Conservation Officer Report (2016)

CONSERVATION & RECORDING COMMITTEE

1. What is the Conservation and Recording Committee (CRC)? Molluscan conservation and recording are two key Conchological Society objectives. To oversee these activities we have three specialist officers for marine and non-marine recording and conservation. The CRC is one of the Society's four committees. In 2015 Robert Cameron retired as chair with the responsibility passing to me. Committee membership remains largely unchanged, comprising Martin Willing (Chair), Adrian Norris (Non-marine Recorder), Simon Taylor (Marine Recorder) Bas Payne, Peter Topley, Mary Seddon, Adrian Sumner, Evelyn Mookens, Ian Killeen, Robert Cameron and Julia Nunn. This very experienced team represents a wealth of experience covering many aspects of non-marine and marine recording, conservation, ecology and specialist regional issues affecting Britain, Ireland and Europe.

In November 2016 the reformed committee held its first meeting at the National Museum of Wales in Cardiff (preceding the regional meeting). A series of issues were discussed with the main focus on record verification.

IMAGE 1: Shots of CRC members in Cardiff

2. The need for accurate / reliable records – some background. The Society maintains one of the most accurate and reliable non-marine data sets for Britain. Our records can be viewed through the NBN Gateway (post March 2017 to become 'NBN Atlas') and the National Biodiversity Data Centre (NBDC) (for Ireland). Filtered Conchological Society data is often used in preference to the full NBN data set which, is often 'contaminated' with erroneous or questionable entries. By upholding rigorous standards our data is invaluable in:

1. Allowing wide-scale condition assessments of both rare and common species;
2. Tracking the spread of native and non-native species;
3. Identifying declines of species both in *range* and sometimes population trends.
4. Maintaining the Society's reputation as a trusted source of British molluscan records.

At present the Society's verification procedures for new records are unclear and possibly inconsistent. Currently the Society offers guidance on our website for those submitting records: http://www.conchsoc.org/node/2062. This doesn't, however, explain what our verification and acceptance standards are or provide identification guidance.

3. Meeting discussion and decisions:

A. New Vice-county records and species of conservation importance: It was agreed that generally for new records acceptance a specimen (or specimens) would need to be produced and (except in special cases) retained as a voucher in an appropriate museum (possibly linking to the specimen's origin so, for example, the National Museum of Wales for welsh finds). A more formalised 'protocol', will be produced during 2017 for discussion and possible adoption at the CRC meeting in November 2017.

B. Common, 'every day' and non-new VC records: Again this would be down to a number of factors such as (1) knowing the competence of the recorder, (2) the likelihood of the species being present where it was recorded and possible use of evidence such as photographs.

C. Plans to develop a verification tool: To assist Society members (and those inputting records to iRECORD and during Bioblitz events) it was decided to develop a '**verification guide tool'**. This will be developed throughout 2017 to assist people to undertake simple ID checks. These included:

- The importance of including **HABITAT details**; some species are generalists whilst others have very specialised habitats. Thus *Pseudanodonta complanata* is most unlikely to be found in still water or *Abida secale* in woodland.
- **GEOGRAPHICAL LOCATION** is revealing; some species are unlikely to be found outside particular regions (e.g. *Cochlicella acuta* mostly in coastal locations and *Clausilia dubia* unlikely outside northern England).
- Is **PHOTOGRAPHIC EVIDENCE** sufficient? For some species such evidence might be suitable provided that the image shows appropriate views and scale (e.g. a side view is required for verification of *Hygromia cinctella*).
- Is **DISSECTION** required for identification? For certain splits this maybe essential ; thus in the separation of *Lymnaea fusca* from *L. palustris* and *Ambigolimax nyctelius* from *A. valentianus*.
- The frequent confusion between species with **SIMILAR APPEARANCES** regularly lead to mis-identification. (e.g. *Valvata piscinalis* / *V. macrostoma*; *Segmentina nitida* / *Hippeutis complanatus* and *Anodonta anatina* / *Pseudonadonta complanata)*.
- Do species require **EXPERT EXAMINATION** by a Society approved 'expert'? (Such species include *Vertigo geyeri, V. lilljeborgii* and *Valvata macrostoma)*.

Other items and issues discussed included:

1. It was decided to **retain the Vice-counties** for non-marine recording. Although this system does consist of rather irregular recording units its retention is useful to (1) allow continuity with the Society's past records and (2) to act as 'trigger' for the review of new records.
2. **Non-marine card records**. Work is underway to improve archival storage of the many recording cards stored at the NHM. Work is also in progress to determine if all old records have been digitised.
3. **Marine matters**: In the absence of the marine recorder discussion was limited but the committee believed that:
   - The now discontinued Sea Areas recording system should be replaced with new (more regularly sized) geographical units;
   - That verification procedures adopted for non-marine recording should be broadly similar for marine recording.
4. **Data sharing with Ireland**: This was discussed but not fully resolved. Whilst the Conchological Society provides all of its data to NBN on an 'open access' basis (except for some rare protected species subject to illegal exploitation) there were a number of potentially legal issues with some Irish records and questions concerning record ownership. It was agreed to maintain the current status quo until some of the Irish committee members had clarified issues.

5. **iRECORD**: Although the Society Recorders can act to help in the verification of records submitted to this open-access repository of individual entries, it was pointed out that the Society has no official link with, or obligation to this scheme. It was agreed that new records arising from iRECORD should undergo the same level of scrutiny as those submitted directly to the Society (and certainly before they were 'accepted' as Society endorsed records).
6. **NBN - erroneous mollusc records**: Following reports of incorrect (non-Conchological Society) records appearing on NBN (e.g. *Vertigo geyeri*, *Valvata macrostoma* and *Anisus vorticulus*) it was decided to launch a rolling programme, initially selecting species of conservation concern, to identify errors and report them to NBN colleagues. It was also felt important to encourage Society members to notify the Recorders of any apparent errors in Conchological Society records.

7. **Monitoring of selected species**: 'Conservation agenda' rare species are regularly monitored but the majority of common and local species are not. Consequently we know little about any changes facing them; even if the overall range appears stable there may be overall population declines. The fortunes of many widespread invertebrate groups in Britain are well known because of widespread popular appeal linked to accessible monitoring schemes. For example Butterfly Conservation successfully produces annual reviews for most butterfly species. It is difficult for us to achieve such similar outcomes for molluscs; few people are actively involved and identification difficulties for many species is a further obstacle. The meeting suggested that the Society select a suite of widespread species that might form the basis for national or regional schemes. Examples of readily identifiable and widespread species might include *Helicella itala, Pomatias elegans*, *Cepaea* spp*, Limacus maculatus* and *Lauria cylindracea*. Additionally because of low Society membership it was suggested that we also plan to engage the wider public. This would not only generate more data but also raise the Society's profile and hopefully encourage recruitment.

IMAGE 2: Example of one of the monitoring candidate species (? *Pomatias elegans*)

THE GULF WEDGE CLAM *RANGIA CUNEATA* - FURTHER DEVELOPMENTS

In my last Officer's report I described the discovery of *Rangia cuneata*; work to learn more about the clam continued in 2016.

1. Risk Assessement: When newly discovered non-natives species are discovered in Britain the governmental Non-native Species Secretariat (NNSS) seek expert opinion to assess the possibility of spread and the possible impacts on native wildlife and the economy. As action maybe required, Rapid Risk Assessment (RRA) documents are produced as a matter of urgency . 2016 saw Society involvement in the completion of a RRA for *R. cuneata* which will be available to view on the NNSS website http://www.nonnativespecies.org/index.cfm?sectionid=51 after April 2017. RRAs have already been produced for 8 mollusc species*.

*Risk Assessments are also included for:

- *Corbicula fluminea* (Asian clam)
- *Crassostrea gigas* (Pacific oyster)
- *Crepidula fornicata* (Slipper limpet)

- *Dreissena polymorpha* (Zebra mussel)
- *Dreissena rostriformis bugensis* (Quagga mussel)
- *Potamopyrgus antipodarum* (New Zealand mud snail)
- *Ruditapes phillippinarum* (Manila clam)
- *Rapana venosa* (Rapa whelk)

IMAGE 3: shots of a couple of the listed invasives

How did *Rangia* get into Britain and spread in Europe?

Another *Rangia* issue concerns the origins of the newly discovered Lincolnshire population as well as established breeding populations in Belgium, Holland and at Baltic sites in Germany, Poland and Russia. Had a first European 'founder population' been established which acted as a spread source within Europe or were these isolated populations the result of a series of separate introduction events from across the Atlantic? If the European populations are linked how are they inter-related and if they arose separately, where were the source populations in the USA? In early 2016 the Conchological Society was invited to help answer some of these questions together with a continental research team based in Belgium and Russia (*see below). This project has been using tissue samples to undertake DNA molecular studies to explore genetic links between populations. To provide English material for the study the Lincolnshire sites were revisited in June 2016 to collect live clams. Tissue samples were taken from 25 adult *Rangia* (snips of mussel foot tissue being used). The samples were sent (together with those from other populations across Europe) to Russia for DNA sequencing. The results of this study were still being evaluated at the end of 2016 but answers to these various questions will hopefully be available in published form in 2017.

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Further *Rangia* studies in England

In my last report (*Mollusc World* **41**: 18 – 23) I listed a series of questions focussing on further studies on the clam in 2016. Collaborative work with colleagues from the Environment Agency have now managed to plot distribution in the Boston area, reveal more about its salinity tolerances and formulate some hypotheses concerning its colonisation of the South Forty Foot Drain. Work is still in progress on shell aging (sclerochronology), which may provide more precision concerning the time of the bivalve's arrival in Lincolnshire. A meeting at Environment Agency offices in June 2016 considered a number of options to reduce or eliminate this potentially harmful invasive. Studies are still ongoing; more specific results will appear later in 2017.

THE POSSIBLE USE OF eDNA FOR THE SURVEY AND CONSERVATION OF THE LITTLE WHIRLPOOL RAM'S-HORN SNAIL *ANISUS VORTICULUS* – NEWS OF A JOINT VENTURE.

Anisus vorticulus – brief background

Anisus vorticulus is a very rare freshwater gastropod that in the UK is restricted to three areas of coastal and floodplain grazing marsh in the Norfolk Broads, Pevensey Levels and River Arun valley (the last two both in Sussex). This is Britain's most protected freshwater mollusc as well as being an English Species of Principal Importance (NERC Act 2006) and on Annexes IIa and IV of the EUHSD obliging the government to provide suitable Special Areas of Protection (SACs) and 'strict protection' for the snail. *A. vorticulus* is not easy to survey; quite apart from it being a tiny snail (rarely exceeding 5 mm) and superficially resembling the much commoner and often co-occurring *A. vortex.* Reliable identification requires taxonomic experience and surveyors also need to be licenced. Additionally, *A. vorticulus* is often present in very low numbers, requiring the examination of large quantities of material to locate it, so it can easily be over-looked.

The start of an *A. vorticulus* eDNA project: 2016 saw the start of a project to investigate the feasibility of using eDNA to monitor *A. vorticulus* presence in ditches in the Arun Valley SAC as part of the Lower Tidal River Arun Strategy. This eDNA initiative is being project managed by Oliver Sykes (Environment Agency, Worthing) with Dr Inga Zeisset (University of Brighton) undertaking all aspects of the laboratory based eDNA procedures. The Conchological Society, also part of the project group, will be offering the help and advice described below.

What is eDNA? Environmental DNA (eDNA) is used increasingly in field investigations to detect the presence of organisms without the need to physically encounter them. The use of the technique is now well established in Britain for the survey and conservation management of organisms like great crested newts. As not everyone is familiar with the eDNA process it is useful to provide a simplified summary of the technique. Environmental DNA (eDNA) is DNA that organisms naturally shed into the environment. Many bodily fluids such as mucus (perhaps especially significant for molluscs), faeces and urine contain cells with the organism's DNA. Additionally gametes, shed skin and dead and decaying organsims also add DNA to the environment. The quantities released might be incredibly small, degrade quite rapidly (eDNA typically lasts for about two weeks) and also be mixed with the DNA from numerous other organisms.
The essence of eDNA monitoring is the development of DNA primers that are complimentary to the target DNA, allowing it to be amplified to obtain sufficient material to confirm the presence of the target organism.

What procedures are being used to develop an eDNA test for *A. vorticulus*? To detect *A. vorticulus* eDNA in ditch water samples, species-specific primers need to be developed. The gene targeted in this instance (COI) is found in mitochondrial DNA and one widely used for other eDNA surveys as it can usually be used to distinguish between closely related species. Inga checked on GenBank and discovered sequenced versions for *A. vortex*, *A. leucostoma* and *A. spirorbis,* but not the target *A. vorticulus*. Existing primers were then used to obtain the COI sequence for *A. vorticulus* from which new species -specific DNA primers were produced to amplify a short, species unique

region of the COI gene. It is important that the DNA sequence chosen adequately separates *A. vorticulus* from other Planorbidae. If successful the new primers will be trialled in the laboratory to check that they only detect *A. vorticulus* DNA. A further test will try to establish the concentrations of the snail's eDNA that can be identified by the technique. If this succeeds field trials will follow in 2017.

How does the technique work? Water samples are collected, typically several litres, and DNA is extracted using one of several methods (depending on the type of sample e.g. the levels of suspended sediment). The extracted and cleaned environmental DNA is then used in a PCR reaction with species-specific primers. This amplifies the target DNA (i.e. a short region of the *A. vorticulus* COI gene) if it is present in the sample. This amplified DNA can then be visualized by electrophoresis. Alternatively qPCR may be applied using a fluorescent label in the PCR reaction to create a signal during the PCR reaction with products quantified in the PCR machine.

IMAGE 4: a laboratory set-up for eDNA work at the University of Brighton

The Conchological Society contribution: Suitably preserved *A. vorticulus*, live-collected from a ditch on Amberley Wild Brooks in June 2016 (during a 2-year study of the area for Natural England) were used by Inga to develop a species-specific eDNA primer. A review of numerous *A.vorticulus* surveys undertaken on the snail's SACs during the last 20 years allowed a listing of all co-existing freshwater mollusc species (important for the Planorbidae that might release similar DNA to that from *A. vorticulus)*. A field visit to Pulborough Brooks in November 2016 allowed the survey team to meet and also collect additional *A. vorticulus* and associated Planorbidae (*A. vortex, Hippeutis complanatus*, *Planorbarius corneus*, *Planorbis carinatus* and *Gyraulus albus*) for further laboratory studies. If eDNA primers are successfully developed, then the Society's involvement will continue into 2017 when field trials will begin. Similar eDNA work on great crested newts has shown that although tests occasionally failed to detect newts at certain times of the year, or with animals present in low numbers, they never gave 'false-positives' suggesting that the animals were present when known not to be.

IMAGE 5: The survey group working at Pulborough Brooks

The rewards of success. Numerous benefits and opportunities will follow successful development of an eDNA test for *A. vorticulus*. It will mean that:

1. ditches can be surveyed relatively quickly without the need to use licenced operators;
2. traditional survey techniques that are time-consuming, and require a high level of identification skill could be avoided;
3. ditches would not need to be disturbed by potentially invasive survey techniques;
4. large numbers of previously un-surveyed ditches (probably supporting further A. *vorticulus* populations) could be surveyed on the vast Pevensey Levels and Norfolk Broads SACs.
5. Successful use of eDNA surveying for such a small mollusc might encourage the development of eDNA tests for other molluscan species.

In short success with this project will revolutionise both the monitoring and new surveying of this endangered mollusc.

A further use of eDNA testing for another 'conservation priority' mollusc is described in:
Stoeckle, Bernhard (2016) Environmental DNA as a monitoring tool for the endangered freshwater pearl mussel (*Margaritifera margaritifera* L.): a substitute for classical monitoring

approaches? *Aquatic Conservation: Marine and Freshwater Ecosystems*. **26** (6): 1120–1129. doi:10.1371/journal.pone.0156217. ISSN 1932-6203.

For a general introduction to eDNA usage read: Bohmann *et al*. (2014) Environmental DNA for wildlife biology and biodiversity monitoring." @ https://www.google.co.uk/?gfe_rd=cr&ei=yK7TWLb3BsXU8gfYwq3YAg#q=http://m.docente.unife.it/silvia.fuselli/dispense-corsi/eDNA_TEE_2014.pdf&*

A further interesting account of eDNA used to study freshwater turtles in Canada: http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0130965

ASSISTANCE WITH CONSERVATION ORIENTATED PROJECTS:

Help and advice were offered to numerous individuals, organisations and academic institutions concerning conservation orientated projects. Examples include:

1. **Detecting invasive freshwater mussels**: A PhD student (School of Biological, Biomedical & Environmental Sciences, University of Hull) was given assistance with a project developing the eDNA detection of a number of invasive species including the Zebra mussel *Dreissena polymorpha,* and Quagga mussel *D.rostriformis bugensis*. This work involved the development of specific primers for their detection. Tissue samples of other native freshwater mussel species were required for primer testing. The Society was not only able to assist with identification of juvenile unioid mussels collected by the student (to provide tissue for DNA sequencing) but also with the supply of further live-caught unionid tissue samples from sites in Sussex and Lincolnshire.

IMAGE 6: Quagga mussel – a rapidly spreading invasive mussel

2. **The Dyserth Environmental Group**: This is a local biological recording group who have been undertaking surveys and biological recording around the village of Dyserth (Denbighshire, N. Wales). We were able to assist with the identification of numerous larger molluscs solely by the use of digital imaging. The group were assisted in making preliminary identifications assisted by use of the Society land snail guides.

3. **Molluscan Survey of Loch Strathbeg**: Society member Richard Marriott was given assistance with the identification of Pisidia taken from the loch, an RSPB reserve with the distinction of being the largest dune pool in Britain.

IMAGE 7: Strathbeg Loch

CONSERVATION IN ACTION AT *VERTIGO MOULINSIANA* SITES IN WEST SUSSEX

In 2016 the Conservation Officer joined the 'Burton Mill Pond Project Board' and also the 'Burton and Chingford Ponds Local Nature reserve Management Advisory Committee'. The interconnected Burton Mill and Chingford Ponds lie on a north flowing tributary of the River Rother near Petworth in West Sussex. There has been much recent activity at the ponds. Chingford Pond (upstream of Burton Mill Pond) has recently undergone restoration to reinstate a derelict dam so that water levels have returned to former levels leading to losses of some fen. Burton Mill Pond meanwhile has been the

subject of detailed ecological and hydrological studies by the Environmental Change Research Centre of University College London. The ponds are of interest in that they support large and regionally important populations of *Vertigo moulinsiana*, the conservation of which has been a high priority for the two management bodies. The catchment is also of molluscan interest in supporting large populations of several unionid mussels. A more detailed report on the work at the ponds is planned for a later Society publication.

IMAGE 8: View of Burton Mill Pond showing *V. moulinsiana* habitat

BRITISH WILDLIFE

Three molluscan 'Wildlife Reports' were published during 2016 (*British Wildlife* **27**:**4** 285 – 287; **27:6** 437 – 439; **28:2** 133 - 135). As in previous years these were able to cover a range of molluscan news, issues and discussions partly drawing upon and discussing the Society's non-marine and marine reports as well as a selection of reports and papers from *Mollusc World* and *The Journal of Conchology*. Additionally a main feature on invasive bivalves appeared in **27: 5**: 318 – 331.

ASSOCIATIONS WITH OTHER ORGANISATIONS

The Conchological Society has active associations with many other conservation organisations. The main ones are **Buglife, Invertebrate Link*** (to which we provide an annual report of our recording and conservation activities), and the **Wildlife Trusts** (by way of membership of the Conservation Committee of the Sussex Wildlife Trust). Additionally the Conservation Officer is a member of the **Arun & Rother Rivers Trust** (ARRT); this provides numerous opportunities to become involved in river catchment discussions where molluscan assessments and conservation issues are of relevance.

* Invertebrate Link: further information @ www.royensoc.co.uk/InvLink/Index.html

M.J. Willing (March 2017)