Benthic community analysis to support the development of the Coastal and Marine Ecological Classification Standard (CMECS) for Deep Reefs (30-100 m) in the Hauraki Gulf

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June 2024

A report prepared for the Department of Conservation under contract NOF-BIO386

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Executive summary

Temperate mesophotic ecosystems (TMEs) are found all around the coast of New Zealand, typically between 30 to 150 m, at the limit of light for photosynthesis. Despite the widespread occurrence of TMEs in New Zealand, little is known about their distribution patterns, biodiversity, and ecological significance, which currently limits our ability to effectively manage these ecosystems. The primary aim of this project was to collect abundance data of the benthic communities from deep rocky reefs (30-100 m) in the Hauraki Gulf region using a remotely operated vehicle (ROV). This abundance data was then used in combination with information on geoform and substrate type to delineate biotopes using the Coastal and Marine Ecological Classification Standard (CMECS). We conducted 28 ROV drops in February 2024 and analysed frame grabs from 13 of the videos we obtained. We generally found that sponges, biological matrix, crustose coralline algae, and macroalgae (at transition zones between TMEs and shallower photic ecosystems) were the dominant biotic components of the communities we observed. Using multivariate analysis, we were able to show that the biological communities at all 13 sites were significantly different from each other, although this was not surprising given that the 13 sites were selected to encompass as wide a range of deep reef communities as possible. Using the biological data and information on geoform (either platform or rock outcrop) and substrate (either bedrock or boulder as the primary substrate and various mixes of sandy gravel as secondary substrates), we defined 12 biotopes from the 13 ROV drops. The descriptions of the biotopes can be found in an accompanying document. We also describe the issues we had in applying CMECS to deep reefs, providing considerations for similar work in the future.

1.0 Introduction

1.1 Temperate Mesophotic Ecosystems (TMEs)

Temperate Mesophotic Ecosystems (TMEs) occur throughout the world, at the limit of light availability for photosynthesis (Cerrano et al. 2019; Turner et al. 2019). A range of depths and environmental conditions have been used to describe mesophotic ecosystems (e.g. Micaroni et al. 2021), but recently Cerrano et al. (2019) provided an unambiguous definition based on light attenuation. At its upper limit, the mesophotic zone receives ~ 1% of surface irradiance, and extends to the deepest extent of benthic primary producers. This zone has typically been reported to fall within a depth range of ~30 – 150 m, although animal-dominated systems more typical of mesophotic communities can occur in shallower water depending on local environmental conditions (e.g. Micaroni et al. 2021).

Decreased light availability with depth is thought to be the primary environmental driver characterising the ecology of mesophotic zones in temperate systems (Bell et al. 2024 a), although this has not been empirically tested. Decreased light with depth generates a reduction in, and eventually, the exclusion of algae and other photosynthetic organisms (Lesser et al. 2009), changing competitive pressures on benthic fauna. The ecological dynamics of TMEs, therefore, are increasingly determined by the community composition and relative abundance of the benthic invertebrate fauna, which typically includes sponges, bryozoans, ascidians, and cnidarians. The upper-extent of TMEs is likely to be highly location-specific, because of interactions between light, turbidity, and depth.

Mesophotic ecosystems in coastal regions have received very little attention when compared to shallower macroalgal-dominated (infralittoral) zones (Bell et al. 2024 a). Furthermore, most of our understanding of mesophotic habitats is derived from tropical mesophotic coral ecosystems (MCEs) (e.g. Lesser et al. 2009; Kahng et al. 2014), while TMEs have been largely overlooked, and only recently formally recognised (Cerrano et al. 2019; Turner, 2019; Bell et al. 2024 a). Given the extensive benthic habitat that TMEs encompass, and their likely connectivity with shallow habitats, the lack of research effort afforded to TMEs imposes significant limitations on our holistic understanding of coastal benthic ecosystems generally.

With recent advancements in remotely operated vehicle (ROV) technology, the exploration of TMEs is becoming much easier and more economically viable. Small, low-cost ROVs can be deployed from small vessels by a single user and have been shown to be capable of generating species distribution and abundance data of comparable quality to those gathered using SCUBA (Boavida et al. 2016; Harris et al. 2021). This has also been demonstrated by other projects carried out in New Zealand by the Bell

research group (see Harris et al. 2021; Bell et al. 2024 b). This advancement in technology provides an opportunity for non-commercial groups to explore and determine the community composition of TMEs at relatively low cost.

1.2 Introduction to the Coastal and Marine Ecological Classification Standard (CMECS)

Marine habitat classification systems, such as the Coastal and Marine Ecological Classification Standard (CMECS) aim to categorise habitat types based on geological, substrate and biological factors with a goal of creating a standardised language for effectively managing and sharing habitat information (McDougall et al. 2007). Accurate descriptions of marine habitats are important for effective marine management (Carollo et al. 2013; Baker and Harris 2012) and the demand for habitat classification by environmental managers is increasing (FDGC 2012). Ecosystem-based management relies on characterising and classifying habitat features to assess their ecological status and vulnerability to anthropogenic changes (Legare and Mace 2017; Zare et al. 2017; Ansari et al., 2014). However, this task is challenging due to marine habitat complexity and temporal dynamics, leading to variations in descriptions based on resolution and data collection methods (Legare et al. 2020; Sköld et al., 2018; Diaz et al., 2004).

CMECS is a comprehensive framework designed to classify and organise marine and coastal environments for US ecosystems based on abiotic and ecological characteristics (Figure 1). Developed by the National Oceanic and Atmospheric Administration (NOAA) in collaboration with other federal agencies, academic institutions, and non-governmental organizations, CMECS serves as a unified system for understanding and managing coastal and marine ecosystems. With the introduction of the CMECS endorsed by the Federal Geographic Data Committee (FGDC) in 2012, the United States adopted this national standard for marine habitat classification, which was created with information from over 40 coastal and 20 marine habitats (Madden et al., 2008). While the broader systems within aquatic settings were initially derived from the Classification of Wetlands and Deepwater Habitats in the United States, FGDC-STD-004 (FGDC, 1996), CMECS redefined these systems to better suit the requirements of a standard specifically designed for marine environments (FGDC, 2012).

CMECS studies within marine systems, encompassing all estuarine waters from coastlines to central oceans, have generated many maps delineating the geological, biological, and environmental aspects of habitats, enabling the identification of sensitive and environmentally stressed areas (Madden et al. 2009). CMECS is primarily utilized in coastal and marine environments across different scales including but not limited to:

1. Coastal regions and transitional zones (intertidal): These encompass areas such as beaches, rocky shores, coastal wetlands, and estuaries such as for the Columbia and Oregon rivers (Keefer et al., 2008). Transitional zones include areas where freshwater meets saltwater, such as mangrove forests and tidal marshes (Sköld et al., 2018; Aghajanpour et al., 2015).

2. Marine environments (subtidal – shallow seas): Habitat mapping has been undertaken in various shallow subtidal environments across the United States, shallower than around 45 m, including nearshore shallow areas and the open ocean. These studies also include bays and gulfs such as for Cape Cod Bay (Mittermyer et al., 2020), Florida Bay (Madden and Goodin, 2007), and San Francisco Bay (Office for Coastal Management, 2024), as well as the Gulf of Mexico (Allee et al., 2014) and Gulf Islands (Lavoie, 2014). Researchers have also applied CMECS to nearshore island ecosystems, including Rhode Island, Fire Island, and Channel Island (Guarinello et al., 2010; Shumchenia et al., 2010; Sayre et al., 2021), All these studies span sub-tropical, temperate, to arctic regions and extend from the Atlantic to the Pacific Oceans (Field et al., 2020; Hodson et al., 2013). However, while data is available at various depth ranges, primary descriptions typically focus on depths ranging from 10 to 45 meters, with very limited attention to mesophotic depths (see Bell et al., 2024 a for discussion of this issue).
3. Marine environments (subtidal - deep sea): while deep-sea benthic surveys have utilised the CMECS successfully for continental shelves and deep-sea habitats, these have mainly been used to map geomorphic components of coral mounds, seamounts, and continental platforms at depths ranging from 500 to over 1000 m (Cochrane et al., 2022; Sowers et al., 2020a; Sowers et al., 2020b; Basset et al., 2017; Cochrane, 2017; Conley et al., 2017; Trusel et al., 2010).

Most of these CMECS subtidal studies have been primarily conducted for resource management and baseline characterisation efforts, as well as for ecosystem service assessments (e.g. Mittermayr et al., 2020a; Menza et al., 2019; Ozmon, 2018; LaFrance Bartley et al., 2018; Costa et al., 2017; Ackerman et al., 2015; Weaver et al., 2013; Stolt et al., 2011; Shumchenia et al., 2010; Madden and Goodin, 2007). However, in recent years, CMECS has also been applied in post-hurricane habitat mapping and studies related to offshore renewable energy development (LaFrance Bartley et al., 2022; Guarinello and Carey, 2020; HDR, 2020; Trembanis et al., 2019; Guida et al., 2017; Cochrane et al., 2017; Collie and King, 2016; LaFrance Bartley et al., 2014).

CMECS does not follow a specific methodology but instead empowers investigators to determine data types and collection methods based on available resources (FGDC 2012). Consequently, CMECS has been employed across different spatial scales and at various resolutions, depending on project scale and available tools and resources (Brown et al., 2011). For example, recent studies have utilized new benthic imagery through integrated video and still imagery, satellite-derived and modelled data, Remotely Operated Vehicle (ROV) video footage, and diver-operated video transects (Mittermayr et al., 2020a, 2020b; Allee et al., 2014; Scott et al., 2014; Ackerman et al., 2015; Lanier et al., 2018; Bassett et al., 2017; Ruby, 2017; Kingon, 2018; Stolt et al., 2011).

Historically, CMECS has been widely used by various federal and state governments, non-governmental organizations, and partnerships within the United States to assess the ecological health and distribution of marine and lacustrine ecosystems (Raineault et al., 2018). Although initially created to address the need for a standard application in the United States, the hierarchical structure standards of CMECS remain adaptable and can accommodate diverse datasets regardless of their acquisition or processing methods, spatial or temporal scales, resolution, or density (LaFrance Bartley et al., 2022).

While similar marine hierarchical systems to CMECS exist worldwide, such as the European Nature Information System (EUNIS) for Europe's aquatic, terrestrial, and marine habitats (Davies et al., 2004), the Joint Nature Conservation Committee (JNCC) biotope classification scheme in the United Kingdom, the Seamap Australia Benthic Marine Habitat Classification Scheme in Australia (Holmes et al., 2004), and the Coastal and Marine Habitat and Ecosystem Classification (CMHEC) in New Zealand (Ministry of Fisheries and DOC, 2008), many of these nations are now adopting the CMECS approach to help support coastal management (Rowden et al., 2018).While many of the CMECS components (particuarly the Substrate and Geomorph components) can generally be applied directly to new geographical regions, some modification of the original scheme is generally needed to describe new biotopes. In particular the final biotic communities need to be specifically described for new locations to enbable biotopes to be appropriately described. Furthermore, the flexibility of the CMECS system allows a range of modifers to be incorporated into biotope descriptions (many are provided with the CMECS documentation) to suit specific situations. For example, it might be relevant to include a morphology/shape modifier (as we do in the present study) to describe specific components of the biotic community when it is not possible to accurately identify all common species present or to represent habitat complexity.

Here we apply the CMECS hierarchical classification scheme for the first time to mesophotic reefs in the Hauraki Gulf region in New Zealand between approximately 30 and 100 m.

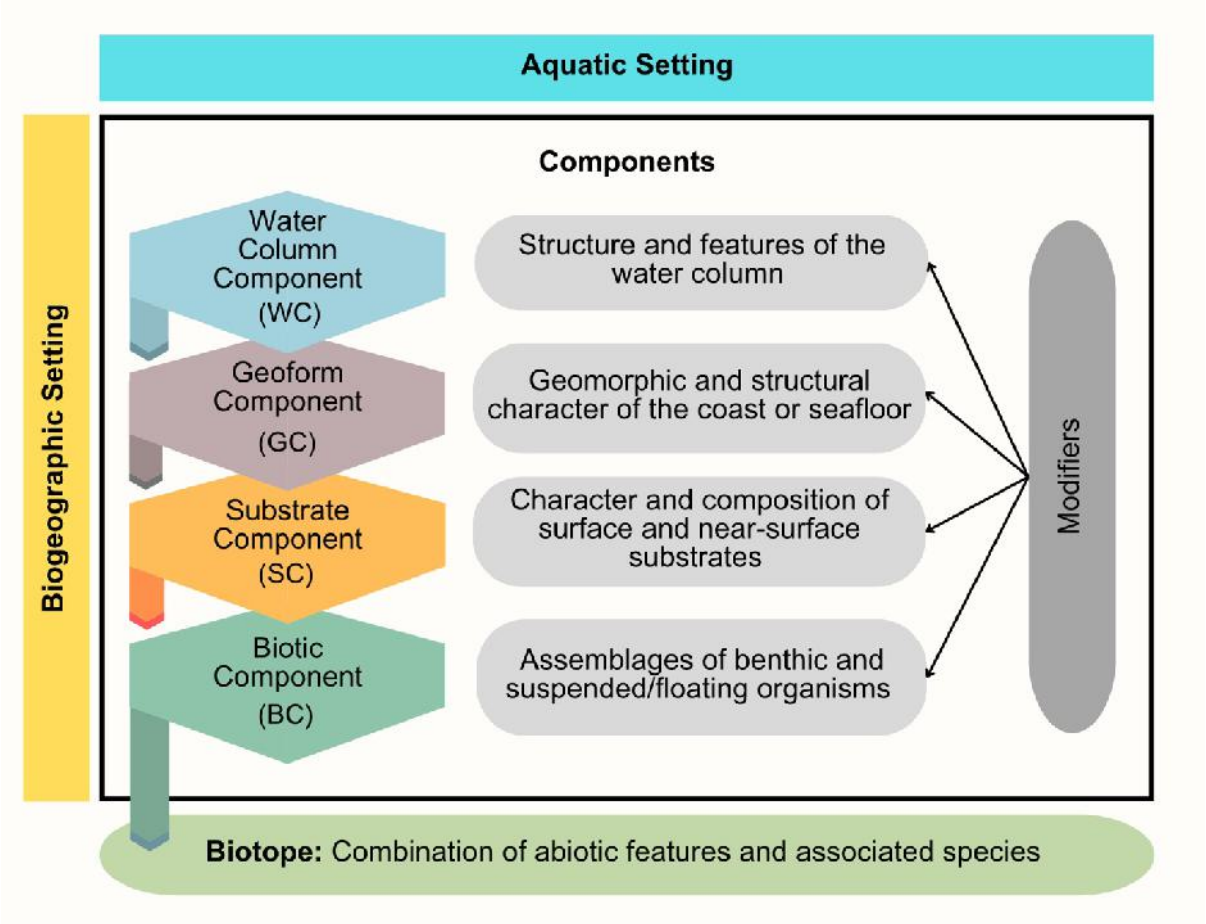

Figure 1. The components and settings used in The Coastal and Marine Ecological Classification Standard (CMECS).

1.3 Project aims

The aims of this project are:

1) To conduct Remotely Operated Vehicle (ROV) deployments at multiple rocky structures in the Hauraki Gulf within the depth range 30 to 100 m;

2) To collect abundance data from frame grabs from a selection of the ROV drops to characterise as wide a range of community types as possible;

3) To complete a multivariate analysis of the data collected from the ROV frame grabs to look for statistically significant differences between the community composition of different deep reefs;

4) To define the CMECS Geoform and Substrate components at each of the ROV drops where the benthic community was characterised;
5) To use the information in 3) and 4) to guide biotopes delineation for deep reefs in the Hauraki Gulf (note that the description of these biotopes can be found in a separate document) using the CMECS methodology;
6) To highlight any issues in the in the application of CMECS to deep reef biotope delineation.

2.0 Methods

2.1 Study sites

We conducted 28 Remotely Operated Vehicle drops between 3rd and 6th February 2024 at four regional locations in the Hauraki Gulf (Figures 2-5) with sites ranging in depth from 31 to 89 m (Table 1).

2.1.1 Hauraki Gulf

The Hauraki Gulf/Tiikapa Moana (Figure 2) is a coastal inlet on the northeast coast of the North Island, which is approximately 65 km wide (Manighetti and Carter, 1999). It is connected to the ocean by three channels: the Jellicoe, Cradock, and Colville channels, which are located between Te Hauturu-o-Toi (Little Barrier), Aotea (Great Barrier), and the Coromandel Peninsula (Cape Colville) (Lhériau-Nice and Penna 2024). The Gulf has a relatively uniform depth, ranging mostly from 20 to 70 meters, with a gradual slope towards the edge of the continental shelf (Zeldis et al., 2004).

This coastal sea can be divided into two areas based on the sheltered waters and the influence of the East Auckland Current (EAuC) in the inner region compared to the outer Hauraki Gulf (Stevens et al., 2021). Due to the shape of the coast, winds with a component along the NW-SE axis have a strong impact on the region (Zeldis et al., 2004). As a result of the interaction of the East Auckland Current, the interplay of local surface winds, currents, and geomorphological features within the embayment, the Gulf hosts some of the highest levels of primary production in New Zealand, attributed to seasonal upwelling (Stephenson et al., 2023). The hydrodynamic regime controlled by tidal currents, oceanic inflows, and wave-induced currents is also responsible for an N-S gradient in sediment texture concentrations in the central part of the Hauraki Gulf (Boxberg et al., 2020).

Within the Hauraki Gulf Marine Park (HGMP)/Ko te Paataka kai o Tiikapa Moana Te Moananui-aa-Toi, which spans from Mangawhai Heads to Waihi Beach are many groups of islands, covering an area of 14,000 km^2 that includes the Auckland Region, Hauraki Plains, and the Coromandel Peninsula. These include the Great and Little Barrier Islands, the Aldermen Islands, the Mercury Islands, and the Mokohinau Islands (Bennion et al. 2024). The Hauraki Gulf, with its varied landscape, multiple islands, embayments, and harbours, fosters a wide array of habitat types (Jackson and Lundquist, 2016),

including sponge beds, kelp forests, and protected coral species. The area supports a diverse range of marine life, including fish and large marine mammals (Buhl-Mortensen & Mortensen, 2004; Fosså, Mortensen & Furevik, 2002; Putland et al., 2018; Wiseman et al., 2011; Dweyer et al., 2016).

Economically, socially, and culturally, the Gulf holds significant value, supporting recreational and commercial fisheries, as well as being home to the country's largest commercial port (Stephenson et al., 2023). However, the Gulf faces threats from marine resource extraction (particularly fishing) and sedimentation (Morrison, 2021), noise, metal pollution, invasive species, and sand extraction (Hauraki-Gulf-Forum, 2020). In addition, the Hauraki Gulf experiences high levels of both private and commercial vessel activity throughout the year (Stockin et al., 2008). Efforts like Sea Change Tai Timu Tai Pari and government proposals aim to reverse degradation, aligned with the Hauraki Gulf Marine Park Act (2000), focusing on protecting and enhancing natural resources (Morrison et al., 2021).

2.1.2 Aldermen Islands

The Aldermen Islands (Figure 3) are one of the several small island groups that occur along the east coast of the North Island, in the Hauraki Gulf (Cochrane, 1962). Located 20-25km east from the small harbour of Tairua on the mainland, there are four main volcanic islands, which encompass a total area of only 133.5 ha (Cochrane, 1962). These islands exhibit highly irregular shorelines and steep cliffs, particularly evident on the central islands, known as Middle Island. When viewed from several km to the north or south, these islands present as a continuous row of grey, jagged peaks.

2.1.3 Colville Channel (including Channel Island)

Connecting Great Barrier Island with the northern tip of the Coromandel Peninsula, Jellicoe Channel serves as the entry point for water into the Gulf (Black, 2000). From there, the water flows in an anti-clockwise direction across the central and inner Gulf, ultimately exiting via the Colville Channel (Greig, 1990; Figure 4). Water entering through the Cradock Channel generally flows directly out of the Gulf via the Colville Channel. Due to these circulation patterns, this area accumulates a range of sediment types, from shell gravel near Cape Colville to sandy mud further east, coinciding with a deepening continental shelf (Manighetti and Carter, 1999).

2.1.4 Cradock Channel (including the Great and Little Barrier Islands)

Situated between Great Barrier Island and Little Barrier Island, the Cradock Channel (Figure 5) has a persistent southward flow that exits the Gulf through the Colville Channel (Manighetti and Carter, 1999). The surrounding waters of the Great and Little Barrier Islands range from relatively shallow inshore waters to deeper waters and include coastal temperate rocky reefs and soft-sediment habitats.

2.1.5 Mokohinau Islands

The Mokohinau Islands (Figure 6) are a group of small islands located 100 km off the north-eastern coast of the North New Zealand Island in the Hauraki Gulf. This group of islands which includes Burgess Island, the northernmost Island, Fanal, Flax and Trig Islands are nature reserves and protected wildlife sanctuaries. The subtidal habitat is composed of large rock boulders (12 m diameter) and is characterized in some areas by dense *Ecklonia radiata* (Pecorino et al., 2013).

Table 1. Metadata for surveyed deep reef sites in the Hauraki Gulf (blue highlighted rows indicate analysed drops).

Drop	Date	Location	Site	Latitude	Longitude	Depth range (m)
1	4-Feb-24	Colville channel	Cape Colville	S 36° 27.020'	E 175° 23.205'	43 - 44
2	4-Feb-24	Aldermen Islands	South Ohinau Island	S 36° 45.904'	E 175° 55.546'	53 - 55
3	5-Feb-24	Aldermen Islands	South Aldermen Islands	S 37° 00.710'	E 176° 03.245'	49 - 54
4	5-Feb-24	Aldermen Islands	South Aldermen Islands	S 37° 02.077'	E 176° 04.918'	77 - 78
5	5-Feb-24	Aldermen Islands	South Aldermen Islands	S 37° 02.643'	E 176° 04.673'	86 - 88
6	5-Feb-24	Aldermen Islands	South Aldermen Islands	S 37° 01.470'	E 176° 06.459'	83 - 87
7	5-Feb-24	Aldermen Islands	South Aldermen Islands	S 36° 59.698'	E 176° 06.596'	63 - 67
8	5-Feb-24	Aldermen Islands	East Aldermen Islands	S 36° 57.737'	E 176° 07.249'	68 - 70
9	5-Feb-24	Aldermen Islands	East Aldermen Islands	S 36° 56.521'	E 176° 07.543'	84 - 86
10	5-Feb-24	Aldermen Islands	East Aldermen Islands	S 36° 56.005'	E 176° 06.748'	79 - 80
11	5-Feb-24	Aldermen Islands	East Aldermen Islands	S 36° 53.957'	E 176° 04.531'	74 - 75
12	6-Feb-24	Cradock Channel	Cradock Channel	S 36º 15.867	E 175° 11.284'	31 - 32
13	6-Feb-24	Cradock Channel	Cradock Channel	S 36° 15.516	E 175° 10.632'	34 -3 6
14	6-Feb-24	Cradock Channel	Cradock Channel	S 36° 14.626'	E 175° 10.838'	45 - 46
15	6-Feb-24	Mokohinau Islands	SW Mokohinau Islands	S 35° 59.986'	E 175° 07.184'	51 - 52
16	6-Feb-24	Mokohinau Islands	SW Mokohinau Islands	S 35° 57.298'	E 175° 08.910'	56 - 57
17	6-Feb-24	Mokohinau Islands	South Mokohinau Islands	S 35° 57.298'	E 175° 08.955'	60 - 61
18	6-Feb-24	Mokohinau Islands	NE Mokohinau Islands	S 35° 55.072'	E 175° 09.203'	55 - 56
19	6-Feb-24	Mokohinau Islands	Burgess Island	S 35° 53.563'	E 175° 08.301'	79 - 83
20	6-Feb-24	Mokohinau Islands	Burgess Island	S 35° 53.946'	E 175° 07.608'	51 - 52
21	6-Feb-24	Mokohinau Islands	Burgess Island	S 35° 54.796'	E 175° 07.261'	50
22	6-Feb-24	Mokohinau Islands	South Atihau Island	S 35° 55.638'	E 175° 06.310'	48 - 50
23	6-Feb-24	Mokohinau Islands	Groper Island	S 35° 53.998'	E 175° 03.002'	75 - 76
24	6-Feb-24	Mokohinau Islands	West Atihau Island	S 35° 54.100'	E 175° 06.123	46 - 47
25	7-Feb-24	Colville Channel	SE Channel Island	S 36° 25.320'	E 175° 20.324'	52 - 53
26	7-Feb-24	Colville Channel	SE Channel Island	S 36° 25.829'	E 175° 21.287'	35 - 38
27	7-Feb-24	Colville Channel	SE Channel Island	S 36° 26.730'	E 175° 19.912'	29 - 31
28	7-Feb-24	Colville Channel	SE Channel Island	S 35° 26.519'	E 175° 18.569'	54 - 56

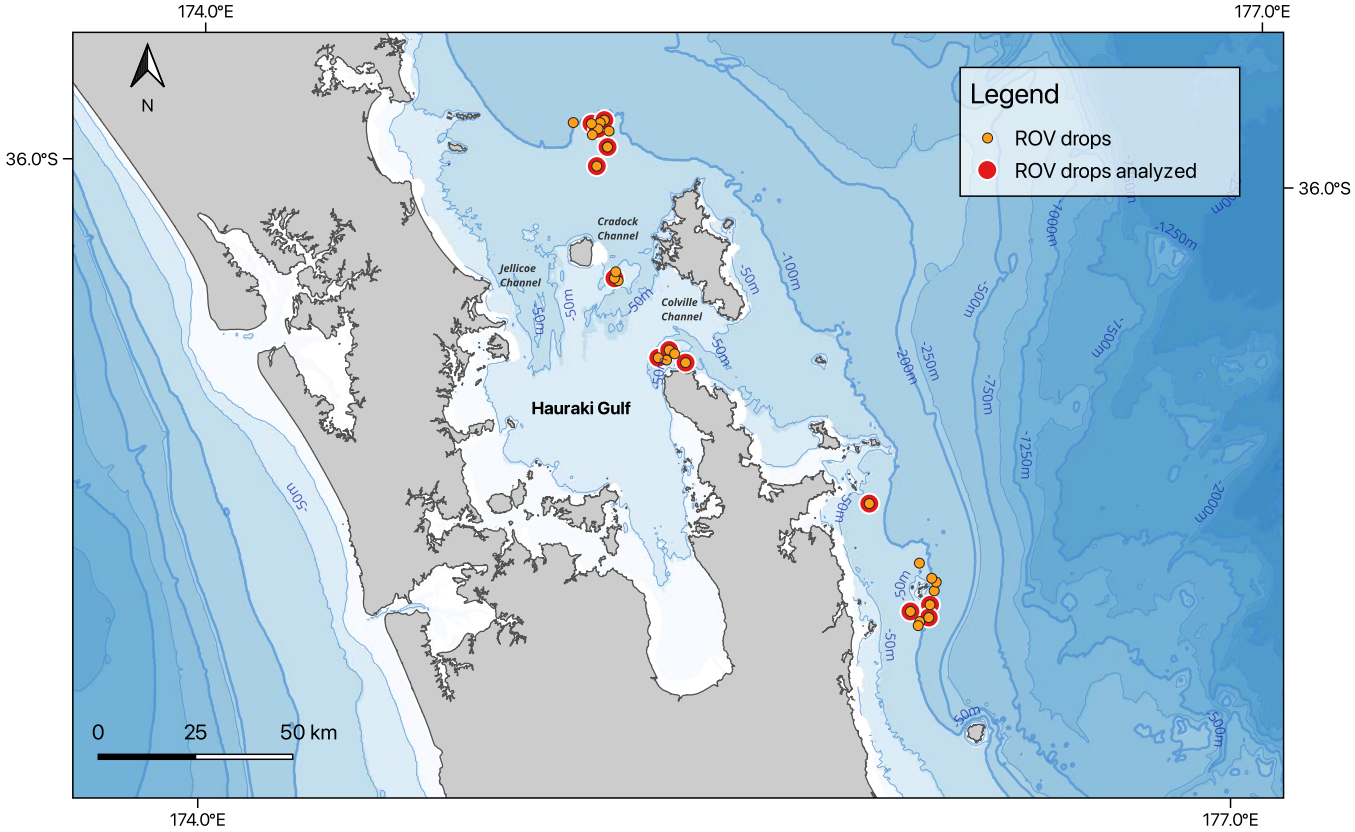

Figure 2. Locations where ROV deployments were made in the Hauraki Gulf across four sub-regions. Note that data were not collected from all deployments.

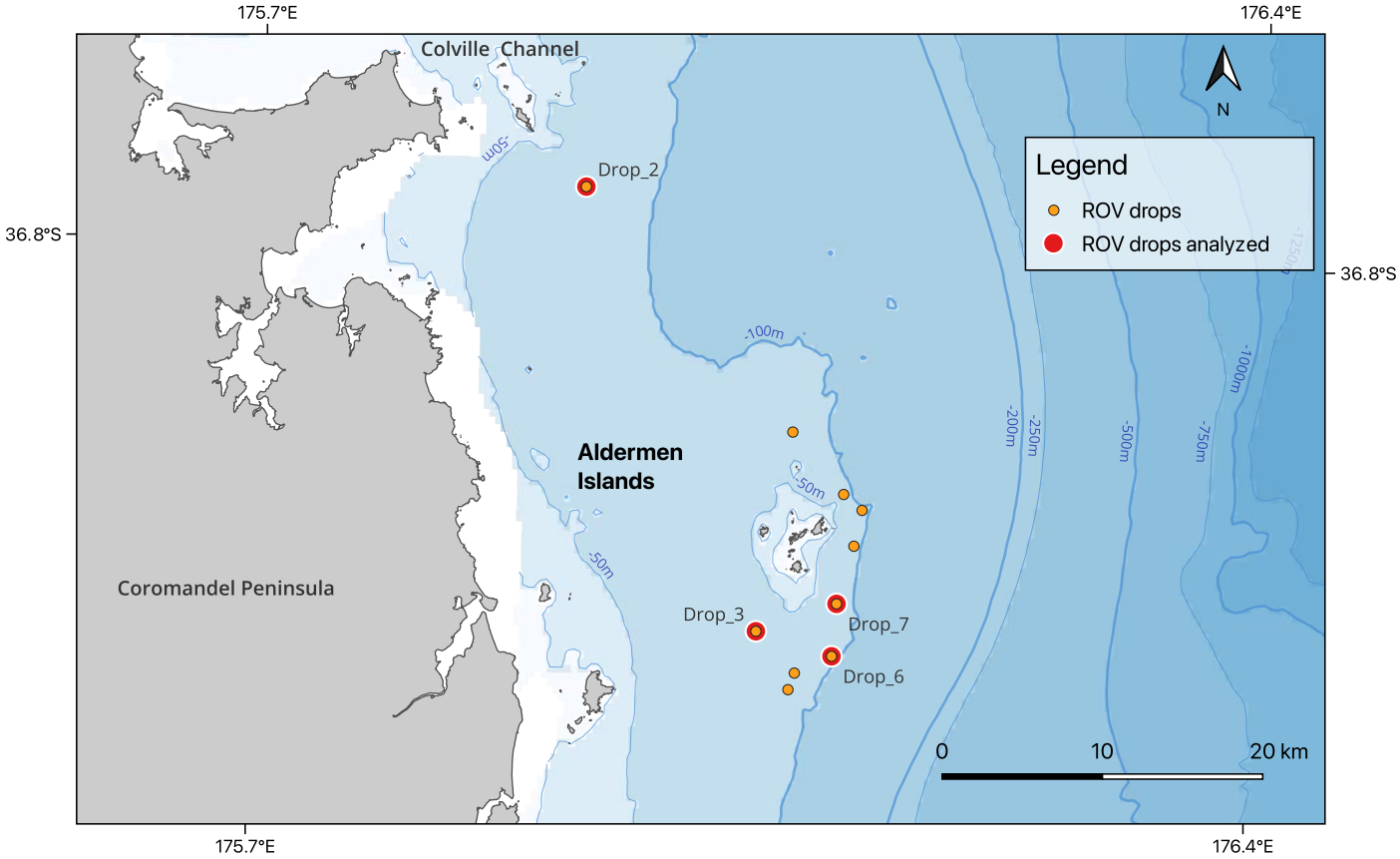

Figure 3. Locations at the Aldermen Islands where ROV deployments were made, and data analysed.

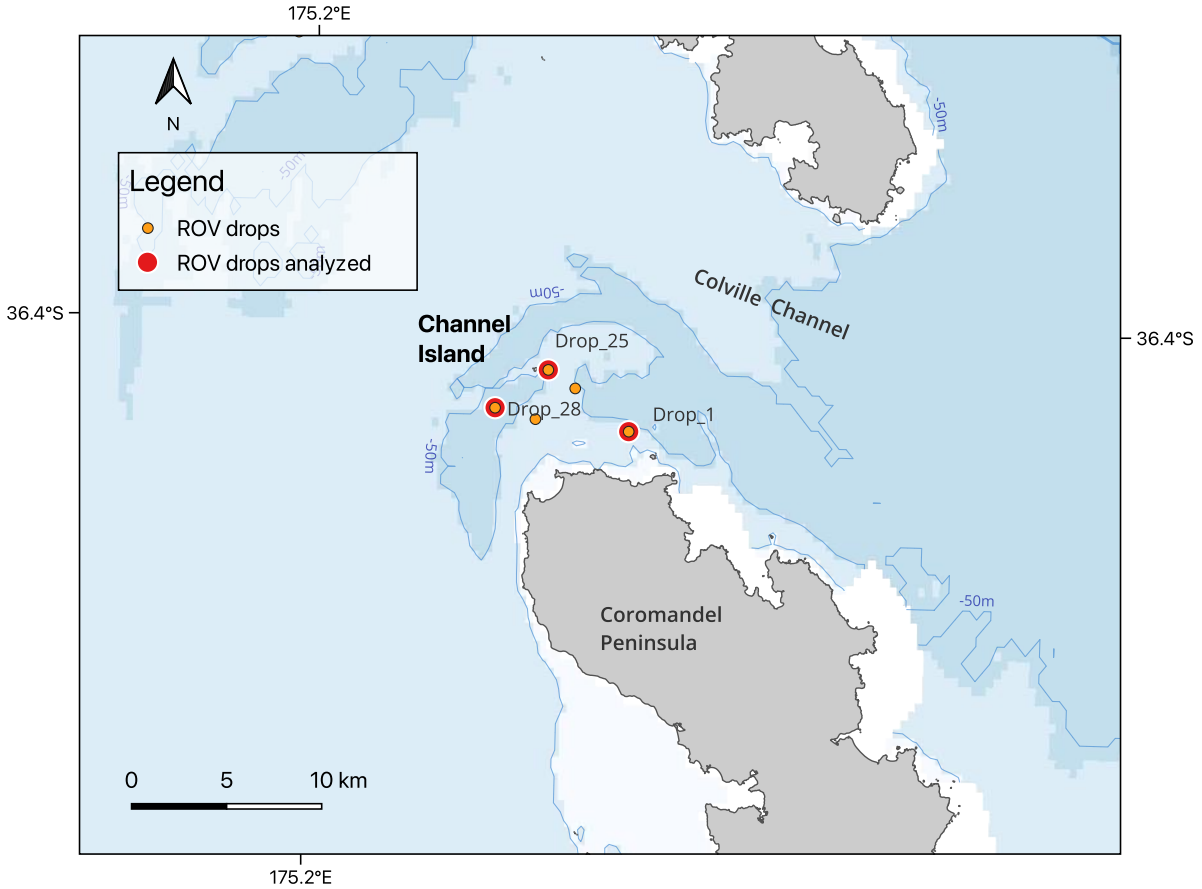

Figure 4. Locations near Colville Channel/Channel Island where ROV deployments were made, and data analysed.

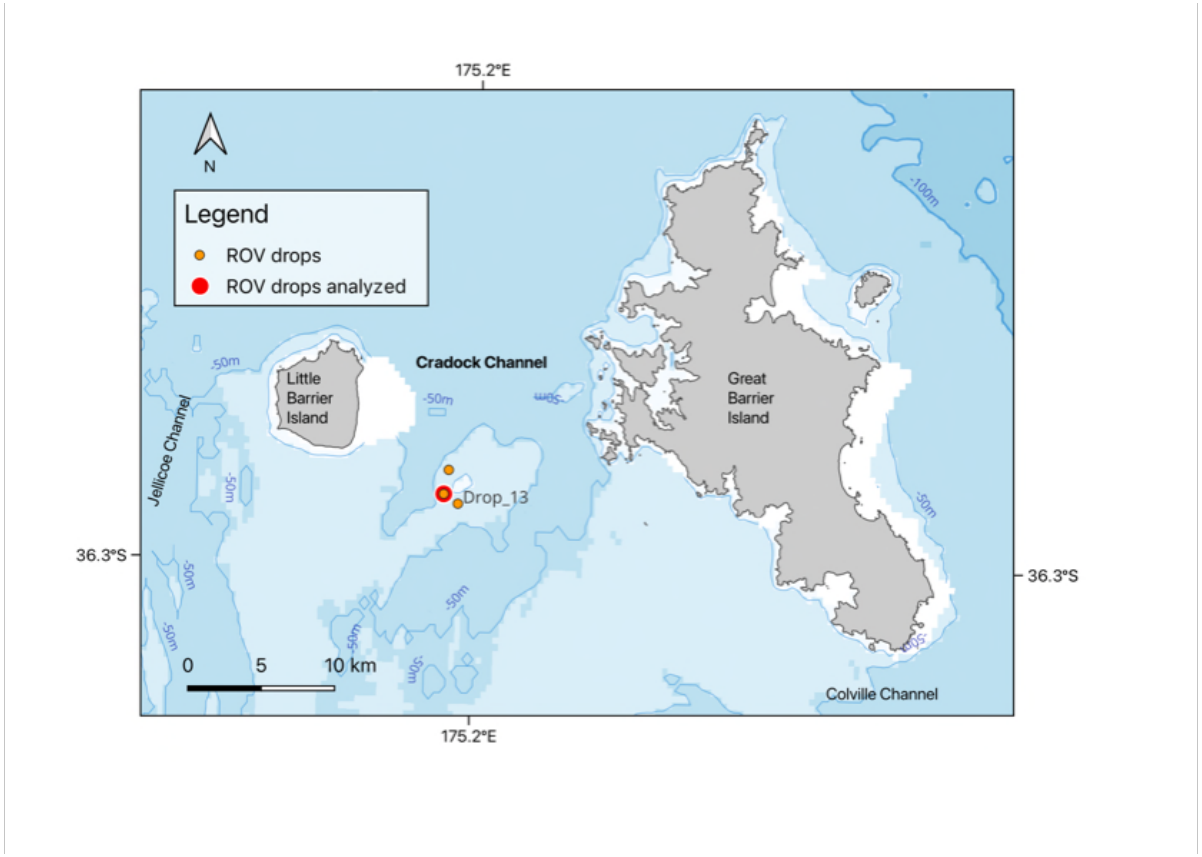

Figure 5. Locations at the Cradock Channel where ROV deployments were made, and data analysed.

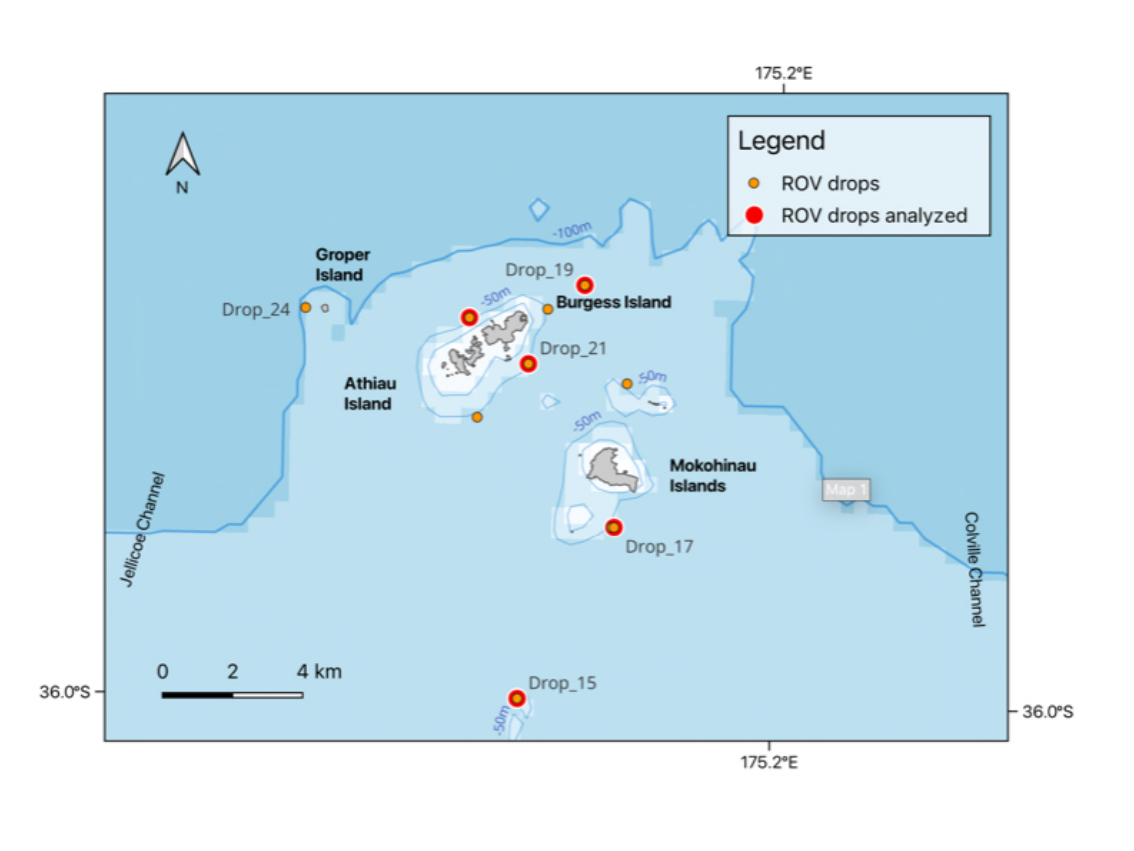

Figure 6. Locations at the Mokohinau (and surrounding) Islands where ROV deployments were made, and data analysed.

2.2 Benthic video collection

A Boxfish Alpha was used to capture video footage at each of the sampling sites. The ROV was deployed from the back of the MV Reefspirit. The ROV was driven vertically downwards from the vessel until reaching approximately 1 m above the benthos and then driven along a transect approximately 1 m from the substrate for approximately 5-8 minutes. The Boxfish ROV is fully vectored, meaning the camera is fixed and the ROV can move on any axis to become perpendicular to the substrate. ROV lasers were used to determine and then maintain distance from the benthos (approximately 1 m), producing frame grabs of similar scales. As most of the organism we encountered are not considered individuals (e.g. sponges, CCA and ascidians), we characterised their abundance using a percentage cover approach and therefore. Therefore a more precise ROV scale was not required as percentage cover abundance estimates are not sensitive to small differences in area sampled. The potential issue of parallax error, which is an apparent change in the relative position of fixed objects as a result of the angle as surface is viewed at by the ROV (Rivero Calle, 2010 as discussed in Lesser & Slattery, 2019), was addressed by employing a randomised point count approach for percentage cover analysis of images where the whole image area is not used. The depths at which the ROV was deployed ranged from 31 to 89 m (Table 1). Previous work using this same approach in similar habitats in New Zealand has yielded results indistinguishable from those obtained from photo-quadrats using SCUBA (Harris et al. 2021).

2.3 Video analysis to characterise the community composition

We only analysed videos from thirteen of the twenty eight drops because of funding limitations. However, we selected videos to encompass as wide a range of biotope types as possible (based on an initial visual assessment) from the ROVs rather than to replicate different biotopes. The selected videos collected from ROV deployments were visualised using VLC media player. All possible frame grabs were extracted from the videos. The choice of frame grabs for analysis was dependent on the efficacy of each image. Frame grabs exhibiting the lowest occurrence of blurring and with the most perpendicular perspective of the substrate were prioritised. This ensured the greatest accuracy of the proceeding analyses and reduced potential selection bias toward images displaying specific community compositions or components. Ten images were then randomly selected from each transect as replicates. Coral Point Count with Excel extensions (CPCe) was used to estimate the percentage cover of categorised benthic groups (Kohler & Gill 2006). Ninety-three benthic categories (See Appendices A and B) were assigned to a CPCe codefile after preliminary analyses of video transects. When reliable identification was not possible, we made classifications at the taxon or OTU (operational taxonomic unit) level. OTUs are known for their effectiveness in identifying distribution

patterns of benthic invertebrates (Brind'Amour et al., 2014) and marine sponges (Strano et al., 2020), while also avoiding the need for destructive sampling. These sub-categories were also assigned under ten higher taxon/abiotic groups including porifera, bryozoa, cnidaria and ascidiacea, annelida (only polychaetes observed), the polyphyletic group macroalgae, Crustose Coralline Algae (CCA) and biological matrix. Biological matrix was used to categorise a likely diverse group of small and tightly packed organisms unidentifiable from the resolution of the ROV camera, which includes a mixture of small low profile, but branched bryozoans, hydroids, and ascidians, which form a dense biological mat. These major categories covered every identifiable organism observed. Abiotic categories, bare substrate, and sediment (combined as 'substrate') was also included ensuring the total cover of each image equalled 100%. Sediment included areas of the reef where the substrate could not be seen, and it was covered in sediment. CPCe randomly allocates 'points' over an image; the user then manually identifies the substrate or benthic taxa beneath each point (for example see Figure 7). The software uses this input to estimate substrate composition across the entire frame-grab (percentage cover of each substrate/ benthos), exporting the information as a comma-separated values (CSV) database. 120 points per quadrat was considered sufficient to reach a plateau of a species accumulation curve, based on other work by the authors in similar habitats. We also included a single category to account for cases where a CPCe 'point' fell on water or a shadow or fish etc. These points were removed from the data set and the abundances of organisms scaled according to the number of remaining points.

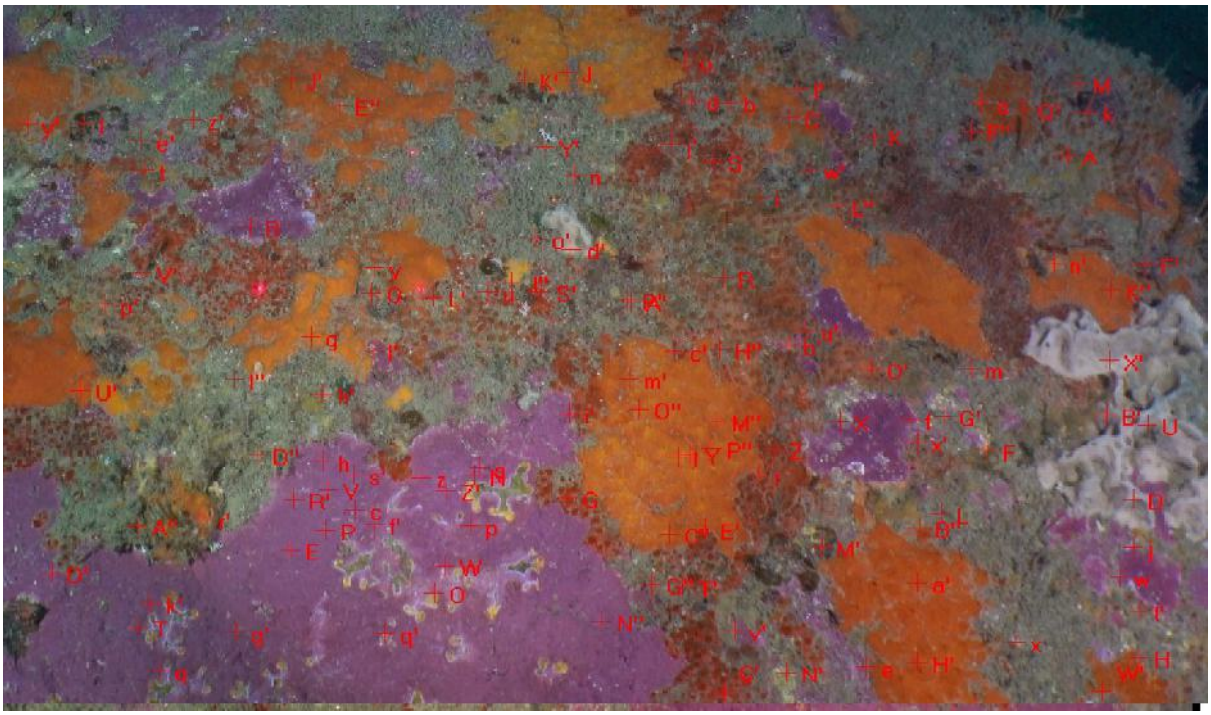

Figure 7. An example of a frame grab from the ROV video footage with overlaid CPCe 'points'. The benthic organism or abiotic category under each point is recorded to estimate the percentage cover. Image taken from South Ohinau Island.

2.4 Data analysis

Data was analysed using PRIMER V6 + PERMANOVA. All data were squared root transformed to down weigh the importance of rare and very abundant species. Multidimensional scaling (MDS) was used to visualise the dissimilarity between samples. Benthic group vectors were then overlaid according to a Pearson's rank correlation threshold of 0.45 to visualise the most important benthic community categories explaining these distribution patterns. Differences in dispersion between sites (i.e. the variability in the samples across multivariate space) were analysed using permutational analyses of multivariate dispersions (PERMDISP). Permutational multivariate analysis of variance (PERMANOVA) was used to determine the effect of site on multivariate data (community composition) using a Bray-Curtis similarity matrix across all sampling sites. Where significant effects of fixed factors were found, PERMANOVA in PRIMER was also used to conduct *post-hoc* pairwise tests. PERMANOVA can be used to assess differences between groups based on multivariate data. Unlike traditional MANOVA, PERMANOVA does not rely on assumptions of normality and homogeneity of variance, making it suitable for analysing complex ecological datasets. This non-parametric approach assesses the significance of group dissimilarities by permuting data points, making it particularly useful for studying communities with heterogeneous structures. However, since the multivariate datasets showed some variation in dispersion between sites, we also used ANOSIM (Analysis of Similarities) to statistically compare differences in the multivariate data between sites. ANOSIM is a statistical method used to compare similarity matrices between different groups or treatments, in this case sites. The ANOSIM test generates an R statistic ranging from -1 to 1, describing the degree of dissimilarity between groups. A value close to 1 indicates strong dissimilarity, while a value near 0 suggests no significant difference. This test is more suited to multivariate data with uneven dispersion between samples. SIMPER (Similarity Percentage) analysis was then used to identify the contributions of different species to dissimilarity between groups. This method calculates the average percentage contribution of each species to the dissimilarity observed between groups or treatments. By quantifying the importance of individual species in driving differences between sites, SIMPER enables key species responsible for variations in community composition to be identified.

We included abiotic categories for sediment covered substrate and bare rock in the CPCe analysis, which is consistent with previous studies (Harris et al. 2021), otherwise it is not possible to calculate

the true percentage cover of each organism. However, as our intention was to use the differences identified from the multivariate analyses to help delineate our CMECS biotopes, and physical characteristics are captured in other elements of the hierarchy, the inclusion of this category has the potential to mislead the biotope differentiation process. To test the potential impact of the inclusion of these abiotic categories and whether differences in community could be identified based on higher taxonomic groups, we conducted four separate analyses of the data collected (including MDS plots, PERMANOVA, PERMDISP and SIMPER). In the first analysis, each of the total 93 benthic categories were combined into 10 major groups: sponges, biological matrix, all substrate (including rock and sediment), macroalgae, crustose coralline algae, bryozoans, cnidaria, ascidians, echinodermata and other (which accounted for <0.2% of the total cover).

The second analysis was conducted on the full data set including the substrate category. In the third analysis, we removed the substrate category, although this potentially creates a sampling area effect, since the total percentage is each sample is no longer 100%. In the fourth analysis we removed the substrate category from the dataset and scaled the abundance of the remaining groups to 100% to account for the sampling area effect in analysis 2. This form of standardisation is more typically applied to count data (e.g. densities) to account for differences in sampling effort and is less suited to percentage cover data as it overinflates the percentage cover of each benthic group. Nevertheless, this analysis again provided us the opportunity to assess the impact of these abiotic categories on the differences in benthic communities between sites.

2.5 Application of CMECS to the data collected and defining of biotopes

We defined distinct biotopes using the CMECS methodology described in FDGC (2012) including the three components: Geoform, Substrate, and Biotic Components (Figure 1), which respectively describe geomorphic and structural characteristics, composition and particle size of sediment surface layers, and the classification of organisms.

In addition to the multivariate analysis that we conducted to identify differences in the benthic communities, we conducted a cluster analysis by creating a Bray-Curtis similarity dendrogram to further assess similarities between sites. However, while previous studies have used this approach (e.g. Kingon 2018), it does not appear to have been used with data as species rich or as high taxonomic resolution as our study. For this analysis we averaged the abundance of each benthic group across the 10 frame grabs to create a single abundance value for each benthic group to account for some of the

variability in frame grabs. Data were square-root transformed to reduce the importance of rate of abundant organisms.

We created two of our own modifiers to help in the delineation of the CMECS biotopes. The first encompassed the different mesophotic reef zones, based largely on light availability (Table 2) and the second included the dominant sponge morphologies (Table 3), since many sponges could not be identified reliably from the ROV frame grabs.

Table 2.5.1. The mesophotic reef modifier considered in our CEMECS classification. Mesophotic zones were classified based on the presence of macroalgae, calcareous coralline algae (CCA), and depth.

Zone	**Code**	**Characteristics**
Mesophotic Transition Zone	MTZ	Characterised by the presence of more than 10% cover of macroalgae
Mesophotic Shallow Reef	MSR	Animal-dominated reef in less than 40 m with no algae or CCA
Mesophotic Mid-Depth Reef	MMR	Reef ranging in depth generally from around 40 to 60 m that has more than 10% CCA cover
Mesophotic Deep Reef	MDR	Reefs generally below 60 m that have no CCA cover and are completely animal-dominated

Table 2.5.2. Sponge morphology modifiers. This modifier was only used in the biotope description if the sponge morphology covered more than 5% of the substrate. Note that lowercase letters are used to describe this modifier in the biotope identifiers.

Code	**Characteristics**
pa	Papillate
br	Branching
ma	Massive
en	Encrusting
gl	Globulose
mi	Mixed

Geoform and substrate components were identified using CMECS (FGDC 2012) categories from high-resolution ROV video. The broadest geoform component category is tectonic setting. New Zealand was categorised as an *active continental margin* (Harris et al. 2014). Nested within the tectonic setting is the physiographic setting, followed by the geoform origin and one or more levels of modifiers.

We used the CMECS substrate component categories to identify the origin, class, subclass, group, subgroup, and substrate modifiers for each substrate, as seen in the videos. While the substrate component was based on Wentworth (1922) and Folk (1954) for their work on specific particle characteristics, recent (October 2023) updates to the substrate components allow CMECS users more flexibility in describing this component and any co-occurring elements in each biotope. In this study, substrate modifiers were used for both the primary (>50%) substrate and co-occurring substrate categories to further refine the biotope descriptions. For each category, we focused only on substrates colonised by attached biota. Rugosity was used as a substrate modifier according to CMECS to describe each biotope in three-dimensional space (Table 2.5.3).

Table 2.5.3: Seafloor Rugosity: Value of 1 is completely flat. Value of >2 means for each metre horizontal you are going up and down more than 2m.

Rugosity	Value	Characteristics
Very Low	1.0 to < 1.25	Flat > Sand Ripples
Low	1.25 to < 1.50	Sand Ripples > Megaripples
Moderate	1.50 to < 1.75	Low Relief Reef
High	1.75 to < 2.00	Complex Reef
Very High	≥ 2.00	Very Complex, Crevices, Boulder Field

3.0 Results

3.1 Overall abundance in the major groups of benthic organisms

When the 10 major benthic groups (which included an abiotic substrate group) were averaged across all thirteen sites (Figure 8; Appendix C), sponges were the most abundant benthic group occupying 28.1% $\pm$ 1.3 of the benthos, followed by biological matrix (25.0% $\pm$ 1.4), substrate (19.2% $\pm$ 1.4), macroalgae (8.6% $\pm$ 1.1) and CCA (7.9% $\pm$ 0.9). The PERMDISP (Figure 9) analyses showed significant differences (F=3.563, df1=12 df2=117, P(perm)=0.0004) between the distances to the centroids for the different site clusters, indicating differences in the dispersion between the sites. Of the 75 pairwise comparisons, 22 were significant at the 0.05 significance level (see Appendix D). Because of the significant differences in dispersion between many pairs of sites, both PERMANOVA, and ANOSIM were used to compare the overall community composition between sites. The PERMANOVA test showed an overall significant difference in benthic community composition between sites (F=24.34.006, df=12, 117, P<0.0001), and all pairwise comparisons were highly significant (P<0.001; Appendix E). ANOSIM results were consistent with the PERMANOVA, where R=0. 788, P<0.01, and all pairwise tests were significant (Appendix F). These results indicate that the overall benthic communities at each site are significantly different from each other. MDS plots examining differences in community composition are shown in Figures 10 and 11. While clear differences can be seen

between some pairs of sites, it is important to remember that these plots only show the relationships between samples in only two dimensions, not in multi-dimensional space, hence not all differences are obvious from a 2D plot and some care should be taken in drawing conclusions from these 2D plots. The overlaid Pearson's correlations (Figure 11) show the importance of eight of the major categories in driving the differences between sites, demonstrating no single or limited number of groups drove the differences between sites.

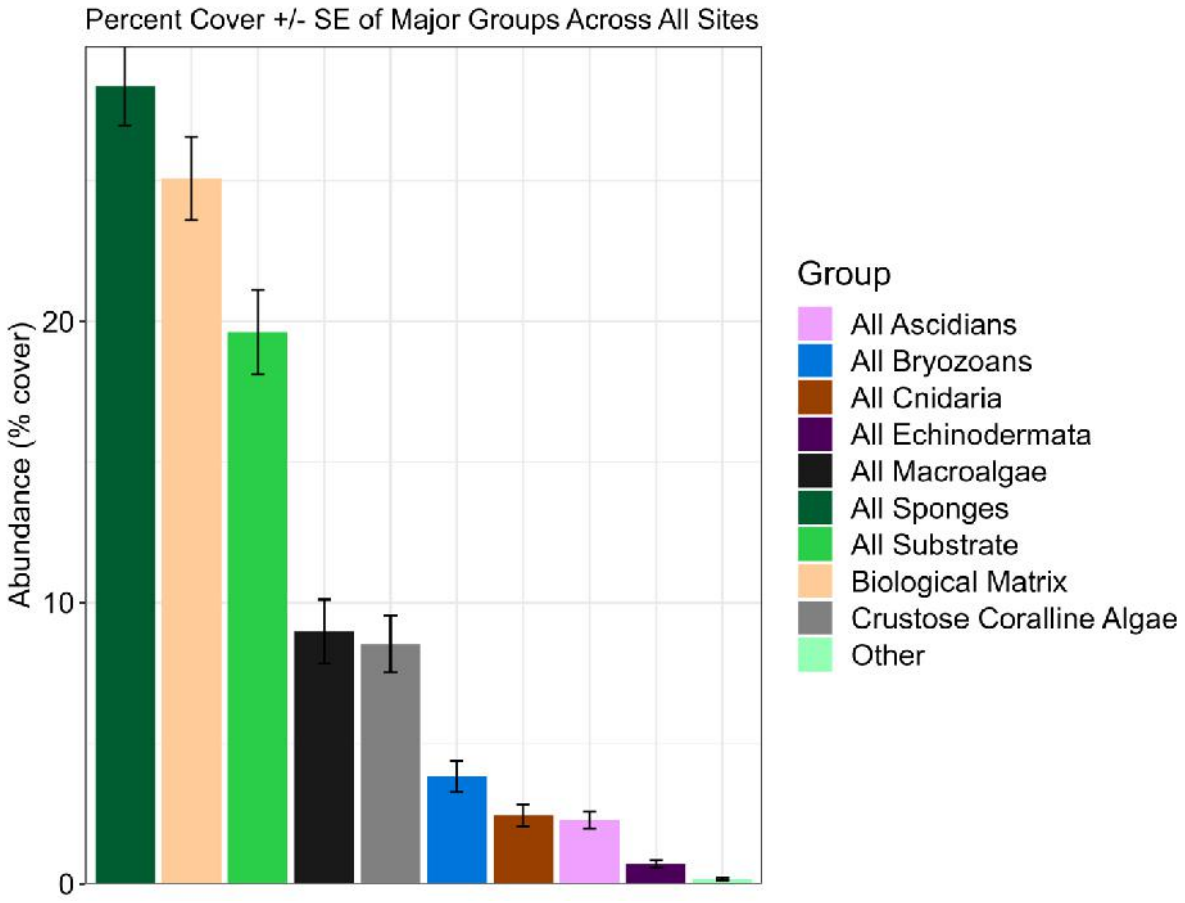

Figure 8. The abundance of the major benthic groups inhabiting deep reefs (31-89 m) in the Hauraki Gulf averaged across all 13 sites.

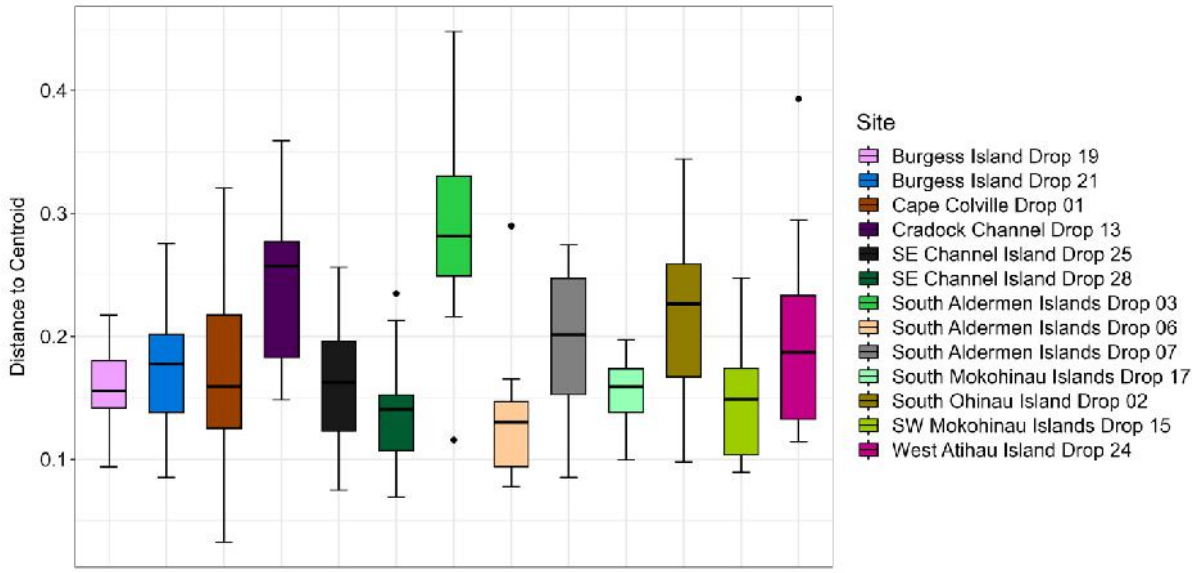

Figure 9. Results from PERMDISP comparing the dispersion of the samples collected (representing the analyses of individual frame grabs at each site) around the centroid for samples taken at 13 sites in the Hauraki Gulf. The analysis was conducted at the level of the 10 major benthic groups. Distances were calculated from a PCoA of the Bray-Curtis dissimilarities between samples. Boxes encompass the 25th–75th percentiles; horizontal lines are medians; top whiskers represent the largest value within 1.5 times interquartile range above the 75th percentile; bottom whiskers represent the smallest value within 1.5 times the interquartile range below the 25th percentile; circles are outliers (>1.5 times and <3 times the interquartile range beyond either end of the box)

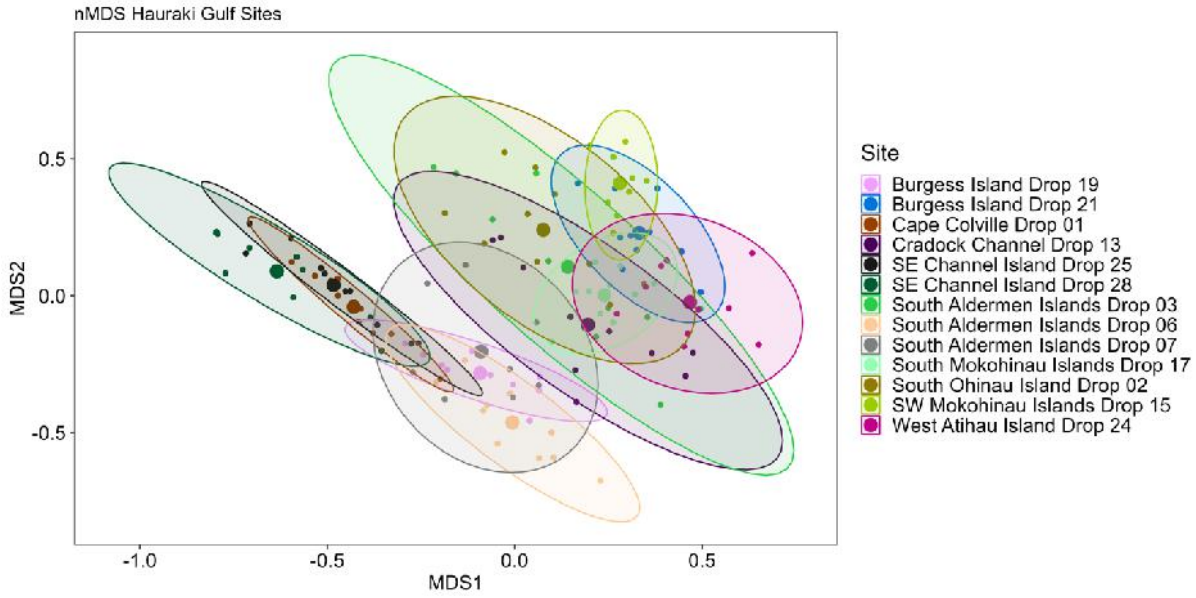

Figure 10. Multidimensional scaling (MDS) plot to compare the benthic communities at 13 deep reef sites in the Hauraki Gulf. Large dots indicate the centroids for each site, with the 95% confidence intervals shown around those centroids. The analysis was based on the 10 major benthic groups.

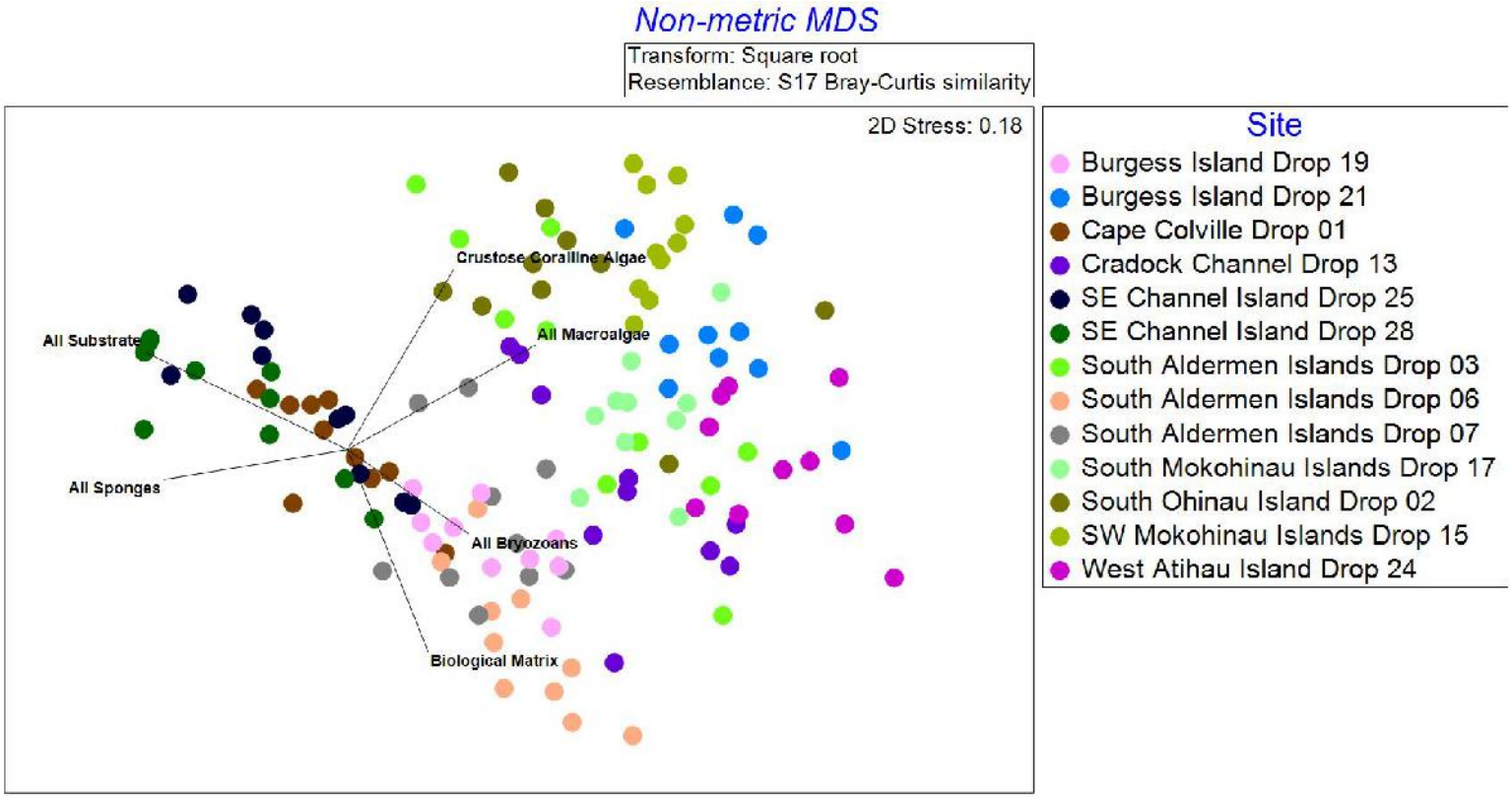

Figure 11. Multidimensional scaling (MDS) plot to compare the benthic communities at 13 deep reef sites in the Hauraki Gulf with overlaid vector using Pearson correlations (> 0.45). Each point represents the data from an individual frame grab and the different colour/shapes represent the different sites. The analysis was conducted at the level of the 10 major benthic groups.

3.2 Variation in benthic community composition (with sediment included)

When averaged across all sites (Figure 12) for the 93 different benthic categories the most common benthic group was biological matrix (25.0 $\pm$ 1.37%), followed by the abiotic group sediment (19.1 $\pm$ 1.4%), and CCA (8.2 $\pm$ 0.9%). No other benthic group occupied more than 5% of the available rocky surface, although of the 15 most abundant benthic groups (Figure 12) seven were sponges. The PERMDISP (Figure 13) analyses showed significant differences (F=9.4, df=12, 117, P= 0.0001) between the distances to the centroids for the different site clusters, indicating differences in the dispersion (essentially variation) between the sites. Of the 75 pairwise comparisons, 34 were significant at the 0.05 significance level (see Appendix G). In particular high levels of dispersion were seen at South Aldermen Islands Drop 6 and SW Mokinhinau Drop 15. As a result, in addition to running a PERMANOVA, we also ran an ANOSIM to compare the overall community composition between sites. The overall PERMANOVA test showed an overall significant difference in benthic community composition between sites (F=14.9, df=12,117, P<0.001), and all pairwise comparisons were highly significant (P<0.001; Appendix H). The results of the ANOSIM test were consistent with the PERMANOVA, where R=0.869, P<0.01, and all pairwise tests were significant (Appendix I). These results indicate the overall benthic communities at each site are statistically significantly different from each other. MDS plots examining differences in community composition are shown in Figures 14 and 15. While clear differences are only seen between some pairs of sites, it is important to remember that these plots are showing the relationships between samples in two dimensions, not in multi-dimensional space. The overlaid Pearson's correlations (Figure 15) show that many different species/benthic groups are correlated with the community differences.

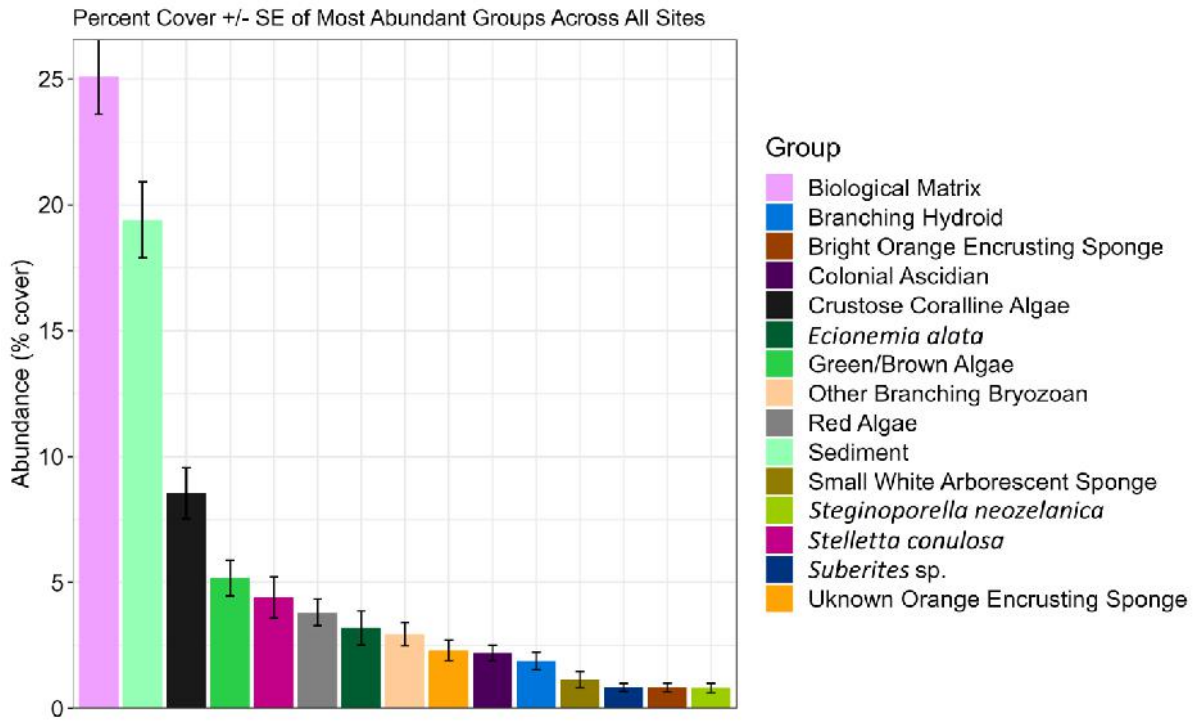

Figure 12. The percentage cover of the 15 most abundant benthic groups (of a total of 93 groups) averaged across the 13 sampling sites in the Hauraki Gulf.

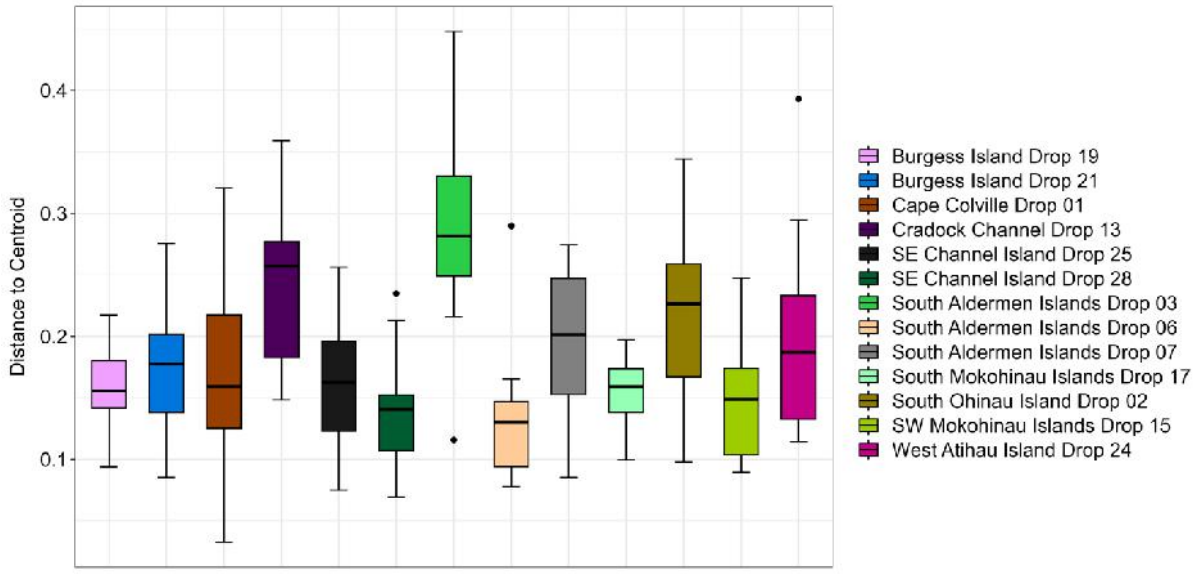

Figure 13. Results from PERMDISP comparing the dispersion of the samples collected (representing the analyses of individual frame grabs at each site) around the centroid for samples taken at 13 sites in the Hauraki Gulf. The analysis was conducted using all 93 benthic groups.

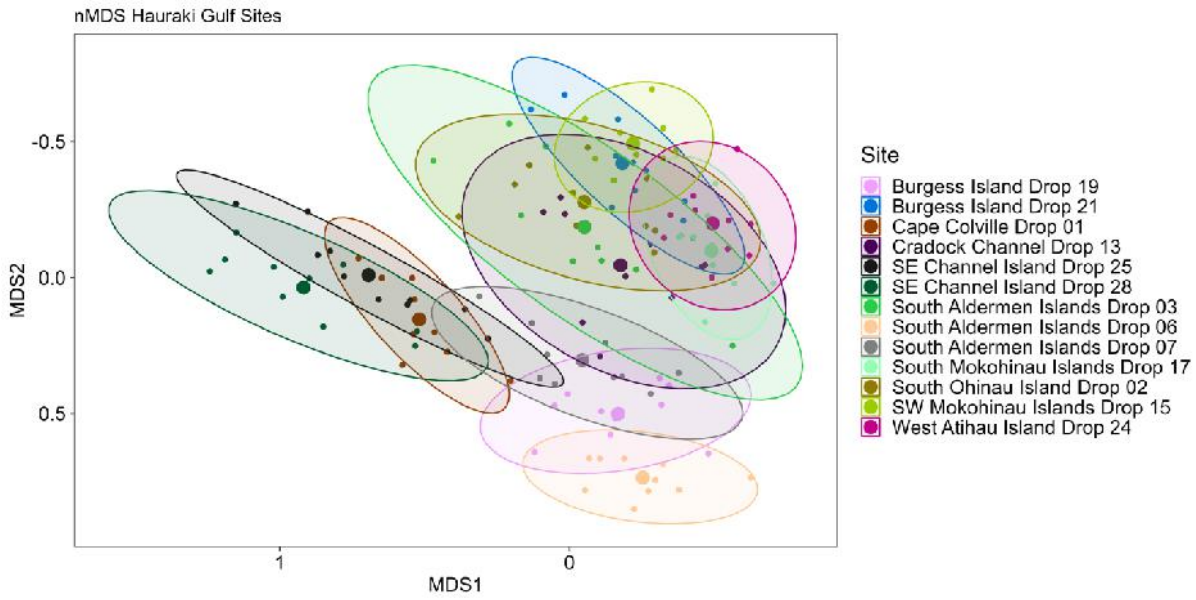

Figure 14. Multidimensional scaling (MDS) plot to compare the benthic communities at 13 deep reef sites in the Hauraki Gulf. Large dots indicate the centroids for each site, with the 95% confidence intervals shown around those centroids. The analysis was based on all 93 benthic groups.

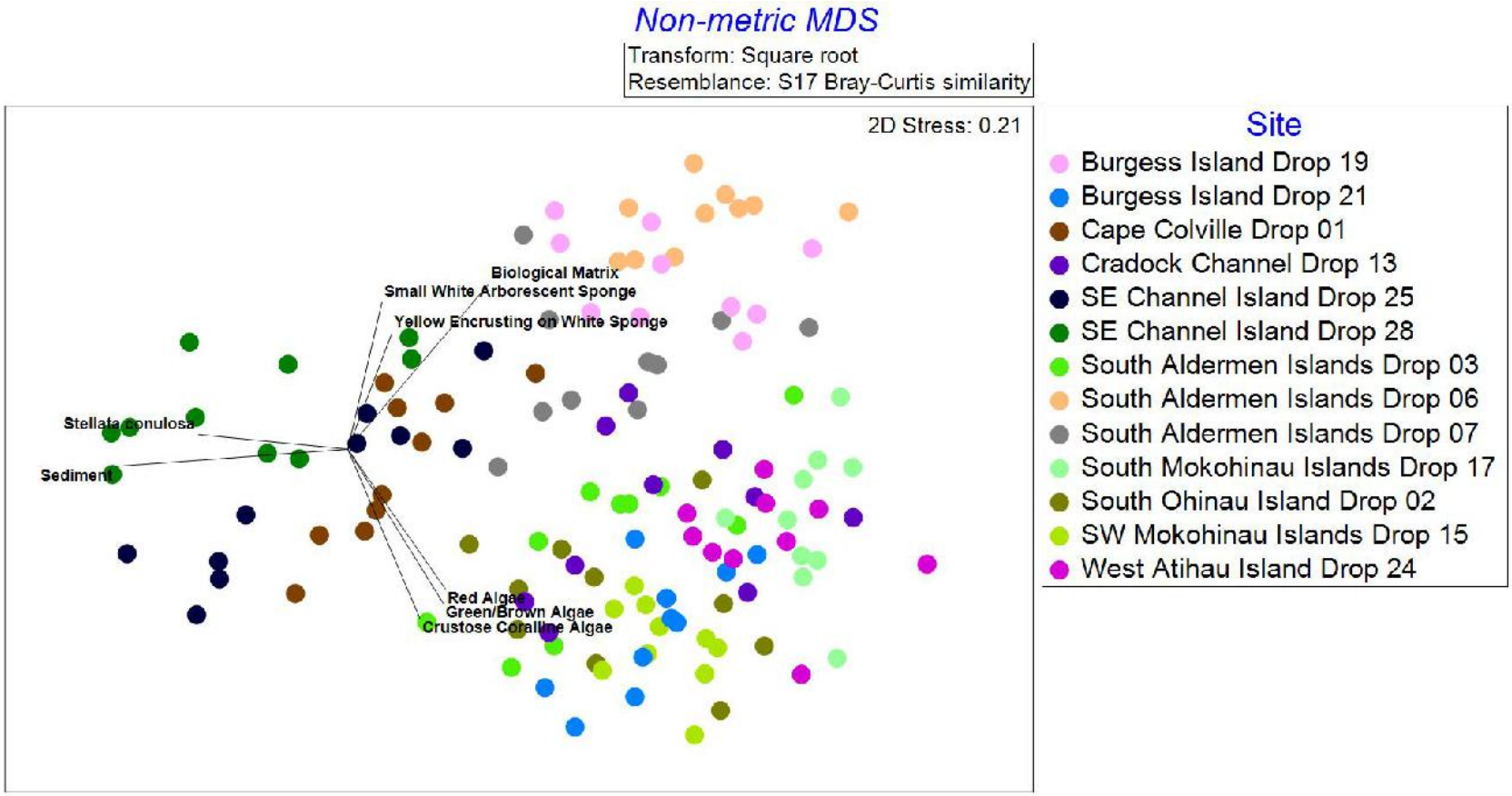

Figure 15. Multidimensional scaling (MDS) plot to compare the benthic communities at 13 deep reef sites in the Hauraki Gulf with overlaid vectors using Pearson correlations (> 0.45). Each point represents the data from an individual frame grab and different colour/shapes represent the different sites. The analysis was conducted on all 93 benthic groups.

3.3 Variation in benthic community composition

Although we conducted a further series of multi-variate analyses on our data where we: 1) removed the abiotic data; and 2) removed the abiotic data and then standardised the remaining data, we found no differences in any of the analyses compared to the data with sediment included. The results from these analyses for the MDS, PERMDISP, PERMANOVA and ANOSIM are shown in Appendices J and K. Based on these results, all further discussion of site-specific community differences/composition and SIMPER analyses are based on the full data set with sediment included.

3.4 Site-specific benthic community composition

Here we describe the dominant benthic groups at the different sites. The percentage cover of the most abundant benthic groups based on the 10 major groups and the full 93 benthic groups at each site are shown in Figures 16 and 17, and in Appendices L and M. The SIMPER analyses that describe the benthic groups that are responsible for differences between sites can be found in Appendix N (based major benthic groups) and O (93 individual groups). Given there are 150 pairwise comparisons between the 13 sites it is not practical to describe each pairwise difference. These descriptions should be read in conjunction with the accompanying document describing the defined biotopes.

Burgess Drop 19 was one of the deeper reefs at around 79-83 m and was dominated by sponges and biological matrix (Figure 17), which together covered over 67% of the substrate at the major group level, followed by sediment/bare substrate, which occupied around 16%. When considering all the benthic groups, biological matrix (approx. 30%), sediment (16%) and several unidentified species including a white arborescent sponge, unidentified bryozoans and colonial ascidians dominated the benthos. This site was also characterised by the arborescent sponge *Raspailia topsenti*. This site had a diverse benthic community with few dominant organisms, compared to some of the other sites.

At the SE Channel Island Drop 25 (around 52-53 m) substrate (53%), sponges (31%) and biological matrix (12%) accounted for over 90% of the benthic cover. When all benthic groups were considered, sediment covered around 53% of the substrate with biological matrix, *Stelletta conulosa* and several unidentified encrusting sponges making up a further 20% of the substrate cover. This site also had high? sponge diversity and was characterised by globular sponges (including *Aaptos globosum*, *Tethya* sp. & *Polymastia hirsuta*), *Raspailia topsenti*, *Polymastia crocea*, *Psammocinia hawere*, along with the bryozoan *Steginoporella neozelanica*, which each occupied around 2% of the benthos.

At SE Channel Island Drop 28, despite being close to Drop 25, the community was very different (the site was slightly deeper at around 54-56 m). Based on the 10 major groups, sponges were the most abundant group (around 57%), followed by substrate (34%) and biological matrix (7%). When considering all the benthic

groups, and excluding sediment (around 34%), *Stelletta conulosa* was very abundant (around 27% cover for this single species, more than at any other site), with lower abundance of biological matrix (7%), *Psammocinia hawere* (6%), *Geodia regina* (4%) and other sponges.

SW Mokohinau Drop 15 was one of the mid-depth range sites at around 51-52 m. However, unlike some of the other sites at this depth, at the major group level this site was dominated by CCA, macroalgae, substrate and then sponges (sponges were more abundant at other sites at this depth), occupying approximately 27, 24, 17 and 14% of the benthos, respectively. When considering all benthic groups, this site was dominated by CCA and green/brown algae, which occupied around 44% of the substrate, with sediment and biological matrix occupying around 14 and 12% of the substrate, respectively. There was also a particularly abundant encrusting orange sponge (unidentified) at this site occupying around 10% of the benthos.

At **West Atihau Island Drop 24**, which was one of our shallowest drops at 46-47 m, macroalgae (30%), biological matrix (28%), sponges (12%), and bryozoans (11%) were the most abundant major biological groups, accounting for around 80% of the benthic cover. This was one of the few sites where substrate occupied a very low proportion of the sea floor (only around 6%). When considering all the benthic groups, biological matrix (approx. 28%,) green/brown algae (approx. 18%), red algae (12%) and a series of unidentified branching bryozoans (8%) were the dominant groups. This was one of the few sites where bryozoans (including *Steginoporella neozelanica*) occupied more than 10% of the substrate.

At **Cape Colville Drop 1** (approximately 43-44 m), the three most abundant major benthic groups were sponges (41%), substrate (35%) and biological matrix (21%), occupying over 97% of the benthos. When including all the benthic groups, excluding sediment (nearly 35% cover), biological matrix (21%), *Ecionemia alata* (15%), and *Stelletta conulosa* (5%) made up around 40% of the benthic cover. The remaining organisms dominating this site were all sponges and some branching hydroids.

At **Cradock Channel Drop 13** (34-36 m), biological matrix and sponges occupied >60% of the substrate, with substrate occupying around 10%. This site differed from others also at this depth by having very limited CCA or macroalgae. When considering all the benthic groups, biological matrix, *Ecionemia alata* and sediment, where the dominant groups, occupying 35, 17 and 10% of the substrate, respectively. This site was characterised by low abundance of different macroalgal groups, occupying between 2-5%, which was perhaps surprising since this site was only around 36 m.

At **South Aldermen Island Drop 3** (49-54 m), biological matrix (23%), substrate (21%), sponges (19%), CCA (15% and cnidaria (9%) were dominant when considering the major groups. Based on all benthic groups, biological matrix (23%, sediment (21%), CCA (15%), branching hydroids (9%) and branching bryozoan (5%)

were the most abundant groups. There were also several sponge species, including *Stelletta conulosa*, *Ecionemia alata* and several unidentified species that each occupied between 2 and 4% of the benthos.

At **South Aldermen Island Drop 6**, which was the deepest site at approximately 86-87 m, when considering the major groups, this site had the highest abundance of biological matrix (61%) of any site, with sponges (22%), and substrate (6%) being the only other abundant benthic categories. When all benthic groups were considered, this site was dominated by biological matrix, with a diverse community of benthic groups including sponges, hydroids, and bryozoans, although each only occupied less than 2% of the benthos.

At **South Aldermen Islands Drop 7** (63-67 m) biological matrix (33%), sponges (30%) and substrate (21%) were the most dominant major groups. When all the benthic groups were considered the most abundant were again biological matrix along with sediment, with no other organism occupying more than 5% of the benthos, but a diverse range of sponges and other invertebrates occurred at this site. Five of the remaining most abundant benthic groups were sponges and included *Stelletta conulosa*, *Fasciospongia turgida*, and two undescribed species.

Burgess Drop 21 (50 m) at the major group level was dominated by macroalgae (36%), sponges (17%), biological matrix (14%), and substrate (12%), with bryozoans, sediment and CCA having between 8-10% cover. When considering all the benthic groups, green/brown algae (18%) and red algae (17%) were the most abundant groups, followed by biological matrix (13%) and sediment (12%). This site was also characterised by several bryozoan species and sponge species (around 10% cover). These species included the sponges *Stelletta conulosa*, *Ecionemia alata*, *Raspailia topsenti* and the bryozoan *Steginoporella neozelanica*. The community at this site was consistent with a transition zone, despite being a relatively deep site, given the abundance of macroalgae.

South Mokohinau Drop 17 (60-61 m) was dominated by sponges (36%), biological matrix (23%), CCA (16%) and macroalgae (6.7%). This was one of the few sites to show high abundance of ascidians with approximately 10% cover. When considering all the benthic groups, biological matrix (23%), CCA (16%) and a colonial ascidian were the abundant organisms. Although this site was dominated by sponges overall, there were low abundances of many sponge species including *Dysidea* sp. and several unidentified sponges (around 3-4%).

South Ohinau Drop 2 (53-55 m) at the major group level was dominated by CCA (33%), biological matrix (25%), sponges (19%) and substrate (18%). All other major groups had low abundance (<2%). When considering all benthic groups, CCA covered 33%, biological matrix 25%, sediment (19%), and the sponges *Stelletta conulosa* and two unidentified orange encrusting sponges occupied around 11% of the benthos.

3.5 CMECS biotopes

Although our multivariate analysis showed significant differences between all thirteen communities, our clustering analysis showed groupings between some sites (Figure 18). However, while the clustering analysis identified six larger groups, sites within these groups were only 50-60% similar in most cases, which we believe does not constitute enough evidence for separate biotopes. Based on further re-examination of the videos from all 28 drops, and the data from the 13 analysed videos, the clustering analyses, and the substrate classifications (since biotopes are not defined on biotic communities alone), we defined twelve different biotopes, with only drop 7 (South Aldermen Islands) and 19 (Burgess) being combined to represent a single biotope. These biotopes are described in detail in the accompanying document.

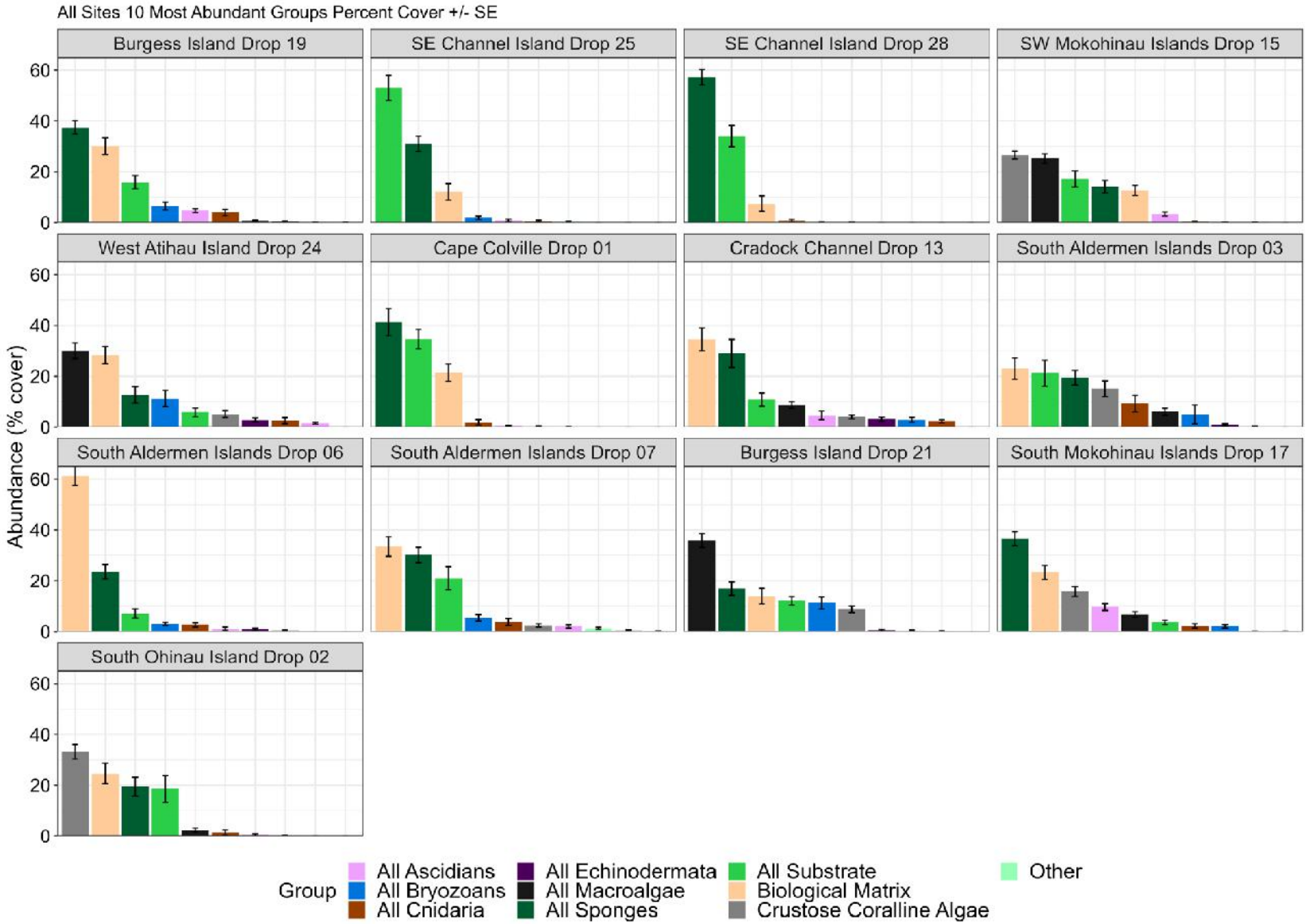

Figure 16. The 10 most abundant benthic groups (based on the percentage cover of the 10 major benthic groups) at 13 sites in the Hauraki Gulf.

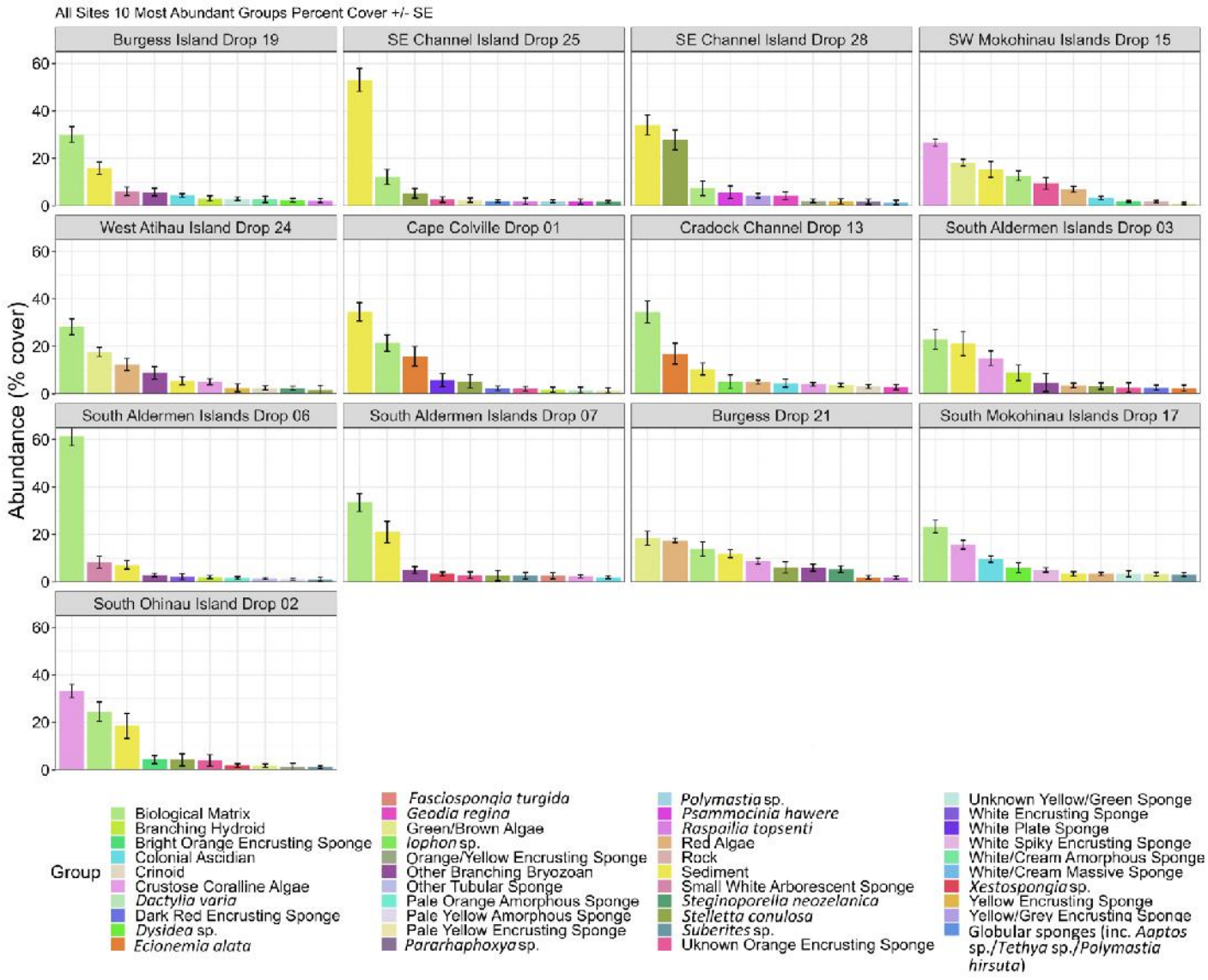

Figure 17. The 10 most abundant benthic groups (based on the percentage cover of all 93 benthic groups) at 13 sites in the Hauraki Gulf. Pictures of benthic groups identified can be found in Appendix B.

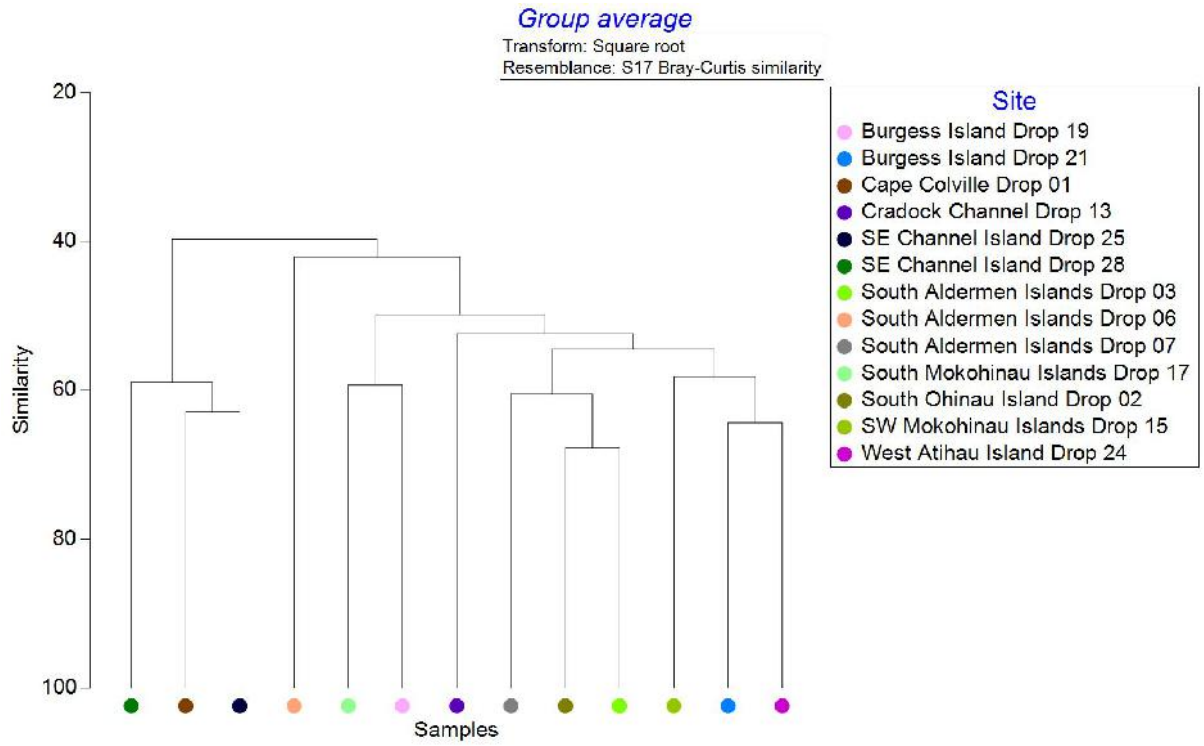

Figure 18. Bray-Curtis Similarity analysis to assess the similarity between the benthic communities at 13 different deep reef sites in the Hauraki Gulf.

3.6 CMECS substrate component

Rock substrate and unconsolidated mineral substrate (2012 CMECS) were the only two primary substrate classes identified in this study. The substrate subclass of the primary substrate revealed that 8 out of 13 drops contained bedrock but no other nested categories, while the remaining 5 drops also contained gravel substrate/gravel (2012 CMECS/ 2023 CMECS). Substrate component classifications have recently been updated (CMECS 2023). To address substrate updates more appropriately, we have added the corresponding classification by year for both the primary substrate classifications (Table 3.6.1) and the co-occurring substrate classifications (Table 3.6.1). While all drops were assigned a primary substrate classification, drops 1, 6, 13, 15, 25, and 28 were additionally assigned co-occurring substrate classifications. Finally, the rugosity of the primary substrate showed moderate (drops 2, 25), high (drops 1, 6, 13, 15, 21, 28), and very high (drops 3, 7, 17, 19, 24) complexities, while any co-occurring substrate classifications showed a very low rugosity rating (drops 1, 6, 13).

Table 3.6.1: Primary Substrate (> 50% cover) assignments for analysed ROV drops. Each category is compared with the 2012 CMECS and the corresponding 2023 CMECS substrate categories. Substrate origin is of geologic substrate for all drops irrespective of CMECS version. Primary substrate modifiers follow the 2012 CMECS. Please refer to Table 1 for corresponding location details for each drop number.

Drops	Substrate Class		Substrate Subclass		Substrate Group		Substrate Subgroup	
	2012	2023	2012	2023	2012	2023	2012	2023
2, 3, 7, 17, 19, 21, 24, 25	Rock Substrate	Consolidated Mineral Substrate	Bedrock	N/A	N/A	N/A	N/A	N/A
1, 6, 13, 15, 28	Unconsolidated Mineral Substrate	Coarse Unconsolidated Mineral Substrate	Coarse Unconsolidated Mineral Substrate	Gravel Substrate	Gravel	Very Coarse Gravel	Boulder	Boulder

Drops	Primary Substrate Modifiers (2012 CMECS)		
	Percent Cover	Geoform	Rugosity
15	80 to < 90 %	Boulder Field (>256mm)	High
28	60 to < 70%	Boulder Field (>256mm)	High
13	50 to <60%	Boulder Field (>256mm)	High
1	50 to <60%	Boulder Field (>256mm)	High
6	40 to <50%	Boulder Field (>256mm)	High
3, 7, 17,19, 24	90 – 100 %	Rock Outcrop	Very High
21	80 to < 90 %	Rock Outcrop	High
2, 25	90 – 100 %	Platform	Moderate

Table 3.6.2: Co-Occurring Substrate assignments. Each category is compared with the 2012 CMECS (FDGC 2012) and the corresponding updated 2023 CMECS substrate categories. Substrate origin is of geologic substrate for all drops irrespective of CMECS version. Primary substrate modifiers follow the 2012 CMECS. Please refer to Table 1 for corresponding location details for each drop number.

Drops	Co-Occuring Substrate Class		Co-Occuring Substrate Subclass		Co-Occuring Substrate Group		Co-Occuring Substrate Subgroup	
	2012	2023	2012	2023	2012	2023	2012	2023
1, 6, 13, 15, 25, 28	Unconsolidated Mineral Substrate	Coarse Unconsolidated Substrate	Coarse Unconsolidated Substrate	Mixed Gravels	Gravel Mixes	Gravel Mixes	Sandy Gravel	Sandy Gravel

Co-Occuring Substrate Modifiers (2012 CMECS)

Drops	Percent Cover	Geoform	Rugosity
1, 6, 13	40 to < 50 %	Sediment Wave Field	Very Low
15, 25	1 to < 10 %	N/A	N/A
28	20 to < 30 %	N/A	N/A

4.0 Discussion

4.1 Brief overview of deep reef communities

We made 28 ROV deployments across four sub-regions in the Hauraki Gulf and analysed frame grabs from thirteen of these drops. From our multivariate analyses, we found significant differences between all the benthic communities, which is perhaps not surprising as these sites were selected to encompass as wide a range of ecosystems as possible to aid with the delineation of many biotopes using CMECS, and we characterized communities at a high taxonomic level. At some of the shallower ROV drops (but not always), Crustose Corraline Algae (CCA) and macroalgae were abundant, but generally, we found deep reef communities were dominated by sponges. However, there was variation in the sponge species that dominated at the different sites, which often drove the significant pairwise differences between sites. We did not measure any environmental parameters at the ROV drop sites, which limits our ability to determine the drivers of these differences. However, there were differences between communities based on depth and substrate types. Interestingly, our analysis using the major benthic groups showed the same results as when we used all 93 groups. The consistency between these two analyses provides support for the biotopes we have defined. While our multivariate analyses showed significant differences between all 13 sites, our clustering analysis of benthic community data identified only six major groups. However, despite this discrepancy, upon examination of the abundance information, combined with the substrate/geoform classification, we defined twelve biotopes from the 13 ROV drops. The specific biotopes based on CMECS, which incorporate not only the biological components but also the geoform and substrate components, are described in a separate document, which should be read in conjunction with this report.

4.2 Evidence of human impacts

We believe the most likely threats to the deep-water communities in the Hauraki Gulf include physical damage to the seafloor from recreational fishing (e.g. from anchors) and changes in water quality (including nutrients and sedimentation/turbidity; see recent review by Bell et al. (2024b) for a qualitative ranking of human impacts on temperate mesophotic ecosystems). However, we did not observe any major obvious impacts on the communities we observed. Despite the areas we sampled being subject to recreational fishing pressure, there were no obvious impacts from these activities based on our ROV deployments, except for anchor rope at Cradock Channel (drop 13). However, given that our sampling only represents a 'snapshot' of the condition of the deep-water communities, it is very hard to determine if these ecosystems have been significantly degraded over time. It is noteworthy that we did find some protected species in our ROV deployments, specifically black corals and cup corals. The black corals are likely to be susceptible to physical disturbance since they are slow-growing and long-lived and therefore susceptible to the impact of bottom contact fisheries (Hitt et al.

2020). It is possible that black corals have inhabited all the deep reefs we explored in the past, since many of the reefs seemed to provide suitable habitat, but that human impacts have removed them over time.

4.3 Potential issues in the application of the CMECS approach to mesophotic reefs

4.3.1 Use of Modifiers

We used one existing CMECS modifier, rugosity, and developed two of our own modifiers to characterise the mesophotic depth zone and sponge morphological variation. The rugosity measure was relatively useful in helping to characterize our biotopes, but it was not as useful as the mesophotic depth zone and sponge morphology modifiers. The mesophotic depth zone modifier is important, as light is a major driver of benthic community composition in mesophotic ecosystems (Bell et al., 2024b), and therefore, it is crucial to capture some aspects of this environmental variable. The sponge morphology modifier was also useful, as it was very difficult from the ROV frame grabs and videos to confidently identify all the sponges (see below); however, this modifier enabled us to capture the nature of and differences in sponge assemblages between biotopes. Furthermore, the sponge morphology modifier provides some indication of the environmental conditions that a location experiences, as sponge morphology has been strongly linked to local environmental conditions (e.g., Bell and Barnes, 2000b).

As we conducted only a single ROV drop at each site and collected no environmental data, it was very difficult for us to consider or use any other modifiers reliably. This limitation restricted our ability to delineate biotopes more precisely since biotopes represent a combination of biological and physical aspects. Further environmental data from each location would help support a stronger delineation of biotopes, especially in cases where the underlying structure of the environment might look similar between two locations, but the biological communities are very different.

4.3.2 Geoform and substrate categorisation

The identification of the geoform component for each CMECS biotope classification was relatively straightforward, although it was not particularly useful in our case for the delineation of biotopes. The geoform component only separated our biotopes into two groups, based on the level 1 geoform being either a rock outcrop or platform. However, this should not be surprising given that we targeted a specific habitat type, mesophotic depth reefs, in a single region. The substrate component was more useful in helping to support the delineation of biotopes, but we found it hard to apply from the ROV footage. Again, as we targeted a specific habitat type, rocky reef, it was relatively easy to classify the primary substrate, which was either boulder or bedrock. However, classifying any secondary substrate

was more difficult since it's not particularly easy to determine sediment grain size from imagery. Also, the CMECS substrate divisions are specific (e.g., 10-20% cover of a specific grain size), and this is not always easy to accurately determine from videos and frame grabs. There were also issues with deciding whether to include a secondary substrate or not, for example, when a large rocky reef met the seafloor, which was soft sediment. Generally, in such cases, we did not include a secondary substrate as our focus was on the rocky reef structure and the soft sediment extended beyond the scale of our assessment (see below for more discussion on scale).

4.3.3 Delineation of CMECS biotopes and replication

Deciding what constituted a separate biotope based on the biological data was not straightforward, and determining just how different a community needs to be, while also considering the substrate components, to represent a distinct biotope was challenging, even when supported by robust statistical analysis. If we had relied on the multivariate analysis alone to differentiate between different biotopes, we would have defined 13 separate biotopes. However, it is important to recognize that statistical significance does not necessarily equate to ecological significance, and the multivariate analyses are likely to pick up smaller differences between marine communities than might be relevant for management purposes. We used the abundance information and multivariate analysis combined with the subsequent assessment of geoform and substrate at each ROV drop, overlaying our expert opinion based on >300 shallow water ROV dives in New Zealand and >2500 SCUBA dives, to define the twelve biotopes. Several previous studies have exclusively relied on clustering analysis to define biotopes (including combining Bray-Curtis similarity dendrograms with the statistical test SIMPROF), but these earlier studies have generally encompassed a much wider range of ecosystem types (e.g., soft sediment, sandy and rocky habitats) or have quantified the biological component at a much broader taxonomic level than our study (e.g., only to the level of sponges, bryozoans, etc.). This differs from our study in that we targeted a specific habitat type, rocky deep reefs, and conducted our analysis at a very high taxonomic level (even though we were unable to identify many taxa to species level and relied on OTUs). If we had relied exclusively on the clustering analysis, we would have defined just six major biotopes (Figure 18), although the members in those four groups generally had only around 50-60% similarity. We chose not to use these six groups since they encompassed what we considered an unacceptable range of communities (see section 3.4 for a description of the communities at each site) and would have encompassed multiple substrate components. However, while biotopes are not just defined on the biotic community alone, the delination of our 12 biotopes from what the clustering analysis showed was not just based on the overlay of the substrate and geomorph components.

It is important to note that our initial selection of the ROV drops aimed to capture as much of the variation in benthic communities in the Hauraki Gulf as possible and therefore it should not be surprising that the multivariate analyses identified significant differences between all sites. Based on an initial rapid assessment of the remaining drops that were not analysed in this study, we expect many of the biotopes we identified to be repeated when the remaining ROV drops are analysed. Importantly, this will be the key test for the support of the biotopes we have defined. The CMECS approach recognizes that there will be some variation in the final biotopes that are defined (FDGC, 2012), but a key component to the CMECS scheme is that the same biotope is replicated, meaning the biotope is found in multiple locations. The next step will be to analyse the remaining ROV videos and ideally collect more videos to ensure that all the biotopes we have defined occur at more than one location. We highlight that during this process, some modifications may be needed to the biotopes we have defined, particularly to recognize the presence of more co-occurring species and some variation in the abundance of key groups. Furthermore, some biotopes may need to be combined or collapsed once we have a better understanding of the spatial variation in the biotopes.

Another issue that arose when applying the CMECS hierarchy was how to classify the transition zones or so-called 'ecotones' that often occur along habitat edges. These ecotones can range from sharp boundaries to very broad and gradually changing areas. Ecotones are important areas that can have increased biodiversity and greater abundances of organisms since they can potentially include groups of organisms from different communities (Braga-Henriques et al., 2022). Importantly for deep reefs, ecotones occur at the boundaries between the shallower macroalgal-dominated communities and the deeper animal-dominated (and also CCA) communities (Harris et al., 2022). Several of the sites we analyzed (e.g., South Ohinau Island Drop 2) had a combination of animals and macroalgae and represented transitional communities between shallow and mesophotic communities. However, while previous authors have highlighted issues in classifying ecotones (see Kingon 2018), for most of the rocky structures we explored, depth was consistent across the ROV deployment (Table 1), so we chose to characterize these communities as distinct biotopes. We believe this is important as these transitional communities form unique community compositions compared to shallower and deeper communities. The presence of biogeographical ecotones also has the potential to confound the classification of benthic communities. All species we encountered will have different biogeographical ranges, and ranges for individual species are unlikely to have very sharp boundaries given various environmental gradients from the north to south of New Zealand (particularly temperature; e.g., Sutton and Bowen, 2019). Instead, species are likely to decline in abundance over perhaps 10-100s km scales, which incorporates the scales used in the present study. However, although some species

will decline slowly and others increase in abundance across these larger scale biogeographical scales, the result still results in different biological communities that can be classified in the CMECS hierarchy. The importance (or not) of such ecotones across small (perhaps 10s m in the case of the transition from macroalgal to animal-dominated communities) and larger scale (100 km in the case of biogeographical gradients) gradients can only be assessed once more communities/biotopes are classified.

4.3.4 Identification of organism's presence

The Boxfish ROV provides 4K video footage, with extracted stills having approximately 12MP resolution. While these still images provide high resolution of the seafloor, as the ROV can get within centimetres of the substrate, identification of organisms in deeper mesophotic ecosystems is problematic. Although we are confident in the identification of the most conspicuous organisms, there were many, particularly small, cryptic, and encrusting organisms that it was not possible to identify to the species level and, in many cases, it was only possible to identify organisms to the level of phyla or class. Despite this, we were able to consistently identify the same species across photographs (see Appendix B for categorisations), even though it was not always possible to name the species. This gives confidence in the multivariate analyses conducted, and the pictures associated with each of the categories used in the CPCe analysis should allow a relatively high level of repeatability when trying to include future deep reef ROV analysis in CMECS. It is also important to note that several of the biological groups we identified as generally being the most abundant require microscopic examination to confirm their identity (e.g., sponges, bryozoans, and the organisms making up the biological matrix). The deeper nature of the reefs we have surveyed makes them difficult to collect samples from with traditional SCUBA divers. Unfortunately, our ROV grabber was not functional during the Hauraki Gulf surveys, although most of the species we could not identify were either very small or encrusting, so it would not have been possible to get samples with the ROV grabber anyway. Given that we have only just begun exploring mesophotic ecosystems within New Zealand, it also seems very likely that many of the species are undescribed.

Since many of the species observed were rare, they are not too important in the context of CMECS, since the classification of biotopes is generally based on the dominant organisms. However, while not identifying species to a low taxonomic level didn't impede our ability to distinguish our biotopes, the category 'biological matrix' requires some consideration since it was one of the most abundant groups across all sites. This category, used in the analyses (and consistent with our previous work and published studies; Micaroni et al., 2021; Bell et al., 2024b), describes a complex association between a number of taxonomic groups including bryozoans, hydrozoans, sponges, filamentous algae, and

other cnidarians, and also supports many mobile fauna. While our CMECS biotopes are defined based on the larger conspicuous organisms, it is very possible (but not yet explored in the literature) that there is considerable variation in the makeup of the biological matrix between sites. Whether or not this is important to the larger CMECS biotope classifications remains unclear, and perhaps represents spatial variation at a smaller biological scale than needs to be considered for biotope differentiation.

4.3.5 Spatial scale of assessment

CMECS requires the spatial scale of assessment to be identified at the outset of assessments (FDGC, 2012). In this study, we decided on a scale of approximately 20-50 m² based on our goal to capture defined hard substratum biotopes, rather than multiple biotopes, while sampling at an ecologically relevant spatial scale to capture representative organisms of different community types. This spatial scale was also used because some of the deep-water rocky structures we sampled were this size. This sampling scale was driven by the practical limitations of live-ROV deployments from the back of a vessel, which essentially creates a point sample with the ROV moving in a 180-degree arc from the back of the boat. While we believe this sampling scale was appropriate for characterizing biotopes, it's important to recognize that in many of the rocky habitats we sampled, there are major differences between the communities inhabiting vertical and inclined/horizontal surfaces on those reefs. This difference between these surface types has been well described (see Bell and Barnes 2000a; Cardenas et al., 2012; 2016) and occurs because of direct impacts from variation in light and sedimentation, and indirectly because of competition, particularly with algae (Preciado and Maldonado, 2005; Cardenas et al., 2016). In some of our sampling locations (e.g., Cape Colville Drop 1 and South Alderman Islands Drop 6) the rocky areas were mostly horizontal, but in others (e.g., East Burgess Island Drop 19 and South Ohinau Island Drop 2), there was a clear mix of vertical, inclined, and horizontal surfaces. Our approach of collecting all possible images/frames that would be suitable for analysis from the videos and randomly selecting ten images to analyse will have combined communities from all surface angles, and therefore combined this variation, which we believe is appropriate given the initial defined scale for the CMECS classification. However, it does highlight a potential issue in defining deep reef biotopes if there is a bias towards specific reef surface angles, and the dominance of a specific surface angle could be responsible for defining a new biotope, when it’s just a subset of another community.

4.3.6 Usefulness of using percentage cover for community assessments in 3D habitats

There are three approaches that have been used to characterize the abundance of subtidal organisms: percentage cover, number of 'individuals', and volumetric measurements. We used a widely adopted method to estimate the abundance of reef-inhabiting organisms by estimating the percentage cover of different benthic groups (e.g., Micaroni et al., 2021; Harris et al., 2022; Bell et al., 2024bb). Given that most of the organisms we encountered were either colonial or colonial-type organisms (e.g., sponges, which are not classified as either true individuals or colonies), this approach was the most suitable for characterising the communities we encountered. However, a percentage cover approach does not capture the three-dimensional nature of many of the communities we encountered. For example, there were many upright branching sponges, which often have high overall volume but only occupy a small area of the substrate. Therefore, for such species, a percentage cover approach might not fully capture their contribution to an overall biotope. Furthermore, the CMECS approach does not capture the three-dimensional nature of biological communities, although we did manage this to some extent with our sponge morphology modifier. While for such species a volumetric measurement might provide a better representation of the overall ecosystem function of these organisms (see Bell et al. 2017 for a full discussion), these measurements are generally hard to collect. The application of photogrammetry (e.g., see Rovellini et al., 2023) has the potential to address these shortcomings, although if only a volumetric approach is used, there is the potential for thin encrusting species to be under-represented in community characterisation. We also recognize that for some solitary organisms, such as cup corals or barnacles, percentage cover might not be the most appropriate way to characterize abundance, and densities might be better. However, these organisms were comparatively rare at the sites we sampled. These issues illustrate the importance of using a combination of formal data collection/analyses and expert opinion in defining biotopes.

4.3.7 Temporal stability of defined biotopes

It is important to note that our sampling was undertaken at a single time point, and it's possible that there are seasonal fluctuations and inter-annual fluctuations in the community compositions of the deep reef communities we surveyed. It is also highly likely that co-occurring elements will be temporally variable. While CMECS biotopes should be delineated to account for any seasonal variation, there is currently no published data on the degree of seasonal or inter-annual variability for reefs in the 50-100 m depth range. However, the Bell research group currently has an ongoing project looking at inter-annual variation in deep reefs between 20 and 100 m in Fiordland and at the Poor Knights Marine Reserve, and initial results from this work suggest that these deeper reefs are very stable over time, compared to shallower reefs (5-25 m). This stability is perhaps not surprising, given that the dominant fauna on most of the deep reefs examined are sponges, which are generally long-lived and slow-growing. To ensure the stability of the biotopes we have defined, it may be useful in the future to re-sample some of the same reefs and assess any variation through time.

4.3.8 Implications of identifying abiotic factors in analysis

Generally, in analyses such as the one we have conducted, abiotic categories and points that fall on sediment-covered substrates or bare substrates are also recorded in addition to biological groups. If they are not included, or are removed prior to the analysis, then the actual percentage cover of each biotic group would be overestimated. However, the final CMECS biotopes are defined based on a combination of biological communities and abiotic factors, abiotic habitat features are generally captured outside any biological community analysis when applying the CMECS hierarchy. To address this issue, we conducted our analyses on three different sub-datasets based on the high abundance of the abiotic category 'other substrate' that we included in our CPCe analysis (up to 51% cover, average around 18%). These analyses included the full dataset with the sediment included, a dataset with the sediment removed, and a dataset with the sediment removed and then standardized (so scaling of the remaining categories to 100% cover). With these three separate analyses, we were able to assess the robustness of our biological analysis to this potential issue. While we did find some variation in the results of the multivariate analyses with the different datasets, all three still identified the same significantly different communities, providing confidence in the community differences we defined. The issue we have highlighted here could become more problematic in areas where there are very high levels of bare space or sediment, where these categories become most important in driving patterns in the multivariate analyses.

4.3.9 Co-occurring elements, range, and related biotopes

While co-occurring elements can be useful in describing biotopes, it can be difficult in some cases to accurately define such species or the consistency of these species for specific biotopes. The

consistency of any co-occurring elements is also difficult to determine without first exploring the spatial variation in the biotopes defined. Of note, we found a few protected black corals (likely *Antipathella* spp.) at five of the thirteen sites, and while they were rarely recorded in our benthic analysis, they are regularly found in deep reef environments. However, since black corals are particularly sensitive to benthic contact activities like anchoring and fishing, because they are very slow-growing and long-lived (Hitt et al., 2020), their absence from most sites might reflect past human impact rather than the lack of a specific habitat requirement for this species.

We were not able to define the biogeographical range for any of our biotopes since we are the first to formally define deep water biotopes in New Zealand, and this won't be possible until many more deep reefs are explored. However, the Bell research group has now explored deep reefs in the Bay of Islands, Northland, Fiordland, and Wellington/Kapiti, and the communities in each of these regions appear to support different-looking benthic communities, although most are still dominated by sponges and biological matrix (Harris et al., 2022; Bell et al., 2024b). The authors' experience suggests that deep reef communities may vary considerably between different regions in New Zealand. This is perhaps not surprising given the wide range of environmental gradients from the north to the south of New Zealand and would be consistent with what has been reported for shallower reef systems (Shears et al., 2008). As this is the first attempt to define deep reef communities in New Zealand using the CMECS scheme, it is also difficult to define related biotopes, and this will only really be possible once the classification scheme is developed for more communities.

4.4 Next steps

The most important next step will be to analyse the remaining videos from the ROV drops we completed, and ideally, collect further video data from the deep reefs in the Hauraki Gulf, as we only visited a small proportion of the deep reefs in the region. This will enable us to assess the spatial variation of the biotopes we have defined and determine if these biotopes are replicated throughout the area. Further ROV drops across the region, including those in reef areas below 100 m, will also be important to capture the full range of biotopes present. It would also be valuable to re-sample some of the same locations over time to assess the temporal stability of the biotopes we have defined. Some temporal variation in communities is expected within the context of the CMECS hierarchy, and while long-term stability (over decades) might be expected in mesophotic ecosystems, this assumption should be explicitly tested. Once a broader picture of the distribution of the different deep reef biotopes has been mapped, the next step will be to consider how current protection measures safeguard representatives of these communities and what further protection might be needed.

Finally, while the aim of this study was to assess the benthic communities at deep reef sites and classify/define biotopes based on the CMECS hierarchy, there would also be value in understanding more about the biological (e.g., food availability) and physical factors (particularly sediment and light) that explain the distribution patterns, as these will help identify future potential threats to these ecosystems and further strengthen the biotope descriptions.

We have only considered the deep reefs in a single region of New Zealand, and while other assessments are currently being undertaken in New Zealand (including in Wellington, Fiordland, and Otago), more comprehensive biotope classification is needed to build a complete picture of mesophotic biotope classifications at the national level. Although this is likely to be time-consuming and expensive, we have shown that it is likely that biotope delineation might not require a full community-level assessment for every community; in fact, classification at higher taxonomic levels might be adequate to enbable initial differences between communities to be identified. For example, we found that similar multivariate differences between communities were apparent using both our full dataset containing all OTUs/species, as well as when using higher taxonomic levels. However, this higher taxonomic level information would be the starting point for CMECS delination as this biological information would still need the geoform and substrate components overload to define biotopes. Furthermore, specific consideration would still be needed of the actual species present when describing the final biotopes to ensure appropriate biotope delineation.

Finally, while the biotopes we delineated were supported by multivariate analysis and the geoform/substrate classification, there was also some reliance on expert opinion. While we believe the biotopes we have defined are robust (based on extensive experience with deep reefs), relying on only a few experts has the potential for bias. We suggest that once biotope classifications are available for many geographical regions, a workshop should be held with many specialists to assess each defined biotope, which will support a consistent national approach to the classification of mesophotic ecosystems to be implemented. While we expect this approach will provide the most robust approach to define biotopes, it is important to also recognise that the mesophotic hierarchies we have define here for mesophotic regions will be specific for different regions around New Zealand.

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Appendix A

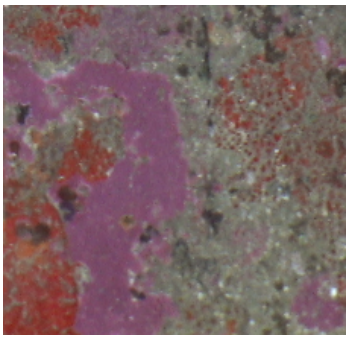
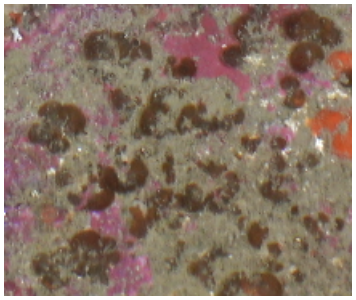
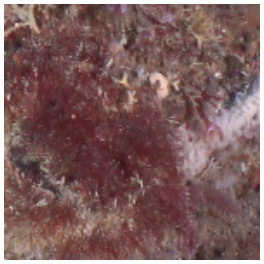
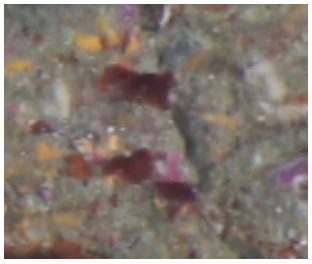
Species list of benthic organisms identified during the ROV analysis.

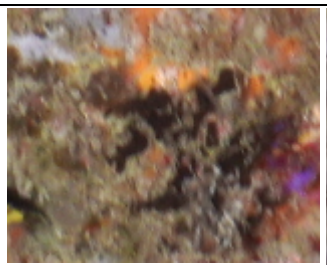
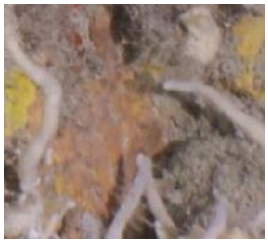
Algae	*Fasciospongia turgida?*
Crustose Coralline Algae (CCA)	*Geodia regina*
Green/Brown Algae	Globular sponges (including *Aaptos*
Red Algae	*globosum*, *Tethya* sp. & *Polymastia hirsuta*)
	Grey Pedunculate Sponge
Ascidiacea	*Iophon laevistylis*
Colonial Ascidian	*Iophon* sp.
Lissoclinum sp.	Large White Arborescent Sponge
Orange Solitary Ascidian	Massive/Arborescent Orange Sponge
	Orange Massive/Encrusting Sponge
Bryozoa	Orange Spiked Sponge
Other Branching Bryozoan	Orange/Yellow Encrusting Sponge
Other Encrusting Bryozoan	Other Globular Sponge
Purple Encrusting Bryozoan	Other Tubular Sponge
Steginoporella neozelanica	Pale Orange Amorphous Sponge
	Pale Orange Encrusting Sponge
Cnidaria	Pale Yellow Amorphous Sponge
Alcyonium sp.	Pale Yellow Encrusting Sponge
Anemone (e.g. *Alicia* sp.)	*Pararhaphoxya* sp.*?*
Antipathella sp.	*Petromica* sp.
Branching Hydroid	*Polymastia crocea*
Cup corals *(Desmophyllum dianthus;*	*Psammocinia hawere*
Caryophyllia spp.)	*Psammocinia perforadorsa?*
Unidentified (Bryozoa/Cnidaria?)	*Raspailia topsenti?*
Unidentified Cnidaria	*Rossella ijimai?*
	Rowella tubulosa
Echinodermata	Small White Arborescent Sponge
Asteroidea	*Stelletta conulosa*
Crinoid	*Stelletta crater*
Urchin	*Stelletta maori*
	Suberites sp.*?*
Other	*Symplectella rowi?*
Biological Matrix	*Tethya* sp.
Bivalve	Unknown Orange Encrusting Sponge
Brachiopod	Unknown Red Encrusting Sponge
Polychaete Worm	Unknown Textured Encrusting Sponge
Porifera	Unknown Yellow/Green sponge
Amorphous Brown Sponge	White Encrusting Sponge
Amorphous Pale Grey Sponge	White Plate Sponge
Axinella australiensis?	White Spiky Encrusting Sponge
Bright Orange Encrusting Sponge	White Tubular Sponge
Callyspongia latituba	White/Cream Amorphous Sponge
Callyspongia ramosa	White/Cream Massive Sponge
Ciocalypta cf. *penicillis*	*Xestospongia sp.?*
Dactylia varia?	Yellow Arborescent Sponge
Dark Grey Amorphous Sponge	Yellow Encrusting on White Sponge
Dark Red Encrusting Sponge	Yellow Encrusting Sponge
Dendrilla rosa	Yellow Flabellate Sponge

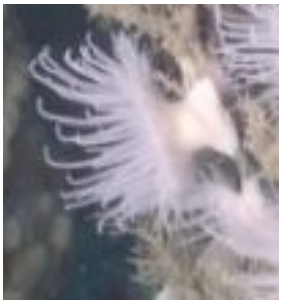
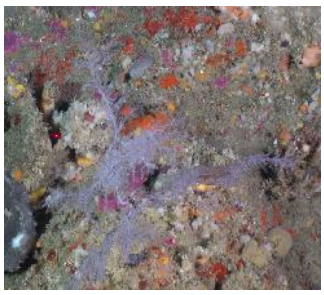
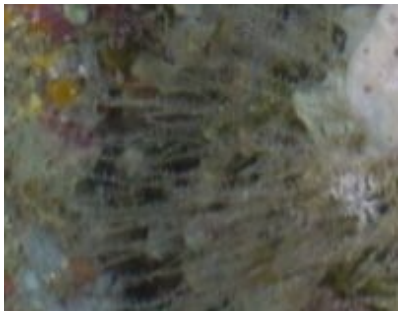
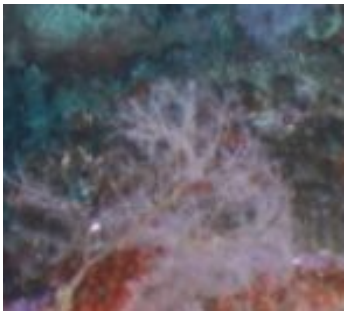
Desmacidon mammilatum? *Dictyodendrila* sp.*?* *Dysidea* sp. *Ecionemia alata*	Yellow/Brown Massive Sponge Yellow/Grey Amorphous Sponge Yellow/Grey Encrusting Sponge

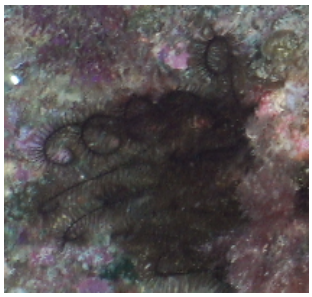
Appendix B

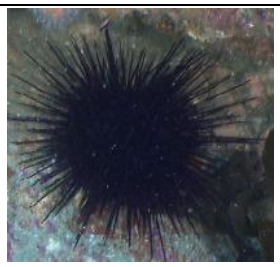
Pictures of the benthic groups identified from the ROV analysis.

Algae	
Crustose Coralline Algae	 
Green/Brown Algae	 
Red Algae	  
Ascidiacea	
Colonial Ascidian	  
Lissoclinum sp.	

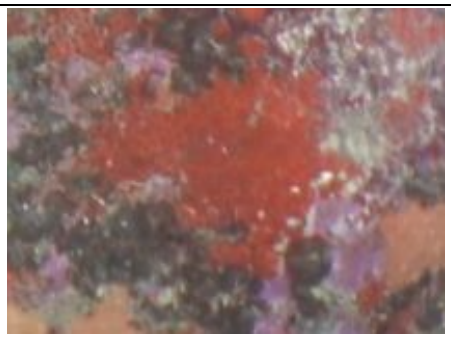
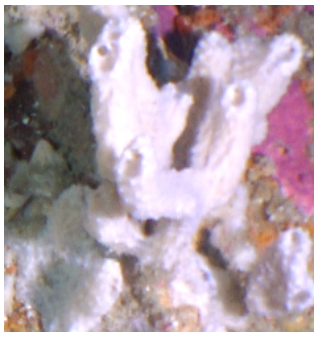
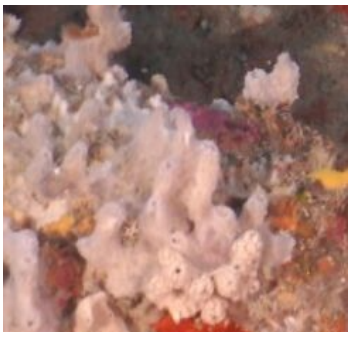
	 
Orange Solitary Ascidian	 
Bryozoa	
Other Branching Bryozoan	  
Other Encrusting Bryozoan	 
Purple Encrusting Bryozoan	 
Steginoporella neozelanica	

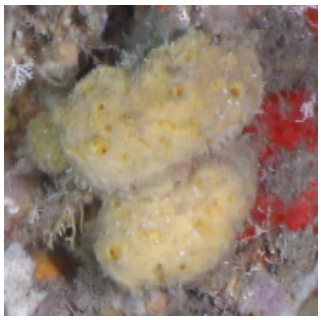
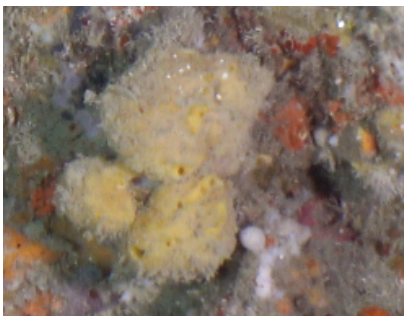
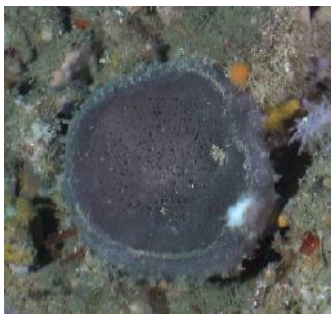
	 
Cnidaria	
Alcyonium sp.	 
Anemone	  *Alicia* sp.
Antipathella sp.	 
Branching Hydroid	 
Cup corals	

	  *Desmophyllum dianthus* *Caryophyllia spp.*
Unidentified (bryozoa/cnidaria?)	 
Unidentified cnidarians	
Echinodermata	
Asteroidea	 
Crinoid	 
Urchin	

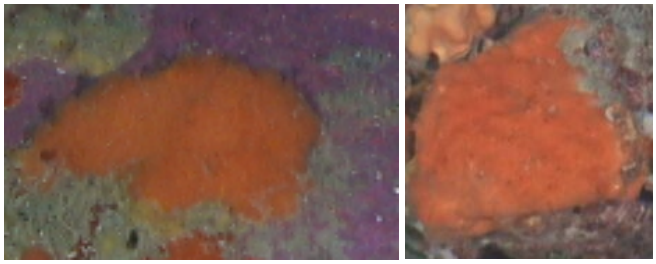
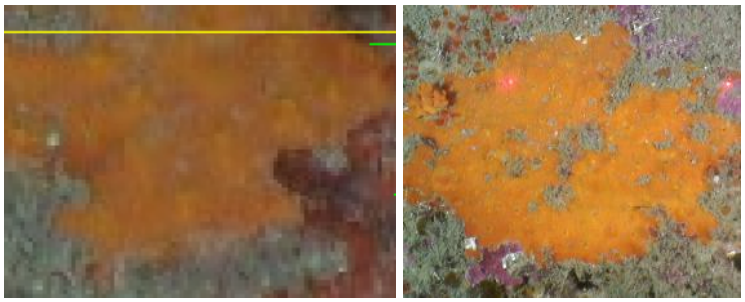
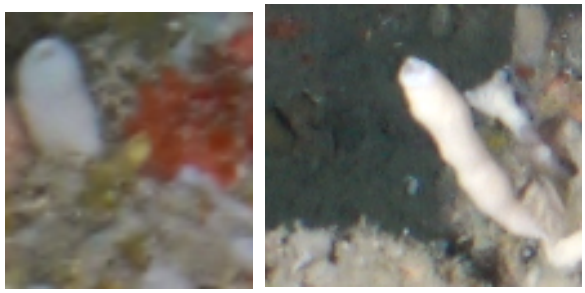
	 
Porifera	
Amorphous Brown Sponge	
Amorphous Pale Grey Sponge	
Axinella australiensis?	
Bright Orange Encrusting Sponge	 
Callyspongia latituba	

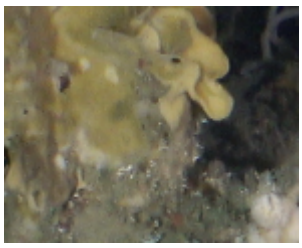
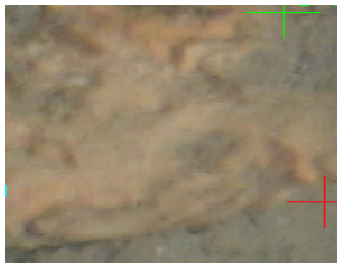
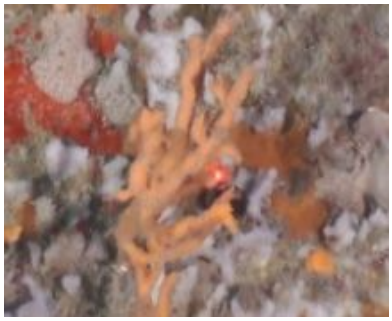
	 
Callyspongia ramosa	
Ciocalypta cf penicillis	
Dactylia varia?	
Dark Grey Amorphous Sponge	 
Dark Red Encrusting Sponge	

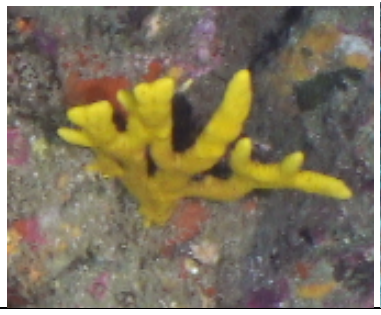
	
Dendrilla rosa	
Desmacidon mammilatum?	 
Dictyodendrila sp.?	
Dysidea sp.	 

Ecionemia alata	 
Fasciospongia turgida?	 
Geodia regina	 
Globular sponges (including *Aaptos globosum*, *Tethya* sp. & *Polymastia hirsuta*)	   
Grey Pedunculate Sponge	

	
Iophon laevistylis	 
Iophon sp.	 
Large White Arborescent Sponge	 
Massive/Arborescent Orange Sponge	

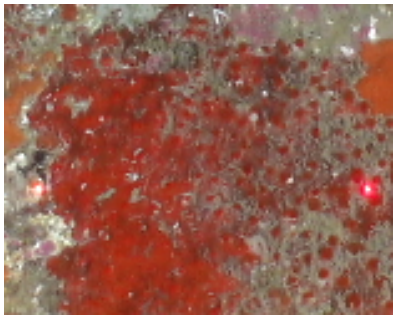
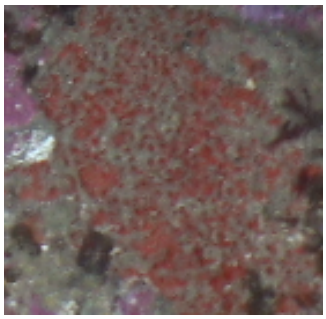
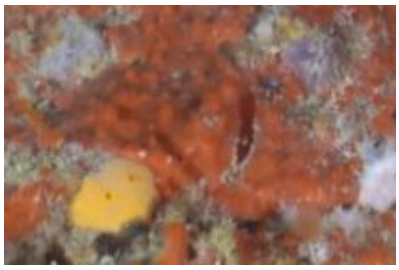
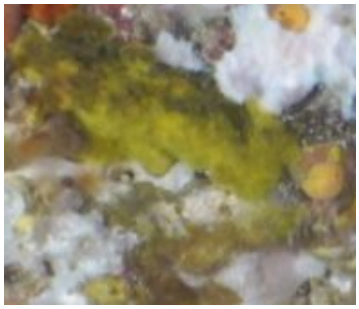
Orange Massive/Encrusting Sponge	
Orange Spiked Sponge	
Orange/Yellow Encrusting Sponge	
Other Globular Sponge	
Other Tubular Sponge	

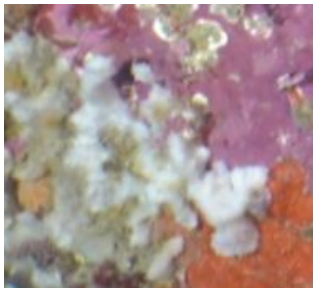
Pale Orange Amorphous Sponge	
Pale Orange Encrusting Sponge	 
Pale Yellow Amorphous Sponge	 
Pale Yellow Encrusting Sponge	 
Pararhaphoxya sp.?	
Petromica sp.	

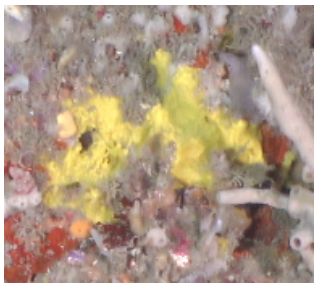
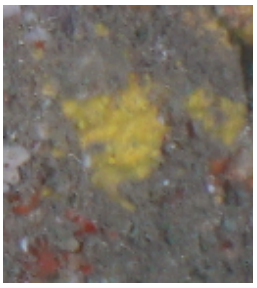
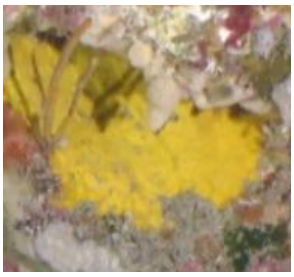
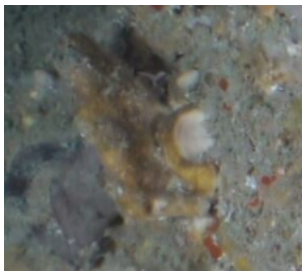
	 
Polymastia crocea	 
Psammocinia hawere	 
Psammocinia perforadorsa?	
Raspailia topsenti?	 

Rossella ijimai?	
Rowella tubulosa	
Small White Arborescent Sponge	
Stelletta conulosa	 
Stelletta crater	  
Stelletta maori	

	 
Suberites sp.?	 
Symplectella rowi?	
Tethya sp.	
Unknown Orange Encrusting Sponge	 

Unknown Red Encrusting Sponge	 
Unknown Textured Encrusting Sponge	
Unknown Yellow/Green Sponge	
White Encrusting Sponge	 
White Plate Sponge	 

White Spiky Encrusting Sponge	 
White Tubular Sponge	
White/Cream Amorphous Sponge	
White/Cream Massive Sponge	 
Xestospongia sp.?	 

Yellow Arborescent Sponge	
Yellow Encrusting on White Sponge	 
Yellow Encrusting Sponge	  
Yellow Flabellate Sponge	 
Yellow/Brown Massive Sponge	

Yellow/Grey Amorphous Sponge	 
Yellow/Grey Encrusting Sponge	
Other	
Biological Matrix	  
Bivalve	
Brachiopod	 

Polychaete Worm	 

Appendix C

	Group	N	Mean % Cover	SD	SE	CI
1	All Sponges	130	28.3772225	16.0470591	1.40742019	2.78461531
2	Biological Matrix	130	25.0844867	16.9396805	1.48570826	2.93951018
3	All Substrate	130	19.6256580	17.1181474	1.50136084	2.97047920
4	All Macroalgae	130	8.9717643	12.9967925	1.13989411	2.25530841
5	Crustose Coralline Algae	130	8.5363617	11.5020316	1.00879490	1.99592542
6	All Bryozoans	130	3.8226862	6.3454790	0.55653532	1.10111877
7	All Cnidaria	130	2.4385730	4.4187456	0.38754962	0.76677642
8	All Ascidians	130	2.2718840	3.4204955	0.29999730	0.59355201
9	All Echinodermata	130	0.7032295	1.5439217	0.13541089	0.26791376
10	Other	130	0.1681341	0.5268707	0.04620962	0.09142686

Appendix D

PERMPDISP results based on the multivariate analyses for the 10 major groups.

F: 3.563 df1: 12 df2: 117

P(perm): 0.0004

PAIRWISE COMPARISONS

Site 1	Site 2	t	P(perm)
Cape Colville Drop 01	South Ohinau Island Drop 02	0.99557	0.3512
Cape Colville Drop 01	South Aldermen Islands Drop 03	2.661	0.0111
Cape Colville Drop 01	South Aldermen Islands Drop 06	0.494	0.6088
Cape Colville Drop 01	South Aldermen Islands Drop 07	1.454	0.1578
Cape Colville Drop 01	Cradock Channel Drop 13	2.5066	0.0251
Cape Colville Drop 01	SW Mokohinau Islands Drop 15	1.0205	0.3513
Cape Colville Drop 01	South Mokohinau Islands Drop 17	0.43782	0.6476
Cape Colville Drop 01	Burgess Island Drop 19	0.43034	0.6765
Cape Colville Drop 01	Burgess Island Drop 21	0.39224	0.7105
Cape Colville Drop 01	West Atihau Island Drop 24	1.0913	0.3468
Cape Colville Drop 01	SE Channel Island Drop 25	1.127	0.2478
Cape Colville Drop 01	SE Channel Island Drop 28	0.2718	0.7935
South Ohinau Island Drop 02	South Aldermen Islands Drop 03	1.8139	0.0881
South Ohinau Island Drop 02	South Aldermen Islands Drop 06	0.67308	0.5012
South Ohinau Island Drop 02	South Aldermen Islands Drop 07	0.39003	0.7048
South Ohinau Island Drop 02	Cradock Channel Drop 13	1.3526	0.2029
South Ohinau Island Drop 02	SW Mokohinau Islands Drop 15	2.2158	0.0535
South Ohinau Island Drop 02	South Mokohinau Islands Drop 17	1.6843	0.133
South Ohinau Island Drop 02	Burgess Island Drop 19	1.6943	0.1002
South Ohinau Island Drop 02	Burgess Island Drop 21	1.4602	0.205
South Ohinau Island Drop 02	West Atihau Island Drop 24	0.10584	0.9259
South Ohinau Island Drop 02	SE Channel Island Drop 25	0.055576	0.9552
South Ohinau Island Drop 02	SE Channel Island Drop 28	0.80747	0.4441
South Aldermen Islands Drop 03	South Aldermen Islands Drop 06	2.5703	0.0115
South Aldermen Islands Drop 03	South Aldermen Islands Drop 07	1.5763	0.1299
South Aldermen Islands Drop 03	Cradock Channel Drop 13	0.91108	0.3442
South Aldermen Islands Drop 03	SW Mokohinau Islands Drop 15	3.8376	0.0004
South Aldermen Islands Drop 03	South Mokohinau Islands Drop 17	3.4455	0.001
South Aldermen Islands Drop 03	Burgess Island Drop 19	3.4648	0.0005
South Aldermen Islands Drop 03	Burgess Island Drop 21	3.1243	0.0037
South Aldermen Islands Drop 03	West Atihau Island Drop 24	1.7102	0.1248
South Aldermen Islands Drop 03	SE Channel Island Drop 25	2.0876	0.0311
South Aldermen Islands Drop 03	SE Channel Island Drop 28	2.5918	0.0084
South Aldermen Islands Drop 06	South Aldermen Islands Drop 07	1.2094	0.246
South Aldermen Islands Drop 06	Cradock Channel Drop 13	2.5366	0.0121
South Aldermen Islands Drop 06	SW Mokohinau Islands Drop 15	1.9567	0.0606
South Aldermen Islands Drop 06	South Mokohinau Islands Drop 17	1.2742	0.233
South Aldermen Islands Drop 06	Burgess Island Drop 19	1.2876	0.226

Site 1	Site 2	t	P(perm)
South Aldermen Islands Drop 06	Burgess Island Drop 21	1.0186	0.3358
South Aldermen Islands Drop 06	West Atihau Island Drop 24	0.7874	0.4887
South Aldermen Islands Drop 06	SE Channel Island Drop 25	0.79853	0.4008
South Aldermen Islands Drop 06	SE Channel Island Drop 28	0.22441	0.8077
South Aldermen Islands Drop 07	Cradock Channel Drop 13	1.0189	0.3285
South Aldermen Islands Drop 07	SW Mokohinau Islands Drop 15	2.9294	0.0077
South Aldermen Islands Drop 07	South Mokohinau Islands Drop 17	2.3867	0.0267
South Aldermen Islands Drop 07	Burgess Island Drop 19	2.4132	0.0278
South Aldermen Islands Drop 07	Burgess Island Drop 21	2.0004	0.0612
South Aldermen Islands Drop 07	West Atihau Island Drop 24	0.27256	0.7986
South Aldermen Islands Drop 07	SE Channel Island Drop 25	0.53893	0.5939
South Aldermen Islands Drop 07	SE Channel Island Drop 28	1.3022	0.2043
Cradock Channel Drop 13	SW Mokohinau Islands Drop 15	4.5532	0.0002
Cradock Channel Drop 13	South Mokohinau Islands Drop 17	4.0668	0.0003
Cradock Channel Drop 13	Burgess Island Drop 19	4.1458	0.0001
Cradock Channel Drop 13	Burgess Island Drop 21	3.2287	0.0068
Cradock Channel Drop 13	West Atihau Island Drop 24	1.2119	0.2828
Cradock Channel Drop 13	SE Channel Island Drop 25	1.8056	0.0612
Cradock Channel Drop 13	SE Channel Island Drop 28	2.4789	0.0269
SW Mokohinau Islands Drop 15	South Mokohinau Islands Drop 17	0.86661	0.3684
SW Mokohinau Islands Drop 15	Burgess Island Drop 19	0.90922	0.3491
SW Mokohinau Islands Drop 15	Burgess Island Drop 21	0.64546	0.5689
SW Mokohinau Islands Drop 15	West Atihau Island Drop 24	2.3103	0.0377
SW Mokohinau Islands Drop 15	SE Channel Island Drop 25	2.8337	0.0057
SW Mokohinau Islands Drop 15	SE Channel Island Drop 28	1.4908	0.089
South Mokohinau Islands Drop 17	Burgess Island Drop 19	0.020995	0.9838
South Mokohinau Islands Drop 17	Burgess Island Drop 21	0.022203	0.9833
South Mokohinau Islands Drop 17	West Atihau Island Drop 24	1.7896	0.0865
South Mokohinau Islands Drop 17	SE Channel Island Drop 25	2.2046	0.0293
South Mokohinau Islands Drop 17	SE Channel Island Drop 28	0.85836	0.4334
Burgess Island Drop 19	Burgess Island Drop 21	0.03788	0.9751
Burgess Island Drop 19	West Atihau Island Drop 24	1.8005	0.1124
Burgess Island Drop 19	SE Channel Island Drop 25	2.2437	0.0293
Burgess Island Drop 19	SE Channel Island Drop 28	0.8585	0.4425
Burgess Island Drop 21	West Atihau Island Drop 24	1.5566	0.2116
Burgess Island Drop 21	SE Channel Island Drop 25	1.7291	0.0913
Burgess Island Drop 21	SE Channel Island Drop 28	0.7263	0.4904
West Atihau Island Drop 24	SE Channel Island Drop 25	0.18003	0.872
West Atihau Island Drop 24	SE Channel Island Drop 28	0.91243	0.4015
SE Channel Island Drop 25	SE Channel Island Drop 28	0.93324	0.3762

Appendix E

Results from the PERMANOVA based on the analysis of the 10 major benthic groups with sediment included.

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms
Si	12	68646	5720.5	24.346	0.0001	9873
Res	117	27491	234.96			
Total	129	96136				

Groups	t	P(perm)	Unique
Cape Colville Drop 01, South Ohinau Island Drop 02	5.0697	0.0001	9465
Cape Colville Drop 01, South Aldermen Islands Drop 03	3.861	0.0001	9450
Cape Colville Drop 01, South Aldermen Islands Drop 06	4.924	0.0001	9470
Cape Colville Drop 01, South Aldermen Islands Drop 07	3.1406	0.0002	9397
Cape Colville Drop 01, Cradock Channel Drop 13	4.6461	0.0001	9412
Cape Colville Drop 01, SW Mokohinau Islands Drop 15	7.6865	0.0001	9447
Cape Colville Drop 01, South Mokohinau Islands Drop 17	6.7209	0.0001	9431
Cape Colville Drop 01, Burgess Island Drop 19	3.8467	0.0001	9425
Cape Colville Drop 01, Burgess Island Drop 21	7.6206	0.0001	9452
Cape Colville Drop 01, West Atihau Island Drop 24	7.0574	0.0001	9417
Cape Colville Drop 01, SE Channel Island Drop 25	1.9963	0.0137	9501
Cape Colville Drop 01, SE Channel Island Drop 28	2.3585	0.0075	9429
South Ohinau Island Drop 02, South Aldermen Islands Drop 03	1.8976	0.0187	9422
South Ohinau Island Drop 02, South Aldermen Islands Drop 06	5.6697	0.0002	9456
South Ohinau Island Drop 02, South Aldermen Islands Drop 07	4.1977	0.0001	9441
South Ohinau Island Drop 02, Cradock Channel Drop 13	3.8176	0.0001	9404
South Ohinau Island Drop 02, SW Mokohinau Islands Drop 15	3.3899	0.0001	9476
South Ohinau Island Drop 02, South Mokohinau Islands Drop 17	3.9812	0.0002	9407
South Ohinau Island Drop 02, Burgess Island Drop 19	5.7834	0.0001	9422
South Ohinau Island Drop 02, Burgess Island Drop 21	5.1577	0.0001	9421
South Ohinau Island Drop 02, West Atihau Island Drop 24	5.1878	0.0001	9418
South Ohinau Island Drop 02, SE Channel Island Drop 25	5.6277	0.0001	9459
South Ohinau Island Drop 02, SE Channel Island Drop 28	6.4791	0.0001	9458
S Aldermen Islands Drop 03, South Aldermen Islands Drop 06	4.0278	0.0001	9458
S Aldermen Islands Drop 03, South Aldermen Islands Drop 07	2.7663	0.0003	9432
South Aldermen Islands Drop 03, Cradock Channel Drop 13	2.0737	0.0102	9431
S Aldermen Islands Drop 03, SW Mokohinau Islands Drop 15	2.8725	0.0001	9424
S Aldermen Islands Drop 03, South Mokohinau Islands Drop 17	2.7991	0.0002	9431
South Aldermen Islands Drop 03, Burgess Island Drop 19	3.7304	0.0001	9460
South Aldermen Islands Drop 03, Burgess Island Drop 21	3.0623	0.0001	9465
South Aldermen Islands Drop 03, West Atihau Island Drop 24	3.1478	0.0002	9400
South Aldermen Islands Drop 03, SE Channel Island Drop 25	4.238	0.0001	9410
South Aldermen Islands Drop 03, SE Channel Island Drop 28	5.1834	0.0001	9419
S Aldermen Islands Drop 06, South Aldermen Islands Drop 07	3.0021	0.0001	9436
South Aldermen Islands Drop 06, Cradock Channel Drop 13	3.3832	0.0001	9488
S Aldermen Islands Drop 06, SW Mokohinau Islands Drop 15	8.4246	0.0001	9394
South Aldermen Islands Drop 06, S Mokohinau Islands Drop 17	5.8006	0.0001	9419
South Aldermen Islands Drop 06, Burgess Island Drop 19	3.2375	0.0002	9418
South Aldermen Islands Drop 06, Burgess Island Drop 21	6.9957	0.0001	9401
South Aldermen Islands Drop 06, West Atihau Island Drop 24	5.0341	0.0001	9441

South Aldermen Islands Drop 06, SE Channel Island Drop 25	5.5061	0.0001	9414
South Aldermen Islands Drop 06, SE Channel Island Drop 28	7.1234	0.0001	9435

South Aldermen Islands Drop 07, Cradock Channel Drop 13	2.6453	0.0001	9416
S Aldermen Islands Drop 07, SW Mokohinau Islands Drop 15	6.0592	0.0001	9405
S Aldermen Islands Drop 07, South Mokohinau Islands Drop 17	4.057	0.0002	9419
South Aldermen Islands Drop 07, Burgess Island Drop 19	2.0187	0.0003	9422
South Aldermen Islands Drop 07, Burgess Island Drop 21	5.0433	0.0001	9438
South Aldermen Islands Drop 07, West Atihau Island Drop 24	4.2861	0.0001	9465
South Aldermen Islands Drop 07, SE Channel Island Drop 25	3.6312	0.0001	9437
South Aldermen Islands Drop 07, SE Channel Island Drop 28	4.8728	0.0001	9427
Cradock Channel Drop 13, SW Mokohinau Islands Drop 15	4.2204	0.0001	9434
Cradock Channel Drop 13, South Mokohinau Islands Drop 17	2.545	0.0001	9417
Cradock Channel Drop 13, Burgess Island Drop 19	2.8447	0.0001	9430
Cradock Channel Drop 13, Burgess Island Drop 21	3.6993	0.0001	9413
Cradock Channel Drop 13, West Atihau Island Drop 24	2.5293	0.0001	9444
Cradock Channel Drop 13, SE Channel Island Drop 25	5.2238	0.0001	9437
Cradock Channel Drop 13, SE Channel Island Drop 28	6.1892	0.0001	9404
SW Mokohinau Islands Drop 15, S Mokohinau Islands Drop 17	4.8943	0.0001	9434
SW Mokohinau Islands Drop 15, Burgess Island Drop 19	7.8069	0.0001	9457
SW Mokohinau Islands Drop 15, Burgess Island Drop 21	3.9032	0.0001	9400
SW Mokohinau Islands Drop 15, West Atihau Island Drop 24	4.3277	0.0001	9438
SW Mokohinau Islands Drop 15, SE Channel Island Drop 25	7.5661	0.0002	9445
SW Mokohinau Islands Drop 15, SE Channel Island Drop 28	8.9542	0.0002	9427
South Mokohinau Islands Drop 17, Burgess Island Drop 19	4.6572	0.0001	9389
South Mokohinau Islands Drop 17, Burgess Island Drop 21	5.4677	0.0001	9449
South Mokohinau Islands Drop 17, West Atihau Island Drop 24	4.4408	0.0001	9438
South Mokohinau Islands Drop 17, SE Channel Island Drop 25	7.1081	0.0001	9417

South Mokohinau Islands Drop 17, SE Channel Island Drop 28	8.28	0.0001	9432
Burgess Island Drop 19, Burgess Island Drop 21	6.6445	0.0001	9426
Burgess Island Drop 19, West Atihau Island Drop 24	5.0384	0.0002	9392
Burgess Island Drop 19, SE Channel Island Drop 25	4.4887	0.0001	9429
Burgess Island Drop 19, SE Channel Island Drop 28	5.8438	0.0001	9449
Burgess Island Drop 21, West Atihau Island Drop 24	2.2278	0.0009	9418
Burgess Island Drop 21, SE Channel Island Drop 25	7.0393	0.0001	9440
Burgess Island Drop 21, SE Channel Island Drop 28	8.7766	0.0001	9451
West Atihau Island Drop 24, SE Channel Island Drop 25	7.0994	0.0001	9461
West Atihau Island Drop 24, SE Channel Island Drop 28	8.7599	0.0001	9443
SE Channel Island Drop 25, SE Channel Island Drop 28	2.7716	0.0007	9425

Appendix F

Tests for differences between unordered Site groups

Global Test

Sample statistic (R): 0.788

Significance level of sample statistic: 0.1%

Number of permutations: 999 (Random sample from a large number)

Number of permuted statistics greater than or equal to R: 0

Pairwise Tests

Groups	Statistic	Significance Level %	Possible Permutations	Actual Permutations	Number >=Observed
Cape Colville Drop 01, South Ohinau Island Drop 02	0.913	0.1	92378	999	0
Cape Colville Drop 01, South Aldermen Islands Drop 03	0.74	0.1	92378	999	0
Cape Colville Drop 01, South Aldermen Islands Drop 06	0.81	0.1	92378	999	0
Cape Colville Drop 01, South Aldermen Islands Drop 07	0.596	0.1	92378	999	0
Cape Colville Drop 01, Cradock Channel Drop 13	0.823	0.1	92378	999	0
Cape Colville Drop 01, SW Mokohinau Islands Drop 15	1	0.1	92378	999	0
Cape Colville Drop 01, South Mokohinau Islands Drop 17	0.995	0.1	92378	999	0
Cape Colville Drop 01, Burgess Island Drop 19	0.657	0.1	92378	999	0
Cape Colville Drop 01, Burgess Island Drop 21	1	0.1	92378	999	0
Cape Colville Drop 01, West Atihau Island Drop 24	0.998	0.1	92378	999	0
Cape Colville Drop 01, SE Channel Island Drop 25	0.23	1.4	92378	999	13
Cape Colville Drop 01, SE Channel Island Drop 28	0.219	0.7	92378	999	6
South Ohinau Island Drop 02, South Aldermen Islands Drop 03	0.242	1.1	92378	999	10

South Ohinau Island Drop 02, South Aldermen Islands Drop 06	0.966	0.1	92378	999	0
South Ohinau Island Drop 02, South Aldermen Islands Drop 07	0.833	0.1	92378	999	0
South Ohinau Island Drop 02, Cradock Channel Drop 13	0.772	0.1	92378	999	0
South Ohinau Island Drop 02, SW Mokohinau Islands Drop 15	0.627	0.1	92378	999	0
South Ohinau Island Drop 02, South Mokohinau Islands Drop 17	0.807	0.1	92378	999	0
South Ohinau Island Drop 02, Burgess Island Drop 19	0.974	0.1	92378	999	0
South Ohinau Island Drop 02, Burgess Island Drop 21	0.935	0.1	92378	999	0
South Ohinau Island Drop 02, West Atihau Island Drop 24	0.957	0.1	92378	999	0
South Ohinau Island Drop 02, SE Channel Island Drop 25	0.934	0.1	92378	999	0
South Ohinau Island Drop 02, SE Channel Island Drop 28	0.967	0.1	92378	999	0
South Aldermen Islands Drop 03, South Aldermen Islands Drop 06	0.77	0.1	92378	999	0
South Aldermen Islands Drop 03, South Aldermen Islands Drop 07	0.57	0.1	92378	999	0
South Aldermen Islands Drop 03, Cradock Channel Drop 13	0.308	0.2	92378	999	1
South Aldermen Islands Drop 03, SW Mokohinau Islands Drop 15	0.57	0.1	92378	999	0
South Aldermen Islands Drop 03, South Mokohinau Islands Drop 17	0.599	0.1	92378	999	0
South Aldermen Islands Drop 03, Burgess Island Drop 19	0.736	0.1	92378	999	0
South Aldermen Islands Drop 03, Burgess Island Drop 21	0.637	0.1	92378	999	0
South Aldermen Islands Drop 03, West Atihau Island Drop 24	0.572	0.1	92378	999	0
South Aldermen Islands Drop 03, SE Channel Island Drop 25	0.803	0.1	92378	999	0
South Aldermen Islands Drop 03, SE Channel Island Drop 28	0.853	0.1	92378	999	0
South Aldermen Islands Drop 06, South Aldermen Islands Drop 07	0.556	0.1	92378	999	0
South Aldermen Islands Drop 06, Cradock Channel Drop 13	0.669	0.1	92378	999	0
South Aldermen Islands Drop 06, SW Mokohinau Islands Drop 15	1	0.1	92378	999	0
South Aldermen Islands Drop 06, South Mokohinau Islands Drop 17	0.978	0.1	92378	999	0
South Aldermen Islands Drop 06, Burgess Island Drop 19	0.601	0.1	92378	999	0
South Aldermen Islands Drop 06, Burgess Island Drop 21	0.991	0.1	92378	999	0
South Aldermen Islands Drop 06, West Atihau Island Drop 24	0.959	0.1	92378	999	0
South Aldermen Islands Drop 06, SE Channel Island Drop 25	0.874	0.1	92378	999	0

South Aldermen Islands Drop 06, SE Channel Island Drop 28	0.933	0.1	92378	999	0
South Aldermen Islands Drop 07, Cradock Channel Drop 13	0.56	0.1	92378	999	0
South Aldermen Islands Drop 07, SW Mokohinau Islands Drop 15	0.976	0.1	92378	999	0
South Aldermen Islands Drop 07, South Mokohinau Islands Drop 17	0.852	0.1	92378	999	0
South Aldermen Islands Drop 07, Burgess Island Drop 19	0.301	0.1	92378	999	0
South Aldermen Islands Drop 07, Burgess Island Drop 21	0.943	0.1	92378	999	0
South Aldermen Islands Drop 07, West Atihau Island Drop 24	0.874	0.1	92378	999	0
South Aldermen Islands Drop 07, SE Channel Island Drop 25	0.561	0.1	92378	999	0
South Aldermen Islands Drop 07, SE Channel Island Drop 28	0.854	0.1	92378	999	0
Cradock Channel Drop 13, SW Mokohinau Islands Drop 15	0.808	0.1	92378	999	0
Cradock Channel Drop 13, South Mokohinau Islands Drop 17	0.51	0.1	92378	999	0
Cradock Channel Drop 13, Burgess Island Drop 19	0.609	0.1	92378	999	0
Cradock Channel Drop 13, Burgess Island Drop 21	0.762	0.1	92378	999	0
Cradock Channel Drop 13, West Atihau Island Drop 24	0.421	0.1	92378	999	0
Cradock Channel Drop 13, SE Channel Island Drop 25	0.911	0.1	92378	999	0
Cradock Channel Drop 13, SE Channel Island Drop 28	0.918	0.1	92378	999	0
SW Mokohinau Islands Drop 15, South Mokohinau Islands Drop 17	0.847	0.1	92378	999	0
SW Mokohinau Islands Drop 15, Burgess Island Drop 19	1	0.1	92378	999	0
SW Mokohinau Islands Drop 15, Burgess Island Drop 21	0.831	0.1	92378	999	0
SW Mokohinau Islands Drop 15, West Atihau Island Drop 24	0.791	0.1	92378	999	0
SW Mokohinau Islands Drop 15, SE Channel Island Drop 25	1	0.1	92378	999	0
SW Mokohinau Islands Drop 15, SE Channel Island Drop 28	1	0.1	92378	999	0
South Mokohinau Islands Drop 17, Burgess Island Drop 19	0.907	0.1	92378	999	0
South Mokohinau Islands Drop 17, Burgess Island Drop 21	0.962	0.1	92378	999	0
South Mokohinau Islands Drop 17, West Atihau Island Drop 24	0.86	0.1	92378	999	0
South Mokohinau Islands Drop 17, SE Channel Island Drop 25	0.992	0.1	92378	999	0
South Mokohinau Islands Drop 17, SE Channel Island Drop 28	0.997	0.1	92378	999	0

Burgess Island Drop 19, Burgess Island Drop 21	0.998	0.1	92378	999	0
Burgess Island Drop 19, West Atihau Island Drop 24	0.93	0.1	92378	999	0
Burgess Island Drop 19, SE Channel Island Drop 25	0.684	0.1	92378	999	0
Burgess Island Drop 19, SE Channel Island Drop 28	0.875	0.1	92378	999	0
Burgess Island Drop 21, West Atihau Island Drop 24	0.297	0.1	92378	999	0
Burgess Island Drop 21, SE Channel Island Drop 25	0.999	0.1	92378	999	0
Burgess Island Drop 21, SE Channel Island Drop 28	1	0.1	92378	999	0
West Atihau Island Drop 24, SE Channel Island Drop 25	0.991	0.1	92378	999	0
West Atihau Island Drop 24, SE Channel Island Drop 28	1	0.1	92378	999	0
SE Channel Island Drop 25, SE Channel Island Drop 28	0.409	0.2	92378	999	1

Appendix G

PERMDISP results based on the full 93 benthic groups with sediment included.

Distance-based test for homogeneity of multivariate dispersions

Resemblance worksheet
Name: BC
Data type: Similarity
Selection: All
Transform: Square root
Resemblance: S17 Bray-Curtis similarity

Group factor: Site
Number of permutations: 9999

Number of groups: 13
Number of samples: 130

DEVIATIONS FROM CENTROID

F: 9.4188 df1: 12 df2: 117

P(perm): 0.0001

PAIRWISE COMPARISONS

Groups	t	P(perm)
(Cape Colville Drop 01,South Ohinau Island Drop 02)	1.3933	0.1566
(Cape Colville Drop 01,South Aldermen Islands Drop 03)	0.62608	0.5432
(Cape Colville Drop 01,South Aldermen Islands Drop 06)	1.5111	0.1494
(Cape Colville Drop 01,South Aldermen Islands Drop 07)	0.3205	0.7546
(Cape Colville Drop 01,Cradock Channel Drop 13)	3.1914	0.006
(Cape Colville Drop 01,SW Mokohinau Islands Drop 15)	7.9315	0.0001
(Cape Colville Drop 01,South Mokohinau Islands Drop 17)	2.2304	0.0435
(Cape Colville Drop 01,Burgess Island Drop 19)	0.097093	0.9215
(Cape Colville Drop 01,Burgess Island Drop 21)	4.1812	0.0005
(Cape Colville Drop 01,West Atihau Island Drop 24)	1.7764	0.104
(Cape Colville Drop 01,SE Channel Island Drop 25)	1.4799	0.139
(Cape Colville Drop 01,SE Channel Island Drop 28)	0.2874	0.7764
(South Ohinau Island Drop 02,South Aldermen Islands Drop 03)	1.601	0.1351
(South Ohinau Island Drop 02,South Aldermen Islands Drop 06)	0.070832	0.946
(South Ohinau Island Drop 02,South Aldermen Islands Drop 07)	1.5897	0.1289
(South Ohinau Island Drop 02,Cradock Channel Drop 13)	1.363	0.1752
(South Ohinau Island Drop 02,SW Mokohinau Islands Drop 15)	5.7103	0.0001
(South Ohinau Island Drop 02,South Mokohinau Islands Drop 17)	0.79955	0.456
(South Ohinau Island Drop 02,Burgess Island Drop 19)	1.4769	0.1483
(South Ohinau Island Drop 02,Burgess Island Drop 21)	2.1785	0.0414
(South Ohinau Island Drop 02,West Atihau Island Drop 24)	0.52249	0.6162
(South Ohinau Island Drop 02,SE Channel Island Drop 25)	2.6139	0.0161
(South Ohinau Island Drop 02,SE Channel Island Drop 28)	1.4758	0.1638
(South Aldermen Islands Drop 03,South Aldermen Islands Drop 06)	1.6551	0.1198
(South Aldermen Islands Drop 03,South Aldermen Islands Drop 07)	0.37159	0.7178
(South Aldermen Islands Drop 03,Cradock Channel Drop 13)	2.7697	0.008
(South Aldermen Islands Drop 03,SW Mokohinau Islands Drop 15)	6.1215	0.0001

(South Aldermen Islands Drop 03,South Mokohinau Islands Drop 17)	2.2217	0.042
(South Aldermen Islands Drop 03,Burgess Island Drop 19)	0.72838	0.4874
(South Aldermen Islands Drop 03,Burgess Island Drop 21)	3.3964	0.0009
(South Aldermen Islands Drop 03,West Atihau Island Drop 24)	1.9158	0.0866
(South Aldermen Islands Drop 03,SE Channel Island Drop 25)	0.47702	0.6549
(South Aldermen Islands Drop 03,SE Channel Island Drop 28)	0.36044	0.7351
(South Aldermen Islands Drop 06,South Aldermen Islands Drop 07)	1.7076	0.1134
(South Aldermen Islands Drop 06,Cradock Channel Drop 13)	1.656	0.1033
(South Aldermen Islands Drop 06,SW Mokohinau Islands Drop 15)	6.5533	0.0001
(South Aldermen Islands Drop 06,South Mokohinau Islands Drop 17)	0.95331	0.3701
(South Aldermen Islands Drop 06,Burgess Island Drop 19)	1.6623	0.1185
(South Aldermen Islands Drop 06,Burgess Island Drop 21)	2.6169	0.023
(South Aldermen Islands Drop 06,West Atihau Island Drop 24)	0.62891	0.5514
(South Aldermen Islands Drop 06,SE Channel Island Drop 25)	2.8418	0.014
(South Aldermen Islands Drop 06,SE Channel Island Drop 28)	1.5592	0.1507
(South Aldermen Islands Drop 07,Cradock Channel Drop 13)	3.2404	0.0057
(South Aldermen Islands Drop 07,SW Mokohinau Islands Drop 15)	7.6242	0.0001
(South Aldermen Islands Drop 07,South Mokohinau Islands Drop 17)	2.3715	0.0389
(South Aldermen Islands Drop 07,Burgess Island Drop 19)	0.44891	0.6715
(South Aldermen Islands Drop 07,Burgess Island Drop 21)	4.1323	0.0007
(South Aldermen Islands Drop 07,West Atihau Island Drop 24)	1.9403	0.0891
(South Aldermen Islands Drop 07,SE Channel Island Drop 25)	1.0886	0.3155
(South Aldermen Islands Drop 07,SE Channel Island Drop 28)	0.0065915	0.995
(Cradock Channel Drop 13,SW Mokohinau Islands Drop 15)	5.1534	0.0001
(Cradock Channel Drop 13,South Mokohinau Islands Drop 17)	0.41779	0.6976
(Cradock Channel Drop 13,Burgess Island Drop 19)	3.6571	0.0047
(Cradock Channel Drop 13,Burgess Island Drop 21)	0.94571	0.3471
(Cradock Channel Drop 13,West Atihau Island Drop 24)	0.60002	0.5836
(Cradock Channel Drop 13,SE Channel Island Drop 25)	4.3587	0.0006
(Cradock Channel Drop 13,SE Channel Island Drop 28)	2.9532	0.01
(SW Mokohinau Islands Drop 15,South Mokohinau Islands Drop 17)	4.6965	0.0004
(SW Mokohinau Islands Drop 15,Burgess Island Drop 19)	9.0193	0.0001
(SW Mokohinau Islands Drop 15,Burgess Island Drop 21)	4.4141	0.0005
(SW Mokohinau Islands Drop 15,West Atihau Island Drop 24)	4.4459	0.0001
(SW Mokohinau Islands Drop 15,SE Channel Island Drop 25)	8.5796	0.0001
(SW Mokohinau Islands Drop 15,SE Channel Island Drop 28)	7.0244	0.0001
(South Mokohinau Islands Drop 17,Burgess Island Drop 19)	2.3993	0.0422
(South Mokohinau Islands Drop 17,Burgess Island Drop 21)	1.188	0.2658
(South Mokohinau Islands Drop 17,West Atihau Island Drop 24)	0.20236	0.8525
(South Mokohinau Islands Drop 17,SE Channel Island Drop 25)	3.3564	0.0056
(South Mokohinau Islands Drop 17,SE Channel Island Drop 28)	2.2121	0.0578
(Burgess Island Drop 19,Burgess Island Drop 21)	4.8734	0.0003
(Burgess Island Drop 19,West Atihau Island Drop 24)	1.8603	0.0893
(Burgess Island Drop 19,SE Channel Island Drop 25)	1.7448	0.1001
(Burgess Island Drop 19,SE Channel Island Drop 28)	0.39598	0.6974
(Burgess Island Drop 21,West Atihau Island Drop 24)	1.2853	0.2481
(Burgess Island Drop 21,SE Channel Island Drop 25)	5.2473	0.0002
(Burgess Island Drop 21,SE Channel Island Drop 28)	3.7537	0.0028
(West Atihau Island Drop 24,SE Channel Island Drop 25)	2.8478	0.0156
(West Atihau Island Drop 24,SE Channel Island Drop 28)	1.8297	0.0992
(SE Channel Island Drop 25,SE Channel Island Drop 28)	1.0204	0.3138

Appendix H

PERMANOVA results based on the full XXX benthic groups with sediment included

Permutational MANOVA

Source	df	SS	MS	Pseudo-F	P(perm)	perms
Si	12	1.6002E+05	13335	14.936	0.0001	9797
Res	117	1.0446E+05	892.79			
Total	129	2.6448E+05				

Permutational MANOVA

Resemblance worksheet
Name: BC
Data type: Similarity
Selection: All
Transform: Square root
Resemblance: S17 Bray-Curtis similarity

Sums of squares type: Type III (partial)
Fixed effects sum to zero for mixed terms
Permutation method: Unrestricted permutation of raw data
Number of permutations: 9999

Factors

Name	Abbrev.	Type	Levels
Site	Si	Fixed	13

Groups	t	P(perm)	Unique perms
Cape Colville Drop 01, South Ohinau Island Drop 02	3.6528	0.0001	9414
Cape Colville Drop 01, South Aldermen Islands Drop 03	2.8623	0.0002	9374
Cape Colville Drop 01, South Aldermen Islands Drop 06	4.1257	0.0001	9442
Cape Colville Drop 01, South Aldermen Islands Drop 07	3.163	0.0002	9437
Cape Colville Drop 01, Cradock Channel Drop 13	3.3366	0.0001	9379
Cape Colville Drop 01, SW Mokohinau Islands Drop 15	5.1972	0.0001	9459
Cape Colville Drop 01, South Mokohinau Islands Drop 17	4.7662	0.0001	9411
Cape Colville Drop 01, Burgess Island Drop 19	3.658	0.0001	9400
Cape Colville Drop 01, Burgess Island Drop 21	4.4555	0.0001	9393
Cape Colville Drop 01, West Atihau Island Drop 24	4.4939	0.0001	9407
Cape Colville Drop 01, SE Channel Island Drop 25	2.3986	0.0001	9421
Cape Colville Drop 01, SE Channel Island Drop 28	3.0031	0.0001	9398
South Ohinau Island Drop 02, South Aldermen Islands Drop 03	1.8523	0.0028	9383
South Ohinau Island Drop 02, South Aldermen Islands Drop 06	4.3465	0.0002	9393
South Ohinau Island Drop 02, South Aldermen Islands Drop 07	3.007	0.0001	9430
South Ohinau Island Drop 02, Cradock Channel Drop 13	3.8356	0.0001	9422
South Ohinau Island Drop 02, SW Mokohinau Islands Drop 15	3.0164	0.0002	9409
South Ohinau Island Drop 02, South Mokohinau Islands Drop 17	3.345	0.0001	9407
South Ohinau Island Drop 02, Burgess Island Drop 19	4.1615	0.0001	9455

South Ohinau Island Drop 02, Burgess Island Drop 21	3.8283	0.0002	9427
South Ohinau Island Drop 02, West Atihau Island Drop 24	3.5956	0.0001	9446
South Ohinau Island Drop 02, SE Channel Island Drop 25	3.8269	0.0001	9422
South Ohinau Island Drop 02, SE Channel Island Drop 28	4.2425	0.0001	9407
South Aldermen Islands Drop 03, South Aldermen Islands Drop 06	3.6696	0.0001	9428
South Aldermen Islands Drop 03, South Aldermen Islands Drop 07	2.475	0.0002	9430
South Aldermen Islands Drop 03, Cradock Channel Drop 13	2.4277	0.0001	9439
South Aldermen Islands Drop 03, SW Mokohinau Islands Drop 15	2.9793	0.0001	9410
South Aldermen Islands Drop 03, South Mokohinau Islands Drop 17	3.0558	0.0001	9426
South Aldermen Islands Drop 03, Burgess Island Drop 19	3.477	0.0001	9429
South Aldermen Islands Drop 03, Burgess Island Drop 21	2.739	0.0001	9446
South Aldermen Islands Drop 03, West Atihau Island Drop 24	2.707	0.0001	9441
South Aldermen Islands Drop 03, SE Channel Island Drop 25	3.4172	0.0001	9385
South Aldermen Islands Drop 03, SE Channel Island Drop 28	3.6843	0.0001	9398
South Aldermen Islands Drop 06, South Aldermen Islands Drop 07	2.9381	0.0001	9432
South Aldermen Islands Drop 06, Cradock Channel Drop 13	4.0389	0.0002	9450
South Aldermen Islands Drop 06, SW Mokohinau Islands Drop 15	6.1855	0.0001	9424
South Aldermen Islands Drop 06, South Mokohinau Islands Drop 17	4.5892	0.0001	9381
South Aldermen Islands Drop 06, Burgess Island Drop 19	2.9424	0.0001	9425
South Aldermen Islands Drop 06, Burgess Island Drop 21	5.1827	0.0001	9387
South Aldermen Islands Drop 06, West Atihau Island Drop 24	4.035	0.0001	9430
South Aldermen Islands Drop 06, SE Channel Island Drop 25	4.3712	0.0001	9441
South Aldermen Islands Drop 06, SE Channel Island Drop 28	4.9594	0.0001	9430
South Aldermen Islands Drop 07, Cradock Channel Drop 13	3.5375	0.0002	9399
South Aldermen Islands Drop 07, SW Mokohinau Islands Drop 15	4.459	0.0001	9422
South Aldermen Islands Drop 07, South Mokohinau Islands Drop 17	3.4357	0.0002	9424
South Aldermen Islands Drop 07, Burgess Island Drop 19	2.8847	0.0001	9411
South Aldermen Islands Drop 07, Burgess Island Drop 21	4.0636	0.0001	9427
South Aldermen Islands Drop 07, West Atihau Island Drop 24	3.3203	0.0002	9415
South Aldermen Islands Drop 07, SE Channel Island Drop 25	3.4392	0.0002	9404
South Aldermen Islands Drop 07, SE Channel Island Drop 28	3.8911	0.0001	9420
Cradock Channel Drop 13, SW Mokohinau Islands Drop 15	4.6015	0.0001	9410
Cradock Channel Drop 13, South Mokohinau Islands Drop 17	3.9927	0.0001	9393
Cradock Channel Drop 13, Burgess Island Drop 19	3.9613	0.0001	9347
Cradock Channel Drop 13, Burgess Island Drop 21	3.5411	0.0001	9407
Cradock Channel Drop 13, West Atihau Island Drop 24	2.8746	0.0002	9426
Cradock Channel Drop 13, SE Channel Island Drop 25	4.3778	0.0001	9434
Cradock Channel Drop 13, SE Channel Island Drop 28	4.8311	0.0001	9413
SW Mokohinau Islands Drop 15, South Mokohinau Islands Drop 17	3.915	0.0001	9445
SW Mokohinau Islands Drop 15, Burgess Island Drop 19	5.1783	0.0001	9440
SW Mokohinau Islands Drop 15, Burgess Island Drop 21	3.6156	0.0002	9415
SW Mokohinau Islands Drop 15, West Atihau Island Drop 24	3.5631	0.0001	9450
SW Mokohinau Islands Drop 15, SE Channel Island Drop 25	4.9058	0.0001	9433
SW Mokohinau Islands Drop 15, SE Channel Island Drop 28	5.8871	0.0001	9404
South Mokohinau Islands Drop 17, Burgess Island Drop 19	3.0854	0.0001	9431
South Mokohinau Islands Drop 17, Burgess Island Drop 21	3.8265	0.0001	9430
South Mokohinau Islands Drop 17, West Atihau Island Drop 24	3.3387	0.0001	9449
South Mokohinau Islands Drop 17, SE Channel Island Drop 25	4.5225	0.0001	9410
South Mokohinau Islands Drop 17, SE Channel Island Drop 28	5.4621	0.0001	9401
Burgess Island Drop 19, Burgess Island Drop 21	4.2756	0.0001	9442
Burgess Island Drop 19, West Atihau Island Drop 24	3.8231	0.0001	9410
Burgess Island Drop 19, SE Channel Island Drop 25	3.6779	0.0001	9421
Burgess Island Drop 19, SE Channel Island Drop 28	4.2949	0.0001	9426
Burgess Island Drop 21, West Atihau Island Drop 24	2.1798	0.0001	9445
Burgess Island Drop 21, SE Channel Island Drop 25	4.1631	0.0001	9410
Burgess Island Drop 21, SE Channel Island Drop 28	4.8417	0.0001	9425
West Atihau Island Drop 24, SE Channel Island Drop 25	4.4804	0.0001	9394
West Atihau Island Drop 24, SE Channel Island Drop 28	5.1904	0.0001	9439

SE Channel Island Drop 25, SE Channel Island Drop 28	2.6736	0.0001	9426

Appendix I

ANOSIM to compare the benthic communities based on the analyses of all 93 major benthic groups with sediment included.

Analysis of Similarities

Tests for differences between unordered Site groups

Global Test

Sample statistic (R): 0.869

Significance level of sample statistic: 0.1%

Number of permutations: 999 (Random sample from a large number)

Number of permuted statistics greater than or equal to R: 0

Pairwise Tests

Pairwise Tests

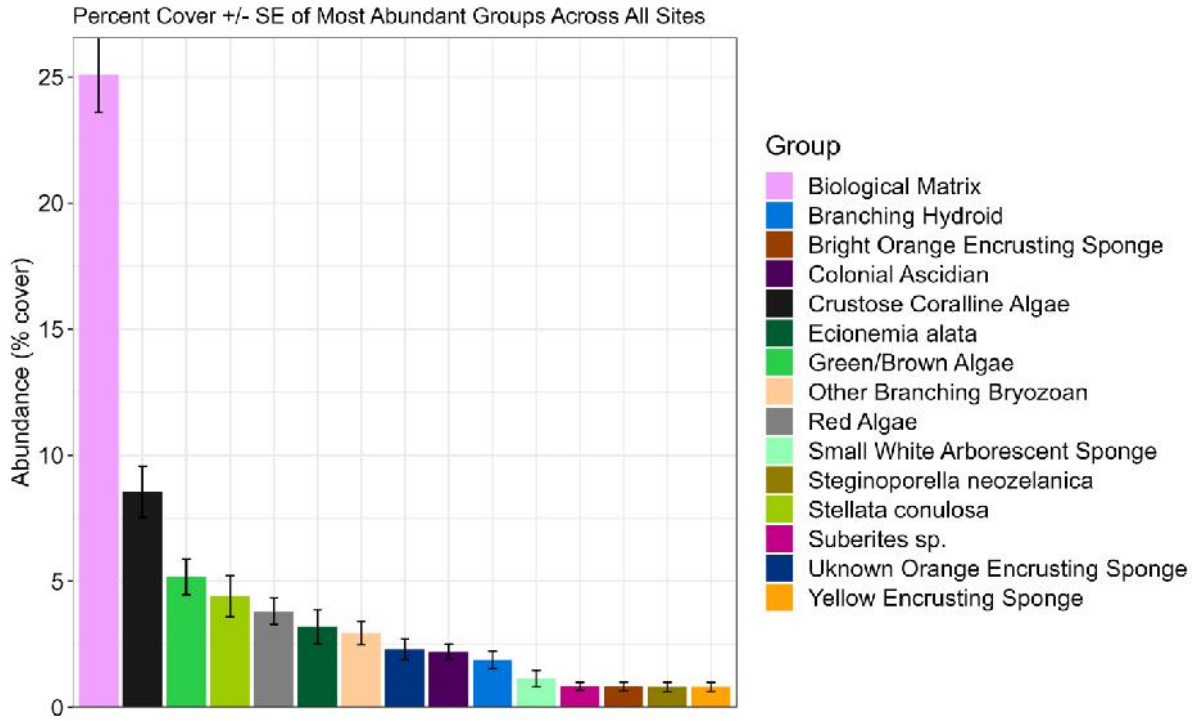
	R Statistic	Significance Level %	Possible Permutations	Actual Permutations	Number >= Observed
Groups					
Cape Colville Drop 01, South Ohinau Island Drop 02	0.915	0.1	92378	999	0
Cape Colville Drop 01, South Aldermen Islands Drop 03	0.74	0.1	92378	999	0
Cape Colville Drop 01, South Aldermen Islands Drop 06	0.981	0.1	92378	999	0
Cape Colville Drop 01, South Aldermen Islands Drop 07	0.831	0.1	92378	999	0
Cape Colville Drop 01, Cradock Channel Drop 13	0.89	0.1	92378	999	0
Cape Colville Drop 01, SW Mokohinau Islands Drop 15	0.99	0.1	92378	999	0
Cape Colville Drop 01, South Mokohinau Islands Drop 17	0.998	0.1	92378	999	0
Cape Colville Drop 01, Burgess Island Drop 19	0.953	0.1	92378	999	0
Cape Colville Drop 01, Burgess Island Drop 21	0.991	0.1	92378	999	0
Cape Colville Drop 01, West Atihau Island Drop 24	0.996	0.1	92378	999	0
Cape Colville Drop 01, SE Channel Island Drop 25	0.56	0.1	92378	999	0
Cape Colville Drop 01, SE Channel Island Drop 28	0.801	0.1	92378	999	0
South Ohinau Island Drop 02, South Aldermen Islands Drop 03	0.332	0.1	92378	999	0
South Ohinau Island Drop 02, South Aldermen Islands Drop 06	0.998	0.1	92378	999	0
South Ohinau Island Drop 02, South Aldermen Islands Drop 07	0.85	0.1	92378	999	0
South Ohinau Island Drop 02, Cradock Channel Drop 13	0.962	0.1	92378	999	0

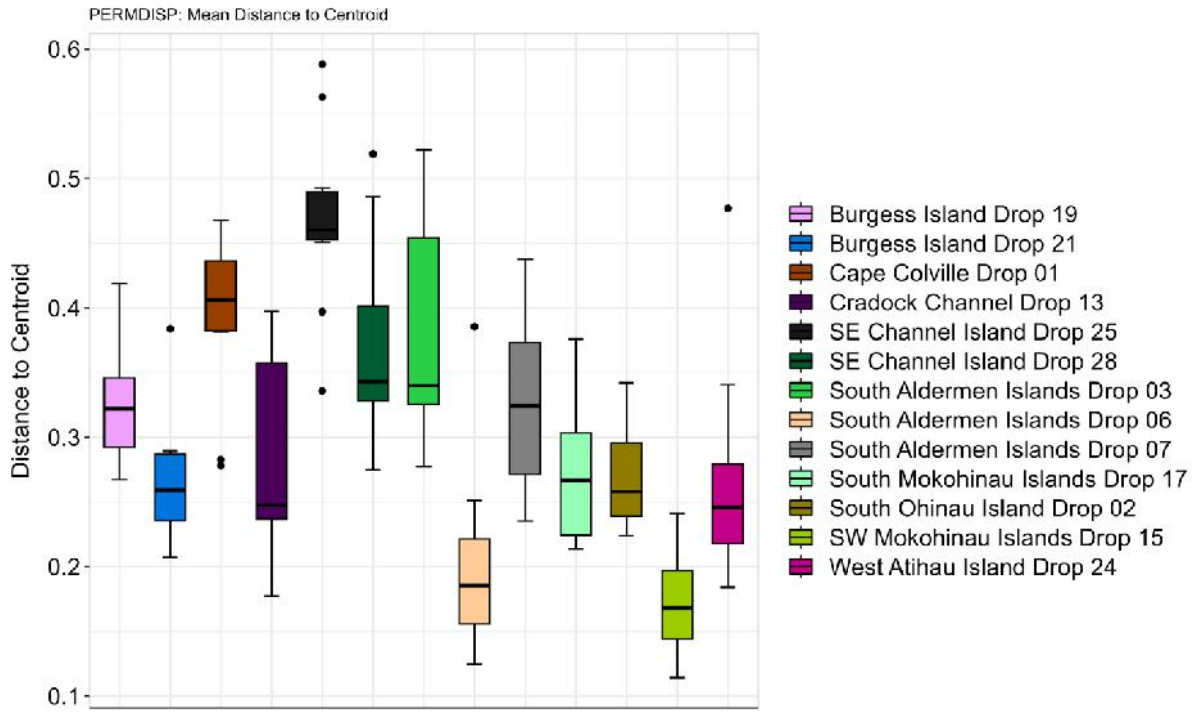
South Ohinau Island Drop 02, SW Mokohinau Islands Drop 15	0.62	0.1	92378	999	0
South Ohinau Island Drop 02, South Mokohinau Islands Drop 17	0.889	0.1	92378	999	0
South Ohinau Island Drop 02, Burgess Island Drop 19	0.999	0.1	92378	999	0
South Ohinau Island Drop 02, Burgess Island Drop 21	0.938	0.1	92378	999	0
South Ohinau Island Drop 02, West Atihau Island Drop 24	0.896	0.1	92378	999	0
South Ohinau Island Drop 02, SE Channel Island Drop 25	0.938	0.1	92378	999	0
South Ohinau Island Drop 02, SE Channel Island Drop 28	0.94	0.1	92378	999	0
South Aldermen Islands Drop 03, South Aldermen Islands Drop 06	0.925	0.1	92378	999	0
South Aldermen Islands Drop 03, South Aldermen Islands Drop 07	0.683	0.1	92378	999	0
South Aldermen Islands Drop 03, Cradock Channel Drop 13	0.568	0.1	92378	999	0
South Aldermen Islands Drop 03, SW Mokohinau Islands Drop 15	0.631	0.1	92378	999	0
South Aldermen Islands Drop 03, South Mokohinau Islands Drop 17	0.834	0.1	92378	999	0
South Aldermen Islands Drop 03, Burgess Island Drop 19	0.934	0.1	92378	999	0
South Aldermen Islands Drop 03, Burgess Island Drop 21	0.709	0.1	92378	999	0
South Aldermen Islands Drop 03, West Atihau Island Drop 24	0.642	0.1	92378	999	0
South Aldermen Islands Drop 03, SE Channel Island Drop 25	0.904	0.1	92378	999	0
South Aldermen Islands Drop 03, SE Channel Island Drop 28	0.928	0.1	92378	999	0
South Aldermen Islands Drop 06, South Aldermen Islands Drop 07	0.869	0.1	92378	999	0
South Aldermen Islands Drop 06, Cradock Channel Drop 13	0.973	0.1	92378	999	0
South Aldermen Islands Drop 06, SW Mokohinau Islands Drop 15	1	0.1	92378	999	0
South Aldermen Islands Drop 06, South Mokohinau Islands Drop 17	1	0.1	92378	999	0
South Aldermen Islands Drop 06, Burgess Island Drop 19	0.923	0.1	92378	999	0
South Aldermen Islands Drop 06, Burgess Island Drop 21	1	0.1	92378	999	0
South Aldermen Islands Drop 06, West Atihau Island Drop 24	0.988	0.1	92378	999	0
South Aldermen Islands Drop 06, SE Channel Island Drop 25	0.994	0.1	92378	999	0
South Aldermen Islands Drop 06, SE Channel Island Drop 28	0.999	0.1	92378	999	0
South Aldermen Islands Drop 07, Cradock Channel Drop 13	0.942	0.1	92378	999	0
South Aldermen Islands Drop 07, SW Mokohinau Islands Drop 15	0.978	0.1	92378	999	0
South Aldermen Islands Drop 07, South Mokohinau Islands Drop 17	0.931	0.1	92378	999	0
South Aldermen Islands Drop 07, Burgess Island Drop 19	0.892	0.2	92378	999	1
South Aldermen Islands Drop 07, Burgess Island Drop 21	0.988	0.1	92378	999	0

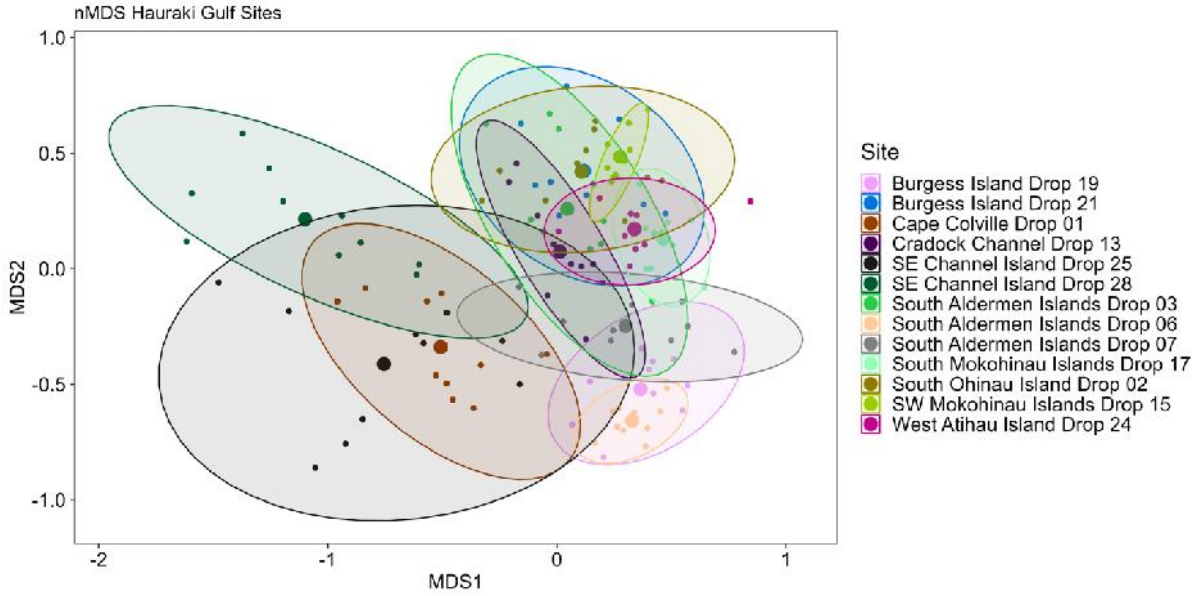
South Aldermen Islands Drop 07, West Atihau Island Drop 24	0.901	0.1	92378	999	0
South Aldermen Islands Drop 07, SE Channel Island Drop 25	0.904	0.1	92378	999	0
South Aldermen Islands Drop 07, SE Channel Island Drop 28	0.967	0.1	92378	999	0
Cradock Channel Drop 13, SW Mokohinau Islands Drop 15	0.977	0.1	92378	999	0
Cradock Channel Drop 13, South Mokohinau Islands Drop 17	0.98	0.1	92378	999	0
Cradock Channel Drop 13, Burgess Island Drop 19	0.986	0.1	92378	999	0
Cradock Channel Drop 13, Burgess Island Drop 21	0.928	0.1	92378	999	0
Cradock Channel Drop 13, West Atihau Island Drop 24	0.752	0.1	92378	999	0
Cradock Channel Drop 13, SE Channel Island Drop 25	0.963	0.1	92378	999	0
Cradock Channel Drop 13, SE Channel Island Drop 28	0.984	0.1	92378	999	0
SW Mokohinau Islands Drop 15, South Mokohinau Islands Drop 17	0.882	0.1	92378	999	0
SW Mokohinau Islands Drop 15, Burgess Island Drop 19	1	0.1	92378	999	0
SW Mokohinau Islands Drop 15, Burgess Island Drop 21	0.891	0.1	92378	999	0
SW Mokohinau Islands Drop 15, West Atihau Island Drop 24	0.786	0.1	92378	999	0
SW Mokohinau Islands Drop 15, SE Channel Island Drop 25	0.975	0.1	92378	999	0
SW Mokohinau Islands Drop 15, SE Channel Island Drop 28	1	0.1	92378	999	0
South Mokohinau Islands Drop 17, Burgess Island Drop 19	0.899	0.1	92378	999	0
South Mokohinau Islands Drop 17, Burgess Island Drop 21	0.982	0.1	92378	999	0
South Mokohinau Islands Drop 17, West Atihau Island Drop 24	0.902	0.1	92378	999	0
South Mokohinau Islands Drop 17, SE Channel Island Drop 25	0.99	0.2	92378	999	1
South Mokohinau Islands Drop 17, SE Channel Island Drop 28	1	0.1	92378	999	0
Burgess Island Drop 19, Burgess Island Drop 21	1	0.1	92378	999	0
Burgess Island Drop 19, West Atihau Island Drop 24	0.992	0.1	92378	999	0
Burgess Island Drop 19, SE Channel Island Drop 25	0.929	0.1	92378	999	0
Burgess Island Drop 19, SE Channel Island Drop 28	0.996	0.1	92378	999	0
Burgess Island Drop 21, West Atihau Island Drop 24	0.463	0.1	92378	999	0
Burgess Island Drop 21, SE Channel Island Drop 25	0.97	0.1	92378	999	0
Burgess Island Drop 21, SE Channel Island Drop 28	0.996	0.1	92378	999	0
West Atihau Island Drop 24, SE Channel Island Drop 25	0.99	0.1	92378	999	0
West Atihau Island Drop 24, SE Channel Island Drop 28	0.999	0.1	92378	999	0
SE Channel Island Drop 25, SE Channel Island Drop 28	0.746	0.1	92378	999	0

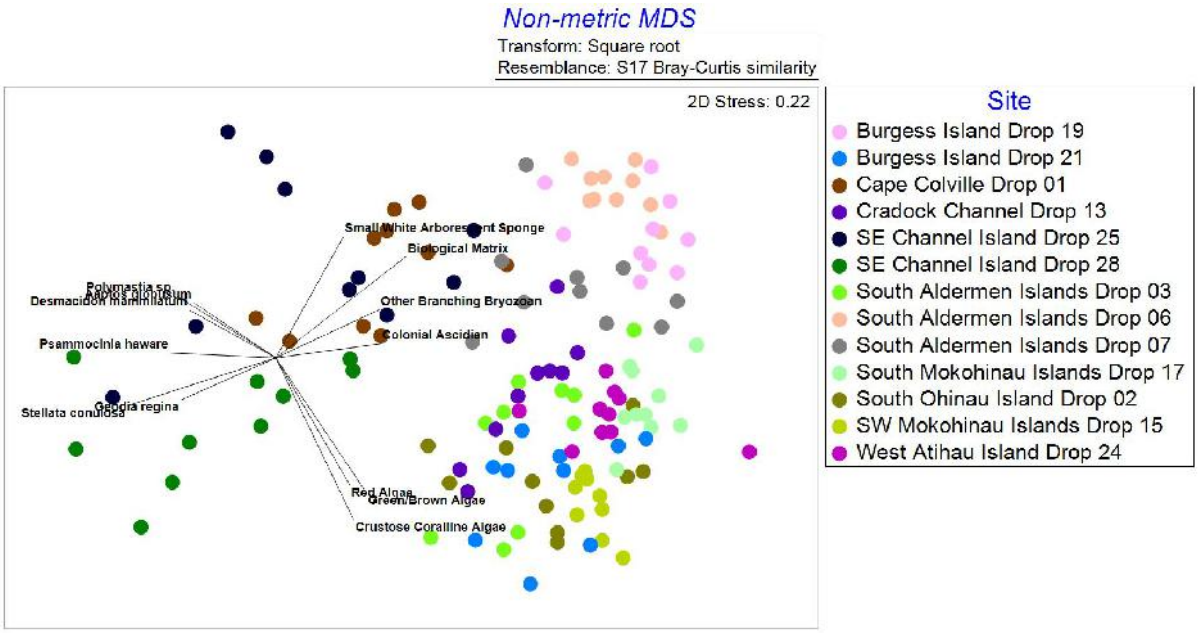
Appendix J

All analyses for the full 93 benthic groups with sediment excluded from the analyses – not standardised









PERMDISP
Distance-based test for homogeneity of multivariate dispersions

Data type: Similarity
Selection: All
Transform: Square root
Resemblance: S17 Bray-Curtis similarity

Group factor: Site

Number of permutations: 9999

Number of groups: 13
Number of samples: 130

DEVIATIONS FROM CENTROID
F: 18.914 df1: 12 df2: 117
P(perm): 0.0001

PAIRWISE COMPARISONS

Groups	t	P(perm)
(Cape Colville Drop 01,South Ohinau Island Drop 02)	3.9663	0.0011
(Cape Colville Drop 01,South Aldermen Islands Drop 03)	1.0946	0.2964
(Cape Colville Drop 01,South Aldermen Islands Drop 06)	4.1908	0.0004
(Cape Colville Drop 01,South Aldermen Islands Drop 07)	1.942	0.0639
(Cape Colville Drop 01,Cradock Channel Drop 13)	5.7635	0.0003
(Cape Colville Drop 01,SW Mokohinau Islands Drop 15)	10.005	0.0001
(Cape Colville Drop 01,South Mokohinau Islands Drop 17)	5.4114	0.0003
(Cape Colville Drop 01,Burgess Island Drop 19)	2.8502	0.0109
(Cape Colville Drop 01,Burgess Island Drop 21)	6.2846	0.0001
(Cape Colville Drop 01,West Atihau Island Drop 24)	4.5087	0.0008
(Cape Colville Drop 01,SE Channel Island Drop 25)	2.3944	0.0198
(Cape Colville Drop 01,SE Channel Island Drop 28)	0.042937	0.9656
(South Ohinau Island Drop 02,South Aldermen Islands Drop 03)	1.9671	0.0802
(South Ohinau Island Drop 02,South Aldermen Islands Drop 06)	0.24119	0.8203
(South Ohinau Island Drop 02,South Aldermen Islands Drop 07)	2.1968	0.0516
(South Ohinau Island Drop 02,Cradock Channel Drop 13)	1.8939	0.0854
(South Ohinau Island Drop 02,SW Mokohinau Islands Drop 15)	6.3741	0.0001
(South Ohinau Island Drop 02,South Mokohinau Islands Drop 17)	1.5534	0.1681
(South Ohinau Island Drop 02,Burgess Island Drop 19)	1.9039	0.0806
(South Ohinau Island Drop 02,Burgess Island Drop 21)	2.0619	0.0605
(South Ohinau Island Drop 02,West Atihau Island Drop 24)	1.122	0.3195
(South Ohinau Island Drop 02,SE Channel Island Drop 25)	6.587	0.0001
(South Ohinau Island Drop 02,SE Channel Island Drop 28)	3.2185	0.0068
(South Aldermen Islands Drop 03,South Aldermen Islands Drop 06)	2.1433	0.0593
(South Aldermen Islands Drop 03,South Aldermen Islands Drop 07)	0.37434	0.7271
(South Aldermen Islands Drop 03,Cradock Channel Drop 13)	3.356	0.0024
(South Aldermen Islands Drop 03,SW Mokohinau Islands Drop 15)	6.599	0.0001
(South Aldermen Islands Drop 03,South Mokohinau Islands Drop 17)	3.1025	0.0052
(South Aldermen Islands Drop 03,Burgess Island Drop 19)	0.86144	0.4424
(South Aldermen Islands Drop 03,Burgess Island Drop 21)	3.5111	0.0018
(South Aldermen Islands Drop 03,West Atihau Island Drop 24)	2.6734	0.025
(South Aldermen Islands Drop 03,SE Channel Island Drop 25)	3.0096	0.013
(South Aldermen Islands Drop 03,SE Channel Island Drop 28)	0.93442	0.3859
(South Aldermen Islands Drop 06,South Aldermen Islands Drop 07)	2.4393	0.026
(South Aldermen Islands Drop 06,Cradock Channel Drop 13)	1.6501	0.1287
(South Aldermen Islands Drop 06,SW Mokohinau Islands Drop 15)	6.1239	0.0001
(South Aldermen Islands Drop 06,South Mokohinau Islands Drop 17)	1.3123	0.2308
(South Aldermen Islands Drop 06,Burgess Island Drop 19)	2.189	0.0513
(South Aldermen Islands Drop 06,Burgess Island Drop 21)	1.7899	0.1064
(South Aldermen Islands Drop 06,West Atihau Island Drop 24)	0.91611	0.3949
(South Aldermen Islands Drop 06,SE Channel Island Drop 25)	6.8149	0.0001
(South Aldermen Islands Drop 06,SE Channel Island Drop 28)	3.4035	0.0042
(South Aldermen Islands Drop 07,Cradock Channel Drop 13)	4.1243	0.0019
(South Aldermen Islands Drop 07,SW Mokohinau Islands Drop 15)	8.6897	0.0001
(South Aldermen Islands Drop 07,South Mokohinau Islands Drop 17)	3.7576	0.0019
(South Aldermen Islands Drop 07,Burgess Island Drop 19)	0.6874	0.5196
(South Aldermen Islands Drop 07,Burgess Island Drop 21)	4.5584	0.0007
(South Aldermen Islands Drop 07,West Atihau Island Drop 24)	2.9974	0.0141

(South Aldermen Islands Drop 07,SE Channel Island Drop 25)	4.5436	0.0004
(South Aldermen Islands Drop 07,SE Channel Island Drop 28)	1.5491	0.1727
(Cradock Channel Drop 13,SW Mokohinau Islands Drop 15)	4.4794	0.0002
(Cradock Channel Drop 13,South Mokohinau Islands Drop 17)	0.32346	0.7534
(Cradock Channel Drop 13,Burgess Island Drop 19)	4.1782	0.0018
(Cradock Channel Drop 13,Burgess Island Drop 21)	0.050912	0.9568
(Cradock Channel Drop 13,West Atihau Island Drop 24)	0.48257	0.6486
(Cradock Channel Drop 13,SE Channel Island Drop 25)	8.4385	0.0002
(Cradock Channel Drop 13,SE Channel Island Drop 28)	4.6863	0.0003
(SW Mokohinau Islands Drop 15,South Mokohinau Islands Drop 17)	4.7606	0.0006
(SW Mokohinau Islands Drop 15,Burgess Island Drop 19)	9.6289	0.0001
(SW Mokohinau Islands Drop 15,Burgess Island Drop 21)	5.0845	0.0001
(SW Mokohinau Islands Drop 15,West Atihau Island Drop 24)	4.247	0.0005
(SW Mokohinau Islands Drop 15,SE Channel Island Drop 25)	12.816	0.0001
(SW Mokohinau Islands Drop 15,SE Channel Island Drop 28)	8.1201	0.0001
(South Mokohinau Islands Drop 17,Burgess Island Drop 19)	3.7376	0.0048
(South Mokohinau Islands Drop 17,Burgess Island Drop 21)	0.31031	0.7687
(South Mokohinau Islands Drop 17,West Atihau Island Drop 24)	0.20519	0.8479
(South Mokohinau Islands Drop 17,SE Channel Island Drop 25)	8.0536	0.0001
(South Mokohinau Islands Drop 17,SE Channel Island Drop 28)	4.4105	0.0006
(Burgess Island Drop 19,Burgess Island Drop 21)	4.8523	0.0004
(Burgess Island Drop 19,West Atihau Island Drop 24)	2.8023	0.0183
(Burgess Island Drop 19,SE Channel Island Drop 25)	5.8866	0.0003
(Burgess Island Drop 19,SE Channel Island Drop 28)	2.1776	0.0506
(Burgess Island Drop 21,West Atihau Island Drop 24)	0.47946	0.661
(Burgess Island Drop 21,SE Channel Island Drop 25)	9.2593	0.0002
(Burgess Island Drop 21,SE Channel Island Drop 28)	4.9457	0.0001
(West Atihau Island Drop 24,SE Channel Island Drop 25)	6.7704	0.0001
(West Atihau Island Drop 24,SE Channel Island Drop 28)	3.8268	0.0022
(SE Channel Island Drop 25,SE Channel Island Drop 28)	2.0398	0.0653

MEANS AND STANDARD ERRORS

MEANS AND STANDARD ERRORS

Group	Size	Average	SE
Cape Colville Drop 01	10	37.338	1.5877
South Ohinau Island Drop 02	10	28.961	1.4685
South Aldermen Islands Drop 03	10	34.222	2.3196
South Aldermen Islands Drop 06	10	28.582	1.3837
South Aldermen Islands Drop 07	10	33.242	1.3749
Cradock Channel Drop 13	10	25.237	1.367
SW Mokohinau Drop 15	10	16.642	1.3174
South Mokohinau Drop 17	10	25.854	1.3935
Burgess Drop 19	10	32.063	0.90644
Burgess Drop 21	10	25.331	1.0644
West Atihau Island Drop 24	10	26.351	1.8483
SE Channel Island Drop 25	10	42.519	1.5241
SE Channel Island Drop 28	10	37.096	2.1501

PERMDISP
Distance-based test for homogeneity of multivariate dispersions

Data type: Similarity
Selection: All
Transform: Square root

Resemblance: S17 Bray-Curtis similarity

Group factor: Site
Number of permutations: 9999

Number of groups: 13
Number of samples: 130

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms
Si	12	1.8551E+05	15459	14.174	0.0001	9775
Res	117	1.2761E+05	1090.7			
Total	129	3.1311E+05				

PAIR-WISE TESTS

Groups	t	P(perm)	Unique perms
Cape Colville Drop 01, South Ohinau Island Drop 02	3.5953	0.0001	9426
Cape Colville Drop 01, South Aldermen Islands Drop 03	2.8329	0.0002	9404
Cape Colville Drop 01, South Aldermen Islands Drop 06	3.7264	0.0001	9430
Cape Colville Drop 01, South Aldermen Islands Drop 07	3.0814	0.0001	9422
Cape Colville Drop 01, Cradock Channel Drop 13	2.9371	0.0001	9422
Cape Colville Drop 01, SW Mokohinau Islands Drop 15	4.9059	0.0001	9413
Cape Colville Drop 01, South Mokohinau Islands Drop 17	4.1263	0.0001	9439
Cape Colville Drop 01, Burgess Island Drop 19	3.484	0.0001	9412
Cape Colville Drop 01, Burgess Island Drop 21	4.1451	0.0001	9432
Cape Colville Drop 01, West Atihau Island Drop 24	3.997	0.0001	9414
Cape Colville Drop 01, SE Channel Island Drop 25	2.3661	0.0001	9403
Cape Colville Drop 01, SE Channel Island Drop 28	3.1338	0.0001	9403
South Ohinau Island Drop 02, South Aldermen Islands Drop 03	1.9247	0.0011	9359
South Ohinau Island Drop 02, South Aldermen Islands Drop 06	4.553	0.0001	9419
South Ohinau Island Drop 02, South Aldermen Islands Drop 07	3.1768	0.0001	9404
South Ohinau Island Drop 02, Cradock Channel Drop 13	4.0517	0.0001	9446
South Ohinau Island Drop 02, SW Mokohinau Islands Drop 15	3.0904	0.0001	9383
South Ohinau Island Drop 02, South Mokohinau Islands Drop 17	3.3102	0.0001	9454
South Ohinau Island Drop 02, Burgess Island Drop 19	4.3654	0.0001	9415
South Ohinau Island Drop 02, Burgess Island Drop 21	3.9873	0.0001	9418
South Ohinau Island Drop 02, West Atihau Island Drop 24	3.6682	0.0001	9426
South Ohinau Island Drop 02, SE Channel Island Drop 25	3.584	0.0001	9424

South Ohinau Island Drop 02, SE Channel Island Drop 28	4.3063	0.0001	9416
South Aldermen Islands Drop 03, South Aldermen Islands Drop 06	3.737	0.0001	9421
South Aldermen Islands Drop 03, South Aldermen Islands Drop 07	2.5861	0.0001	9421
South Aldermen Islands Drop 03, Cradock Channel Drop 13	2.4409	0.0001	9433
South Aldermen Islands Drop 03, SW Mokohinau Islands Drop 15	2.9965	0.0001	9431
South Aldermen Islands Drop 03, South Mokohinau Islands Drop 17	2.8957	0.0001	9395
South Aldermen Islands Drop 03, Burgess Island Drop 19	3.6032	0.0001	9385
South Aldermen Islands Drop 03, Burgess Island Drop 21	2.7687	0.0001	9448
South Aldermen Islands Drop 03, West Atihau Island Drop 24	2.6223	0.0001	9432
South Aldermen Islands Drop 03, SE Channel Island Drop 25	3.2381	0.0001	9391
South Aldermen Islands Drop 03, SE Channel Island Drop 28	3.7461	0.0001	9422
South Aldermen Islands Drop 06, South Aldermen Islands Drop 07	2.9317	0.0001	9429
South Aldermen Islands Drop 06, Cradock Channel Drop 13	4.2321	0.0001	9419
South Aldermen Islands Drop 06, SW Mokohinau Islands Drop 15	6.5443	0.0001	9388
South Aldermen Islands Drop 06, South Mokohinau Islands Drop 17	4.7175	0.0001	9402
South Aldermen Islands Drop 06, Burgess Island Drop 19	2.9578	0.0001	9390
South Aldermen Islands Drop 06, Burgess Island Drop 21	5.3678	0.0001	9446
South Aldermen Islands Drop 06, West Atihau Island Drop 24	4.1944	0.0001	9422
South Aldermen Islands Drop 06, SE Channel Island Drop 25	3.7503	0.0001	9398
South Aldermen Islands Drop 06, SE Channel Island Drop 28	4.7013	0.0001	9418
South Aldermen Islands Drop 07, Cradock Channel Drop 13	3.6357	0.0001	9380
South Aldermen Islands Drop 07, SW Mokohinau Islands Drop 15	4.6367	0.0001	9414
South Aldermen Islands Drop 07, South Mokohinau Islands Drop 17	3.2966	0.0001	9384
South Aldermen Islands Drop 07, Burgess Island Drop 19	2.964	0.0001	9388
South Aldermen Islands Drop 07, Burgess Island Drop 21	4.1691	0.0001	9475
South Aldermen Islands Drop 07, West Atihau Island Drop 24	3.2676	0.0001	9444
South Aldermen Islands Drop 07, SE Channel Island Drop 25	3.1916	0.0001	9416
South Aldermen Islands Drop 07, SE Channel Island Drop 28	3.9089	0.0001	9438
Cradock Channel Drop 13, SW Mokohinau Islands Drop 15	4.9935	0.0001	9418
Cradock Channel Drop 13, South Mokohinau Islands Drop 17	4.1232	0.0001	9411
Cradock Channel Drop 13, Burgess Island Drop 19	4.1098	0.0001	9420

Cradock Channel Drop 13, Burgess Island Drop 21	3.7394	0.0001	9465
Cradock Channel Drop 13, West Atihau Island Drop 24	3.0094	0.0001	9415
Cradock Channel Drop 13, SE Channel Island Drop 25	3.8085	0.0001	9438
Cradock Channel Drop 13, SE Channel Island Drop 28	4.6286	0.0001	9434
SW Mokohinau Islands Drop 15, South Mokohinau Islands Drop 17	3.9794	0.0001	9439
SW Mokohinau Islands Drop 15, Burgess Island Drop 19	5.4093	0.0001	9408
SW Mokohinau Islands Drop 15, Burgess Island Drop 21	3.7838	0.0001	9419
SW Mokohinau Islands Drop 15, West Atihau Island Drop 24	3.6861	0.0001	9434
SW Mokohinau Islands Drop 15, SE Channel Island Drop 25	4.3385	0.0001	9425
SW Mokohinau Islands Drop 15, SE Channel Island Drop 28	5.7552	0.0001	9439
South Mokohinau Islands Drop 17, Burgess Island Drop 19	2.965	0.0001	9418
South Mokohinau Islands Drop 17, Burgess Island Drop 21	3.8192	0.0001	9388
South Mokohinau Islands Drop 17, West Atihau Island Drop 24	3.4654	0.0001	9405
South Mokohinau Islands Drop 17, SE Channel Island Drop 25	3.6348	0.0001	9431
South Mokohinau Islands Drop 17, SE Channel Island Drop 28	4.9381	0.0001	9401
Burgess Island Drop 19, Burgess Island Drop 21	4.4004	0.0001	9365
Burgess Island Drop 19, West Atihau Island Drop 24	3.8393	0.0001	9377
Burgess Island Drop 19, SE Channel Island Drop 25	3.2804	0.0001	9415
Burgess Island Drop 19, SE Channel Island Drop 28	4.1944	0.0002	9423
Burgess Island Drop 21, West Atihau Island Drop 24	2.1879	0.0001	9447
Burgess Island Drop 21, SE Channel Island Drop 25	3.5736	0.0001	9399
Burgess Island Drop 21, SE Channel Island Drop 28	4.622	0.0001	9442
West Atihau Island Drop 24, SE Channel Island Drop 25	3.7503	0.0001	9398
West Atihau Island Drop 24, SE Channel Island Drop 28	4.8425	0.0001	9440
SE Channel Island Drop 25, SE Channel Island Drop 28	2.6787	0.0001	9360

ANOSIM
Analysis of Similarities

Data type: Similarity
Selection: All

Factors

Place	Name	Type	Levels
A	Site	Unordered	13

Site levels
Cape Colville Drop 01
South Ohinau Island Drop 02
South Aldermen Islands Drop 03
South Aldermen Islands Drop 06
South Aldermen Islands Drop 07
Cradock Channel Drop 13
SW Mokohinau Drop 15
South Mokohinau Drop 17
Burgess Drop 19
Burgess Drop 21
West Atihau Island Drop 24
SE Channel Island Drop 25
SE Channel Island Drop 28

Tests for differences between unordered Site groups
Global Test
Sample statistic (R): 0.806
Significance level of sample statistic: 0.1%
Number of permutations: 999 (Random sample from a large number)
Number of permuted statistics greater than or equal to R: 0

Pairwise Tests

Groups	R	% Sig	Possible Perms	Actual Perms	Observed >= Expected
Cape Colville Drop 01, South Ohinau Island Drop 02	0.908	0.2	92378	999	1
Cape Colville Drop 01, South Aldermen Islands Drop 03	0.734	0.1	92378	999	0
Cape Colville Drop 01, South Aldermen Islands Drop 06	0.921	0.1	92378	999	0
Cape Colville Drop 01, South Aldermen Islands Drop 07	0.825	0.1	92378	999	0
Cape Colville Drop 01, Cradock Channel Drop 13	0.733	0.1	92378	999	0
Cape Colville Drop 01, SW Mokohinau Islands Drop 15	0.967	0.1	92378	999	0
Cape Colville Drop 01, South Mokohinau Islands Drop 17	0.958	0.1	92378	999	0
Cape Colville Drop 01, Burgess Island Drop 19	0.917	0.1	92378	999	0
Cape Colville Drop 01, Burgess Island Drop 21	0.96	0.1	92378	999	0
Cape Colville Drop 01, West Atihau Island Drop 24	0.954	0.1	92378	999	0
Cape Colville Drop 01, SE Channel Island Drop 25	0.542	0.1	92378	999	0
Cape Colville Drop 01, SE Channel Island Drop 28	0.772	0.1	92378	999	0
South Ohinau Island Drop 02, South Aldermen Islands Drop 03	0.382	0.3	92378	999	2
South Ohinau Island Drop 02, South Aldermen Islands Drop 06	0.999	0.1	92378	999	0

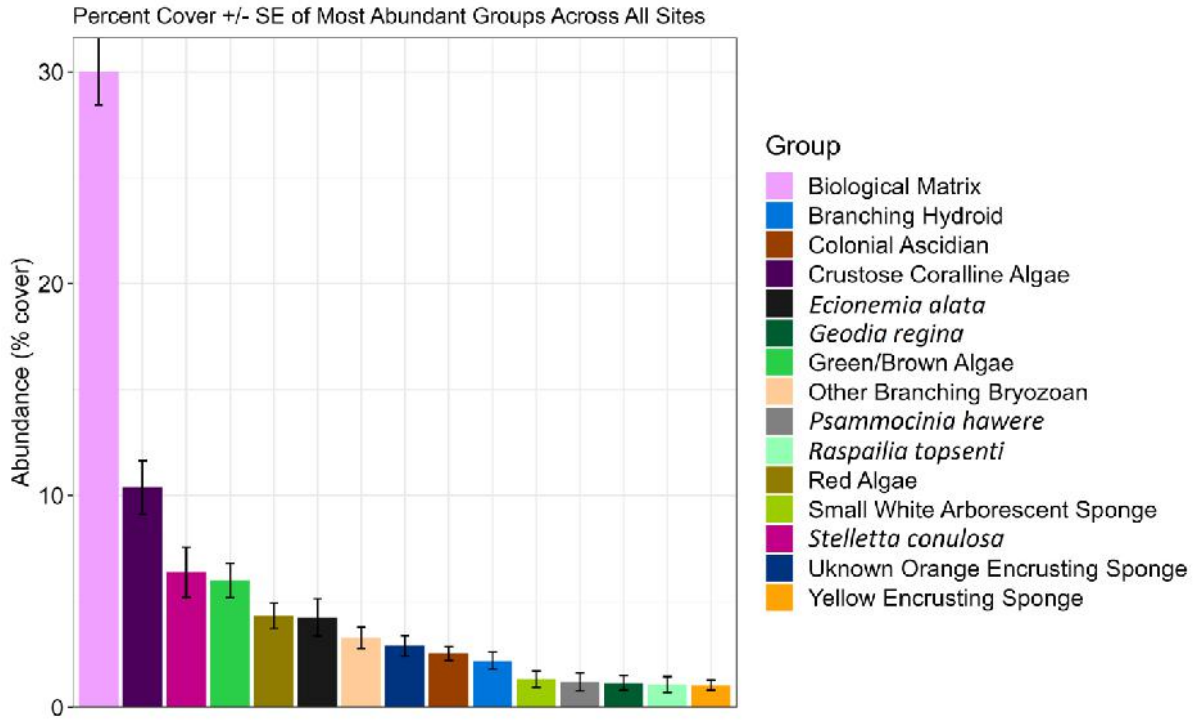
South Ohinau Island Drop 02, South Aldermen Islands Drop 07	0.912	0.1	92378	999	0
South Ohinau Island Drop 02, Cradock Channel Drop 13	0.979	0.1	92378	999	0
South Ohinau Island Drop 02, SW Mokohinau Islands Drop 15	0.621	0.1	92378	999	0
South Ohinau Island Drop 02, South Mokohinau Islands Drop 17	0.872	0.1	92378	999	0
South Ohinau Island Drop 02, Burgess Island Drop 19	1	0.1	92378	999	0
South Ohinau Island Drop 02, Burgess Island Drop 21	0.961	0.1	92378	999	0
South Ohinau Island Drop 02, West Atihau Island Drop 24	0.92	0.1	92378	999	0
South Ohinau Island Drop 02, SE Channel Island Drop 25	0.895	0.1	92378	999	0
South Ohinau Island Drop 02, SE Channel Island Drop 28	0.945	0.1	92378	999	0
South Aldermen Islands Drop 03, South Aldermen Islands Drop 06	0.913	0.1	92378	999	0
South Aldermen Islands Drop 03, South Aldermen Islands Drop 07	0.704	0.1	92378	999	0
South Aldermen Islands Drop 03, Cradock Channel Drop 13	0.542	0.1	92378	999	0
South Aldermen Islands Drop 03, SW Mokohinau Islands Drop 15	0.601	0.1	92378	999	0
South Aldermen Islands Drop 03, South Mokohinau Islands Drop 17	0.76	0.1	92378	999	0
South Aldermen Islands Drop 03, Burgess Island Drop 19	0.941	0.1	92378	999	0
South Aldermen Islands Drop 03, Burgess Island Drop 21	0.697	0.1	92378	999	0
South Aldermen Islands Drop 03, West Atihau Island Drop 24	0.593	0.1	92378	999	0
South Aldermen Islands Drop 03, SE Channel Island Drop 25	0.88	0.1	92378	999	0
South Aldermen Islands Drop 03, SE Channel Island Drop 28	0.932	0.1	92378	999	0
South Aldermen Islands Drop 06, South Aldermen Islands Drop 07	0.856	0.1	92378	999	0
South Aldermen Islands Drop 06, Cradock Channel Drop 13	0.97	0.1	92378	999	0
South Aldermen Islands Drop 06, SW Mokohinau Islands Drop 15	1	0.1	92378	999	0
South Aldermen Islands Drop 06, South Mokohinau Islands Drop 17	1	0.1	92378	999	0
South Aldermen Islands Drop 06, Burgess Island Drop 19	0.909	0.1	92378	999	0
South Aldermen Islands Drop 06, Burgess Island Drop 21	1	0.1	92378	999	0
South Aldermen Islands Drop 06, West Atihau Island Drop 24	0.99	0.1	92378	999	0
South Aldermen Islands Drop 06, SE Channel Island Drop 25	0.911	0.1	92378	999	0
South Aldermen Islands Drop 06, SE Channel Island Drop 28	0.993	0.1	92378	999	0
South Aldermen Islands Drop 07, Cradock Channel Drop 13	0.927	0.1	92378	999	0
South Aldermen Islands Drop 07, SW Mokohinau Islands Drop 15	0.986	0.1	92378	999	0
South Aldermen Islands Drop 07, South Mokohinau Islands Drop 17	0.889	0.1	92378	999	0

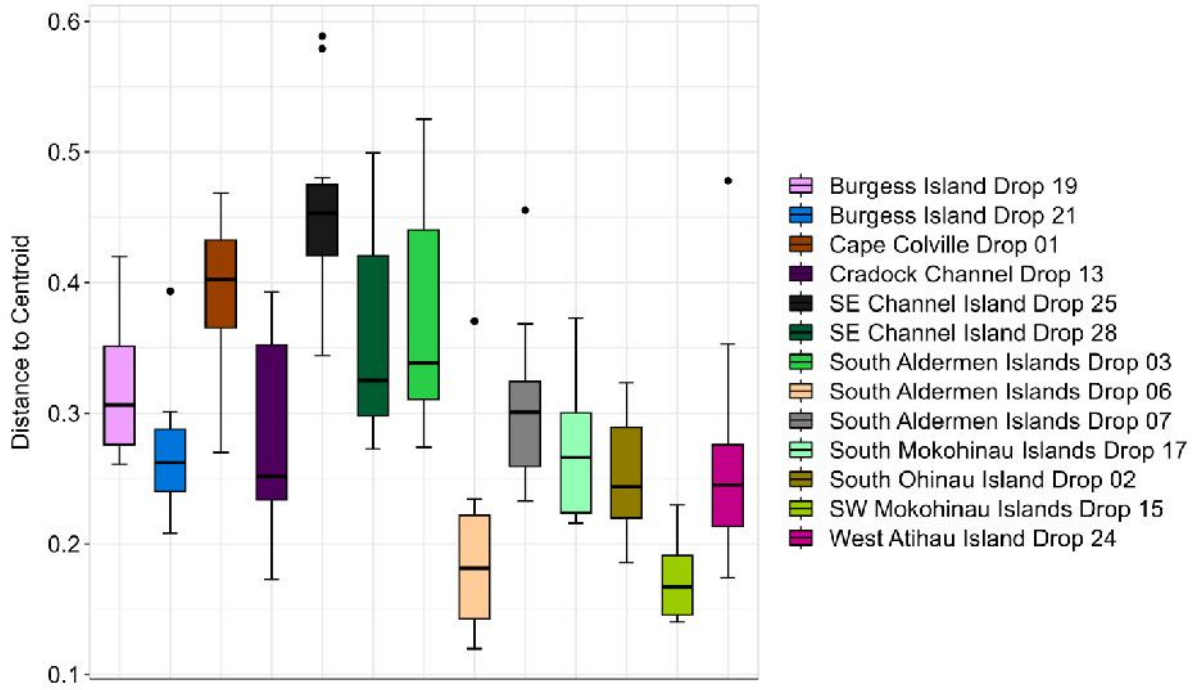
South Aldermen Islands Drop 07, Burgess Island Drop 19	0.911	0.1	92378	999	0
South Aldermen Islands Drop 07, Burgess Island Drop 21	0.991	0.1	92378	999	0
South Aldermen Islands Drop 07, West Atihau Island Drop 24	0.882	0.1	92378	999	0
South Aldermen Islands Drop 07, SE Channel Island Drop 25	0.834	0.1	92378	999	0
South Aldermen Islands Drop 07, SE Channel Island Drop 28	0.956	0.1	92378	999	0
Cradock Channel Drop 13, SW Mokohinau Islands Drop 15	0.976	0.1	92378	999	0
Cradock Channel Drop 13, South Mokohinau Islands Drop 17	0.974	0.1	92378	999	0
Cradock Channel Drop 13, Burgess Island Drop 19	0.982	0.1	92378	999	0
Cradock Channel Drop 13, Burgess Island Drop 21	0.929	0.1	92378	999	0
Cradock Channel Drop 13, West Atihau Island Drop 24	0.766	0.1	92378	999	0
Cradock Channel Drop 13, SE Channel Island Drop 25	0.862	0.1	92378	999	0
Cradock Channel Drop 13, SE Channel Island Drop 28	0.958	0.1	92378	999	0
SW Mokohinau Islands Drop 15, South Mokohinau Islands Drop 17	0.891	0.1	92378	999	0
SW Mokohinau Islands Drop 15, Burgess Island Drop 19	1	0.1	92378	999	0
SW Mokohinau Islands Drop 15, Burgess Island Drop 21	0.898	0.1	92378	999	0
SW Mokohinau Islands Drop 15, West Atihau Island Drop 24	0.813	0.1	92378	999	0
SW Mokohinau Islands Drop 15, SE Channel Island Drop 25	0.886	0.1	92378	999	0
SW Mokohinau Islands Drop 15, SE Channel Island Drop 28	0.998	0.1	92378	999	0
South Mokohinau Islands Drop 17, Burgess Island Drop 19	0.861	0.1	92378	999	0
South Mokohinau Islands Drop 17, Burgess Island Drop 21	0.99	0.1	92378	999	0
South Mokohinau Islands Drop 17, West Atihau Island Drop 24	0.917	0.1	92378	999	0
South Mokohinau Islands Drop 17, SE Channel Island Drop 25	0.836	0.1	92378	999	0
South Mokohinau Islands Drop 17, SE Channel Island Drop 28	0.996	0.1	92378	999	0
Burgess Island Drop 19, Burgess Island Drop 21	1	0.1	92378	999	0
Burgess Island Drop 19, West Atihau Island Drop 24	0.998	0.1	92378	999	0
Burgess Island Drop 19, SE Channel Island Drop 25	0.816	0.1	92378	999	0
Burgess Island Drop 19, SE Channel Island Drop 28	0.981	0.1	92378	999	0
Burgess Island Drop 21, West Atihau Island Drop 24	0.452	0.1	92378	999	0
Burgess Island Drop 21, SE Channel Island Drop 25	0.847	0.1	92378	999	0
Burgess Island Drop 21, SE Channel Island Drop 28	0.977	0.1	92378	999	0
West Atihau Island Drop 24, SE Channel Island Drop 25	0.886	0.1	92378	999	0

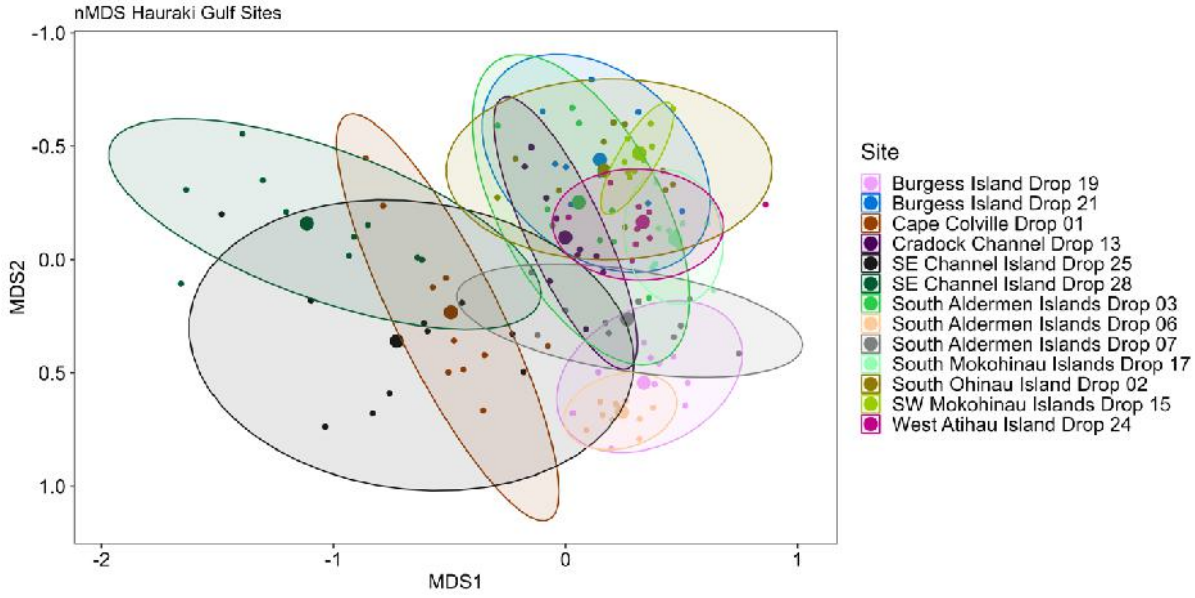
West Atihau Island Drop 24, SE Channel Island Drop 28	0.982	0.1	92378	999	0
SE Channel Island Drop 25, SE Channel Island Drop 28	0.726	0.1	92378	999	0

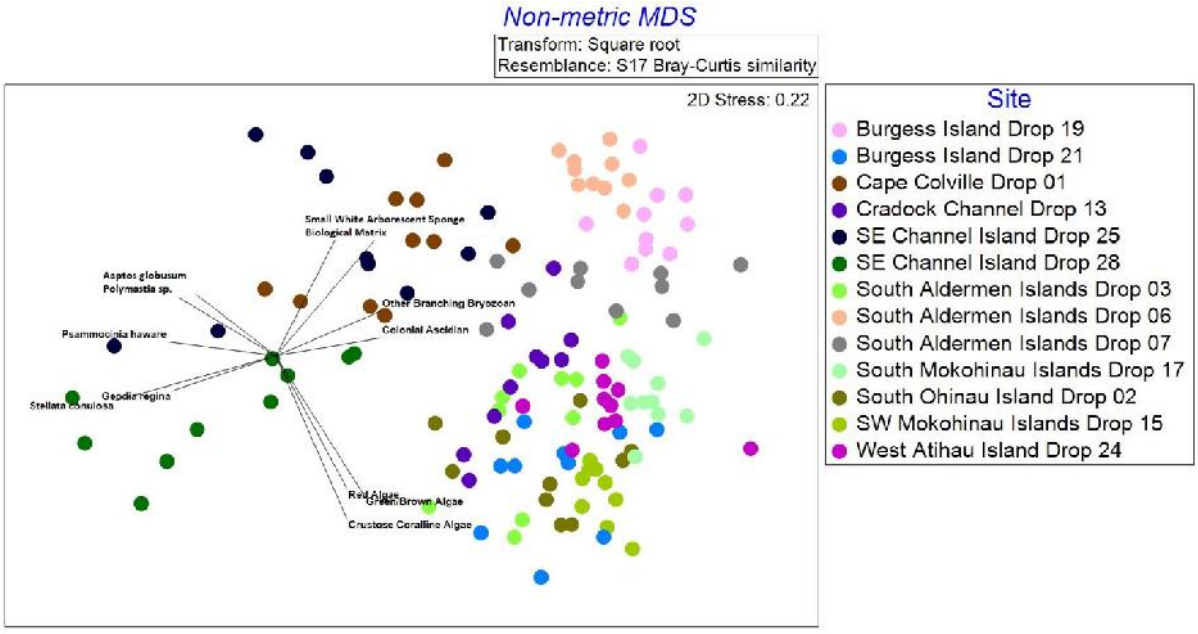
Appendix K

All analyses for the full 93 benthic groups with sediment excluded from the analyses – standardized.




Distance to Centroid
0.6
0.5
0.4
0.3
0.2
0.1
Burgess Island Drop 19
Burgess Island Drop 21
Cape Colville Drop 01
Cradock Channel Drop 13
SE Channel Island Drop 25
SE Channel Island Drop 28
South Aldermen Islands Drop 03
South Aldermen Islands Drop 06
South Aldermen Islands Drop 07
South Mokohinau Islands Drop 17
South Ohinau Island Drop 02
SW Mokohinau Islands Drop 15
West Atihau Island Drop 24


nMDS Hauraki Gulf Sites
MDS2
-1.0
-0.5
0.0
0.5
1.0
-2
-1
0
1
MDS1
Site
Burgess Island Drop 19
Burgess Island Drop 21
Cape Colville Drop 01
Cradock Channel Drop 13
SE Channel Island Drop 25
SE Channel Island Drop 28
South Aldermen Islands Drop 03
South Aldermen Islands Drop 06
South Aldermen Islands Drop 07
South Mokohinau Islands Drop 17
South Ohinau Island Drop 02
SW Mokohinau Islands Drop 15
West Atihau Island Drop 24



PERMDISP
Distance-based test for homogeneity of multivariate dispersions

Resemblance worksheet
Name: Resem2
Data type: Similarity
Selection: All
Standardise Samples by Total
Transform: Square root
Resemblance: S17 Bray-Curtis similarity

Group factor: Site
Number of permutations: 999

Number of groups: 13
Number of samples: 130

DEVIATIONS FROM CENTROID
F: 18.519 df1: 12 df2: 117
P(perm): 0.0001

PAIRWISE COMPARISONS

Groups	t	P(perm)
(Cape Colville Drop 01,South Ohinau Island Drop 02)	4.2915	0.0002
(Cape Colville Drop 01,South Aldermen Islands Drop 03)	1.1215	0.2935

(Cape Colville Drop 01,South Aldermen Islands Drop 06)	4.1925	0.0005
(Cape Colville Drop 01,South Aldermen Islands Drop 07)	1.9957	0.0631
(Cape Colville Drop 01,Cradock Channel Drop 13)	5.6759	0.0002
(Cape Colville Drop 01,SW Mokohinau Islands Drop 15)	10.231	0.0001
(Cape Colville Drop 01,South Mokohinau Islands Drop 17)	5.3064	0.0002
(Cape Colville Drop 01,Burgess Island Drop 19)	2.8122	0.0093
(Cape Colville Drop 01,Burgess Island Drop 21)	6.0229	0.0001
(Cape Colville Drop 01,West Atihau Island Drop 24)	4.376	0.001
(Cape Colville Drop 01,SE Channel Island Drop 25)	2.2878	0.0276
(Cape Colville Drop 01,SE Channel Island Drop 28)	0.19337	0.8497
(South Ohinau Island Drop 02,South Aldermen Islands Drop 03)	2.1352	0.0499
(South Ohinau Island Drop 02,South Aldermen Islands Drop 06)	0.037848	0.9697
(South Ohinau Island Drop 02,South Aldermen Islands Drop 07)	2.4447	0.0307
(South Ohinau Island Drop 02,Cradock Channel Drop 13)	1.7199	0.0992
(South Ohinau Island Drop 02,SW Mokohinau Islands Drop 15)	6.7482	0.0001
(South Ohinau Island Drop 02,South Mokohinau Islands Drop 17)	1.3405	0.2243
(South Ohinau Island Drop 02,Burgess Island Drop 19)	2.3632	0.032
(South Ohinau Island Drop 02,Burgess Island Drop 21)	1.7539	0.1034
(South Ohinau Island Drop 02,West Atihau Island Drop 24)	0.90865	0.4171
(South Ohinau Island Drop 02,SE Channel Island Drop 25)	6.9972	0.0001
(South Ohinau Island Drop 02,SE Channel Island Drop 28)	3.2993	0.0041
(South Aldermen Islands Drop 03,South Aldermen Islands Drop 06)	2.1209	0.065
(South Aldermen Islands Drop 03,South Aldermen Islands Drop 07)	0.39648	0.7134
(South Aldermen Islands Drop 03,Cradock Channel Drop 13)	3.2848	0.0032
(South Aldermen Islands Drop 03,SW Mokohinau Islands Drop 15)	6.6465	0.0001
(South Aldermen Islands Drop 03,South Mokohinau Islands Drop 17)	3.0162	0.0091
(South Aldermen Islands Drop 03,Burgess Island Drop 19)	0.80838	0.4746
(South Aldermen Islands Drop 03,Burgess Island Drop 21)	3.3435	0.0018
(South Aldermen Islands Drop 03,West Atihau Island Drop 24)	2.5767	0.027
(South Aldermen Islands Drop 03,SE Channel Island Drop 25)	2.9751	0.0166
(South Aldermen Islands Drop 03,SE Channel Island Drop 28)	0.83357	0.4476
(South Aldermen Islands Drop 06,South Aldermen Islands Drop 07)	2.391	0.0301
(South Aldermen Islands Drop 06,Cradock Channel Drop 13)	1.6193	0.1292
(South Aldermen Islands Drop 06,SW Mokohinau Islands Drop 15)	6.4196	0.0001
(South Aldermen Islands Drop 06,South Mokohinau Islands Drop 17)	1.2556	0.2478
(South Aldermen Islands Drop 06,Burgess Island Drop 19)	2.2813	0.0448
(South Aldermen Islands Drop 06,Burgess Island Drop 21)	1.6332	0.1393
(South Aldermen Islands Drop 06,West Atihau Island Drop 24)	0.85529	0.4244
(South Aldermen Islands Drop 06,SE Channel Island Drop 25)	6.8023	0.0001
(South Aldermen Islands Drop 06,SE Channel Island Drop 28)	3.2578	0.0056
(South Aldermen Islands Drop 07,Cradock Channel Drop 13)	4.0082	0.0028
(South Aldermen Islands Drop 07,SW Mokohinau Islands Drop 15)	8.9573	0.0001
(South Aldermen Islands Drop 07,South Mokohinau Islands Drop 17)	3.619	0.0033
(South Aldermen Islands Drop 07,Burgess Island Drop 19)	0.57251	0.5857
(South Aldermen Islands Drop 07,Burgess Island Drop 21)	4.273	0.0014
(South Aldermen Islands Drop 07,West Atihau Island Drop 24)	2.8402	0.0227
(South Aldermen Islands Drop 07,SE Channel Island Drop 25)	4.5301	0.0005
(South Aldermen Islands Drop 07,SE Channel Island Drop 28)	1.4459	0.2073
(Cradock Channel Drop 13,SW Mokohinau Islands Drop 15)	4.6934	0.0002
(Cradock Channel Drop 13,South Mokohinau Islands Drop 17)	0.34577	0.7473
(Cradock Channel Drop 13,Burgess Island Drop 19)	4.2157	0.0019
(Cradock Channel Drop 13,Burgess Island Drop 21)	0.1585	0.8791
(Cradock Channel Drop 13,West Atihau Island Drop 24)	0.48724	0.66
(Cradock Channel Drop 13,SE Channel Island Drop 25)	8.3351	0.0001
(Cradock Channel Drop 13,SE Channel Island Drop 28)	4.4804	0.0004
(SW Mokohinau Islands Drop 15,South Mokohinau Islands Drop 17)	5.002	0.0004
(SW Mokohinau Islands Drop 15,Burgess Island Drop 19)	10.427	0.0001
(SW Mokohinau Islands Drop 15,Burgess Island Drop 21)	5.4562	0.0001
(SW Mokohinau Islands Drop 15,West Atihau Island Drop 24)	4.3101	0.0002
(SW Mokohinau Islands Drop 15,SE Channel Island Drop 25)	13.224	0.0001

(SW Mokohinau Islands Drop 15,SE Channel Island Drop 28)	8.0739	0.0001
(South Mokohinau Islands Drop 17,Burgess Island Drop 19)	3.7388	0.0029
(South Mokohinau Islands Drop 17,Burgess Island Drop 21)	0.2254	0.8266
(South Mokohinau Islands Drop 17,West Atihau Island Drop 24)	0.19597	0.8585
(South Mokohinau Islands Drop 17,SE Channel Island Drop 25)	7.926	0.0001
(South Mokohinau Islands Drop 17,SE Channel Island Drop 28)	4.19	0.001
(Burgess Island Drop 19,Burgess Island Drop 21)	4.7011	0.001
(Burgess Island Drop 19,West Atihau Island Drop 24)	2.7397	0.0179
(Burgess Island Drop 19,SE Channel Island Drop 25)	5.8134	0.0001
(Burgess Island Drop 19,SE Channel Island Drop 28)	1.9871	0.081
(Burgess Island Drop 21,West Atihau Island Drop 24)	0.39426	0.7179
(Burgess Island Drop 21,SE Channel Island Drop 25)	8.9567	0.0002
(Burgess Island Drop 21,SE Channel Island Drop 28)	4.6188	0.0004
(West Atihau Island Drop 24,SE Channel Island Drop 25)	6.5702	0.0001
(West Atihau Island Drop 24,SE Channel Island Drop 28)	3.5994	0.0038
(SE Channel Island Drop 25,SE Channel Island Drop 28)	2.1162	0.0586

MEANS AND STANDARD ERRORS

Group	Size	Average	SE
Cape Colville Drop 01	10	37.219	1.6238
South Ohinau Island Drop 02	10	28.378	1.2681
South Aldermen Islands Drop 03	10	34.037	2.3272
South Aldermen Islands Drop 06	10	28.307	1.3719
South Aldermen Islands Drop 07	10	32.964	1.3822
Cradock Channel Drop 13	10	25.171	1.3673
SW Mokohinau Drop 15	10	16.705	1.1766
South Mokohinau Drop 17	10	25.847	1.3987
Burgess Drop 19	10	32.026	0.88002
Burgess Drop 21	10	25.448	1.0878
West Atihau Island Drop 24	10	26.308	1.8922
SE Channel Island Drop 25	10	42.34	1.5407
SE Channel Island Drop 28	10	36.694	2.1783

PERMANOVA
Permutational MANOVA

Data type: Similarity
Selection: All
Transform: Square root
Resemblance: S17 Bray-Curtis similarity

Sums of squares type: Type III (partial)
Fixed effects sum to zero for mixed terms
Permutation method: Unrestricted permutation of raw data
Number of permutations: 9999

Factors

Name	Abbrev.	Type	Levels
Site	Si	Fixed	13

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms
Si	12	1.8332E+05	15277	14.181	0.0001	9816

Res	117	1.2604E+05	1077.3
Total	129	3.0936E+05	

Groups	t	P(perm)	Unique perms
Cape Colville Drop 01, South Ohinau Island Drop 02	3.6345	0.0001	9402
Cape Colville Drop 01, South Aldermen Islands Drop 03	2.8121	0.0001	9435
Cape Colville Drop 01, South Aldermen Islands Drop 06	3.5811	0.0001	9420
Cape Colville Drop 01, South Aldermen Islands Drop 07	3.0465	0.0001	9423
Cape Colville Drop 01, Cradock Channel Drop 13	2.88	0.0001	9427
Cape Colville Drop 01, SW Mokohinau Islands Drop 15	4.9437	0.0001	9398
Cape Colville Drop 01, South Mokohinau Islands Drop 17	4.1127	0.0001	9417
Cape Colville Drop 01, Burgess Island Drop 19	3.4464	0.0001	9387
Cape Colville Drop 01, Burgess Island Drop 21	4.1781	0.0002	9455
Cape Colville Drop 01, West Atihau Island Drop 24	3.9677	0.0001	9465
Cape Colville Drop 01, SE Channel Island Drop 25	2.3104	0.0001	9443
Cape Colville Drop 01, SE Channel Island Drop 28	3.1849	0.0001	9416
South Ohinau Island Drop 02, South Aldermen Islands Drop 03	1.9223	0.0011	9449
South Ohinau Island Drop 02, South Aldermen Islands Drop 06	4.5769	0.0001	9422
South Ohinau Island Drop 02, South Aldermen Islands Drop 07	3.2037	0.0001	9392
South Ohinau Island Drop 02, Cradock Channel Drop 13	4.0992	0.0001	9439
South Ohinau Island Drop 02, SW Mokohinau Islands Drop 15	3.1059	0.0001	9432
South Ohinau Island Drop 02, South Mokohinau Islands Drop 17	3.3702	0.0002	9442
South Ohinau Island Drop 02, Burgess Island Drop 19	4.3998	0.0001	9412
South Ohinau Island Drop 02, Burgess Island Drop 21	4.0314	0.0001	9440
South Ohinau Island Drop 02, West Atihau Island Drop 24	3.6676	0.0001	9394
South Ohinau Island Drop 02, SE Channel Island Drop 25	3.5759	0.0001	9415
South Ohinau Island Drop 02, SE Channel Island Drop 28	4.39	0.0001	9417
South Aldermen Islands Drop 03, South Aldermen Islands Drop 06	3.7205	0.0001	9435
South Aldermen Islands Drop 03, South Aldermen Islands Drop 07	2.5996	0.0001	9417
South Aldermen Islands Drop 03,Cradock Channel Drop 13	2.4103	0.0001	9446
South Aldermen Islands Drop 03,SW Mokohinau Islands Drop 15	3.0194	0.0001	9418
South Aldermen Islands Drop 03, South Mokohinau Islands Drop 17	2.9089	0.0001	9447
South Aldermen Islands Drop 03, Burgess Island Drop 19	3.6	0.0001	9411
South Aldermen Islands Drop 03, Burgess Island Drop 21	2.7791	0.0001	9431
South Aldermen Islands Drop 03, West Atihau Island Drop 24	2.5832	0.0001	9426
South Aldermen Islands Drop 03, SE Channel Island Drop 25	3.1977	0.0001	9381
South Aldermen Islands Drop 03, SE Channel Island Drop 28	3.7946	0.0002	9443
South Aldermen Islands Drop 06, South Aldermen Islands Drop 07	2.9227	0.0001	9431
South Aldermen Islands Drop 06, Cradock Channel Drop 13	4.2406	0.0001	9420
South Aldermen Islands Drop 06, SW Mokohinau Islands Drop 15	6.5536	0.0001	9439
South Aldermen Islands Drop 06, South Mokohinau Islands Drop 17	4.7517	0.0001	9404
South Aldermen Islands Drop 06, Burgess Island Drop 19	2.9687	0.0001	9400
South Aldermen Islands Drop 06, Burgess Island Drop 21	5.3663	0.0001	9438
South Aldermen Islands Drop 06, West Atihau Island Drop 24	4.2153	0.0001	9409
South Aldermen Islands Drop 06, SE Channel Island Drop 25	3.6362	0.0001	9405
South Aldermen Islands Drop 06, SE Channel Island Drop 28	4.7396	0.0001	9397
South Aldermen Islands Drop 07, Cradock Channel Drop 13	3.6539	0.0001	9421
South Aldermen Islands Drop 07, SW Mokohinau Islands Drop 15	4.6843	0.0001	9434
South Aldermen Islands Drop 07, South Mokohinau Islands Drop 17	3.326	0.0002	9403
South Aldermen Islands Drop 07, Burgess Island Drop 19	2.9779	0.0002	9376
South Aldermen Islands Drop 07, Burgess Island Drop 21	4.1939	0.0001	9434
South Aldermen Islands Drop 07, West Atihau Island Drop 24	3.2855	0.0001	9413
South Aldermen Islands Drop 07, SE Channel Island Drop 25	3.0862	0.0001	9432
South Aldermen Islands Drop 07, SE Channel Island Drop 28	3.9646	0.0001	9450
Cradock Channel Drop 13, SW Mokohinau Islands Drop 15	5.0156	0.0001	9449
Cradock Channel Drop 13, South Mokohinau Islands Drop 17	4.1241	0.0001	9415
Cradock Channel Drop 13, Burgess Island Drop 19	4.1204	0.0001	9443
Cradock Channel Drop 13, Burgess Island Drop 21	3.7378	0.0001	9434
Cradock Channel Drop 13, West Atihau Island Drop 24	2.9967	0.0001	9409

Cradock Channel Drop 13, SE Channel Island Drop 25	3.7014	0.0001	9444
Cradock Channel Drop 13,SE Channel Island Drop 28	4.6699	0.0001	9419
SW Mokohinau Islands Drop 15, South Mokohinau Islands Drop 17	4.0008	0.0001	9368
SW Mokohinau Islands Drop 15, Burgess Island Drop 19	5.4296	0.0001	9390
SW Mokohinau Islands Drop 15, Burgess Island Drop 21	3.7654	0.0001	9429
SW Mokohinau Islands Drop 15, West Atihau Island Drop 24	3.6851	0.0001	9389
SW Mokohinau Islands Drop 15, SE Channel Island Drop 25	4.3298	0.0001	9448
SW Mokohinau Islands Drop 15, SE Channel Island Drop 28	5.8215	0.0001	9384
South Mokohinau Islands Drop 17, Burgess Island Drop 19	2.9737	0.0001	9387
South Mokohinau Islands Drop 17, Burgess Island Drop 21	3.7967	0.0001	9373
South Mokohinau Islands Drop 17, West Atihau Island Drop 24	3.4663	0.0002	9433
South Mokohinau Islands Drop 17, SE Channel Island Drop 25	3.5623	0.0001	9398
South Mokohinau Islands Drop 17, SE Channel Island Drop 28	4.9649	0.0001	9412
Burgess Island Drop 19, Burgess Island Drop 21	4.4119	0.0002	9385
Burgess Island Drop 19,West Atihau Island Drop 24	3.8519	0.0001	9384
Burgess Island Drop 19, SE Channel Island Drop 25	3.1941	0.0001	9412
Burgess Island Drop 19, SE Channel Island Drop 28	4.2263	0.0003	9433
Burgess Island Drop 21, West Atihau Island Drop 24	2.1917	0.0001	9411
Burgess Island Drop 21, SE Channel Island Drop 25	3.5788	0.0001	9437
Burgess Island Drop 21, SE Channel Island Drop 28	4.6861	0.0001	9456
West Atihau Island Drop 24, SE Channel Island Drop 25	3.6825	0.0001	9397
West Atihau Island Drop 24, SE Channel Island Drop 28	4.8845	0.0001	9424
SE Channel Island Drop 25,SE Channel Island Drop 28	2.6922	0.0001	9427

ANOSIM
Analysis of Similarities

One-Way - A

Data type: Similarity
Selection: All

Factors

Place	Name	Type	Levels
A	Site	Unordered	13

Site levels
Cape Colville Drop 01
South Ohinau Island Drop 02
South Aldermen Islands Drop 03
South Aldermen Islands Drop 06
South Aldermen Islands Drop 07
Cradock Channel Drop 13
SW Mokohinau Islands Drop 15
South Mokohinau Islands Drop 17
Burgess Island Drop 19
Burgess Island Drop 21
West Atihau Island Drop 24
SE Channel Island Drop 25
SE Channel Island Drop 28

Tests for differences between unordered Site groups
Global Test
Sample statistic (R): 0.807
Significance level of sample statistic: 0.1%
Number of permutations: 999 (Random sample from a large number)
Number of permuted statistics greater than or equal to R: 0

Groups	R	Significance %	Possible Perms	Actual Perm	Number >= Ob
Cape Colville Drop 01, South Ohinau Island Drop 02	0.906	0.1	92378	999	0
Cape Colville Drop 01, South Aldermen Islands Drop 03	0.72	0.1	92378	999	0
Cape Colville Drop 01, South Aldermen Islands Drop 06	0.89	0.1	92378	999	0
Cape Colville Drop 01, South Aldermen Islands Drop 07	0.817	0.1	92378	999	0
Cape Colville Drop 01, Cradock Channel Drop 13	0.702	0.1	92378	999	0
Cape Colville Drop 01, SW Mokohinau Islands Drop 15	0.964	0.1	92378	999	0
Cape Colville Drop 01, South Mokohinau Islands Drop 17	0.959	0.1	92378	999	0
Cape Colville Drop 01, Burgess Island Drop 19	0.91	0.1	92378	999	0
Cape Colville Drop 01, Burgess Island Drop 21	0.962	0.1	92378	999	0
Cape Colville Drop 01, West Atihau Island Drop 24	0.953	0.1	92378	999	0

Cape Colville Drop 01, SE Channel Island Drop 25	0.523	0.1	92378	999	0
Cape Colville Drop 01, SE Channel Island Drop 28	0.777	0.1	92378	999	0
South Ohinau Island Drop 02, South Aldermen Islands Drop 03	0.373	0.3	92378	999	2
South Ohinau Island Drop 02, South Aldermen Islands Drop 06	1	0.1	92378	999	0
South Ohinau Island Drop 02, South Aldermen Islands Drop 07	0.909	0.1	92378	999	0
South Ohinau Island Drop 02, Cradock Channel Drop 13	0.98	0.1	92378	999	0
South Ohinau Island Drop 02, SW Mokohinau Islands Drop 15	0.616	0.1	92378	999	0
South Ohinau Island Drop 02, South Mokohinau Islands Drop 17	0.881	0.1	92378	999	0
South Ohinau Island Drop 02, Burgess Island Drop 19	1	0.1	92378	999	0
South Ohinau Island Drop 02, Burgess Island Drop 21	0.969	0.1	92378	999	0
South Ohinau Island Drop 02, West Atihau Island Drop 24	0.911	0.1	92378	999	0
South Ohinau Island Drop 02, SE Channel Island Drop 25	0.895	0.1	92378	999	0
South Ohinau Island Drop 02, SE Channel Island Drop 28	0.946	0.1	92378	999	0
South Aldermen Islands Drop 03, South Aldermen Islands Drop 06	0.915	0.1	92378	999	0
South Aldermen Islands Drop 03, South Aldermen Islands Drop 07	0.708	0.1	92378	999	0
South Aldermen Islands Drop 03, Cradock Channel Drop 13	0.536	0.1	92378	999	0
South Aldermen Islands Drop 03, SW Mokohinau Islands Drop 15	0.599	0.1	92378	999	0
South Aldermen Islands Drop 03, South Mokohinau Islands Drop 17	0.762	0.1	92378	999	0
South Aldermen Islands Drop 03, Burgess Island Drop 19	0.94	0.1	92378	999	0
South Aldermen Islands Drop 03, Burgess Island Drop 21	0.699	0.1	92378	999	0
South Aldermen Islands Drop 03, West Atihau Island Drop 24	0.58	0.1	92378	999	0
South Aldermen Islands Drop 03, SE Channel Island Drop 25	0.875	0.1	92378	999	0
South Aldermen Islands Drop 03, SE Channel Island Drop 28	0.932	0.1	92378	999	0
South Aldermen Islands Drop 06, South Aldermen Islands Drop 07	0.854	0.1	92378	999	0
South Aldermen Islands Drop 06, Cradock Channel Drop 13	0.968	0.1	92378	999	0
South Aldermen Islands Drop 06, SW Mokohinau Islands Drop 15	1	0.1	92378	999	0
South Aldermen Islands Drop 06, South Mokohinau Islands Drop 17	1	0.1	92378	999	0
South Aldermen Islands Drop 06, Burgess Island Drop 19	0.91	0.1	92378	999	0
South Aldermen Islands Drop 06, Burgess Island Drop 21	1	0.1	92378	999	0
South Aldermen Islands Drop 06, West Atihau Island Drop 24	0.991	0.1	92378	999	0
South Aldermen Islands Drop 06, SE Channel Island Drop 25	0.887	0.1	92378	999	0

South Aldermen Islands Drop 06, SE Channel Island Drop 28	0.992	0.1	92378	999	0
South Aldermen Islands Drop 07, Cradock Channel Drop 13	0.921	0.1	92378	999	0
South Aldermen Islands Drop 07, SW Mokohinau Islands Drop 15	0.989	0.1	92378	999	0
South Aldermen Islands Drop 07, South Mokohinau Islands Drop 17	0.896	0.1	92378	999	0
South Aldermen Islands Drop 07, Burgess Island Drop 19	0.913	0.1	92378	999	0
South Aldermen Islands Drop 07, Burgess Island Drop 21	0.993	0.1	92378	999	0
South Aldermen Islands Drop 07, West Atihau Island Drop 24	0.886	0.1	92378	999	0
South Aldermen Islands Drop 07, SE Channel Island Drop 25	0.81	0.1	92378	999	0
South Aldermen Islands Drop 07, SE Channel Island Drop 28	0.959	0.1	92378	999	0
Cradock Channel Drop 13, SW Mokohinau Islands Drop 15	0.977	0.1	92378	999	0
Cradock Channel Drop 13, South Mokohinau Islands Drop 17	0.973	0.1	92378	999	0
Cradock Channel Drop 13, Burgess Island Drop 19	0.982	0.1	92378	999	0
Cradock Channel Drop 13, Burgess Island Drop 21	0.927	0.1	92378	999	0
Cradock Channel Drop 13, West Atihau Island Drop 24	0.765	0.1	92378	999	0
Cradock Channel Drop 13, SE Channel Island Drop 25	0.843	0.1	92378	999	0
Cradock Channel Drop 13, SE Channel Island Drop 28	0.959	0.1	92378	999	0
SW Mokohinau Islands Drop 15, South Mokohinau Islands Drop 17	0.894	0.1	92378	999	0
SW Mokohinau Islands Drop 15, Burgess Island Drop 19	1	0.1	92378	999	0
SW Mokohinau Islands Drop 15, Burgess Island Drop 21	0.891	0.1	92378	999	0
SW Mokohinau Islands Drop 15, West Atihau Island Drop 24	0.806	0.1	92378	999	0
SW Mokohinau Islands Drop 15, SE Channel Island Drop 25	0.894	0.1	92378	999	0
SW Mokohinau Islands Drop 15, SE Channel Island Drop 28	0.998	0.1	92378	999	0
South Mokohinau Islands Drop 17, Burgess Drop 19	0.868	0.1	92378	999	0
South Mokohinau Islands Drop 17, Burgess Drop 21	0.99	0.1	92378	999	0
South Mokohinau Islands Drop 17, West At Island Drop 24	0.915	0.1	92378	999	0
South Mokohinau Islands Drop 17, SE Char Island Drop 25	0.835	0.1	92378	999	0
South Mokohinau Islands Drop 17, SE Char Island Drop 28	0.995	0.1	92378	999	0
Burgess Island Drop 19, Burgess Island Drop 21	0.999	0.1	92378	999	0
Burgess Island Drop 19, West Atihau Island Drop 24	0.998	0.1	92378	999	0
Burgess Island Drop 19, SE Channel Island Drop 25	0.803	0.1	92378	999	0
Burgess Island Drop 19, SE Channel Island Drop 28	0.983	0.1	92378	999	0

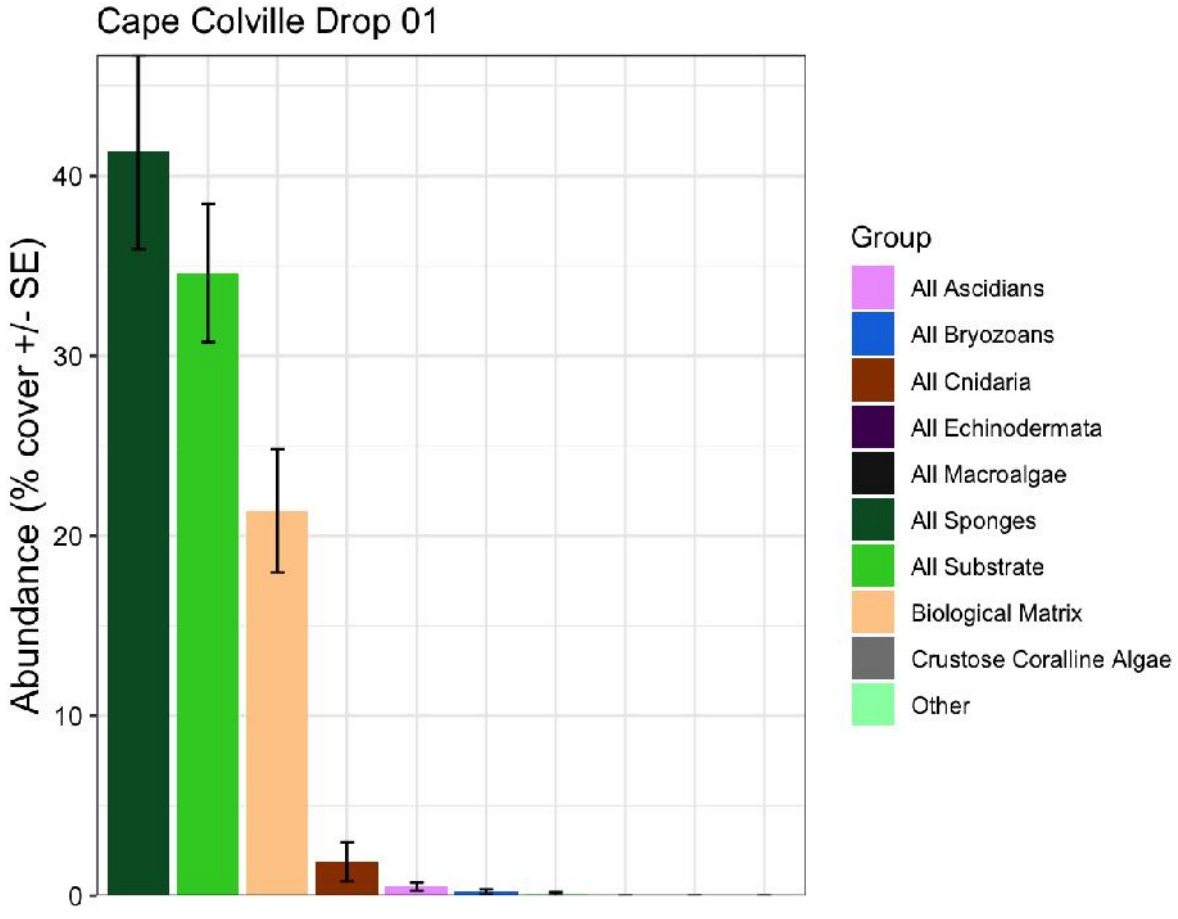
Burgess Island Drop 21, West Atihau Island Drop 24	0.444	0.1	92378	999	0
Burgess Island Drop 21, SE Channel Island Drop 25	0.863	0.1	92378	999	0
Burgess Island Drop 21, SE Channel Island Drop 28	0.98	0.1	92378	999	0
West Atihau Island Drop 24, SE Channel Island Drop 25	0.881	0.1	92378	999	0
West Atihau Island Drop 24, SE Channel Island Drop 28	0.982	0.1	92378	999	0
SE Channel Island Drop 25, SE Channel Island Drop 28	0.723	0.1	92378	999	0

Appendix L

The abundance of the 10 major benthic groups at each site

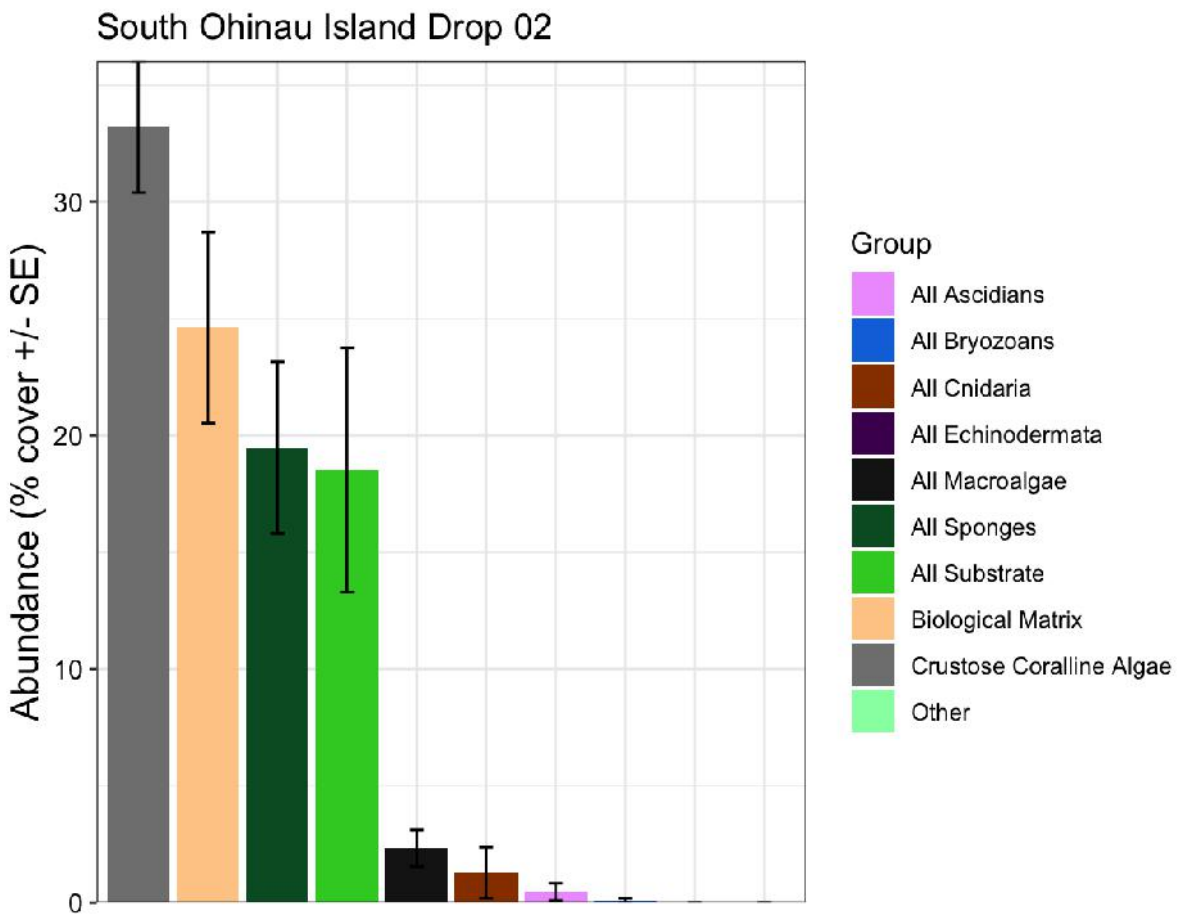
Cape Colville Drop 01

	Group	N	Mean	SD	SE	CI
1	All Sponges	10	41.33169179	17.0618364	5.39542639	12.2053025
2	All Substrate	10	34.59895309	12.1174776	3.83188288	8.6683213
3	Biological Matrix	10	21.39274982	10.7874663	3.41129637	7.7168885
4	All Cnidaria	10	1.87633021	3.4160998	1.08026562	2.4437306
5	All Ascidians	10	0.50471612	0.7145069	0.22594693	0.5111275
6	All Bryozoans	10	0.20627326	0.4349777	0.13755204	0.3111643
7	Other	10	0.08928571	0.2823462	0.08928571	0.2019783
8	All Echinodermata	10	0.00000000	0.0000000	0.00000000	0.0000000
9	All Macroalgae	10	0.00000000	0.0000000	0.00000000	0.0000000
10	Crustose Coralline Algae	10	0.00000000	0.0000000	0.00000000	0.0000000



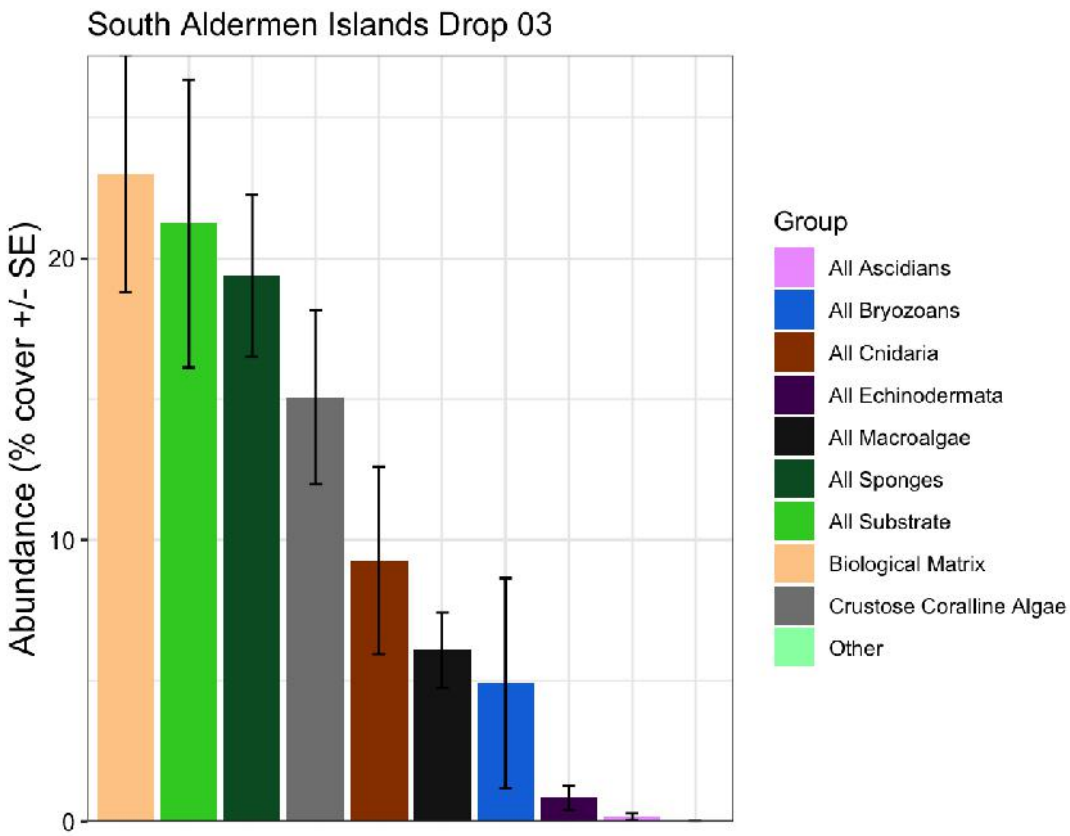
South Ohinau Island Drop 02

	Group	N	Mean	SD	SE	CI
1	Crustose Coralline Algae	10	33.2124768	8.9264087	2.8227783	6.3855681
2	Biological Matrix	10	24.6182625	12.9214857	4.0861325	9.2434740
3	All Sponges	10	19.4793586	11.6077817	3.6707029	8.3037068
4	All Substrate	10	18.5306914	16.5416139	5.2309176	11.8331578
5	All Macroalgae	10	2.3252869	2.4915916	0.7879105	1.7823773
6	All Cnidaria	10	1.2765723	3.4391566	1.0875568	2.4602244
7	All Ascidians	10	0.4621135	1.1749048	0.3715375	0.8404763
8	All Bryozoans	10	0.0952381	0.3011693	0.0952381	0.2154435
9	All Echinodermata	10	0.0000000	0.0000000	0.0000000	0.0000000
10	Other	10	0.0000000	0.0000000	0.0000000	0.0000000



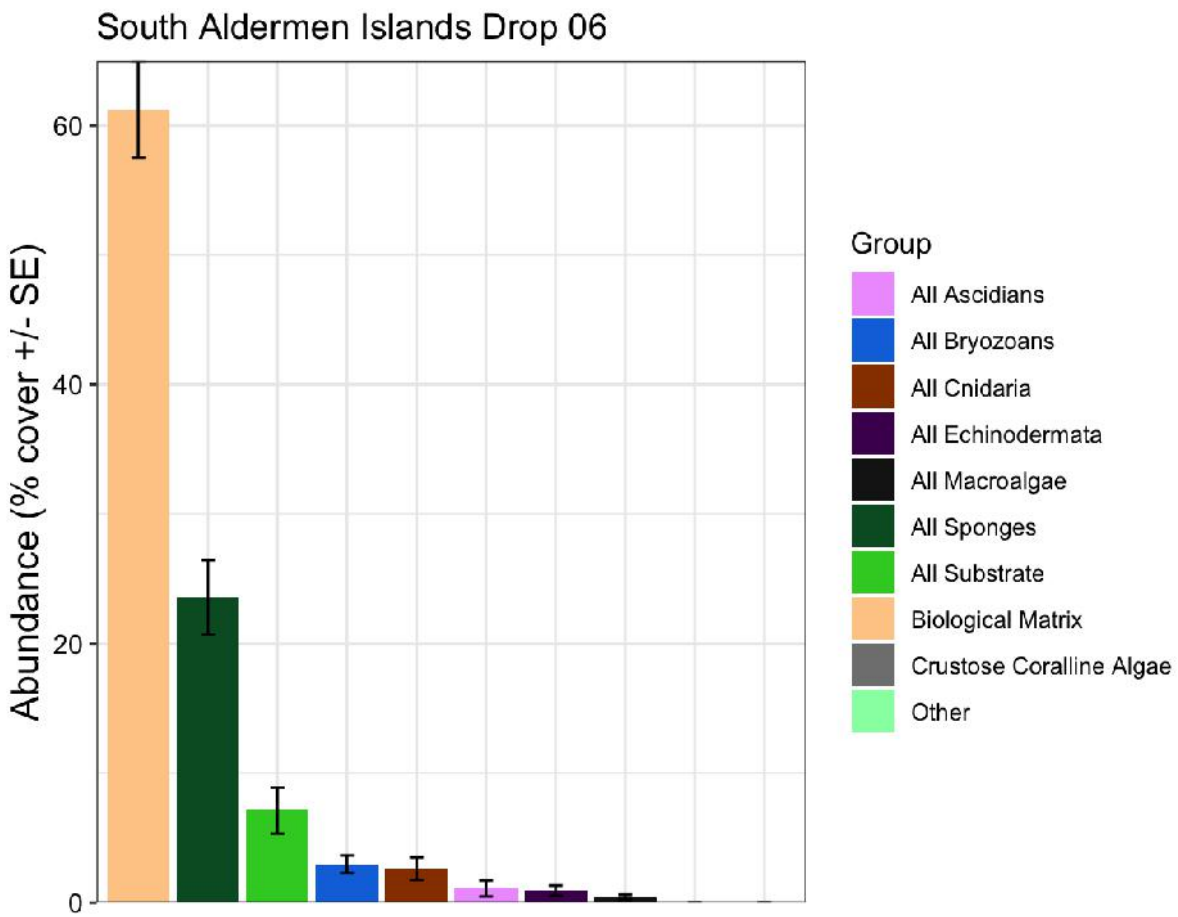
South Aldermen Islands Drop 03

	Group	N	Mean	SD	SE	CI
1	Biological Matrix	10	23.0044138	13.3049242	4.2073865	9.5177694
2	All Substrate	10	21.2361180	16.1728096	5.1142915	11.5693311
3	All Sponges	10	19.3897683	9.1069678	2.8798761	6.5147323
4	Crustose Coralline Algae	10	15.0742063	9.7670757	3.0886205	6.9869451
5	All Cnidaria	10	9.2719313	10.4915429	3.3177172	7.5051977
6	All Macroalgae	10	6.0858190	4.2475818	1.3432033	3.0385370
7	All Bryozoans	10	4.9169138	11.7857472	3.7269805	8.4310156
8	All Echinodermata	10	0.8412804	1.3625314	0.4308703	0.9746962
9	All Ascidians	10	0.1795491	0.3787558	0.1197731	0.2709456
10	Other	10	0.0000000	0.0000000	0.0000000	0.0000000



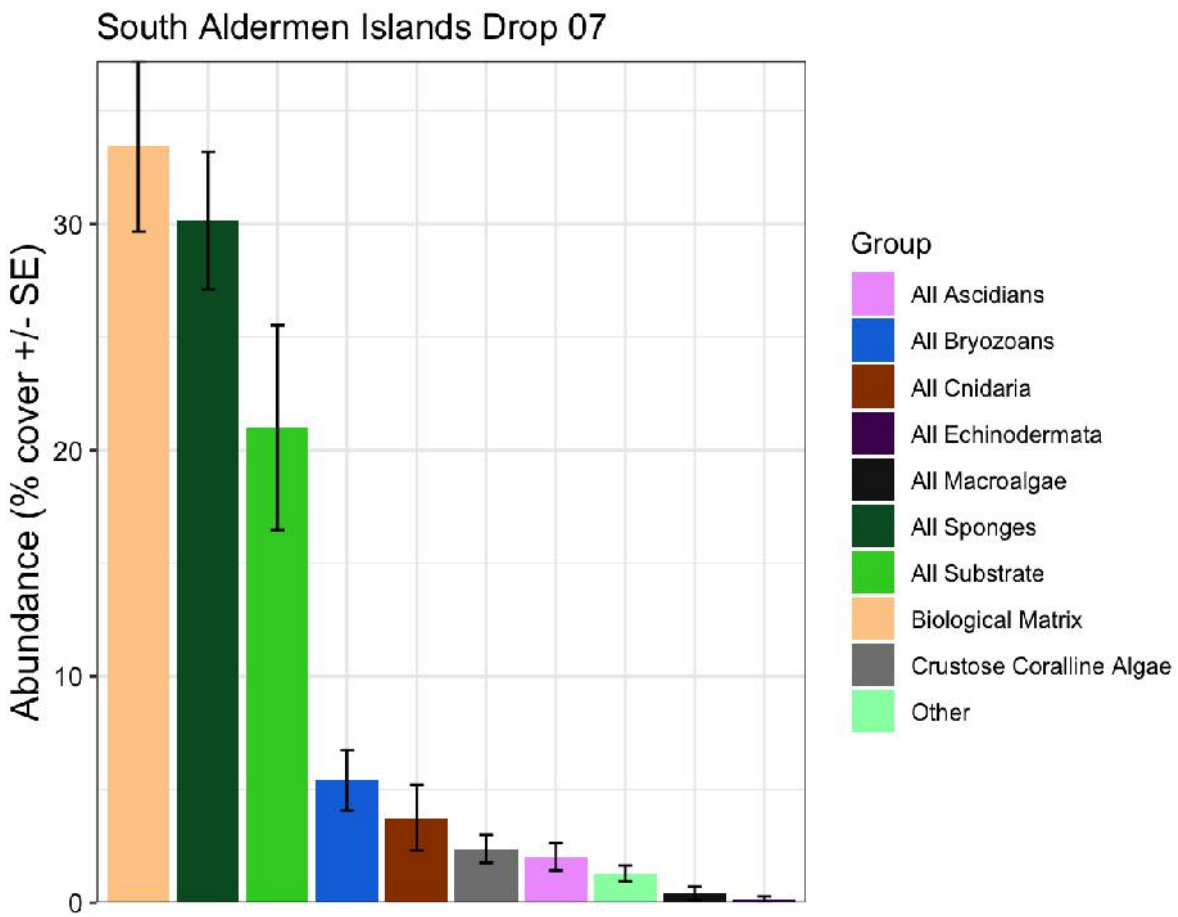
South Aldermen Islands Drop 06

	Group	N	Mean	SD	SE	CI
1	Biological Matrix	10	61.2593543	11.8065798	3.7335683	8.4459184
2	All Sponges	10	23.5835251	9.0438300	2.8599101	6.4695662
3	All Substrate	10	7.1299623	5.6219622	1.7778206	4.0217095
4	All Bryozoans	10	2.9628696	2.1796146	0.6892547	1.5592024
5	All Cnidaria	10	2.6271389	2.7393262	0.8662510	1.9595959
6	All Ascidians	10	1.0927110	1.9672646	0.6221037	1.4072963
7	All Echinodermata	10	0.9236151	1.2529705	0.3962241	0.8963211
8	All Macroalgae	10	0.4208238	0.5913067	0.1869876	0.4229953
9	Crustose Coralline Algae	10	0.0000000	0.0000000	0.0000000	0.0000000
10	Other	10	0.0000000	0.0000000	0.0000000	0.0000000



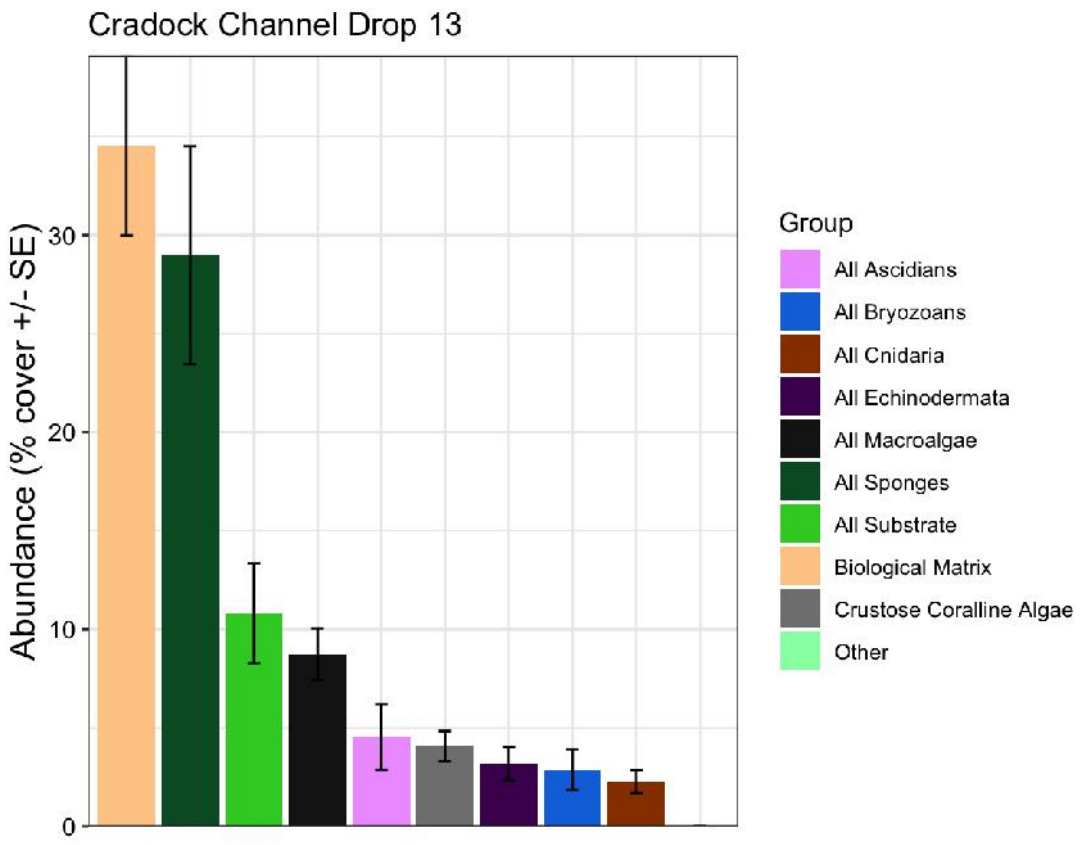
South Aldermen Islands Drop 07

	Group	N	Mean	SD	SE	CI
1	Biological Matrix	10	33.4449146	11.9129736	3.7672130	8.5220279
2	All Sponges	10	30.1449185	9.6320185	3.0459117	6.8903310
3	All Substrate	10	20.9991882	14.3297812	4.5314747	10.2509080
4	All Bryozoans	10	5.4198026	4.2163063	1.3333131	3.0161639
5	All Cnidaria	10	3.7540675	4.5846354	1.4497890	3.2796506
6	Crustose Coralline Algae	10	2.3781499	1.9423662	0.6142301	1.3894850
7	All Ascidians	10	2.0268771	1.9579191	0.6191484	1.4006110
8	Other	10	1.2904693	1.1346364	0.3588035	0.8116700
9	All Macroalgae	10	0.4064772	0.9580506	0.3029622	0.6853481
10	All Echinodermata	10	0.1351351	0.4273348	0.1351351	0.3056969



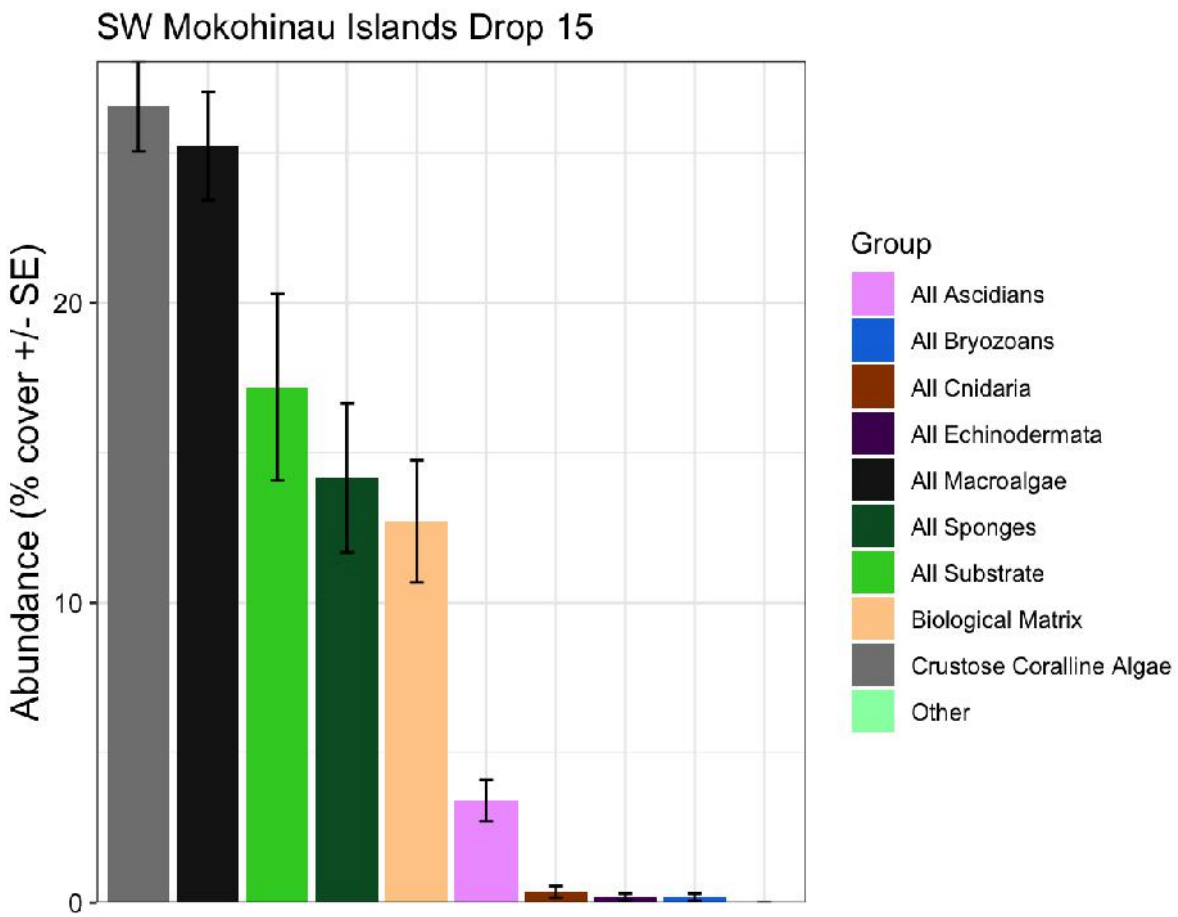
Cradock channel Drop 13

	Group	N	Mean	SD	SE	CI
1	Biological Matrix	10	34.542636	14.430839	4.5634319	10.323200
2	All Sponges	10	28.988686	17.494052	5.5321051	12.514491
3	All Substrate	10	10.809654	8.036287	2.5412971	5.748813
4	All Macroalgae	10	8.737233	4.143834	1.3103954	2.964320
5	All Ascidians	10	4.552145	5.262796	1.6642421	3.764777
6	Crustose Coralline Algae	10	4.068330	2.443868	0.7728190	1.748238
7	All Echinodermata	10	3.169516	2.638833	0.8344723	1.887708
8	All Bryozoans	10	2.876089	3.292042	1.0410352	2.354985
9	All Cnidaria	10	2.255710	1.836213	0.5806616	1.313548
10	Other	10	0.000000	0.000000	0.0000000	0.000000



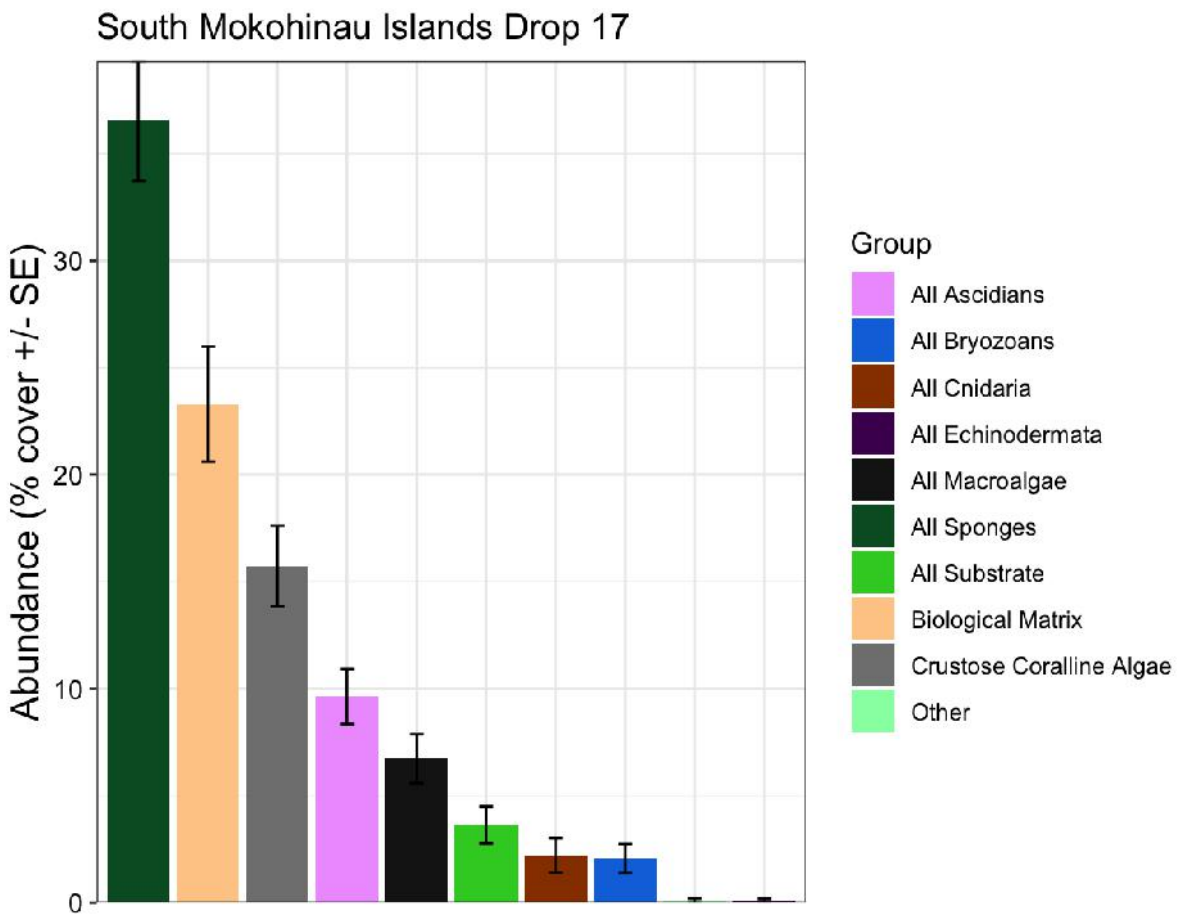
SW Mokohinau Islands Drop 15

	Group	N	Mean	SD	SE	CI
1	Crustose Coralline Algae	10	26.5674574	4.7735343	1.5095241	3.4147807
2	All Macroalgae	10	25.2382488	5.7151235	1.8072807	4.0883531
3	All Substrate	10	17.1946297	9.8401398	3.1117254	7.0392119
4	All Sponges	10	14.1669610	7.8609279	2.4858437	5.6233691
5	Biological Matrix	10	12.7233861	6.4496036	2.0395437	4.6137685
6	All Ascidians	10	3.3955391	2.2020256	0.6963416	1.5752342
7	All Cnidaria	10	0.3604343	0.6232579	0.1970914	0.4458518
8	All Echinodermata	10	0.1770466	0.3733201	0.1180542	0.2670571
9	All Bryozoans	10	0.1762970	0.3717794	0.1175670	0.2659549
10	Other	10	0.0000000	0.0000000	0.0000000	0.0000000



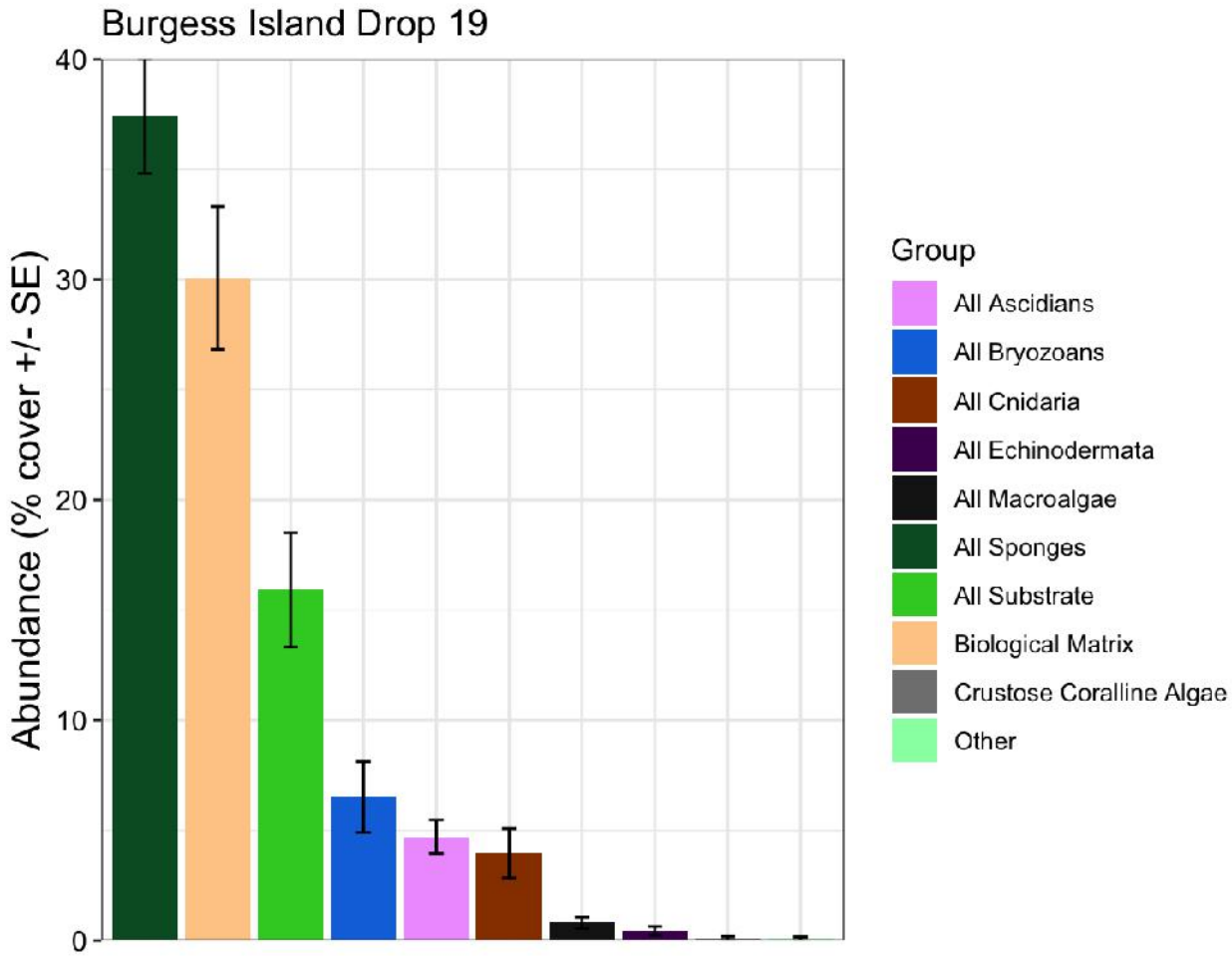
South Mokohinau Islands Drop 17

	Group	N	Mean	SD	SE	CI
1	All Sponges	10	36.53806926	8.8585796	2.80132883	6.3370461
2	Biological Matrix	10	23.29948690	8.5220776	2.69491755	6.0963270
3	Crustose Coralline Algae	10	15.72942881	5.9252543	1.87372993	4.2386716
4	All Ascidians	10	9.63585805	4.0631453	1.28487936	2.9065991
5	All Macroalgae	10	6.72646471	3.6175227	1.14396113	2.5878199
6	All Substrate	10	3.63037711	2.7239323	0.86138303	1.9485838
7	All Cnidaria	10	2.20287820	2.5811871	0.81624303	1.8464700
8	All Bryozoans	10	2.05614083	2.1408991	0.67701175	1.5315070
9	Other	10	0.09433962	0.2983281	0.09433962	0.2134111
10	All Echinodermata	10	0.08695652	0.2749807	0.08695652	0.1967093



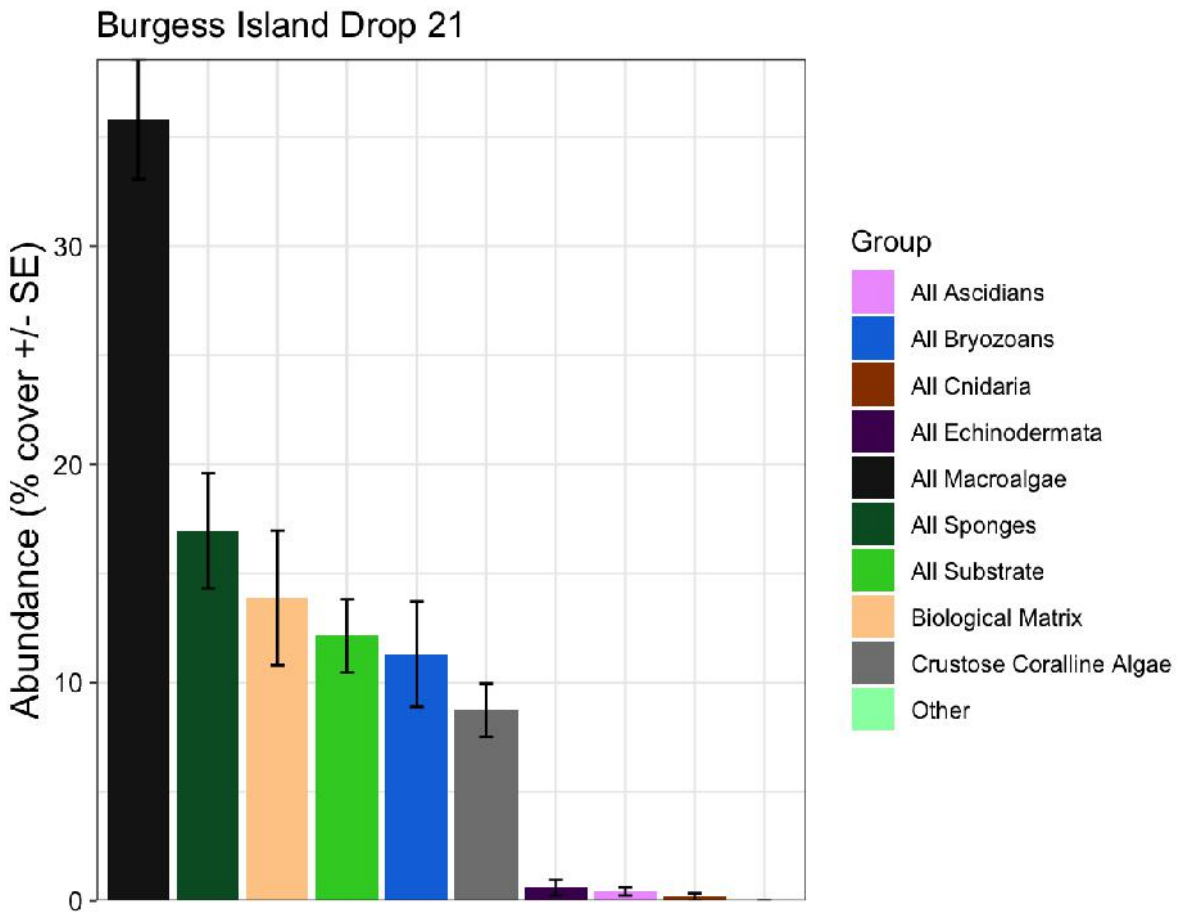
Burgess Island Drop 19

	Group	N	Mean	SD	SE	CI
1	All Sponges	10	37.42061665	8.2199906	2.59938925	5.8802270
2	Biological Matrix	10	30.07137207	10.2646490	3.24596704	7.3428876
3	All Substrate	10	15.91936279	8.1979948	2.59243357	5.8644922
4	All Bryozoans	10	6.50793002	5.0576592	1.59937228	3.6180315
5	All Ascidians	10	4.71426663	2.3914010	0.75622739	1.7107052
6	All Cnidaria	10	3.95763309	3.5341759	1.11760455	2.5281971
7	All Macroalgae	10	0.80200540	0.7928592	0.25072409	0.5671773
8	All Echinodermata	10	0.43349402	0.6116836	0.19343135	0.4375721
9	Crustose Coralline Algae	10	0.08928571	0.2823462	0.08928571	0.2019783
10	Other	10	0.08403361	0.2657376	0.08403361	0.1900972



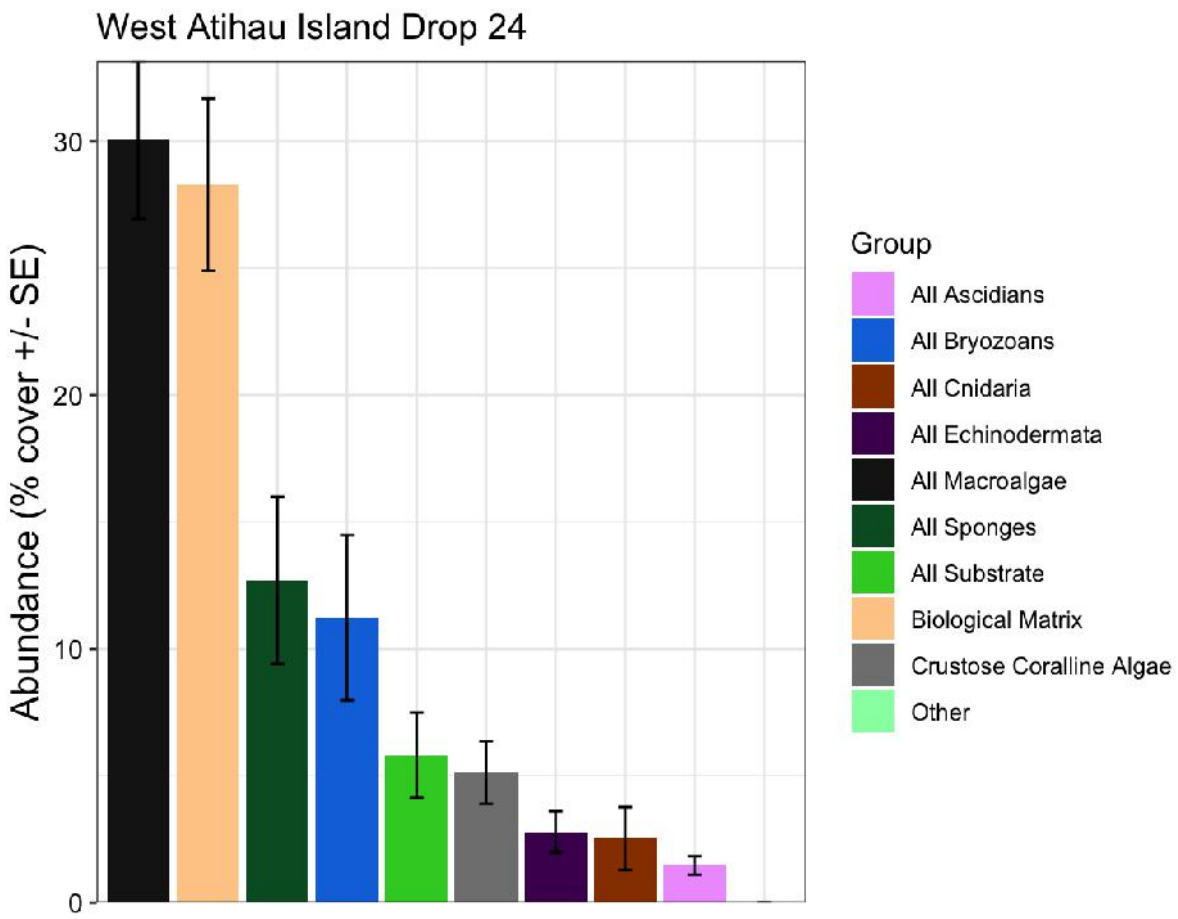
Burgess Island Drop 21

	Group	N	Mean	SD	SE	CI
1	All Macroalgae	10	35.8322191	8.7261082	2.7594377	6.2422817
2	All Sponges	10	16.9470518	8.3559116	2.6423713	5.9774591
3	Biological Matrix	10	13.8817036	9.7849146	3.0942617	6.9997062
4	All Substrate	10	12.1386000	5.3104846	1.6793227	3.7988918
5	All Bryozoans	10	11.2955618	7.6474847	2.4183470	5.4706810
6	Crustose Coralline Algae	10	8.7232863	3.8572904	1.2197823	2.7593393
7	All Echinodermata	10	0.5868585	1.1178345	0.3534903	0.7996506
8	All Ascidians	10	0.4252274	0.6004671	0.1898844	0.4295483
9	All Cnidaria	10	0.1694915	0.5359793	0.1694915	0.3834165
10	Other	10	0.0000000	0.0000000	0.0000000	0.0000000



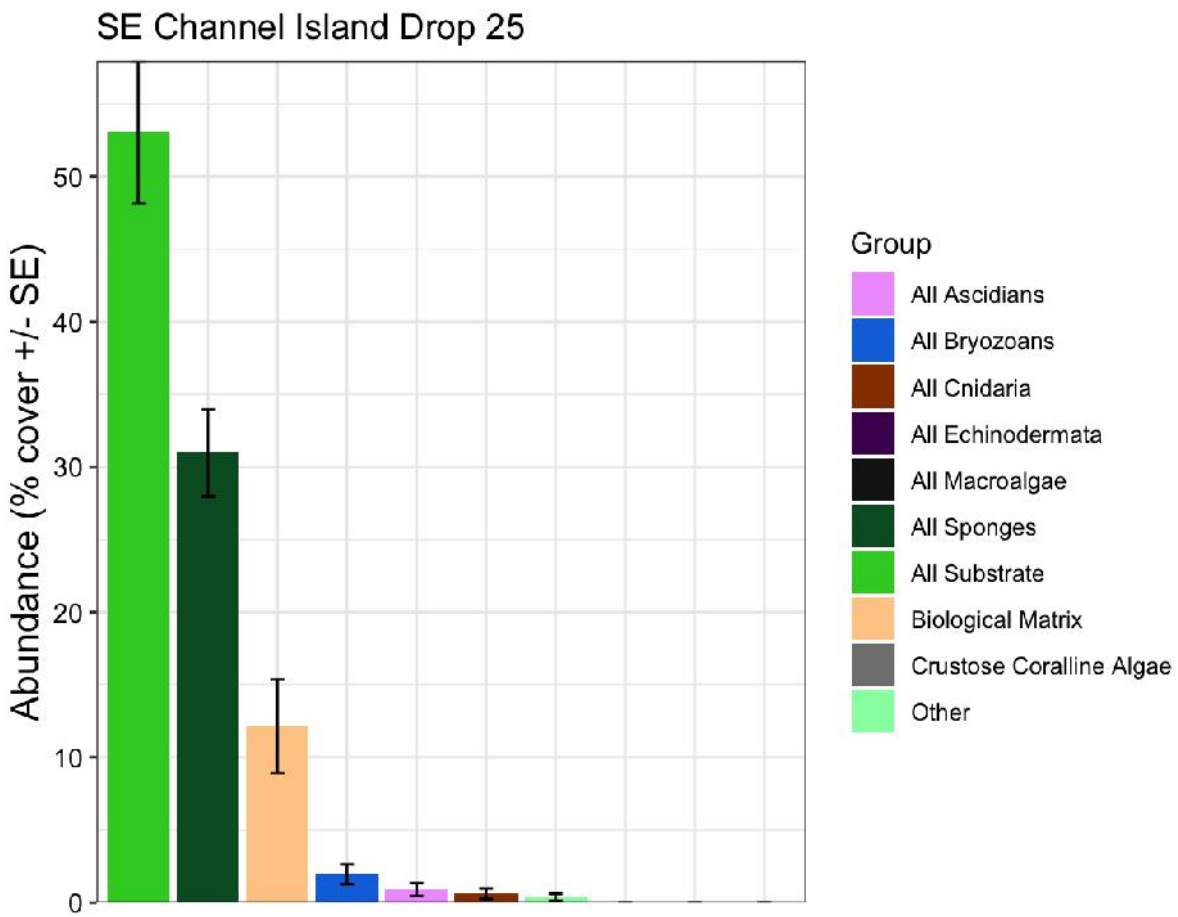
West Atihau Island Drop 24

	Group	N	Mean	SD	SE	CI
1	All Macroalgae	10	30.058358	9.848909	3.1144985	7.045485
2	Biological Matrix	10	28.290721	10.740428	3.3964214	7.683239
3	All Sponges	10	12.696450	10.403097	3.2897480	7.441927
4	All Bryozoans	10	11.225810	10.289398	3.2537934	7.360592
5	All Substrate	10	5.813066	5.326013	1.6842331	3.810000
6	Crustose Coralline Algae	10	5.130081	3.922815	1.2405030	2.806213
7	All Echinodermata	10	2.788081	2.590361	0.8191440	1.853032
8	All Cnidaria	10	2.527224	3.925117	1.2412309	2.807859
9	All Ascidians	10	1.470208	1.159210	0.3665744	0.829249
10	Other	10	0.000000	0.000000	0.0000000	0.000000



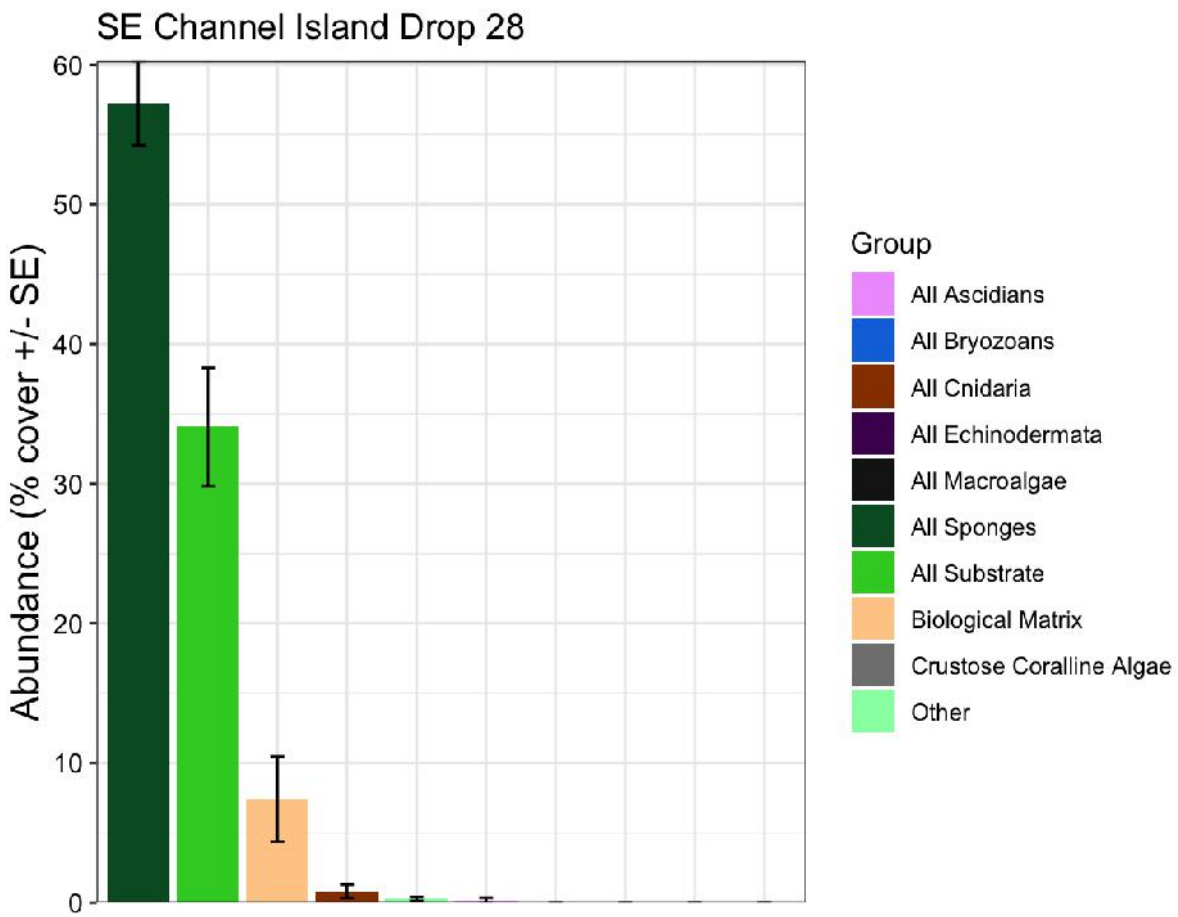
SE Channel Island Drop 25

	Group	N	Mean	SD	SE	CI
1	All Substrate	10	53.0614859	15.4880396	4.8977481	11.0794761
2	All Sponges	10	30.9621915	9.4554158	2.9900650	6.7639970
3	Biological Matrix	10	12.1543444	10.1842278	3.2205356	7.2853577
4	All Bryozoans	10	1.9559946	2.1610746	0.6833918	1.5459396
5	All Ascidians	10	0.8967093	1.4289961	0.4518882	1.0222422
6	All Cnidaria	10	0.6103494	1.1723789	0.3707388	0.8386694
7	Other	10	0.3589248	0.7569177	0.2393584	0.5414663
8	All Echinodermata	10	0.0000000	0.0000000	0.0000000	0.0000000
9	All Macroalgae	10	0.0000000	0.0000000	0.0000000	0.0000000
10	Crustose Coralline Algae	10	0.0000000	0.0000000	0.0000000	0.0000000



SE Channel Island Drop 28

	Group	N	Mean	SD	SE	CI
1	All Sponges	10	57.2546029	9.5432120	3.0178286	6.8268026
2	All Substrate	10	34.0714656	13.3780532	4.2305119	9.5700827
3	Biological Matrix	10	7.4149814	9.6388619	3.0480758	6.8952265
4	All Cnidaria	10	0.8116883	1.4987517	0.4739469	1.0721424
5	Other	10	0.2686904	0.4326715	0.1368227	0.3095145
6	All Ascidians	10	0.1785714	0.5646924	0.1785714	0.4039566
7	All Bryozoans	10	0.0000000	0.0000000	0.0000000	0.0000000
8	All Echinodermata	10	0.0000000	0.0000000	0.0000000	0.0000000
9	All Macroalgae	10	0.0000000	0.0000000	0.0000000	0.0000000
10	Crustose Coralline Algae	10	0.0000000	0.0000000	0.0000000	0.0000000

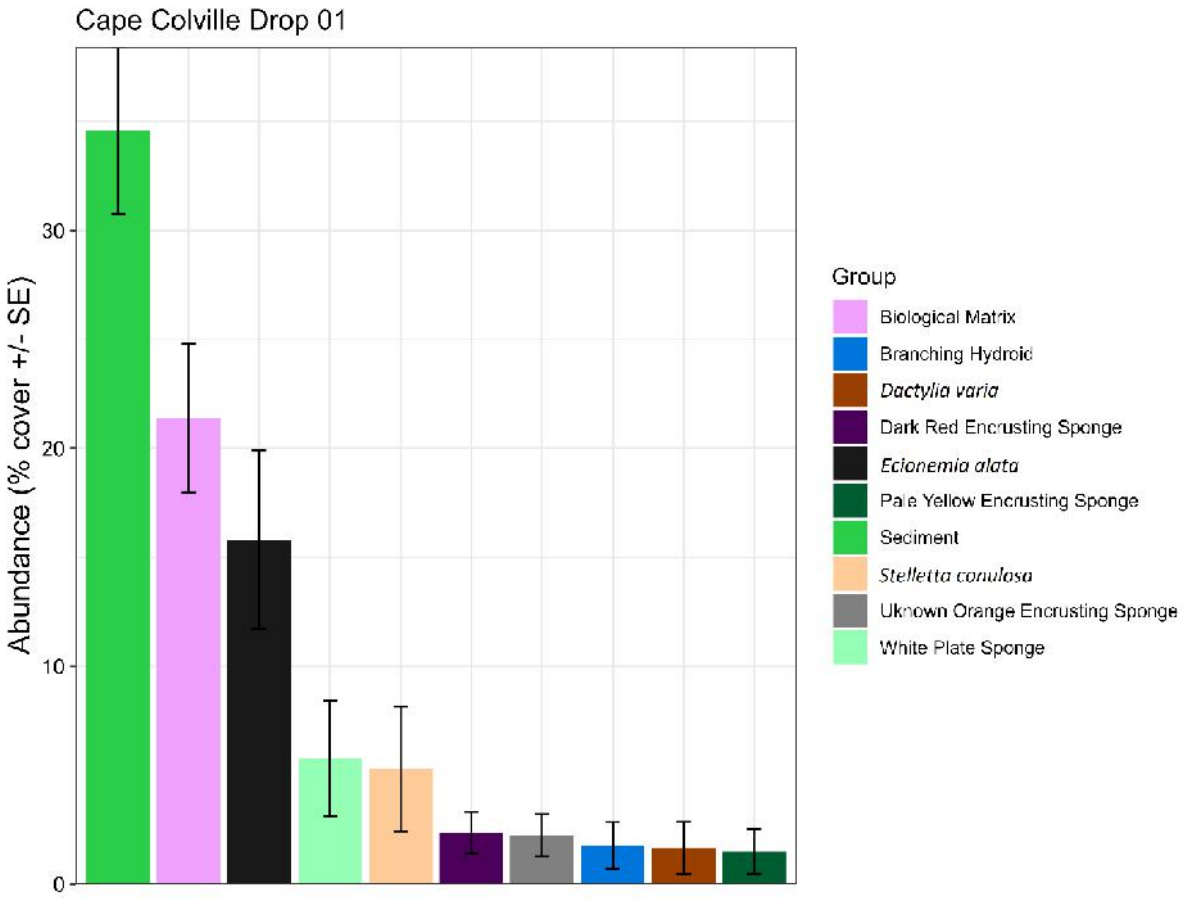


Appendix M

The abundance of the 10 most abundant benthic groups at each site.

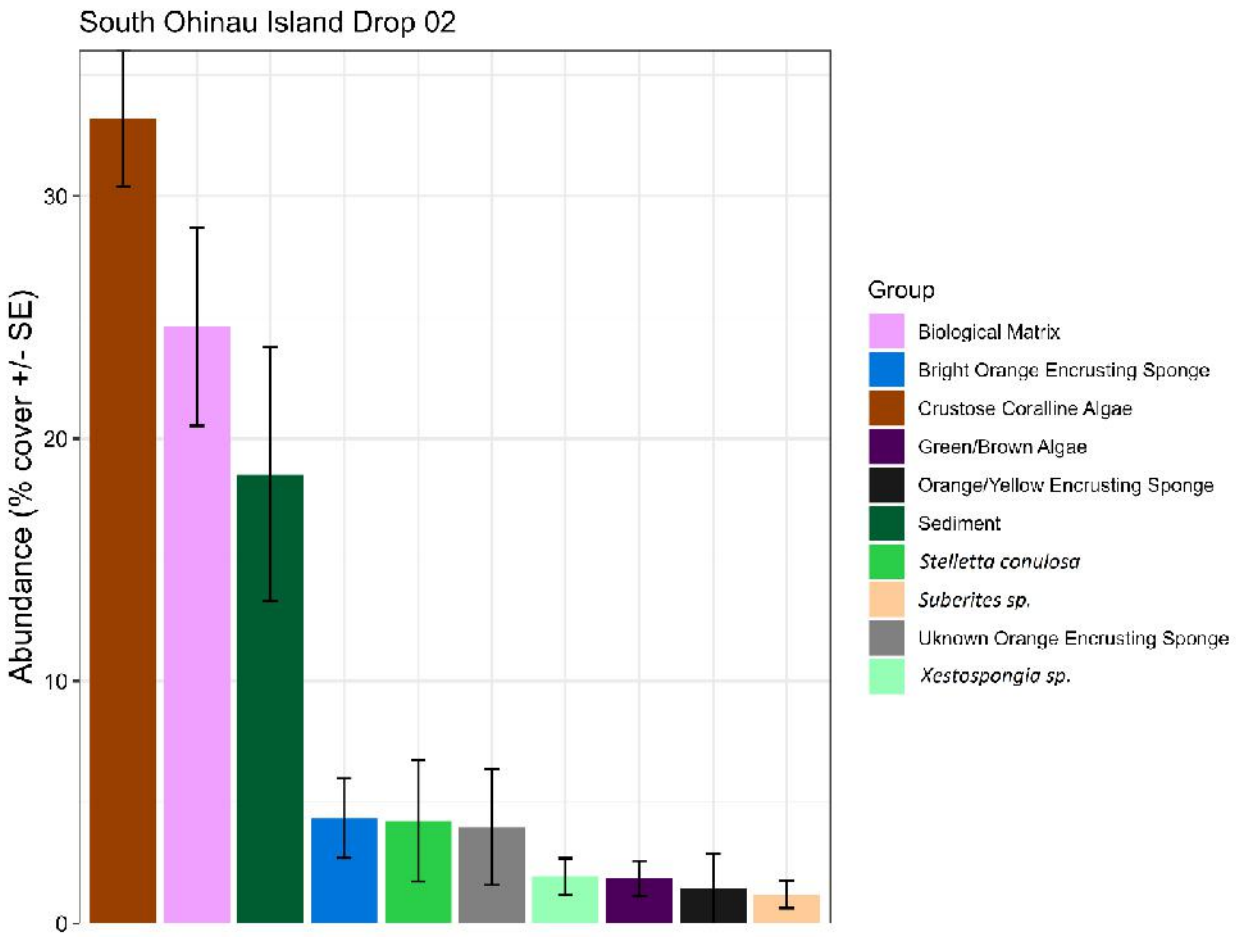
Cape Colville Drop 01

	Group	N	Mean	SD	SE	CI
1	Sediment	10	34.59895309	12.1174776	3.83188288	8.6683213
2	Biological Matrix	10	21.39274982	10.7874663	3.41129637	7.7168885
3	*Ecionemia alata*	10	15.81710927	12.9348103	4.09034616	9.2530059
4	White Plate Sponge	10	5.77799783	8.4242454	2.66398031	6.0263421
5	*Stelletta conulosa*	10	5.29042074	9.0227327	2.85323859	6.4544741
6	Dark Red Encrusting Sponge	10	2.35576910	3.0606182	0.96785246	2.1894344
7	Unknown Orange Encrusting Sponge	10	2.23487488	3.1086067	0.98302776	2.2237633
8	Branching Hydroid	10	1.77633021	3.3941175	1.07331420	2.4280054
9	*Dactylia varia*	10	1.66033641	3.7820326	1.19598373	2.7055032
10	Pale Yellow Encrusting Sponge	10	1.50475813	3.2783607	1.03670869	2.3451980



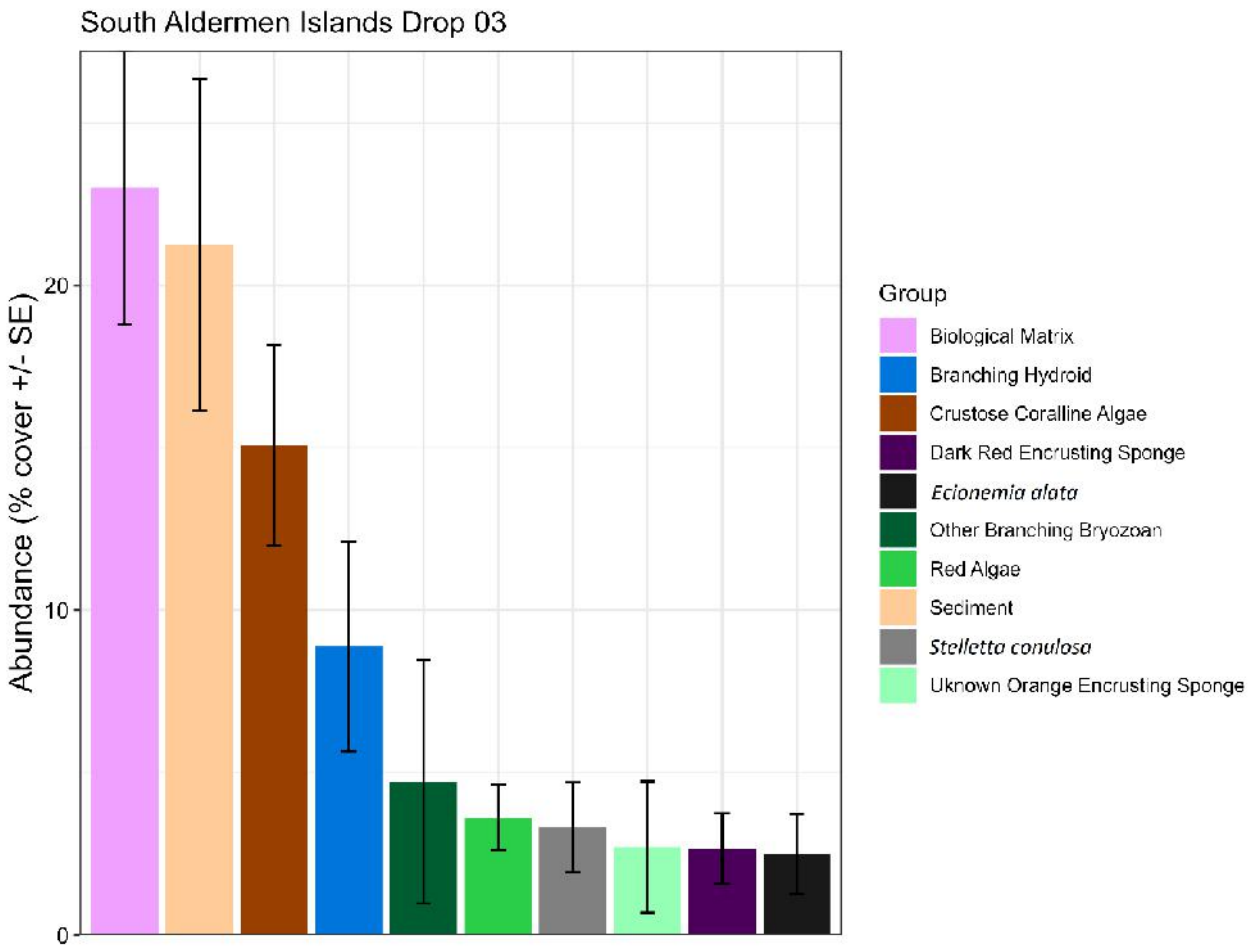
South Ohinau Island Drop 02

	Group	N	Mean	SD	SE	CI
1	Crustose Coralline Algae	10	33.21247683	8.9264087	2.82277829	6.3855681
2	Biological Matrix	10	24.61826246	12.9214857	4.08613255	9.2434740
3	Sediment	10	18.53069140	16.5416139	5.23091762	11.8331578
4	Bright Orange Encrusting Sponge	10	4.35134334	5.1931870	1.64222992	3.7149822
5	*Stelletta conulosa*	10	4.23119948	7.9116573	2.50188570	5.6596587
6	Unknown Orange Encrusting Sponge	10	3.97393555	7.5428012	2.38524317	5.3957949
7	*Xestospongia* sp.	10	1.93689617	2.3819004	0.75322304	1.7039089
8	Green/Brown Algae	10	1.86277563	2.2877286	0.72344329	1.6365424
9	Orange/Yellow Encrusting Sponge	10	1.44067797	4.5558237	1.44067797	3.2590400
10	*Suberites* sp.	10	1.19496604	1.7851114	0.56450180	1.2769918



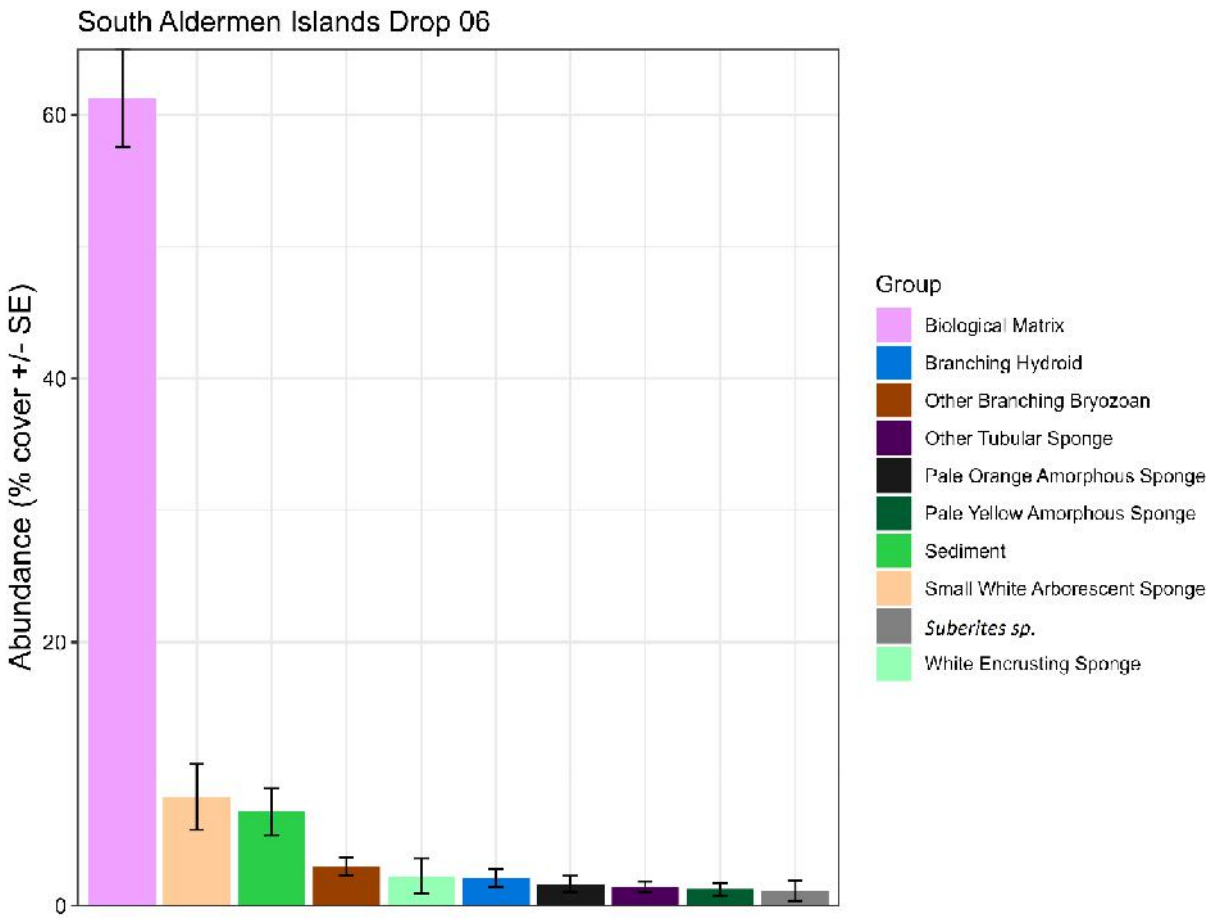
South Aldermen Islands Drop 03

	Group	N	Mean	SD	SE	CI
1	Biological Matrix	10	23.00441384	13.3049242	4.20738647	9.5177694
2	Sediment	10	21.23611801	16.1728096	5.11429146	11.5693311
3	Crustose Coralline Algae	10	15.07420631	9.7670757	3.08862054	6.9869451
4	Branching Hydroid	10	8.88472593	10.2214636	3.23231059	7.3119946
5	Other Branching Bryozoan	10	4.71590365	11.8480938	3.74669624	8.4756157
6	Red Algae	10	3.60998773	3.1945930	1.01021900	2.2852741
7	*Stelletta conulosa*	10	3.31931537	4.3612381	1.37914457	3.1198418
8	Unknown Orange Encrusting Sponge	10	2.71194927	6.3961380	2.02263642	4.5755215
9	Dark Red Encrusting Sponge	10	2.67151234	3.4332730	1.08569626	2.4560156
10	*Ecionemia alata*	10	2.50832130	3.8993255	1.23307499	2.7894094



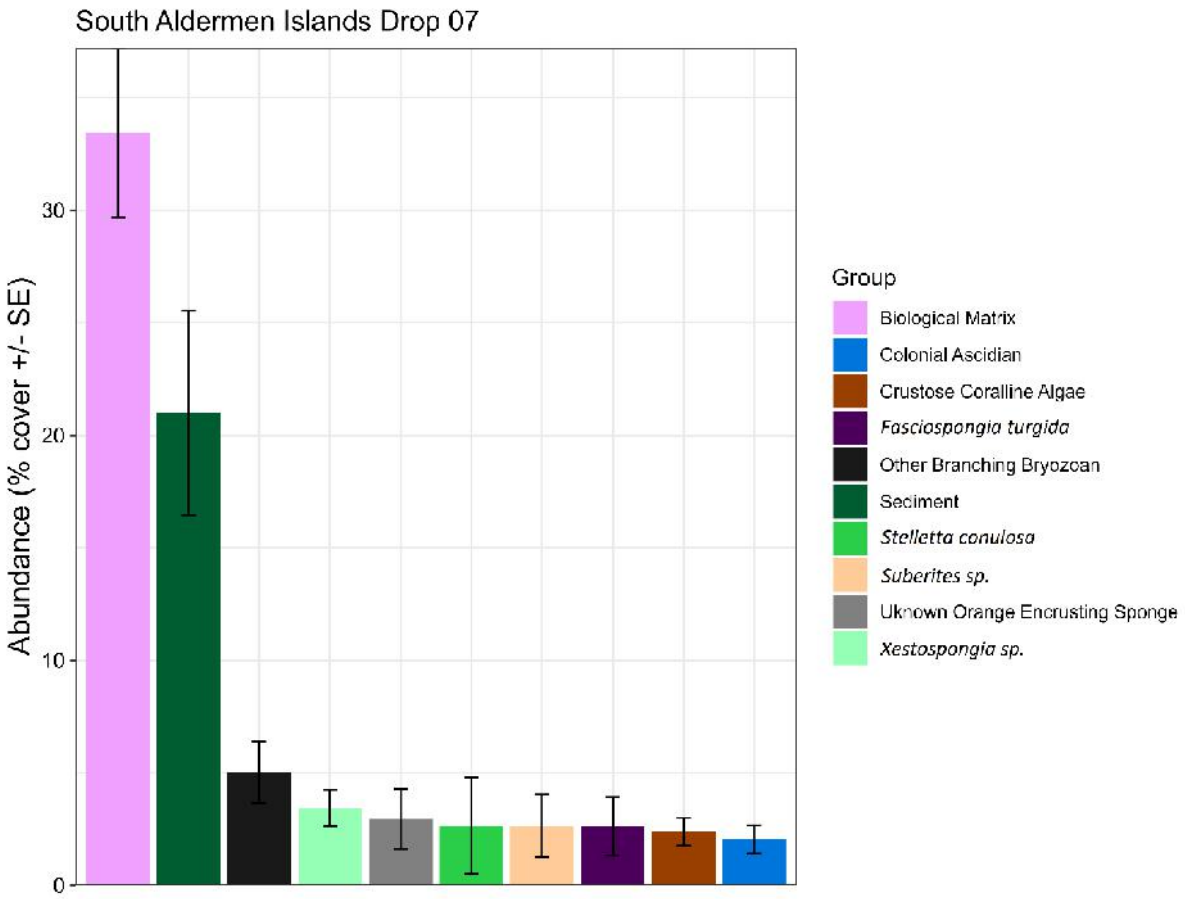
South Aldermen Islands Drop 06

	Group	N	Mean	SD	SE	CI
1	Biological Matrix	10	61.25935426	11.8065798	3.73356834	8.4459184
2	Small White Arborescent Sponge	10	8.25853476	7.8725120	2.48950688	5.6316558
3	Sediment	10	7.12996232	5.6219622	1.77782056	4.0217095
4	Other Branching Bryozoan	10	2.96286956	2.1796146	0.68925466	1.5592024
5	White Encrusting Sponge	10	2.26184102	4.1997450	1.32807599	3.0043166
6	Branching Hydroid	10	2.11479966	2.1081229	0.66664700	1.5080603
7	Pale Orange Amorphous Sponge	10	1.64564807	1.9398680	0.61344013	1.3876980
8	Other Tubular Sponge	10	1.42577094	1.2443073	0.39348453	0.8901238
9	Pale Yellow Amorphous Sponge	10	1.26204016	1.4698482	0.46480683	1.0514661
10	*Suberites* sp.	10	1.12038091	2.5966440	0.82113093	1.8575272



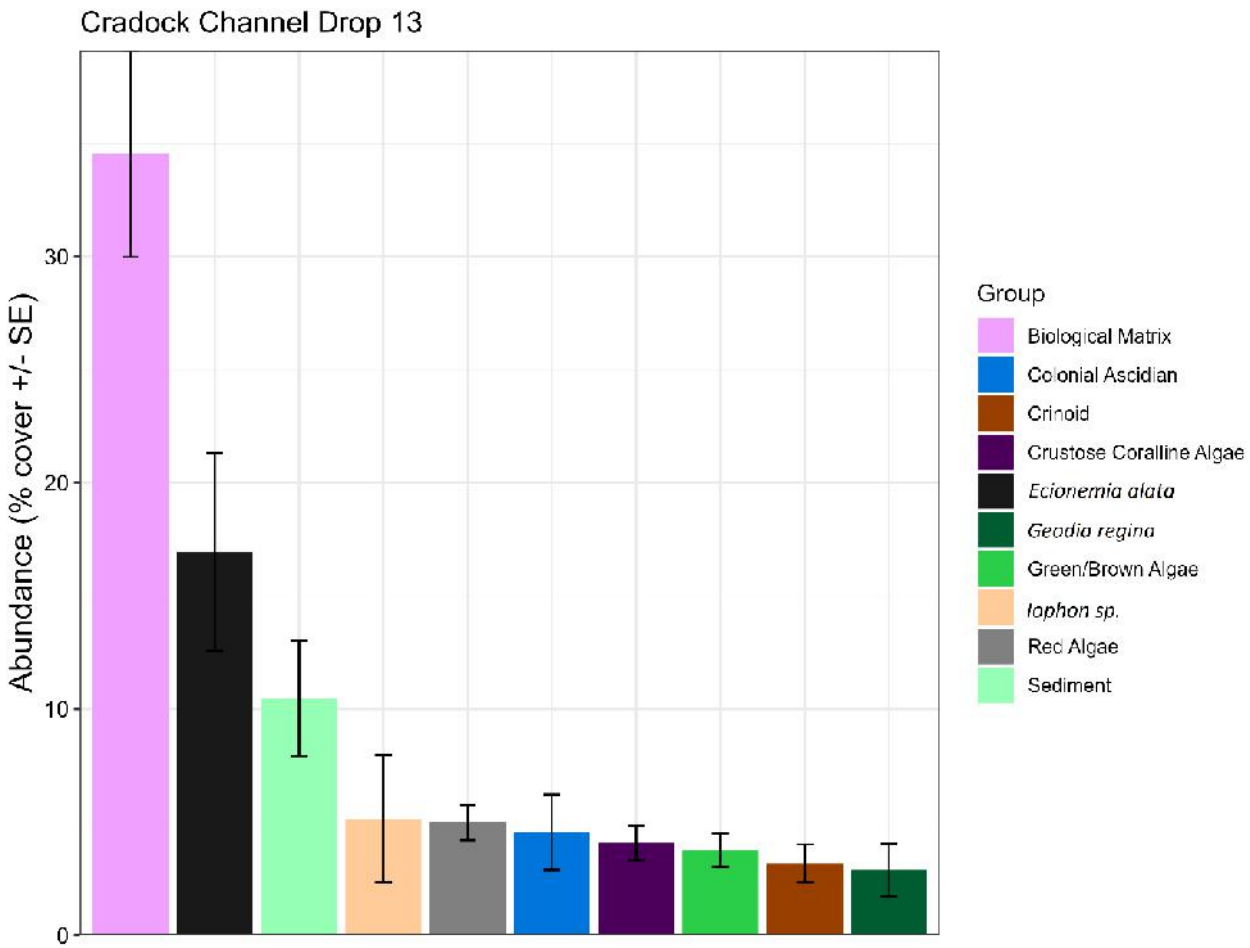
South Aldermen Islands Drop 07

	Group	N	Mean	SD	SE	CI
1	Biological Matrix	10	33.44491463	11.9129736	3.76721303	8.5220279
2	Sediment	10	20.99918818	14.3297812	4.53147471	10.2509080
3	Other Branching Bryozoan	10	5.01424008	4.3524973	1.37638050	3.1135890
4	*Xestospongia* sp.	10	3.42951895	2.5253029	0.79857088	1.8064928
5	Unknown Orange Encrusting Sponge	10	2.93949657	4.1629497	1.31644028	2.9779948
6	*Stelletta conulosa*	10	2.65149956	6.7471056	2.13362215	4.8265886
7	*Suberites* sp.	10	2.62845993	4.3771373	1.38417236	3.1312154
8	*Fasciospongia turgida*	10	2.60553481	4.0785400	1.28974758	2.9176117
9	Crustose Coralline Algae	10	2.37814991	1.9423662	0.61423011	1.3894850
10	Colonial Ascidian	10	2.02687711	1.9579191	0.61914839	1.4006110



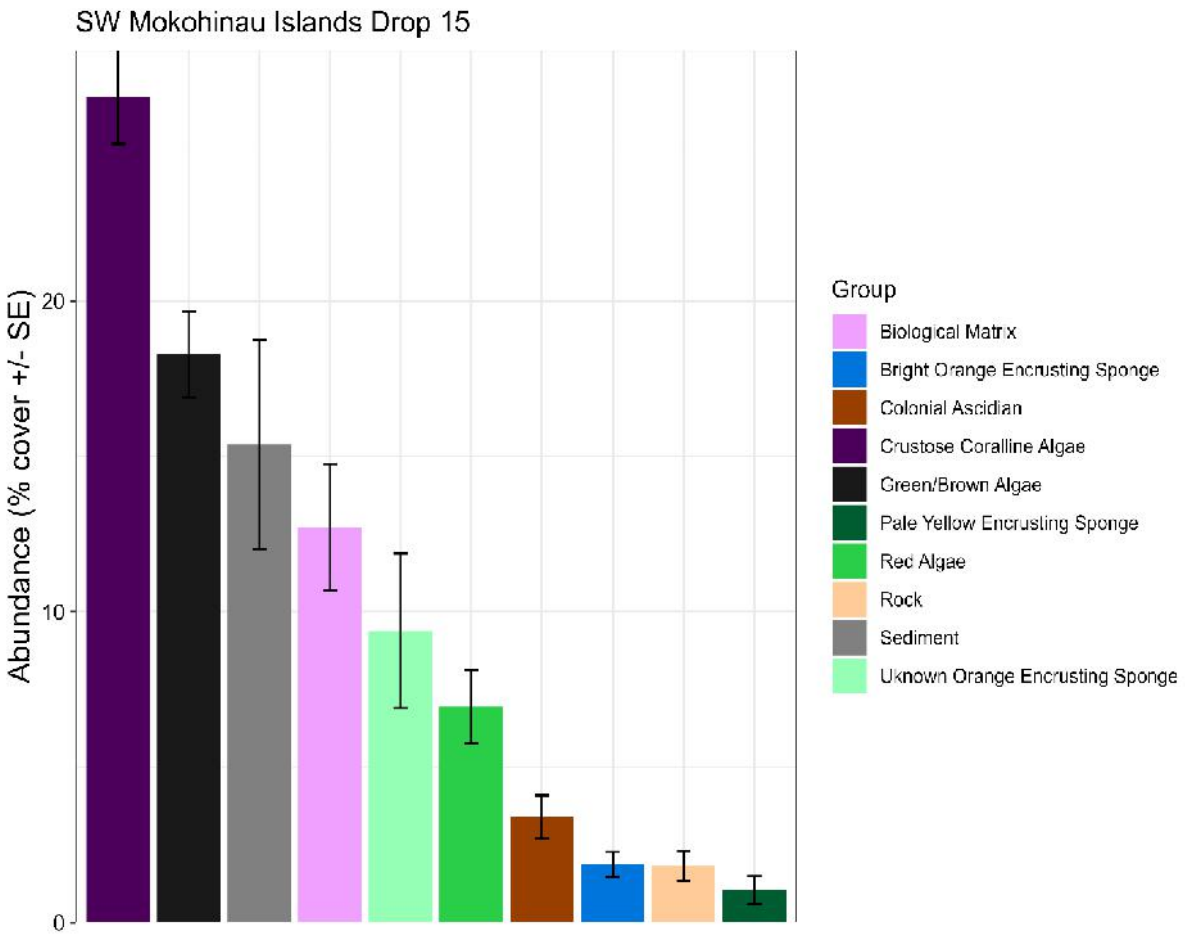
Cradock channel Drop 13

1	Biological Matrix	10	34.54263551	14.4308389	4.56343194	10.3232003
2	*Ecionemia alata*	10	16.93937432	13.7918489	4.36136556	9.8660943
3	Sediment	10	10.45736449	8.0648365	2.55032523	5.7692365
4	*Iophon* sp.	10	5.14726534	8.8854615	2.80982963	6.3562762
5	Red Algae	10	4.97531844	2.4536688	0.77591819	1.7552489
6	Colonial Ascidian	10	4.55214494	5.2627957	1.66424213	3.7647773
7	Crustose Coralline Algae	10	4.06832964	2.4438683	0.77281903	1.7482381
8	Green/Brown Algae	10	3.76191499	2.3488304	0.74276537	1.6802520
9	Crinoid	10	3.16951649	2.6388332	0.83447234	1.8877076
10	*Geodia regina*	10	2.88542844	3.6184683	1.14426015	2.5884963



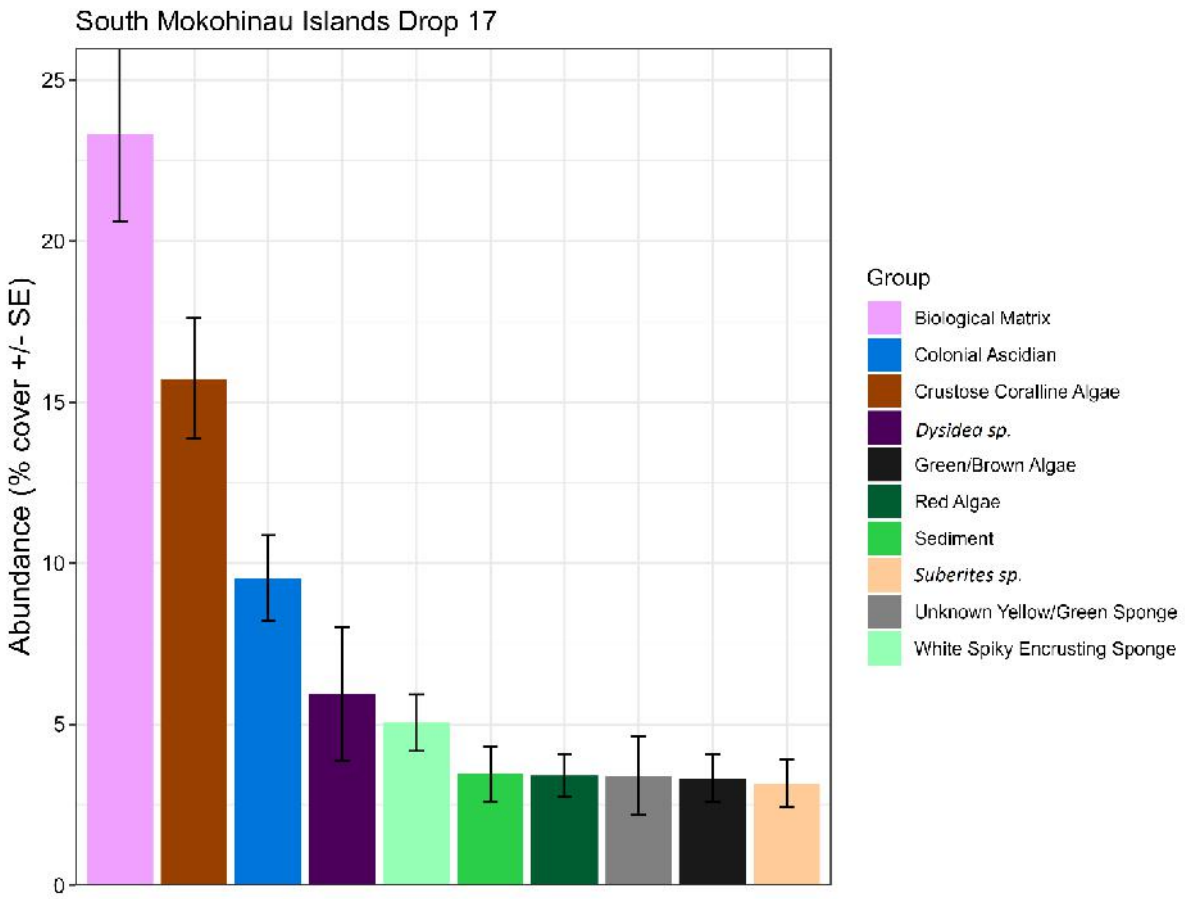
SW Mokohinau Islands Drop 15

	Group	N	Mean	SD	SE	CI
1	Crustose Coralline Algae	10	26.56745739	4.7735343	1.50952409	3.4147807
2	Green/Brown Algae	10	18.28436900	4.3917783	1.38880223	3.1416889
3	Sediment	10	15.37755980	10.6556275	3.36960526	7.6225767
4	Biological Matrix	10	12.72338611	6.4496036	2.03954373	4.6137685
5	Unknown Orange Encrusting Sponge	10	9.39220126	7.8492885	2.48216298	5.6150428
6	Red Algae	10	6.95387978	3.7321727	1.18021663	2.6698355
7	Colonial Ascidian	10	3.39553906	2.2020256	0.69634162	1.5752342
8	Bright Orange Encrusting Sponge	10	1.87224873	1.2865198	0.40683329	0.9203208
9	Rock	10	1.81706991	1.5159932	0.47939913	1.0844762
10	Pale Yellow Encrusting Sponge	10	1.03830375	1.4496325	0.45841404	1.0370046



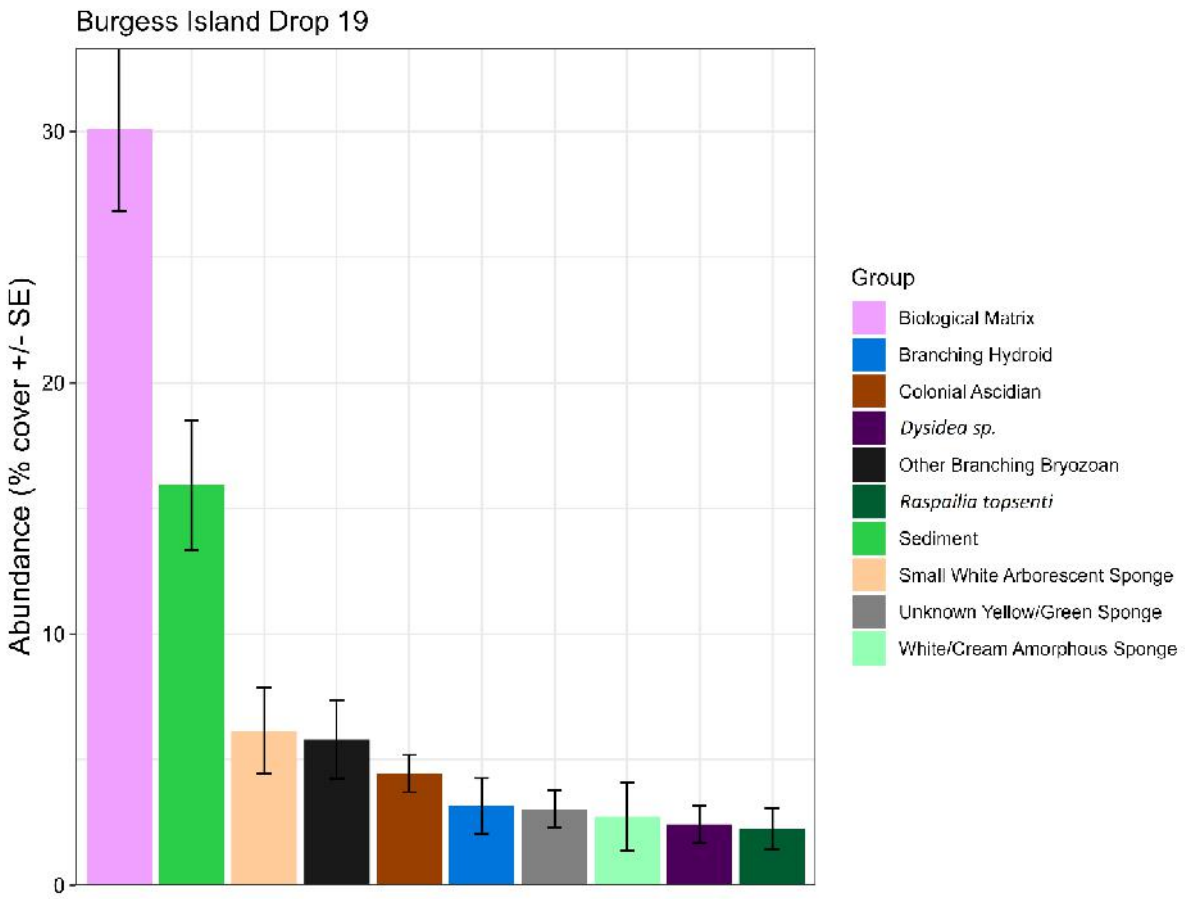
South Mokohinau Islands Drop 17

	Group	N	Mean	SD	SE	CI
1	Biological Matrix	10	23.29948690	8.5220776	2.69491755	6.0963270
2	Crustose Coralline Algae	10	15.72942881	5.9252543	1.87372993	4.2386716
3	Colonial Ascidian	10	9.54965115	4.1956739	1.32678858	3.0014043
4	*Dysidea* sp.	10	5.94112529	6.5639615	2.07570687	4.6955752
5	White Spiky Encrusting Sponge	10	5.05124188	2.7568310	0.87178652	1.9721181
6	Sediment	10	3.44801637	2.6724736	0.84511037	1.9117725
7	Red Algae	10	3.40890022	2.0616407	0.65194803	1.4748089
8	Unknown Yellow/Green Sponge	10	3.39276263	3.8448027	1.21583337	2.7504062
9	Green/Brown Algae	10	3.31756448	2.3460465	0.74188505	1.6782606
10	*Suberites* sp.	10	3.15811580	2.3566497	0.74523806	1.6858456



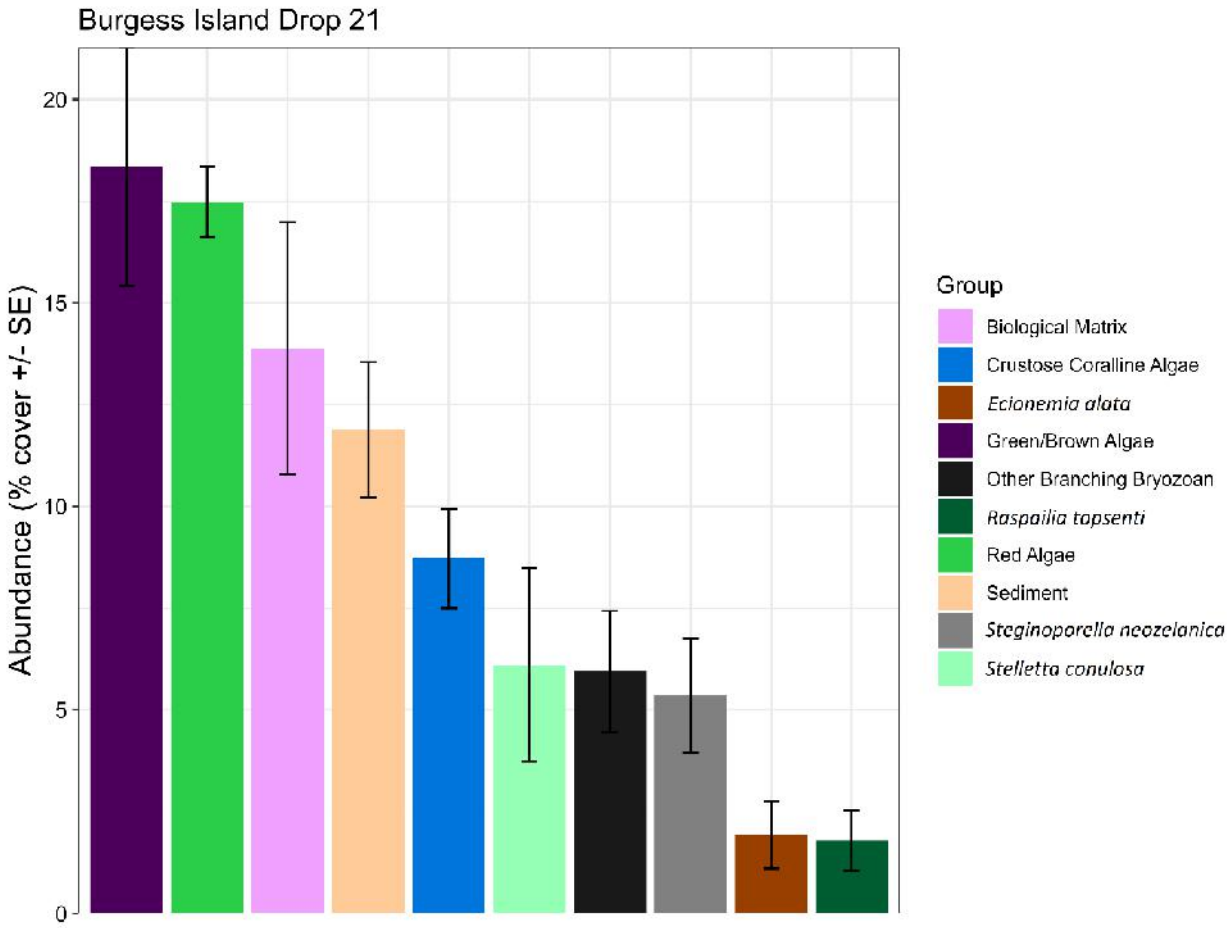
Burgess Island Drop 19

	Group	N	Mean	SD	SE	CI
1	Biological Matrix	10	30.07137207	10.2646490	3.24596704	7.3428876
2	Sediment	10	15.91936279	8.1979948	2.59243357	5.8644922
3	Small White Arborescent Sponge	10	6.14298607	5.4408710	1.72055449	3.8921647
4	Other Branching Bryozoan	10	5.80577642	4.9125260	1.55347713	3.5142094
5	Colonial Ascidian	10	4.44376208	2.3700811	0.74948545	1.6954539
6	Branching Hydroid	10	3.15243937	3.5514627	1.12307113	2.5405634
7	Unknown Yellow/Green Sponge	10	3.02894528	2.3772993	0.75176804	1.7006175
8	White/Cream Amorphous Sponge	10	2.74246961	4.2512903	1.34437605	3.0411899
9	*Dysidea* sp.	10	2.41288902	2.4053852	0.76064959	1.7207089
10	*Raspailia topsenti*	10	2.23870206	2.5556326	0.80816198	1.8281894



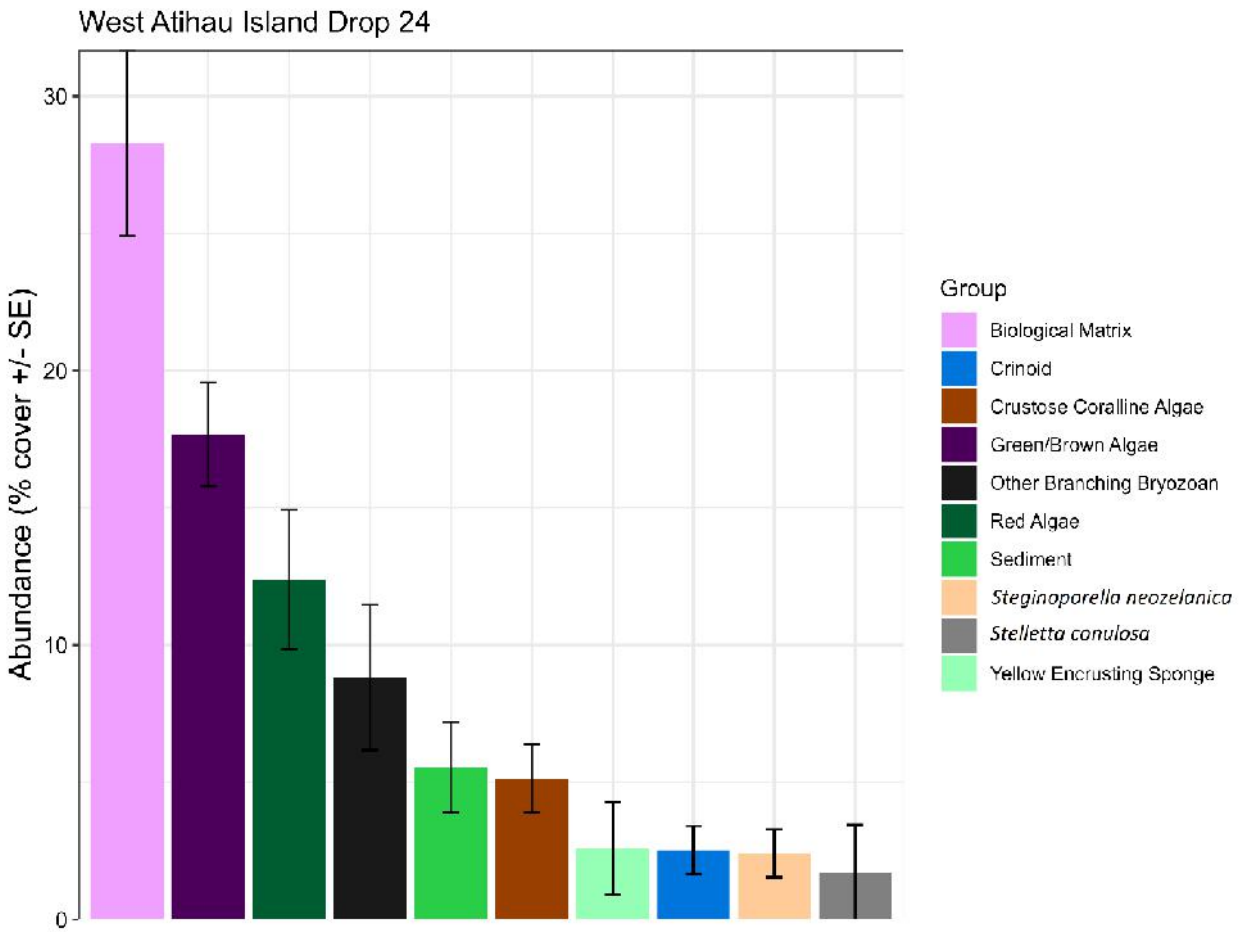
Burgess Island Drop 21

	Group	N	Mean	SD	SE	CI
1	Green/Brown Algae	10	18.34629863	9.2544132	2.92650240	6.6202084
2	Red Algae	10	17.48592050	2.7391449	0.86619366	1.9594662
3	Biological Matrix	10	13.88170364	9.7849146	3.09426169	6.9997062
4	Sediment	10	11.88502613	5.2727247	1.66738196	3.7718801
5	Crustose Coralline Algae	10	8.72328625	3.8572904	1.21978233	2.7593393
6	*Stelletta conulosa*	10	6.11395888	7.4776484	2.36464005	5.3491874
7	Other Branching Bryozoan	10	5.94713315	4.7338251	1.49696693	3.3863745
8	*Steginoporella neozelanica*	10	5.34842866	4.4123372	1.39530355	3.1563959
9	*Ecionemia alata*	10	1.93704600	2.6322841	0.83240133	1.8830226
10	*Raspailia topsenti*	10	1.78996262	2.3240417	0.73492651	1.6625193



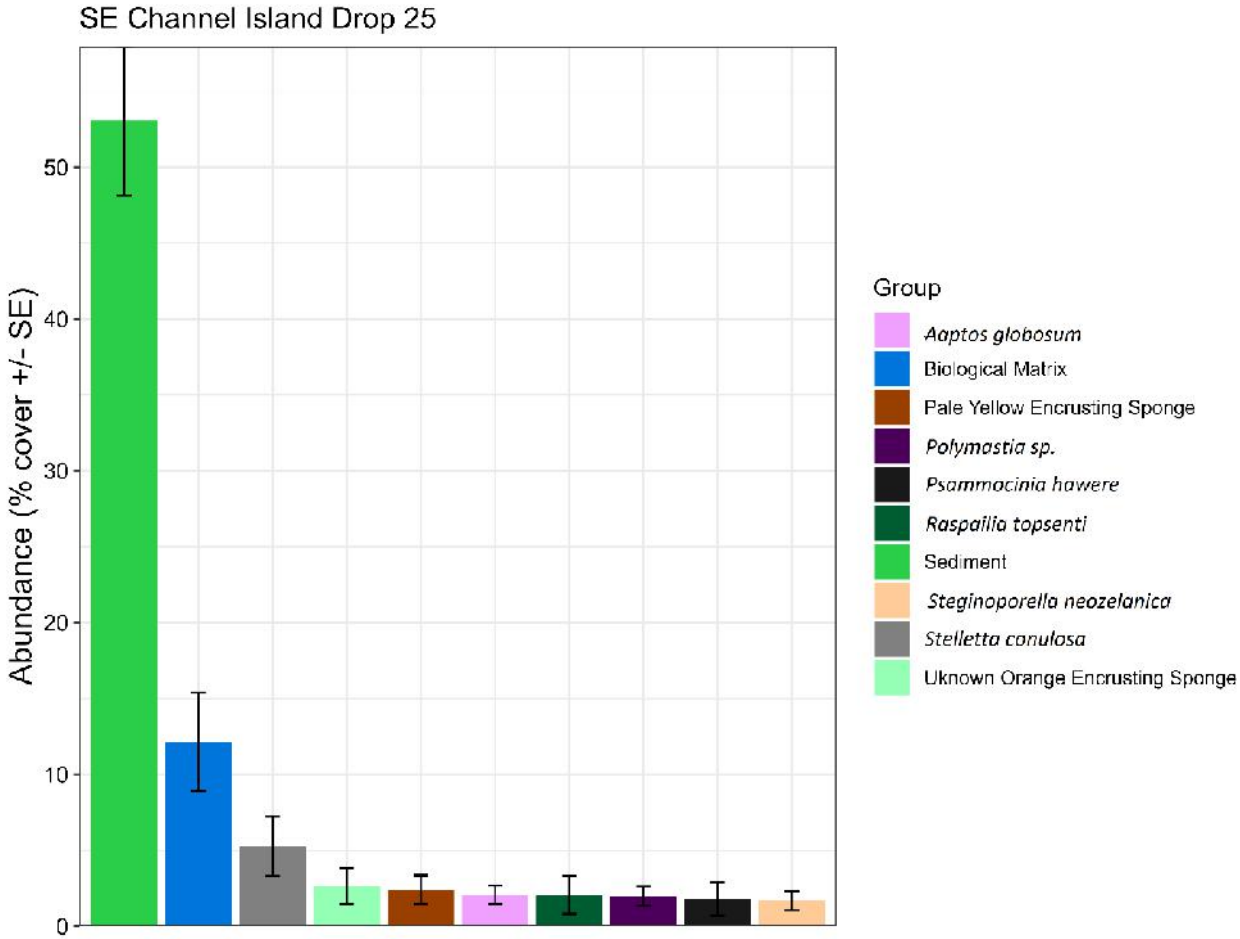
West Atihau Island Drop 24

	Group	N	Mean	SD	SE	CI
1	Biological Matrix	10	28.29072148	10.7404276	3.39642143	7.6832391
2	Green/Brown Algae	10	17.67247435	5.9700471	1.88789466	4.2707144
3	Red Algae	10	12.38588345	8.0316483	2.53983021	5.7454951
4	Other Branching Bryozoan	10	8.81309796	8.3540080	2.64176930	5.9760973
5	Sediment	10	5.54989460	5.2407835	1.65728126	3.7490307
6	Crustose Coralline Algae	10	5.13008145	3.9228148	1.24050297	2.8062127
7	Yellow Encrusting Sponge	10	2.59473914	5.3308526	1.68576362	3.8134623
8	Crinoid	10	2.52871073	2.7676467	0.87520674	1.9798552
9	*Steginoporella neozelanica*	10	2.41271185	2.7539818	0.87088550	1.9700799
10	*Stelletta conulosa*	10	1.72413793	5.4522029	1.72413793	3.9002710



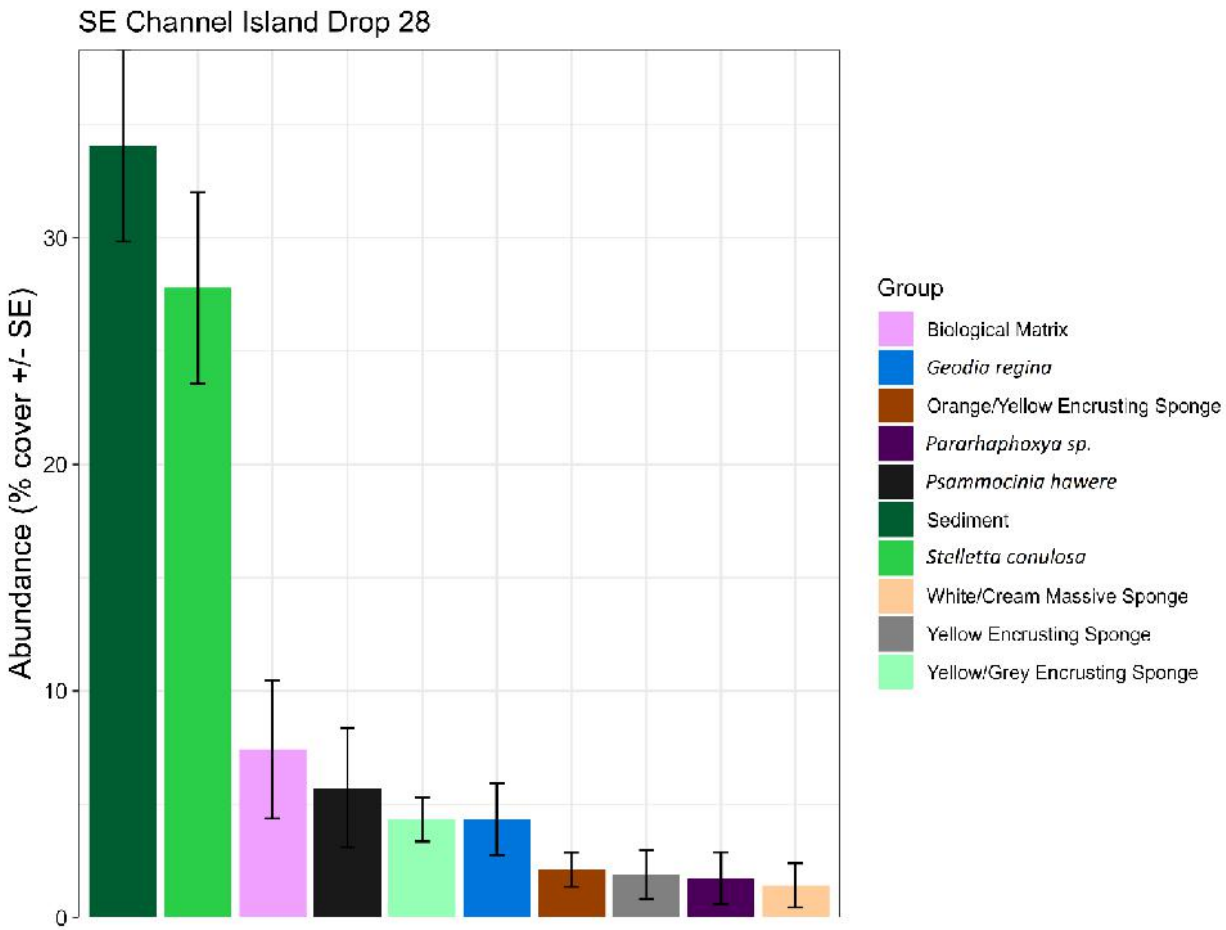
SE Channel Island Drop 25

	Group	N	Mean	SD	SE	CI
1	Sediment	10	53.06148585	15.4880396	4.89774815	11.0794761
2	Biological Matrix	10	12.15434440	10.1842278	3.22053559	7.2853577
3	*Stelletta conulosa*	10	5.27190557	6.2570419	1.97865039	4.4760181
4	Unknown Orange Encrusting Sponge	10	2.65720197	3.7367718	1.18167100	2.6731255
5	Pale Yellow Encrusting Sponge	10	2.42168553	2.9475923	0.93211052	2.1085805
6	*Globular sponges (including Aaptos globulosum, Tethya sp. & Polymastia hirsuta)*	1	2.075045	1.859258	0.587949	1.330033
7	*Raspailia topsenti*	10	2.06115836	3.9748589	1.25696075	2.8434428
8	*Polymastia crocea*	10	1.98027792	2.0192330	0.63853753	1.4444723
9	*Psammocinia hawere*	10	1.79001014	3.4242968	1.08285771	2.4495943
10	*Steginoporella neozelanica*	10	1.68478908	1.9080005	0.60336275	1.3649014



SE Channel Island Drop 28

	Group	N	Mean	SD	SE	CI
1	Sediment	10	34.07146556	13.3780532	4.23051187	9.5700827
2	*Stelletta conulosa*	10	27.78563036	13.3519981	4.22227253	9.5514440
3	Biological Matrix	10	7.41498143	9.6388619	3.04807578	6.8952265
4	*Psammocinia hawere*	10	5.72515876	8.2598400	2.61199076	5.9087336
5	Yellow/Grey Encrusting Sponge	10	4.32602673	3.0751031	0.97243298	2.1997962
6	*Geodia regina*	10	4.32247569	4.9845448	1.57625146	3.5657285
7	Orange/Yellow Encrusting Sponge	10	2.11366600	2.3907398	0.75601831	1.7102322
8	Yellow Encrusting Sponge	10	1.89605111	3.4143394	1.07970893	2.4424713
9	*Pararhaphoxya* sp.	10	1.73075032	3.6144225	1.14298074	2.5856021
10	White/Cream Massive Sponge	10	1.42004338	3.0968837	0.97932062	2.2153772



Appendix N

SIMPER results comparing the abundances of the ten major benthic groups.

SIMPER
Similarity Percentages - species contributions
One-Way Analysis

Data type: Abundance
Sample selection: All
Variable selection: All

Parameters
Resemblance: S17 Bray-Curtis similarity
Cut off for low contributions: 70.00%

Groups
Cape Colville Drop 01 & South Ohinau Island Drop 02
Average dissimilarity = 38.81

	Cape Colville Drop 01	South Ohinau Island Drop 02				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
Crustose Coralline Algae	0.00	5.72	14.72	6.72	37.93	37.93
All Substrate	5.81	3.84	6.32	1.51	16.27	54.20
All Sponges	6.28	4.26	6.04	1.62	15.55	69.75
Biological Matrix	4.48	4.81	3.64	1.39	9.37	79.12

Groups
Cape Colville Drop 01 & South Aldermen Islands Drop 03
Average dissimilarity = 38.86

	Cape Colville Drop 01	South Aldermen Islands Drop 03				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
Crustose Coralline Algae	0.00	3.67	8.96	2.64	23.05	23.05
All Sponges	6.28	4.30	5.44	1.66	13.99	37.04
All Macroalgae	0.00	2.27	5.41	2.34	13.92	50.96
All Cnidaria	0.88	2.33	4.95	1.29	12.75	63.70
All Substrate	5.81	4.26	4.85	1.40	12.49	76.20

Groups
South Ohinau Island Drop 02 & South Aldermen Islands Drop 03
Average dissimilarity = 28.91

	South Ohinau Island Drop 02	South Aldermen Islands Drop 03				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
All Substrate	3.84	4.26	4.99	1.40	17.25	17.25
All Cnidaria	0.52	2.33	4.88	1.24	16.88	34.13
Crustose Coralline Algae	5.72	3.67	4.79	1.63	16.56	50.69
Biological Matrix	4.81	4.58	3.57	1.38	12.36	63.05
All Macroalgae	1.26	2.27	3.10	1.51	10.71	73.76

Groups
Cape Colville Drop 01 & South Aldermen Islands Drop 06
Average dissimilarity = 34.76

	Cape Colville Drop 01	South Aldermen Islands Drop 06				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
All Substrate	5.81	2.39	9.08	2.26	26.12	26.12
Biological Matrix	4.48	7.79	8.91	2.26	25.62	51.74
All Sponges	6.28	4.78	5.08	1.59	14.63	66.37
All Bryozoans	0.20	1.62	3.78	2.02	10.86	77.23
Groups South Ohinau Island Drop 02 & South Aldermen Islands Drop 06 Average dissimilarity = 42.91						
	South Ohinau Island Drop 02	South Aldermen Islands Drop 06				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
Crustose Coralline Algae	5.72	0.00	14.19	6.90	33.07	33.07
Biological Matrix	4.81	7.79	7.46	2.16	17.40	50.47
All Substrate	3.84	2.39	5.36	1.35	12.49	62.96
All Bryozoans	0.10	1.62	3.76	2.36	8.76	71.71
Groups South Aldermen Islands Drop 03 & South Aldermen Islands Drop 06 Average dissimilarity = 40.21						
	South Aldermen Islands Drop 03	South Aldermen Islands Drop 06				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
Crustose Coralline Algae	3.67	0.00	8.65	2.66	21.52	21.52
Biological Matrix	4.58	7.79	7.64	1.89	19.00	40.52
All Substrate	4.26	2.39	5.50	1.36	13.67	54.19
All Macroalgae	2.27	0.41	4.49	2.06	11.18	65.37
All Cnidaria	2.33	1.34	4.47	1.47	11.13	76.50
Groups Cape Colville Drop 01 & South Aldermen Islands Drop 07 Average dissimilarity = 29.10						
	Cape Colville Drop 01	South Aldermen Islands Drop 07				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
All Substrate	5.81	4.33	4.74	1.43	16.28	16.28
All Bryozoans	0.20	2.08	4.65	1.80	15.98	32.26
Biological Matrix	4.48	5.70	3.98	1.32	13.68	45.93
All Sponges	6.28	5.43	3.72	1.48	12.79	58.72
All Cnidaria	0.88	1.51	3.30	1.28	11.33	70.05

Groups
South Ohinau Island Drop 02 & South Aldermen Islands Drop 07
Average dissimilarity = 37.19

	South Ohinau Island Drop 02	South Aldermen Islands Drop 07				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
Crustose Coralline Algae	5.72	1.34	10.09	3.90	27.13	27.13
All Substrate	3.84	4.33	4.68	1.37	12.58	39.71
All Bryozoans	0.10	2.08	4.54	1.89	12.21	51.92
All Sponges	4.26	5.43	3.57	1.52	9.61	61.53
Biological Matrix	4.81	5.70	3.48	1.42	9.36	70.89

Groups
South Aldermen Islands Drop 03 & South Aldermen Islands Drop 07
Average dissimilarity = 34.61

	South Aldermen Islands Drop 03	South Aldermen Islands Drop 07				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
Crustose Coralline Algae	3.67	1.34	5.28	1.68	15.27	15.27
All Macroalgae	2.27	0.28	4.41	1.98	12.74	28.01
All Cnidaria	2.33	1.51	4.29	1.40	12.40	40.41
All Substrate	4.26	4.33	4.20	1.44	12.14	52.54
All Bryozoans	1.23	2.08	4.11	1.46	11.88	64.42
Biological Matrix	4.58	5.70	3.69	1.25	10.68	75.10

Groups
South Aldermen Islands Drop 06 & South Aldermen Islands Drop 07
Average dissimilarity = 28.70

	South Aldermen Islands Drop 06	South Aldermen Islands Drop 07				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
All Substrate	2.39	4.33	5.14	1.34	17.93	17.93
Biological Matrix	7.79	5.70	5.06	1.85	17.64	35.57
Crustose Coralline Algae	0.00	1.34	3.15	1.77	10.97	46.54
All Cnidaria	1.34	1.51	2.91	1.36	10.14	56.68
All Sponges	4.78	5.43	2.66	1.44	9.26	65.94
All Bryozoans	1.62	2.08	2.56	1.49	8.91	74.85

Groups
Cape Colville Drop 01 & Cradock Channel Drop 13
Average dissimilarity = 39.22

	Cape Colville Drop 01	Cradock Channel Drop 13				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
All Macroalgae	0.00	2.86	6.73	3.74	17.16	17.16
All Substrate	5.81	2.95	6.68	1.68	17.03	34.19
All Sponges	6.28	5.12	4.68	1.34	11.94	46.13
Crustose Coralline Algae	0.00	1.85	4.38	2.32	11.16	57.28
Biological Matrix	4.48	5.75	4.10	1.40	10.44	67.73
All Echinodermata	0.00	1.51	3.52	1.62	8.97	76.70

Groups
South Ohinau Island Drop 02 & Cradock Channel Drop 13
Average dissimilarity = 36.93

	South Ohinau Island Drop 02	Cradock Channel Drop 13				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
Crustose Coralline Algae	5.72	1.85	8.60	3.43	23.28	23.28
All Substrate	3.84	2.95	4.64	1.41	12.55	35.83
All Sponges	4.26	5.12	4.11	1.45	11.12	46.95
All Macroalgae	1.26	2.86	3.79	1.72	10.26	57.20
Biological Matrix	4.81	5.75	3.57	1.42	9.66	66.86
All Ascidians	0.29	1.59	3.35	1.17	9.07	75.93

Groups
South Aldermen Islands Drop 03 & Cradock Channel Drop 13
Average dissimilarity = 31.61

	South Aldermen Islands Drop 03	Cradock Channel Drop 13				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
All Substrate	4.26	2.95	4.55	1.38	14.41	14.41
Crustose Coralline Algae	3.67	1.85	4.20	1.48	13.30	27.70
All Cnidaria	2.33	1.35	3.95	1.54	12.51	40.21
Biological Matrix	4.58	5.75	3.80	1.31	12.02	52.23
All Sponges	4.30	5.12	3.70	1.49	11.70	63.93
All Bryozoans	1.23	1.32	3.26	1.08	10.30	74.23

Groups
South Aldermen Islands Drop 06 & Cradock Channel Drop 13
Average dissimilarity = 32.62

	South Aldermen Islands Drop 06	Cradock Channel Drop 13				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
All Macroalgae	0.41	2.86	5.59	2.66	17.15	17.15
Biological Matrix	7.79	5.75	4.92	1.61	15.08	32.23
Crustose Coralline Algae	0.00	1.85	4.23	2.33	12.97	45.20
All Sponges	4.78	5.12	3.66	1.48	11.21	56.41
All Substrate	2.39	2.95	3.65	1.38	11.19	67.60
All Ascidians	0.67	1.59	3.34	1.32	10.23	77.83

Groups
South Aldermen Islands Drop 07 & Cradock Channel Drop 13
Average dissimilarity = 31.08

	South Aldermen Islands Drop 07	Cradock Channel Drop 13				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
All Macroalgae	0.28	2.86	5.52	2.73	17.74	17.74
All Substrate	4.33	2.95	4.15	1.28	13.36	31.10
All Sponges	5.43	5.12	3.30	1.41	10.63	41.73
All Echinodermata	0.12	1.51	3.05	1.58	9.82	51.56
All Ascidians	1.15	1.59	2.94	1.43	9.47	61.03
All Bryozoans	2.08	1.32	2.93	1.40	9.43	70.46

Groups
Cape Colville Drop 01 & SW Mokohinau Islands Drop 15
Average dissimilarity = 46.14

	Cape Colville Drop 01	SW Mokohinau Islands Drop 15				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
Crustose Coralline Algae	0.00	5.14	12.32	11.00	26.70	26.70
All Macroalgae	0.00	4.99	12.00	7.75	26.00	52.70
All Sponges	6.28	3.61	6.78	1.77	14.70	67.40
All Substrate	5.81	4.01	4.72	1.74	10.24	77.64

Groups
South Ohinau Island Drop 02 & SW Mokohinau Islands Drop 15
Average dissimilarity = 27.14

	South Ohinau Island Drop 02	SW Mokohinau Islands Drop 15				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
All Macroalgae	1.26	4.99	8.46	3.46	31.16	31.16
All Substrate	3.85	4.01	4.09	1.41	15.08	46.25
Biological Matrix	4.81	3.42	3.80	1.28	14.01	60.26
All Ascidians	0.29	1.68	3.39	1.84	12.49	72.74

Groups
South Aldermen Islands Drop 03 & SW Mokohinau Islands Drop 15
Average dissimilarity = 31.09

	South Aldermen Islands Drop 03	SW Mokohinau Islands Drop 15				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
All Macroalgae	2.27	4.99	5.89	2.27	18.93	18.93
All Cnidaria	2.33	0.32	4.57	1.23	14.70	33.63
All Substrate	4.26	4.01	3.72	1.50	11.98	45.61
Biological Matrix	4.58	3.42	3.68	1.47	11.84	57.45
Crustose Coralline Algae	3.67	5.14	3.41	1.46	10.98	68.43
All Ascidians	0.19	1.68	3.27	1.97	10.51	78.95

Groups
South Aldermen Islands Drop 06 & SW Mokohinau Islands Drop 15
Average dissimilarity = 50.65

	South Aldermen Islands Drop 06	SW Mokohinau Islands Drop 15				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
Crustose Coralline Algae	0.00	5.14	11.90	11.62	23.50	23.50
All Macroalgae	0.41	4.99	10.67	5.55	21.06	44.56
Biological Matrix	7.79	3.42	10.16	3.32	20.06	64.62
All Substrate	2.39	4.01	4.18	1.28	8.25	72.87

Groups
South Aldermen Islands Drop 07 & SW Mokohinau Islands Drop 15
Average dissimilarity = 42.50

	South Aldermen Islands Drop 07	SW Mokohinau Islands Drop 15				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
All Macroalgae	0.28	4.99	10.21	5.22	24.03	24.03
Crustose Coralline Algae	1.34	5.14	8.21	4.23	19.31	43.34
Biological Matrix	5.70	3.42	4.99	1.57	11.75	55.09
All Sponges	5.43	3.61	4.13	1.52	9.72	64.81
All Bryozoans	2.08	0.19	4.12	1.84	9.69	74.50

Groups
Cradock Channel Drop 13 & SW Mokohinau Islands Drop 15
Average dissimilarity = 34.71

	Cradock Channel Drop 13	SW Mokohinau Islands Drop 15				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
Crustose Coralline Algae	1.85	5.14	6.86	3.59	19.77	19.77
Biological Matrix	5.75	3.42	4.99	1.60	14.38	34.15
All Macroalgae	2.86	4.99	4.50	2.26	12.96	47.12
All Sponges	5.12	3.61	4.36	1.44	12.57	59.68
All Substrate	2.95	4.01	3.39	1.26	9.76	69.44
All Echinodermata	1.51	0.19	2.90	1.56	8.35	77.79

Groups
Cape Colville Drop 01 & South Mokohinau Islands Drop 17
Average dissimilarity = 42.54

	Cape Colville Drop 01	South Mokohinau Islands Drop 17

Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
All Substrate	5.81	1.66	9.82	2.94	23.09	23.09
Crustose Coralline Algae	0.00	3.90	9.16	5.55	21.52	44.62
All Ascidians	0.44	3.04	6.14	3.02	14.43	59.05
All Macroalgae	0.00	2.48	5.84	3.26	13.72	72.77

Groups
South Ohinau Island Drop 02 & South Mokohinau Islands Drop 17
Average dissimilarity = 31.38

	South Ohinau Island Drop 02	South Mokohinau Islands Drop 17				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
All Ascidians	0.29	3.04	6.12	3.09	19.51	19.51
All Substrate	3.84	1.66	5.55	1.39	17.69	37.20
All Sponges	4.26	6.00	4.28	1.77	13.63	50.83
Crustose Coralline Algae	5.72	3.90	4.10	1.74	13.06	63.89
All Macroalgae	1.26	2.48	3.13	1.55	9.97	73.86

Groups
South Aldermen Islands Drop 03 & South Mokohinau Islands Drop 17
Average dissimilarity = 31.59

	South Aldermen Islands Drop 03	South Mokohinau Islands Drop 17				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
All Ascidians	0.19	3.04	5.99	3.85	18.96	18.96
All Substrate	4.26	1.66	5.81	1.39	18.39	37.34
All Cnidaria	2.33	1.16	4.12	1.38	13.04	50.38
All Sponges	4.30	6.00	3.79	1.79	11.98	62.37
All Bryozoans	1.23	1.19	2.99	1.02	9.46	71.83

Groups
South Aldermen Islands Drop 06 & South Mokohinau Islands Drop 17
Average dissimilarity = 38.25

	South Aldermen Islands Drop 06	South Mokohinau Islands Drop 17				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
Crustose Coralline Algae	0.00	3.90	8.85	5.61	23.15	23.15
Biological Matrix	7.79	4.76	6.89	2.73	18.00	41.15
All Ascidians	0.67	3.04	5.42	2.41	14.17	55.32
All Macroalgae	0.41	2.48	4.75	2.30	12.41	67.73
All Sponges	4.78	6.00	3.23	1.62	8.43	76.16

Groups
South Aldermen Islands Drop 07 & South Mokohinau Islands Drop 17
Average dissimilarity = 32.63

	South Aldermen Islands Drop 07	South Mokohinau Islands Drop 17				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
All Substrate	4.33	1.66	5.81	1.60	17.80	17.80
Crustose Coralline Algae	1.34	3.90	5.43	2.44	16.63	34.43
All Macroalgae	0.28	2.48	4.73	2.41	14.50	48.92
All Ascidians	1.15	3.04	4.06	1.82	12.44	61.36
All Bryozoans	2.08	1.19	2.79	1.43	8.55	69.92
Biological Matrix	5.70	4.76	2.78	1.35	8.51	78.43

Groups
Cradock Channel Drop 13 & South Mokohinau Islands Drop 17
Average dissimilarity = 27.00

	Cradock Channel Drop 13	South Mokohinau Islands Drop 17				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
Crustose Coralline Algae	1.85	3.90	4.19	1.91	15.52	15.52
All Substrate	2.95	1.66	3.74	1.42	13.84	29.36
All Ascidians	1.59	3.04	3.62	1.39	13.41	42.77
All Sponges	5.12	6.00	3.34	1.35	12.36	55.13
Biological Matrix	5.75	4.76	2.98	1.45	11.05	66.19
All Echinodermata	1.51	0.09	2.96	1.59	10.97	77.16

Groups
SW Mokohinau Islands Drop 15 & South Mokohinau Islands Drop 17
Average dissimilarity = 28.99

	SW Mokohinau Islands Drop 15	South Mokohinau Islands Drop 17				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
All Macroalgae	4.99	2.48	5.27	2.62	18.17	18.17
All Sponges	3.61	6.00	5.03	1.89	17.35	35.52
All Substrate	4.01	1.66	4.98	1.64	17.19	52.71
Biological Matrix	3.42	4.76	3.09	1.22	10.65	63.36
All Ascidians	1.68	3.04	2.89	1.45	9.97	73.33

Groups
Cape Colville Drop 01 & Burgess Island Drop 19
Average dissimilarity = 27.27

	Cape Colville Drop 01	Burgess Island Drop 19				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
All Bryozoans	0.20	2.36	5.24	2.07	19.21	19.21
All Substrate	5.81	3.83	4.89	1.38	17.93	37.14
All Ascidians	0.44	2.11	4.09	2.16	14.98	52.12
Biological Matrix	4.48	5.41	3.47	1.34	12.71	64.83
All Cnidaria	0.88	1.85	3.25	1.52	11.93	76.76

Groups
South Ohinau Island Drop 02 & Burgess Island Drop 19
Average dissimilarity = 41.21

	South Ohinau Island Drop 02	Burgess Island Drop 19				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
Crustose Coralline Algae	5.72	0.09	12.90	6.36	31.31	31.31
All Bryozoans	0.10	2.36	5.14	2.27	12.47	43.78
All Sponges	4.26	6.09	4.55	1.83	11.05	54.83
All Substrate	3.84	3.83	4.31	1.50	10.46	65.28
All Ascidians	0.29	2.11	4.25	2.49	10.32	75.61

Groups
South Aldermen Islands Drop 03 & Burgess Island Drop 19
Average dissimilarity = 36.91

	South Aldermen Islands Drop 03	Burgess Island Drop 19				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
Crustose Coralline Algae	3.67	0.09	7.82	2.55	21.20	21.20
All Bryozoans	1.23	2.36	4.38	1.63	11.86	33.06
All Ascidians	0.19	2.11	4.16	2.94	11.26	44.32
All Sponges	4.30	6.09	4.03	1.85	10.91	55.23
All Cnidaria	2.33	1.85	3.98	1.72	10.78	66.01
All Substrate	4.26	3.83	3.92	1.47	10.63	76.64

Groups
South Aldermen Islands Drop 06 & Burgess Island Drop 19
Average dissimilarity = 25.42

	South Aldermen Islands Drop 06	Burgess Island Drop 19				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
Biological Matrix	7.79	5.41	5.69	2.16	22.38	22.38
All Substrate	2.39	3.83	4.28	1.47	16.84	39.22
All Ascidians	0.67	2.11	3.61	1.94	14.19	53.41
All Sponges	4.78	6.09	3.42	1.64	13.45	66.86
All Bryozoans	1.62	2.36	2.55	1.37	10.05	76.91

Groups
South Aldermen Islands Drop 07 & Burgess Island Drop 19
Average dissimilarity = 22.99

	South Aldermen Islands Drop 07	Burgess Island Drop 19				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
All Substrate	4.33	3.83	3.43	1.30	14.91	14.91
Crustose Coralline Algae	1.34	0.09	2.80	1.71	12.17	27.08
All Bryozoans	2.08	2.36	2.63	1.36	11.44	38.53
All Cnidaria	4.51	1.85	2.60	1.39	11.33	49.85
Biological Matrix	5.70	5.41	2.46	1.35	10.71	60.57
All Ascidians	1.15	2.11	2.42	1.31	10.52	71.09

Groups
Cradock Channel Drop 13 & Burgess Island Drop 19
Average dissimilarity = 28.52

	Cradock Channel Drop 13	Burgess Island Drop 19				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
All Macroalgae	2.86	0.68	4.62	2.24	16.21	16.21
Crustose Coralline Algae	1.85	0.09	3.78	2.21	13.25	29.46
All Sponges	5.12	6.09	3.45	1.33	12.09	41.55
All Substrate	2.95	3.83	3.40	1.28	11.91	53.46
All Bryozoans	1.32	2.36	3.08	1.40	10.82	64.27
All Ascidians	1.59	2.11	2.89	1.56	10.12	74.39
Groups SW Mokohinau Islands Drop 15 & Burgess Island Drop 19 Average dissimilarity = 43.32						
	SW Mokohinau Islands Drop 15	Burgess Island Drop 19				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
Crustose Coralline Algae	5.14	0.09	10.86	9.23	25.06	25.06
All Macroalgae	4.99	0.68	9.32	4.85	21.50	46.56
All Sponges	3.61	6.09	5.35	1.97	12.35	58.92
All Bryozoans	0.19	2.36	4.64	2.12	10.71	69.62
Biological Matrix	3.42	5.41	4.34	1.49	10.01	79.63
Groups South Mokohinau Islands Drop 17 & Burgess Island Drop 19 Average dissimilarity = 29.59						
	South Mokohinau Islands Drop 17	Burgess Island Drop 19				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
Crustose Coralline Algae	3.90	0.09	8.04	4.98	27.17	27.17
All Substrate	1.66	3.83	4.89	1.72	16.52	43.69
All Macroalgae	2.48	0.68	3.87	1.98	13.08	56.77
All Bryozoans	1.19	2.36	2.98	1.42	10.06	66.83
Biological Matrix	4.76	5.41	2.37	1.40	8.02	74.86
Groups Cape Colville Drop 01 & Burgess Island Drop 21 Average dissimilarity = 48.36						
	Cape Colville Drop 01	Burgess Island Drop 21				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
All Macroalgae	0.00	5.95	14.18	7.62	29.32	29.32
All Bryozoans	0.20	3.23	7.19	3.00	14.88	44.19
Crustose Coralline Algae	0.00	2.88	6.87	4.43	14.21	58.41
All Sponges	6.28	3.98	5.99	1.68	12.38	70.79

Groups
South Ohinau Island Drop 02 & Burgess Island Drop 21
Average dissimilarity = 38.14

	South Ohinau Island Drop 02	Burgess Island Drop 21				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
All Macroalgae	1.26	5.95	10.53	4.01	27.62	27.62
All Bryozoans	0.10	3.23	6.99	3.31	18.32	45.94
Crustose Coralline Algae	5.72	2.88	6.36	2.86	16.68	62.62
Biological Matrix	4.81	3.46	4.14	1.33	10.84	73.47

Groups
South Aldermen Islands Drop 03 & Burgess Island Drop 21
Average dissimilarity = 33.41

	South Aldermen Islands Drop 03	Burgess Island Drop 21				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
All Macroalgae	2.27	5.95	7.86	2.82	23.54	23.54
All Bryozoans	1.23	3.23	5.52	2.07	16.53	40.06
All Cnidaria	2.33	0.13	4.69	1.20	14.05	54.11
Biological Matrix	4.58	3.46	3.91	1.39	11.70	65.82
All Substrate	4.26	3.41	3.75	1.48	11.23	77.04

Groups
South Aldermen Islands Drop 06 & Burgess Island Drop 21
Average dissimilarity = 45.38

	South Aldermen Islands Drop 06	Burgess Island Drop 21				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
All Macroalgae	0.41	5.95	12.78	5.90	28.17	28.17
Biological Matrix	7.79	3.46	9.99	2.68	22.01	50.18
Crustose Coralline Algae	0.00	2.88	6.65	4.47	14.64	64.83
All Bryozoans	1.62	3.23	3.74	1.54	8.24	73.07

Groups
South Aldermen Islands Drop 07 & Burgess Island Drop 21
Average dissimilarity = 38.49

	South Aldermen Islands Drop 07	Burgess Island Drop 21				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
All Macroalgae	0.28	5.95	12.19	5.58	31.67	31.67
Biological Matrix	5.70	3.46	5.09	1.49	13.24	44.91
All Sponges	5.43	3.98	3.45	1.38	8.96	53.87
Crustose Coralline Algae	1.34	2.88	3.40	1.69	8.84	62.71
All Substrate	4.33	3.41	3.23	1.31	8.38	71.10

Groups
Cradock Channel Drop 13 & Burgess Island Drop 21
Average dissimilarity = 33.20

	Cradock Channel Drop 13	Burgess Island Drop 21				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
All Macroalgae	2.86	5.95	6.44	2.93	19.40	19.40
Biological Matrix	5.75	3.46	5.08	1.51	15.30	34.70
All Bryozoans	1.32	3.23	4.14	1.49	12.47	47.17
All Sponges	5.12	3.98	3.96	1.46	11.94	59.11
All Ascidians	1.59	0.41	3.08	1.28	9.27	68.38
All Substrate	2.95	3.41	2.76	1.32	8.32	76.70

Groups
SW Mokohinau Islands Drop 15 & Burgess Island Drop 21
Average dissimilarity = 25.87

	SW Mokohinau Islands Drop 15	Burgess Island Drop 21				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
All Bryozoans	0.19	3.23	6.39	3.11	24.69	24.69
Crustose Coralline Algae	5.14	2.88	4.74	2.94	18.34	43.03
Biological Matrix	3.42	3.46	2.91	1.34	11.23	54.26
All Ascidians	1.68	0.41	2.88	1.77	11.12	65.38
All Sponges	3.61	3.98	2.61	1.39	10.09	75.46

Groups
South Mokohinau Islands Drop 17 & Burgess Island Drop 21
Average dissimilarity = 34.13

	South Mokohinau Islands Drop 17	Burgess Island Drop 21				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
All Macroalgae	2.48	5.95	7.21	3.28	21.12	21.12
All Ascidians	3.04	0.41	5.47	3.28	16.02	37.14
All Bryozoans	6.00	3.98	4.27	1.69	12.50	49.64
All Sponges	1.19	3.23	4.25	1.66	12.44	62.09
All Substrate	1.66	3.41	3.72	1.49	10.90	72.99

Groups
Burgess Island Drop 19 & Burgess Island Drop 21
Average dissimilarity = 40.26

	Burgess Island Drop 19	Burgess Island Drop 21				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
All Macroalgae	0.68	5.95	11.29	5.28	28.05	28.05
Crustose Coralline Algae	0.09	2.88	5.98	3.92	14.84	42.90
All Sponges	6.09	3.98	4.52	1.72	11.23	54.12
Biological Matrix	5.41	3.46	4.51	1.44	11.20	65.32
All Cnidaria	1.85	0.13	3.67	2.22	9.11	74.43

Groups
Cape Colville Drop 01 & West Atihau Island Drop 24
Average dissimilarity = 51.46

	Cape Colville Drop 01	West Atihau Island Drop 24				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
All Macroalgae	0.00	5.41	12.69	5.19	24.65	24.65
All Substrate	5.81	2.17	8.58	2.48	16.67	41.33
All Sponges	6.28	3.38	7.15	1.88	13.89	55.21
All Bryozoans	0.20	3.08	6.76	2.10	13.14	68.35
Crustose Coralline Algae	0.00	2.05	4.77	2.20	9.27	77.62

Groups
South Ohinau Island Drop 02 & West Atihau Island Drop 24
Average dissimilarity = 42.87

	South Ohinau Islands Drop 02	West Atihau Island Drop 24				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
All Macroalgae	1.26	5.41	9.19	3.11	21.43	21.43
Crustose Coralline Algae	5.72	2.05	8.11	2.89	18.91	40.35
All Bryozoans	0.10	3.08	6.58	2.23	15.34	55.69
All Substrate	3.84	2.17	4.92	1.34	11.48	67.16
All Sponges	4.26	3.38	3.24	1.28	7.56	74.72

Groups
South Aldermen Islands Drop 03 & West Atihau Island Drop 24
Average dissimilarity = 36.06

	South Aldermen Island Drop 03	West Atihau Island Drop 24				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
All Macroalgae	2.27	5.41	6.65	2.24	18.45	18.45
All Bryozoans	1.23	3.08	5.31	1.70	14.71	33.16
All Substrate	4.26	2.17	5.16	1.38	14.31	47.47
All Cnidaria	2.33	1.04	4.30	1.31	11.91	59.38
Crustose Coralline Algae	3.67	2.05	3.97	1.41	11.01	70.38

Groups
South Aldermen Islands Drop 06 & West Atihau Island Drop 24
Average dissimilarity = 39.89

	South Aldermen Islands Drop 06	West Atihau Island Drop 24				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
All Macroalgae	0.41	5.41	11.36	4.33	28.49	28.49
Biological Matrix	7.79	5.18	5.96	1.85	14.93	43.42
Crustose Coralline Algae	0.00	2.05	4.61	2.21	11.56	54.98
All Sponges	4.78	3.38	3.92	1.78	9.83	64.81
All Bryozoans	1.62	3.08	3.69	1.32	9.25	74.07

Groups
South Aldermen Islands Drop 07 & West Atihau Island Drop 24
Average dissimilarity = 38.11

	South Aldermen Islands Drop 07	West Atihau Island Drop 24				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
All Macroalgae	0.28	5.41	10.87	4.23	28.53	28.53
All Substrate	4.33	2.17	4.98	1.46	13.07	41.60
All Sponges	5.43	3.38	4.76	2.05	12.50	54.10
All Bryozoans	2.08	3.08	3.16	1.14	8.30	62.40
All Cnidaria	1.51	1.04	2.94	1.28	7.71	70.10

Groups
Cradock Channel Drop 13 & West Atihau Island Drop 24
Average dissimilarity = 29.71

	Cradock Channel Drop 13	West Atihau Island Drop 24				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
All Macroalgae	2.86	5.41	5.28	2.16	17.78	17.78
All Sponges	5.12	3.38	4.63	1.51	15.60	33.38
All Bryozoans	1.32	3.08	4.06	1.35	13.68	47.06
All Substrate	2.95	2.17	3.39	1.48	11.39	58.45
Biological Matrix	5.75	5.18	2.89	1.23	9.73	68.19
All Ascidians	1.59	1.05	2.80	1.59	9.43	77.62

Groups
SW Mokohinau Islands Drop 15 & West Atihau Island Drop 24
Average dissimilarity = 32.16

	SW Mokohinau Islands Drop 15	West Atihau Island Drop 24				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
Crustose Coralline Algae	5.14	2.05	6.42	2.85	19.95	19.95
All Bryozoans	0.19	3.08	6.01	2.13	18.68	38.63
Biological Matrix	3.42	5.18	4.32	1.80	13.44	52.06
All Substrate	4.01	2.17	4.14	1.46	12.88	64.94
All Sponges	3.61	3.38	2.64	1.35	8.21	73.15

Groups
South Mokohinau Islands Drop 17 & West Atihau Island Drop 24
Average dissimilarity = 33.94

	South Mokohinau Islands Drop 17	West Atihau Island Drop 24				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
All Macroalgae	2.48	5.41	6.02	2.41	17.74	17.74
All Sponges	6.00	3.38	5.55	2.35	16.35	34.09
All Bryozoans	1.19	3.08	1.09	1.40	12.04	46.13
All Ascidians	3.04	1.05	4.07	2.25	12.01	58.14
Crustose Coralline Algae	3.90	2.05	3.86	1.67	11.38	69.52
All Echinodermata	0.09	1.35	2.65	1.40	7.80	77.32

Groups
Burgess Island Drop 19 & West Atihau Island Drop 24
Average dissimilarity = 37.35

	Burgess Island Drop 19	West Atihau Island Drop 24				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
All Macroalgae	0.68	5.41	9.99	3.96	26.76	26.76

All Sponges	6.09	3.38	5.89	2.48	15.76	42.52
Crustose Coralline Algae	0.09	2.05	4.14	2.11	11.08	53.60
All Substrate	3.83	2.17	4.12	1.59	11.04	64.63
All Bryozoans	2.36	3.08	2.94	1.25	7.88	72.51

Groups
Burgess Island Drop 21 & West Atihau Island Drop 24
Average dissimilarity = 23.49

	Burgess Island Drop 21	West Atihau Island Drop 24				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
Biological Matrix	3.46	5.18	4.36	1.52	18.58	18.58
All Substrate	3.41	2.17	3.13	1.50	13.30	31.88
All Sponges	3.98	3.38	2.88	1.54	12.25	44.13
All Bryozoans	3.23	3.08	2.51	1.17	10.67	54.79
All Echinodermata	0.40	1.35	2.48	1.35	10.54	65.33
Crustose Coralline Algae	2.88	2.05	2.33	1.30	9.92	75.25

Groups
Cape Colville Drop 01 & SE Channel Island Drop 25
Average dissimilarity = 22.45

	Cape Colville Drop 01	SE Channel Island Drop 25				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
Biological Matrix	4.48	3.04	5.74	1.30	25.55	25.55
All Substrate	5.81	7.21	4.73	1.50	21.06	46.60
All Sponges	6.28	5.51	4.16	1.51	18.54	65.14
All Bryozoans	0.20	1.05	2.72	1.18	12.10	77.24

Groups
South Ohinau Island Drop 02 & SE Channel Island Drop 25
Average dissimilarity = 43.92

	South Ohinau Island Drop 02	SE Channel Island Drop 25				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
Crustose Coralline Algae	5.72	0.00	14.79	6.35	33.67	33.67
All Substrate	3.84	7.21	9.12	1.62	20.75	54.43
Biological Matrix	4.81	3.04	5.92	1.27	13.48	67.90
All Sponges	4.26	5.51	4.09	1.54	9.31	77.22

Groups
South Aldermen Islands Drop 03 & SE Channel Island Drop 25
Average dissimilarity = 42.72

	South Aldermen Island Drop 03	SE Channel Island Drop 25				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
Crustose Coralline Algae	3.67	0.00	9.00	2.62	21.06	21.06
All Substrate	4.26	7.21	7.38	1.61	17.28	38.34
All Macroalgae	2.27	0.00	5.43	2.32	12.70	51.05
Biological Matrix	4.58	3.04	5.40	1.32	12.64	63.69
All Cnidaria	2.33	0.41	5.15	1.23	12.07	75.75

Groups
South Aldermen Islands Drop 06 & SE Channel Island Drop 25
Average dissimilarity = 40.20

	South Aldermen Islands Drop 06	SE Channel Island Drop 25				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
All Substrate	2.39	7.21	12.98	2.76	32.30	32.30
Biological Matrix	7.79	3.04	12.95	2.23	32.21	64.50
All Cnidaria	1.34	0.41	3.17	1.35	7.87	72.38

Groups
South Aldermen Islands Drop 07 & SE Channel Island Drop 25
Average dissimilarity = 32.36

	South Aldermen Islands Drop 07	SE Channel Island Drop 25				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
All Substrate	4.33	7.21	7.46	1.64	23.05	23.05
Biological Matrix	5.70	3.04	7.01	1.37	21.66	44.71
All Bryozoans	2.08	1.05	3.54	1.41	10.95	55.66
All Cnidaria	1.51	0.41	3.34	1.23	10.31	65.97
Crustose Coralline Algae	1.34	0.00	3.27	1.76	10.12	76.08

Groups
Cradock Channel Drop 13 & SE Channel Island Drop 25
Average dissimilarity = 44.82

	Cradock Channel Drop 13	SE Channel Island Drop 25				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
All Substrate	2.95	7.21	10.12	2.31	22.59	22.59
Biological Matrix	5.75	3.04	6.94	1.43	15.47	38.07
All Macroalgae	2.86	0.00	6.76	3.69	15.08	53.15
Crustose Coralline Algae	1.85	0.00	4.39	2.31	9.80	62.95
All Sponges	5.12	5.51	3.69	1.42	8.24	71.19

Groups
SW Mokohinau Islands Drop 15 & SE Channel Island Drop 25
Average dissimilarity = 48.75

	SW Mokohinau Islands Drop 15	SE Channel Island Drop 25				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
Crustose Coralline Algae	5.14	0.00	12.37	9.75	25.37	25.37
All Macroalgae	4.99	0.00	12.05	7.26	24.71	50.08
All Substrate	4.01	7.21	7.86	2.14	16.11	66.19
All Sponges	3.61	5.51	4.69	1.52	9.63	75.82

Groups
South Mokohinau Islands Drop 17 & SE Channel Island Drop 25
Average dissimilarity = 47.24

	South Mokohinau Islands Drop 17	SE Channel Island Drop 25				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
All Substrate	1.66	7.21	13.28	3.29	28.10	28.10
Crustose Coralline Algae	3.90	0.00	9.19	5.37	19.46	47.57
All Macroalgae	2.48	0.00	5.86	3.22	12.40	59.97
All Ascidians	3.04	0.63	5.79	2.41	12.25	72.22

Groups
Burgess Island Drop 19 & SE Channel Island Drop 25
Average dissimilarity = 31.91

	Burgess Island Drop 19	SE Channel Island Drop 25				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
All Substrate	3.83	7.21	8.40	2.05	26.31	26.31
Biological Matrix	5.41	3.04	6.27	1.31	19.66	45.97
All Ascidians	2.11	0.63	3.81	1.84	11.95	57.92
All Bryozoans	2.36	1.05	3.80	1.41	11.90	69.82
All Cnidaria	1.85	0.41	3.69	1.74	11.56	81.37

Groups
Burgess Island Drop 21 & SE Channel Island Drop 25
Average dissimilarity = 48.04

	Burgess Island Drop 21	SE Channel Island Drop 25				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
All Macroalgae	5.95	0.00	14.24	7.16	29.64	29.64
All Substrate	3.41	7.21	9.17	2.77	19.09	48.72
Crustose Coralline Algae	2.88	0.00	6.90	4.33	14.37	63.09
All Bryozoans	3.23	1.05	5.27	1.65	10.98	74.07

Groups
West Atihau Island Drop 24 & SE Channel Island Drop 25
Average dissimilarity = 54.10

	West Atihau Island Drop 24	SE Channel Island Drop 25				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
All Macroalgae	5.41	0.00	12.74	5.04	23.55	23.55
All Substrate	2.17	7.21	12.00	2.93	22.18	45.73
Biological Matrix	5.18	3.04	5.90	1.33	10.91	56.64
All Sponges	3.38	5.51	5.45	2.17	10.07	66.71
All Bryozoans	3.08	1.05	5.09	1.44	9.40	76.11

Groups
Cape Colville Drop 01 & SE Channel Island Drop 28
Average dissimilarity = 21.89

	Cape Colville Drop 01	SE Channel Island Drop 28				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
Biological Matrix	4.48	1.96	8.35	1.54	38.13	38.13
All Sponges	6.28	7.54	4.36	1.23	19.92	58.05
All Substrate	5.81	5.72	3.58	1.49	16.36	74.42

Groups
South Ohinau Island Drop 02 & SE Channel Island Drop 28
Average dissimilarity = 47.14

	South Ohinau Island Drop 02	SE Channel Island Drop 28				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
Crustose Coralline Algae	5.72	0.00	15.56	6.60	33.00	33.00
All Sponges	4.26	7.54	8.93	2.53	18.95	51.95
Biological Matrix	4.81	1.96	8.55	1.53	18.14	70.09

Groups
South Aldermen Islands Drop 03 & SE Channel Island Drop 28
Average dissimilarity = 47.51

	South Aldermen Islands Drop 03	SE Channel Island Drop 28				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
Crustose Coralline Algae	3.67	0.00	9.44	2.36	19.87	19.87
All Sponges	4.30	7.54	8.21	2.90	17.27	37.14
Biological Matrix	4.58	1.96	7.62	1.55	16.05	53.19
All Macroalgae	2.27	0.00	5.69	2.34	11.98	65.17
All Cnidaria	2.33	0.48	5.38	1.24	11.32	76.49

Groups
South Aldermen Islands Drop 06 & SE Channel Island Drop 28
Average dissimilarity = 47.23

	South Aldermen Islands Drop 06	SE Channel Island Drop 28				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
Biological Matrix	7.79	1.96	16.59	2.59	35.12	35.12
All Substrate	2.39	5.72	9.46	1.95	20.02	55.14
All Sponges	4.78	7.54	7.78	2.59	16.47	71.61

Groups
South Aldermen Islands Drop 07 & SE Channel Island Drop 28
Average dissimilarity = 38.57

	South Aldermen Islands Drop 07	SE Channel Island Drop 28				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
Biological Matrix	5.70	1.96	10.00	1.74	25.93	25.93
All Sponges	5.43	7.54	5.43	2.14	14.08	40.00
All Bryozoans	2.08	0.00	5.28	1.96	13.70	53.70
All Substrate	4.33	5.72	5.07	1.35	13.15	66.85
All Cnidaria	1.51	0.48	3.49	1.22	9.05	75.90

Groups
Cradock Channel Drop 13 & SE Channel Island Drop 28
Average dissimilarity = 48.85

	Cradock Channel Drop 13	SE Channel Island Drop 28				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
Biological Matrix	5.75	1.96	9.73	1.78	19.92	19.92
All Substrate	2.95	5.72	7.08	1.65	14.50	34.42
All Macroalgae	2.86	0.00	7.08	3.73	14.49	48.91
All Sponges	5.12	7.54	6.14	1.49	12.57	61.47
Crustose Coralline Algae	1.85	0.00	4.60	2.32	9.42	70.89

Groups
SW Mokohinau Islands Drop 15 & SE Channel Island Drop 28
Average dissimilarity = 53.31

	SW Mokohinau Islands Drop 15	SE Channel Island Drop 28				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
Crustose Coralline Algae	5.14	0.00	12.96	10.73	24.32	24.32
All Macroalgae	4.99	0.00	12.63	7.61	23.69	48.01
All Sponges	3.61	7.54	9.94	3.14	18.65	66.66
Biological Matrix	3.42	1.96	5.60	1.52	10.50	77.16

Groups South Mokohinau Islands Drop 17 & SE Channel Island Drop 28 Average dissimilarity = 51.12						
	South Mokohinau Islands Drop 17	SE Channel Island Drop 28				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
All Substrate	1.66	5.72	10.17	2.47	19.90	19.90
Crustose Coralline Algae	3.90	0.00	9.63	5.53	18.83	38.73
Biological Matrix	4.76	1.96	7.55	1.57	14.77	53.50
All Ascidians	3.04	0.13	7.20	3.88	14.09	67.59
All Macroalgae	2.48	0.00	6.14	3.25	12.00	79.59
Groups Burgess Island Drop 19 & SE Channel Island Drop 28 Average dissimilarity = 37.24						
	Burgess Island Drop 19	SE Channel Island Drop 28				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
Biological Matrix	5.14	1.96	9.22	1.71	24.75	24.75
All Bryozoans	2.36	0.00	6.01	2.48	16.14	40.89
All Substrate	3.83	5.72	5.44	1.49	14.60	55.49
All Ascidians	2.11	0.13	5.07	2.99	13.62	69.12
All Cnidaria	1.85	0.48	3.85	1.77	10.33	79.45
Groups Burgess Island Drop 21 & SE Channel Island Drop 28 Average dissimilarity = 55.15						
	Burgess Island Drop 21	SE Channel Island Drop 28				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
All Macroalgae	5.95	0.00	14.92	7.49	27.05	27.05
All Sponges	3.98	7.54	8.93	2.94	16.19	43.25
All Bryozoans	3.23	0.00	8.06	3.59	14.61	57.86
Crustose Coralline Algae	2.88	0.00	7.23	4.41	13.12	70.97
Groups West Atihau Island Drop 24 & SE Channel Island Drop 28 Average dissimilarity = 62.57						
	West Atihau Island Drop 24	SE Channel Island Drop 28				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
All Macroalgae	5.41	0.00	13.34	5.13	21.32	21.32
All Sponges	3.38	7.54	10.21	3.16	16.32	37.64
All Substrate	2.17	5.72	8.88	2.14	14.19	51.83
Biological Matrix	5.18	1.96	8.53	1.69	13.64	65.47
All Bryozoans	3.08	0.00	7.58	2.35	12.11	77.58

Groups
SE Channel Island Drop 25 & SE Channel Island Drop 28
Average dissimilarity = 25.78

	SE Channel Island Drop 25	SE Channel Island Drop 28				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
Biological Matrix	3.04	1.96	6.69	1.47	25.94	25.94
All Sponges	5.51	7.54	6.01	2.08	23.31	49.25
All Substrate	7.21	5.72	5.20	1.38	20.17	69.42
All Bryozoans	1.05	0.00	2.97	1.13	11.53	80.95

Appendix O

SIMPER results comparing the abundances of the 93 benthic groups.

SIMPER
Similarity Percentages - species contributions
One-Way Analysis

Data type: Abundance
Sample selection: All
Variable selection: All

Parameters
Resemblance: S17 Bray-Curtis similarity
Cut off for low contributions: 70.00%

Groups
Cape Colville Drop 01 & South Ohinau Island Drop 02
Average dissimilarity = 64.61

	Cape Colville Drop 01	South Ohinau Island Drop 02				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
Crustose Coralline Algae	0.00	5.72	11.48	5.86	17.76	17.76
Ecionemia alata	3.55	0.10	6.91	1.89	10.70	28.47
Sediment	5.81	3.84	4.93	1.48	7.64	36.10
Stelletta conulosa	1.36	1.08	3.55	0.94	5.49	41.59
White Plate Sponge	1.58	0.00	3.17	0.86	4.90	46.49
Bright Orange Encrusting Sponge	0.00	1.59	3.11	1.19	4.81	51.30
Unknown Orange Encrusting Sponge	1.00	1.10	2.89	1.06	4.48	55.78
Biological Matrix	4.48	4.81	2.83	1.38	4.39	60.16
Dark Red Encrusting Sponge	1.18	0.10	2.28	1.19	3.53	63.69
Green/Brown Algae	0.00	0.99	1.98	1.06	3.07	66.76
Branching Hydroid	0.84	0.42	1.98	0.92	3.06	69.82
Xestospongia sp.	0.14	0.95	1.89	0.98	2.92	72.74

Groups
Cape Colville Drop 01 & South Aldermen Islands Drop 03
Average dissimilarity = 60.77

	Cape Colville Drop 01	South Aldermen Islands Drop 03				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
Crustose Coralline Algae	0.00	3.67	6.70	2.63	11.03	11.03
Ecionemia alata	3.55	1.04	5.07	1.55	8.34	19.37
Sediment	5.81	4.26	3.69	1.35	6.07	25.44
Branching Hydroid	0.84	2.27	3.65	1.30	6.00	31.45
Stelletta conulosa	1.36	1.46	3.17	1.34	5.22	36.66
Red Algae	0.00	1.68	3.00	1.93	4.93	41.60
White Plate Sponge	1.58	0.00	2.86	0.86	4.71	46.31
Biological Matrix	4.48	4.58	2.73	1.37	4.49	50.79
Green/Brown Algae	0.00	1.44	2.58	2.35	4.25	55.04
Unknown Orange Encrusting Sponge	1.00	0.72	2.36	0.99	3.88	58.92
Dark Red Encrusting Sponge	1.18	1.10	2.28	1.36	3.75	62.67
Other Branching Bryozoan	0.20	1.10	2.03	0.63	3.33	66.00
Bright Orange Encrusting Sponge	0.00	0.80	1.41	0.90	2.31	68.31
Stelletta crater	0.66	0.00	1.19	0.76	1.96	70.27

Groups
South Ohinau Island Drop 02 & South Aldermen Islands Drop 03
Average dissimilarity = 49.42

	South Ohinau Island Drop 02	South Aldermen Islands Drop 03				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
Sediment	3.84	4.26	4.05	1.42	8.20	8.20
Branching Hydroid	0.42	2.27	3.99	1.23	8.07	16.27
Crustose Coralline Algae	5.72	3.67	3.93	1.59	7.95	24.22
Stelletta conulosa	1.08	1.46	3.19	1.35	6.46	30.68
Biological Matrix	4.81	4.58	2.91	1.39	5.89	36.57
Unknown Orange Encrusting Sponge	1.10	0.72	2.64	0.82	5.34	41.91
Bright Orange Encrusting Sponge	1.59	0.80	2.58	1.27	5.22	47.13
Red Algae	0.42	1.68	2.49	1.53	5.03	52.17
Other Branching Bryozoan	0.10	1.10	2.03	0.60	4.10	56.27
Dark Red Encrusting Sponge	0.10	1.10	2.01	0.95	4.06	60.33
Ecionemia alata	0.10	1.04	1.90	0.91	3.85	64.18
Green/Brown Algae	0.99	1.44	1.86	1.52	3.77	67.95
Xestospongia sp.	0.95	0.56	1.85	1.12	3.74	71.69

Groups
Cape Colville Drop 01 & South Aldermen Islands Drop 06
Average dissimilarity = 69.87

	Cape Colville Drop 01	South Aldermen Islands Drop 06				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
Ecionemia alata	3.55	0.00	6.76	1.97	9.67	9.67
Sediment	5.81	2.39	6.55	2.19	9.38	19.05
Biological Matrix	4.48	7.79	6.36	2.29	9.11	28.16
Small White Arborescent Sponge	0.00	2.62	4.93	2.30	7.06	35.22
White Plate Sponge	1.58	0.00	3.01	0.86	4.30	39.52
Other Branching Bryozoan	0.20	1.62	2.69	2.04	3.86	43.38
Stelletta conulosa	1.36	0.00	2.59	0.73	3.71	47.09
Dark Red Encrusting Sponge	1.18	0.00	2.24	1.20	3.21	50..30
Branching Hydroid	0.84	1.16	2.10	1.33	3.00	53.30
Unknown Orange Encrusting Sponge	1.00	0.00	1.85	0.91	2.65	55.95
Other Tubular Sponge	0.00	0.97	1.84	1.38	2.64	58.58
Pale Orange Amorphous Sponge	0.00	0.94	1.80	1.07	2.58	61.16
White Encrusting Sponge	0.24	0.87	1.75	0.81	2.50	63.66
Pale Yellow Amorphous Sponge	0.00	0.83	1.57	1.08	2.25	65.91
Yellow Encrusting on White Sponge	0.00	0.78	1.49	1.18	2.13	68.04
White/Cream Amorphous Sponge	0.57	0.37	1.43	0.76	2.05	70.09

Groups
South Ohinau Island Drop 02 & South Aldermen Islands Drop 06
Average dissimilarity = 69.44

	South Ohinau Island Drop 02	South Aldermen Islands Drop 06				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
Crustose Coralline Algae	5.72	0.00	11.18	5.94	16.10	16.10
Biological Matrix	4.81	7.79	5.88	2.12	8.47	24.57
Small White Arborescent Sponge	0.00	2.62	5.06	2.30	7.29	31.85
Sediment	3.84	2.39	4.21	1.35	6.06	37.92
Bright Orange Encrusting Sponge	1.59	0.00	3.03	1.19	4.36	42.28
Other Branching Bryozoan	0.10	1.62	2.94	2.37	4.24	46.52
Branching Hydroid	0.42	1.16	2.39	1.33	3.44	49.96
Stelletta conulosa	1.08	0.00	2.18	0.62	3.14	53.10
Unknown Orange Encrusting Sponge	1.10	0.00	2.12	0.66	3.06	56.16
Other Tubular Sponge	0.00	0.97	1.89	1.38	2.72	58.88
Pale Orange Amorphous Sponge	0.00	0.94	1.85	1.07	2.66	61.54
White Encrusting Sponge	0.38	0.87	1.83	0.90	2.64	64.17
Xestospongia sp.	0.95	0.00	1.81	0.93	2.61	66.79
Green/Brown Algae	0.99	0.41	1.80	1.16	2.59	69.38
Suberites sp.	0.73	0.58	1.71	1.02	2.46	71.84

South Aldermen Islands Drop 03 & South Aldermen Islands Drop 06
Average dissimilarity = 67.06

	South Aldermen Islands Drop 03	South Aldermen Islands Drop 06				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
Crustose Coralline Algae	3.67	0.00	6.55	2.64	9.76	9.76
Biological Matrix	4.58	7.79	5.72	1.97	8.53	18.30
Biological Matrix	0.00	2.62	4.59	2.29	6.84	25.14
Small White Arborescent Sponge	4.26	2.39	4.11	1.39	6.14	31.27
Sediment	2.27	1.16	3.35	1.41	5.00	36.27
Branching Hydroid	1.68	0.00	2.93	1.93	4.37	40.64
Red Algae	1.10	1.62	2.90	1.36	4.32	44.96
Other Branching Bryozoan	1.46	0.00	2.61	1.25	3.89	48.86
Stelletta conulosa	1.44	0.41	1.97	1.67	2.94	51.80
Green/Brown Algae	1.10	0.00	1.91	0.90	2.85	54.65
Dark Red Encrusting Sponge	1.04	0.00	1.82	0.87	2.71	57.36
Ecionemia alata	0.00	0.94	1.67	1.07	2.49	59.85
Pale Orange Amorphous Sponge	0.13	0.87	1.59	0.76	2.37	62.22
White Encrusting Sponge	0.54	0.97	1.49	1.26	2.22	64.44
Pale Yellow Amorphous Sponge	0.00	0.83	1.46	1.08	2.18	66.62
Yellow Encrusting on White Sponge	0.00	0.78	1.38	1.18	2.06	68.68
Bright Orange Encrusting Sponge	0.80	0.00	1.37	0.90	2.05	70.73

Cape Colville Drop 01 & South Aldermen Islands Drop 07
Average dissimilarity = 62.63

	Cape Colville Drop 01	South Aldermen Islands Drop 07				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
Ecionemia alata	3.55	0.43	5.43	1.77	8.67	8.67
Sediment	5.81	4.33	3.24	1.43	5.18	13.84
Other Branching Bryozoan	0.20	1.91	2.95	1.59	4.71	18.55
Stelletta conulosa	1.36	0.78	2.72	0.89	4.34	22.89
Xestospongia sp.	0.14	1.74	2.71	2.22	4.33	27.22
Biological Matrix	4.48	5.70	2.70	1.35	4.32	31.54
White Plate Sponge	1.58	0.00	2.66	0.86	4.24	35.78
Crustose Coralline Algae	0.00	1.34	2.27	1.72	3.62	39.40
Unknown Orange Encrusting Sponge	1.00	1.23	2.11	1.23	3.37	42.77
Suberites sp.	0.00	1.18	2.04	1.02	3.26	46.03
Other Tubular Sponge	0.00	1.14	1.90	1.60	3.03	49.06
Fasciospongia turgida	0.00	1.15	1.89	1.02	3.01	52.07
Dark Red Encrusting Sponge	1.18	0.40	1.83	1.21	2.93	55.00
Branching Hydroid	0.84	0.77	1.68	1.12	2.69	57.69
Colonial Ascidian	0.44	1.15	1.65	1.33	2.63	60.32
Tethya sp.	0.14	1.02	1.62	1.35	2.59	62.91
Other Globular Sponge	0.00	0.97	1.62	1.39	2.58	65.49
Yellow Encrusting Sponge	0.37	1.01	1.61	1.22	2.57	68.06
Bright Orange Encrusting Sponge	0.00	0.93	1.54	1.11	2.45	70.52

Groups
South Ohinau Island Drop 02 & South Aldermen Islands Drop 07
Average dissimilarity = 58.82

	South Ohinau Island Drop 02	South Aldermen Islands Drop 07				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
Crustose Coralline Algae	5.72	1.34	7.52	3.89	12.79	12.79
Sediment	3.84	4.33	3.50	1.36	5.94	18.73

Other Branching Bryozoan	0.10	1.91	3.11	1.61	5.29	24.02
Unknown Orange Encrusting Sponge	1.10	1.23	2.63	1.15	4.47	28.49
Biological Matrix	4.81	5.70	2.60	1.43	4.42	32.91
Stelletta conulosa	1.08	0.78	2.53	0.82	4.30	37.21
Bright Orange Encrusting Sponge	1.59	0.93	2.34	1.35	3.98	41.19
Xestospongia sp.	0.95	1.74	2.10	1.54	3.58	44.77
Other Tubular Sponge	0.00	1.14	1.94	1.60	3.30	48.07
Fasciospongia turgida	0.00	1.15	1.93	1.02	3.28	51.34
Colonial Ascidian	0.17	1.15	1.91	1.34	3.25	54.60
Suberites sp.	0.73	1.18	1.91	1.08	3.25	57.84
Tethya sp.	0.00	1.02	1.73	1.43	2.95	60.79
Yellow Encrusting Sponge	0.19	1.01	1.69	1.24	2.87	63.67
Green/Brown Algae	0.99	0.28	1.68	1.13	2.85	66.54
Other Globular Sponge	0.00	0.97	1.65	1.39	2.81	69.33
Branching Hydroid	0.42	0.77	1.61	0.93	2.74	72.08

South Aldermen Islands Drop 03 & South Aldermen Islands Drop 07
Average dissimilarity = 57.76

	South Aldermen Islands Drop 03	South Aldermen Islands Drop 07				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
Crustose Coralline Algae	3.67	1.34	3.80	1.69	6.58	6.58
Branching Hydroid	2.27	0.77	3.16	1.29	5.47	12.05
Sediment	4.26	4.33	3.03	1.45	5.25	17.30
Other Branching Bryozoan	1.10	1.91	3.00	1.38	5.20	22.50
Biological Matrix	4.58	5.70	2.63	1.30	4.56	27.06
Red Algae	1.68	0.00	2.61	1.92	4.52	31.58
Stelletta conulosa	1.46	0.78	2.41	1.23	4.17	35.75
Unknown Orange Encrusting Sponge	0.72	1.23	2.28	1.11	3.94	39.69
Xestospongia sp.	0.56	1.74	2.11	1.66	3.65	43.34
Green/Brown Algae	1.44	0.28	1.97	1.85	3.41	46.75
Ecionemia alata	1.04	0.43	1.76	0.98	3.05	49.80
Dark Red Encrusting Sponge	1.10	0.40	1.76	1.06	3.04	52.84
Fasciospongia turgida	0.10	1.15	1.74	1.04	3.02	55.86
Colonial Ascidian	0.19	1.15	1.69	1.37	2.93	58.79
Suberites sp.	0.46	1.18	1.69	1.00	2.92	61.71
Tethya sp.	0.00	1.02	1.59	1.43	2.75	64.46
Yellow Encrusting Sponge	0.24	1.01	1.53	1.21	2.65	67.11
Bright Orange Encrusting Sponge	0.80	0.93	1.50	1.26	2.60	69.71
Other Tubular	0.54	1.14	1.47	1.37	2.54	72.25

Groups
South Aldermen Islands Drop 06 & South Aldermen Islands Drop 07
Average dissimilarity = 58.19

	South Aldermen Islands Drop 06	South Aldermen Islands Drop 07				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
Small White Arborescent Sponge	2.62	0.31	3.77	1.86	6.49	6.49
Sediment	2.39	4.33	3.60	1.32	6.19	12.68
Biological Matrix	7.79	5.70	3.52	1.87	6.05	18.73
Xestospongia sp.	0.00	1.74	2.85	2.64	4.90	23.63
Crustose Coralline Algae	0.00	1.34	2.22	1.72	3.81	27.44
Unknown Orange Encrusting Sponge	0.00	1.23	1.96	1.04	3.37	30.81
Suberites sp.	0.58	1.18	1.90	1.06	3.27	34.08
Other Branching Bryozoan	1.62	1.91	1.87	1.58	3.22	37.30
Fasciospongia turgida	0.30	1.15	1.79	1.05	3.08	40.38
Branching Hydroid	1.16	0.77	1.72	1.31	2.96	43.34

Yellow Encrusting Sponge	0.09	1.01	1.65	1.21	2.84	46.18
White Encrusting Sponge	0.87	0.53	1.63	0.95	2.80	48.98
Colonial Ascidian	0.51	1.15	1.63	1.33	2.80	51.79
Bright Orange Encrust. Sponge	0.00	0.93	1.50	1.11	2.58	54.37
Pale Orange Encrusting Sponge	0.94	0.20	1.50	1.12	2.58	56.95
Tethya sp.	0.45	1.02	1.44	1.38	2.47	59.42
Pale Yellow Amorphous Sponge	0.83	0.00	1.36	1.09	2.34	61.75
Other Globular Sponge	0.57	0.97	1.36	1.34	2.33	64.08
Other Tubular Sponge	0.97	1.14	1.32	1.31	2.27	66.35
Stelletta conulosa	0.00	0.78	1.28	0.54	2.19	68.54
Yellow Encrusting White Sponge	0.78	0.10	1.25	1.20	2.15	70.69

Groups
Cape Colville Drop 01 & Cradock Channel Drop 13
Average dissimilarity = 58.89

Species	Cape Colville Drop 01 Av. Abund	Cradock Channel Drop 13 Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
Sediment	5.81	2.86	5.33	1.67	9.06	9.06
Red Algae	0.00	2.17	3.92	4.15	6.65	15.71
Ecionemia alata	3.55	3.86	3.54	1.47	5.97	21.68
Crustose Coralline Algae	0.00	1.85	3.32	2.31	5.63	27.31
Biological Matrix	4.48	5.75	3.16	1.37	5.37	32.68
Green/Brown Algae	0.00	1.72	3.08	1.90	5.23	37.92
White Plate Sponge	1.58	0.00	2.86	0.86	4.86	42.77
Crinoid	0.00	1.51	2.70	1.62	4.59	47.36
Colonial Ascidian	0.44	1.59	2.69	1.25	4.57	51.93
Iophon sp.	0.23	1.41	2.57	0.84	4.36	56.29
Stelletta conulosa	1.36	0.25	2.55	0.81	4.33	60.62
Other Branching Bryozoan	0.20	1.32	2.23	1.27	3.79	64.41
Dark Red Encrusting Sponge	1.18	0.00	2.13	1.20	3.62	68.03
Geodia regina	0.14	1.23	2.13	1.07	3.61	71.64

Groups
South Ohinau Island Drop 02 & Cradock Channel Drop 13
Average dissimilarity = 61.02

Species	South Ohinau Island Drop 02 Av. Abund	Cradock Channel Drop 13 Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
Crustose Coralline Algae	5.72	1.85	7.22	3.02	11.83	11.83
Ecionemia alata	0.10	3.86	6.97	2.41	11.43	23.26
Sediment	3.84	2.86	3.92	1.40	6.43	29.69
Red Algae	0.42	2.17	3.24	2.33	5.31	34.99
Biological Matrix	4.81	5.75	3.00	1.37	4.92	39.92
Bright Orange Encrusting Sponge	1.59	0.00	2.88	1.19	4.72	44.64
Colonial Ascidian	0.17	1.59	2.85	1.12	4.67	49.31
Crinoid	0.00	1.51	2.77	1.67	4.54	53.85
Iophon sp.	0.00	1.41	2.53	0.78	4.15	58.00
Branching Hydroid	0.42	1.30	2.42	1.80	3.97	61.97
Other Branching Bryozoan	0.10	1.32	2.36	1.28	3.87	65.84
Green/Brown Algae	0.99	1.72	2.24	1.41	3.67	69.51
Stelletta conulosa	1.08	0.25	2.24	0.72	3.67	73.18

Groups
South Aldermen Islands Drop 03 & Cradock Channel Drop 13
Average dissimilarity = 52.23

	South Aldermen Islands Drop 03	Cradock Channel Drop 13				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
Ecionemia alata	1.04	3.86	4.94	1.61	9.45	9.45
Sediment	4.26	2.86	3.73	1.42	7.14	16.59
Crustose Coralline Algae	3.67	1.85	3.40	1.43	6.50	23.09
Branching Hydroid	2.27	1.30	3.08	1.53	5.89	28.99
Biological Matrix	4.58	5.75	3.04	1.32	5.81	34.80
Other Branching Bryozoan	1.10	1.32	2.68	1.09	5.12	39.93
Colonial Ascidian	0.19	1.59	2.59	1.16	4.95	44.88
Iophon sp.	0.33	1.41	2.40	0.88	4.59	49.47
Crinoid	0.29	1.51	2.32	1.51	4.43	53.91
Stelletta conulosa	1.46	0.25	2.31	1.20	4.43	58.33
Geodia regina	0.10	1.23	1.98	1.07	3.79	62.13
Dark Red Encrusting Sponge	1.10	0.00	1.82	0.90	3.49	65.62
Green/Brown Algae	1.44	1.72	1.58	1.41	3.02	68.64
Red Algae	1.68	2.17	1.55	1.33	2.98	71.62

Groups
South Aldermen Islands Drop 06 & Cradock Channel Drop 13
Average dissimilarity = 62.81

	South Aldermen Islands Drop 06	Cradock Channel Drop 13				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
Ecionemia alata	0.00	3.86	6.83	2.53	10.87	10.87
Small White Arborescent Sponge	2.62	0.00	4.59	2.29	7.30	18.17
Red Algae	0.00	2.17	3.83	4.17	6.09	24.26
Biological Matrix	7.79	5.75	3.75	1.65	5.98	30.24
Crustose Coralline Algae	0.00	1.85	3.24	2.31	5.16	35.40
Sediment	2.39	2.86	2.84	1.45	4.53	39.92
Colonial Ascidian	0.51	1.59	2.61	1.25	4.16	44.08
Green/Brown Algae	0.41	1.72	2.59	1.87	4.13	48.21
Iophon sp.	0.00	1.41	2.42	0.78	3.85	52.07
Crinoid	0.60	1.51	2.18	1.48	3.47	55.53
Geodia regina	0.00	1.23	2.10	1.04	3.34	58.87
Other Branching Bryozoan	1.62	1.32	1.79	1.50	2.85	61.73
Pale Orange Amorphous Sponge	0.94	0.00	1.67	1.07	2.66	64.39
Other Tubular Sponge	0.97	0.09	1.65	1.36	2.63	67.01
Branching Hydroid	1.16	1.30	1.57	1.38	2.50	69.51
White Encrusting Sponge	0.87	0.00	1.53	0.70	2.43	71.94

Groups
South Aldermen Islands Drop 07 & Cradock Channel Drop 13
Average dissimilarity = 61.68

	South Aldermen Islands Drop 07	Cradock Channel Drop 13				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
Ecionemia alata	0.43	3.86	5.43	2.01	8.81	8.81
Red Algae	0.00	2.17	3.41	4.14	5.52	14.34
Sediment	4.33	2.86	3.19	1.28	5.17	19.50
Xestospongia sp.	1.74	0.00	2.73	2.63	4.43	23.93
Green/ Brown Algae	0.28	1.72	2.42	1.72	3.93	27.85
Crinoid	0.00	1.51	2.35	1.61	3.82	31.67
Iophon sp.	0.28	1.41	2.27	0.84	3.68	35.35
Colonial Ascidian	1.15	1.59	2.19	1.43	3.55	38.90
Other Branching Bryozoan	1.91	1.32	2.14	1.42	3.47	42.37
Biological Matrix	5.70	5.75	2.02	1.38	3.28	45.66
Geodia regina	0.25	1.23	1.92	1.08	3.12	48.77
Suberites sp.	1.18	0.00	1.91	1.02	3.09	51.87
Unknown Orange Encrusting Sponge	1.23	0.17	1.86	1.06	3.02	54.89
Fasciospongia turgida	1.15	0.00	1.77	1.02	2.87	57.76
Other Tubular Sponge	1.14	0.09	1.69	1.52	2.74	60.50
Branching Hydroid	0.77	1.30	1.60	1.48	2.60	63.10
Tethya sp.	1.02	0.00	1.59	1.43	2.58	65.68
Yellow Encrusting Sponge	1.01	0.19	1.55	1.24	2.51	68.19
Crustose Coralline Algae	1.34	1.85	1.53	1.36	2.49	70.67

Groups
Cape Colville Drop 01 & SW Mokohinau Islands Drop 15
Average dissimilarity = 69.55

	Cape Colville Drop 01	SW Mokohinau Islands Drop 15

Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
Crustose Coralline Algae	0.00	5.14	9.42	11.01	13.55	13.55
Green/Brown Algae	0.00	4.25	7.81	8.06	11.22	24.77
Ecionemia alata	3.55	0.00	6.53	1.97	9.39	34.16
Red Algae	0.00	2.55	4.68	3.56	6.73	40.89
Sediment	5.81	3.72	4.11	1.69	5.92	46.81
Unknown Orange Encrusting Sponge	1.00	2.61	3.85	1.47	5.54	52.35
White Plate Sponge	1.58	0.00	2.91	0.86	4.18	56.53
Biological Matrix	4.48	3.42	2.76	1.41	3.97	60.49
Stelletta conulosa	1.36	0.00	2.50	0.73	3.60	64.09
Colonial Ascidian	0.44	1.68	2.46	1.74	3.54	67.63
Bright Orange Encrusting Sponge	0.00	1.25	2.30	2.19	3.30	70.93

Groups
South Ohinau Island Drop 02 & SW Mokohinau Islands Drop 15
Average dissimilarity = 45.67

Species	South Ohinau Island Drop 02 Av. Abund	SW Mokohinau Islands Drop 15 Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
Green/Brown Algae	0.99	4.25	6.13	3.05	13.43	13.43
Unknown Orange Encrusting Sponge	1.10	2.61	4.26	1.44	9.32	22.75
Red Algae	0.42	2.55	4.01	2.37	8.78	31.53
Sediment	3.84	3.72	3.55	1.41	7.77	39.29
Biological Matrix	4.81	3.42	3.17	1.28	6.94	46.23
Colonial Ascidian	0.17	1.68	2.96	1.99	6.48	52.71
Bright Orange Encrusting Sponge	1.59	1.25	2.35	1.57	5.14	57.85
Rock	0.00	1.15	2.15	1.66	4.70	62.55
Stelletta conulosa	1.08	0.00	2.11	0.62	4.61	67.16
Xestospongia sp.	0.95	0.00	1.75	0.93	3.84	71.00

Groups
South Aldermen Islands Drop 03 & SW Mokohinau Islands Drop 15
Average dissimilarity = 51.01

	South Aldermen Islands Drop 03	SW Mokohinau Islands Drop 15				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
Green/Brown Algae	1.44	4.25	4.83	3.27	9.46	9.46
Unknown Orange Encrusting Sponge	0.72	2.61	4.10	1.49	8.04	17.51
Branching Hydroid	2.27	0.09	3.73	1.21	7.32	24.82
Sediment	4.26	3.72	3.12	1.42	6.12	30.94
Biological Matrix	4.58	3.42	2.97	1.44	5.83	36.77
Crustose Coralline Algae	3.67	5.14	2.74	1.45	5.37	42.14
Colonial Ascidian	0.19	1.68	2.61	1.99	5.11	47.25
Stelletta conulosa	1.46	0.00	2.53	1.26	4.96	52.21
Red Algae	1.68	2.55	1.99	1.35	3.91	56.12
Rock	0.00	1.15	1.95	1.66	3.83	59.95
Other Branching Bryozoan	1.10	0.09	1.87	0.60	3.67	63.62
Dark Red Encrusting Sponge	1.10	0.00	1.85	0.90	3.63	67.25
Ecionemia alata	1.04	0.00	1.76	0.87	3.45	70.70

Groups
South Aldermen Islands Drop 06 & SW Mokohinau Islands Drop 15
Average dissimilarity = 74.95

	South Aldermen Islands Drop 06	SW Mokohinau Islands Drop 15				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
Crustose Coralline Algae	0.00	5.14	9.20	11.26	12.27	12.27
Biological Matrix	7.79	3.42	7.86	3.31	10.49	22.76
Green/Brown Algae	0.41	4.25	6.91	5.13	9.21	31.98
Small White Arborescent Sponge	2.62	0.00	4.66	2.30	6.21	38.19
Unknown Orange Encrusting Sponge	0.00	2.61	4.62	1.61	6.17	44.36
Red Algae	0.00	2.55	4.57	3.57	6.10	50.46
Sediment	2.39	3.72	3.10	1.25	4.14	54.60
Other Branching Bryozoan	1.62	0.09	2.72	2.38	3.63	58.23
Colonial Ascidian	0.51	1.68	2.36	1.68	3.15	61.38
Bright Orange Encrusting Sponge	0.00	1.25	2.24	2.19	2.99	64.38
Rock	0.00	1.15	2.05	1.66	2.73	67.11
Branching Hydroid	1.16	0.09	2.02	1.30	2.69	69.80
Other Tubular Sponge	0.97	0.00	1.74	1.38	2.32	72.12

Groups South Aldermen Islands Drop 07 & SW Mokohinau Islands Drop 15 Average dissimilarity = 63.34						
	South Aldermen Islands Drop 07	SW Mokohinau Islands Drop 15				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
Green/Brown Algae	0.28	4.25	6.33	5.15	9.99	9.99
Crustose Coralline Algae	1.34	5.14	6.03	4.55	9.52	19.50
Red Algae	0.00	2.55	4.06	3.56	6.41	25.92
Biological Matrix	5.70	3.42	3.68	1.60	5.81	31.73
Unknown Orange Encrusting Sponge	1.23	2.61	3.22	1.46	5.08	36.81
Other Branching Bryozoan	1.91	0.09	2.90	1.61	4.58	41.38
Xestospongia sp.	1.74	0.00	2.77	2.65	4.37	45.76
Sediment	4.33	3.72	2.61	1.32	4.13	49.88
Suberites sp.	1.18	0.00	1.94	1.02	3.06	52.94
Rock	0.00	1.15	1.82	1.66	2.88	55.82
Other Tubular Sponge	1.14	0.00	1.80	1.60	2.85	58.66
Fasciospongia turgida	1.15	0.00	1.79	1.02	2.83	61.49
Tethya sp.	1.02	0.00	1.61	1.43	2.55	64.04
Colonial Ascidian	1.15	1.68	1.58	1.36	2.50	66.54
Yellow Encrusting Sponge	1.01	0.42	1.49	1.32	2.36	68.89
Bright Orange Encrusting Sponge	0.93	1.25	1.38	1.39	2.17	71.07
Groups Cradock Channel Drop 13 & SW Mokohinau Islands Drop 15 Average dissimilarity = 55.74						
	Cradock Channel Drop 13	SW Mokohinau Islands Drop 15				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
Ecionemia alata	3.86	0.00	6.61	2.53	11.86	11.86
Crustose Coralline Algae	1.85	5.14	5.63	3.26	10.10	21.97
Green/Brown Algae	1.72	4.25	4.35	2.35	7.80	29.77
Unknown Orange Encrusting Sponge	0.17	2.61	4.25	1.57	7.63	37.40
Biological Matrix	5.75	3.42	4.13	1.56	7.40	44.80
Sediment	2.86	3.72	2.88	1.31	5.17	49.97
Crinoid	1.51	0.00	2.56	1.62	4.59	54.57
Iophon sp.	1.41	0.00	2.35	0.78	4.21	58.77
Colonial Ascidian	1.59	1.68	2.33	1.53	4.18	62.95
Other Branching Bryozoan	1.32	0.09	2.18	2.27	3.92	66.87
Bright Orange Encrusting Sponge	0.00	1.25	2.14	2.18	3.84	70.70

Groups
Cape Colville Drop 01 & South Mokohinau Islands Drop 17
Average dissimilarity = 75.35

	Cape Colville Drop 01	South Mokohinau Islands Drop 17				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
Sediment	5.81	1.61	6.60	2.87	8.75	8.75
Crustose Coralline Algae	0.00	3.90	6.07	5.07	8.05	16.81
Ecionemia alata	3.55	0.00	5.53	1.97	7.34	24.15
Colonial Ascidian	0.44	3.02	4.00	3.00	5.31	29.45
Dysidea sp.	0.00	2.24	3.51	2.08	4.66	34.12
White Spiky Encrusting Sponge	0.00	2.10	3.22	2.58	4.28	38.39
Red Algae	0.00	1.69	2.67	2.25	3.54	41.93
Green/Brown Algae	0.00	1.71	2.66	2.74	3.53	45.46
Suberites sp.	0.00	1.60	2.49	2.08	3.30	48.76
White Plate Sponge	1.58	0.00	2.46	0.86	3.27	52.03
Unknown Yellow/Green Sponge	0.00	1.50	2.30	1.39	3.05	55.08
Stelletta conulosa	1.36	0.22	2.19	0.78	2.91	57.99
Raspailia topsenti	0.00	1.40	2.15	1.52	2.86	60.85
Unknown Orange Encrusting Sponge	1.00	1.45	1.94	1.40	2.58	63.43
Biological Matrix	4.48	4.76	1.87	1.41	2.48	65.91
Dark Red Encrusting Sponge	1.18	0.37	1.77	1.22	2.35	68.26
Pale Yellow Encrusting Sponge	0.54	0.87	1.66	1.10	2.20	70.46

Groups
South Ohinau Island Drop 02 & South Mokohinau Islands Drop 17
Average dissimilarity = 57.20

	South Ohinau Island Drop 02	South Mokohinau Islands Drop 17				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
Colonial Ascidian	0.17	3.02	4.52	3.44	7.91	7.91
Sediment	3.84	1.61	4.03	1.39	7.05	14.95
Dysidea sp.	0.19	2.24	3.34	1.78	5.84	20.79
White Spiky Encrusting Sponge	0.00	2.10	3.29	2.57	5.75	26.54
Crustose Coralline Algae	5.72	3.90	2.93	1.73	5.12	31.66
Unknown Orange Encrusting Sponge	1.10	1.45	2.54	1.46	4.45	36.11
Unknown Yellow/Green Sponge	0.00	1.50	2.35	1.39	4.10	40.22
Bright Orange Encrusting Sponge	1.59	0.38	2.31	1.23	4.04	44.26
Raspailia topsenti	0.00	1.40	2.20	1.52	3.84	48.10
Red Algae	0.42	1.69	2.20	1.76	3.84	51.94
Biological Matrix	4.81	4.76	1.95	1.42	3.42	55.35
Stelletta conulosa	1.08	0.22	1.90	0.69	3.32	58.67
Suberites sp.	0.73	1.60	1.88	1.50	3.29	61.96
Green/Brown Algae	0.99	1.71	1.75	1.48	3.06	65.02
Xestospongia sp.	0.95	0.60	1.54	1.25	2.69	67.71
Other Branching Bryozoan	0.10	0.96	1.44	1.23	2.52	70.24

Groups
South Aldermen Islands Drop 03 & South Mokohinau Islands Drop 17
Average dissimilarity = 59.31

	S Aldermen Islands Drop 03	South Mokohinau Islands Drop 17				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
Colonial Ascidian	0.19	3.02	4.13	3.74	6.97	6.97

Sediment	4.26	1.61	4.07	1.43	6.87	13.84
Dysidea sp.	0.00	2.24	3.31	2.09	5.57	19.41
White Spiky Encrusting Sponge	0.00	2.10	3.04	2.57	5.12	24.53
Branching Hydroid	2.27	0.75	2.94	1.28	4.93	29.50
Unknown Orange Encrusting Sponge	0.72	1.45	2.33	1.50	3.94	33.43
Unknown Yellow/Green Sponge	0.00	1.50	2.17	1.39	3.65	37.09
Stelletta conulosa	1.46	0.22	2.11	1.27	3.56	40.64
Raspailia topsenti	0.00	1.40	2.03	1.52	3.42	44.06
Biological Matrix	4.58	4.76	2.02	1.40	3.40	47.46
Other Branching Bryozoan	1.10	0.96	2.02	0.93	3.40	50.86
Suberites sp.	0.46	1.60	1.86	1.62	3.14	54.01
Crustose Coralline Algae	3.67	3.90	1.75	1.35	2.95	56.95
Dark Red Encrusting Sponge	1.10	0.37	1.65	1.01	2.78	59.73
Ecionemia alata	1.04	0.00	1.51	0.87	2.54	62.28
Red Algae	1.68	1.69	1.35	1.38	2.28	64.56
Pale Yellow Encrusting Sponge	0.00	0.87	1.25	1.01	2.11	66.67
Bright Orange Encrusting Sponge	0.80	0.38	1.22	1.04	2.05	68.72
White Encrusting Sponge	0.13	0.78	1.11	1.37	1.87	70.59

South Aldermen Islands Drop 06 & South Mokohinau Islands Drop 17
Average dissimilarity = 70.10

	S Aldermen Islands Drop 06	South Mokohinau Islands Drop 17				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
Crustose Coralline Algae	0.00	3.90	5.95	5.09	8.48	8.48
Biological Matrix	7.79	4.76	4.60	2.78	6.56	15.04
Colonial Ascidian	0.51	3.02	3.82	2.72	5.45	20.49
Small White Arborescent Sponge	2.62	0.13	3.76	2.09	5.36	25.85
Dysidea sp.	0.00	2.24	3.44	2.09	4.91	30.76
White Spiky Encrusting Sponge	0.00	2.10	3.16	2.58	4.51	35.27
Red Algae	0.00	1.69	2.61	2.25	3.73	39.00
Unknown Yellow/Green Sponge	0.00	1.50	2.25	1.39	3.22	42.21
Unknown Orange Encrusting Sponge	0.00	1.45	2.23	1.51	3.18	45.39
Sediment	2.39	1.61	2.12	1.34	3.02	48.41
Raspailia topsenti	0.00	1.40	2.11	1.52	3.01	51.42
Suberites sp.	0.58	1.60	2.04	1.72	2.91	54.33
Green/Brown Algae	0.41	1.71	2.02	1.70	2.88	57.21
White Encrusting Sponge	0.87	0.78	1.57	1.23	2.27	59.48
Branching Hydroid	1.16	0.75	1.55	1.29	2.21	61.70
Pale Orange Amorphous Sponge	0.94	0.00	1.44	1.07	2.06	63.75
Other Branching Bryozoan	1.62	0.96	1.44	1.37	2.05	65.81
Other Tubular Sponge	0.97	0.09	1.42	1.38	2.02	67.83
Pale Yellow Encrusting Sponge	0.00	0.87	1.30	1.01	1.86	69.69
Pale Yellow Amorphous Sponge	0.83	0.00	1.26	1.09	1.80	71.50

Groups
South Aldermen Islands Drop 07 & South Mokohinau Islands Drop 17
Average dissimilarity = 61.61

	S Aldermen Islands Drop 07	South Mokohinau Islands Drop 17				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
Sediment	4.33	1.61	3.86	1.61	6.27	6.27
Crustose Coralline Algae	1.34	3.90	3.52	2.45	5.71	11.98
Dysidea sp.	0.10	2.24	2.96	1.95	4.80	16.78
White Spiky Encrusting Sponge	0.20	2.10	2.66	2.13	4.32	21.10
Colonial Ascidian	1.15	3.02	2.58	1.84	4.19	25.30
Red Algae	0.00	1.69	2.36	2.25	3.83	29.13
Green/Brown Algae	0.28	1.71	2.05	2.04	3.33	32.46
Unknown Yellow/Green Sponge	0.00	1.50	2.04	1.39	3.31	35.77
Other Branching Bryozoan	1.91	0.96	1.94	1.51	3.14	38.91

Raspailia topsenti	0.00	1.40	1.91	1.51	3.10	42.01
Biological Matrix	5.70	4.76	1.79	1.38	2.90	44.91
Unk. Orange Encrusting Sponge	1.23	1.45	1.72	1.39	2.79	47.69
Xestospongia sp.	1.74	0.60	1.68	1.54	2.73	50.43
Suberites sp.	1.18	1.60	1.59	1.39	2.58	53.01
Fasciospongia turgida	1.15	0.20	1.50	1.06	2.44	55.45
Other Tubular Sponge	1.14	0.09	1.48	1.54	2.40	57.85
Tethya sp.	1.02	0.00	1.40	1.43	2.26	60.11
Yellow Encrusting Sponge	1.01	0.33	1.32	1.25	2.13	62.25
Branching Hydroid	0.77	0.75	1.26	1.14	2.04	64.29
Bright Orange Encrusting Sponge	0.93	0.38	1.23	1.18	2.00	66.28
Stelletta conulosa	0.78	0.22	1.23	0.62	1.99	68.27
Pale Yellow Encrusting Sponge	0.00	0.87	1.18	1.01	1.92	70.19

Cradock Channel Drop 13 & South Mokohinau Islands Drop 17
Average dissimilarity = 60.63

	Cradock Ch. Drop 13	S Mokohinau Islands Drop 17				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
Ecionemia alata	3.86	0.00	5.66	2.55	9.34	9.34
Dysidea sp.	0.00	2.24	3.30	2.09	5.45	14.78
White Spiky Encrusting Sponge	0.00	2.10	3.03	2.57	5.00	19.79
Crustose Coralline Algae	1.85	3.90	3.02	1.81	4.97	24.76
Sediment	2.86	1.61	2.69	1.51	4.44	29.20
Colonial Ascidian	1.59	3.02	2.56	1.40	4.21	33.41
Suberites sp.	0.00	1.60	2.34	2.08	3.86	37.27
Crinoid	1.51	0.00	2.19	1.61	3.62	40.89
Unknown Yellow/Green Sponge	0.00	1.50	2.16	1.39	3.57	44.46
Biological Matrix	5.75	4.76	2.14	1.43	3.52	47.98
Unk. Orange Encrusting Sponge	0.17	1.45	2.04	1.46	3.37	51.36
Raspailia topsenti	0.00	1.40	2.03	1.52	3.34	54.70
Iophon sp.	1.41	0.00	2.02	0.78	3.32	58.02
Geodia regina	1.23	0.00	1.75	1.04	2.89	60.91
Other Branching Bryozoan	1.32	0.96	1.58	1.37	2.61	63.52
Branching Hydroid	1.30	0.75	1.44	1.42	2.38	65.90
Green/Brown Algae	1.72	1.71	1.32	1.41	2.17	68.07
Pale Yellow Encrusting Sponge	0.00	0.87	1.25	1.01	2.07	70.14

SW Mokohinau Islands Drop 15 & South Mokohinau Islands Drop 17
Average dissimilarity = 51.04

	SW Mokohinau Islands Drop 15	South Mokohinau Islands Drop 17				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
Green/Brown Algae	4.25	1.71	3.77	3.17	7.39	7.39
Dysidea sp.	0.00	2.24	3.35	2.09	6.56	13.95
Sediment	3.72	1.61	3.27	1.41	6.41	20.36
White Spiky Encrusting Sponge	0.13	2.10	2.92	2.38	5.72	26.08
Unknown Orange Encrusting Sponge	2.61	1.45	2.74	1.61	5.37	31.45
Suberites sp.	0.00	1.60	2.37	2.08	4.65	36.10
Biological Matrix	3.42	4.76	2.20	1.23	4.32	40.41
Unknown Yellow/Green Sponge	0.00	1.50	2.19	1.39	4.30	44.71
Colonial Ascidian	1.68	3.02	2.05	1.45	4.02	48.73
Raspailia topsenti	0.27	1.40	1.87	1.41	3.67	52.39
Crustose Coralline Algae	5.14	3.90	1.86	1.53	3.65	56.04
Bright Orange Encrusting Sponge	1.25	0.38	1.54	1.67	3.03	59.06
Rock	1.15	0.19	1.53	1.52	3.00	62.07
Red Algae	2.55	1.69	1.50	1.28	2.95	65.01
Pale Yellow Encrusting Sponge	0.64	0.87	1.35	1.19	2.65	67.67

Other Branching Bryozoan	0.09	0.96	1.35	1.22	2.65	70.31
Cape Colville Drop 01 & Burgess Island Drop 19 Average dissimilarity = 67.20						
	Cape Colville Drop 01	Burgess Island Drop 19				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
Ecionemia alata	3.55	0.23	5.22	1.80	7.76	7.76
Small White Arborescent Sponge	0.00	2.17	3.41	1.76	5.07	12.83
Sediment	5.81	3.83	3.16	1.36	4.70	17.54
Other Branching Bryozoan	0.20	2.22	3.15	2.00	4.68	22.22
Unknown Yellow/Green Sponge	0.00	1.63	2.56	2.55	3.81	26.03
Colonial Ascidian	0.44	2.04	2.50	2.11	3.72	29.75
White Plate Sponge	1.58	0.00	2.48	0.87	3.68	33.43
Biological Matrix	4.48	5.41	2.21	1.35	3.29	36.73
Stelletta conulosa	1.36	0.00	2.13	0.73	3.17	39.90
Dysidea sp.	0.00	1.29	2.04	1.46	3.03	42.93
Branching Hydroid	0.84	1.52	1.92	1.34	2.85	45.78
White/Cream Amorphous Sponge	0.57	1.54	1.86	1.11	2.76	48.54
Raspailia topsenti	0.00	1.18	1.83	1.29	2.72	51.26
Dark Red Encrusting Sponge	1.18	0.34	1.82	1.24	2.71	53.98
Yellow/Brown Massive Sponge	0.00	1.17	1.80	1.59	2.68	56.66
Ciocalypta cf. *penicillus*	0.00	1.06	1.66	2.39	2.47	59.13
Unk. Orange Encrusting Sponge	1.00	0.42	1.58	1.05	2.36	61.49
Orange/Yellow Encrusting Sponge	0.00	0.84	1.34	0.76	2.00	63.48
Yellow Encrusting Sponge	0.37	0.78	1.26	1.02	1.87	65.36
White Spiky Encrusting Sponge	0.00	0.80	1.24	1.11	1.85	67.21
Pale Yellow Encrusting Sponge	0.54	0.38	1.22	0.82	1.82	69.03
Stelletta crater	0.66	0.00	1.03	0.76	1.53	70.56
South Ohinau Island Drop 02 & Burgess Island Drop 19 Average dissimilarity = 70.26						
	S Ohinau Isl Drop 02	Burgess Island Drop 19				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
Crustose Coralline Algae	5.72	0.09	9.00	5.46	12.81	12.81
Small White Arborescent Sponge	0.00	2.17	3.48	1.76	4.95	17.76
Other Branching Bryozoan	0.10	2.22	3.37	2.19	4.79	22.55
Colonial Ascidian	0.17	2.04	3.02	2.76	4.29	26.84
Sediment	3.84	3.83	3.00	1.50	4.27	31.11
Unknown Yellow/Green Sponge	0.00	1.63	2.61	2.54	3.72	34.83
Bright Orange Encrusting Sponge	1.59	0.09	2.44	1.19	3.47	38.30
Branching Hydroid	0.42	1.52	2.36	1.57	3.36	41.66
Biological Matrix	4.81	5.41	2.17	1.45	3.09	44.74
Dysidea sp.	0.19	1.29	2.01	1.42	2.86	47.60
Unk. Orange Encrusting Sponge	1.10	0.42	1.93	0.82	2.74	50.35
Raspailia topsenti	0.00	1.18	1.87	1.29	2.66	53.00
Yellow/Brown Massive Sponge	0.00	1.17	1.84	1.59	2.62	55.62
White/Cream Amorph. Sponge	0.00	1.14	1.78	0.97	2.54	58.16
Stelletta conulosa	1.08	0.00	1.78	0.62	2.53	60.69
Ciocalypta cf. *penicillus*	0.00	1.06	1.69	2.39	2.41	63.10
Orange/Yellow Encr. Sponge	0.38	0.84	1.69	0.83	2.40	65.50
Xestospongia sp.	0.95	0.09	1.49	0.97	2.13	67.63
Green/Brown Algae	0.99	0.55	1.46	1.23	2.08	69.70
White Spiky Encrusting Sponge	0.00	0.80	1.27	1.11	1.81	71.51
South Aldermen Islands Drop 03 & Burgess Island Drop 19 Average dissimilarity = 67.46						
	S Ald. Isl. Drop 03	Burgess Island Drop 19				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%

Crustose Coralline Algae	3.67	0.09	5.30	2.56	7.86	7.86
Small White Arborescent Sponge	0.00	2.17	3.21	1.76	4.75	12.61
Other Branching Bryozoan	1.10	2.22	3.01	1.66	4.46	17.07
Branching Hydroid	2.27	1.52	2.73	1.50	4.04	21.11
Colonial Ascidian	0.19	2.04	2.72	2.85	4.03	25.14
Sediment	4.26	3.83	2.65	1.49	3.93	29.07
Unknown Yellow/Green Sponge	0.00	1.63	2.41	2.55	3.57	32.64
Red Algae	1.68	0.13	2.31	1.78	3.42	36.06
Biological Matrix	4.58	5.41	2.23	1.31	3.30	39.36
Stelletta conulosa	1.46	0.00	2.17	1.27	3.22	42.58
Dysidea sp.	0.00	1.29	1.92	1.46	2.84	45.42
Raspailia topsenti	0.00	1.18	1.72	1.29	2.55	47.97
Yellow/Brown Massive Sponge	0.00	1.17	1.70	1.58	2.52	50.49
Dark Red Encrusting Sponge	1.10	0.34	1.66	0.99	2.46	52.95
White/Cream Amorph. Sponge	0.10	1.14	1.62	0.98	2.40	55.35
Ciocalypta cf. *penicillus*	0.00	1.06	1.56	2.38	2.31	57.66
Ecionemia alata	1.04	0.23	1.53	0.95	2.27	59.93
Green/Brown Algae	1.44	0.55	1.49	1.49	2.20	62.13
Unk. Orange Encrusting Sponge	0.72	0.42	1.40	0.71	2.08	64.21
Orange/Yellow Encrust. Sponge	0.23	0.84	1.37	0.82	2.03	66.24
White Spiky Encrusting Sponge	0.00	0.80	1.17	1.11	1.74	67.97
Yellow Encrusting Sponge	0.24	0.78	1.17	0.99	1.73	69.70
Bright Orange Encrusting Sponge	0.80	0.09	1.15	0.94	1.71	71.41

Groups
South Aldermen Islands Drop 06 & Burgess Island Drop 19
Average dissimilarity = 57.42

Species	South Aldermen Islands Drop 06 Av. Abund	Burgess Island Drop 19 Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
Biological Matrix	7.79	5.41	3.69	2.21	6.43	6.43
Sediment	2.39	3.83	2.79	1.47	4.85	11.28
Unknown Yellow/Green Sponge	0.00	1.63	2.51	2.55	4.37	15.65
Colonial Ascidian	0.51	2.04	2.38	1.98	4.15	19.81
Small White Arborescent Sponge	2.62	2.17	2.13	1.35	3.70	23.51
Dysidea sp.	0.00	1.29	2.00	1.46	3.47	26.99
Raspailia topsenti	0.00	1.18	1.79	1.29	3.12	30.11
White/Cream Amorphous Sponge	0.37	1.14	1.77	1.06	3.08	33.19
Yellow/Brown Massive Sponge	0.00	1.17	1.77	1.59	3.08	36.27
Ciocalypta cf. *penicillus*	0.00	1.06	1.62	2.39	2.83	39.10
Branching Hydroid	1.16	1.52	1.61	1.30	2.80	41.90
Other Branching Bryozoan	1.62	2.22	1.51	1.27	2.63	44.53
White Encrusting Sponge	0.87	0.33	1.44	0.86	2.50	47.03
Pale Orange Amorphous Sponge	0.94	0.09	1.42	1.09	2.48	49.51
Other Tubular Sponge	0.97	0.28	1.32	1.35	2.30	51.81
Orange/Yellow Encrusting Sponge	0.00	0.84	1.32	0.76	2.29	54.10
Pale Yellow Amorphous Sponge	0.83	0.09	1.24	1.10	2.17	56.27
Yellow Encrusting on White Sponge	0.78	0.44	1.22	1.22	2.13	58.40
White Spiky Encrusting Sponge	0.00	0.80	1.22	1.11	2.12	60.52
Yellow Encrusting Sponge	0.09	0.78	1.18	0.92	2.05	62.57
Other Globular Sponge	0.57	0.62	1.06	1.15	1.85	64.42
Yellow/Grey Amorphous Sponge	0.00	0.65	0.98	0.63	1.70	66.12
Dark Grey Amorphous Sponge	0.31	0.40	0.97	0.59	1.70	67.82
Suberites sp.	0.58	0.28	0.97	0.80	1.69	69.51
Anemone	0.32	0.65	0.94	1.15	1.64	71.15

Groups
South Aldermen Islands Drop 07 & Burgess Island Drop 19
Average dissimilarity = 59.81

	South Aldermen Islands Drop 07	Burgess Island Drop 19				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
Small White Arborescent Sponge	0.31	2.17	2.68	1.58	4.49	4.49
Xestospongia sp.	1.74	0.09	2.28	2.31	3.81	8.30
Unknown Yellow/Green Sponge	0.00	1.63	2.27	2.56	3.79	12.08
Sediment	4.33	3.83	2.17	1.30	3.63	15.71
Crustose Coralline Algae	1.34	0.09	1.78	1.67	2.98	18.70
Other Branching Bryozoan	1.91	2.22	1.75	1.39	2.92	21.62
Dysidea sp.	0.10	1.29	1.72	1.43	2.87	24.49
Branching Hydroid	0.77	1.52	1.66	1.36	2.77	27.26
Raspailia topsenti	0.00	1.18	1.62	1.29	2.71	29.97
Unknown Orange Encrusting Sponge	1.23	0.42	1.60	1.11	2.68	32.66
Yellow/Brown Massive Sponge	0.00	1.17	1.60	1.58	2.67	35.33
Fasciospongia turgida	1.15	0.00	1.56	1.02	2.61	37.94
Biological Matrix	5.70	5.41	1.54	1.39	2.57	40.52
Suberites sp.	1.18	0.28	1.51	0.99	2.53	43.04
White/Cream Amorphous Sponge	0.30	1.14	1.48	1.02	2.48	45.52
Ciocalypta cf. *penicillus*	0.00	1.06	1.47	2.38	2.45	47.97
Colonial Ascidian	1.15	2.04	1.45	1.31	2.42	50.40
Yellow Encrusting Sponge	1.01	0.78	1.34	1.25	2.25	52.64
Tethya sp.	1.02	0.13	1.34	1.37	2.24	54.89
Other Tubular Sponge	1.14	0.28	1.34	1.39	2.23	57.12
Bright Orange Encrusting Sponge	0.93	0.09	1.24	1.12	2.08	59.20
Orange/Yellow Encrusting Sponge	0.00	0.84	1.19	0.76	1.98	61.19
White Spiky Encrusting Sponge	0.20	0.80	1.15	1.15	1.92	63.11
Other Globular Sponge	0.97	0.62	1.10	1.26	1.84	64.95
Stelletta conulosa	0.78	0.00	1.08	0.54	1.80	66.75
Anemone	0.49	0.65	1.03	1.30	1.73	68.48
Dark Grey Amorphous Sponge	0.45	0.40	0.98	0.69	1.64	70.12

Cradock Channel Drop 13 & Burgess Island Drop 19
Average dissimilarity = 64.98

	Cradock Channel Drop 13	Burgess Island Drop 19				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
Ecionemia alata	3.86	0.23	5.35	2.30	8.24	8.24
Small White Arborescent Sponge	0.00	2.17	3.20	1.76	4.93	13.17
Red Algae	2.17	0.13	2.99	3.13	4.60	17.76
Crustose Coralline Algae	1.85	0.09	2.60	2.21	3.99	21.76
Sediment	2.86	3.83	2.44	1.29	3.75	25.51
Unknown Yellow/Green Sponge	0.00	1.63	2.41	2.54	3.70	29.22
Crinoid	1.51	0.00	2.20	1.61	3.39	32.61
Green/Brown Algae	1.72	0.55	2.03	1.85	3.13	35.74
Iophon sp.	1.41	0.00	2.03	0.78	3.12	38.85
Colonial Ascidian	1.59	2.04	1.99	1.59	3.06	41.92
Other Branching Bryozoan	1.32	2.22	1.98	1.40	3.05	44.97
Dysidea sp.	0.00	1.29	1.91	1.46	2.95	47.92
Biological Matrix	5.75	5.41	1.87	1.43	2.88	50.79
Geodia regina	1.23	0.00	1.76	1.04	2.71	53.50
Raspailia topsenti	0.00	1.18	1.72	1.29	2.65	56.15
Yellow/Brown Massive Sponge	0.00	1.17	1.70	1.58	2.61	58.76
White/Cream Amorph. Sponge	0.00	1.14	1.65	0.97	2.53	61.30
Ciocalypta cf. *penicillus*	0.00	1.06	1.56	2.38	2.40	63.70
Branching Hydroid	1.30	1.52	1.28	1.20	1.98	65.67
Orange/Yellow Encrust. Sponge	0.00	0.84	1.26	0.76	1.94	67.61
White Spiky Encrusting Sponge	0.00	0.80	1.17	1.11	1.80	69.42
Yellow Encrusting Sponge	0.19	0.78	1.13	0.96	1.74	71.16

SW Mokohinau Islands Drop 15 & Burgess Island Drop 19
Average dissimilarity = 69.07

	SW Mokohinau Islands Drop 15	Burgess Island Drop 19				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
Crustose Coralline Algae	5.14	0.09	7.51	9.46	10.87	10.87
Green/Brown Algae	4.25	0.55	5.51	4.90	7.98	18.85
Red Algae	2.55	0.13	3.59	2.98	5.20	24.05
Unk. Orange Encrusting Sponge	2.61	0.42	3.50	1.55	5.07	29.12
Small White Arborescent Sponge	0.00	2.17	3.25	1.76	4.70	33.82
Other Branching Bryozoan	0.09	2.22	3.15	2.19	4.56	38.38
Biological Matrix	3.42	5.41	3.01	1.50	4.35	42.74
Unknown Yellow/Green Sponge	0.00	1.63	2.44	2.55	3.53	46.27
Branching Hydroid	0.09	1.52	2.15	1.55	3.11	49.38
Sediment	3.72	3.83	2.08	1.43	3.01	52.39
Dysidea sp.	0.00	1.29	1.94	1.46	2.81	55.20
Bright Orange Encrusting Sponge	1.25	0.09	1.76	1.96	2.55	57.75
Yellow/Brown Massive Sponge	0.00	1.17	1.72	1.58	2.49	60.24
Rock	1.15	0.00	1.70	1.66	2.47	62.71
White/Cream Amorph. Sponge	0.00	1.14	1.67	0.97	2.42	65.12
Raspailia topsenti	0.27	1.18	1.62	1.25	2.34	67.47
Ciocalypta cf. *penicillus*	0.00	1.06	1.58	2.39	2.29	69.75
Orange/Yellow Encrust. Sponge	0.00	0.84	1.28	0.76	1.85	71.61

Groups
South Mokohinau Islands Drop 17 & Burgess Island Drop 19
Average dissimilarity = 57.13

	South Mokohinau Islands	Burgess Island Drop 19

	Drop 17					
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
Crustose Coralline Algae	3.90	0.09	4.94	4.70	8.65	8.65
Sediment	1.61	3.83	3.06	1.76	5.36	14.01
Small White Arborescent Sponge	0.13	2.17	2.69	1.69	4.72	18.73
Red Algae	1.69	0.13	2.09	2.05	3.66	22.38
White Spiky Encrusting Sponge	2.10	0.80	1.89	1.72	3.31	25.69
Other Branching Bryozoan	0.96	2.22	1.85	1.41	3.24	28.93
Suberites sp.	1.60	0.28	1.78	1.76	3.12	32.05
Unkn. Orange Encrusting Sponge	1.45	0.42	1.66	1.39	2.91	34.96
Dysidea sp.	2.24	1.29	1.58	1.08	2.76	37.72
Green/Brown Algae	1.71	0.55	1.57	1.56	2.74	40.46
Branching Hydroid	0.75	1.52	1.53	1.32	2.67	43.13
Yellow/Brown Massive Sponge	0.00	1.17	1.50	1.58	2.63	45.77
White/Cream Amorphous Sponge	0.19	1.14	1.48	1.01	2.58	48.35
Biological Matrix	4.76	5.41	1.45	1.41	2.55	50.89
Colonial Ascidian	3.02	2.04	1.41	1.54	2.47	53.36
Raspailia topsenti	1.40	1.18	1.37	1.30	2.39	55.75
Unknown Yellow/Green Sponge	1.50	1.63	1.33	1.41	2.33	58.08
Ciocalypta cf. *penicillus*	0.23	1.06	1.20	1.79	2.10	60.18
Orange/Yellow Encrusting Sponge	0.19	0.84	1.16	0.86	2.03	62.21
Yellow Encrusting Sponge	0.33	0.78	1.03	1.03	1.80	64.01
Pale Yellow Encrusting Sponge	0.87	0.38	1.02	1.07	1.79	65.80
Anemone	0.67	0.65	0.92	1.24	1.60	67.41
Unknown Textured Encrusting Sponge	0.72	0.00	0.90	0.59	1.57	68.98
White Encrusting Sponge	0.78	0.33	0.89	1.26	1.56	70.53

Groups
Cape Colville Drop 01 & Burgess Island Drop 21
Average dissimilarity = 69.22

	Cape Colville Drop 01	Burgess Island Drop 21				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
Red Algae	0.00	4.17	7.22	11.76	10.42	10.42
Green/Brown Algae	0.00	4.14	7.18	3.57	10.38	20.80
Crustose Coralline Algae	0.00	2.88	4.99	4.51	7.20	28.01
Ecionemia alata	3.55	0.94	4.91	1.56	7.09	35.09
Sediment	5.81	3.37	4.23	2.05	6.11	41.20
Steginoporella neozelanica	0.00	2.16	3.75	2.50	5.42	46.62
Other Branching Bryozoan	0.20	2.19	3.50	1.88	5.06	51.69
Stelletta conulosa	1.36	1.70	3.40	1.14	4.91	56.60
Biological Matrix	4.48	3.46	2.90	1.36	4.18	60.78
White Plate Sponge	1.58	0.00	2.74	0.86	3.96	64.74
Dark Red Encrusting Sponge	1.18	0.20	2.03	1.22	2.93	67.67
Unk. Orange Encrusting Sponge	1.00	0.67	1.91	1.10	2.76	70.43

Groups
South Ohinau Island Drop 02 & Burgess Island Drop 21
Average dissimilarity = 59.33

	South Ohinau Island Drop 02	Burgess Island Drop 21				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
Red Algae	0.42	4.17	6.64	5.62	11.19	11.19
Green/Brown Algae	0.99	4.14	5.61	2.17	9.46	20.65
Crustose Coralline Algae	5.72	2.88	5.06	2.66	8.53	29.19
Steginoporella neozelanica	0.00	2.16	3.84	2.50	6.47	35.66

Other Branching Bryozoan	0.10	2.19	3.72	1.97	6.27	41.93
Stelletta conulosa	1.08	1.70	3.36	1.07	5.66	47.59
Biological Matrix	4.81	3.46	3.29	1.31	5.54	53.13
Sediment	3.84	3.37	3.08	1.47	5.20	58.33
Bright Orange Encrusting Sponge	1.59	0.13	2.70	1.21	4.55	62.88
Unknown Orange Encrusting Sponge	1.10	0.67	2.35	0.92	3.96	66.84
Xestospongia sp.	0.95	0.00	1.65	0.93	2.79	69.63
Ecionemia alata	0.10	0.94	1.64	0.94	2.77	72.39
Groups South Aldermen Islands Drop 03 & Burgess Island Drop 21 Average dissimilarity = 54.15						
	South Aldermen Islands Drop 03	Burgess Island Drop 21				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
Green/Brown Algae	1.44	4.14	4.42	2.08	8.16	8.16
Red Algae	1.68	4.17	4.06	2.52	7.50	15.66
Branching Hydroid	2.27	0.13	3.53	1.21	6.51	22.17
Steginoporella neozelanica	0.00	2.16	3.51	2.50	6.48	28.65
Other Branching Bryozoan	1.10	2.19	3.34	1.59	6.17	34.82
Biological Matrix	4.58	3.46	3.02	1.35	5.57	40.39
Stelletta conulosa	1.46	1.70	2.87	1.48	5.30	45.69
Sediment	4.26	3.37	2.85	1.51	5.26	50.95
Crustose Coralline Algae	3.67	2.88	2.18	1.35	4.03	54.98
Ecionemia alata	1.04	0.94	1.93	1.15	3.56	58.54
Unknown Orange Encrusting Sponge	0.72	0.67	1.81	0.81	3.34	61.88
Dark Orange Encrusting Sponge	1.10	0.20	1.80	0.95	3.32	65.20
Raspailia topsenti	0.00	0.91	1.47	0.91	2.71	67.91
Bright Orange Encrusting Sponge	0.80	0.13	1.29	0.96	2.38	70.28

Groups
South Aldermen Islands Drop 06 & Burgess Island Drop 21
Average dissimilarity = 73.24

Species	South Aldermen Islands Drop 06 Av. Abund	Burgess Island Drop 21 Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
Biological Matrix	7.79	3.46	7.35	2.62	10.04	10.04
Red Algae	0.00	4.17	7.06	12.06	9.63	19.67
Green/Brown Algae	0.41	4.14	6.35	2.94	8.67	28.34
Crustose Coralline Algae	0.00	2.88	4.87	4.53	6.66	34.99
Small White Arborescent Sponge	2.62	0.00	4.40	2.29	6.01	41.00
Steginoporella neozelanica	0.00	2.16	3.67	2.51	5.01	46.01
Stelletta conulosa	0.00	1.70	2.87	0.94	3.92	49.93
Sediment	2.39	3.37	2.34	1.35	3.19	53.12
Branching Hydroid	1.16	0.13	1.90	1.30	2.60	55.72
Other Branching Bryozoan	1.62	2.19	1.88	1.43	2.57	58.28
Other Tubular Sponge	0.97	0.00	1.64	1.38	2.24	60.53
Pale Orange Amorphous Sponge	0.94	0.00	1.60	1.07	2.19	62.71
Ecionemia alata	0.00	0.94	1.56	0.90	2.14	64.85
Raspailia topsenti	0.00	0.91	1.53	0.91	2.09	66.94
White Encrusting Sponge	0.87	0.09	1.50	0.75	2.05	68.99
Pale Yellow Amorphous Sponge	0.83	0.00	1.40	1.09	1.91	70.91

Groups
South Aldermen Islands Drop 07 & Burgess Island Drop 21
Average dissimilarity = 65.84

Species	South Aldermen Islands Drop 07 Av. Abund	Burgess Island Drop 21 Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
Red Algae	0.00	4.17	6.31	11.49	9.58	9.58
Green/Brown Algae	0.28	4.14	5.85	3.01	8.89	18.47
Biological Matrix	5.70	3.46	3.60	1.48	5.46	23.93
Steginoporella neozelanica	0.00	2.16	3.28	2.51	4.98	28.92
Stelletta conulosa	0.78	1.70	2.76	1.08	4.19	33.11
Xestospongia sp.	1.74	0.00	2.63	2.65	4.00	37.11
Crustose Coralline Algae	1.34	2.88	2.37	1.72	3.60	40.71
Sediment	4.33	3.37	2.31	1.30	3.51	44.22
Other Branching Bryozoan	1.91	2.19	1.98	1.31	3.00	47.22
Unknown Orange Encrusting Sponge	1.23	0.67	1.85	1.18	2.82	50.04
Suberites sp.	1.18	0.25	1.75	1.03	2.65	52.69
Other Tubular Sponge	1.14	0.00	1.71	1.60	2.60	55.30
Fasciospongia turgida	1.15	0.00	1.71	1.02	2.59	57.89
Ecionemia alata	0.43	0.94	1.55	1.00	2.36	60.25
Tethya sp.	1.02	0.00	1.53	1.43	2.33	62.58
Yellow Encrusting Sponge	1.01	0.09	1.52	1.22	2.30	64.88
Colonial Ascidian	1.15	0.41	1.50	1.37	2.28	67.16
Other Globular Sponge	0.97	0.09	1.41	1.38	2.14	69.30
Raspailia topsenti	0.00	0.91	1.37	0.91	2.08	71.38

Groups Cradock Channel Drop 13 & Burgess Island Drop 21 Average dissimilarity = 53.55						
	Cradock Channel Drop 13	Burgess Island Drop 21				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
Ecionemia alata	3.86	0.94	4.84	1.68	9.03	9.03
Biological Matrix	5.75	3.46	4.00	1.46	7.48	16.51
Green/Brown Algae	1.72	4.14	3.99	1.71	7.46	23.96
Steginoporella neozelanica	0.00	2.16	3.51	2.50	6.55	30.51
Red Algae	2.17	4.17	3.23	3.26	6.04	36.55
Stelletta conulosa	0.25	1.70	2.75	1.02	5.13	41.68
Crinoid	1.51	0.00	2.42	1.61	4.53	46.20
Colonial Ascidian	1.59	0.41	2.42	1.26	4.52	50.72
Other Branching Bryozoan	1.32	2.19	2.29	1.43	4.28	55.00
Iophon sp.	1.41	0.31	2.25	0.87	4.20	59.20
Sediment	2.86	3.37	2.22	1.34	4.14	63.34
Branching Hydroid	2.30	0.13	1.98	1.77	3.70	67.05
Geodia regina	1.23	0.29	1.90	1.10	3.54	70.59

Groups SW Mokohinau Islands Drop 15 & Burgess Island Drop 21 Average dissimilarity = 45.83						
	SW Mokohinau Islands Drop 15	Burgess Island Drop 21				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
Crustose Coralline Algae	5.14	2.88	3.70	2.85	8.07	8.07
Unknown Orange Encrusting Sponge	2.61	0.67	3.68	1.55	8.04	16.11
Steginoporella neozelanica	0.00	2.16	3.56	2.51	7.76	23.88
Other Branching Bryozoan	0.09	2.19	3.46	1.96	7.55	31.43
Stelletta conulosa	0.00	1.70	2.78	0.94	6.07	37.50
Red Algae	2.55	4.17	2.66	2.18	5.80	43.30
Biological Matrix	3.42	3.46	2.28	1.33	4.97	48.27
Colonial Ascidian	1.68	0.41	2.23	1.79	4.86	53.13
Bright Orange Encrusting Sponge	1.25	0.13	1.92	1.93	4.19	57.32
Sediment	3.72	3.37	1.92	1.28	4.18	61.50
Green/Brown Algae	4.25	4.14	1.62	1.40	3.53	65.03
Rock	1.15	0.28	1.61	1.45	3.52	68.55
Ecionemia alata	0.00	0.94	1.52	0.90	3.31	71.86

South Mokohinau Islands Drop 17 & Burgess Island Drop 21
Average dissimilarity = 57.48

	South Mokohinau Islands Drop 17	Burgess Island Drop 21				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
Colonial Ascidian	3.02	0.41	3.68	3.18	6.40	6.40
Green/Brown Algae	1.71	4.14	3.49	1.99	6.07	12.47
Red Algae	1.69	4.17	3.47	3.38	6.04	18.51
Dysidea sp.	2.24	0.22	2.88	1.75	5.00	23.51
White Spiky Encrusting Sponge	2.10	0.09	2.82	2.50	4.91	28.43
Steginoporella neozelanica	0.39	2.16	2.57	1.77	4.47	32.90
Sediment	1.61	3.37	2.56	1.49	4.46	37.36
Stelletta conulosa	0.22	1.70	2.40	0.99	4.18	41.54
Biological Matrix	4.76	3.46	2.34	1.25	4.09	45.63
Other Branching Bryozoan	0.96	2.19	2.14	1.51	3.72	49.35
Suberites sp.	1.60	0.25	2.03	1.78	3.52	52.87
Unknown Yellow/Green Sponge	1.50	0.13	2.02	1.37	3.51	56.38
Unknown Orange Encrusting Sponge	1.45	0.67	1.81	1.41	3.14	59.53
Crustose Coralline Algae	3.90	2.88	1.65	1.45	2.87	62.39
Raspailia topsenti	1.40	0.91	1.64	1.38	2.85	65.25
Ecionemia alata	0.00	0.94	1.31	0.90	2.28	67.52
Pale Yellow Encrusting Sponge	0.87	0.26	1.20	1.07	2.09	69.61
Branching Hydroid	0.75	0.13	1.05	0.96	1.82	71.44

Burgess Island Drop 19 & Burgess Island Drop 21
Average dissimilarity = 66.89

	Burgess Island Drop 19	Burgess Island Drop 21				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
Red Algae	0.13	4.17	5.72	8.04	8.56	8.56
Green/Brown Algae	0.55	4.14	5.11	2.82	7.64	16.19
Crustose Coralline Algae	0.09	2.88	3.95	4.00	5.91	22.11
Small White Arborescent Sponge	2.17	0.00	3.09	1.76	4.63	26.73
Biological Matrix	5.41	3.46	3.00	1.42	4.49	31.23
Steginoporella neozelanica	0.23	2.16	2.87	2.14	4.29	35.52
Stelletta conulosa	0.00	1.70	2.41	0.94	3.60	39.12
Colonial Ascidian	2.04	0.41	2.31	2.24	3.46	42.57
Unknown Yellow/Green Sponge	1.63	0.13	2.17	2.11	3.24	45.82
Branching Hydroid	1.52	0.13	2.04	1.55	3.05	48.86
Dysidea sp.	1.29	0.22	1.69	1.39	2.53	51.39
Sediment	3.83	3.37	1.66	1.44	2.48	53.87
Yellow/Brown Massive Sponge	1.17	0.00	1.64	1.58	2.45	56.32
Other Branching Bryozoan	2.22	2.19	1.62	1.31	2.42	58.74
Raspailia topsenti	1.18	0.91	1.55	1.32	2.32	61.06
White/Cream Amorphous Sponge	1.14	0.18	1.54	1.00	2.31	63.37
Ecionemia alata	0.23	0.94	1.33	1.00	1.99	65.36
Orange/Yellow Encrust. Sponge	0.84	0.00	1.22	0.76	1.82	67.18
Unknown Orange Encrust Sponge	0.42	0.67	1.15	0.90	1.72	68.90
Ciocalypta cf. *penicillus*	1.06	0.44	1.12	1.48	1.67	70.57

Groups
Cape Colville Drop 01 & West Atihau Island Drop 24
Average dissimilarity = 72.99

	Cape Colville Drop 01	West Atihau Island Drop 24

Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
Green/Brown Algae	0.00	4.15	7.26	5.61	9.95	9.95
Sediment	5.81	2.04	6.65	2.38	9.11	19.06
Ecionemia alata	3.55	0.19	5.91	1.82	8.10	27.16
Red Algae	0.00	3.33	5.88	2.75	8.05	35.21
Other Branching Bryozoan	0.20	2.73	4.43	2.06	6.06	41.27
Crustose Coralline Algae	0.00	2.05	3.58	2.20	4.90	46.17
White Plate Sponge	1.58	0.00	2.77	0.86	3.80	49.97
Stelletta conulosa	1.36	0.42	2.67	0.80	3.66	53.63
Biological Matrix	4.48	5.18	2.59	1.34	3.55	57.19
Dark Red Encrusting Sponge	1.18	0.00	2.06	1.20	2.83	60.01
Crinoid	0.00	1.18	2.02	1.12	2.77	62.78
Steginoporella neozelanica	0.00	1.14	2.00	1.09	2.74	65.52
Yellow Encrusting Sponge	0.37	0.92	1.75	0.83	2.40	67.92
Unknown Orange Encrusting Sponge	1.00	0.00	1.71	0.91	2.34	70.26
Groups South Ohinau Island Drop 02 & West Atihau Island Drop 24 Average dissimilarity = 60.01						
	South Ohinau Islands Drop 02	West Atihau Island Drop 24				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
Crustose Coralline Algae	5.72	2.05	6.61	2.80	11.02	11.02
Green/Brown Algae	0.99	4.15	5.65	2.66	9.42	20.44
Red Algae	0.42	3.33	5.26	2.20	8.77	29.21
Other Branching Bryozoan	0.10	2.73	4.70	2.20	7.83	37.04
Sediment	3.84	2.04	4.18	1.36	6.96	44.00
Biological Matrix	4.81	5.18	2.65	1.46	4.41	48.41
Bright Orange Encrusting Sponge	1.59	0.43	2.61	1.23	4.34	52.75
Stelletta conulosa	1.08	0.42	2.36	0.70	3.94	56.69
Crinoid	0.00	1.18	2.07	1.12	3.44	60.13
Steginoporella neozelanica	0.00	1.14	2.04	1.09	3.40	63.53
Xestospongia sp.	0.95	0.78	1.96	1.10	3.27	66.80
Unknown Orange Encrusting Sponge	1.10	0.00	1.95	0.66	3.25	70.05

Groups
South Aldermen Islands Drop 03 & West Atihau Island Drop 24
Average dissimilarity = 55.89

	South Aldermen Island Drop 03	West Atihau Island Drop 24				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
Green/Brown Algae	1.44	4.15	4.45	2.73	7.96	7.96
Sediment	4.26	2.04	4.16	1.41	7.45	15.41
Other Branching Bryozoan	1.10	2.73	3.93	1.75	7.02	22.43
Branching Hydroid	2.27	0.67	3.32	1.26	5.94	28.37
Crustose Coralline Algae	3.67	2.05	3.11	1.40	5.56	33.93
Red Algae	1.68	3.33	3.03	1.43	5.42	39.36
Stelletta conulosa	1.46	0.42	2.61	1.31	4.67	44.03
Biological Matrix	4.58	5.18	2.56	1.26	4.58	48.61
Steginoporella neozelanica	0.00	1.14	1.87	1.09	3.34	51.95
Crinoid	0.29	1.18	1.85	1.16	3.30	55.26
Dark Red Encrusting Sponge	1.10	0.00	1.77	0.90	3.17	58.43
Ecionemia alata	1.04	0.19	1.69	0.94	3.02	61.44
Yellow Encrusting Sponge	0.24	0.92	1.59	0.79	2.85	64.29
Xestospongia sp.	0.56	0.78	1.56	0.99	2.79	67.08
Colonial Ascidian	0.19	1.05	1.53	1.53	2.73	69.81
Bright Orange Encrusting Sponge	0.80	0.43	1.40	1.05	2.50	72.31

Groups
South Aldermen Islands Drop 06 & West Atihau Island Drop 24
Average dissimilarity = 64.86

	South Aldermen Islands Drop 06	West Atihau Island Drop 24				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
Green/Brown Algae	0.41	4.15	6.41	4.12	9.89	9.89
Red Algae	0.00	3.33	5.74	2.76	8.86	18.74
Biological Matrix	7.79	5.18	4.49	1.88	6.93	25.67
Small White Arborescent Sponge	2.62	0.00	4.45	2.29	6.85	32.52
Crustose Coralline Algae	0.00	2.05	3.50	2.20	5.39	37.92
Sediment	2.39	2.04	2.36	1.39	3.64	41.56
Other Branching Bryozoan	1.62	2.73	2.26	1.22	3.49	45.05
Steginoporella neozelanica	0.00	1.14	1.95	1.09	3.01	48.06
Crinoid	0.60	1.18	1.87	1.25	2.89	50.94
Branching Hydroid	1.16	0.67	1.77	1.27	2.73	53.68
Pale Orange Amorphous Sponge	0.94	0.00	1.62	1.07	2.50	56.17
Yellow Encrusting Sponge	0.09	0.92	1.61	0.73	2.49	58.66
Other Tubular Sponge	0.97	0.09	1.60	1.36	2.47	61.13
White Encrusting Sponge	0.87	0.19	1.54	0.79	2.38	63.51
Suberites sp.	0.58	0.86	1.48	1.25	2.28	65.79
Colonial Ascidian	0.51	1.05	1.46	1.41	2.25	68.04
Pale Yellow Amorphous Sponge	0.83	0.00	1.42	1.08	2.18	70.22

Groups
South Aldermen Islands Drop 07 & West Atihau Island Drop 24
Average dissimilarity = 60.87

Species	South Aldermen Islands Drop 07 Av. Abund	West Atihau Island Drop 24 Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
Green/Brown Algae	0.28	4.15	5.91	4.17	9.71	9.71
Red Algae	0.00	3.33	5.13	2.76	8.42	18.13
Sediment	4.33	2.04	3.79	1.44	6.22	24.35
Other Branching Bryozoan	1.91	2.73	2.20	1.19	3.61	27.96
Xestospongia sp.	1.74	0.78	2.07	1.78	3.39	31.35
Biological Matrix	5.70	5.18	1.91	1.13	3.13	34.49
Unknown Orange Encrusting Sponge	1.23	0.00	1.83	1.04	3.01	37.49
Yellow Encrusting Sponge	1.01	0.92	1.79	1.10	2.94	40.43
Crinoid	0.00	1.18	1.77	1.12	2.91	43.33
Steginoporella neozelanica	0.00	1.14	1.74	1.09	2.86	46.20
Fasciospongia turgida	1.15	0.00	1.72	1.02	2.83	49.03
Crustose Coralline Algae	1.34	2.05	1.68	1.31	2.77	51.79
Other Tubular Sponge	1.14	0.09	1.65	1.52	2.71	54.51
Stelletta conulosa	0.78	0.42	1.60	0.64	2.63	57.14
Tethya sp.	1.02	0.00	1.55	1.43	2.54	59.68
Suberites sp.	1.18	0.86	1.51	1.06	2.48	62.16
Other Globular Sponge	0.97	0.00	1.47	1.39	2.42	64.58
Branching Hydroid	0.77	0.67	1.40	1.14	2.31	66.89
Bright Orange Encrusting Sponge	0.93	0.43	1.40	1.19	2.30	69.19
Colonial Ascidian	1.15	1.05	1.27	1.34	2.09	71.28

Groups
Cradock Channel Drop 13 & West Atihau Island Drop 24
Average dissimilarity = 50.70

Species	Cradock Channel Drop 13 Av. Abund	West Atihau Island Drop 24 Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
Ecionemia alata	3.86	0.19	6.03	2.32	11.89	11.89
Green/Brown Algae	1.72	4.15	3.99	2.05	7.87	19.76
Sediment	2.86	2.04	2.81	1.48	5.54	25.31
Other Branching Bryozoan	1.32	2.73	2.75	1.34	5.41	30.72
Biological Matrix	5.75	5.18	2.32	1.23	4.57	35.29
Iophon sp.	1.41	0.19	2.29	0.83	4.52	39.81
Red Algae	2.17	3.33	2.28	1.35	4.50	44.31
Colonial Ascidian	1.59	1.05	2.26	1.55	4.46	48.77
Geodia regina	1.23	0.00	1.95	1.04	3.84	52.61
Crinoid	1.51	1.18	1.90	1.31	3.75	56.36
Steginoporella neozelanica	0.00	1.14	1.86	1.09	3.68	60.04
Branching Hydroid	1.30	0.67	1.69	1.50	3.34	63.38
Crustose Coralline Algae	1.85	2.05	1.60	1.21	3.16	66.54
Yellow Encrusting Sponge	0.19	0.92	1.57	0.77	3.10	66.64
Suberites sp.	0.00	0.86	1.41	1.39	2.77	72.41

Groups SW Mokohinau Islands Drop 15 & West Atihau Island Drop 24 Average dissimilarity = 48.89						
	SW Mokohinau Islands Drop 15	West Atihau Island Drop 24				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
Crustose Coralline Algae	5.14	2.05	5.12	2.88	10.47	10.47
Other Branching Bryozoan	0.09	2.73	4.36	2.20	8.93	19.40
Unknown Orange Encrusting Sponge	2.61	0.00	4.28	1.61	8.75	28.15
Biological Matrix	3.42	5.18	3.46	1.79	7.09	35.23
Sediment	3.72	2.04	3.25	1.34	6.66	41.89
Red Algae	2.55	3.33	2.10	1.40	4.30	46.19
Crinoid	0.00	1.18	1.92	1.12	3.92	50.11
Steginoporella neozelanica	0.00	1.14	1.89	1.09	3.87	53.98
Bright Orange Encrusting Sponge	1.25	0.43	1.75	1.68	3.57	57.56
Yellow Encrusting Sponge	0.42	0.92	1.67	0.89	3.42	60.98
Rock	1.15	0.28	1.63	1.44	3.34	64.31
Colonial Ascidian	1.68	1.05	1.58	1.42	3.23	67.54
Suberites sp.	0.00	0.86	1.43	1.40	2.92	70.46
Groups South Mokohinau Islands Drop 17 & West Atihau Island Drop 24 Average dissimilarity = 56.04						
	South Mokohinau Islands Drop 17	West Atihau Island Drop 24				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
Green/Brown Algae	1.71	4.15	3.48	2.57	6.21	6.21
Dysidea sp.	2.24	0.09	3.09	1.95	5.51	11.72
Colonial Ascidian	3.02	1.05	2.80	2.17	5.01	16.73
White Spiky Encrusting Sponge	2.10	0.18	2.75	2.43	4.90	21.63
Crustose Coralline Algae	3.90	2.05	2.71	1.66	4.83	26.46
Other Branching Bryozoan	0.96	2.73	2.65	1.45	4.73	31.19
Red Algae	1.69	3.33	2.46	1.40	4.40	35.59
Unknown Yellow/Green Sponge	1.50	0.00	2.11	1.39	3.77	39.35
Unknown Orange Encrusting Sponge	1.45	0.00	2.08	1.51	3.71	43.07
Raspailia topsenti	1.40	0.00	1.97	1.52	3.52	46.59
Sediment	1.61	2.04	1.80	1.33	3.22	49.81
Biological Matrix	4.76	5.18	1.77	1.39	3.17	52.97
Crinoid	0.00	1.18	1.65	1.12	2.95	55.92
Steginoporella neozelanica	0.39	1.14	1.56	1.17	2.79	58.71
Suberites sp.	1.60	0.86	1.43	1.41	2.56	61.27
Yellow Encrusting Sponge	0.33	0.92	1.41	0.83	2.52	63.79
Xestospongia sp.	0.60	0.78	1.34	1.11	2.38	66.17
Pale Yellow Encrusting Sponge	0.87	0.56	1.26	1.14	2.25	68.42
Branching Hydroid	0.75	0.67	1.24	1.14	2.22	70.64

Burgess Island Drop 19 & West Atihau Island Drop 24
Average dissimilarity = 65.34

	Burgess Island Drop 19	West Atihau Island Drop 24				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
Green/Brown Algae	0.55	4.15	5.15	3.94	7.89	7.89
Red Algae	0.13	3.33	4.61	2.55	7.05	14.94
Small White Arborescent Sponge	2.17	0.00	3.12	1.76	4.78	19.71
Sediment	3.83	2.04	2.95	1.57	4.52	24.23
Crustose Coralline Algae	0.09	2.05	2.82	2.10	4.32	28.55
Unknown Yellow/Green Sponge	1.63	0.00	2.34	2.55	3.59	32.14
Dysidea sp.	2.29	0.09	1.79	1.41	2.73	34.88
Other Branching Bryozoan	2.22	2.73	1.77	1.27	2.71	37.59
Branching Hydroid	1.52	0.67	1.75	1.37	2.68	40.27
Raspailia topsenti	1.18	0.00	1.68	1.29	2.57	42.84
Crinoid	0.00	1.18	1.66	1.12	2.54	45.38
Yellow/Brown Massive Sponge	1.17	0.00	1.65	1.58	2.53	47.91
Steginoporella neozelanica	0.23	1.14	1.65	1.11	2.52	50.44
Biological Matrix	5.41	5.18	1.63	1.12	2.49	52.93
Yellow Encrusting Sponge	0.78	0.92	1.62	1.00	2.48	55.40
White/Cream Amorphous Sponge	1.14	0.00	1.61	0.97	2.46	57.86
Ciocalypta cf. *penicillus*	1.06	0.00	1.52	2.38	2.33	60.19
Colonial Ascidian	2.04	1.05	1.50	1.41	2.30	62.48
Orange/Yellow Encrust. Sponge	0.84	0.00	1.23	0.76	1.88	64.36
Xestospongia sp.	0.09	0.78	1.17	0.78	1.79	66.15
White Spiky Encrusting Sponge	0.80	0.18	1.09	1.13	1.66	67.81
Suberites sp.	0.28	0.86	1.07	1.30	1.64	69.45
Alcyonium sp.	0.09	0.65	0.94	0.74	1.44	70.89

Burgess Island Drop 21 & West Atihau Island Drop 24
Average dissimilarity = 43.95

	Burgess Isl. Drop 21	West Atihau Island Drop 24				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
Biological Matrix	3.46	5.18	3.34	1.48	7.60	7.60
Stelletta conulosa	1.70	0.42	2.79	0.97	6.34	6.34
Sediment	3.37	2.04	2.51	1.44	5.71	5.71
Steginoporella neozelanica	2.16	1.14	2.15	1.37	4.89	4.89
Other Branching Bryozoan	2.19	2.73	2.02	1.19	4.60	4.60
Red Algae	4.17	3.33	1.83	1.46	4.17	4.17
Crinoid	0.00	1.18	1.82	1.12	4.14	4.14
Crustose Coralline Algae	2.88	2.05	1.77	1.31	4.02	4.02
Green/Brown Algae	4.14	4.15	1.68	1.42	3.82	3.82
Yellow Encrusting Sponge	0.09	0.92	1.49	0.74	3.38	3.38
Ecionemia alata	0.94	0.19	1.46	0.98	3.32	3.32
Raspailia topsenti	0.91	0.00	1.42	0.91	3.24	3.24
Colonial Ascidian	0.41	1.05	1.30	1.39	2.95	2.95
Suberites sp.	0.25	0.86	1.28	1.34	2.91	2.91
Xestospongia sp.	0.00	0.78	1.26	0.74	2.86	2.86
Branching Hydroid	0.13	0.67	1.07	0.86	2.43	2.43
Unk. Orange Encrusting Sponge	0.67	0.00	1.06	0.69	2.42	
Pale Yellow Encrusting Sponge	0.26	0.56	1.00	0.88	2.29	

Groups
Cape Colville Drop 01 & SE Channel Island Drop 25
Average dissimilarity = 56.97

	Cape Colville Drop 01	SE Channel Island Drop 25

Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
Ecionemia alata	3.55	0.61	5.78	1.70	10.14	10.14
Biological Matrix	4.48	3.04	3.88	1.30	6.80	16.95
Stelletta conulosa	1.36	1.59	3.55	1.14	6.22	23.17
Sediment	5.81	7.21	3.19	1.52	5.59	28.77
White Plate Sponge	1.58	0.55	3.04	0.99	5.34	34.11
Unknown Orange Encrusting Sponge	1.00	1.30	2.26	1.39	3.96	38.07
Pale Yellow Encrusting Sponge	0.54	1.08	2.24	1.03	3.93	42.00
Globular sponges (including *Aaptos globosum, Tethya* sp. & *Polymastia hirsuta)*	0.09	1.17	2.15	1.37	3.78	45.78
Dark Red Encrusting Sponge	1.18	0.13	2.14	1.18	3.76	49.54
Polymastia crocea	0.10	1.12	2.10	1.27	3.68	53.22
Desmacidon mamillatum	0.00	0.97	1.87	1.30	3.28	56.50
Steginoporella neozelanica	0.00	0.97	1.80	1.10	3.16	59.66
Psammocinia hawere	0.62	0.77	1.77	1.00	3.11	62.78
Branching Hydroid	0.84	0.19	1.64	0.90	2.88	65.66
Raspailia topsenti	0.00	0.83	1.60	0.68	2.81	68.47
Raspailia hispida	0.19	0.81	1.58	0.93	2.77	71.23

Groups
South Ohinau Island Drop 02 & SE Channel Island Drop 25
Average dissimilarity = 69.79

	South Ohinau Island Drop 02	SE Channel Island Drop 25				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
Crustose Coralline Algae	5.72	0.00	11.03	5.54	15.80	15.80
Sediment	3.84	7.21	6.81	1.60	9.76	25.56
Biological Matrix	4.81	3.04	4.41	1.28	6.31	31.87
Stelletta conulosa	1.08	1.59	3.50	1.08	5.01	36.88
Bright Orange Encrusting Sponge	1.59	0.00	2.99	1.19	4.28	41.17
Unknown Orange Encrusting Sponge	1.10	0.30	2.90	1.27	4.15	45.32
Globular sponges (including *Aaptos globosum, Tethya* sp. & *Polymastia hirsuta)*	0.00	1.17	2.29	1.36	3.28	48.60
Polymastia crocea	0.09	1.12	2.16	1.26	3.09	51.69
Pale Yellow Encrusting Sponge	0.39	1.08	2.04	1.08	2.93	54.62
Desmacidon mamillatum	0.00	0.97	1.91	1.30	2.74	57.36
Green/Brown Algae	0.99	0.00	1.91	1.06	2.73	60.09
Steginoporella neozelanica	0.00	0.97	1.85	1.10	2.65	62.74
Xestospongia sp.	0.95	0.00	1.79	0.93	2.56	65.30
Raspailia topsenti	0.00	0.83	1.64	0.68	2.35	67.65
Raspailia hispida	0.00	0.81	1.52	0.87	2.18	69.84
Other Massive Sponge	0.00	0.79	1.51	0.83	2.16	72.00

South Aldermen Islands Drop 03 & SE Channel Island Drop 25
Average dissimilarity = 69.79

	Drop 03	Drop 25				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
Crustose Coralline Algae	3.67	0.00	6.46	2.60	9.26	9.26
Sediment	4.26	7.21	5.39	1.57	7.73	16.99
Biological Matrix	4.58	3.04	3.91	1.29	5.60	22.59
Branching Hydroid	2.27	0.19	3.78	1.29	5.41	28.00
Stelletta conulosa	1.46	1.59	2.91	1.21	4.17	32.18
Red Algae	1.68	0.00	2.89	1.45	4.15	36.32
Unknown Orange Encrusting Sponge	0.72	1.30	2.60	1.91	3.72	40.05
Green/Brown Algae	1.44	0.00	2.49	1.37	3.57	43.61
Globular sponges (inc. *Aaptos globosum, Tethya* sp. & *Polymastia hirsuta)*	0.00	1.17	2.07	2.33	2.97	46.58

Ecionemia alata	1.04	0.61	2.03	1.36	2.90	49.49
Polymastia crocea	0.00	1.12	2.02	1.03	2.89	52.38
Other Branching Bryozoan	1.10	0.23	1.97	1.27	2.82	55.19
Dark Red Encrusting Sponge	1.10	0.13	1.90	0.63	2.73	57.92
Pale Yellow Encrusting Sponge	0.00	1.08	1.85	0.95	2.64	60.56
Desmacidon mamillatum	0.00	0.97	1.73	1.30	2.48	63.05
Steginoporella neozelanica	0.00	0.97	1.68	1.10	2.40	65.45
Raspailia hispida	0.28	0.81	1.60	0.93	2.30	67.75
Raspailia topsenti	0.00	0.83	1.48	0.68	2.13	69.87
Other Massive Sponge	0.00	0.79	1.37	0.83	1.96	71.84

South Aldermen Islands Drop 06 & SE Channel Island Drop 25
Average dissimilarity = 76.33

	S Aldermen Islands Drop 06	SE Channel Island Drop 25				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
Sediment	2.39	7.21	8.95	2.71	11.72	11.72
Biological Matrix	7.79	3.04	8.88	2.25	11.64	23.36
Small White Arborescent Sponge	2.62	0.00	4.75	2.28	6.23	29.58
Stelletta conulosa	0.00	1.59	2.87	0.95	3.76	33.34
Other Branching Bryozoan	1.62	0.23	2.60	1.99	3.41	36.76
Unknown Orange Encrusting Sponge	0.00	1.30	2.32	1.37	3.04	39.79
Globular sponges (inc. *A. globosum, Tethya* sp. & *P. hirsuta)*	0.00	1.17	2.18	1.36	2.85	42.64
Branching Hydroid	1.16	0.19	2.07	1.28	2.72	45.36
Polymastia crocea	0.22	1.12	1.97	1.27	2.58	47.94
Pale Yellow Encrusting Sponge	0.00	1.08	1.93	0.95	2.53	50.47
Desmacidon mamillatum	0.00	0.97	1.82	1.30	2.38	52.85
Steginoporella neozelanica	0.00	0.97	1.76	1.10	2.30	55.16
Pale Orange Amorphous Sponge	0.94	0.00	1.73	1.07	2.27	57.43
Other Tubular Sponge	0.97	0.10	1.72	1.35	2.25	59.68
Other Massive Sponge	0.35	0.79	1.60	0.96	2.09	61.77
White Encrusting Sponge	0.87	0.00	1.58	0.70	2.07	63.84
Raspailia topsenti	0.00	0.83	1.56	0.68	2.04	65.89
Pale Yellow Amorphous Sponge	0.83	0.00	1.51	1.08	1.98	67.87
Raspailia hispida	0.00	0.81	1.45	0.87	1.90	69.77
Yellow Encrusting on White Sponge	0.78	0.00	1.43	1.18	1.87	71.65

Groups
South Aldermen Islands Drop 07 & SE Channel Island Drop 25
Average dissimilarity = 68.56

	South Aldermen Islands Drop 07	SE Channel Island Drop 25				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
Sediment	4.33	7.21	4.90	1.66	7.15	7.15
Biological Matrix	5.70	3.04	4.60	1.40	6.72	13.87
Other Branching Bryozoan	1.91	0.23	2.85	1.55	4.15	18.02
Xestospongia sp.	1.74	0.00	2.82	2.61	4.11	22.13
Stelletta conulosa	0.78	1.59	2.80	1.09	4.09	26.21
Crustose Coralline Algae	1.34	0.00	2.19	1.71	3.19	29.41
Unkn. Orange Encrusting Sponge	1.23	1.30	1.97	1.33	2.88	32.28
Suberites sp.	1.18	0.00	1.97	1.02	2.88	35.16
Globular sponges (inc. *A. globosum, Tethya* sp. & *Polymastia hirsuta)*	0.00	1.17	1.93	1.36	2.81	37.97
Polymastia crocea	0.00	1.12	1.87	1.28	2.73	40.70
Fasciospongia turgida	1.15	0.00	1.83	1.02	2.66	43.36
Other Tubular Sponge	1.14	0.10	1.75	1.50	2.56	45.92
Pale Yellow Encrusting Sponge	0.00	1.08	1.72	0.95	2.51	48.42
Yellow Encrusting Sponge	1.01	0.44	1.67	1.29	2.43	50.86

Desmacidon mamillatum	0.00	0.97	1.61	1.30	2.35	53.20
Colonial Ascidian	1.15	0.63	1.60	1.33	2.33	55.53
Steginoporella neozelanica	0.00	0.97	1.56	1.10	2.28	57.81
Other Globular Sponge	0.97	0.14	1.51	1.33	2.20	60.01
Bright Orange Encrusting Sponge	0.93	0.00	1.48	1.11	2.17	62.18
Tethya sp.	1.02	0.41	1.39	1.35	2.03	64.21
Raspailia topsenti	0.00	0.83	1.38	0.68	2.01	66.22
Ecionemia alata	0.43	0.61	1.37	0.77	2.00	68.22
Branching Hydroid	0.77	0.19	1.33	0.92	1.94	70.16

Groups
Cradock Channel Drop 13 & SE Channel Island Drop 25
Average dissimilarity = 73.35

	Cradock Channel Drop 13	SE Channel Island Drop 25				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
Sediment	2.86	7.21	7.65	2.26	10.44	10.44
Ecionemia alata	3.86	0.61	5.71	1.87	7.78	18.21
Biological Matrix	5.75	3.04	5.15	1.41	7.02	25.24
Red Algae	2.17	0.00	3.78	4.04	5.15	30.39
Crustose Coralline Algae	1.85	0.00	3.20	2.28	4.36	34.75
Green/Brown Algae	1.72	0.00	2.97	1.89	4.05	38.80
Stelletta conulosa	0.25	1.59	2.74	1.03	3.74	42.54
Crinoid	1.51	0.00	2.61	1.61	3.56	46.09
Colonial Ascidian	1.59	0.63	2.56	1.25	3.50	49.59
Iophon sp.	1.41	0.00	2.39	0.78	3.26	52.85
Geodia regina	1.23	0.37	2.31	1.07	3.16	56.00
Branching Hydroid	1.30	0.19	2.17	1.83	2.96	58.97
Other Branching Bryozoan	1.32	0.23	2.16	1.25	2.94	61.91
Unknown Orange Encrusting Sponge	0.17	1.30	2.14	1.34	2.91	64.82
Globular sponges (including *Aaptos globosum, Tethya* sp. & *Polymastia hirsuta)*	0.00	1.17	2.07	1.36	2.82	67.64
Polymastia crocea	0.00	1.12	2.02	1.27	2.75	70.39

Groups
SW Mokohinau Islands Drop 15 & SE Channel Island Drop 25
Average dissimilarity = 71.23

	SW Mokohinau Islands Drop 15	SE Channel Island Drop 25				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
Crustose Coralline Algae	5.14	0.00	9.08	9.34	12.75	12.75
Green/Brown Algae	4.25	0.00	7.52	7.33	10.56	23.31
Sediment	3.72	7.21	6.28	2.12	8.81	32.12
Red Algae	2.55	0.00	4.51	3.49	6.34	38.46
Unknown Orange Encrusting Sponge	2.61	1.30	3.43	1.54	4.81	43.27
Biological Matrix	3.42	3.04	2.94	1.36	4.13	47.40
Stelletta conulosa	0.00	1.59	2.78	0.95	3.90	51.30
Colonial Ascidian	1.68	0.63	2.25	1.55	3.16	54.46
Bright Orange Encrusting Sponge	1.25	0.00	2.21	2.17	3.11	57.57
Globular sponges (including *Aaptos globosum, Tethya* sp. & *Polymastia hirsuta)*	0.00	1.17	2.10	1.36	2.95	60.52
Polymastia crocea	0.00	1.12	2.05	1.28	2.88	63.40
Rock	1.15	0.00	2.02	1.65	2.84	66.23
Pale Yellow Encrusting Sponge	0.64	1.08	1.91	1.13	2.68	68.92
Desmacidon mamillatum	0.00	0.97	1.76	1.30	2.47	71.39

Groups
South Mokohinau Islands Drop 17 & SE Channel Island Drop 25
Average dissimilarity = 76.20

Species	South Mokohinau Islands Drop 17 Av. Abund	SE Channel Island Drop 25 Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
Sediment	1.61	7.21	8.55	3.28	11.23	11.23
Crustose Coralline Algae	3.90	0.00	5.88	4.92	7.71	18.94
Colonial Ascidian	3.02	0.63	3.65	2.38	4.79	23.73
Dysidea sp.	2.24	0.09	3.27	1.92	4.29	28.01
Biological Matrix	4.76	3.04	3.19	1.24	4.18	32.20
White Spiky Encrusting Sponge	2.10	0.00	3.12	2.56	4.10	36.29
Red Algae	1.69	0.00	2.58	2.24	3.39	39.68
Green/Brown Algae	1.71	0.00	2.57	2.71	3.38	43.06
Suberites sp.	1.60	0.00	2.41	2.07	3.16	46.22
Stelletta conulosa	0.22	1.59	2.38	0.99	3.12	49.34
Unknown Yellow/Green Sponge	1.50	0.19	2.07	1.31	2.72	52.06
Raspailia topsenti	1.40	0.83	1.97	1.37	2.58	54.64
Globular sponges (including *Aaptos globosum, Tethya* sp. & *Polymastia hirsuta)*	0.00	1.17	1.79	1.36	2.35	56.99
Polymastia crocea	0.00	1.12	1.74	1.28	2.28	59.27
Pale Yellow Encrusting Sponge	0.87	1.08	1.70	1.28	2.23	61.50
Unknown Orange Encrusting Sponge	1.45	1.30	1.65	1.35	2.17	63.66
Desmacidon mamillatum	0.00	0.97	1.49	1.30	1.96	65.62
Steginoporella neozelanica	0.39	0.97	1.39	1.15	1.83	67.45
Other Branching Bryozoan	0.96	0.23	1.34	1.22	1.76	69.21
Other Massive Sponge	0.31	0.79	1.29	0.93	1.69	70.90

Groups
Burgess Island Drop 19 & SE Channel Island Drop 25
Average dissimilarity = 70.31

Species	Burgess Island Drop 19 Av. Abund	SE Channel Island Drop 25 Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
Sediment	3.83	7.21	5.21	2.05	7.40	7.40
Biological Matrix	5.41	3.04	3.87	1.32	5.50	12.90
Small White Arborescent Sponge	2.17	0.00	3.30	1.75	4.69	17.60
Other Branching Bryozoan	2.22	0.23	3.04	1.93	4.32	21.92
Stelletta conulosa	0.00	1.59	2.38	0.95	3.39	25.30
Colonial Ascidian	2.04	0.63	2.26	1.78	3.21	28.51
Unknown Yellow/Green Sponge	1.63	0.19	2.21	1.93	3.14	31.65
Branching Hydroid	1.52	0.19	2.19	1.58	3.11	34.77
Dysidea sp.	1.29	0.09	1.89	1.40	2.69	37.46
Raspailia topsenti	1.18	0.83	1.83	1.23	2.61	40.07
Globular sponges (including *Aaptos globosum, Tethya* sp. & *Polymastia hirsuta)*	0.00	1.17	1.80	1.37	2.55	42.62
Yellow/Brown Massive Sponge	1.17	0.00	1.75	1.58	2.49	45.11
Polymastia crocea	0.00	1.12	1.74	1.28	2.48	47.59
Unknown Orange Encrusting Sponge	0.42	1.30	1.72	1.26	2.44	50.03
White/Cream Amorph. Sponge	1.14	0.00	1.70	0.97	2.41	52.44
Pale Yellow Encrusting Sponge	0.38	1.08	1.62	1.20	2.30	54.74
Steginoporella neozelanica	0.23	0.97	1.51	1.13	2.15	56.89
Desmacidon mamillatum	0.00	0.97	1.50	1.30	2.13	59.02
Other Massive Sponge	0.25	0.79	1.36	0.90	1.93	60.95
Ciocalypta cf. *penicillus*	1.06	0.39	1.32	1.68	1.88	62.83
Yellow Encrusting Sponge	0.78	0.44	1.30	1.03	1.85	64.68
Orange/Yellow Encrust. Sponge	0.84	0.00	1.30	0.76	1.85	66.53
White Spiky Encrusting Sponge	0.80	0.00	1.21	1.11	1.72	68.25
Raspailia hispida	0.00	0.81	1.21	0.87	1.72	69.96
Psammocinia hawere	0.19	0.77	1.18	0.81	1.68	71.65

Groups Burgess Island Drop 21 & SE Channel Island Drop 25 Average dissimilarity = 69.77						
	Burgess Island Drop 21	SE Channel Island Drop 25				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
Red Algae	4.17	0.00	6.97	9.96	9.99	9.99
Green/Brown Algae	4.14	0.00	6.94	3.50	9.94	19.93
Sediment	3.37	7.21	6.49	2.75	9.31	29.24
Crustose Coralline Algae	2.88	0.00	4.81	4.38	6.90	36.14
Other Branching Bryozoan	2.19	0.23	3.37	1.81	4.83	40.96
Stelletta conulosa	1.70	1.59	3.11	1.15	4.45	45.42
Biological Matrix	3.46	3.04	3.10	1.35	4.44	49.85
Steginoporella neozelanica	2.16	0.97	2.31	1.35	3.31	53.17
Globular sponges (inc. *Aaptos globosum, Tethya* sp. & *Polymastia hirsuta)*	0.00	1.17	1.99	1.36	2.85	56.01
Unknown Orange Encrusting Sponge	0.67	1.30	1.98	1.33	2.84	58.85
Polymastia crocea	0.00	1.12	1.93	1.28	2.77	61.62
Raspailia topsenti	0.91	0.83	1.92	1.06	2.76	64.38
Ecionemia alata	0.94	0.61	1.80	1.05	2.58	66.95
Pale Yellow Encrusting Sponge	0.26	1.08	1.78	1.04	2.55	69.50
Desmacidon mamillatum	0.00	0.97	1.66	1.30	2.38	71.88
Groups West Atihau Island Drop 24 & SE Channel Island Drop 25 Average dissimilarity = 76.51						
	W Atihau Island Drop 24	SE Channel Island Drop 25				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
Sediment	2.04	7.21	8.85	2.86	11.57	11.57
Green/Brown Algae	4.15	0.00	7.01	5.37	9.16	20.73
Red Algae	3.33	0.00	5.67	2.72	7.41	28.14
Other Branching Bryozoan	2.73	0.23	4.26	1.99	5.57	33.71
Biological Matrix	5.18	3.04	4.26	1.33	5.56	39.27
Crustose Coralline Algae	2.05	0.00	3.45	2.18	4.51	43.79
Stelletta conulosa	0.42	1.59	2.82	0.99	3.69	47.48
Unknown Orange Encrusting Sponge	0.00	1.30	2.14	1.37	2.80	50.28
Polymastia crocea	0.00	1.12	1.95	1.28	2.55	52.83
Crinoid	1.18	0.00	1.95	1.11	2.55	55.38
Globular sponges (including *Aaptos globosum, Tethya* sp. & *Polymastia hirsuta)*	0.19	1.17	1.94	1.33	2.54	57.92
Pale Yellow Encrusting Sponge	0.56	1.08	1.83	1.15	2.40	60.32
Steginoporella neozelanica	1.14	0.97	1.83	1.29	2.40	62.72
Yellow Encrusting Sponge	0.92	0.44	1.78	0.86	2.32	65.04
Desmacidon mamillatum	0.00	0.97	1.68	1.30	2.19	67.23
Suberites sp.	0.86	0.00	1.45	1.39	1.90	69.13
Raspailia topsenti	0.00	0.83	1.44	0.68	1.88	71.01

Groups
Cape Colville Drop 01 & SE Channel Island Drop 28
Average dissimilarity = 61.04

	Cape Colville Drop 01	SE Channel Island Drop 28				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
Stelletta conulosa	1.36	5.12	7.55	1.91	12.36	12.36
Ecionemia alata	3.55	0.58	6.08	1.68	9.97	22.33
Biological Matrix	4.48	1.96	5.55	1.51	9.09	31.42
Yellow/Grey Encrusting Sponge	0.00	1.88	3.61	2.18	5.92	37.34
White Plate Sponge	1.58	0.33	3.20	0.92	5.23	42.57
Psammocinia hawere	0.62	1.60	3.14	1.04	5.14	47.71
Geodia regina	0.14	1.52	2.85	1.09	4.68	52.39
Sediment	5.81	5.72	2.38	1.45	3.90	56.29
Dark Red Encrusting Sponge	1.18	0.00	2.28	1.20	3.74	60.03
Unknown Orange Encrusting Sponge	1.00	0.55	1.98	1.13	3.24	63.27
Orange/Yellow Encrusting Sponge	0.00	1.02	1.92	0.97	3.15	66.42
Branching Hydroid	0.84	0.48	1.79	1.02	2.94	69.36
Yellow Encrusting Sponge	0.37	0.82	1.67	0.91	2.73	72.09

Groups
South Ohinau Island Drop 02 & SE Channel Island Drop 28
Average dissimilarity = 71.64

	South Ohinau Island Drop 02	SE Channel Island Drop 28				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
Crustose Coralline Algae	5.72	0.00	11.39	5.66	15.89	15.89
Stelletta conulosa	1.08	5.12	8.14	2.07	11.36	27.25
Biological Matrix	4.81	1.96	6.27	1.51	8.75	36.00
Sediment	3.84	5.72	4.83	1.38	6.74	42.74
Yellow/Grey Encrusting Sponge	0.00	1.88	3.70	2.17	5.17	47.91
Psammocinia hawere	0.00	1.60	3.19	0.87	4.45	52.36
Bright Orange Encrusting Sponge	1.59	0.00	3.08	1.19	4.30	56.66
Geodia regina	0.19	1.52	2.95	1.11	4.11	60.78
Unknown Orange Encrusting Sponge	1.10	0.55	2.48	0.89	3.46	64.23
Orange/Yellow Encrusting Sponge	0.38	1.02	2.31	1.01	3.22	67.46
Green/Brown Algae	0.99	0.00	1.97	1.06	2.75	70.20

Groups
South Aldermen Islands Drop 03 & SE Channel Island Drop 28
Average dissimilarity = 70.57

	South Aldermen Islands Drop 03	SE Channel Island Drop 28				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
Crustose Coralline Algae	3.67	0.00	6.65	2.61	9.43	9.43
Stelletta conulosa	1.46	5.12	6.60	2.24	9.36	18.79
Biological Matrix	4.58	1.96	5.45	1.49	7.73	26.51
Sediment	4.26	5.72	3.79	1.42	5.37	31.88
Branching Hydroid	2.27	0.48	3.73	1.25	5.28	37.17
Yellow/Grey Encrusting Sponge	0.00	1.88	3.35	2.16	4.75	41.92
Red Algae	1.68	0.00	2.98	1.92	4.22	46.14
Psammocinia hawere	0.00	1.60	2.88	0.87	4.09	50.22
Geodia regina	0.10	1.52	2.66	1.10	3.77	53.99
Green/Brown Algae	1.44	0.00	2.56	2.34	3.63	57.63
Ecionemia alata	1.04	0.58	2.06	1.02	2.92	60.54
Dark Red Encrusting Sponge	1.10	0.00	1.94	0.90	2.75	63.29
Other Branching Bryozoan	1.10	0.00	1.92	0.58	2.73	66.02
Unknown Orange Encrusting Sponge	0.72	0.55	1.87	0.82	2.65	68.67
Orange/Yellow Encrusting Sponge	0.23	1.02	1.85	1.00	2.62	71.29

Groups
South Aldermen Islands Drop 06 & SE Channel Island Drop 28
Average dissimilarity = 80.48

	South Aldermen Islands Drop 06	SE Channel Island Drop 28				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
Biological Matrix	7.79	1.96	11.14	2.54	13.85	13.85
Stelletta conulosa	0.00	5.12	9.68	3.79	12.03	25.87
Sediment	2.39	5.72	6.34	1.95	7.88	33.75
Small White Arborescent Sponge	2.62	0.00	4.90	2.29	6.09	39.84
Yellow/Grey Encrusting Sponge	0.00	1.88	3.52	2.18	4.38	44.22
Other Branching Bryozoan	1.62	0.00	3.04	2.81	3.77	47.99
Psammocinia hawere	0.00	1.60	3.03	0.87	3.77	51.75
Geodia regina	0.00	1.52	2.83	1.07	3.51	55.27
Branching Hydroid	1.16	0.48	2.01	2.27	2.50	57.77
Orange/Yellow Encrusting Sponge	0.00	1.02	1.88	0.97	2.33	60.10
Other Tubular Sponge	0.97	0.00	1.83	1.38	2.27	62.37
Pale Orange Amorphous Sponge	0.94	0.00	1.79	1.07	2.22	64.59
White Encrusting Sponge	0.87	0.00	1.63	0.70	2.03	66.62
Pale Yellow Encrusting Sponge	0.83	0.00	1.56	1.08	1.94	68.56
Yellow Encrusting Sponge	0.09	0.82	1.50	0.79	1.86	70.43

Groups
South Aldermen Islands Drop 07 & SE Channel Island Drop 28
Average dissimilarity = 71.50

	South Aldermen Islands Drop 07	SE Channel Island Drop 28				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
Stelletta conulosa	0.78	5.12	7.36	2.43	10.29	10.29
Biological Matrix	5.70	1.96	6.45	1.74	9.02	19.31
Sediment	4.33	5.72	3.24	1.38	4.54	23.85
Other Branching Bryozoan	1.91	0.00	3.12	1.62	4.36	28.22
Yellow/Grey Encrusting Sponge	0.00	1.88	3.11	2.16	4.36	32.57

Xestospongia sp.	1.74	0.00	2.90	2.62	4.05	36.62
Psammocinia hawere	0.00	1.60	2.68	0.87	3.74	40.36
Geodia regina	0.25	1.52	2.50	1.10	3.50	43.87
Crustose Coralline Algae	1.34	0.00	2.25	1.72	3.15	47.01
Suberites sp.	1.18	0.26	1.92	1.02	2.69	49.70
Unknown Orange Encrusting Sponge	1.23	0.55	1.90	1.16	2.66	52.36
Other Tubular Sponge	1.14	0.00	1.88	1.60	2.64	55.00
Fasciospongia turgida	1.15	0.00	1.87	1.02	2.62	57.62
Colonial Ascidian	1.15	0.13	1.85	1.34	2.58	60.20
Yellow Encrusting Sponge	1.01	0.82	1.78	1.18	2.49	62.69
Orange/Yellow Encrusting Sponge	0.00	1.02	1.66	0.97	2.33	65.02
Bright Orange Encrusting Sponge	0.93	0.00	1.52	1.11	2.13	67.15
Branching Hydroid	0.77	0.48	1.45	1.04	2.03	69.19
Other Globular Sponge	0.97	0.32	1.42	1.30	1.99	71.18

Groups
Cradock Channel Drop 13 & SE Channel Island Drop 28
Average dissimilarity = 75.36

	Cradock Channel Drop 13	SE Channel Island Drop 28				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
Stelletta conulosa	0.25	5.12	8.77	3.28	11.63	11.63
Biological Matrix	5.75	1.96	7.10	1.71	9.42	21.05
Ecionemia alata	3.86	0.58	6.01	1.86	7.97	29.03
Sediment	2.86	5.72	5.25	1.65	7.00	36.03
Red Algae	2.17	0.00	3.89	4.09	5.16	41.19
Yellow/Grey Encrusting Sponge	0.00	1.88	3.35	2.16	4.45	45.63
Crustose Coralline Algae	1.85	0.00	3.29	2.29	4.37	50.01
Green/Brown Algae	1.72	0.00	3.06	1.89	4.06	54.06
Psammocinia hawere	0.37	1.60	2.88	0.95	3.83	57.89
Colonial Ascidian	1.59	0.13	2.77	1.12	3.68	61.57
Crinoid	1.51	0.00	2.68	1.61	3.56	65.13
Geodia regina	1.23	1.52	2.64	1.26	3.50	68.63
Iophon sp.	1.41	0.00	2.46	0.78	3.26	71.89

Groups
SW Mokohinau Islands Drop 15 & SE Channel Island Drop 28
Average dissimilarity = 78.03

	SW Mokohinau Islands Drop 15	SE Channel Island Drop 28				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
Stelletta conulosa	0.00	5.12	9.36	3.80	11.99	11.99
Crustose Coralline Algae	5.14	0.00	9.35	10.01	11.98	23.97
Green/Brown Algae	4.25	0.00	7.75	7.64	9.93	33.90
Red Algae	2.55	0.00	4.65	3.52	5.96	39.86
Unknown Orange Encrusting Sponge	2.61	0.55	4.12	1.56	5.28	45.13
Sediment	3.72	5.72	4.08	1.63	5.23	50.37
Biological Matrix	3.42	1.96	4.06	1.50	5.21	55.58
Yellow/Grey Encrusting Sponge	0.00	1.88	3.40	2.17	4.36	59.94
Psammocinia hawere	0.00	1.60	2.93	0.87	3.75	63.69
Colonial Ascidian	1.68	0.13	2.88	2.01	3.69	67.38
Geodia regina	0.00	1.52	2.73	1.07	3.50	70.88

South Mokohinau Islands Drop 17 & SE Channel Island Drop 28
Average dissimilarity = 84.48

	South Mokohinau Islands Drop 17	SE Channel Island Drop 28

Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
Stelletta conulosa	0.22	5.12	7.59	3.29	8.99	8.99
Sediment	1.61	5.72	6.41	2.52	7.59	16.58
Crustose Coralline Algae	3.90	0.00	6.03	4.99	7.13	23.72
Biological Matrix	4.76	1.96	4.72	1.55	5.59	29.30
Colonial Ascidian	3.02	0.13	4.45	3.72	5.27	34.58
Dysidea sp.	2.24	0.00	3.49	2.08	4.13	38.71
White Spiky Encrusting Sponge	2.10	0.00	3.20	2.57	3.79	42.50
Yellow/Grey Encrusting Sponge	0.00	1.88	2.89	2.16	3.42	45.92
Red Algae	1.69	0.00	2.65	2.24	3.14	49.05
Green/Brown Algae	1.71	0.00	2.64	2.72	3.12	52.18
Psammocinia hawere	0.00	1.60	2.48	0.87	2.94	55.12
Geodia regina	0.00	1.52	2.32	1.07	2.75	57.87
Unknown Yellow/Green Sponge	1.50	0.00	2.29	1.39	2.70	60.57
Suberites sp.	1.60	0.26	2.21	1.78	2.61	63.18
Raspailia topsenti	1.40	0.00	2.14	1.52	2.53	65.72
Unknown Orange Encrusting Sponge	1.45	0.55	1.87	1.37	2.21	67.93
Orange/Yellow Encrusting Sponge	0.19	1.02	1.55	1.08	1.84	69.77
Other Branching Bryozoan	0.96	0.00	1.46	1.25	1.73	71.50

Groups
Burgess Island Drop 19 & SE Channel Island Drop 28
Average dissimilarity = 75.35

	Burgess Island Drop 19	SE Channel Island Drop 28				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
Stelletta conulosa	0.00	5.12	7.97	3.84	10.58	10.58
Biological Matrix	5.41	1.96	5.57	1.69	7.40	17.97
Other Branching Bryozoan	2.22	0.00	3.43	2.40	4.55	22.52
Small White Arborescent Sponge	2.17	0.00	3.38	1.76	4.49	27.02
Sediment	3.83	5.72	3.28	1.49	4.35	31.37
Colonial Ascidian	2.04	0.13	2.96	2.87	3.93	35.30
Yellow/Grey Encrusting Sponge	0.53	1.88	2.60	1.92	3.46	38.75
Unknown Yellow/Green Sponge	1.63	0.00	2.54	2.53	3.38	42.13
Psammocinia hawere	1.19	1.60	2.49	0.93	3.31	45.44
Geodia regina	0.00	1.52	2.34	1.07	3.10	48.54
Dysidea sp.	1.29	0.00	2.02	1.46	2.68	51.22
Branching Hydroid	1.52	0.48	2.02	1.43	2.68	53.90
Raspailia topsenti	1.18	0.00	1.82	1.29	2.41	56.32
Yellow/Brown Massive Sponge	1.17	0.00	1.79	1.58	2.38	58.69
Orange/Yellow Encrust. Sponge	0.84	1.02	1.78	1.12	2.36	61.05
White/Cream Amorph. Sponge	1.14	0.00	1.74	0.97	2.31	63.36
Yellow Encrusting Sponge	0.78	0.82	1.58	1.08	2.10	65.46
Ciocalypta cf. *penicillus*	1.06	0.09	1.52	2.04	2.02	67.48
White Spiky Encrusting Sponge	0.80	0.00	1.24	1.11	1.64	69.12
White/Cream Massive Sponge	0.36	0.61	1.17	0.82	1.55	70.67

Groups
Burgess Island Drop 21 & SE Channel Island Drop 28
Average dissimilarity = 74.20

	Burgess Island Drop 21	SE Channel Island Drop 28				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
Red Algae	4.17	0.00	7.16	10.68	9.66	9.66
Green/Brown Algae	4.14	0.00	7.13	3.53	9.61	19.27
Stelletta conulosa	1.70	5.12	6.07	1.69	8.18	27.45
Crustose Coralline Algae	2.88	0.00	4.95	4.44	6.67	34.12
Sediment	3.37	5.72	4.16	1.90	5.60	39.72
Biological Matrix	3.46	1.96	4.06	1.43	5.48	45.20
Other Branching Bryozoan	2.19	0.00	3.75	2.03	5.05	50.25
Steginoporella neozelanica	2.16	0.00	3.73	2.49	5.02	55.27
Yellow/Grey Encrusting Sponge	0.00	1.88	3.21	2.17	4.33	59.60
Psammocinia hawere	0.00	1.60	2.76	0.87	3.72	63.32
Geodia regina	0.29	1.52	2.51	1.12	3.39	66.71
Ecionemia alata	0.94	0.58	1.81	1.04	2.44	69.15
Orange/Yellow Encrusting Sponge	0.00	1.02	1.72	0.97	2.31	71.46

Groups
West Atihau Island Drop 24 & SE Channel Island Drop 28
Average dissimilarity = 81.93

	West Atihau Island Drop 24	SE Channel Island Drop 28				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
Stelletta conulosa	0.42	5.12	8.25	2.71	10.06	10.06
Green/Brown Algae	4.15	0.00	7.21	5.48	8.80	18.86
Sediment	2.04	5.72	6.45	2.12	7.87	26.74
Biological Matrix	5.18	1.96	6.05	1.65	7.39	34.13
Red Algae	3.33	0.00	5.83	2.73	7.12	41.25
Other Branching Bryozoan	2.73	0.00	4.73	2.34	5.78	47.03
Crustose Coralline Algae	2.05	0.00	3.55	2.19	4.34	51.36
Yellow/Grey Encrusting Sponge	0.09	1.88	3.12	2.06	3.80	55.16
Psammocinia hawere	0.00	1.60	2.79	0.87	3.41	58.57
Geodia regina	0.00	1.52	2.61	1.06	3.18	61.75
Yellow Encrusting Sponge	0.92	0.82	2.04	0.93	2.49	64.25
Crinoid	1.18	0.00	2.01	1.12	2.45	66.69
Steginoporella neozelanica	1.14	0.00	1.98	1.09	2.42	69.11
Orange/Yellow Encrusting Sponge	0.00	1.02	1.73	0.97	2.11	71.23

Groups
SE Channel Island Drop 25 & SE Channel Island Drop 28
Average dissimilarity = 60.59

	SE Channel Island Drop 25	SE Channel Island Drop 28				
Species	Av. Abund	Av. Abund	Av. Diss	Diss/SD	Contrib%	Cum.%
Stelletta conulosa	1.59	5.12	6.75	1.74	11.15	11.15
Biological Matrix	3.04	1.96	4.25	1.46	7.01	18.16
Yellow/Grey Encrusting Sponge	0.00	1.88	3.47	2.15	5.73	23.89
Sediment	7.21	5.72	3.31	1.35	5.46	29.36
Psammocinia hawere	0.77	1.60	3.10	1.04	5.11	34.47
Geodia regina	0.37	1.52	2.93	1.09	4.84	39.31
Globular sponges (including *Aaptos globosum, Tethya* sp. & *Polymastia hirsuta)*	1.17	0.09	2.15	1.35	3.54	42.85
Polymastia crocea	1.12	0.13	2.07	1.27	3.42	46.27
Unknown Orange Encrusting Sponge	1.30	0.55	2.00	1.25	3.30	49.57
Pale Yellow Encrusting Sponge	1.08	0.13	1.97	0.99	3.25	52.82
Orange/Yellow Encrusting Sponge	0.00	1.02	1.85	0.96	3.06	55.88
Desmacidon mamillatum	0.97	0.00	1.85	1.29	3.06	58.93
Other Massive Sponge	0.79	0.54	1.81	0.93	2.99	61.92
Steginoporella neozelanica	0.97	0.00	1.79	1.10	2.95	64.87
Yellow Encrusting Sponge	0.44	0.82	1.71	0.94	2.82	67.69
Ecionemia alata	0.61	0.58	1.69	0.84	2.79	70.49