**BEQUALM/**
**NATIONAL MARINE BIOLOGICAL**
**ANALYTICAL QUALITY CONTROL SCHEME**

# Workshop to Discuss Quality Assurance Needs for Assessment of Video for Monitoring and Survey

## Proceedings

## 11th -12th April 2007

## Agri-Food and Biosciences Institute, Belfast

# Contents

# *Introduction*

**National Marine Biological Analytical Quality Control Scheme (NMBAQC)**

The NMBAQC Scheme was originally developed to provide a form of Quality Assurance (QA) and Quality Control (QC) for the data resulting from the National Marine Monitoring Plan (NMMP, now the Clean Safe Seas Environmental Monitoring Programme (CSEMP)). The scheme has since had its remit widened to include work undertaken for the Habitats and Water Framework Directives. The participants in the Scheme include laboratories from the Environment, Fisheries and Conservation agencies and a number of independent environmental consultancies.

**The Workshop**

***Background***

Video is increasingly being used as a tool in both survey and monitoring to provide a means of investigating the benthic environment. Video provides a permanent record, is able to be manipulated using computerised methods and is a non-destructive way to get information about habitats/species that may well be fragile or endangered.

Thus far work has been carried out to produce standard operating procedures (SOPs) for undertaking the surveys themselves and ensuring the best results from use of video. However, less work has gone into QA of *interpretation* of the footage produced. Currently there is no standard way to analyse footage and the QA procedures that exist have been developed by specific workers for internal QA processes. Some of these procedures were the topics for discussion at the workshop.

***Aims***

The aim of this workshop was to work towards standard assessment methods for video footage for workers across all sectors in the UK. It is hoped that ultimately we will be able to have QA of video "samples" in the same way we currently undertake QA of traditional biological samples.

The workshop considered all uses of video and was not focussed on a particular sector of marine work. The Conservation Agencies, Fisheries and Environment sectors all use video for a variety of monitoring, mapping and stock assessment purposes and all were represented in the discussions. The ultimate aim is to produce a universal QA scheme that will be usable for video whatever the desired use of the footage, scale of assessment, or technique used (hand-held, drop down, ROV).

Key objectives were:

- To share experience of use of video in monitoring work
- To discuss technical aspects of image manipulation and analysis
- To assess the needs of a QA scheme and materials necessary for this
- To produce the structure of a pilot QA scheme

## *DAY 1: 11th April*

## *SESSION 1 - PRESENTATIONS*

### 1. General Introduction - Jane Hawkridge (JNCC)

JH gave a general introduction to the UK Marine Monitoring and Assessment Strategy (UKMMAS) (http://www.defra.gov.uk/environment/water/marine/uk/science/monitoring.htm) and where Analytical Quality Control (AQC) and Quality Assurance (QA) sit within this.

### 2. Introduction to the NMBAQC - Matt Service (AFBI)

MS gave the background to NMBAQC (http://www.nmbaqcs.org/). In summary:

a. From the minutes of 56th Marine Environment Monitoring Group (MEMG, 4th November 2005) – ***there was unanimous agreement that all sub-contractors should be members of the NMBAQC scheme* or *an equivalent*** – should be written into sub-contract agreements.

b. Aim of NMBAQC:
   - Assure and improve quality of data
   - Develop awareness and commitment among marine biologists and manager
   - Assist laboratories to achieve required level
   - Achieve improvements

c. Definitions:
   - AQC – defined as process of checking errors and correcting them
   - QA – check that errors have been reduced to acceptable level
   - Accurate – how close you are to correct answer
   - Precision – ability to produce same value or result

There are currently 5 tests in place for the infaunal side of NMBAQC. In addition, a ring-test has been set up for Fish ID and a photographic ring-test has been developed for macroalgae based on the WFD 'Reduced Species List'.

For hard substrates we have no accepted model for the QA, this workshop begins the process of developing this area.

### 3. Objectives of this workshop - Paolo Pizzolla (JNCC)

PP outlined the rationale for starting a QA scheme for video;

- Used by many sectors
- Provides a 'sample' to assess
- Easiest/most practical epibiota area to get started on

**The objectives of the workshop were based on the following questions:**

a. Is a universal QA scheme possible - bearing in mind different purposes/requirements of the three main sectors using video (Conservation, Environment Agencies and Fisheries)?

b. What would a scheme look like?

c. What are practical considerations associated with a scheme (e.g. time required to set up and funds)?

d. What other tools do we need to develop (e.g. Procedural Guidelines, taxonomic keys, and workshops)?

**Outputs from the current workshop:**

- Dissemination of workshop outputs:
    a. Presentations available on-line
    b. Proceedings available on-line
- An agreed pilot scheme, if possible
- A process to establish the pilot scheme and trials (2007-2008)

Ultimately, it is envisaged that the pilot would lead to a full scheme being implemented (at the earliest 2008-2009)

## 4. High quality video – practical considerations - Ian Sotheran (Envision)

IS introduced some of the practical considerations necessary to obtain high quality footage. These were broken down into five main areas:

1. Environmental conditions (e.g. sea surface state, current, tide, turbidity)
2. Vessel & logistics (e.g. size of vessel, type of equipment (e.g. winches), depth of survey)
3. Equipment – (technical specifications)
4. Operators – (e.g. how many, experience)
5. Deployment and camera control

SEE PRESENTATION (**1 - Ian Sotheran - NMBAQC Video Workshop.pdf**) FOR EXAMPLES OF EQUIPMENT SET UPS

## 5. High quality video – equipment specifications (camera & video) - Rohan Holt (CCW)

RH introduced some of the technical considerations necessary to obtain high quality footage. The presentation discussed equipment set-ups to obtain imagery in the following ways:

- Still photography – including a discussion of best current set-up to achieve in-situ imagery, mosaicing for monitoring purposes
- Basic hand held video for quantitative recording – introduction of High Definition (HD) video and problems associated with data storage
- Drop-down video from small research vessels

Examples of footage were included to illustrate different qualities of image and what could be derived from these.

SEE PRESENTATION (**2 - Rohan image spec v2.pdf**) FOR EQUIPMENT SET UPS AND SPEC

RH demonstrated a training tool being developed by CCW. Video clips are stretched or frozen to add arrows and labels so that specific species can be highlighted for identification. It was suggested that this could be used as training or testing tool. Alternatively, slowing down the footage can also be used to examine the relationship between species in biotopes e.g. showing *Alcyonium* living on live *Modiolus*, where people might otherwise miss that *Modiolus* was present.

**Conclusions, Comments and Recommendations on Presentations 1& 2**

- Whilst we do not want to dictate specific equipment, we might want to recommend a certain image resolution that equipment should be able to resolve e.g. have a test-card to illustrate image quality
- Could we create a grading scale for quality of video footage – e.g. metadata that would describe the level of resolution in the footage? This would be useful to enable future use of imagery for a different purpose/reanalysis (*collect once, use many times*).
- Poor quality footage can still be useful for gross level assessment and……. What was conclusion, don't throw away? (e.g. bottom type)
- Video is useful for obtaining contextual information – e.g. panoramic shots for metadata
- Use of a training/testing system such as that presented by Rohan Holt (e.g. editing/slowing footage, adding arrows to specimen to be identified) could easily form the basis of a test e.g. arrows on video

## *SESSION 2 - PRESENTATIONS*

### 1. Resolution and Image Quality issues – comparison of different data sets and use of still imagery - Viv Blyth-Skyrme and Emma Verling (JNCC)

EV and VBS looked at two issues of video data collection and analysis, using data from the Eastern English Channel Marine Habitat Map project (JNCC, Cefas, BGS, MES Ltd)

**Does loss of video quality affect results of analysis?** (VBS)
VBS looked at whether quality of video footage affected results of analysis. Video footage was collected in 2005 and from further sites in the same survey area in 2006. Twenty minute tows were conducted using a video sledge with stills camera, over an area of fine sand to coarse gravel and cobbles. The same equipment was used both years, but slight differences in set-up resulted in higher quality video footage in 2006, compared to 2005 (less pixelated, finer resolution).

Initially, the two data sets were analysed by different contractors (contractor A 2005, contractor B 2006), To allow comparison between two years, seven videos from 2005 were re-analysed by contractor B, using same methodology (% cover of sediment by category, abundance of visible taxa using SACFOR). Each video represented one of the seven biotopes found.

PRIMER analysis concluded that at the biotope level, the difference in quality did not appear to affect results. A higher number of taxa per video recorded in 2006 (better quality) videos in comparison to 2005 video from CCS2 (well sorted fine gravel and pebbles) and CCS4 (cobble and pebble biotope). No difference with the fine sand biotope, or coarse gravel biotope. Smaller or more cryptic fauna tended to be missed in poorer quality video.

**How many still images need to be analysed?**
The community analysis for the Eastern English Channel project was conducted using a combination of both still images and video footage. There are several advantages associated with each technique, and analyzing both maximizes the information that can be obtained. Table 1 shows the advantages associated with each technique**.**

*Table 1 The advantages associated with analysis of still images and video footage.*

| Video | Stills |
|---|---|
| Covers a broad area (20 min continuous recording) | More detailed view of community – do you mean you can get closer? What do you mean by this exactly? |
| Rare & mobile species detected more easily than what? | Quantitative data can be collected actual densities – you can from video too, if you have the right set-up and resolution |
| Good sediment profile in area – what area? | Smaller/cryptic organisms can be identified – is this not the same as the first? |
| Ability to detect habitat/biotope changes along a tow | Verifying identification from videos |

EV looked at the use of data from still images in community analysis, and specifically investigated the results emerging from analysing different numbers of stills. The following question was addressed: How many still images need to be analysed to achieve an accurate representation of the communities present in the Eastern English Channel?

The analysis was conducted using only data collected in 2006 and video tows for which only one habitat had been identified across their extent. Each tow selected had a set of 20 still images (one taken every minute along a 20-minute video tow). Quantitative counts to the finest taxonomic level had been obtained for all still images. As well as the full set of 20 images per tow, several different datasets were created using two techniques:

- A given number of still images were selected (4, 6, 10 images) positioned *evenly* throughout the video tow
- A given number of still images (4, 8, 10, 16 images) were *randomly* selected, regardless of their position within tows

PRIMER analysis revealed that the greater the number of stills analysed, the more closely the dataset resembled the full dataset. Using 'randomly' or 'evenly' placed stills did not appear to have a consistent effect on the results - the number of stills was the most important parameter. However, similarity values were quite high even for those datasets least similar to the full dataset, the lowest similarity value being 0.8. Despite this, the variability between datasets (replicate datasets) increased the fewer stills were analysed. Thus the analysis of fewer stills can yield a very similar result to the full set, but it can also introduce variability and so will affect between-year comparisons, for example. Moreover, although Shannon Diversity was variable, the number of species detected was consistently lower the fewer stills were analysed, so where obtaining a full species list is important, as many stills as possible should be analysed.

**Conclusions, Comments and Recommendations**

- Reduced video quality may be more important when dealing with fine-scale, rather than community level analysis. The implication for monitoring is possibility of overlooking rare or important fauna.
- The number of stills that need to be analysed should be considered in the context of question being asked and the level of accuracy required.

## 2. How do we interpret our images? - Matt Service (AFBI)

The use of unstable platforms for video collection, such as divers and remotely operated vehicles, can lead to variation in the field of view, and consequently the dimensions of the surveyed area. Unless this can be accounted for, quantifying the species present can be time consuming or unworkable. Use of time-based, rather than areas-based, enumeration techniques, such as the visual fast count (VFC), can overcome this variation. Using seabed video footage from Strangford Lough, the reliability of the VFC was assessed through comparison with direct counts. Multivariate analysis of variance indicates that data derived from the VFC did not differ from that obtained from direct counts. Pairwise comparisons between locations in Strangford Lough using analysis of similarities (PRIMER) also indicated good agreement between the two methods.

Use of the VFC method therefore provides: (1) a reliable alternative to direct counts for epibenthic enumeration; (2) a substantial reduction in post-survey processing time and; (3) a method capable of allowing variation in the visual field/sampled area.

**Issues**

- Only been tried in Strangford at the moment – need to apply to other habitat types to see if still as effective.
- Can generate various indices, but cannot get precise species richness.

*Strong, J.A, Service, M. and Mitchell, A.J. (2006) Application of the Visual Fast Count for the quantification of temperate epibenthic communities from video footage, Journal of the Marine Biological Association of the UK, 86: 939-945 Cambridge University Press*

**Conclusions, Comments and Recommendations**

KH tried to identify quality baselines for particular biotopes e.g. how many of particular species would you expect to find for that biotope in a particular area – did this for Environment Agency for WFD. Think can work towards getting measures for comparison.

## 3. Training tools, video tagging, image archives - Kerry Howell (University of Plymouth) (presented by Jane Hawkridge (JNCC))

Two systems were discussed; one developed as part of KH's work on the SEA 7 Survey data and the other developed in the USA (VARS – Video Annotation and Reference System. http://www.mbari.org/vars/). KH posed a number of questions:

- Are image/video (species) reference libraries needed a) at a UK level and b) for individual projects? Who should develop and maintain these?
- Do we need the same for substrate types?
- Equipment type used can make a vast difference to what is consistently identifiable and what it looks like on camera, how can we over come this if developing an reference libraries and tests
- Still image data (currently) allows a greater level of taxonomic resolution than video data. Do we therefore require different minimum quality standards for different gear types?
- Are there standard size cut off points that can be set below which species cannot be reliably identified or must it be done on a case by case basis?

**Conclusions, Comments and Recommendations**

- Reference libraries for images are needed. However, we don't necessarily need one comprehensive catalogue but need to fill in gaps in existing guides. Specific guides could be

developed for particular areas of interest (e.g. customised guides for specific location or habitat type).

- Multiple guides would require a signposting system and a quality guarantee. Who should develop and maintain this? Should this be role for DASSH?
- Need to think about substrate ID (i.e. muddy sand or sandy mud?) and recognising live from dead individuals

### 4. Simple *vs* Complex habitats: How much sampling do we need? - Roger Coggan (CEFAS)

RC presented an as yet unpublished study by Anke Weber & Jan Tjalling van der Wal of TNO ( Netherlands) looking at the efficacy of video survey footage on sandy substrates on the Dogger Bank. The study collected several video samples of 10-minute duration which were analysed in their entirety, noting the time at which each organism appeared.

The study then tested 3 sub-sampling strategies to see what information was lost using shorter observational periods.

1) analysed first 10 seconds of each minute of video
2) analysed first 6 minutes of video, but only first 10 seconds of each minute
3) fully analysed just the first 6 minutes of each video

It also considered how many stations have to be sampled to catch the characteristic epifauna (on genus level) of this sandy habitat?:

- Identified 'characterising taxa' and then compared how many of these were missed using each (sub-) sampling strategy.
- This suggested an optimum sampling strategy (verified by repeat survey)

**Conclusions,**
The study concluded that the optimum sampling strategy was a full analysis of 6 minutes of video, and that 8 stations or more needed to be sampled to confidently capture all the characterising species of the habitat with this duration of video tow.

**Comments and Recommendations**

- Camera avoidance by fauna may have been responsible for some odd results
- Will it take a shorter time to capture 50% of the detectable species in a high complexity habitat than in a low complexity habitat?
- Within NMBAQC we need to standardise or agree on some sampling strategies for both the collection and interpretation of video
- Are these two sampling strategies independent of each other?

### 5. Day One Summary - Jane Hawkridge (JNCC)

Issues to consider

1. Taxonomy: important for categorising (e.g. biotopes) and qualitative analysis. Quantification is necessary for monitoring in order to detect non-gross changes

2. Sampling strategies: Two sampling strategies i) collecting data initially ii) how you then 'sample' for your analysis
   *Although we don't want to constrain sampling methods, we might want to say if specific approaches or equipment should not be used.*

MESH (http://www.searchmesh.net/default.aspx?page=2) has come up with Recommended Operational Guidelines but avoided coming up with standards. There is resistance from industry to having too specific guidance as this is too constraining (some flexibility of approach is required to take into account prevailing conditions).

3. There are major quality issues associated with viewing footage, laptop screens, projection and domestic DVD player will all deliver different qualities. Viewing method should either be standardised or recorded in the analysis report.

4. It is essential to know which keys are being used for assessment and the time/effort involved in image interpretation

5. Do we need to grade categories of quality of footage (for archiving purposes) in order that old footage can be re-examined for new purposes?

6. How do we capture/promulgate in-situ experience (local knowledge; species behaviour etc) and separate educated guess from definite ID?

## *12th April*

## *SESSION 3 - PRESENTATIONS*

### 1. Quality measures for SAC monitoring - Francis Bunker (ASML)

FB presented QA techniques used by ASML for sublittoral monitoring of marine SACs (drop down video and diving) in England. The work was undertaken using:

- JNCC procedural guidelines (Holt & Sanderson, 2001). Also procedural guideline No.1-6 (Moore and Bunker, 2005), "Monitoring biotope richness using Remote Video".
- Post-processing of video dealt with in Holt & Sanderson (2000) and Donnan (in prep, ROV) and Bunker & Moore (2005). Also Foster-Smith et al (2000).

QA process used:
- Independent review of 10% of records
- Chosen to include examples where biotope was difficult to determine.
- Where there was disagreement the footage was re-examined not only for the particular 'sample' but for all others of same biotope to resolve inconsistencies.

**Conclusions, Comments and Recommendations**

- Video is not always as sensitive as in-situ recording - some boulders appeared devoid of life in video but diver survey showed that boulders were in fact covered with lots of species.
- Assignment of biotopes to footage is complicated by the interpretation of biotopes and the range of biotopes available.
- A QA scheme should include a testing element and recommendations for remedial action. The first part of the scheme should be pass/fail, the second part is to recommend remedial action. There is then a requirement to demonstrate that you have taken the remedial action before data is accepted into central database.

### 2. Archiving marine photographs and videos - Gaynor Evans (MEDAG)

GE presented recommendations following on from an IACMST workshop:

'Marine and coastal photographs and videos: their availability, uses and curation' http://www.oceannet.org/medag/reports/medag_reports/photo_workshop_report_nov2006.pdf

These included;

- looking outside marine community for advice and guidance;
- widen access and profile of marine digital resources using umbrella organisations such as MDIP, MEDAG, DASSH;
- investigate metadata standards; copyright and ownership issues should be clarified;
- focus on 'collect once, use many times'

**Conclusions, Comments and Recommendations**
BODC are currently building up protocols and guidelines for managing photos and videos and other digital data to answer the following questions:

- What is best file format for archiving each data type?
- What tools to perform format conversions?
- What size files expected?
- What are metadata standards for digital data?
- How much data should be archived – just analysed part or whole lot?
- How could you achieve quality control?

It is suggested at the moment that images should be archived as TIFF (lossless format), video should be archived as DV (digital video) and /or MPEG2.

### 3. QA of CCW/SeaStar video - Keith Hiscock (MBA)

KH discussed two video analysis projects:

N.A. Holme video (1975-1982) – (*Hiscock, K & Oakley, J (2005). English Channel towed seabed images. Phase 2: Analysis of selected tow images. Report to the Joint Nature Conservation Committee from the Marine Biological Association. Plymouth: Marine biological association. JNCC contract F90-01-784*)

- Re-examined some of these videos for JNCC. Two filing cabinets of these, including reel-to-reel videos which degraded. Transferred these to VHS which they reviewed.
- Videos mostly poor quality but the 35mm photos were excellent quality.

CCW videos (*Hiscock, K., Seeley, B. 2006. Quality assurance of biotope identification from drop-down video footage. Report to Countryside Council for Wales from the Marine Life Information Network (*MarLIN*). Plymouth: Marine Biological Association of the UK*).

KH reviewed 10% of tapes for QA. There was a mis-match between biotopes assigned by KH and SeaStar. The main reasons for differences were:

- Different species were identified by the two parties
- Poor quality video made species and biotope ID difficult. A species in the name of the biotope might be missing, but might still be that biotope – this is down to experience and knowledge of the biotope classification.
- The biotope suite is not fully comprehensive
- Some biotopes were from wrong environmental conditions and were wrongly assigned by KH because of lack of metadata
- Sediment identification (e.g. coarse sand, sand and shingle) is problematic with video

### 4. Interpretation of video: analyser bias - Viv Blyth-Skyrme (JNCC)

Eastern English Channel data were analysed by two different contractors following an identical methodology.

- There was no apparent clustering by contractor.
- Contractors were often identifying the same species but were giving very different abundances. Sometimes this was a difference of more than one SACFOR step.
- One contractor consistently identified more species- often a small or cryptic species.
- Some species were identified by one contractor that were never identified by another – so this indicates a knowledge gap.
- There were also some large discrepancies in terms of the sediment identified by contractors (A: 100% fine sediment versus B: 50% fine sediment, 45% gravel).

**Conclusions, Comments and Recommendations on Presentations 3 & 4**

- QA at the biotope level – is this appropriate based on the fact that many people have issues with 'missing biotopes'. There is also concern that JNCC contracts have requested people to fit samples somewhere into biotope classification – there is a feeling that the correct biotope may not exist and that workers are forcing data into pigeon holes (thus bringing in a new error).
- For some biotopes, video is not a good way of identifying that biotope, e.g. fine sand video is not the correct tool to ID these habitats. A grab sample would be needed.
- Contractors that didn't pick up *O. albida* – was that to do with the background of the person reviewing the video? If they were a diver they should have a more trained eye. VBS: they sometimes ID'd a species in one video whilst not doing so in another. This suggests a quality problem rather than lack of ability to actually ID that species.

- Recommendations:
  - We need a reference system for sediment sizes and a methodology to determine relative abundance of these sediments
  - Appropriate metadata must be included to help support biotope identification e.g. depth, location
  - High quality equipment is needed for viewing the footage
  - Video should be supplemented with high quality still images
  - Improved aids are needed for biotope matching
  - Training is required to improve estimation of abundance

*Note – It is recognised that the biotope classification is a work in progress (especially in offshore habitat classification) and work is being undertaken by JNCC to extend the current suite.*

## *BREAKOUT DISCUSSIONS 1*

### Breakout group A (Paolo Pizzolla, Chair)

**1. What metadata is required to accompany each video:**

| | |
|---|---|
| Speed of tow | Depth |
| Field of view | Location |
| Image resolution | Further fields need to be taken |
| Whether still images were taken | Quality measure |

**2) How do we measure quality of footage?**

Measure of quality would be a checklist of questions. Recommendation would be for these to be yes/no questions rather than scoring them. Different ways in which questions could be phrased:
Can you see bottom?
Can you determine bottom type?
Can you distinguish certain features?
Can you distinguish certain organisms e.g. by size, by specific example species?

Might also ask other questions to do with footage:
Does camera pause on occasion?
Is camera at constant height off the seabed?

**3) Should stills be required alongside video?**
No clear agreement was reached on this. Various arguments for and against:

| **Support for making stills mandatory** | **Against making stills mandatory** |
|---|---|
| Aid species identification | Stills aren't always necessary depending on purpose of survey |
| Could facilitate QA scheme | Might take stills, but doesn't mean they are any good |
| Makes data more useful for future needs | Increases system complexity/cost |
| Creates a level playing field | |

Also discussion about whether frame grabs would be sufficient versus dedicated stills, and whether requirements should be guidance, or mandatory (e.g. through MEDAG), or whether agencies would have option of including this in contract specification if they wish.

It was noted there would be a cost implication if stills would be required, and this cost would be passed on by contractors to those issuing contracts.

It was also noted that whatever was decided would have implications for surveys outside of conservation sector, e.g. impact surveys.

### Breakout group B (Emma Verling, Chair)

**1. Ability to ID and classify biotopes**

How can we bring people up everyone to same level with species ID and biotope classification – less experience and lack of local knowledge etc?

3 main tools were identified

- Video archives - can we create a library of images and video to build equivalent skill to in-situ experience
- Ring tests – in addition to training/testing ring test feedback can be used to catalogue which keys/resources are used with ID then these can be assessed and limits set on what is possible with which resources.
- Workshops – NMBAQC workshops on 'difficult' species have led to notable improvements in their recognition and identification (e.g. Cirratulid polychaetes).

## 2. QA Issues identified:

- Abundance estimates – whether direct counts, SACFOR or % coverage estimates this is a universal QA need and should be addressed for all sectors

- Regional specificity - can we supply geographic species lists to help people familiarise themselves with areas before assessments or general working/surveying? The Ring test metadata should include temporal and location information to help with this problem.

- Field knowledge particularly of cryptic species is difficult to quantify and is experience based.

- Some resources already exist, these need to be signposted and approved.

- Operator ability –operator skills make a big difference to outputs. Should there be levels of training assessment/certification for data collection?

  - this could be covered by procedural guidelines
  - Could training be introduced to produce something akin to Seasearch levels (Observer = basic level and then Surveyor = more experienced)?

**3. Practical Concerns**

- Cost – Industry worries that the cost of QA in terms of both time and money is prohibitive:

  - This would be resolved by making QA compulsory – thus ensuring a level playing field.
  - Likewise any costs from extra equipment requirements would be passed on to the commissioning body
  - In chemical/heavy metals assessment industry 25-30% of project time is spent on QA as a standard.
  - If 10% of time is spent then data will be more convincing in disputes and court proceedings.

- Effort - Should the ring test be effort (time) limited to standardise all responses?

  - There should be no time limit on the first ring test - time spent should be included as part of the data collected by the exercise. Maybe limit time in later ring tests.
  - Create several tasks for the ring test assessment i.e. sediment type, species, video quality, speed of ID and assessment.

- Publish a list of existing training resources The NMBAQC website should be in use soon and would be the best platform. Also list Agency resources such as image catalogues (SNH, CCW)

## *BREAKOUT DISCUSSION 2 – The Way Forward*

### Current funding of ring-test - Matt Service (AFBI)

2 ring-tests – standard samples sent out, and reverse ring-test where labs send own samples for checking. Test includes PSA sample, and macrobenthic sample.

To join NMBAQC scheme there is an annual scheme of £2500 + VAT. If labs want to send in extra samples, then these can be sent in for an additional fee. You can pay to participate in particular elements e.g. if lab only does PSA analysis. Separate fee for each of the additional modules e.g. fish test, macroalgae test, phytoplankton test.

Scheme is run by contractor (awarded through commercial tender). One important aspect is confidentiality of results of different labs. Alongside scheme also run various workshops, and do additional pieces of work such as review of standards.

**The scheme is self-funding, and no extra funding has been input.**

## Discussion on Pilot Video Ring Test - Paolo Pizzolla (JNCC)

**Each test should have no more than half an hour footage. 10-15 video clips**
**The Contractor should develop and run subsequent test. The following areas need to be addressed by the pilot.**

- **Quality**
  - A variety of image qualities would be desirable for the initial pilot to reflect the reality of survey footage
  - Most drop-down video isn't perfect. Information about the area/habitat is taken from two or three runs in the same area. So could have several clips from one area merged together into one video clip to review.
  - Varied quality will also highlight problems with over-interpretation of poor quality video
- Type
  - All sectors should be covered (agencies etc to provide footage for pilot)
  - Different skills should be addressed (species ID, habitat classification, substrate, enumeration)

- Metadata
  - To be refined, but must include location, date, depth, gear type
  - Blind testing unhelpful as it is unrealistic and wastes time

- Feedback – the following should be recorded
  - Keys used
  - Effort
  - Viewing method
  - Scoring system? Could have a multiple scoring system. Can score separately on overall basis, on species identification ability, on other aspects (e.g. with benthic infaunal samples labs are assessed on ability to sort, identify and count).

- Issues
  - Should biotopes be used (Could essentially ask people to fill in an MNCR recording form?)
  - How much information should be required from the initial Pilot
  - How do we incorporate still images

- Pilot Format
  - Three tests in 'Year One' (12 – 18 months)
  - Feedback from the test should refine the next stage
  - This should lead to a final workshop to address roll-out of the pilot into a full scheme

## Finances - Jane Hawkridge (JNCC)

Main Points

- There would be a competitive tender for a contractor to develop ring-test. The contractor would have to come to quarterly NMBAQC meetings. Might have it built into contract that a workshop must be run to review outputs of first test.
- Ballpark cost for this ~ £20K. Could expect 30-40 interested parties for the test. Could maybe then divide this by parties as a subscription fee.

- There is a possibility that pump-priming may be available. Existing schemes don't receive any central funding from government. We may be looking at up to £1000 contributions to fund pilot (dependent on the number of parties involved)

### Summing-up and thanks - Jane Hawkridge (JNCC)

**Actions**

1) Put together tender specification for development of ring test (PP, MS, RH, VBS, TM)

2) Will set up a smaller working group through NMBAQC to focus just on video (PP, MS, RH, VBS, TM)

3) Through the workshop, various training needs have been identified some of which can be explored further.

4) Clearly there are funding issues which need to be resolved through NMBAQC, pump priming funds will be sought (JH, MS)

5) Email links of available QA resources to PP and then links can be put on NMBAQC website (All)

## *Appendix 1*

## Timetable

| | *Time* | | *Topic* | *Notes* | *Speaker* |
|---|---|---|---|---|---|
| **DAY ONE** | | | | | |
| 12.00 – 12.45 | | **Lunch** | | | |
| 12.45 | 10 | Intro | **General Introduction and welcome** | | Jane Hawkridge, JNCC |
| 12.55 | 10 | Intro | **Why are we here, NMBAQC** | Brief intro into NMBAQC and requirements for QA | Matt Service, AFBI |
| 13.05 | 20 | Intro | **Aims and Objectives** | Outline of objectives | Paolo Pizzolla, JNCC |
| | | **Session 1** | **Matt Service to Chair** | | |
| 13.25 | 20 | Presentation | **How do we ensure we get high quality images? Practical considerations** | How to get quality images in the first place | Ian Sotheran, Envision |
| 13.45 | 20 | Presentation | **How do we ensure we get high quality images? Equipment specifications** | Follows on from above, technical specifications | Rohan Holt, CCW |
| 14.05 | *20* | Discussion/ key points | | | |
| 14.25 | 15 | **Break** | | | |
| | | **Session 2** | **Jane Hawkridge to Chair** | | |
| 14.40 | 20 | Presentation | **What resolution do we need to have? Species and Habitat identification** | Species ID issues<br>Video + Stills<br>Local knowledge | Emma Verling/Viv Blyth-Skyrme, JNCC |
| 15.00 | 10 | Discussion/ key points | | | |
| 15.10 | 20 | Presentation | **How do we interpret our images? Interpretation for assessment purposes, evidence** | Abundance, coverage<br>VFC | Matt Service, AFBI |
| 15.30 | 10 | Discussion/ key points | | | |
| 15.40 | 20 | Presentation | **Training Tools, video tagging, image archives** | | Kerry Howell, University of Plymouth (delivered by Jane Hawkridge) |
| 16.00 | 10 | Discussion/ key points | | | |
| 16.10 | 20 | Presentation | **Complex versus 'simple' habitats** | What are the considerations for looking at sediment habitats/rocky habitats | Roger Coggan, CEFAS |
| 16.30 | 10 | Discussion/ key points | | | |
| 16.40 | 35 | Discussion/ Summing up | | | Jane Hawkridge, JNCC |
| 17.15 | | Close | | | |

| DAY TWO | | | | | |
|---|---|---|---|---|---|
| 9.00 | 15 | **Coffee and Tea** | | | |
| 9.15 | 10 | Format for the day | | | Paolo Pizzolla, JNCC |
| | | **Session 3** | **Roger Coggan to Chair** | | |
| 9.25 | 20 | Presentation | **ASML QA** | | Francis Bunker, ASML |
| 9.45 | 10 | Discussion/ key points | | | |
| 9.55 | 20 | Presentation | **Archiving and cataloguing protocols, data storage implications** | | Gaynor Evans, MEDAG |
| 10.15 | 10 | Discussion/ key points | | | |
| 10.25 | 30 | QA | **Results and lessons from CCW/Sea Star QA** | Time, effort, cost | Keith Hiscock, MarLIN |
| 10.55 | 10 | QA | **PRIMER comparison of habitat assignment** | | Viv Blyth-Skyrme, JNCC |
| 11.05 | 10 | Discussion/ key points | | | |
| 11.15 | 15 | **Break** | | | |
| 11.30 | 75 | Break out group | 1 – Technical issues | Kit quality<br>Archiving | |
| 11.30 | 75 | Break out group | 2 –Interpretation | ID<br>Training needs<br>Reference Library | |
| 12.45 | | **Lunch** | | | |
| | | **Session 4** | **Paolo Pizzolla to Chair** | | |
| 13.30 | 60 | Discussion | Conclusions of the breakout groups | **Including funding** | |
| 14.30 | | **Break** | | | |
| 14.45 | | Summing up | QA needs<br>**Funding method and estimates** | | Jane Hawkridge |
| 15.15 | | Thanks and close | | | |

## *Appendix 2*

### Attendees

| | Name | Initial | Representing |
|---|---|---|---|
| 1 | Paolo Pizzolla | PP | JNCC |
| 2 | Jane Hawkridge | JH | JNCC |
| 3 | Emma Verling | EV | JNCC |
| 4 | Viv Blyth-Skyrme | VBS | JNCC |
| 5 | Matt Service | MS | AFBI |
| 6 | Rohan Holt | RH | CCW |
| 7 | Charlie Lindenbaum | CL | CCW |
| 8 | Laura Baxter | LB | SNH |
| 9 | Dylan Todd | DT | SNH |
| 10 | Stephanie Bennett | SB | EHS |
| 11 | Tim Mackie | TM | EHS |
| 12 | Hugh Edwards | HE | EHS |
| 13 | Roger Coggan | RC | CEFAS |
| 14 | Bill Meadows | BM | CEFAS |
| 15 | Christopher Barrio-Frojan | CBF | CEFAS |
| 16 | Lex Pearce | LP | SEPA |
| 17 | Sheena Warnock | SW | SEPA |
| 18 | Keith Hiscock | KH | MarLIN |
| 19 | Gaynor Evans | GE | MEDAG |
| 20 | Malcolm Hearn | MH | BODC |
| 21 | Francis Bunker | FB | ASML |
| 22 | Ian Sotheran | IS | Envision |
| 23 | Harry Goudge | HG | MES |
| 24 | Clare Greathead | CG | FRS |
| 25 | Martin Burns | MB | FRS |
| 26 | Frank Fortune | FF | Royal Haskoning |
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