deleseriaceae	*Myriogramme*	*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	0	0
Rhodophyceae	Ceramiales	Deleseriaceae	*Hymenena*	*curdieana ?*	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	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
Rhodophyceae	Ceramiales	Deleseriaceae	*Laingia*	*hookeri*	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
Rhodophyceae	Ceramiales	Deleseriaceae	*Schizoseris*	*griffithsia*	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
Rhodophyceae	Ceramiales	Delesseriaceae	*Delesserian*	*sp. A*	SI	0	0	0	0	0	0	1	0	0	0	0	1	0	0	1	0	0	0	0	0	1	0	0	1	1	0	0
Rhodophyceae	Ceramiales	Delesseriaceae	*Delesseriaceae*	*sp.*	SI	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	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
Rhodophyceae	Ceramiales	Delesseriaceae	*Apoglossum*	*oppositifolium*	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
Rhodophyceae	Ceramiales	Delesseriaceae	*Delesserian*	*sp. B*	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	0	0
Rhodophyceae	Ceramiales	Delesseriaceae	*Delesserian*	*sp. C*	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	0	0
Rhodophyceae	Ceramiales	Delesseriaceae	*Delesserian*	*epiphytes*	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
Rhodophyceae	Ceramiales	Rhodomelaceae	*Polysiphonia*	*sp.*	SI	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0
Rhodophyceae	Ceramiales	Rhodomelaceae	*Bostrychia*	*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
Rhodophyceae	Ceramiales	Rhodomelaceae	*Polysiphonia*	*abscissoides*	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
Rhodophyceae	Ceramiales	Rhodomelaceae	*Adamsiella*	*chauvinii*	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
Rhodophyceae	Ceramiales	Rhodomelaceae	*Brongniartella*	*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
Rhodophyceae	Ceramiales	Rhodomelaceae	*Echinothamnion*	*hystrix*	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
Rhodophyceae	Ceramiales	Rhodomelaceae	*Echinothamnion*	*lyallii*	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
Rhodophyceae	Ceramiales	Rhodomelaceae	*Echinothamnion*	*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
Rhodophyceae	Ceramiales	Rhodomelaceae	*Polysiphonia*	*brodiaei*	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
Rhodophyceae	Ceramiales	Rhodomelaceae	*Pterosiphonia ?*	*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
Rhodophyceae	Gigartinales	Cystocloniaceae	*Rhodophyllis*	*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
Rhodophyceae	Gigartinales	Cystocloniaceae	*Rhodophyllis*	*centrocarpa*	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	0	0
Rhodophyceae	Gigartinales	Cystocloniaceae	*Rhodophyllis*	*lacerata?*	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	0	0
Rhodophyceae	Gigartinales	Gigartinaceae	*Sarcothalia*	*livida*	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	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			3A																		7							
					Pile replicate			1								2								1								2
					Pile position			IN				OUT				IN				OUT				IN				OUT				IN
Class	Orders	Family	Genus	Species	*Status	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1
Rhodophyceae	Gigartinales	Gigartinaceae	*Gigartina*	*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
Rhodophyceae	Gigartinales	Kallymeniaceae	*Callophyllis*	*variegata*	N	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
Rhodophyceae	Gigartinales	Kallymeniaceae	*Callophyllis*	*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
Rhodophyceae	Gigartinales	Nemastomaceae	*Nemastoma?*	*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
Rhodophyceae	Plocamiales	Plocamiaceae	*Plocamium*	*cartilagineum*	N	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	0
Rhodophyceae	Plocamiales	Plocamiaceae	*Plocamium*	*sp.*	SI	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	1	1	1	0	0	1	0
Rhodophyceae	Plocamiales	Plocamiaceae	*Plocamium*	*cirrhosum*	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
Rhodophyceae	Plocamiales	Plocamiaceae	*Plocamium*	*microcladioides*	N	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0
Rhodophyceae	Plocamiales	Plocamiaceae	*Plocamium*	*leptophyllum*	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
Rhodophyceae	Plocamiales	Plocamiaceae	*Plocamium*	*angustum*	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
Rhodophyceae	Rhodymeniales	Lomentariaceae	*Lomentaria*	*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
Rhodophyceae	Rhodymeniales	Rhodymeniaceae	*Rhodymenia*	*sp.*	SI	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0	1
Rhodophyceae	Rhodymeniales	Rhodymeniaceae	*Rhodymenia*	*obtusa*	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
Rhodophyceae			*Rhodophyceae*	*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	0
Ulvophyceae	Ulvales	Ulvaceae	*Enteromorpha*	*sp.*	SI	0	0	0	0	0	0	0	1	0	0	1	0	0	0	1	0	0	0	1	0	1	0	1	0	0	0	1
Ulvophyceae	Ulvales	Ulvaceae	*Ulva*	*sp.*	SI	1	0	0	0	0	0	0	0	0	0	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1	1
Ulvophyceae	Ulvales	Ulvaceae	*Ulva*	*spathulata*	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

*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							TY															
					Pile replicate							1								2							
					Pile position			OUT				IN				OUT				IN				OUT			
Class	Orders	Family	Genus	Species	*Status	2	3	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Actinopterygii	Perciformes	Plesiopidae	*Acanthoclinus*	*littoreus*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0
Actinopterygii	Perciformes	Plesiopidae	*Acanthoclinus*	*fuscus*	N	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	*Forsterygion*	*varium*	N	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	*Grahamina*	*capito*	N	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	*Grahamina*	*sp.*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Alismatidae	Najadales	Zosteraceae	*Zostera*	*sp.*	SI	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	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Ascidiacea	Aplousobranchia	Didemnidae	*Lissoclinum*	*notti*	N	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	0
Ascidiacea	Aplousobranchia	Didemnidae	*Didemnum*	*incanum*	C1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ascidiacea	Aplousobranchia	Holozoidae	*Hypsistozoa*	*fasmeriana*	N	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	1	1	0	0	0	1
Ascidiacea	Aplousobranchia	Polyclinidae	*Aplidium*	*adamsi*	N	0	0	0	0	0	1	0	1	0	0	0	1	0	1	0	0	0	0	0	1	0	0
Ascidiacea	Aplousobranchia	Polyclinidae	*Aplidium*	*phortax*	C1	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Ascidiacea	Aplousobranchia	Polyclinidae	*Aplidium*	*benhami*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Ascidiacea	Aplousobranchia	Polyclinidae	*Polyclinum*	*sluteri*	N	0	0	0	0	1	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	1	0	0	0	0	0	0	1	1	0	1	0	1	0	0	1	1
Ascidiacea	Stolidobranchia	Botryllinae	*Botrylliodes*	*leachii*	C1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Ascidiacea	Stolidobranchia	Molgulidae	*Molgula*	*mortenseni*	N	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ascidiacea	Stolidobranchia	Pyuridae	*Pyura*	*cancellata*	N	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
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
Ascidiacea	Stolidobranchia	Pyuridae	*Pyura*	*lutea*	N	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*	*carnea*	N	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	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*	*subuculata*	N	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*	*cerea*	C1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Ascidiacea	Stolidobranchia	Styelidae	*Cnemidocarpa*	*nisiotus*	N	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*	*bicornuta*	N	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*	*regalis*	N	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*	*mortenseni*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Asteroidea	Valvatida	Goniasteridae	*Pentagonaster*	*pulchellus*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	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	0	0	0	1	0	0	0	0	0
Bivalvia	Mytiloida	Mytilidae	*Aulacomya*	*maoriana*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bivalvia	Mytiloida	Mytilidae	*Mytilus*	*galloprovincialis*	C1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bivalvia	Ostreoida	Ostreidae	*Ostrea*	*chilensis*	N	0	0	0	0	0	0	0	1	1	1	0	1	0	0	0	1	1	0	0	1	1	0
Bivalvia	Pterioida	Pectinidae	*Talochlamys*	*zelandiae*	N	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Bryopsidophyceae	Bryopsidales	Bryopsidaceae	*Bryopsis*	*sp.*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bryopsidophyceae	Bryopsidales	Bryopsidaceae	*Bryposis*	*vestita*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Bryopsidophyceae	Halimediales	Caulerpaceae	*Caulerpa*	*brownii*	N	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0
Calcarea	Leucosolenida	Heteropiidae	*Grantessa*	*intusarticulata*	A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Calcarea	Leucosolenida	Leucosoleniidae	*Leucosolenia*	*cf. discoveryi*	A	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Calcarea	Leucosolenida	Sycettidae	*Sycon*	*cf. ornatum*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cladophorophyceae	Cladophorales	Cladophoraceae	*Cladophora*	*sp.*	SI	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Crustacea	Anomura	Porcellanidae	*Petrocheles*	*spinosus*	N	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Crustacea	Brachyura	Cancridae	*Cancer*	*amphioetus*	A	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Crustacea	Brachyura	Cancridae	*Cancer*	*novaezelandiae*	N	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	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*	*tongi*	N	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	1	0	0	0	0	0	0	0	1	1	0	1	0	0	0	0	0	1
Crustacea	Brachyura	Majidae	*Notomithrax*	*minor*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Crustacea	Caridea	Crangonidae	*Nauticaris*	*marionis*	N	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*	*multicolorata*	N	0	1	0	0	1	0	0	0	0	0	0	1	1	0	0	0	1	0	0	0	0	0
Crustacea	Caridea	Hippolytidae	*Hippolyte*	*sp?*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Crustacea	Caridea	Palemonidae	*Periclimenes*	*yaldwyni*	N	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	1	0	0	0	1	1	0	0	1	1	0	0	1	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	Berth code																						
					Pile replicate							TY															
					Pile position							1								2							
								OUT				IN				OUT				IN				OUT			
					*Status	2	3	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Crustacea	Thoracica	Balanidae	*Notomegabalanus*	*decorus*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Crustacea	Thoracica	Chthamalidae	*Chaemosipho*	*columna*	N	0	0	0	0	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1	0	0
Crustacea	Thoracica	Pachylasmidae	*Epopella*	*plicata*	N	0	0	0	0	0	0	0	1	0	0	1	1	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
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
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
Demospongiae	Halichondrida	Dictyonellidae	*Stylotella*	*agminata*	A	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Demospongiae	Halichondrida	Halichondriidae	*Vosmaeria*	*torquata*	N	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. 8 (fingery turrets)*	C2	0	0	0	0	0	0	0	0	0	0	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	0	0	1	0	0	1	1	0	0	0	1	0	0	0	1
Demospongiae	Haplosclerida	Callyspongiidae	*Callyspongia*	*stellata*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0
Demospongiae	Haplosclerida	Callyspongiidae	*Siphonochalina*	*n. sp. 1 (Bluff small chimney)*	C2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Demospongiae	Haplosclerida	Callyspongiidae	*Callyspongia*	*cf. bathami*	N	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Demospongiae	Haplosclerida	Chalinidae	*Adocia*	*n. sp. 5 (Bluff encrustor)*	C2	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0
Demospongiae	Poecilosclerida	Chondropsidae	*Chondropsis*	*topsentii*	A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1
Demospongiae	Poecilosclerida	Chondropsidae	*Psammoclema*	*cf. crassum*	A	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)*	*hentscheli*	N	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	0	0	0	0	0	0	0	0
Gastropoda	Basommatophora	Siphonariidae	*Siphonaria*	*australis*	N	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Gastropoda	Littorinimorpha	Calyptraeidae	*Sigapatella*	*novaezelandiae*	N	0	0	0	0	0	0	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1
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
Gymnolaemata	Cheilostomata	Beaniidae	*Beania*	*magellanica*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0
Gymnolaemata	Cheilostomata	Beaniidae	*Beania*	*quadricornuta*	N	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	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	1	0	1	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	1
Gymnolaemata	Cheilostomata	Candidae	*Caberea*	*zelandica*	N	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*	*n.sp. (cf. guntheri)*	N	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
Gymnolaemata	Cheilostomata	Celleporidae	*Galeopsis*	*porcellanicus*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Gymnolaemata	Cheilostomata	Hippothoidae	*Celleporella*	*delta*	N	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gymnolaemata	Cheilostomata	Schizoporellidae	*Chiastosella*	*watersi*	N	0	0	0	0	0	1	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
Gymnolaemata	Cheilostomata	Watersiporidae	*Watersipora*	*subtorquata*	A	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	*Clytia*	*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
Hydrozoa	Hydroida	Haleciidae	*Halecium*	*corrrugatissimum*	N	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hydrozoa	Hydroida	Plumulariidae	*Monotheca*	*flexuosa*	N	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hydrozoa	Hydroida	Plumulariidae	*Plumularia*	*brachiata*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hydrozoa	Hydroida	Plumulariidae	*Plumularia*	*setacea*	C1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hydrozoa	Hydroida	Plumulariidae	*Plumularia*	*setaceoides*	N	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hydrozoa	Hydroida	Plumulariidae	*Plumularia*	*spirocladia*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Hydrozoa	Hydroida	Sertulariidae	*Sertularella*	*robusta*	N	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hydrozoa	Hydroida	Sertulariidae	*Amphisbetia*	*minima*	N	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hydrozoa	Hydroida	Sertulariidae	*Salacia*	*bicalycula*	N	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	*Symplectoscyphus*	*indivisus*	A	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Malacostraca	Amphipoda	Amaryllidae	*Amaryllis*	*macrophthalma*	N	0	0	0	0	1	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	0	1	0	0	0	0	0	0	0	0
Malacostraca	Amphipoda	Aoridae	*Aoridae*	*sp.*	SI	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Malacostraca	Amphipoda	Aoridae	*Aora*	*maculata*	N	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	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Malacostraca	Amphipoda	Hyalidae	*Hyale*	*rubra*	N	0	0	0	0	1	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	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Malacostraca	Amphipoda	Liljeborgiidae	*Liljeborgia*	*akaroica*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Malacostraca	Amphipoda	Liljeborgiidae	*Liljeborgia*	*hansoni*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Malacostraca	Amphipoda	Lysianassidae	*Parawaldeckia*	*stephenseni*	N	0	0	0	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), 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	Berth code							TY															
					Pile replicate							1								2							
					Pile position			OUT				IN				OUT				IN				OUT			
Class	Orders	Family	Genus	Species	*Status	2	3	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Malacostraca	Amphipoda	Lysianassidae	*Parawaldeckia*	*vesca*	N	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Malacostraca	Amphipoda	Lysianassidae	*Conicistomatid*	*n. gen. et sp.*	C2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Malacostraca	Amphipoda	Lysianassidae	*Parawaldeckia*	*sp. C*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Malacostraca	Amphipoda	Lysianassidae	*Parawaldeckia*	*sp. D*	SI	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	*Mallacoota*	*subcarinata*	N	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Malacostraca	Amphipoda	Melitidae	*Ceradocopsis*	*carnleyi*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Malacostraca	Isopoda	Cirolanidae	*Natatolana*	*rossi*	N	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Malacostraca	Isopoda	Sphaeromatidae	*Cilicaea*	*sp.*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phaeophyceae	Desmarestiales	Desmarestiaceae	*Desmarestia*	*ligulata*	N	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	1	0	0	0	0	0
Phaeophyceae	Dictyotales	Dictyotaceae	*Glossophora*	*kunthii*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Phaeophyceae	Ectocarpales	Ectocarpaceae	*Ectocarpoid*	*sp.*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phaeophyceae	Ectocarpales	incertae sedis	*Adenocystis*	*utricularis*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phaeophyceae	Ectocarpales	Myrionemataceae	*Myrionema*	*strangulans*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phaeophyceae	Ectocarpales	Scytosiphonaceae	*Scytosiphon*	*lomentaria*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phaeophyceae	Sphacelariales	Cladostephaceae	*Cladostephus*	*spongiosus*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phaeophyceae			*Phaeophyceae*	*sp.*	SI	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	1	1	0	0	0	0	0	0	1	0
Polychaeta	Eunicida	Eunicidae	*Eunice*	*Eunice-A*	SI	0	0	0	0	0	1	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	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Phyllodocida	Glyceridae	*Glycera*	*benhami*	N	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	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
Polychaeta	Phyllodocida	Nereididae	*Platynereis*	*Platynereis_australis_group*	SI	1	0	0	0	1	0	0	1	0	1	0	0	1	1	0	0	1	0	0	1	1	1
Polychaeta	Phyllodocida	Nereididae	*Nereis*	*falcaria*	N	0	1	0	0	0	1	0	1	0	0	0	0	0	0	0	1	1	1	0	1	0	1
Polychaeta	Phyllodocida	Nereididae	*Neanthes*	*Neanthes-A*	SI	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Polychaeta	Phyllodocida	Nereididae	*Perinereis*	*camiguinoides*	N	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Phyllodocida	Nereididae	*Perinereis*	*pseudocamiguina*	N	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	*Pirakia*	*Pirakia-A*	N	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	*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	0
Polychaeta	Phyllodocida	Polynoidae	*Lepidonotus*	*Lepidonotus-B*	SI	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Phyllodocida	Polynoidae	*Lepidonotus*	*polychromus*	N	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Polychaeta	Phyllodocida	Polynoidae	*Lepidonotus*	*Indet*	SI	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*	*jacksoni*	N	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
Polychaeta	Phyllodocida	Syllidae	*Eusyllin-unknown*	*Eusyllin-unknown-B*	SI	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*	*Indet*	SI	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	*Typosyllis*	*Typosyllis-A*	SI	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	1	0	0	0	0	0	0	0	0	0	0	1	0
Polychaeta	Sabellida	Sabellidae	*Branchiomma*	*curta*	N	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	0	0	0	0	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	0
Polychaeta	Sabellida	Serpulidae	*Neovermilia*	*sphaeropomatus*	N	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	*Romanchella*	*perrieri*	N	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	*Serpula*	*Indet*	SI	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	*Serpula*	*Serpula-D*	SI	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
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
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
Polychaeta	Terebellida	Terebellidae	*Lanassa*	*Lanassa-A*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Polychaeta	Terebellida	Terebellidae	*Nicolea*	*armilla*	N	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	*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
Polyplacophora	Acanthochitonina	Acanthochitonidae	*Acanthochitona*	*zelandica*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Polyplacophora	Acanthochitonina	Acanthochitonidae	*Cryptoconchus*	*porosus*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	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	1	0	0
Polyplacophora	Ischnochitonina	Mopaliidae	*Plaxiphora*	*caelata*	N	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodophyceae	Acrochaetiales	Acrochaetiaceae	*Audouinella*	*sp.*	SI	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		TY																					
				Pile replicate				1												2							
				Pile position				OUT				IN				OUT				IN				OUT			
Class	Orders	Family	Genus	Species	*Status	2	3	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Rhodophyceae	Bangiales	Bangiaceae	*Bangia*	*sp.*	SI	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
Rhodophyceae	Ceramiales	Ceramiaceae	*Mediothamnion*	*lyallii*	N	1	1	1	0	0	1	0	0	0	1	0	0	0	1	0	0	0	0	0	1	0	0
Rhodophyceae	Ceramiales	Ceramiaceae	*Ceramium*	*sp.*	SI	1	0	0	0	1	0	0	0	1	0	0	0	0	0	0	1	1	0	0	1	0	0
Rhodophyceae	Ceramiales	Ceramiaceae	*Anotrichium*	*crinitum*	N	0	0	1	0	0	0	0	0	1	0	0	0	0	1	0	1	1	0	0	1	0	1
Rhodophyceae	Ceramiales	Ceramiaceae	*Griffithsia*	*antarctica*	N	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
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
Rhodophyceae	Ceramiales	Ceramiaceae	*Griffithsia*	*crassiuscula*	A	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodophyceae	Ceramiales	Ceramiaceae	*Ceramium*	*vestitum*	N	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*	*sp.*	SI	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Rhodophyceae	Ceramiales	Ceramiaceae	*Antithamnionella*	*adnata*	N	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	*Ceramium*	*rubrum*	N	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	*Dasyptilon*	*pellucidum*	N	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	*Lophothamnion*	*hirtum*	N	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	*Perithamnion*	*sp.*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Rhodophyceae	Ceramiales	Ceramiaceae	*Acrothamnion*	*sp.*	SI	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	*Antithamnion*	*applicitum*	N	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	*Antithamnion*	*sp.*	SI	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*	*sp.*	SI	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	*Ceramiaceae*	*indet*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodophyceae	Ceramiales	Dasyaceae	*Heterosiphonia*	*concinna*	N	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	1	0	0	1	0	0
Rhodophyceae	Ceramiales	Dasyaceae	*Dasya*	*collabens*	N	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Rhodophyceae	Ceramiales	Dasyaceae	*Dasyaceae*	*indet*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Rhodophyceae	Ceramiales	Dasyaceae	*Heterosiphonia*	*squarrosa*	N	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodophyceae	Ceramiales	Deleseriaceae	*Phycodrys*	*quercifolia*	N	0	1	0	1	1	1	0	0	1	1	0	0	1	0	0	0	1	0	0	1	0	1
Rhodophyceae	Ceramiales	Deleseriaceae	*Schizoseris*	*sp*	SI	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	*Schizoseris*	*dichotoma*	N	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodophyceae	Ceramiales	Deleseriaceae	*Hymenena*	*sp.*	SI	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
Rhodophyceae	Ceramiales	Deleseriaceae	*Hymenena*	*curdieana ?*	SI	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	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodophyceae	Ceramiales	Deleseriaceae	*Laingia*	*hookeri*	N	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	*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
Rhodophyceae	Ceramiales	Delesseriaceae	*Delesserian*	*sp. A*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Rhodophyceae	Ceramiales	Delesseriaceae	*Delesseriaceae*	*sp.*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Rhodophyceae	Ceramiales	Delesseriaceae	*Erythroglossum*	*undulatissimum*	N	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Rhodophyceae	Ceramiales	Delesseriaceae	*Apoglossum*	*oppositifolium*	N	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	*Delesserian*	*sp. B*	SI	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	*Delesserian*	*sp. C*	SI	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	*Delesserian*	*epiphytes*	N	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodophyceae	Ceramiales	Rhodomelaceae	*Polysiphonia*	*sp.*	SI	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0
Rhodophyceae	Ceramiales	Rhodomelaceae	*Bostrychia*	*sp.*	SI	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*	*abscissoides*	N	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	*Adamsiella*	*chauvinii*	N	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	*Brongniartella*	*australis*	N	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Rhodophyceae	Ceramiales	Rhodomelaceae	*Echinothamnion*	*hystrix*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Rhodophyceae	Ceramiales	Rhodomelaceae	*Echinothamnion*	*lyallii*	N	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	*Echinothamnion*	*sp.*	SI	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodophyceae	Ceramiales	Rhodomelaceae	*Polysiphonia*	*brodiaei*	A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Rhodophyceae	Ceramiales	Rhodomelaceae	*Pterosiphonia ?*	*sp.*	SI	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*	*sp.*	SI	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	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodophyceae	Gigartinales	Cystocloniaceae	*Rhodophyllis*	*lacerata?*	SI	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	*Sarcothalia*	*livida*	N	1	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							TY															
					Pile replicate							1								2							
					Pile position			OUT				IN				OUT				IN				OUT			
Class	Orders	Family	Genus	Species	*Status	2	3	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Rhodophyceae	Gigartinales	Gigartinaceae	*Gigartina*	*sp.*	SI	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
Rhodophyceae	Gigartinales	Kallymeniaceae	*Callophyllis*	*sp.*	SI	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodophyceae	Gigartinales	Nemastomaceae	*Nemastoma?*	*sp.*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Rhodophyceae	Plocamiales	Plocamiaceae	*Plocamium*	*cartilagineum*	N	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodophyceae	Plocamiales	Plocamiaceae	*Plocamium*	*sp.*	SI	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodophyceae	Plocamiales	Plocamiaceae	*Plocamium*	*cirrhosum*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Rhodophyceae	Plocamiales	Plocamiaceae	*Plocamium*	*microcladioides*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodophyceae	Plocamiales	Plocamiaceae	*Plocamium*	*leptophyllum*	N	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Rhodophyceae	Plocamiales	Plocamiaceae	*Plocamium*	*angustum*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Rhodophyceae	Rhodymeniales	Lomentariaceae	*Lomentaria*	*sp.*	SI	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodophyceae	Rhodymeniales	Rhodymeniaceae	*Rhodymenia*	*sp.*	SI	1	1	1	1	1	0	0	0	0	1	0	0	0	1	0	0	0	0	0	1	0	0
Rhodophyceae	Rhodymeniales	Rhodymeniaceae	*Rhodymenia*	*obtusa*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodophyceae			*Rhodophyceae*	*sp.*	SI	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	*Enteromorpha*	*sp.*	SI	0	1	1	1	1	0	0	0	0	0	1	0	0	0	0	1	0	0	0	1	0	0
Ulvophyceae	Ulvales	Ulvaceae	*Ulva*	*sp.*	SI	1	0	0	1	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	1	0	0
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

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

Appendic 5b. Results from the benthic grab samples.

Class	Order	Family	Genus	Species	Berth code	11			14			3			3A			7			BW			TY		
					*Status	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
Bivalvia	Veneroida	Veneridae	*Austrovenus*	*stutchburyi*	N	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bivalvia	Veneroida	Veneridae	*Tawera*	*spissa*	N	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Malacostraca	Amphipoda	Phoxocephalidae	*Torridoharpinia*	*hurleyi*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Polychaeta	Terebellida	Cirratulidae	*Cirratulidae*	*Indet*	SI	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Terebellida	Pectinariidae	*Pectinaria*	*australis*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Rhodophyceae	Ceramiales	Ceramiaceae	*Ceramium*	*flaccidum*	N	1	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	1	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	1	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 5c. Results from the benthic sled samples.

					Berth code	11	12	3			3A		4	5	6	7			8			OIL			TY	
Class	Order	Family	Genus	Species	*Status	1	1	1	2	3	1	2	1	1	1	1	2	3	1	2	3	1	2	3	1	2
Actinopterygii	Perciformes	Percophidae	*Hemerocoetes*	*artus*	N	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Actinopterygii	Perciformes	Tripterygiidae	*Tripterygiidae*	*sp.*	SI	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Actinopterygii	Perciformes	Trypterigiidae	*Grahamina*	*sp.*	N	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Actinopterygii	Perciformes	Trypterigiidae	*Grahamina*	*capito*	N	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Actinopterygii	Perciformes	Trypterigiidae	*Apopterygion*	*oculus*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Actinopterygii	Pleuronectiformes	Pleuronectidae	*Peltorhamphus*	*latus*	N	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0
Alismatidae	Najadales	Zosteraceae	*Zostera*	*sp.*	SI	1	1	1	0	1	1	1	0	1	0	0	0	0	0	0	0	0	1	0	1	1
Ascidiacea	Aplousobranchia	Didemnidae	*Didemnum*	*tuberatum*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Ascidiacea	Aplousobranchia	Holozoidae	*Hypsistozoa*	*fasmeriana*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
Ascidiacea	Aplousobranchia	Polyclinidae	*Aplidium*	*benhami*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	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	1
Bivalvia	Veneroida	Veneridae	*Tawera*	*spissa*	N	1	0	0	0	1	0	1	0	0	0	0	1	0	0	0	0	1	0	0	0	0
Bryopsidophyceae	Halimediales	Caulerpaceae	*Caulerpa*	*brownii*	N	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
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	1
Crustacea	Anomura	Paguridae	*Lophopagurus (A.)*	*cristatus*	N	1	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	1	0	0	0	0
Crustacea	Anomura	Paguridae	*Lophopagurus (A.)*	*cooki*	N	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
Crustacea	Anomura	Paguridae	*Diacanthurus*	*spinulimanus*	N	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Crustacea	Brachyura	Hymenosomatidae	*Halicarcinus*	*cookii*	N	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Crustacea	Brachyura	Hymenosomatidae	*Elamena*	*aff. producta*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Crustacea	Brachyura	Hymenosomatidae	*Elamena*	*momona*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Crustacea	Brachyura	Hymenosomatidae	*Elamena*	*sp. nov.*	N	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*	*peronii*	N	1	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	1	0	0	0	1	0	0	0	1	0	0	0	0	1	0	0	0	0
Crustacea	Brachyura	Portunidae	*Nectocarcinus*	*antarcticus*	N	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Crustacea	Caridea	Crangonidae	*Pontophilus*	*australis*	N	1	0	0	1	0	0	0	0	0	0	0	1	1	0	0	0	1	1	0	1	0
Crustacea	Caridea	Crangonidae	*Nauticaris*	*marionis*	N	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	1
Crustacea	Caridea	Crangonidae	*Pontophilus*	*hamiltoni*	N	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Crustacea	Caridea	Hippolytidae	*Hippolyte*	*sp?*	SI	0	1	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	1
Crustacea	Caridea	Palemonidae	*Periclimenes*	*yaldwyni*	N	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Demospongiae	Haplosclerida	Callyspongiidae	*Callyspongia*	*stellata*	N	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Demospongiae	Poecilosclerida	Chondropsidae	*Chondropsis*	*topsentii*	A	1	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	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gastropoda	Neogastropoda	Volutidae	*Alcithoe*	*arabica*	N	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gastropoda	Vetigastropoda	Fissurellidae	*Emarginula*	*striatula*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Gastropoda	Vetigastropoda	Trochidae	*Micrelenchus*	*huttonii*	N	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gastropoda	Vetigastropoda	Trochidae	*Micrelenchus*	*tenebrosus*	N	0	1	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	1	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	0
Gymnolaemata	Cheilostomata	Bugulidae	*Bugula*	*flabellata*	A	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gymnolaemata	Cheilostomata	Candidae	*Caberea*	*n.sp. (cf. guntheri)*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Gymnolaemata	Cheilostomata	Candidae	*Emma*	*rotunda*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Gymnolaemata	Cheilostomata	Catenicellidae	*Orthoscuticella*	*margaritacea*	N	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*	*delta*	N	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Gymnolaemata	Cheilostomata	Hippothoidae	*Celleporella*	*tongima*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Gymnolaemata	Cheilostomata	Microporidae	*Micropora*	*sp. (cf. inarmata)*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Gymnolaemata	Cheilostomata	Schizoporellidae	*Chiastosella*	*watersi*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Hydrozoa	Hydroida	Sertulariidae	*Amphisbetia*	*fasciculata*	N	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hydrozoa	Hydroida	Sertulariidae	*Amphisbetia*	*operculata*	C1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Hydrozoa	Hydroida	Sertulariidae	*Salacia*	*bicalycula*	N	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Malacostraca	Amphipoda	Ampeliscidae	*Ampelisca*	*sp. C*	SI	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Malacostraca	Amphipoda	Aoridae	*Aora*	*maculata*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Malacostraca	Amphipoda	Dexaminidae	*Paradexamine*	*pacifica*	N	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Malacostraca	Amphipoda	Eusiridae	*Prostebbingia?*	*levis*	SI	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Malacostraca	Amphipoda	Melitidae	*Mallacoota*	*subcarinata*	N	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Malacostraca	Amphipoda	Phoxocephalidae	*Torridoharpinia*	*hurleyi*	N	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Phaeophyceae	Desmarestiales	Desmarestiaceae	*Desmarestia*	*ligulata*	N	0	0	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, C! = cryptogenic category 1, C2 = cryptogenic category 2, SI = species indeterminata. See text for details.

Appendix 5c. Results from the benthic sled samples.

					Berth code	11	12	3			3A		4	5	6	7			8			OIL			TY	
Class	Order	Family	Genus	Species	*Status	1	1	1	2	3	1	2	1	1	1	1	2	3	1	2	3	1	2	3	1	2
Phaeophyceae	Fucales	Cystoseiraceae	*Landsburgia*	*quercifolia*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Phaeophyceae	Fucales	Sargassaceae	*Carpophyllum*	*flexuosum*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Phaeophyceae	Fucales	Sargassaceae	*Sargassum*	*sinclairii*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Polychaeta	Sabellida	Serpulidae	*Filograna*	*implexa*	N	1	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	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Spionida	Spionidae	*Prionospio*	*multicristata*	N	0	0	0	1	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	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodophyceae	Ceramiales	Ceramiaceae	*Ceramium*	*flaccidum*	N	1	1	1	1	0	1	1	0	0	1	1	0	0	1	0	0	1	1	0	1	1
Rhodophyceae	Ceramiales	Ceramiaceae	*Anotrichium*	*crinitum*	N	0	0	0	0	0	1	1	0	1	1	0	0	0	0	0	0	1	1	0	1	1
Rhodophyceae	Ceramiales	Ceramiaceae	*Ceramium*	*sp.*	SI	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	1	0	0	1	1
Rhodophyceae	Ceramiales	Ceramiaceae	*Griffithsia*	*sp.*	SI	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodophyceae	Ceramiales	Ceramiaceae	*Acrothamnion*	*sp.*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Rhodophyceae	Ceramiales	Ceramiaceae	*Antithamnion*	*sp.*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Rhodophyceae	Ceramiales	Ceramiaceae	*Callithamnion*	*sp.*	SI	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodophyceae	Ceramiales	Ceramiaceae	*Ceramium*	*apiculatum*	N	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodophyceae	Ceramiales	Ceramiaceae	*Ceramium*	*vestitum*	N	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*	*antarctica*	N	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodophyceae	Ceramiales	Ceramiaceae	*Mediothamnion*	*lyallii*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Rhodophyceae	Ceramiales	Dasyaceae	*Dasya*	*collabens*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Rhodophyceae	Ceramiales	Dasyaceae	*Dasyaceae*	*indet*	SI	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Rhodophyceae	Ceramiales	Dasyaceae	*Heterosiphonia*	*concinna*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Rhodophyceae	Ceramiales	Dasyaceae	*Heterosiphonia*	*tessellata*	N	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodophyceae	Ceramiales	Deleseriaceae	*Acrosorium*	*sp.*	SI	0	0	0	0	0	1	1	0	1	0	1	0	0	1	0	0	0	0	0	0	1
Rhodophyceae	Ceramiales	Deleseriaceae	*Hymenena*	*sp.*	SI	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	1	1	0	0	1
Rhodophyceae	Ceramiales	Deleseriaceae	*Acrosorium*	*venulosum*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Rhodophyceae	Ceramiales	Deleseriaceae	*Hymenena*	*palmata*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Rhodophyceae	Ceramiales	Deleseriaceae	*Laingia*	*hookeri*	N	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	1	0	0	0
Rhodophyceae	Ceramiales	Deleseriaceae	*Schizoseris*	*griffithsia*	N	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodophyceae	Ceramiales	Deleseriaceae	*Schizoseris*	*sp*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Rhodophyceae	Ceramiales	Delesseriaceae	*Erythroglossum*	*undulatissimum*	N	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
Rhodophyceae	Ceramiales	Rhodomelaceae	*Polysiphonia*	*sp.*	SI	1	1	1	1	0	1	1	0	0	0	1	0	0	1	0	0	1	1	0	1	0
Rhodophyceae	Ceramiales	Rhodomelaceae	*Brongniartella*	*australis*	N	0	1	1	0	0	0	1	0	0	1	0	0	1	1	0	0	1	1	0	1	1
Rhodophyceae	Ceramiales	Rhodomelaceae	*Adamsiella*	*chauvinii*	N	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Rhodophyceae	Ceramiales	Rhodomelaceae	*Echinothamnion*	*hystrix*	N	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Rhodophyceae	Ceramiales	Rhodomelaceae	*Echinothamnion*	*sp.*	SI	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodophyceae	Ceramiales	Rhodomelaceae	*Adamsiella*	*angustifolia*	N	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodophyceae	Ceramiales	Rhodomelaceae	*Aphanocladia*	*delicatula*	N	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodophyceae	Ceramiales	Rhodomelaceae	*Bostrychia*	*sp.*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Rhodophyceae	Ceramiales	Rhodomelaceae	*Chondria?*	*sp.*	SI	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodophyceae	Ceramiales	Rhodomelaceae	*Polysiphonia*	*decipiens*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Rhodophyceae	Corallinales		*Corallinales*	*sp. (non-geniculate)*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0
Rhodophyceae	Gigartinales	Cystocloniaceae	*Rhodophyllis*	*sp.*	SI	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	1	0	0	0
Rhodophyceae	Gigartinales	Cystocloniaceae	*Rhodophyllis*	*membranacea*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Rhodophyceae	Gigartinales	Phyllophoraceae	*Stenogramme*	*interrupta*	N	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodophyceae	Plocamiales	Plocamiaceae	*Plocamium*	*sp.*	SI	1	0	0	0	0	0	0	0	1	1	1	0	0	1	0	0	1	1	0	1	0
Rhodophyceae	Plocamiales	Plocamiaceae	*Plocamium*	*cartilagineum*	N	0	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Rhodophyceae	Plocamiales	Plocamiaceae	*Plocamium*	*angustum*	N	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Rhodophyceae	Plocamiales	Plocamiaceae	*Plocamium*	*cirrhosum*	N	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Rhodophyceae	Plocamiales	Plocamiaceae	*Plocamium*	*leptophyllum*	N	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Rhodophyceae	Plocamiales	Plocamiaceae	*Plocamium*	*microcladioides*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Rhodophyceae			*Rhodophyceae*	*sp.*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Ulvophyceae	Ulvales	Ulvaceae	*Ulva*	*sp.*	SI	0	0	1	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, C! = cryptogenic category 1, C2 = cryptogenic category 2, SI = species indeterminata. See text for details.

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

Class	Order	Family	Genus	Species	Berth code *Status	BASIN 1 - 2 INNER 1	 2	BASIN 1 - 2 OUTER 1	 2	BASIN 3 - 6 INNER 1	 2	BASIN 3 - 6 OUTER 1	 2	TIWAI INNER 1	 2
Dinophyceae	Gonyaulacales	Gonyaulaceae	*Alexandrium*	*cf.catenella*	C1	0	0	0	1	0	0	0	1	0	0
Dinophyceae	Gymnodiniales	Gymnodiniacea	*Cochlodinium*	*sp.*	N	0	0	0	1	1	0	0	1	1	0
Dinophyceae	Peridiniales	Peridiniaceae	*Protoperidinium*	*sp.*	N	0	0	0	1	1	0	1	0	1	0
Dinophyceae	Peridiniales	Peridiniaceae	*Protoperidinium conicum*	*cf. conicoides*	N	0	0	1	0	0	0	0	0	0	1
Dinophyceae	Peridiniales	Peridiniaceae	*Lingulodinium*	*polyedrum*	N	0	0	0	0	0	1	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 5e. Results from the fish trap samples.

					Berth code	11				14				3				3A				7				TY			
					Line No.	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
Actinopterygii	Anguilliformes	Congridae	*Conger*	*verreauxi*	N	0	0	0	0	0	0	0	0	0	1	0	1	1	0	0	0	1	0	0	0	0	0	0	0
Actinopterygii	Mugiliformes	Mugilidae	*Parapercis*	*colias*	N	0	1	1	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Actinopterygii	Perciformes	Cheilodactylidae	*Nemadactylus*	*macropterus*	N	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Actinopterygii	Perciformes	Labridae	*Notolabrus*	*celidotus*	N	1	1	1	1	1	1	0	0	1	0	0	0	1	1	0	0	0	0	1	0	1	1	0	0
Actinopterygii	Perciformes	Labridae	*Notolabrus*	*miles*	N	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Actinopterygii	Perciformes	Trypterigiidae	*Forsterygion*	*varium*	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
Cephalopoda	Octopoda	Octopodidae	*Octopus*	*maorum*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	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 5f. Results from the crab trap samples.

					Berth code	11				14				3				3A				7				BR	BW				TY			
					Line no.	1		2		1		2		1		2		1		2		1		2		1	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	1	2	1	2	1	2	1	2
Actinopterygii	Mugiliformes	Mugilidae	*Parapercis*	*colias*	N	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	0	0	0	0
Actinopterygii	Perciformes	Labridae	*Notolabrus*	*celidotus*	N	0	0	1	1	0	1	0	1	0	0	0	0	0	0	1	0	0	0	1	1	0	0	0	0	0	1	0	1	1
Actinopterygii	Perciformes	Trypterigiidae	*Forsterygion*	*varium*	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
Actinopterygii	Perciformes	Trypterigiidae	*Grahamina*	*capito*	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
Actinopterygii	Perciformes	Trypterigiidae	*Grahamina*	*gymnota*	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	0
Ascidiacea	Aplousobranchia	Didemnidae	*Lissoclinum*	*notti*	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	0
Ascidiacea	Aplousobranchia	Holozoidae	*Hypsistozoa*	*fasmeriana*	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	0	0	0	0	0
Ascidiacea	Phlebobranchia	Rhodosomatidae	*Corella*	*eumyota*	C1	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
Ascidiacea	Stolidobranchia	Botryllinae	*Botrylliodes*	*leachii*	C1	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
Ascidiacea	Stolidobranchia	Pyuridae	*Pyura*	*pulla*	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	0
Ascidiacea	Stolidobranchia	Styelidae	*Asterocarpa*	*cerea*	C1	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
Ascidiacea	Stolidobranchia	Styelidae	*Cnemidocarpa*	*bicornuta*	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	0
Asteroidea	Forcipulata	Asteriidae	*Coscinasterias*	*muricata*	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	0
Bryopsidophyceae	Halimediales	Caulerpaceae	*Caulerpa*	*brownii*	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	0	0	0	0
Cephalopoda	Octopoda	Octopodidae	*Octopus*	*maorum*	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	1	0	0	0
Crustacea	Anomura	Paguridae	*Diacanthurus*	*spinulimanus*	N	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0
Crustacea	Anomura	Paguridae	*Lophopagurus (A.)*	*cristatus*	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
Crustacea	Anomura	Paguridae	*Lophopagurus (L.)*	*thompsoni*	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	0
Crustacea	Brachyura	Cancridae	*Cancer*	*novaezelandiae*	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
Crustacea	Brachyura	Majidae	*Leptomithrax*	*longimanus*	N	0	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	0	0
Crustacea	Brachyura	Majidae	*Notomithrax*	*peronii*	N	0	0	0	0	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
Crustacea	Brachyura	Portunidae	*Nectocarcinus*	*antarcticus*	N	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
Crustacea	Caridea	Crangonidae	*Nauticaris*	*marionis*	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
Crustacea	Palinura	Palinuridae	*Jasus*	*edwardsi*	N	0	0	1	0	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
Phaeophyceae	Fucales	Seirococcaceae	*Marginariella*	*boryana*	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	0
Rhodophyceae	Ceramiales	Rhodomelaceae	*Brongniartella*	*australis*	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	0	0	0	0
Rhodophyceae	Plocamiales	Plocamiaceae	*Plocamium*	*cartilagineum*	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	0	0	0	0
Rhodophyceae	Plocamiales	Plocamiaceae	*Plocamium*	*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	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 5g. Results from the starfish trap samples.

					Berth code	11				14				3				3A				7				BW				TY			
					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
Actinopterygii	Perciformes	Labridae	*Notolabrus*	*celidotus*	N	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
Ascidiacea	Aplousobranchia	Holozoidae	*Hypsistozoa*	*fasmeriana*	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
Asteroidea	Forcipulata	Asteriidae	*Coscinasterias*	*muricata*	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
Bivalvia	Veneroida	Veneridae	*Austrovenus*	*stutchburyi*	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
Bivalvia	Veneroida	Veneridae	*Tawera*	*spissa*	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
Bryopsidophyceae	Halimediales	Caulerpaceae	*Caulerpa*	*brownii*	N	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	0	0
Crustacea	Anomura	Paguridae	*Diacanthurus*	*spinulimanus*	N	0	0	1	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
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	1	0	0
Crustacea	Brachyura	Portunidae	*Nectocarcinus*	*antarcticus*	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
Crustacea	Palinura	Palinuridae	*Jasus*	*edwardsi*	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
Holothuroidea	Aspidochirotida	Stichopodidae	*Stichopus*	*mollis*	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
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	1	0	0
Polyplacophora	Acanthochitonina	Acanthochitonidae	*Cryptoconchus*	*porosus*	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	1	0
Rhodophyceae	Ceramiales	Ceramiaceae	*Ceramium*	*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	1	0	0
Rhodophyceae	Plocamiales	Plocamiaceae	*Plocamium*	*cartilagineum*	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	0	0
Rhodophyceae	Plocamiales	Plocamiaceae	*Plocamium*	*microcladioides*	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

*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	11				14				3		3A		7				BW				TY			
					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
Actinopterygii	Perciformes	Trypterigiidae	*Grahamina*	*capito*	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
Crustacea	Brachyura	Hymenosomatidae	*Halicarcinus*	*cookii*	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
Crustacea	Brachyura	Hymenosomatidae	*Halicarcinus*	*varius*	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
Malacostraca	Isopoda	Cirolanidae	*Natatolana*	*rossi*	N	1	1	1	0	1	1	1	1	1	1	0	0	1	1	1	1	1	1	1	0	1	1	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).