ENVIRONMENTAL OBSERVATION FRAMEWORK

UKEOF Freshwater Monitoring Review and Future Strategies Workshop

Location: Birmingham (Aston Conference); **Date**: 8th & 9th November 2017

Summary of Meeting

Prepared by Gareth Old (CEH) UKEOF Secretariat

Workshop Purpose: For the four UK water regulatory authorities to share best practice and explore opportunities for working together as we develop monitoring programmes for our freshwater systems. To discuss current and future approaches to monitoring freshwater quality and quantity, particularly in support of the WFD.

Anticipated Outcomes: A shared understanding of the approach each agency is taking, opportunities for closer working and a set of specific topics, questions and challenges to be resolved together (with support of UKEOF where appropriate).

For full agenda and delegate list see Annex A. For a comprehensive report of the detailed discussions of the workshop see Annex B.

Day 1: Nathan Critchlow-Watton, NCW (SEPA) introduced the workshop by identifying key challenges facing UK monitoring and the potential benefits of talking to and learning from each other.

Organisational perspectives on future strategies were given by Jennifer Taylor, JT (EA), Alun Attwood, AA (NRW), Wendy McKinley, WK (DAERA) and Nathan Critchlow-Watton, NCW (SEPA).

All emphasised the need to use the best available evidence to manage the water environment whilst acknowledging the financial constraints on monitoring. It is important that we understand environmental state, pressures and impacts of events. A transformation of approach is needed in water quality and quantity monitoring. This will be increasingly agile and risk based (informed by Earth Observation). It will embrace new technologies (e.g. eDNA), optimise the use of indicators/proxies/modelling and use varied data sources (e.g. third-party and citizen science). Rapid assessment techniques are likely to play an increasingly important role in targeting field sampling and monitoring has to be increasingly focused on the questions that need to be answered.

Andy Nisbet, AN (NE) reminded us of the value of monitoring beyond WFD compliance. The Common Standards Monitoring Guidance (JNCC) has been revised to better align with WFD. Pressures are the same for all organisations and questions are changing.

Discussion: Similar challenges across organisations and a need to develop solutions. Greater understanding of uncertainty (data, models and interpretation) is needed. How do we evaluate evidence on the effectiveness of interventions? WFD status monitoring does not always give us the bigger picture overview. Some of our current monitoring methods are written in legislation – a challenge for adoption of new techniques. Enhanced resources may be needed to initiate a new method in the short-term.

Long term monitoring networks – purpose and future design

Mattie O'Hare (MO) and Dan Chapman (DC) gave a stimulus presentation on the CEH/SEPA Sentinel project. This project was driven by SEPA's need to obtain the best possible sentinel evidence, whilst maximising the resource available for investigation and focussed monitoring. The sentinel monitoring needs to cover the whole range of water body types and pressures, and be able to detect trends. CEH undertook statistical analysis of the current monitoring network to see how it could be improved. This identified waterbody types that are over sampled with scope to reconsider their monitoring. However, this can mean losing the historic record for those sites. They explored how power to detect a trend changed with sampling regime. For some parameters sampling more sites at lower frequency is better. MO also introduced his review of innovative monitoring methods.

Wouter Van De Bund (WV), chair of ECOSTAT, gave his perspective on monitoring networks and the future. He focused on the WFD and Biological Quality Element scores (BQEs). He emphasised that there is some overlap in what BQEs are sensitive to, and that the UK potentially duplicates BQEs in some water bodies.

Shane O'Boyle (SO), Irish Environment Agency, gave a summary of their monitoring. Data are used to evaluate status and to assess effects of programmes of measures. They identified a huge reduction in poor sites from mid 1980s to 2015. They also identified a decline in the highest quality sites – these should not be assumed to be 'safe'. Monitoring is now identifying areas for quick wins.

Discussions points included: how to measure change, trade off of representativeness vs detecting change, fixed sites verses agile networks, how to extrapolate to others sites, how to combine with other data, how to reconcile datasets collected using different techniques.

Sub-group discussions: development of sentinel-type monitoring networks and the potential to add value through collaboration.

The following four questions were considered.

1. What questions do we want to answer with a sentinel network?
2. Monitoring at sentinel sites: what to monitor?
3. Monitoring at sentinel sites: frequency in time and space (representativeness)?
4. How can we maximise the use of evidence from multiple sources?

Key discussion points are noted below and the detail of discussions is included in Annex A.

- Sentinel networks should be able to tell us the state of the environment, what is changing, what do we need to manage, are there trends, are there any emerging national scale issues, and they should support the validation of models/remote sensed data.
- A wide range of parameters should be measured at sentinel sites with the aim to evaluate correlations with the aim to rationalise measurements in the longer term.
- Flow data at sentinel sites are important and should it be monitored or modelled.
- Robust methods, data recording and analysis are important. Methods that give 'good enough' answers may be useful.
- Monitoring frequency should be optimised for catchment response type.
- Need to consider data analysis in design (including magnitude of change anticipated).
- Monitoring sites could be shared with partners to share the burden. Include co-location of measurements to maximise use of data.
- Data need to be readily accessible with robust metadata and standards.

- Introducing new methods needs resourcing and intercalibration.
- Need to link monitored and unmonitored sites to draw conclusions from where we do not have data.
- Modelling approaches should be shared – working towards common UK systems.

Day 2: David Allen (DA), NRW, began with some observations from Day 1. The importance of linking monitoring and modelling was noted. When adopting risk based approaches it is important that we are clear what risks we are considering. Monitoring networks must be designed well to support decision making. Some would prioritise observing good sites; preventative management is important as it is more efficient that improving bad sites.

Organisational perspectives on **emerging risk based approaches** were summarised by Hannah Green, HG (EA), Dave Johnston, DJ (NRW), Nathan Critchlow-Watton, NCW, (SEPA), and Wendy McKinley, WM (DAERA).

HG presented on the **EA's strategic monitoring review**. Monitoring and evaluation are essential and should be balanced. There is a perception that lots of data are not used. Data should be used in iterative management. Most monitoring is classification based – in future it needs to be more agile, catchment based and collaborative. Risk based approaches are needed with a watching brief to check controls are working. What are the trigger levels of concern?

DG reported on **NRWs approach to risk based monitoring**. Reputational risk was highlighted as an important consideration. NRW have used a risk based approach (decision tree –pressure/risk of deterioration) to reduce monitoring. Need to manage those places not being monitored and keep a watching brief.

NCW reported on **SEPA's monitoring approach**. Monitoring has become progressively more focused on the areas of highest risk. "WFD" biological monitoring has stopped in areas where we have high confidence in the status, and no obvious drivers of change. These water bodies will be monitored using rapid assessment techniques to check/track changes. By 2019, SEPA intends to use the SAGIS modelling software to classify rivers for water quality, and to make regulatory decisions.

WM reported on **DAERA's monitoring approach**. Water Assessment Data & Evidence involves surveillance, investigative, compliance, R&D and operational monitoring. There is a move towards more investigative monitoring and new technologies.

Sub-group discussions: discuss future risk based approaches and collaborative actions.

The following four questions were considered:

1) Risk and impact assessments. What we mean and how to use together. Appetite for risk and link to evidence.
2) Framework of rapid assessment techniques and links to sentinel.
3) Using available external data and optimising mixed data sources.
4) Tools for maintaining a watching brief where monitoring is scaled back.

Key discussion points are noted below and the detail of discussions is included in Annex A.

- A tiered approach to risk assessment (pressure plus impact) can be used to inform where to monitor.
- Appetite for risk is increasing by necessity – varies between organisations.
- How dynamic are risk assessments given we now have high frequency real time data?

- Unlikely to have a UK approach to risk assessment but could have a UK framework to align broad principles.
- Rapid assessment techniques may play a key role in risk based monitoring – questions regarding standards of data and when appropriate remain.
- Rapid assessment techniques could be developed through UKTAG and across Europe. There is a need for a suitable framework and intercalibration.
- Varied data may be very valuable but can be poor quality, monitoring cannot be prescribed but could be influenced. Metadata can add value.
- Varied data can be used as screening tools, to influence monitoring, provide information on pressures. We should share examples of its use.
- Co-ordination of data collection and recording is important. A framework for using these data may be important.
- Tools for maintaining a watching brief are important. Must understand what we are watching. Must have triggers for monitoring, impact, resilience.
- A watching brief may be supported by understanding land use change, modelling wide areas with local validation, using local knowledge, use of new low cost sensors, social media (photos; mobile apps), enthuse communities with new technology.

Agreements on next steps: The workshop closed with the identification of 8 actions to take forward. These are summarised below and full details are included in Annex B.

Eight workshop outcomes were identified (see below). These are being taken forward with support of UKEOF, members of the Management Group are encouraged to contribute where they have a mutual interest. Each of the 8 outcomes will be explored in detail during the Freshwater Monitoring Strategies dissemination webinar that is planned for 17th January 2018.

1. Explore robust approaches to using varied data; evaluating the evidence base
2. Promote rapid assessment techniques
3. Share case studies: Questions and approaches
4. Risk based approach – share best practice
5. Freshwater Monitoring workshop – disseminate outcomes
6. Water quality classification and confidence
7. Share approaches to designing sentinel network
8. Initiate regular strategic cross agency discussions