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# Robin Rigg Monitoring Cable Route Benthic Survey Data Report, May 2010

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## 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 5<sup>th</sup> May 2010

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 1**).

Samples were recovered using a 0.1m<sup>2</sup> 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. Under normal procedure (according to the approved methodology) invertebrate identification is only performed on one set of faunal samples, however for this survey due to an error both sets of samples were sent for invertebrate identification. For this reason results of invertebrate identification for both sets of faunal samples have been presented in this report (**Appendix A**) and these results have been average in the results table to be consistent with previous reports.

Taxonomic identification of the macro-faunal species found in the samples was undertaken by Identichaete, while the PSA and TOC analysis on the sediment samples was undertaken by AES Laboratories<sup>1</sup>.

## 3. Results

The physical and environmental data from the survey are recorded in **Table 1.1**.

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<sup>1</sup> United Kingdom Accreditation Service (UKAS) accredited laboratory

**Table 1.1 – Sampling station locations and physical data, May 2010**

Sampling station	Date	Time (GMT)	Lat.	Long.	Depth (m)	Salinity (‰)	Water Temp (°C)	Secchi Depth (m)	Visual Sediment Type
Site 1	05/06/10	1508	N54°44.9430'	W003°41.2930'	17.98	33	11	3	Fine Sand
Site 2	05/06/10	1514	N54°44.5960'	W003°40.5790'	35.05	33	11	3	Fine Sand
Site 3	05/06/10	1520	N54°44.2560'	W003°39.7500'	32.00	33	10.9	3	Fine Sand
Site 4	05/06/10	1529	N54°43.9460'	W003°38.9710'	24.99	32	10.9	3	clay
Site 5	05/06/10	1535	N54°43.6620'	W003°38.2880'	45.11	32	10.7	3	Shelly, coarse sand sediment
Site 6	05/06/10	1615	N54°43.4310'	W003°37.5790'	32.92	32	10.5	3	clay
Site 7	05/06/10	1626	N54°42.7120'	W003°35.9940'	65.84	31	10.9	4	clay
Site 8	05/06/10	1634	N54°42.4850'	W003°35.5190'	64.92	31	11	4	Fine Sand

Particle size distributions agree with the visual assessment for sampling stations 1, 2 & 8, i.e. fine sand (**Table 1.2**). Sample 3 was the most mixed sample with a high proportion of mud, fine sands as well as some the medium-coarse sands. Sample station 5 was less coarse than the visual assessment would indicate as it was predominantly made up of fine-medium sands. Although the samples from sampling stations 4, 6 & 7 did contain a large proportion of fine sediments the PSA analysis places them more in the category of sandy mud, rather than clay.

**Table 1.2 – Particle Size Analysis (PSA) and Total Organic Carbon (TOC) of sediment, May 2010**

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	1.08	91.48	5.34	2.030	<1.0
Site 2	<0.1	<0.1	<0.1	<0.1	0.22	82.08	14.46	3.230	1.1
Site 3	<0.1	0.69	<0.49	2.43	4.47	11.39	36.29	44.40	4.5
Site 4	<0.1	<0.1	<0.1	<0.1	1.20	86.41	8.95	3.450	<1.0
Site 5	<0.1	<0.1	<0.1	<0.1	16.12	76.85	3.57	3.630	<1.0
Site 6	<0.1	<0.1	<0.1	<0.1	0.12	6.28	28.8	65.42	6.3
Site 7	<0.1	<0.1	<0.1	<0.1	0.14	11.86	27.83	60.11	7.2
Site 8	<0.1	<0.1	<0.1	<0.1	1.08	91.48	5.34	2.030	<1.0

In total 23 species of invertebrate were identified from the samples taken (Table 1.3). Although no statistical analysis has been undertaken it can be seen that the invertebrate samples were generally more diverse (i.e. a larger number of species) the closer inshore they were taken. The exception to this was sampling station 3 which was the most diverse. Samples taken from the more inshore sampling stations (7 and 8) also contained a number of bivalve species (*Nucula nitidosa*, *Tellinomya ferruginosa*, *Solenacea* spp., and *Fabulina fibula*) which were not found in the other samples. Site 3 was unique amongst the samples in its sediment composition of muddy sand, and the faunal component of this sample also differs from the other samples. Samples from site 3 were the only ones to contain gammarid shrimps and contained a different community of polychaetes to the other samples including *Phyllodoce groenlandica*, *Scalibregma inflatum* and the sand mason worm *Lanice conchilega*. The invertebrates found in the other sampling stations were consistent with an impoverished sand community including fauna such as the amphipod *Bathyporeia* spp and the polychaete *Nephtys cirrosa*.

**Table 1.3 – Macro-invertebrate counts from Robin Rigg cable route, May 2010 (mean numbers from duplicate samples)**

Species	Sampling Station and Species Counts								Total
	1	2	3	4	5	6	7	8	
<i>Nemertea indet.</i>			0.5						0.5
<i>Eteone flava/longa</i>		0.5							0.5
<i>Goniada maculata</i>							0.5		0.5
<i>Nephtys assimilis</i>								1	1
<i>Nephtys cirrosa</i>		3	0.5	2.5	3	1			10
<i>Nephtys hombergii</i>			0.5				1	1	2.5
<i>Nephtys caeca</i>								1	1
<i>Scolelepis mesnili</i>	0.5								0.5
<i>Spiophanes bombyx</i>							0.5		0.5
<i>Ophelia borealis</i>						0.5			0.5
<i>Scalibregma inflatum</i>			3						3
<i>Cerebratulus sp.</i>							1	0.5	1.5
<i>Phyllodoce groenlandica</i>			0.5						0.5
<i>Lanice conchilega</i>			0.5						0.5
<i>Urothoe brevicornis</i>						0.5			0.5
<i>Bathyporeia elegans</i>	12	6		3	6	2			29
<i>Gammarus indet.</i>			2						2
<i>Nucula nitidosa</i>							2.5	2.5	5
<i>Tellimya ferruginosa</i>							0.5		0.5
<i>Solenacea indet.</i>							0.5	0.5	1
<i>Fabulina fabula</i>							0.5	2.5	3
<i>Barnea candida siphons</i>			P						1
<i>Echinocardium cordatum</i>		2	0.5	0.5					3
Total number of individuals	12.5	11.5	9	6	9	4	7	9	68
Total number of species	2	4	9	3	2	4	8	7	23

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

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# Appendix A

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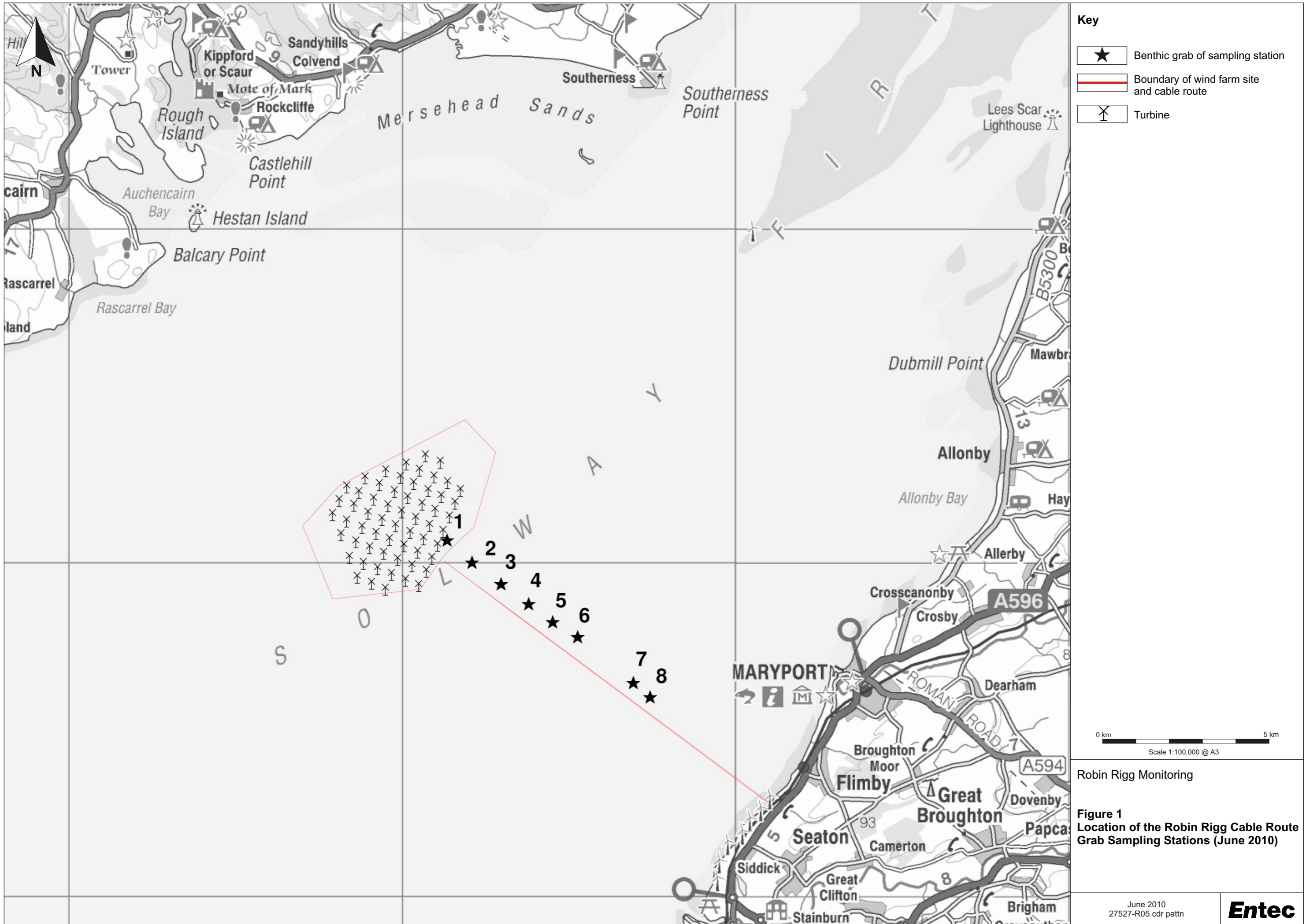




## Technical Note

### Invertebrate Results for Cable Route Grab Samples

Species	Cable route sampling station															
	1.1	1.2	2.1	2.2	3.1	3.2	4.1	4.2	5.1	5.2	6.1	6.2	7.1	7.2	8.1	8.2
<i>Nemertea indet.</i>					1											
<i>Eteone flava/longa</i>				1												
<i>Goniada maculata</i>													1			
<i>Nephtys assimilis</i>															2	
<i>Nephtys cirrosa</i>			3	3	1	1	1	4	5	1	1	1				
<i>Nephtys hombergii</i>					1								2			2
<i>Scolecopsis mesnili</i>	1															
<i>Spiophanes bombyx</i>														1		
<i>Ophelia borealis</i>											1					
<i>Scalibregma inflatum</i>					6											
<i>Urothoe brevicornis</i>											1					
<i>Bathyporeia elegans</i>	16	8	3	9			4	2	3	9	4					
<i>Nucula nitidosa</i>													4	1	2	3
<i>Tellinomya ferruginosa</i>														1		
<i>Solenacea indet.</i>														1		1
<i>Fabulina fabula</i>														1	1	4
<i>Echinocardium cordatum</i>			2	2	1		1									
<i>Cerebratulus sp.</i>														2		1
<i>Phyllodoce groenlandica</i>					1											
<i>Nephtys caeca</i>																1
<i>Lanice conchilega</i>					1											
<i>Gammarus indet.</i>					4											
<i>Barnea candida?</i> siphons					P											



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