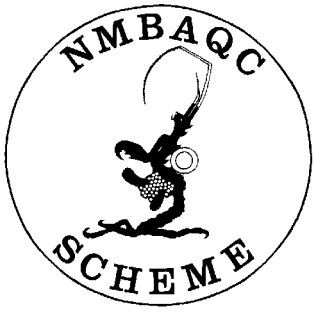

The National Marine Biological Analytical Quality Control Scheme

Fish Component Report from the Contractor Scheme Operation – Year 16 2009/10

David Hall and Jessica Taylor
davidhall@unicomarine.com

August 2010

Unicomarine Ltd.
Head Office
7 Diamond Centre
Works Road
Letchworth
Hertfordshire
SG6 1LW
www.unicomarine.com

unicomarine

FISH COMPONENT REPORT FROM THE CONTRACTOR

SCHEME OPERATION – YEAR 16 – 2009/10

Linked Documents (hyperlinked in this report)

Reverse Ring Test Report – F-RRT#01

1. Introduction

The sixteenth year of the National Marine Biological Analytical Quality Control (NMBAQC) Scheme (2009/10) followed the format of the fifteenth year. A series of exercises involved the distribution of test materials to participating laboratories and the centralised examination of returned data and samples. The labelling and distribution procedures employed previously have been maintained and specific details can be found in the Scheme's annual reports for 1994/95 and 1995/96 (Unicomarine, 1995 & 1996).

Exercises for the Fish Component of the NMBAQC scheme commenced in 2006 with Fish Ring Tests which comprised circulations of sets of 25 different fish species to be identified by participants. Fifteen labs participated in the first Fish Ring Test (FRT-01) in April 2006 followed by fourteen labs for the second Fish Ring Test (FRT-02) in April 2007 and seventeen labs for the third Fish Ring Test (FRT-03) in December 2007. Trials of Fish Reverse Ring Tests where participants submit a selection of fish specimens for confirmation were under taken in Year 15 to pave the way the first proper Fish Reverse Ring Test in Year 16. Scheme Year 16 also saw an NMBAQC Estuarine Fish ID Workshop (organised via the Environment Agency) which took place at the University Marine Biological Station, Millport in April 2009 (see Appendix 1).

For the Year 16 Fish Component exercises twenty laboratories / fish teams participated. Nineteen participants were government laboratories / fish teams; one was a private consultancy. Two of the government laboratories / fish teams combined their final entry. .

1.1 Summary of Performance

This report presents the findings of the Fish component for the sixteenth year of operation of the National Marine Biological Analytical Quality Control (NMBAQC) Scheme.

This component consisted of one module, 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).

A series of two unofficial trial exercises were conducted in the previous Scheme year (2008/09) to assess the feasibility and logistical protocols for a reverse fish ring test. One exercise was aligned with the spring fish monitoring surveys and one with the autumn surveys (LR-F Trial_1 and LR_F Trial_2, respectively). The findings of these trial exercises were not formally reported, however the logistics were deemed robust enough to commission an official exercise (F-RRT01) for Scheme year 16 (2009/10). The analytical procedures of this module were the same as used in two previous trial exercises. The results for this Scheme exercise are presented and discussed.

Fish Reverse Ring Test (F-RRT): The identification of a set of fifteen fish species selected and supplied by the participating laboratories was generally accurate. The majority of specimens were collected by fish teams during their 2009 autumn monitoring surveys. One potential problem identified by this exercise concerned the identification of Lesser pipefish, *Syngnathus rostellatus*, with over half the submissions of this taxon incorrectly identified. Other recurring errors were noted for Gobies (several species), Bull-rout and Lesser sandeels. 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.

1.1.1 Statement of Performance

Each participating laboratory has received a 'Statement of Performance', which includes a summary of results for each of the Schemes modules and details the resulting flags where appropriate. These statements were first circulated with the 1998/1999 annual report, for the purpose of providing proof of Scheme participation and for ease of comparing year on year progress.

2. Summary of Fish Component

2.1 Introduction

There was one module in the fish component for Scheme year sixteen; Fish Reverse Ring Test identification (F-RRT) module.

This fish module is described in more detail below. A brief outline of the information to be obtained from the module is given, together with a description of the preparation of the necessary materials and brief details of the processing instructions given to each of the participating laboratories.

2.1.1 Logistics

The labelling and distribution procedures employed previously have been maintained and specific details can be found in the Scheme's annual reports for 1994/95 and 1995/96 (Unicomarine, 1995 & 1996). Email was the primary means of communication for all participating laboratories. This has considerably reduced the amount of paper required for the administration of the Scheme.

2.1.2 Data returns

Return of data to Unicomarine Ltd. followed the same process as in previous years. Spreadsheet based forms (tailored to the receiving laboratory) were distributed via email, with additional hard copies where appropriate. All returned data have been converted to Excel 2003 format for storage and analysis. In this and previous Scheme years slow or missing returns for exercises lead to delays in processing the data and resulted in difficulties with reporting and rapid feedback of results to laboratories. Reminders were distributed shortly before each exercise deadline.

2.1.3 Confidentiality

To preserve the confidentiality of participating laboratories, each are identified by a four-digit Laboratory Code. In September 2009 each participant was given a confidential, randomly assigned Scheme year sixteen LabCode. Codes are prefixed with the Scheme year to reduce the possibility of obsolete codes being used inadvertently by laboratories, *e.g.* Laboratory number four in Scheme year sixteen will be recorded as LB1604.

In the present report all references to Laboratory Codes are the post-August 2009 codes (Scheme year sixteen), unless otherwise stated. To further 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 analysis components of the NMBAQC Scheme (due to Unicomarine administering these three components).

2.2 Fish Reverse Ring Test (**F-RRT**) Module

2.2.1 Description

This training module enables the identification of fish specimens to be externally verified and encourages laboratories / fish teams to build extensive, verified reference collections to improve identification consistency. The value of reference material / images in assisting the process of identification cannot be over-emphasised; the creation and use of reference collections are viewed as best practice. The module follows the format of the Benthic Invertebrate Component's Laboratory Reference (LR) module which was introduced in Scheme year three (1996/97). These modules assess the ability of participating laboratories to identify material from their own area, or with which they are familiar, or to have difficult specimens examined externally. This was the first official Fish Reverse Ring Test exercise (F-RRT01). The participants were required to submit a reference collection of fifteen specimens for re-examination by Unicomarine Ltd. Laboratories are also permitted to use this exercise to verify identifications of difficult or problematic taxa about which they are unsure.

2.2.1.1 Selection of fauna

The different geographical distributions of species meant that a request for a uniform set of species from all laboratories was unlikely to be successful. Accordingly a list of instructions was distributed to

participating laboratories. Each laboratory / fish team was permitted to include one unidentified or problematic taxon. Specimens wherever possible were to be representatives from WFD or CSEMP monitoring surveys.

2.2.1.2 Analysis

A prepared results sheet was distributed with the exercise's instructions and attached labels for the laboratories to identify each of the specimens. Polystyrene produce boxes and ice-strips were also supplied, if requested, to enable the best transportation protocol for frozen fish. Full instructions for the preparation and postage of specimens were provided. Participating laboratories / fish teams were permitted **eleven weeks** to prepare and submit their reference specimens. All specimens were re-identified and the identification made by Unicomarine Ltd. compared with that made by the participating laboratories. All specimens were returned to the laboratories after analysis, if requested.

2.2.2 Results

2.2.2.1 General comments

All twenty laboratories / fish teams participating in this exercise (F-RRT01) supplied specimens for verification; two laboratories (LB1645 and LB1646) combined their entry. Three laboratories submitted data and specimens after the submission deadline (LB1612, LB1642 and LB1644). Two laboratories submitted more than the fifteen requested taxon bags (LB1649 and LB1652); two laboratories pooled their submission and submitted less than the specified number of taxa (LB1645 and LB1646). In total two hundred and ninety fish taxon bags were submitted for verification.

2.2.2.2 Returns from participating laboratories

Table 1 (Fish Reverse Ring Test Report, F-RRT#01) presents a summary of the data sets and specimens received for the F-RRT#01 exercise. The identification of the specimens received from the participating laboratories was checked using a variety of identification literature and in-house reference material. Detailed results have been reported to each of the participating laboratories / fish teams via a single exercise report containing the individual report sheets for all participants. Due to this module's emphasis upon training and the diversity of submissions, comparisons of results are not applicable and as such no summary statistics are provided in this report.

Each participant received a Fish Reverse Ring Test Report (Fish Reverse Ring Test Report, F-RRT#01), outlining the AQC identifications and providing brief notes for identification discrepancies. Participating laboratories were given the option to request the return of all or some of their specimens for re-examination.

Specific details of each participant's results can be found in the Fish Reverse Ring Test Report (Fish Reverse Ring Test Report, F-RRT#01) which was circulated to each laboratory that supplied results for this exercise and was also posted on the Scheme's website (www.nmbaqcs.org).

2.2.3 Discussion

In the majority of instances identifications made by Unicomarine Ltd. were in agreement with those made by the participating laboratories. In view of the different species that were sent by laboratories for identification it is difficult to make detailed inter-lab comparisons with such a small data set and the potentially differing approaches taken to this exercise. However in this exercise, half of the eight participating laboratories that elected to send *Syngnathus rostellatus* incorrectly identified their specimens; as *Syngnathus acus* (LB1612, LB1614, LB1641 and LB1649) and *Syngnathus typhle* (LB1651). Other recurring errors were noted for Gobies (*Pomatoschistus minutus*, *P. microps* and *Aphia minuta*), *Myoxocephalus scorpius* and *Ammodytes tobianus*. Such trends will be monitored in future reverse fish ring tests and potentially difficult taxa identified could be specifically targeted in future fish ring tests (F-RT exercises) to quantify and resolve problems via the circulation of standardised specimens.

The results for this exercise should be viewed giving consideration to the different approaches by participant laboratories. Some laboratories appear to be sending well known species while others elect

to obtain a 'second opinion' on more difficult species or atypical individuals. Thus the scores are not comparable and it is not considered appropriate to assign any rank to the laboratories. Each participant should deliberate upon the aims of this component in terms of data quality assessment.

3. Conclusions and Recommendations

A number of observations may be made from the results of the exercise described above. The following is a summary of the major points of importance.

1. The first official Fish Reverse Ring Test (F-RRT01) was successfully implemented and the format can be brought forward for another exercise in the next Scheme year. Participants are encouraged to continue to provide feedback to enable the protocols to be refined.
2. The majority of participating laboratories submitted data before the deadline, however late submissions contributed in delaying the production of the final report. Laboratories should endeavour to submit their results within the requested time; this would greatly facilitate the analysis of results and effective feedback.
3. The Fish Reverse Ring test (F-RRT01) highlighted at least one instance of error due to the incorrect translation of a common name (sand smelt). Similar errors and several spelling errors were also noted in previous Fish Ring Test circulations (F-RT01, F-RT02 and F-RT03). Fish teams are to incorporate scientific names in field data records and/or ensure that common to scientific name translations are correct prior to database submission.
4. Fish teams are encouraged to collate fish identification literature to improve their identification skills and follow the most recent taxonomy; a number of scientific papers were sourced by Unicomarine to assist with the identification of juvenile Grey Mullet submissions in F-RRT01; these papers will be included in the next version of the Scheme's Standard Taxonomic Literature Database.
5. The maintenance of a comprehensive reference collection has numerous benefits for improving identification ability, training new staff, maintaining consistency of identification between surveys and access to growth series material. The inclusion of growth series material is extremely useful for certain faunal groups. Ideally all surveys should have an associated reference collection to enable ease of cross-checking or adopting future taxonomic developments. It is strongly recommended that laboratories implement and expand in-house reference collections of fish fauna; these collections could include images and physical specimens.
6. An improved learning structure to the Scheme through detailed individual exercise reports has been successfully implemented and was continued in this Scheme year. Participants are encouraged to review their exercise reports and provide feedback concerning content and format wherever appropriate.
7. Future Fish Ring Test (F-RT) circulations will target taxa identified in the Fish Reverse Ring Tests (F-RRT) as potentially problematic. Participants are encouraged to inform Unicomarine 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).
8. The RT and Reverse RT modules offer training and baseline data for fish; a quality control module (similar to the benthic invertebrate component's Own Sample module) should be devised to provide quantifiable data assurance.

4. References

Hall, D.J. (2008) *National Marine Biological Analytical Quality Control Scheme. Ring Test Bulletin – RTB#33(F-RT03).* Report to the NMBAQC Scheme participants. Unicomarine report NMBAQCrt33, January 2008.

Hall, D.J. & Dyson, J. (2006) *National Marine Biological Analytical Quality Control Scheme. Ring Test Bulletin – RTB#28(F-RT01).* Report to the NMBAQC Scheme participants. Unicomarine report NMBAQCrt28, May 2006.

Hall, D.J. & Worsfold, T.M. (2007) *National Marine Biological Analytical Quality Control Scheme. Ring Test Bulletin – RTB#31(F-RT02).* Report to the NMBAQC Scheme participants. Unicomarine report NMBAQCrt31, May 2007.

Taylor, J.G. & Hall, D.J. (2009) *National Marine Biological Analytical Quality Control Scheme. Reverse Fish Ring Test Bulletin: RRT01.* Report to the NMBAQC Scheme participants. Unicomarine Report NMBAQCrrt01, 22pp, December 2009.

Unicomarine (1995) *National Marine Biological Quality Control Scheme. Annual Report (Year one).* Report to the NMBAQC Committee and Scheme participants. September 1995.

Unicomarine (1996) *National Marine Biological Quality Control Scheme. Annual Report (Year two).* Report to the NMBAQC Committee and Scheme participants. September 1996.

Appendix 1 – Programme for NMBAQC Scheme - Estuarine Fish ID Workshop

University Marine Biological Station, Millport, 20-23 April 2009

Outline
This workshop will be emphasise the development of practical identification skills with hands-on sessions using previously frozen fish. This workshop will also act as an opportunity to discuss and exchange views on fishing in estuaries between key experts from all competent authorities for WFD estuarine fish surveying in UK and Ireland. Key national experts are on hands to lead each day, with additional support provided by University laboratory staff.

Monday 20 April

1500-1900	Arrival, booking in and field work*
1900	Introduction and meal

Tuesday 21 April

0900-1000	Lecture theatre - Open discussion on problems with fish ID in UK and Ireland
1000-1115	Lecture theatre – introduction from Peter Henderson, leading on general ID methods for estuaries
1115-1130	Coffee/tea
1130-1300	Lecture theatre – continuation of general ID methods for estuaries, Peter Henderson
1300-1345	Lunch
1345-1700	Lab work – split into groups of two to work through trays of mixed fishes

End 1700-1800

Wednesday 22 April

0900-1000	Lecture theatre - Presentation from Rob Hillman on alternative methods for improvements in fish health followed by open discussion on fish health
1000-1115	Introduction from Peter Miller, leading on ID methods for gobies in marine and estuarine surveys
1115-1130	Coffee/tea
1100-1300	Continuation of ID methods for gobies, Peter Miller
1300-1345	Lunch
1345-1700	Lab work – focussing on gobies

End 1700-1800

Thursday 23 April

Morning	Departure check out by 1000?

There will be opportunity during the breaks and laboratory sessions to discuss ID issues with colleagues and with the experts on hand.

Timings may be subject to change with the option for starting afternoon laboratory work earlier and an option for an intertidal session on comparing field sampling methods, see below.

*Optional:
Opportunity for practising/comparing field sampling methods subject to interest, tides and weather. Bring suitable outdoor clothing to observe this activity run by NIEA. Activities may take place on first afternoon.