Monitoring survey of the Fal Estuary: effects of maerl extraction

12 November 2004
Final Report
9M5679
Falmouth Harbour Commissioners

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1 INTRODUCTION

1.1 Background

Dead maerl is currently extracted from the fundus of the Falmouth Harbour Commissioners (FHC) within the Fal Estuary. This activity has been going on for many years (from the FHC fundus since 1975 and from the Fal area since the 18th century). A licence is granted by FHC for the extraction, which is renewed on an annual basis.

In July 2003, FHC commissioned a survey of the maerl beds in an effort to determine the effects of maerl extraction on the Fal and Helford candidate Special Area of Conservation (cSAC). The results of the survey were reported in Posford Haskoning (2004). FHC subsequently undertook an appropriate assessment of the extraction licenses and renewed the annual extraction licences in January 2004. In order to monitor the effects of extraction FHC have carried out a monitoring survey of the maerl beds in summer 2004. This report presents the results of the monitoring survey.

1.2 Aims and rationale for monitoring

The overall aim of monitoring is to provide further information on the effects of maerl extraction on the cSAC. This data will help inform future appropriate assessments of the maerl dredging (if required). The monitoring has focussed on two aspects of the maerl habitat: the depth of maerl resource and the benthic communities associated with the maerl beds.

A potential impact of maerl extraction is reduction in the spatial extent (in terms of surface area) of the maerl habitat due to maerl extraction. This could happen if a sufficient depth of maerl is extracted exposing another underlying sediment type. In order to try and prevent this happening, and therefore maintain the extent of maerl habitat, FHC have restricted maerl extraction to certain areas (Figure 1.1). In order to determine if these restrictions imposed by FHC are successful, the depth of maerl resource has therefore been surveyed.

The infaunal communities of the maerl beds have been surveyed in order to investigate effects of maerl extraction on infaunal community structure and also to determine recolonisation rate of maerl beds following extraction. In 2003, FHC designated an area of seabed as a no-extraction zone. Up until that point it had been subject to intensive maerl extraction for the last 15 years. Surveys of this area have therefore been undertaken to determine the colonisation of the maerl habitat and provide information on the effect of extraction on the infaunal communities.

The scope of this monitoring is limited to effects on the benthic community in relation to effects upon the biological communities of the SAC. It does not investigate effects on water quality or coastal processes.

1.3 Extraction activity

A full account of the maerl extraction process and methods is provided in Posford Haskoning (2004).

Maerl is extracted in the Fal by two companies, the Cornish Calcified Seaweed Company Ltd (CCSC) and Mr A Riggall. Up until January 2004, the extraction companies were licensed to extract from anywhere within the FHC fundus (which covers the lower half of the Fal Estuary) but in practise they tended to extract from only certain areas where they know there was a good dead maerl resource and which were suited to their equipment. CCSC extracted from an area along the western side of the channel near Black Rock illustrated in Figure 1.1. This area has been extracted by CCSC for around 15 years at around the rate of $20,000m^3$ per year. Up until July 2003 an average of approximately 0.09m depth of seabed was removed by CCSC each year.

Mr Riggall carried out extraction from the northern area, known as Falmouth Bank. He has typically carried out extraction at very low intensities and has not carried out any extraction since July 2003.

In January 2004, as part of the appropriate assessment procedure, FHC decided that future extraction should take place in such a way that at least 1m of maerl is left following extraction. This depth was decided upon following a literature review (presented in Posford Haskoning, 2004) of the depths required to support maerl infauna, plus an appropriate margin for safety. Accordingly, restrictions were placed on licenses for the following year (January 2004 to Dec 2004) limiting extraction to areas where at least 1m of maerl had been recorded. These areas are shown in Figure 1.1, with extraction by CCSC being limited to the southern area and extraction by Mr Riggall being limited to the two northern areas. Because extraction by CCSC has been limited to this southern area (which is $135,400m^2$ and equates to approximately 75% of the area previously extracted), the rate of extraction (in terms of volume extracted per m^2) in this area has increased since January 2004.

In total between July 2003 and July 2004, CCSC extracted 148 vessel loads of maerl, which given that the cubic capacity of the hold of the dredger *M/V Diction* is 134.55 m^3, equates to approximately $19,913m^3$. This means that, assuming CCSC have extracted evenly from across the licensed area, a depth of 0.13m has been extracted between July 2003 and July 2004.

On 3rd September 2004, following the results of this survey (which have shown that there is less than 1m of maerl across much of the southern extraction area) FHC decided to relocate the CCSC extraction area to Falmouth Bank. The new license area is shown in Figure 1.1.

2 METHODOLOGY

2.1 Introduction

This section details the methodology employed for the maerl survey. As described in Section 1.2, the aim of the survey was to monitor the depth and infaunal community composition of the dead maerl beds and where possible provide further information on the effects of extraction. To this end the survey work comprised the following elements:

- Airlifting at 24 locations to establish the depth of maerl beneath the seabed;
- Collection of cores from the seabed at 12 locations, for analysis of the benthic infauna; and
- Collection of samples for particle size analysis to characterise the type of seabed.

Survey work was carried out on 16th July 2004 and 31st August 2004. Diving work was undertaken by Sub Marine Services Ltd using surface supplied SCUBA and all survey work was overseen by a marine biologist from Posford Haskoning. Sample positions were recorded on the boat using the onboard GPS.

The survey methodology was provided to English Nature prior to commencing the survey.

2.2 Volumetric surveys

At a total of 24 locations, airlift sampling was used to measure the depth of maerl resource below the seabed. This comprised a repeat of six of the stations monitored in 2003, to see if there has been any change in depth over the last year. In addition, the depth was measured at 18 new stations within the extraction areas to provide more comprehensive coverage of maerl depths within these areas (see Figure 2.1 for locations).

In addition to the two airlift surveys, a vibrocore survey was carried out on behalf of FHC as part of a FEPA application for a proposed capital dredge. The results of this survey have also been included in this report. The vibrocore survey, included three locations within the maerl extraction areas.

In order to interpret the airlift results, it is important to have an understanding of the methodology including any limitations. The airlift method involves using an air suction hose to excavate a hole in the seabed of around 200mm in diameter. The end of the hose has a metal tube with depth markings on it which is held on the seabed by a diver. The airlift sucks up maerl which then passes through a tube to the boat where the returns are observed by surface crew. As the hole is excavated, the diver makes observations on how the maerl changed with depth below the seabed. Where there is a change in the substrate, the depth is noted by the diver and communicated to the surface team via the underwater communication system. In some locations, it is possible for the diver to observe obvious strata in the substrate beneath the surface, whereas in other places the transition between sediments can be more gradual. The airlift is capable of sampling to a maximum of 2m below the seabed.

It should be noted that the airlift method does not provide very accurate measurements of the depth of maerl below the seabed. This is because it is very difficult to identify the nature of the sediment in the airlift returns as they come out of the tube on the boat.

This is because the same volume of water is pumped up as sediment which means that when the material reaches the boat any fine particles are suspended within the pumped water. In practice, the change in maerl depth was observed by the divers rather than looking at the returns. However, this becomes increasingly difficult as the hole gets deeper. In addition, the airlift can sometimes get blocked by stones, thus preventing further extraction at that site.

Vibrocoring took place on the 6th October 2004. A 5m long vibrocorer was deployed from a crane barge at 11 locations in the vicinity of the Falmouth Bank and the Docks. The core was recovered and then logged and sampled by a geotechnical engineer. Core logs were produced detailing the type of sediment present and its depths within the core.

2.3 Biological Survey Work

Monitoring of the biological communities of the maerl beds was carried out by taking core samples. Samples were taken from the 12 stations listed in Table 2.1 and illustrated in Figure 2.1. These stations were made up of the following:

- 3 stations from the no-take zone (Stations 18, 19 and 20)
- 3 stations from reference sites (Stations 4, 9 and 26);
- 6 stations from the areas of continued extraction (Stations 2, 5, 8, 13, 15 and 16).

All of these sites were visited in July 2003. At each of these stations five replicate samples were taken. A total of 60 samples were taken. Cores of roughly 11cm diameter were used and coring methods followed Procedural Guideline 3-8 of the Marine Monitoring Handbook. Maerl communities vary with season (Davies *et al.*, 2001), the survey work was therefore carried out at the same time of year as the previous survey (i.e. July).

Upon collection, the cores were placed in polythene bags and labelled, then taken to the Marine Ecological Surveys Ltd laboratory within 24 hours for preservation and analysis. Upon receipt of the samples by the laboratory, the samples were transferred to sealed plastic buckets, fixed with 10% formalin and left for at least 24 hours. Samples were sieved over a 0.5mm mesh sieve to remove fine particles. At this point the samples were also carefully picked over by hand in order to remove larger, more obvious, organisms particularly the heavy-shelled taxa[1] (i.e. bivalves).

The remaining sediment was then carefully transferred to a 15 litre plastic bucket which was then filled with approximately 10 litres of tap water. After gentle stirring the water was carefully poured through a 0.5mm sieve in order to remove the suspended invertebrates. This procedure was repeated three times. The supernatant, consisting of invertebrates, small sediment particles and light organic matter was then transferred to a suitably sized plastic vessel and preserved in 70% industrial methylated spirit. All invertebrates were then removed using a stereo-microscope and placed into separate vessels according to major phyletic groups before identification and enumeration. In accordance with the 2003 survey, samples were identified to genus level only.

[1] group or category, at any level, in a system for classifying plants or animals

Table 2.1 Details of biological monitoring stations

Station number	Number of cores collected	Airlift	Type of site	Latitude (WGS84)	Longitude (WGS84)
2	5	Yes	LE	50.16383333	-5.045983333
4	5	Yes	RS	50.1615	-5.049466667
5	5	Yes	LE	50.16146667	-5.045966667
8	5	Yes	LE	50.1596	-5.042116667
9	5	Yes	RS	50.1594	-5.038733333
13	5	Yes	HE	50.14861667	-5.030816667
15	5	Yes	HE	50.14698333	-5.0282
16	5	Yes	HE-B	50.14525	-5.02835
18	5	No	HE / NTZ	50.1437	-5.028483333
19	5	No	HE/ NTZ	50.14351667	-5.026533333
20	5	No	HE/ NTZ	50.14338333	-5.027733333
26	5	No	RS	50.15256667	-5.043766667

RS = reference site

LE = low extraction area

LE-B = on border of low extraction area

HE = high extraction area

HE-B = on border of high extraction area

NTZ = no-take zone designated July 2003

In addition video of the seabed was taken by the divers at each sampling station prior to undertaking the air-lift or coring. This provides a visual record of the nature of the seabed and level of epifauna at each survey station.

At each of these stations a sample was also taken for particle size analysis. This was done by scooping the surface of the sediment with a corer. The particle size distribution of sediments was analysed by Alcontrol Ltd using dry sieving.

2.4 Data analysis

In order to investigate the effects of maerl extraction on the infaunal community, the data collected from the sites between 2003 and 2004 have been compared using appropriate statistical techniques. Univariate indices have been calculated (species richness, total abundance and diversity) per station and the indices between the survey areas compared. An explanation of these parameters is provided in Box 1. In addition, multivariate analyses have been undertaken, using PRIMER software, on the data sets to investigate any change in benthic community structure and composition over time.

Box 2.1 Explanation of statistical parameters used to describe infaunal component of samples

Number of individuals (N): The abundance or number of individuals in a sample
Number of species (S): The number of species in a sample or group of sample..
Shannon-Wiener's diversity index (H'): This is the measure of the diversity of a community which incorporates both species richness and equitability components. The higher the Shannon-Weiner value the more diverse the community.
Standard deviation: A measure of the average amount by which each observation in a series of observations differs from the mean.

2.5 Quality Assurance

In order to ensure consistency between the results of 2003 and 2004, the same survey team and survey equipment was used to carry out the survey. In addition, the identification of the infauna was carried out by the same laboratory, who maintained reference collections in order to ensure consistency of species identification. Furthermore the 2003 and 2004 species matrices were checked to ensure that no synonyms for the same species had been used.

The species identification was undertaken by a laboratory which participates in the National Marine Biological Quality Control (NMBAQC) scheme and the particle size analysis was undertaken by a UKAS accredited laboratory.

3 RESULTS

3.1 Volumetric results

The depth of the maerl resource recorded in 2004 and compared to the 2003 results are presented in Table 3.1 and 3.2.

The monitoring has shown that the depth of maerl at the two reference sites has varied little between 2003 and 2004. This is to be expected given that these sites have not been subject to extraction.

Within the northern extraction area, the depths of maerl recorded in 2004 at the three stations were broadly similar to that recorded in 2003. However, there were some variations due to the airlift hitting stones and getting blocked. No extraction has taken place in this area between July 2003 and July 2004. The data show that over most of the Falmouth bank area there is at least 1.7m of maerl. This has been confirmed by the vibrocore survey which recorded between 1.4 and 3.9m of maerl in this area.

Within the southern extraction area, the depth of maerl has reduced from more than 2m depth in 2003 to between 1.1m and 0.3m in 2004. Data is available for eight locations within the southern extraction area. These show that in summer 2004 there was a mean thickness of 0.8m of maerl in this area with minimum and maximum depths of 0.3m and 1.6m respectively. This area has been heavily extracted by CCSC between 2003 and 2004 who have extracted almost 20,000m^3. However, assuming this volume was extracted evenly across the licensed area, this equates to a depth of only 0.13m being removed. This depth is clearly far less than the reduction in maerl depths that has been observed (up to 1.7m depth). It therefore seems unlikely that extraction could account solely for the reduction in maerl depth and it is considered that storm action probably accounts for some of this reduction in maerl. It is possible that in this area, which lies at the entrance to the harbour, wave action during southerly storms could move large quantities of sediment around. The skipper of the *M/V Diction* has reported that he has observed that there is natural variability in the movements of sediment in this area over the years.

It should be noted that since January 2004 FHC aim to manage the maerl resource in such a way that at least 1m depth of maerl is left following extraction. However, the data shows that there is less than 1m of maerl left across much of the southern extraction area, although this is probably due to natural wave action. In response to the data, FHC have therefore moved the extraction to the Falmouth Bank area where there is at least 1.7m of maerl below the seabed.

Table 3.1 Depths of maerl in the Fal Estuary recorded using airlift

		July 2003 results		July 2004 results	
Station number	**Type of site**	**Depth of maerl (m below seabed)**	**Description of seabed and airlift results**	**Depth of maerl (m below seabed)**	**Description of seabed and airlift results**
2	Northern extraction area	2	Loose uncompacted maerl. Mostly white (some red nodules on surface) Some sand fraction, some dead shells. Constant down to 2.2m at which point hit rock.	0.85m – airlift stopped	Loose uncompacted clean maerl. Some undulations on seabed. Constant down to 0.85m at which point airlift stopped – presumed hit rock or stones.
4	Reference site	0.7	Loose uncompacted dead maerl gradually becoming darker and with a higher shell gravel content with depth. At 1.4m it comprised 50% maerl and 50% shell gravel. This continued down to 2m.	0.7m	10cm of loose clean maerl overlying a muddy maerl matrix. Maerl quite hard and compacted, slightly muddy appearance. Maerl continued to 1.4m at which point comprised around 50% maerl and 50% mud.
5	Northern extraction area	0.7	Loose uncompacted maerl with large dead shells. Uncompacted maerl on surface gradually becoming muddier with depth. At 1.7m it was predominantly mud with the odd maerl fragment.	0.7m	10cm of loose uncompacted maerl overlying a muddy maerl matrix. Lots of dead shells present. Airlift down to 2m, at which point comprised around 50% maerl and 50% mud.
8	Northern extraction area	2	Loose uncompacted dead maerl constant down to 2m. Many clams and gapers present. Maerl became slightly darker with depth. Some backfilling of hole experienced.	1.6m – airlift stopped	Loose uncompacted maerl constant down to 1.6m at which point hit stone or rock. Ripples present on seabed with dead shells present on top of ridges.
9	Reference site	0.7	Loose uncompacted clean maerl down to 0.7m at which point hit rock. Maerl was orange to light grey in colour. Maerl nodules abraded into fine/medium gravel. Lots of sea urchins, starfish and clams recorded on seabed.	0.6m	Loose uncompacted maerl constant down to 0.6m at which point hit rock.
13	Southern extraction area	2	Clean loose yellow/orange maerl uncompacted constant down to 2m. Little shell gravel and no silt. Some large shells. More intricate structure of maerl nodules than at other stations. Little change with depth. Mega-ripples (?) recorded on seabed.	0.5	0.5m of maerl overlying stones and shells.
15	Southern extraction area	2	Loose uncompacted maerl constant down to 2m, similar to site 13. No pink maerl fragments. Some large shells present but not much shell gravel.	- (airlift broke)	Loose uncompacted maerl. Seabed appears uneven and disturbed. Airlift broke and dive aborted.
16	Southern extraction area	2	Dark grey and white loose uncompacted maerl. Small fraction of shell gravel, quite silty and grey.	0.3m	30cm of loose maerl overlying broken shells and rubbles. Maerl was reasonably compacted with quite a lot of

		July 2003 results		July 2004 results	
			Constant down to 2m. Many broken shells and some sand and silt.		dead shells.
A	Northern extraction area	-	New site not surveyed before.	1m	10cm of loose uncompacted maerl then, maerl becoming more compact and muddier with depth. Airlifted to 1m.
B	Northern extraction area	-	New site not surveyed before.	1.7m	30cm of loose uncompacted maerl overlying a muddy maerl matrix.
C	Southern extraction area	-	New site not surveyed before.	1.1m	1.1m of loose maerl overlying mud and shell.
D	Southern extraction area	-	New site not surveyed before.	0.5m	50cm of maerl. Excavation stopped at this depth and underlying substrate appeared muddy with shells.
A1	Northern extraction area	-	New site not surveyed before.	1.7m	Loose clean maerl present to at least 1.7m.
A2	Northern extraction area	-	New site not surveyed before.	1.7m	0.1m of loose clean maerl overlying a muddy maerl matrix present down to at least 1.7m.
A3	Northern extraction area	-	New site not surveyed before.	1.7m	Loose uncompacted clean maerl present to at least 1.7m.
A4	Northern extraction area	-	New site not surveyed before.	1.7m	Very loose maerl, clean present to at least 1.7m.
A5	Southern extraction area	-	New site not surveyed before.	1.5m	Loose maerl present to 1m. At this depth, mud started to be present in the maerl. At 1.5m it comprised roughly 50% mud and 50% maerl.
A6	Southern extraction area	-	New site not surveyed before.	1.6m	Loose maerl with some fine sand (backfilling experienced), present down to 1.6m (not possible to excavate deeper due to backfilling).
A7	Southern extraction area	-	New site not surveyed before.	0.4m	Loose maerl present to 0.4m. At this depth it changed to approximately 50% maerl and 50% broken shells and stones. Excavation beyond this depth not possible due to size of stones clogging airlift.
A8	Southern extraction area	-	New site not surveyed before.	0.8m	0.1m of loose maerl overlying compact mud and maerl. Excavated to 0.8m. Despite 4 attempts, not possible to excavate below this due to airlift clogging.
B1	Falmouth Bank	-	New site not surveyed before.	1.7m	Loose maerl present to at least 1.7m.
B2	Falmouth Bank	-	New site not surveyed before.	1.7m	Loose maerl presented to 1.7m.
B3	Falmouth Bank	-	New site not surveyed before.	1.7m	0.15m of very loose maerl below which was more compacted clean maerl (grey in appearance), present to at least 1.7m.

The results of the vibrocore survey are presented in Table 3.2.

Table 3.2 Depths of maerl in the Fal Estuary recorded using vibrocores

Vibrocore number	Latitude (WGS84)	Longitude (WGS84)	Depth of maerl below seabed (m)
1-1	50.15796	-5.05642	0
1-2	50.15808	-5.05109	0
1-3	50.15688	-5.04934	0.25
2-1	50.15684	-5.05829	0
2-2	50.15711	-5.05383	0
2-2a	50.15711	-5.05383	0
3-1	50.15433	-5.05034	0
3-2	50.1556	-5.04984	0
4-1	50.15851	-5.04719	2.5
4-2	50.15794	-5.0424	3.9
4-3	50.15807	-5.03926	3.35
4-4	50.15807	-5.03822	1.4

3.2 Particle size analysis

The particle size distribution of seabed sediments in 2004 is presented in Figure 3.1. The 2003 data for comparison is presented in Figure 3.2. The particle size distribution of sediments in 2004 appears broadly similar to 2003, that is the samples have a very low silt content and are dominated by large and medium sized particles, which probably comprise the maerl nodules. It is likely that small variations in the particle size distribution from year to year could be caused by the seabed at each sampling station not being entirely homogeneous with patches of slightly coarser and slightly finer sediments being present. The particle size sample is a fairly small sample of the seabed and therefore variations in the data could be caused by sampling slightly different areas of the seabed on each survey.

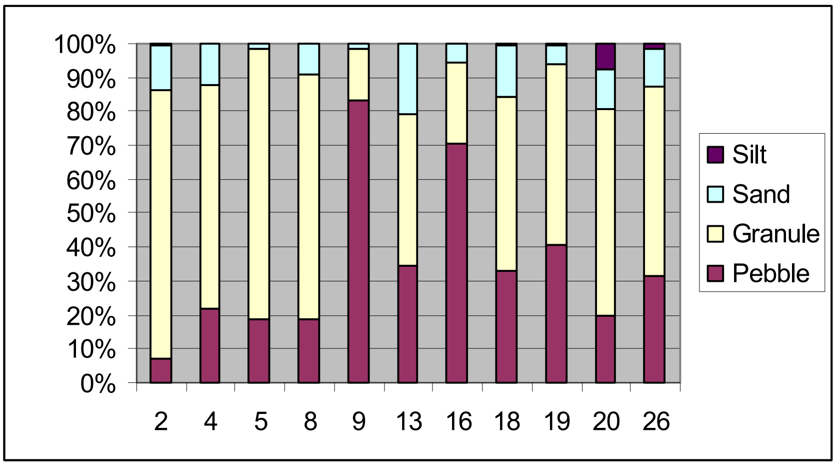

Figure 3.1 Particle size distribution of seabed samples in 2004

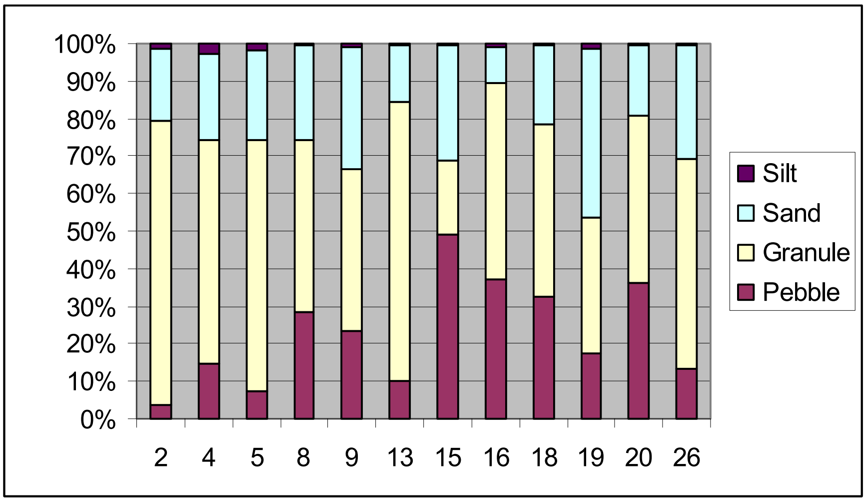

Figure 3.2 Particle size distribution of seabed samples in 2003

3.3 Benthic infauna

3.3.1 Overall description

In common with the 2003 data, the benthic community of the samples in 2004 is very diverse with a wide range of taxa occurring. A total of 204 different taxa were recorded, which is a relatively high number especially given that fauna were identified to genus level only (the species matrix is provided in Appendix 1). The benthic community is dominated by annelids, crustaceans and molluscs which is typical of marine communities, however there are representatives of a number of other phyla such as echinoderms and bryozoans. Numerically, the samples are dominated by (in order of descending abundance) *Leptocheirus, Sphaerosyllis, Pomatoceros and Psamathe.*

Leptocheirus is a sedentary amphipod of which there are four species known in Britain. They are typically found in coarse sediments. *Sphaerosyllis* is a small worm which is common in clean, often mobile coarse sediments and not restricted to maerl. *Pomatoceros* or keel worms build calcareous tubes on hard substarted including gravel or maerl. *Psamathe* (formerly known as *Kefersteinia*) is an errant polychaete found in mixed sediments.

Using PRIMER, the Bray-Curtis similarity between the 2003 samples and 2004 samples have been calculated. This provides an estimate of the degree of similarity between each of the samples, taking into account species identity and has been used to determine if there has been a change in community type between the two years.

For the purposes of the analysis, samples have been excluded if they were sampled in 2003 but not visited in 2004, to remove any spatial variation. The Bray-Curtis similarity is represented in a multi-dimensional scaling plot in Figure 3.3. The figure shows that when viewed as one large dataset, there appears to have been little change in the structure of the benthic communities at most sites between 2003 and 2004. However the communities have altered significantly at sites 13,15 and 16. These sites all lie within the southern extraction area which has been heavily extracted since July 2003.

Figures 3.4 to 3.6 show how the mean number of taxa per core, mean abundance and mean Shannon-Wiener values per core have changed between 2003 and 2004. The following sections provide a comparison of the data at the different stations.

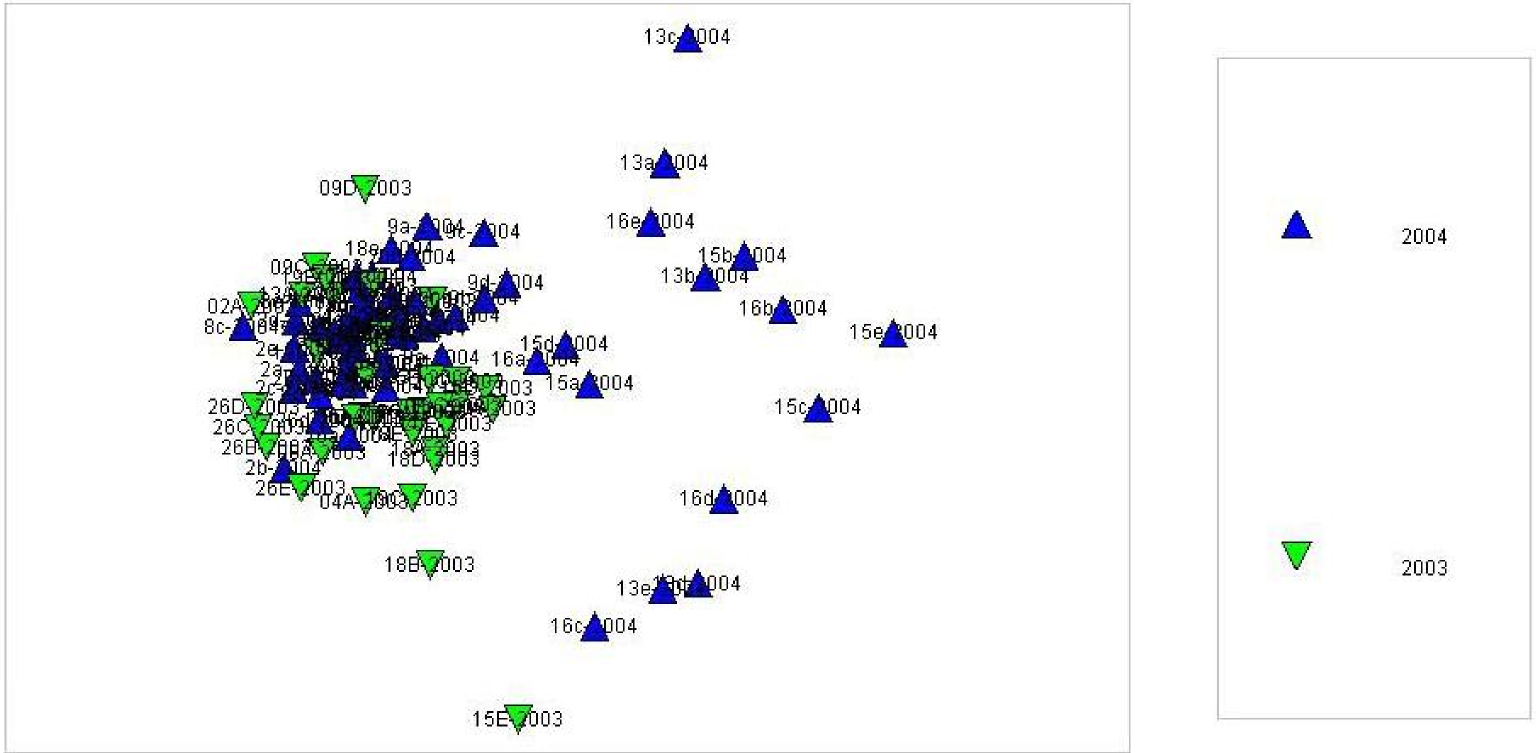

Figure 3.3 **Multi-dimensional scaling plot of 2003 and 2004, repeat stations only, using transformation log x+1.**

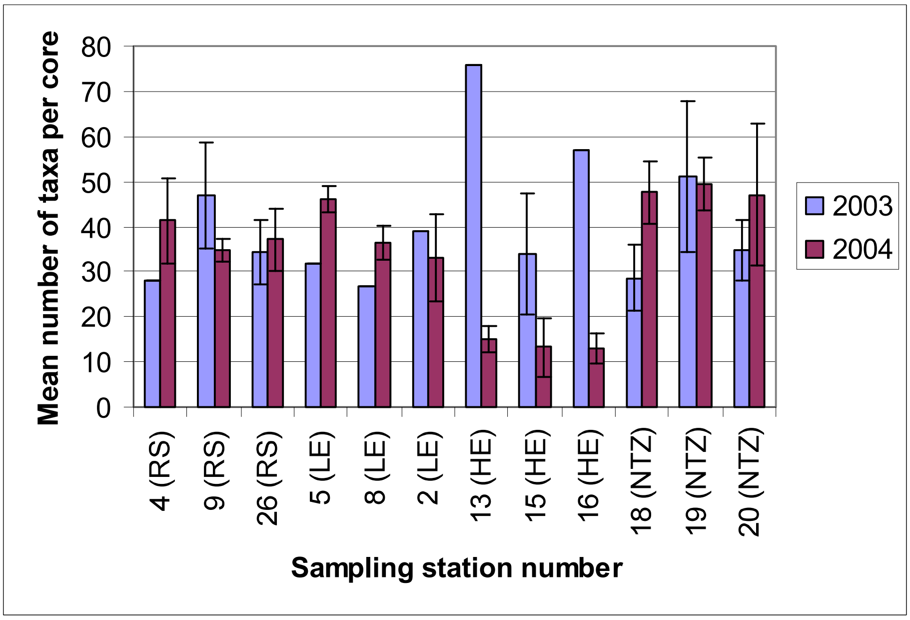

Figure 3.4 Mean number of taxa per core in 2004 (+/- Standard Deviation). RS = Reference Site; LE = Low extraction site; HE= High extraction site; NTZ = no-take zone.

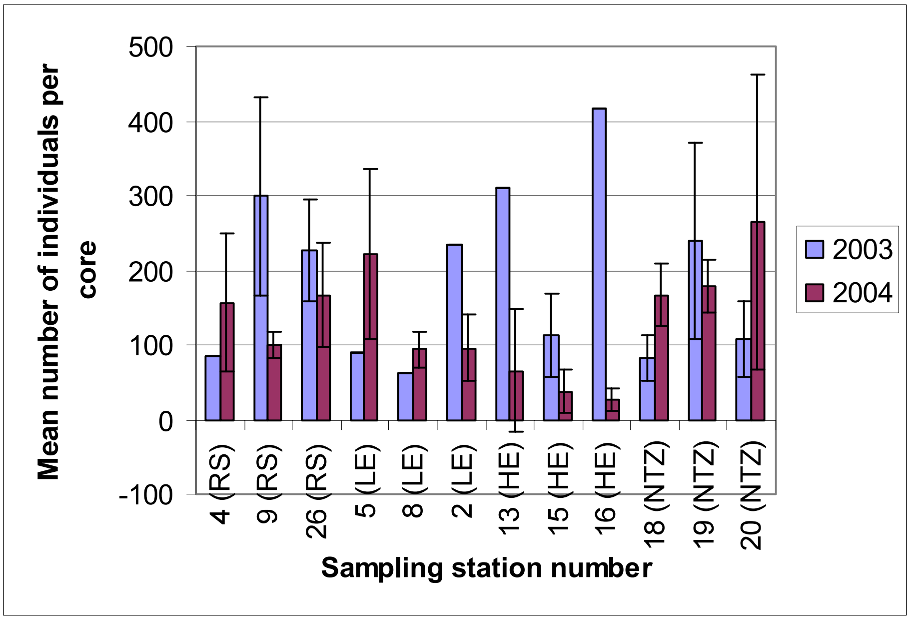

Figure 3.5 Mean abundance of benthic infauna per core in 2004 (+/- Standard Deviation). RS = Reference Site; LE = Low extraction site; HE= High extraction site; NTZ = no-take zone.

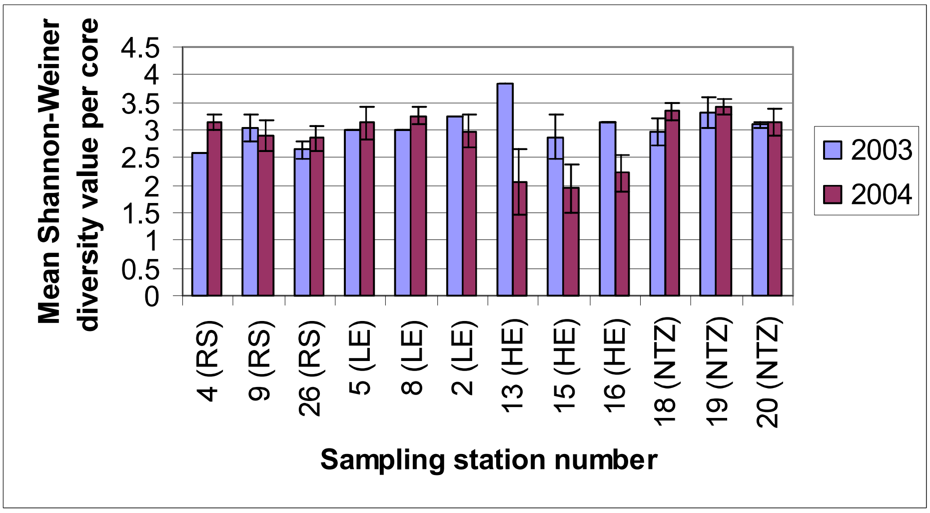

Figure 3.6 Mean Shannon-Weiner diversity values per core (+/- Standard Deviation). RS = Reference Site; LE = Low extraction site; HE= High extraction site; NTZ = no-take zone.

3.3.2 Reference sites

Three reference stations have been monitored since 2003. Monitoring of reference sites is important because it provides an indication of temporal variation in the benthic communities not caused by maerl extraction. The similarity of the benthic communities in 2003 and 2004 are illustrated in Figures 3.7 and 3.8. These show that there have been some changes in the benthic community between 2003 and 2004, although the samples are similar at the 40 to 50% level. Since 2003 there have been no known major changes in the estuary for example through pollution incidents (R Covey, pers. Comm..)

The species which account for the difference between the samples have been determined using a SIMPER (similarity percentages) analysis, the results of which are presented in Appendix 2. This has shown that the difference is due to an increase in abundance of *Mediomastus* and *Leptochirus* in 2004 compared to high numbers of *Sphaerosyllis,* Nematoda and *Guernea* in 2003. It is not unusual to record annual variations within communities as the abundance of species can change naturally from year to year due to factors such as sea temperature and inter-species competition. It cannot be ruled out that some of the difference is also due to sampling slightly different areas of the seabed on each survey, as there is likely to be some inaccuracy in locating exactly the same spot in the seabed on each survey.

The mean number of taxa per core has varied slightly between 2003 and 2004 (see Figure 3.4). At two of the sampling stations it has increased slightly whereas at one of the stations it has decreased slightly. Similarly, at one of the stations (Station 9), the abundance of fauna has dropped by two thirds since 2003, whereas at Station 4 the abundance of fauna has increased. There has been less variation in the Shannon-

Weiner diversity values which have increased slightly at Stations 4 and 26 and decreased slightly at Station 9. Overall,. the reference sites are not particularly different compared to the other sampling stations.

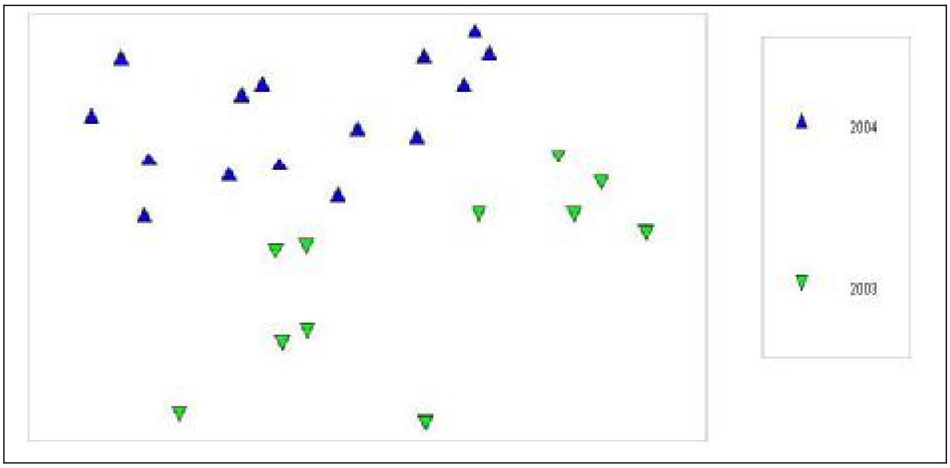

Figure 3.7 Multidimensional scaling plot of Bray-Curtis similarity transformation log X=1) from 2003 and 2004 samples for reference sites with the Fal Estuary

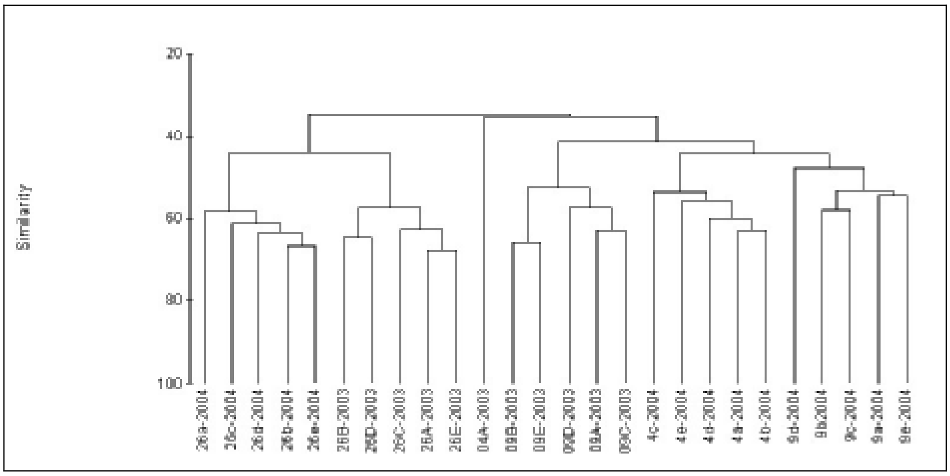

Figure 3.8 Dendrogram of Bray-Curtis similarity (transformation log X=1) from 2003 and 2004 samples for reference sites with the Fal Estuary

3.3.3 High Extraction Area

Between July 2003 and July 2004, the southern extraction area has been subject to intensive extraction (approximately 0.13m depth of maerl has been removed over 12 months). Three sites have been monitored in this area (Stations 13, 15 and 16). Since

2003, there have been large scale changes in the infaunal communities at these sites. The number of taxa and the abundance of those taxa have decreased dramatically (see Figure 3.4 to 3.6). For example, at Station 13, 76 taxa were recorded in 2003 whereas only 15 taxa were recorded in 2004. The area has changed from being one of the richest areas recorded in 2003 to having the most impoverished benthic community.

The similarity of the 2003 and 2004 samples is presented in Figure 3.9. In 2003 the samples were characterised by *Harpcaticoida, Socarnes, Caprella, Leptocheirus* and *Metaphoxus.* In 2004 they were characterised by *Pomatoceros, Socarnes, Psamathe Sphaerosyllis,* and *Leptocheirus.*

It is likely that the increased extraction has resulted in the large scale changes in the benthic communities that have been observed in this area. However, storm action may also have a role to play because in this area it is thought that wave action has moved large quantities of the sediment around, probably creating high levels of natural disturbance for the flora and fauna. Although it is interesting to note that within the no-take zone, which lies adjacent to this area and therefore would presumably be subject to similar levels of storm action, the benthic communities have remained stable.

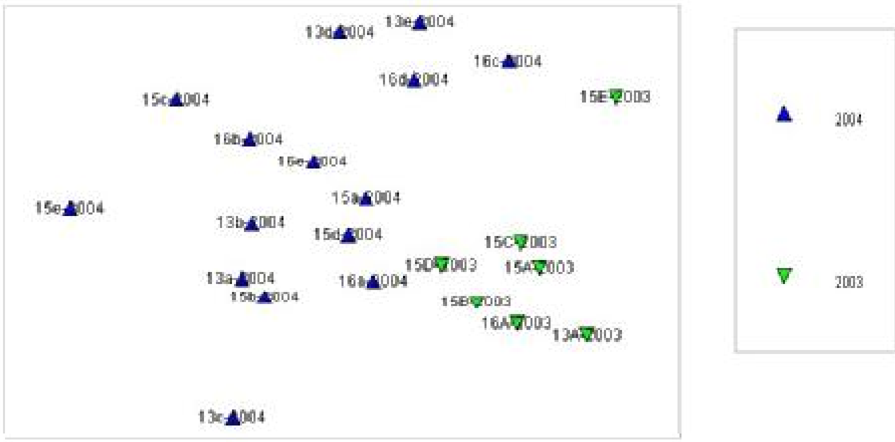

Figure 3.9 Multi-dimensional scaling plot of Bray-Curtis similarity index (logX+1) of 2003 and 2004 samples from the high extraction areas within the Fal Estuary

3.3.4 No-Take Zone

Three sites within the no-take zone have been monitored since 2003. This provides valuable information on colonisation rates following cessation of extraction, of which little has been known before.

Three sampling stations within the no-take zone have been monitored. At Station 18 the number of taxa, their abundance and Shannon-Weiner diversity values per core all increased significantly since 2003 (see Figure 3.4 to 3.6). These increases are statistically significant ($p<0.05$) when tested using a Students T-test. At Stations 19 the number of taxa and their abundance decreased slightly since 2003 and the diversity increased whereas at Station 20 all parameters increased. However the differences recorded at these sites were not statistically significant ($p>0.05$) due to the greater level of variation between the cores.

The similarity of the samples from the no-take zone is shown in Figure 3.10. The 2004 samples are fairly similar to each other clustering at around 50% similarity. The 2003 samples from Station 19 are closest to these samples. This shows that there have been some changes in the benthic community between 2003 and 2004. SIMPER has shown that the 2004 samples are characterised by increased abundance of *Jasmineira, Psamathe* and *Polycirrus*

These results only represent the results of one years monitoring of colonisation. Ideally monitoring is required for a much longer time to gain a more accurate and reliable estimate of recovery rates. However, the results are encouraging as they indicate that the infaunal communities are remaining stable, although it should be recognised that the samples were rich and diverse anyway while extraction was taking place and therefore it is possible that they may change little in the absence of maerl extraction.

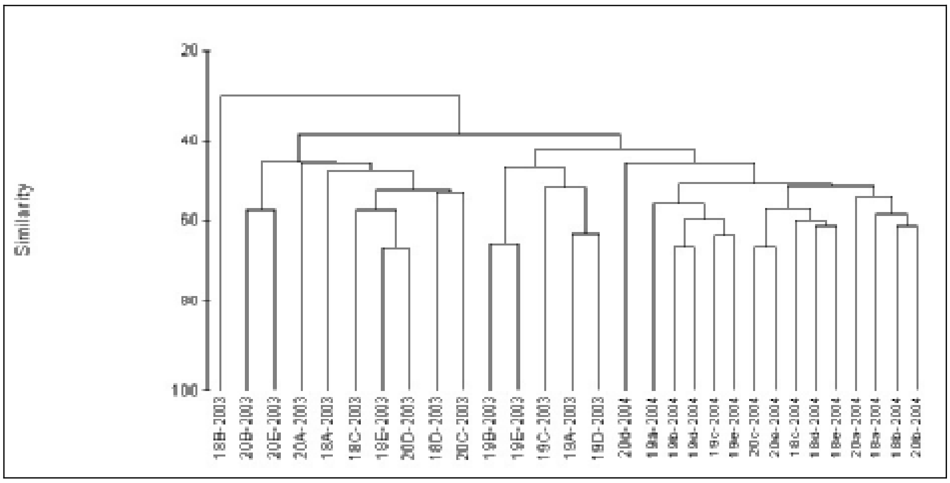

Figure 3.10 Dendrogram of Bray-Curtis similarity index (log X+1) of samples from the no-take zone in 2003 and 2004

4 DISCUSSION

4.1 Effects of extraction

In summary, the monitoring survey has found the following results:

- There has been a reduction in the depth of maerl in the southern extraction area of around 1.7m and there now remains less than 1m depth of maerl across much of this area. Although much of this reduction in maerl is likely to be due to storm action, in response to this FHC have nevertheless relocated the extraction area to the north (Falmouth Bank) where vibrocores have confirmed that there is a greater depth of maerl.
- There has been a depletion in the number of taxa and the abundance of benthic infauna at the area which has been subject to high intensities of extraction;

- Within the no-take zone, increases in diversity compared to 2003 levels have been observed at two stations, whilst the other site was stable, however it should be noted that this area was already relatively rich before.
- Very diverse and rich communities of benthic infauna continue to occur in most of the maerl beds of the Fal Estuary. It is encouraging to see that in the no-take zone, levels of taxa, abundances and diversity are good.
- It is likely that the rate of extraction has an important bearing on the degree of effect caused on the benthic community. In July 2003 it was observed in the southern extraction area, that extraction was causing a depletion in the abundance of species but a high number of taxa and a highly diverse community was still present. Since extraction in this area has intensified there has been a more dramatic effect on the benthic community. However, it should be noted that storm action has probably caused the large scale movement of sediment in this area which may also have contributed to the change in the benthic communities.

If maerl extraction continues it is recommended that monitoring should continue on an annual basis. The monitoring of the no-take zone provides novel and useful information on rates of change following extraction within the maerl habitat. Ideally the monitoring of the no-take zone should continue even if maerl extraction in the estuary stops, to give an estimate of long-term rates of change. However, there is a cost associated with this work and it is recognised that the monitoring would be of little value to either FHC or the maerl extractors and is more of scientific interest. Therefore, if possible research grants should be sought to allow this monitoring to continue.

It is recommended that if maerl extraction continues, vibrocoring should be used to more accurately determine the depth of the maerl resource. Given the limitations of the airlift method and the rate of extraction of maerl, this appears to be the only suitable method for determining the extent of extraction that could be removed over a longer timescale whilst still ensuring enough resource for colonisation.

4.2 Recommendations

FHC are required to carry out an appropriate assessment of future maerl extraction licenses. The legal position of appropriate assessment for activities which are licensed on an annual basis has been confirmed by a recent EU court ruling[2]. It is recommended that the conclusions of this report are taken into account in the appropriate assessment.

If the extraction is licensed for a further year it is recommended that the following measures are put in place:

- Now that the volume of the hold of *M/V Diction* is known it is recommended that volume calculations are carried out prior to licensing to estimate the volume that will be extracted by CCSC for the future year and therefore the depth of maerl that will be taken out. This should be related to the depth of maerl resource remaining to ensure that at least 1m of maerl is left following extraction.
- Records of the vessel tracks should be maintained and provided to FHC on a regular basis in order to ensure that the extractors are remaining within their licensed areas.

[2] The European Court of Justice ruled on 7 September that an activity which has been carried out for many years but is licensed on an annual basis falls within the concept of 'plan or project'.

5 REFERENCES

Davies, J., Baxter, J., Bradley, M., Connor, D., Khan, J., Sanderson, W., Turnbull, C., and Vincent, M., 2001. *Marine Monitoring Handbook.* Peterborough: Joint Nature Conservation Committee.

Posford Haskoning, 2004. *Marine Ecological Survey of the Fal Estuary: Effects of Maerl Extraction.* Unpublished report to Falmouth Harbour Commissioners.

Appendix 1

Species matrix

Appendix 2

SIMPER results

SDC	TaxonName	2					4					5					8					9					13					15					16					18					19					20					26				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
C0131_97	*Scypha*	-	P	P	P	P	P	-	-	P	P	-	P	P	-	P	P	-	P	P	P	-	-	P	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	P	-	-	-	P	-	P	-	-	-	-	-	P	P	-	-	-
D0016_97	*Lucernariopsis*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	1	-	-	-	-	-	-
D0662_97	*ACTINIARIA*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-
D0757_97	*Halcampa*	3	-	-	1	-	1	-	1	1	-	-	1	-	-	-	-	4	1	3	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	1	2	-	-	-	-	-	-	-	-	-	-	-
F0002_97	*TURBELLARIA*	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
F0073_97	*Discocelides*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	-	-	-	-	-	-	-	-	-
F0105_97	*Prostheceraeus*	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
G0001_97	*NEMERTEA*	1	-	-	-	1	-	-	-	-	1	1	-	-	-	1	-	-	-	-	-	-	-	-	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	-	-	2	1	3	1	-	9	-	10	-	-	-	-	1
G0026_97	*Tubulanus*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	1
G0039_97	*Cerebratulus*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	3	-	-	-	1	-	-	-	1	-	-	-	-	-	-	-
G0117_97	*Tetrastemma*	-	-	-	3	-	2	3	-	2	4	1	-	7	6	1	-	1	2	2	2	-	4	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	1	1	1	7	1	4	-	-	2	1	5	-	2	3	-	1
HD0001_97	*NEMATODA*	3	4	9	4	4	2	-	2	5	2	4	3	4	4	-	3	2	6	3	7	2	1	2	1	2	1	-	-	-	-	2	-	-	-	-	4	-	-	-	1	3	1	10	4	3	10	18	3	5	2	-	2	4	-	-	6	18	14	-	37
L0009_97	*Sagitta*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-
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P0014_97	*Pisione*	-	-	2	1	-	-	-	-	-	1	1	-	-	-	-	-	1	1	1	-	-	-	-	-	-	1	-	-	-	-	-	1	-	-	-	1	-	-	-	-	1	-	-	-	-	-	-	-	2	-	-	-	-	-	1	7	16	8	8	16
P0025_97	*Polynoidae*	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
P0050_97	*Harmothoe*	-	-	-	-	2	-	1	1	1	-	1	-	2	3	1	-	1	-	-	3	-	-	1	-	-	-	-	-	-	-	-	-	-	1	-	-	1	-	-	-	1	1	3	3	2	-	5	4	2	6	1	4	1	-	5	-	-	-	-	2
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P0091_97	*Pholoe*	2	-	-	3	-	7	6	1	4	1	2	1	8	10	2	7	7	-	-	1	2	3	4	1	2	-	1	-	-	-	-	-	-	1	-	-	-	-	-	2	-	1	-	3	-	-	6	3	5	3	-	-	2	-	6	1	7	1	2	1
P0116_97	*Eteone*	-	1	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	1	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	1	-	-	-	-	-	-	-	-
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P0150_97	*Eulalia*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
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P0172_97	*Notophyllum*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-
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P0190_97	*Sige*	-	-	-	-	-	1	2	-	-	-	1	-	-	-	1	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	2	-	-	-	-	-	-	-	-	1	-	-
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P0354_97	*Eurysyllis*	-	-	-	-	-	-	-	-	-	-	2	-	-	1	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	1	-	1	-	-	-	-	-	-	-	-	-	-
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P0364_97	*Typosyllis*	-	-	-	-	-	-	1	-	-	1	2	-	-	-	-	-	-	2	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	1	-	1	-	-	7	-	6	1	-	1	-	-	-	3	5	15	11	5
P0385_97	*Odontosyllis*	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-
P0406_97	*Syllides*	-	-	4	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	-	-	-	-	-	1	-	5	3	1	2	-	-	-	-
P0418_97	*Exogone*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-
P0424_97	*Sphaerosyllis*	19	11	10	23	17	8	5	7	44	14	7	6	12	12	5	3	4	4	8	8	-	-	1	1	2	1	1	-	1	1	1	-	1	1	-	5	-	-	-	-	15	6	6	11	2	13	8	5	10	4	2	7	21	9	15	18	61	22	52	76
P0482_97	*Platynereis*	-	-	-	-	-	1	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	1	-	-
P0494_97	*Nephtys*	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	1	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
P0494_97	*Nephtys (juv.)*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
P0519_97	*Pareurythoe*	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-
P0524_97	*Euphrosine*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-
P0554_97	*Eunice*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
P0567_97	*Nematonereis*	-	-	-	1	-	1	1	-	-	-	2	-	1	-	2	-	1	-	-	-	2	4	6	-	1	-	-	4	-	1	-	-	-	-	-	-	1	-	1	1	1	-	-	1	-	-	-	-	-	-	-	-	3	1	-	1	1	-	-	2
P0572_97	*Lumbrineris*	-	-	1	-	-	-	1	-	2	-	-	1	-	1	-	-	-	2	4	5	2	1	-	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	2	-	1	1	-	4	4	3	2	6	-	1	3	-	5	-	-	-	-	-
P0637_97	*Protodorvillea*	-	1	-	-	-	-	1	4	1	1	3	2	1	2	-	-	-	-	-	-	-	2	1	-	1	-	1	-	1	9	1	-	-	1	-	1	-	1	-	-	1	-	-	4	-	-	5	1	3	2	2	-	7	-	2	5	2	1	3	3
P0641_97	*Schistomeringos*	-	1	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-
P0703_97	*Paraonis*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-
P0721_97	*Aonides*	-	-	-	-	-	1	-	-	-	1	1	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	2	2	1	-	5	6	-	5	1	-	1	1	-	1	-	-	-	-	-
P0748_97	*Polydora*	-	-	-	-	1	-	-	-	3	-	-	-	-	2	-	-	-	-	-	-	2	1	1	-	1	-	-	-	-	-	1	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	1
P0763_97	*Prionospio*	-	-	-	1	-	-	-	1	4	1	-	-	-	-	-	-	-	-	-	1	-	-	3	1	1	1	1	-	-	-	-	-	1	-	-	-	-	-	-	-	-	1	-	1	1	1	1	-	1	-	2	1	3	-	2	-	3	1	1	1
P0777_97	*Scolelepis*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
P0787_97	*Spio*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-
P0822_97	*Cirratulidae*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-
P0823_97	*Aphelochaeta*	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	-	-	-	-	-	-	-
P0828_97	*Caulleriella*	-	-	-	-	-	-	-	-	1	-	-	-	-	1	-	-	-	-	-	-	-	2	6	5	-	-	-	-	-	1	1	-	-	-	-	1	1	-	1	-	1	1	-	2	2	-	-	3	-	-	1	1	2	-	-	-	1	-	-	-
P0889_97	*Macrochaeta*	-	-	-	1	-	-	1	1	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	1	2	-	-	-	-	-	-	2	3	2	5	-	-	-	-	-
P0918_97	*Mediomastus*	2	2	3	1	1	11	9	10	24	12	24	6	11	14	7	-	-	-	2	-	24	36	13	7	48	2	-	-	-	1	1	-	-	1	-	-	-	1	-	1	1	3	1	1	-	14	15	14	15	13	4	-	7	-	1	6	8	1	3	1
P0920_97	*Notomastus*	-	-	2	-	-	-	-	1	-	-	-	-	-	-	1	-	-	-	-	2	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	1	4	1	2	-	4	2	-	-	-	-	-	-	-	-	-	-
P0938_97	*Maldanidae*	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
P0960_97	*Euclymene*	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
P0979_97	*Nicomache*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-
P0993_97	*Opheliidae*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-
P1025_97	*Scalibregma*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	1	-	-	-	-	-	-	-
P1062_97	*Polygordius*	-	-	1	1	1	-	-	-	-	1	5	-	-	-	-	2	1	-	1	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	1	1	1	1	-	-	-	-	-	-	4	4	1	2	25
P1097_97	*Owenia*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-
P1106_97	*Lagis*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
P1118_97	*Ampharetidae*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
P1133_97	*Ampharete*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	1	-	-	-	1	-	-	3	-	-	-	-	-	-	-	-
P1174_97	*Terebellides*	-	-	-	-	-	-	-	-	-	-	1	-	1	-	1	-	-	-	-	-	-	-	1	-	-	-	-	1	1	7	-	-	1	-	-	-	-	-	-	-	1	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
P1176_97	*Trichobranchus*	-	-	1	1	-	-	-	1	1	-	-	1	-	2	1	-	1	1	-	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	3	2	-	4	-	2	-	-	-	2	-	1	1	-	-	-	-
P1209_97	*Nicolea*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	1	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
P1216_97	*Pista*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	1	-	2	-	2	1	-	-	-	2	-	-	-	-	-	-	-	-	1	1	2	6	5	3	5	9	2	2	6	2	4	5	2	3	4	-	1	-	-	-
P1235_97	*Polycirrus*	4	-	1	3	4	3	4	2	6	1	2	2	4	5	3	2	2	3	1	2	3	1	-	3	-	1	-	-	1	2	-	-	-	1	-	-	-	1	-	1	3	8	9	15	5	4	8	11	7	9	9	16	10	26	14	2	7	2	1	3
P1287_97	*Jasmineira*	6	1	-	9	2	2	-	3	4	-	5	-	1	4	-	-	-	1	2	4	-	-	1	-	1	-	-	-	-	-	1	-	-	-	-	1	-	-	-	1	10	23	27	23	27	12	3	6	6	6	5	7	5	11	5	2	2	3	3	3
P1296_97	*Megalomma*	-	-	-	-	-	1	3	1	2	-	1	-	3	2	-	-	1	-	-	-	5	-	4	2	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	1	-	1	3	-	4	-	-	-	-	-	1	-	1	1	-	-	4	2	3	3

SDC	TaxonName	2					4					5					8					9					13					15					16					18					19					20					26				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
P1298_97	*Myxicola*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-
P1315_97	*Pseudopotamilla*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
P1330_97	*Hydroides*	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	1	4	1	-	-	2	-	1	1	-	-	-	-	1	-	3	-	4	-	-	-	-	1	-	2	1	3	1	-	-	-	3	-	-	1	-	-	-	-	-	-	-
P1339_97	*Pomatoceros*	3	-	4	1	3	1	3	9	4	1	1	2	-	1	4	2	1	2	1	-	12	10	9	20	1	19	7	27	1	-	10	28	3	43	5	20	12	-	1	7	1	-	3	5	12	6	4	2	7	20	10	35	54	4	68	1	3	-	-	2
P1342_97	*Serpula*	-	-	-	-	-	-	-	1	1	-	-	-	-	-	1	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	1	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-
P1487_97	*Tubificoides*	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-
P1501_97	*Enchytraeidae*	-	-	1	-	-	1	-	2	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	3	-	4	1	-
R0040_97	*Verruca*	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	5	-	-	-	-	159	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-	-	-	-	-
R0074_97	*Balanus*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
R0785_97	*HARPACTICOIDA*	-	-	2	1	-	1	-	-	1	-	6	2	2	4	3	-	2	-	2	1	-	-	-	1	-	-	-	-	-	-	1	2	-	-	-	1	-	-	-	-	2	1	9	10	-	3	3	1	-	2	-	1	9	-	8	-	1	-	-	-
R2412_97	*OSTRACODA*	-	-	-	-	-	7	2	2	14	3	2	1	3	6	1	-	-	-	-	-	11	4	4	1	8	-	1	-	-	-	-	6	-	-	-	-	1	-	-	-	-	-	1	1	-	-	1	-	-	2	-	-	9	-	1	-	-	-	-	-
S0025_97	*MYSIDACEA*	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
S0091_97	*Heteromysis*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
S0101_97	*Apherusa*	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-
S0139_97	*Westwoodilla*	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
S0156_97	*Amphilochus*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
S0162_97	*Gitana*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	2	1	-	-	-	-	-	-	1	-	1	-	-	-	-	-
S0176_97	*Leucothoe*	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-
S0207_97	*Stenothoe*	-	-	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-
S0246_97	*Urothoe*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
S0253_97	*Harpinia*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
S0261_97	*Metaphoxus*	3	1	1	3	1	5	4	2	13	5	6	9	12	29	3	6	3	-	1	7	7	3	1	-	9	-	-	-	-	-	1	-	-	1	-	1	-	2	-	-	8	6	12	13	8	5	3	1	-	6	4	5	20	1	12	-	1	-	2	1
S0317_97	*Orchomene*	1	1	3	4	3	2	5	4	6	-	5	2	4	2	8	1	2	1	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	1	-	3	5	-	-	-	-	1	1	-	13	-	35	-	5	4	4	1
S0329_97	*Socarnes*	-	-	-	-	-	7	8	2	27	4	13	2	15	22	1	2	2	2	3	-	-	1	-	1	6	-	-	-	4	6	-	2	1	6	-	-	1	1	1	-	1	1	1	5	2	-	-	1	3	1	3	3	46	8	88	3	8	3	1	2
S0350_97	*Austrosyrrhoe*	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
S0395_97	*Liljeborgia*	-	-	-	3	1	-	-	-	4	-	-	1	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	1	-	-	-	1	-	-	-	-	2	1	-	-	-	-
S0398_97	*Listriella*	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	1	4	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2
S0409_97	*Atylus*	-	-	-	-	-	-	-	-	1	-	-	-	2	3	-	-	-	-	1	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	2	1	1	2	-	-	-	1	-	3	-	1	-	1	-	1	1
S0417_97	*Guernea*	-	5	2	2	2	-	2	-	6	3	11	1	5	4	2	2	2	-	3	-	-	-	-	-	1	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	5	9	12	8	1	2	-	-	1	1	1	2	9	-	3	4	2	2	2	6
S0423_97	*Ampelisca*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	1	-	-	1	-	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
S0496_97	*Abludomelita*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
S0501_97	*Ceradocus*	2	-	-	-	-	2	-	-	-	-	-	-	1	-	1	1	-	1	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	1	1	-	-	-	-	-	3	-	-	-	-	2	-	-
S0503_97	*Cheirocratus*	-	1	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
S0513_97	*Gammarella*	-	-	-	-	-	1	1	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-
S0515_97	*Maera*	-	-	-	-	-	2	2	-	9	1	3	1	-	1	-	-	-	-	1	-	1	2	-	2	2	-	-	-	-	-	-	-	-	-	-	1	-	2	-	-	5	-	10	-	-	-	-	-	2	7	-	-	-	-	15	-	1	-	-	1
S0522_97	*Melita*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	1	-	-	-	-	-	-	-	-	-
S0530_97	*Ampithoe*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-
S0537_97	*Isaeidae*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
S0538_97	*Gammaropsis*	-	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	1	3	-	-	1	-	-
S0548_97	*Microprotopus*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-
S0561_97	*Ericthonius*	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
S0584_97	*Lembos*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-
S0586_97	*Leptocheirus*	-	-	-	-	-	24	19	16	57	15	53	20	72	138	8	8	1	-	1	1	3	4	1	2	1	-	-	-	-	-	3	1	-	-	-	5	1	2	2	-	1	2	5	10	-	9	23	14	7	25	10	4	26	3	59	1	17	5	3	3
S0592_97	*Microdeutopus*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
S0605_97	*Corophium*	-	-	-	-	-	-	-	2	-	-	1	-	-	-	-	-	-	-	-	-	-	2	-	1	-	1	2	-	-	-	-	-	1	-	-	-	-	-	-	1	-	-	2	2	3	-	5	4	1	1	1	-	9	-	1	-	-	-	-	-
S0640_97	*Caprella*	3	1	6	23	1	19	9	4	8	7	16	-	15	21	-	7	2	-	-	8	4	1	-	1	2	-	2	-	1	-	-	-	-	4	1	-	-	-	-	-	1	1	13	4	16	1	32	9	3	17	2	4	49	2	58	-	-	1	-	1
S0656_97	*Phtisica*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	1	-	2	-	-	-	-	-	-	-	3	-	-	-	-	-	-	-
S0790_97	*ISOPODA*	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
S0793_97	*Gnathia (juv.)*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
S0793_97	*Gnathia*	-	-	-	6	-	2	-	1	-	-	-	-	7	1	-	-	-	-	-	-	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	-	-	-	1	1	-	2	1	-	2	-	1	-	-	1	-	-
S0802_97	*Anthura*	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	1	-	-	-	-	1	-	-	-	-	-
S0850_97	*Eurydice*	-	-	-	1	-	-	-	-	-	-	-	-	1	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	1	-	2	2	1	1	-	1	2	-	-	-	1	2	-	-	-	-	-
S0891_97	*Janira*	-	-	1	2	-	2	-	-	2	1	4	1	1	2	-	-	1	-	3	4	1	3	1	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	3	-	4	-	-	1	2	2	-	7	10	1	12	-	-	1	-	2
S0898_97	*Microjaera*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	1	1	-	1	1
S1113_97	*Leptochelia*	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	2	-	-	-	-	-	-	-	-	-	-	-	1	-	-
S1131_97	*Leptognathia*	-	-	-	1	1	-	-	-	5	2	11	-	3	2	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
S1139_97	*Pseudoparatanais*	-	-	-	-	-	4	1	2	2	-	-	-	3	-	1	1	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-
S1173_97	*Apseudes*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	1	-	-	-	-	-	-	1	-	-	-	-	-
S1183_97	*CUMACEA*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
S1193_97	*Bodotria*	-	-	2	1	1	-	1	-	2	-	-	1	2	1	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	1	-	-	-	-	-	-	2	4	5	1	2	-	-	-	-	1	1	-	-	3	-	-	-	-	-
S1200_97	*Iphinoe*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7	-	-	-	-	-	-	-
S1247_97	*Diastylis*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-
S1276_97	*DECAPODA (Type C, juv.)*	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
S1332_97	*Athanas*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
S1454_97	*Pagurus*	-	1	-	1	-	-	-	-	1	-	-	-	-	-	-	1	-	-	-	-	-	1	-	-	-	-	-	-	-	-	2	-	-	-	-	-	2	-	1	-	2	5	1	1	-	1	-	-	1	-	1	3	4	-	1	-	1	-	-	-
S1481_97	*Pisidia*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
S1504_97	*Ebalia*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-
S1577_97	*Liocarcinus*	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	1	-	1	-	-	-	-	-
W0052	*Leptochiton*	-	-	1	4	4	1	2	-	2	-	2	3	3	1	4	3	1	3	3	6	3	2	2	1	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	2	4	1	1	7	-	3	5	7	5	7	9	7	-	1	3	-	-
W0077	*Tonicella*	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-
W0124	*Tectura*	-	-	-	-	-	-	-	1	-	-	1	-	1	1	-	-	-	-	-	-	-	-	-	2	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	1	-
W0187	*Gibbula*	-	1	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
W0217	*Skenea*	-	-	-	-	-	-	-	-	1	-	3	1	1	1	1	1	1	2	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	1	-	-	-	2	-	-	-
W0278	*Rissoa*	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
W0304	*Alvania*	-	-	-	-	-	-	-	-	1	-	-	2	-	-	-	-	-	-	1	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
W0336	*Onoba*	-	-	-	-	-	1	-	-	2	-	-	3	-	1	1	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
W0419	*Rissoella*	-	-	-	1	-	1	3	2	6	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
W0433	*Caecum*	-	-	-	1	1	-	-	-	-	-	-	2	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	3	-	-	1	1	-	-	-	-	5	1	-	-	1	1	-	-

SDC	TaxonName	2					4					5					8					9					13					15					16					18					19					20					26				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
W0537	*Odostomia*	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
W0551	*Brachystomia*	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
W0721	*Calyptraea*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
W0725	*Crepidula*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-
W0770@	*Polinices*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	1	-	-	1	-	-	-	-	-	-
W0977	*Philine*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-
W1013	*Retusa*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
W1648	*Mytilidae*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-
W1649	*Mytilus (juv.)*	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-
W1649	*Mytilus*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
W1672	*Modiolus (juv.)*	-	-	1	-	1	1	-	3	2	-	-	-	3	-	1	-	-	1	-	1	1	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	-	1
W1808	*Pecten*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-
W1813	*Anomiidae*	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	2	-	1	1	-	2	1	1	2	-	2	-	3	-	1	1	2	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	1	6	2	-	1	-	-	3	-	3	-	1
W1884	*Kellia*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-
W1904	*Mysella*	1	-	2	-	1	1	-	1	2	-	1	2	8	4	5	-	-	-	-	-	8	-	2	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	1	-	-	-	-	-	-	-
W1943	*Astarte*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
W1952	*Goodallia*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	1	-	1	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
W1974	*Parvicardium*	-	-	-	1	1	-	-	-	-	-	1	1	-	2	1	1	-	1	2	5	2	-	-	1	1	-	1	-	1	-	1	-	-	-	-	-	-	-	-	-	1	1	1	-	-	2	-	-	-	-	1	1	1	2	2	-	1	-	1	-
W1986	*Laevicardium*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
W1990	*Cerastoderma*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-
W2002	*Spisula*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-
W2009	*Lutraria*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Tellina	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
W2049	*Arcopagia*	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	2	1	-	-	-	-	-	-	-	-	-	-	-
W2085	*Gari*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	2	2	3	-	-	-	1	-	1	-	-	-	1	-	-	-	-	-
W2101	*Abra*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
W2154	*Gouldia*	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
W2162	*Dosinia*	1	2	3	2	3	1	-	-	1	1	1	1	1	2	2	3	4	5	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	1	1	1	2	1	1	-	-	-	-	-	1	1	1	3	-
W2169	*Tapes*	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	2	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	1	-
W2192	*Clausinella*	4	2	-	3	4	2	1	-	1	-	1	2	3	1	-	6	3	2	-	2	1	2	1	2	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	2	1	-	-	-	-	-	-	-	-	1	-	3	-
W2200	*Timoclea*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
W2250	*Hiatella*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Y0160_97	*Scruparia*	-	-	-	-	-	-	-	-	-	-	-	P	-	-	P	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Y0175_97	*Electra*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	P	-	-	-	-	P	-	-
Y0255_97	*Bicellariella*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	P	-	-	-	-	-	-	-	P	-	-	-	-	-	-	-	-	-	-	-	-	-	P	-	P	-	-	-	-	-	-	-	-	-	-
Y0274_97	*Scrupocellaria*	-	-	-	-	-	P	-	-	-	P	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ZA0003_97	*Phoronis*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-
ZB0018_97	*ASTEROIDEA (juv.)*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ZB0105_97	*OPHIUROIDEA*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	1	-	-	-	-	-	-	-
ZB0123_97	*Ophiothrix*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	1	-	-	-	-	-	-	-	-
ZB0160_97	*Amphipholis*	-	5	4	21	3	1	2	2	5	1	14	8	8	29	-	14	20	4	12	13	2	1	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	8	-	-	1	4	4	-	1	-	1	3	2	-	-	3	-	-	-
ZB0166_97	*Ophiura*	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	2	-	-	-	1	4
ZB0192_97	*Psammechinus*	-	-	-	-	-	2	1	-	1	-	-	-	-	-	-	-	-	1	-	-	1	-	-	-	-	2	1	-	-	-	-	-	-	-	2	-	-	-	-	-	1	-	-	1	2	1	3	1	4	1	1	1	5	1	2	-	-	-	-	1
ZB0192_97	*Psammechinus (juv.)*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ZB0211_97	*Echinocyamus*	1	-	-	1	1	2	-	-	1	-	2	2	1	5	2	1	-	-	-	6	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8	8	9	2	4	1	3	7	-	5	4	6	7	9	9	1	2	2	2	7
ZB0273_97	*Ocnus*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ZB0291_97	*Leptosynapta*	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	1	5
ZD0087_97	*Ascidia*	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	-	-	-	-	-	-	-	-	-	-
ZD0146_97	*Molgula*	-	-	-	-	-	-	-	-	-	-	-	-	1	-	1	-	-	-	P	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	-	-	-	-	-	-
ZE0001_97@	*Branchiostoma*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

** DECAPODA (Type C, juv.) = Brachyura larvae*

APPENDIX 2 Results of SIMPER analyses for 2003 and 2004 data

1. SIMPER results for all repeat stations

Table 1.1 2004 SIMPER results

Species	Average Abundance	Average Similarity	Similarity/SD	Contribution%	Cumulative%
Psamathe	7.02	2.79	1.4	8.3	8.3
Pomatoceros	8.58	2.77	0.88	8.26	16.57
Sphaerosyllis	10.1	2.47	1.25	7.35	23.92
Leptocheirus	11.42	1.62	0.89	4.82	28.74
Polycirrus	3.95	1.57	1.16	4.69	33.43
Mediomastus	6.37	1.48	0.86	4.42	37.86
NEMATODA	3.78	1.35	0.92	4.02	41.87
Metaphoxus	4.12	1.32	0.93	3.92	45.8
Socarnes	5.33	1.31	0.8	3.9	49.7
Caprella	6.33	1.19	0.8	3.54	53.24
Jasmineira	3.97	0.96	0.73	2.85	56.09
Glycera	1.98	0.83	0.74	2.48	58.57
Pholoe	1.98	0.74	0.67	2.2	60.77
Leptochiton	1.95	0.73	0.68	2.18	62.94
Guernea	2.07	0.67	0.62	1.99	64.93
Amphipholis	3.33	0.65	0.54	1.95	66.88
Protodorvillea	1.27	0.59	0.57	1.77	68.65
Echinocyamus	2.03	0.54	0.56	1.6	70.25
Orchomene	2.18	0.52	0.55	1.56	71.81
Trypanosyllis	1.15	0.5	0.6	1.5	73.31

Table 1.2 2003 SIMPER results

Species	Average Abundance	Average Similarity	Similarity/SD	Contribution%	Cumulative%
HARPACTICOIDA	13.31	3.06	2.03	7.83	7.83
Sphaerosyllis	14.69	2.75	1.58	7.03	14.86
Socarnes	8.44	2.68	1.34	6.84	21.7
Guernea	7.67	2.14	1.38	5.48	27.18
Psamathe	4.47	2.05	1.5	5.23	32.41
Metaphoxus	3.31	2	2.5	5.12	37.52
Caprella	13.28	1.87	1.12	4.78	42.3
NEMATODA	7.06	1.38	0.8	3.52	45.83
Leptocheirus	6.11	1.33	0.85	3.4	49.23
Glycera	2.83	1.32	1.28	3.38	52.6
Mediomastus	8.78	1.18	0.78	3.02	55.62
Pomatoceros	6.47	1.15	0.82	2.93	58.55
Janira	3.72	1.04	0.84	2.65	61.2
Harmothoe	1.92	0.94	0.88	2.4	63.6
Vauntompsonia	2.94	0.86	0.66	2.19	65.8
Pholoe	3.83	0.77	0.74	1.96	67.76
Dosinia	2.22	0.7	0.7	1.78	69.54
Jasmineira	2.33	0.69	0.74	1.77	71.31
Pisione	2.08	0.62	0.58	1.59	72.9
Protodorvillea	1.94	0.6	0.63	1.52	74.43

2. SIMPER results for high extraction stations

Table 2.1 2004 SIMPER results

Species	Average Abundance	Average Similarity	Similarity/SD	Contribution%	Cumulative%
Pomatoceros	12.2	9.31	1.33	38.93	38.93
Socarnes	1.47	1.95	0.57	8.16	47.09
Psamathe	1.6	1.92	0.57	8.05	55.14
Sphaerosyllis	0.8	1.29	0.58	5.41	60.54
Leptocheirus	0.93	1	0.39	4.19	64.74
Protodorvillea	1	0.96	0.48	4.04	68.78
Polycirrus	0.47	0.69	0.4	2.91	71.68
Mediomastus	0.47	0.63	0.4	2.62	74.3
Caulleriella	0.33	0.5	0.32	2.08	76.38
Nematonereis	0.53	0.49	0.31	2.07	78.45
Anomiidae	0.6	0.46	0.31	1.93	80.38
Hydroides	0.67	0.43	0.32	1.78	82.15
Caprella	0.53	0.37	0.24	1.54	83.69
Terebellides	0.67	0.32	0.24	1.35	85.04
Corophium	0.33	0.31	0.24	1.3	86.34
Pista	0.33	0.29	0.24	1.19	87.53
NEMATODA	0.53	0.25	0.24	1.05	88.58
Eumida	0.27	0.25	0.24	1.03	89.6
Metaphoxus	0.33	0.24	0.24	1	90.6

Table 2.2 2003 SIMPER results

Species	Average Abundance	Average Similarity	Similarity/SD	Contribution%	Cumulative%
HARPACTICOIDA	**25.86**	**4.53**	**2.18**	**11.5**	**11.5**
Socarnes	**16**	**2.18**	**1.32**	**5.53**	**17.03**
Caprella	**12.14**	**2.04**	**1.13**	**5.18**	**22.21**
Leptocheirus	**6.57**	**1.92**	**1.33**	**4.87**	**27.08**
Metaphoxus	**4.29**	**1.9**	**3.36**	**4.83**	**31.92**
Parvicardium	**2.14**	**1.83**	**2.07**	**4.64**	**36.56**
Glycera	**2.57**	**1.47**	**1.42**	**3.73**	**40.29**
Sphaerosyllis	**4**	**1.46**	**1.45**	**3.71**	**44**
Guernea	**6.29**	**1.36**	**0.9**	**3.46**	**47.46**
Aonides	**4.71**	**1.19**	**0.9**	**3.02**	**50.49**
Polycirrus	**3.14**	**1.14**	**1.32**	**2.9**	**53.39**
Pista	**6.71**	**1.02**	**0.79**	**2.58**	**55.97**
OSTRACODA	**2.71**	**0.96**	**0.86**	**2.43**	**58.4**
Pomatoceros	**8.43**	**0.96**	**0.74**	**2.43**	**60.83**
Mysella	**2.14**	**0.89**	**1.42**	**2.25**	**63.08**
Caulleriella	**1.43**	**0.88**	**1.39**	**2.24**	**65.32**
Psamathe	**3.14**	**0.87**	**0.83**	**2.2**	**67.52**
Harmothoe	**2.71**	**0.84**	**0.85**	**2.13**	**69.65**
Pusillina	**3**	**0.8**	**0.52**	**2.02**	**71.67**
Vauntompsonia	**6.43**	**0.8**	**0.61**	**2.02**	**73.7**

3. SIMPER results for No-take zone sites

Table 3.1 2004 SIMPER results

Species	Average Abundance	Average Similarity	Similarity/SD	Contribution %	Cumulative%
Jasmineira	11.73	4.06	1.32	9.24	9.24
Psamathe	10.2	4.05	2.1	9.22	18.46
Polycirrus	10.27	3.84	2	8.74	27.2
Sphaerosyllis	8.93	3.05	1.75	6.95	34.15
Leptocheirus	13.2	2.63	1.14	5.98	40.14
Pomatoceros	15.4	2.42	0.96	5.5	45.64
Caprella	14.13	2.09	0.94	4.77	50.41
Echinocyamus	5.47	1.99	1.24	4.52	54.93
Metaphoxus	6.93	1.93	1.3	4.39	59.33
Glycera	4.93	1.64	1.29	3.73	63.06
Pista	4	1.63	1.72	3.71	66.77
Mediomastus	5.93	1.31	0.57	2.98	69.75
Leptochiton	4	1.13	0.97	2.58	72.33
NEMATODA	4.33	0.98	0.89	2.23	74.57
Socarnes	10.87	0.79	0.7	1.79	76.36
Guernea	3.6	0.71	0.69	1.61	77.97
Harmothoe	2.53	0.7	1.11	1.6	79.58
HARPACTICOIDA	3.27	0.53	0.72	1.2	80.77
Trypanosyllis	1.53	0.52	1.32	1.19	81.97
Lumbrineris	2.13	0.46	0.81	1.05	83.01

Table 3.2 2003 SIMPER results

Species	Average Abundance	Average Similarity	Similarity/SD	Contribution%	Cumulative%
Socarnes	7.93	4.41	1.28	12.44	12.44
HARPACTICOIDA	14.2	3.82	1.3	10.77	23.21
Sphaerosyllis	8.47	2.67	1.45	7.53	30.74
Psamathe	4.27	2.03	1.48	5.73	36.47
Caprella	6.33	1.7	1.1	4.8	41.26
Vauntompsonia	3.4	1.6	1.13	4.5	45.76
Pusillina	8.93	1.48	0.43	4.16	49.92
Guernea	3.47	1.4	1.64	3.95	53.87
Mediomastus	8.13	1.32	0.52	3.73	57.6
Janira	3.6	1.3	0.99	3.68	61.27
Pomatoceros	3.4	1.25	0.69	3.53	64.8
Harmothoe	2.4	1.24	1.04	3.49	68.29
Metaphoxus	2	1.07	1.49	3.03	71.32
Glycera	3.87	1.06	1.02	2.98	74.3
Protodorvillea	3.4	0.85	0.7	2.39	76.69
Leptocheirus	2.73	0.81	0.65	2.29	78.97
Pholoe	2.8	0.67	0.83	1.89	80.86
NEMATODA	3.53	0.64	0.46	1.8	82.66
Pista	1.93	0.59	0.88	1.66	84.33
Pisione	2.27	0.47	0.48	1.34	85.66

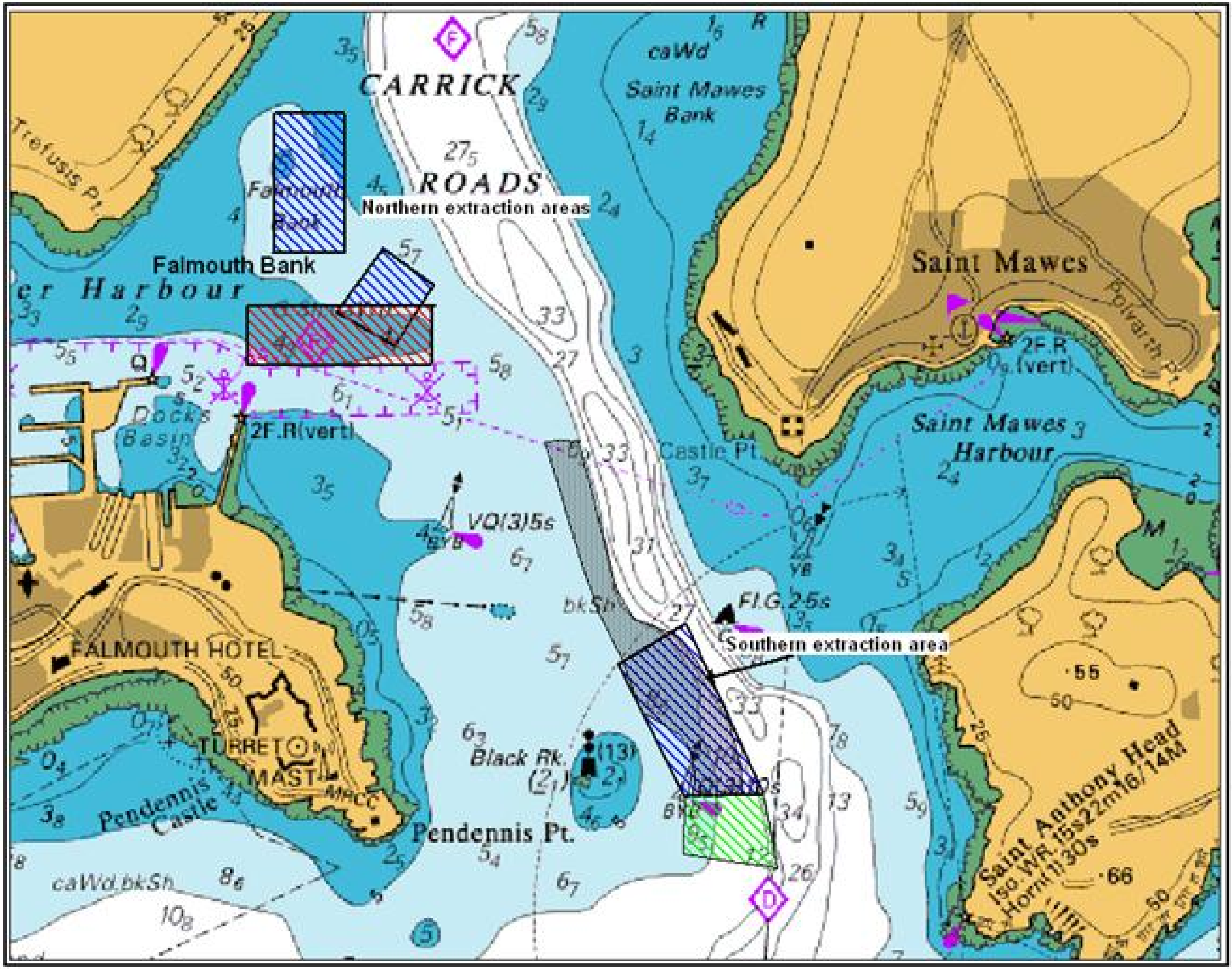
4 Reference stations

Table 4.1 2004 SIMPER results

Species	Average Abundance	Average Similarity	Similarity/SD	Contribution%	Cumulative%
Mediomastus	14.2	4.17	2.12	9.22	9.22
Leptocheirus	11.4	2.95	2.14	6.52	15.74
Sphaerosyllis	20.73	2.89	1.19	6.39	22.13
Psamathe	6.47	2.69	1.8	5.95	28.07
Pholoe	2.87	2.03	2.98	4.47	32.55
Pomatoceros	5.07	1.9	1.1	4.19	36.73
Socarnes	4.87	1.83	1.38	4.05	40.78
NEMATODA	6.27	1.82	1.41	4.01	44.78
Polycirrus	2.53	1.64	1.51	3.61	48.4
Metaphoxus	3.53	1.53	1.05	3.37	51.76
OSTRACODA	3.73	1.28	0.79	2.82	54.59
Glycera	1.6	1.25	1.2	2.77	57.36
Caprella	3.8	1.2	0.87	2.66	60.01
Protodorvillea	1.67	1.16	1.12	2.57	62.58
Megalomma	2	1.16	0.94	2.57	65.15
Jasmineira	1.6	0.91	0.81	2	67.15
Leptochiton	1.27	0.84	0.8	1.86	69.01
Guernea	1.87	0.78	0.69	1.73	70.74
Maera	1.53	0.77	0.79	1.71	72.45
Tetrastemma	1.53	0.77	0.66	1.69	74.14

Table 4.2 2003 SIMPER results

Species	Average Abundance	Average Similarity	Similarity/SD	Contribution%	Cumulative%
Sphaerosyllis	30.64	3.32	1.25	7.81	7.81
NEMATODA	15.18	2.95	1.6	6.95	14.77
Guernea	14.09	2.47	1.05	5.83	20.59
Metaphoxus	4.27	2.36	4.26	5.56	26.15
HARPACTICOIDA	5.82	2.25	2.54	5.3	31.45
Leptocheirus	11.91	1.81	0.93	4.28	35.73
Psamathe	5.09	1.8	1.22	4.24	39.97
Mediomastus	15.73	1.75	0.89	4.12	44.1
Socarnes	6	1.68	0.93	3.96	48.06
Mysella	3.45	1.61	1.81	3.81	51.86
Dosinia	3.27	1.59	1.72	3.75	55.62
Pomatoceros	11.18	1.36	1.18	3.22	58.83
Caprella	25.18	1.31	0.69	3.08	61.91
Janira	5.73	0.95	0.73	2.24	64.16
Caecum	5.27	0.87	0.83	2.05	66.2
Glycera	1.91	0.86	0.92	2.02	68.22
Amphipholis	4.36	0.85	0.87	1.99	70.22
ISOPODA	1.64	0.83	0.73	1.96	72.18
Stenothoe	4.73	0.82	0.46	1.93	74.1
Skenea	2.27	0.73	0.74	1.71	75.81



Key:

Area licensed for extraction Jan 2004 to July 2004

No-take zone No extraction since July 2003

Area extracted by OCSC July 2003 to Jan. 2004

Extraction area licensed from 3rd Sept 04

Source:

Title:
Maerl extraction areas since July 2003

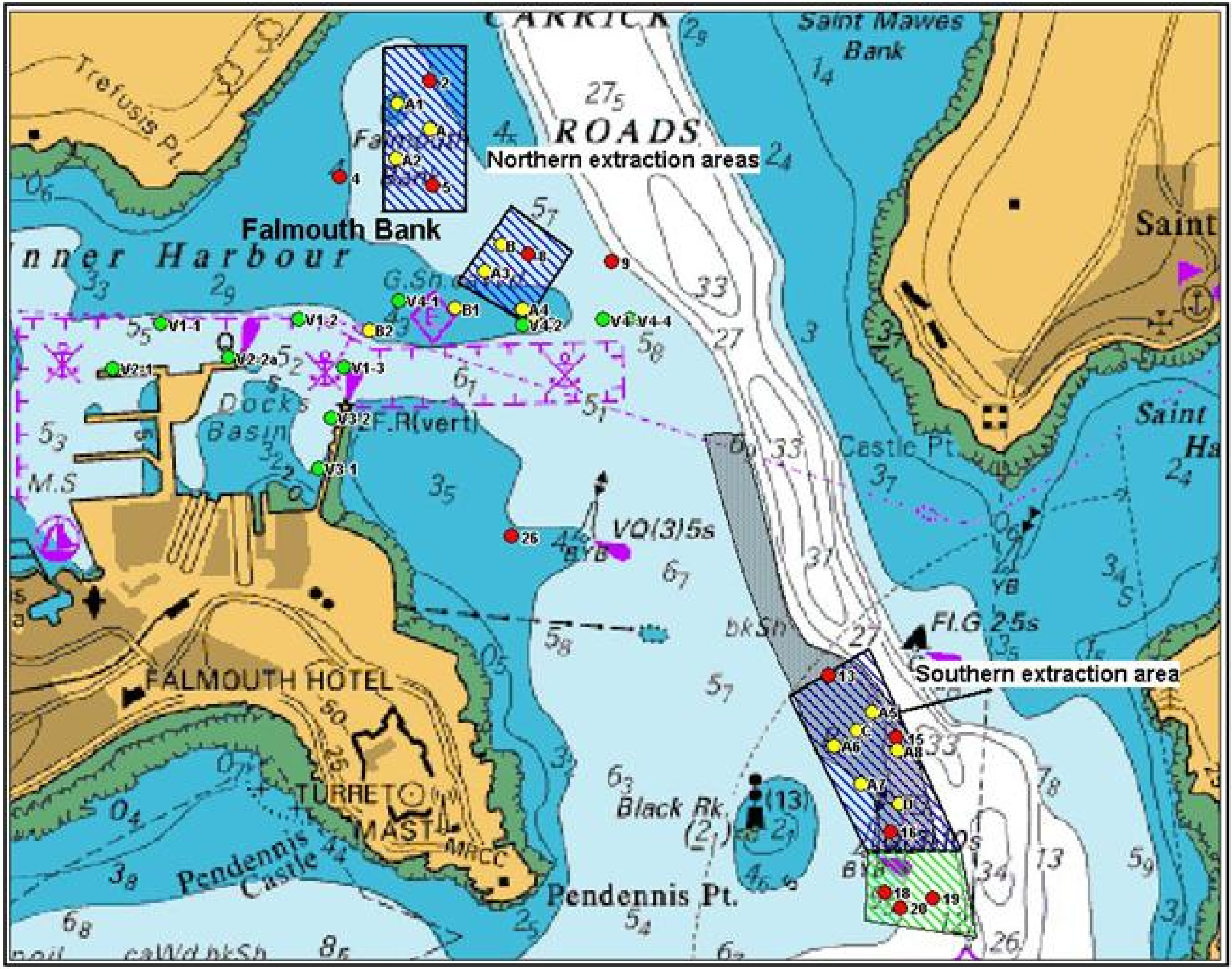
Project:
Fal maerl extraction

Client:
Falmouth Harbour Commissioners

Date:	Scale:
Oct 04	NTS

Figure: 1.1

ROYAL HASKONING
POSFORD HASKONING



Key

Area licensed for extraction Jan 2004 to July 2004

No-take zone No extraction since July 2003

Area extracted by CCSC July 2003 to Jan. 2004

Sampling stations Airlift sampling only

Sampling stations Biological sampling and airlift sampling

Vibrocore stations

Title:
2004 sampling stations

Project:
Fal maerl extraction

Client:
Falmouth Harbour Commissioners

Date:
Oct 04

Scale:
NTS

Figure: 2.1

ROYAL HASKONING
POSFORD HASKONING