Great Southern Energy Pty Ltd
(T/A Delta Coal)
Mannering & Chain Valley Collieries

Seagrass Survey of Chain Valley Bay, Summerland Point, Bardens Bay and Crangan Bay, Lake Macquarie, NSW

by Dr Emma Laxton

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J.H. & E.S. Laxton - Environmental Consultants P/L
170 Warrimoo Avenue, St Ives, Sydney, 2075. Australia
T: 0429 85589. Email: emmalaxton07@gmail.com

Summary

From 2011, fourteen stations in Chain Valley Bay, ten off Summerland Point and four in Crangan Bay were surveyed for seagrass cover. In 2014 six stations in Bardens Bay were added to the sampling schedule, and by 2018, 50 seagrass transects were being surveyed.

The average length of transects in Chain Valley Bay, Summerland Point and Brightwaters was 56.9m, 59.9m and 55.1m respectively. The average length of transect in Bardens Bay was 26.6m. The transects with the greatest length were Transects E9 (152m), F2 (131m) and S4 (105m). The transects with the shortest lengths were Transects T2, C6 and A6, all approximately 14m in length.

In June 2021, two seabed elevations had changed by more than 150mm from the initial seabed heights recorded. These were E9 outer and E16 inner. These transects are in the Chain Valley Bay region where no mining has occurred since 24 December 2017. Seagrass coverage at these transects were 100% and 98.75% respectively.

Water Temperature ranged from 13.63ºC to 17.18ºC, with a mean water temperature of 17.18ºC. Conductivity ranged from 50.02 mS/cm to 52.03 mS/cm. Mean conductivity was 50.91 mS/cm. Salinity ranged from 32.7 ppt to 34.23 ppt. Mean salinity was 33.39 ppt. Turbidity ranged from 0.3 NTU to 7.8 NTU, with a mean of 4.22 NTU. pH ranged from 7.94 to 8.13. Mean pH was 8.03. Dissolved oxygen (% saturation) ranged from 82.6% to 141.1%. Mean dissolved oxygen was 102.3% saturation. Super saturation of dissolved oxygen was the result of oxygen production by the seagrass and epiphytic algae.

The growth form of *Zostera capricorni* in the Summerland Point, Frying Pan Bay and Sugar Bay region and the Crangan Bay region was predominantly short leaved. The growth form of *Z. capricorni* in Chain Valley Bay and Bardens Bay was long leaved.

Since 2008, seagrass coverage has been increasing throughout the study area, and percentage cover has been consistent since 2012. Initial seagrass coverage at transect E6 was 17.74% in 2008. In 2021, percent seagrass cover had risen to 99.78%. Initial seagrass cover at transect T3 was 46.2%. Coverage has now increased to 98%. In June 2021, seagrass cover ranged from 91.0 percent to 100 percent. The health and condition of the seagrasses were fair, with most seagrasses lightly to moderately fouled with epiphytic algae. Nine out of the fifty transects had quadrats with heavily fouled seagrass.

The increase in percent cover of seagrasses marks the decrease in bare ground in the study area:

- from 38.13 percent in 2011 to 2 percent in 2021 in the Summerland Point, Frying Pan Bay and Sugar Bay region
- from 13.32 percent in 2011 to 0.26 percent in 2021 in the Chain Valley Bay region
- a decrease of bare ground in the Crangan Bay region from 26.98 percent in 2011 to 1.32 percent in 2021
- Seagrass cover in Bardens Bay has been around 95 percent since 2011.

The brown seaweed *Cystophyllum onustum* was observed at Transects E2, E4, E6, T1, T6, C1, C5, F1, F2, S1, S5, S6 and L1. The bivalve mollusc *Pinna menkei* was observed at transects C1-C4, C6, F2-F4, F6 and S6.

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1. Introduction

Lake Macquarie is the largest saline lake in New South Wales. It lies on the central coast between Sydney and Newcastle within the local government areas of Wyong Shire and Lake Macquarie City. Lake Macquarie has a catchment of 700 square kilometers and a water surface area of 125 square kilometers (Bell & Edwards, 1980). The lake has a permanent entrance to coastal waters at Swansea and has an average depth of around 6 meters (Laxton, 2005).

The catchment of Lake Macquarie is largely rural with large areas of bushland and grazing land. The shoreline of Lake Macquarie is heavily urbanized, especially the eastern, western and northern shorelines. The region has a relatively long history of coal mining and power generation, with mining occurring since the late 1800s and the first power station at Lake Macquarie commencing operations in 1958.

Chain Valley Colliery is situated on the southern shores of Lake Macquarie near Mannering Park, NSW. The mine has been operating since 1963. Mining is continuing within the Chain Valley Coal Lease Area using the miniwall method. Prior to mining, there were three economically viable seams in the lease area, namely the Wallarah seam (mined completely of coal by 1997); the Great Northern seam, and the Fassifern seam. In 2018 Chain Valley Colliery went into voluntary receivership and was taken over by Delta Coal to provide coal for Vales Point Power Station.

Delta Coal is mining the Fassifern Seam beneath Lake Macquarie. As part of the protection of the lake foreshore, the mining leases require a protection zone. This zone, known as the High Water Mark (HWM) Subsidence Barrier, was calculated using a 35^{o} angle of draw from the depth of mining. The zone is approximately 130 meters wide. J.H. & E.S. Laxton – Environmental Consultants P/L was engaged by Mr. Keith Harris of Chain Valley Colliery in 2007 to assess the potential effects of pillar extraction mining beneath Lake Macquarie on seagrasses, benthic fauna and bathymetry. The studies were supervised by:

- Mr Chris Ellis of LDO Group from 2012 to 2015
- Mr Wade Covey from 2016 to 2018
- Mr Chris Armit from 2019 to 2020, and
- Mr Lachlan McWha in 2021.

2. Previous surveys

J.H. & E.S. Laxton – Environmental Consultants P/L was engaged in 2007 to provide the following:

- a bathymetric survey of the study area
- a soft bottom benthic survey of the study area and
- a seagrass survey of the western and eastern shorelines in the area proposed for underground mining.

The bathymetric and benthic surveys were conducted on 30th and 31st July 2007 by Dr John H. Laxton and Dr Emma Laxton of J.H. & E.S. Laxton – Environmental Consultants P/L and Mr Robert Payne of Ecological Surveys & Management, and the seagrass survey was conducted by John Laxton and Emma Laxton on 27th August 2007. A report entitled:

> Peabody/Lake Coal. Chain Valley Colliery. *Aquatic Biology of Chain Valley Bay Lake Macquarie, NSW* by Emma Laxton and John H. Laxton. August 2007

was prepared.

This report drew attention to the following:

- There was only one species of seagrass present in the lease area of Chain Valley Bay in 2007. It was *Zostera capricorni.* (Later surveys in 2010, 2013-2015, 2017 and 2020 found the small seagrass *Halophila ovalis* also in the study area.)
- There could be changes to the distribution and density of seagrass beds in Chain Valley Bay that were unrelated to underground coal mining.
- It was recommended that an annual survey of seagrass beds in Chain Valley Bay be carried out over the life of the current proposal to mine the Fassifern seam.
- A pre-mining survey carried out in June/July 2008 would establish baseline conditions of seagrass beds in Chain Valley Bay.

NSW Department of Industry and Investment and Fisheries Divisions both accepted this recommendation.

A meeting was held on 17th April 2008 attended by Mine Environment Manager Mr Shaun McDonell (Contact: 02 43580880), Mr Owen Farrugia (a former Manager of Mining Engineering Chain Valley Colliery), Mr James Sakker of NSW Department of Primary Industries, Fisheries Division (contact: 02 49163955) and Drs John and Emma Laxton of J.H. & E.S. Laxton – Environmental Consultants P/L (contact: 0429 855891).

At this meeting, and at subsequent discussions between NSW Government Departments and the mine management, the following programme was agreed upon:

- Ten experimental transects through the seagrass beds were to be established in the area to be mined in Chain Valley Bay. Four control transects were to be established in Crangan Bay, Lake Macquarie.
- The outer ends of the transects were to be marked by cast concrete blocks fitted with subsurface buoys.
- Differential GPS survey methods were to be used to establish the precise location and height of the lakebed at the inner and outer ends of each transect in Chain Valley Bay. This procedure was used to establish the baseline to detect any subsidence of the lakebed due to underground mining.
- Seagrass distribution, density, and condition along each transect was to be recorded using a video camera enclosed within a waterproof housing and mounted on a floating platform.

The work was supervised by Mr Keith Harris of Lake Coal. A report entitled:

> Chain Valley Colliery. *Seagrass survey of Chain Valley Bay, Lake Macquarie, NSW* by Dr John H. Laxton and Dr Emma Laxton. July 2008.
> was produced.

In 2009, a further survey of the Lake along Summerland Point (Domain No. 2) was carried out. The following aspects were investigated:

- a bathymetric survey of the study area was undertaken,
- a soft bottom benthic survey of the study area was carried out,

- a survey to determine the maximum seaward extent of the seagrass beds and the maximum depth at which they occurred was undertaken,
- a photographic seagrass survey of the shoreline of Summerland Point in the area proposed for underground mining was carried out (the original ten experimental stations and four control stations). In addition, eight new permanent transects (T1 to T8) were established and surveyed using the underwater video camera.

A report entitled: Peabody Energy – Chain Valley Colliery*. Aquatic Biology of Domain No. 2 off Summerland Point, Lake Macquarie, NSW.* Emma and John H. Laxton. July 2009 was prepared.

In June 2010 a survey of all 22 permanent seagrass transects was carried out, including a survey, using differential GPS, to determine the elevation and location of the inner and outer ends of each transect (by Pearson & Associates Pty. Ltd.).

In June 2011, along with the 22 permanent seagrass transects, a further 6 transects were surveyed along the eastern shoreline of Chain Valley Bay (**Figure 4.1**).

In June 2012 and June 2013, 28 transects were surveyed using the underwater video camera mounted on the floating platform. The lakebed heights of the inner and outer ends of each transect (excluding the control transects in Crangan Bay) were measured by Pearson and Associates Pty. Ltd.

In 2014, LDO Lake Coal had new plans to mine coal beneath Bardens Bay. Mr Chris Ellis required the 2014 seagrass survey to be brought forward to April so that baseline data on seagrasses and lakebed levels in Bardens Bay were available before mining commenced. Six new seagrass transects were established in Bardens Bay (A1 to A6 - **Figure 4.2**). Documents were required for submission by 23rd June 2014. It was found that Bardens Bay around Trinity Point on the southern side had deep water. Seagrasses consequently only occupied a narrow band along the shoreline. At the tip of Trinity Point, rocks outcrop at the shoreline leaving no room for seagrasses.

In 2015, the seagrass survey was conducted between 24th and 26th May. It was instructed that transects E10 to E16, located in Chain Valley Bay, were not to be surveyed as mining was not to occur in that area. A new Transect L1 was established and photographed.

The seagrass survey in 2016 was undertaken between 14th and 16th June. Very rough weather with heavy rainfall preceded the survey.

In June 2017, all established seagrass transects (35) were re-photographed. The weather prior to sampling included a period of heavy rain which caused the water transparency in the lake to deteriorate. Seagrass photography was delayed until the lake water cleared.

In 2018 the seagrass survey was carried out between 18th and 19th May. Fifteen new seagrass transects were added to the sampling schedule, bringing the total number of transects sampled to 50.

The 2019 seagrass survey was carried out between June 25th and June 27th, and the 2020 survey was conducted between 18th and 20th May.

3. Seagrass survey - June 2021

The determination of the elevations of the inner and outer ends of the transects by differential GPS was undertaken on 25 June 2021. This phase of the work was carried out by Mr Samuel Booth of Daly.Smith Pty Ltd (02 4973 2745) of Morisset.

The seagrass survey was conducted on the 15th, 16th and 23rd June 2021 (purchase order No. D123619).

Methods

Surveying Methods

Daly.Smith P/L established base stations for their differential GPS equipment along the shore of Chain Valley Bay. A measured carbon fibre staff fitted with a 110mm diameter aluminium base plate (to prevent penetration into the sediment) was attached to the end of the staff. Survey data (x, y & z coordinates) were recorded on a separate hand piece. Communication between the GPS receiver, the base stations and the hand piece was by coded radio signals.

The boat was maneuvered into position at the inshore end of each transect. The staff was placed on the lakebed and held vertically until the observation was made and recorded. Next, the boat was moved outwards from the shore where intermediate points along the transect were established and recorded. When the outer end of the transect was reached, the staff was placed on the exact coordinates and the position and height of the lakebed were recorded.

The memory of the handheld computer was downloaded, and the following plots were made:

- A map of the position of transects in Chain Valley Bay, Summerland Point, Bardens Bay, Sugar Bay and Frying Pan Bay.
- A table of the coordinates of the inner and outer ends of each transect and the coordinates of the base stations.
- The elevations of the seabed at the inner and outer ends of each transect, relative to AHD, were established and tabulated.

Seagrass photography

A Sony Handycam 6.1 megapixel video camera (DCR-SR300E) with 40 GB hard drive fitted with a wide conversion X0.7 lens (VCL-HG737C) was inserted into an underwater housing. The underwater housing was mounted vertically in the centre of a 1m long surfboard. This rig was towed alongside a work boat. Best photographic results were obtained when the boat and photographic rig were poled very slowly along the transect line on windless days.

The water depth along most of the transect lines ranged from around 0.5 to 1.2m (depending upon the lake water level). At the end of the transect line the water depth could be around 1.8m. Transect lines were photographed from the outer end to the inner end.

The hard drive of the video camera was downloaded to a desk top computer. The videos were played using VLC Media Player. The film was paused at around 1m intervals along the transect line. Each still frame was examined, and the following information recorded into an Excel spreadsheet:

1. The transect number and the date the video was taken.
2. The percentage areas occupied by the following plants and animals in each still photograph or quadrat:
   (a) % area occupied by long leaved seagrass *Zostera capricorni*;
   (b) % area occupied by short leaved seagrass *Zostera capricorni*;
   (c) % area occupied by the small seagrass *Halophila ovalis*;
   (d) degree of fouling of the seagrass leaves by algae 1=no fouling, 2=light fouling, 3=heavy fouling;
   (e) % area occupied by the large brown alga (*Sargassum* sp., *Hormosira banksii or Cystoseira trinodis*);
   (f) % area occupied by filamentous and thallous algae (green or brown algae);
   (g) Number of the large bivalve *Pinna menkei*;
   (h) % area of uncolonised ground (bare ground, no macroscopic epibenthos).

4. Locations of permanent seagrass transects

Figures 4.1, 4.2 and 4.3 show the location of seagrass transects in Chain Valley Bay, Summerland Point, Bardens Bay, Brightwaters and Crangan Bay. From 2018 to 2021, a total of 50 transects were photographed annually:

- Transects E1 to E16 are established experimental transects in Chain Valley Bay and Summerland Point (**Figure 4.1**)
- Transects T1 to T8 are established experimental transects along Summerland Point (**Figure 4.1**)
- Transects C1 to C4 are established control stations in Crangan Bay (**Figure 4.1**)
- Transect L1 was established in Chain Valley Bay in 2015 (**Figure 4.1**)
- Transects A1 to A6 are establised experimental stations in Bardens Bay. They were first surveyed in 2014 (**Figure 4.2**)
- Transects C5 to C6 were estabished in 2018 (**Figure 4.3**)
- Transects F1 to F7 in Brightwaters Bay were established in 2018 (**Figure 4.3**), and
- Transects S1 to S6 were established in Sugar Bay in 2018 (**Figure 4.3**).

Figure 4.1 Locations of Transects in Chain Valley Bay, Summerland Point and Crangan Bay, Lake Macquarie.

Figure 4.2 Locations of Transects A1 to A6 in Bardens Bay, Lake Macquarie established in 2014.

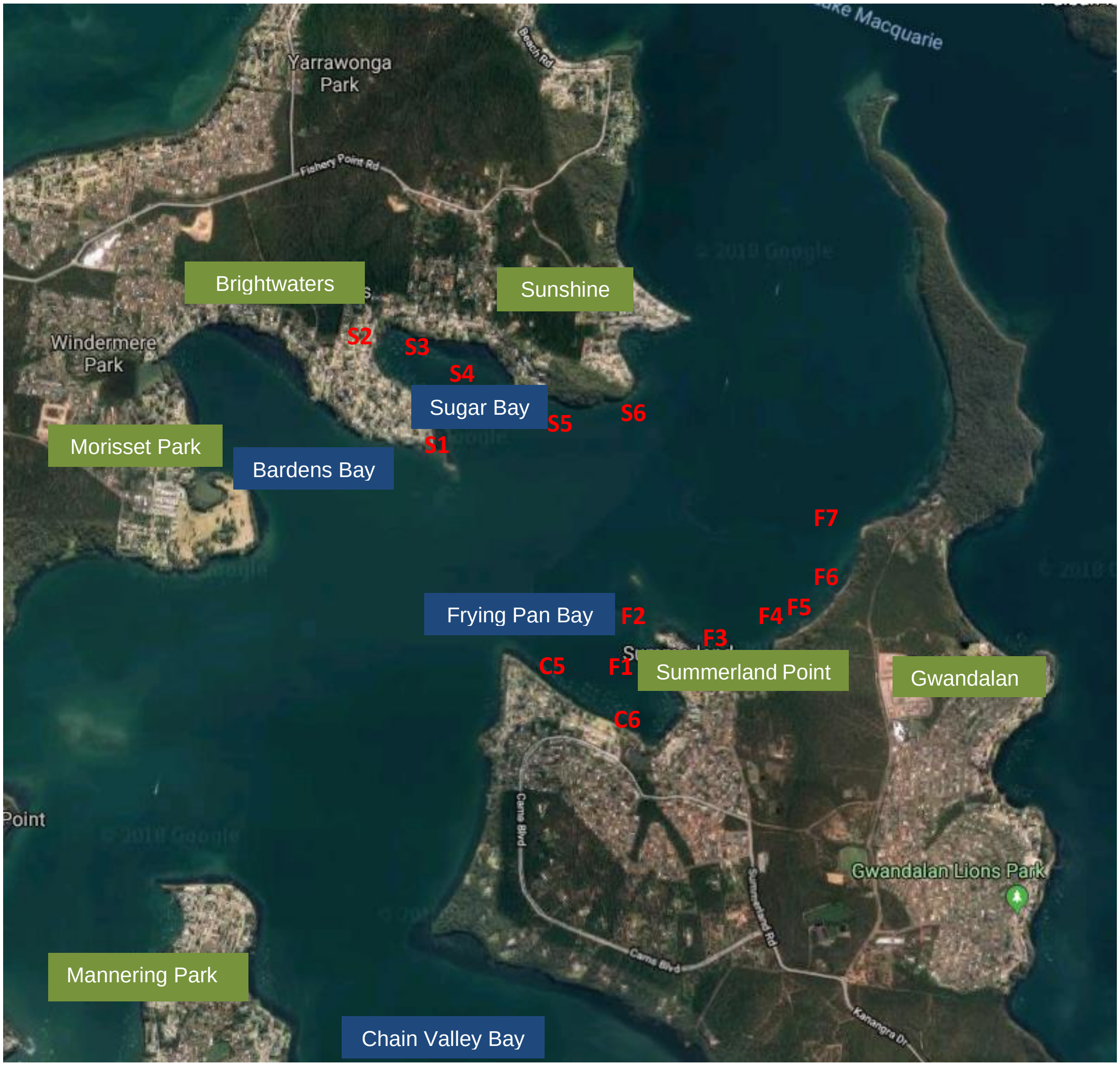

Figure 4.3 Location of transects C5-C6, F1-F7 and S1-S6 in Lake Macquarie established in 2018.

Tables 4.1 to 4.5 show the precise locations of the inner and outer ends of the permanent seagrass monitoring transects in Chain Valley Bay, Summerland Point, Bardens Bay, Crangan Bay and Brightwaters as determined by differential GPS.

Transects in Crangan Bay were for biological purposes only and did not require precise locations (handheld GPS coordinates were sufficient to re-locate them).

Table 4.1 Coordinates of inner and outer ends of permanent seagrass transects in Chain Valley Bay

Transect No.	Easting	Northing	Transect No.	Easting	Northing
E1 Inner	56363985.56	6331796.12	**E1 Outer**	56364003.66	6331816.06
E2 Inner	56364035.74	6331701.21	**E2 Outer**	56364076.97	6331716.45
E3 Inner	56363953.19	6331404.63	**E3 Outer**	56364027.57	6331417.71
E4 Inner	56364220.41	6331078.04	**E4 Outer**	56364259.92	6331122.01
E5 Inner	56365005.52	6330163.60	**E5 Outer**	56365034.44	6330225.24
E6 Inner	56365118.34	6329788.72	**E6 Outer**	56365174.56	6329802.58
E7 Inner	56385350.74	6332350.32	**E7 Outer**	56365297.96	6332344.97
E8 Inner	56365128.31	6331795.44	**E8 Outer**	56365096.58	6331811.56
E9 Inner	56365040.02	6331607.80	**E9 Outer**	56364913.26	6331523.98
E10 Inner	56365422.82	6331427.70	**E10 Outer**	56365394.86	6331361.84
E11 Inner	56365554.10	6331410.24	**E11 Outer**	56365524.31	6331343.51
E12 Inner	56365749.60	6331328.35	**E12 Outer**	56365735.31	6331284.62
E13 Inner	56365990.71	6331278.46	**E13 Outer**	56365970.44	6331190.80
E14 Inner	56366447.51	6331046.57	**E14 Outer**	56366370.49	6330984.28
E15 Inner	56366657.26	6330098.71	**E15 Outer**	56366610.88	6330167.27
E16 Inner	56366310.52	6329644.48	**E16 Outer**	56366272.93	6329666.33
T1 inner	56365439.70	6333217.30	**T1 outer**	56365442.62	6333264.67
T2 inner	56365402.69	6333100.83	**T2 outer**	56365388.27	6333100.67
T3 inner	56365400.34	6332951.79	**T3 outer**	56365384.15	6332949.28
T4 inner	56365377.42	6332816.19	**T4 outer**	56365357.10	6332831.62
T5 inner	56365350.31	6332990.09	**T5 outer**	56365309.37	6332575.63
T6 inner	56365347.91	6332380.19	**T6 outer**	56365300.00	6332337.91
T7 inner	56365320.68	6332207.46	**T7 outer**	56365267.96	6332206.74
T8 inner	56365336.86	6332262.46	**T8 outer**	56365295.11	6332270.42
L1 inner	56364292.62	6330367.65	**L1 outer**	56364304.40	6330399.71

Table 4.2 Coordinates of inner and outer ends of permanent seagrass transects off Summerland Point

Transect No.	Easting	Northing	Transect No.	Easting	Northing
C5 inner	56365676.16	6333038.68	C5 outer	56365702.98	6333084.58
C6 inner	56366045.20	6332831.77	C6 outer	56366058.95	6332870.63
F1 inner	56366320.96	6333281.31	F1 outer	56366285.58	6333249.79
F2 inner	56366342.19	6333330.55	F2 outer	56366290.92	6333450.31
F3 inner	56366611.11	6333163.11	F3 outer	56366621.00	6333228.01
F4 inner	56366968.01	6333242.46	F4 outer	56366918.81	6333285.18
F5 inner	56367106.95	6333361.98	F5 outer	56367068.97	6333421.28

F6 inner	56367271.10	6333493.19	F6 outer	56367202.42	6333522.83
F7 inner	56367402.36	6333682.09	F7 outer	56367374.73	6333694.93

Table 4.3 Coordinates of inner and outer ends of permanent seagrass transects in Bardens Bay.

Transect No.	Easting	Northing	Transect No.	Easting	Northing
A1 inner	56364006.28	6333892.16	A1 outer	56364048.43	6333899.34
A2 inner	56363979.36	6334006.51	A2 outer	56364002.16	6334013.22
A3 inner	56363918.06	6334157.90	A3 outer	56363927.53	6334165.80
A4 inner	56363633.48	6334426.20	A4 outer	56363660.06	6334425.14
A5 inner	56363686.18	6335068.50	A5 outer	56363688.41	6335049.82
A6 inner	56364434.63	6334566.67	A6 outer	56364422.84	6334560.15

Table 4.4 Coordinates of inner and outer ends of permanent seagrass transects in Crangan Bay.

Transect No.	Easting	Northing	Transect No.	Easting	Northing
C1 Inner	56368596	6332235	C1 Outer	56368616	6332250
C2 Inner	56368619	6332147	C2 Outer	56368658	6332151
C3 Inner	56368524	6331811	C3 Outer	56368538	6331806
C4 Inner	56368467	6331435	C4 Outer	56368486	6331421

Table 4.5 Coordinates of inner and outer ends of permanent seagrass monitoring transects off Brightwaters.

Transect No.	Easting	Northing	Transect No.	Easting	Northing
S1 inner	56365009.02	6334470.41	S1 outer	56365077.72	6334481.77
S2 inner	5636642.29	6334943.57	S2 outer	56364673.53	6334939.82
S3 inner	56365017.76	6335008.93	S3 outer	56365041.97	6334932.70
S4 inner	56365235.10	6334992.86	S4 outer	56365217.43	6334889.31
S5 inner	56365575.20	6334709.08	S5 outer	36365569.66	6334693.44
S6 inner	56366144.58	6334765.21	S6 outer	56366172.04	6334761.92

The outer end of Transect A3 was relocated in July 2015. It had initially been placed in water so deep the survey staff and GPS unit could not reach the lakebed. The end of the transect was therefore moved inshore to coincide with the outer edge of the seagrass bed.

5. Transect lengths

The length of each permanent transect is shown in **Table 5.1**.

Table 5.1 Transect lengths in Chain Valley Bay, Summerland Point, Bardens Bay and Brightwaters

Chain Valley Bay

Transect Number	Length (m)	Transect Number	Length (m)
Transect E1	26.25	**Transect E2**	44.60
Transect E3	75.09	**Transect E4**	59.30
Transect E5	67.45	**Transect E6**	57.97
Transect E7	52.44	**Transect E8**	35.36
Transect E9	152.68	**Transect E10**	71.01
Transect E11	73.21	**Transect E12**	46.22
Transect E13	89.54	**Transect E14**	98.63
Transect E15	82.85	**Transect E16**	44.26
Transect T1	47.48	**Transect T2**	14.39
Transect T3	16.32	**Transect T4**	25.14
Transect T5	49.14	**Transect T6**	63.53
Transect T7	52.90	**Transect T8**	42.36
Transect L1	20.00		

Summerland Point

Transect Number	Length (m)	Transect Number	Length (m)
Transect C5	41.57	**Transect C6**	13.67
Transect F1	47.11	**Transect F2**	130.55
Transect F3	65.64	**Transect F4**	65.04
Transect F5	70.46	**Transect F6**	74.81
Transect F7	30.47		

Bardens Bay

Transect Number	Length (m)	Transect Number	Length (m)
Transect A1	42.60	**Transect A2**	24.00
Transect A3	34.80	**Transect A4**	26.30
Transect A5	18.30	**Transect A6**	13.70

Brightwaters

Transect Number	Length (m)	Transect Number	Length (m)
Transect S1	69.64	**Transect S2**	31.46
Transect S3	79.98	**Transect S4**	105.05
Transect S5	16.60	**Transect S6**	27.67

The average length of transects in Chain Valley Bay, Summerland Point and Brightwaters was 56.9m, 59.9m and 55.1m respectively. The average length of transect in Bardens Bay was 26.6m. The transects with the greatest lengths were Transects E9 (152m), F2 (131m) and S4 (105m) (**Table 5.1**). The transects with the shortest lengths were Transects T2, C6 and A6, all approximately 14m in length (**Table 5.1**).

6. Changes in Elevation of the Lakebed

Table 6.1 shows the seabed heights at each permanent transect in Chain Valley Bay between the period 2013 to 2021. For Transects E1 to E10, the difference between seabed heights were calculated by subtracting the height gained in 2021 from the initial seabed heights recorded in 2008 (**Table 6.1**). Difference between seabed elevation for Transects E11 to E16 and T1 to T8 were calculated using the initial seabed height data from 2011 (**Table 6.1**) and 2010 respectively. Transect L1 calculations were determined by subtracting height data collected in 2021 from initial seabed height data collected in 2015 (not shown).

Table 6.1 Seabed heights at each transect for Chain Valley Bay (2008-2021)

Transect	2008	2011	2016	2017	2018	2019	2020	2021	Diff.
E1 Inner	-0.68	-0.75	-0.69	-0.70	-0.68	-0.66	-0.67	-0.691	**0.01**
E1 Outer	-1.00	-.1.07	-1.02	-1.02	-1.05	-0.99	-0.98	-1.019	**0.02**
E2 Inner	-0.64	-0.75	-0.67	-0.67	-0.69	-0.63	-0.67	-0.659	**0.02**
E2 Outer	-1.78	-1.64	-1.84	-1.85	-1.80	-1.76	-1.84	-1.788	**0.01**
E3 Inner	-0.32	-0.31	-0.33	-0.33	-0.31	-0.30	-0.35	-0.308	**-0.01**
E3 Outer	-2.34	-2.22	-2.33	-2.34	-2.38	-2.34	-2.33	-2.412	**0.07**
E4 Inner	-0.46	-0.52	-0.47	-0.46	-0.47	-0.46	-0.47	-0.429	**-0.03**
E4 Outer	-1.69	-1.72	-1.67	-1.66	-1.67	-1.56	-1.69	-1.642	**-0.05**
E5 Inner	-0.46	-0.53	-0.38	-0.39	-0.43	-0.35	-0.46	-0.354	**-0.11**
E5 Outer	-1.68	-1.72	-1.56	-1.57	-1.60	-1.53	-1.64	-1.592	**-0.09**
E6 Inner	-0.48	-0.53	-0.48	-0.44	-0.44	-0.48	-0.48	-0.411	**-0.07**
E6 Outer	-1.21	-1.27	-1.16	-1.16	-1.16	-1.14	-1.17	-1.156	**-0.05**
E7 Inner	-0.24	-0.24	-0.16	-0.19	-0.22	-0.22	-0.21	-0.212	**-0.03**
E7 Outer	-1.68	-1.77	-1.72	-1.77	-1.69	-1.66	-1.72	-1.751	**0.07**
E8 Inner	-0.27	-0.32	-0.31	-0.25	-0.34	-0.38	-0.34	-0.342	**0.07**
E8 Outer	-0.99	-1.13	-1.10	-1.00	-1.04	-1.01	-0.98	-0.989	**0.00**
E9 Inner	-0.19	-0.30	-0.30	-0.25	-0.29	-0.30	-0.27	-0.241	**0.05**
E9 Outer	-1.07	-1.10	-1.21	-1.17	-1.20	-1.31	-1.15	-1.287	**0.22**
E10 Inner	-0.45	-0.52	-0.43	-0.42	-0.43	-0.49	-0.48	-0.456	**0.01**
E10 Outer	-1.73	-1.89	-1.69	-1.70	-1.79	-1.80	-1.73	-1.699	**-0.03**
E11 Inner		-0.46	-0.37	-0.35	-0.37	-0.41	-0.37	-0.357	**-0.10**
E11 Outer		-1.12	-1.09	-1.08	-1.10	-1.14	-1.23	-1.104	**-0.02**
E12 Inner		-0.66	-0.59	-0.55	-0.56	-0.59	-0.58	-0.521	**-0.14**
E12 Outer		-1.50	-1.44	-1.41	-1.44	-1.53	-1.46	-1.498	**0.00**
E13 Inner		-0.64	-0.58	-0.58	-0.58	-0.65	-0.60	-0.531	**-0.11**
E13 Outer		-1.48	-1.39	-1.44	-1.42	-1.46	-1.44	-1.418	**-0.06**
E14 Inner		-0.58	-0.45	-0.45	-0.45	-0.54	-0.50	-0.504	**-0.08**
E14 Outer		-1.40	-1.31	-1.32	-1.34	-1.38	-1.35	-1.314	**-0.09**
E15 Inner		-0.37	-0.33	-0.31	-0.32	-0.36	-0.36	-0.305	**-0.07**
E15 Outer		-1.11	-1.18	-1.12	-1.16	-1.17	-1.16	-1.163	**-0.11**
E16 Inner		-0.44	-0.46	-0.45	-0.48	-0.47	-0.42	-0.428	**-0.17**
E16 Outer		-0.96	-0.98	-0.98	-1.01	-0.99	-0.98	-0.928	**-0.03**

T1 inner		-0.44	-0.46	-0.45	-0.48	-0.37	-0.48	-0.442	**0.04**
T1 outer		-1.21	--1.20	-1.21	-1.20	-1.17	-1.28	-1.142	**-0.01**
T2 inner		-0.73	-0.72	-0.72	-0.74	-0.83	-0.71	-0.722	**0.02**
T2 outer		-1.35	-1.35	-1.37	-1.36	-1.35	-1.39	-1.339	**0.03**
T3 inner		-0.34	-0.38	-0.35	-0.38	-0.37	-0.34	-0.302	**0.01**
T3 outer		-1.08	-1.03	-1.04	-1.06	-1.11	-1.08	-1.054	**0.04**
T4 inner		-0.49	-0.49	-0.50	-0.50	-0.38	-0.45	-0.488	**0.03**
T4 outer		-1.14	-1.15	-1.16	-1.15	-1.16	-1.15	-1.142	**0.02**
T5 inner		-0.49	-0.46	-0.47	-0.52	-0.50	-0.52	-0.501	**0.08**
T5 outer		-1.62	-1.44	-1.46	-1.47	-1.50	-1.49	-1.431	**0.05**
T6 inner		-0.46	-0.42	-0.41	-0.42	-0.39	-0.40	-0.417	**-0.05**
T6 outer		-1.64	-1.63	-1.64	-1.64	-1.64	-1.64	-1.668	**0.06**
T7 inner		-0.20	-0.20	-0.12	-0.22	-0.26	-0.23	-0.194	**0.02**
T7 outer		-1.78	-1.67	-1.67	-1.69	-1.69	-1.66	-1.659	**0.02**
T8 inner		-0.24	-0.27	-0.18	-0.27	-0.15	-0.17	-0.19	**-0.01**
T8 outer		-1.27	-1.18	-1.18	-1.24	-1.20	-1.24	-1.204	**0.06**
L1 inner			-1.14	-1.11	-1.12	-1.07	-1.11	-1.044	**-0.08**
L1 outer			-1.66	-1.70	-1.63	-1.68	-1.66	-1.649	**0.02**

In June 2021, two seabed elevations in Chain Valley Bay had changed by more than 150mm from the initial seabed heights recorded. The transect points were E9 outer and E16 inner (**Table 6.1**).

Table 6.2 shows the seabed heights at each permanent transect for Summerland Point for the period 2018 to 2021. The difference between seabed heights was calculated by subtracting the height gained in 2021 from the seabed heights recorded in 2018.

Table 6.2 Seabed heights at each transect for Summerland Point (2018-2021)

Transect	2018	2019	2020	2021					Diff.
C5 inner	-0.09	-0.03	-0.12	-0.014					**-0.08**
C5 outer	-2.18	-2.17	-2.18	-2.167					**-0.01**
C6 inner	-0.08	0.01	-0.08	-0.042					**-0.04**
C6 outer	-2.06	-1.82	-2.02	-2.133					**0.07**
F1 inner	-0.23	-0.30	-0.27	-0.26					**0.03**
F1 outer	-1.28	-1.22	-1.25	-1.232					**-0.05**
F2 inner	-0.25	-0.19	-0.20	-0.227					**-0.02**
F2 outer	-1.96	-1.94	-2.01	-1.883					**-0.08**
F3 inner	--0.11	-0.12	-0.05	0.032					**-0.14**
F3 outer	-1.86	-1.70	-1.87	-1.779					**-0.08**
F4 inner	-0.09	-0.10	-0.12	-0.104					**0.01**
F4 outer	-2.45	-2.44	-2.39	-2.373					**-0.08**
F5 inner	-0.31	-0.29	-0.30	-0.213					**-0.10**
F5 outer	-2.45	-2.48	-2.44	-2.485					**0.03**
F6 inner	-0.33	-0.28	-0.33	-0.274					**-0.06**
F6 outer	-2.78	-2.75	-2.80	-2.825					**0.05**
F7 inner	-0.47	-0.45	-0.50	-0.388					**-0.08**
F7 outer	-1.46	-1.47	-1.45	-1.42					**-0.04**

In June 2021, no seabed elevations off Summerland Point had changed by more than 150mm from the initial seabed heights recorded (**Table 6.2**).

Table 6.3 shows the seabed heights at each permanent transect in Bardens Bay for the period 2014 to 2021. The difference between seabed heights were calculated by subtracting the height gained in 2021 from the initial seabed height recorded in 2014 for each transect.

Table 6.3 Seabed heights at each transect for Bardens Bay (2014-2021)

Transect	2014	2015	2016	2017	2018	2019	2020	2021	Diff.
A1 inner	-0.51	-0.57	-0.56	-0.59	-0.58	-0.52	-0.57	-0.567	**0.06**
A1 outer	-1.19	-1.20	-1.24	-1.25	-1.25	-1.32	-1.27	-1.251	**0.06**
A2 inner	-0.39	-0.44	-0.42	-0.45	-0.46	-0.45	-0.40	-0.401	**0.01**
A2 outer	-0.81	-0.87	-0.86	-0.86	-0.89	-0.91	-0.88	-0.868	**0.06**
A3 inner	-0.33	-0.34	-0.31	-0.30	-0.35	-0.25	-0.34	-0.35	**0.02**
A3 outer	-3.44	-1.38	-1.42	-1.43	-1.44	-1.24	-1.41	-1.421	**-0.02**
A4 inner	-0.16	-0.19	-0.16	-0.16	-0.17	-0.17	-0.21	-0.176	**0.02**
A4 outer	-0.72	-0.73	-0.73	-0.71	-0.71	-0.68	-0.70	-0.685	**-0.03**
A5 inner	-0.30	-0.32	-0.33	-0.30	-0.32	-0.36	-0.32	-0.321	**0.02**
A5 outer	-0.96	-0.95	-0.95	-0.95	-0.98	-1.01	-0.98	-1.012	**0.05**
A6 inner	-0.14	-0.16	-0.14	-0.14	-0.15	-0.20	-0.13	-0.116	**-0.02**
A6 outer	-0.68	-0.69	-0.68	-0.68	-0.73	-0.76	-0.72	-0.749	**0.07**

In June 2021, no seabed elevations in Bardens Bay had changed by more than 150mm from the initial seabed heights recorded in 2014 (**Table 6.3**).

Table 6.4 shows the seabed heights at each permanent transect off Brightwaters for the period 2018 to 2021. The difference between seabed heights were calculated by subtracting the height gained in 2021 from the seabed height recorded in 2018.

In June 2021, no seabed elevations off Brightwaters had changed by more than 150mm from the initial seabed heights recorded in 2018 (**Table 6.4**).

Table 6.4 Seabed heights at each transect for Brightwaters (2018-2021)

Transect	2018	2019	2020	2021					Diff.
S1 inner	-0.61	-0.56	-0.57	-0.539					**-0.07**
S1 outer	-1.75	-1.71	-1.77	-1.746					**-0.02**
S2 inner	-0.25	-0.23	-0.21	-0.208					**-0.04**
S2 outer	-1.56	-1.51	-1.54	-1.531					**-0.03**
S3 inner	-0.08	-0.15	-0.09	-0.022					**-0.03**
S3 outer	-1.84	-1.94	-1.84	-1.844					**0.00**
S4 inner	-0.08	-0.14	-0.09	-0.076					**0.05**
S4 outer	-1.70	-1.74	-1.76	-1.686					**-0.02**
S5 inner	-0.66	-0.66	-0.65	-0.597					**-0.06**
S5 outer	-1.36	-1.40	-1.39	-1.417					**0.06**
S6 inner	-0.07	-0.06	-0.06	-0.003					**-0.06**
S6 outer	-0.89	-0.89	-0.889	-0.892					**0.00**

7. Physical characteristics of bottom water in Lake Macquarie – June 2021

The physical characteristics of the bottom waters in Lake Macquarie were tested between 15th and 23rd June 2021 at each transect using a calibrated Yeo-Kal 618RU Analyser. Units of measurement were Temperature (TEMP) - degrees Celsius; Conductivity (COND) - mS/cm; Salinity (SAL) - parts per thousand; pH; Dissolved Oxygen - % saturation and mg/L; and Turbidity (TURB) - NTU.

The physical characteristics of the bottom water at each transect in Lake Macquarie are shown in **Table 7** and were as follows:

- Water Temperature ranged from 13.63°C at Transect L1 to 17.18°C at Transect C6. Mean water temperature was 17.18°C.
- Conductivity ranged from 50.02 mS/cm at Transect A1 to 52.03 mS/cm at Transect C4. Mean conductivity was 50.91 mS/cm.
- Salinity ranged from 32.7 ppt at Transect E4 to 34.23 ppt at Transect C4. Mean salinity was 33.39 ppt.
- Turbidity ranged from 0.3 NTU at Transect E8 to 7.8 NTU at Transect C1. Mean turbidity was 4.22 NTU.
- pH ranged from 7.94 at Transect S2 to 8.13 at Transect C3. Mean pH was 8.03.
- Dissolved oxygen (% saturation) ranged from 82.6% at Transect T2 to 141.1% at Transect C1. Mean dissolved oxygen was 102.3% saturation. Super saturation of dissolved oxygen was the result of oxygen production by the seagrass and epiphytic

algae.

Table 7.1 Physical characteristics of bottom waters of Lake Macquarie - June 2021

Chain Valley Bay

Station	Temperature ºC	Conductivity mS/cm	Salinity ppt	Dissolved Oxygen % sat	Dissolved Oxygen mg/L	pH	Turbidity NTU
E1	14.28	50.65	33.21	85.9	6.81	7.97	7.5
E2	14.27	50.60	33.16	87.7	6.88	7.98	6.7
E3	14.45	50.60	33.16	88.9	6.95	8.00	6.5
E4	13.71	50.03	32.70	100.2	8.18	8.07	5.6
E5	14.02	50.15	32.83	95.8	7.78	8.04	6.0
E6	14.22	50.17	32.78	89.3	7.01	7.99	5.6
E7	15.40	51.03	33.44	97.3	7.94	8.01	2.2
E8	15.61	51.03	33.47	101.3	8.22	8.05	0.3
E9	15.23	50.43	33.04	118.1	9.50	8.08	6.1
E10	14.89	50.27	32.92	102.9	8.41	8.03	5.7
E11	14.77	50.45	33.05	102.0	8.40	8.01	5.7
E12	14.88	50.50	33.09	102.1	8.35	8.00	5.8
E13	14.72	50.51	33.10	100.7	8.19	8.00	5.9
E14	14.42	50.53	33.11	98.7	8.05	8.03	5.7
E15	14.21	50.38	33.02	89.6	6.98	7.98	5.7
E16	14.17	50.19	32.88	101.0	8.20	8.05	6.0
T1	16.77	51.08	33.40	111.5	8.82	8.01	1.0
T2	15.11	51.12	33.54	82.6	6.78	8.01	3.2
T3	15.20	51.07	33.52	88.5	7.26	8.00	2.4
T4	15.31	51.02	33.46	92.3	7.54	8.01	1.9
T5	15.34	51.06	33.48	94.4	7.71	8.01	1.0
T6	15.41	51.04	33.47	96.6	7.89	8.01	1.0
T7	15.42	50.99	33.45	102.5	8.38	8.03	0.7
T8	15.38	50.92	33.36	98.7	8.05	8.02	0.7
L1	13.63	50.04	32.74	99.6	7.98	8.08	5.9

Frying Pan Bay/ Summerland Point

Station	Temperature ºC	Conductivity mS/cm	Salinity ppt	Dissolved Oxygen % sat	Dissolved Oxygen mg/L	pH	Turbidity NTU
C5	17.09	51.07	33.52	123.5	9.72	8.08	0.6
C6	17.18	51.30	33.54	133.7	10.64	8.11	1.8
F1	16.70	51.01	33.46	103.7	8.21	7.96	2.6
F2	16.82	51.01	33.49	103.6	8.24	7.96	3.1
F3	16.38	51.21	33.64	118.7	9.50	8.07	2.4
F4	16.45	51.18	33.59	107.2	8.61	8.02	2.1
F5	16.55	51.14	33.57	104.0	8.28	7.98	2.1
F6	16.31	51.25	33.62	107.9	8.63	8.02	1.9
F7	16.21	51.23	33.62	102.1	8.19	7.96	3.8

Bardens Bay

Station	Temperature ºC	Conductivity mS/cm	Salinity ppt	Dissolved Oxygen % sat	Dissolved Oxygen mg/L	pH	Turbidity NTU
A1	15.98	50.02	33.44	91.4	7.38	8.00	3.1
A2	15.78	50.97	33.42	96.6	7.84	8.01	2.9
A3	16.22	51.02	33.51	106.0	8.53	8.07	3.1
A4	15.69	51.06	33.45	113.0	9.34	8.13	2.3
A5	15.32	51.08	33.57	99.7	8.13	8.02	3.8
A6	16.00	51.05	33.49	99.5	8.00	7.99	3.3

Crangan Bay

Station	Temperature ºC	Conductivity mS/cm	Salinity ppt	Dissolved Oxygen % sat	Dissolved Oxygen mg/L	pH	Turbidity NTU
C1	17.00	51.75	33.80	141.1	9.78	8.02	7.8
C2	16.12	52.01	34.19	112.3	9.30	8.06	6.9
C3	16.28	52.02	34.16	122.0	9.58	8.13	6.5
C4	16.35	52.03	34.23	121.4	9.52	8.12	6.6

Sugar Bay Brightwaters

Station	Temperature ºC	Conductivity mS/cm	Salinity ppt	Dissolved Oxygen % sat	Dissolved Oxygen mg/L	pH	Turbidity NTU
S1	15.13	50.84	33.30	97.2	7.99	8.08	6.8
S2	16.15	50.84	33.35	102.5	8.19	7.94	6.2
S3	14.79	51.20	33.51	90.4	7.43	8.01	7.2
S4	15.30	51.05	33.50	95.0	7.77	8.02	6.4
S5	15.25	51.03	33.49	96.7	7.93	8.03	6.5
S6	15.35	51.05	33.50	97.5	7.96	8.04	6.5

8. Plant and animal species monitored in the study area

Plate 8.1 provides information about the plants monitored in the seagrass surveys of Lake Macquarie, NSW. **Plate 8.2** provides information about the bivalve *Pinna menkei*.

Plate 8.1 Plant species found in the study area of Lake Macquarie (2007 - 2021).

Kingdom: Plantae
Phylum: Magnoliophyta
Class: Liliopsida
Order: Potamogetonales
Family: Zosteraceae
Genus: *Zostera*
Species: *Z. capricorni*

Remarks: *Zostera capricorni* is a species of eelgrass native to the seacoasts of New Guinea, Queensland, New South Wales, Victoria, South Australia, Norfolk Island and the North Island of New Zealand. It was first discovered at Moreton Bay in Queensland in 1875.

Kingdom: Plantae
Phylum: Magnoliophyta
Class: Liliopsida
Order: Hydrocharitales
Family: Hydrocharitaceae
Genus: *Halophila*
Species: *H. ovalis*

Remarks: *Halophila ovalis* commonly known as paddle weed, spoon grass or dugong grass, is a seagrass in the family Hydrocharitaceae. It is a small herbaceous plant that occurs in seabeds and other saltwater environments in the Indo-Pacific. First seen at Transect E6 in Chain Valley Bay on 12th June 2010.

Kingdom: Plantae
Phylum: Phaeophyta
Class: Phaeophyceae
Order: Fucales
Family: Hormosiraceae
Genus: *Hormosira*
Species: *H. banksii*

Remarks: *Hormosira banksii*, also known as Neptune's necklace, Neptune's pearls, sea grapes, or bubbleweed is a species of brown alga native to Australia and New Zealand. It is abundant on low-energy rocky reefs at midtide levels, where it outcompetes other algal species due to its high tolerance to desiccation. First recorded at Transect C1 in Crangan Bay on 12th June 2010.

Kingdom: Plantae
Phylum: Phaeophyta
Class: Phaeophyceae
Order: Fucales
Family: Sargassaceae
Genus: *Sargassum*

Remarks: *Sargassum* is a genus of brown macroalgae in the order Fucales. Numerous species are distributed throughout the temperate and tropical oceans of the world, where they generally inhabit shallow water and coral reefs, and the genus is widely known for its planktonic species.

Kingdom: Plantae
Phylum: Phaeophyta
Class: Phaeophyceae
Order: Fucales
Family: Cystoseiraceae
Genus: *Cystoseira*
Species: *C. trinodis*
Synonym: *Cystophyllum onustum*

Remarks: A macroalgae widespread in Australia and the Indo-Pacific region. The plants vary considerably in size and form, with tall thin plants up to 1.5m high in very sheltered and estuarine waters, or more compact thicker-stemmed plants up to 30cm high in oceanic reef pools. Characterised by small peg-like projections on the lower parts of the main branches.

Kingdom: Plantae

Green filamentous algae

Remarks: Filamentous algae are colonies of microscopic plants that link together to form threads or mesh-like filaments. These primitive plants normally grow on the surface of hard objects or other substrates under the water but they can break loose and form floating mats.

Plate 8.2. *Pinna menkei* are found amongst the seagrass beds of Lake Macquarie, NSW.

Kingdom:	Animalia
Phylum:	Mollusca
Class:	Bivalvia
Order:	Pteriida
Family:	Pinnidae
Genus:	*Pinna*
Species:	*P. menkei*

Remarks: Bivalve mollusc characterised by thin, elongated, wedge-shaped and almost triangular shells with long, toothless edges. The genus is ancient, going back to the Carboniferous period.

9. Seagrass characteristics and fouling levels measured in surveys

The following plates show the various growth characteristics of the seagrass *Zostera capricorni* in regard to leaf length. In the study area, due to environmental factors, *Zostera capricorni* either had short leaf growth (**Plate 9.1**) or was long leaved (**Plate 9.4**). The plates also show the levels of fouling of seagrass beds by filamentous algae and other algal species. In this study, fouling is described as No (Level 1), Low (Level 2) or Heavy (Level 3) (**Plates 9.1- 9.6**).

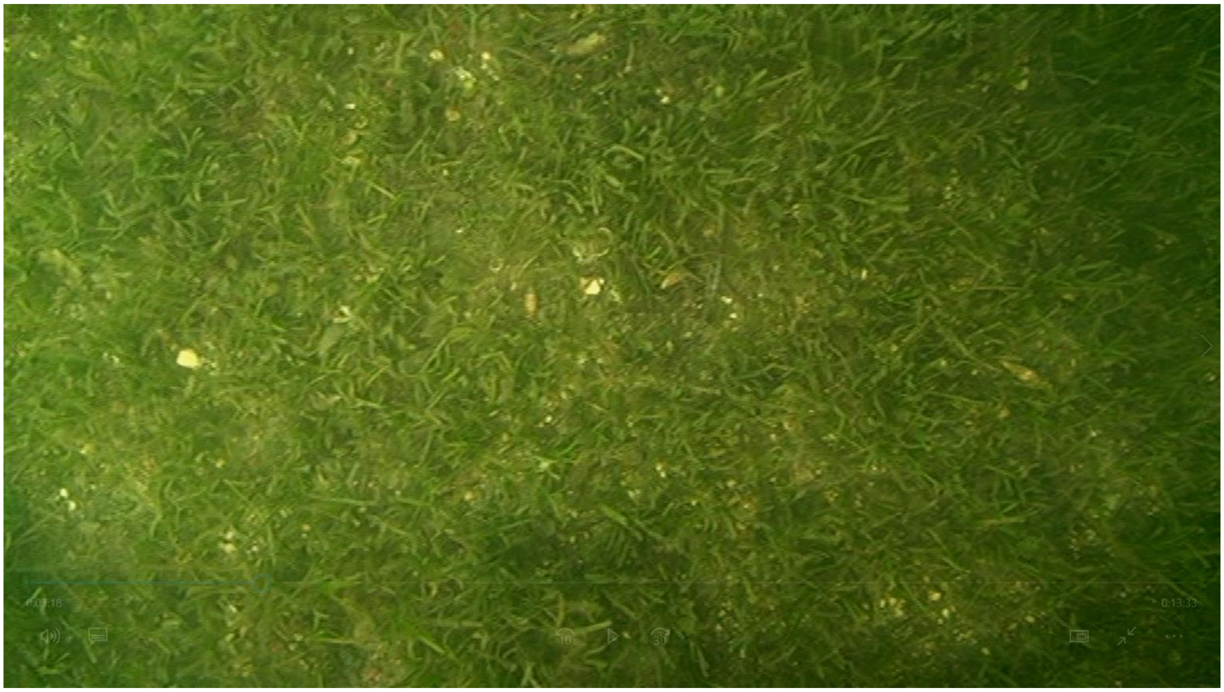

Plate 9.1 Short leaved sea grass with level 1 fouling (no fouling).

Plate 9.2 Short leaved seagrass with level 2 fouling (low fouling).

Plate 9.3 Short leaved seagrass with level 3 fouling (heavy fouling)

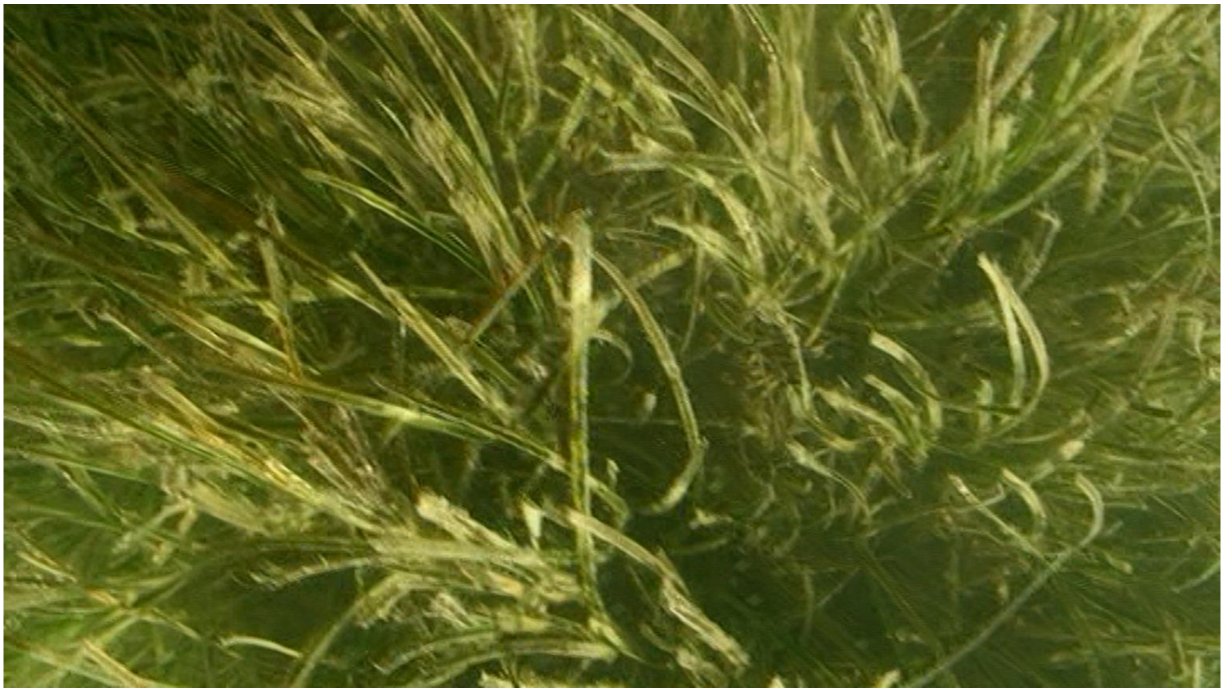

Plate 9.4 Long leaved seagrass with level 1 fouling (no fouling).

Plate 9.5 Long leaved seagrass with level 2 fouling (low fouling).

Plate 9.6 Long leaved seagrass with level 3 fouling (heavy fouling)

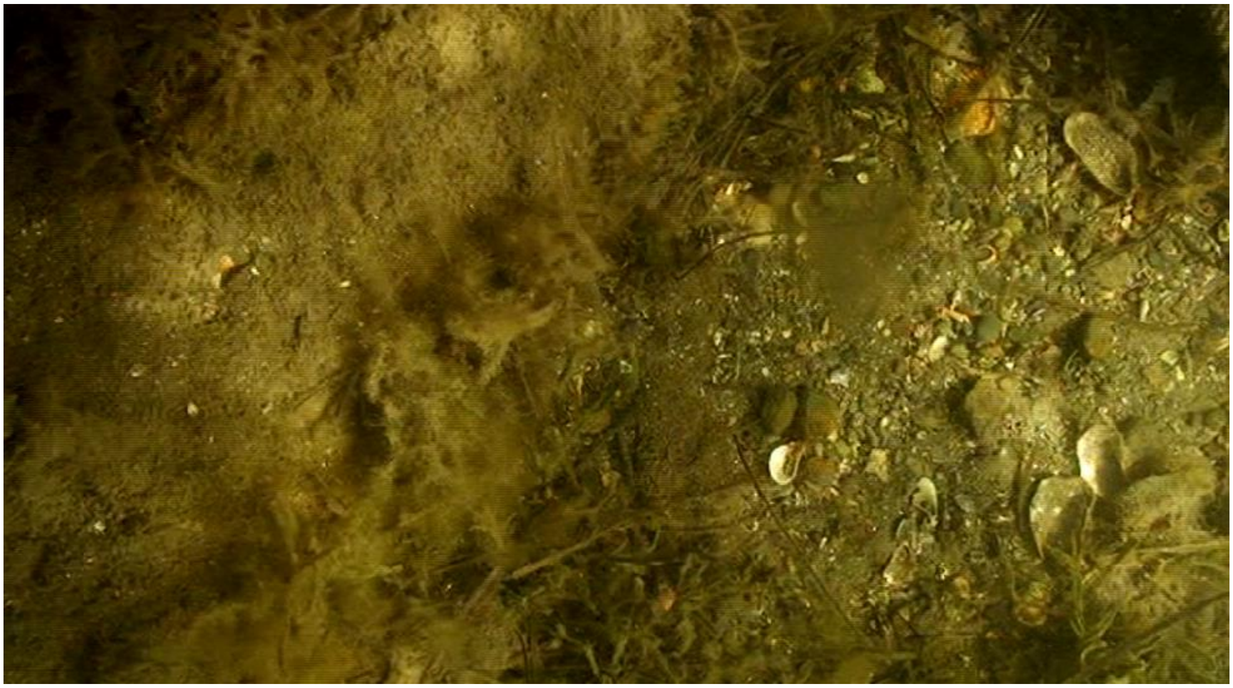

Plate 9.7 Algal mat and bareground.

10. Analysis of quadrats along permanent transects

Figures 10.1 to **10.6** show annual changes in the percentage cover of seagrass in the Chain Valley Bay, Summerland, Bardens Bay, Crangan Bay and Sugar Bay regions. In June 2019, seagrass cover at the transects ranged from 24.7 percent at transect S1 to 100 percent at transects C5 and F1 (**Table 10.1, Figures 10.6 and 10.3**). By June 2021, seagrass cover ranged from 91 percent at transect A3 to 100 percent at transects E5, E10-E12, T7, A4, C3, S3 and S4 (**Table 10.1**).

In June 2021, the condition of the seagrasses was fair, with most seagrasses lightly to heavily fouled with epiphytic algae (**Appendix 1**). Seagrass transects with particularly high levels of fouling included E4-E6, E9 and S1.

The brown seaweed *Cystophyllum onustum* (**Plate 8.1**) was observed at transects E2, E4, E6, T1, T6, C1, C5, F1, F2, S1, S5, S6 and L1. The bivalve mollusc *Pinna menkei* (**Plate 8.2**) was observed at transects C1-C4, C6, F2-F4, F6 and S6.

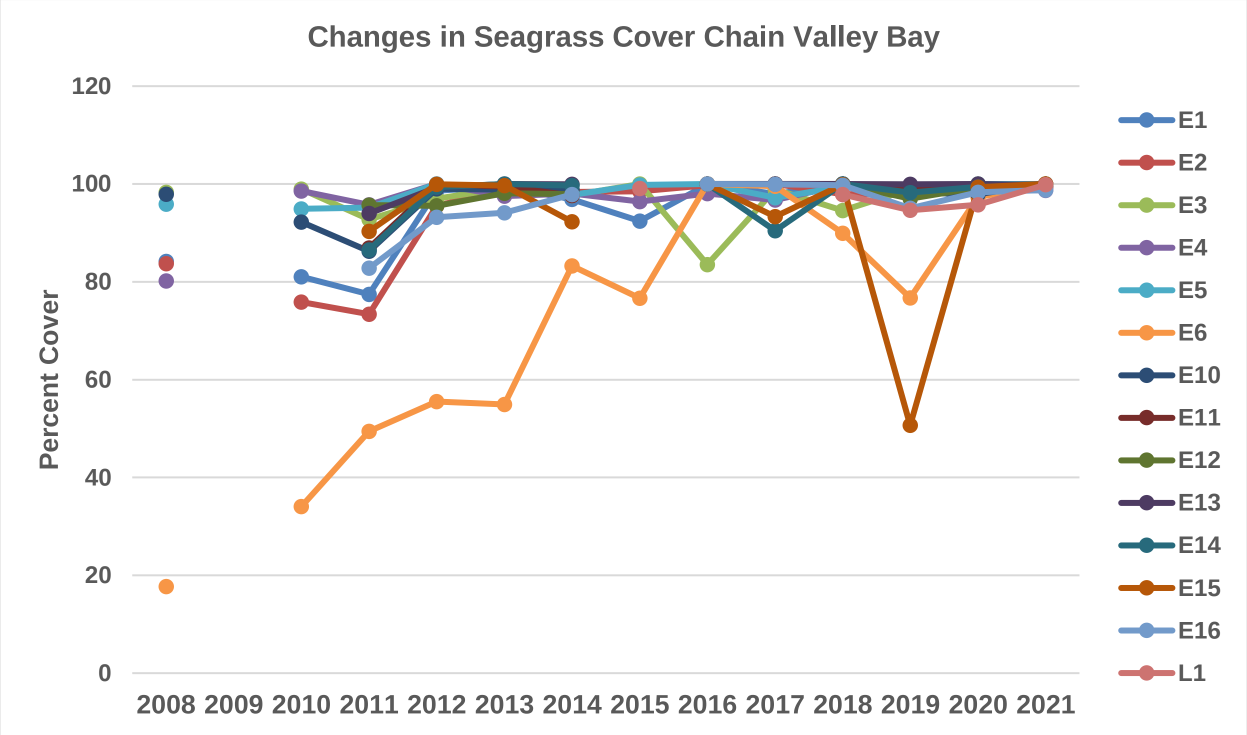

Figure 10.1 Changes in percent cover of seagrass in Chain Valley Bay (2008-2021)

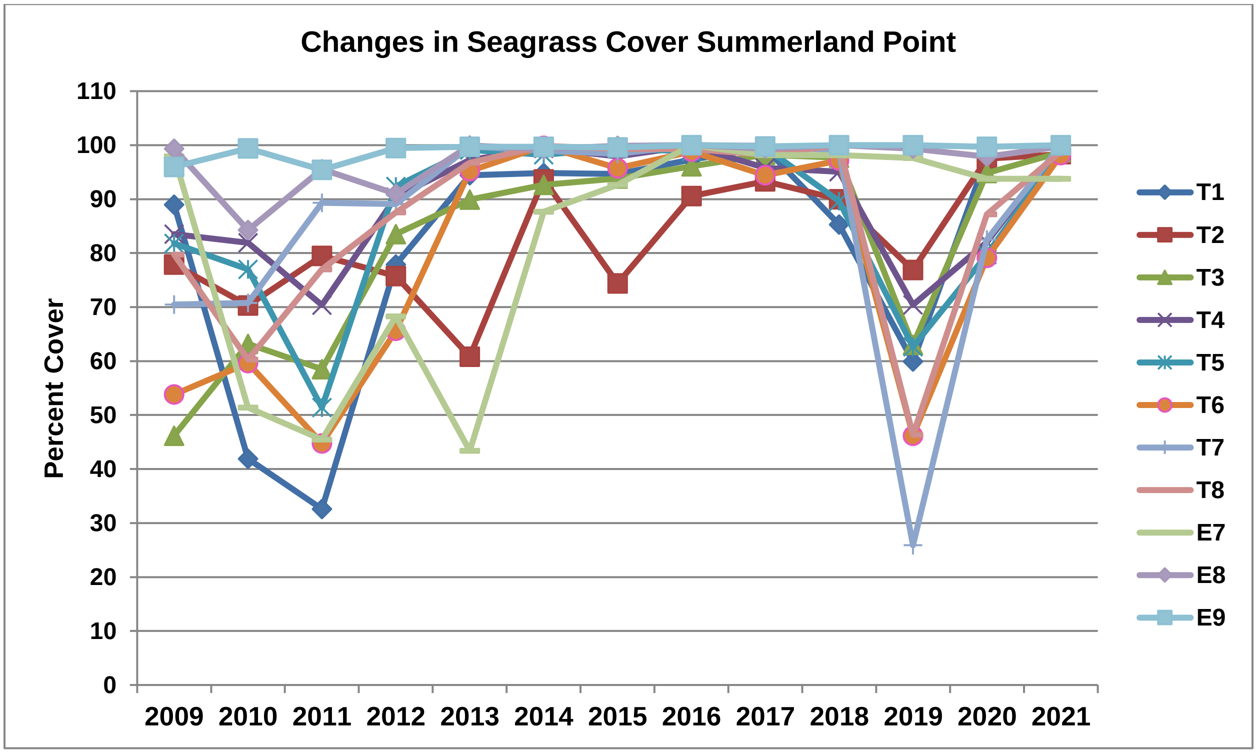

Figure 10.2 Changes in percent cover of seagrass along Summerland Point (2009-2021)

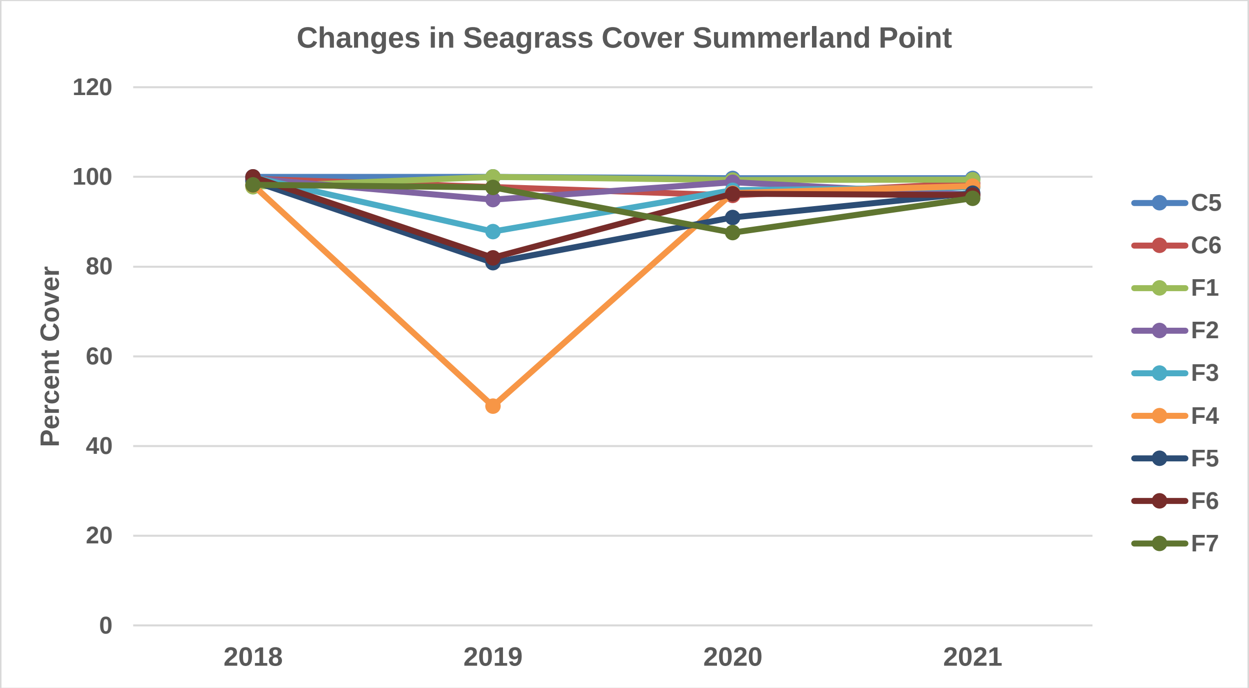

Figure 10.3 Changes in percent cover of seagrass along Frying Pan Bay Summerland Point (2018-2021)

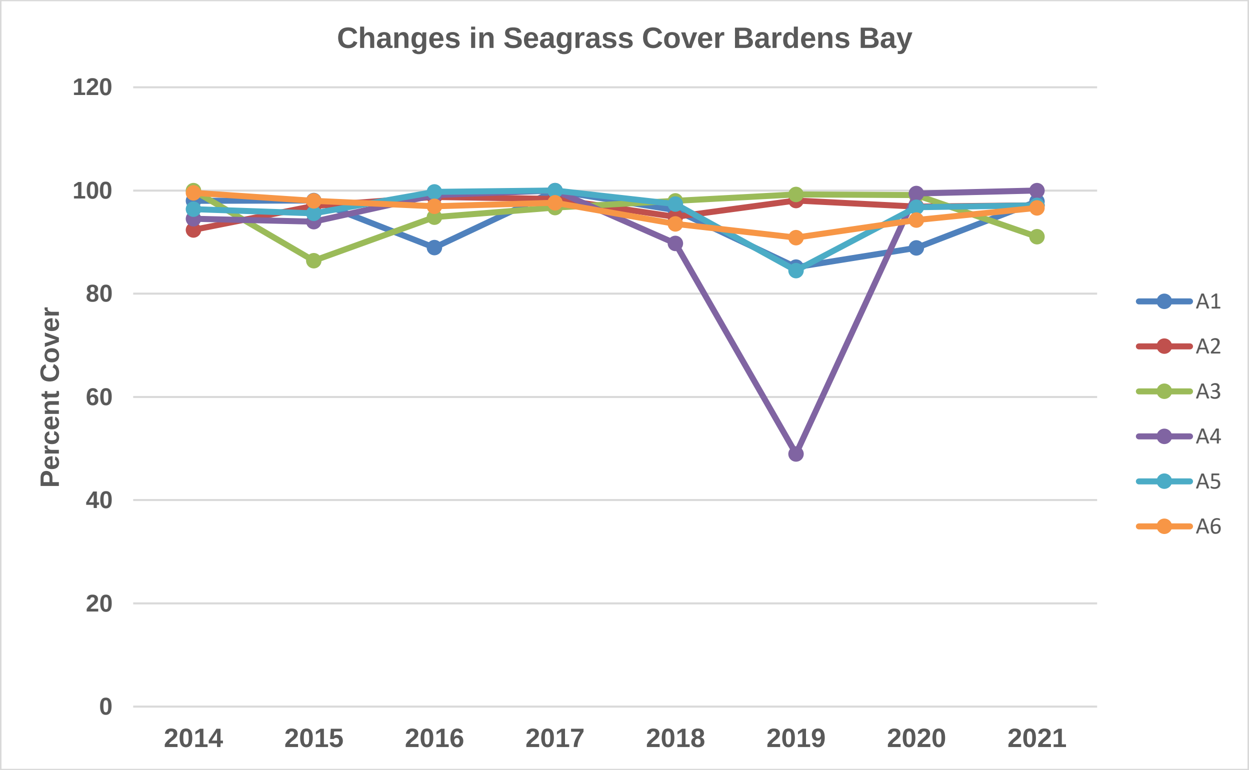

Figure 10.4 Changes in percent cover of seagrass in Bardens Bay (2014-2021)

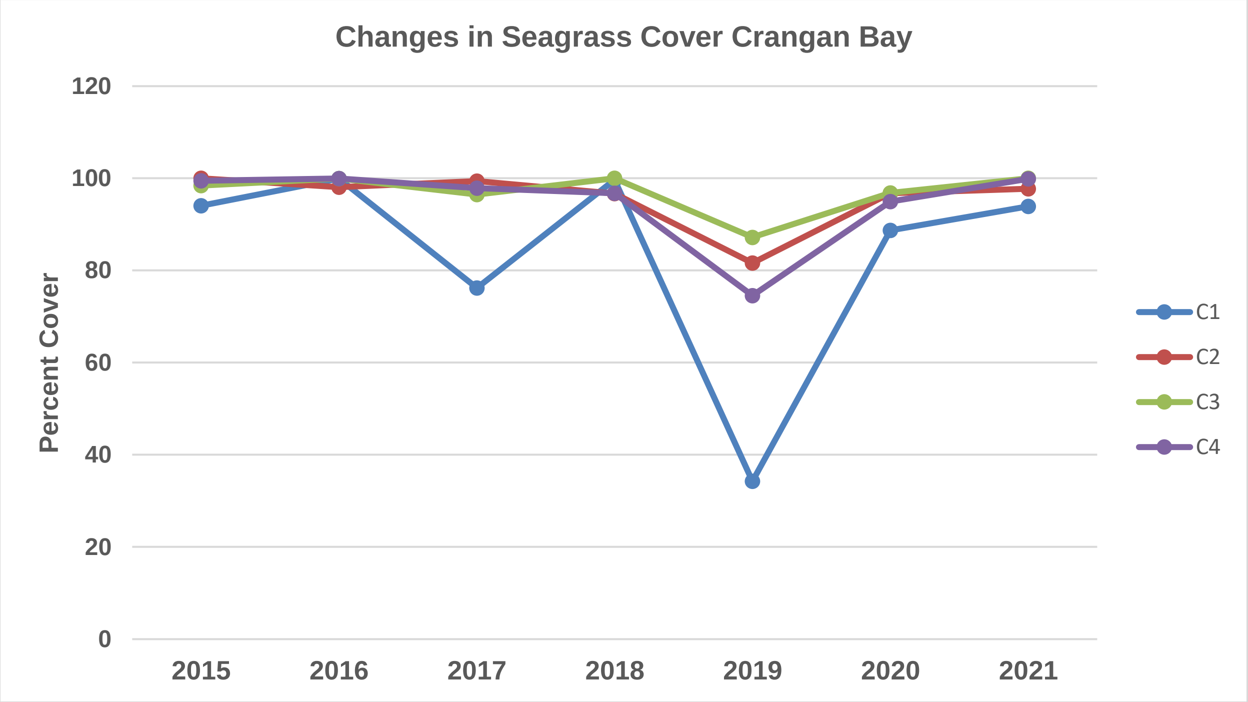

Figure 10.5 Changes in percent cover of seagrass in Crangan Bay (2015-2021)

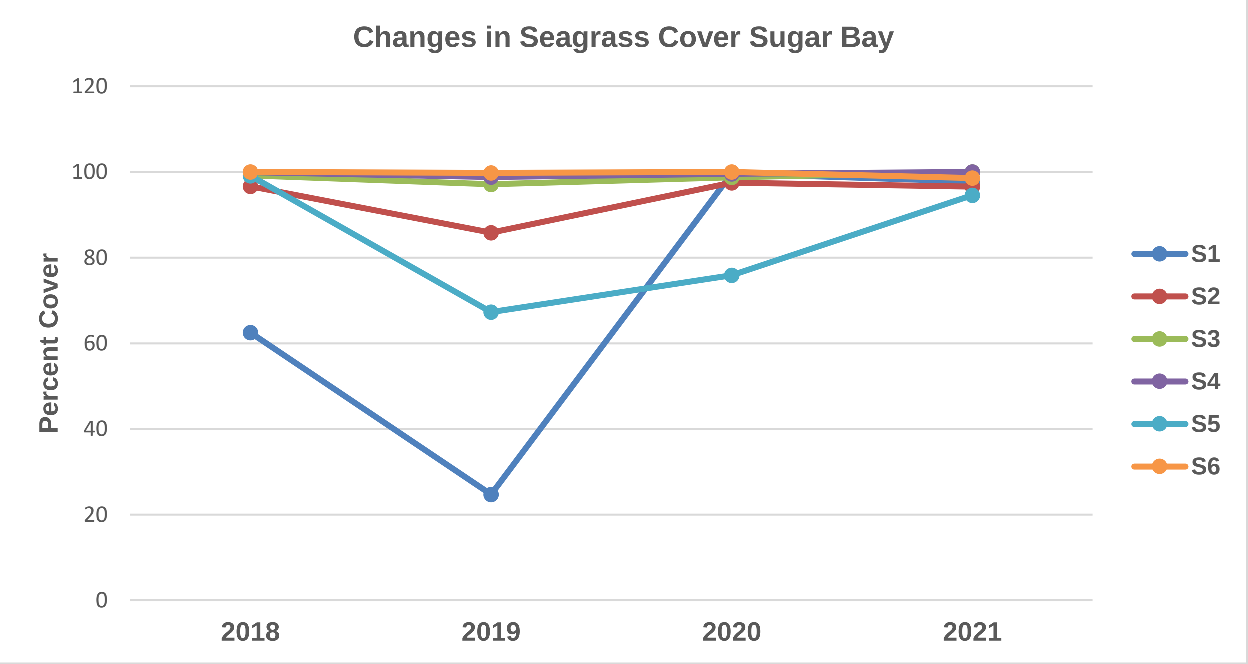

Figure 10.6 Changes in percent cover of seagrass in Sugar Bay (2018-2021)

Changes in the percentage area of the substratum covered by seagrasses in the study area in 2010 to 2021, compared with the 2008 values are shown in **Table 10.1**. The table shows that since 2008, seagrass coverage has been increasing throughout the study area, and percentage cover has been consistent since 2012. At transects where the percentage area of substratum covered was relatively low, such as Transects E6 (17.74%), T3 (46.20%) and T6 (53.82%), seagrass coverage has increased by about 82%, 52% and 44% respectively.

Table 10.1 Changes in percent cover of the substratum by seagrasses in Lake Macquarie (2008-2021)

Chain Valley Bay 2008 to 2020

Transect E1	**2008**	**2010**	**2011**	**2012**	**2013**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**
% seagrass	84.15	81.01	77.75	98.62	99.44	92.44	99.88	97.96	97.87	99.12	99.04	99.34
% no seagrass	15.85	18.99	22.25	1.38	0.56	7.56	0.12	2.04	2.13	0.88	0.96	0.66
Transect E2	**2008**	**2010**	**2011**	**2012**	**2013**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**
% seagrass	83.72	75.87	73.38	95.49	99.09	98.49	99.71	100.0	97.94	97.94	98.53	99.26
% no seagrass	16.28	24.13	26.62	4.49	0.91	1.51	0.29	0.00	2.06	2.06	1.47	0.37
Transect E3	**2008**	**2010**	**2011**	**2012**	**2013**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**
% seagrass	98.29	98.97	92.76	96.97	99.16	100.0	83.53	98.90	94.56	98.97	100.0	99.93
% no seagrass	1.71	1.03	7.24	1.54	0.84	0.00	16.47	1.10	5.44	1.03	0.00	0.66
Transect E4	**2008**	**2010**	**2011**	**2012**	**2013**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**
% seagrass	80.16	98.54	95.74	100.0	97.50	96.43	98.01	96.76	99.71	99.85	98.82	98.68
% no seagrass	19.84	1.46	4.26	0.00	2.50	3.57	1.99	3.24	0.29	0.15	1.18	0.88
Transect E5	**2008**	**2010**	**2011**	**2012**	**2013**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**
% seagrass	95.88	94.93	95.19	100.0	98.82	99.82	100.0	97.22	99.41	98.97	100.0	100.0
% no seagrass	4.12	5.07	4.81	0.00	1.18	0.18	0.00	2.78	0.59	1.03	0.00	0.00
Transect E6	**2008**	**2010**	**2011**	**2012**	**2013**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**
% seagrass	17.74	34.06	49.56	55.51	54.93	76.62	100.0	99.56	89.91	76.69	97.35	99.78
% no seagrass	82.16	65.94	50.44	44.49	45.07	23.38	0.00	0.44	10.09	23.31	2.65	0.00
Transect E7	**2008**	**2010**	**2011**	**2012**	**2013**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**
% seagrass	97.93	51.40	45.47	68.31	43.38	92.65	100.0	98.16	98.16	97.65	93.75	93.75
% no seagrass	2.07	48.60	54.53	31.69	56.62	7.35	0.00	1.84	1.84	2.35	6.25	6.18
Transect E8	**2008**	**2010**	**2011**	**2012**	**2013**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**
% seagrass	99.32	84.26	95.56	90.96	99.93	99.85	100.0	99.34	100.0	99.34	97.87	99.78
% no seagrass	0.68	15.74	4.44	9.04	0.07	0.15	0.00	0.66	0.00	0.66	2.13	0.00
Transect E9	**2008**	**2010**	**2011**	**2012**	**2013**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**
% seagrass	95.94	99.39	95.51	99.49	99.71	99.56	100.0	99.78	100.0	100.0	99.71	100.0
% no seagrass	4.06	0.61	4.49	0.51	0.29	0.44	0.00	0.22	0.00	0.00	0.29	0.00
Transect E10	**2008**	**2010**	**2011**	**2012**	**2013**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**
% seagrass	97.94	92.21	86.25	98.99	98.82	NS	100.0	100.0	100.0	98.21	97.94	100.0
% no seagrass	2.06	7.79	13.75	1.01	1.18		0.00	0.00	0.00	1.79	2.06	0.00
Transect E11	**2008**	**2010**	**2011**	**2012**	**2013**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**
% seagrass			86.93	99.85	99.49	NS	100.0	100.0	100.0	98.94	99.63	100.0
% no seagrass			13.07	0.15	0.51		0.00	0.00	0.00	1.06	0.37	0.00

Transect E12	**2008**	**2010**	**2011**	**2012**	**2013**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**
% seagrass			95.68	95.53	98.09	NS	100.0	100.0	100.0	97.0	99.26	100.0
% no seagrass			7.32	4.47	1.91		0.00	0.00	0.00	3.0	0.74	0.00
Transect E13	**2008**	**2010**	**2011**	**2012**	**2013**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**
% seagrass			93.97	99.26	100.0	NS	100.0	100.0	100.0	99.95	100	99.71
% no seagrass			6.03	0.74	0.00		0.00	0.00	0.00	0.05	0.00	0.29
Transect E14	**2008**	**2010**	**2011**	**2012**	**2013**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**
% seagrass			86.54	99.34	100.0	NS	100.0	90.44	100.0	98.24	99.41	99.78
% no seagrass			13.46	0.56	0.00		0.00	9.56	0.00	1.76	0.59	0.22
Transect E15	**2008**	**2010**	**2011**	**2012**	**2013**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**
% seagrass			90.29	99.93	99.66	NS	100.0	93.31	99.85	50.66	99.34	100.0
% no seagrass			9.71	0.07	0.34		0.00	6.69	0.15	49.34	0.66	0.00
Transect E16	**2008**	**2010**	**2011**	**2012**	**2013**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**
% seagrass			82.79	93.22	94.12	NS	100.0	99.94	99.71	95.0	98.31	98.75
% no seagrass			17.21	6.78	5.88		0.00	0.06	0.29	5.0	1.69	1.25
Transect T1	**2008**	**2010**	**2011**	**2012**	**2013**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**
% seagrass	88.94	41.90	32.60	77.91	94.41	94.65	97.35	99.47	85.29	59.92	97.87	90.96
% no seagrass	11.06	58.10	67.40	22.09	5.59	5.35	2.65	0.53	14.71	40.08	2.13	7.06
Transect T2	**2008**	**2010**	**2011**	**2012**	**2013**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**
% seagrass	77.91	70.29	7.95	75.74	60.83	74.41	90.59	93.31	90.00	76.87	97.50	98.31
% no seagrass	22.09	29.71	92.05	24.26	39.17	25.59	9.41	6.69	10.00	23.13	2.5	1.32
Transect T3	**2008**	**2010**	**2011**	**2012**	**2013**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**
% seagrass	46.20	63.16	58.53	83.53	89.93	93.82	96.10	98.19	97.57	63.01	94.85	98.68
% no seagrass	53.80	36.84	41.47	16.47	10.07	6.18	3.90	1.81	2.43	36.99	5.14	1.32
Transect T4	**2008**	**2010**	**2011**	**2012**	**2013**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**
% seagrass	83.51	81.89	70.37	90.37	97.28	97.94	99.85	95.76	95.07	70.44	82.06	99.93
% no seagrass	16.49	18.01	29.63	9.63	2.72	2.06	0.15	4.24	4.93	29.56	17.94	0.07
Transect T5	**2008**	**2010**	**2011**	**2012**	**2013**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**
% seagrass	81.78	77.00	51.40	92.35	99.12	99.41	98.82	99.56	89.63	62.65	79.71	98.97
% no seagrass	18.22	23.00	48.60	7.65	0.88	0.59	1.18	0.44	10.37	37.35	20.29	1.03
Transect T6	**2008**	**2010**	**2011**	**2012**	**2013**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**
% seagrass	53.82	59.63	44.77	65.59	95.22	95.74	98.82	94.41	97.13	46.18	79.12	98.16
% no seagrass	46.18	40.37	53.23	34.41	4.78	4.26	1.18	5.59	2.87	53.82	20.88	1.84
Transect T7	**2008**	**2010**	**2011**	**2012**	**2013**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**
% seagrass	97.93	70.79	89.34	89.09	99.78	98.38	100.0	99.85	98.97	25.88	82.50	100.0
% no seagrass	2.07	29.51	10.66	10.91	0.22	1.62	0.00	0.15	1.03	74.12	17.50	0.00
Transect T8	**2008**	**2010**	**2011**	**2012**	**2013**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**
% seagrass	95.94	60.29	76.99	87.64	96.76	99.26	99.26	98.24	100.0	46.32	87.21	98.82
% no seagrass	4.06	39.71	23.01	13.26	3.24	0.74	0.74	1.76	0.00	53.68	12.79	1.18
Transect L1	**2008**	**2010**	**2011**	**2012**	**2013**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**
% seagrass						99.12	99.71	97.87	97.87	94.63	95.74	99.85
% no seagrass						0.88	0.29	2.13	2.13	5.37	4.26	0.00

Summerland Point 2018-2020

Transect C5	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	
% seagrass								100.0	100.0	99.71	99.71	
% no seagrass								0.00	0.00	0.29	0.00	
Transect C6	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	
% seagrass								99.56	97.76	95.88	98.60	
% no seagrass								0.44	2.24	4.11	1.25	
Transect F1	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	
% seagrass								97.81	100.0	99.34	99.41	
% no seagrass								2.19	0.00	0.66	0.59	
Transect F2	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	
% seagrass								99.63	94.93	98.82	96.03	
% no seagrass								0.37	5.07	1.18	2.13	
Transect F3	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	
% seagrass								99.93	87.82	97.06	97.65	
% no seagrass								0.07	12.18	2.94	2.35	
Transect F4	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	
% seagrass								98.16	48.90	96.40	97.94	
% no seagrass								1.84	51.1	3.60	2.06	
Transect F5	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	
% seagrass								99.04	80.80	90.96	96.40	
% no seagrass								0.96	19.2	9.04	3.53	
Transect F6	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	
% seagrass								100.0	81.99	96.25	95.96	
% no seagrass								10.00	18.01	3.75	3.97	
Transect F7	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	
% seagrass								98.24	97.65	87.57	95.22	
% no seagrass								1.76	2.35	12.43	4.78	

Bardens Bay 2014 to 2020

Transect A1	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	
% seagrass				97.97	98.09	88.97	99.85	96.18	85.15	88.88	97.87	
% no seagrass				2.03	1.91	11.03	0.15	3.82	14.85	11.10	1.91	
Transect A2	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	
% seagrass				92.38	96.99	98.75	98.38	94.93	98.09	96.91	97.13	
% no seagrass				7.62	3.01	1.25	1.62	5.07	1.91	3.09	2.28	
Transect A3	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	
% seagrass				100.0	86.40	94.85	96.69	98.01	99.26	99.12	91.03	
% no seagrass				0.00	13.60	5.15	3.31	1.99	0.74	0.88	8.97	
Transect A4	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	
% seagrass				94.51	93.97	99.12	100.0	89.78	48.98	99.41	100.0	
% no seagrass				5.49	6.03	0.88	0.00	10.22	51.02	0.59	0.00	
Transect A5	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	

% seagrass				96.37	95.59	99.71	100.0	97.35	84.50	96.76	97.13	
% no seagrass				3.63	4.41	0.29	0.00	2.65	15.50	3.24	2.87	
Transect A6	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	
% seagrass				99.56	98.01	96.97	97.65	93.53	90.88	94.26	96.62	
% no seagrass				0.44	1.99	3.03	2.35	6.47	9.12	5.74	3.38	

Crangan Bay 2008 to 2020

Transect C1	**2008**	**2010**	**2011**	**2012**	**2013**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**
% seagrass	48.60	80.53	68.71	85.38	99.31	94.04	99.94	76.18	99.68	34.26	88.68	93.90
% no seagrass	51.40	19.47	31.29	14.62	0.69	5.96	0.06	23.82	0.32	65.74	11.32	3.90
Transect C2	**2008**	**2010**	**2011**	**2012**	**2013**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**
% seagrass	93.09	98.03	67.79	95.21	97.24	100.0	98.09	99.40	96.69	81.62	96.76	97.72
% no seagrass	6.91	1.97	32.21	4.79	2.76	0.00	1.91	0.60	3.31	18.38	3.24	1.25
Transect C3	**2008**	**2010**	**2011**	**2012**	**2013**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**
% seagrass	95.59	88.75	94.41	97.16	99.93	98.46	99.90	96.47	100.0	87.21	96.84	100.0
% no seagrass	4.41	11.25	5.59	2.84	0.07	1.54	0.10	3.53	0.00	12.79	3.16	0.00
Transect C4	**2008**	**2010**	**2011**	**2012**	**2013**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**
% seagrass	87.25	86.56	58.09	90.40	100.0	99.49	99.96	96.47	96.76	74.56	94.93	99.85
% no seagrass	12.75	13.44	41.91	9.60	0.00	0.51	0.04	3.53	3.24	25.44	5.07	0.15

Sugar Bay Brightwaters 2018 to 2020

Transect S1	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	
% seagrass								62.50	24.71	99.63	97.79	
% no seagrass								37.50	75.29	0.37	0.74	
Transect S2	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	
% seagrass								96.62	85.83	97.50	96.54	
% no seagrass								3.38	14.17	2.50	3.46	
Transect S3	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	
% seagrass								99.19	97.13	98.75	100.0	
% no seagrass								0.81	2.87	1.25	0.00	
Transect S4	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	
% seagrass								99.97	98.82	99.56	100.0	
% no seagrass								0.03	1.18	0.44	0.00	
Transect S5	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	
% seagrass								99.12	67.08	75.88	94.56	
% no seagrass								0.88	32.92	24.11	5.37	
Transect S6	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	
% seagrass								100.0	99.78	100.0	98.57	
% no seagrass								0.00	0.22	0.00	1.32	

Table 10.2 shows the average composition, percent cover and condition of seagrass beds in the four regions of Lake Macquarie under investigation for the years 2011 to 2021. It shows that the

growth form of *Zostera capricorni* in the Summerland Point, Frying Pan Bay and Sugar Bay region and the Crangan Bay region is predominantly short leaved. Alternatively, the growth form of *Z. capricorni* in Chain Valley Bay and Bardens Bay is long leaved.

Table 10.2 Average composition, % cover and condition of seagrass beds in the four regions of Lake Macquarie under investigation for the years 2011 to 2021.

Year	Total SG	% long	% short	% long 1	% long 2	% short 1	% short 2	algae	bare gr.
Summerland Point, Frying Pan Bay and Sugar Bay									
2011	61.74	9.88	51.86	9.98	0.00	51.86	0.00	0.27	38.13
2012	82.18	38.03	44.15	38.03	0.00	44.15	0.00	0.00	17.85
2013	90.92	25.19	65.88	25.03	0.32	64.92	0.80	0.82	8.26
2014	96.74	19.73	80.27	19.93	0.00	80.27	0.00	0.00	3.26
2015	95.06	17.31	69.33	17.31	0.00	77.75	0.00	0.00	4.93
2016	98.15	20.82	77.64	28.32	0.00	77.66	0.00	0.00	1.30
2017	97.92	17.05	80.63	14.61	2.50	65.14	15.63	0.24	1.35
2018	96.22	28.00	66.03	25.44	5.36	67.00	0.91	1.31	2.28
2019	77.37	32.99	40.16	36.46	0.00	44.00	0.00	2.11	20.51
2020	93.29	35.89	57.40	33.99	1.67	56.91	0.49	0.03	6.64
2021	97.76	48.55	48.14	17.35	26.98	11.33	33.43	0.52	2.00
Chain Valley Bay									
2011	85.44	41.75	43.68	40.28	1.47	43.68	0.00	0.99	13.32
2012	95.26	89.97	5.28	89.97	0.00	5.28	0.00	2.89	1.92
2013	95.63	62.25	35.84	55.83	1.06	35.84	0.00	0.25	4.00
2014	96.57	34.15	65.85	34.14	0.64	65.85	0.00	0.69	2.74
2015	94.70	70.26	18.80	58.28	11.97	24.45	0.00	1.02	5.06
2016	98.65	74.52	27.13	71.30	0.00	27.13	0.00	1.20	0.15
2017	97.63	52.60	42.79	36.35	18.19	49.82	0.11	0.60	1.62
2018	98.46	72.25	25.48	66.32	5.88	23.48	1.79	0.83	0.71
2019	93.15	84.48	8.64	84.48	0.00	15.66	0.00	0.39	6.72
2020	98.82	94.53	4.29	91.70	2.84	4.29	0.00	0.21	0.92
2021	99.65	95.35	4.30	2.84	74.63	0.21	2.51	0.00	0.26
Crangan Bay									
2011	72.52	28.47	44.05	28.47	0.00	43.31	0.74	0.87	26.98
2012	92.38	0.00	92.38	0.00	0.00	92.38	0.00	0.01	7.99
2013	98.82	13.79	85.52	10.84	2.96	85.52	0.00	0.02	1.02
2014	97.94	23.23	76.77	23.23	0.00	76.77	0.00	0.06	2.02
2015	98.00	23.53	74.47	23.53	0.00	74.47	0.00	0.00	2.01
2016	99.47	15.90	83.30	6.99	9.18	55.37	27.93	0.13	0.49
2017	92.48	16.73	75.75	15.99	3.20	74.71	1.05	0.02	7.57
2018	98.28	46.25	52.03	5.48	89.13	49.09	2.94	0.01	1.74
2019	69.39	39.56	29.95	39.56	0.00	29.95	0.00	0.00	30.40
2020	94.30	25.40	68.90	25.40	0.70	59.12	7.06	0.57	4.01
2021	97.87	67.28	30.59	16.54	50.74	20.66	9.93	0.00	1.32
Bardens Bay									
2014	96.87	54.20	45.80	54.20	0.00	45.80	0.00	1.20	2.03
2015	94.84	68.18	26.67	68.18	0.00	26.67	0.00	0.00	2.92
2016	96.40	63.48	33.01	63.98	0.00	33.01	0.00	0.00	3.61
2017	98.78	76.02	22.75	51.51	24.51	20.59	3.78	0.03	1.23
2018	94.96	55.58	39.39	38.78	16.80	37.67	2.45	2.19	2.68
2019	84.48	73.08	6.40	73.03	11.40	11.40	0.00	0.00	15.52
2020	95.89	81.08	16.04	63.26	1.69	14.60	0.22	0.00	4.11
2021	96.63	96.63	0.00	12.41	78.48	0.00	0.00	3.79	3.24

Table 10.2 also shows in greater detail the increase in percent cover of seagrasses, with bare ground decreasing from 38.13 percent in 2011 to 2 percent in 2021 in the Summerland Point, Frying Pan Bay and Sugar Bay region. In the Chain Valley Bay region, bare ground decreased from 13.32 percent in 2011 to 0.26 percent in 2021. In the Crangan Bay region, bare ground decreased from 26.98 percent in 2011 to 1.32 percent in 2021. Seagrass cover in Bardens Bay has mostly been around 95 percent since 2014.

Plate 10.1 shows sand deposited on seagrasses along Summerland Point after strong onshore winds in June 2011. This event demonstrated how climatic conditions can affect seagrass coverage. It also shows how the movement of sand from deeper waters due to strong winds can increase water depth in some areas whilst decreasing water depth closer to shore as sediment is deposited.

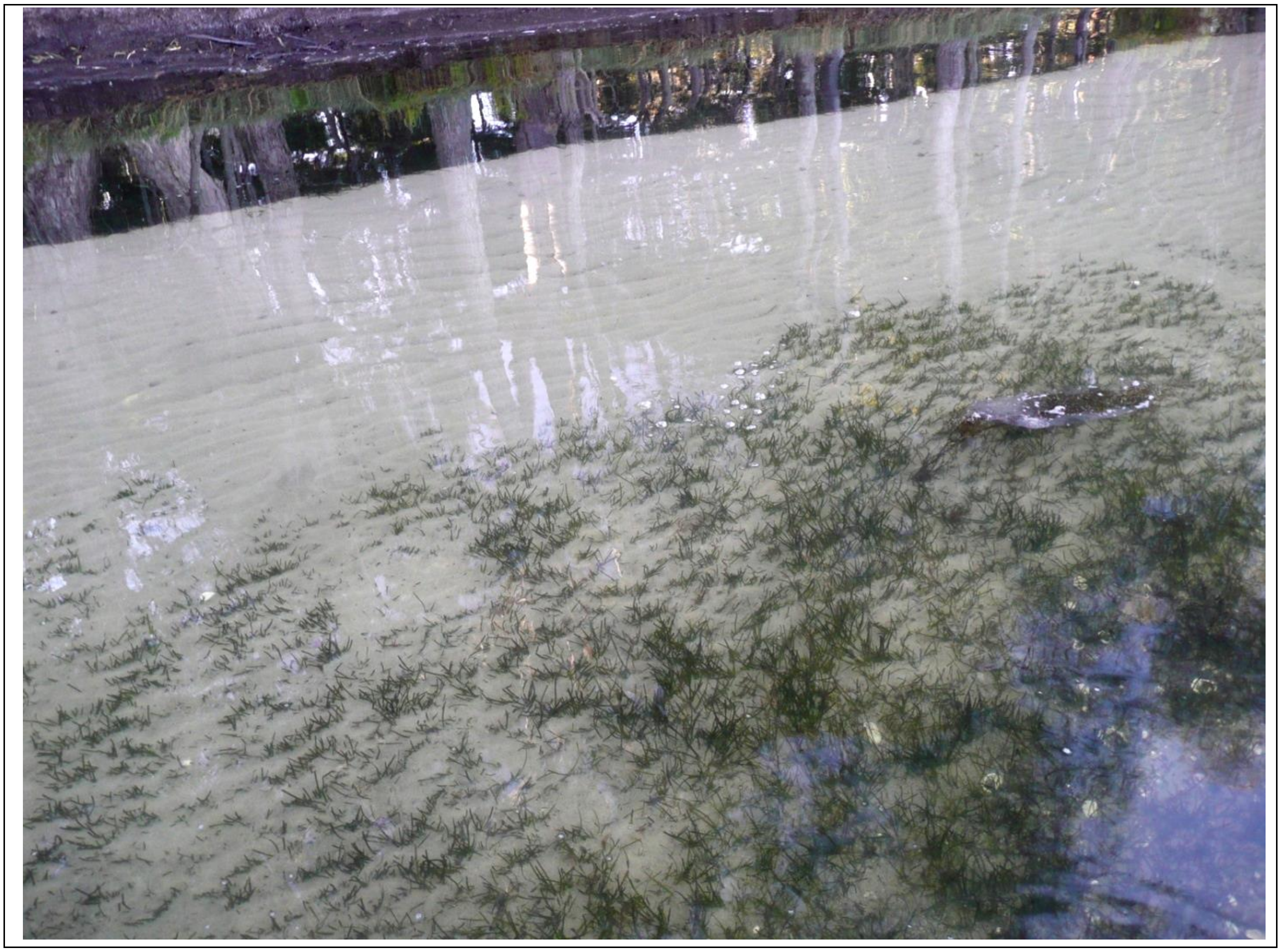

Plate 10.1 *Zostera capricorni* covered by sand along Summerland Point after strong southwesterly winds in 2011.

11. Extent of Coal Mining

Figure 11.1 shows the extent of mining up to June 2021. Mining of the Fassifern seam is currently underway in the Brightwaters and Summerland Point regions. Mining ceased in the Chain Valley Bay region on 24 December 2017.

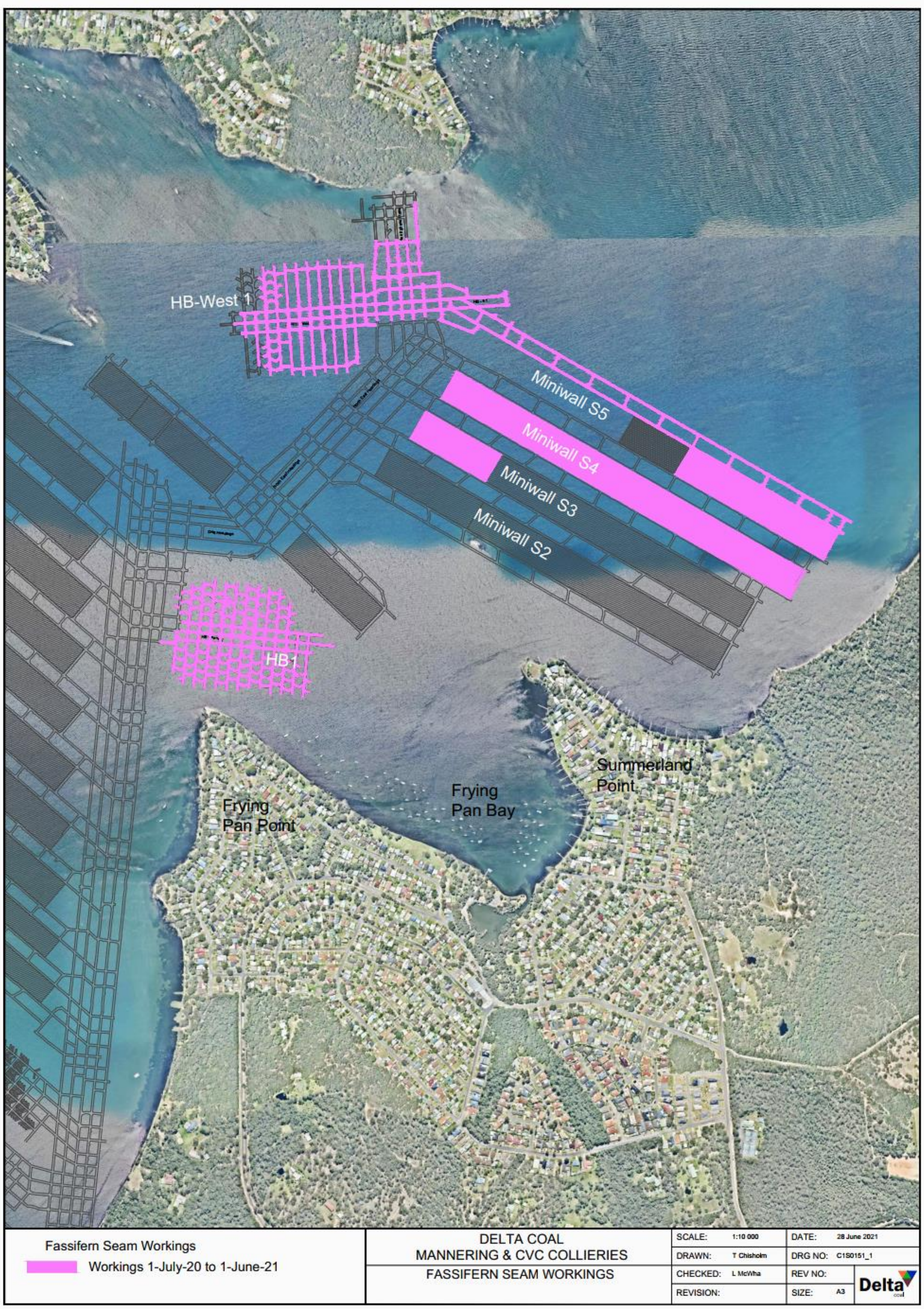

Figure 11.1 Extent of Fassifern Seam Workings from July 2020 – June 2021 (pink)

12. Seagrass Management Plan

The mine, in conjunction with the relevant stake holders, has developed a Seagrass Management Plan. While the colliery is not mining beneath the seagrass beds, the purpose of the plan is to monitor any changes and identify if subsidence is the cause.

Elements of the plan require:

- That the July 2008 survey is to act as a baseline of seagrass distribution, density and condition. Since this time new seagrass transects have been added to the sampling schedule (now 50 transects in 2018-2021).
- Annual re-surveys of the permanent transect lines will be carried out.
- If, during the annual re-surveys, either:
    - Subsidence along the seagrass permanent transects greater than 150mm is detected, or
    - There are reductions in seagrass cover of 20% or more (compared to 2008 values),

then Mine Management will notify the relevant stakeholders of the event and convene a meeting to discuss the implications.

13. Discussion

In June 2021 the seagrasses in the study area were lightly to moderately fouled with epiphytic algae. Seagrass cover along the transects ranged from 91% to 100% of the substratum. Since 2011 seagrass cover has increased progressively. This annual increase in seagrass cover was treated with some suspicion until it was realized that almost all of the beaches in the study area were used by commercial fishermen as net landing grounds. Nets up the 2-3 km in length were drawn across the lake and hauled up on beaches to extract and sort the various fish species. This fishing effort caused minor damage to seagrass beds over the 150 years of commercial fishing in Lake Macquarie. Netting was stopped eventually and the minor damage to seagrass beds began to recover. This recovery process took place over the period of this study and is almost complete in most areas.

In June 2021, two seabed elevations had changed by more than 150mm from the initial seabed heights recorded. These were E9 outer and E16 inner. These transects are in the Chain Valley Bay region where no mining has occurred since 24 December 2017. Seagrass coverage at these transects were 100% and 98.75% respectively.

The results from the June 2021 seagrass monitoring programme show compliance to the Schedule 4 Environmental Conditions - underground mining of SSD5465 - Modification 3 in the Performance Measures table with respect to the Subsidence Impact Performance Measure for Natural Environment Biodiversity - Seagrass which display nil to minor environmental consequences due to underground mining.

The below summary of findings outline the historical basis for this compliance statement and the compliance is detailed in the table below.

Condition from SSD5465 - Mod 3	Compliance Status and Comments
Schedule 4 Environmental Conditions - underground mining Performance Measures - Natural Environment Biodiversity - Benthic Communities. Subsidence Impact Performance Measure - Minor environmental consequences, including minor changes composition and/or distribution.	Compliant - See section 16 - Conclusions
Measurements undertaken by generally accepted methods.	Compliant - See section 4 and 5
Measurements Methods fully described.	Compliant - See section 4 and 5

14. References

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Mr Stewart Ambridge	Delta Coal
Mr Samuel Booth	Daly.Smith Pty. Ltd., Surveyors.

Appendix 1 – Results of Analysis of Quadrat photographs comprising each Transect (Results for June 2021)

Chain Valley Bay

Transect E1

Long=1 Short=2	Fouling 1,2,3	Zostera % cover	Cystophyllum % cover	% algae filamentous	Pinna Number
1	2	100	0	0	0
1	2	100	0	0	0
1	2	85	0	0	0
1	2	100	0	0	0
1	2	100	0	0	0
1	2	95	0	0	0
1	2	100	0	0	0
1	2	100	0	0	0
1	2	100	0	0	0
1	2	100	0	0	0
1	2	100	0	0	0
1	2	100	0	0	0
1	2	100	0	0	0
1	2	100	0	0	0
1	2	100	0	0	0
1	2	100	0	0	0
1	2	100	0	0	0
1	2	100	0	0	0
1	2	90	0	0	0
1	2	90	0	0	0
1	2	100	0	0	0
1	2	100	0	0	0
1	2	100	0	0	0
1	2	95	0	0	0
1	2	100	0	0	0
1	2	100	0	0	0
1	2	100	0	0	0
1	2	100	0	0	0
1	2	100	0	0	0
1	2	100	0	0	0
1	2	100	0	0	0
1	2	100	0	0	0
1	2	100	0	0	0

1	2	100	0	0	0
1	2	100	0	0	0
1	2	100	0	0	0
1	2	100	0	0	0
1	2	100	0	0	0
1	2	100	0	0	0
1	2	100	0	0	0
1	2	100	0	0	0
1	2	100	0	0	0
1	2	100	0	0	0
1	2	100	0	0	0
1	2	100	0	0	0
1	2	100	0	0	0
1	2	100	0	0	0
1	2	100	0	0	0
1	2	100	0	0	0
1	2	100	0	0	0
1	2	100	0	0	0
1	2	100	0	0	0
1	2	100	0	0	0
1	2	100	0	0	0
1	2	100	0	0	0
1	2	100	0	0	0
1	2	100	0	0	0
1	2	100	0	0	0
1	2	100	0	0	0
1	2	100	0	0	0
1	2	100	0	0	0
1	2	100	0	0	0
1	2	100	0	0	0
1	2	100	0	0	0
1	2	100	0	0	0
1	2	100	0	0	0
1	2	100	0	0	0
1	2	100	0	0	0

Transect E2

Long=1 Short=2	Fouling 1,2,3	Zostera % cover	Cystophyllum % cover	% algae filamentous	Pinna Number
1	1	100	0	0	0
1	2	100	0	0	0

1	2	100	0	0	0
1	2	100	0	0	0
1	2	100	0	0	0
1	2	100	0	0	0
1	2	90	0	0	0
1	2	100	0	0	0
1	2	100	0	0	0
1	2	100	0	0	0
1	2	100	0	0	0
1	2	100	0	0	0
1	2	100	0	0	0
1	2	100	0	0	0
1	2	100	0	0	0
1	2	100	0	0	0
1	2	100	0	0	0
1	2	100	0	0	0
1	2	100	0	0	0
1	2	100	0	0	0
1	2	100	0	0	0
1	2	100	0	0	0
1	2	100	0	0	0
1	2	90	0	0	0
1	2	100	0	0	0
1	2	95	5	0	0
1	2	100	0	0	0
1	2	90	10	0	0
1	2	100	0	0	0
1	2	100	0	0	0
1	2	100	0	0	0
1	2	95	0	0	0
1	2	100	0	0	0
1	2	100	0	0	0
1	2	100	0	0	0
1	2	100	0	0	0
1	2	100	0	0	0
1	2	100	0	0	0
1	2	100	0	0	0
1	2	100	0	0	0
1	2	95	5	0	0
1	2	100	0	0	0
1	2	100	0	0	0
1	2	100	0	0	0

1	2	100	0	0	0
1	2	100	0	0	0
1	2	95	5	0	0
1	2	100	0	0	0
1	2	100	0	0	0
1	2	100	0	0	0
1	2	100	0	0	0
1	2	100	0	0	0
1	2	100	0	0	0
1	2	100	0	0	0
1	2	100	0	0	0
1	2	100	0	0	0
1	2	100	0	0	0
1	3	100	0	0	0
1	3	100	0	0	0
1	3	100	0	0	0
1	3	100	0	0	0
1	3	100	0	0	0
1	3	100	0	0	0
1	3	100	0	0	0
1	3	100	0	0	0
1	3	100	0	0	0
1	3	100	0	0	0
1	3	100	0	0	0

Transect E3

Long=1 Short=2	**Fouling 1,2,3**	**Zostera % cover**	**Cystophyllum % cover**	**% algae filamentous**	**Pinna Number**	**% Bare Ground**
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0

1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	95	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0

1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0

Transect E4

Long=1 Short=2	Fouling 1,2,3	Zostera % cover	Cystophyllum % cover	% algae filamentous	Pinna Number	% Bare Ground
1	2	85	0	0	0	15
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	95	5	0	0	0
1	2	95	5	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	95	5	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0

1	2	95	5	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	90	10	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	3	90	0	0	0	10
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	90	0	0	0	10
1	3	100	0	0	0	0
1	3	75	0	0	0	25
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0

Transect E5

Long=1 Short=2	Fouling 1,2,3	Zostera % cover	Cystophyllum % cover	% algae filamentous	Pinna Number	% Bare Ground
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0

1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	3	100	0	0	0	0
2	3	100	0	0	0	0
2	3	100	0	0	0	0

Transect E6

Long=1 Short=2	**Fouling 1,2,3**	**Zostera % cover**	**Cystophyllum % cover**	**% algae filamentous**	**Pinna Number**	**% Bare Ground**
1	2	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0

1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	90	10	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	95	5	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0

1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0

Transect E10

Long=1 Short=2	Fouling 1,2,3	Zostera % cover	Cystophyllum % cover	% algae filamentous	Pinna Number	% Bare Ground
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0

1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0

1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	3	100	0	0	0	0

Transect E11

Long=1 Short=2	Fouling 1,2,3	Zostera % cover	Cystophyllum % cover	% algae filamentous	Pinna Number	% Bare Ground
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0

1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0

Transect E12

Long=1 Short=2	Fouling 1,2,3	Zostera % cover	Cystophyllum % cover	% algae filamentous	Pinna Number	% Bare Ground
1	2	100	0	0	0	0

1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0

1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0

Transect E13

Long=1 Short=2	**Fouling 1,2,3**	**Zostera % cover**	**Cystophyllum % cover**	**% algae filamentous**	**Pinna Number**	**% Bare Ground**
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0

1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	95	0	0	0	5
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0

1	2	85	0	0	0	15
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0

Transect E14

Long=1 Short=2	Fouling 1,2,3	Zostera % cover	Cystophyllum % cover	% algae filamentous	Pinna Number	% Bare Ground
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0

1	2	100	0	0	0	0
1	2	95	0	0	0	5
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	90	0	0	0	10
1	3	100	0	0	0	0
2	1	100	0	0	0	0
2	1	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	3	100	0	0	0	0
2	3	100	0	0	0	0
2	3	100	0	0	0	0
2	3	100	0	0	0	0
2	3	100	0	0	0	0
2	3	100	0	0	0	0
2	3	100	0	0	0	0
2	3	100	0	0	0	0
2	3	100	0	0	0	0
2	3	100	0	0	0	0
2	3	100	0	0	0	0

2	3	100	0	0	0	0

Transect E15

Long=1 Short=2	Fouling 1,2,3	Zostera % cover	Cystophyllum % cover	% algae filamentous	Pinna Number	% Bare Ground
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0

1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0

Transect E16

Long=1 Short=2	**Fouling 1,2,3**	**Zostera % cover**	**Cystophyllum % cover**	**% algae filamentous**	**Pinna Number**	**% Bare Ground**
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	95	0	0	0	5
1	2	90	0	0	0	10

1	2	95	0	0	0	5
1	2	95	0	0	0	5
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	90	0	0	0	10
1	2	90	0	0	0	10
1	2	85	0	0	0	15
1	2	100	0	0	0	0
1	2	95	0	0	0	5
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	90	0	0	0	10
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0

1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	90	0	0	0	10

Transect L1

Long=1 Short=2	Fouling 1,2,3	Zostera % cover	Cystophyllum % cover	% algae filamentous	Pinna Number	% Bare Ground
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0

1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	95	5	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0

1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	95	5	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0

Bardens Bay

Transect A1

Long=1 Short=2	Fouling 1,2,3	Zostera % cover	Cystophyllum % cover	% algae filamentous	Pinna Number	% Bare Ground
1	1	90	0	0	0	10
1	1	90	0	5	0	5
1	1	100	0	0	0	0
1	1	100	0	5	0	0
1	1	100	0	25	0	0
1	1	100	0	5	0	0
1	1	100	0	10	0	0
1	1	100	0	5	0	0
1	1	100	0	10	0	0
1	1	100	0	10	0	0
1	1	100	0	5	0	0
1	1	100	0	15	0	0
1	1	100	0	40	0	0
1	1	100	0	25	0	0
1	1	100	0	15	0	0
1	1	100	0	15	0	0
1	1	100	0	5	0	0
1	1	100	0	5	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	95	0	5	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	5	0	0
1	2	100	0	0	0	0
1	2	100	0	10	0	0

1	2	100	0	10	0	0
1	2	100	0	0	0	0
1	2	100	0	15	0	0
1	2	100	0	0	0	0
1	2	100	0	10	0	0
1	2	100	0	5	0	0
1	2	100	0	30	0	0
1	2	100	0	35	0	0
1	2	100	0	25	0	0
1	2	100	0	15	0	0
1	2	100	0	15	0	0
1	2	100	0	20	0	0
1	2	100	0	10	0	0
1	2	100	0	10	0	0
1	2	50	0	0	0	50
1	2	65	0	0	0	35
1	2	100	0	25	0	0
1	2	100	0	0	0	0
1	2	100	0	10	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	10	0	0
1	2	100	0	0	0	0
1	2	100	0	5	0	0
1	2	95	0	5	0	5
1	2	100	0	5	0	0
1	2	100	0	15	0	0
1	2	100	0	5	0	0
1	2	100	0	0	1	0
1	2	100	0	0	0	0
1	2	90	0	5	0	5
1	2	100	0	20	0	0
1	2	100	0	0	0	0
1	2	85	0	0	0	15
1	2	100	0	0	0	0
1	2	95	0	5	0	5
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0

Transect A2

Long=1 Short=2	Fouling 1,2,3	Zostera % cover	Cystophyllum % cover	% algae filamentous	Pinna Number	% Bare Ground

1	1	85	0	0	0	15
1	2	100	0	10	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	90	0	10	0	10
1	2	80	0	5	0	20
1	2	100	0	15	0	0
1	2	100	0	0	0	0
1	2	100	0	5	0	0
1	2	100	0	0	0	0
1	2	100	0	20	0	0
1	2	90	0	5	0	10
1	2	100	0	0	0	0
1	2	85	0	5	0	10
1	2	100	0	10	0	0
1	2	100	0	10	0	0
1	2	100	0	20	0	0
1	2	100	0	25	0	0
1	2	85	0	0	0	15
1	2	100	0	5	0	0
1	2	95	0	10	0	5
1	2	95	0	5	0	5
1	2	100	0	0	0	0
1	2	90	0	5	0	5
1	2	100	0	10	0	0
1	2	100	0	5	0	0
1	2	90	0	5	0	5
1	2	90	0	5	0	5
1	2	100	0	5	0	0
1	2	100	0	5	0	0
1	2	100	0	10	0	0
1	2	100	0	0	0	0
1	2	100	0	5	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	95	0	10	0	5
1	2	100	0	30	0	0
1	2	100	0	20	0	0
1	2	100	0	5	0	0
1	2	100	0	15	0	0
1	2	95	0	5	0	5

1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	5	0	0
1	3	100	0	10	0	0
1	3	75	0	20	0	5
1	3	100	0	50	0	0
1	3	100	0	15	0	0
1	3	100	0	15	0	0
1	3	100	0	75	0	0
1	3	90	0	25	0	10
1	3	100	0	20	0	0
1	3	100	0	15	0	0
1	3	100	0	30	0	0
1	3	100	0	15	0	0
1	3	85	0	45	0	15
1	3	100	0	30	0	0
1	3	100	0	20	0	0
1	3	100	0	25	0	0
1	3	100	0	30	0	0
1	3	100	0	75	0	0
1	3	100	0	20	0	0
1	3	100	0	35	0	0
1	3	90	0	15	0	10
1	3	100	0	20	0	0
1	3	100	0	50	0	0
1	3	100	0	30	0	0
1	3	100	0	25	0	0

Transect A3

Long=1 Short=2	Fouling 1,2,3	Zostera % cover	Cystophyllum % cover	% algae filamentous	Pinna Number	% Bare Ground
0	0	0	0	0	0	100
0	0	0	0	0	0	100
1	1	30	0	0	0	70
1	1	80	0	0	0	20
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	90	0	0	0	10
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0

1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	50	0	0	0	50
1	2	80	0	0	0	20
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	20	0	0	0	80
1	2	50	0	0	0	50
1	2	90	0	0	0	10
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	70	0	0	0	30
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0

1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	30	0	0	0	70
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0

Transect A4

Long=1 Short=2	Fouling 1,2,3	Zostera % cover	Cystophyllum % cover	% algae filamentous	Pinna Number	% Bare Ground
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0

1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0

1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0

Transect A5

Long=1 Short=2	Fouling 1,2,3	Zostera % cover	Cystophyllum % cover	% algae filamentous	Pinna Number	% Bare Ground
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	30	0	0	0	70
1	2	95	0	0	0	5
1	2	100	0	0	0	0
1	2	100	0	0	0	0

1	2	70	0	0	0	30
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	10	0	0	0	90
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0

Transect A6

Long=1 Short=2	Fouling 1,2,3	Zostera % cover	Cystophyllum % cover	% algae filamentous	Pinna Number	% Bare Ground
1	1	100	0	0	0	0
1	2	100	0	0	0	0
1	2	90	0	0	0	10
1	2	90	0	0	0	10
1	2	90	0	0	0	10

1	2	95	0	0	0	5
1	2	90	0	0	0	10
1	2	95	0	0	0	5
1	2	95	0	0	0	5
1	2	95	0	0	0	5
1	2	95	0	0	0	5
1	2	90	0	0	0	10
1	2	100	0	0	0	0
1	2	90	0	0	0	10
1	2	90	0	0	0	10
1	2	95	0	0	0	5
1	2	95	0	0	0	5
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	95	0	0	0	5
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	95	0	0	0	5
1	2	95	0	0	0	5
1	2	95	0	0	0	5
1	2	95	0	0	0	5
1	2	95	0	0	0	5
1	2	95	0	0	0	5
1	2	95	0	0	0	5
1	2	95	0	0	0	5
1	2	95	0	0	0	5
1	2	95	0	0	0	5
1	2	95	0	0	0	5
1	2	95	0	0	0	5
1	2	95	0	0	0	5
1	2	95	0	0	0	5
1	2	95	0	0	0	5

1	2	95	0	0	0	5
1	2	95	0	0	0	5
1	2	95	0	0	0	5
1	2	95	0	0	0	5
1	2	95	0	0	0	5
1	2	95	0	0	0	5
1	2	95	0	0	0	5
1	2	95	0	0	0	5
1	2	95	0	0	0	5
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0

Crangan Bay

Transect C1

Long=1 Short=2	Fouling 1,2,3	Zostera % cover	Cystophyllum % cover	% algae filamentous	Pinna Number	% Bare Ground
0	0	0	0	0	0	100
0	0	0	0	0	0	100
1	1	90	0	0	0	10
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	90	0	0	0	10
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0

1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	95	0	0	0	5
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	90	0	0	0	10
1	2	100	0	0	0	0
1	2	95	0	0	0	5
1	2	100	0	0	1	0
1	2	50	0	0	1	0
1	2	80	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	1	0
1	2	90	0	0	0	0
1	2	50	50	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	80	20	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
2	1	90	0	0	0	10
2	1	95	0	0	0	5

2	1	90	0	0	1	10
2	1	100	0	0	0	0
2	1	100	0	0	0	0
2	1	100	0	0	0	0
2	1	100	0	0	0	0
2	1	100	0	0	0	0
2	1	100	0	0	0	0
2	1	100	0	0	0	0
2	1	100	0	0	0	0
2	1	100	0	0	0	0

Transect C2

Long=1 Short=2	Fouling 1,2,3	Zostera % cover	Cystophyllum % cover	% algae filamentous	Pinna Number	% Bare Ground
1	1	90	0	0	0	10
1	1	95	0	0	0	5
1	1	95	0	0	0	5
1	1	95	0	0	0	5
1	1	90	0	0	0	10
1	1	95	0	0	0	5
1	1	80	0	0	0	20
1	1	80	0	0	1	20
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	80	20	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0

1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
2	1	100	0	0	0	0
2	1	100	0	0	0	0
2	1	95	0	0	0	5
2	1	100	0	0	0	0
2	1	100	0	0	0	0
2	1	100	0	0	0	0
2	1	50	0	0	1	0
2	1	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0

Transect C3

Long=1 Short=2	Fouling 1,2,3	Zostera % cover	Cystophyllum % cover	% algae filamentous	Pinna Number	% Bare Ground
1	1	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
2	1	100	0	0	0	0
2	1	100	0	0	0	0
2	1	100	0	0	0	0
2	1	100	0	0	1	0
2	1	100	0	0	0	0
2	1	100	0	0	0	0
2	1	100	0	0	0	0
2	1	100	0	0	0	0
2	1	100	0	0	0	0
2	1	100	0	0	0	0
2	1	100	0	0	0	0
2	1	100	0	0	0	0
2	1	100	0	0	0	0
2	1	100	0	0	0	0
2	1	100	0	0	0	0
2	1	100	0	0	0	0
2	1	100	0	0	0	0
2	1	100	0	0	0	0
2	1	100	0	0	0	0
2	1	100	0	0	0	0
2	1	100	0	0	0	0
2	1	100	0	0	0	0
2	1	100	0	0	0	0
2	1	100	0	0	0	0
2	1	100	0	0	0	0
2	1	100	0	0	0	0
2	1	100	0	0	0	0
2	1	100	0	0	0	0
2	1	100	0	0	0	0

2	1	100	0	0	0	0
2	1	100	0	0	0	0
2	1	100	0	0	0	0
2	1	100	0	0	0	0
2	1	100	0	0	0	0
2	1	100	0	0	0	0
2	1	100	0	0	0	0
2	1	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0

Transect C4

Long=1 Short=2	Fouling 1,2,3	Zostera % cover	Cystophyllum % cover	% algae filamentous	Pinna Number	% Bare Ground
1	1	100	0	0	1	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0

1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	1	0
1	2	100	0	0	0	0
1	2	100	0	0	1	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0

1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	1	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	2	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	90	0	0	0	10
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0

Summerland Point, Frying Pan Bay, Sugar Bay

Transect C5

Long=1	**Fouling**	**Zostera**	**Cystophyllum**	**% algae**	**Pinna**	**% Bare**
Short=2	**1,2,3**	**% cover**	**% cover**	**filamentous**	**Number**	**Ground**
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0

1	2	100	0	0	0	0
1	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	90	10	0	0	0

2	2	100	0	0	0	0
2	2	90	10	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0

Transect C6

Long=1 Short=2	**Fouling 1,2,3**	**Zostera % cover**	**Cystophyllum % cover**	**% algae filamentous**	**Pinna Number**	**% Bare Ground**
1	2	95	0	0	0	5
1	2	90	0	10	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0

1	2	100	0	0	0	0
1	3	100	0	0	0	0
2	2	100	0	0	0	0
2	2	90	0	0	0	10
2	2	75	0	0	0	25
2	2	85	0	15	0	15
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	95	0	0	0	5
2	2	95	0	0	0	5
2	2	95	0	0	0	5
2	2	100	0	0	0	0
2	2	100	0	0	1	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	95	0	0	0	5
2	2	95	0	0	0	5
2	2	100	0	0	0	0
2	3	100	0	0	0	0
2	3	100	0	0	0	0
2	3	100	0	0	0	0
2	3	100	0	0	0	0
2	3	100	0	0	0	0
2	3	100	0	0	0	0
2	3	100	0	0	0	0
2	3	100	0	0	0	0
2	3	100	0	0	0	0
2	3	100	0	0	0	0
2	3	100	0	0	0	0
2	3	100	0	0	0	0
2	3	100	0	0	0	0
2	3	95	0	0	0	5

Transect F1

Long=1 Short=2	Fouling 1,2,3	Zostera % cover	Cystophyllum % cover	% algae filamentous	Pinna Number	% Bare Ground

2	1	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	95	5	0	0	5
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	95	0	5	0	5
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	90	0	10	0	10
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	90	0	10	0	10
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	90	0	10	0	10
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0

2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	3	100	0	0	0	0
2	3	100	0	0	0	0
2	3	100	0	0	0	0
2	3	100	0	0	0	0
2	3	100	0	0	0	0
2	3	100	0	0	0	0
2	3	100	0	0	0	0
2	3	100	0	0	0	0
2	3	100	0	0	0	0

Transect F2

Long=1 Short=2	Fouling 1,2,3	Zostera % cover	Cystophyllum % cover	% algae filamentous	Pinna Number	% Bare Ground
1	2	90	0	0	0	10
1	2	95	0	0	0	5
1	2	65	0	0	1	35
1	2	85	0	0	0	15
1	2	95	0	0	0	5
1	2	100	0	0	0	0
1	2	90	0	0	0	10
1	2	100	0	0	0	0
1	2	90	0	0	0	10
1	2	90	0	0	0	10
1	2	100	0	0	0	0
1	2	100	0	0	0	0

1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	95	0	0	0	5
1	2	90	0	0	0	10
1	2	80	0	0	0	20
1	2	95	0	0	0	5
1	2	95	0	0	1	5
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
2	1	100	0	0	0	0
2	1	100	0	0	0	0
2	1	100	0	0	0	0
2	1	100	0	0	0	0
2	1	100	0	0	0	0
2	1	100	0	0	0	0
2	1	100	0	0	0	0
2	1	100	0	0	0	0
2	1	100	0	0	0	0
2	1	100	0	0	0	0
2	1	100	0	0	0	0
2	1	100	0	0	0	0
2	1	95	5	0	0	0
2	1	95	5	0	0	0
2	1	100	0	0	0	0
2	1	100	0	0	0	0
2	1	100	0	0	0	0
2	1	95	5	0	0	0
2	1	90	10	0	0	0
2	1	85	15	0	0	0
2	1	95	5	0	0	0
2	1	85	15	0	0	0
2	1	50	50	0	0	0
2	1	100	0	0	0	0
2	1	95	5	0	0	0
2	1	100	0	0	0	0
2	1	100	0	0	0	0
2	1	100	0	0	0	0
2	1	100	0	0	0	0
2	1	100	0	0	0	0
2	1	100	0	0	0	0

2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	1	0
2	2	100	0	0	0	0
2	2	90	10	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0

Transect F3

Long=1 Short=2	Fouling 1,2,3	Zostera % cover	Cystophyllum % cover	% algae filamentous	Pinna Number	% Bare Ground
1	1	80	0	0	0	20
1	1	80	0	0	0	20
1	1	85	0	0	0	15
1	1	90	0	0	0	10
1	1	80	0	0	0	20
1	1	90	0	0	0	10
1	1	90	0	0	0	10
1	1	95	0	0	0	5
1	2	95	0	0	0	5
1	2	90	0	0	0	10
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	1	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0

2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	95	0	0	0	5
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	95	0	0	0	5
2	2	95	0	0	0	5
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	90	0	0	0	10
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	90	0	0	0	10
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0

2	2	100	0	0	0	0
2	2	100	0	0	0	0

Transect F4

Long=1 Short=2	Fouling 1,2,3	Zostera % cover	Cystophyllum % cover	% algae filamentous	Pinna Number	% Bare Ground
1	2	75	0	0	0	25
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
2	1	100	0	0	0	0
2	1	100	0	0	0	0
2	1	100	0	0	0	0
2	1	90	0	0	0	10
2	1	100	0	0	0	0
2	1	100	0	0	0	0
2	1	100	0	0	1	0
2	1	100	0	0	0	0
2	1	100	0	0	0	0
2	1	100	0	0	0	0
2	1	100	0	0	0	0
2	1	100	0	0	0	0
2	1	100	0	0	0	0
2	1	100	0	0	0	0
2	1	100	0	0	0	0
2	1	100	0	0	0	0
2	1	100	0	0	0	0
2	2	85	0	0	0	15
2	2	90	0	0	0	10
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	95	0	0	0	5
2	2	100	0	0	0	0
2	2	95	0	0	0	5
2	2	90	0	0	0	10

2	2	95	0	0	0	5
2	2	100	0	0	0	0
2	2	95	0	0	0	5
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	90	0	0	0	10
2	2	100	0	0	0	0
2	2	90	0	0	0	10
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	95	0	0	0	5
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	95	0	0	0	5
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	90	0	0	0	10
2	2	90	0	0	0	10

Transect F5

Long=1 Short=2	**Fouling 1,2,3**	**Zostera % cover**	**Cystophyllum % cover**	**% algae filamentous**	**Pinna Number**	**% Bare Ground**
1	1	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	95	0	0	0	5
1	2	95	0	0	0	5
1	2	95	0	0	0	5

1	2	100	0	0	0	0
1	2	100	0	0	0	0
2	1	100	0	0	0	0
2	1	100	0	0	0	0
2	1	100	0	0	0	0
2	1	100	0	0	0	0
2	1	100	0	0	0	0
2	1	100	0	0	0	0
2	1	95	0	0	0	5
2	1	100	0	0	0	0
2	1	95	0	0	0	5
2	1	100	0	0	0	0
2	1	100	0	0	0	0
2	1	95	0	0	0	5
2	1	100	0	0	0	0
2	1	95	0	0	0	5
2	1	90	0	0	0	10
2	1	90	0	0	0	10
2	1	95	0	0	0	5
2	1	95	0	0	0	5
2	1	95	0	0	0	5
2	1	100	0	0	0	0
2	1	95	0	0	0	5
2	1	90	0	0	0	10
2	1	95	0	0	0	5
2	1	95	0	0	0	5
2	1	90	0	0	0	10
2	1	95	0	0	0	5
2	1	90	0	0	0	10
2	1	85	0	0	0	15
2	1	85	0	0	0	10
2	1	90	0	0	0	10
2	1	80	0	0	0	20
2	1	100	0	0	0	0
2	1	100	0	0	0	0
2	1	100	0	0	0	0
2	1	100	0	0	0	0
2	1	100	0	0	0	0
2	1	100	0	0	0	0
2	1	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0

2	2	95	0	0	0	5
2	2	95	0	0	0	5
2	2	95	0	0	0	5
2	2	90	0	0	0	10
2	2	95	0	0	0	5
2	2	95	0	0	0	5
2	2	95	0	0	0	5
2	2	95	0	0	0	5
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	95	0	0	0	5
2	2	100	0	0	0	0
2	2	95	0	0	0	5
2	2	95	0	0	0	5
2	2	100	0	0	0	0
2	2	95	5	0	0	5

Transect F6

Long=1 Short=2	Fouling 1,2,3	Zostera % cover	Cystophyllum % cover	% algae filamentous	Pinna Number	% Bare Ground
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
2	1	95	0	0	0	5
2	1	100	0	0	0	0
2	1	100	0	0	0	0
2	1	100	0	0	0	0
2	1	95	0	0	0	5
2	1	100	0	0	0	0
2	1	95	0	0	0	5
2	1	95	0	0	0	5
2	1	95	0	0	0	5
2	1	95	0	0	0	5
2	1	95	0	0	0	5
2	1	95	0	0	0	5
2	1	95	0	0	1	5
2	1	90	0	0	0	5
2	1	95	0	0	0	5

2	1	90	0	0	0	10
2	1	95	0	0	0	5
2	1	100	0	0	0	0
2	1	95	0	0	0	5
2	1	95	0	0	0	5
2	1	100	0	0	0	0
2	1	100	0	0	0	0
2	1	95	0	0	0	5
2	1	100	0	0	0	0
2	1	95	0	0	0	5
2	1	100	0	0	0	0
2	1	100	0	0	0	0
2	1	95	0	0	0	5
2	1	95	0	0	0	5
2	1	95	0	0	0	5
2	1	95	0	0	0	5
2	1	95	0	0	0	5
2	1	95	0	0	0	5
2	1	95	0	0	0	5
2	1	95	0	0	0	5
2	2	95	0	0	0	5
2	2	95	0	0	0	5
2	2	95	0	0	0	5
2	2	95	0	0	0	5
2	2	95	0	0	0	5
2	2	95	0	0	0	5
2	2	95	0	0	0	5
2	2	100	0	0	0	0
2	2	95	0	0	0	5
2	2	95	0	0	0	5
2	2	100	0	0	0	0
2	2	95	0	0	0	5
2	2	95	0	0	0	5
2	2	90	0	0	0	10
2	2	95	0	0	0	5
2	2	100	0	0	0	0
2	2	95	0	0	0	5
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	95	0	0	0	5

2	2	95	0	0	0	5
2	2	95	0	0	0	5
2	2	90	0	0	0	10
2	2	85	0	0	0	15
2	2	90	0	0	0	10
2	2	95	0	0	0	5
2	2	95	0	0	0	5
2	2	95	0	0	0	5

Transect F7

Long=1 Short=2	Fouling 1,2,3	Zostera % cover	Cystophyllum % cover	% algae filamentous	Pinna Number	% Bare Ground
1	1	100	0	0	0	0
1	1	90	0	0	0	10
1	1	95	0	0	0	5
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	95	0	0	0	5
1	1	95	0	0	0	5
1	1	95	0	0	0	5
1	1	100	0	0	0	0
1	1	95	0	0	0	5
1	1	95	0	0	0	5
1	1	95	0	0	0	5
1	1	95	0	0	0	5
1	1	100	0	0	0	0
1	1	90	0	0	0	10
1	1	95	0	0	0	5
1	1	95	0	0	0	5
1	1	95	0	0	0	5
1	1	95	0	0	0	5
1	1	95	0	0	0	5
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	95	0	0	0	5
1	1	95	0	0	0	5
1	1	100	0	0	0	0
1	1	95	0	0	0	5
1	1	100	0	0	0	0
1	1	95	0	0	0	5
1	1	100	0	0	0	0

1	1	90	0	0	0	10
1	1	95	0	0	0	5
1	1	100	0	0	0	0
1	1	95	0	0	0	5
1	1	95	0	0	0	5
1	1	95	0	0	0	5
1	1	90	0	0	0	10
1	1	95	0	0	0	5
1	1	90	0	0	0	10
1	1	90	0	0	0	10
1	1	95	0	0	0	5
1	1	90	0	0	0	10
1	1	85	0	0	0	15
1	1	90	0	0	0	10
1	1	85	0	0	0	15
1	1	95	0	0	0	5
1	1	90	0	0	0	10
1	1	90	0	0	0	10
1	1	95	0	0	0	5
1	1	90	0	0	0	10
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	90	0	0	0	10
1	1	95	0	0	0	5
1	1	95	0	0	0	5
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	2	90	0	0	0	10
1	2	95	0	0	0	5
1	2	90	0	0	0	10
1	2	85	0	0	0	15

Transect S1

Long=1 Short=2	**Fouling 1,2,3**	**Zostera % cover**	**Cystophyllum % cover**	**% algae filamentous**	**Pinna Number**	**% Bare Ground**

1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	2	100	10	0	0	0
1	2	100	0	0	0	0
1	2	95	0	10	0	5
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	95	0	0	0	5
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	3	100	10	0	0	0
1	3	100	0	60	0	0
1	3	100	0	60	0	0
1	3	100	0	70	0	0
1	3	90	10	25	0	0
1	3	100	0	35	0	0
1	3	100	0	60	0	0
1	3	100	0	50	0	0
1	3	100	0	30	0	0
1	3	100	0	25	0	0
1	3	65	0	15	0	20
1	3	100	0	15	0	0
1	3	100	0	85	0	0
1	3	100	0	50	0	0
1	3	95	0	10	0	5
1	3	95	0	5	0	5
1	3	95	0	5	0	5

1	3	100	0	15	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	95	0	0	0	5
1	3	100	0	2	0	0
1	3	30	0	80	0	0
1	3	100	0	2	0	0
1	3	100	0	2	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	95	0	5	0	0
1	3	100	0	0	0	0
1	3	100	0	80	0	0
1	3	100	0	30	0	0
1	3	100	0	15	0	0
1	3	100	0	15	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0

Transect S2

Long=1 Short=2	Fouling 1,2,3	Zostera % cover	Cystophyllum % cover	% algae filamentous	Pinna Number	% Bare Ground
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0

1	2	100	0	0	0	0
1	2	95	0	0	0	5
1	2	100	0	0	0	0
1	2	85	0	0	0	15
1	2	75	0	0	0	25
1	2	75	0	0	0	25
1	2	75	0	0	0	25
1	2	50	0	0	0	50
1	2	50	0	0	0	50
1	2	100	0	0	0	0
1	2	90	0	0	0	10
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	90	0	0	0	10
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	90	0	0	0	10
1	2	100	0	0	0	0
1	2	95	0	0	0	5
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0

1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	95	0	0	0	5
1	3	100	0	0	0	0

Transect S3

Long=1	**Fouling**	**Zostera**	**Cystophyllum**	**% algae**	**Pinna**	**% Bare**
Short=2	**1,2,3**	**% cover**	**% cover**	**filamentous**	**Number**	**Ground**
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0

1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0

2	2	100	0	0	0	0
2	2	100	0	0	0	0

Transect S4

Long=1 Short=2	Fouling 1,2,3	Zostera % cover	Cystophyllum % cover	% algae filamentous	Pinna Number	% Bare Ground
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0

1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
2	1	100	0	0	0	0
2	1	100	0	0	0	0

Transect S5

Long=1 Short=2	Fouling 1,2,3	Zostera % cover	Cystophyllum % cover	% algae filamentous	Pinna Number	% Bare Ground
1	1	85	0	0	0	15
1	1	90	0	0	0	10
1	1	85	0	0	0	15
1	1	95	0	0	0	5
1	1	100	0	0	0	0
1	1	100	0	0	0	0

1	1	90	0	0	0	10
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	90	0	0	0	10
1	1	95	0	0	0	5
1	1	95	0	0	0	5
1	1	90	0	0	0	10
1	1	100	0	0	0	0
1	1	95	0	0	0	5
1	1	95	0	0	0	5
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	85	0	0	0	15
1	1	90	0	0	0	10
1	1	85	0	0	0	15
1	1	75	0	0	0	25
1	1	85	0	0	0	15
1	1	95	0	0	0	5
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	95	0	0	0	5
1	1	95	0	0	0	5
1	1	90	0	0	0	10
1	1	95	0	0	0	5
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	95	0	0	0	5
1	1	90	0	0	0	10
1	1	90	0	0	0	10
1	1	90	5	0	0	5
1	1	95	0	0	0	5
1	1	95	0	0	0	5
1	1	95	0	0	0	5
1	1	90	0	0	0	10
1	1	95	0	0	0	5
1	1	95	0	0	0	5
1	1	95	0	0	0	5
1	1	85	0	0	0	15
1	1	85	0	0	0	15
1	1	95	0	0	0	5

1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	95	0	0	0	5
1	1	95	0	0	0	5
1	1	95	0	0	0	5
1	1	95	0	0	0	5
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	90	0	0	0	10
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	95	0	0	0	5
1	1	95	0	0	0	5
1	1	100	0	0	0	0
1	1	95	0	0	0	5
1	1	95	0	0	0	5
1	1	95	0	0	0	5
1	1	100	0	0	0	0
1	1	100	0	0	0	0

Transect S6

Long=1 Short=2	**Fouling 1,2,3**	**Zostera % cover**	**Cystophyllum % cover**	**% algae filamentous**	**Pinna Number**	**% Bare Ground**
1	1	100	0	0	0	0
1	1	85	0	0	0	15
1	1	85	0	0	0	15
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	95	0	0	0	5
1	1	95	0	0	0	5
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	95	0	0	0	5
1	1	100	0	1	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0

1	1	100	0	0	0	0
1	1	95	0	0	0	5
1	1	100	0	0	0	0
1	1	90	0	0	0	10
1	1	95	0	0	0	5
1	1	100	0	0	0	0
1	1	98	2	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	90	0	0	0	10
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	1	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	2	95	5	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0

1	2	100	0	0	0	0
1	2	100	0	0	0	0
2	1	95	0	0	0	5
2	1	100	0	0	0	0
2	1	90	0	0	0	10
2	1	100	0	0	0	0
2	1	100	0	0	0	0
2	1	100	0	0	0	0

Transect E7

Long=1 Short=2	Fouling 1,2,3	Zostera % cover	Cystophyllum % cover	% algae filamentous	Pinna Number	% Bare Ground
1	1	90	0	0	0	10
2	1	80	0	0	0	20
2	1	80	0	0	0	20
2	1	70	0	0	0	30
2	1	80	0	0	0	20
2	1	80	0	0	0	20
2	1	90	0	0	0	10
2	1	90	0	0	0	10
2	1	90	0	0	0	10
2	1	95	0	0	0	5
2	1	90	0	0	0	10
2	1	80	0	0	0	20
2	1	90	0	0	0	10
2	1	95	0	0	0	5
2	1	90	0	0	0	10
2	1	100	0	0	0	0
2	1	90	0	0	0	10
2	1	85	0	0	0	15
2	1	80	0	0	0	20
2	1	90	0	0	0	10
2	1	90	0	0	0	10
2	1	90	0	0	0	10
2	1	95	0	0	0	5
2	1	95	0	0	0	5
2	1	95	0	0	0	5
2	1	100	0	0	0	0
2	1	100	0	0	0	0
2	1	100	0	0	0	0
2	1	90	0	0	0	10
2	1	100	0	0	0	0

2	1	95	0	0	0	5
2	1	95	0	0	0	5
2	1	95	0	0	0	5
2	1	95	0	0	0	5
2	1	95	0	0	0	5
2	1	95	0	0	0	5
2	1	95	0	0	0	5
2	1	95	0	0	0	5
2	1	90	0	0	0	10
2	1	90	0	0	0	10
2	1	95	0	0	0	5
2	1	90	0	0	0	10
2	1	90	0	0	0	10
2	1	90	0	0	0	10
2	1	95	0	0	0	5
2	1	95	0	0	0	5
2	1	100	0	0	0	0
2	1	100	0	0	0	0
2	1	100	0	0	0	0
2	1	100	0	0	0	0
2	1	100	0	0	0	0
2	1	100	0	0	0	0
2	1	95	0	5	0	0
2	1	100	0	0	0	0
2	1	100	0	0	0	0
2	1	100	0	0	0	0
2	1	100	0	0	0	0
2	1	100	0	0	0	0
2	1	100	0	0	0	0
2	1	100	0	0	0	0
2	1	100	0	0	0	0
2	1	100	0	0	0	0
2	1	95	0	0	0	5
2	1	100	0	0	0	0
2	1	100	0	0	0	0
2	1	100	0	0	0	0
2	1	100	0	0	0	0
2	1	100	0	0	0	0

Transect E8

Long=1	**Fouling**	**Zostera**	**Cystophyllum**	**% algae**	**Pinna**	**% Bare**
Short=2	**1,2,3**	**% cover**	**% cover**	**filamentous**	**Number**	**Ground**

1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	95	0	0	0	0
1	2	95	0	0	0	0
1	2	95	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0

1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0

Transect E9

Long=1 Short=2	Fouling 1,2,3	Zostera % cover	Cystophyllum % cover	% algae filamentous	Pinna Number	% Bare Ground
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0

1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0

1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0

Transect T1

Long=1 Short=2	Fouling 1,2,3	Zostera % cover	Cystophyllum % cover	% algae filamentous	Pinna Number	% Bare Ground
0	0	0	0	0	0	0
0	0	0	0	0	0	100
1	1	90	0	0	0	10
1	1	95	0	0	0	5
1	1	100	0	0	0	0
1	1	90	0	0	0	10
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	95	0	0	0	5
1	1	95	0	0	0	5
1	1	95	0	0	0	5
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	95	5	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0

1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	95	0	0	0	5
1	2	100	0	0	0	0
1	2	80	0	0	0	20
1	2	95	0	0	0	5
1	2	90	0	0	0	10
1	2	90	0	0	0	10
1	2	90	0	0	0	10
1	2	100	0	0	0	0
1	2	80	0	0	0	20
1	2	95	0	0	0	5
1	2	95	0	0	0	5
1	2	90	0	0	0	10
1	2	90	0	0	0	10
1	2	85	0	0	0	15
1	2	95	0	0	0	5
1	2	75	5	0	0	20
1	2	65	5	0	0	30
1	2	100	0	0	0	0
1	2	90	0	0	0	10
1	2	90	0	0	0	10
1	2	95	0	0	0	5
1	2	100	0	0	0	0
1	2	90	0	0	0	10
1	2	95	0	0	0	5
1	2	100	0	0	0	0
1	2	90	0	0	0	10
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	90	5	0	0	5
1	2	80	0	0	0	20
1	2	100	0	0	0	0
1	2	95	0	0	0	5
2	2	80	0	0	0	20
2	2	80	15	0	0	5
2	2	100	0	0	0	0
2	2	90	0	0	0	10
2	2	95	0	0	0	5
2	2	95	0	0	0	5

2	2	75	0	0	0	25
2	2	90	0	0	0	10

Transect T2

Long=1 Short=2	Fouling 1,2,3	Zostera % cover	Cystophyllum % cover	% algae filamentous	Pinna Number	% Bare Ground
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	95	0	0	0	5
1	2	90	0	0	0	10
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
2	1	100	0	0	0	0
2	1	100	0	0	0	0
2	1	100	0	0	0	0
2	1	90	0	0	0	10
2	1	100	0	0	0	0
2	1	100	0	0	0	0
2	1	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	90	0	0	0	10

2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	90	0	0	0	10
2	2	100	0	0	0	0
2	2	50	0	0	0	50
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	95	0	0	0	5
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	90	0	0	0	10
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	95	0	0	0	5
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0

Transect T3

Long=1 Short=2	Fouling 1,2,3	Zostera % cover	Cystophyllum % cover	% algae filamentous	Pinna Number	% Bare Ground
2	1	100	0	0	0	0
2	1	95	0	0	0	5
2	1	95	0	5	0	5
2	1	100	0	0	0	0
2	1	100	0	0	0	0
2	1	100	0	0	0	0

2	1	100	0	0	0	0
2	1	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	50	0	0	1	50
2	2	95	0	0	0	5
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	80	0	0	0	20
2	2	100	0	0	0	0
2	2	95	0	0	0	5
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0

2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	3	100	0	0	0	0

Transect T4

Long=1 Short=2	Fouling 1,2,3	Zostera % cover	Cystophyllum % cover	% algae filamentous	Pinna Number	% Bare Ground
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
1	3	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0

2	2	95	0	0	0	5
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	3	100	0	0	0	0
2	3	100	0	0	0	0
2	3	100	0	0	0	0
2	3	100	0	0	0	0
2	3	100	0	0	0	0
2	3	100	0	0	0	0
2	3	100	0	0	0	0
2	3	100	0	0	0	0
2	3	100	0	0	0	0
2	3	100	0	0	0	0
2	3	100	0	0	0	0
2	3	100	0	0	0	0
2	3	100	0	0	0	0
2	3	100	0	0	0	0
2	3	100	0	0	0	0

2	3	100	0	0	0	0
2	3	100	0	0	0	0
2	3	100	0	0	0	0
2	3	100	0	0	0	0
2	3	100	0	0	0	0
2	3	100	0	0	0	0
2	3	100	0	0	0	0
2	3	100	0	0	0	0

Transect T5

Long=1 Short=2	**Fouling 1,2,3**	**Zostera % cover**	**Cystophyllum % cover**	**% algae filamentous**	**Pinna Number**	**% Bare Ground**
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0

2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	90	0	0	0	10
2	2	100	0	0	0	0
2	2	95	0	0	0	5
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	90	0	0	0	10
2	2	90	0	0	0	10
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	90	0	0	0	10
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	3	100	0	0	0	0
2	3	100	0	0	0	0
2	3	100	0	0	0	0
2	3	100	0	0	0	0
2	3	100	0	0	0	0
2	3	85	0	0	0	15
2	3	90	0	0	0	10
2	3	100	0	0	0	0
2	3	100	0	0	0	0
2	3	100	0	0	0	0

Transect T6

Long=1	Fouling	Zostera	Cystophyllum	% algae	Pinna	% Bare
Short=2	**1,2,3**	**% cover**	**% cover**	**filamentous**	**Number**	**Ground**

1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	95	0	0	0	5
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	90	0	0	0	10
2	2	90	0	0	0	10
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	90	0	0	0	10
2	2	95	0	0	0	5
2	2	95	0	0	0	5
2	2	95	0	0	0	5
2	2	90	0	0	0	10
2	2	95	0	0	0	5
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	95	0	0	0	5
2	2	95	0	0	0	5
2	2	100	0	0	0	0

2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	95	0	0	0	5
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	90	0	0	0	10
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	95	0	0	0	5
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	90	0	0	0	10
2	2	90	10	0	0	10
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	90	0	0	0	10
2	2	100	0	0	0	0
2	2	100	0	0	0	0

Transect T7

Long=1 Short=2	Fouling 1,2,3	Zostera % cover	Cystophyllum % cover	% algae filamentous	Pinna Number	% Bare Ground
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0

1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0

2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0

Transect T8

Long=1	**Fouling**	**Zostera**	**Cystophyllum**	**% algae**	**Pinna**	**% Bare**
Short=2	**1,2,3**	**% cover**	**% cover**	**filamentous**	**Number**	**Ground**
1	1	100	0	0	0	0
1	1	80	0	0	0	20
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	1	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	1	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0
1	2	100	0	0	0	0

2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	90	0	0	0	10
2	2	100	0	0	0	0
2	2	90	0	0	0	10
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	90	0	0	0	10
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	95	0	0	0	5
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	95	0	0	0	5
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	95	0	0	0	5
2	2	95	0	0	0	5
2	2	100	0	0	0	0
2	2	100	0	0	0	0
2	2	95	0	0	0	5

2	2	95	0	0	0	5
2	2	100	0	0	0	0