Port of Auckland

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

Biosecurity New Zealand Technical Paper No: 2005/08

Prepared for BNZ Post-clearance Directorate
by Graeme Inglis, Nick Gust, Isla Fitridge, Oliver Floerl, Chris Woods, Barbara Hayden, Graham Fenwick

ISBN No: 0-478-07908-7
ISSN No: 1176-838X

March 2006

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Publication Adviser
MAF Information Bureau
P O Box 2526
WELLINGTON

Telephone: (04) 474 4100
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Executive Summary

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

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

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

- A wide range of sampling techniques was used to collect marine organisms from a range of habitats within the commercial Port of Auckland. 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 Auckland 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 173 species or higher taxa were identified from the Auckland Port survey. They consisted of 114 native species, 13 non-indigenous species, 24 cryptogenic species (those whose geographic origins are uncertain) and 22 species indeterminata (taxa for which there is insufficient taxonomic or systematic information available to allow identification to species level).

- Two species of non-indigenous marine organisms collected from the Port of Auckland (the bryozoan *Celleporaria sp. 1* and the ascidian *Cnemidocarpa sp.*) have not previously been recorded from New Zealand waters.

- The 13 non-indigenous organisms described from the Port of Auckland included representatives of eight phyla. The non-indigenous species detected (ordered alphabetically by phylum, class, order, family, genus and species) were: (Annelida) *Hydroides elegans*, (Bryozoa) *Bugula flabellata*, *Bugula neritina*, *Celleporaria sp 1* and *Anguinella palmata*, (Cnidaria) *Obelia longissima* and *Pennaria disticha*, (Crustacea) *Charybdis japonica*, (Mollusca) *Crassostrea gigas* and *Theora lubrica*, (Porifera) *Halisarca dujardini*, (Urochordata) *Cnemidocarpa sp.*, and (Vertebrata) *Arenigobius bifrenatus*.

- None of the species from the Port of Auckland are listed on the New Zealand register of unwanted organisms. Two species recorded from Auckland, the Pacific oyster *Crassostrea gigas* and the toxic cryptogenic dinoflagellate *Gymnodinium catenatum*, are listed on the Australian ABWMAC list of unwanted marine pests.

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

- Approximately 61.5 % (eight of 13 species) of NIS in the Port of Auckland are likely to have been introduced in hull fouling assemblages, 15.4 % via ballast water and 23.1 % 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 Auckland (as opposed to ballast water introductions) is consistent with findings from similar port baseline studies overseas.

Introduction

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

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

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

BIOLOGICAL BASELINE SURVEYS FOR NON-INDIGENOUS MARINE SPECIES

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

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

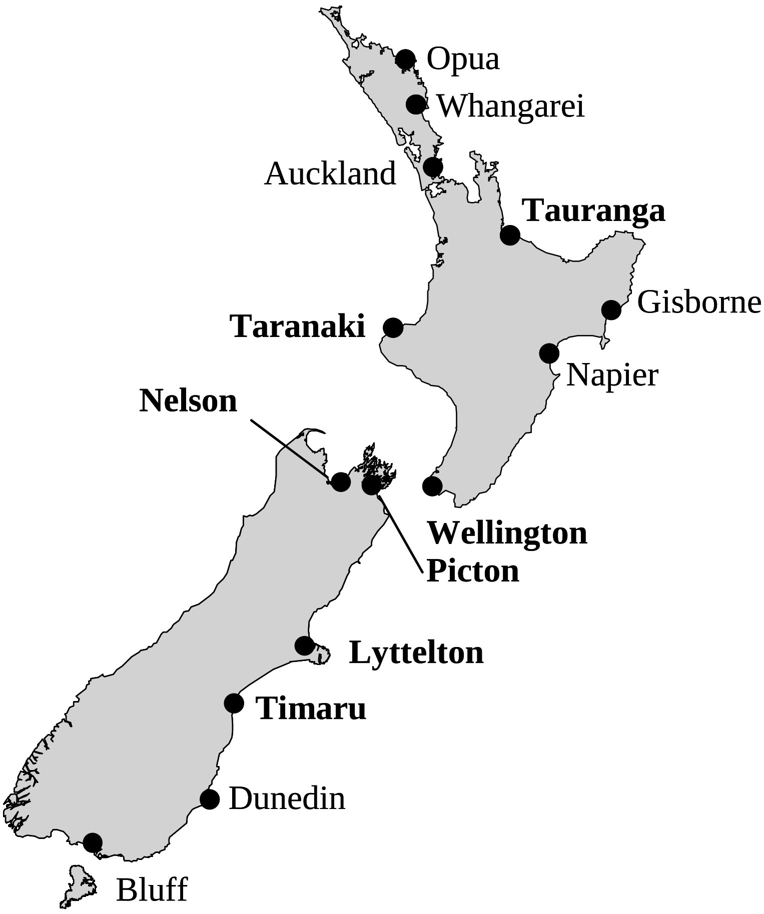

Figure 1: Commercial shipping ports in New Zealand where baseline non-indigenous species surveys have been conducted. Group 1 ports surveyed in the summer of 2001/2002 are indicated in bold and group 2 ports surveyed in the summer of 2002/2003 are indicated in plain font. Marinas were also surveyed for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

The port surveys have two principal objectives:

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

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

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

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

DESCRIPTION OF THE PORT OF AUCKLAND

The Port of Auckland (36° 51'S, 174° 48'E) on the east coast of the North Island (Fig.1) is located on the southern shore of Waitemata Harbour (Fig. 2). The port area is the largest in the country with continuous wharves and jetties spanning over 2.5 km of coastline (Fig. 3). Westhaven Marina is situated immediately west of the main commercial port area and is one of the largest marinas in the southern hemisphere. Westhaven Marina covers more than a kilometre of coastline in additional man-made structures and provides 1,432 marina berths 8-30 metres in length, with 331 pile moorings and 53 swing moorings. A second marina is also nestled into the Port of Auckland area. Hobson West Marina is situated in the Viaduct Harbour and has a total of 23, 16-50 m berths for charter and private recreational vessels, including visiting super yachts, with a minimum draught of 4 m (www.poal.co.nz). The Hobson West Marina consists of a series of interconnecting floating pontoons restrained by piles, with a floating walkway around the marina with finger piers. The two marinas were sold by the Port of Auckland to the City of Auckland in 2004. The Royal New Zealand Navy Dockyard is located immediately opposite the port (Fig. 3; Calliope Wharves (unlabelled) opposite Axis Fergusson), where refitting and maintainance of Naval vessels takes place.

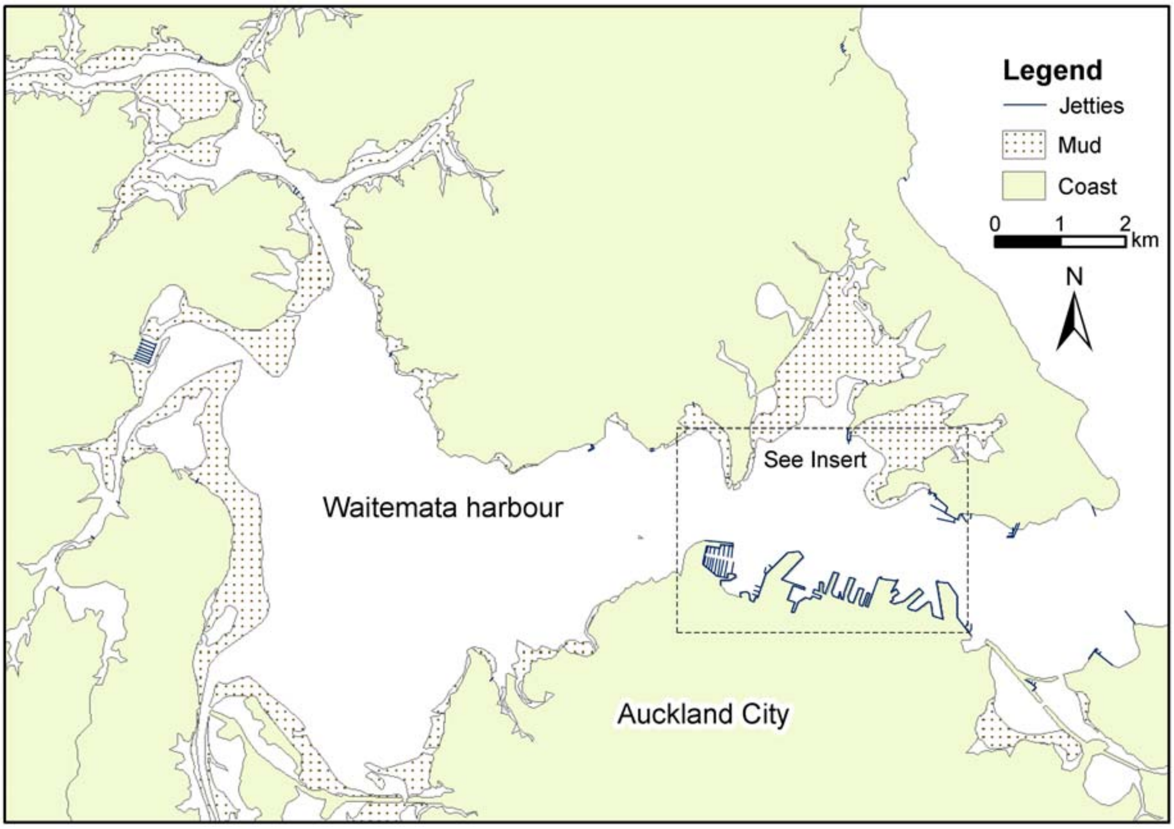

Figure 2: Waitemata Harbour map

PORT OPERATION AND SHIPPING MOVEMENTS

The Port of Auckland was first established the early 1840's because of an urgent need to establish a suitable capital and trading in New Zealand. By 1843, 3,000 people were living in Auckland and most of them depended on the port to provide them with a living either directly or indirectly. By the end of the 1860's, Auckland's population had grown to more than 12,000 (www.poal.co.nz).

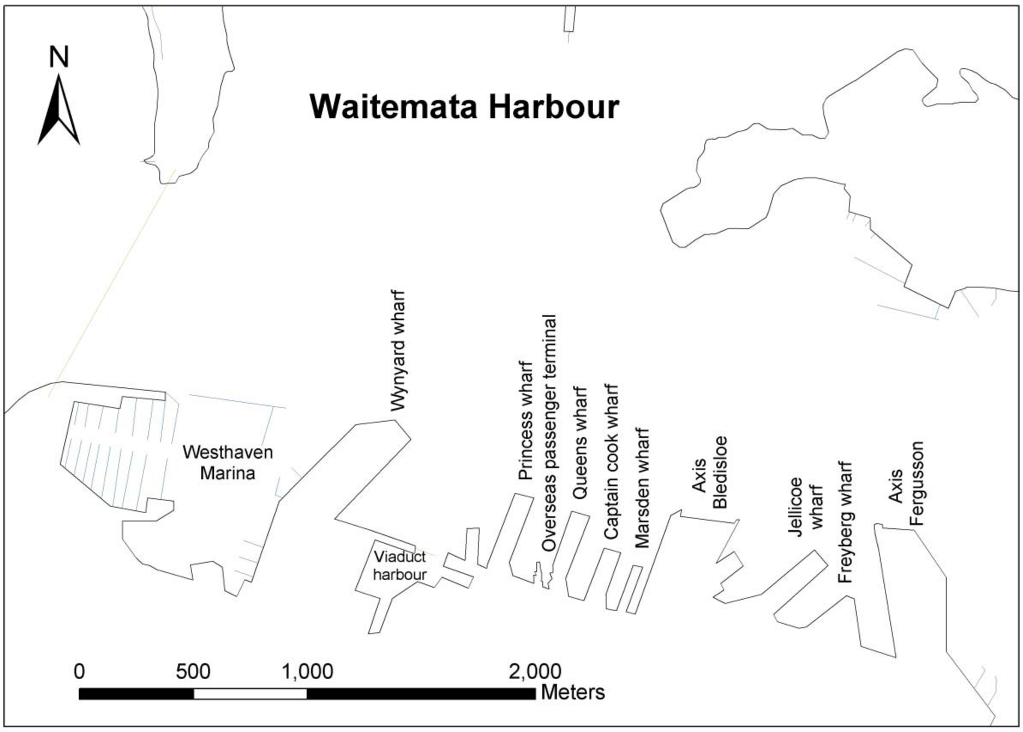

Figure 3: Waitemata Harbour - Port of Auckland map

The Auckland Harbour Board was established by an Act of Parliament in 1870. The Board was governed by an elected Board with three-year terms of office and administered by permanent staff. It remained in existence until the Port Companies Act in 1988. By the 1860s the first harbour reclamation had been completed and Queen Street Wharf had become the port's main pier.

By the end of the 1860s overseas trade was growing, mainly with England and Australia, and a very active coastal shipping trade had been established. By 1920, Auckland was the busiest port in New Zealand. Development between Princes Wharf and Kings Wharf (now incorporated into Axis Bledisloe) was completed between 1904 and 1924. Bledisloe, Jellicoe and Freyberg Wharves were developed between 1940 and 1962, and Bledisloe was again extended in the 1970s.

The sea freight business began to change dramatically in the 1960's and 1970s. More and more, cargoes were shipped in containers. Fergusson Container Terminal (now called Axis Fergusson) was built as a specialist container operation in 1971. In the 1970s, Bledisloe Wharf (now Axis Bledisloe) was redeveloped to handle more containers.

Ports of Auckland Ltd was formed in 1988 and took over the operations of the commercial port. The Port of Auckland (owned and operated by Ports of Auckland Ltd, which also operates the regional Port of Onehunga) is currently still New Zealand's busiest shipping port, and the major hub port in the North Island (Inglis 2001). It is the biggest general cargo port in New Zealand and the main export port for meat and dairy products from the North Island (www.arc.govt.nz).

The Port of Auckland has nine major wharves (Fig. 3) that handle a wide variety of cargo including containers, petroleum products, breakbulk (e.g. steel, imported vehicles and timber), and bulk cargo (e.g. gypsum and wheat). Berth construction is predominantly concrete deck (including the very early wharves) on concrete piling with hardwood fender piling. Details of the major berthing facilities are provided in Table 1.

The Port of Auckland handles 43 % of New Zealand's total container trade and 56 % of the North Island's container trade. In total 68 % of New Zealand imports by value and 33 % of exports by value come through the Port (www.poal.co.nz). In 1998-99 the Port of Auckland received a total of 2,036 ship calls and provides shipping links to 207 ports in 73 countries in addition to domestic links with other New Zealand ports (www.arc.govt.nz). In 2004, the Port of Auckland received a total of 1,648 ship calls and handled around 660,000 containers (TEU: 20-foot equivalent units) and 4.6 million tonnes of breakbulk cargo (www.poal.co.nz). The Port of Auckland is handling growing numbers of cruise ships of larger sizes. During the 2004-2005 cruise season the Port of Auckland will host 33 calls by 19 different cruise ships. Recent analyses of shipping arrivals show that the Port of Auckland received 1,419 international ship visits during 2002/2003 (1,222 merchant, 132 pleasure, 53 fishing, 7 passenger, and 5 barge/tug vessels). During this period, most commercial vessels entering the port arrived from Australia (35.1 %), the south Pacific (25.5 %), the north-west Pacific (10.7 %), east Asia (9.2 %), south-east Pacific (5.9 %) and the north-east Pacific (5.6 %) (Campbell 2004).

Vessels unable to be berthed immediately in the port may anchor inside the port off Princes Wharf in the stream on their own anchors. This is not a common occurrence, and usually only occurs if the vessel is on layby. There are some pile moorings on the southwest corner of Waiheke Island for mooring vessel hulks (Murray Dennis, Port of Auckland Ltd, *pers. comm*.). Pilotage is compulsory on the Waitemata Harbour for vessels over 500 gross registered tonnes. Pilots board one to two nautical miles north of the Rangitoto Beacon (36° 46.9'S, 174° 49.3'E).

Vessels are expected to comply with the Voluntary Controls on the Discharge of Ballast Water in New Zealand (www.fish.govt.nz/sustainability/biosecurity/); vessels are requested to exchange ballast water in mid-ocean (away from coastal influences) en route to New Zealand and discharge only the exchanged water while in port. According to Inglis (2001), a total volume of 20,571 m^3 of ballast water was discharged in the Port of Auckland in 1999, with the largest country-of-origin volumes of 3,656 m^3 from Australia, 3,475 m^3 from Taiwan, 1,466 m^3 from Hong Kong, and 9,681 m^3 unspecified.

Within the port, there is on-going maintenance dredging as required. This usually involves the dredging of 20-30,000 m^3 within the port. Spoil disposal used to be 10-15 nautical miles east of Great Barrier Island, however, spoil is currently mudcreted to form part of the new 9.4 ha reclamation at Axis Fergusson, and will continue to do so for many years (Murray Dennis, Port of Auckland Ltd, *pers. comm*.).

A trio of major infrastructure developments are occurring at the port (www.poal.co.nz). The port company is investing in a new container terminal reclamation extension at Axis Fergusson, the deepening of the commercial shipping lane in the Rangitoto Channel and new refrigerated container facilities. The shipping lane deepening is required in order to widen the tidal window for larger containerships now calling at the port and also to provide for the next generation of vessels expected in the future. The 150,000 m^3 of dredgings has been mudcreted with cement and placed as fill in the terminal extension. The Axis Fergusson container terminal, with its container capacity of 350,000 TEU (twenty-foot equivalent container unit), is being extended by 9.4 hectares to provide for future container handling. The initial six hectares (stage one) will provide an additional 120,000 TEU capacity when completed in 2006. The new three-container high refrigerated container facility will expand reefer capacity over its current 1,800 containers. There is a current emphasis on increasing productivity and efficiency, with reduced turnaround times for visiting vessels.

PHYSICAL ENVIRONMENT OF WAITEMATA HARBOUR

Waitemata Harbour is a deeply embayed inlet of Hauraki Gulf (Thompson 1981). Auckland city extends along the southern shoreline of the harbour, and the cities of Takapuna, Birkenhead and Waitemata occupy the north shore. Waitemata Harbour occupies a drowned valley system with numerous ancillary tidal rivers and is connected to the Hauraki Gulf via the Rangitoto channel. The harbour is approximately 20 km long from North Head to the upper harbour bridge and varies in width from around two to 15 km. The Rangitoto channel curves south-west to enter the mouth of the harbour and then runs west for the length of Waitemata Harbour. Tidal currents help maintain water depths of around 15 m in this central channel.

The vast majority of the harbour area outside the Rangitoto channel is less than 5 m deep, with extensive areas such as Shoal Bay and Ngataringa Bay and most of the upper harbour being less than 2 m deep. Deeper areas exist around the commercial port where the Port of Auckland dredges approximately 30,000 cubic metres of muddy sediment from the vicinity of the port annually. This regular dredging programme aims to maintain shipping berths at depths of 11 to 13 m. The majority of the subtidal habitat in Waitemata Harbour is composed of mud and fine sand, with a few small areas of coarse sand/shell/gravel near the centre of the harbour (Hayward et al. 1997). Muddy intertidal flats are common around the harbour with mangroves present on the flats towards the northwest end of the harbour. Rocky coastline exists on the northern entrance to the harbour around north head, and patches of rocky reef exist in the upper harbour extending north from Point Chevalier.

EXISTING BIOLOGICAL INFORMATION

Over the last two decades, a variety of biological surveys have been carried out in Waitemata Harbour and around the Port of Auckland. One of these surveys (Hayward 1997) specifically focused on collecting and identifying non-indigenous species in the harbour. We briefly review these studies and their major findings below.

Dromgoole and Foster (1983) reviewed studies of the marine biota of Waitemata Harbour. They noted some marked biological changes as a result of reclamation around the port, namely the loss of mangrove and saltmarsh communities, and also suggested that *Zostera* seagrass beds and the green-lipped mussel *Perna canaliculus* numbers were in decline. They concluded, however, that there was a lack of information to make quantitative assessments of the changes that may have occurred with the development of the Port of Auckland.

Hayward et al. (1997) undertook a resurvey of Powell's 1930 study of subtidal, soft-bottom communities in the Waitemata harbour to determine the nature of faunal change over a 60-year period and the impacts of invasive species on the natural fauna. Dredge samples were collected from 152 stations between 1993 and 1995. The authors concluded that the soft-bottom fauna was still diverse away from the wharves and marinas, and retained a similar spatial distribution pattern to that described in Powell's 1930 study. However they noted that fourteen mollusc species (predominantly carnivorous gastropods) seemed to have disappeared or significantly declined in abundance within the harbour. The gastropod *Maoricolpus roseus* and several species associated with the shelly channel sediments in the harbour showed a reduction in abundance. Furthermore, since the 1930s at least nine native New Zealand mollusc species and one crab appeared to have colonised the harbour, and nine others had increased in relative abundance. The establishment of extensive horse mussel (*Atrina* *zelandica*) beds was thought to be the most significant of these changes in native abundance over this 60 year period.

Three non-indigenous bivalves (*Limaria orientalis*, *Theora lubrica*, *Musculista senhousia*) became established in Waitemata harbour in the 1960’s and 1970’s (Hayward et al. 1997). By the late 1990’s these molluscs had become so abundant they were dominant components of six of the eight fauna associations recognised in the harbour benthos by Hayward et al. (1997).

Turner (1997) conducted an ecological assessment of the Naval Dockyard for the Royal New Zealand Navy. In this confidential report she reviewed the available literature on the marine environment and associated biological communities in and around the dockyard, and discussed options for a biological monitoring programme to document future ecological changes.

Taylor and MacKenzie (2001) examined the Waitemata 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).

In view of the plans for increased urban development in the upper Waitemata Harbour, Cummings et al. (2002) reported on a study designed to define the benthic ecological values of the area’s intertidal and subtidal habitats (74 sites). Based on information on the distribution and densities of taxa postulated as being sensitive to long term habitat change (e.g. the bivalve *Paphies australis*), they provided a qualitative assessment of the potential effect on benthic communities to long-term habitat change, and identified specific ecologically important areas of the upper Waitemata Harbour. They found the intertidal and subtidal benthic communities in the area to be generally in good condition, and although the sediment organic content was notably high in some areas that communities at these sites did not show characteristics of highly organically enriched areas.

Nicholls et al. (2002) reported on a long-term monitoring programme established in 2000 in the Waitemata Harbour. This programme was set up to monitor the ecological status and trends in marine macrobenthic species representative of the region, and to monitor habitats that have the potential to be affected by sedimentation, pollution and other anthropogenic impacts. Common taxa (e.g. the bivalve *Nucula hartvigiana*) and sediments at five monitored intertidal sites showed considerable temporal variability. There was suggestion of cyclic patterns and trends in abundance for some taxa at some sites, caused by natural fluctuations related to recruitment events and storm disturbance, although the data series was not long enough to confirm these trends.

Hayward (1997) identified 39 non-indigenous marine or intertidal species that had established populations in Waitemata Harbour. These included the bivalves, *Crassostrea gigas*, *Musculista senhousia*, *Limaria orientalis* and *Theora lubrica*, the Californian majid crab *Pyromaia tuberculata*, the invasive green alga *Codium fragile* ssp. *tomentosoides*, the tubeworm *Ficopomatus enigmaticus*, and 17 species of bryozoan. Many of these species have become dominant components of biotic assemblages in different parts of the harbour and appear to have had major (but unquantified) impacts on native assemblages.

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 Auckland survey. The survey was undertaken between the 1st and 9th of April 2003. Sampling was concentrated on the commercial Port of Auckland and did not include the nearby marinas: Westhaven and Viaduct Basin (although cyst samples were taken in Westhaven marina). Most sampling in the survey occurred at six main wharves: Axis Fergusson, Jellicoe, Marsden, Queens, Princes and Wynard.

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.

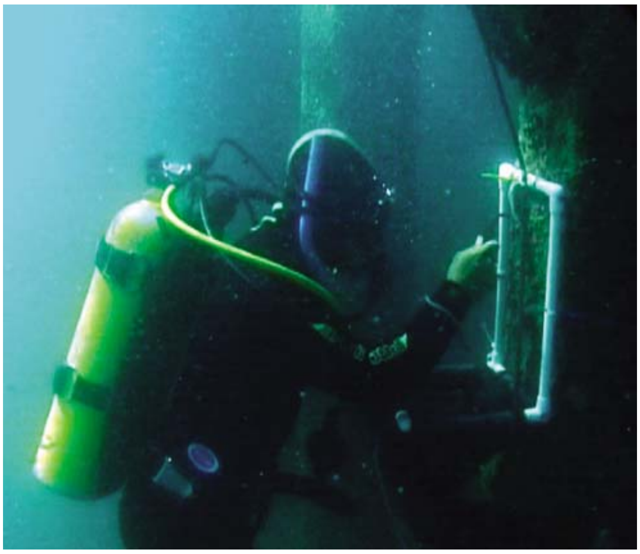

Figure 4: Diver sampling organisms on pier piles.

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 5m 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 (Graham Fenwick, NIWA, *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.

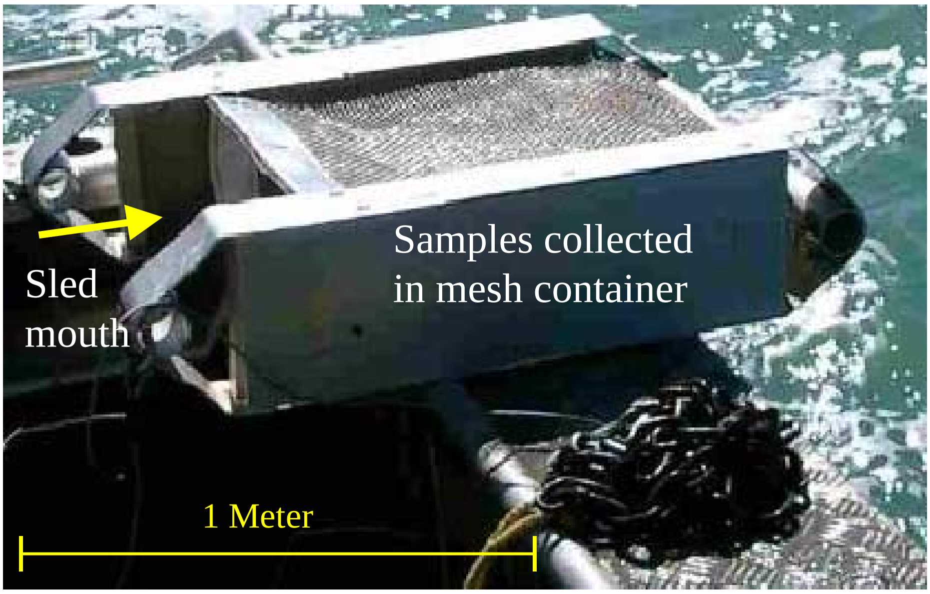

Figure 6: Benthic sled

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

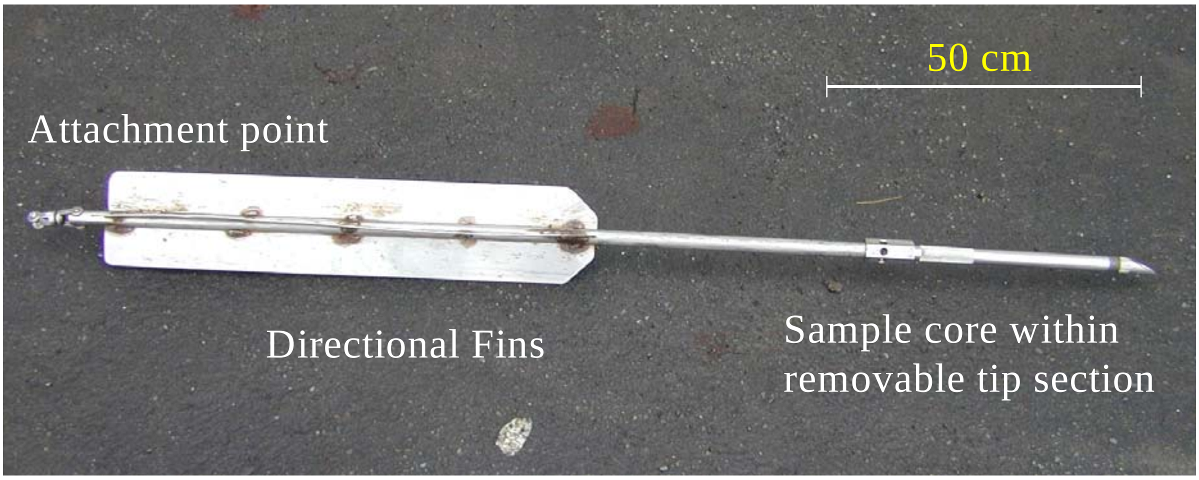

Figure 7: **Javelin corer**

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

Starfish traps

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

Shrimp traps

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

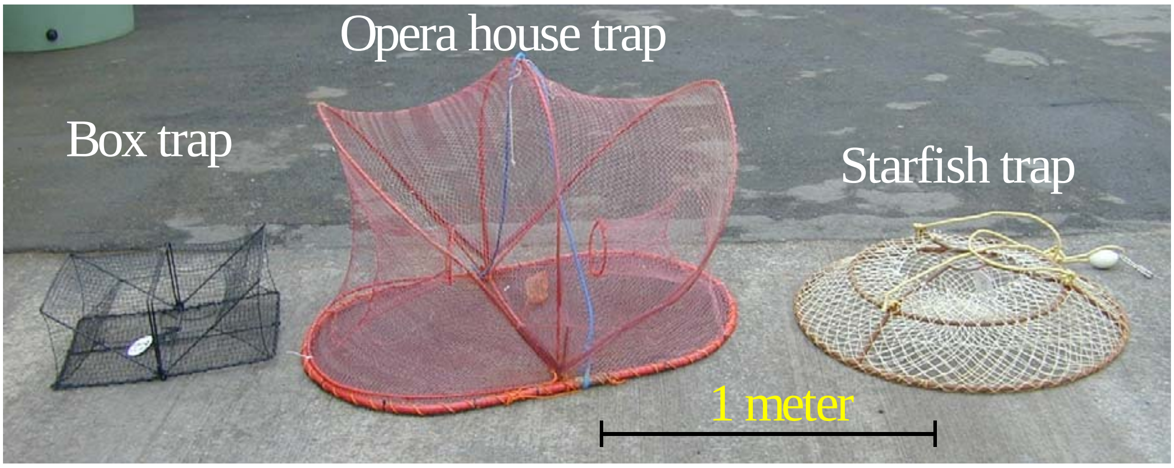

Figure 8: Trap types deployed in the port.

SAMPLING EFFORT

A summary of sampling effort within the Port of Auckland 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 Auckland is indicated in the following figures: diver pile scrapings and dinoflagellate cyst sampling (Fig. 9), benthic sledding and benthic grabs (Fig. 10), and, box, starfish, shrimp and opera fish trapping (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.

SORTING AND IDENTIFICATION OF SPECIMENS

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

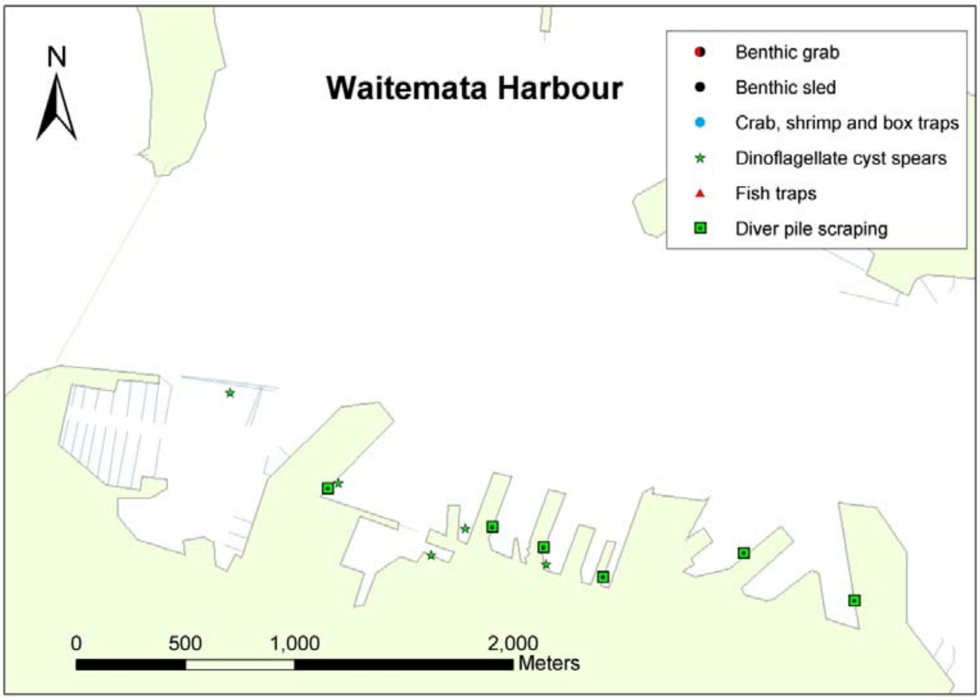

Figure 9: Diver pile scraping sites and dinoflagellate cyst sample sites

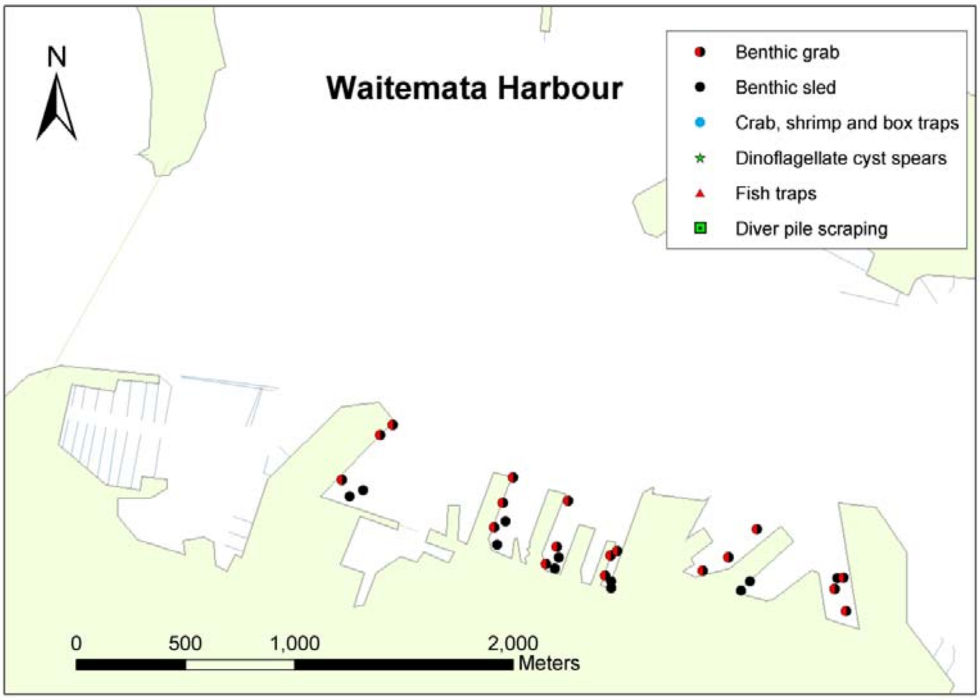

Figure 10: Benthic sled and benthic grab sites.

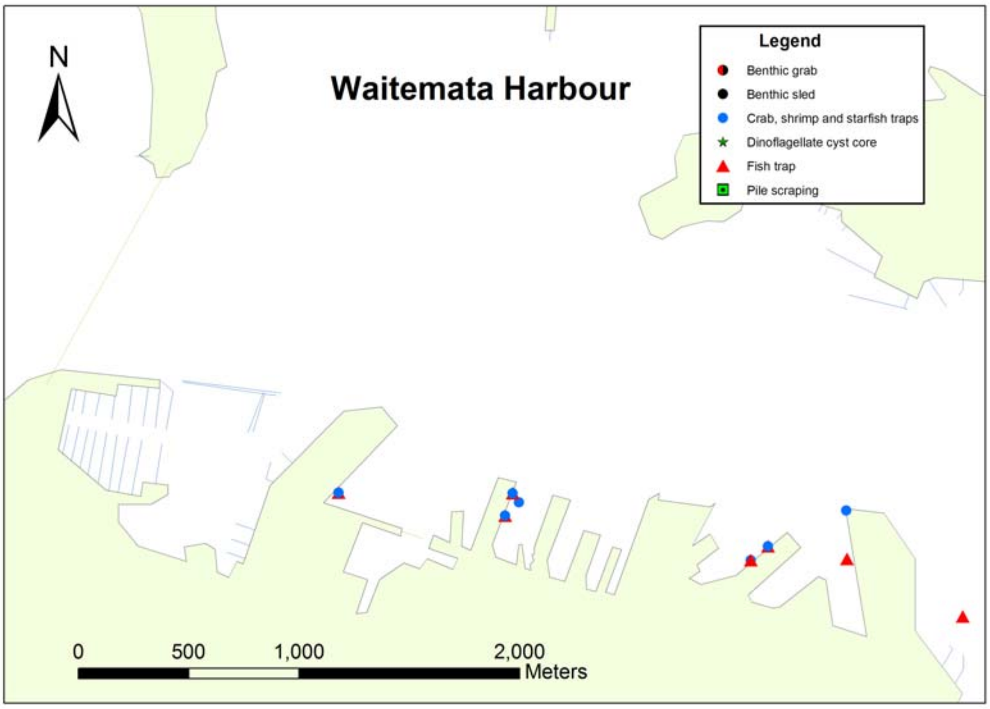

Figure 11: Sites trapped using crab (box), shrimp and starfish traps and opera house fish traps

DEFINITIONS OF SPECIES CATEGORIES

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

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

Native species

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

Non-indigenous species (NIS)

Non-indigenous species (NIS) are known or suspected to have been introduced to New Zealand as a result of human activities. They were determined using a series of questions posed by Chapman and Carlton (1991, 1994), as 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 173 species or higher taxa was identified from the Port of Auckland survey. This collection consisted of 114 native (Table 6), 24 cryptogenic (Table 7), 13 non-indigenous species (Table 8) and 22 species indeterminata (Table 9, Fig. 12). The biota included a diverse array of organisms from 12 Phyla (Fig. 13). Twelve species from the Port of Auckland had not previously been described from New Zealand waters. These included two non-indigenous species and 10 cryptogenic species, 11 of which did not match existing species descriptions in New Zealand or overseas and may be new to science. For general descriptions of the main groups of organisms (Phyla) encountered during this study refer to Appendix 2.

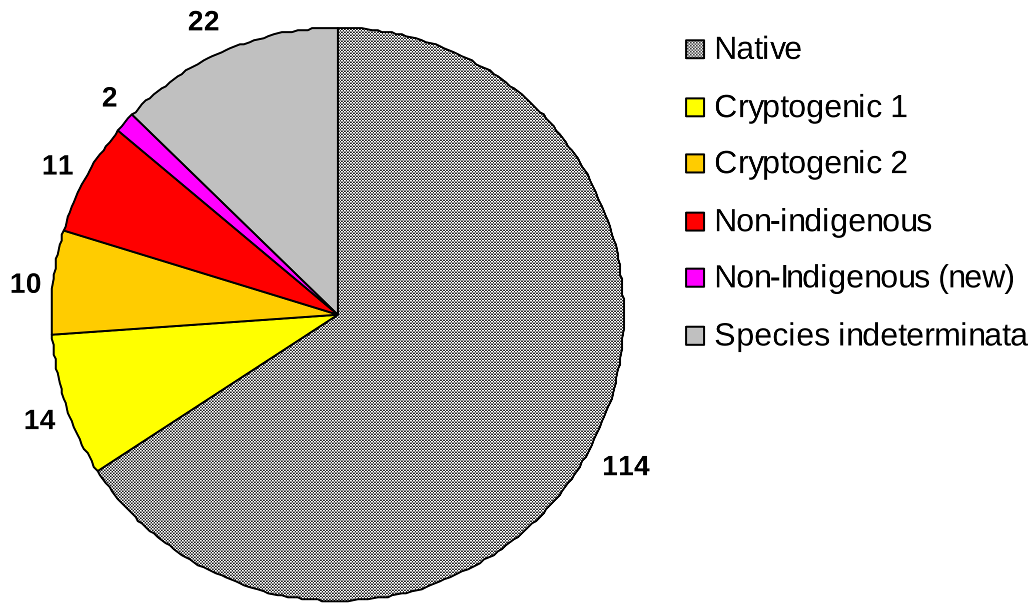

Figure 12: **Diversity of marine species sampled in the Port of Auckland. Values indicate the number of species in native, cryptogenic, non-indigenous and species indeterminata categories.**

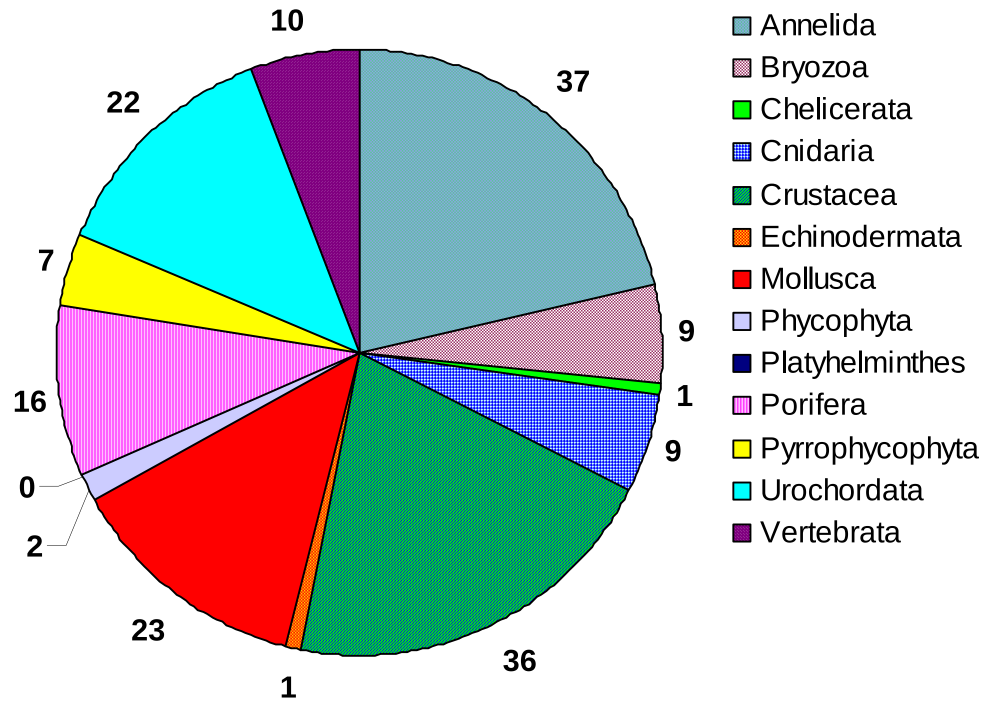

Figure 13: **Marine Phyla sampled in the Port of Auckland. Values indicate the number of species in each of the major taxonomic groups.**

NATIVE SPECIES

A total of 114 native species was identified from the Port of Auckland. Native species represent 65.9 % of all species identified from this location (Table 6) and included highly diverse assemblages of annelids (27 species), crustaceans (25 species), molluscs (20 species), urochordates (14 species), and vertebrate (eight species). A number of other less diverse phyla including bryozoans, chelicerates, cnidarians, echinoderms, porifera, phycophyta, and pyrrophycophyta were also sampled from the Port (Table 6).

CRYPTOGENIC SPECIES

Twenty-four cryptogenic species were discovered in the Port of Auckland. Cryptogenic species represent 13.9 % of all species or higher taxa identified from the Port. The cryptogenic organisms identified included 14 Category 1 and 10 Category 2 species as defined in Section 2.9 above. These organisms included three cnidarians (*Bougainvillia muscus*, *Clytia hemisphaerica*, *Obelia bidentata*), three crustaceans (the barnacle, *Balanus trigonus*; the crab, *Pilumnopeus serratifrons*, and an unidentified amphipod, *Acontiostoma* n.sp.), 11 sponges (*Callyspongia ramosa*, *Haliclona heterofibrosa*, *Plakina monolopha*, *Adocia* n. sp. 2, *Adocia* n. sp. 4, *Adocia* n. sp. 6, *Esperiopsis* n. sp. 1, *Euryspongia* n. sp. 1, *Euryspongia* n. sp. 2, *Haliclona* n. sp. 16, *Haliclona* n. sp. 5), one dinoflagellate (*Gymnodinium catenatum*), and six ascidian species (*Aplidium phortax*, *Asterocarpa cerea*, *Corella eumyota*, *Diplosoma listerianum*, *Styela plicata*, *Microcosmus squamiger*; Table 7). Many of the Category 1 cryptogenic species (such as the ascidians *Aplydium phortax*, *Astereocarpa 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

Thirteen non-indigenous species (NIS) were recorded from the Port of Auckland (Table 8). NIS represent 7.5 % of all identified species from this location. Two of these species, the bryozoan *Celleporaria* sp. 1 and the ascidian *Cnemidocarpa* sp., were not previously known from New Zealand. NIS included one annelid (the serpulid polychaete *Hydroides elegans*), four bryozoans (*Anguinella palmata*, *Bugula flabellata*, *Bugula neritina*, *Celleporaria* sp. 1), two cnidarians (*Obelia longissima*, *Pennaria disticha*), one crustacean (the Asian portunid *Charybdis japonica*), two molluscs (the bivalves *Theora lubrica* and *Crassostrea gigas*), one sponge (*Halisarca dujardini*), one urochordate (*Cnemidocarpa* sp.), and one vertebrate (the goby *Arenigobius bifrenatus*).

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.

***Hydroides elegans* (Haswell, 1883)**

Image and information: NIMPIS (2002d)

Hydroides elegans is a small, tube dwelling polychaete worm that grows to up to 20mm in length. It constructs hard, sinuous, calcareous tubes. The worm has 65-80 body segments, and an opercular crown with 14-17 spines. *Hydroides elegans* is a fouling species on both natural and artificial structures. It is found subtidally and is highly tolerant of contaminated waters. Although the type specimen for this species was described from Sydney Harbour, Australia (Haswell 1883), the exact native range of *H. elegans* is unknown, as it is possible it was introduced to Australia prior to 1883 (Australian Faunal Directory 2005). *H. elegans* is present in the Caribbean Sea, Brazil, Argentina, north-west Europe, Japan, the Mediterranean, north-west and south-east Africa, and New Zealand. This species is able to grow in high densities, particularly in tropical and sub-tropical ports, sometimes heavily fouling any newly immersed structure. It creates microhabitat for some species and competes with others for food and space. *H. elegans* has been present in New Zealand since at least 1952 and has been recorded from Waitemata and Lyttelton Harbours (Cranfield et al. 1998). During the port baseline surveys, *H. elegans* was recorded in Gulf Harbour Marina and the Port of Auckland. In the Port of Auckland it occurred in pile scrape samples taken from Jellicoe Wharf (Fig. 14).

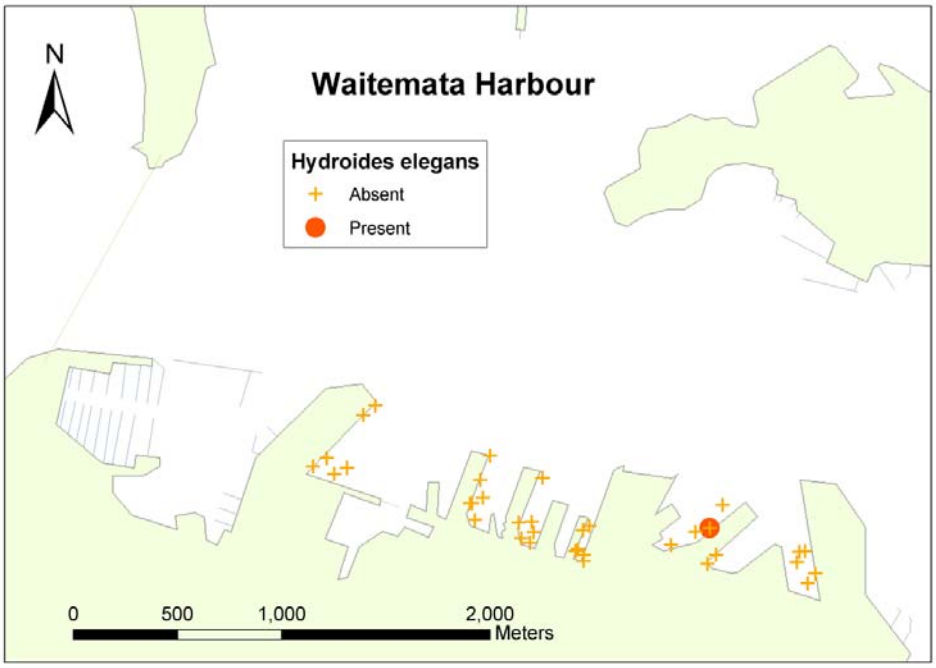

Figure 14: ***Hydroides elegans* distribution in the Port of Auckland**

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

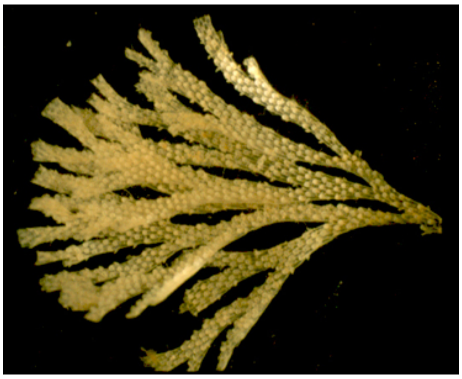

Image and information: NIMPIS (2002a)

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* (see below), or growing on encrusting bryozoans. Vertical, shaded, sub-littoral rock surfaces also form substrata for this species. It has been recorded down to 35 m. *Bugula flabellata* is native to the British Isles and North Sea and has been introduced to Chile, Florida and the Caribbean and the northern east and west coasts of the USA, as well as Australia and New Zealand. It is cryptogenic on the Atlantic coasts of Spain, Portugal and France. *Bugula flabellata* is a major fouling bryozoan in ports and harbours, particularly on vessel hulls, pilings and pontoons and has also been reported from offshore oil platforms. There have been no recorded impacts from *B. flabellata.* During the current baseline surveys it was recorded from Opua Marina, Whangarei, Auckland, Tauranga, Napier, Taranaki, Wellington, Picton, Nelson, Lyttelton, Timaru, Dunedin and Bluff. In the Port of Auckland *B. flabellata* occurred in pile scrape samples taken from the Axis Fergusson and Jellicoe Wharves (Fig. 15).

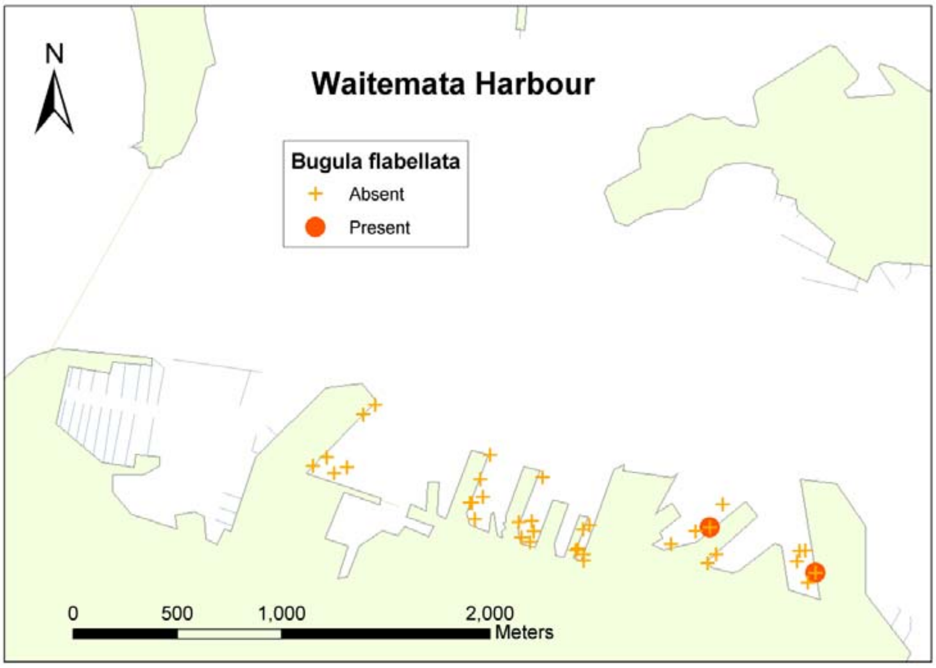

Figure 15: *Bugula flabellata* distribution in the Port of Auckland

Bugula neritina (Linnaeus, 1758)

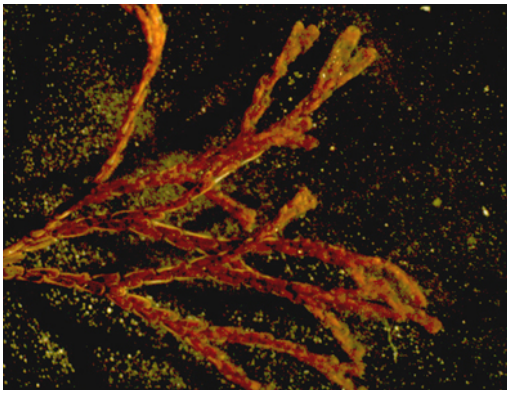

Image and information: NIMPIS (2002b)

Bugula neritina is an erect, bushy, red-purple-brown bryozoan. Branching is dichotomous (in series of two) and zooids alternate in two rows on the branches. Unlike all other species of *Bugula*, *B. neritina* has no avicularia (defensive structures) or spines, but there is a single pointed tip on the outer corner of zooids. Ovicells (reproductive structures) are large, globular and white in colour. They often appear in such high numbers that they resemble small snails or beads. *Bugula neritina* is native to the Mediterranean Sea. It has been introduced to most of North America, Hawaii, India, the Japan and China Seas, Australia and New Zealand. It is cryptogenic in the British Isles. *Bugula neritina* is one of the most abundant bryozoans in ports and harbours and an important member of the fouling community. The species colonises any available substratum and can form extensive monospecific growths. It grows well on pier piles, vessel hulls, buoys and similar submerged surfaces. It even grows heavily in ships' intake pipes and condenser chambers. In North America, *B. neritina* occurs on rocky reefs and seagrass leaves. In Australia, it occurs primarily on artificial substrata. *B. neritina* occurs in all New Zealand ports (Gordon and Matawari 1992). In the Port of Auckland it occurred in pile scrape samples taken from Jellicoe Wharf (Fig. 16).

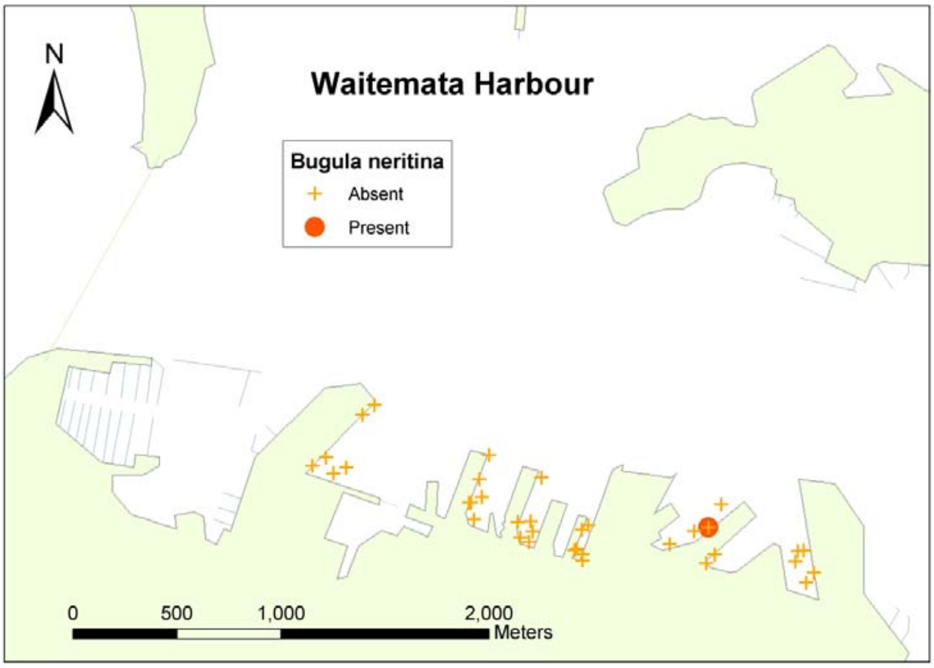

Figure 16: ***Bugula neritina* distribution in the Port of Auckland**

***Celleporaria* sp. 1**

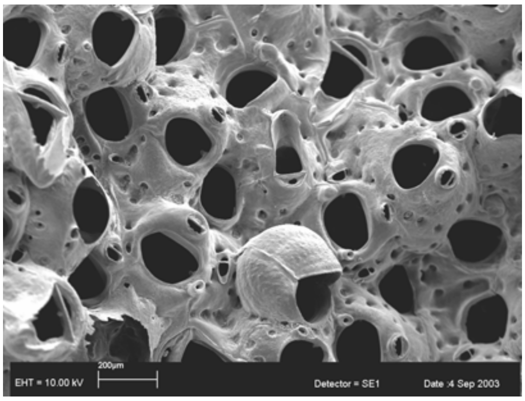

Image and information: Dennis Gordon, NIWA

This species of *Celleporaria* does not match existing species descriptions from this genus in New Zealand. Features typical of the genus include an encrusting, irregular, mounded colony form, with multiple layers of zooids through frontal budding and self-overgrowth. There are usually small adventitious avicularia (zooidal polymorphs) and large, somewhat columnar vicarious avicularia. Zooidal orifices have a straight or gently concave proximal rim. Some species have oral spines. Permutations and combinations of these characters are the basis of species discrimination. There are scores of described nominal species worldwide, many more are likely to be discovered, and the genus is badly in need of revision.
Celleporaria is the same genus as "Tasman Bay coral" (*C. agglutinans*), which provides habitat for a range of cryptic invertebrates. The non-indigenous species of *Celleporaria* found in the Port of Auckland forms thick crusts. Its impacts are unknown. During the Port baseline surveys it was also recorded from Whangarei Harbour. It was relatively widely distributed in the Port of Auckland, occurring in pile scrape samples taken from Marsden, Princes, Queens and Wynyards Wharves, and in benthic sled samples taken near Marsden Wharf (Fig. 17).

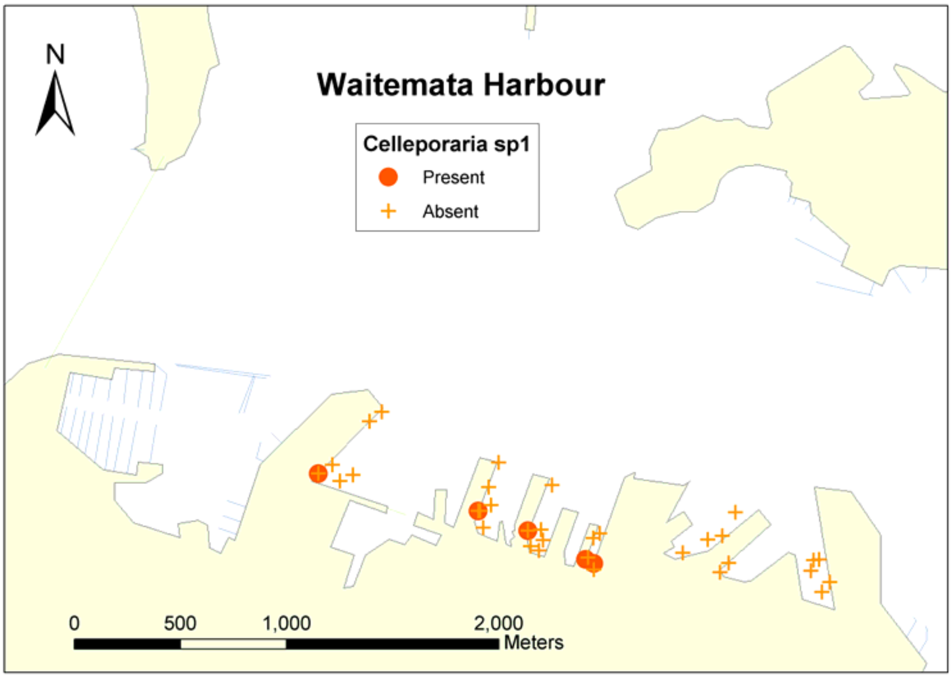

Figure 17: ***Celleporaria* sp. 1 distribution in the Port of Auckland**

***Anguinella palmata* (van Beneden, 1845)**

Image and information: Gordon and Matawari (1992)

Anguinella palmata is a bryozoan that forms erect and uncalcified tufts that are pale beige in colour. The tufts comprise a main axis with numerous branches of tubular zooids slightly incurved toward the axis. The New Zealand specimens reach up to 6 cm in length, but specimens of 20 cm have been reported from other countries. This species occurs in both intertidal and subtidal habitats. The native range of *Anguinella palmata* is unknown, but is thought to be southern Europe. Its current distribution includes Britain, the North Sea, Senegal, Ghana, Zaire, the Atlantic coast of North America, Brazil and Australia. *A. palmata* has been present in New Zealand since at least 1960 and has been recorded from Waitemata Harbour and Nelson (Gordon and Matawari 1992). There have been no recorded impacts from *A. palmata*. In the Port of Auckland it occurred in pile scrape samples taken from Queens Wharf (Fig. 18).

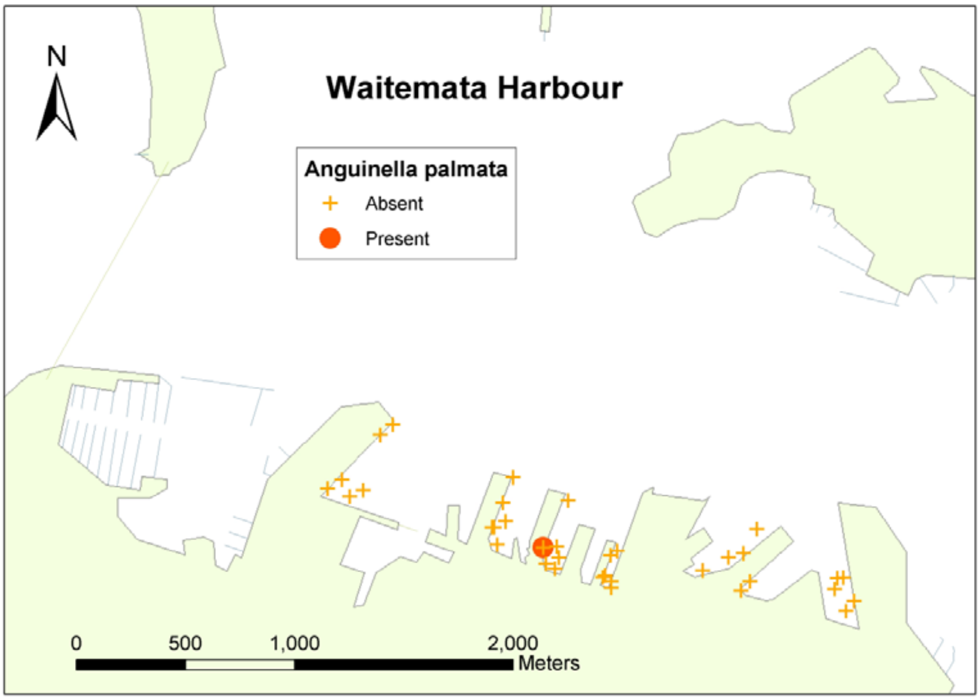

Figure 18: *Anguinella palmata* distribution in the Port of Auckland

***Obelia longissima* (Pallas, 1766)**

No image available

Obelia longissima is a long, flexible hydroid (family Campanulariidae) with a prominent main stem and branches. It usually reaches up to 20 cm in length but may reach 35 cm. The main stem is long, reddish brown and unforked but may become forked in older colonies. *Obelia longissima* is found growing on algae and hard substrata. It is normally subtidal but can occasionally be found growing in intertidal rockpools and at extreme low water of spring tides. Subtidal colonies that become detached may continue to grow if washed up into rockpools and entangled with other species such as mussels. It is a suspension feeder that feeds upon small zooplankton, small crustaceans, oligochaetes, insect larvae and probably detritus. *O. longissima* exhibits a typical leptolid life-cycle consisting of a sessile colonial, vegetative hydroid stage, a free-living sexual medusoid stage, and a planula larval stage.

Obelia longissima has a near cosmopolitan distribution. It was thought to be a predominantly cold water species, present in the north-east and north-west Pacific, north-east and north-west Atlantic, the Arctic Circle, the Black Sea, and, in the southern hemisphere, in Argentina, Chile, and New Zealand (Stepanjants 1998). However, numerous Indo-Pacific records may also be this species (Cornelius 1995). In New Zealand, O. longissima has previously been recorded from Christchurch and Dunedin (Jeanette Watson, Hydrozoan Research Laboratory, *pers. comm*.). During the port baseline surveys, it occurred in the Port of Auckland and in Opua Marina. In the Port of Auckland, *O. longissima* occurred in pile scrape samples taken from Queens Wharf (Fig. 19).

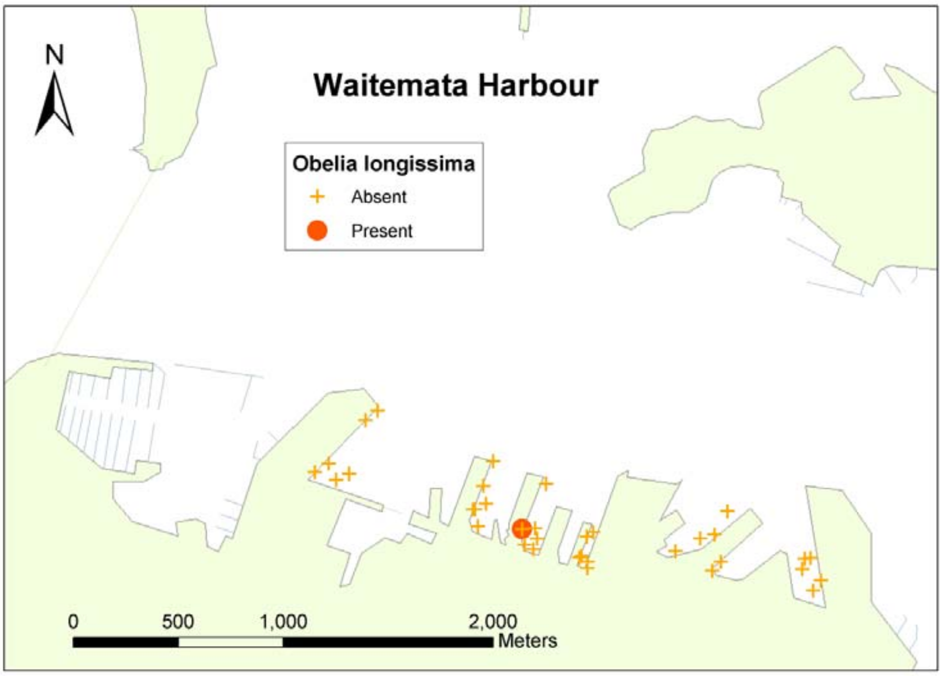

Figure 19: *Obelia longissima* distribution in the Port of Auckland

***Pennaria disticha* (Goldfuss, 1820)**

Image and information: Eldredge and Smith (2001)

Pennaria disticha is a hydroid that forms large colonies as tall as 30 cm, with dark brown to black stems and branches. The branches are usually overgrown with diatoms and algae, making them appear muddy brown. The branching is alternate. The polyps at the tip of the branches are white with a reddish tinge. *Pennaria disticha* lives attached to artificial and natural hard substrates where there is some water movement. It is a very common fouling organism in harbours and commonly found on reefs usually in more protected areas or in cracks and crevices. The native range of *P. disticha* is thought to be the north east Atlantic, but it now occurs in tropical and subtropical seas around the world (Cranfield et al. 1998). Its impacts on native organisms are unknown. It has been present in Waitemata Harbour since at least 1928 (Cranfield et al. 1998). During the port baseline surveys it was recorded in pile scrape samples taken from Jellicoe, Princes and Queens Wharves and in benthic sled samples taken near Princes Wharf (Fig. 20).

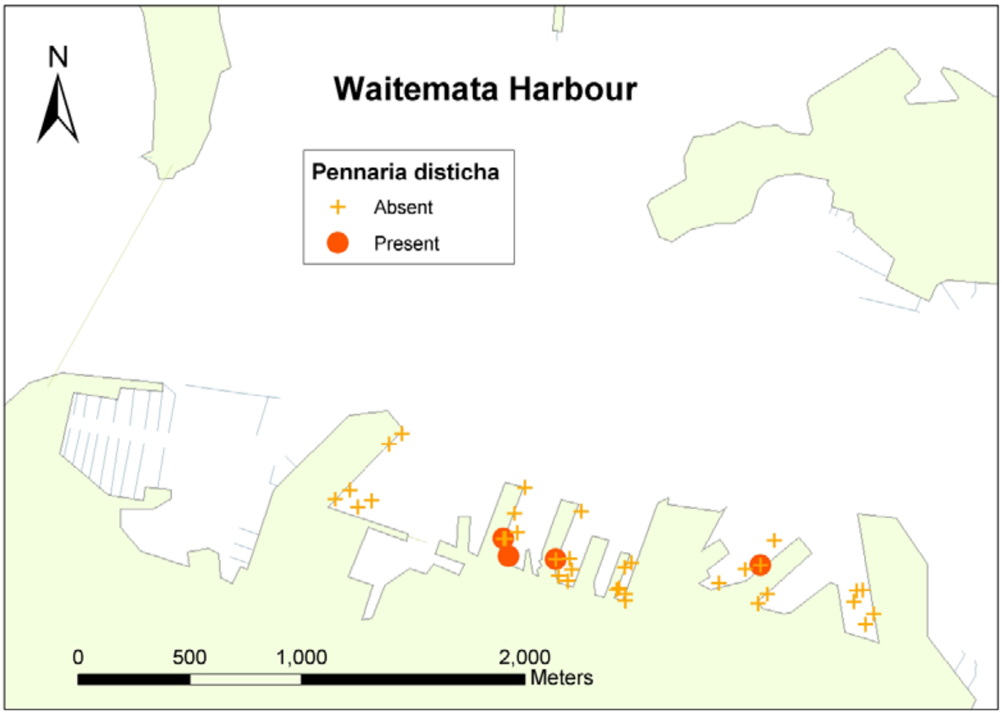

Figure 20: ***Pennaria disticha*** **distribution in the Port of Auckland**

Charybdis japonica (A. Milne-Edwards, 1861)

Image and information:
Gust and Inglis (In Press)

Charybdis japonica is a large (max. carapace width ~ 10 cm) portunid (paddle) crab that was first discovered in New Zealand, in Waitemata Harbour in September 2000. It is native to the north-west Pacific, including coastal regions of China, Malaysia, Korea, Taiwan and Japan.

Carapace colouration is variable, but can include a yellow-brown marbled shell or a dark shell with blue and red flashes on the ventral surfaces and legs. Adult crabs occupy a range of habitats in sub-tidal coastal areas and estuaries. In its native range, juvenile *C. japonica* are commonly found in tide pools in the rocky intertidal zone. Trapping surveys of the Waitemata population showed that *C. japonica* had spread widely throughout a range of habitats in the Harbour (Gust and Inglis *In press*). Delimitation surveys undertaken in late 2002 showed that it was abundant in the Waitemata Harbour and two nearby estuaries (the Tamaki and Weiti), but there was no evidence of its spread to other shipping ports nationwide. As a key estuarine predator, *C. japonica* is likely to have significant impacts on native estuarine benthic assemblages, particularly small bivalves. In the Port of Auckland it occurred in baited crab traps set at Axis Fergusson, Jellicoe, Marsden, Princes and Queens Wharves, in starfish traps set at Marsden, Princes and Wynyard Wharves, and in fish traps set at Jellicoe and Marsden Wharves (Fig. 21).

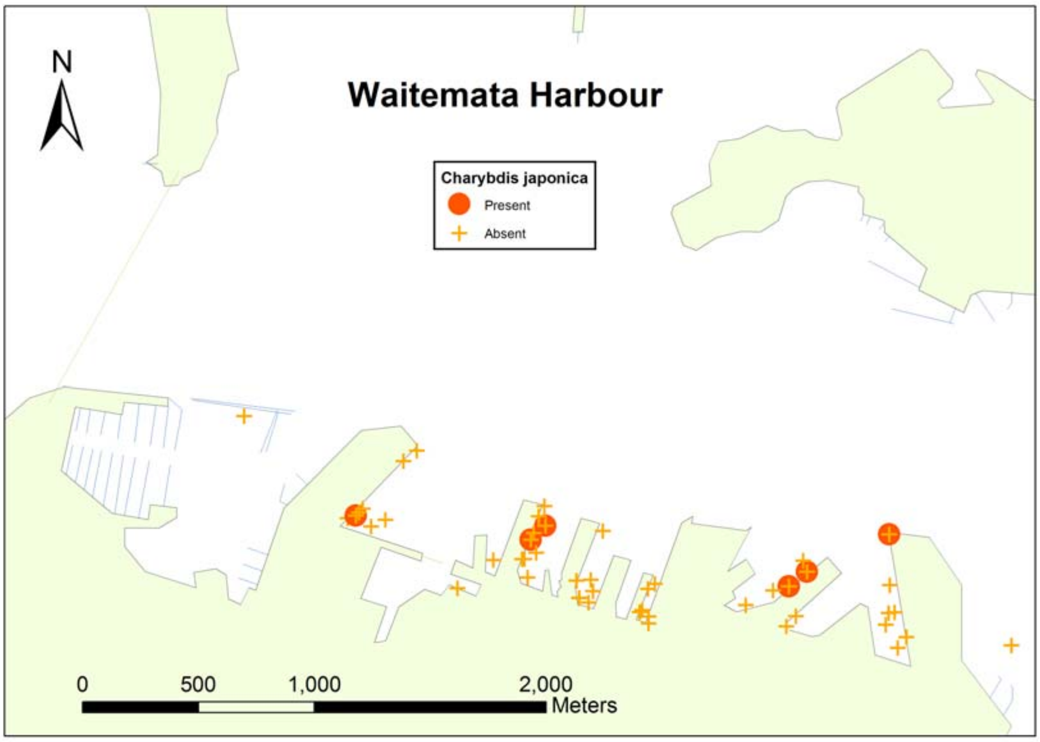

Figure 21: ***Charybdis japonica* distribution in the Port of Auckland**

***Crassostrea gigas* (Thunberg, 1793)**

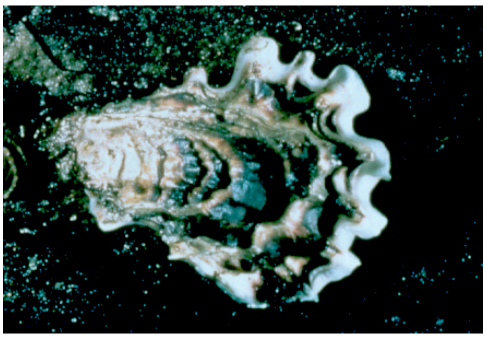

Image and information: NIMPIS (2002c)

The Pacific oyster, *Crassostrea gigas*, is an important aquaculture species throughout the world, including New Zealand. It has a white elongated shell, with an average size of 150-200 mm. The two valves are solid, but unequal in size and shape. The left valve is slightly convex and the right valve is quite deep and cup shaped. One valve is usually entirely cemented to the substratum. The shells are sculpted with large, irregular, rounded, radial folds.

Crassostrea gigas is native to the Japan and China Seas and the north-west Pacific. It has been introduced to the west coast of both North and South America, the West African coast, the northeast Atlantic, the Mediterranean, Australia, New Zealand, Polynesia and Micronesia. It is cryptogenic in Alaska. *Crassostrea gigas* will attach to almost any hard surface in sheltered waters. Whilst they usually attach to rocks, the oysters can also be found in muddy or sandy areas. Oysters will also settle on adult oysters of the same or other species. They prefer sheltered waters in estuaries where they are found in the intertidal and shallow subtidal zones, to a depth of about 3 m. *Crassostrea gigas* settles in dense aggregations in the intertidal zone, resulting in the limitation of food and space available for other intertidal species.

C. gigas has been present in New Zealand since the early 1960s. Little is known about the impacts of this species in New Zealand, but it is now a dominant structural component of fouling assemblages and intertidal shorelines in northern harbours of New Zealand and the upper South Island. *C. gigas* is now the basis of New Zealand's oyster aquaculture industry, having displaced the native rock oyster, *Saccostrea glomerata*. *C. gigas* was recorded from Opua marina, Whangarei Harbour, Gulf Harbour Marina, Auckland, Taranaki, Nelson and Dunedin during the port baseline surveys (Table 10). In the Port of Auckland it occurred in pile scrape samples taken from Axis Fergusson, Princes, Jellicoe, Marsden, Queens and Wynyard Wharves, and in benthic sled samples taken near Marsden Wharf (Fig. 22).

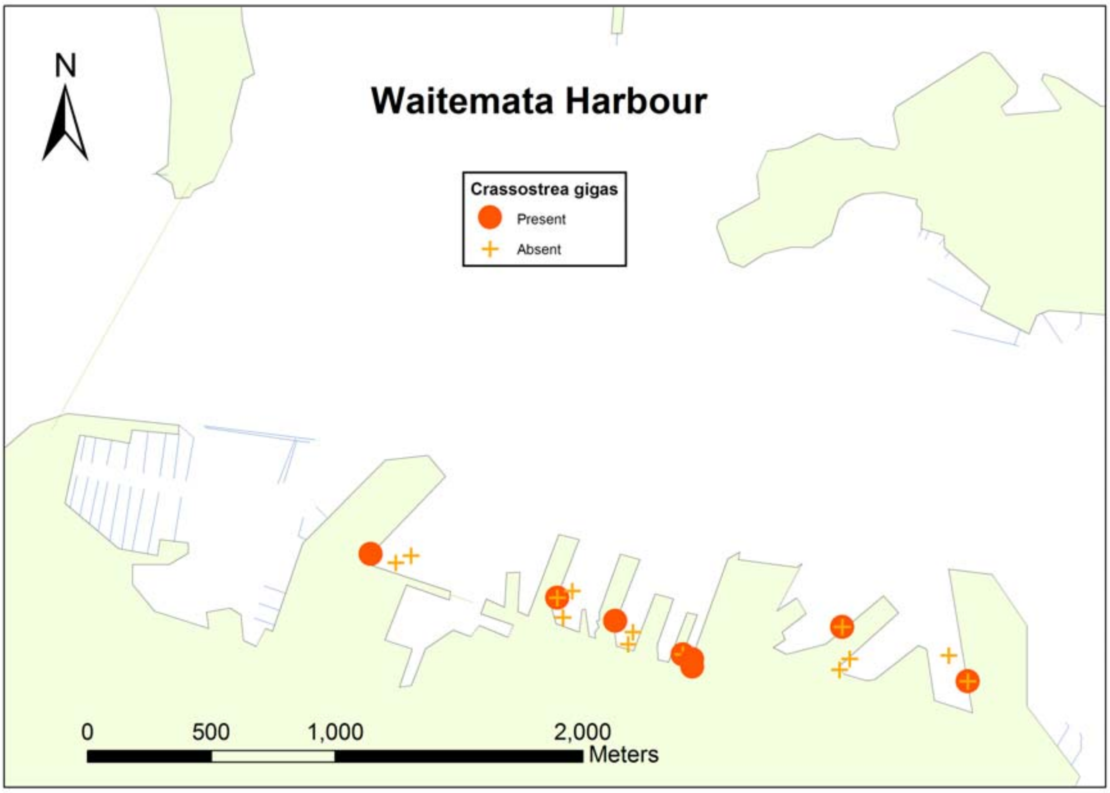

Figure 22: ***Crassostrea gigas*** **distribution in the Port of Auckland**

***Theora lubrica* (Gould, 1861)**

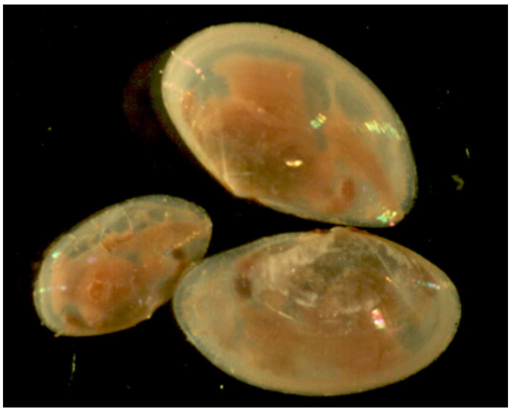

Image and information: NIMPIS (2002e)

Theora lubrica is a small bivalve with an almost transparent shell. The shell is very thin, elongated and has fine concentric ridges. *T. lubrica* grows to about 15 mm in size, and is characterised by a fine elongate rib extending obliquely across the internal surface of the shell. *Theora lubrica* is native to the Japan and China Seas. It has been introduced to the west coast of the USA, Australia and New Zealand. *Theora lubrica* typically lives in muddy sediments from the low tide mark to 50 m, however it has been found at 100 m. In many localities, *T. lubrica* is an indicator species for eutrophic and anoxic areas. *T. lubrica* has been present in New Zealand since at least 1971 (Cranfield et al. 1998). It occurs in estuaries of the north-east coast of the North Island, including the Bay of Islands, Whangarei Harbour, Waitemata Harbour, Wellington and Pelorus Sound. During the port baseline surveys, it was recovered from Opua, Whangarei Port and Marina, Gulf Harbour Marina, Auckland, Gisborne, Napier, Taranaki, Wellington, Nelson, and Lyttelton. In the Port of Auckland, *T. lubrica* occurred in benthic sled samples taken near Axis Fergusson, Jellicoe, Princes, Queens and Wynyard Wharves and from benthic grab samples taken near Queens and Wynyard Wharves (Fig. 23).

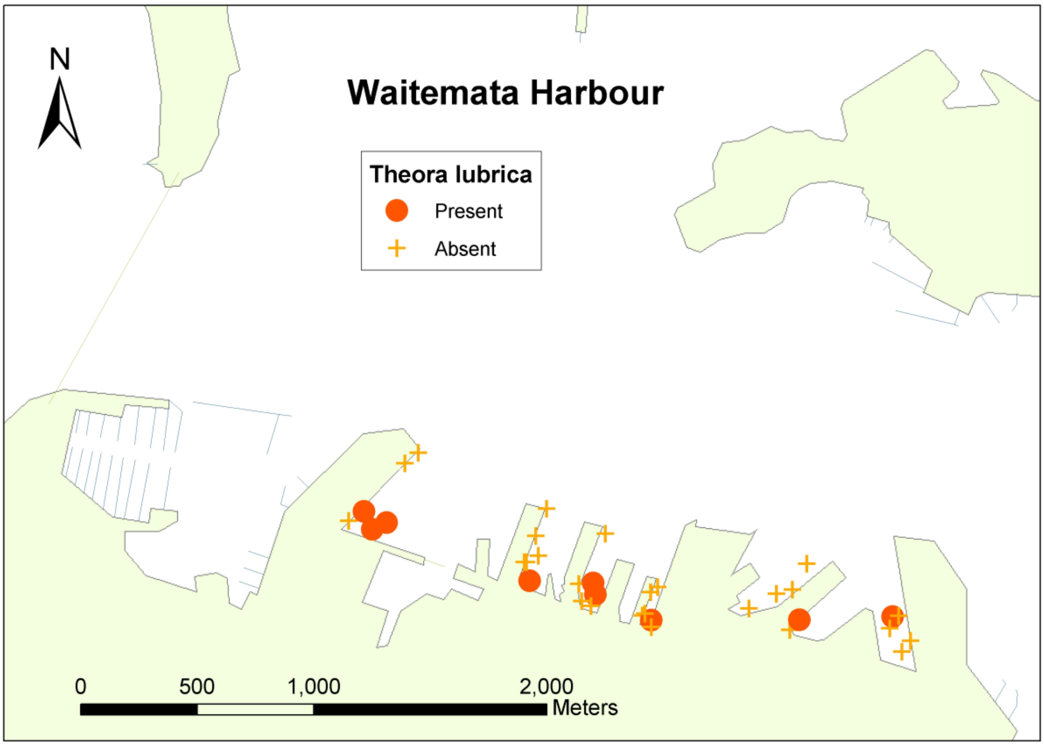

Figure 23: *Theora lubrica* distribution in the Port of Auckland

***Halisarca dujardini* (Johnston, 1842)**

No image available

Halisarca dujardini is an encrusting cold-water sponge. It is a cosmopolitan species with a wide distribution that includes the Arctic and Antarctic, the Subantarctic Islands, Australia, New Zealand, Chile, England, the Atlantic and the Mediterranean. It occurs from the shallow subtidal to a depth of 450 m. It has no known impacts. During the port baseline surveys *H. dujardini* was recorded from Auckland, Taranaki, Picton, Dunedin and Bluff. In the Port of Auckland it occurred in pile scrape samples taken from Jellicoe Wharf (Fig. 24).

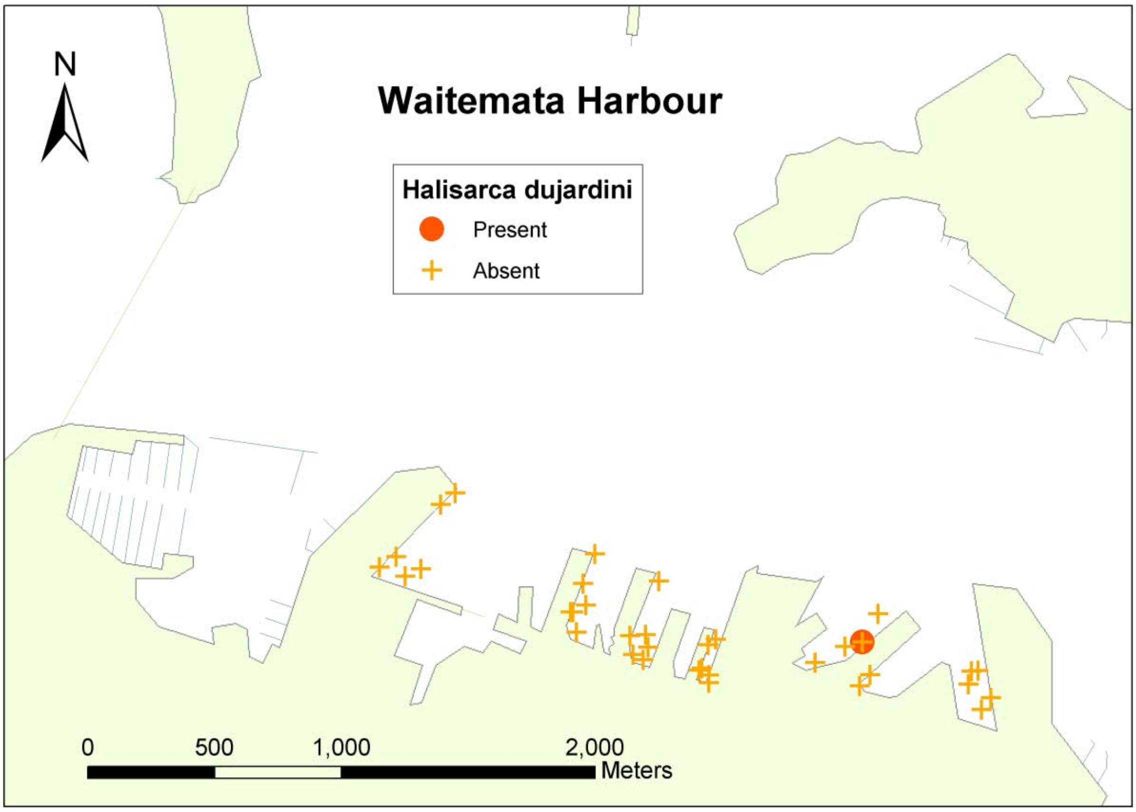

Figure 24: *Halisarca dujardini* distribution in the Port of Auckland

***Cnemidocarpa* sp.**

No image available

This ascidian is in the family Styelidae. It appears to be a new species that is closely related to *C. nisiotus*, but varies from this species in gonad structure, the number of branchial tentacles and shape of rectal opening. It is not similar to any species described in Australia, Japan or South Africa. Its native distribution, habitat preferences and impacts are unknown. Specimens matching this description were also recovered from Gulf Harbour Marina, Auckland, Tauranga, Gisborne, Taranaki, Picton, Lyttelton and Timaru during the port baseline surveys. In the Port of Auckland, *Cnemidocarpa* sp. occurred in pile scrape samples taken from the Axis Fergusson and Marsden Wharves (Fig. 25).

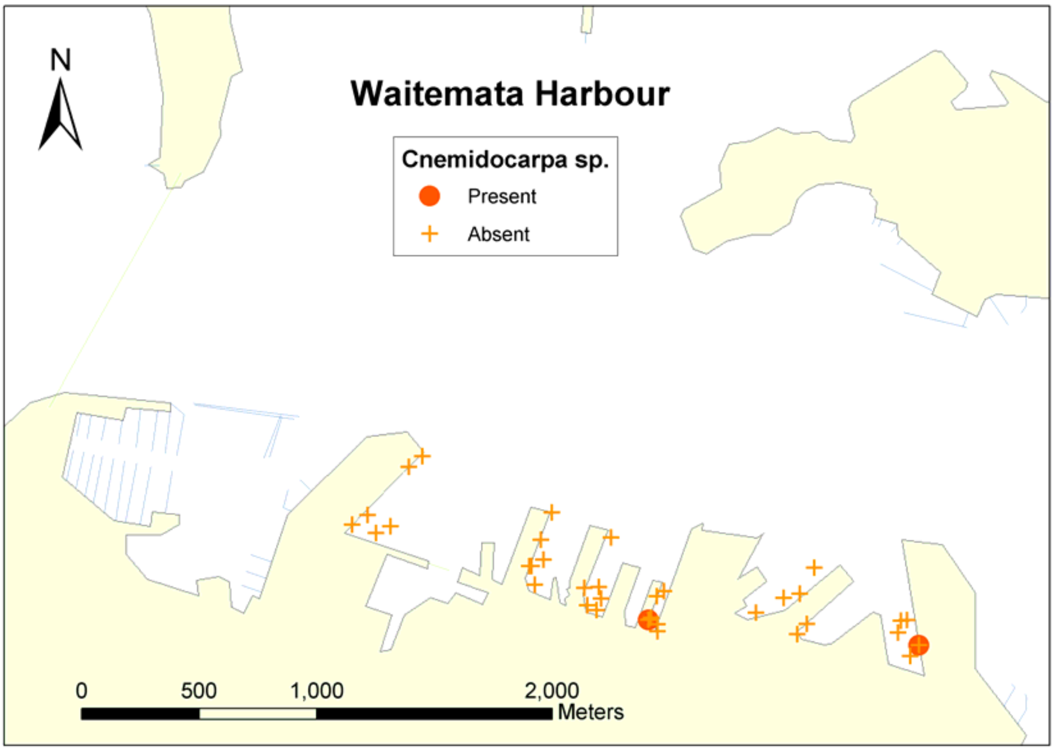

Figure 25: *Cnemidocarpa* sp. distribution in the Port of Auckland

***Arenigobius bifrenatus* (Kner 1865)**

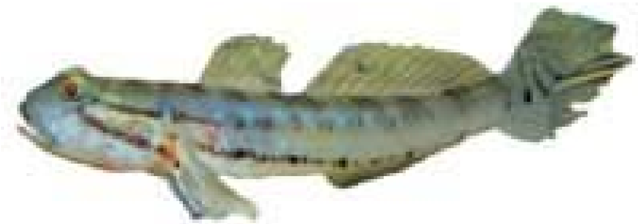

Image: Ross and Diane Armstrong
Information: Kuiter, 1993; Willis et al. (1999)

The Bridled Goby (*Arenigobius bifrenatus*) is easily diagnosed by its distinctive colouration, elongate fins, and the terminal filaments of the pectorals. It is native to Australia, where it is common on sand and silt bottoms of estuaries and coastal bays of southern Australia. It was first recorded in New Zealand in 1998. Overall body form is typical of burrowing gobies, with a blunt head and eyes situated high on the head. Maximum length given by Kuiter (1993) is 15 cm TL. As they can inhabit intertidal areas they are well adapted to fluctuating environmental conditions. Its impacts are unknown.

The known distribution of *A. bifrenatus* in New Zealand is currently restricted to five harbours spanning about 150 km of coastline on the east coast of the North Island (Francis et al. 2003). It has been captured in Whangateau, Mahurangi, Waitemata and Whangarei Harbours (Francis et al. 2003). In the Port of Auckland, *A. bifrenatus* occurred in benthic sled samples taken near Jellicoe, Marsden, Princes and Wynyard and Queens Wharves (Fig. 26).

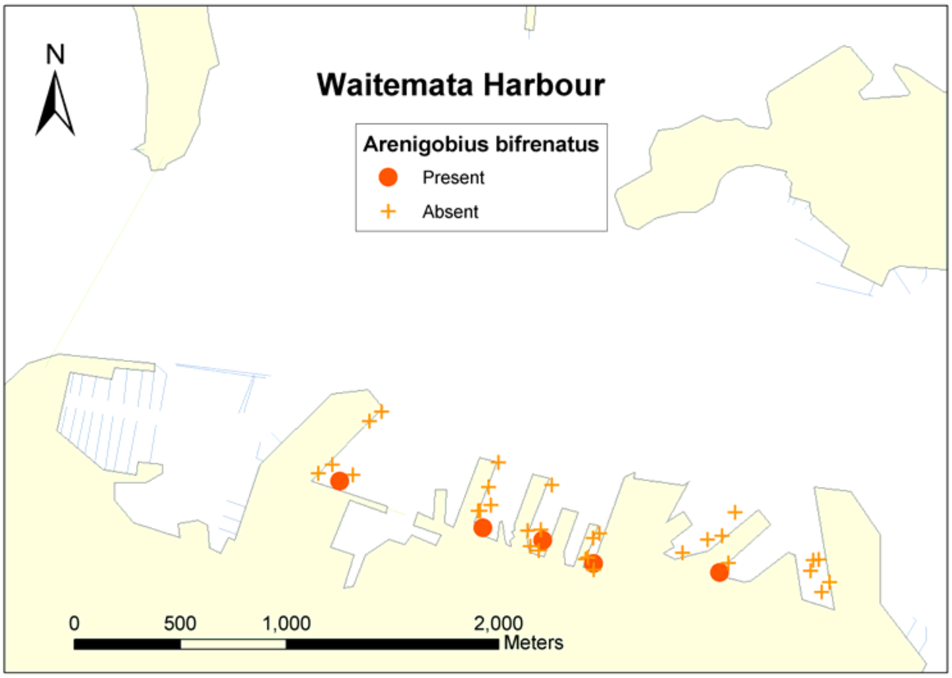

Figure 26: *Arenigobius bifrenatus* distribution in the Port of Auckland

SPECIES INDETERMINATA

Twenty-two organisms from the Port of Auckland were classified as species indeterminata. If each of these organisms is considered a species of unresolved identity, then together they represent 12.7 % of all species collected from this survey (Fig 15). Species indeterminata from the Port of Auckland included nine Annelida, two Cnidaria, seven Crustacea, one Mollusca, one Phycophyta, one Urochordata, and one Vertebrata species (Table 9).

NOTIFIABLE AND UNWANTED SPECIES

Of the non-indigenous species identified from the Port of Auckland, none are currently listed as Unwanted Organisms on the New Zealand register (Table 5a). The non-indigenous Pacific oyster, *Crassostrea gigas*, and cysts of the cryptogenic toxic dinoflagellate *Gymnodinium catenatum* both occurred in the Port of Auckland. These species are both included on the Australian ABWMAC list of marine pests (Table 5b).

PREVIOUSLY UNDESCRIBED SPECIES IN NEW ZEALAND

Two species of non-indigenous species from the Port of Auckland were previously undescribed from New Zealand waters; the bryozoan *Celleporaria* sp. 1 and the ascidian *Cnemidocarpa* sp. (Table 8).

CYST-FORMING SPECIES

Seven species of dinoflagellate cysts were collected during this survey; they are indicated as members of the Pyrrophycophyta in Tables 6 and 7. The motile form of one these species, *Lingulodinium polyedrum*, is potentially capable of producing toxins that cause diarrhetic shellfish poisoning (Hoe Chang, NIWA, *pers. comm.*). Cysts of the cryptogenic toxic dinoflagellate *Gymnodinium catenatum* were also collected from the port (Table 7). *G. catenatum* toxins can cause Paralytic Shellfish Poisoning (PSP) and are a significant public health problem. Blooms of both species may cause problems for aquaculture and recreational harvesting of shellfish.

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

The non-indigenous species located in the Port are thought to have arrived in New Zealand via international shipping. Table 8 indicates the possible vectors for the introduction of each NIS into the Port. Likely vectors of introduction are largely derived from Cranfield et al. (1998) and indicate that approximately 15.4 % (two of the 13 NIS) probably arrived via ballast water, 61.5 % probably were introduced to New Zealand waters via hull fouling, and 23.1 % could have arrived via either of these mechanisms.

COMPARISON WITH OTHER PORTS

Sixteen locations (13 ports and three marinas) were surveyed during the summers of 2001/2002 and 2002/2003 (Fig. 1). The total number of species identified in these surveys varied from 336 in the Port of Wellington to 56 in Whangarei Town Basin Marina (Fig. 27a). 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 each location. However differences in sampling effort between locations did not explain differences in the numbers of NIS found in each ($F_{1,14} = 0.77$, $P = 0.394$, $R^2 = 0.052$). When sampling effort was adjusted for, the Port of Auckland had a smaller than average number of native, NIS, and Cryptogenic 2 species relative to the other ports and marinas surveyed, and an average diversity of Cryptogenic 1 species (Fig 28). Largest numbers of NIS were reported from the ports of Lyttelton and Whangarei, but significantly more Cryptogenic 1 species were recorded in Whangarei Port than in other surveyed locations (Fig 28c, Studentised residual = 3.87).

Native organisms represented over 60 % of the species diversity sampled in each of the ports and marinas surveyed, with a minimum contribution of 61.0 % in the Port of Lyttelton and a maximum of 68.5 % in Picton (Fig. 27b). Species indeterminata organisms represented between 10.6 % and 25.6 % of the sampled diversity in each location. Non-indigenous and category 1 and 2 cryptogenic species were present in each port and marina, although their relative contributions differed between locations (Fig. 27b). Non-indigenous species represented between 3.6 % of all identified species in Bluff and 16.1 % in Whangarei Marina. NIS comprised 7.5 % of the total sampled diversity in the Port of Auckland (Fig. 27b), ranking it 6th highest in percentage composition of NIS from the sixteen locations surveyed.

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 with 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).

A considerable proportion of the commercial shipping arriving in the port of Auckland from overseas comes from temperate regions such as Australia (35.1 %) and the north-west Pacific (10.7 %); environments which are broadly compatible with those in the Port of Auckland. In addition, the Port of Auckland is the biggest general cargo port, handling a wide variety of cargo including containers, petroleum products, breakbulk, and bulk cargo. This is reflected in the high volume of ballast that is discharged in the Port of Auckland. According to Inglis (2001), a total volume of 20,571 m^3 of ballast water was discharged in the Port of Auckland in 1999, with the largest country-of-origin volumes being 3,656 m^3 from Australia, 3,475 m^3 from Taiwan, 1,466 m^3 from Hong Kong. Shipping from these regions presents an on-going risk of introduction of new NIS to the Port of Auckland. A further 9,681 m^3 of ballast water was translocated to the Port of Auckland from unspecified locations.

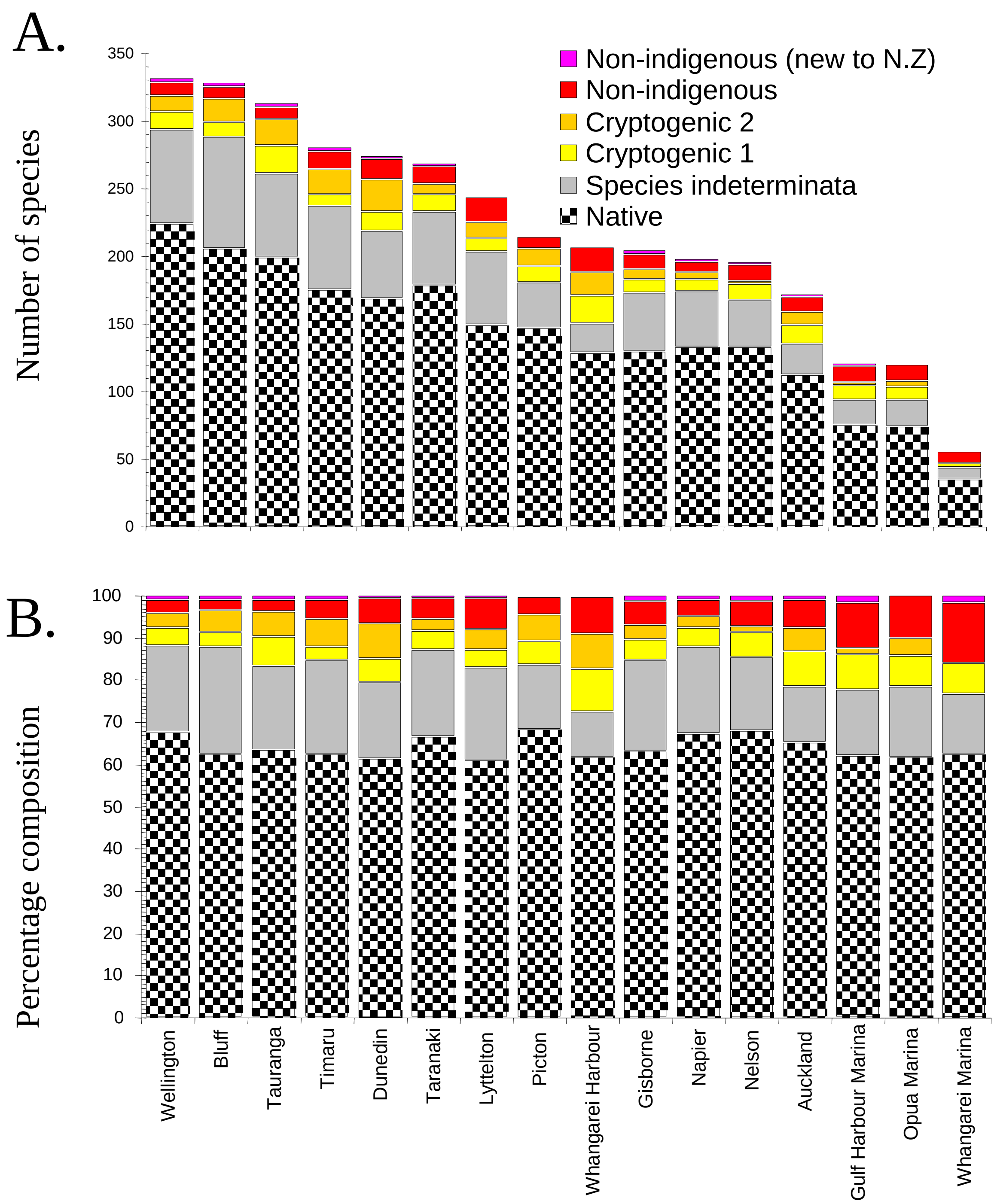

Figure 27: Differences in (a) the number of species, and (b) the relative proportions of non-indigenous, cryptogenic, species indeterminata and native categories among the sixteen locations sampled over the summers of 2001 – 2002, and 2002-2003. Locations are presented in order of decreasing species diversity sampled.

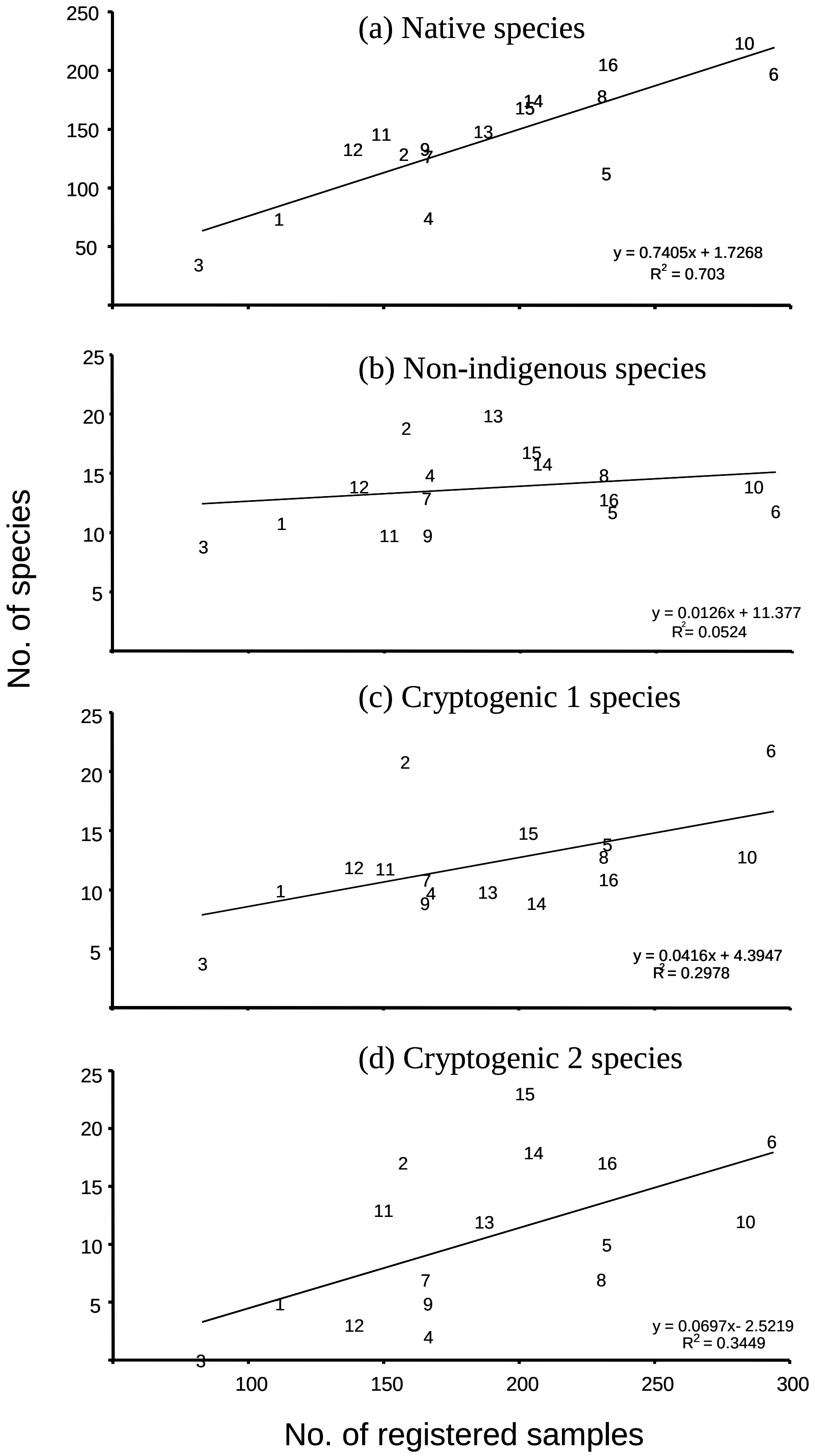

Figure 28. Linear regression equations relating numbers of species detected to sample effort at the 16 locations surveyed nation-wide. Location codes are as follows; 1 = Opua Marina, 2 = Whangarei Port, 3 = Whangarei Marina, 4 = Gulf Harbour Marina, 5 = Auckland Port, 6 = Tauranga Port, 7 = Gisborne 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 translocation risk for non-indigenous species found in the port

As a major international port, the Port of Auckland is connected directly to ports in Australia, Hong Kong and Taiwan through regular shipping traffic. It is also connected to the domestic ports of Whangarei, Nelson and Lyttelton by regular coastal shipping and is 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 Auckland survey have been found widely in New Zealand during these surveys, there were some notable exceptions.

The ascidian *Cnemidocarpa* sp. was first described from New Zealand waters during these port surveys, and was found to be present in Auckland, Gisborne, Gulf Harbour Marina, Nelson, Picton, Tauranga, Taranaki, Timaru and Wellington. Little is currently known about this species, however it appears to now be widely spread through New Zealand's shipping ports where it may be competing with native fauna for space in fouling assemblages. The bryozoan *Celleporaria* sp 1 was also first described from New Zealand waters during these port surveys. However in contrast to *Cnemidocarpa*, this species was only found in Whangarei Harbour and the Port of Auckland, and it does not appear to have spread widely around the country at this time. Its ecological impacts are unknown although it may compete with native fauna for resources.

The Asian portunid crab *Charybdis japonica* also currently has a restricted distribution, being limited to Waitemata Harbour, Tamaki and Weiti estuaries (Gust and Inglis In Press). In October 2003, a single mature female *C. japonica* was trapped at berths within the Port of Whangarei. Subsequent intensive trapping throughout Whangarei Harbour, and in estuaries at Ngunguru, Pataua, Ruakaka and Mangawhai, did not collect any additional specimens (Inglis et al 2004). It appears that the species has not yet established in Whangarei and it is possible that the specimen captured there was transported by shipping from the Waitemata population and did not arrive through natural larval or adult dispersal. *C. japonica* is a large, aggressive crab that feeds on shellfish and other benthic infauna. It poses a risk to valued intertidal and shallow subtidal beds of cockles (*Austrovenus stutchburyi*), pipi (*Paphies australis*), tua tua (*P. subtriangulata*), scallops (*Pecten novaezelandiae*), and other valued shellfish. Although New Zealand is the first country that *C. japonica* has become established in outside its native range, a single specimen was trapped in South Australia in 2000, and a related species, *C. hellerii* has established non-indigenous populations in Colombia, Cuba, Venezuela, Florida and Brazil (Dineen et al. 2001). *C. hellerii* was recently recorded in the sea-chest of a fishing vessel surveyed in the port of Nelson (Dodgshun and Coutts 2002). It appears, therefore, that species from this genus are transported quite readily by shipping and that measures may be necessary to prevent its translocation to other New Zealand ports.

The highly invasive alga, *Undaria pinnatifida*, was not found in the Port of Auckland during this survey, undertaken in April 2003. *U. pinnatifida* has since been found (in September 2004) in parts of Westhaven Marina, Viaduct Harbour and along the breakwall at Wynyard Wharf (Stuart and McClary 2004). It has been spread through shipping and other vectors to 11 of the 16 ports and marinas surveyed during the baseline surveys (the exceptions being Opua Marina, Whangarei Port and Marina, Gulf Harbour Marina and Tauranga Port). A control programme in Bluff Harbour has subsequently removed populations established there. Nevertheless, vessels departing from the Port of Auckland and Westhaven Marina after having spent time at berth within areas of infestation may pose a significant risk of spreading this species to ports within New Zealand that remain uninfested and to valued marine environments in the Hauraki Gulf and north of Auckland where *U. pinnatifida* is not currently present. 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. As such coal barges, recreational craft, and seasonal fishing vessels that are laid up for significant periods pose a particular risk for the spread of *Undaria* and other fouling organisms. Preventing further spread will require greater scrutiny of poorly maintained boats and other vessel types departing from infested locations and regular surveillance of uninfested locations for signs of the presence of *U. pinnatifida* sporophytes (the visible adult plant).

Management of existing non-indigenous species in the port

Most of the NIS detected in this survey appear to be well established in the Port of Auckland. With the exceptions of *Charybdis japonica* and *Celleporaria* sp. (discussed in Section 5 above), and the goby *Arenigobius bifrenatus*, most of the NIS found within the Port of Auckland have widespread distributions in other ports and marinas nationwide (Table 10). It is unclear at this stage, whether the population of *C. japonica* in Waitemata harbour is self-sustaining, since catch rates for this species have been declining in the harbour since 2002 (NIWA unpubl. data). Further surveys targeting this species are necessary to determine whether it is successfully reproducing in Waitemata Harbour.

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 Auckland are widespread and local population controls are unlikely to be effective. Management should be directed toward preventing spread of species established in Auckland Harbour to locations where they do not presently occur. This may be particularly relevant to potentially harmful species found in the Port of Auckland and few other locations nationwide. Such management will require better understanding of the frequency of movements by vessels of different types from the Port of Auckland 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 Auckland from high-risk locations elsewhere in New Zealand or overseas. Under the Biosecurity Act 1993, the New Zealand Government has developed an Import Health Standard for ballast water that requires large ships to exchange foreign coastal ballast water with oceanic water prior to entering New Zealand, unless exempted on safety grounds. This procedure ("ballast exchange") does not remove all risk, but does reduce the abundance and diversity of coastal species that may be discharged with ballast. Ballast exchange requirements do not currently apply to ballast water that is uptaken domestically. Globally, shipping nations are moving toward implementing the International Convention for the Control and Management of Ships Ballast Water & Sediments that was recently adopted by the International Maritime Organisation (IMO). By 2016 all merchant vessels will be required to meet discharge standards for ballast water that are stipulated within the agreement.

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

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

Conclusions and recommendations

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

The predominance of hull fouling as a likely introduction vector for NIS encountered in the Port of Auckland (probably responsible for 61.5% of the NIS introductions) is consistent with previous findings from a range of overseas locations. For instance, Hewitt et al. (1999) attributed the introduction of 77 % of the 99 NIS encountered in Port Phillip Bay (Australia) to hull fouling, and only 20 % to ballast water. Similarly, 61 % of the 348 marine and brackish water NIS established in the Hawaiian Islands are thought to have arrived on ships' hulls, but only 5 % in ballast water (Eldredge and Carlton 2002). However, ballast water is thought to be responsible for the introduction of 30 % of the 212 marine NIS established in San Fransisco Bay (USA), compared to 34 % for hull fouling (Cohen and Carlton 1995). The high percentages of NIS thought to have been introduced by hull fouling in Australasia may reflect the fact that hull fouling has a far longer history (~200 years) as an introduction vector than ballast water (~40 years) (Hewitt et al. 1999). However, the fact that some of New Zealand and Australia's most recent marine NIS introductions (e.g. *Undaria pinnatifida*, *Codium fragile sp. tomentosoides*) have been facilitated by hull fouling suggests that it has remained an important transport mechanism (Cranfield et al. 1998; Hewitt et al. 1999).

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

Acknowledgements

We thank the Port of Auckland for access to its facilities and assistance during the survey, and Murray Dennis for port information. We also thank the following people for field assistance with the diving, boat, trapping and sorting of organisms during this survey program: Aleki Taumoepeau, Anna Bradley, Anthony Dugdale, Corina Kemp, Crispin Middleton, Evan Skipworth, Gavin Newmarch, Geoff Holland, Graeme MacKay, Ian Maze, Jeff Forman, John Hunt, Kate Neill, Marty Flanagan, Matt Smith, Mike Page, Neil Blair, Niki Davey, Peter Marriott, Phil James, Rob Stewart, Rob Tasker, Scott Stephens, Sean Handley, Stephen Brown, Todd Williston, Tony Dugdale and Walter Hillman. Many thanks to Don Morrisey for reviewing drafts of this report.

We also extend our thanks to the numerous taxonomists involved in this programme, including: Bruce Marshall, Clive Roberts, Colin McLay, David Staples, Dennis Gordon, Don McKnight, Fukuoka Kouki, Geoff Read, Hoe Chang, Jan Watson, Lesley Newman, Michelle Kelly, Mike Page, Niel Bruce, Niki Davey, Patricia Kott, Sean Handley and Wendy Nelson.

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Tables

Table 1: Berthage facilities in the Port of Auckland.

Wharf	No of Berths	Purpose	Construction	Total Length of Berths (m)	Depth (m below chart datum)
Axis Fergusson container terminal	4	Containers	Concrete deck/concrete piling with wooden fendering	610	13.5
Freyberg Wharf	2	Containers, general cargo, fruit & vegetables, steel, dry bulk cargo, imported vehicles	Concrete deck/concrete piling with wooden fendering, some steel sheet piling on south end	426	12
Jellicoe Wharf	4	Containers, general cargo, fruit & vegetables, steel, dry bulk cargo, imported vehicles	Concrete deck/concrete piling with wooden fendering	670	12
Axis Bledisloe Wharf	2	Containers	Concrete deck/concrete piling with wooden fendering	430	8-12
Marsden Wharf	2	Imported vehicles	Concrete deck/concrete piling with wooden fendering	398	2-10
Captain Cook Wharf	2	Imported vehicles	Concrete deck/concrete piling with wooden fendering	478	10
Queens Wharf	2	Imported vehicles, fruit & vegetables, timber, back-up cruise ship berth	Concrete deck/concrete piling with wooden fendering	516	12
Princes Wharf		Passenger vessels, water taxis, accomodation	Concrete deck/concrete piling with wooden fendering	516	13
Wynyard Wharf	2	Chemicals, mineral, vegetable oils, fish, general cargo, bulk sand, petroleum based products	Concrete deck/concrete piling with wooden fendering	486	13

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	
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

	CRIMP Protocol		NIWA Method		
Taxa sampled	Survey method	Sample procedure	Survey method	Sample procedure	Notes
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 Auckland sampling effort.

Sample method	Number of shipping berths sampled	Number of samples taken
Benthic Sled Tows	6	12
Benthic Grab (Shipek)	6	18
Box traps	6	24
Diver quadrat scraping	6	101
Opera house fish traps	6	24
Starfish traps	6	24
Shrimp traps	5	20
Javelin cores	N/A	10

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

Sample Depth (M)	Outer Piles	Inner Piles
0.5	2 concrete, 10 wood	12 concrete
1.5	2 concrete, 10 wood	12 concrete
3.5	2 concrete, 10 wood	12 concrete
7	2 concrete, 8 wood	8 concrete
Miscellaneous	1 concrete, 6 wood	4 concrete

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 Auckland survey.

Phylum, Class	Order	Family	Genus and species
Annelida			
Polychaeta	Eunicida	Lumbrineridae	*Lumbrineris sphaerocephala*
Polychaeta	Phyllodocida	Glyceridae	*Glycera lamelliformis*
Polychaeta	Phyllodocida	Goniadidae	*Glycinde dorsalis*
Polychaeta	Phyllodocida	Nephtyidae	*Aglaophamus verrilli*
Polychaeta	Phyllodocida	Nereididae	*Perinereis pseudocamiguina*
Polychaeta	Phyllodocida	Phyllodocidae	*Eulalia microphylla*
Polychaeta	Phyllodocida	Polynoidae	*Harmothoe macrolepidota*
Polychaeta	Phyllodocida	Polynoidae	*Lepidonotus polychromus*
Polychaeta	Phyllodocida	Sigalionidae	*Labiosthenolepis laevis*
Polychaeta	Phyllodocida	Syllidae	*Haplosyllis spongicola*
Polychaeta	Phyllodocida	Syllidae	*Trypanosyllis zebra*
Polychaeta	Sabellida	Sabellariidae	*Neosabellaria kaiparaensis*
Polychaeta	Sabellida	Sabellariidae	*Paraidanthyrsus quadricornis*
Polychaeta	Sabellida	Sabellidae	*Megalomma suspiciens*
Polychaeta	Sabellida	Sabellidae	*Pseudopotamilla alba*
Polychaeta	Sabellida	Sabellidae	*Pseudopotamilla laciniosa*
Polychaeta	Sabellida	Serpulidae	*Filograna implexa*
Polychaeta	Sabellida	Serpulidae	*Spirobranchus cariniferus*
Polychaeta	Scolecida	Orbiniidae	*Phylo novazealandiae*
Polychaeta	Terebellida	Acrocirridae	*Acrocirrus trisectus*
Polychaeta	Terebellida	Cirratulidae	*Protocirrineris nuchalis*
Polychaeta	Terebellida	Cirratulidae	*Timarete anchylochaetus*
Polychaeta	Terebellida	Flabelligeridae	*Flabelligera affinis*
Polychaeta	Terebellida	Flabelligeridae	*Pherusa-parmata parmata*
Polychaeta	Terebellida	Pectinariidae	*Pectinaria australis*
Polychaeta	Terebellida	Terebellidae	*Pseudopista rostrata*
Polychaeta	Terebellida	Terebellidae	*Streblosoma toddae*
Bryozoa			
Gymnolaemata	Cheilostomata	Beaniidae	*Beania n.sp.*
Gymnolaemata	Cheilostomata	Beaniidae	*Beania plurispinosa*
Gymnolaemata	Cheilostomata	Candidae	*Caberea rostrata*
Gymnolaemata	Cheilostomata	Chaperiidae	*Chaperiopsis cervicornis*

Phylum, Class	Order	Family	Genus and species
Gymnolaemata	Cheilostomata	Hippoporidridae	*Odontoporella n.sp.*
Chelicerata			
Pycnogonida	Pantopoda	Ammotheidae	*Achelia assimilis*
Cnidaria			
Hydrozoa	Hydroida	Sertulariidae	*Amphisbetia fasciculata*
Hydrozoa	Hydroida	Solanderiidae	*Solanderia ericopsis*
Crustacea			
Cirripedia	Thoracica	Balanidae	*Austrominius modestus*
Cirripedia	Thoracica	Chthamalidae	*Chaemosipho columna*
Malacostraca	Amphipoda	Liljeborgiidae	*Liljeborgia akaroica*
Malacostraca	Amphipoda	Lysianassidae	*Parawaldeckia vesca*
Malacostraca	Amphipoda	Melitidae	*Melita festiva*
Malacostraca	Amphipoda	Podoceridae	*Podocerus cristatus*
Malacostraca	Anomura	Porcellanidae	*Petrolisthes elongatus*
Malacostraca	Anomura	Porcellanidae	*Petrolisthes novaezelandiae*
Malacostraca	Brachyura	Hymenosomatidae	*Halicarcinus cookii*
Malacostraca	Brachyura	Hymenosomatidae	*Halicarcinus varius*
Malacostraca	Brachyura	Hymenosomatidae	*Halimena aoteoroa*
Malacostraca	Brachyura	Majidae	*Notomithrax minor*
Malacostraca	Brachyura	Ocypodidae	*Macrophthalmus hirtipes*
Malacostraca	Brachyura	Pinnotheridae	*Pinnotheres atrinocola*
Malacostraca	Brachyura	Pinnotheridae	*Pinnotheres novaezelandiae*
Malacostraca	Brachyura	Xanthidae	*Pilumnus lumpinus*
Malacostraca	Brachyura	Xanthidae	*Pilumnus novaezelandiae*
Malacostraca	Caridea	Alpheidae	*Alpheus richardsoni*
Malacostraca	Caridea	Crangonidae	*Pontophilus australis*
Malacostraca	Caridea	Palemonidae	*Periclimenes yaldwyni*
Malacostraca	Isopoda	Arcturidae	*Neastacilla aff. tuberculata*
Malacostraca	Isopoda	Cirolanidae	*Cirolana kokoru*
Malacostraca	Isopoda	Cirolanidae	*Cirolana quechso*
Malacostraca	Isopoda	Cirolanidae	*Natatolana rossi*
Malacostraca	Isopoda	Sphaeromatidae	*Pseudosphaeroma campbellensis*

Phylum, Class	Order	Family	Genus and species
Echinodermata			
Asteroidea	Valvatida	Asterinidae	*Patiriella regularis*
Mollusca			
Bivalvia	Myoida	Hiatellidae	*Hiatella arctica*
Bivalvia	Mytiloida	Mytilidae	*Modiolarca impacta*
Bivalvia	Mytiloida	Mytilidae	*Modiolus areolatus*
Bivalvia	Mytiloida	Mytilidae	*Perna canaliculus*
Bivalvia	Mytiloida	Mytilidae	*Xenostrobus pulex*
Bivalvia	Ostreoida	Ostreidae	*Ostrea chilensis*
Bivalvia	Pterioida	Pectinidae	*Talochlamys zelandiae*
Bivalvia	Veneroida	Lasaeidae	*Lasaea hinemoa*
Gastropoda	Basommatophora	Ellobiidae	*Leuconopsis obsoleta*
Gastropoda	Littorinimorpha	Calyptraeidae	*Maoricrypta costata*
Gastropoda	Littorinimorpha	Calyptraeidae	*Sigapatella novaezelandiae*
Gastropoda	Littorinimorpha	Littorinidae	*Risellopsis varia*
Gastropoda	Neogastropoda	Buccinidae	*Cominella adspersa*
Gastropoda	Systellomatophora	Onchidiidae	*Onchidella nigricans*
Gastropoda	Vetigastropoda	Fissurellidae	*Tugali suteri*
Polyplacophora	Acanthochitonina	Acanthochitonidae	*Acanthochitona zelandica*
Polyplacophora	Acanthochitonina	Acanthochitonidae	*Cryptoconchus porosus*
Polyplacophora	Ischnochitonina	Chitonidae	*Onithochiton neglectus*
Polyplacophora	Ischnochitonina	Chitonidae	*Sypharochiton pelliserpentis*
Polyplacophora	Ischnochitonina	Chitonidae	*Sypharochiton sinclairi*
Phycophyta			
Phaeophyceae	Fucales	Sargassaceae	*Carpophyllum flexuosum*
Porifera			
Demospongiae	Haplosclerida	Chalinidae	*Adocia cf. parietalioides*
Demospongiae	Haplosclerida	Chalinidae	*Adocia cf. venustina*
Demospongiae	Haplosclerida	Chalinidae	*Haliclona maxima*
Demospongiae	Haplosclerida	Chalinidae	*Haliclona stelliderma*
Pyrrophycophyta			
Dinophyceae	Gymnodiniales	Gymnodiniacea	*Cochlodinium sp.*

Phylum, Class	Order	Family	Genus and species
Dinophyceae	Peridiniales	Peridiniaceae	*Lingulodinium polyedrum*
Dinophyceae	Peridiniales	Peridiniaceae	*Protoperidinium conicum*
Dinophyceae	Peridiniales	Peridiniaceae	*Protoperidinium conicum cf. conicoides*
Dinophyceae	Peridiniales	Peridiniaceae	*Protoperidinium sp.*
Dinophyceae	Peridiniales	Peridiniaceae	*Scrippsiella trochoidea*
Urochordata			
Ascidiacea	Aplousobranchia	Didemnidae	*Lissoclinum notti*
Ascidiacea	Aplousobranchia	Polyclinidae	*Aplidium adamsi*
Ascidiacea	Stolidobranchia	Molgulidae	*Molgula amokurae*
Ascidiacea	Stolidobranchia	Molgulidae	*Molgula mortenseni*
Ascidiacea	Stolidobranchia	Polyzoinae	*Polyzoa opuntia*
Ascidiacea	Stolidobranchia	Pyuridae	*Microcosmus australis*
Ascidiacea	Stolidobranchia	Pyuridae	*Pyura cancellata*
Ascidiacea	Stolidobranchia	Pyuridae	*Pyura picta*
Ascidiacea	Stolidobranchia	Pyuridae	*Pyura rugata*
Ascidiacea	Stolidobranchia	Pyuridae	*Pyura subuculata*
Ascidiacea	Stolidobranchia	Styelidae	*Asterocarpa coerulea*
Ascidiacea	Stolidobranchia	Styelidae	*Cnemidocarpa bicornuta*
Ascidiacea	Stolidobranchia	Styelidae	*Cnemidocarpa nisiotus*
Ascidiacea	Stolidobranchia	Styelidae	*Polycarpa pegasus*
Vertebrata			
Actinopterygii	Anguilliformes	Anguillidae	*Anguilla australis*
Actinopterygii	Anguilliformes	Congridae	*Conger wilsoni*
Actinopterygii	Mugiliformes	Mugilidae	*Aldrichetta forsteri*
Actinopterygii	Perciformes	Carangidae	*Decapterus koheru*
Actinopterygii	Perciformes	Carangidae	*Trachurus novaezelandiae*
Actinopterygii	Perciformes	Labridae	*Notolabrus celidotus*
Actinopterygii	Perciformes	Sparidae	*Pagrus auratus*
Actinopterygii	Perciformes	Trypterigiidae	*Forsterygion lapillum*

Table 7. Cryptogenic marine species recorded from the Port of Auckland 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	
Cnidaria				
Hydrozoa	Hydroida	Bougainvilliidae	*Bougainvillia muscus*	C1
Hydrozoa	Hydroida	Campanulariidae	*Clytia hemisphaerica*	C1
Hydrozoa	Hydroida	Campanulariidae	*Obelia bidentata*	C1
Crustacea				
Cirripedia	Thoracica	Balanidae	*Balanus trigonus*	C1
Malacostraca	Amphipoda	Lysianassidae	*Acontiostoma n.sp.*	C2
Malacostraca	Brachyura	Xanthidae	*Pilumnopeus serratifrons*	C1
Porifera				
Demospongiae	Dictyoceratida	Dysideidae	*Euryspongia n. sp. 1*	C2
Demospongiae	Dictyoceratida	Dysideidae	*Euryspongia n. sp. 2*	C2
Demospongiae	Haplosclerida	Callyspongiidae	*Callyspongia ramosa*	C1
Demospongiae	Haplosclerida	Chalinidae	*Adocia n. sp. 2*	C2
Demospongiae	Haplosclerida	Chalinidae	*Adocia n. sp. 4*	C2
Demospongiae	Haplosclerida	Chalinidae	*Adocia n. sp. 6*	C2
Demospongiae	Haplosclerida	Chalinidae	*Haliclona heterofibrosa*	C1
Demospongiae	Haplosclerida	Chalinidae	*Haliclona n. sp. 5*	C2
Demospongiae	Haplosclerida	Chalinidae	*Haliclona n. sp. 16*	C2
Demospongiae	Homosclerophorida	Plakinidae	*Plakina monolopha*	C1
Demospongiae	Poecilosclerida	Esperiopsidae	*Esperiopsis n. sp. 1*	C2
Pyrrophycophyta				
Dinophyceae	Gymnodiniales	Gymnodiniacea	*Gymnodinium catenatum*	C1
Urochordata				
Ascidiacea	Aplousobranchia	Didemnidae	*Diplosoma listerianum*	C1
Ascidiacea	Aplousobranchia	Polyclinidae	*Aplidium phortax*	C1
Ascidiacea	Phlebobranchia	Pyuridae	*Microcosmus squamiger*	C2
Ascidiacea	Phlebobranchia	Rhodosomatidae	*Corella eumyota*	C1
Ascidiacea	Stolidobranchia	Styelidae	*Asterocarpa cerea*	C1
Ascidiacea	Stolidobranchia	Styelidae	*Styela plicata*	C1

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

Phylum, Class	Order	Family	Genus and species	Probable means of introduction	Date of introduction or detection (d)
Annelida					
Polychaeta	Sabellida	Serpulidae	*Hydroides elegans*	H or B	Pre-1952
Bryozoa					
Gymnolaemata	Cheilostomata	Bugulidae	*Bugula flabellata*	H	Pre-1949
Gymnolaemata	Cheilostomata	Bugulidae	*Bugula neritina*	H	1949
Gymnolaemata	Cheilostomata	Lepraliellidae	*Celleporaria* sp. 1 **(NR)**	H	Nov. 2002 [d]
Gymnolaemata	Ctenostomata	Nolellidae	*Anguinella palmata*	H	1960
Cnidaria					
Hydrozoa	Hydroida	Campanulariidae	*Obelia longissima*	H	Pre-1928
Hydrozoa	Hydroida	Pennariidae	*Pennaria disticha*	H	Pre-1928
Crustacea					
Malacostraca	Brachyura	Portunidae	*Charybdis japonica*	H or B	Sep. 2000 [d]
Mollusca					
Bivalvia	Ostreoida	Ostreidae	*Crassostrea gigas*	H	1961
Bivalvia	Veneroida	Semelidae	*Theora lubrica*	B	1971
Porifera					
Demospongiae	Halisarcida	Halisarcidae	*Halisarca dujardini*	H or B	Pre-1973
Urochordata					
Ascidiacea	Stolidobranchia	Styelidae	*Cnemidocarpa* sp. **(NR)**	H	Dec. 2001 [d]
Vertebrata					
Actinopterygii	Perciformes	Gobiidae	*Arenigobius bifrenatus*	B [1]	1998 [d]

[1] Based on predictions of Willis et al. 1999.

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

Phylum, Class	Order	Family	Genus and species
Annelida			
Polychaeta	Terebellida	Cirratulidae	*Cirratulidae Indet*
Polychaeta	Eunicida	Lumbrineridae	*Lumbrineridae Indet*
Polychaeta	Phyllodocida	Nereididae	*Nereididae Indet*
Polychaeta	Scolecida	Orbiniidae	*Orbiniidae Indet*
Polychaeta	Sabellida	Sabellidae	*Pseudopotamilla Indet*
Polychaeta	Sabellida	Sabellidae	*Pseudopotamilla Pseudopotamilla-A*
Polychaeta	Sabellida	Sabellidae	*Sabellidae Indet*
Polychaeta	Terebellida	Terebellidae	*Terebellidae Indet*
Polychaeta	Phyllodocida	Syllidae	*Typosyllis Typosyllis-B*
Cnidaria			
Hydrozoa	Hydroida	Campanulariidae	*Clytia sp. 1*
Hydrozoa	Hydroida	Campanulariidae	*Obelia sp. 1*
Crustacea			
Cirripedia	Thoracica	Balanidae	*Balanus sp.*
Malacostraca	Amphipoda	Aoridae	*Aoridae sp.*
Malacostraca	Isopoda	Sphaeromatidae	*Cilicaea sp.*
Malacostraca	Isopoda	Cirolanidae	*Cirolana? kokoru*
Malacostraca	Isopoda	Sphaeromatidae	*Ischyromene sp.*
Malacostraca	Isopoda		*Isopoda sp.*
Malacostraca	Isopoda	Mysidacea	*Mysidacea sp.*
Mollusca			
Gastropoda			*Gastropoda sp.*
Phycophyta			
Rhodophyceae	Gracilariales	Gracilariceae	*Gracilaria sp.*
Urochordata			
Ascidiacea	Aplousobranchia	Didemnidae	*Didemnum sp.*
Vertebrata			
Actinopterygii	Perciformes	Gobiidae	*Gobiidae sp.*

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

Genus and species	Capture technique in Port of Auckland	Locations detected in Port of Auckland	Detected in other locations surveyed in ZBS2000_04
Hydroides elegans	Pile scrape	Jellicoe Wharf (See Fig 14)	Gulf Harbour Marina
Bugula flabellata	Pile scrape	Axis Ferguson; Jellicoe Wharf (See Fig 15)	Bluff, Dunedin, Lyttleton, Napier, Nelson, Opua Marina, Picton, Taranaki, Tauranga, Timaru, Whangarei Harbour, Wellington
Bugula neritina	Pile scrape	Jellicoe Wharf (See Fig 16)	Dunedin, Gisborne, Guld Harbour Marina, Lyttleton, Napier, Opua Marina, Taranaki, Tauranga, Timaru, Whangarei Harbour, Whangarei Marina
Celleporaria sp. 1	Benthic sled, Pile scrape	Marsden Wharf; Princes Wharf, Queens Wharf; Wynyard Wharf (See Fig 17)	Whangarei Harbour
Anguinella palmata	Pile scrape	Queens Wharf (See Fig 18)	Nelson
Obelia longissima	Pile scrape	Queens Wharf (See Fig 19)	Opua Marina, Whangarei Harbour
Pennaria disticha	Pile scrape, Benthic sled	Jellicoe Wharf; Princes Wharf; Queens Wharf (See Fig 20)	None
Charybdis japonica	Crab, Fish and Starfish traps	Axis Fergusson; Jellicoe Wharf; Princes Wharf; Marsden Wharf, Wynard Wharf (See Fig 21)	None
Crassostrea gigas	Pile scrape, Benthic sled	Axis Fergusson; Jellicoe Wharf; Marsden Wharf; Princes Wharf; Queens Wharf; Wynyard Wharf (See Fig 22)	Dunedin, Gulf Harbour Marina, Nelson, Opua, Taranaki, Whangarei Harbour

Genus and species	Capture technique in Port of Auckland	Locations detected in Port of Auckland	Detected in other locations surveyed in ZBS2000_04
Theora lubrica	Benthic sled, Benthic grab	Axis Fergusson; Capt Cook Wharf; Jellicoe Wharf; Marsden Wharf; Princes Wharf; Queens Wharf; Wynyard Wharf (See Fig 23)	Gisborne, Guld Harbour Marina, Lyttleton, Napier, Nelson, Opua Marina, Taranaki, Whangarei Harbour, Whangarei Marina, Wellington
Halisarca dujardini	Pile scrape	Jellicoe Wharf (See Fig 24)	Bluff, Dunedin, Picton, Taranaki and Wellington.
Cnemidocarpa sp.	Pile scrape	Axis Fergusson; Marsden Wharf (See Fig 25)	Gisborne, Gulf Harbour Marina, Lyttleton, Nelson, Picton, Taranaki, Tauranga, Timaru, Wellington
Arenigobius bifrenatus	Benthic sled	Jellicoe Wharf; Marsden Wharf; Princes Wharf; Wynyard Wharf (See Fig 26)	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: Criteria for assigning non-indigenous status to species sampled from the Port of Auckland.

Criteria that apply to each species are indicated by (+). Criteria (C1-C9) were developed by Chapman and Carlton (1994). Here we apply Cranfield et al.'s (1998) analysis to species previously known from New Zealand waters. For non-indigenous species 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 criteria.

Phylum and species	C1	C2	C3	C4	C5	C6	C7	C8	C9
Annelida									
Hydroides elegans	+	+	+	+	+	+	+	+	+
Bryozoa									
Bugula flabellata	+	+	+		+	+	+	+	+
Bugula neritina	+				+	+	+	+	+
Celleporaria sp. 1	+		+		+	+		+	+
Anguinella palmata	+	+			+	+	+	+	+
Cnidaria									
Obelia longissima	+	+	+						+
Pennaria disticha	+		+		+	+			
Crustacea									
Charybdis japonica	+	+						+	+
Mollusca									
Crassostrea gigas	+	+	+			+	+	+	+
Theora lubrica	+	+			+	+	+	+	+
Porifera									
Halisarca dujardini	+		+	+		+	+	+	+
Urochordata									
Cnemidocarpa sp.	+		+		+			+	
Vertebrata									
Arenigobius bifrenatus	+	+	+					+	+

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 Auckland

Site	Eastings	Northings	NZ Latitude	NZ Longitude	Survey Method	No. of sample units
FERGUS	2669411	6482661	-36.84565	174.78280	BGRB	1
FERGUS	2669450	6482713	-36.84517	174.78322	BGRB	1
FERGUS	2669463	6482560	-36.84655	174.78340	BGRB	1
FERGUS	2669423	6482710	-36.84520	174.78292	BSLD	2
FERGUS	2667942	6483087	-36.84208	174.76624	CRBTP	2
FERGUS	2669426	6483051	-36.84214	174.78287	CRBTP	2
FERGUS	2669429	6482832	-36.84411	174.78296	FSHTP	2
FERGUS	2669954	6482571	-36.84636	174.78890	FSHTP	2
FERGUS	2669500	6482606	-36.84612	174.78381	PSC	18
FERGUS	2667942	6483087	-36.84208	174.76624	SHRTP	2
FERGUS	2669426	6483051	-36.84214	174.78287	SHRTP	2
FERGUS	2667942	6483087	-36.84208	174.76624	STFTP	2
FERGUS	2669426	6483051	-36.84214	174.78287	STFTP	2
JELLICOE	2668807	6482745	-36.84500	174.77600	BGRB	1
JELLICOE	2668924	6482807	-36.84442	174.77730	BGRB	1
JELLICOE	2669054	6482936	-36.84324	174.77874	BGRB	1
JELLICOE	2668982	6482653	-36.84580	174.77799	BSLD	1
JELLICOE	2669023	6482696	-36.84540	174.77844	BSLD	1
JELLICOE	2668993	6482825	-36.84425	174.77807	CRBTP	2
JELLICOE	2669071	6482888	-36.84366	174.77893	CRBTP	2
JELLICOE	2668993	6482825	-36.84425	174.77807	FSHTP	2
JELLICOE	2669071	6482888	-36.84366	174.77893	FSHTP	2
JELLICOE	2668993	6482825	-36.84425	174.77807	PSC	18
JELLICOE	2668993	6482825	-36.84425	174.77807	SHRTP	2
JELLICOE	2669071	6482888	-36.84366	174.77893	SHRTP	2
JELLICOE	2668993	6482825	-36.84425	174.77807	STFTP	2
JELLICOE	2669071	6482888	-36.84366	174.77893	STFTP	2
MARSDEN	2668360	6482723	-36.84529	174.77100	BGRB	1
MARSDEN	2668384	6482815	-36.84445	174.77125	BGRB	1
MARSDEN	2668414	6482836	-36.84425	174.77159	BGRB	1
MARSDEN	2668387	6482665	-36.84580	174.77132	BSLD	1
MARSDEN	2668387	6482695	-36.84553	174.77131	BSLD	1
MARSDEN	2664389	6485197	-36.82372	174.72593	CRBTP	2
MARSDEN	2671822	6485045	-36.82372	174.80926	CRBTP	2
MARSDEN	2664389	6485197	-36.82372	174.72593	FSHTP	2
MARSDEN	2671822	6485045	-36.82372	174.80926	FSHTP	2
MARSDEN	2668349	6482715	-36.84536	174.77088	PSC	13
MARSDEN	2664389	6485197	-36.82372	174.72593	SHRTP	2
MARSDEN	2671822	6485045	-36.82372	174.80926	SHRTP	2
MARSDEN	2664389	6485197	-36.82372	174.72593	STFTP	2
MARSDEN	2671822	6485045	-36.82372	174.80926	STFTP	2
PRINCES	2667852	6482944	-36.84339	174.76525	BGRB	1
PRINCES	2667891	6483056	-36.84237	174.76567	BGRB	1
PRINCES	2667938	6483172	-36.84132	174.76617	BGRB	1
PRINCES	2667865	6482864	-36.84411	174.76542	BSLD	1
PRINCES	2667903	6482971	-36.84314	174.76582	BSLD	1
PRINCES	2667879	6483027	-36.84264	174.76554	CRBTP	2
PRINCES	2667913	6483128	-36.84172	174.76590	CRBTP	2

Site	Eastings	Northings	NZ Latitude	NZ Longitude	Survey Method	No. of sample units
PRINCES	2667718	6482940	-36.84345	174.76375	CYST	2
PRINCES	2667879	6483027	-36.84264	174.76554	FSHTP	2
PRINCES	2667913	6483128	-36.84172	174.76590	FSHTP	2
PRINCES	2667842	6482944	-36.84339	174.76514	PSC	18
PRINCES	2667879	6483027	-36.84264	174.76554	STFTP	2
PRINCES	2667913	6483128	-36.84172	174.76590	STFTP	2
QUEENS	2668089	6482777	-36.84485	174.76795	BGRB	1
QUEENS	2668138	6482855	-36.84414	174.76849	BGRB	1
QUEENS	2668190	6483065	-36.84224	174.76902	BGRB	1
QUEENS	2668129	6482755	-36.84504	174.76840	BSLD	1
QUEENS	2668148	6482805	-36.84459	174.76860	BSLD	1
QUEENS	2671822	6485045	-36.82372	174.80926	CRBTP	4
QUEENS	2668088	6482775	-36.84487	174.76794	CYST	2
QUEENS	2671822	6485045	-36.82372	174.80926	FSHTP	4
QUEENS	2668076	6482851	-36.84418	174.76779	PSC	18
QUEENS	2671822	6485045	-36.82372	174.80926	SHRTP	4
QUEENS	2671822	6485045	-36.82372	174.80926	STFTP	4
VIADUCT	2667562	6482817	-36.84459	174.76204	CYST	2
WESTHAVEN	2666642	6483561	-36.83805	174.75155	CYST	2
WYNARD	2667154	6483162	-36.84155	174.75739	BGRB	1
WYNARD	2667329	6483367	-36.83967	174.75930	BGRB	1
WYNARD	2667387	6483413	-36.83925	174.75994	BGRB	1
WYNARD	2667190	6483085	-36.84224	174.75780	BSLD	1
WYNARD	2667251	6483114	-36.84197	174.75849	BSLD	1
WYNARD	2666191	6483360	-36.83994	174.74654	CRBTP	4
WYNARD	2667138	6483146	-36.84170	174.75720	CYST	2
WYNARD	2666191	6483360	-36.83994	174.74654	FSHTP	4
WYNARD	2667088	6483121	-36.84193	174.75665	PSC	16
WYNARD	2666191	6483360	-36.83994	174.74654	SHRTP	4
WYNARD	2666191	6483360	-36.83994	174.74654	STFTP	4

*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	FERGUS																		JELLICOE			
				Pile replicate	1								2										1			
				Pile position	IN				OUT				IN					OUT					IN			
Class	Orders	Family	Genus	Species	*Status	1	2	3	4	1	2	3	4	1	2	3	4	MISC	1	2	3	4	MISC	1	2	3	4
Actinopterygii	Perciformes	Trypterigiidae	*Forsterygion*	*lapillum*	N	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ascidiacea	Aplousobranchia	Didemnidae	*Didemnum*	*sp.*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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
Ascidiacea	Aplousobranchia	Didemnidae	*Diplosoma*	*listerianum*	C1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Ascidiacea	Aplousobranchia	Polyclinidae	*Aplidium*	*adamsi*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	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
Ascidiacea	Phlebobranchia	Pyuridae	*Microcosmus*	*squamiger*	C2	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	1	0	1	0	0
Ascidiacea	Phlebobranchia	Rhodosomatidae	*Corella*	*eumyota*	C1	0	1	1	1	0	0	0	0	0	1	1	1	0	0	0	1	1	0	0	1	0	1
Ascidiacea	Stolidobranchia	Molgulidae	*Molgula*	*mortenseni*	N	0	0	0	0	0	1	0	0	0	1	1	0	0	0	0	1	0	1	0	1	0	0
Ascidiacea	Stolidobranchia	Molgulidae	*Molgula*	*amokurae*	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	Polyzoinae	*Polyzoa*	*opuntia*	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*	*picta*	N	1	1	1	0	1	0	1	1	0	0	1	0	0	0	0	1	0	1	0	0	1	0
Ascidiacea	Stolidobranchia	Pyuridae	*Pyura*	*rugata*	N	0	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0
Ascidiacea	Stolidobranchia	Pyuridae	*Pyura*	*subuculata*	N	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0
Ascidiacea	Stolidobranchia	Pyuridae	*Microcosmus*	*australis*	N	0	0	0	0	0	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	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Ascidiacea	Stolidobranchia	Styelidae	*Cnemidocarpa*	*nisiotus*	N	0	0	0	1	0	1	1	0	0	1	1	0	0	0	0	1	1	0	0	0	1	0
Ascidiacea	Stolidobranchia	Styelidae	*Cnemidocarpa*	*bicornuta*	N	0	0	0	0	0	0	1	0	0	1	0	1	0	0	1	1	1	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	1	0	0	0	0
Ascidiacea	Stolidobranchia	Styelidae	*Styela*	*plicata*	C1	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0
Ascidiacea	Stolidobranchia	Styelidae	*Cnemidocarpa*	*sp.*	A	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ascidiacea	Stolidobranchia	Styelidae	*Asterocarpa*	*coerulea*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ascidiacea	Stolidobranchia	Styelidae	*Polycarpa*	*pegasus*	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*	*regularis*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bivalvia	Myoida	Hiatellidae	*Hiatella*	*arctica*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bivalvia	Mytiloida	Mytilidae	*Xenostrobus*	*pulex*	N	1	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0
Bivalvia	Mytiloida	Mytilidae	*Perna*	*canaliculus*	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	0	0	0	0	0	0
Bivalvia	Mytiloida	Mytilidae	*Modiolus*	*areolatus*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bivalvia	Ostreoida	Ostreidae	*Crassostrea*	*gigas*	A	1	0	0	0	1	0	1	0	1	0	0	0	0	1	1	1	1	0	0	0	0	0
Bivalvia	Ostreoida	Ostreidae	*Ostrea*	*chilensis*	N	0	0	1	0	1	1	1	0	0	1	1	1	0	0	1	1	1	0	1	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
Bivalvia	Veneroida	Lasaeidae	*Lasaea*	*hinemoa*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Crustacea	Anomura	Porcellanidae	*Petrolisthes*	*novaezelandiae*	N	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1	1
Crustacea	Anomura	Porcellanidae	*Petrolisthes*	*elongatus*	N	0	0	0	0	0	1	1	0	0	0	0	0	0	1	1	0	0	0	0	0	1	0
Crustacea	Brachyura	Hymenosomatidae	*Halicarcinus*	*varius*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	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
Crustacea	Brachyura	Hymenosomatidae	*Halimena*	*aoteoroa*	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*	*minor*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Crustacea	Brachyura	Pinnotheridae	*Pinnotheres*	*atrinocola*	N	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Crustacea	Brachyura	Pinnotheridae	*Pinnotheres*	*novaezelandiae*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Crustacea	Brachyura	Xanthidae	*Pilumnus*	*novaezelandiae*	N	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
Crustacea	Brachyura	Xanthidae	*Pilumnopeus*	*serratifrons*	C1	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	1	0	0	0	0	0	0
Crustacea	Brachyura	Xanthidae	*Pilumnus*	*lumpinus*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Crustacea	Caridea	Palemonidae	*Periclimenes*	*yaldwyni*	N	0	0	0	0	0	1	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Crustacea	Thoracica	Balanidae	*Austrominius*	*modestus*	N	1	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0
Crustacea	Thoracica	Balanidae	*Balanus*	*trigonus*	C1	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	*Balanus*	*sp.*	SI	0	0	0	0	0	0	0	0	0	0	0	1	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
Demospongiae	Dictyoceratida	Dysideidae	*Euryspongia*	*n. sp. 1 (soft spikey tan cushion)*	C2	0	1	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
Demospongiae	Dictyoceratida	Dysideidae	*Euryspongia*	*n. sp. 2 (pale blue bushy encrusting)*	C2	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Demospongiae	Halisarcida	Halisarcidae	*Halisarca*	*dujardini*	A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Demospongiae	Haplosclerida	Callyspongiidae	*Callyspongia*	*ramosa*	C1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Demospongiae	Haplosclerida	Chalinidae	*Haliclona*	*heterofibrosa*	C1	0	0	1	0	0	1	1	1	0	1	0	1	0	0	1	1	1	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	FERGUS																		JELLICOE			
					Pile replicate	1								2										1			
					Pile position	IN				OUT				IN					OUT					IN			
Class	Orders	Family	Genus	Species	*Status	1	2	3	4	1	2	3	4	1	2	3	4	MISC	1	2	3	4	MISC	1	2	3	4
Demospongiae	Haplosclerida	Chalinidae	*Adocia*	*cf. parietalioides*	N	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Demospongiae	Haplosclerida	Chalinidae	*Adocia*	*n. sp. 6 (Auckland smooth)*	C2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1
Demospongiae	Haplosclerida	Chalinidae	*Haliclona*	*stelliderma*	N	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Demospongiae	Haplosclerida	Chalinidae	*Adocia*	*n. sp. 2 (smooth tough 180)*	C2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0
Demospongiae	Haplosclerida	Chalinidae	*Adocia*	*cf. venustina*	N	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Demospongiae	Haplosclerida	Chalinidae	*Haliclona*	*maxima*	N	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Demospongiae	Homosclerophorida	Plakinidae	*Plakina*	*monolopha*	C1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Demospongiae	Poecilosclerida	Esperiopsidae	*Esperiopsis*	*n. sp. 1 (smooth bubble sponge)*	C2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gastropoda	Basommatophora	Ellobiidae	*Leuconopsis*	*obsoleta*	N	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	*Maoricrypta*	*costata*	N	0	0	1	1	0	1	1	1	0	1	1	1	0	0	0	1	1	0	0	1	0	1
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
Gastropoda	Littorinimorpha	Littorinidae	*Risellopsis*	*varia*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Gastropoda	Systellomatophora	Onchidiidae	*Onchidella*	*nigricans*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gastropoda	Vetigastropoda	Fissurellidae	*Tugali*	*suteri*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gymnolaemata	Cheilostomata	Beaniidae	*Beania*	*plurispinosa*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Gymnolaemata	Cheilostomata	Beaniidae	*Beania*	*n.sp.*	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	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Gymnolaemata	Cheilostomata	Bugulidae	*Bugula*	*neritina*	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	1	1	0	1	1	1	0	1	1	1	0	0	0	1	1	0	0	1	0	1
Gymnolaemata	Cheilostomata	Chaperiidae	*Chaperiopsis*	*cervicornis*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Gymnolaemata	Cheilostomata	Lepraliellidae	*Celleporaria*	*sp. 1*	A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gymnolaemata	Ctenostomata	Nolellidae	*Anguinella*	*palmata*	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	Bougainvilliidae	*Bougainvillia*	*muscus*	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	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	Campanulariidae	*Obelia*	*bidentata*	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	Campanulariidae	*Clytia*	*hemisphaerica*	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	Campanulariidae	*Obelia*	*longissima*	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	*Obelia*	*sp.*	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	Pennariidae	*Pennaria*	*disticha*	A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Hydrozoa	Hydroida	Solanderiidae	*Solanderia*	*ericopsis*	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	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
Malacostraca	Amphipoda	Liljeborgiidae	*Liljeborgia*	*akaroica*	N	0	0	1	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Malacostraca	Amphipoda	Lysianassidae	*Acontiostoma*	*n.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*	*vesca*	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	Melitidae	*Melita*	*festiva*	N	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0
Malacostraca	Amphipoda	Podoceridae	*Podocerus*	*cristatus*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Malacostraca	Isopoda	Arcturidae	*Neastacilla*	*aff. tuberculata*	N	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	*Cirolana*	*quechso*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Malacostraca	Isopoda	Cirolanidae	*Cirolana*	*kokoru*	N	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
Malacostraca	Isopoda	Mysidacea	*Mysidacea*	*sp.*	SI	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	*Pseudosphaeroma*	*campbellensis*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	1	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
Malacostraca	Isopoda	Sphaeromatidae	*Ischyromene*	*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	Fucales	Sargassaceae	*Carpophyllum*	*flexuosum*	N	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Eunicida	Lumbrineridae	*Lumbrineris*	*sphaerocephala*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Phyllodocida	Nereididae	*Nereididae*	*Indet*	SI	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Polychaeta	Phyllodocida	Nereididae	*Perinereis*	*pseudocamiguina*	N	1	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*	*microphylla*	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	Polynoidae	*Lepidonotus*	*polychromus*	N	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0
Polychaeta	Phyllodocida	Polynoidae	*Harmothoe*	*macrolepidota*	N	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	*Trypanosyllis*	*zebra*	N	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Phyllodocida	Syllidae	*Typosyllis*	*Typosyllis-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	*Haplosyllis*	*spongicola*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

*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	FERGUS																					JELLICOE			
					Pile replicate	1								2													1			
					Pile position	IN				OUT				IN					OUT								IN			
Class	Orders	Family	Genus	Species	*Status	1	2	3	4	1	2	3	4	1	2	3	4	MISC	1	2	3	4	MISC				1	2	3	4
Polychaeta	Sabellida	Sabellariidae	*Neosabellaria*	*kaiparaensis*	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	Sabellariidae	*Paraidanthyrsus*	*quadricornis*	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	Sabellidae	*Pseudopotamilla*	*alba*	N	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0				0	0	0	0
Polychaeta	Sabellida	Sabellidae	*Megalomma*	*suspiciens*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0				0	0	0	0
Polychaeta	Sabellida	Sabellidae	*Pseudopotamilla*	*laciniosa*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				0	0	0	0
Polychaeta	Sabellida	Sabellidae	*Pseudopotamilla*	*Pseudopotamilla-A*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				0	0	0	0
Polychaeta	Sabellida	Sabellidae	*Sabellidae*	*Indet*	SI	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	*Pseudopotamilla*	*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	*Spirobranchus*	*cariniferus*	N	1	0	1	0	1	1	0	0	0	0	0	0	0	1	0	1	0	0				0	0	0	0
Polychaeta	Sabellida	Serpulidae	*Filograna*	*implexa*	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	*Hydroides*	*elegans*	A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				0	0	0	0
Polychaeta	Terebellida	Acrocirridae	*Acrocirrus*	*trisectus*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				0	0	0	0
Polychaeta	Terebellida	Cirratulidae	*Timarete*	*anchylochaetus*	N	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0				0	0	0	0
Polychaeta	Terebellida	Cirratulidae	*Cirratulidae*	*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	Terebellida	Cirratulidae	*Protocirrineris*	*nuchalis*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				0	0	0	0
Polychaeta	Terebellida	Flabelligeridae	*Pherusa*	*parmata*	N	0	1	1	0	0	0	1	1	0	1	1	0	0	0	0	0	0	0				1	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	*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
Polychaeta	Terebellida	Terebellidae	*Terebellidae*	*Indet*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				0	0	1	0
Polychaeta	Terebellida	Terebellidae	*Pseudopista*	*rostrata*	N	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	*Acanthochitona*	*zelandica*	N	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0				1	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	*Sypharochiton*	*pelliserpentis*	N	0	0	0	0	1	0	0	0	0	0	0	0	0	1	1	0	0	0				0	0	0	0
Polyplacophora	Ischnochitonina	Chitonidae	*Onithochiton*	*neglectus*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				0	0	0	0
Polyplacophora	Ischnochitonina	Chitonidae	*Sypharochiton*	*sinclairi*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				0	0	0	0
Pycnogonida	Pantopoda	Ammotheidae	*Achelia*	*assimilis*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				0	0	0	0
Rhodophyceae	Gracilariales	Gracilariceae	*Gracilaria*	*sp.*	SI	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															MARSDEN										
					Pile replicate						2										1						2			
					Pile position		OUT				IN				OUT					IN				OUT			IN			OUT
Class	Orders	Family	Genus	Species	*Status	MISC	1	2	3	4	1	2	3	4	1	2	3	4	MISC		1	2	3	1	2	3	1	2	3	1
Actinopterygii	Perciformes	Trypterigiidae	*Forsterygion*	*lapillum*	N	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	1	0	0	0	0	0	0	0	1	1		0	0	0	0	0	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
Ascidiacea	Aplousobranchia	Didemnidae	*Diplosoma*	*listerianum*	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
Ascidiacea	Aplousobranchia	Polyclinidae	*Aplidium*	*adamsi*	N	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*	*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
Ascidiacea	Phlebobranchia	Pyuridae	*Microcosmus*	*squamiger*	C2	0	0	0	0	0	0	0	0	1	0	0	0	1	0		0	0	0	0	0	1	1	0	0	1
Ascidiacea	Phlebobranchia	Rhodosomatidae	*Corella*	*eumyota*	C1	1	0	0	0	0	0	0	0	0	0	0	0	1	1		0	1	1	0	1	1	0	1	1	0
Ascidiacea	Stolidobranchia	Molgulidae	*Molgula*	*mortenseni*	N	0	0	0	0	0	0	0	0	0	0	0	1	0	0		0	0	0	0	1	0	0	0	0	0
Ascidiacea	Stolidobranchia	Molgulidae	*Molgula*	*amokurae*	N	0	0	0	0	0	0	0	0	0	0	0	0	1	0		0	1	1	1	0	0	0	0	0	0
Ascidiacea	Stolidobranchia	Polyzoinae	*Polyzoa*	*opuntia*	N	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*	*picta*	N	0	0	0	0	0	1	0	1	1	0	0	0	0	0		1	1	1	1	1	1	0	0	1	1
Ascidiacea	Stolidobranchia	Pyuridae	*Pyura*	*rugata*	N	0	0	0	0	0	1	0	0	0	0	0	0	1	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		1	0	1	1	0	1	0	0	0	0
Ascidiacea	Stolidobranchia	Pyuridae	*Microcosmus*	*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
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
Ascidiacea	Stolidobranchia	Styelidae	*Cnemidocarpa*	*nisiotus*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	1	0	0	1	0	0	1	0	0
Ascidiacea	Stolidobranchia	Styelidae	*Cnemidocarpa*	*bicornuta*	N	0	0	0	0	0	0	0	1	0	0	0	0	0	0		0	0	1	0	1	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		1	0	0	0	0	0	1	0	0	1
Ascidiacea	Stolidobranchia	Styelidae	*Styela*	*plicata*	C1	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	1	0	0	1
Ascidiacea	Stolidobranchia	Styelidae	*Cnemidocarpa*	*sp.*	A	0	0	0	0	0	0	0	0	0	0	0	0	0	0		1	0	0	0	0	0	0	0	0	0
Ascidiacea	Stolidobranchia	Styelidae	*Asterocarpa*	*coerulea*	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
Ascidiacea	Stolidobranchia	Styelidae	*Polycarpa*	*pegasus*	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
Asteroidea	Valvatida	Asterinidae	*Patiriella*	*regularis*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0
Bivalvia	Myoida	Hiatellidae	*Hiatella*	*arctica*	N	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	*Xenostrobus*	*pulex*	N	0	0	0	0	0	1	0	0	0	0	0	0	0	0		0	0	0	1	0	0	0	0	0	1
Bivalvia	Mytiloida	Mytilidae	*Perna*	*canaliculus*	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
Bivalvia	Mytiloida	Mytilidae	*Modiolarca*	*impacta*	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
Bivalvia	Mytiloida	Mytilidae	*Modiolus*	*areolatus*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0
Bivalvia	Ostreoida	Ostreidae	*Crassostrea*	*gigas*	A	0	0	0	0	0	1	1	0	1	1	1	0	0	0		0	0	0	1	1	1	0	0	0	1
Bivalvia	Ostreoida	Ostreidae	*Ostrea*	*chilensis*	N	0	0	0	0	0	0	1	0	0	0	1	1	1	1		1	1	1	0	1	1	0	1	1	0
Bivalvia	Pterioida	Pectinidae	*Talochlamys*	*zelandiae*	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
Bivalvia	Veneroida	Lasaeidae	*Lasaea*	*hinemoa*	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
Crustacea	Anomura	Porcellanidae	*Petrolisthes*	*novaezelandiae*	N	0	0	0	0	0	0	0	1	1	0	0	0	1	1		0	0	1	0	1	1	0	0	1	1
Crustacea	Anomura	Porcellanidae	*Petrolisthes*	*elongatus*	N	0	0	0	0	0	1	1	0	0	0	0	0	0	0		1	0	0	0	0	1	0	0	0	0
Crustacea	Brachyura	Hymenosomatidae	*Halicarcinus*	*varius*	N	0	0	0	0	0	1	0	0	0	0	0	0	0	0		1	0	0	0	0	0	0	0	0	1
Crustacea	Brachyura	Hymenosomatidae	*Halicarcinus*	*cookii*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0
Crustacea	Brachyura	Hymenosomatidae	*Halimena*	*aoteoroa*	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
Crustacea	Brachyura	Majidae	*Notomithrax*	*minor*	N	0	0	0	0	0	0	0	0	1	0	0	0	0	0		1	0	0	1	0	1	0	0	1	0
Crustacea	Brachyura	Pinnotheridae	*Pinnotheres*	*atrinocola*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0
Crustacea	Brachyura	Pinnotheridae	*Pinnotheres*	*novaezelandiae*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0
Crustacea	Brachyura	Xanthidae	*Pilumnus*	*novaezelandiae*	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
Crustacea	Brachyura	Xanthidae	*Pilumnopeus*	*serratifrons*	C1	0	0	0	0	0	0	0	0	0	0	0	1	0	0		0	0	1	0	0	0	0	0	0	0
Crustacea	Brachyura	Xanthidae	*Pilumnus*	*lumpinus*	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	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	1	0	0
Crustacea	Thoracica	Balanidae	*Austrominius*	*modestus*	N	0	0	1	1	1	0	0	0	0	1	0	1	0	0		0	0	0	1	0	0	0	0	0	0
Crustacea	Thoracica	Balanidae	*Balanus*	*trigonus*	C1	0	0	1	1	0	0	0	0	0	0	0	1	0	0		0	1	0	0	0	0	0	0	0	0
Crustacea	Thoracica	Balanidae	*Balanus*	*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
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
Demospongiae	Dictyoceratida	Dysideidae	*Euryspongia*	*n. sp. 1 (soft spikey tan cushion)*	C2	0	0	0	0	0	0	1	1	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0
Demospongiae	Dictyoceratida	Dysideidae	*Euryspongia*	*n. sp. 2 (pale blue bushy encrusting)*	C2	0	0	0	0	0	0	0	0	0	0	0	0	1	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	0	0	0	1	0		0	0	0	0	0	0	0	0	0	0
Demospongiae	Haplosclerida	Callyspongiidae	*Callyspongia*	*ramosa*	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
Demospongiae	Haplosclerida	Chalinidae	*Haliclona*	*heterofibrosa*	C1	0	0	0	0	0	0	0	1	0	0	0	0	1	0		0	1	1	0	1	1	0	1	1	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															MARSDEN									
					Pile replicate						2									1						2			
					Pile position		OUT				IN				OUT					IN			OUT			IN			OUT
Class	Orders	Family	Genus	Species	*Status	MISC	1	2	3	4	1	2	3	4	1	2	3	4	MISC	1	2	3	1	2	3	1	2	3	1
Demospongiae	Haplosclerida	Chalinidae	*Adocia*	*cf. parietalioides*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0	0	1	1	0	0	0
Demospongiae	Haplosclerida	Chalinidae	*Adocia*	*n. sp. 6 (Auckland smooth)*	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
Demospongiae	Haplosclerida	Chalinidae	*Haliclona*	*stelliderma*	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
Demospongiae	Haplosclerida	Chalinidae	*Adocia*	*n. sp. 2 (smooth tough 180)*	C2	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Demospongiae	Haplosclerida	Chalinidae	*Adocia*	*cf. venustina*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Demospongiae	Haplosclerida	Chalinidae	*Haliclona*	*maxima*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Demospongiae	Homosclerophorida	Plakinidae	*Plakina*	*monolopha*	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
Demospongiae	Poecilosclerida	Esperiopsidae	*Esperiopsis*	*n. sp. 1 (smooth bubble sponge)*	C2	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	Ellobiidae	*Leuconopsis*	*obsoleta*	N	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	*Maoricrypta*	*costata*	N	0	0	0	0	0	0	1	1	1	0	0	0	1	0	0	0	1	0	0	1	0	1	1	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
Gastropoda	Littorinimorpha	Littorinidae	*Risellopsis*	*varia*	N	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	Systellomatophora	Onchidiidae	*Onchidella*	*nigricans*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gastropoda	Vetigastropoda	Fissurellidae	*Tugali*	*suteri*	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
Gymnolaemata	Cheilostomata	Beaniidae	*Beania*	*plurispinosa*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gymnolaemata	Cheilostomata	Beaniidae	*Beania*	*n.sp.*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gymnolaemata	Cheilostomata	Bugulidae	*Bugula*	*flabellata*	A	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Gymnolaemata	Cheilostomata	Bugulidae	*Bugula*	*neritina*	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
Gymnolaemata	Cheilostomata	Candidae	*Caberea*	*rostrata*	N	0	0	0	1	1	0	1	1	1	0	0	1	1	1	0	1	0	0	1	1	0	0	1	0
Gymnolaemata	Cheilostomata	Chaperiidae	*Chaperiopsis*	*cervicornis*	N	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	Lepraliellidae	*Celleporaria*	*sp. 1*	A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0
Gymnolaemata	Ctenostomata	Nolellidae	*Anguinella*	*palmata*	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
Hydrozoa	Hydroida	Bougainvilliidae	*Bougainvillia*	*muscus*	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
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
Hydrozoa	Hydroida	Campanulariidae	*Obelia*	*bidentata*	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
Hydrozoa	Hydroida	Campanulariidae	*Clytia*	*hemisphaerica*	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
Hydrozoa	Hydroida	Campanulariidae	*Obelia*	*longissima*	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
Hydrozoa	Hydroida	Campanulariidae	*Obelia*	*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
Hydrozoa	Hydroida	Pennariidae	*Pennaria*	*disticha*	A	1	0	0	0	0	0	1	1	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0
Hydrozoa	Hydroida	Solanderiidae	*Solanderia*	*ericopsis*	N	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	*Aoridae*	*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
Malacostraca	Amphipoda	Liljeborgiidae	*Liljeborgia*	*akaroica*	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
Malacostraca	Amphipoda	Lysianassidae	*Acontiostoma*	*n.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
Malacostraca	Amphipoda	Lysianassidae	*Parawaldeckia*	*vesca*	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
Malacostraca	Amphipoda	Melitidae	*Melita*	*festiva*	N	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Malacostraca	Amphipoda	Podoceridae	*Podocerus*	*cristatus*	N	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	Arcturidae	*Neastacilla*	*aff. tuberculata*	N	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	*Cirolana*	*quechso*	N	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0
Malacostraca	Isopoda	Cirolanidae	*Cirolana*	*kokoru*	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
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
Malacostraca	Isopoda	Mysidacea	*Mysidacea*	*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
Malacostraca	Isopoda	Sphaeromatidae	*Pseudosphaeroma*	*campbellensis*	N	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	1	0	0	0	0	0	0	0
Malacostraca	Isopoda	Sphaeromatidae	*Ischyromene*	*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
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	0	0	0	0	0
Polychaeta	Eunicida	Lumbrineridae	*Lumbrineris*	*sphaerocephala*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Phyllodocida	Nereididae	*Nereididae*	*Indet*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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
Polychaeta	Phyllodocida	Phyllodocidae	*Eulalia*	*microphylla*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Phyllodocida	Polynoidae	*Lepidonotus*	*polychromus*	N	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Polychaeta	Phyllodocida	Polynoidae	*Harmothoe*	*macrolepidota*	N	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0
Polychaeta	Phyllodocida	Syllidae	*Trypanosyllis*	*zebra*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0
Polychaeta	Phyllodocida	Syllidae	*Typosyllis*	*Typosyllis-B*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Polychaeta	Phyllodocida	Syllidae	*Haplosyllis*	*spongicola*	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

*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															MARSDEN									
					Pile replicate		2													1						2			
					Pile position		OUT				IN				OUT					IN			OUT			IN			OUT
Class	Orders	Family	Genus	Species	*Status	MISC	1	2	3	4	1	2	3	4	1	2	3	4	MISC	1	2	3	1	2	3	1	2	3	1
Polychaeta	Sabellida	Sabellariidae	*Neosabellaria*	*kaiparaensis*	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
Polychaeta	Sabellida	Sabellariidae	*Paraidanthyrsus*	*quadricornis*	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
Polychaeta	Sabellida	Sabellidae	*Pseudopotamilla*	*alba*	N	0	0	0	0	0	0	1	0	1	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0
Polychaeta	Sabellida	Sabellidae	*Megalomma*	*suspiciens*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Polychaeta	Sabellida	Sabellidae	*Pseudopotamilla*	*laciniosa*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Sabellida	Sabellidae	*Pseudopotamilla*	*Pseudopotamilla-A*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Sabellida	Sabellidae	*Sabellidae*	*Indet*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Sabellida	Sabellidae	*Pseudopotamilla*	*Indet*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Polychaeta	Sabellida	Serpulidae	*Spirobranchus*	*cariniferus*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
Polychaeta	Sabellida	Serpulidae	*Filograna*	*implexa*	N	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	*Hydroides*	*elegans*	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
Polychaeta	Terebellida	Acrocirridae	*Acrocirrus*	*trisectus*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Terebellida	Cirratulidae	*Timarete*	*anchylochaetus*	N	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Polychaeta	Terebellida	Cirratulidae	*Cirratulidae*	*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
Polychaeta	Terebellida	Cirratulidae	*Protocirrineris*	*nuchalis*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Terebellida	Flabelligeridae	*Pherusa*	*parmata*	N	0	0	0	0	0	0	0	1	1	0	0	0	1	0	0	0	0	0	1	0	1	1	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
Polychaeta	Terebellida	Terebellidae	*Streblosoma*	*toddae*	N	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Polychaeta	Terebellida	Terebellidae	*Terebellidae*	*Indet*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Terebellida	Terebellidae	*Pseudopista*	*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
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
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
Polyplacophora	Ischnochitonina	Chitonidae	*Sypharochiton*	*pelliserpentis*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polyplacophora	Ischnochitonina	Chitonidae	*Onithochiton*	*neglectus*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Polyplacophora	Ischnochitonina	Chitonidae	*Sypharochiton*	*sinclairi*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pycnogonida	Pantopoda	Ammotheidae	*Achelia*	*assimilis*	N	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	Gracilariales	Gracilariceae	*Gracilaria*	*sp.*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0

*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				PRINCES																		QUEENS
					Pile replicate				1									2									1
					Pile position				IN				OUT					IN				OUT					IN
Class	Orders	Family	Genus	Species	*Status	2	3	MISC	1	2	3	4	1	2	3	4	MISC	1	2	3	4	1	2	3	4	MISC	1
Actinopterygii	Perciformes	Trypterigiidae	*Forsterygion*	*lapillum*	N	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	1	0	0	0	1	0	0	0	0	1	0	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
Ascidiacea	Aplousobranchia	Didemnidae	*Diplosoma*	*listerianum*	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	Polyclinidae	*Aplidium*	*adamsi*	N	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*	*phortax*	C1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ascidiacea	Phlebobranchia	Pyuridae	*Microcosmus*	*squamiger*	C2	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Ascidiacea	Phlebobranchia	Rhodosomatidae	*Corella*	*eumyota*	C1	1	1	0	0	0	0	1	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0
Ascidiacea	Stolidobranchia	Molgulidae	*Molgula*	*mortenseni*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ascidiacea	Stolidobranchia	Molgulidae	*Molgula*	*amokurae*	N	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ascidiacea	Stolidobranchia	Polyzoinae	*Polyzoa*	*opuntia*	N	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Ascidiacea	Stolidobranchia	Pyuridae	*Pyura*	*picta*	N	1	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Ascidiacea	Stolidobranchia	Pyuridae	*Pyura*	*rugata*	N	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Ascidiacea	Stolidobranchia	Pyuridae	*Pyura*	*subuculata*	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	*Microcosmus*	*australis*	N	0	1	0	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
Ascidiacea	Stolidobranchia	Styelidae	*Cnemidocarpa*	*nisiotus*	N	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0
Ascidiacea	Stolidobranchia	Styelidae	*Cnemidocarpa*	*bicornuta*	N	0	1	0	0	0	1	1	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	0	0	0	0	0	0	0	0	0	0	1	0	0
Ascidiacea	Stolidobranchia	Styelidae	*Styela*	*plicata*	C1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ascidiacea	Stolidobranchia	Styelidae	*Cnemidocarpa*	*sp.*	A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ascidiacea	Stolidobranchia	Styelidae	*Asterocarpa*	*coerulea*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ascidiacea	Stolidobranchia	Styelidae	*Polycarpa*	*pegasus*	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*	*regularis*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Bivalvia	Myoida	Hiatellidae	*Hiatella*	*arctica*	N	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bivalvia	Mytiloida	Mytilidae	*Xenostrobus*	*pulex*	N	0	0	0	1	1	1	1	0	0	0	0	0	0	1	1	0	1	0	1	0	0	1
Bivalvia	Mytiloida	Mytilidae	*Perna*	*canaliculus*	N	0	0	0	0	0	1	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	0	0	0	1	0	0
Bivalvia	Mytiloida	Mytilidae	*Modiolus*	*areolatus*	N	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bivalvia	Ostreoida	Ostreidae	*Crassostrea*	*gigas*	A	0	0	0	0	1	1	1	0	0	0	1	0	1	1	1	1	1	0	0	0	0	1
Bivalvia	Ostreoida	Ostreidae	*Ostrea*	*chilensis*	N	0	1	0	0	0	1	1	0	0	0	0	0	0	0	1	1	0	0	0	0	0	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
Bivalvia	Veneroida	Lasaeidae	*Lasaea*	*hinemoa*	N	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Crustacea	Anomura	Porcellanidae	*Petrolisthes*	*novaezelandiae*	N	0	1	0	0	0	0	1	0	0	0	1	0	0	0	1	1	0	0	0	0	0	0
Crustacea	Anomura	Porcellanidae	*Petrolisthes*	*elongatus*	N	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Crustacea	Brachyura	Hymenosomatidae	*Halicarcinus*	*varius*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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	*Halimena*	*aoteoroa*	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*	*minor*	N	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Crustacea	Brachyura	Pinnotheridae	*Pinnotheres*	*atrinocola*	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	Pinnotheridae	*Pinnotheres*	*novaezelandiae*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Crustacea	Brachyura	Xanthidae	*Pilumnus*	*novaezelandiae*	N	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0
Crustacea	Brachyura	Xanthidae	*Pilumnopeus*	*serratifrons*	C1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Crustacea	Brachyura	Xanthidae	*Pilumnus*	*lumpinus*	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	Palemonidae	*Periclimenes*	*yaldwyni*	N	0	1	0	0	0	0	0	0	0	0	1	0	0	0	1	1	0	1	0	0	0	0
Crustacea	Thoracica	Balanidae	*Austrominius*	*modestus*	N	0	0	0	1	1	1	1	1	1	1	0	0	1	1	1	0	1	1	1	0	0	1
Crustacea	Thoracica	Balanidae	*Balanus*	*trigonus*	C1	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	*Balanus*	*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	Thoracica	Chthamalidae	*Chaemosipho*	*columna*	N	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Demospongiae	Dictyoceratida	Dysideidae	*Euryspongia*	*n. sp. 1 (soft spikey tan cushion)*	C2	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Demospongiae	Dictyoceratida	Dysideidae	*Euryspongia*	*n. sp. 2 (pale blue bushy encrusting)*	C2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0
Demospongiae	Halisarcida	Halisarcidae	*Halisarca*	*dujardini*	A	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*	*ramosa*	C1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Demospongiae	Haplosclerida	Chalinidae	*Haliclona*	*heterofibrosa*	C1	1	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0

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

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

					Berth code				PRINCES																		QUEENS
					Pile replicate				1									2									1
					Pile position				IN				OUT					IN				OUT					IN
Class	Orders	Family	Genus	Species	*Status	2	3	MISC	1	2	3	4	1	2	3	4	MISC	1	2	3	4	1	2	3	4	MISC	1
Demospongiae	Haplosclerida	Chalinidae	*Adocia*	*cf. parietalioides*	N	0	0	1	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Demospongiae	Haplosclerida	Chalinidae	*Adocia*	*n. sp. 6 (Auckland smooth)*	C2	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Demospongiae	Haplosclerida	Chalinidae	*Haliclona*	*stelliderma*	N	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. 2 (smooth tough 180)*	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	Chalinidae	*Adocia*	*cf. venustina*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Demospongiae	Haplosclerida	Chalinidae	*Haliclona*	*maxima*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Demospongiae	Homosclerophorida	Plakinidae	*Plakina*	*monolopha*	C1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Demospongiae	Poecilosclerida	Esperiopsidae	*Esperiopsis*	*n. sp. 1 (smooth bubble sponge)*	C2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gastropoda	Basommatophora	Ellobiidae	*Leuconopsis*	*obsoleta*	N	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gastropoda	Littorinimorpha	Calyptraeidae	*Maoricrypta*	*costata*	N	0	1	0	0	0	1	1	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0
Gastropoda	Littorinimorpha	Calyptraeidae	*Sigapatella*	*novaezelandiae*	N	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gastropoda	Littorinimorpha	Littorinidae	*Risellopsis*	*varia*	N	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gastropoda	Systellomatophora	Onchidiidae	*Onchidella*	*nigricans*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gastropoda	Vetigastropoda	Fissurellidae	*Tugali*	*suteri*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gymnolaemata	Cheilostomata	Beaniidae	*Beania*	*plurispinosa*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Gymnolaemata	Cheilostomata	Beaniidae	*Beania*	*n.sp.*	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	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	Bugulidae	*Bugula*	*neritina*	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	0	1	1	1	0	0	0	1	0	0	0	1	1	0	0	0	1	0	0
Gymnolaemata	Cheilostomata	Chaperiidae	*Chaperiopsis*	*cervicornis*	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	Lepraliellidae	*Celleporaria*	*sp. 1*	A	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Gymnolaemata	Ctenostomata	Nolellidae	*Anguinella*	*palmata*	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	Bougainvilliidae	*Bougainvillia*	*muscus*	C1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0
Hydrozoa	Hydroida	Campanulariidae	*Clytia*	*sp. 1*	SI	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Hydrozoa	Hydroida	Campanulariidae	*Obelia*	*bidentata*	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	Campanulariidae	*Clytia*	*hemisphaerica*	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	Campanulariidae	*Obelia*	*longissima*	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	*Obelia*	*sp.*	SI	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Hydrozoa	Hydroida	Pennariidae	*Pennaria*	*disticha*	A	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	1
Hydrozoa	Hydroida	Solanderiidae	*Solanderia*	*ericopsis*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	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
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	Lysianassidae	*Acontiostoma*	*n.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*	*vesca*	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	Melitidae	*Melita*	*festiva*	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	Podoceridae	*Podocerus*	*cristatus*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Malacostraca	Isopoda	Arcturidae	*Neastacilla*	*aff. tuberculata*	N	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	*Cirolana*	*quechso*	N	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
Malacostraca	Isopoda	Cirolanidae	*Cirolana*	*kokoru*	N	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	1	0	0	0	0	0	0
Malacostraca	Isopoda	Mysidacea	*Mysidacea*	*sp.*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Malacostraca	Isopoda	Sphaeromatidae	*Pseudosphaeroma*	*campbellensis*	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	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
Malacostraca	Isopoda	Sphaeromatidae	*Ischyromene*	*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	Fucales	Sargassaceae	*Carpophyllum*	*flexuosum*	N	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	0	0	0	0	0	0	0	0	0
Polychaeta	Phyllodocida	Nereididae	*Nereididae*	*Indet*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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
Polychaeta	Phyllodocida	Phyllodocidae	*Eulalia*	*microphylla*	N	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Phyllodocida	Polynoidae	*Lepidonotus*	*polychromus*	N	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Phyllodocida	Polynoidae	*Harmothoe*	*macrolepidota*	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	*Trypanosyllis*	*zebra*	N	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Phyllodocida	Syllidae	*Typosyllis*	*Typosyllis-B*	SI	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Phyllodocida	Syllidae	*Haplosyllis*	*spongicola*	N	0	0	0	0	0	0	0	0	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				PRINCES																		QUEENS
					Pile replicate				1									2									1
					Pile position				IN				OUT					IN				OUT					IN
Class	Orders	Family	Genus	Species	*Status	2	3	MISC	1	2	3	4	1	2	3	4	MISC	1	2	3	4	1	2	3	4	MISC	1
Polychaeta	Sabellida	Sabellariidae	*Neosabellaria*	*kaiparaensis*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Polychaeta	Sabellida	Sabellariidae	*Paraidanthyrsus*	*quadricornis*	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	Sabellidae	*Pseudopotamilla*	*alba*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Polychaeta	Sabellida	Sabellidae	*Megalomma*	*suspiciens*	N	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Polychaeta	Sabellida	Sabellidae	*Pseudopotamilla*	*laciniosa*	N	0	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Sabellida	Sabellidae	*Pseudopotamilla*	*Pseudopotamilla-A*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Polychaeta	Sabellida	Sabellidae	*Sabellidae*	*Indet*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Sabellida	Sabellidae	*Pseudopotamilla*	*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	*Spirobranchus*	*cariniferus*	N	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Sabellida	Serpulidae	*Filograna*	*implexa*	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	*Hydroides*	*elegans*	A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Terebellida	Acrocirridae	*Acrocirrus*	*trisectus*	N	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Terebellida	Cirratulidae	*Timarete*	*anchylochaetus*	N	0	0	0	0	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Polychaeta	Terebellida	Cirratulidae	*Cirratulidae*	*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	Terebellida	Cirratulidae	*Protocirrineris*	*nuchalis*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Terebellida	Flabelligeridae	*Pherusa*	*parmata*	N	0	0	0	0	1	1	0	0	0	0	0	0	0	0	1	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	*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
Polychaeta	Terebellida	Terebellidae	*Terebellidae*	*Indet*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Polychaeta	Terebellida	Terebellidae	*Pseudopista*	*rostrata*	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	1	1	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	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polyplacophora	Ischnochitonina	Chitonidae	*Sypharochiton*	*pelliserpentis*	N	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Polyplacophora	Ischnochitonina	Chitonidae	*Onithochiton*	*neglectus*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polyplacophora	Ischnochitonina	Chitonidae	*Sypharochiton*	*sinclairi*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pycnogonida	Pantopoda	Ammotheidae	*Achelia*	*assimilis*	N	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodophyceae	Gracilariales	Gracilariceae	*Gracilaria*	*sp.*	SI	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																			WYNARD					
					Pile replicate									2										1					
					Pile position				OUT					IN					OUT				IN				OUT		
Class	Orders	Family	Genus	Species	*Status	2	3	4	1	2	3	4	MISC	1	2	3	4	MISC	1	2	3	4	1	2	3	MISC	1	2	3
Actinopterygii	Perciformes	Trypterigiidae	*Forsterygion*	*lapillum*	N	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	1	0	0	1	1	0	0	0	0	0	0	0	0	1	0	0	1	1	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
Ascidiacea	Aplousobranchia	Didemnidae	*Diplosoma*	*listerianum*	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
Ascidiacea	Aplousobranchia	Polyclinidae	*Aplidium*	*adamsi*	N	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*	*phortax*	C1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ascidiacea	Phlebobranchia	Pyuridae	*Microcosmus*	*squamiger*	C2	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Ascidiacea	Phlebobranchia	Rhodosomatidae	*Corella*	*eumyota*	C1	0	1	1	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0
Ascidiacea	Stolidobranchia	Molgulidae	*Molgula*	*mortenseni*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ascidiacea	Stolidobranchia	Molgulidae	*Molgula*	*amokurae*	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
Ascidiacea	Stolidobranchia	Polyzoinae	*Polyzoa*	*opuntia*	N	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*	*picta*	N	0	0	1	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	1	1	0	0	0	0
Ascidiacea	Stolidobranchia	Pyuridae	*Pyura*	*rugata*	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
Ascidiacea	Stolidobranchia	Pyuridae	*Pyura*	*subuculata*	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
Ascidiacea	Stolidobranchia	Pyuridae	*Microcosmus*	*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
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
Ascidiacea	Stolidobranchia	Styelidae	*Cnemidocarpa*	*nisiotus*	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
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	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
Ascidiacea	Stolidobranchia	Styelidae	*Styela*	*plicata*	C1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ascidiacea	Stolidobranchia	Styelidae	*Cnemidocarpa*	*sp.*	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
Ascidiacea	Stolidobranchia	Styelidae	*Asterocarpa*	*coerulea*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ascidiacea	Stolidobranchia	Styelidae	*Polycarpa*	*pegasus*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Asteroidea	Valvatida	Asterinidae	*Patiriella*	*regularis*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bivalvia	Myoida	Hiatellidae	*Hiatella*	*arctica*	N	1	0	0	0	1	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Bivalvia	Mytiloida	Mytilidae	*Xenostrobus*	*pulex*	N	0	0	0	0	1	0	0	0	1	0	0	0	0	0	1	0	0	1	1	0	0	0	1	1
Bivalvia	Mytiloida	Mytilidae	*Perna*	*canaliculus*	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
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
Bivalvia	Mytiloida	Mytilidae	*Modiolus*	*areolatus*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bivalvia	Ostreoida	Ostreidae	*Crassostrea*	*gigas*	A	1	1	1	1	1	1	0	0	1	1	1	1	0	0	1	0	0	1	1	1	0	0	1	1
Bivalvia	Ostreoida	Ostreidae	*Ostrea*	*chilensis*	N	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	1	0	0	1	0	0	0	1
Bivalvia	Pterioida	Pectinidae	*Talochlamys*	*zelandiae*	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
Bivalvia	Veneroida	Lasaeidae	*Lasaea*	*hinemoa*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Crustacea	Anomura	Porcellanidae	*Petrolisthes*	*novaezelandiae*	N	0	0	1	0	0	1	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0
Crustacea	Anomura	Porcellanidae	*Petrolisthes*	*elongatus*	N	0	0	0	0	1	0	0	0	0	1	1	1	0	0	0	0	0	0	1	0	0	0	0	0
Crustacea	Brachyura	Hymenosomatidae	*Halicarcinus*	*varius*	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
Crustacea	Brachyura	Hymenosomatidae	*Halicarcinus*	*cookii*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Crustacea	Brachyura	Hymenosomatidae	*Halimena*	*aoteoroa*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Crustacea	Brachyura	Majidae	*Notomithrax*	*minor*	N	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0
Crustacea	Brachyura	Pinnotheridae	*Pinnotheres*	*atrinocola*	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
Crustacea	Brachyura	Pinnotheridae	*Pinnotheres*	*novaezelandiae*	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
Crustacea	Brachyura	Xanthidae	*Pilumnus*	*novaezelandiae*	N	0	0	1	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0
Crustacea	Brachyura	Xanthidae	*Pilumnopeus*	*serratifrons*	C1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Crustacea	Brachyura	Xanthidae	*Pilumnus*	*lumpinus*	N	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
Crustacea	Thoracica	Balanidae	*Austrominius*	*modestus*	N	1	0	0	1	1	0	0	0	1	0	0	0	0	1	1	1	0	1	1	1	0	1	1	1
Crustacea	Thoracica	Balanidae	*Balanus*	*trigonus*	C1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Crustacea	Thoracica	Balanidae	*Balanus*	*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
Crustacea	Thoracica	Chthamalidae	*Chaemosipho*	*columna*	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
Demospongiae	Dictyoceratida	Dysideidae	*Euryspongia*	*n. sp. 1 (soft spikey tan cushion)*	C2	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	Dictyoceratida	Dysideidae	*Euryspongia*	*n. sp. 2 (pale blue bushy encrusting)*	C2	0	1	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	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Demospongiae	Haplosclerida	Callyspongiidae	*Callyspongia*	*ramosa*	C1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0
Demospongiae	Haplosclerida	Chalinidae	*Haliclona*	*heterofibrosa*	C1	0	1	0	0	0	1	0	0	0	0	0	0	0	1	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																				WYNARD						
					Pile replicate										2										1						
					Pile position				OUT						IN						OUT				IN				OUT		
Class	Orders	Family	Genus	Species	*Status	2	3	4	1	2	3	4	MISC		1	2	3	4	MISC		1	2	3	4	1	2	3	MISC	1	2	3
Demospongiae	Haplosclerida	Chalinidae	*Adocia*	*cf. parietalioides*	N	0	0	0	0	0	0	0	0		0	0	0	1	1		0	0	0	0	0	0	0	1	0	0	0
Demospongiae	Haplosclerida	Chalinidae	*Adocia*	*n. sp. 6 (Auckland smooth)*	C2	0	1	0	0	0	0	0	0		0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0
Demospongiae	Haplosclerida	Chalinidae	*Haliclona*	*stelliderma*	N	0	0	1	0	0	0	1	0		0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0
Demospongiae	Haplosclerida	Chalinidae	*Adocia*	*n. sp. 2 (smooth tough 180)*	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
Demospongiae	Haplosclerida	Chalinidae	*Adocia*	*cf. venustina*	N	0	0	0	0	0	0	0	0		0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0
Demospongiae	Haplosclerida	Chalinidae	*Haliclona*	*maxima*	N	0	0	0	0	0	0	0	0		0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0
Demospongiae	Homosclerophorida	Plakinidae	*Plakina*	*monolopha*	C1	0	1	0	0	0	0	0	0		0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0
Demospongiae	Poecilosclerida	Esperiopsidae	*Esperiopsis*	*n. sp. 1 (smooth bubble sponge)*	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
Gastropoda	Basommatophora	Ellobiidae	*Leuconopsis*	*obsoleta*	N	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	*Maoricrypta*	*costata*	N	0	0	1	0	0	0	0	0		0	1	0	1	0		0	0	0	0	0	0	0	0	0	0	0
Gastropoda	Littorinimorpha	Calyptraeidae	*Sigapatella*	*novaezelandiae*	N	1	1	1	0	0	0	1	0		0	1	1	1	0		0	0	0	0	0	0	0	0	0	0	0
Gastropoda	Littorinimorpha	Littorinidae	*Risellopsis*	*varia*	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
Gastropoda	Systellomatophora	Onchidiidae	*Onchidella*	*nigricans*	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
Gastropoda	Vetigastropoda	Fissurellidae	*Tugali*	*suteri*	N	0	0	0	0	0	0	0	0		0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0
Gymnolaemata	Cheilostomata	Beaniidae	*Beania*	*plurispinosa*	N	0	0	0	0	0	0	0	0		0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0
Gymnolaemata	Cheilostomata	Beaniidae	*Beania*	*n.sp.*	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
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	0	0
Gymnolaemata	Cheilostomata	Bugulidae	*Bugula*	*neritina*	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
Gymnolaemata	Cheilostomata	Candidae	*Caberea*	*rostrata*	N	1	1	1	0	0	1	1	1		0	0	1	1	0		0	0	1	1	0	0	1	0	0	0	1
Gymnolaemata	Cheilostomata	Chaperiidae	*Chaperiopsis*	*cervicornis*	N	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	Lepraliellidae	*Celleporaria*	*sp. 1*	A	0	0	0	0	0	1	0	0		0	0	0	1	0		0	0	1	0	0	0	0	0	0	0	0
Gymnolaemata	Ctenostomata	Nolellidae	*Anguinella*	*palmata*	A	1	0	0	0	0	0	0	0		0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0
Hydrozoa	Hydroida	Bougainvilliidae	*Bougainvillia*	*muscus*	C1	0	0	0	0	0	0	0	0		0	0	0	0	0		0	0	0	1	0	0	0	0	0	0	0
Hydrozoa	Hydroida	Campanulariidae	*Clytia*	*sp. 1*	SI	0	0	0	0	0	0	0	0		0	0	0	0	0		0	0	1	1	0	0	0	0	0	0	0
Hydrozoa	Hydroida	Campanulariidae	*Obelia*	*bidentata*	C1	0	0	0	0	0	0	0	0		0	0	0	0	0		1	0	1	1	0	0	0	0	0	0	0
Hydrozoa	Hydroida	Campanulariidae	*Clytia*	*hemisphaerica*	C1	0	0	0	0	0	0	0	0		0	0	0	0	0		1	0	0	0	0	0	0	0	0	0	0
Hydrozoa	Hydroida	Campanulariidae	*Obelia*	*longissima*	A	0	0	0	0	0	0	0	0		0	0	0	0	0		0	0	0	1	0	0	0	0	0	0	0
Hydrozoa	Hydroida	Campanulariidae	*Obelia*	*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
Hydrozoa	Hydroida	Pennariidae	*Pennaria*	*disticha*	A	1	1	0	0	0	1	0	0		0	0	1	0	0		0	0	1	1	0	0	0	0	0	0	0
Hydrozoa	Hydroida	Solanderiidae	*Solanderia*	*ericopsis*	N	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	*Aoridae*	*sp.*	SI	0	0	0	0	1	0	0	0		0	0	0	0	0		0	1	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	0	0
Malacostraca	Amphipoda	Lysianassidae	*Acontiostoma*	*n.sp.*	C2	0	0	0	0	0	0	0	0		0	0	0	0	0		0	0	0	0	0	0	1	1	0	0	0
Malacostraca	Amphipoda	Lysianassidae	*Parawaldeckia*	*vesca*	N	0	0	0	0	0	0	0	0		0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0
Malacostraca	Amphipoda	Melitidae	*Melita*	*festiva*	N	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	Podoceridae	*Podocerus*	*cristatus*	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
Malacostraca	Isopoda	Arcturidae	*Neastacilla*	*aff. tuberculata*	N	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	*Cirolana*	*quechso*	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
Malacostraca	Isopoda	Cirolanidae	*Cirolana*	*kokoru*	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
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
Malacostraca	Isopoda	Mysidacea	*Mysidacea*	*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
Malacostraca	Isopoda	Sphaeromatidae	*Pseudosphaeroma*	*campbellensis*	N	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
Malacostraca	Isopoda	Sphaeromatidae	*Ischyromene*	*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
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	0	0	0	0	0
Polychaeta	Eunicida	Lumbrineridae	*Lumbrineris*	*sphaerocephala*	N	0	0	0	0	0	0	0	0		0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Phyllodocida	Nereididae	*Nereididae*	*Indet*	SI	0	0	0	0	0	0	0	0		0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0
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	1
Polychaeta	Phyllodocida	Phyllodocidae	*Eulalia*	*microphylla*	N	0	0	0	0	0	0	0	0		0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Phyllodocida	Polynoidae	*Lepidonotus*	*polychromus*	N	0	0	0	1	0	0	0	0		0	1	0	0	0		0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Phyllodocida	Polynoidae	*Harmothoe*	*macrolepidota*	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
Polychaeta	Phyllodocida	Syllidae	*Trypanosyllis*	*zebra*	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
Polychaeta	Phyllodocida	Syllidae	*Typosyllis*	*Typosyllis-B*	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
Polychaeta	Phyllodocida	Syllidae	*Haplosyllis*	*spongicola*	N	0	0	0	0	0	0	0	0		0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0

*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																	WYNARD							
					Pile replicate										2										1				
					Pile position				OUT					IN					OUT				IN				OUT		
Class	Orders	Family	Genus	Species	*Status	2	3	4	1	2	3	4	MISC	1	2	3	4	MISC	1	2	3	4	1	2	3	MISC	1	2	3
Polychaeta	Sabellida	Sabellariidae	*Neosabellaria*	*kaiparaensis*	N	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	Sabellariidae	*Paraidanthyrsus*	*quadricornis*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Sabellida	Sabellidae	*Pseudopotamilla*	*alba*	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
Polychaeta	Sabellida	Sabellidae	*Megalomma*	*suspiciens*	N	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Sabellida	Sabellidae	*Pseudopotamilla*	*laciniosa*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Polychaeta	Sabellida	Sabellidae	*Pseudopotamilla*	*Pseudopotamilla-A*	SI	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Sabellida	Sabellidae	*Sabellidae*	*Indet*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Sabellida	Sabellidae	*Pseudopotamilla*	*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
Polychaeta	Sabellida	Serpulidae	*Spirobranchus*	*cariniferus*	N	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	1	0
Polychaeta	Sabellida	Serpulidae	*Filograna*	*implexa*	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
Polychaeta	Sabellida	Serpulidae	*Hydroides*	*elegans*	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
Polychaeta	Terebellida	Acrocirridae	*Acrocirrus*	*trisectus*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Terebellida	Cirratulidae	*Timarete*	*anchylochaetus*	N	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Terebellida	Cirratulidae	*Cirratulidae*	*Indet*	SI	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Terebellida	Cirratulidae	*Protocirrineris*	*nuchalis*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Polychaeta	Terebellida	Flabelligeridae	*Pherusa*	*parmata*	N	0	0	1	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	1	0	0	0	0
Polychaeta	Terebellida	Flabelligeridae	*Flabelligera*	*affinis*	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
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	1	0	0	0	0
Polychaeta	Terebellida	Terebellidae	*Terebellidae*	*Indet*	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Terebellida	Terebellidae	*Pseudopista*	*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
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
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
Polyplacophora	Ischnochitonina	Chitonidae	*Sypharochiton*	*pelliserpentis*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polyplacophora	Ischnochitonina	Chitonidae	*Onithochiton*	*neglectus*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polyplacophora	Ischnochitonina	Chitonidae	*Sypharochiton*	*sinclairi*	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pycnogonida	Pantopoda	Ammotheidae	*Achelia*	*assimilis*	N	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	Gracilariales	Gracilariceae	*Gracilaria*	*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

*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									
					Pile replicate				2					
					Pile position			IN			OUT			
Class	Orders	Family	Genus	Species	*Status	4	MISC	1	2	3	1	2	3	4
Actinopterygii	Perciformes	Trypterigiidae	*Forsterygion*	*lapillum*	N	0	0	0	0	0	0	0	0	0
Ascidiacea	Aplousobranchia	Didemnidae	*Didemnum*	*sp.*	SI	0	0	0	0	0	0	0	0	1
Ascidiacea	Aplousobranchia	Didemnidae	*Lissoclinum*	*notti*	N	1	0	0	0	0	0	0	0	0
Ascidiacea	Aplousobranchia	Didemnidae	*Diplosoma*	*listerianum*	C1	0	0	0	0	0	0	0	0	0
Ascidiacea	Aplousobranchia	Polyclinidae	*Aplidium*	*adamsi*	N	0	0	0	0	0	0	0	0	0
Ascidiacea	Aplousobranchia	Polyclinidae	*Aplidium*	*phortax*	C1	0	0	0	0	0	0	0	0	0
Ascidiacea	Phlebobranchia	Pyuridae	*Microcosmus*	*squamiger*	C2	0	0	0	0	1	0	0	0	0
Ascidiacea	Phlebobranchia	Rhodosomatidae	*Corella*	*eumyota*	C1	0	0	0	0	1	0	0	0	0
Ascidiacea	Stolidobranchia	Molgulidae	*Molgula*	*mortenseni*	N	0	0	0	0	0	0	0	0	1
Ascidiacea	Stolidobranchia	Molgulidae	*Molgula*	*amokurae*	N	0	0	0	0	0	0	0	0	1
Ascidiacea	Stolidobranchia	Polyzoinae	*Polyzoa*	*opuntia*	N	0	0	0	0	0	0	0	0	0
Ascidiacea	Stolidobranchia	Pyuridae	*Pyura*	*picta*	N	1	0	0	1	1	0	0	0	0
Ascidiacea	Stolidobranchia	Pyuridae	*Pyura*	*rugata*	N	1	0	0	0	1	0	0	0	0
Ascidiacea	Stolidobranchia	Pyuridae	*Pyura*	*subuculata*	N	0	0	0	0	1	0	0	0	0
Ascidiacea	Stolidobranchia	Pyuridae	*Microcosmus*	*australis*	N	0	0	0	0	0	0	0	0	0
Ascidiacea	Stolidobranchia	Pyuridae	*Pyura*	*cancellata*	N	0	0	0	0	0	0	0	0	0
Ascidiacea	Stolidobranchia	Styelidae	*Cnemidocarpa*	*nisiotus*	N	0	0	0	0	0	0	0	0	0
Ascidiacea	Stolidobranchia	Styelidae	*Cnemidocarpa*	*bicornuta*	N	0	0	0	0	1	0	0	0	0
Ascidiacea	Stolidobranchia	Styelidae	*Asterocarpa*	*cerea*	C1	0	0	0	0	0	0	0	0	0
Ascidiacea	Stolidobranchia	Styelidae	*Styela*	*plicata*	C1	0	0	0	0	0	0	0	0	0
Ascidiacea	Stolidobranchia	Styelidae	*Cnemidocarpa*	*sp.*	A	0	0	0	0	0	0	0	0	0
Ascidiacea	Stolidobranchia	Styelidae	*Asterocarpa*	*coerulea*	N	0	0	0	0	0	0	0	0	0
Ascidiacea	Stolidobranchia	Styelidae	*Polycarpa*	*pegasus*	N	0	0	0	0	0	0	0	0	0
Asteroidea	Valvatida	Asterinidae	*Patiriella*	*regularis*	N	0	0	0	0	0	0	0	0	0
Bivalvia	Myoida	Hiatellidae	*Hiatella*	*arctica*	N	0	0	0	0	0	0	0	0	0
Bivalvia	Mytiloida	Mytilidae	*Xenostrobus*	*pulex*	N	0	0	1	1	0	0	0	0	0
Bivalvia	Mytiloida	Mytilidae	*Perna*	*canaliculus*	N	0	0	0	0	0	0	0	0	0
Bivalvia	Mytiloida	Mytilidae	*Modiolarca*	*impacta*	N	0	0	0	0	0	0	0	0	0
Bivalvia	Mytiloida	Mytilidae	*Modiolus*	*areolatus*	N	0	0	0	0	0	0	0	0	0
Bivalvia	Ostreoida	Ostreidae	*Crassostrea*	*gigas*	A	0	0	1	1	1	0	0	0	0
Bivalvia	Ostreoida	Ostreidae	*Ostrea*	*chilensis*	N	0	0	0	0	1	0	0	0	0
Bivalvia	Pterioida	Pectinidae	*Talochlamys*	*zelandiae*	N	0	0	0	0	0	0	0	0	0
Bivalvia	Veneroida	Lasaeidae	*Lasaea*	*hinemoa*	N	0	0	0	0	0	0	0	0	0
Crustacea	Anomura	Porcellanidae	*Petrolisthes*	*novaezelandiae*	N	0	0	0	0	0	0	0	0	0
Crustacea	Anomura	Porcellanidae	*Petrolisthes*	*elongatus*	N	0	0	0	0	0	0	0	0	0
Crustacea	Brachyura	Hymenosomatidae	*Halicarcinus*	*varius*	N	0	0	0	0	0	0	0	0	0
Crustacea	Brachyura	Hymenosomatidae	*Halicarcinus*	*cookii*	N	0	0	0	0	0	0	0	0	0
Crustacea	Brachyura	Hymenosomatidae	*Halimena*	*aoteoroa*	N	0	0	0	0	0	0	0	0	0
Crustacea	Brachyura	Majidae	*Notomithrax*	*minor*	N	0	0	0	0	0	0	0	0	0
Crustacea	Brachyura	Pinnotheridae	*Pinnotheres*	*atrinocola*	N	0	0	0	0	0	0	0	0	0
Crustacea	Brachyura	Pinnotheridae	*Pinnotheres*	*novaezelandiae*	N	0	0	0	0	0	0	0	0	0
Crustacea	Brachyura	Xanthidae	*Pilumnus*	*novaezelandiae*	N	0	0	0	0	0	0	0	0	0
Crustacea	Brachyura	Xanthidae	*Pilumnopeus*	*serratifrons*	C1	0	0	0	0	0	0	0	0	0
Crustacea	Brachyura	Xanthidae	*Pilumnus*	*lumpinus*	N	0	0	0	0	0	0	0	0	0
Crustacea	Caridea	Palemonidae	*Periclimenes*	*yaldwyni*	N	0	0	0	0	1	0	0	0	0
Crustacea	Thoracica	Balanidae	*Austrominius*	*modestus*	N	0	0	1	1	1	1	1	1	0
Crustacea	Thoracica	Balanidae	*Balanus*	*trigonus*	C1	0	0	0	0	0	0	0	0	0
Crustacea	Thoracica	Balanidae	*Balanus*	*sp.*	SI	0	0	0	0	0	0	0	0	0
Crustacea	Thoracica	Chthamalidae	*Chaemosipho*	*columna*	N	0	0	1	0	0	0	0	0	0
Demospongiae	Dictyoceratida	Dysideidae	*Euryspongia*	*n. sp. 1 (soft spikey tan cushion)*	C2	0	0	0	0	0	0	0	0	0
Demospongiae	Dictyoceratida	Dysideidae	*Euryspongia*	*n. sp. 2 (pale blue bushy encrusting)*	C2	0	0	0	0	0	0	0	0	0
Demospongiae	Halisarcida	Halisarcidae	*Halisarca*	*dujardini*	A	0	0	0	0	0	0	0	0	0
Demospongiae	Haplosclerida	Callyspongiidae	*Callyspongia*	*ramosa*	C1	0	0	0	0	0	0	0	0	0
Demospongiae	Haplosclerida	Chalinidae	*Haliclona*	*heterofibrosa*	C1	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									
					Pile replicate			2						
					Pile position			IN			OUT			
Class	Orders	Family	Genus	Species	*Status	4	MISC	1	2	3	1	2	3	4
Demospongiae	Haplosclerida	Chalinidae	*Adocia*	*cf. parietalioides*	N	0	0	0	0	0	0	0	0	0
Demospongiae	Haplosclerida	Chalinidae	*Adocia*	*n. sp. 6 (Auckland smooth)*	C2	0	0	0	0	0	0	0	0	0
Demospongiae	Haplosclerida	Chalinidae	*Haliclona*	*stelliderma*	N	0	0	0	0	0	0	0	0	0
Demospongiae	Haplosclerida	Chalinidae	*Adocia*	*n. sp. 2 (smooth tough 180)*	C2	0	0	0	0	0	0	0	0	0
Demospongiae	Haplosclerida	Chalinidae	*Adocia*	*cf. venustina*	N	0	0	0	0	0	0	0	0	0
Demospongiae	Haplosclerida	Chalinidae	*Haliclona*	*maxima*	N	0	0	0	0	0	0	0	0	0
Demospongiae	Homosclerophorida	Plakinidae	*Plakina*	*monolopha*	C1	0	0	0	0	0	0	0	0	0
Demospongiae	Poecilosclerida	Esperiopsidae	*Esperiopsis*	*n. sp. 1 (smooth bubble sponge)*	C2	0	0	0	0	0	0	0	0	0
Gastropoda	Basommatophora	Ellobiidae	*Leuconopsis*	*obsoleta*	N	0	0	0	0	0	0	0	0	0
Gastropoda	Littorinimorpha	Calyptraeidae	*Maoricrypta*	*costata*	N	0	0	0	0	0	0	0	0	0
Gastropoda	Littorinimorpha	Calyptraeidae	*Sigapatella*	*novaezelandiae*	N	0	0	0	0	0	0	0	0	0
Gastropoda	Littorinimorpha	Littorinidae	*Risellopsis*	*varia*	N	0	0	1	0	0	0	0	0	0
Gastropoda	Systellomatophora	Onchidiidae	*Onchidella*	*nigricans*	N	0	0	0	0	0	0	0	0	0
Gastropoda	Vetigastropoda	Fissurellidae	*Tugali*	*suteri*	N	0	0	0	0	0	0	0	0	0
Gymnolaemata	Cheilostomata	Beaniidae	*Beania*	*plurispinosa*	N	0	0	0	0	1	0	0	0	0
Gymnolaemata	Cheilostomata	Beaniidae	*Beania*	*n.sp.*	N	0	0	0	0	0	0	0	0	0
Gymnolaemata	Cheilostomata	Bugulidae	*Bugula*	*flabellata*	A	0	0	0	0	0	0	0	0	0
Gymnolaemata	Cheilostomata	Bugulidae	*Bugula*	*neritina*	A	0	0	0	0	0	0	0	0	0
Gymnolaemata	Cheilostomata	Candidae	*Caberea*	*rostrata*	N	1	0	0	0	1	0	0	0	1
Gymnolaemata	Cheilostomata	Chaperiidae	*Chaperiopsis*	*cervicornis*	N	0	0	0	0	0	0	0	0	0
Gymnolaemata	Cheilostomata	Lepraliellidae	*Celleporaria*	*sp. 1*	A	1	0	0	0	0	0	0	0	0
Gymnolaemata	Ctenostomata	Nolellidae	*Anguinella*	*palmata*	A	0	0	0	0	0	0	0	0	0
Hydrozoa	Hydroida	Bougainvilliidae	*Bougainvillia*	*muscus*	C1	0	1	0	0	0	0	0	0	0
Hydrozoa	Hydroida	Campanulariidae	*Clytia*	*sp. 1*	SI	0	0	0	0	0	0	0	0	0
Hydrozoa	Hydroida	Campanulariidae	*Obelia*	*bidentata*	C1	0	0	0	0	0	0	0	0	0
Hydrozoa	Hydroida	Campanulariidae	*Clytia*	*hemisphaerica*	C1	0	0	0	0	0	0	0	0	0
Hydrozoa	Hydroida	Campanulariidae	*Obelia*	*longissima*	A	0	0	0	0	0	0	0	0	0
Hydrozoa	Hydroida	Campanulariidae	*Obelia*	*sp.*	SI	0	0	0	0	0	0	0	0	0
Hydrozoa	Hydroida	Pennariidae	*Pennaria*	*disticha*	A	0	0	0	0	0	0	0	0	0
Hydrozoa	Hydroida	Solanderiidae	*Solanderia*	*ericopsis*	N	0	0	0	0	0	0	0	0	0
Malacostraca	Amphipoda	Aoridae	*Aoridae*	*sp.*	SI	0	0	0	0	0	0	0	0	0
Malacostraca	Amphipoda	Liljeborgiidae	*Liljeborgia*	*akaroica*	N	0	0	0	0	0	0	0	0	0
Malacostraca	Amphipoda	Lysianassidae	*Acontiostoma*	*n.sp.*	C2	0	0	0	0	0	0	0	0	1
Malacostraca	Amphipoda	Lysianassidae	*Parawaldeckia*	*vesca*	N	0	0	0	0	0	0	0	0	0
Malacostraca	Amphipoda	Melitidae	*Melita*	*festiva*	N	0	0	0	0	1	0	0	0	0
Malacostraca	Amphipoda	Podoceridae	*Podocerus*	*cristatus*	N	0	0	0	0	0	0	0	0	0
Malacostraca	Isopoda	Arcturidae	*Neastacilla*	*aff. tuberculata*	N	0	0	0	0	0	1	0	0	0
Malacostraca	Isopoda	Cirolanidae	*Cirolana*	*quechso*	N	0	0	0	0	0	0	0	0	0
Malacostraca	Isopoda	Cirolanidae	*Cirolana*	*kokoru*	N	0	0	0	0	0	0	0	0	0
Malacostraca	Isopoda	Cirolanidae	*Natatolana*	*rossi*	N	0	0	0	0	0	0	0	0	0
Malacostraca	Isopoda	Mysidacea	*Mysidacea*	*sp.*	SI	0	0	0	0	0	0	0	0	0
Malacostraca	Isopoda	Sphaeromatidae	*Pseudosphaeroma*	*campbellensis*	N	0	0	0	0	0	0	0	0	0
Malacostraca	Isopoda	Sphaeromatidae	*Cilicaea*	*sp.*	SI	0	0	0	0	0	0	0	0	0
Malacostraca	Isopoda	Sphaeromatidae	*Ischyromene*	*sp.*	SI	0	0	0	0	0	0	0	0	0
Phaeophyceae	Fucales	Sargassaceae	*Carpophyllum*	*flexuosum*	N	0	0	0	0	0	0	0	0	0
Polychaeta	Eunicida	Lumbrineridae	*Lumbrineris*	*sphaerocephala*	N	0	0	0	0	0	0	0	0	0
Polychaeta	Phyllodocida	Nereididae	*Nereididae*	*Indet*	SI	0	0	0	0	0	0	0	0	0
Polychaeta	Phyllodocida	Nereididae	*Perinereis*	*pseudocamiguina*	N	0	0	0	0	0	0	0	0	0
Polychaeta	Phyllodocida	Phyllodocidae	*Eulalia*	*microphylla*	N	0	0	0	1	0	0	0	0	0
Polychaeta	Phyllodocida	Polynoidae	*Lepidonotus*	*polychromus*	N	0	0	0	0	1	0	0	0	0
Polychaeta	Phyllodocida	Polynoidae	*Harmothoe*	*macrolepidota*	N	0	0	0	0	0	0	0	0	0
Polychaeta	Phyllodocida	Syllidae	*Trypanosyllis*	*zebra*	N	0	0	0	0	0	0	0	0	0
Polychaeta	Phyllodocida	Syllidae	*Typosyllis*	*Typosyllis-B*	SI	0	0	0	0	0	0	0	0	0
Polychaeta	Phyllodocida	Syllidae	*Haplosyllis*	*spongicola*	N	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									
					Pile replicate			2						
					Pile position			IN			OUT			
Class	Orders	Family	Genus	Species	*Status	4	MISC	1	2	3	1	2	3	4
Polychaeta	Sabellida	Sabellariidae	*Neosabellaria*	*kaiparaensis*	N	0	0	0	0	0	0	0	0	0
Polychaeta	Sabellida	Sabellariidae	*Paraidanthyrsus*	*quadricornis*	N	0	0	0	0	0	0	0	0	0
Polychaeta	Sabellida	Sabellidae	*Pseudopotamilla*	*alba*	N	0	0	0	0	0	0	0	0	0
Polychaeta	Sabellida	Sabellidae	*Megalomma*	*suspiciens*	N	0	0	0	0	0	0	0	0	0
Polychaeta	Sabellida	Sabellidae	*Pseudopotamilla*	*laciniosa*	N	0	0	0	0	1	0	0	0	0
Polychaeta	Sabellida	Sabellidae	*Pseudopotamilla*	*Pseudopotamilla-A*	SI	0	0	0	0	0	0	0	0	0
Polychaeta	Sabellida	Sabellidae	*Sabellidae*	*Indet*	SI	0	0	0	0	0	0	0	0	0
Polychaeta	Sabellida	Sabellidae	*Pseudopotamilla*	*Indet*	SI	0	0	0	0	0	0	0	0	0
Polychaeta	Sabellida	Serpulidae	*Spirobranchus*	*cariniferus*	N	0	0	0	0	1	0	0	0	0
Polychaeta	Sabellida	Serpulidae	*Filograna*	*implexa*	N	0	0	0	0	0	0	0	0	0
Polychaeta	Sabellida	Serpulidae	*Hydroides*	*elegans*	A	0	0	0	0	0	0	0	0	0
Polychaeta	Terebellida	Acrocirridae	*Acrocirrus*	*trisectus*	N	0	0	0	0	0	0	0	0	0
Polychaeta	Terebellida	Cirratulidae	*Timarete*	*anchylochaetus*	N	0	0	0	1	0	0	0	0	0
Polychaeta	Terebellida	Cirratulidae	*Cirratulidae*	*Indet*	SI	0	0	0	0	0	0	0	0	0
Polychaeta	Terebellida	Cirratulidae	*Protocirrineris*	*nuchalis*	N	0	0	0	0	0	0	0	0	0
Polychaeta	Terebellida	Flabelligeridae	*Pherusa*	*parmata*	N	0	0	0	0	1	0	0	0	0
Polychaeta	Terebellida	Flabelligeridae	*Flabelligera*	*affinis*	N	0	0	0	0	0	0	0	0	0
Polychaeta	Terebellida	Terebellidae	*Streblosoma*	*toddae*	N	0	0	0	0	0	0	0	0	0
Polychaeta	Terebellida	Terebellidae	*Terebellidae*	*Indet*	SI	0	0	0	0	0	0	0	0	0
Polychaeta	Terebellida	Terebellidae	*Pseudopista*	*rostrata*	N	0	0	0	0	0	0	0	0	0
Polyplacophora	Acanthochitonina	Acanthochitonidae	*Acanthochitona*	*zelandica*	N	0	0	0	1	0	0	0	0	0
Polyplacophora	Acanthochitonina	Acanthochitonidae	*Cryptoconchus*	*porosus*	N	0	0	0	0	0	0	0	0	0
Polyplacophora	Ischnochitonina	Chitonidae	*Sypharochiton*	*pelliserpentis*	N	0	0	0	0	0	0	0	0	0
Polyplacophora	Ischnochitonina	Chitonidae	*Onithochiton*	*neglectus*	N	0	0	0	0	0	0	0	0	0
Polyplacophora	Ischnochitonina	Chitonidae	*Sypharochiton*	*sinclairi*	N	0	0	1	0	0	0	0	0	0
Pycnogonida	Pantopoda	Ammotheidae	*Achelia*	*assimilis*	N	0	0	0	0	0	0	0	0	0
Rhodophyceae	Gracilariales	Gracilariceae	*Gracilaria*	*sp.*	SI	0	0	0	0	0	0	0	0	0

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

Appendix 5b. Results from the benthic grab samples.

					Berth code	FERGUS			JELLICOE			MARSDEN			PRINCES			QUEENS			WYNARD		
Class	Order	Family	Genus	Species	*Status	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
Bivalvia	Ostreoida	Ostreidae	*Ostrea*	*chilensis*	N	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0
Bivalvia	Veneroida	Semelidae	*Theora*	*lubrica*	A	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0
Crustacea	Caridea	Palemonidae	*Periclimenes*	*yaldwyni*	N	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Crustacea	Thoracica	Balanidae	*Balanus*	*trigonus*	C1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Gymnolaemata	Cheilostomata	Candidae	*Caberea*	*rostrata*	N	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Gymnolaemata	Cheilostomata	Hippoporidridae	*Odontoporella*	*n.sp.*	N	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hydrozoa	Hydroida	Sertulariidae	*Amphisbetia*	*fasciculata*	N	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Phyllodocida	Glyceridae	*Glycera*	*lamelliformis*	N	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Polychaeta	Phyllodocida	Nephtyidae	*Aglaophamus*	*verrilli*	N	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	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.

Class	Order	Family	Genus	Species	Berth code *Status	FERGUS 1	FERGUS 2	JELLICOE 1	JELLICOE 2	MARSDEN 1	MARSDEN 2	PRINCES 1	PRINCES 2	QUEENS 1	QUEENS 2	WYNARD 1	WYNARD 2
Actinopterygii	Perciformes	Gobiidae	*Arenigobius*	*bifrenatus*	A	0	0	0	1	1	0	1	0	0	1	1	0
Actinopterygii	Perciformes	Gobiidae	*Gobiidae*	*sp.*	SI	1	0	0	0	0	0	0	0	0	0	0	0
Ascidiacea	Phlebobranchia	Rhodosomatidae	*Corella*	*eumyota*	C1	0	0	0	0	1	0	0	0	0	0	0	0
Ascidiacea	Stolidobranchia	Pyuridae	*Pyura*	*picta*	N	0	0	0	0	0	0	0	1	0	0	0	0
Bivalvia	Ostreoida	Ostreidae	*Crassostrea*	*gigas*	A	0	0	0	0	1	1	0	0	0	0	0	0
Bivalvia	Ostreoida	Ostreidae	*Ostrea*	*chilensis*	N	0	0	0	0	1	0	0	0	0	0	0	0
Bivalvia	Veneroida	Semelidae	*Theora*	*lubrica*	A	1	1	1	0	1	0	1	0	0	1	1	1
Crustacea	Anomura	Porcellanidae	*Petrolisthes*	*novaezelandiae*	N	0	0	0	0	0	0	1	0	0	0	0	0
Crustacea	Brachyura	Hymenosomatidae	*Halicarcinus*	*varius*	N	0	0	0	0	0	0	0	1	0	0	0	0
Crustacea	Brachyura	Majidae	*Notomithrax*	*minor*	N	0	0	0	0	0	0	0	1	0	0	0	0
Crustacea	Brachyura	Ocypodidae	*Macrophthalmus*	*hirtipes*	N	0	0	0	0	0	1	0	0	0	0	0	0
Crustacea	Brachyura	Pinnotheridae	*Pinnotheres*	*atrinocola*	N	0	0	0	0	1	0	0	0	0	0	0	0
Crustacea	Caridea	Alpheidae	*Alpheus*	*richardsoni*	N	0	0	0	1	0	0	0	0	0	0	0	0
Crustacea	Caridea	Crangonidae	*Pontophilus*	*australis*	N	0	0	0	1	0	0	0	0	0	0	0	0
Crustacea	Caridea	Palemonidae	*Periclimenes*	*yaldwyni*	N	0	1	1	0	0	0	1	1	0	1	0	0
Demospongiae	Haplosclerida	Chalinidae	*Haliclona*	*heterofibrosa*	C1	0	0	0	0	0	0	1	0	1	0	0	0
Demospongiae	Haplosclerida	Chalinidae	*Adocia*	*n. sp. 6 (Auckland smooth)*	C2	0	0	0	0	0	0	0	0	0	1	0	0
Gymnolaemata	Cheilostomata	Candidae	*Caberea*	*rostrata*	N	0	0	0	0	1	0	1	0	1	0	0	0
Gymnolaemata	Cheilostomata	Lepraliellidae	*Celleporaria*	*sp. 1*	A	0	0	0	0	1	0	0	0	0	0	0	0
Hydrozoa	Hydroida	Pennariidae	*Pennaria*	*disticha*	A	0	0	0	0	0	0	1	0	0	0	0	0
Polychaeta	Eunicida	Lumbrineridae	*Lumbrineridae*	*Indet*	SI	0	0	0	0	0	0	0	0	1	0	0	0
Polychaeta	Phyllodocida	Glyceridae	*Glycera*	*lamelliformis*	N	0	0	0	0	1	0	0	0	1	0	0	0
Polychaeta	Phyllodocida	Goniadidae	*Glycinde*	*dorsalis*	N	0	0	0	0	0	0	0	0	0	1	0	0
Polychaeta	Phyllodocida	Nephtyidae	*Aglaophamus*	*verrilli*	N	0	0	0	0	0	0	0	0	0	1	0	0
Polychaeta	Phyllodocida	Sigalionidae	*Labiosthenolepis*	*laevis*	N	0	0	0	0	1	0	0	1	0	1	0	0
Polychaeta	Scolecida	Orbiniidae	*Orbiniidae*	*Indet*	SI	0	0	0	0	1	0	0	0	0	1	0	0
Polychaeta	Scolecida	Orbiniidae	*Phylo*	*novazealandiae*	N	0	0	1	0	0	0	0	1	0	0	0	0
Polychaeta	Terebellida	Pectinariidae	*Pectinaria*	*australis*	N	1	1	1	0	0	0	1	1	1	1	1	1
Polyplacophora	Acanthochitonina	Acanthochitonidae	*Cryptoconchus*	*porosus*	N	0	0	0	1	0	0	0	0	0	0	0	0

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

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

				Berth code	PRINCES		QUEENS		VIADUCT		WESTHAVEN		WYNARD		
Class	Order	Family	Genus	Species	*Status	1	2	1	2	1	2	1	2	1	2	Total
Dinophyceae	Gymnodiniales	Gymnodiniacea	*Gymnodinium*	*catenatum*	C1	1	0	0	0	0	0	0	0	0	1	
Dinophyceae	Peridiniales	Peridiniaceae	*Protoperidinium*	*conicum*	N	0	1	1	0	0	0	0	0	0	0	
Dinophyceae	Peridiniales	Peridiniaceae	*Protoperidinium*	*sp.*	N	1	0	0	0	0	0	1	0	0	0	
Dinophyceae	Peridiniales	Peridiniaceae	*Lingulodinium*	*polyedrum*	N	0	0	0	0	0	0	0	0	0	1	
Dinophyceae	Peridiniales	Peridiniaceae	*Protoperidinium conicum*	*cf. conicoides*	N	0	0	1	0	0	0	0	0	0	0	
Dinophyceae	Peridiniales	Peridiniaceae	*Scrippsiella*	*trochoidea*	N	0	1	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 5e. Results from the fish trap samples.

					Berth code	FERGUS				JELLICOE				MARSDEN				PRINCES				QUEENS				WYNARD			
					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	Anguillidae	*Anguilla*	*australis*	N	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	1	0	0	0	0	0	0
Actinopterygii	Mugiliformes	Mugilidae	*Aldrichetta*	*forsteri*	N	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0
Actinopterygii	Perciformes	Carangidae	*Decapterus*	*koheru*	N	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	1	1	0	0
Actinopterygii	Perciformes	Carangidae	*Trachurus*	*novaezelandiae*	N	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Actinopterygii	Perciformes	Labridae	*Notolabrus*	*celidotus*	N	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	1	1	0	0
Actinopterygii	Perciformes	Sparidae	*Pagrus*	*auratus*	N	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0
Crustacea	Brachyura	Portunidae	*Charybdis*	*japonica*	A	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0

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

Appendix 5f. Results from the crab trap samples.

				Berth code	FERGUS				JELLICOE				MARSDEN				PRINCES				QUEENS				WYNARD			
				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*	*wilsoni*	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
Actinopterygii	Perciformes	Labridae	*Notolabrus*	*celidotus*	N	0	0	1	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0
Actinopterygii	Perciformes	Sparidae	*Pagrus*	*auratus*	N	0	1	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	*Charybdis*	*japonica*	A	1	0	0	1	1	1	0	1	0	1	0	0	0	0	1	0	0	1	0	0	0	0	0	0
Gastropoda	Neogastropoda	Buccinidae	*Cominella*	*adspersa*	N	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gastropoda			*Gastropoda*	*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	1

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

Appendix 5g. Results from the starfish trap samples.

				Berth code		FERGUS				JELLICOE				MARSDEN				PRINCES				QUEENS				WYNARD			
				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
Crustacea	Brachyura	Portunidae	*Charybdis*	*japonica*	A	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	1	0	1	0
Asteroidea	Valvatida	Asterinidae	*Patiriella*	*regularis*	N	0	0	0	0	1	0	0	0	0	0	0	0	0	1	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	FERGUS				JELLICOE				MARSDEN				QUEENS				WYNARD			
					Line No.	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
Malacostraca	Isopoda	Cirolanidae	*Cirolana*	*quechso*	N	1	1	1	1	1	0	1	1	1	0	0	0	1	1	1	0	1	1	1	1

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

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).