

Crop & Food Research Confidential Report No. 2007

***Very low prevalence of Clostridium botulinum
in New Zealand marine sediments***

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February 2008



KNOWLEDGE AND VALUE FROM SCIENTIFIC DISCOVERY

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A report prepared for
New Zealand Food Safety Authority

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1 *Executive summary*

Clostridium botulinum and related organisms are anaerobic bacteria that can grow in food and produce an extremely potent neurotoxin (BoNT) causing a food poisoning syndrome known as botulism. Internationally BoNT-producing organisms are of particular concern to seafood producers because one group of these organisms (Type E) naturally occurs in the marine environment and can grow and produce toxins at refrigerated temperatures. The aim of this research was to determine the prevalence of BoNT-producing organisms in the New Zealand marine environment.

Five hundred and one samples of marine sediment were collected from selected harbours and inshore coastal areas around New Zealand. These were tested for the presence of *C. botulinum* by mouse bioassay of toxin production during anaerobic enrichment and by molecular methods (PCR) for the presence of the toxin-producing gene. No toxin was detected by mouse bioassays and only one sample contained BoNT-producing genes. This sample had been collected at a depth of 3 m from Houhora Harbour in the far north of New Zealand. The toxin type of the gene that was detected was BoNT type A, a type only known to be produced by mesophilic organisms that cannot grow at refrigerated temperatures and are not considered to be marine organisms. We conclude that there is minimal risk that chilled seafood from New Zealand would cause botulism.

2 *Introduction*

Clostridium botulinum is an anaerobic spore-forming bacterium that can grow and produce a potent neurotoxin (BoNT) in food products. *C. botulinum* is traditionally defined by its ability to produce toxins and is sub-grouped according to the types of toxin produced (Types A, B, C, D, E, F, and G) with types C and D reported to not cause human botulism and type G being very rare. Some *Clostridia* species other than *C. botulinum* (e.g. *Clostridium butyricum*) can also produce BoNT. Non-toxic organisms which are genotypically very closely related to the *C. botulinum* species are also known, but *C. botulinum* is taxonomically defined as being capable of producing BoNT.

C. botulinum organisms causing food poisoning fall into two main taxonomic groups, which each have different implications for food safety (Hatheway 1993, 1995; International Commission on Microbiological Specifications for Foods (ICMSF) 1996; Lund & Peck 2000):

Organisms from Group I are proteolytic mesophiles with minimum growth temperatures of 10-12°C and optimums of 30-45°C. Their spores are highly

heat-resistant with D values of 1.23 min at 112°C, and food needs to contain 10% NaCl to prevent their growth. Group I organisms which produce BoNT types A, B and F have been identified. Additionally *Clostridium butyricum*, *Clostridium baratii* and *Clostridium argentinense* are non-proteolytic mesophilic organisms producing BoNT types E, F and G respectively. Because they will not grow at refrigerated temperatures these organisms are mostly of concern for the safety of shelf-stable foods. Canning procedures are designed to eliminate these organisms to assure product safety.

Organisms from Group II are non-proteolytic psychrotrophic bacteria with minimum growth temperatures of around 3°C and reported optimums of 18-25°C. They are easier to inactivate with heat with D-values of 0.8 to 1.3 min at 80°C and only need 5% NaCl to prevent their growth. Group II organisms which produce BoNT types B, E and F have been identified. These organisms are of particular concern for refrigerated foods.

Group III organisms produce toxin types C/D, which do not affect humans but can cause animal and avian botulism.

C. botulinum is a soil organism and positive samples have been recorded in most surveys of terrestrial soils and marine sediments from around the world (Dodds 1993). Only one environmental survey has been carried out in New Zealand (Gill & Penney 1982) and only type C/D was detected. In that survey, two of the 20 samples were collected from marine sources. However, New Zealand has had one incident of botulism which was caused by BoNT type A from a jar of home-preserved mussels and watercress (Till 1984; Flacks 1985). The main organism found in temperate marine sediments has been type E but this is rare in tropical regions and has not been recorded in the southern hemisphere. Types C/D and B are the other types most commonly isolated from marine sediments.

The aim of the current work was to determine the prevalence of BoNT-producing organisms in New Zealand marine sediments.

3 *Methods*

3.1 *Samples*

Sediment samples (494) of 30-50 g were collected from sub-tidal inshore waters around the New Zealand coastline between December 24, 1998 and July 6, 2000 using a core sampler (55 mm diameter). A further six samples were collected inter-tidally around Auckland on 15 January 2007 while an initial inter-tidal sample had been taken on 24 December 1998. Sites were selected on the basis of their perceived likelihood of harbouring *C. botulinum*. Sandy or rocky bottoms were avoided, as were deep waters because studies show that the prevalence of the organism is lower in sediments from deeper water (Hatherway 1995). As sediments from shallow waters with a muddy seafloor are the most likely habitat for finding the organism (Huss 1981 and pers. comm.) we used a 5 m aluminium

boat (McLay) able to operate in shallow waters from which to collect the samples. A percussion sediment sampler/corer was constructed to collect core samples from the seafloor and this could be operated to a maximum working seawater depth of about 25 m. Most of New Zealand's sheltered marine waterways with significant stretches of shallow water (<25 m) and muddy seafloors were sampled (Figure 1). Notable exceptions were Parengarenga and Wellington harbours and the harbours around Banks Peninsula. Sampling regions are identified in Figure 1 and sample details are recorded in the Appendix. As much as possible, for each selected harbour, samples were taken at 2 to 4 km distances apart across the entire area of the harbour (e.g. Figure 1a) but at times seafloor type, weather and water currents limited our ability to collect samples. Intertidal sites were not sampled except for seven samples collected in the Auckland area (sample numbers 001 and 510 to 515). Most sediment samples were of mud although some locations sampled yielded sand (e.g. Rangaunu Bay in Figure 1a), shell or clay sediments. Most mud samples were collected from the anaerobic (black) zone 2 to 4 cm below the surface of the seafloor, but at 11 sites an additional sample was collected 50 cm into the mud (Sample numbers 043, 100, 123, 169, 179, 190, 220, 265, 271, 418, 481). Water depths at the time of sampling ranged from 0.1 to 24.0 m (median 4.9 m). Most samples were collected during warmer summer months and the surface water temperatures ranged from 12.4 to 27.7°C (median 20.1°C). Samples were chilled over ice to about 3°C on board the boat and kept refrigerated until their first enrichment for mouse bioassay (1-7 days). Samples (20-25 g) were then stored frozen (-85°C) in 25 mL universal tubes for up to 8 years before testing for the presence of BoNT-producing genes by polymerase chain reaction (PCR). Other work has shown that such frozen storage would be unlikely to have materially affect the viability of BoNT-producing spores (Fletcher et al. 2008).

3.2 *Mouse bioassays*

To carry out mouse bioassays, 25 g samples of sediment were placed in sterile Whirl pack bags. One hundred mL of freshly steamed PYGS broth (Lund et al. 1990) was added with minimum agitation, then air was squeezed out from the bag and the bag was heat sealed. The sample was then hand-massaged into the broth and the bags were incubated in anaerobic jars (four bags per jar) for 3 weeks at 20°C. Anaerobiosis within the sealed bag as indicated by the resazurin indicator in the media was achieved by the reducing agent in the media (cysteine) and by the permeability of the Whirl pack bag to the anaerobic atmosphere in the anaerobic jar. This was confirmed by determining the redox potential of PYGS using a platinum combination electrode (MC241Pt, red rod in saturated KCl, Radiometer, Copenhagen). Steamed PYGS had redox potential of about -220 mv compared with +250 mv for distilled water. Extensive agitation increased the PYGS redox potential to -140 mv. After 2 days' incubation in the anaerobic chamber at 20°C, agitated PYGS broth sealed in a Whirl pack bag had a redox potential of -440 mv, indicating good conditions for growth of anaerobic organisms. After incubation, the contents of the bags were again hand-massaged and allowed to settle for 5 min. A sub-sample (12 mL) was transferred to a sterile

15 mL centrifuge tube and centrifuged for 25 min at 7500 x g at 10°C. If the pH was not between 6 and 6.5, it was adjusted to 6.1 ± 0.1 using NaOH and/or HCl. The supernatant was then filter sterilised (0.45 µm) and tested by mouse bioassay. Other work has shown that centrifugation and filter sterilisation do not adversely affect the toxicity of enriched samples (Roman et al. 1994).

Non-proteolytic botulinum toxins can be produced in a form that is not toxic by intraperitoneal injection, but such toxins can be activated by trypsin (Huss 1981; Solomon et al. 1998). Trypsin (0.2 mL of 10% solution in water - Sigma) was therefore added to one 1.8 mL aliquot of the extract and incubated for 1 h at 35°C. The trypsin in this aliquot was then diluted by adding 10 mL gelatine phosphate buffer (Food and Drug Administration 1998). A second 1.8 mL aliquot not treated with trypsin was diluted with an equal volume of gelatine phosphate buffer. Two Swiss white mice (16-20 g) were intraperitoneally injected with 0.5 mL of each of the treated and untreated extracts (four mice in total). Mice were observed for symptoms of botulism and/or death for a 48 h period.

3.3 *PCR detection of BoNT genes*

The methods previously developed (Fletcher et al. 2008) were used to test for the presence of BoNT genes types A, B, E or F in the sediment samples.

Positive control samples were first prepared. Sediment samples (20 g) were separately spiked with 3000 spores/g of three mesophilic (*C. botulinum* Types A and F, and *C. butyricum* Type E) and three psychrotrophic (*C. botulinum* Types B (17B), E (Beluga) and F (202)) BoNT-producing organisms.

Sediment samples were thawed from -85°C to room temperature and sediment samples and spiked controls were tested for BoNT. One 10 g sub-sample was placed in a 125 mL container while another was heated (60°C, 10 min) in a 50 mL centrifuge tube, rapidly cooled to 30°C and 10 g transferred to a 125 mL container. TPYG (90 mL) was gently added to each of the 10 g sub-samples which were then gently mixed and the containers (with loose lids) were sealed in an anaerobic jar using 4 anaerobic generators (Difco) giving anaerobic conditions within 2 h. Samples were incubated anaerobically at 30°C before testing after 14 and 35 days.

When testing, the sediment cultures were thoroughly mixed by inverting and sub-samples (four in total) of 100 µL were taken from the two subcultures at day 14 and 35, respectively. The sub-samples taken at day 14 were stored at -85°C until tested after day 35. Samples taken at both dates were pooled (400 µL) and subjected to DNA extraction by FastPrep® bead-beating as follows:

1. The pooled samples were centrifuged (8000 x g, 5 min) and the supernatant removed. The pellet was re-suspended in 0.1 M phosphate buffer (200 µL, pH 7.4) and mixed by vortexing. The pooled samples were centrifuged again (8000 x g, 5 min) and the supernatant removed.
2. The pellet was re-suspended in 0.1 M phosphate buffer (270 µL, pH 7.4) with added lysozyme (30 µL, 50 mg/mL). This suspension was mixed by vortexing

and incubated (37°C, 30 min) followed by the addition of Lysis buffer (300 µL, 0.1M NaCl, 0.5M Tris, pH 8.0, 10% SDS) and 300 µL chloroform: isoamyl alcohol (24:1). The suspension was then mixed and transferred into a 2 mL Screw-top Micro tube (Cat. #72693005, Sarstedt, Germany) containing 100 mg of 0.1 mm Zirconia/silica beads (Catalogue #110791012, Biospec products Inc.) and 100 mg of 2.5 mm Zirconia/silica beads (Catalogue #110791252, Biospec products Inc.). The mixture was run on the FastPrep® FP220A Instrument (Qbiogene, CA, USA) at 4.5 m/s for 40 s.

3. The supernatant (about 700 µL) was transferred to an Eppendorf tube followed by addition of 7 M NH₄Ac (390 µL). The suspension was mixed by vortexing and centrifuged at 13 000 x g for 8 min. The supernatant (about 830 µL) was transferred to another Eppendorf tube, then isopropanol (448 µL) was added and thoroughly mixed by repeatedly inverting of the tube. The mixture was left to stand (room temperature, 1 min) and then centrifuged (3000 x g, 10 min). The supernatant was then decanted and the pellet washed with ice-cold ethanol (750 µL), centrifuged (13 000 x g, 10 min) and the DNA in the pellet air-dried and re-suspended in 20 µL Ultrapure water (Invitrogen). This was stored (4 or -20°C) for PCR use.

Two µL from each DNA sample was used for separate PCR amplification for each of the four BoNT genes (A, B, E, and F) using the primer sets described by Lindström et al. (2001). The PCR mix contained the following reagents: 2 µL of DNA template, 2 µL of 10 x PCR buffer, 0.3 µM of each primer, 2.5 mM MgCl₂, 220 µM concentrations of each deoxynucleotide triphosphate, 0.5 U of DNA polymerase (Invitrogen, Carlsbad, USA) in a total volume of 20 µL. The PCR was carried out using the following temperature profiles: 1 cycle of 95°C for 3 min; 35 cycles of 95°C for 30 s, 60°C for 30 s, and 72°C for 60 s; and 1 cycle of 72°C for 3 min. The amplified PCR product (10 µL) was then loaded on to 1% agarose gels for electrophoresis analysis for the presence of the BoNT genes. The gels were then compared with those for DNA extracted from samples containing *C. botulinum* types A, B, E and F. Bands with similar molecular sizes to the bands from the controls were taken as presumptively positive for the respective BoNT. In the case of BoNT type A, these bands were excised from the gels to exclude any products of non-specific amplification of different molecular weights, and the excised bands were subjected to nested PCR based on the following primers:

Forward primer: 5'-GGCTGGGTAGAACAATTAG-3'

Reverse primer: 5'-AGACCTCATCCCATTTTTC-3'

The PCR reaction mixture contained 1 µL PCR product, 2 µL of 10 x PCR buffer, 2.5 mM MgCl₂, 220 µM concentrations of each deoxynucleotide triphosphate, 0.5 U of DNA polymerase (Invitrogen, Carlsbad, USA), 0.3 µM of each nested primer for fully nested PCR and just the forward primer for semi-nested PCR in a total volume of 20 µL. The temperature profiles used were: 1 cycle of 95°C for 3 min; 40 cycles of 95°C for 30 s, 56°C for 30 s, and 72°C for 30 s; and 1 cycle of 72°C for 3 min. The nested PCR product (10 µL) was then loaded on to 1% agarose gels for electrophoresis analysis for the presence of the BoNT genes.

Where the nested PCR gave bands of a molecular weight similar to those of the nested PCR from controls containing BoNT type A they were subjected to sequencing. The band was excised from the gel and DNA was purified using Wizard® SV Gel and PCR clean-up system (Promega, Madison, USA). The purified PCR products were sequenced by the Allan Wilson Centre, Massey University, Albany. The obtained DNA sequence was blasted against Genbank to search for its homologue and to compare their similarity. Overall, this PCR detection method will detect any BoNT-producing spores present in a sample down to a level of 15 spores per g or lower (Fletcher et al. 2008).

4 Results

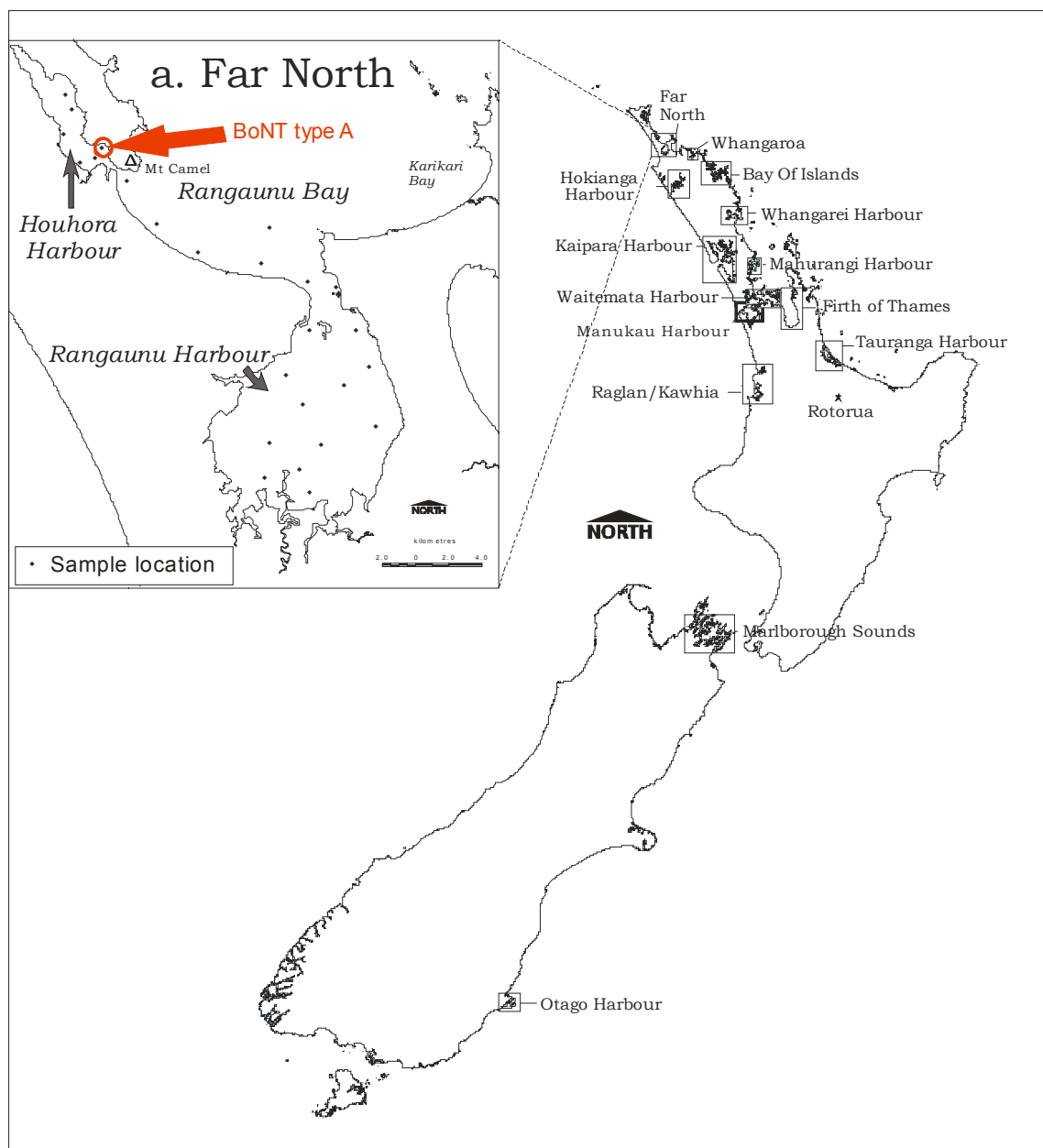
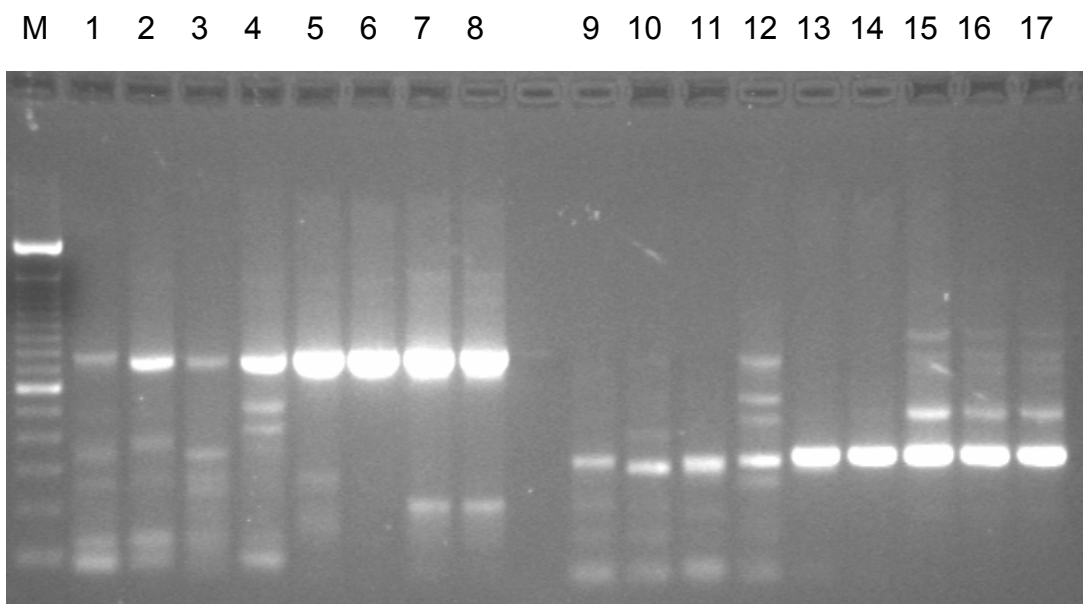


Figure 1: Regions where sediment samples were collected. Insert a. shows the far north sampling region, indicating sampling density and the location of sample 151 which was positive for BoNT type A.

All mouse bioassays were negative, with no symptoms of botulism or deaths.

Of the 501 samples tested by PCR, one sample (No. 151) was positive for the BoNT type A gene. This sample was collected near the entrance of Houhora Harbour (Lat: 34° 48.799' S Long: 173° 08.828' E) in the far north of the North Island (Figure 1). Houhora Harbour was the most northerly and one of the least populated areas surveyed. Parengarenga Harbour north of Houhora was not sampled. Sample 151 was collected in a water depth of 3 m at 12:40 PM on December 8, 1999 when the surface water temperature was 20.2°C (Appendix).

None of the PCR gels gave any bands whose size matched those of the positive control samples for BoNT types B, E or F. However, of the original 501 samples tested by PCR, 247 (49.3%) gave bands approximating the size found for BoNT type A. Nested PCR of the 247 samples still gave 47 bands approximating the size of that of BoNT type A, although only one of these (Sample 151) was of very similar intensity and size (Figure 2). When sequencing PCR product from the 47 samples, only PCR product from sample 151 gave any significant alignment with BoNT. This had a good match of 91% to *C. botulinum* BoNT type A over 100% of the sequenced DNA. There were some varying base pair results near the 3' terminal of the DNA, but all except one of the last 111 base pairs up to the 5' terminal matched the DNA sequences found for the completely nested PCR and all but one of the last 236 base pairs up to the 5' terminal matched the control DNA in the semi-nested PCR. For each of these there was a single A-C substitution distinguishing the sample from the control DNA. The nested and semi-nested PCR results from sample 151 are shown in Figure 2.



*Figure 2: PCR detection of BoNT type A nested PCR products from selected New Zealand marine sediments. Lanes 1 to 8: nested PCR products, Lanes 9 to 17: semi-nested PCR products. Lanes 1, 9: Sample 288, Lanes 2, 10: Sample 62, Lanes 3, 11: Sample 83, Lanes 4, 12: Sample 167, Lanes 5, 13: Sample 151, Lanes 6 to 8, 14 to 16: three separate enrichments of sediment containing *C. botulinum* Type A (10 spores/g), Lane 17: repeat PCR of lane 16, Lane M: 1 kb DNA ladder (Invitrogen).*

From the other 46 samples subjected to sequencing, 14 gave sequences best matching the peptide deformylase gene of *C. botulinum* Types A or F, with up to 77% identity match over 100% of the sequenced DNA. A further two samples gave good DNA sequences that were not found in the Genbank. The remaining 30 gave sequences that were of too poor quality to expect to match in the Genbank, even on repeated extraction from the nested PCR. While it is possible that some of the latter might be from BoNT type A, the facts that none were as intense or quite the same size as those from either the control or from sample 151, and that sample 151 and the controls gave very good sequences, strongly suggests that they were not.

5 Discussion and conclusions

Current practices in the New Zealand seafood processing industry typically do not treat *C. botulinum* as a significant hazard for chilled seafood, even for products that would be considered a risk in countries overseas. For example, whereas internationally accepted controls require that smoked fish is not vacuum-packed or that it contains at least 3.5% water phase salt to prevent the growth of *C. botulinum* Type E, New Zealand smoked products with low salt

levels have been regularly marketed in vacuum packs. The very low prevalence of BoNT-producing organisms in New Zealand marine sediments found in this study confirms that this approach is not unsafe.

BoNT-producing organisms are usually isolated with higher prevalence in sediments than in aquatic animals (Dodds 1993) so the prevalence in seafood is likely to be lower than the one in 500 samples found in the sediments tested in this study. Overseas, in areas that have had major issues with seafood-transmitted botulism, such as Alaska and the Great Lakes in North America or the Baltic Sea, surveys of marine sediments and coastal soils usually find Group II botulinum organisms in 25 to 100% of samples (Huss 1981; Dodds 1993). In the current sampling programme we found only 0.2% of Group I and no group II organisms. Using a Bayesian statistics approach, we can estimate the prevalence of BoNT-producing organisms in New Zealand. If we assume a beta distribution for the incidence rate, start with no opinion about what the rate is (i.e. use a Beta (1,1) "uninformative prior") and assume the results from the sampling follow a binomial distribution, then in light of those results the distribution for the incidence rate for type A becomes a Beta (2,500), which means that we can have 99% confidence that the incidence rate is 1.32% or less. The absence of any group II organisms in the 500 samples gives an even greater confidence of low incidence. On the basis of these results, BoNT-producing organisms should not be deemed to present a significant hazard that could be reasonably associated with chilled New Zealand seafood and therefore generally would not need to be included in HACCP plans prepared for seafood processors (Food and Drug Administration 2001).

The absence from or very low prevalence of *C. botulinum* type E in the New Zealand marine environment might be explained by New Zealand's geographical isolation. However, New Zealand has been colonised by European peoples for more than 160 years and there has been extensive shipping from the northern hemisphere to New Zealand over that period. As *C. botulinum* is commonly present in many soils around the world and the spores are very robust there is a reasonable likelihood that viable spores might have been released into the New Zealand marine environment. Harbours of four major import/export cities (Whangarei, Auckland, Tauranga and Dunedin) were surveyed during the study but no evidence of BoNT-producing organisms was found in any of these harbours. Another possible explanation for the absence of *C. botulinum* type E, the main BoNT-producing organism found in marine environments, is the consistently high salinity (>3%) of New Zealand seawaters compared with those in areas of the world where a high prevalence of *C. botulinum* type E is recorded. The organism may have difficulty in becoming established at such salinities. Low seawater salinity is reported to be a major factor contributing to high concentrations of *C. botulinum* Type E in waters such as the Great Lakes and the Baltic Sea (Hatherway 1993). Although 5% salt is required to prevent the growth of *C. botulinum* Type E in brine, water phase salt levels of just 3.5% are used to control its growth in smoked seafood (Food and Drug Administration 2001) and salinities approach this level on the seafloor around New Zealand (Ridgway 1969).

The occurrence of the gene for BoNT type A in a New Zealand sample was not unexpected in that there has been one outbreak of botulism caused by BoNT type A from food produced in New Zealand. The occurrence in a marine sediment in a remote area such as Houhora Harbour was a little less expected. BoNT-producing type A organisms are not known to be marine organisms, so it is likely that the organism containing this gene was washed into the harbour from a terrestrial source. The only recorded incident of botulism in New Zealand occurred in Rotorua (Figure 1) from mussels and water cress that had both been harvested locally (Flacks 1985). The distance between Rotorua and Houhora suggests that organisms producing BoNT type A might be widely distributed in New Zealand but only in low numbers. There might be benefit in surveying terrestrial sources including the catchment for Houhora Harbour to determine the incidence of this organism.

Although a gene segment matching BoNT type A was identified, toxin was not detected by the mouse bioassay. This could mean that the gene was not expressed, but a more likely explanation is that the PYGS media used for enriching the growth of BoNT-producing organisms for the mouse bioassay was less effective than that of the TPYG used for the PCR detection method (Fletcher et al. 2007). Most laboratories using PYGS use anaerobic cabinets for enriching the growth of *C. botulinum*, whereas Solomon & Lilly (1998) recommend TPYG for use with anaerobic jars such as we used, and we found better recovery with this media (Fletcher et al. 2008).

Despite many years of extensive international research, BoNT type A has only ever been found in mesophilic bacteria of the *C. botulinum* species, whereas types B, E and F have been found in psychrotrophic organisms and in *Clostridia* species other than *C. botulinum*. It is therefore reasonable to assume that the organism that contained the type A gene found in the Houhora sediment was a mesophilic organism incapable of growth at refrigeration temperatures below 10°C. However, as New Zealand has been geographically isolated from the rest of the world for a long time, it is possible that the New Zealand organism differs from those found elsewhere.

We recommend that further work be carried out to:

1. Isolate the organism containing the BoNT gene.
2. Determine whether the gene is expressed by the production of toxin in a mouse bioassay.
3. Determine the growth characteristics of the organism (whether it is mesophilic or psychrotrophic, its salt and acid tolerance, and the requirements for thermal inactivation).
4. Investigate the prevalence of BoNT type A producing organisms in terrestrial soil samples in the Houhora catchment and around Rotorua.
5. Carry out a limited ongoing monitoring programme, perhaps once every 10 years, to confirm that psychrotrophic BoNT-producing organisms do not become established in the New Zealand marine environment. This might

include surveying areas of lower salinity in upper estuarine areas. Other areas that were not sampled in the current study (e.g. the shipping ports of Wellington and Lyttleton, and Parengarenga Harbour, the largest harbour north of Houhora) should also be sampled.

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Appendix – Sampling data of sediments tested for the presence of BoNT-producing organisms

| No. | Date | Time | Region | Position | Depth (m) | Temp. (°C) |
|-----|----------|-------|-------------------|---|-----------|------------|
| 001 | 24/12/98 | - | Manukau Harbour | Lat: 36° 55.781' S Long: 174° 42.322' E | <0 | - |
| 002 | 20/01/99 | 08:30 | Waitemata Harbour | Lat: 36° 56.532' S Long: 174° 51.521' E | 2.2 | 25 |
| 003 | 20/01/99 | 09:10 | Waitemata Harbour | Lat: 36° 56.095' S Long: 174° 52.205' E | 2.1 | 25.7 |
| 004 | 20/01/99 | 10:30 | Waitemata Harbour | Lat: 36° 55.482' S Long: 174° 51.844' E | 5 | 25.7 |
| 005 | 20/01/99 | 11:10 | Waitemata Harbour | Lat: 36° 54.350' S Long: 174° 51.205' E | 3.3 | - |
| 006 | 20/01/99 | 11:40 | Waitemata Harbour | Lat: 36° 53.603' S Long: 174° 52.015' E | 5.2 | 26 |
| 007 | 20/01/99 | 12:00 | Waitemata Harbour | Lat: 36° 52.322' S Long: 174° 54.015' E | 6.3 | 25.5 |
| 008 | 20/01/99 | 12:50 | Waitemata Harbour | Lat: 36° 51.425' S Long: 174° 48.321' E | 1.5 | 25.3 |
| 009 | 20/01/99 | 13:20 | Waitemata Harbour | Lat: 36° 51.441' S Long: 174° 48.298' E | 3 | 25.5 |
| 010 | 20/01/99 | 13:35 | Waitemata Harbour | Lat: 36° 50.949' S Long: 174° 48.186' E | 4.7 | 25.3 |
| 011 | 20/01/99 | 14:00 | Waitemata Harbour | Lat: 36° 50.475' S Long: 174° 45.021' E | 3.9 | 25.5 |
| 012 | 20/01/99 | 14:30 | Waitemata Harbour | Lat: 36° 50.688' S Long: 174° 43.271' E | 0.6 | 27 |
| 013 | 20/01/99 | 14:30 | Waitemata Harbour | Lat: 36° 50.439' S Long: 174° 43.176' E | 1.1 | 26.6 |
| 014 | 20/01/99 | 15:00 | Waitemata Harbour | Lat: 36° 51.171' S Long: 174° 41.467' E | 1.2 | 26.6 |
| 015 | 20/01/99 | 15:00 | Waitemata Harbour | Lat: 36° 56.779' S Long: 174° 40.461' E | 1.1 | 27.3 |
| 016 | 20/01/99 | 15:30 | Waitemata Harbour | Lat: 36° 49.116' S Long: 174° 40.089' E | 0.4 | 27.3 |
| 017 | 20/01/99 | 15:50 | Waitemata Harbour | Lat: 36° 49.345' S Long: 174° 43.600' E | 1.1 | 25.8 |
| 018 | 20/01/99 | 16:05 | Waitemata Harbour | Lat: 36° 49.342' S Long: 174° 44.552' E | 1.2 | 26 |
| 019 | 20/01/99 | 16:15 | Waitemata Harbour | Lat: 36° 49.497' S Long: 174° 44.556' E | 7.3 | 25.5 |
| 020 | 20/01/99 | 16:25 | Waitemata Harbour | Lat: 36° 49.436' S Long: 174° 44.838' E | 0.8 | 27.1 |
| 021 | 20/01/99 | 16:45 | Waitemata Harbour | Lat: 36° 49.834' S Long: 174° 48.253' E | 1.4 | 25.9 |
| 022 | 27/01/99 | 07:40 | Manukau Harbour | Lat: 36° 57.439' S Long: 174° 44.795' E | 0.9 | 23.4 |
| 023 | 27/01/99 | 07:55 | Manukau Harbour | Lat: 36° 57.135' S Long: 174° 44.288' E | 5.2 | 24 |
| 024 | 27/01/99 | 08:15 | Manukau Harbour | Lat: 36° 58.162' S Long: 174° 43.185' E | 5.3 | 23.9 |
| 025 | 27/01/99 | 08:40 | Manukau Harbour | Lat: 37° 00.481' S Long: 174° 40.813' E | 3.4 | 23.3 |
| 026 | 27/01/99 | 09:00 | Manukau Harbour | Lat: 37° 01.935' S Long: 174° 43.498' E | 6.2 | 23.3 |
| 027 | 27/01/99 | 09:30 | Manukau Harbour | Lat: 37° 02.075' S Long: 174° 47.748' E | 13.4 | 23.1 |
| 028 | 27/01/99 | 09:50 | Manukau Harbour | Lat: 37° 02.300' S Long: 174° 49.192' E | 4.4 | 24 |
| 029 | 27/01/99 | 10:15 | Manukau Harbour | Lat: 37° 02.853' S Long: 174° 43.811' E | 3.1 | 23.5 |
| 030 | 27/01/99 | 10:50 | Manukau Harbour | Lat: 37° 05.324' S Long: 174° 40.844' E | 2.4 | 24 |
| 031 | 27/01/99 | 11:15 | Manukau Harbour | Lat: 37° 03.227' S Long: 174° 40.420' E | 21.1 | 23.8 |
| 032 | 27/01/99 | 11:30 | Manukau Harbour | Lat: 37° 03.102' S Long: 174° 40.982' E | 3.7 | 23.6 |
| 033 | 27/01/99 | 11:50 | Manukau Harbour | Lat: 37° 02.236' S Long: 174° 38.329' E | 8.3 | 23.4 |
| 034 | 27/01/99 | 12:15 | Manukau Harbour | Lat: 37° 00.839' S Long: 174° 33.874' E | 1.4 | 22.3 |
| 036 | 27/01/99 | 12:25 | Manukau Harbour | Lat: 37° 00.676' S Long: 174° 34.195' E | 1.1 | 22.6 |
| 037 | 27/01/99 | 12:35 | Manukau Harbour | Lat: 37° 00.764' S Long: 174° 35.636' E | 1.2 | 22.1 |
| 038 | 27/01/99 | 12:45 | Manukau Harbour | Lat: 37° 01.514' S Long: 174° 35.696' E | 7.2 | 23.3 |
| 039 | 27/01/99 | 13:25 | Manukau Harbour | Lat: 36° 59.895' S Long: 174° 36.614' E | 2 | 24.2 |
| 040 | 27/01/99 | 13:40 | Manukau Harbour | Lat: 36° 59.113' S Long: 174° 37.583' E | 1.9 | 24.7 |
| 041 | 27/01/99 | 14:00 | Manukau Harbour | Lat: 36° 58.111' S Long: 174° 37.012' E | 2.1 | 25.1 |
| 042 | 27/01/99 | 14:15 | Manukau Harbour | Lat: 36° 56.714' S Long: 174° 40.382' E | 3.7 | 25.4 |

| No. | Date | Time | Region | Position | Depth (m) | Temp. (°C) |
|-----|----------|-------|-------------------|---|--------------|---------------|
| 044 | 27/01/99 | 14:30 | Manukau Harbour | Lat: 36° 55.931' S Long: 174° 42.245' E | 7.5 | 25.6 |
| 045 | 27/01/99 | 15:10 | Manukau Harbour | Lat: 36° 55.839' S Long: 174° 45.908' E | 1.6 | 25.8 |
| 046 | 27/01/99 | 15:30 | Manukau Harbour | Lat: 36° 56.013' S Long: 174° 47.721' E | 1.9 | 25.8 |
| 047 | 04/03/99 | 08:50 | Kaipara Harbour | Lat: 36° 32.614' S Long: 174° 21.852' E | 0.6 | 20.3 |
| 048 | 04/03/99 | 09:10 | Kaipara Harbour | Lat: 36° 30.617' S Long: 174° 21.367' E | 2.1 | 20.8 |
| 049 | 04/03/99 | 09:50 | Kaipara Harbour | Lat: 36° 29.198' S Long: 174° 17.349' E | 1.3 | 20.9 |
| 050 | 04/03/99 | 10:05 | Kaipara Harbour | Lat: 36° 28.136' S Long: 174° 16.110' E | 0.7 | 21 |
| 051 | 04/03/99 | 10:15 | Kaipara Harbour | Lat: 36° 27.110' S Long: 174° 15.224' E | 0.9 | 20.9 |
| 052 | 04/03/99 | 10:35 | Kaipara Harbour | Lat: 36° 25.969' S Long: 174° 13.431' E | 1.4 | 20.7 |
| 053 | 04/03/99 | 11:00 | Kaipara Harbour | Lat: 36° 24.047' S Long: 174° 16.007' E | 1.9 | 20.9 |
| 054 | 04/03/99 | 11:20 | Kaipara Harbour | Lat: 36° 24.286' S Long: 174° 19.064' E | 2.4 | 20.9 |
| 055 | 04/03/99 | 11:35 | Kaipara Harbour | Lat: 36° 24.584' S Long: 174° 22.205' E | 3.1 | 20.5 |
| 056 | 04/03/99 | 11:50 | Kaipara Harbour | Lat: 36° 23.488' S Long: 174° 23.371' E | 4.4 | 20.3 |
| 057 | 04/03/99 | 12:25 | Kaipara Harbour | Lat: 36° 25.344' S Long: 174° 23.875' E | 4.8 | 20.1 |
| 058 | 04/03/99 | 12:40 | Kaipara Harbour | Lat: 36° 26.160' S Long: 174° 21.438' E | 3.8 | 20.4 |
| 059 | 04/03/99 | 13:00 | Kaipara Harbour | Lat: 36° 27.218' S Long: 174° 19.021' E | 2.5 | 20.9 |
| 060 | 04/03/99 | 13:20 | Kaipara Harbour | Lat: 36° 29.261' S Long: 174° 20.847' E | 3.5 | 21 |
| 061 | 04/03/99 | 13:35 | Kaipara Harbour | Lat: 36° 30.353' S Long: 174° 22.662' E | 3.5 | 21 |
| 062 | 04/03/99 | 13:50 | Kaipara Harbour | Lat: 36° 32.246' S Long: 173° 23.730' E | 3.9 | 21.3 |
| 063 | 04/03/99 | 14:20 | Kaipara Harbour | Lat: 36° 34.052' S Long: 174° 24.725' E | 2.6 | 21 |
| 064 | 04/03/99 | 14:25 | Kaipara Harbour | Lat: 36° 35.215' S Long: 174° 23.791' E | 5.5 | 21.2 |
| 065 | 04/03/99 | 14:40 | Kaipara Harbour | Lat: 36° 36.138' S Long: 174° 25.477' E | 2.2 | 21.2 |
| 066 | 04/03/99 | 14:40 | Kaipara Harbour | Lat: 36° 36.843' S Long: 174° 24.294' E | 2.5 | 20.9 |
| 067 | 04/03/99 | 15:10 | Kaipara Harbour | Lat: 36° 34.505' S Long: 174° 22.934' E | 14.6 | 21.2 |
| 068 | 29/03/99 | 12:10 | Kaipara Harbour | Lat: 36° 29.343' S Long: 174° 43.840' E | 2.3 | 22.6 |
| 069 | 29/03/99 | 12:35 | Mahurangi Harbour | Lat: 36° 26.241' S Long: 174° 42.973' E | 2.5 | 23.7 |
| 070 | 29/03/99 | 13:50 | Mahurangi Harbour | Lat: 36° 27.751' S Long: 174° 43.281' E | 4.6 | 22.8 |
| 071 | 29/03/99 | 13:05 | Mahurangi Harbour | Lat: 36° 28.948' S Long: 174° 42.496' E | 1.1 | 22.4 |
| 072 | 29/03/99 | 13:50 | Mahurangi Harbour | Lat: 36° 26.425' S Long: 174° 49.914' E | 3.4 | 22.4 |
| 073 | 29/03/99 | 14:15 | Mahurangi Harbour | Lat: 36° 25.334' S Long: 174° 49.063' E | 9.7 | 22.3 |
| 074 | 29/03/99 | 14:30 | Mahurangi Harbour | Lat: 36° 24.653' S Long: 174° 49.368' E | 4.8 | 22.3 |
| 075 | 29/03/99 | 14:50 | Mahurangi Harbour | Lat: 36° 24.290' S Long: 174° 46.496' E | 8.7 | 22.1 |
| 076 | 29/03/99 | 15:10 | Mahurangi Harbour | Lat: 36° 23.279' S Long: 174° 43.705' E | 1 | 22.9 |
| 077 | 30/03/99 | 08:15 | Kaipara Harbour | Lat: 36° 17.792' S Long: 174° 15.501' E | 4.5 | 22 |
| 078 | 30/03/99 | 08:40 | Kaipara Harbour | Lat: 36° 21.444' S Long: 174° 13.513' E | 1.5 | 21.8 |
| 079 | 30/03/99 | 09:00 | Kaipara Harbour | Lat: 36° 19.601' S Long: 174° 10.668' E | 5.3 | 21.5 |
| 080 | 30/03/99 | 09:15 | Kaipara Harbour | Lat: 36° 17.853' S Long: 174° 08.836' E | 5.9 | 21.5 |
| 081 | 30/03/99 | 09:40 | Kaipara Harbour | Lat: 36° 15.624' S Long: 174° 09.481' E | 7 | 22 |
| 082 | 30/03/99 | 09:55 | Kaipara Harbour | Lat: 36° 14.124' S Long: 174° 06.715' E | 4.2 | 22 |
| 083 | 30/03/99 | 10:15 | Kaipara Harbour | Lat: 36° 12.441' S Long: 174° 04.544' E | 4.3 | 22.2 |
| 084 | 30/03/99 | 10:35 | Kaipara Harbour | Lat: 36° 10.774' S Long: 174° 02.783' E | 6.9 | 22.3 |
| 085 | 30/03/99 | 10:55 | Kaipara Harbour | Lat: 36° 08.794' S Long: 174° 00.865' E | 5.5 | 22.6 |
| 086 | 30/03/99 | 11:05 | Kaipara Harbour | Lat: 36° 09.258' S Long: 174° 01.994' E | 13.5 | 22.5 |
| 087 | 30/03/99 | 11:40 | Kaipara Harbour | Lat: 36° 12.048' S Long: 174° 06.377' E | 5.6 | 22.6 |
| 088 | 30/03/99 | 11:55 | Kaipara Harbour | Lat: 36° 12.773' S Long: 174° 08.749' E | 2.5 | 22.6 |
| 089 | 30/03/99 | 12:15 | Kaipara Harbour | Lat: 36° 15.136' S Long: 174° 10.447' E | 5.7 | 22.5 |
| 090 | 30/03/99 | 12:30 | Kaipara Harbour | Lat: 36° 15.985' S Long: 174° 13.579' E | 4.9 | 27.4 |
| 091 | 30/03/99 | 13:15 | Kaipara Harbour | Lat: 36° 15.111' S Long: 174° 15.461' E | 10.1 | 22.3 |
| 092 | 30/03/99 | 13:30 | Kaipara Harbour | Lat: 36° 13.989' S Long: 174° 17.763' E | 2.6 | 22.5 |

| No. | Date | Time | Region | Position | Depth (m) | Temp. (°C) |
|-----|----------|-------|-----------------------|---|--------------|---------------|
| 093 | 30/03/99 | 13:50 | Kaipara Harbour | Lat: 36° 11.482' S Long: 174° 16.237' E | 9 | 22.7 |
| 094 | 30/03/99 | 14:10 | Kaipara Harbour | Lat: 36° 13.338' S Long: 174° 19.679' E | 3.7 | 22.6 |
| 095 | 30/03/99 | 14:35 | Kaipara Harbour | Lat: 36° 16.294' S Long: 174° 15.552' E | 6.2 | 22.5 |
| 096 | 30/03/99 | 14:55 | Kaipara Harbour | Lat: 36° 18.378' S Long: 174° 18.163' E | 7.3 | 23.4 |
| 097 | 30/03/99 | 15:10 | Kaipara Harbour | Lat: 36° 19.188' S Long: 174° 20.989' E | 1.8 | 23.1 |
| 098 | 30/03/99 | 15:31 | Kaipara Harbour | Lat: 36° 17.476' S Long: 174° 23.790' E | 2 | 27.7 |
| 099 | 06/12/99 | 15:30 | Hokianga Harbour | Lat: 35° 29.845' S Long: 173° 22.364' E | 1.5 | 19.5 |
| 100 | 06/12/99 | 15:50 | Hokianga Harbour | Lat: 35° 28.816' S Long: 173° 22.927' E | 1.7 | 20.3 |
| 102 | 06/12/99 | 16:05 | Hokianga Harbour | Lat: 35° 28.108' S Long: 173° 22.901' E | 0.7 | 20.3 |
| 103 | 06/12/99 | 16:15 | Hokianga Harbour | Lat: 35° 27.375' S Long: 173° 23.171' E | 0.6 | 20.4 |
| 104 | 06/12/99 | 16:25 | Hokianga Harbour | Lat: 35° 26.689' S Long: 173° 23.767' E | 0.7 | 20.9 |
| 105 | 06/12/99 | 16:40 | Hokianga Harbour | Lat: 35° 25.893' S Long: 173° 24.563' E | 9 | 20.5 |
| 106 | 06/12/99 | 17:00 | Hokianga Harbour | Lat: 35° 24.435' S Long: 173° 25.520' E | 0.5 | 22.4 |
| 107 | 06/12/99 | 17:10 | Hokianga Harbour | Lat: 35° 24.210' S Long: 173° 26.682' E | 4.4 | 20.7 |
| 108 | 06/12/99 | 17:15 | Hokianga Harbour | Lat: 35° 23.908' S Long: 173° 28.054' E | 2.6 | 21 |
| 109 | 06/12/99 | 17:30 | Hokianga Harbour | Lat: 35° 24.565' S Long: 173° 27.317' E | 1.5 | 20.7 |
| 110 | 06/12/99 | 17:45 | Hokianga Harbour | Lat: 35° 24.873' S Long: 173° 25.986' E | 1.2 | 20.5 |
| 111 | 06/12/99 | 17:55 | Hokianga Harbour | Lat: 35° 26.547' S Long: 173° 25.097' E | 2.1 | 20.3 |
| 112 | 06/12/99 | 18:10 | Hokianga Harbour | Lat: 35° 27.811' S Long: 173° 24.646' E | 4.5 | 19.5 |
| 113 | 06/12/99 | 18:20 | Hokianga Harbour | Lat: 35° 29.262' S Long: 173° 23.948' E | 2.3 | 19.6 |
| 114 | 06/12/99 | 18:35 | Hokianga Harbour | Lat: 35° 30.193' S Long: 173° 23.574' E | 7.1 | 19 |
| 115 | 06/12/99 | 18:45 | Hokianga Harbour | Lat: 35° 31.038' S Long: 173° 23.150' E | 3.6 | 19.4 |
| 116 | 06/12/99 | 19:00 | Hokianga Harbour | Lat: 35° 32.110' S Long: 173° 23.082' E | 2.4 | 19 |
| 117 | 07/12/99 | 09:10 | Hokianga Harbour | Lat: 35° 23.978' S Long: 173° 29.627' E | 3.6 | 19.9 |
| 118 | 07/12/99 | 09:25 | Hokianga Harbour | Lat: 35° 24.800' S Long: 173° 29.378' E | 3.2 | 20.2 |
| 119 | 07/12/99 | 09:40 | Hokianga Harbour | Lat: 35° 23.051' S Long: 173° 29.699' E | 3.5 | 20.1 |
| 120 | 07/12/99 | 09:50 | Hokianga Harbour | Lat: 35° 23.159' S Long: 173° 31.221' E | 3.7 | 20.7 |
| 121 | 07/12/99 | 10:00 | Hokianga Harbour | Lat: 35° 22.667' S Long: 173° 32.164' E | 8 | 20.9 |
| 122 | 07/12/99 | 10:15 | Hokianga Harbour | Lat: 35° 20.923' S Long: 173° 32.940' E | 4.5 | 20.9 |
| 123 | 07/12/99 | 10:25 | Hokianga Harbour | Lat: 35° 19.922' S Long: 173° 32.643' E | 3.3 | 21.3 |
| 124 | 07/12/99 | 10:25 | Hokianga Harbour | Lat: 35° 19.922' S Long: 173° 32.643' E | 3.3 | 21.3 |
| 125 | 07/12/99 | 10:45 | Hokianga Harbour | Lat: 35° 18.052' S Long: 173° 31.995' E | 3 | 21.7 |
| 126 | 07/12/99 | 10:55 | Hokianga Harbour | Lat: 35° 19.185' S Long: 173° 31.946' E | 3.4 | 21.7 |
| 127 | 07/12/99 | 11:10 | Hokianga Harbour | Lat: 35° 21.305' S Long: 173° 34.466' E | 5.4 | 20.9 |
| 128 | 07/12/99 | 11:20 | Hokianga Harbour | Lat: 35° 20.740' S Long: 173° 36.034' E | 2.4 | 21.8 |
| 129 | 07/12/99 | 11:45 | Hokianga Harbour | Lat: 35° 21.995' S Long: 173° 33.144' E | 4.2 | 21.2 |
| 130 | 07/12/99 | 12:00 | Hokianga Harbour | Lat: 35° 24.378' S Long: 173° 31.474' E | 8.1 | 21.4 |
| 131 | 07/12/99 | 12:10 | Hokianga Harbour | Lat: 35° 23.707' S Long: 173° 30.563' E | 3.7 | 20.8 |
| 132 | 08/12/99 | 07:50 | Far north, east coast | Lat: 34° 49.882' S Long: 173° 09.696' E | 4.3 | 18.7 |
| 133 | 08/12/99 | 08:00 | Far north, east coast | Lat: 34° 51.272' S Long: 173° 10.835' E | 6.5 | 18.2 |
| 134 | 08/12/99 | 08:10 | Far north, east coast | Lat: 34° 52.167' S Long: 173° 12.419' E | 5.7 | 18 |
| 135 | 08/12/99 | 08:20 | Far north, east coast | Lat: 34° 52.521' S Long: 173° 14.879' E | 6.9 | 18.4 |
| 136 | 08/12/99 | 08:35 | Far north, east coast | Lat: 34° 53.099' S Long: 173° 16.707' E | 5.9 | 17.9 |
| 137 | 08/12/99 | 08:45 | Far north, east coast | Lat: 34° 53.289' S Long: 173° 17.782' E | 6.3 | 17.2 |
| 138 | 08/12/99 | 09:00 | Far north, east coast | Lat: 34° 54.657' S Long: 173° 18.555' E | 4.1 | 17.3 |
| 139 | 08/12/99 | 09:10 | Far north, east coast | Lat: 34° 55.822' S Long: 173° 19.108' E | 2.3 | 19.2 |
| 140 | 08/12/99 | 09:25 | Far north, east coast | Lat: 34° 57.700' S Long: 173° 19.324' E | 1.5 | 20.4 |
| 141 | 08/12/99 | 09:40 | Far north, east coast | Lat: 34° 56.381' S Long: 173° 18.132' E | 3.9 | 19 |
| 142 | 08/12/99 | 09:55 | Far north, east coast | Lat: 34° 56.990' S Long: 173° 16.530' E | 6.2 | 18.4 |

| No. | Date | Time | Region | Position | Depth (m) | Temp. (°C) |
|-----|----------|-------|-----------------------|---|--------------|---------------|
| 143 | 08/12/99 | 10:10 | Far north, east coast | Lat: 34° 58.295' S Long: 173° 17.194' E | 4.7 | 20.5 |
| 144 | 08/12/99 | 10:25 | Far north, east coast | Lat: 34° 59.802' S Long: 173° 16.749' E | 2.2 | 21.6 |
| 145 | 08/12/99 | 10:35 | Far north, east coast | Lat: 34° 59.060' S Long: 173° 16.364' E | 2 | 21.2 |
| 146 | 08/12/99 | 11:00 | Far north, east coast | Lat: 34° 58.197' S Long: 173° 15.192' E | 4.6 | 21.6 |
| 147 | 08/12/99 | 11:10 | Far north, east coast | Lat: 34° 59.354' S Long: 173° 14.994' E | 2.7 | 21.6 |
| 148 | 08/12/99 | 11:35 | Far north, east coast | Lat: 34° 56.051' S Long: 173° 15.868' E | 4.6 | 20.2 |
| 149 | 08/12/99 | 11:50 | Far north, east coast | Lat: 34° 54.642' S Long: 173° 16.740' E | 4.8 | 19 |
| 150 | 08/12/99 | 12:10 | Far north, east coast | Lat: 34° 51.388' S Long: 173° 15.208' E | 6.7 | 19.5 |
| 151 | 08/12/99 | 12:40 | Far north, east coast | Lat: 34° 48.799' S Long: 173° 08.828' E | 3 | 20.2 |
| 152 | 08/12/99 | 12:50 | Far north, east coast | Lat: 34° 49.169' S Long: 173° 08.485' E | 3.6 | 19.6 |
| 153 | 08/12/99 | 13:05 | Far north, east coast | Lat: 34° 49.299' S Long: 173° 07.870' E | 3.5 | 19.9 |
| 154 | 08/12/99 | 13:15 | Far north, east coast | Lat: 34° 48.432' S Long: 173° 07.232' E | 3.6 | 21.6 |
| 155 | 08/12/99 | 13:25 | Far north, east coast | Lat: 34° 47.608' S Long: 173° 07.525' E | 3.6 | 21.2 |
| 156 | 08/12/99 | 13:35 | Far north, east coast | Lat: 34° 47.175' S Long: 173° 07.288' E | 2.1 | 22.8 |
| 157 | 08/12/99 | 16:10 | Whangaroa Harbour | Lat: 35° 02.198' S Long: 173° 45.042' E | 3.6 | 20.8 |
| 158 | 08/12/99 | 16:15 | Whangaroa Harbour | Lat: 35° 02.663' S Long: 173° 45.537' E | 2.3 | 21.8 |
| 159 | 08/12/99 | 16:25 | Whangaroa Harbour | Lat: 35° 02.320' S Long: 173° 45.643' E | 5.3 | 20.8 |
| 160 | 08/12/99 | 16:35 | Whangaroa Harbour | Lat: 35° 01.932' S Long: 173° 46.222' E | 2 | 22 |
| 161 | 08/12/99 | 16:40 | Whangaroa Harbour | Lat: 35° 01.662' S Long: 173° 45.097' E | 8.7 | 20.4 |
| 162 | 08/12/99 | 16:50 | Whangaroa Harbour | Lat: 35° 01.574' S Long: 173° 46.339' E | 4.3 | 20.7 |
| 163 | 08/12/99 | 16:55 | Whangaroa Harbour | Lat: 35° 00.978' S Long: 173° 45.587' E | 4.3 | 20.4 |
| 164 | 08/12/99 | 17:00 | Whangaroa Harbour | Lat: 35° 00.283' S Long: 173° 45.162' E | 3.9 | 19.4 |
| 165 | 08/12/99 | 17:10 | Whangaroa Harbour | Lat: 35° 00.092' S Long: 173° 43.861' E | 1.6 | 21.1 |
| 166 | 08/12/99 | 17:15 | Whangaroa Harbour | Lat: 35° 00.473' S Long: 173° 43.490' E | 1.4 | 22.1 |
| 167 | 08/12/99 | 17:35 | Whangaroa Harbour | Lat: 35° 01.200' S Long: 173° 44.536' E | 3.7 | 22 |
| 7.1 | 08/12/99 | 17:30 | Whangaroa Harbour | Lat: 35° 01.121' S Long: 173° 44.884' E | 10.2 | 18.4 |
| 168 | 08/12/99 | 17:45 | Whangaroa Harbour | Lat: 35° 02.002' S Long: 173° 44.478' E | 3 | 20.4 |
| 169 | 08/12/99 | 17:50 | Whangaroa Harbour | Lat: 35° 02.692' S Long: 173° 43.723' E | 3.8 | 21.5 |
| 170 | 08/12/99 | 17:50 | Whangaroa Harbour | Lat: 35° 02.692' S Long: 173° 43.723' E | 3.8 | 21.5 |
| 171 | 08/12/99 | 18:00 | Whangaroa Harbour | Lat: 35° 03.262' S Long: 173° 43.033' E | 2.1 | 21.5 |
| 172 | 08/12/99 | 18:10 | Whangaroa Harbour | Lat: 35° 03.404' S Long: 173° 43.740' E | 2 | 20.8 |
| 173 | 08/12/99 | 18:15 | Whangaroa Harbour | Lat: 35° 02.852' S Long: 173° 44.398' E | 5.2 | 20.6 |
| 174 | 09/12/99 | 08:15 | Bay of Islands | Lat: 35° 13.594' S Long: 174° 03.730' E | 5.9 | 19.7 |
| 175 | 08/12/99 | 08:30 | Bay of Islands | Lat: 35° 12.753' S Long: 174° 04.423' E | 4.9 | 19 |
| 5.2 | 08/12/99 | 08:30 | Bay of Islands | Lat: 35° 12.652' S Long: 174° 04.486' E | 3.8 | 19 |
| 176 | 09/12/99 | 08:45 | Bay of Islands | Lat: 35° 12.664' S Long: 174° 03.185' E | 3.9 | 19.3 |
| 177 | 09/12/99 | 08:55 | Bay of Islands | Lat: 35° 12.313' S Long: 174° 02.623' E | 2.7 | 19.4 |
| 178 | 09/12/99 | 09:05 | Bay of Islands | Lat: 35° 12.922' S Long: 174° 02.500' E | 2.5 | 20.2 |
| 179 | 09/12/99 | 09:15 | Bay of Islands | Lat: 35° 12.315' S Long: 174° 01.441' E | 4.9 | 20.2 |
| 180 | 09/12/99 | 09:15 | Bay of Islands | Lat: 35° 12.315' S Long: 174° 01.441' E | 4.9 | 20.2 |
| 181 | 09/12/99 | 09:20 | Bay of Islands | Lat: 35° 12.327' S Long: 174° 00.617' E | 3 | 20 |
| 182 | 09/12/99 | 09:30 | Bay of Islands | Lat: 35° 11.850' S Long: 174° 00.611' E | 3 | 20.3 |
| 183 | 09/12/99 | 09:40 | Bay of Islands | Lat: 35° 12.072' S Long: 173° 59.586' E | 2.7 | 20.5 |
| 184 | 09/12/99 | 09:50 | Bay of Islands | Lat: 35° 12.525' S Long: 173° 58.615' E | 5 | 20.3 |
| 185 | 09/12/99 | 10:10 | Bay of Islands | Lat: 35° 11.787' S Long: 174° 01.626' E | 3.8 | 20.5 |
| 187 | 09/12/99 | 10:20 | Bay of Islands | Lat: 35° 11.701' S Long: 174° 02.392' E | 4.9 | 20.1 |
| 188 | 09/12/99 | 10:25 | Bay of Islands | Lat: 35° 11.506' S Long: 174° 02.818' E | 5 | 19.9 |
| 189 | 09/12/99 | 10:35 | Bay of Islands | Lat: 35° 11.055' S Long: 174° 01.881' E | 2.8 | 20.4 |
| 190 | 09/12/99 | 10:50 | Bay of Islands | Lat: 35° 10.219' S Long: 174° 00.950' E | 5.3 | 21.3 |

| No. | Date | Time | Region | Position | Depth (m) | Temp. (°C) |
|-----|----------|-------|-----------------|---|--------------|---------------|
| 191 | 09/12/99 | 10:50 | Bay of Islands | Lat: 35° 10.219' S Long: 174° 00.950' E | 5.3 | 21.3 |
| 192 | 09/12/99 | 11:00 | Bay of Islands | Lat: 35° 09.044' S Long: 173° 59.582' E | 2.4 | 22.2 |
| 193 | 09/12/99 | 11:10 | Bay of Islands | Lat: 35° 09.063' S Long: 174° 00.598' E | 3.8 | 22.1 |
| 194 | 09/12/99 | 11:25 | Bay of Islands | Lat: 35° 09.743' S Long: 174° 01.723' E | 4.8 | 22.3 |
| 195 | 09/12/99 | 11:35 | Bay of Islands | Lat: 35° 09.735' S Long: 174° 02.561' E | 3.5 | 21.5 |
| 196 | 09/12/99 | 11:45 | Bay of Islands | Lat: 35° 10.649' S Long: 174° 03.391' E | 4.2 | 21.1 |
| 197 | 09/12/99 | 12:05 | Bay of Islands | Lat: 35° 10.881' S Long: 174° 04.565' E | 4.7 | 19.9 |
| 198 | 09/12/99 | 12:15 | Bay of Islands | Lat: 35° 10.215' S Long: 174° 05.799' E | 3.7 | 20.8 |
| 199 | 09/12/99 | 12:50 | Bay of Islands | Lat: 35° 12.849' S Long: 174° 13.256' E | 3.6 | 19.3 |
| 200 | 09/12/99 | 12:55 | Bay of Islands | Lat: 35° 13.407' S Long: 174° 13.685' E | 1.7 | 19.6 |
| 201 | 09/12/99 | 13:10 | Bay of Islands | Lat: 35° 13.417' S Long: 174° 14.369' E | 5.1 | 19.2 |
| 202 | 09/12/99 | 13:35 | Bay of Islands | Lat: 35° 13.629' S Long: 174° 15.344' E | 3.7 | 19.7 |
| 203 | 09/12/99 | 13:40 | Bay of Islands | Lat: 35° 14.103' S Long: 174° 15.438' E | 2 | 20 |
| 204 | 09/12/99 | 13:50 | Bay of Islands | Lat: 35° 14.844' S Long: 174° 14.966' E | 3.9 | 20.8 |
| 205 | 09/12/99 | 14:00 | Bay of Islands | Lat: 35° 15.302' S Long: 174° 14.987' E | 2.4 | 21.5 |
| 206 | 09/12/99 | 14:10 | Bay of Islands | Lat: 35° 15.217' S Long: 174° 14.069' E | 5.2 | 20.5 |
| 207 | 09/12/99 | 14:20 | Bay of Islands | Lat: 35° 14.818' S Long: 174° 13.300' E | 3.7 | 20.1 |
| 208 | 09/12/99 | 14:30 | Bay of Islands | Lat: 35° 14.979' S Long: 174° 12.509' E | 3.3 | 19.7 |
| 209 | 09/12/99 | 14:45 | Bay of Islands | Lat: 35° 15.556' S Long: 174° 12.337' E | 4.9 | 20.5 |
| 210 | 09/12/99 | 14:55 | Bay of Islands | Lat: 35° 16.008' S Long: 174° 12.725' E | 2.6 | 20.5 |
| 211 | 09/12/99 | 15:05 | Bay of Islands | Lat: 35° 16.525' S Long: 174° 12.737' E | 2.4 | 20.8 |
| 212 | 09/12/99 | 15:15 | Bay of Islands | Lat: 35° 15.751' S Long: 174° 11.112' E | 5.6 | 20.3 |
| 213 | 09/12/99 | 15:30 | Bay of Islands | Lat: 35° 16.400' S Long: 174° 10.389' E | 3.1 | 20.1 |
| 214 | 09/12/99 | 15:45 | Bay of Islands | Lat: 35° 15.313' S Long: 174° 07.977' E | 3.9 | 19.6 |
| 215 | 08/12/99 | 16:00 | Bay of Islands | Lat: 35° 14.727' S Long: 174° 07.053' E | 4.2 | 20 |
| 216 | 10/12/99 | 08:00 | Bay of Islands | Lat: 35° 16.504' S Long: 174° 03.732' E | 1.2 | 19.2 |
| 217 | 10/12/99 | 08:00 | Bay of Islands | Lat: 35° 16.297' S Long: 174° 04.498' E | 1.9 | 19.4 |
| 218 | 10/12/99 | 08:20 | Bay of Islands | Lat: 35° 16.586' S Long: 174° 05.374' E | 3.7 | 19.6 |
| 219 | 10/12/99 | 08:30 | Bay of Islands | Lat: 35° 17.125' S Long: 174° 05.947' E | 3.4 | 19 |
| 220 | 10/12/99 | 08:35 | Bay of Islands | Lat: 35° 17.345' S Long: 174° 06.381' E | 13.1 | 19.6 |
| 221 | 10/12/99 | 08:35 | Bay of Islands | Lat: 35° 17.345' S Long: 174° 06.381' E | 13.1 | 19.6 |
| 222 | 10/12/99 | 08:50 | Bay of Islands | Lat: 35° 17.716' S Long: 174° 06.301' E | 1.8 | 19.3 |
| 223 | 10/12/99 | 08:55 | Bay of Islands | Lat: 35° 17.953' S Long: 174° 07.011' E | 3 | 20 |
| 224 | 10/12/99 | 09:05 | Bay of Islands | Lat: 35° 18.574' S Long: 174° 07.020' E | 5.2 | 20.3 |
| 225 | 10/12/99 | 09:20 | Bay of Islands | Lat: 35° 19.444' S Long: 174° 07.188' E | 3.3 | 20.1 |
| 226 | 10/12/99 | 09:25 | Bay of Islands | Lat: 35° 19.063' S Long: 174° 07.695' E | 2.8 | 20.3 |
| 227 | 10/12/99 | 09:35 | Bay of Islands | Lat: 35° 19.180' S Long: 174° 08.364' E | 3.1 | 20.4 |
| 228 | 10/12/99 | 09:45 | Bay of Islands | Lat: 35° 18.362' S Long: 174° 09.416' E | 2.6 | 20.6 |
| 229 | 10/12/99 | 09:55 | Bay of Islands | Lat: 35° 18.599' S Long: 174° 10.412' E | 2.5 | 20.8 |
| 230 | 10/12/99 | 10:05 | Bay of Islands | Lat: 35° 18.926' S Long: 174° 11.568' E | 2.6 | 21.3 |
| 231 | 10/12/99 | 10:10 | Bay of Islands | Lat: 35° 19.342' S Long: 174° 12.769' E | 2.1 | 21.6 |
| 232 | 10/12/99 | 10:40 | Bay of Islands | Lat: 35° 16.480' S Long: 174° 06.775' E | 6.3 | 20 |
| 233 | 10/12/99 | 10:50 | Bay of Islands | Lat: 35° 17.065' S Long: 174° 08.198' E | 3.7 | 20.5 |
| 234 | 10/12/99 | 11:00 | Bay of Islands | Lat: 35° 16.333' S Long: 174° 07.634' E | 4.9 | 20.5 |
| 235 | 10/12/99 | 11:10 | Bay of Islands | Lat: 35° 15.657' S Long: 174° 06.955' E | 4.9 | 20.5 |
| 236 | 10/12/99 | 11:20 | Bay of Islands | Lat: 35° 16.351' S Long: 174° 05.781' E | 6.4 | 21.1 |
| 237 | 03/02/00 | 10:10 | Firth of Thames | Lat: 37° 02.478' S Long: 175° 19.862' E | 11.2 | 21.6 |
| 238 | 03/02/00 | 10:30 | Firth of Thames | Lat: 37° 05.381' S Long: 175° 21.614' E | 9 | 21.6 |
| 239 | 03/02/00 | 10:50 | Firth of Thames | Lat: 37° 05.480' S Long: 175° 25.688' E | 7.1 | 21.7 |

| No. | Date | Time | Region | Position | Depth (m) | Temp. (°C) |
|-----|----------|-------|--------------------|---|--------------|---------------|
| 240 | 03/02/00 | 11:10 | Firth of Thames | Lat: 37° 02.825' S Long: 175° 26.489' E | 9 | 21.9 |
| 241 | 03/02/00 | 11:25 | Firth of Thames | Lat: 37° 00.341' S Long: 175° 27.086' E | 10.3 | 21.4 |
| 242 | 03/02/00 | 11:45 | Firth of Thames | Lat: 36° 55.940' S Long: 175° 27.254' E | 7.8 | 22.3 |
| 243 | 03/02/00 | 12:00 | Firth of Thames | Lat: 36° 58.700' S Long: 175° 29.652' E | 3.7 | 22.4 |
| 244 | 03/02/00 | 12:20 | Firth of Thames | Lat: 37° 01.294' S Long: 175° 30.078' E | 4.7 | 21.6 |
| 245 | 03/02/00 | 12:30 | Firth of Thames | Lat: 37° 03.996' S Long: 175° 30.791' E | 2.7 | 22 |
| 246 | 03/02/00 | 12:45 | Firth of Thames | Lat: 37° 06.308' S Long: 175° 30.225' E | 2.5 | 22.3 |
| 247 | 03/02/00 | 12:55 | Firth of Thames | Lat: 37° 08.353' S Long: 175° 31.009' E | 1.1 | 23.7 |
| 248 | 03/02/00 | 13:05 | Firth of Thames | Lat: 37° 10.048' S Long: 175° 32.323' E | 2.1 | 21.8 |
| 249 | 03/02/00 | 13:20 | Firth of Thames | Lat: 37° 11.226' S Long: 175° 33.721' E | 3.4 | 21.4 |
| 250 | 03/02/00 | 13:45 | Firth of Thames | Lat: 37° 08.140' S Long: 175° 28.048' E | 2.1 | 23.3 |
| 251 | 03/02/00 | 14:10 | Firth of Thames | Lat: 37° 10.342' S Long: 175° 26.761' E | 1.3 | 22.6 |
| 252 | 03/02/00 | 14:20 | Firth of Thames | Lat: 37° 11.157' S Long: 175° 23.600' E | 1.2 | 21.7 |
| 253 | 03/02/00 | 14:35 | Firth of Thames | Lat: 37° 09.979' S Long: 175° 21.098' E | 2.9 | 22 |
| 254 | 03/02/00 | 14:50 | Firth of Thames | Lat: 37° 07.950' S Long: 175° 19.648' E | 4.1 | 22.1 |
| 255 | 03/02/00 | 15:03 | Firth of Thames | Lat: 37° 04.415' S Long: 175° 18.763' E | 5.2 | 21.8 |
| 256 | 03/02/00 | 15:25 | Firth of Thames | Lat: 37° 00.917' S Long: 175° 17.330' E | 4.1 | 21.8 |
| 257 | 03/02/00 | 15:40 | Firth of Thames | Lat: 36° 57.963' S Long: 175° 15.597' E | 6.4 | 22 |
| 258 | 03/02/00 | 15:50 | Firth of Thames | Lat: 36° 56.558' S Long: 175° 12.915' E | 4.4 | 21.9 |
| 259 | 03/02/00 | 16:00 | Firth of Thames | Lat: 36° 56.115' S Long: 175° 10.936' E | 2.8 | 21.9 |
| 260 | 03/02/00 | 16:10 | Firth of Thames | Lat: 36° 56.481' S Long: 175° 09.800' E | 3.2 | 22 |
| 261 | 04/02/00 | 08:35 | Waitemata Harbour | Lat: 36° 52.282' S Long: 175° 04.075' E | 7.3 | 21.5 |
| 262 | 04/02/00 | 08:45 | Waitemata Harbour | Lat: 36° 53.793' S Long: 175° 04.619' E | 4.6 | 21.4 |
| 263 | 04/02/00 | 08:55 | Waitemata Harbour | Lat: 36° 53.754' S Long: 175° 06.426' E | 6.7 | 21.4 |
| 264 | 04/02/00 | 09:05 | Waitemata Harbour | Lat: 36° 55.442' S Long: 175° 06.978' E | 4 | 21.4 |
| 265 | 04/02/00 | 09:05 | Waitemata Harbour | Lat: 36° 55.442' S Long: 175° 06.978' E | 4 | 21.4 |
| 266 | 04/02/00 | 09:15 | Waitemata Harbour | Lat: 36° 54.531' S Long: 175° 08.857' E | 5.3 | 21.4 |
| 267 | 04/02/00 | 09:25 | Waitemata Harbour | Lat: 36° 52.787' S Long: 175° 10.044' E | 6.3 | 21.5 |
| 268 | 04/02/00 | 09:35 | Waitemata Harbour | Lat: 36° 53.848' S Long: 175° 11.042' E | 3 | 21.4 |
| 269 | 04/02/00 | 09:45 | Waitemata Harbour | Lat: 36° 53.232' S Long: 175° 12.045' E | 5.1 | 21.5 |
| 270 | 22/02/00 | 10:00 | Coromandel harbour | Lat: 36° 52.468' S Long: 175° 15.926' E | 23.4 | 21.4 |
| 271 | 22/02/00 | 10:00 | Coromandel harbour | Lat: 36° 52.468' S Long: 175° 15.926' E | 23.4 | 21.4 |
| 272 | 22/02/00 | 10:25 | Coromandel harbour | Lat: 36° 51.145' S Long: 175° 24.918' E | 3.7 | 21.4 |
| 273 | 22/02/00 | 10:35 | Coromandel harbour | Lat: 36° 50.781' S Long: 175° 26.294' E | 2.5 | 21.4 |
| 274 | 22/02/00 | 10:45 | Coromandel harbour | Lat: 36° 48.544' S Long: 175° 25.883' E | 7.4 | 21.8 |
| 275 | 22/02/00 | 10:55 | Coromandel harbour | Lat: 36° 49.682' S Long: 176° 27.067' E | 2.9 | 22.3 |
| 276 | 22/02/00 | 11:05 | Coromandel harbour | Lat: 36° 48.376' S Long: 175° 27.228' E | 9 | 21.6 |
| 277 | 22/02/00 | 11:20 | Coromandel harbour | Lat: 36° 47.983' S Long: 175° 29.183' E | 3 | 22.2 |
| 278 | 22/02/00 | 11:25 | Coromandel harbour | Lat: 36° 46.742' S Long: 175° 27.981' E | 4.1 | 22 |
| 279 | 22/02/00 | 11:35 | Coromandel harbour | Lat: 36° 45.789' S Long: 175° 28.538' E | 1.7 | 22.1 |
| 280 | 22/02/00 | 11:50 | Coromandel harbour | Lat: 36° 44.848' S Long: 175° 28.228' E | 4.2 | 22.2 |
| 281 | 22/02/00 | 11:55 | Coromandel harbour | Lat: 36° 43.881' S Long: 175° 27.134' E | 4.9 | 22.1 |
| 282 | 22/02/00 | 12:10 | Coromandel harbour | Lat: 36° 44.617' S Long: 175° 24.398' E | 4.3 | 21.5 |
| 283 | 22/02/00 | 13:15 | Waitemata Harbour | Lat: 36° 47.601' S Long: 175° 11.591' E | 2.2 | 21.5 |
| 284 | 22/02/00 | 13:25 | Waitemata Harbour | Lat: 36° 46.611' S Long: 175° 10.957' E | 2.6 | 21.7 |
| 285 | 22/02/00 | 13:40 | Waitemata Harbour | Lat: 36° 47.954' S Long: 175° 09.630' E | 3.1 | 21.7 |
| 286 | 22/02/00 | 13:50 | Waitemata Harbour | Lat: 36° 49.323' S Long: 175° 11.535' E | 4.9 | 21.6 |
| 287 | 22/02/00 | 14:05 | Waitemata Harbour | Lat: 36° 50.144' S Long: 175° 10.770' E | 3.7 | 22 |
| 288 | 22/02/00 | 14:15 | Waitemata Harbour | Lat: 36° 50.119' S Long: 175° 09.143' E | 2.9 | 22.2 |

| No. | Date | Time | Region | Position | Depth (m) | Temp. (°C) |
|-----|----------|-------|--------------------|---|--------------|---------------|
| 289 | 22/02/00 | 14:30 | Waitemata Harbour | Lat: 36° 50.687' S Long: 175° 07.888' E | 1.8 | 21.8 |
| 290 | 22/02/00 | 14:45 | Waitemata Harbour | Lat: 36° 50.321' S Long: 175° 05.923' E | 3 | 22.1 |
| 291 | 22/02/00 | 15:10 | Waitemata Harbour | Lat: 36° 49.179' S Long: 175° 03.196' E | 2.9 | 22.3 |
| 292 | 22/02/00 | 15:30 | Waitemata Harbour | Lat: 36° 48.704' S Long: 175° 01.967' E | 4.2 | 21.9 |
| 293 | 22/02/00 | 15:50 | Waitemata Harbour | Lat: 36° 48.310' S Long: 175° 00.051' E | 3.8 | 21.9 |
| 294 | 22/02/00 | 16:10 | Waitemata Harbour | Lat: 36° 52.256' S Long: 175° 01.765' E | 3.1 | 22 |
| 295 | 22/02/00 | 08:00 | Otago Harbour | Lat: 45° 48.431' S Long: 170° 37.528' E | 4.5 | 15 |
| 296 | 22/02/00 | 10:50 | Otago Harbour | Lat: 45° 46.878' S Long: 170° 43.545' E | 0.3 | 15 |
| 297 | 22/02/00 | 11:00 | Otago Harbour | Lat: 45° 47.108' S Long: 170° 43.422' E | 1.5 | 15 |
| 298 | 22/02/00 | 11:05 | Otago Harbour | Lat: 45° 47.404' S Long: 170° 42.938' E | 0.5 | 15 |
| 299 | 22/02/00 | 11:10 | Otago Harbour | Lat: 45° 47.847' S Long: 170° 42.947' E | - | 15 |
| 300 | 22/02/00 | 11:20 | Otago Harbour | Lat: 45° 47.332' S Long: 170° 40.760' E | 0.9 | 15 |
| 301 | 22/02/00 | 12:10 | Otago Harbour | Lat: 45° 48.127' S Long: 170° 41.750' E | 2 | 14.9 |
| 302 | 22/02/00 | 12:50 | Otago Harbour | Lat: 45° 47.893' S Long: 170° 38.742' E | 6 | 14.9 |
| 303 | 22/02/00 | 13:10 | Otago Harbour | Lat: 45° 49.598' S Long: 170° 39.234' E | 3 | 14.9 |
| 304 | 22/02/00 | 13:20 | Otago Harbour | Lat: 45° 50.056' S Long: 170° 38.483' E | 2 | 14.9 |
| 305 | 22/02/00 | 13:40 | Otago Harbour | Lat: 45° 50.585' S Long: 170° 37.107' E | 2 | 15.2 |
| 306 | 22/02/00 | 14:15 | Otago Harbour | Lat: 45° 52.142' S Long: 170° 35.455' E | 0.5 | 15.2 |
| 307 | 22/02/00 | 14:25 | Otago Harbour | Lat: 45° 52.562' S Long: 170° 33.429' E | 2.5 | 15.2 |
| 308 | 22/02/00 | 14:25 | Otago Harbour | Lat: 45° 53.018' S Long: 170° 31.484' E | 1.4 | 15.2 |
| 309 | 22/02/00 | 14:40 | Otago Harbour | Lat: 45° 53.180' S Long: 170° 30.438' E | 0.2 | 16.6 |
| 310 | 22/02/00 | 15:00 | Otago Harbour | Lat: 45° 52.829' S Long: 170° 30.630' E | 7.1 | 16.6 |
| 311 | 22/02/00 | 15:05 | Otago Harbour | Lat: 45° 52.804' S Long: 170° 30.410' E | 7 | 16.6 |
| 312 | 22/02/00 | 15:15 | Otago Harbour | Lat: 45° 52.227' S Long: 170° 32.592' E | 10.5 | 16.6 |
| 313 | 22/02/00 | 15:30 | Otago Harbour | Lat: 45° 50.783' S Long: 170° 34.981' E | 2 | 16.6 |
| 314 | 22/02/00 | 15:45 | Otago Harbour | Lat: 45° 49.463' S Long: 170° 36.415' E | 1.5 | 16.6 |
| 315 | 22/02/00 | 16:00 | Otago Harbour | Lat: 45° 49.198' S Long: 170° 37.505' E | 1.5 | 15.1 |
| 316 | 13/03/00 | - | Marlborough Sounds | Lat: 41° 16.231' S Long: 173° 46.316' E | - | 19.8 |
| 317 | 15/03/00 | - | Marlborough Sounds | Lat: 41° 15.928' S Long: 173° 46.048' E | 3.5 | - |
| 318 | 15/03/00 | - | Marlborough Sounds | Lat: 41° 16.610' S Long: 173° 48.407' E | 3.5 | - |
| 319 | 15/03/00 | - | Marlborough Sounds | Lat: 41° 15.207' S Long: 173° 48.411' E | 3.5 | - |
| 320 | 15/03/00 | - | Marlborough Sounds | Lat: 41° 15.272' S Long: 173° 51.879' E | 3.5 | - |
| 321 | 15/03/00 | - | Marlborough Sounds | Lat: 41° 13.569' S Long: 173° 53.328' E | 5.5 | - |
| 322 | 15/03/00 | - | Marlborough Sounds | Lat: 41° 13.654' S Long: 173° 51.168' E | 14 | - |
| 323 | 15/03/00 | - | Marlborough Sounds | Lat: 41° 11.876' S Long: 173° 53.881' E | 8.5 | - |
| 324 | 15/03/00 | - | Marlborough Sounds | Lat: 41° 12.205' S Long: 174° 00.696' E | 6.5 | - |
| 325 | 15/03/00 | - | Marlborough Sounds | Lat: 41° 10.275' S Long: 174° 02.015' E | 7 | - |
| 326 | 15/03/00 | - | Marlborough Sounds | Lat: 41° 11.193' S Long: 174° 04.055' E | 5 | - |
| 327 | 15/03/00 | - | Marlborough Sounds | Lat: 41° 10.453' S Long: 174° 06.617' E | 1 | - |
| 328 | 14/03/00 | 09:17 | Marlborough Sounds | Lat: 41° 10.006' S Long: 173° 52.966' E | 3.5 | - |
| 329 | 14/03/00 | 09:34 | Marlborough Sounds | Lat: 41° 09.976' S Long: 173° 50.650' E | 3.5 | - |
| 330 | 14/03/00 | 09:56 | Marlborough Sounds | Lat: 41° 09.960' S Long: 173° 47.159' E | 6 | - |
| 331 | 14/03/00 | 10:13 | Marlborough Sounds | Lat: 41° 08.382' S Long: 173° 49.536' E | 2 | - |
| 332 | 14/03/00 | 10:35 | Marlborough Sounds | Lat: 41° 07.066' S Long: 173° 51.829' E | 15 | - |
| 333 | 14/03/00 | 10:52 | Marlborough Sounds | Lat: 41° 02.371' S Long: 173° 54.210' E | 11 | - |
| 334 | 14/03/00 | 11:10 | Marlborough Sounds | Lat: 41° 06.781' S Long: 173° 55.696' E | 13 | - |
| 335 | 14/03/00 | 11:48 | Marlborough Sounds | Lat: 41° 04.896' S Long: 173° 52.102' E | 2 | - |
| 336 | 14/03/00 | 01:07 | Marlborough Sounds | Lat: 41° 06.573' S Long: 173° 59.539' E | 2 | - |
| 337 | 14/03/00 | 01:13 | Marlborough Sounds | Lat: 41° 06.323' S Long: 173° 59.638' E | 2 | - |

| No. | Date | Time | Region | Position | Depth (m) | Temp. (°C) |
|-----|----------|-------|--------------------|---|--------------|---------------|
| 338 | 14/03/00 | 01:53 | Marlborough Sounds | Lat: 41° 08.846' S Long: 173° 58.013' E | 2 | - |
| 339 | 14/03/00 | 02:21 | Marlborough Sounds | Lat: 41° 06.628' S Long: 174° 02.091' E | 6.5 | - |
| 340 | 14/03/00 | 03:05 | Marlborough Sounds | Lat: 41° 03.754' S Long: 174° 01.130' E | 3.5 | - |
| 341 | 14/03/00 | - | Marlborough Sounds | Lat: 41° 02.224' S Long: 173° 59.430' E | 5 | - |
| 342 | 15/03/00 | 08:30 | Marlborough Sounds | Lat: 40° 56.204' S Long: 173° 57.935' E | 2.5 | - |
| 343 | 15/03/00 | 08:54 | Marlborough Sounds | Lat: 40° 55.691' S Long: 173° 57.699' E | 1.5 | - |
| 344 | 15/03/00 | 09:12 | Marlborough Sounds | Lat: 40° 54.512' S Long: 173° 58.941' E | 3 | - |
| 345 | 15/03/00 | 09:24 | Marlborough Sounds | Lat: 40° 56.001' S Long: 173° 59.961' E | 14 | 17 |
| 346 | 15/03/00 | 10:25 | Marlborough Sounds | Lat: 40° 58.761' S Long: 174° 01.054' E | 3 | 17 |
| 347 | 15/03/00 | 10:40 | Marlborough Sounds | Lat: 40° 58.867' S Long: 174° 00.980' E | 24 | 17 |
| 348 | 15/03/00 | 10:51 | Marlborough Sounds | Lat: 41° 00.612' S Long: 174° 00.585' E | 2.5 | 17 |
| 349 | 15/03/00 | 11:03 | Marlborough Sounds | Lat: 41° 00.924' S Long: 174° 02.438' E | 11 | 17 |
| 350 | 15/03/00 | 11:27 | Marlborough Sounds | Lat: 40° 59.170' S Long: 174° 04.182' E | - | 17.4 |
| 351 | 15/03/00 | 11:42 | Marlborough Sounds | Lat: 41° 02.777' S Long: 174° 06.263' E | 1.5 | 17 |
| 352 | 15/03/00 | 11:59 | Marlborough Sounds | Lat: 41° 00.818' S Long: 174° 03.947' E | 3.5 | 17 |
| 353 | 15/03/00 | 12:17 | Marlborough Sounds | Lat: 40° 57.139' S Long: 174° 04.144' E | 2.5 | 17 |
| 354 | 15/03/00 | 12:44 | Marlborough Sounds | Lat: 40° 59.142' S Long: 174° 00.062' E | 14 | 17 |
| 355 | 15/03/00 | 01:01 | Marlborough Sounds | Lat: 40° 57.877' S Long: 173° 56.735' E | 4.5 | 17 |
| 356 | 15/03/00 | 01:16 | Marlborough Sounds | Lat: 40° 59.206' S Long: 173° 54.011' E | 3.5 | 17 |
| 357 | 15/03/00 | 01:52 | Marlborough Sounds | Lat: 41° 00.236' S Long: 173° 52.525' E | - | 17 |
| 358 | 15/03/00 | 02:12 | Marlborough Sounds | Lat: 41° 01.079' S Long: 173° 51.898' E | - | 17 |
| 359 | 15/03/00 | 02:32 | Marlborough Sounds | Lat: 41° 00.888' S Long: 173° 48.977' E | 3.5 | 17 |
| 360 | 15/03/00 | 02:43 | Marlborough Sounds | Lat: 41° 00.528' S Long: 173° 46.950' E | 2.5 | 17 |
| 361 | 15/03/00 | 03:10 | Marlborough Sounds | Lat: 41° 01.368' S Long: 173° 47.199' E | 2.2 | 17 |
| 362 | 15/03/00 | 03:30 | Marlborough Sounds | Lat: 41° 03.300' S Long: 173° 46.412' E | 5 | 17 |
| 363 | 15/03/00 | 03:59 | Marlborough Sounds | Lat: 41° 04.210' S Long: 173° 46.579' E | 6 | 17 |
| 364 | 15/03/00 | 04:12 | Marlborough Sounds | Lat: 41° 05.556' S Long: 173° 47.625' E | 2 | 17 |
| 365 | 15/03/00 | 04:37 | Marlborough Sounds | Lat: 41° 03.622' S Long: 173° 51.144' E | 8 | 17 |
| 366 | 15/03/00 | 05:44 | Marlborough Sounds | Lat: 41° 09.006' S Long: 173° 53.899' E | 3.5 | 17 |
| 367 | 15/03/00 | 06:02 | Marlborough Sounds | Lat: 41° 11.979' S Long: 173° 52.536' E | 6 | 17 |
| 368 | 16/03/00 | 08:02 | Marlborough Sounds | Lat: 41° 17.353' S Long: 174° 00.756' E | 3.5 | 16.2 |
| 369 | 16/03/00 | 08:14 | Marlborough Sounds | Lat: 41° 17.175' S Long: 174° 00.479' E | 9.5 | 16.2 |
| 370 | 16/03/00 | 08:24 | Marlborough Sounds | Lat: 41° 17.120' S Long: 174° 00.352' E | 7.5 | 16.2 |
| 371 | 16/03/00 | 08:31 | Marlborough Sounds | Lat: 41° 16.735' S Long: 174° 00.312' E | 3 | 16.2 |
| 372 | 16/03/00 | 08:38 | Marlborough Sounds | Lat: 41° 16.322' S Long: 174° 00.610' E | 13.5 | 16.2 |
| 373 | 16/03/00 | 08:52 | Marlborough Sounds | Lat: 41° 16.748' S Long: 173° 59.859' E | 6.5 | 16.2 |
| 374 | 16/03/00 | 09:07 | Marlborough Sounds | Lat: 41° 15.535' S Long: 174° 00.358' E | 4 | 16.2 |
| 375 | 16/03/00 | 09:18 | Marlborough Sounds | Lat: 41° 16.246' S Long: 173° 58.102' E | 1 | 16.5 |
| 376 | 16/03/00 | 09:27 | Marlborough Sounds | Lat: 41° 16.128' S Long: 173° 56.490' E | 8 | 16.5 |
| 377 | 16/03/00 | 09:46 | Marlborough Sounds | Lat: 41° 16.473' S Long: 173° 55.001' E | 5.5 | 17 |
| 378 | 16/03/00 | 09:46 | Marlborough Sounds | Lat: 41° 15.319' S Long: 173° 56.464' E | 2 | 17 |
| 379 | 16/03/00 | 09:57 | Marlborough Sounds | Lat: 41° 14.441' S Long: 173° 58.532' E | 2.5 | 16.5 |
| 380 | 16/03/00 | 10:08 | Marlborough Sounds | Lat: 41° 13.426' S Long: 173° 58.015' E | 3 | 16.5 |
| 381 | 16/03/00 | 10:22 | Marlborough Sounds | Lat: 41° 14.055' S Long: 173° 58.783' E | 5 | 16.5 |
| 382 | 16/03/00 | 10:33 | Marlborough Sounds | Lat: 41° 14.538' S Long: 173° 59.276' E | 10 | 16.5 |
| 383 | 16/03/00 | 10:45 | Marlborough Sounds | Lat: 41° 13.220' S Long: 173° 59.600' E | 2 | 16.5 |
| 384 | 16/03/00 | 11:04 | Marlborough Sounds | Lat: 41° 13.759' S Long: 174° 01.175' E | 4 | 16.5 |
| 385 | 16/03/00 | 11:26 | Marlborough Sounds | Lat: 41° 13.023' S Long: 174° 01.408' E | 6.5 | 16.5 |
| 386 | 16/03/00 | 11:34 | Marlborough Sounds | Lat: 41° 12.605' S Long: 174° 01.847' E | 5 | 16.5 |

| No. | Date | Time | Region | Position | Depth (m) | Temp. (°C) |
|-----|----------|-------|--------------------|---|--------------|---------------|
| 387 | 16/03/00 | 11:54 | Marlborough Sounds | Lat: 41° 13.333' S Long: 174° 04.650' E | 8 | 16.5 |
| 388 | 16/03/00 | 12:15 | Marlborough Sounds | Lat: 41° 12.144' S Long: 174° 05.618' E | 8.5 | 16.5 |
| 389 | 16/03/00 | 12:34 | Marlborough Sounds | Lat: 41° 12.494' S Long: 174° 08.672' E | 3 | 16.5 |
| 390 | 16/03/00 | 12:52 | Marlborough Sounds | Lat: 41° 10.809' S Long: 174° 10.719' E | 8.5 | 16.5 |
| 391 | 16/03/00 | 01:17 | Marlborough Sounds | Lat: 41° 10.490' S Long: 174° 11.155' E | 6.5 | 15.8 |
| 392 | 16/03/00 | 01:55 | Marlborough Sounds | Lat: 41° 08.948' S Long: 174° 09.620' E | 4 | 15.8 |
| 393 | 16/03/00 | 02:10 | Marlborough Sounds | Lat: 41° 07.791' S Long: 174° 09.331' E | 11 | 15.8 |
| 394 | 16/03/00 | 02:27 | Marlborough Sounds | Lat: 41° 05.351' S Long: 174° 10.622' E | 3 | 15.8 |
| 395 | 16/03/00 | 02:48 | Marlborough Sounds | Lat: 41° 07.417' S Long: 174° 11.757' E | 16 | 15.8 |
| 396 | 16/03/00 | 03:22 | Marlborough Sounds | Lat: 41° 07.209' S Long: 174° 14.210' E | 3 | 15.8 |
| 397 | 16/03/00 | 03:47 | Marlborough Sounds | Lat: 41° 06.130' S Long: 174° 14.324' E | 8 | 15.8 |
| 398 | 16/03/00 | 03:47 | Marlborough Sounds | Lat: 41° 10.260' S Long: 174° 14.872' E | 3.5 | 15.8 |
| 399 | 16/03/00 | 04:10 | Marlborough Sounds | Lat: 41° 11.807' S Long: 174° 15.868' E | 2 | 15.8 |
| 400 | 17/03/00 | 07:54 | Marlborough Sounds | Lat: 41° 15.967' S Long: 174° 02.325' E | 4 | - |
| 401 | 17/03/00 | 08:11 | Marlborough Sounds | Lat: 41° 15.523' S Long: 174° 03.446' E | 9 | - |
| 402 | 17/03/00 | 08:22 | Marlborough Sounds | Lat: 41° 16.037' S Long: 174° 04.648' E | 6 | - |
| 403 | 17/03/00 | 08:46 | Marlborough Sounds | Lat: 41° 15.557' S Long: 174° 08.331' E | 11 | - |
| 404 | 17/03/00 | 09:02 | Marlborough Sounds | Lat: 41° 16.569' S Long: 174° 12.138' E | 2 | - |
| 405 | 17/03/00 | 09:11 | Marlborough Sounds | Lat: 41° 15.762' S Long: 174° 12.269' E | 5 | - |
| 406 | 17/03/00 | 09:30 | Marlborough Sounds | Lat: 41° 13.579' S Long: 174° 13.930' E | 2 | - |
| 407 | 17/03/00 | 09:30 | Marlborough Sounds | Lat: 41° 14.083' S Long: 174° 14.281' E | 2 | - |
| 408 | 17/03/00 | 10:01 | Marlborough Sounds | Lat: 41° 14.933' S Long: 174° 14.515' E | 2 | - |
| 409 | 17/03/00 | 10:08 | Marlborough Sounds | Lat: 41° 14.861' S Long: 174° 14.424' E | 17 | - |
| 410 | 17/03/00 | 10:26 | Marlborough Sounds | Lat: 41° 13.337' S Long: 174° 14.994' E | 5 | - |
| 411 | 17/03/00 | 10:38 | Marlborough Sounds | Lat: 41° 12.568' S Long: 174° 16.859' E | 3 | - |
| 412 | 17/03/00 | 11:05 | Marlborough Sounds | Lat: 41° 12.217' S Long: 174° 18.344' E | 5 | - |
| 413 | 17/03/00 | - | Marlborough Sounds | Lat: 41° 06.057' S Long: 174° 22.601' E | - | - |
| 414 | 09/05/00 | 10:15 | Whangarei Harbour | Lat: 35° 48.896' S Long: 174° 26.659' E | 4.4 | 18.5 |
| 415 | 09/05/00 | 10:30 | Whangarei Harbour | Lat: 35° 48.556' S Long: 174° 25.582' E | 3.2 | 18.4 |
| 416 | 09/05/00 | 10:40 | Whangarei Harbour | Lat: 35° 48.152' S Long: 174° 24.028' E | 2.9 | 18.2 |
| 417 | 09/05/00 | 10:50 | Whangarei Harbour | Lat: 35° 47.294' S Long: 174° 23.838' E | 6.9 | 18.5 |
| 418 | 09/05/00 | 0.461 | Whangarei Harbour | Lat: 35° 46.696' S Long: 174° 22.662' E | 0.5 | 18.1 |
| 419 | 09/05/00 | 11:05 | Whangarei Harbour | Lat: 35° 46.696' S Long: 174° 22.662' E | 0.1 | 18.1 |
| 420 | 09/05/00 | 11:10 | Whangarei Harbour | Lat: 35° 47.461' S Long: 174° 21.364' E | 4.9 | 17.9 |
| 421 | 09/05/00 | 11:20 | Whangarei Harbour | Lat: 35° 48.806' S Long: 174° 21.069' E | 5.4 | 17.9 |
| 422 | 09/05/00 | 11:40 | Whangarei Harbour | Lat: 35° 46.571' S Long: 174° 20.987' E | 2.4 | 18.1 |
| 423 | 09/05/00 | 11:50 | Whangarei Harbour | Lat: 35° 45.767' S Long: 174° 21.142' E | 4.2 | 18 |
| 424 | 09/05/00 | 12:00 | Whangarei Harbour | Lat: 35° 44.660' S Long: 174° 20.981' E | 4.2 | 18.1 |
| 425 | 09/05/00 | 12:10 | Whangarei Harbour | Lat: 35° 43.924' S Long: 174° 20.054' E | 2.8 | 18.2 |
| 426 | 09/05/00 | 12:40 | Whangarei Harbour | Lat: 35° 46.498' S Long: 174° 23.801' E | 4 | 18.1 |
| 427 | 09/05/00 | 12:55 | Whangarei Harbour | Lat: 35° 47.578' S Long: 174° 25.310' E | 5.9 | 18.3 |
| 428 | 09/05/00 | 13:10 | Whangarei Harbour | Lat: 35° 48.028' S Long: 174° 26.726' E | 5.2 | 18.6 |
| 429 | 09/05/00 | 13:20 | Whangarei Harbour | Lat: 35° 46.985' S Long: 174° 27.390' E | 2.9 | 18.4 |
| 430 | 09/05/00 | 13:30 | Whangarei Harbour | Lat: 35° 46.621' S Long: 174° 28.502' E | 2.2 | 18 |
| 431 | 09/05/00 | 14:00 | Whangarei Harbour | Lat: 35° 47.733' S Long: 174° 28.209' E | 8.4 | 18.5 |
| 432 | 09/05/00 | 14:15 | Whangarei Harbour | Lat: 35° 49.279' S Long: 174° 27.893' E | 1.6 | 18.5 |
| 433 | 09/05/00 | 16:25 | Whangarei Harbour | Lat: 35° 48.860' S Long: 174° 30.018' E | 4.2 | 18.4 |
| 434 | 09/05/00 | 16:35 | Whangarei Harbour | Lat: 35° 49.611' S Long: 174° 29.762' E | 1.7 | 18.6 |
| 435 | 09/05/00 | 15:45 | Whangarei Harbour | Lat: 35° 49.915' S Long: 174° 30.879' E | 1.8 | 18.5 |

| No. | Date | Time | Region | Position | Depth (m) | Temp. (°C) |
|-----|----------|-------|-------------------|---|--------------|---------------|
| 436 | 09/05/00 | 14:55 | Whangarei Harbour | Lat: 35° 50.520' S Long: 174° 32.011' E | 6 | 18.6 |
| 437 | 09/05/00 | 15:00 | Whangarei Harbour | Lat: 35° 51.287' S Long: 174° 31.618' E | 4.1 | 18.7 |
| 438 | 09/05/00 | 15:15 | Whangarei Harbour | Lat: 35° 49.857' S Long: 174° 28.564' E | 0.8 | 18.4 |
| 439 | 06/06/00 | 08:50 | Tauranga Harbour | Lat: 37° 37.804' S Long: 176° 02.497' E | 1.3 | 14 |
| 440 | 06/06/00 | 09:05 | Tauranga Harbour | Lat: 37° 37.275' S Long: 176° 01.258' E | 2.8 | 13.7 |
| 441 | 06/06/00 | 09:20 | Tauranga Harbour | Lat: 37° 33.754' S Long: 175° 59.444' E | 1.4 | 13 |
| 442 | 06/06/00 | 09:30 | Tauranga Harbour | Lat: 37° 32.916' S Long: 175° 58.689' E | 1.2 | 13.1 |
| 443 | 06/06/00 | 09:45 | Tauranga Harbour | Lat: 37° 31.776' S Long: 175° 58.127' E | 2.1 | 14.8 |
| 444 | 06/06/00 | 09:50 | Tauranga Harbour | Lat: 37° 30.851' S Long: 175° 59.246' E | 2.5 | 15.7 |
| 445 | 06/06/00 | 10:05 | Tauranga Harbour | Lat: 37° 29.258' S Long: 175° 58.892' E | 1.8 | 16 |
| 446 | 06/06/00 | 10:15 | Tauranga Harbour | Lat: 37° 28.397' S Long: 175° 58.201' E | 3.2 | 15.5 |
| 447 | 06/06/00 | 10:30 | Tauranga Harbour | Lat: 37° 27.455' S Long: 175° 58.413' E | 1.9 | 15.5 |
| 448 | 06/06/00 | 10:40 | Tauranga Harbour | Lat: 37° 28.187' S Long: 175° 57.543' E | 2.1 | 15.6 |
| 449 | 06/06/00 | 10:45 | Tauranga Harbour | Lat: 37° 28.896' S Long: 175° 57.349' E | 3.1 | 15.6 |
| 450 | 06/06/00 | 10:55 | Tauranga Harbour | Lat: 37° 29.693' S Long: 175° 58.158' E | 2.4 | 15.5 |
| 451 | 06/06/00 | - | Tauranga Harbour | Lat: 37° 31.720' S Long: 176° 00.121' E | 2.2 | 15 |
| 452 | 06/06/00 | 11:20 | Tauranga Harbour | Lat: 37° 34.832' S Long: 175° 59.836' E | 2.5 | 12.4 |
| 453 | 06/06/00 | 11:30 | Tauranga Harbour | Lat: 37° 35.534' S Long: 176° 00.683' E | 1.2 | 14.1 |
| 454 | 06/06/00 | 11:40 | Tauranga Harbour | Lat: 37° 36.215' S Long: 176° 01.593' E | 2.6 | 14.5 |
| 455 | 06/06/00 | 11:50 | Tauranga Harbour | Lat: 37° 36.798' S Long: 176° 02.826' E | 2.7 | 15 |
| 456 | 06/06/00 | 12:00 | Tauranga Harbour | Lat: 37° 37.584' S Long: 176° 04.054' E | 3.9 | 15 |
| 457 | 06/06/00 | 12:10 | Tauranga Harbour | Lat: 37° 37.895' S Long: 176° 05.805' E | 3.3 | 16.6 |
| 458 | 06/06/00 | 12:20 | Tauranga Harbour | Lat: 37° 37.703' S Long: 176° 07.588' E | 2.1 | 16.2 |
| 459 | 06/06/00 | 12:30 | Tauranga Harbour | Lat: 37° 37.011' S Long: 176° 06.395' E | 2.8 | 15.4 |
| 460 | 06/06/00 | 13:05 | Tauranga Harbour | Lat: 37° 38.486' S Long: 176° 08.305' E | 2.8 | 16.5 |
| 461 | 06/06/00 | 13:15 | Tauranga Harbour | Lat: 37° 38.465' S Long: 176° 09.344' E | 1.3 | 16.4 |
| 462 | 06/06/00 | 13:25 | Tauranga Harbour | Lat: 37° 37.570' S Long: 176° 09.457' E | 3.9 | 16.5 |
| 463 | 06/06/00 | 13:35 | Tauranga Harbour | Lat: 37° 38.114' S Long: 176° 10.600' E | 1.4 | 16.7 |
| 464 | 06/06/00 | 13:50 | Tauranga Harbour | Lat: 37° 40.079' S Long: 176° 10.417' E | 1.6 | 15.4 |
| 465 | 06/06/00 | 14:10 | Tauranga Harbour | Lat: 37° 41.480' S Long: 176° 10.526' E | 3.2 | 14.4 |
| 466 | 06/06/00 | 14:15 | Tauranga Harbour | Lat: 37° 42.475' S Long: 176° 11.170' E | 2 | 14.3 |
| 467 | 06/06/00 | 14:35 | Tauranga Harbour | Lat: 37° 39.583' S Long: 176° 09.157' E | 2.6 | 15 |
| 468 | 06/06/00 | 14:50 | Tauranga Harbour | Lat: 37° 38.850' S Long: 176° 06.994' E | 1.9 | 15.1 |
| 469 | 06/06/00 | 15:00 | Tauranga Harbour | Lat: 37° 39.089' S Long: 176° 05.746' E | 2.9 | 15.2 |
| 470 | 06/06/00 | 15:10 | Tauranga Harbour | Lat: 37° 39.398' S Long: 176° 04.051' E | 0.7 | 14 |
| 471 | 06/06/00 | 15:15 | Tauranga Harbour | Lat: 37° 38.574' S Long: 176° 03.017' E | 2.3 | 14.3 |
| 472 | 07/06/00 | 09:30 | Kawhia Harbour | Lat: 38° 04.592' S Long: 174° 49.038' E | 4.7 | 14.4 |
| 473 | 07/06/00 | 09:40 | Kawhia Harbour | Lat: 38° 04.934' S Long: 174° 47.844' E | 3.1 | 14.4 |
| 474 | 07/06/00 | 09:50 | Kawhia Harbour | Lat: 38° 05.302' S Long: 174° 47.181' E | 5.1 | 14.8 |
| 475 | 07/06/00 | 09:55 | Kawhia Harbour | Lat: 38° 05.515' S Long: 174° 46.536' E | 2.7 | 14.7 |
| 476 | 07/06/00 | 10:05 | Kawhia Harbour | Lat: 38° 06.325' S Long: 174° 47.036' E | 2 | 14.7 |
| 477 | 07/06/00 | 10:15 | Kawhia Harbour | Lat: 38° 06.608' S Long: 174° 48.178' E | 3.5 | 14.1 |
| 478 | 07/06/00 | 10:35 | Kawhia Harbour | Lat: 38° 07.462' S Long: 174° 48.568' E | 3.2 | 13.8 |
| 479 | 07/06/00 | 10:35 | Kawhia Harbour | Lat: 38° 08.137' S Long: 174° 49.491' E | 3 | 13.5 |
| 480 | 07/06/00 | 10:45 | Kawhia Harbour | Lat: 38° 07.775' S Long: 174° 50.085' E | 1 | 13.4 |
| 481 | 07/06/00 | 10:45 | Kawhia Harbour | Lat: 38° 07.775' S Long: 174° 50.085' E | 1 | 13.4 |
| 482 | 07/06/00 | 11:15 | Kawhia Harbour | Lat: 38° 05.730' S Long: 174° 47.738' E | 1.1 | 15.9 |
| 483 | 07/06/00 | 11:25 | Kawhia Harbour | Lat: 38° 05.573' S Long: 174° 49.006' E | 1.5 | - |
| 484 | 07/06/00 | 11:45 | Kawhia Harbour | Lat: 38° 06.013' S Long: 174° 50.350' E | 3.7 | - |

| No. | Date | Time | Region | Position | Depth (m) | Temp. (°C) |
|-----|----------|-------|-------------------|---|--------------|---------------|
| 485 | 07/06/00 | 12:10 | Kawhia Harbour | Lat: 38° 04.839' S Long: 174° 50.669' E | 4.3 | 15.1 |
| 486 | 07/06/00 | 12:20 | Kawhia Harbour | Lat: 38° 05.081' S Long: 174° 51.570' E | 2.8 | 14.8 |
| 487 | 07/06/00 | 12:45 | Kawhia Harbour | Lat: 38° 04.094' S Long: 174° 49.936' E | 4.5 | 15.4 |
| 488 | 07/06/00 | 12:55 | Kawhia Harbour | Lat: 38° 03.869' S Long: 174° 51.378' E | 4.6 | 14.9 |
| 489 | 07/06/00 | 15:45 | Raglan Harbour | Lat: 37° 47.511' S Long: 174° 53.067' E | 6.7 | 15.9 |
| 490 | 07/06/00 | 15:50 | Raglan Harbour | Lat: 37° 47.530' S Long: 174° 53.987' E | 0.4 | 15 |
| 492 | 07/06/00 | 16:00 | Raglan Harbour | Lat: 37° 46.461' S Long: 174° 54.309' E | 2.3 | 14.4 |
| 493 | 07/06/00 | 16:10 | Raglan Harbour | Lat: 37° 46.017' S Long: 174° 54.987' E | 2 | 14.4 |
| 494 | 07/06/00 | 16:10 | Raglan Harbour | Lat: 37° 46.017' S Long: 174° 54.987' E | 2 | 14.4 |
| 495 | 07/06/00 | 16:20 | Raglan Harbour | Lat: 37° 47.353' S Long: 174° 55.275' E | 2.2 | 14.7 |
| 496 | 07/06/00 | 16:25 | Raglan Harbour | Lat: 37° 48.026' S Long: 174° 54.963' E | 0.9 | 14.2 |
| 497 | 07/06/00 | 16:35 | Raglan Harbour | Lat: 37° 47.893' S Long: 174° 51.722' E | 3.7 | 15.8 |
| 498 | 07/06/00 | 16:45 | Raglan Harbour | Lat: 37° 47.908' S Long: 174° 50.831' E | 1.6 | 15.9 |
| 510 | 15/01/07 | 11:35 | Manukau Harbour | Lat: 36° 50.886' S Long: 174° 43.377' E | 0 | - |
| 511 | 15/01/07 | 11:40 | Manukau Harbour | Lat: 36° 50.924' S Long: 174° 43.436' E | <0 | - |
| 512 | 15/01/07 | 12:05 | Waitemata Harbour | Lat: 36° 51.170' S Long: 174° 42.163' E | <0 | - |
| 513 | 15/01/07 | 12:19 | Waitemata Harbour | Lat: 36° 52.155' S Long: 174° 41.700' E | <0 | - |
| 514 | 15/01/07 | 12:48 | Waitemata Harbour | Lat: 36° 55.787' S Long: 174° 41.149' E | <0 | - |
| 515 | 14/02/07 | 12:48 | Manukau Harbour | Lat: 36° 55.781' S Long: 174° 42.322' E | <0 | - |

Date and Time are the date and time that the sample was collected, Depth is the water depth at the time of sampling, depths of less than 0 refer to inter-tidal samples and - identifies data not collected. Depths of less than zero (<0) refer to inter-tidal samples.