Robin Rigg Monitoring
Cable Route Benthic Survey Data Report, April 2011

1. Introduction

In order to comply with Marine Environment Monitoring Programme (MEMP) and FEPA licence requirements for the monitoring of the Robin Rigg Offshore Windfarm, a benthic survey along the cable route of the windfarm was undertaken on 8th April 2011

This technical note summarises the methodology and results of this survey. No data interpretation has been undertaken.

2. Method

A benthic survey for macro invertebrates of the Robin Rigg windfarm cable route was conducted using the fisheries patrol vessel *Solway Protector*. Eight sampling stations were sampled along the length of the cable route (**Figure 2.1**).

Samples were recovered using a $0.1m^2$ Day grab. At each sampling station duplicate grab samples were collected. The time and location the grab was dropped were recorded using the vessel's Global Positioning System (GPS), depth was measured using the vessel's sounder and temperature was measured by the vessel's in-built thermometer. Surface water salinity was measured using a hand held refractometer and turbidity was measured using a Secchi disc.

Duplicate grab samples were taken at each sampling station. A visual assessment of sediment type in each grab sample was made and a sample of sediment from the first grab sample was retained for particle size analysis (PSA) and Total Organic Carbon (TOC) analysis. The sediment from each grab sample was then sieved using a 1mm mesh and the fauna retained in the sieve and preserved in 5% formaldehyde. Taxonomic identification of the macro-faunal species found in one replicate from each sampling station was undertaken by Identichaete, while the PSA and TOC analysis on the sediment samples was undertaken by AES Laboratories[1].

3. Results

The physical and environmental data from the survey are recorded in **Table 3.1**.

[1] United Kingdom Accreditation Service (UKAS) accredited laboratory

Table 3.1 – Sampling Station Locations and Physical Data, April 2011

Sampling station	Date	Time (GMT)	Lat.	Long.	Depth (m)	Salinity (‰)	Water Temp (°C)	Secchi Depth (m)	Visual Sediment Type
Site 1	08/04/2011	08:38:00	N54°44.544'	W003°41.100'	1.52	33	9.6	1.5	Sand
Site 2	08/04/2011	08:45:00	N54°44.361'	W003°40.694'	9.14	33	9.6	1.5	Sand
Site 3	08/04/2011	08:52:00	N54°44.095'	W003°40.042'	15.54	33	9.6	1.5	Sand
Site 4	08/04/2011	09:00:00	N54°43.766'	W003°39.066'	3.66	32	9.7	1.5	Lots of shell
Site 5	08/04/2011	09:12:00	N54°43.439'	W003°38.346'	9.75	32	9.7	1.5	Very sandy
Site 6	08/04/2011	09:20:00	N54°43.175'	W003°37.667'	5.18	32	9.6	1.5	Muddier than 5
Site 7	08/04/2011	09:27:00	N54°42.496'	W003°36.198'	16.46	31	9.9	1.5	Thick mud
Site 8	08/04/2011	09:37:00	N54°42.154'	W003°35.319'	12.19	31	9.8	1.5	rocks

Particle size distributions largely agree with the visual assessment of the sediment, with the majority of the samples being classified as fine sands (**Table 3.2**). Sample 6, which was considered to be muddy when compared to sample 5, actually had a lower mud content, although the reduced fraction of medium sands was the likely cause of comment. Sample 3 was the most mixed sample with a mix of mud, fine sands as well as some the medium-coarse sands. The large amounts of shell found in sample 4 were not picked up by the PSA, which classifies this sample fine sand. No PSA was undertaken on sample 8 as only rocks were retrieved in all grabs at this station. This sample was taken approximately 300m further inshore than the 2010 sample as a vessel in the vicinity made access to the planned site difficult.

Table 3.2 – Particle Size Analysis (PSA) and Total Organic Carbon (TOC) of sediment, April 2011

Sampling station	>4000 µm (%)	4000-2000 µm (%)	2000-1000 µm (%)	1000-500 µm (%)	500-250 µm (%)	250-125 µm (%)	125-63 µm (%)	<63 µm (%)	TOC (%)
Site 1	<0.1	<0.1	<0.1	<0.1	0.2	74.07	22.18	3.520	<1.0
Site 2	<0.1	<0.1	<0.1	<0.1	1.93	90.06	6.62	1.390	<1.0
Site 3	2.09	4.00	4.86	12.39	10.77	46.53	16.26	3.100	<1.0
Site 4	<0.1	<0.1	<0.1	<0.1	1.57	90.31	5.42	2.670	<1.0
Site 5	<0.1	<0.1	<0.1	0.24	31.42	57.31	8.01	2.930	<1.0
Site 6	<0.1	<0.1	<0.1	<0.1	9.49	84.45	3.88	2.100	<1.0
Site 7	<0.1	<0.1	<0.1	<0.1	0.23	3.73	11.58	84.37	3.2
Site 8	-	-	-	-	-	-	-	-	-

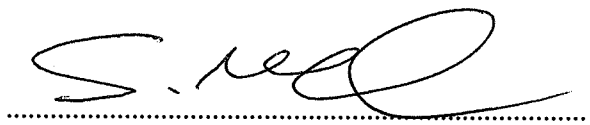
In total 18 species of invertebrate were identified from the samples taken (**Table 3.3).** Site 3 was unique amongst the samples in its mixed sediment composition, and although it was not the most diverse, it contained the most individuals. The invertebrates found at the sampling stations are consistent with an impoverished sand community including fauna such as the amphipod *Bathyporeia elegans* and the polychaete *Nephtys cirrosa.* The fauna encountered at sampling station 8 were typical of hard bottoms, consisting of the keel worm *Pomatoceros triqueter,* the limpet *Patella vulgata,* the brittle star *Ophiura albida* and a number of sea squirts (*Ascidiacea* spp.).

Table 3.3 – Macro-Invertebrate Counts from Robin Rigg Cable Route, April 2011

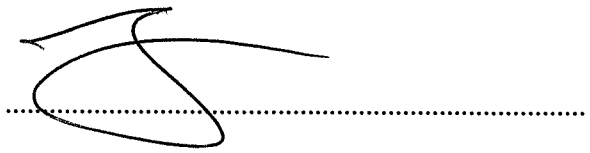
Species	Sampling Station and Species Counts								Total
	1	2	3	4	5	6	7	8	
Ascidiacea indet.								1	1
Nephtys cirrosa	2	6		2	2	3			15
Nephtys hombergii							2		2
Magelona johnstoni						1			1
Ophelia borealis	1		4		1				6
Scalibregma inflatum		1			1	2			4
Lanice conchilega			1						1
Pomataceros triqueter								1	1
Pontocrates altamarinus						3			3
Bathyporeia elegans	2	1	58	3		1			65
Liocarcinus marmoreus		1							1
Polinices pulchellus							1		1
Nucula nitidosa							22		22
Tellimya ferruginosa		1							1
Fabulina fabula			1						1
Donax vittatus		1							1
Abra alba							1		1
Patella vulgata								1	1
Ophiura albida			1					1	2
Echinocardium cordatum		2							2
Achelia echinata							1		1
Amphiura filiformis							1		1
Total number of individuals	5	13	65	5	4	10	28	4	130
Total number of species	3	7	5	2	3	5	6	4	22

NOTE: Indet = not possible to identify to higher taxonomic resolution

Author: Stuart McCallum



Reviewer: Jane Lancaster



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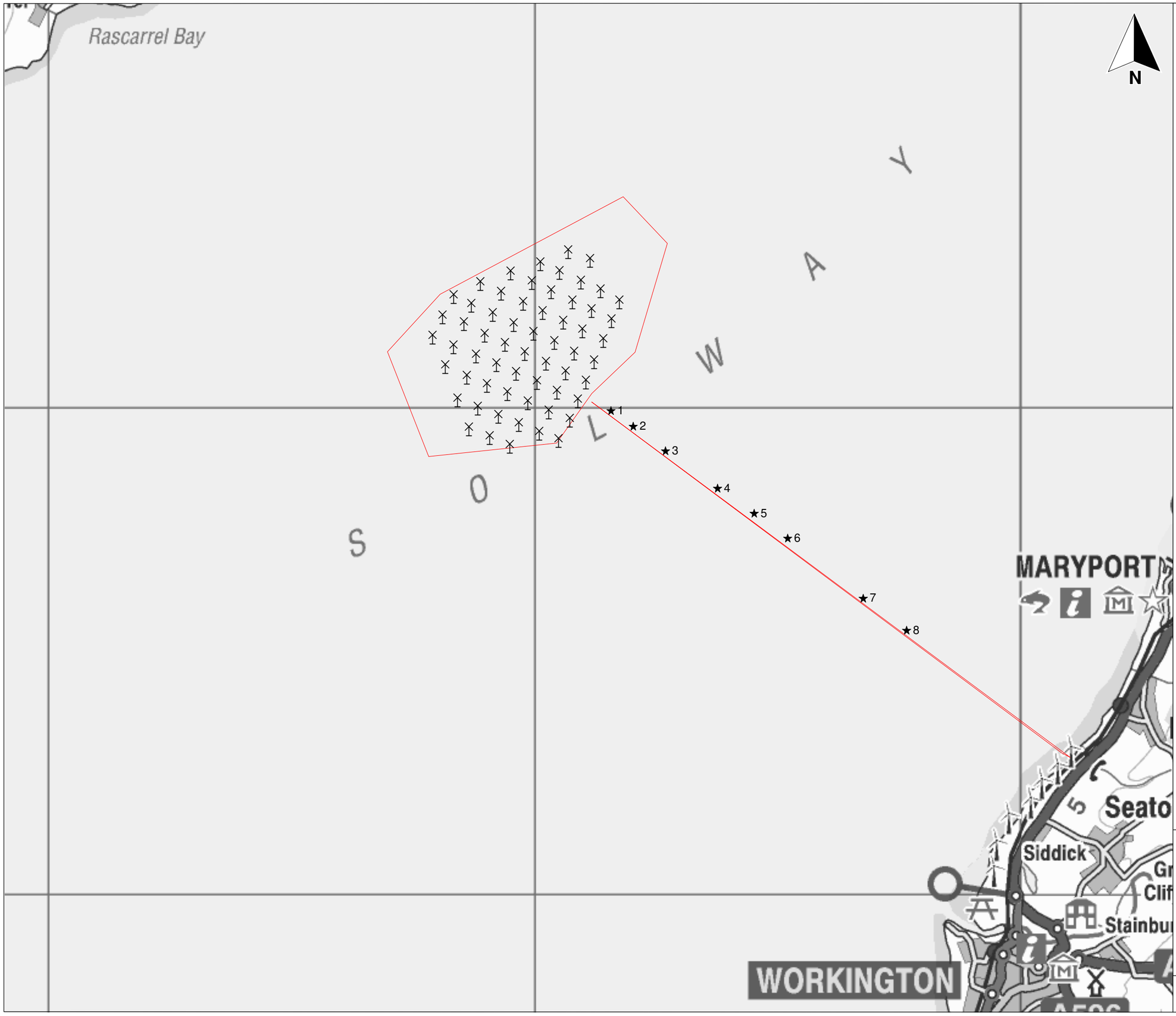

Key:

★1 Grab location and station ID

Wind farm boundary and cable route

Turbine location

0 km 4.5 km

Scale 1:75,000 @ A3

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Figure 2.1
Locations of the Robin Rigg Cable Route Grab Sampling Stations, April 2011

April 2011
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