



**BEQUALM
NATIONAL MARINE BIOLOGICAL
ANALYTICAL QUALITY CONTROL SCHEME
Annual Report - Year 17 - 2010/2011**

A report prepared by the NMBAQC Coordinating Committee – December 2012

Table of Contents

1	Scheme Review.....	1
2	Invertebrate component	1
2.1	Summary of activities.....	1
2.2	Summary of exercise results	2
2.3	Taxonomic literature	4
3	Particle Size Analysis Component.....	4
3.1	Summary of activities.....	4
3.2	Summary of results.....	5
4	Fish component.....	6
4.1	Summary of activities and results	6
4.2	Phytoplankton component.....	7
4.3	Summary of activities.....	7
4.4	Summary of results.....	8
5	Epibiota component	8
5.1	Summary of activities.....	9
5.2	Recommendations	9
	Appendix 1 - NMBAQC Co-ordinating Committee – Year 17 - 2010/2011	10
	Appendix 2 - NMBAQC scheme participation for Year 17	11
	Appendix 3 - BEQUALM/NMBAQC Scheme Taxonomic Expert Workshop.....	13

The Year 17 Annual Report provides synopsis of the scheme year's activities over 2010/2011. Detailed information about each of the scheme components is now available as separate reports or bulletins on the scheme's website. The relevant documents are all cited here and the reader is directed via hyperlinks to the NMBAQC website as appropriate.

The NMBAQC coordinating committee held four meetings during the scheme Year 17: on 13th April 2010, 29th June 2010, 23rd September 2010 and 13th January 2011. The minutes from these committee meetings are now available on the [NMBAQC website](#).

Committee Membership for Year 17 is shown in Appendix 1.

1 Scheme Review

The seventeenth year (2010/2011) of the scheme followed the format of the sixteenth year. The scope of the NMBAQC scheme continued to develop in Year 17 to encompass the requirement to provide quality assurance for assessments under the Water Framework Directive (WFD), for which monitoring commenced in the UK in 2007. The scheme still maintains its role to provide Analytical Quality Control for Invertebrate and Particle Size data collected for UK CSEMP (Clean Seas Environment Monitoring Programme – formerly the NMMP). Under the UK Marine Monitoring and Assessment Strategy (UKMMAS) the NMBAQC coordinating committee now reports to the Healthy and Biologically Diverse Seas Evidence Group HBDSEG. In Yr 17 the NMBAQC agreed their [Terms of Reference](#) with HBDSEG.

Year 17 of the scheme involved training and testing exercises for the Invertebrate, Particle Size, Macroalgae and Phytoplankton components as in previous years. This year the annual Invertebrate component workshop involved a five-day experts' taxonomic workshop at the Dove Marine Laboratory in Cullercoats. The scheme produced some new taxonomic guides for in Year 17 for scaleworms and opheliid polychaetes (see page 4 of this report).

The NMBAQC continued to maintain their webpage which introduces a [Quality Assurance](#) system for marine biological monitoring, and includes a paper outlining the QA system that all agencies, their contractors, partners and data providers are expected to adhere to (for European directives: WFD, MSFD and OSPAR).

The participation level in the NMBAQC was very similar in Year 17 compared to Year 16 with a total of 53 organisations involved in its training and testing exercises (see Appendix 2, pages 10 and 11).

Summaries of all the component activities are provided below:

2 Invertebrate component

Contract Manager: Myles O' Reilly, SEPA

Component Administrator: David Hall, Thomson Unicmarine Ltd

2.1 Summary of activities

The seventeenth year of the Scheme (2010/11) involved a series of four modules under the Invertebrate component:

- Invertebrate Ring Test identification (RT39 and RT40) training exercise.
Two sets of twenty-five specimens of benthic invertebrates (RT39 general invertebrate ring test, RT 40 'Targeted Beginners' Training Pack specimens', taxa without errors from previous ring tests) supplied for identification by participating laboratories.
- Macrobenthic invertebrate sample analysis (MB18; artificial estuarine samples) training exercise. One macrobenthic sample, supplied by the contractor, for full laboratory processing (extraction, enumeration and biomass).
- Laboratory Reference (LR15) training exercise.
Participating laboratories submitted twenty-five benthic invertebrate specimens for re-examination by the contractor. The specimens could be either voucher material from their reference collection for confirmation or difficult/problematic taxa about which they are unsure.
- Own Sample (OS44, OS45 and OS46) reanalysis testing exercise, with pass/fail flag for Clean Seas Environment Monitoring Programme (CSEMP, formerly UK NMMP laboratories).
Participating laboratories were requested to send the contractor their benthic invertebrate data matrices from which three samples were selected. The three chosen samples were submitted and were reanalysed by the contractor. Each 'Own Sample' was assessed on the efficiency of extraction, identification, enumeration and biomass.

An Invertebrate Taxonomic Workshop was held at the Dove Marine Laboratory, Cullercoats, between 15th and 19th November 2010. This workshop was tailored for experts. Please see Appendix 3 (page 12 of this report) for the workshop timetable.

2.2 Summary of exercise results

Forty laboratories participated in the benthic invertebrate component of the NMBAQC Scheme in Year 17 (see Appendix 2). Fifteen participants were Competent Monitoring Authorities (CMAs); twenty-five were private consultancies. Two of the participants were consortia of sole traders. Fourteen of the CMA participants were responsible for CSEMP (Clean Seas Environment Monitoring Programme) sample analysis (excluding subcontracted samples). A summary of the overall NMBAQC participation levels is shown in Appendix 2 (pages 10 and 11 of this report).

The average value of the Own Sample (OS44, OS45 and OS46) Bray-Curtis similarity index (between the participating laboratory and the contractor) was 94.4%. Fourteen samples from nine laboratories achieved a similarity value of less than 90%. Eighteen samples produced a similarity value of 100%; these were submitted by eleven different laboratories. These figures are generally in line with those from previous OS exercises (see Table 6; Own Sample Module Summary Report – OS44, 45 & 46). For the OS exercise the majority of laboratories are considered to have met or exceeded the required standard for three of the OS targets - the enumeration of taxa and individuals and the Bray-Curtis comparison. Overall 97% of the comparisons were considered to have passed the enumeration of taxa standard; 96% exceeded the enumeration of individuals

standard and 86% passed the Bray-Curtis comparison standard. Eleven of the ninety-nine applicable samples are flagged as 'Fail - Bad'; three are flagged as 'Fail - Poor'; eight are flagged as 'Pass - Acceptable'; fifty-nine are flagged as 'Pass - Good'; and eighteen are flagged as 'Pass - Excellent' for achieving 100% Bray-Curtis similarity indices. All the laboratories with 'Poor' or 'Bad' sample flags have been provided with specific recommendations of remedial actions to quality assure their Own Sample data sets.

Of the training exercises, the Macroinvertebrate exercise MB18 posed similar problems to previous MB tests: some problems associated with sample processing methods (faunal extraction, identification of the taxa and determination of biomass).

The ring test RT39 had generally good agreement at the generic level but the agreement at the specific level was generally poor. The bulk of the errors recorded could be attributed to six specimens. *Leptochiton cancellatus* (medium, good specimen), *Jasmineira caudata* (medium, poor specimen), *Musculus discors* (small, good specimen), *Axinulus croulinensis* (small, good specimen), *Lekanesphaera levii* (medium, good specimen) and *Pusillina inconspicua* (medium, good / fair specimen) accounted for a total of 45% of all generic and 56% of all the specific differences recorded. One of these specimens, *Lekanesphaera levii*, was incorrectly identified at species level by all except six participants, however just five generic errors were recorded. None of the twenty-five circulated specimens were correctly identified by all participating laboratories. Further details on RT39 can be found in the Ring Test Bulletin ([RTB#39](#)).

The 'targeted' ring test (RT40 – 'Beginners' Training Pack') had fairly good agreement at the generic level but the agreement at the specific level was generally poor. The bulk of the errors recorded could be attributed to six specimens. *Gibbula pennanti* (medium, good specimen), *Barleeia unifasciata* (medium, good specimen), *Potamopyrgus antipodarum* (small / medium, good / fair specimen), *Tubificoides heterochaetus* (medium, fair specimen), *Ensis directus* (large, good specimen) and *Thyasira equalis* (medium, fair specimen) accounted for a total of 40% of all generic and 54% of all the specific differences recorded. Two of the twenty-five circulated specimens were correctly identified by all participating laboratories; these specimens were *Sternaspis scutata* (small, good specimen) and *Apocorophium lacustre* (medium, female, fair specimen). Further details on RT40 can be found in the Ring Test Bulletin ([RTB#40](#)).

The Laboratory Reference (LR) exercise did not reveal any clear problem areas, however there were differences in the approach to this exercise by the individual laboratories (some laboratories used this to confirm voucher specimens whilst others sought a means of having 'unknowns' identified).

More detailed information on these exercises can be found in the contractors report below. Among the recommendations highlighted by the contractor is the need for NMBAQC to develop standard protocols detailing the processing requirements for macroinvertebrate samples and for participants to utilise the NMBAQC's UK Standard Taxonomic Literature List database to minimise the differences in literature used for identification of invertebrates.

Year 17 Invertebrate Component Annual Report:

[Hall, D., 2012. Benthic Invertebrate component - Report from the contractor. Scheme Operation - Year 17 2010/11. A report to the NMBAQC Scheme co-ordinating committee. 37pp, September 2012.](#)

Year 17 Own Sample Report:

[Own Sample Module Summary Report OS44, 45 & 46 - September 2012](#)

Hall, D.J., 2012. National Marine Biological Analytical Quality Control Scheme. Own Sample Module Interim Summary Report OS44, 45 & 46. Report to the NMBAQC Scheme participants. 25pp, September 2012.

Year 17 Ring Test Bulletins

[RTB 40 - October 2011](#) Hall, D.J., Taylor, J.G. and Worsfold, T.M., 2011. National Marine Biological Analytical Quality Control Scheme. Ring Test Bulletin: RTB#40. Report to the NMBAQC Scheme participants. Unicmarine Report NMBAQCrtb#40, 33pp, October 2011.

[RTB 39 - December 2009](#) Hall, D.J. and Worsfold, T.M., 2011. National Marine Biological Analytical Quality Control Scheme. Ring Test Bulletin: RTB#39. Report to the NMBAQC Scheme participants. Unicmarine Report NMBAQCrtb#39, 41pp, June 2010.

Year 17 Macrobenthic Exercise Report

[MB 18 - June 2011](#)

[Kazubek, M. and Hall, D.J., 2011. National Marine Biological Analytical Quality Control Scheme. Macrobenthic Exercise Results - MB18. Report to the NMBAQC Scheme participants. 24pp, June 2011.](#)

2.3 Taxonomic literature

The following taxonomic guides were produced through the NMBAQC in Year 17:

[*Identification of Scale Worms in British and Irish waters, 2011*](#)

Barnich, R. 2011. Identification of scale worms in British and Irish waters. NMBAQC 2010 taxonomic workshop, Dove Marine Laboratory. 52pp, February 2011

[*Opheliidae \(Polychaete\), a Provisional Guide to the family, 2010*](#)

Rowe, G. A. 2010. A Provisional Guide to the family Opheliidae (Polychaeta) from the shallow waters of the British Isles. Report to the NMBAQC 2008 taxonomic workshop participants - Dove Marine Laboratory. EMU Report, 12pp, June 2010

3 Particle Size Analysis Component

Contract Manager: Myles O' Reilly, SEPA

Component Administrator: David Hall, Thomson Unicmarine Ltd

3.1 Summary of activities

The seventeenth year of the Scheme (2010/11) followed the format of the sixteenth year. A total of four exercises were distributed:

- Particle Size Analysis (PS36, PS37, PS38 and PS39) testing exercises, with pass/fail flag for UK CSEMP (NMMP) laboratories.
Two marine sediment samples (one coarse the other much finer) supplied to participating laboratories for Particle Size Analysis.

Following a workshop held in 2009 at Cefas, Lowestoft on current PSA methods used by UK labs, Claire Mason (Cefas) began drafting a best practice guidance document for 'PSA for Supporting Biological Analysis' which was completed in November 2011 ([see report on the NMBAQC web site](#)).

3.2 Summary of results

In Year 17, twelve laboratories participated in the particle size analysis exercises PS36 and PS37; five were government laboratories; seven were private consultancies. Five of the participants were responsible for CSEMP (Clean Seas Environment Monitoring Programme) sample analysis. Nine laboratories participated in exercises PS38 and PS39; five were government laboratories; four were private consultancies. Five of the participants were responsible for CSEMP sample analysis.

To reduce potential errors and simplify administration, LabCodes were assigned in a single series for all laboratories participating in the benthic invertebrates, fish and particle size components of the NMBAQC Scheme (as Thomson Unicmarine administered all three components). A summary of the overall NMBAQC participation levels in Year 17 is shown in Appendix 2 (pages 11 and 12).

The Particle Size module examined the percentage of sediment found in each half-phi interval from the particle size analysis of replicate sediment samples. The Particle Size testing exercise, PS36 (sandy mud sediment sample) resulted in a general similarity in distribution curves, except for one lab who provided data in a different format and pre-treated the sample with hydrogen peroxide, which resulted in a 75.63% silt /clay, much higher than the average %silt/clay value.

PS37 (sand sediment sample) resulted in ten 'fail' and forty-five 'pass' flags; six of these fails, produced by three of the five participants that did not record a gravel component in their results. The derived statistic for %silt/clay ranged from 0.00% to 1.29%, excluding data from the replicate analyses produced by Plymouth University, Geography Department (Malvern Mastersizer 2000).

There was very good agreement for PS38 (artificial gravel sediment) between the results from the analysis of replicates and those from the participating laboratories. The derived statistic for the % silt/clay was 0% for all laboratories.

With regards to PS39 (gravelly muddy sand sediment) there was a fair amount of variation between the results from analysis of replicates and those from the participating laboratories. The derived statistic for the % silt/clay ranged from 13.20% to 52.06%, excluding data from the replicate analyses produced by Thomson Unicmarine (Malvern Mastersizer 2000).

More detailed information on these exercises can be found in the contractors report below. Among the recommendations highlighted by the contractor is the need for the participating laboratories to clearly describe the analytical methods, including pre-treatment, and equipment used.

Particle Size component Annual Report:

[Hall, D.J., and Finbow, L.A. 2012. Particle Size component - Report from the contractor.](#) Scheme Operation–Year 17 – 2010/11. A report to the NMBAQC Scheme participants. 15 pp, April 2012.

Particle Size Reports:

[PS36](#) - Finbow, L.A. and Hall, D.J., 2011. National Marine Biological Analytical Quality Control Scheme. Particle Size Results: PS36. Report to the NMBAQC Scheme participants. Thomson Unicmarine Report NMBAQCps36, 37pp, May 2011.

[PS37](#)- Finbow, L.A. and Hall, D.J., 2011. National Marine Biological Analytical Quality Control Scheme. Particle Size Results: PS37. Report to the NMBAQC Scheme participants. Thomson Unicmarine Report NMBAQCps37, 35pp, May 2011.

[PS38](#) - Finbow, L.A. and Hall, D.J., 2011. National Marine Biological Analytical Quality Control Scheme. Particle Size Results: PS38. Report to the NMBAQC Scheme participants. Thomson Unicmarine Report NMBAQCps38, 46pp, July 2011.

[PS39](#) - Finbow, L.A. and Hall, D.J., 2011. National Marine Biological Analytical Quality Control Scheme. Particle Size Results: PS39. Report to the NMBAQC Scheme participants. Thomson Unicmarine Report NMBAQCps39, 31pp, July 2011.

4 Fish component

Contract Manager: Steve Coates, Environment Agency

Component Administrator: David Hall, Thomson Unicmarine Ltd

4.1 Summary of activities and results

The seventeenth year of the Scheme (2010/11) followed the format of the sixteenth year. Twenty-four laboratories participated in the fish component in year 17 of which 20 were government laboratories and four private consultancies. The component consisted of two modules, each with a single exercise: re-identification of a set of fifteen fish specimens supplied by each of the participating laboratories (Fish Reverse Ring Test module F_RRT02) and identification of one set of fifteen fish specimens (Fish Ring Test module F_RT04). One potential problem highlighted by the Fish Reverse Ring Test concerned the identification of juvenile grey Mulletts, with over one third of the submissions of this taxon incorrectly identified. Other recurring errors were noted for Gobies (several species) and Lesser Pipefish. However, there were differences in the approach to this exercise by the individual laboratories; some laboratories used this as a test for

confirming voucher specimens whilst others sought a means of having uncertain or 'unknowns' identified making it difficult to directly compare results. The Fish Ring Test produced good agreement between the identifications made by the participating laboratories and those made by Thomson Unicmarine Ltd. On average, each laboratory recorded 1.6 generic errors and 2.1 specific errors. Three specimens were responsible for 62% of all generic and 48% of specific errors recorded.

There was also one unofficial trial module, with one exercise: identification of one set of photographs of fifteen fish specimens (Environment Agency Photo Fish Ring Test module); this exercise was essentially an 'image only' version of the standard ring test (F_RT04) and ran in parallel for Environment Agency staff only. The results of this exercise have not been officially reported, as agreed with the NMBAQC Coordinating Committee.

Among the recommendations highlighted by the contractor is the need for the participants to inform Thomson Unicmarine of difficult taxa that they would like to be 'Ring Tested'. Participants are also invited to submit specimens for use in such exercises (approximately 20 specimens of equal size and condition would be required for inclusion).

More detailed information on this exercise can be found in the contractor's report below.

Fish component Annual Report:

[Taylor, J.G. and Hall, D.J, 2011. Fish component - Report from the contractor.](#) Scheme Operation - Year 17 - 2010/11. A report to the NMBAQC Scheme participants. 14pp, July 2011.

Reverse Fish Ring Test Bulletin:

[F-RRT 02](#) – January 2011 Taylor, J.G and Hall, D.J, 2011. National Marine Biological Analytical Quality Control Scheme. Fish Reverse Ring Test Bulletin: F-RRT02. Report to the NMBAQC Scheme participants. Thomson Unicmarine Report NMBAQCf-rrt02, 22pp, January 2011.

Fish Ring Test Bulletin

[FRT 04](#)- June 2011 Taylor, J.G and Hall, D.J, 2011. National Marine Biological Analytical Quality Control Scheme. Fish Ring Test Bulletin: FRT#04. Report to the NMBAQC Scheme participants. Thomson Unicmarine Report NMBAQCfrtb#04, 14pp, June 2011.

4.2 Phytoplankton component

Scheme Administrator: Joe Silke, Marine Institute, Galway, Ireland. Registration and fee collecting arranged through BEQUALM Website (based at CEFAS Lab, Lowestoft).

4.3 Summary of activities

The Phytoplankton inter-comparison exercise comprised of two exercises (enumeration and identification) and one workshop:

- Enumeration of cells exercise: In 2010, six seawater samples was designed to be solely a counting exercise, so no identification of the spiked culture material was

needed as in the previous exercise in 2009. In this exercise one species *Scrippsiella* spp. an armoured Dinoflagellate was spiked in the samples at two different cell concentrations and in triplicates. All analysts received 6 samples for this part of the exercise. There were 3 replicate counts for each cell concentration. One cell concentration was low and the other high.

- Identification exercise: custom-made from ‘scratch’ and comprises 8 questions and 300 marks. The exercise uses photographs and line drawings of marine phytoplankton species. The exercise is biased towards Diatoms, Dinoflagellates and toxic/harmful phytoplankton species. The pass mark for the exercise was set at 70%.
- Taxonomic quiz: a repeat of the exercise from 2008.
- Workshop: the BEQUALM workshop was held on the 27th of May 2010 at INTECMAR in Vilaxoan, Pontevedra, Galicia, Spain. Presentations were by Rafael Salas, the guest speaker Dr. Santiago Fraga IEO (Instituto Español de Oceanografía) on ‘Species Concept on HABs monitoring’. Dr. Yolanda Pazos from INTECMAR showed a poster by MIDTAL (Microarrays for the detection of toxic algae).

4.4 Summary of results

In Year 17, there was a total of 39 analysts from 21 laboratories mostly from Europe (from the UK, Ireland, Holland, Croatia, Sweden, Germany and Spain) but also two laboratories from South America (see Appendix 2).

The identification exercise showed good repeatability between participants, the Galway laboratory and the ‘Galway Gold Standard’. All analysts achieved over 90% overall score. The mean of correct answers for the questions on diatoms was slightly better than the questions on armoured dinoflagellates. The results of the enumeration exercise suggest that there are significant differences in the mean concentration between 10 and 25ml sub-sample volumes and between TR (transect counts) and WC (whole chamber counts) counting strategies. However, all analysts performed within the mean +/- 3 SD of all the results, both for the low and high-density samples. To avoid methodology effects caused by factors like counting strategies, guidelines should be given as to which counting strategy should be used depending on cell concentrations. Perhaps for high cell concentrations fields of view or transect counts should be used instead of whole chamber cell counts.

More detailed information on this exercise can be found in the following contractor report:

Phytoplankton Enumeration and Identification Ring Test

[Salas, R.G., 2010. Phytoplankton enumeration and identification analysis.](#) Ring Test PHY-ICN-10-MI1 Exercise Report. 76pp.

5 Epibiota component

Contract Manager: Matt Service, AFBI

Component Administrator: Ian Sotheran, Envision Mapping

5.1 Summary of activities

In January 2010, a questionnaire was sent out to 32 organisations known to be involved in subtidal epibiota video/stills work in the UK. In June 2010, Prue Addison wrote a [summary report](#) of the results of the questionnaire which can be found on the NBMAQC web site.

5.2 Recommendations

The recommendation from the results of the questionnaire is that there is a need to standardise (or set minimum standards for) certain aspects of video and still image analysis techniques in the UK, as no national or international standards currently exist for this aspect of video work.

Appendix 1 - NMBAQC Co-ordinating Committee – Year 17 - 2010/2011

Name	Organisation	Position
Tim Mackie	Environment & Heritage Service, NI	Chair
Amanda Prior	Environment Agency	Finance Manager
Prue Addison	Environment Agency / Joint Nature Conservation Committee	Technical Secretary
Myles O'Reilly	Scottish Environment Protection Agency	Invertebrate Contract Manager
Steve Coates	Environment Agency	Fish Contract Manager
Joe Silke	Marine Institute, Ireland	Phytoplankton Contract Manager
Clare Scanlan	Scottish Environment Protection Agency	Macroalgae Contract Manager
Carol Milner	APEM Ltd	Contractors Representative
Matt Service	Agri-Food and Biosciences Institute, NI	CMA Representative
Keith Cooper	Centre for Environment, Fisheries & Aquaculture Science	CMA Representative
David Hall	Thomson Unicomarine Ltd	Invertebrate, Particle Size and Fish Components Administrator

Appendix 2 - NMBAQC scheme participation for Year 17

	ORGANISATION	Invertebrate	PSA	Fish	Macroalgae	Phytoplankton
1	Agri-Food and Biosciences Institute	✓	✓	✓	✓	
2	APEM Ltd	✓		✓	✓	✓
3	Benthic Solutions Ltd	✓	✓			
4	Biotikos	✓				
5	Centre for Environment, Fisheries & Aquaculture Science	✓	✓	✓	✓	✓
6	Centro Balear de Biologia					✓
7	CMACS Ltd	✓	✓			
8	Countryside Council for Wales	✓			✓	
9	Dept of Botany, Thessaloniki					✓
10	Ecospan Environmental Ltd	✓				
11	EMU Ltd.	✓	✓	✓		
12	Environment Agency	✓	✓	✓	✓	
13	ERT (Scotland) Ltd	✓	✓	✓	✓	
14	Fisheries and Aquatic Ecosystems Branch					✓
15	Fish Vet Group	✓				
16	Fugro	✓		✓		
17	Gardline Environmental	✓	✓			
18	Grontmij / AquaSense	✓				
19	Hebog Environmental Ltd	✓				
20	Herriot Watt					
21	Hunter Biological	✓				
22	ILVO (Institute for Agricultural and Fisheries Research)	✓				
23	Institute of Aquaculture	✓				
24	Institute of Estuarine and Coastal Studies, University of Hull	✓	✓	✓	✓	
25	IMARES Benthos team	✓				✓
26	INTECMAR					✓
27	IRTA					✓
28	Isle of Man Government Laboratory					✓
29	IZOR					✓
30	Jacobs Engineering UK Ltd	✓				
31	Joint Nature Conservation Committee	Membership only				
32	Koeman en Bijkerk bv, The Netherlands					✓
33	LCCRRPP					✓
34	LVCC Palmones.	✓				✓

	Cadiz, Spain						
35	Marine Ecological Invertebrate Services and Myriad Taxonomy	✓					
36	Marine Ecological Surveys Ltd.		✓			✓	
37	Marine Farm Services, Shetland Seafood Quality Council (SSQC)		✓				
38	Marine Institute, Ireland						✓
39	Marine Scotland - Science (formerly Fisheries Research Services)		✓		✓		✓
40	Monitor Taskforce, Netherlands Institute of Ecology		✓				
41	National University of Ireland (Martin Ryan Marine Science Institute - Benthic Ecology Unit)		✓		✓		
42	Netherlands Institute of Ecology		✓				
43	Northern Ireland Environment Agency		✓		✓	✓	✓
44	Precision Marine Survey Ltd		✓				
45	Sampling & Collection/Analysis & Reporting					✓	
46	Scottish Association for Marine Science						✓
47	Scottish Natural Heritage		Membership Only				
48	Scottish Environment Protection Agency		✓		✓		✓
49	South Downs Area					✓	
50	Unicomarine Ltd		Contract Administrator		Contract Administrator	Contract Administrator	
51	University of Plymouth						
52	University of St Andrews (SERG:ES)		✓				
53	University of Stirling		✓				

Appendix 3 - BEQUALM/NMBAQC Scheme Taxonomic Expert Workshop

15th-19th November 2010, Dove Marine Laboratory, Cullercoats

Day	Session	Discussion / Demonstration / Practical	Aims	Session Leader
Monday 15 th Nov. 2010	am	Arrival. Registration. Laboratory set-up.	Register participants. Laboratory setup.	David Hall (Thomson Unicomarine Ltd.)
	1:00pm	Buffet lunch	-	-
	2:00pm	Introduction. General information.	Welcome participants. Q&A session regarding workshop. Outline timetable.	Carol Milner (Apem Ltd.; NMBAQCC) David Hall (Thomson Unicomarine Ltd.)
	2:15pm	Introduction – The Dove Marine Laboratory. Brief details. Local information. Lab. rules (H&S issues).	To give brief history of Dove Marine Lab. and facilities. Areas of local interest. Pub & food guide.	Jane Delany (Dove Marine Laboratory)
	2:45pm	Discussion / Demonstration - Introduction to selected Cumacea families. Literature. Problem areas. Identification techniques.	To introduce the major features / terminology used for identification of Cumacea.	Salma Shalla (Centre for Marine and Coastal Studies)
	4:00pm	Practical - Examination & identification of range of Cumacea taxa from reference material.	To obtain identification experience. View / verify reference material.	Salma Shalla (Centre for Marine and Coastal Studies)
Tuesday 16 th Nov. 2010	9:00am	Discussion / Demonstration - selected Cumacea families. Literature. Problem areas. Identification techniques.	To introduce the major features / terminology used for identification of Cumacea.	Salma Shalla (Centre for Marine and Coastal Studies)
	am	Practical - Examination & identification of range of Cumacea taxa from reference material.	To obtain identification experience. View / verify reference material.	Salma Shalla (Centre for Marine and Coastal Studies)
	pm	Discussion / Demonstration - selected Cumacea families. Literature. Problem areas. Identification techniques.	To introduce the major features / terminology used for identification of Cumacea.	Salma Shalla (Centre for Marine and Coastal Studies)
	pm	Practical - Examination & identification of range of Cumacea taxa from reference material.	To obtain identification experience. View / verify reference material.	Salma Shalla (Centre for Marine and Coastal Studies)
	4:30pm	Blue Reef Aquarium group trip.		
Wednesday 17 th Nov. 2010	9:00am	Discussion / Demonstration - Introduction to Scaleworms. Literature. Problem areas. Identification techniques.	To introduce the major features / terminology used for identification of Scaleworms.	Ruth Barnich (Senckenberg Natural History Museum)
	am	Practical - Examination & identification of range of Scaleworm taxa from reference material.	To obtain identification experience. View / verify reference material.	Ruth Barnich (Senckenberg Natural History Museum)
	pm	Practical continued.	To obtain identification experience. View / verify reference material.	Ruth Barnich (Senckenberg Natural History Museum)
	pm	Practical continued.	To obtain identification experience. View / verify reference material.	Ruth Barnich (Senckenberg Natural History Museum)
Thursday 18 th Nov. 2010	9:00am	Discussion / Demonstration - Introduction to Lumbrineridae, Onuphidae & Dorvilleidae. Literature. Problem areas. Identification techniques.	To introduce the major features / terminology used for identification of Lumbrineridae, Onuphidae & Dorvilleidae.	Eivind Oug (Norwegian Institute for Water Research)
	am/pm	Practical - Examination & identification of range of Lumbrineridae, Onuphidae & Dorvilleidae taxa from reference material.	To obtain identification experience. View / verify reference material.	Eivind Oug (Norwegian Institute for Water Research)
	4:00pm	Practical continued.	To obtain identification experience. View / verify reference material.	Eivind Oug (Norwegian Institute for Water Research)
	7:30pm	Workshop Dinner – Spanish restaurant, El Torero, Newcastle.		
Friday 19 th Nov. 2010	9:00am	Workshop feedback. Group photograph. Equipment pack up.	Distribute/collect workshop feedback forms. Pack up equipment & prepare for departure.	Carol Milner (Apem Ltd.; NMBAQCC) David Hall (Thomson Unicomarine Ltd.)
	9:00am	Tea & coffee; Departure	-	-