

Pelorus Sound / Te Hoiere Ground- Truthing Factual-Field Report

Western Marlborough Sounds Hydrographic Survey
(HS66)

*Prepared for Discovery Marine Limited (DML) and iXblue Pty Limited
On behalf of Land Information New Zealand and the Marlborough
District Council*

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Frontispiece: Shelly gravel, brittle stars and blue cod at Keep Clear Rock reef, Port Ligar [NIWA]

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Executive summary

As the science provider for the Western Marlborough Sounds hydrographic survey (HYD-2018/19-01, HS66) for Land Information New Zealand (LINZ) and the Marlborough District Council (MDC), NIWA was contracted by Discovery Marine Ltd (DML) and iXblue Pty Ltd to contribute to the survey through provision of acquisition and quality control services. This included undertaking ground-truthing fieldwork for sediment and benthic community observations, backscatter and water-column data-coverage checking and establishment of underpinning benthic and water-column data for future science products. The present report provides a factual summary of the ground-truthing field work undertaken by NIWA and a compilation of all benthic observations and sampling activities undertaken in Pelorus Sound / Te Hoiere over the survey period 5th November 2019 until 4th August 2020.

Consistent with the ground-truthing approach adopted for the Queen Charlotte Sound HS51 survey (Neil et al., 2018), stratified-random sampling of bottom sediment and benthic video fell into two broad categories: (1) targeted sites that included specific geomorphic features or habitats identified in the newly acquired multibeam bathymetric data and areas with specific acoustic backscatter characteristics; and, (2) random or general characterisation sites to ensure that all of the HS66 survey area attained some sample representation. To aid sampling design a backscatter training set adopted from HS51 allowed the ground-truthing campaign to spread the targeted sampling effort across the range of adopted training backscatter classes. Importantly, intermediate acoustic backscatter responses that were identified in the HS66 survey, which for the most part have limited spatial coverage but represent diverse textural mixtures of sand, shell, gravel and mud substrates. Note that adoption and use of a training backscatter dataset in the HS66 sampling design does not circumvent or replace the need to fully process the new backscatter data to support future science products.

The NIWA ground-truthing campaign collected a total of 135 grab-sample sites using Dietz-Lafond (clam-shell) and Van Veen grabs deployed from NIWA's coastal survey vessel R.V. *Ikatere*. Grab samples recovered by DML (16 sites) and iXblue (31 sites) for hydrographic purposes were also accounted for in the sampling design and collectively resulted in a total of 182 benthic sample sites and 183 physical samples.

A total of 165 benthic video stations were recorded using NIWA's CoastCam and CBed towed camera system deployed from R.V. *Ikatere*. All grab samples had matching video taken from the same location, either as a static sample of less than a few tens of seconds of footage, or as a short transect of several or tens of minutes duration. Footage duration was more than ten minutes long at specific habitats and in high interest areas, such as a rocky reefs, scallop beds, marine farms or transitions in substrate type.

A provisional measure of the collective benthic ground-truthing effort across the four backscatter training classes (inclusive of all grab and video data) suggests sample representation coverage of: 20% from low backscatter areas; 17% from low-medium backscatter; 18% of medium-high backscatter and 44% from high reflectivity areas. On balance, this spread of samples should provide a robust dataset for quantification of benthic habitats using acoustic and video techniques, will highlight features of interest and support other future science products.

1 Introduction

DML and iXblue were contracted by Land Information New Zealand (LINZ) and the Marlborough District Council (MDC) to provide hydrographic surveying services in Pelorus Sound / Te Hoiere for the Western Marlborough Sounds project revision 5 (dated 16 September 2019), HYD-2018/19-01 (designated as HS66). As the science provider, NIWA was contracted to contribute to the hydrographic survey through provision of post-acquisition services, oversight of marine mammal observations (MMO), undertaking of ground truthing benthic sampling fieldwork, backscatter and water-column data-coverage checking and establishment of underpinning benthic and water-column data for future science products. NIWA's contribution builds on scientific sampling approaches drawn from the HS51 Queen Charlotte Sound hydrographic survey (Neil et al., 2018).

The report herein provides a factual summary of the ground-truthing field work undertaken by NIWA and a compilation of all benthic observations and sampling activities undertaken in Pelorus Sound / Te Hoiere over the survey period 5th November 2019 until 4th August 2020.

2 Approach

Acoustics backscatter data were collected throughout the multibeam echosounder survey and has proven to be an effective and efficient means to map seabed textures and substrate characteristics elsewhere in the Marlborough Sounds, specifically Tōtaranui (Queen Charlotte Sound) and Kura Te Au (Tory Channel) (Neil et al., 2018). However, to validate the acoustic response, as measured by seafloor backscatter surficial seabed samples are required. As such, a requirement of the sampling design is to provide a statistically robust spread of sample sites, fulfilling requirements for both spatial and bottom type representation and characterisation.

The ground-truthing work package included four essential components:

1. Basic training of the survey team to ensure sediment sampling and observations could be recorded in a form compatible with previous and future science products;
2. Ground-truthing for maritime charting (substrate) –random seafloor samples to be collected;
3. Ground-truthing for acoustic soundings – targeted seabed samples to calibrate backscatter response; and,
4. Acquisition of benthic observations using bottom video.

3 Mobilisation for HS66 ground-truthing campaign

Date	Activity
14 July 2020	Mobilisation RV <i>Ikatere</i> in Wellington with TOPAS sub-bottom profiler, large Van Veen grab, gravity core & KC Denmark multicorer. Mobilisation of van with CoastCam, CBed camera, electronics and 2x Dietz-Lafond grabs. Transit to Waikawa/Picton, collect geophysical data in transit.
15–17 July	Queen Charlotte Sound (QCS) survey by NIWA Science
18 Jul	Demobilisation of RV <i>Ikatere</i> QCS gear at Waikawa Picton
0800	Move vessel from berth to travel lift
08:25	Induction to arriving HS66 staff (Alan Orpin and Nick Eton), undertake Job Hazard Analysis (JHA) in lieu of mobilisation/demobilisation activities.
08:45	Truck/Hiab arrival.
09:00	Lift off gravity corer & KC Denmark multicorer
09:30	Unload from vessel sediment core samples/miscellaneous science gear + boxes.
10:00	Lift on CoastCam plate.
10:30	Relocate coring winch to aft position, bolt onto plate to allow fitting of CoastCam winch.
11:00	Lift CoastCam winch and sediment grabs onto vessel.
12:00	Mobilisation for HS66 complete.
13:30	Commence transit to Havelock, Nick connects up CoastCam and undertakes electronic checks followed by wet test. All OK. Alan relocates van to Havelock.
17:00	Arrive at Havelock, finish activity for day
19–25 July	On effort: Alan and Nick, commence sampling campaign.
26 July	Science staff change with hand-over all-day 26 July: Peter Gerring and Neill Barr joining campaign, Alan and Nick departing.
27 July to 3 August	On effort: Peter and Neill, complete sampling campaign.
4 August	HS66 Havelock Marina Demobilisation / RV <i>Ikatere</i> Maintenance. Undertake JHA in lieu of demobilisation
08:00	Demobilise all auxiliary sampling equipment
09:00	Demobilise samples boxes etc
10:00	Lift off vessel CoastCam
12:00	Demobilisation complete, Peter and Neill depart for Nelson.
13:00	Commence RV <i>Ikatere</i> Maintenance
17:00	Finish activity for day

There were no HSSE incidents reported during the RV *Ikatere* HS66 ground-truthing campaign. All activities were undertaken in accordance NIWA's approved Covid-19 operational protocols and accepted Ministry of Health best practise.

4 Equipment

4.1 R.V. *Ikatere*

We used NIWA's RV *Ikatere*, a 13.9 m-long double hull aluminium craft built in 2009 by Q-West. The vessel has a minimum operational depth of 2.7 m (dependent on environmental conditions) and can comfortably accept a crew of 6.

Table 4-1: Specifications of RV *Ikatere*.

Feature	Specification
Dimensions	Length: 13.9 m; Beam: 4.9 m; Draught: 0.7 m Minimum operational water depth 2.7 m (dependent on environmental conditions)
Propulsion	Twin Cummins Diesel coupled with HamiltonJet drive units equipped with JETanchor automatic dynamic positioning (DP).
Electrical	12V DC and 230V AC
Survey Systems	POSMV 320 V5 with L1/L2 Receivers (position & orientation system) Fugro Marinestar DGNSS Echotrac CV100
Survey Class and Limits	MNZ, Part 40A, Restricted Coastal



Figure 4-1: RV *Ikatere*.

4.2 Positioning

Primary positioning is by the inbuilt GNSS card in the Applanix POSMV Wavemaster 5 (POSMV) (fitted with a Trimble BD982 GNSS Card). This positioning card provides a Wide Area Differential Global Navigation Satellite System (WADGNSS) positioning solution and receives corrections from the MarineStar G2 Correction service.

4.3 Seabed sediment sampling

The acquisition of seabed samples for hydrographic and backscatter ground-truthing is a fundamental part of providing information to enable analysis of the benthic habitats in the future. Samples and video (with stills capture) were acquired at designated sites which were determined primarily by the hydrographic criteria (e.g. rocky reefs, shoals, channels etc), with a few targeted samples on specific acoustic backscatter, geomorphic features or biogenic habitats (e.g. shell beds, pockmarks, marine farms, areas of sedimentation).

Seabed samples were collected via Dietz-Lafond and Van Veen grabs. A Dietz-Lafond grab is a small volume (~800 ml) spring loaded 'clam-shell' type grab, ideal for recovering relatively undisturbed samples from soft seafloor substrates. It has spring and weight loaded jaws that close around a seafloor sample upon striking the seafloor after being triggered by a mechanical lever. The heavier and larger volume (~10 litres) Van Veen grab is a bedload sampler, ideal for recovering a wide range of coarse-grained or firm substrates, such as gravel. Prior and during deployment of the Van Veen grab to the seafloor the two buckets are held open by a load-bearing trigger. When the grab contacts the seafloor the load on the trigger is released and it disengages. Upon recovery, the lever-arms of the grab buckets are drawn together in a scissor action, taking a sample from the seabed and closing tight.



Figure 4-2: Dietz-Lafond (clam-shell) grab being deployed through the aft A-frame of RV *Ikateri*. Note the spring-loaded jaws in the open position, which will shut rapidly on contact with the seafloor.

At each sample station, RV *Ikateri* was positioned in DP mode over the preselected site and the grab was deployed (and recovered) using a hydraulic winch. Once samples were on-deck, contents of the grab were emptied into a fish bin, described for texture and character (for IHO and scientific purposes), and photographed with a site identification label and scale. Samples were retained in 800-ml jars for future processing. With larger sample recoveries in the Van Veen grab a representative sub-sample was taken.

Bottom sediments using similar grab samplers were also recovered by DML and iXblue at hydrographic sites throughout the HS66 survey area. These samples were described and collated, and also contributed to the wider benthic characterisation dataset in NIWA's sampling strategy (see Benthic sampling strategy, section 4.5 below)

4.4 Seabed imagery

Seabed imagery was acquired using NIWA's new CoastCam video system. The CoastCam camera system that can be deployed down to 600 m water depth, providing 4K high-resolution video and stills that can be streamed via as a live feed to the surface via the single-mode fibre-optic cable. The system consists of the following components:

- SubC imaging Rayfin liquid optics 4K camera with Digital stills and dual SubCimaging manta ray green lasers 100 mm spacing;
- ZCam E2C 4K cinema camera for video;
- Dual Deep Sea Power and Lights red laser with 200 mm spacing;
- 1080p front facing webcam;
- 2x SubC imaging Aquorea LED Lights;
- Blue Robotics Dual front facing lights;
- Blue Robotics Depth and temperature to 1000 m; and,
- Trittech altimeter.



Figure 4-3: NIWA's CoastCam benthic imaging system. The system uses high-resolution 4K and 1080p video and a fibreoptic umbilical cable to relay imagery as a live feed directly to the vessel.

As a smaller back-up system and for mid-water transects through marine farms, a CBed camera system was used. The CBed camera is a high-resolution drop camera running off a 100-m long single-mode fibre-optic cable. The system consists of the following components:

- Deep Sea Power and Light - HD multi Sea cam;
- Deep Sea Power and Light – Sealite LED lights;
- Odyssey video overlay and recording;
- Dual BLAP-LG05-B150 green lasers with 200 mm spacing; and,
- Proprietary software to operate.



Figure 4-4: NIWA's high-definition CBed camera system. This unit is smaller and lighter than CoastCam and was ideal for towed mid-water surveys along marine farm lines.

At each sample station, RV *Ikatere* was positioned in DP mode over the preselected site while the CoastCam system was deployed, ensuring resulting imagery was of undisturbed seafloor. Depending on requirements, a transect could be undertaken whilst under DP control. For station-record keeping, positional information was taken from the Navipac navigation screen, however, navigation data are also embedded into the digital video files.

4.5 Benthic sampling strategy

Consistent with the ground-truthing approach adopted for the Queen Charlotte Sound HS51 survey (Neil et al., 2018), stratified-random sample sites for collecting bottom sediment and benthic video fall into two broad categories:

1. targeted sites that include specific geomorphic features or habitats identified in the newly acquired multibeam bathymetry, such as reefs, pockmarks, channels and shoals. In addition, areas with specific acoustic backscatter characteristics were targeted; and,
2. random or general characterisation sites to ensure that all the HS66 survey area attained some sample representation. Hydrographic seabed samples collected by DML and iXblue were included in this sample set.

In order to identify and target zonation patterns in the raw acoustic backscatter, a provisional training set of four backscatter classes was adopted from the HS51 survey (after Neil et al., 2018). The distribution of the training set was as follows:

- Class 1: low reflectivity (lower than -22 dB), homogeneous, corresponding to mud.
- Class 2: low-medium reflectivity (-22 to -18 dB), homogeneous, corresponding to fine sandy substrates.
- Class 3: medium-high reflectivity (-18 to -14 dB), homogeneous, corresponding to medium sandy substrates.
- Class 4: high reflectivity (higher than -14 dB), highly heterogeneous, corresponding to coarse sands, shell-rich and gravel substrates.

Separating the unprocessed backscatter data into this provisional training set allowed the ground-truthing campaign to spread the targeted sampling effort across the range of adopted training backscatter classes. Importantly, the intermediate acoustic backscatter responses could be identified (beige and yellow classes in Figure 4-5), which for the most part have limited spatial coverages but represent diverse textural admixtures of sand, shell, gravel and mud substrates.

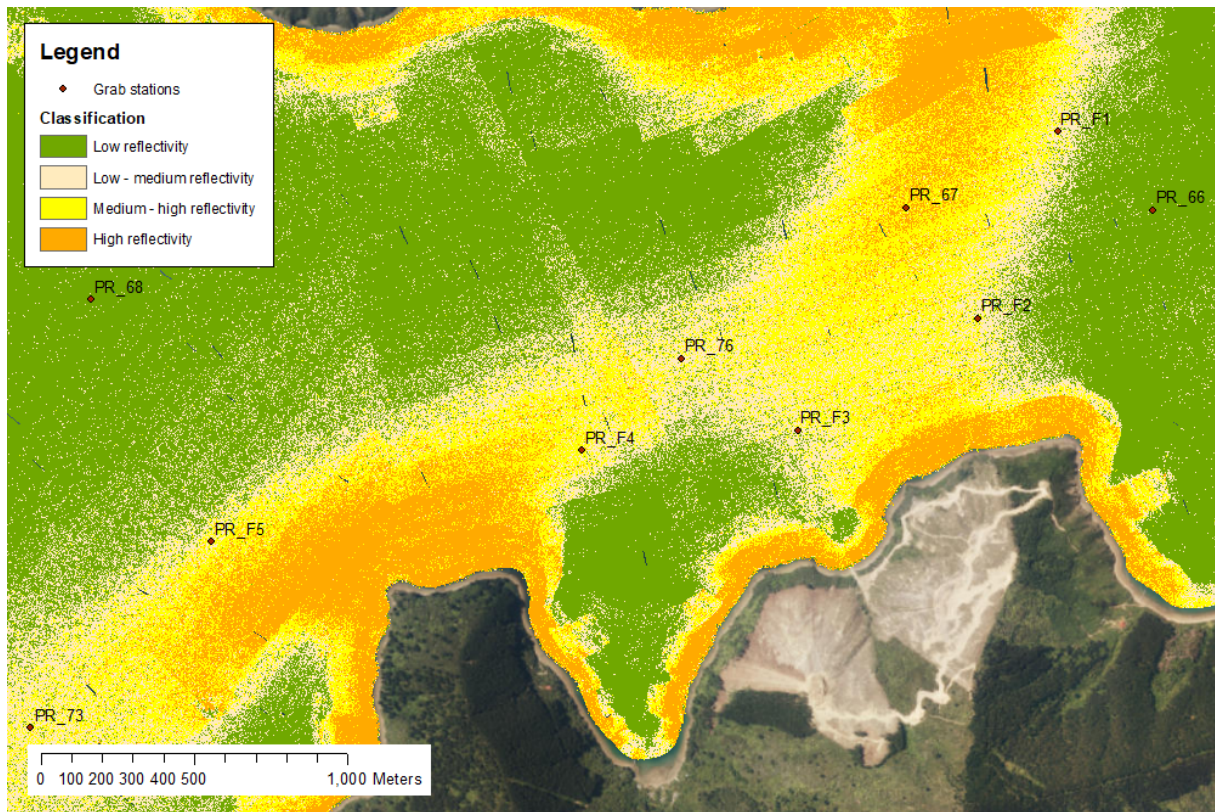


Figure 4-5: Example of site selection from NIWA's HS66 benthic sampling campaign where intermediate acoustic backscatter classes were targeted in Popoure Reach.

Note that adoption and use of a training backscatter dataset from HS51 in the sampling design herein does not circumvent or replace the need to fully process the new HS66 backscatter data to build robust and validated future science products, such as benthic habitat classifications.

5 Results

The NIWA ground-truthing campaign sampled a total of 135 grab sample sites (Appendix A) and 165 benthic videos (Appendix C). A summary of the NIWA grab samples is shown in Figure 5-1.

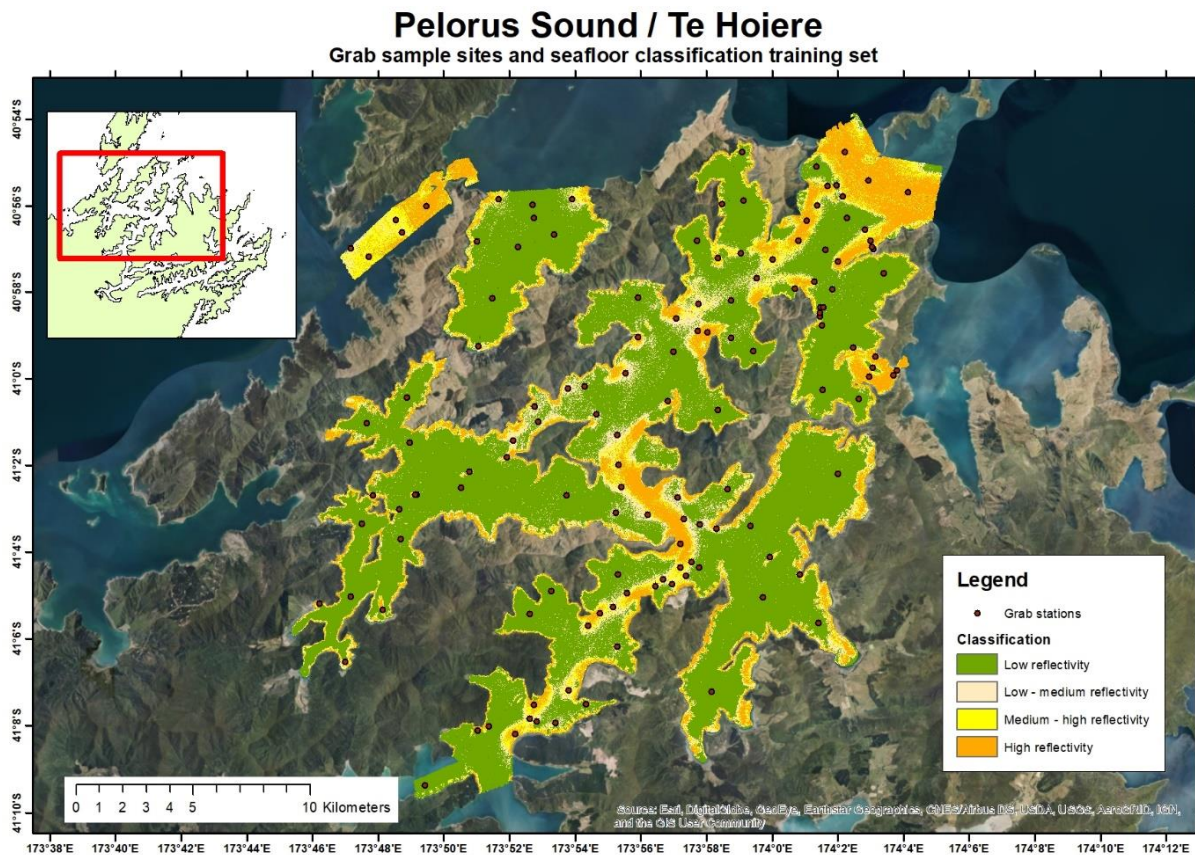


Figure 5-1: Compilation of NIWA grab stations across the HS66 survey area.

Grab samples recovered by DML (16 sites) and iXblue (31 sites) (Appendix B) were accounted for in the sampling design and resulted in a collective total of 182 benthic sample sites and 183 physical samples. A compilation of all recovered samples is summarised in Table 5-1. A summary of total sediment sampling effort is shown in Figure 5-4 and summarised in Table 5-2.

Outcropping rock reefs, boulders or cobble-sized substrates could not be sampled safely using a grab but valuable textural information is also recorded from the seafloor video imagery. All grab samples had matching video taken from the same location, either as a static sample of less than a few tens of seconds of footage, or as a short transect of a few minutes duration. Footage could be more than ten minutes long at specific habitats and high interest areas, such as a rocky reefs, scallop beds, marine farms or across transitions in substrate type.

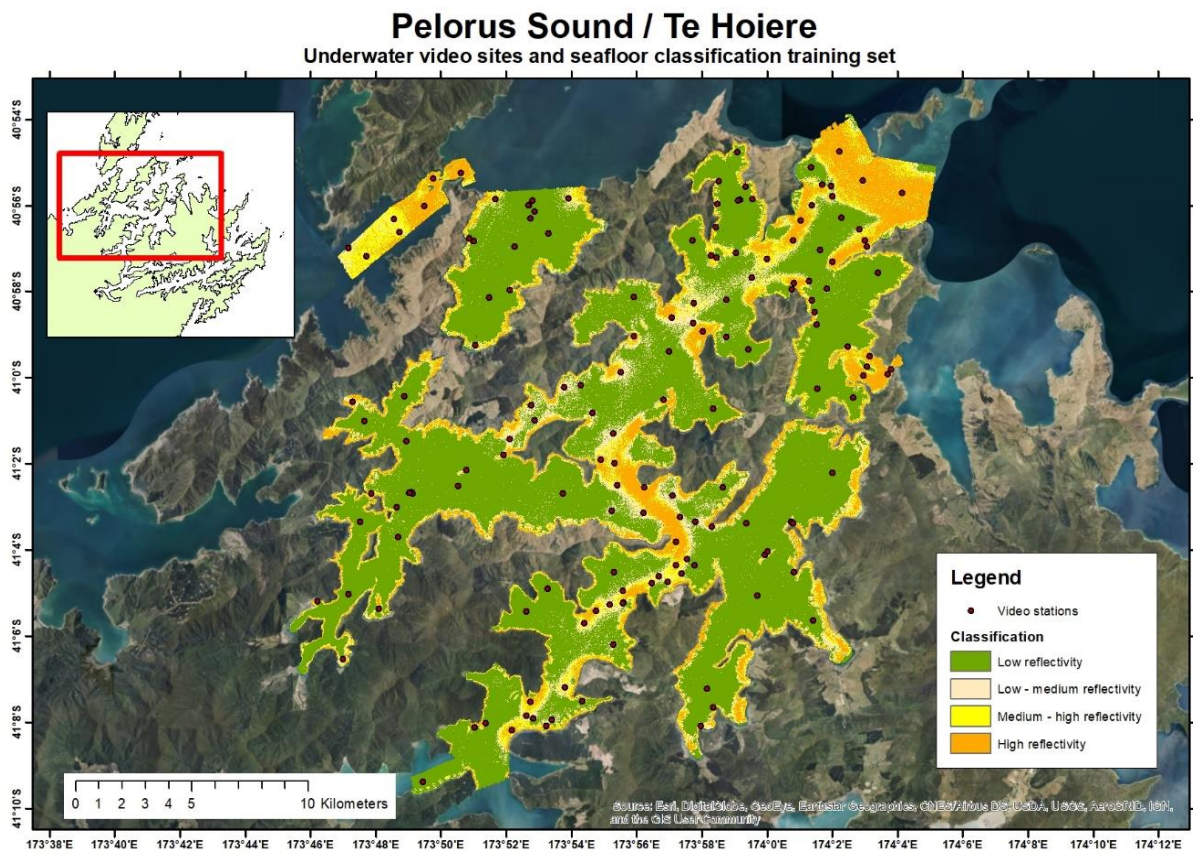


Figure 5-2: Compilation of all NIWA benthic video stations across the HS66 field survey area.

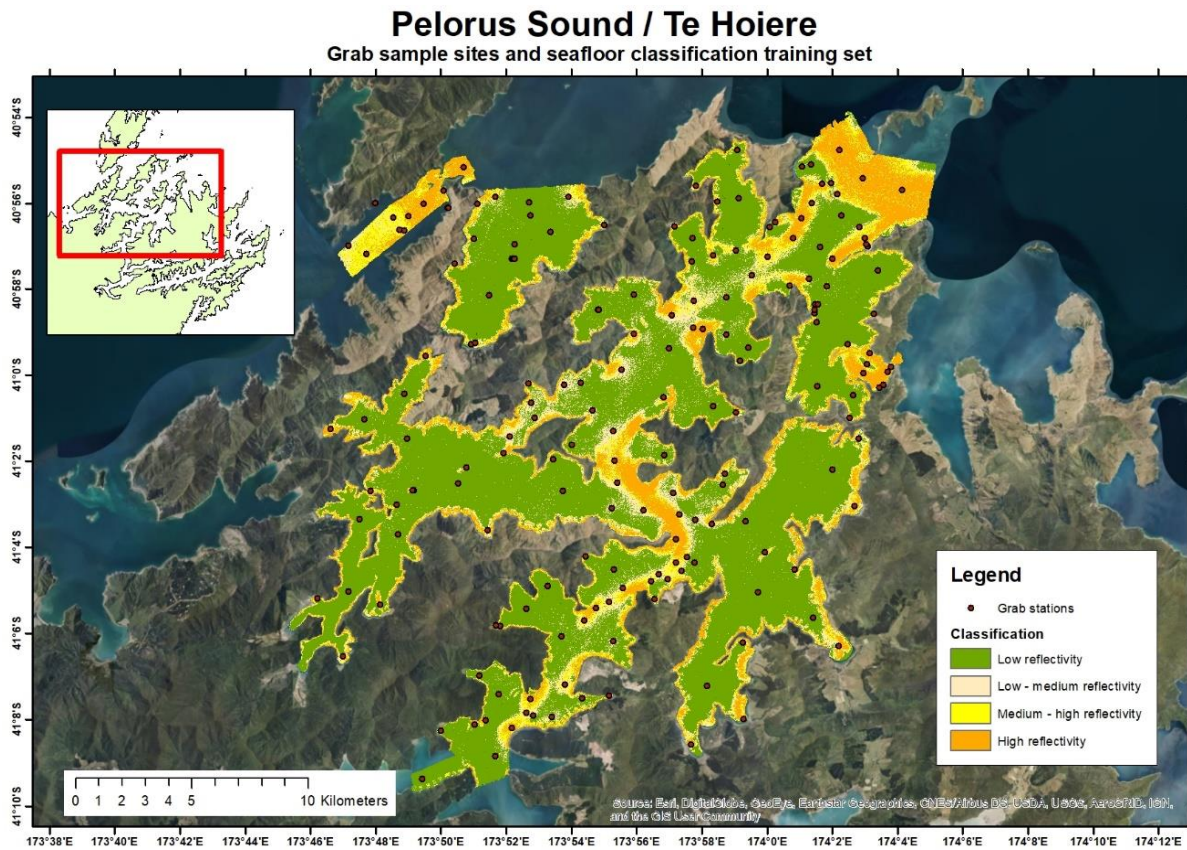


Figure 5-4: Compilation of all benthic grabs across the HS66 survey area, inclusive of NIWA and hydrographic samples from DML and iXblue. Note that sample spread across the backscatter training set.

Table 5-1: Inventory of recovered sediment samples from NIWA, DML and iXblue ground-truthing campaigns. Samples are currently stored in the NIWA refrigerated containment facility at the Greta Point (Wellington) campus.

Provider	800 ml jars	Sample bags	Stations	Comment
NIWA	135		135	
DML	16		16	
iXblue	20	12	31	One station has bag + jar
Total inventory			182	

A provisional measure of the representativeness of the recovered sediment can be made from the breakdown of grab-sample numbers in each of the adopted training backscatter classes (Table 5-2), inclusive of the hydrographic samples collected by DML and iXblue. Note that one station occurred outside the MBES coverage, and therefore could not be directly mapped onto a backscatter training class.

Table 5-2: Compilation of all grab sampling across the four backscatter training classes.

Adopted backscatter training class	Backscatter reflectivity characteristics	All grab samples (no. stations)	Training class representation by station
1	Low reflectivity	32	18%
2	Low – medium reflectivity	29	16%
3	Medium – high reflectivity	35	19%
4	High reflectivity	85	47%

A provisional measure of the collective benthic ground-truthing effort across the four backscatter training classes, inclusive of all grab and video data, is summarised in Table 5-3.

Table 5-3: Compilation of all benthic ground-truthing effort across the four backscatter training classes.

Adopted backscatter training class	Backscatter reflectivity characteristics	Ground-truthing effort (no. stations)	Training class representation by station
1	Low reflectivity	71	20%
2	Low – medium reflectivity	61	17%
3	Medium – high reflectivity	63	18%
4	High reflectivity	154	44%

On balance this spread of samples should provide a robust dataset for quantification of benthic habitats, characterisation of features of interest, and other future science products.

5.1 Examples of benthic sediment samples

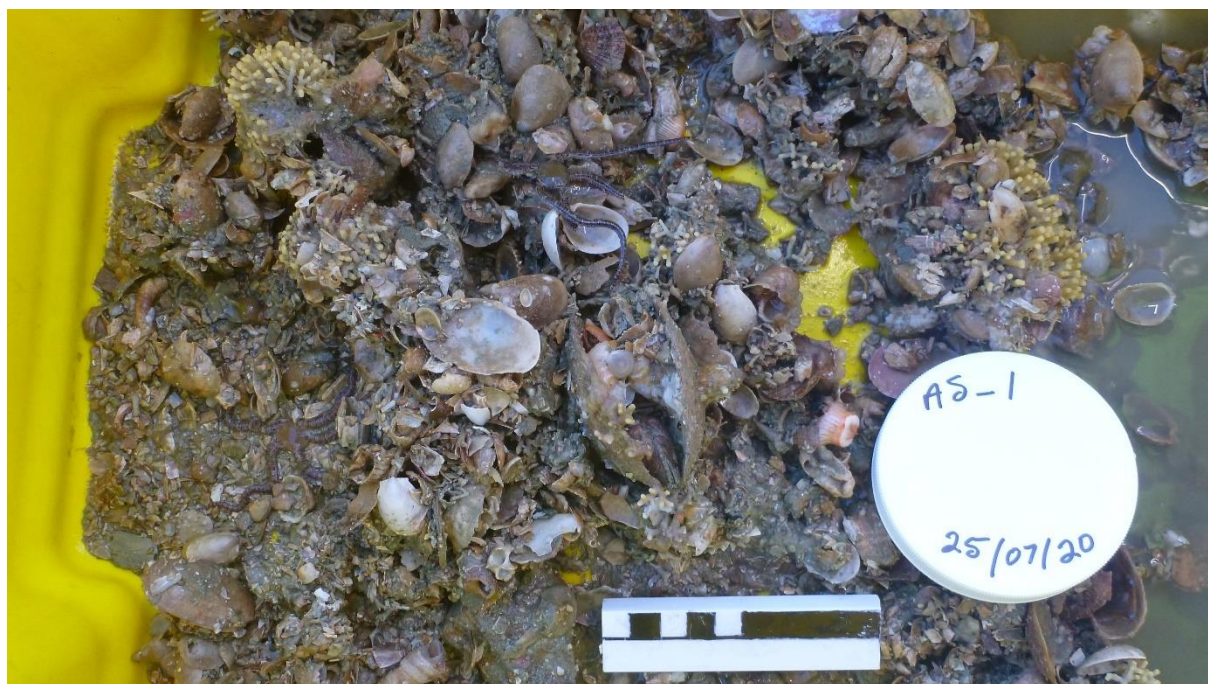


Figure 5-5: Example of shelly gravel hash recovered using the large Van Veen grab. Note the wide range of textural sizes from very fine sand to gravel, rock fragments, whole and broken shells, and the range of benthic fauna. The scale-bar is 10 cm long with centimetre increments. Photo from sample site AS_1 in Allen Strait, 41 m water depth (Appendix A).



Figure 5-6: Example of slightly shelly, sandy mud sample recovered using the small Dietz-Lafond (clam-shell) grab. Note the scallop valve and screw shells. The scale-bar is 10 cm long with centimetre increments. Photo from sample site PS_ENT_30 from the eastern channel at the entrance to Pelorus Sound / Te Hoiere, 47 m water depth (Appendix A).



Figure 5-7: Example of carbonate coarse-sand substrate in Waimaru Bay in the Beatrix Bay - Clova Bay area. Note the sand-sized shell fragments and occurrence of a few complete valves. The scale-bar is 10 cm long with centimetre increments. Photo from sample site CB_WU adjacent to the gannet colony, at 14 m water depth (Appendix A).

5.2 Examples of benthic imagery

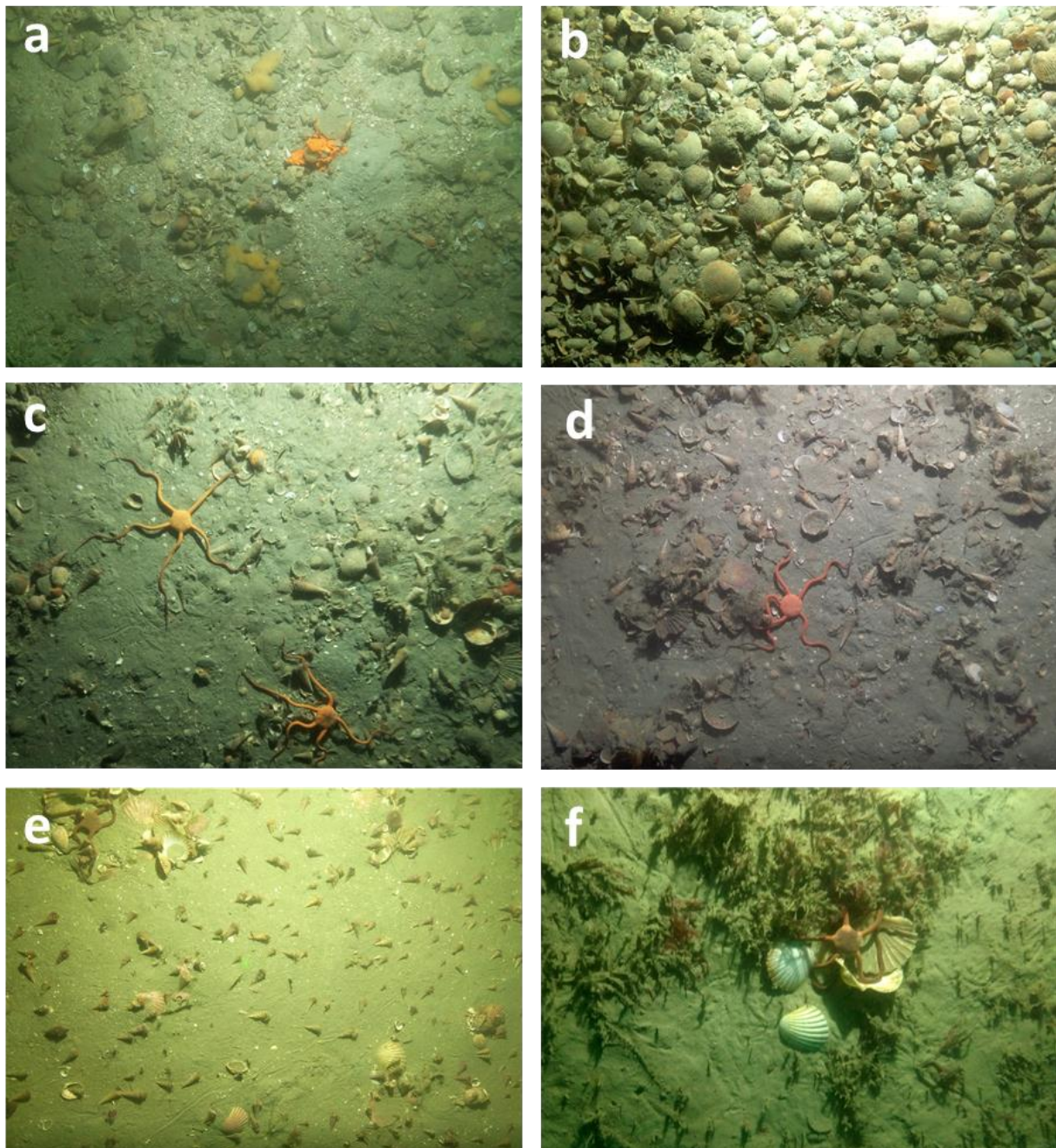


Figure 5-8: Examples of shelly muddy seafloor. (a) muddy shelly substrate at eastern Forsyth Bay, site FB-46, 47 m water depth; (b) shell-armoured and winnowed sandy mud at the northwest Pelorus Sound / Te Hoiere entrance, site PS_ENT_22, 95 m water depth; (c) shelly mud substrate with brittle stars at Duffers Reef in Orchard Bay, site PS_ENT_104, 80 m water depth; (d) shelly sandy mud substrate with high biological content in the east channel of Pelorus Sound / Te Hoiere entrance, site PS_ENT_27, 56 m water depth; (e) shelly mud with screw shells aligned to tidal current, Pelorus Sound entrance southeast, site PS_ENT_21, 96 m water depth; (f) shelly, sandy mud substrate with macroalgae in Wynens Bay Waitata Reach, site WB_TRANS, 19 m water depth.

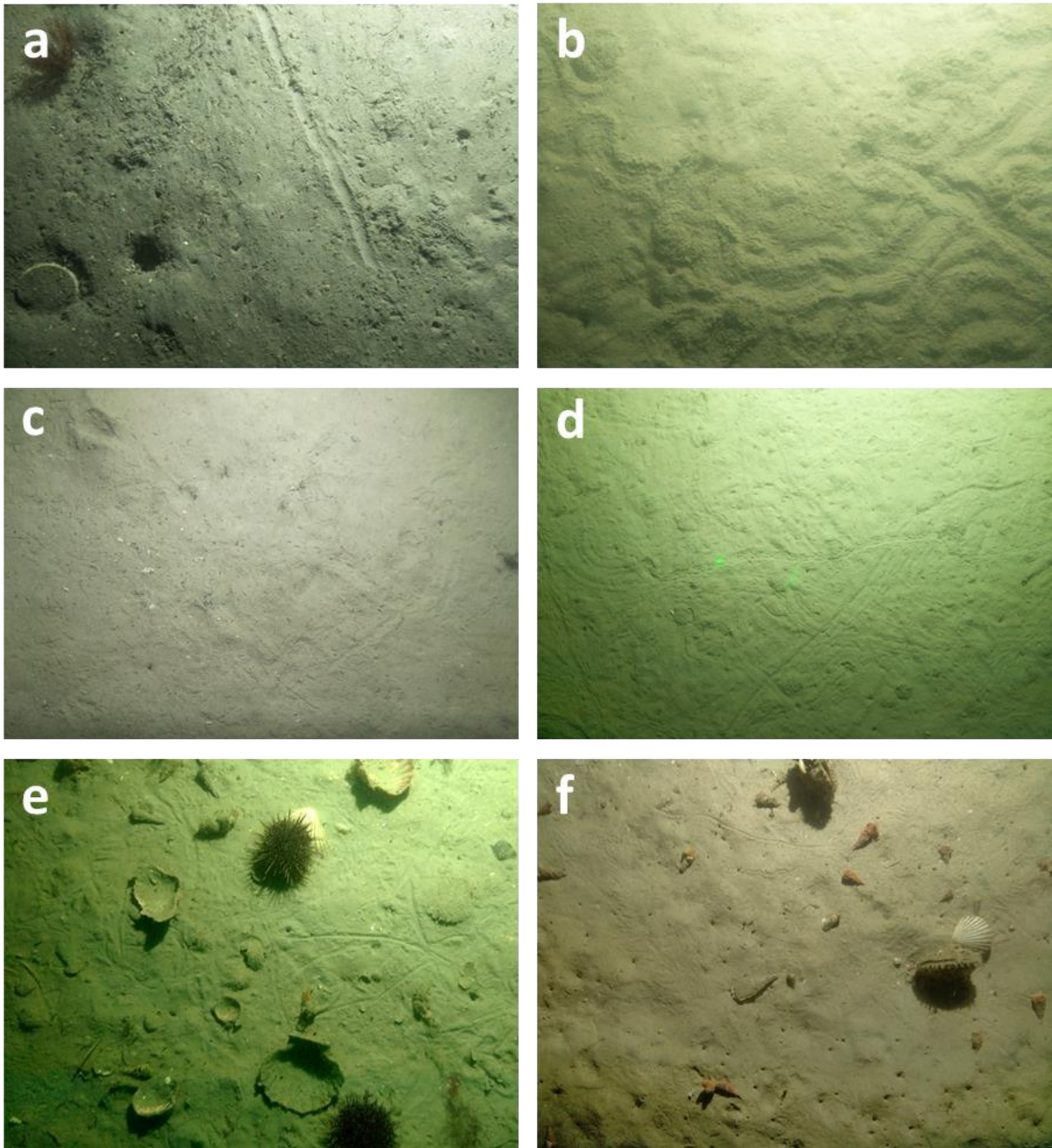


Figure 5-9: Examples of muddy, soft substrates with biological tracks. (a) scallops in muddy substrate with burrows and biological tracks in Tawhitinui Reach, site TR_96, 56 m water depth; (b) seafloor with many and varied biological tracks, Tennyson Inlet, site TI_86, 26 m water depth; (c) burrows and biological tracks in an Admiralty Bay transect across a pockmark, site AB_9_10_11, 46 m water depth; (d) flat, soft muddy substrate with many biological tracks in Forsyth Bay, site FB_48, 35 m water depth; (e) shelly (scallops), sandy mud substrate with urchins (kina) in Wynens Bay Waitata Reach, site WB_TRANS, 19 m water depth; (f) horse mussels, small burrows and muddy sand substrate at Current Basin in French Pass, site FP_1, 33 m water depth.

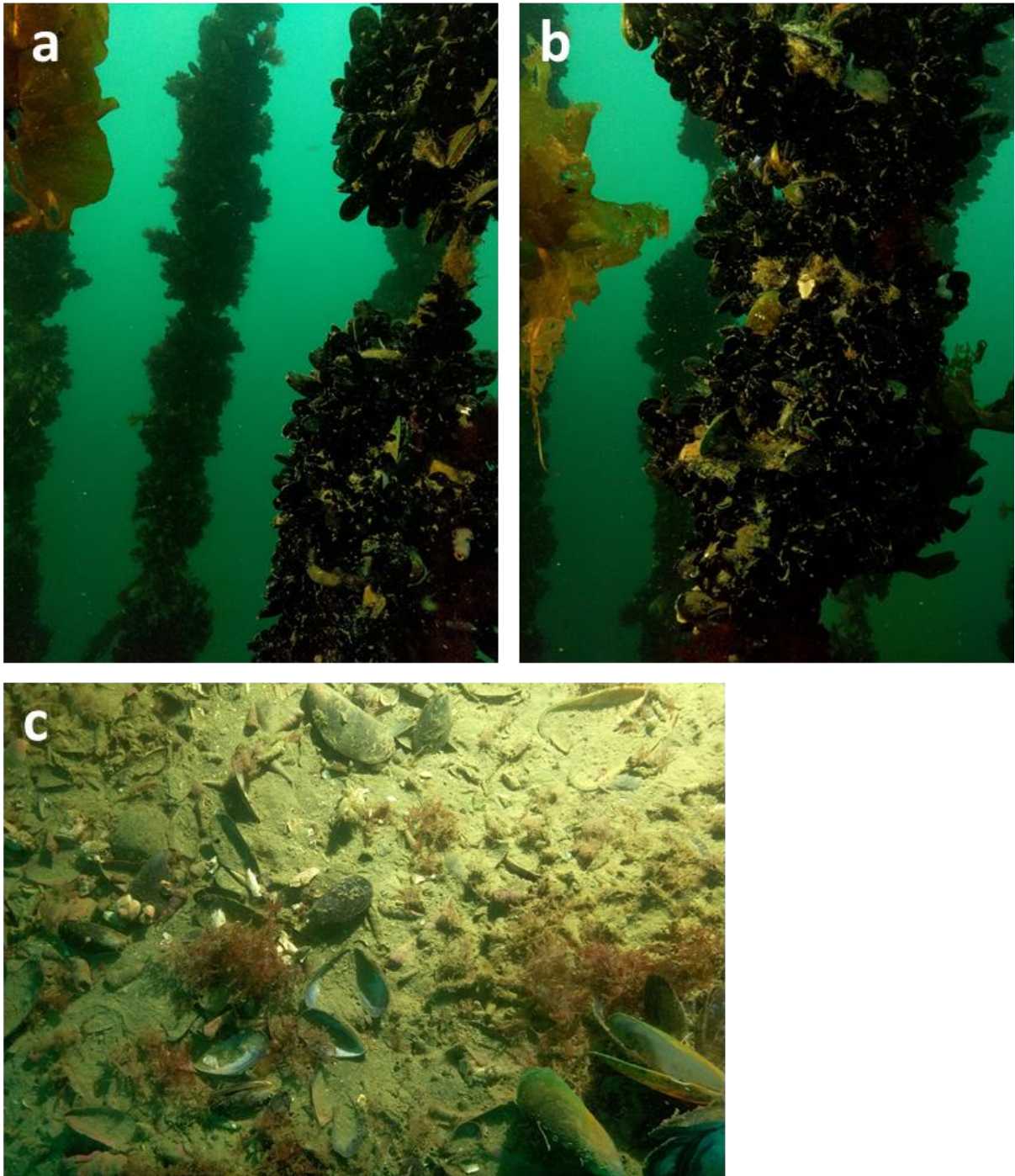


Figure 5-10: Examples of imagery from a mussel farm. (a) and (b) video imagery from along blue mussel lines at Port Ligar, site MFL238, 38 m water depth; (c) benthic imagery of mussel hash and muddy substrate from beneath a mussel farm in Admiralty Bay, site MFL433, 25 m water depth.

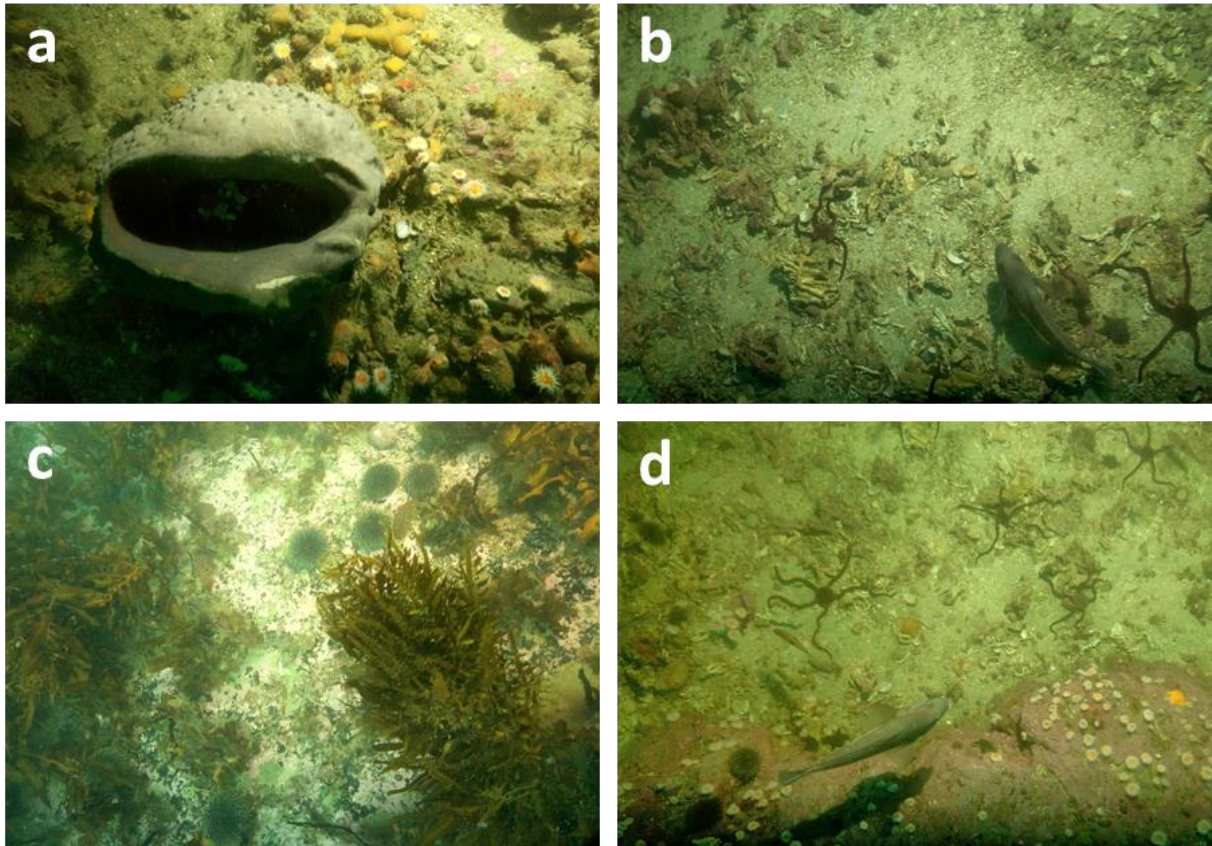


Figure 5-11: Examples of benthic imagery from reef transects. (a) large sponge, anemones and shelly mud substrate from Maud Island reef, site MI_REEF, 34 m water depth; (b) shelly gravel, brittle stars and blue cod at Keep Clear Rock reef, Port Ligar, site PL_REEF_B, 11–6 m water depth; (c) outcropping coralline covered rock, kina and seaweed at Forsyth Bay strike-ridge reef, site FB_STRIKE_REEF_1, 21–17 m water depth; (d) outcropping rock, shelly gravel and sand, brittle stars, kina, anemones and blue cod at Keep Clear Rock reef, Port Ligar, site PL_Reef_B, 11–6 m water depth.

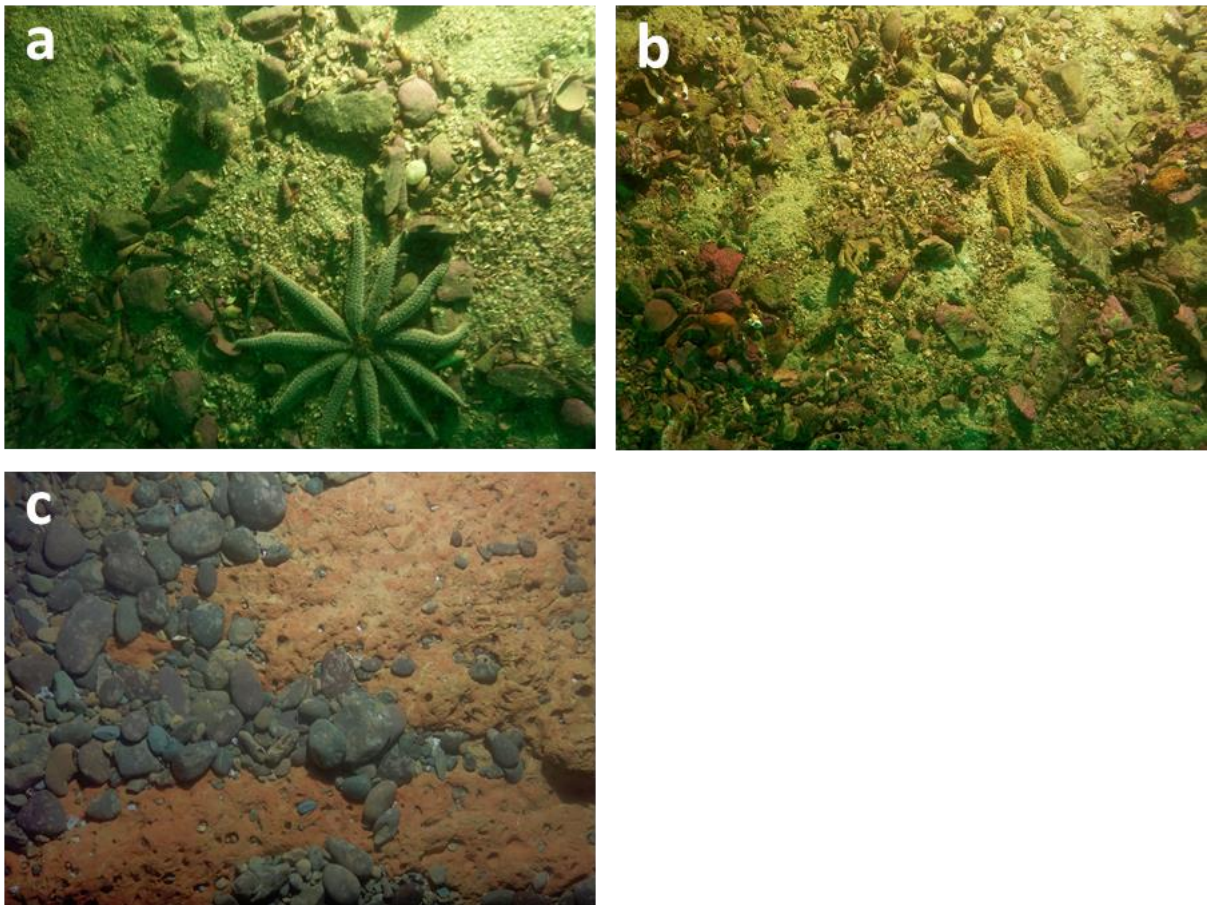


Figure 5-12: Examples of rocky and lithic-gravel substrates. (a) stony, sandy, shelly gravel with seastar at shallow reef-shoal at western Port Ligar, video site PL_WEST, 30 m water depth; (b) stony, rocky and shelly sand substrate with seastar at Dart Rock Tawhitinui Reach, video site DR_DML_5, 14 m water depth; (c) outcropping bedrock and current-swept lithic boulder gravels on the western side of the French Pass narrows, site FP_4, 72-49 m water depth.

6 Concluding remarks

On balance, with the spread of seabed grab samples and video imagery we believe a robust and full dataset has been collected. Moving forward, these data will allow quantification of benthic habitats, characterisation of features of interest, and support for other future scientific products.

7 Acknowledgements

We would like to acknowledge the efforts of the survey teams and entire management of HS66 to recover, describe and collate valuable and insightful benthic datasets. The teams were helpful and professional, and all work has been carried out safely and efficiently. These attributes ensured a successful survey in the face of unprecedented challenges caused by the global COVID-19 pandemic. Sanford Ltd kindly provided chilled storage of sediment samples in Havelock during NIWA's field campaign.

8 References

- Land Information New Zealand (LINZ) (2019) Hydrographic Survey Specification – Western Marlborough Sounds v.5 Project Number HYD-2018/19-01 (HS66).
- Neil, H.L., Mackay, K., Wilcox, S., Kane, T., Lamarche, G., Wallen, B., Orpin, A., Steinmetz, T., Pallentin, A. (2018) What lies beneath? Guide to Survey Results and Graphical Portfolio, Queen Charlotte Sound/Tōtaranui and Tory Channel/Kura Te Au (HS51) Survey. *NIWA Client Report 2018085WN*.

Appendix A NIWA sediment sample stations

Site ID	Location	Latitude °E	Longitude °S	Date UTC	Time UTC	Depth m	Vessel heading Deg	Photo number	Description	IHO Section-J seabed	IHO Section-J qualifying term	IHO Section-J supplementary
AB_12	Admiralty Bay central	-40.9382	173.8790	24/07/2020	21:30	44	57	1050160, 1050161	Slightly greenish med-grey, sticky mud. Slightly firm, rare small shell fragments.	M	sf sy	gn gy
AB_13	Admiralty Bay central outer	-40.9493	173.8709	24/07/2020	22:00	47	63	1050162, 1050163	Slightly greenish grey, soft, sticky mud. Occasional shell, infauna (worm), softer than AB_12.	M	sy so	gn gy
AB_14	Admiralty Bay south	-40.969	173.8578	22/07/2020	1:48	43	30	1050123, 1050125, 1050124	Dark grey, sticky occasionally shelly silty mud. Slightly firm, bioturbated.	M.Sh	sy	dk gn gy
AB_15	Admiralty Bay northeast	-40.9307	173.8984	24/07/2020	20:30	51	43	1050156, 1050157	Greenish dark-med grey, shelly, sticky mud. Gravel-sized shell fragments (scallops).	M.bk.Sh	sy	dk gn gy
AB_16	Admiralty Bay northwest	-40.9308	173.8608	21/07/2020	23:45	55		1050119, 1050120	Darkish greenish grey sticky, slightly shelly mud. Slightly firm, occasional shell fragments.	M.bk.Sh	sy	dk gn gy
AB_18	Admiralty Bay west (MFL433)	-40.9472	173.8502	22/07/2020	3:00	34	45	1050126, 1050127, 1050128, 1050129	Shelly, muddy, very poorly sorted coarse sand. Shell hash mix of abraded and stained bivalves and fragments, sandy component biogenic carbonate. Soft.	S.bk.Sh.M	so	gy
AB_7	Admiralty Bay	-40.9876	173.8506	25/07/2020	2:45	30	9	1050164, 1050165	Very poorly sorted shell-gravelly, muddy sand. Soft, whole and broken shell.	S.M.bk.Sh		gy
AB_9_10_11	Admiralty Bay transect	-40.9444	173.8890	24/07/2020	21:08	46	103	1050158, 1050159	Slightly greenish med-grey, sticky soft mud, no coarse material.	M	so sy	gn gy
AB_Rig	Admiralty Bay north	-40.9331	173.8782	22/07/2020	0:35	42		1050121, 1050122	Dark grey, sticky, slightly firm mud, rare shells, worms.	M		dk gn gy
AS_1	Allen Strait	-40.9969	174.0632	25/07/2020	21:10	41	59	1050168, 1050169, 1050170	Shell hash, coral, brittle stars, pebbles, cobbles, sponges, slate rock fragments (10cm).	G.bk.Sh.St		gy
BB_89	Beatrix Bay	-41.0367	174.0331	27/07/2020	20:25	39	56	1050214, 1050215	Greenish-grey, soft, sticky mud. Very homogeneous with only a couple of shell fragments.	M	sy so	gn gy
CB_79	Grant Bay	-41.0686	173.9988	27/07/2020	23:30	28		1050224, 1050225	Greenish-grey shelly mud. Lot of shell hash.	M.bk.Sh		gn gy
CB_87	Craill Bay	-41.1204	173.9692	27/07/2020	21:34	26	219	1050218, 1050219	Greenish-grey, soft, sticky, shelly mud.	M	sy so	gn gy
CB_88	Clova Bay	-41.0939	174.0233	27/07/2020	22:21	29		1050220, 1050221	Greenish-grey, soft, sticky, shelly mud, few broken shells, worm.	M.bk.Sh	sy so	gn gy
CB_90	Outer Tuhitarata Bay	-41.0565	173.9890	27/07/2020	20:57	33	177	1050216, 1050217	Greenish-grey, firmish, slightly shelly, sticky mud.	M.Sh	sy sf	gn gy
CB_91	Grant Bay	-41.0842	173.9950	27/07/2020	23:07	30	328	1050222, 1050223	Greenish-grey, soft, sticky, slightly shelly mud. Broken shells.	M.bk.Sh	sy so	gn gy
CB_REEF	Craill Bay, Whakamawahi Point	-41.0577	173.9717	2/08/2020	2:30	53	265	1050315, 1050316	Greenish-grey, shelly coarse sandy, soft, sticky mud.	M.S.Sh	sy so	gn gy
CB_WU	Waimaru Bay gannet colony	-41.0752	174.0137	31/07/2020	3:36	14		1050283, 1050284	Grey, slightly gravelly, shelly coarse sand.	cS.G.Sh		gy
CH_DML_43	Waitata Reach	-40.9896	173.9498	25/07/2020		53	36	1050176, 1050177	Greenish grey mud.	M		gn gy
CH_DML_54	Apauau Reach channel	-41.0165	173.8809	23/07/2020	22:35	46	55	1050143, 1050144	Med-dark grey, slightly shelly, sticky mud. Soft upper layers, firmer and more cohesive below. Shell fragments coarse sand to gravel.	M.bk.Sh	sf sy	dk gn gy
CH_DML_55	Tawhitinui Reach	-41.0420	173.8418	23/07/2020	23:00	31	48	1050145, 1050146	Med-dark grey, sticky, slightly firm mud. Rare coarse-sand sized shell fragments. Bioturbated.	M	sy	dk gn gy

Site ID	Location	Latitude °E	Longitude °S	Date UTC	Time UTC	Depth m	Vessel heading Deg	Photo number	Description	IHO Section-J seabed	IHO Section-J qualifying term	IHO Section-J supplementary
CH_DML_56	Popoure Reach channel	-41.0330	173.9218	27/07/2020	0:20	72	18	1050192, 1050193	Greenish-grey, sticky, soft mud, some shell fragments.	M.Sh	sy so	gn gy
CH_DML_57	Popoure Reach channel	-41.0538	173.9551	27/07/2020	2:43	63	341	1050198, 1050199	Greenish grey, soft, shelly mud. Shell occurs as fragments.	M.bk.Sh	so	gn gy
DR_DML_6	Dart Rock, Tawhitinui Reach	-41.0447	173.8193	23/07/2020		32		1050147, 1050148	Dark-med grey, slightly shelly, sticky mud. Bioturbated, shell fragments up to 2-3cm.	M.bk.Sh	sy	dk gn gy
DR_DML_7	Dart Rock, Tawhitinui Reach	-41.0446	173.8188	24/07/2020	0:40	32	79	1050149, 1050150, 1050151	Med-dark grey, very poorly sorted, shelly gravel, slightly sandy sticky mud. Biogenic carbonate gravel has scallop valves.	M.S.bk.Sh	sy	dk gn gy
FB_44_B (repeat)	Eastern Forsyth Bay, Allen Strait	-40.9986	174.0614	18/07/2020	21:15	37	98	1050007, 1050008	Very poorly sorted biogenic gravel, shell hash.	G.Sh		gy
FB_45	Eastern Forsyth Bay	-40.9957	174.0509	18/07/2020	22:10	47	12	1050011, 1050012	Olive-grey sticky mud, slightly sandy, bioturbated, worms.	M.S	sy	gn gy
FB_46	Eastern Forsyth Bay	-40.9916	174.0521	18/07/2020	23:05	47	201	1050013, 1050014	Very poorly sorted sandy, shelly (complete and broken) greenish-grey soft mud.	M.bk.Sh	so	gn gy
FB_47	Eastern Forsyth Bay	-40.9993	174.0492	18/07/2020	21:55	48	358	1050009, 1050010	Very poorly sorted sandy greenish-grey mud, shell hash, high biogenic carbonate, Chlamys, hermit crabs, gastropods abraded.	M.bk.Sh		gn gy
FB_48	Forsyth Bay	-41.0044	174.0253	19/07/2020	0:10	35	200	1050017, 1050018	Firm, olive grey sticky mud, bioturbated, rare shell.	M	sf	gn gy
FB_49	Forsyth Bay	-41.0077	174.0436	18/07/2020	23:18	37	300	1050015, 1050016	Stiff, sticky olive-grey mud, macrofauna rare, minor v.fine sand, rare shell fragment.	M.vfS	sy sf	gn gy
FB_51	Northwestern Forsyth Bay	-40.9795	174.0251	18/07/2020	0:40	43	187	1050019, 1050020	Soft, clayey, olive grey sticky mud, bioturbated.	M	sy so	gn gy
FB_78	Forsyth Bay central	-40.9880	174.0409	25/07/2020	20:25	41	25	1050166, 1050167	Slightly greenish grey, poorly sorted, soft, shelly sandy mud. Shell fragments up to 1cm.	M.Sh	sy so	gn gy
FB_81	Fitzroy Bay	-41.0246	173.8157	26/07/2020	20:07	33	223	1050184, 1050185	Greenish-grey, slightly shelly, soft, sticky mud. Shells valves and broken fragments.	M.Sh	sy so	gn gy
FB_83	Fitzroy Bay	-41.0170	173.7940	29/07/2020	22:48	27	280	1050253, 1050254	Greenish-grey, slightly shelly, very soft and sloppy mud.	M.Sh	so	gn gy
FB_Strike_REE F_1A	Western Forsyth Bay	-40.9760	174.0241	19/07/2020	2:02	16	185	1050021, 1050022, 1050023	Grey shelly sand, poor-mod sorting, starfish, biogenic carbonate rich.	cS.bk.Sh	ca	gy
FB_Strike_REE F_1B	Western Forsyth Bay	-40.9747	174.0240	19/07/2020	2:20	21	185	1050024, 1050025	Biogenic rich coarse shelly sand, grey mud fine-grained component.	cS.bk.Sh.M		gy
FB_Strike_REE F_2A	Western Forsyth Bay	-40.9726	174.0245	19/07/2020	3:20	10	258	1050028, 1050029	Med-grey biogenic-rich coarse sand mod-well sorted.	cS	ca	gy
FB_Strike_REE F_2B	Western Forsyth Bay	-40.9726	174.0258	19/07/2020	3:30	27	258	1050030, 1050031, 1050032, 1050033, 1050034	Muddy biogenic-rich coarse sand, shelly, finer-grained than A sample.	cS.bk.Sh.M		gy
FP_1	French Pass Current Basin	-40.9437	173.8121	21/07/2020	21:15	33	71	1050111, 1050112	Slightly muddy med-sand, rare shell (live pipi), light-med-grey, mod-well sorted, softer than FP_8 and FP_2?	mS.M.Sh		gy
FP_2	French Pass Current Basin	-40.9497	173.7861	21/07/2020	20:24	17	85	1050104, 01050105	Mode-well sorted slightly muddy sand, light-med grey, small biogenic carbonate component.	S.M		gy
FP_6	French Pass Current Basin, narrows	-40.9336	173.8245	21/07/2020	22:20	41	248	1050116, 1050117, 1050118	Slightly sandy, slightly muddy shell-hash gravel, thickets of agglutinated shell hash, sponge.	G.sh.S.M		gn gy

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FP_7	French Pass Current Basin	-40.9388	173.8090	21/07/2020	21:35	36	68	1050113, 1050114, 1050115	Gravelly, sandy mud, very poorly sorted, soft. Biogenic gravel fraction, rare screw shells.	M.S.G.Sh		gn gy
FP_8	French Pass Current Basin	-40.9531	173.7951	21/07/2020	20:55	29	64	1050106, 1050107, 1050108, 1050109, 1050110	Shelly gravelly med-sand. Shells abraded and stained, lots of hermit crabs in screw shells, bivalves.	mS.G.Sh		gy
HC_82	Hallam Cove	-41.0073	173.8145	29/07/2020	22:20	28	81	1050251, 1050252	Greenish-grey, slightly shelly, very soft mud.	M	so	gn gy
KB_41	Ketu Bay	-40.9844	173.9788	23/07/2020	21:55	14	330	1050140, 1050141, 1050142	Med-dark grey, slightly shelly sticky mud. Bioturbated, sand-sized shell fragments, rare complete valves. Top layer soft, firmer and more cohesive below.	M.bk.Sh	sy so	dk gn gy
KB_42	Ketu Bay	-40.9892	173.9902	23/07/2020	21:32	20	311	1050138, 1050139	Med-dark grey mud. Upper surface soft, firmer and more cohesive below, rare shell material, bioturbated.	M		dk gn gy
KB_95	Kauauroa Bay	-41.0426	173.9771	27/07/2020	19:55	27	240	1050212, 1050213	Greenish-grey, firm mud, few shelly fragments.	M.bk.Sh	sf	gn gy
OB_50	Orchard Bay	-40.9596	174.0565	20/07/2020	1:12	31	175	1050057, 1050058, 1050059	Olive-grey sticky silty mud, slightly firm, rare shell, bioturbated.	M.St	sy	gn gy
OBST	Popoure Reach	-41.1322	173.8898	26/07/2020	1:27	19	21	1050180, 1050181	Greenish-grey, shelly, slightly stiff mud. Urchin.	M.Sh	sy sf	gn gy
PL_115	Te Kopi Bay, Port Ligar	-40.9126	173.9846	31/07/2020	20:24	36		1050285, 1050286	Greenish-grey, soft, sticky mud.	M.Sh	sy	gn gy
PL_32	Port Ligar west	-40.9328	173.9745	20/07/2020	21:50	38	41	1050080, 1050081	Dark greenish grey, soft, sticky mud. Slightly smelly, darker blobs below surface.	M	sy so	dk gn gy
PL_33	Port Ligar	-40.9314	173.9851	20/07/2020	21:20	32	246	1050076, 1050077, 1050078, 1050079	Sticky grey mud, occasional shell, soft upper layers firmer below.	M	sy sf	gn gy
PL_34	Port Ligar entrance	-40.9517	173.9839	23/07/2020	20:01	33	39	1050133, 1050132	Dark grey, sticky, slightly sandy slightly shelly mud. Bioturbated, upper layer very soft, lower layer firmer and more cohesive.	M.S.Sh	sy sf	dk gn gy
PL_REEF	Port Ligar southern headland reef	-40.9536	173.9723	21/07/2020	3:50	26	282	1050100, 1050101, 1050102, 1050103	Very poorly sorted biogenic carbonate coarse-sandy muddy gravel. Shells abraded and bored, smaller shells agglutinated into fist-sized thickets, sand component shell.	G.bk.Sh.cS.M		gy
PR_58	Popoure Reach upper	-41.1251	173.9054	29/07/2020	3:42	34	284	1050247, 1050248	Greenish-grey, slightly shelly-sandy, soft, sticky mud. Shell fragments sand-sized.	M.bk.Sh	sy so	gn gy
PR_59	Popoure Reach	-41.1316	173.8804	25/07/2020	23:33	47	40	1050178, 1050179	Greenish-grey, sticky mud, brittlestar, shell fragments.	M.bk.Sh		gn gy
PR_60	Popoure Reach upper	-41.1353	173.8503	29/07/2020	1:40	29	89	1050239, 1050240	Greenish-grey firmish, slightly shelly, sticky mud. Shell fragments, worm.	M.bk.Sh	sy sf	gn gy
PR_61	Popoure Reach upper	-41.1336	173.8562	29/07/2020	2:01	38	68	1050241, 1050242	Greenish-grey, shelly (lots), sticky, soft mud.	M.Sh	sy so	gn gy
PR_62	Popoure Reach upper	-41.1365	173.8693	29/07/2020	2:53	39	40	1050243, 1050244	Greenish-grey, shelly (lots), sticky, soft mud.	M.Sh	sy so	gn gy
PR_63	Nydia Bay	-41.1564	173.8238	29/07/2020	1:20	8	57	1050237, 1050238	Greenish-grey, soft, sticky mud, some algae stalks, no shell.	M	sy so	gn gy
PR_64	Popoure Reach upper	-41.1254	173.8789	29/07/2020	3:17	50	57	1050245, 1050246	Greenish-grey, very poorly sorted shelly, sticky, soft mud. Few live queen scallops.	M.Sh	sy so	gn gy
PR_65	Popoure Reach upper	-41.1198	173.8966	29/07/2020	4:02	46	354	1050249, 1050250	Greenish-grey, slightly shelly, soft, sticky mud.	M.Sh	sy so	gn gy
PR_66	Popoure Reach	-41.0727	173.9627	22/07/2020	20:30	38	278	1050130, 1050130	Med-darkish grey, sticky slightly shelly mud. Soft, bioturbated, large but occasional shell fragments.	M.bk.Sh	sy so	dk gn gy

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PR_67	Popoure Reach upper channel	-41.0726	173.9531	30/07/2020	2:34	55	40	1050263, 1050264	Greenish-grey, soft, shelly-gravelly, sticky mud. Shell fragments up to 9cm.	M.G.Sh	sy	gn gy
PR_68	Popoure Reach	-41.0753	173.9216	24/07/2020	3:08	30		1050152, 1050153	Med-dark grey, soft, slightly shelly, sticky mud. Biogenic carbonate gravel whole and broken shell. Bioturbated.	M.G.Sh	sy	dk gn gy
PR_69	Popoure Reach upper	-41.1031	173.9212	30/07/2020	3:04	20	343	1050267, 1050268	Greenish-grey, slightly shelly, soft, sticky mud. Few worms.	M	sy so	gn gy
PR_70	Popoure Reach	-41.0950	173.9065	27/07/2020	3:56	50	120	1050200, 1050201	Greenish-grey, shelly, sticky, soft mud.	M.Sh	so	gn gy
PR_71	Tiraora Bay	-41.0905	173.8769	28/07/2020	1:39	15	261	1050232, 1050233	Greenish-grey, very soft, sticky mud, 1 worm and tube.	M	sy so	gn gy
PR_72	Miro Bay	-41.0817	173.8876	28/07/2020	1:24	15	172	1050230, 1050231	Greenish-grey, soft, sticky mud, brittle star arm.	M	sy so	gn gy
PR_73	Popoure Reach channel	-41.0878	173.9192	24/07/2020	3:50	49	231	1050154, 1050155	Med-dark grey, slightly shelly, sticky mud. Bioturbated, slightly firm in places, shell fragments up to 2cm.	M.bk.Sh	sy sf	dk gn gy
PR_74	Popoure Reach	-41.1307	173.8767	26/07/2020		49		1050182, 1050183	Greenish-grey, sticky mud, shells, infauna.	M.Sh	sy	gn gy
PR_75	Popoure Reach	-41.0636	173.9533	28/07/2020	0:02	58	336	1050226, 1050227, 1050228, 1050229	Very poorly sorted muddy, sandy, shelly gravel. Lot of infauna, shell hash and soft to firm mud.	G.sh.S.M	sf	gn gy
PR_76	Popoure Reach upper channel	-41.0770	173.9444	30/07/2020	2:53	50	57	1050265, 1050266	Greenish-grey, shelly, soft, sticky mud.	M	sy so	gn gy
PR_F1	Popoure Reach	-41.0704	173.959	3/08/2020	0:59	46	285	1050323, 1050324	Greenish-grey, shelly coarse sandy, soft, sticky mud.	M.cS.Sh	sy so	gn gy
PR_F2	Popoure Reach	-41.0758	173.9559	3/08/2020	1:18	48	282	1050325, 1050326	Greenish-grey, shelly sandy, firmish, sticky mud.	M.S.Sh	sf	gn gy
PR_F3	Popoure Reach	-41.0791	173.9489	3/08/2020	1:43	48	255	1050327, 1050328	Greenish-grey, shelly coarse sandy, soft, sloppy mud	M.cS.Sh	so	gn gy
PR_F4	Popoure Reach	-41.0797	173.9406	3/08/2020	2:07	52	251	1050329, 1050330	Greenish-grey, shelly coarse sandy, sticky, very firm mud.	M.cS.Sh	sf	gn gy
PR_F5	Popoure Reach	-41.0824	173.9262	3/08/2020	2:28	55	224	1050331, 1050332	Greenish-grey, slightly shelly coarse-sandy, sticky, firmish mud	M.cS.Sh	sf	gn gy
PR_F6	Popoure Reach	-41.0903	173.9125	3/08/2020	2:53	54	240	1050333, 1050334	Greenish-grey, slightly shelly coarse-sandy, sticky, soft mud.	M.cS.Sh	so	gn gy
PS_ENT_104	Duffers Reef Orchard Bay	-40.9550	174.0331	31/07/2020		81	209	1050287, 1050288	Grey, soft, sticky, shelly, coarse sandy mud.	M.cS.Sh	sy so	gy
PS_ENT_20	Pelorus Sound entrance east	-40.9283	174.0689	19/07/2020	20:20	100	56	1050036, 1050037	Shelly, gravelly, very poorly sorted greenish grey sandy mud, infauna, worms, complete and broken shells.	M.S.G.bk.Sh		gn gy
PS_ENT_21	Pelorus Sound entrance	-40.9236	174.0488	19/07/2020	21:06	96	88	1050038, 1050039, 1050040	Shelly, gravelly, very poorly sorted greenish dark grey sandy mud, large complete and broken shells.	M.S.G.bk.Sh		dk gn gy
PS_ENT_21A	Pelorus Sound entrance southeast	-40.9501	174.0511	20/07/2020	1:45	24		1050060, 1050061	Grey med-sandy mod-poorly sorted mud, soft.	M.mS	so	gy
PS_ENT_21B	Pelorus Sound entrance southeast	-40.9492	174.0506	20/07/2020	1:55	11		1050062, 1050063, 1050064	Greenish-grey, shelly, gravelly, sandy sticky mud. Lots of infauna, scallop shell fragments up to 5+cm.	M.S.G.bk.Sh	sy	gn gy
PS_ENT_22	Pelorus Sound entrance northwest	-40.9127	174.0368	19/07/2020	21:50	95	113	1050041, 1050042, 1050043	Shelly gravelly very poorly sorted sandy mud, biogenic gravels, shells bored and abraded.	M.S.G.bk.Sh		gn gy
PS_ENT_23	Pelorus Sound entrance west	-40.9184	174.0222	19/07/2020	22:00	19	200	1050041, 1050042, 1050043	Slightly firm, sticky greenish grey silty mud, occasional shells, worm, moderately well sorted.	M.Si.Sh	sy sf	gn gy

Site ID	Location	Latitude °E	Longitude °S	Date UTC	Time UTC	Depth m	Vessel heading Deg	Photo number	Description	IHO Section-J seabed	IHO Section-J qualifying term	IHO Section-J supplementary
PS_ENT_24	Pelorus Sound entrance west	-40.9256	174.0326	19/07/2020	23:42	70	209	1050054, 1050055, 1050056	Med-dark grey, sticky silty mud, rare shells, mod-well sorted.	M.Si	sy	gn gy
PS_ENT_25	Pelorus Sound entrance west channel	-40.9298	174.0357	20/07/2020	3:55	60	351	1050073, 1050074, 1050075	Grey, shelly sticky mud, slightly stiff, some coarse sand, bioturbated, darker grey patches below surface	M.Sh.cS	sy	dk gn gy
PS_ENT_26	Central shoal Pelorus Sound entrance	-40.9382	174.0376	20/07/2020	3:15	37	11	1050071, 1050072	Dark grey, sticky silty mud. Bioturbated, quite firm, rare shell.	M	sf	dk gn gy
PS_ENT_27	Pelorus Sound entrance east channel	-40.9468	174.0497	20/07/2020	2:20	56	164	1050065, 1050066, 1050067	Grey, shelly, gravelly coarse-med sandy very poorly sorted mud, soft, high biogenic carbonate, shells a mix of fresh and abraded.	M.cs.G.Sh	ca so	gy
PS_ENT_28	Pelorus Sound entrance west	-40.9391	174.0172	20/07/2020	22:45	75	26	1050084, 1050085	Very poorly sorted shelly, muddy greyish coarse sand. Biogenic-rich, shells abraded and bored, cockles, scallops.	cS.M.Sh	ca	gy
PS_ENT_29	Pelorus Sound entrance central shoal	-40.9503	174.0268	20/07/2020	23:58	36	231	1050089, 1050090	Shelly, slightly sandy, soft sticky med-dark grey mud. Shell fragments, infauna, branched seaweed.	M.bk.Sh.S	sy so	dk gn gy
PS_ENT_30	Pelorus Sound entrance east channel	-40.9427	174.0470	20/07/2020	2:45	47	170	1050069, 1050070	Grey, shelly, coarse-sandy, gravelly very poorly sorted sticky mud. Whole shells, biogenic carbonate, bioturbated, slightly firm.	M.bk.Sh.cS	ca sy	gy
PS_ENT_36	Pelorus Sound entrance west	-40.9334	174.0225	20/07/2020	22:15	80	38	1050082, 1050083	Dark greenish grey, shelly, slightly sandy soft sticky mud, complete shell valves.	M.Sh.S	sy so	dk gn gy
PS_ENT_37	Pelorus Sound entrance channel southwest	-40.9469	174.0132	20/07/2020	23:30	95	229	1050086, 1050087, 1050088	Very poorly sorted shelly, sandy greyish mud. Complete and broken shells, gastropods, shells cream coloured with dark staining.	M.bk.Sh.S		gy
PS_ENT_52	Pelorus Sound entrance mouth Forsyth Bay	-40.9628	174.0214	21/07/2020	0:40	43	243	1050092, 1050093, 1050094	Dark grey shelly sticky mud, slightly firm in places, whole and broken shells, infauna.	M.bk.Sh	sy sf	dk gn gy
PS_ENT_53	Pelorus Sound -Forsyth Bay entrance	-40.9656	174.0303	19/07/2020		18		1050026, 1050027	Shelly, poorly sorted grey med-coarse sand, biogenic carbonate, silty fines, brittle stars, cone shells, scallop shell, gastropods.	cS.Sh.St		gy
PS_ENT_REEF	Pelorus Sound entrance west	-40.9257	170.0278	19/07/2020	23:10	24	195	1050047, 1050048, 1050049, 1050050, 1050051, 1050052, 1050053	Shelly, sandy, muddy, very poorly sorted biogenic gravel, bored and abraded shells, brachiopods (live), sponges.	M.G.bk.Sh.S	ca	gn gy
TI_108	Penzance Bay, Tennyson Inlet	-41.0865	173.7702	1/08/2020	2:00	15		1050307, 1050308	Greenish-grey, very soft, quite sticky mud. Worm.	M	sy so	gn gy
TI_109	Tennyson Inlet	-41.1088	173.7832	1/08/2020	2:16	12		1050309, 1050310	Greenish-grey, shelly sandy, sticky mud.	M	sy	gn gy
TI_110	Tennyson Inlet	-41.0449	173.7973	1/08/2020		34		1050305, 1050306	Greenish-grey, very slightly shelly sandy, soft, sticky mud.	M.bk.Sh.S	sy so	gn gy
TI_84	Tennyson Inlet	-41.0838	173.7858	29/07/2020	23:27	26	223	1050257, 1050258	Greenish-grey, very soft, sticky mud, couple of shell fragments.	M	sy so	gn gy
TI_85	Tennyson Inlet	-41.0615	173.8112	30/07/2020	0:07	30	14	1050261, 1050262	Greenish-grey, slightly shelly mud, very soft, sticky greenish.	M.bk.Sh	sy so	gn gy
TI_86	Tennyson Inlet	-41.0558	173.7917	29/07/2020	23:09	26	255	1050255, 1050256	Greenish-grey, slightly shelly, very soft and sloppy mud.	M.bk.Sh	so	gn gy
TI_ISL_REE	Tennyson Inlet	-41.0503	173.8105	1/08/2020	1:18	26		1050303, 1050304	Olive-grey, shelly coarse sandy, sticky mud.	M.cS.bk.Sh	sy	gn gy
TI_REEF	Tennyson Inlet	-41.0888	173.8021	29/07/2020	23:51	14		1050259, 1050260	Greenish-grey, firm, sandy-shelly mud.	M.S.bk.Sh	sf	gn gy

Site ID	Location	Latitude °E	Longitude °S	Date UTC	Time UTC	Depth m	Vessel heading Deg	Photo number	Description	IHO Section-J seabed	IHO Section-J qualifying term	IHO Section-J supplementary
TR_101	Tawhitinui Reach	-41.0456	173.9519	31/07/2020	0:07	46	60	1050281, 1050282	Greenish-grey, shelly (30%), sticky, soft mud, 2 crabs	M.Sh	sy so	gn gy
TR_102	Tawhitinui Reach	-41.0514	173.9206	30/07/2020	23:20	35	52	1050277, 1050278	Greenish-grey, slightly shelly, soft, sticky mud.	M.Sh	sy so	gn gy
TR_111	Tawhitinui Reach	-41.0416	173.9233	1/08/2020	20:18	62	15	1050311, 1050312	Greenish-grey, firmish, shelly sandy, sticky mud.	M.S.Sh	sy sf	gn gy
TR_112	Tawhitinui Reach east	-41.0559	173.9632	2/08/2020	1:56	56	241	1050313, 1050314	Greenish-grey, shelly, soft, sticky mud. 1 large broken scallop.	M.Sh	sy so	gn gy
TR_80	Tawhitinui Reach	-41.0357	173.8462	26/07/2020	20:51	26	72	1050186, 1050187	Shell hash gravelly mud, valves up to 3cm, pea crabs.	M.G.bk.Sh	ca	gn gy
TR_92	Tawhitinui Reach	-41.0447	173.8956	26/07/2020	23:55	25	51	1050190, 1050191	Greenish-grey, sticky, soft mud, some shell fragments.	M.bk.Sh	sy so	gn gy
TR_96	Tawhitinui Reach	-41.0523	173.9367	30/07/2020	23:41	56		1050279, 1050280	Greenish-grey, shelly (50%), sticky, soft mud.	M.bk.Sh	sy so	gn gy
TR_REEF	Tawhitinui Reach	-41.0301	173.8653	26/07/2020	21:03	27	9	1050188, 1050189	Greenish-grey, slightly shelly mud. Lots of shell fragments.	M.bk.Sh		gn gy
WB_106	Waitata Bay	-40.9687	173.9318	31/07/2020		22	197	1050291, 1050292	Greenish-grey, soft, sticky mud. Couple of shells, worm	M	sy so	gn gy
WB_TRANS	Wynens Bay, Waitata Reach	-40.9653	174.0114	2/08/2020	21:28	19		1050317, 1050318	Greenish-grey, firm, sticky mud. Nest of tubes.	M	sy sf	gn gy
WR_100	Waitata Reach	-40.9767	173.9512	30/07/2020	20:01	59	210	1050269, 1050270	Greenish-grey, slightly shelly, soft, sticky mud.	M.bk.Sh	sy so	gn gy
WR_103	Waitata Reach	-41.0217	173.9210	31/07/2020	23:19	56		1050297, 1050298	Greenish-grey, soft, sticky mud, couple shell fragments, 1 heart urchin.	M.Sh	sy so	gn gy
WR_105	Waitata Reach, Ketu Bay	-40.9823	173.9668	31/07/2020	21:37	64	241	1050289, 1050290	Grey, shelly, coarse sandy mud.	M.cS.bk.Sh		gy
WR_107	Richmond Bay reef	-41.0086	173.9469	31/07/2020	22:57	43		1050295, 1050296	Grey, shelly coarse sandy, soft mud.	M.cS.bk.Sh	so	gy
WR_112	Waitata Reach	-41.0108	173.8793	1/08/2020		26		1050301, 1050302	Greenish-grey, slightly shelly, soft to slightly firm mud. Worm.	M.Sh	sf	gn gy
WR_114	Waitata Reach	-41.0137	173.9107	31/07/2020	23:40	45		1050299, 1050300	Greenish-grey, shelly gravelly, sandy mud.	M.S.G.Sh		gn gy
WR_19	Waitata Reach	-40.9469	173.9616	21/07/2020	3:22	28	358	1050098, 1050099	Grey, soft sticky mud with occasional shell (scallop valve and fragments).	M.Sh	sy so	gy
WR_35	Waitata Reach outer	-40.9541	174.0000	21/07/2020	1:15	71		1050095, 1050096, 1050097	Greenish-grey, shelly, poorly sorted sandy mud. Top layer of soft sandy mud overlying stickier and firmer sandier mud. Shelly material coarse sand-size to whole valves.	M.Sh	sy sf	gn gy
WR_38	Waitata Reach channel	-40.9612	173.9921	23/07/2020	20:40	62	33	1050134, 1050135	Dark grey, poorly sorted slightly sandy, shelly mud. Large shell fragments (scallops), biogenic sand, soft and soupy, infauna.	M.S.Sh	ca so	dk gn gy
WR_39	Waitata Reach channel	-40.9699	173.9789	23/07/2020	21:05	64	52	1050136, 1050137	Dark grey, slightly firm, silty mud. Top layer softer, firmer and more cohesive below, shell fragments rare, infauna (worms).	M.Si	sf	dk gn gy
WR_40	Waitata Reach	-40.9817	173.9619	25/07/2020		72	42	1050174, 1050175	Greenish grey mud, Rare shell fragments. Brittle star.	M		gn gy
WR_77	Waitata Reach	-40.9712	173.9626	25/07/2020		28	34	1050171, 1050172, 1050173	Greenish grey slightly shelly mud. Shell fragments <5mm	M.bk.Sh		gn gy
WR_93	Waitata Reach	-41.0030	173.9046	27/07/2020	0:46	24	52	1050194, 1050195	Greenish-grey, soft, sticky mud, large shell fragments (up to 3cm)	M.bk.Sh	sy so	gn gy

Site ID	Location	Latitude °E	Longitude °S	Date UTC	Time UTC	Depth m	Vessel heading Deg	Photo number	Description	IHO Section-J seabed	IHO Section-J qualifying term	IHO Section-J supplementary
WR_94	Waitata Reach	-41.0119	173.9723	27/07/2020	2:14	24	7	1050196, 1050197	Greenish-grey, soft, sticky mud with broken and complete shells, brittle star.	M.Sh	sy so	gn gy
WR_97	Waitata Reach	-41.0239	173.8683	30/07/2020	21:29	52	226	1050275, 1050276	Greenish-grey, slightly shelly, soft, sticky mud.	M.Sh	sy so	gn gy
WR_98	Waitata Reach	-41.0037	173.8963	30/07/2020	21:04	21	186	1050273, 1050274	Greenish-grey, sticky, shelly-sandy mud.	M.Sh	sy so	gn gy
WR_99	Waitata Reach	-40.9980	173.9253	30/07/2020	20:38	58	185	1050271, 1050272	Greenish-grey, sticky, shelly-sandy mud.	M.Sh	sy so	gn gy
WR_HOLE	Waitata Reach	-40.9840	173.9319	31/07/2020	22:25	35		1050293, 1050294	Gravelly, shelly, sandy mud.	M.S.G.sh		gy

Appendix B Sediment samples provided by DML and iXblue

Supplier	SiteID	Locality	Latitude °E	Longitude °S	Date UTC	Time UTC	Depth m	Vessel heading Deg	Photo no.	Description	Overall grain size	IHO code
DML	SS_003	Waitata Reach	-41.0271	173.9001	16/03/2020	2:42	20		00666, 00667, 00668	Mud, clay, marine organisms	Clayey mud	fM.Cy
DML	SS_004	Hopai Bay	-41.1036	173.9874	16/03/2020	0:03	25		00649, 00650	Grey mud	Clayey mud	fM.Cy
DML	SS_005	Savill Bay	-41.0208	173.7766	18/03/2020	3:49	14		00685, 00686	Sandy grey mud, broken shells	Muddy sand	fS.M.bk.Sh
DML	SS_006	Waiona Bay	-41.0033	173.8778	16/03/2020	4:52	20		00678, 00679	Mud, clay, broken shell, marine organisms	Shelly mud	M.bk.Sh
DML	SS_008	Richmond Bay	-41.0144	173.9838	16/03/2020	4:16	23		00676, 00677	Mud, clay, fine sand, broken shell, marine organisms	Shelly clayey mud	M.Cy.bk.Sh
DML	SS_009	Clova Bay	-41.1049	174.0363	16/03/2020	0:33	17		00655, 00656	Grey mud, broken shell, marine organisms	Shelly mud	M.bk.Sh
DML	SS_010	Ellie Bay	-41.1331	173.9879	15/03/2020	23:27	10		00642, 00644	Grey mud, broken shell, organic matter	Shelly mud	M.bk.Sh
DML	SS_011	Wet Inlet	-41.1429	173.9609	15/03/2020	23:39	10		00645, 00646	Grey mud, broken shell, organic matter	Shelly mud	M.bk.Sh
DML	SS_012	Kauauroa Bay	-41.0383	173.9784	16/03/2020	2:17	20		00662, 00663	Mud, clay, broken shell, marine organisms	Shelly clayey mud	M.Cy.bk.Sh
DML	SS_013	Horseshoe Bay	-41.0309	173.9473	16/03/2020	2:31	20		00664, 00665	Mud, clay, broken shells	Shelly clayey mud	M.Cy.bk.Sh
DML	SS_014	Tawhitinui Reach	-41.0325	173.8907	18/03/2020	2:59	28		00680, 00681	Grey mud, clay, broken shells, marine organisms	Shelly clayey mud	M.Cy.bk.Sh
DML	SS_015	Brightlands Bay	-41.0600	173.8571	15/03/2020	20:09	19		00639, 00640, 00641	Grey mud, broken shell	Shelly mud	M.bk.Sh
DML	SS_017	Cissy Bay	-40.9924	173.8255	18/03/2020	3:31	17		00683, 00684	Sandy grey mud interspersed with broken shells	Shelly clayey mud	fS.M.bk.Sh
DML	SS_018	Beatrix Bay	-41.0246	174.0466	16/03/2020	1:20	24		00659, 00660, 00661	Grey mud, clay, marine organisms	Clayey mud	fM.Cy
DML	SS_019	Waitata Bay	-40.9746	173.9139	16/03/2020	3:58	22		00674, 00675	Mud, clay, broken shell	Shelly clayey mud	M.Cy.bk.Sh
DML	SS_020	Laverique Bay	-41.0506	174.0444	16/03/2020	0:48	17		00657, 00658	Mud, clay, fine sand, broken shells, marine organisms	Shelly clayey mud	M.Cy.bk.Sh
iXblue	G01	French Pass	-40.9284	173.8345	7/02/2020	21:24	20	110	24890	Dark beige, sand (fine to coarse) with mud, rare pebbles and broken shells (0.1-0.5 cm).	Muddy Sand	S.M
iXblue	G02	French Pass	-40.9382	173.8167	7/02/2020	21:48	34	69	24891	Grey, mud with sand, broken shells (<1cm), entire shells (0.2-4cm), presence of living Molluscs.	Sandy Mud	M.S
iXblue	G03	French Pass	-40.9439	173.8145	7/02/2020	22:12	30	72	24893	Beige, fine to medium sand with mud, presence of living Molluscs.	Fine Sand	fS
iXblue	G04	French Pass	-40.9195	173.8446	7/02/2020	21:13	17	59	24882	Beige, broken shells (0.1-2cm) with coarse sand and pebbles (<5%).	Pebble size broken shells	Bk.Sh.S
iXblue	G06	French Pass	-40.9334	173.7995	7/02/2020	22:01	5	52	24892	Light grey, mud with fine sand and entire shells (2-4cm), presence of Corals, Mollusc and sea (furry) Urchins.	Sandy Mud	M.S

Supplier	SiteID	Locality	Latitude °E	Longitude °S	Date UTC	Time UTC	Depth m	Vessel heading Deg	Photo no.	Description	Overall grain size	IHO code
iXblue	G21	Kokowhai Bay	-40.9417	173.9165	7/02/2020	20:20	14	134	24880	Dark Grey, mud with fine sand and broken shells (0.1-1cm) (10-20%), presence of Annelids and sea (furry) Urchins.	Sandy Mud	M.S
iXblue	G22	Hamilton Bay	-40.9881	173.8486	7/02/2020	19:00	14	135	24879	Greenish grey, sand with mud and broken shells (0.1-2cm) (30%).	Muddy Sand	S.M.bk.Sh
iXblue	G23	Admiralty Bay	-40.9336	173.8517	7/02/2020	20:52	20	61	24906	Dark beige, sand with mud, broken shells (0.1-1cm) and entire shells (1cm).	Muddy Sand	S.M
iXblue	G24	Deep Bay	-40.9568	173.8401	7/02/2020	20:38	21	303	24881	Grey beige, sand with mud, broken shells (0.1-1cm) and entire shells (1-4cm), presence of Rhizoms and living Molluscs.	Muddy Sand	S.M.bk.Sh
iXblue	G29	Sunday Bay	-40.9762	174.0545	7/02/2020	5:28	16	19	24878	Greenish grey, fine sand with mud and fine broken shells (<1cm), presence of sea (furry) Urchin.	Silty Clayey Sand	fS.M
iXblue	G30	Ketu Bay	-40.9944	173.9861	7/02/2020	3:03	16	190	24863	Grey, mud with entire shells (2-5cm), presence of Annelids, sea (furry) urchin, Mollusc and rhizoms.	Silty Clay	M
iXblue	G31	Allen Strait	-41.0048	174.0570	7/02/2020	5:08	13	171	24876	Grey Beige, sand (fine to coarse) with mud and broken shells (<2mm) (30%).	Silty Clayey Sand	S.M.bk.Sh
iXblue	G32	Allen Strait	-41.0039	174.0592	7/02/2020	5:13	22	132	24877	Grey orange-beige, sand (fine to coarse) with mud, pebbles, cobbles, entire (1-4cm) and broken shells (<1cm), presence of living Molluscs.	Clayey Silty Sand with Cobbles	S.bk.Sh.M.Co
iXblue	G33	Forsyth Bay	-41.0166	174.0419	7/02/2020	4:51	25	184	24875	Greenish grey, mud with entire shells (2-4cm), broken shells (20%) (0.1cm-2cm) and rare pebbles.	Silty Clay	M.bk.Sh
iXblue	G34	Homestead Bay	-40.9266	173.9635	7/02/2020	3:46	27	193	24866	Grey, mud with rare entire shells (<2cm) and rare pebbles (<2cm).	Silty Clay	M
iXblue	G35	Te Akaroa	-40.9408	174.0040	7/02/2020	4:09	16	295	24870	Subangular cobble.	Cobble	Cb
iXblue	G36	Waihinau Bay	-40.9423	173.9526	7/02/2020	3:27	18	314	24865	Grey, black stain, mud with broken shells (0.1-1cm) (30%) and entire shells (2-10cm), presence of Annelids.	Silty Clay	M.Sh
iXblue	G37	Waihinau Bay	-40.9560	173.9614	7/02/2020	3:17	28	289	24864	Grey, mud with entire Pecten shells (5-10cm) and broken shells (2-5cm), presence of Annelids, sea (furry) Urchin and rhizoms.	Silty Clay	M
iXblue	G38	Harris Bay	-40.9191	174.0178	7/02/2020	4:26	12	333	24871	Grey, mud with entire shells (1-3cm), presence of living Gastropod, rhizoms and brown algae.	Silty Clay	M
iXblue	G39	Te Akaroa	-40.9426	174.0012	7/02/2020	4:03	15	346	24867	Grey, mud with entire Pecten shells (10-15cm), presence of sea (furry) Urchin.	Silty Clay	M
iXblue	G40	Popoure Reach	-41.1012	173.8947	7/02/2020	1:29	27	235	24857	Greenish grey, mud with entire Pecten Shells (5-10cm) and living Mollusc	Silty Clay	M
iXblue	G41	Marys Bay	-41.0867	173.9423	7/02/2020	2:28	16	203	24861	Grey, mud with rare shells and broken shells (2-4cm), presence of Annelids, sea (furry) Urchin, Molluscs.	Silty Clay	M
iXblue	G42	Yncyca Bay	-41.1241	173.9189	7/02/2020	1:11	9	85	24856	Grey, black stain, mud with entire shells (2-4cm), presence of Annelids and plant debris.	Silty Clay	M
iXblue	G43	Penguin Bay	-41.1376	173.8332	6/02/2020	23:56	8	324	24849	Grey, mud, presence of Annelids	Silty Clay	M

Supplier	SiteID	Locality	Latitude °E	Longitude °S	Date UTC	Time UTC	Depth m	Vessel heading Deg	Photo no.	Description	Overall grain size	IHO code
iXblue	G44	Fairy Bay	-41.1234	173.8626	7/02/2020	0:42	18	142	24855	Grey, black stain, mud, presence of Annelids and plant debris.	Silty Clay	M
iXblue	G45	Fairy Bay	-41.1163	173.8528	7/02/2020	0:27	12	322	24852	Grey, black stain, mud with entire Pecten shells (5-15 cm), presence of Annelids and plant debris.	Silty Clay	M
iXblue	G46	Tamuakawawe Bay	-41.0972	173.8635	7/02/2020	1:43	10	180	24858	Grey, mud with fine sand, pebbles (1%), broken shells (2-5cm) and entire shells (<1cm), presence of Annelids and plant debris.	Sandy Silty Clay	M.fs
iXblue	G47	Tamuakawawe Bay	-41.0969	173.8614	7/02/2020	1:49	11	49	24859	Grey, mud with rare broken shells, presence of Annelids, sea (furry) Urchin, rhizoms.	Silty Clay	M
iXblue	G48	Popoure Reach	-41.1474	173.8610	7/02/2020	0:13	28	337	24851	Grey, mud with entire shells (2-4cm), presence of Annelids and sea (furry) Urchins.	Silty Clay	M
iXblue	G49	Wilson Bay	-41.0702	173.9072	7/02/2020	2:12	14	321	24860	Grey, mud with rare broken shell (5-10cm), presence of Annelids and living Mollusc.	Silty Clay	M
iXblue	G50	Backscatter ref. surface	-40.9747	173.9135	8/02/2020	0:40	21	117	24895	Grey, mud with entire shells (1-5cm).	Mud	M

Appendix C NIWA video stations

Site ID	Location	Latitude °E	Longitude °S	Date UTC	Time UTC	Depth m	Vessel heading Deg	Description
AB_7	Admiralty Bay	-40.9876	173.8506	25/07/2020	2:30	30	9	Mud, sand, small shells, burrows, scallops, rounded bounders draped with mud, cobbles, red weed
AB_9_10_11	Admiralty Bay transect	-40.9442	173.8882	24/07/2020	20:50	46	103	Mud, burrows, biological tracks, small fish, gastropods, more shell at AB_9
AB_12	Admiralty Bay central	-40.9382	173.8790	24/07/2020	21:22	44	57	Mud, burrows, biological tracks, occasional small shell fragments, small fish
AB_13	Admiralty Bay central outer	-40.9494	173.8708	24/07/2020	21:50	47	63	Mud, burrows, biological tracks, occasional small shells, small sponges, urchin
AB_14	Admiralty Bay south	-40.9689	173.8578	22/07/2020	1:48	42-46	30	Mud, biological tracks, burrows, small shells, one big burrow with sand at entrance, murky
AB_15	Admiralty Bay northeast	-40.9307	173.8984	24/07/2020	20:21	51	43	Mud, shelly patches(<30cm), biological tracks, scallops, seastar, horse mussels, occasional screw shells, brittle star, cucumber, small sponges
AB_16	Admiralty Bay northwest	-40.9308	173.8608	21/07/2020	23:30	55		Mud, shells, drape over shells, scallops, seastars, burrows, cucumbers, biological tracks, horse mussels
AB_17	Admiralty Bay Karaka Is	-40.9662	173.8685	22/07/2020	2:14	25-20	53	Outcropping rock, angular lithic boulders, silty-sandy drape, scallops, sponges, rock-ridges, blue cod, spotties
AB_18	Admiralty Bay west (MFL433)	-40.9471	173.8497	22/07/2020	2:30	26	45	Shell, mud, coarse sand, muddy drape over seafloor, scallops, kina shells
AB_18_B	Admiralty Bay west (MFL433)	-40.9472	173.8502	22/07/2020	2:45	20	45	Rock rubble, rock-ridges, large boulders, pebbles, silt drape, blue cod, spotties, sponges, cockles, , mussels
AB_Rig	Admiralty Bay north	-40.9332	173.8782	22/07/2020	0:05	41	337	Mud, burrows, flat, rare shells, scallop, brittle stars, small fish
AB_Rig_B	Admiralty Bay north	-40.9333	173.8778	22/07/2020	0:24	43	48	Mud, burrows, small fish, brittle stars, shelly patches, scallops, possible depression?
AS_1	Allen Strait	-40.9969	174.0632	25/07/2020	21:00	41	59	Shell hash gravel, whole valves, sponges, starfish, cockles, lithic pebbles, sandy matrix, outcropping rock
BB_89	Beatrix Bay	-41.0368	174.0331	27/07/2020	20:16	39	56	Mud, small burrows, biological tracks, fish
BB_TEPT	Te Puraka Point Beatrix Bay	-41.0563	174.0131	31/07/2020		10-30		Sand, tubeworms, bryozoans, cobbles, pebbles, urchins, coralline algae, starfish, Coscinasterias, outcropping rock, Lessonia Carpophyllum, increasing sand >15m depth
BB_TEPT_B (repeat)	Te Puraka Point Beatrix Bay	-41.0557	174.0121	31/07/2020		9-30		Repeat of BB_TEPT transect in opposite direction
CB_79	Grant Bay	-41.0685	173.9988	27/07/2020	23:22	28		Mud, small burrows, biological tracks, scallop and shells
CB_79	Crail Bay	-41.0673	174.0003	2/08/2020	2:47	30	118	Muddy, burrows, biological tracks, few small shell fragments, shelly patches and hash. Increasing shell hash approaching reef. At reef: large sponges, rhodoliths, rock, urchins, coralline tube worms. Reef top 12m depth.
CB_87	Crail Bay	-41.1204	173.9693	27/07/2020	21:25	26	219	Mud, lots of scallop shells, burrows, biological tracks, few live scallops
CB_88	Clova Bay	-41.0939	174.0234	27/07/2020	22:13	29		Mud, burrows, biological tracks, mounds, scattered small broken shells
CB_90	Outer Tuhitarata Bay	-41.0564	173.9891	27/07/2020	20:48	33	177	Mud, small burrows, biological tracks, a few shell fragments, brittlestar, scallop

Site ID	Location	Latitude °E	Longitude °S	Date UTC	Time UTC	Depth m	Vessel heading Deg	Description
CB_91	Grant Bay	-41.0842	173.9950	27/07/2020	23:01	30	328	Mud, small burrows, biological tracks, horse mussel
CB_FI1	Crail Bay	-41.1346	173.9658	2/08/2020		8		Rock reef, urchins, leatherjacket, coralline algae, spotties, small molluscs
CB_FI2	Crail Bay	-41.1276	173.9723	3/08/2020	0:20	18	55	Coarse sediment, shell hash, small molluscs, scallops, coralline material, kina, cobbles, starfish, rock reef and cobbles with veneer fo coarse sand
CB_REEF	Crail Bay Whakamawahi Point	-41.0576	173.9717	2/08/2020	2:20	55	265	Mud, shelly patches, Coscinasterias, starfish, small molluscs, few burrows
CB_WU	Waimaru Bay ganet colony	-41.0753	174.0137	31/07/2020	3:21	16-7		Sandy, shell fragments, burrows, small molluscs, green algae (at 11m), pebbles, cobbles and rock at 7m, outcropping rock, sponges, Carpophyllum, urchins
CH_DML_43	Waitata Reach	-40.9898	173.9497	25/07/2020	22:48	53	36	Mud, burrows, biological tracks, small shells, shell fragments
CH_DML_54	Apauau Reach channel	-41.0165	173.8811	23/07/2020	22:24	46	55	Mud, burrows, small shells, biological tracks, rare large shells
CH_DML_55	Tawhitinui Reach	-41.0420	173.8418	23/07/2020	22:50	31	48	Mud, burrows, biological tracks, rare shells, small sticks
CH_DML_56	Popoure Reach channel	-41.0330	173.9219	27/07/2020	0:07	72	18	Mud, broken shell and hash, sponges, screw shells, starfish, cucumbers, fish
CH_DML_57	Popoure Reach channel	-41.0538	173.9552	27/07/2020	2:31	63	341	Mud, scattered shells, shelly patches, starfish, scallops, sponge, algae
DR_DML_5	Dart Rock Tawhitinui Reach	-41.0446	173.8170	23/07/2020	23:30	14	67	Shell hash (incl. whole valves), spotties, cockles, blue cod, outcropping bedrock, white tube worms, starfish, kina, rock ridges and guts
DR_DML_6	Dart Rock Tawhitinui Reach	-41.0450	173.8188	23/07/2020	23:54	28-34	70	Mud, burrows, biological tracks, rare small shells
DR_DML_7	Dart Rock Tawhitinui Reach	-41.0446	173.8173	24/07/2020	0:15	28	79	Outcropping rock, shell hash between boulders, tube worms, cockles, coralline encrustation, blue cod, channel base shelly sand, merging into mud-draped shell hash.
FB_3	French Pass Current Basin, narrows east	-40.9206	173.8432	21/07/2020		21	262	Cobbles, shell hash, coarse sand, strong current, lithic cobbles sub-rounded to angular, bedforms not evident in live footage?
FB_44_A	Eastern Forsyth Bay, Allen Strait	-40.9986	174.0614	18/07/2020	20:25	38	94	Sandy mud, shelly (whole and broken), cobbles
FB_44_B (repeat)	Eastern Forsyth Bay, Allen Strait	-40.9986	174.0614	18/07/2020	20:41	38	97	Gravelly sand, shell hash, cobbles, brittle stars
FB_45	Eastern Forsyth Bay	-40.9958	174.0508	18/07/2020	22:28	46	284	Mud, burrows, holothurians, slightly turbid, patchy epifauna
FB_46	Eastern Forsyth Bay	-40.9917	174.0521	18/07/2020	22:49	47	212	Mud matrix, shell hash, coarse sand, brittle star, gastropods, sponges, Asteroidea
FB_47	Eastern Forsyth Bay	-40.9993	174.0492	18/07/2020	21:37	48	358	Muddy sand matrix, pebbles, shells (whole and hash), brittle stars, cobbles, gastropods
FB_48	Forsyth Bay	-41.0044	174.0253	18/07/2020	23:57	35	200	Mud, burrows, flat, occasional shells, biological tracks, hermit crab
FB_49	Forsyth Bay	-41.0077	174.0437	18/07/2020	23:10	37	297	Mud, burrows, biological tracks, epifauna not obvious, slightly turbid
FB_51	Northwestern Forsyth Bay	-40.9796	174.0251	19/07/2020	0:30	43	185	Mud, burrows, flat, occasional shells, biological tracks
FB_78	Forsyth Bay central	-40.9880	174.0409	25/07/2020	20:15	41	25	Mud, sand, occasional shell, sponges, sponges, brittle star, occasional burrows, scallops, small patches of agglutinated shell
FB_81	Fitzroy Bay	-41.0246	173.8155	26/07/2020	22:10	32	291	Mud, burrows, urchins, biological tracks

Site ID	Location	Latitude °E	Longitude °S	Date UTC	Time UTC	Depth m	Vessel heading Deg	Description
FB_83	Fitzroy Bay	-41.0170	173.7940	29/07/2020	22:38	27	280	Mud, burrows, biological tracks, few shell fragments, barren
FB_Strike_REE_F_1	Western Forsyth Bay	-40.9747	174.0241	19/07/2020	1:47	21-17	185	Outcropping rock, echinoderms, brittle stars holothurians, fish, algae and seaweed, rock ridges and guts, biogenic hash, sandy algal mat in shallows
FB_Strike_REE_F_2	Western Forsyth Bay	-40.9701	174.0227	19/07/2020	2:56	27-10	258	Muddy sand, scallops, brittle stars, shells, burrows, horse mussels, steep rock ridge, blue cod, live shellfish
FITZ_BAY	Fitzroy Bay	-41.0093	173.7879			17		Mud, scattered shell fragments, burrows, Coscinasterias, starfish, scallop shells, horse mussel, scallops
FP_1	French Pass Current Basin	-40.9437	173.8121	30/07/2020	22:30	33	207	Sand, slightly shelly, small burrows, scallops, starfish, biological tracks, large sponge, no ripples
FP_2	French Pass Current Basin	-40.9497	173.7860	21/07/2020	21:07	17	71	Sandy, ripples (10-15cm wavelength), screw shells, gastropods, horse mussels, scallops, occasional weed, lighter and darker ribbons from crest to trough
FP_4	French Pass Current Basin, narrows west	-40.9228	173.8291	21/07/2020	20:15	72-49	85	Rounded boulders and lithic cobbles over outcropping bedrock (?greywacke), blue cod, thick boulder sheets, rock ledges and ridges
FP_6	French Pass Current Basin, narrows	-40.9336	173.8245	21/07/2020	22:31	41-50	243	Very shelly, hash covering seafloor (matrix not visible), cockles, screw shells, blue cod, brittle stars, scallops, sea stars, moderate current
FP_7	French Pass Current Basin	-40.9387	173.8091	21/07/2020	22:00	36	248	Shells, mud, sand, fines blanket shells, scallops, gastropods, screw shells, sea cucumbers, shell fragments, blue cod, burrows, biological tracks, starfish, stained cockles
FP_8	French Pass Current Basin	-40.9530	173.7951	21/07/2020	21:29	29	68	Shelly, sandy, lots of screw shells, shell fragments, chlamys, horse mussels, echinoderms, no fines blanketing shells
HC_82	Hallam Cove	-41.0073	173.8145	21/07/2020	20:35	28	64	Mud, scattered burrows, biological tracks, few small snails, horse mussel
KB_41	Ketu Bay	-40.9844	173.9788	29/07/2020	22:20	14	81	Mud, shelly patches, algal mats, shell mounds, scallop fragments, live scallops, small gastropods, small white shells
KB_42	Ketu Bay	-40.9892	173.9902	23/07/2020	21:40	20	330	Mud, algae, burrows, biological tracks, small shells, seastar
KB_95	Kauauroa Bay	-41.0426	173.9771	23/07/2020	21:20	27	311	Mud, small burrows, biological tracks, sparse shell fragments, starfish, scallops
MFL119	Popoure Reach	-41.1348	173.8871	27/07/2020	19:44		240	Mussel farm video, new mussel lines
MFL238	Port Ligar	-40.9417	173.9735	25/07/2020				Marine farm blue-mussel lines
MFL433	Admiralty Bay	-40.9462	173.8474	25/07/2020	1:47	25	166	Shell hash (mussels) overlying mud, occasional scallops, starfish, kina. At reef extension: tube worms, spotties, blue cod, cockles, thick shell hash (mussel) bank in rock gut, coarse biogenic sand, big sponges on outcropping rock, seastars
MI_REEF	Maud Island	-41.0318	173.9150	1/08/2020	23:52	34	158	Shell hash and coarse sand, starfish, outcropping rock reef and cobbles, blue cod, sponges. On reef: coralline algae on rocks, lots of sponges, anemones, leatherjackets, increasing coarse sand between cobbles
OB_50	Orchard Bay	-40.9595	174.0566	20/07/2020	1:02	32	60	Mud, burrows, biological tracks, small shells (rare)
OBST	Popoure Reach	-41.1322	173.9231	26/07/2020	1:15	19	21	Mud, burrows, biological tracks, algae patches, shell fragments, screw shells, scallops, shell clusters

Site ID	Location	Latitude °E	Longitude °S	Date UTC	Time UTC	Depth m	Vessel heading Deg	Description
PL_115	Port Ligar Te Kopi Bay	-40.9126	173.9847	31/07/2020	20:15	36	333	Mud, burrows, biological tracks, starfish, pretty barren
PL_32	Port Ligar west	-40.9328	173.9745	20/07/2020	21:40	38	41	Mud, biological tracks, occasional shells, small fish, small burrows
PL_33	Port Ligar	-40.9314	173.9851	20/07/2020	21:07	32	246	Mud, burrows, very small shells, biological tracks, small fish
PL_34	Port Ligar entrance	-40.9517	173.9839	23/07/2020	19:53	33	39	Mud, slightly shelly, burrows, sponges, patches of small shell hash, scallops, murky
PL_EAST	Port Ligar east	-40.9262	173.9889	1/08/2020	22:54	28	303	Mud drape on shelly hash, sandy patches with biological tracks, screw shells, kina, cobbles with coralline algae. At reef: outcropping rock with less fine drape, large rocks, cobbles, spotties, sponges. At top (9m): cobbles and sediment, blue cod, , tube worms, barnacles. Transect deep to shallow
PL_POCK_1	Port Ligar east	-40.9308	173.9924	20/07/2020	20:30	43-41	8	Mud, biological tracks, burrows, human rubbish, small shells
PL_POCK_2	Port Ligar east	-40.9311	173.9860	20/07/2020	20:59	35-32	285	Mud, burrows, biological tracks, very small shells, scallop, algae
PL_REEF	Port Ligar southern headland reef	-40.9536	173.9741	21/07/2020	3:34	50-6-20	282	Start: muddy, shelly patches, scallops, burrows, sponge, some current. Base of slope shell rubble and hash, sponges, seaweed. Rise: shell hash, scallops, cockles, algae, kina. Top: Outcropping rock, blue cod, smaller rubble
PL_REEF_B	Port Ligar Keep Clear Rock	-40.9528	173.9712	21/07/2020	4:10	11-6	342	Slope: shell hash with finer matrix, rocks, boulders, brittle stars, kina, anemone, starfish, seaweed, big sponges, piles of rubble on crest, outcropping rock ridges and deep rock-gut, lots of fish, possible remains of wreck (on chart)
PL_WEST	Port Ligar west	-40.9240	173.9750	1/08/2020	22:28	30	349	Mud, shell fragments, biological tracks, screw shells, shell hash, small molluscs, cobbles with coralline algae, kina, outcropping rock reef at 11m depth
PR_58	Popoure Reach upper	-41.1251	173.9055	29/07/2020	3:33	34	284	Mud, small shell fragments, burrows, biological tracks, seastars, horse mussel, small rocks
PR_59	Popoure Reach	-41.1317	173.8803	25/07/2020	23:20	47	40	Mud, burrows, clusters of shells, brittle stars, sponges, scallops, occasional small shells and fragments
PR_60	Popoure Reach upper	-41.1353	173.8502	29/07/2020	1:28	29	89	Mud, shell hash, scallop valves, burrows, biological tracks, sponges, gurnard, live scallops
PR_61	Popoure Reach upper	-41.1336	173.8561	29/07/2020	1:49	38	68	Mud, scallop shells, biological tracks, bryozoans, sponges, starfish, woody debris, ulva
PR_62	Popoure Reach upper	-41.1364	173.8693	29/07/2020	2:43	39	40	Mud, shell hash, scallop valves, biscuit stars, small mollusc, brittle stars
PR_63	Nydia Bay	-41.1563	173.8238	29/07/2020	1:09	8	57	Mud, burrows, biological tracks, seaweed, starfish, Gigartina algae?, murky
PR_64	Popoure Reach upper	-41.1254	173.8789	29/07/2020	3:05	50	57	Mud, shell hash, sponges, shell hash, biscuit stars, small molluscs, horse mussels, scallops
PR_65	Popoure Reach upper	-41.1199	173.8966	29/07/2020	3:51	46	354	Mud, scattered shelly patches, sponges, small molluscs
PR_66	Popoure Reach	-41.0726	173.9627	22/07/2020	20:16	38	278	Mud, scallops, burrows, fish, small shark, fish, small undulations, occasional small shells
PR_67	Popoure Reach upper channel	-41.0725	173.9531	30/07/2020	2:24	54	40	Mud, shelly patches, sponges, brittle stars, shell hash, small molluscs, few scallops
PR_68	Popoure Reach	-41.0753	173.9216	24/07/2020	3:20	30	227	Mud, burrows, rare shell, small weeds

Site ID	Location	Latitude °E	Longitude °S	Date UTC	Time UTC	Depth m	Vessel heading Deg	Description
PR_69	Popoure Reach upper	-41.1033	173.9213	30/07/2020	3:04	20	343	Mud, burrows, biological tracks, Coscinasterias, shelly patches, scallops, sponges, horse mussels
PR_70	Popoure Reach	-41.0950	173.9065	27/07/2020	4:02	50	120	Mud, shelly patches, shell hash, scallops, biscuit stars, sponges, cucumbers
PR_71	Tiraora Bay	-41.0904	173.8769	28/07/2020	1:31	15	261	Mud, burrows, biological tracks, spare broken shell, small mounds, columella shells, yellowish drape?
PR_72	Miro Bay	-41.0817	173.8877	28/07/2020	1:19	15	172	Mud, burrows, biological tracks, sparse broken shell
PR_73	Popoure Reach channel	-41.0877	173.9193	24/07/2020	3:32	49	231	Mud, shelly accumulations (20cm across), burrows, biological tracks, scallops, current scour, tube worms, cucumber
PR_74	Popoure Reach	-41.1307	173.8767	26/07/2020	1:40	49	49	Mud, shell clusters, sponges, biological tracks, scallops
PR_75	Popoure Reach	-41.0636	173.9534	27/07/2020	23:50	58	336	Shell hash, scallops, sea cucumber, whole valves and fragments, starfish, brittle stars
PR_76	Popoure Reach upper channel	-41.0769	173.9444	30/07/2020	2:44	50	57	Mud, shelly patches, biological tracks, small molluscs, sponges, brittle stars, couple scallops
PR_F1	Popoure Reach	-41.0702	173.9590	3/08/2020	0:50	46	285	Mud, shelly patches and fragments, burrows, biological tracks, small molluscs, sponges, brittle stars
PR_F2	Popoure Reach	-41.0758	173.9559	3/08/2020	1:08	48	282	Mud, burrows, biological tracks, shelly patches, small molluscs, starfish, shell fragments
PR_F3	Popoure Reach	-41.0791	173.9489	3/08/2020	1:34	48	255	Mud, shelly patches, small molluscs, burrows, biological tracks, sponges, scallops
PR_F4	Popoure Reach	-41.0797	173.9408	3/08/2020	1:56	51	251	Mud, shelly patches and fragments, small molluscs, small burrows, biological tracks, sponges, anemones
PR_F5	Popoure Reach	-41.0823	173.9263	3/08/2020	2:18	55	224	Mud, shelly patches, small burrows, biological tracks, small molluscs, starfish, sponges, scallops
PR_F6	Popoure Reach	-41.0902	173.9125	3/08/2020	2:42	54	240	Mud, shelly patches, small burrows, biological tracks, small molluscs, starfish, sponges, scallops
PS_ENT_104	Duffers Reef Orchard Bay	-40.9550	174.0331	31/07/2020		80	209	Mud, shell hash, brittle stars, starfish, biological tracks, scallops, screw shells
PS_ENT_20	Pelorus entrance east	-40.9284	174.0689	19/07/2020	20:01	100	56	Sandy mud, shelly gravel armouring, biogenic carbonate, brittle stars, gastropods, horse mussels, chlamys
PS_ENT_21	Pelorus entrance	-40.9236	174.0489	19/07/2020	20:40	96	88	Sandy mud, shell hash armouring, gastropods, starfish, brittle stars, shark, horse mussel, sea perch
PS_ENT_21	Pelorus entrance southeast	-40.9492	174.0507	20/07/2020	1:28	24-11	154	Mud, lots of screw shells orientated to flow, scallops, brittle stars, horse mussels, echinoderms, algae and seaweed in shallows
PS_ENT_22	Pelorus entrance northwest	-40.9124	174.0369	19/07/2020	21:35	95	113	Shelly gravel, sandy matrix (sandier than PS_ENT_20 & 21?) brittle stars, gastropods, shell bored and abraded, seastars, bivalve-rich
PS_ENT_23	Pelorus entrance west	-40.9185	174.0223	19/07/2020	22:00	19	200	Mud, burrows, algal mats, occasional shells, biological tracks, seaweed, live scallops
PS_ENT_24	Pelorus entrance west	-40.9257	174.0325	19/07/2020	23:33	70	209	Mud, scallops, small shell fragments, biological tracks, burrows, brittle stars
PS_ENT_25	Pelorus entrance west channel	-40.9298	174.0334	20/07/2020	3:36	60	351	Mud, burrows, biological tracks, small shell patches, starfish, scallops

Site ID	Location	Latitude °E	Longitude °S	Date UTC	Time UTC	Depth m	Vessel heading Deg	Description
PS_ENT_26	Central shoal Pelorus entrance	-40.9382	174.0376	20/07/2020	3:02	37	11	Mud, burrows, rare shells, biological tracks, brittle stars
PS_ENT_27	Pelorus entrance east channel	-40.9468	174.0497	20/07/2020	2:05	56	164	Muddy sand, shelly, scallops, gastropods, high biogenic carbonate, brittle stars, holothurians
PS_ENT_28	Pelorus entrance west	-40.9391	174.0171	20/07/2020	22:30	75	26	Sandy, mud, shelly, gastropods, cockles, shell fragments, strong current
PS_ENT_29	Pelorus entrance central shoal	-40.9505	174.0268	20/07/2020	23:47	36	231	Sandy mud, scallops, burrows, occasional small shells, algae, murky, strong tide
PS_ENT_30	Pelorus entrance east channel	-40.9427	174.0470	20/07/2020	2:30	47-49	170	Mud, patchy shells and sponges, burrows, scallops, gastropods, brittle stars
PS_ENT_36	Pelorus entrance west	-40.9334	174.0226	20/07/2020	22:04	80	38	Fine sand, patchy shells, brittle stars, small burrows, biological tracks
PS_ENT_37	Pelorus entrance channel southwest	-40.9470	174.0131	20/07/2020	23:15	95	229	Patchy shell hash, muddy, cockles, scallops, crab, gastropods brittle stars
PS_ENT_52	Pelorus entrance mouth Forsyth Bay	-40.9628	174.0214	21/07/2020	0:29	43	243	Mud, seaweed, occasional burrows, small shells, biological tracks, horsecrab mussel
PS_ENT_53	Pelorus-Forsyth entrance	-40.9656	174.0303	19/07/2020		18		Muddy sand, shelly, scallops, biological tracks, algal mats?
PS_ENT_REEF	Pelorus entrance west	-40.9254	170.0279	19/07/2020	22:47	32-21-28	205	Shelly, muddy matrix, juvenile blue cod, scallops, rocky, rock ridge, fish, sponges, carbonate sand, angular cobbles and boulders
RIG_ANC_1	Admiralty Bay central	-40.9357	173.8809	24/07/2020	22:40	47	15	Mud, burrows, scallops, biological tracks, small dimples (<10cm), small fish, occasional small molluscs
RIG_ANC_2	Admiralty Bay central	-40.9313	173.8801	24/07/2020	22:50	42	122	Mud, burrows, biological tracks, lots of small shells
TI_108	Penzance Bay Tennyson Inlet	-41.0865	173.7702	1/08/2020	1:50	15	281	Mud, burrows, few shell fragments, mooring block
TI_109	Tennyson Inlet	-41.1088	173.7832	1/08/2020	2:09	12	171	Mud, burrows, biological tracks, starfish, some shell fragments
TI_110	Tennyson Inlet	-41.0449	173.7974	1/08/2020	1:24	34	234	Mud, few burrows, biological tracks, shelly patches, murky
TI_84	Tennyson Inlet	-41.0838	173.7858	29/07/2020	23:20	26	223	Mud, burrows, biological tracks, shell fragments, horse mussel
TI_85	Tennyson Inlet	-41.0615	173.8112	29/07/2020	23:58	30	14	Mud, few burrows, biological tracks, barren
TI_86	Tennyson Inlet	-41.0558	173.7918	29/07/2020	23:01	26	255	Mud, burrows, lots of biological tracks, barren
TI_ISL_REE	Tennyson Inlet	-41.0503	173.8106	1/08/2020	1:10	26	222	Mud, mounds, burrows, shell hash blanketed by fine sediment, 2 x Coscinasterias
TI_REEF	Tennyson Inlet	-41.0893	173.8014	29/07/2020	23:20	14-9		Mud, burrows, biological tracks, small molluscs, shell, cobbles with coralline algae, starfish, faecal material, ?tubeworms, Coscinasterias. Transect from deep-shallow-deep
TI_Rock	Tennyson Inlet	-41.0443	173.8178	30/07/2020	21:50	3.5	252	Outcropping rock reef, fish, urchins, small molluscs, pebbles and cobbles, small spotties, Coscinasterias
TR_101	Tawhitinui Reach	-41.0457	173.9516	30/07/2020	23:56	47	60	Mud, burrows, biological tracks, shelly patches, sponges, scallops
TR_102	Tawhitinui Reach	-41.0514	173.9206	30/07/2020	23:12	35	52	Mud, burrows, biological tracks, some scattered shell fragments, shelly patches, sponges, scallops
TR_111	Tawhitinui Reach	-41.0416	173.9233	1/08/2020	20:08	62	15	Mud, shelly patches, sponges, hermit crabs, burrows, biological tracks

Site ID	Location	Latitude °E	Longitude °S	Date UTC	Time UTC	Depth m	Vessel heading Deg	Description
TR_112	Tawhitinui Reach east	-41.0559	173.9632	2/08/2020	1:47	56	241	Mud, burrows, biological tracks, shelly patches, scallop shells, few sponges, barracuda
TR_80	Tawhitinui Reach	-41.0357	173.8462	26/07/2020	20:35	26	72	Shell hash on mud, whole shells and fragments, screw shells, carpet shark, scallops, cucumber
TR_92	Tawhitinui Reach	-41.0448	173.8955	26/07/2020	23:44	24	51	Mud, scallops, burrows, biological tracks
TR_96	Tawhitinui Reach	-41.0523	173.9367	30/07/2020	23:32	56		Mud, burrows, biological tracks, shelly patches, small molluscs
TR_HEAD	Tawhitinui Reach headland	-41.0424	173.9369	31/07/2020	0:18	49		Shell hash, brittle stars, sponges, starfish, Coscinasterias, patches of finer shell hash, cobbles, urchins, outcropping rock, algae, coralline algae on rock
TR_REEF	Tawhitinui Reach	-41.0300	173.8652	26/07/2020	22:51	27	9	Mud, shell hash, sponge, sparse pebbles, fish. Brittle stars, scallops, starfish
WB_106	Waitata Bay	-40.9687	173.9318	31/07/2020	21:52	22	197	Mud, scallops, burrows, biological tracks, starfish, sponges, fan worm
WB_PT_TRANS	Kaitera Waitata Reach	-40.9633	174.0134	2/08/2020	21:40	49-7	137	Coarse sand and pebbles, shell hash, cobbles and rocks at 43m, sponges, outcropping rock reef through shell hash, large sponges, starfish, coralline, sandy between rocks, kina, tubeworms (18m depth), Carpophyllum at 7m depth
WB_TRANS	Wynens Bay Waitata Reach	-40.9657	174.0125	2/08/2020	21:11	19	302	Muddy, cobbles, coarse sand, coralline material, Coscinasterias, kina, small molluscs, brittle stars, rhodoliths. From 27m depth no cobbles, burrows, biological tracks, scallops
WR_100	Waitata Reach	-40.9767	173.9512	30/07/2020	19:42	59	210	Mud, burrows, biological tracks, shelly patches, scallops, barracuda, sponges, scattered shell fragments
WR_103	Waitata Reach	-41.0217	173.9211	31/07/2020	23:09	56	178	Mud, burrows, biological tracks, shelly patches, scallops, scattered shell fragments, sponges
WR_105	Waitata Reach Ketu Bay	-40.9822	173.9668	31/07/2020	21:26	62	214	Sandy, muddy, shell fragments, starfish, brittle stars, screw shells, shelly patches
WR_107	Richmond Bay reef	-41.0086	173.9469	31/07/2020	22:40	43	213	Mud, shelly patches, brittle stars, shell fragments and whole valves, drift algae, scallops, biological tracks
WR_112	Waitata Reach	-41.0107	173.8793	31/07/2020	23:53	26	212	Mud, shelly patches, sponges, burrows, biological tracks
WR_114	Waitata Reach	-41.0137	173.9107	31/07/2020	23:32	45	238	Mud, burrows, biological tracks, scallops, some shell fragments, brittle stars, scattered shelly patches
WR_19	Waitata Reach	-40.9469	173.9617	21/07/2020	3:10	28	358	Mud, small burrows, scallops, biological tracks, occasional small white shells
WR_35	Waitata Reach outer	-40.9541	173.9998	21/07/2020	1:03	71		Muddy, undulating, shell patches, small burrows, brittle stars, scallops, sponges, biological tracks, gastropods, horse mussels
WR_38	Waitata Reach channel	-40.9612	173.9921	23/07/2020	20:28	62	33	Mud, shelly patches, sand-sized shell hash, scallops, burrows, cockles, brittle star, fish
WR_39	Waitata Reach channel	-40.9699	173.9788	23/07/2020	20:52	64	52	Mud, shelly patches, burrows, octopus, occasional screw shells, scallops, slightly hummocky?, murky
WR_40	Waitata Reach	-40.9789	173.9619	25/07/2020	21:53	72	42	Mud, burrows, scallops, very small shell fragments
WR_77	Waitata Reach	-40.9713	173.9625	25/07/2020	21:30	27	34	Mud, shell fragments, burrows, horse mussels, scallops
WR_93	Waitata Reach	-41.0029	173.9047	27/07/2020	0:37	24	52	Mud, burrows, biological tracks, shell fragments, ?algae, starfish, sponge, whole shells, scallops, carpet shark

Site ID	Location	Latitude °E	Longitude °S	Date UTC	Time UTC	Depth m	Vessel heading Deg	Description
WR_94	Waitata Reach	-41.0119	173.9723	27/07/2020	2:05	24	7	Mud, burrows, biological tracks, few shells, starfish
WR_97	Waitata Reach	-41.0238	173.8683	30/07/2020	21:19	52	226	Mud, burrows, biological tracks, scallops, small molluscs
WR_98	Waitata Reach	-41.0037	173.8963	30/07/2020	20:57	21	186	Mud, shelly patches, sponges, small molluscs, horse mussels, biological tracks, Coscinasterias
WR_99	Waitata Reach	-40.9979	173.8919	30/07/2020	20:28	58	185	Mud, burrows, biological tracks, shelly patches, sponges, scallops, starfish
WR_HOLE	Waitata Reach	-40.9840	173.9319	31/07/2020	22:12	35		Shell hash, mud, brittle stars, sponges, small molluscs, scallop shells
Wreck	Popoure Reach	-41.0871	173.9265	24/07/2020	2:15	49	235	Mud, burrows, weed, occasional shell. At target: lots of shells, elevated surface, heavily encrusted vertical structures, shell hash, large rounded boulders (ballast stones?)
Wreck_B	Popoure Reach	-41.0871	173.9264	24/07/2020	2:28	49	234	Mud, scallop shells, horse mussels, mud drape. At target: hummocky seafloor and change in seabed character
Wreck_C	Popoure Reach	-41.0871	173.9265	24/07/2020	2:44	48	231	Mud, burrows, rare shell, small weeds, scallops, brittle stars. At target: rounded boulders (ballast stones?), some structures
Wreck_D	Popoure Reach	-41.0873	173.9260	27/07/2020	2:58	50	57	Transect 1 NE-SW
Wreck_E	Popoure Reach	-41.0873	173.9260	27/07/2020	2:58	50	57	Transect 2 SSE-NNW
Wreck_F	Popoure Reach	-41.0873	173.9260	27/07/2020	2:58	50	57	Transect 3 NNW-SSE