

APPENDIX 1: ANALYTICAL METHODS

Quality Assurance

Within the laboratory quality assurance is based on reference standard control charts, sample replication for batch methods and repetition of sample where replicates do not meet prescribed criteria. Precision of methods has been estimated from a preliminary error analysis based on repeated analysis of a single standard. While this gives an over optimistic long term precision estimate (due to batch to batch variability) the reference standard used for the control chart is used to verify long term (batch to batch) precision. Accuracy is followed using the control chart where the reference standard used in each batch has been prepared from a stock standard prepared from chemicals independent of the calibration stocks and standards. This system has been used for the following analysis; nitrite and nitrate, ammonia, orthophosphate, total nitrogen, total phosphorous and BOD₅.

In laboratory replicates were routinely run for these parameters, i.e. the single field sample was split and run as a pair through the method. Where replicates did not agree within 20% of the higher value, the sample was repeated in the next batch. Samples which were outside the standards range were also repeated after appropriate dilution. No replicates were run for Chlorophyll *a*, suspended sediments, or particulate nitrogen. BOD₅ samples were replicated in the sense that serial dilutions were made but in marine samples values were so low that only the first dilution was used in the result calculation.

The limits of detection and sensitivity shown with each method reflect the particular method and instrumentation used. While general precision values are also given, it should be realised that these have been estimated from a standard near the upper end of the expected range of values and that precision near the limit of detection will not be as good.

Nutrients

Samples were collected in individual sterile Whirl-pacs, and stored frozen until required for analysis.

Nitrate and Nitrite

Nitrate was reduced to nitrite on a copper coated cadmium reduction column using a Flow Injection Analysis (FIA) system. Nitrite was measured on this system using the sulphonilamide/N-1-Naphthylethylene diamine colour reaction at 520 nm. Nitrate was calculated from the nitrate plus nitrite value and the nitrite value by difference.

	Nitrite	Nitrate
Limit of detection: (μM)	0.07	0.07
Sensitivity: (μM)	0.03	0.03
Precision: (% at 2 μM)	5%	11%

Ammonium

Analysis was by indophenol blue colour development method and measurement at 630 nm (Grasshof, 1983).

Limit of detection:	0.07 μM
Sensitivity:	0.05 μM
Precision:	18% at 2 μM

Orthophosphate

Analysis was by molybdenum blue colour development method using ascorbic acid reductant and measurement at 885 nm (Grasshof, 1983).

Limit of detection: 0.05 μM

Sensitivity: 0.03 μM

Precision: 15% at 0.2 μM

Total Phosphorous

The sample was digested using alkaline persulphate and analysis of the resultant phosphate carried out using a molybdenum blue colour development on the FIA.

Limit of detection: 0.06 μM

Sensitivity: 0.04 μM

Precision: 20% at 0.5 μM

Particulate Nitrogen

400ml samples were filtered through GF-C filters and the residue analysed for nitrogen using a C,H,N analyser.

Suspended Solids

One litre water samples were filtered, with vacuum assistance, through pre-weighed 4.7 cm GF-C glass fibre filters. Filters were then dried at 95°C and the residue weighed.

Limit of detection: 0.6 mg/l

Sensitivity: 0.4 mg/l.

Chlorophyll *a* and Phaeophytin analysis

One litre water samples were collected and stored frozen till analysis. Samples were filtered through GF-C filters, the residue and filter ground, soaked in acetone overnight in the dark, and extraction completed. The extract was centrifuged and the pigments were read on a spectrophotometer. Chlorophyll *a* was read at 750 nm and Phaeophytin at 665 nm (Strickland and Parsons, 1968).

Limit of Detection: 0.05 $\mu\text{g/l}$.

Sensitivity: 0.02 $\mu\text{g/l}$.

Biochemical Oxygen Demand (BOD₅)

Samples were collected in one litre containers and frozen till analysis. Analysis was by serial dilution (in general for the marine samples, addition of seed only and 1:1 dilution with BOD dilution water and addition of seed) and measurement after 5 days at 20°C ($\pm 1^\circ\text{C}$). Initial and final dissolved oxygen readings were made using a YSI 57 D.O. meter calibrated against moist air.

Limit of Detection: 0.08 mg/l

Sensitivity: 0.05 mg/l.

Precision: 50% at 1 mg/l.

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The limits of detection and sensitivity shown with each method reflect the particular method and instrumentation used. While general precision values are also given, it should be realised that these have been estimated from a standard near the upper end of the expected range of values and that precision near the limit of detection will not be as good.

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Samples were collected in individual sterile Whirl-pacs, and stored frozen until required for analysis.

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Limit of detection: 0.06 μM

Sensitivity: 0.04 μM

Precision: 20% at 0.5 μM

Particulate Nitrogen

400ml samples were filtered through GF-C filters and the residue analysed for nitrogen using a C,H,N analyser.

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One litre water samples were filtered, with vacuum assistance, through pre-weighed 4.7 cm GF-C glass fibre filters. Filters were then dried at 95°C and the residue weighed.

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Limit of Detection: 0.05 $\mu\text{g/l}$.

Sensitivity: 0.02 $\mu\text{g/l}$.

Biochemical Oxygen Demand (BOD₅)

Samples were collected in one litre containers and frozen till analysis. Analysis was by serial dilution (in general for the marine samples, addition of seed only and 1:1 dilution with BOD dilution water and addition of seed) and measurement after 5 days at 20°C ($\pm 1^\circ\text{C}$). Initial and final dissolved oxygen readings were made using a YSI 57 D.O. meter calibrated against moist air.

Limit of Detection: 0.08 mg/l

Sensitivity: 0.05 mg/l.

Precision: 50% at 1 mg/l.

APPENDIX 2.1.: ANALYSIS OF VARIANCE RESULTS

TEMPORAL STUDY

24 Hr Study

SOURCE OF VARIATION	df	NITRITE+NITRATE		df	AMMONIUM	
		F	P		FP	
(A) TIME OF DAY	7	0.76	0.624	7	0.74	0.644
(B) LOCATION	1	2.04	0.164	1	0.06	0.811
(C) HABITAT	1	2.17	0.151	1	0.17	0.690
A*B	7	1.54	0.192	5	0.25	0.933
A*C	7	2.18	0.064	4	1.28	0.342
B*C	1	1.66	0.207	1	1.09	0.321
A*B*C	7	0.83	0.569	0		
RESIDUAL	31			10		

SOURCE OF VARIATION	DIN df	F	P	df	PHOSPHATE	
					F	P
(A) TIME OF DAY	7	3.24	0.040	7	1.73	0.193
(B) LOCATION	1	0.04	0.841	1	0.58	0.461
(C) HABITAT	1	0.47	0.509	1	0.06	0.813
A*B	5	0.56	0.727	6	0.21	0.966
A*C	6	4.01	0.023	6	1.56	0.240
B*C	1	1.91	0.194	1	0.04	0.844
A*B*C	0			0		
RESIDUAL	11			12		

SOURCE OF VARIATION	TOTAL NITROGEN df	F	P	df	TOTAL PHOSPHATE	
					F	P
(A) TIME OF DAY	7	0.54	0.799	6	3.46	0.389
(B) LOCATION	1	0.01	0.942	1	4.50	0.280
(C) HABITAT	1	1.61	0.215	1	0.22	0.720
A*B	7	0.79	0.599	2	1.56	0.493
A*C	7	1.47	0.218	1	3.97	0.296
B*C	1	0.07	0.799	1	0.00	1.000
A*B*C	7	0.73	0.646	0		
RESIDUAL	29			7		

SOURCE OF VARIATION	TEMPERATURE df	F	P	df	DISSOLVED OXYGEN	
					F	P
(A) TIME OF DAY	7	20.42	0.0001	7	7.88	0.002
(B) HABITAT	1	3.97	0.077	1	6.44	0.028
A*B	5	1.78	0.212	5	4.55	0.017
RESIDUAL	9			11		

SOURCE OF VARIATION	CHLOROPHYLL A df	F	P	df	SUSPENDED SOLIDS	
					F	P
(A) TIME OF DAY	5	2.73	0.218	6	7.80	0.001
(B) HABITAT	1	0.64	0.483	1	0.38	0.550
A*B	3	2.25	0.262	4	1.04	0.428
RESIDUAL	3			3		

APPENDIX 2.2. ANALYSIS OF VARIANCE RESULTS

TEMPORAL STUDY

Daily Study

SOURCE OF VARIATION	df	NITRITE+NITRATE		df	AMMONIUM	
		F	P		F	P
(A) DAY	2	1.48	0.269	2	5.22	0.035
(B) LOCATION	1	0.43	0.526	1	15.61	0.004
(C) HABITAT	1	2.28	0.159	1	0.01	0.924
A*B	2	0.49	0.628	2	0.32	0.732
A*C	2	1.95	0.188	2	0.31	0.590
B*C	1	0.27	0.611	1	0.02	0.901
A*B*C	2	2.42	0.135	2	0.24	0.639
RESIDUAL	11			8		

SOURCE OF VARIATION	DIN df	F	P	df	PHOSPHATE	
					F	P
(A) DAY	2	7.18	0.020	2	0.49	0.628
(B) LOCATION	1	9.12	0.019	1	1.47	0.259
(C) HABITAT	1	3.86	0.090	1	0.00	0.965
A*B	2	0.55	0.601	2	0.54	0.601
A*C	2	0.56	0.593	2	0.84	0.468
B*C	1	0.89	0.378	1	1.18	0.309
A*B*C	2	4.31	0.076	1	1.09	0.328
RESIDUAL	8			8		

SOURCE OF VARIATION	TOTAL NITROGEN df	F	P	df	TOTAL PHOSPHATE	
					F	P
(A) DAY	2	1.88	0.195	2	3.83	0.075
(B) LOCATION	1	0.03	0.866	1	0.70	0.429
(C) HABITAT	1	2.38	0.149	1	1.42	0.273
A*B	2	0.83	0.461	2	0.06	0.815
A*C	2	0.08	0.922	1	0.35	0.571
B*C	1	0.25	0.626	2	0.00	1.000
A*B*C	2	1.75	0.215	1	0.35	0.571
RESIDUAL	9			7		

SOURCE OF VARIATION	TEMPERATURE df	F	P	df	DISSOLVED OXYGEN	
					F	P
(A) DAY	2	166.45	0.0001	2	3.79	0.191
(B) HABITAT	1	5.78	0.047	1	0.36	0.607
A*B	2	4.14	0.081	2	2.43	0.259
RESIDUAL	3			3		

SOURCE OF VARIATION	CHLOROPHYLL A df	F	P	df	F	BOD ₅ P
(A) DAY	2	2.73	0.218	1	0.28	0.691
(B) HABITAT	1	0.64	0.483	1	0.84	0.528
A*B	3	2.25	0.262	1	1.65	0.421
RESIDUAL	3			1		

APPENDIX 2.3 ANALYSIS OF VARIANCE RESULTS

SPATIAL STUDY

SOURCE OF VARIATION	df	NITRITE+NITRATE		df	AMMONIA	
		F	P		F	P
(A) LOCATION	5	5.46	0.031	5	4.56	0.048
(B) DEPTH	1	1.23	0.308	1	14.02	0.079
(C) SITE(LOCATION)	6	1.22	0.409	6	4.12	0.316
A*B	5	1.51	0.314	5	11.178	0.176
B*C	6	1.02	0.442	6	0.18	0.944
RESIDUAL	21					

SOURCE OF VARIATION	DIN df	F	P	df	PHOSPHATE	
					F	P
(A) LOCATION	5	5.61	0.021	5	8.89	0.010
(B) DEPTH	1	1.01	0.287	1	0.02	0.882
(C) SITE(LOCATION)	6	1.22	0.409	6	0.11	0.992
A*B	5	4.51	0.376	5	0.12	0.984
B*C	6	0.88	0.765	6	3.21	0.021
RESIDUAL	31			21		

SOURCE OF VARIATION	df	TOTAL NITROGEN		df	TOTAL PHOSPHOROUS	
		F	P		F	P
(A) LOCATION	5	1.73	0.261	5	0.48	0.779
(B) DEPTH	1	0.41	0.548	1	0.00	0.956
(C) SITE(LOCATION)	6	0.41	0.852	3	1.04	0.522
A*B	5	0.21	0.948	1	0.53	0.544
B*C	6	2.68	0.042	2	2.18	0.194
RESIDUAL	22			6		

SOURCE OF VARIATION	df	DISSOLVED OXYGEN		df	TEMPERATURE	
		F	P		F	P
(A) LOCATION	5	1.98	0.134	5	1.35	0.291
(B) DEPTH	1	0.02	0.886	1	1.79	0.199
A*B	5					
RESIDUAL	22			6		

SOURCE OF VARIATION	df	BOD ₅		df	PARTICULATE NITROGEN	
		F	P		F	P
(A) LOCATION	5	0.76	0.607	5	0.78	0.598
RESIDUAL	6			6		

APPENDIX 4.1.: RESULTS OF 24 HOUR STUDY UNDERTAKEN ON THE 2ND JUNE 1989 AT GREEN ISLAND.

LOCATION	HABITAT	REP	TIME	WIND		WAVE		OXYGEN	TEMPERATURE	NO ₂ +NO ₃	NH ₄	DIN	PO ₄	TN	TP	SS	CHLOROPHYLL <i>a</i>
				DIRECTION	SPEED	DIRECTION	HEIGHT										
			hrs	degrees	m/ms	degrees	metres	mg/l	°C	uM	uM	uM	uM	uM	uM	mg/l	ug/l
Time Period 5: 2110 High Water																	
a	f	1	2110	100	175	190	0.10	6.8	25.1	0.23	-	-	0.54	5.7	-	17	-
a	f	2	2110	100	175	190	0.10	-	-	0.27	0.00	0.27	0.20	7.9	0.5	-	-
a	s	1	2100	100	175	190	0.10	7.0	25.1	0.39	1.60	1.99	0.17	3.6	-	15	-
a	s	2	2100	100	175	190	0.10	-	-	0.31	-	-	-	4.9	-	-	-
b	f	1	2132	100	175	190	0.10	7.5	25.1	0.37	-	-	-	10.3	0.3	17	-
b	f	2	2135	100	175	190	0.10	-	-	0.30	-	-	-	8.3	-	-	-
b	s	1	2130	100	175	190	0.10	7.8	25.2	0.23	-	-	-	6.0	-	14	-
b	s	2	2130	100	175	190	0.10	-	-	0.31	-	-	0.21	7.9	0.2	-	-
Time Period 6: 2405 Ebbing tide																	
a	f	1	2405	180	178	180	0.10	6.4	24.7	0.19	0.63	0.82	0.17	6.6	-	18	1.20
a	f	2	2405	180	178	180	0.10	-	-	0.28	0.11	0.39	0.14	5.4	-	-	-
a	s	1	2350	180	178	180	0.10	7.5	25.0	0.31	-	-	-	10.7	-	23	-
a	s	2	2350	180	178	180	0.10	-	-	0.34	-	-	-	5.3	-	-	-
b	f	1	2435	180	178	180	0.10	-	-	0.33	0.48	0.81	0.17	5.3	-	17	4.92
b	f	2	2435	180	178	180	0.10	-	-	0.31	0.75	1.06	0.36	7.4	-	-	-
b	s	1	2425	180	178	180	0.10	7.7	24.9	0.28	0.67	0.95	0.11	0.0	-	17	-
b	s	2	2425	180	178	180	0.10	-	-	0.24	-	-	-	6.0	-	-	-
Time Period 7: 2700 Low Water																	
a	f	1	2700	170	196	170	0.10	4.8	24.0	0.37	1.07	1.44	0.14	5.7	-	19	-
a	f	2	2700	170	196	170	0.10	-	-	0.32	1.47	1.79	0.30	0.0	-	-	-
a	s	1	2735	170	196	170	0.10	7.9	24.6	0.32	-	-	-	5.5	0.2	16	-
a	s	2	2735	170	196	170	0.10	-	-	0.39	-	-	-	5.7	-	-	-
b	f	1	2800	170	196	170	0.10	-	-	0.41	1.63	2.04	0.22	8.3	0.3	16	-
b	f	2	2800	170	196	170	0.10	-	-	0.14	-	-	-	6.3	-	-	-
b	s	1	2745	170	196	170	0.10	7.4	24.7	0.25	0.42	0.67	0.17	6.3	-	20	-
b	s	2	2745	170	196	170	0.10	-	-	0.37	-	-	-	5.1	-	-	-
Time Period 8: 3000 Flooding tide																	
a	f	1	3000	170	210	190	0.10	6.1	24.3	0.34	-	-	-	5.6	-	18	-
a	f	2	3000	170	210	190	0.10	-	-	0.28	0.57	0.85	0.08	37.4	0.60	-	-
a	s	1	3015	170	210	190	0.10	6.6	-	0.24	-	-	-	5.3	-	18	-
a	s	2	3015	170	210	190	0.10	-	-	0.27	-	-	-	5.3	-	-	-
b	f	1	3105	170	210	190	0.10	6.2	-	0.28	-	-	-	7.5	0.3	18	-
b	f	2	3105	170	210	190	0.10	-	-	0.32	-	-	-	5.6	-	-	-
b	s	1	3045	170	210	190	0.10	6.9	25.1	0.30	0.46	0.75	0.21	4.4	-	18	-
b	s	2	3045	170	210	190	0.10	-	-	0.29	0.00	0.29	0.22	6.0	-	-	-

APPENDIX 4.2.: RESULTS OF DIEL STUDY UNDERTAKEN FROM THE 2ND JUNE TO 4TH JUNE 1989 AT GREEN ISLAND.

LOCATION	HABITAT	REDIRECTION	WIND		WAVE		OXYGEN	TEMP	NO ₂ +NO ₃	NH ₄	DIN	PO ₄	TN	TP	PN	CHL _a	BOD ₅
			SPEED	DIRECTION	HEIGHT												
			degrees	m/ms	degrees	metres											
Day 1: 2/6/89 Time: 0710																	
a	f	1	160	215	160	0.15	6.8	24.7	0.28	0.34	0.62	0.12	6.1	0.2	16.0	-	-
a	f	2	160	215	160	0.15	-	24.9	0.23	0.08	0.31	0.11	4.9	-	-	-	-
a	s	1	160	215	160	0.15	7.4	24.6	0.31	-	-	-	4.6	-	15.0	-	0.0
a	s	2	160	215	160	0.15	-	24.8	0.24	0.00	0.24	0.12	6.5	-	-	-	-
b	f	1	160	215	160	0.15	-	24.5	0.35	0.56	0.91	0.14	4.9	-	18.0	-	0.4
b	f	2	160	215	160	0.15	7.6	24.6	0.27	0.53	0.80	0.22	4.9	-	-	-	-
b	s	1	160	215	160	0.15	7.7	24.8	0.35	-	-	-	5.3	-	17.0	-	0.5
b	s	2	160	215	160	0.15	-	24.3	0.31	-	-	-	10.6	0.2	-	-	-
Day 2: 3/6/89 Time: 0753																	
a	f	1	130	295	180	0.20	8.6	26.8	0.40	0.59	0.99	-	7.1	0.3	16.0	0.5	1.2
a	f	2	130	295	180	0.20	-	-	-	0.43	-	0.25	6.1	0.3	-	-	-
a	s	1	130	295	180	0.20	7.7	26.2	0.33	0.57	0.90	0.19	12.3	0.4	16.0	0.4	0.5
a	s	2	130	295	180	0.20	-	-	0.31	0.48	0.79	0.14	8.7	0.4	-	0.4	-
b	f	1	180	287	180	0.25	-	-	0.49	1.09	1.58	-	7.5	0.3	12.0	0.4	-
b	f	2	180	287	180	0.25	-	-	0.41	1.32	1.73	0.38	6.0	0.3	-	0.4	-
b	s	1	180	287	180	0.25	-	26.1	0.17	0.92	1.09	0.20	6.3	0.3	17.0	0.7	0.2
b	s	2	180	287	180	0.25	-	-	0.37	0.93	1.30	0.27	6.6	0.4	-	5.1	-
Day 3: 4/6/89 Time: 0837																	
a	f	1	170	307	170	0.40	-	-	0.41	-	-	0.25	7.1	0.3	13.0	-	-
a	f	2	170	307	170	0.40	-	-	0.42	0.48	0.90	0.01	7.5	0.3	-	-	-
a	s	1	170	307	170	0.40	-	-	0.23	0.51	0.74	0.28	7.0	-	18.0	-	-
a	s	2	170	307	170	0.40	-	-	0.31	-	-	0.25	6.3	0.3	-	-	-
b	f	1	170	307	170	0.40	-	-	0.31	1.35	1.66	0.37	4.1	0.2	12.0	-	-
b	f	2	170	307	170	0.40	-	-	0.33	0.63	0.95	0.35	9.8	0.3	-	-	-
b	s	1	170	307	170	0.40	-	-	0.51	1.11	1.61	0.17	6.7	0.2	14.0	-	-
b	s	2	170	307	170	0.40	-	-	0.31	1.25	1.56	0.36	11.3	0.4	-	-	-

APPENDIX 4.3.: RESULTS OF SPATIAL STUDY UNDERTAKEN ON THE 4TH JUNE 1989 AT GREEN ISLAND.

LOCATION	HABITAT	REP	TIME	WIND		WAVE		OXYGEN	TEMPERATURE	NO ₂ +NO ₃	NH ₄	DIN	PO ₄	TN	TP	PN	BOD ₅
				DIRECTION	SPEED	DIRECTION	HEIGHT										
				hrs	degrees	m/ms	degrees										
Location A																	
1	1	1	1025	130	295	90	0.20	7.7	26.2	0.33	0.57	0.90	0.19	12.3	0.3	16.0	0.5
1	1	2	1040	130	295	90	0.20	-	-	0.31	0.48	0.79	0.14	8.7	0.4	-	-
1	2	1	1030	130	295	90	0.20	7.8	26.3	0.25	0.70	0.95	0.17	3.9	-	-	-
1	2	2	1045	130	295	90	0.20	-	-	0.26	1.13	1.39	0.24	4.7	-	-	-
2	1	1	1040	130	295	90	0.20	7.7	26.2	0.26	0.46	0.72	0.14	4.6	-	14.0	0.1
2	1	2	1040	130	295	90	0.20	-	-	0.25	0.51	0.76	0.20	4.3	-	-	-
2	2	1	1040	130	295	90	0.20	7.9	26.3	-	-	-	0.17	14.7	0.3	-	-
2	2	2	1040	130	295	90	0.20	-	-	0.24	0.53	0.77	0.27	6.4	0.4	-	-
Location B																	
1	1	1	1110	180	287	180	0.25	8.0	26.1	0.17	0.92	1.09	0.20	9.0	0.4	12.0	0.2
1	1	2	1110	180	287	180	0.25	-	-	0.37	0.93	1.30	0.27	6.3	0.3	-	-
1	2	1	1115	180	287	180	0.25	9.2	26.3	0.25	0.63	0.88	0.26	6.6	-	-	-
1	2	2	1115	180	287	180	0.25	-	-	0.31	0.59	0.90	-	2.8	-	-	-
2	1	1	1135	180	287	180	0.25	10.5	26.7	0.33	0.66	1.00	0.14	5.1	-	10.0	2.5
2	1	2	1135	180	287	180	0.25	-	26.7	-	0.56	-	0.23	0.0	-	-	-
2	2	1	1140	180	287	180	0.25	8.4	26.2	0.30	0.64	0.94	0.13	7.7	0.4	-	-
2	2	2	1140	180	287	180	0.25	-	-	0.42	1.03	1.45	0.27	6.6	0.3	-	-
Location C																	
1	1	1	1200	180	287	180	0.25	8.1	26.1	0.18	0.59	0.77	0.13	5.1	-	16.0	0.7
1	1	2	1200	180	287	180	0.25	-	-	0.17	0.54	0.71	-	4.4	-	-	-
1	2	1	1200	180	287	180	0.25	8.3	26.1	0.23	0.69	0.91	0.11	7.7	0.4	-	-
1	2	2	1200	180	287	180	0.25	-	-	0.23	0.64	0.87	0.15	5.5	-	-	-
2	1	1	1210	180	287	180	0.25	8.1	26.6	0.34	2.15	2.49	0.11	5.3	-	12.0	0.3
2	1	2	1210	180	287	180	0.25	-	-	0.22	0.51	0.73	0.25	4.4	-	-	-
2	2	1	1220	180	287	180	0.25	8.8	26.2	0.23	-	-	0.17	8.3	0.3	-	-
2	2	2	1220	180	287	180	0.25	-	-	-	0.59	-	0.09	0.0	-	-	-

APPENDIX 4.3.: RESULTS OF SPATIAL STUDY UNDERTAKEN ON THE 4TH JUNE 1989 AT GREEN ISLAND.

LOCATION	HABITAT	REP	TIME	WIND		WAVE		OXYGEN	TEMPERATURE	NO ₂ +NO ₃	NH ₄	DIN	PO ₄	TN	TP	PN	BOD ₅
				DIRECTION	SPEED	DIRECTION	HEIGHT										
				degrees	m/ms	degrees	metres										
			hrs					mg/l	°C	uM	uM	uM	uM	uM	uM	uM	mg/l
Location D																	
1	1	1	1245	180	287	180	0.25	8.7	26.3	0.43	0.72	1.15	0.23	5.6	-	66.0	1.1
1	1	2	1245	180	287	180	0.25	-	-	0.27	1.54	1.80	-	7.2	-	-	-
1	2	1	1250	180	287	180	0.25	8.2	26.1	0.37	1.08	1.45	0.30	5.9	-	-	-
1	2	2	1250	180	287	180	0.25	-	-	0.35	0.50	0.85	0.16	9.1	0.3	-	-
2	1	1	1310	180	287	180	0.25	-	26.6	0.46	1.92	2.38	0.13	4.6	-	12.0	0.7
2	1	2	1310	180	287	180	0.25	-	-	0.30	2.20	2.50	0.07	3.2	-	-	-
2	2	1	1310	180	287	180	0.25	8.3	26.2	0.51	-	-	0.28	5.6	-	-	-
2	2	2	1310	180	287	180	0.25	-	-	0.39	-	-	0.24	4.3	-	-	-
Location E																	
1	1	1	1605	120	267	90	0.20	8.6	26.4	0.44	0.04	0.48	0.11	4.6	-	12.0	1.0
1	1	2	1605	120	267	90	0.20	-	-	0.38	-	-	0.01	8.1	0.4	-	-
1	2	1	1615	120	267	90	0.20	8.1	26.4	0.37	-	-	0.11	15.0	0.3	-	-
1	2	2	1615	120	267	90	0.20	-	-	0.38	0.34	0.72	0.17	5.3	-	-	-
2	1	1	1630	120	267	90	0.20	8.6	26.4	0.44	0.03	0.47	0.12	6.8	0.4	16.0	1.2
2	1	2	1630	120	267	90	0.20	-	-	0.34	0.61	0.95	0.41	9.1	0.5	-	-
2	2	1	1635	120	267	90	0.20	8.1	26.4	0.26	-	-	0.04	7.5	0.9	-	-
2	2	2	1635	120	267	90	0.20	-	-	0.33	0.96	1.30	0.04	6.7	-	-	-
Location F																	
1	1	1	1655	120	267	90	0.20	8.1	26.5	0.40	0.08	0.48	0.10	7.3	0.3	13.0	0.6
1	1	2	1655	120	267	90	0.20	-	-	0.32	2.29	2.61	0.15	6.6	-	-	-
1	2	1	1655	120	267	90	0.20	9.1	26.5	0.34	0.56	0.90	0.21	10.7	0.3	-	-
1	2	2	1655	120	267	90	0.20	-	-	0.32	1.45	1.77	0.10	4.6	-	-	-
2	1	1	1710	120	267	90	0.20	8.0	26.5	0.44	-	-	0.18	11.1	0.4	15.0	0.4
2	1	2	1710	120	267	90	0.20	-	-	0.46	-	-	0.27	9.0	-	-	-
2	2	1	1710	120	267	90	0.20	8.9	26.5	0.20	0.86	1.06	0.20	7.7	0.4	-	-
2	2	2	1710	120	267	90	0.20	-	-	0.30	0.91	1.20	0.07	14.7	0.2	-	-