

# PWLL DU CAVE MANAGEMENT GROUP

**Minutes of the Meeting held at the Salisbury Community Hall, Govilon, on Sunday 22<sup>nd</sup> November 2015 commencing at 10am.**

**Attendees:**

|                 |                             |                               |
|-----------------|-----------------------------|-------------------------------|
| Mick Day        |                             | Chairman                      |
| Fleur Loveridge | Oxford UCC/Red Rose CPC     | Secretary                     |
| Sue Mabbett     | South Wales C.C.            | Permit Secretary              |
| Ali Garman      | Draenen Diggers             | Club Rep & Fixed Aids Officer |
| Chris Seal      | Chelsea S.S.                | Club Rep                      |
| Peter Talling   | University of Bristol S. S. | Club Rep                      |
| Richard Hill    | Gagendor                    | Club Rep                      |
| Dave Glover     | Morganwg C. C.              | Club Rep                      |
| Barry Hill      | Hereford C. C.              | Club Rep                      |
| Vince Allkins   | South Wales C.C.            | Club Rep                      |
| Rich Smith      | Bristol Exploration Club    | Club Rep                      |
| Spencer Drew    | Treasurer                   |                               |
| Peter Smith     | Biological Recorder         |                               |
| Andy Farrant    | Geological Recorder         |                               |
| Cristina Byrne  | Natural Resources Wales     |                               |
| Charles Bailey  | Trustee                     |                               |
| Stuart France   | C. C. C.                    |                               |
| Martin Hoff     | South Wales C.C.            |                               |
| Bernie Woodley  | South Wales C. C.           |                               |

**1. Apologies**

Apologies received from Chris Densham (OUCC), Tim Barter (WSG), Josh White (ACC & Conservation Officer) and, after the meeting from Steve King (SMCC).

**2a. Minutes of the last Meetings (23<sup>rd</sup> November 2014)**

There was some discussion of the minutes. CS suggested that there was some confusion regarding the motion voted on at the meeting, and whether it was a re-run of the 2009 vote with respect to Drws Cefn. It was confirmed during discussion that the motion was not intended as a repeat on the 2009. It was a vote in favour of mediation, but to not halt the work then in progress with the licence will awaiting the results of the mediation.

SF requested a clarification to be made. The BCC cavers referred to in the minutes turned out not to be members of the club, but cavers associated with it. This clarification has been added as a post meeting note.

An additional clarification was included regarding the roles of NE and NRW in discussion on CRoW.

SF also requested clarification that the discussions reported under AOB contained no compulsion for diggers outside of Pwll Du Conservation land to contact the PDCMG. This was agreed, however, it was proposed by DG (and seconded by PT) that the

AOB section of the minutes was an appropriate record of the discussion. This was passed in favour with four abstentions.

The minutes as clarified above were then agreed as a true and accurate record.

## **2b. Matters arising not covered elsewhere in the Agenda**

There were no matters arising which would not be covered later in the agenda.

## **3. Officers Reports**

### a) Secretary

The Secretary report is appended to the minutes. Discussion of the matters arising from it are contained under part 5.

### b) Treasurer

The Treasurer reported a quiet period, apart from costs for the hall hire and the fixed aids. His report is appended to the minutes.

CS queried the PDCMG insurance which was confirmed to come in January.

The 10p in the reserve account was confirmed as a nominal amount to keep this open.

CS queried spending on tape and it was confirmed that there had been none in this cycle.

### c) Permit Secretary/Access Officer

The Permit Secretary explained that there had been a delay getting the logbook data from the cave as trips had been cancelled due to the recent poor weather.

No door or padlock issues were reported.

The Permit Secretary continues to issue keys, but only a small number and mainly to university clubs. The most active Draenen cavers remain those in clubs with permanent keys.

There was a discussion about whether caver numbers are dropping off or not. It was reflected that unlike other Welsh caves Draenen has no adjacent hut. The matter was also considered in the light of generally reducing numbers of people participating in outdoor sports (e.g. reference Hazel Barton's recent TEDx talk).

### d) Conservation Officer

The Conservation Officer sent his apologies but had previously circulated a report, which is appended to the minutes. The report set out the first steps in a proposed conservation monitoring programme for the cave. The proposal was well received and it was agreed this was an important step forward. Discussion focussed on the most appropriate ways to implement such a scheme. Clearly it is not possible to cover the entire cave so it was agreed that AF would coordinate with JW regarding an appropriate list of sites to target.

The problem of subjectivity in monitoring was discussed, with suggestions that fixed photography points could be used to ensure like for like monitoring. It was agreed that doing a few areas well would be better than a larger area with fewer details and repeat visits. CBy commented that 5 to 10 year return periods were used in geological conservation site monitoring, but that this was still viewed as worthwhile.

e) Survey Secretary

No report.

f) Survey Recorder

No report.

g) Biological Recorder

The Biological Recorder was pleased to see the invertebrate report (appended). It was agreed to send thanks to Lee Knight for his hard work and to put him in touch with PS for future projects. It was agreed to approve LK's proposal for future invertebrate work in the cave.

Due to reports making reference of the WoW camp in the invertebrate survey a discussion ensued regarding camping in Ogof Draenen. It was confirmed that camping is not against the conservation policy, but that sites should be as small as possible and should be removed when not in use.

h) Geological Recorder.

The Geological Recorder's report is appended. It was confirmed that Chris Smith has just submitted his thesis and that the work contained within has implications for the landscape of Wales.

There was a brief discussion about radon in the cave, for which CS may have some data.

Thanks were offered to the efforts of the Geological Recorder with respect to the ongoing geological research related to the cave.

i) Fixed Aids Officer

The fixed aids officer gave a verbal report. The fixed ropes were replaced in July. The annual inspection is due next summer. The report from the last inspection in July 2015 was circulated at that time and is now appended to the minutes from completeness. An outstanding action is the replacement of the maillon at the top of the entrance climb in due course. This is as a result of that one maillon showing unusual wear

#### **4. Election of Officers/Recorders**

N/A

#### **5. Other Group Business - Update on Drws Cefn Licensing and Mediation with the CCC**

To be read in conjunction with the appended Secretary's report.

In addition to the appended report, a letter which the Secretary had received, from a firm of solicitors based in Cambridge was tabled. The letter, received at 4pm on the Friday before the meeting, effectively threatened NRW will judicial review regarding caving and CRoW should they do anything to prevent access to Drws Cefn. This could be interpreted to include issuing of a bat licence.

There was then a lengthy and detailed discussion on the events of the summer (refer to report and letter appended) and in particular the timings of release of information. CS was disappointed that FL has not provided a more immediate notification of the licence rejection. However, FL was simultaneously juggling the licence process, the

CCC mediation and other work and personal commitments. While she was adamant not to have acted in bad faith, it was clear than some considered otherwise or that greater efforts at timeliness could have been made. SF made a complaint that the method statement for the licence contained dates for carrying out the works that were in parallel to the mediation meetings. However, FL explained that the document was submitted before the mediation meetings, and the by the time of the first meeting in the Yorkshire Dales she was aware that those dates would not be met, hence this was not a barrier to successful mediation.

There was also a discussion about the involvement of PS in the licencing, although the previous design for Drws Cefn and process goes back long before his joining the Group. It was confirmed that FL has sent PS's details to the ecologist only that week for future collaboration.

The potential benefits of Drws Cefn to bats was discussed, whereas the Ogof Draenen entrance is not so suitable for them. It was confirmed that an absence of bat access due to the main gate has not been detrimental for bat usage of, for example, the Big Bang area.

FL explained that one of the reasons for the rejection of the licence was that current advice from NRW has changed compared to the previous recommendation given to the Group by the then CCW some years previously.

It was agreed that it was practical to keep working on the revised licence, despite the letter sent to NRW. For the moment we are awaiting their response.

*Post meeting note: a response from NRW has since been sent to the solicitors and is appended to the minutes.*

It was commented that the new licence application (a development rather than a conservation licence) would need to pass a test of overriding public interest. However, NRW had indicated that this should not be a problem.

CBa suggested that the letter to NRW was against the spirit of the mediation in which he had also been involved.

It was largely agreed that the letter will mainly put the landowner's back up, and was not in any way conciliatory.

It was agreed that formally the Group would note the letter but not respond.

There was a move to send a message of support to the landowner.

SF explained the rationale behind the letter. He explained that Tim Jones (the letter addressee) had previously been contacted by SF to provide a clarification regarding CRoW, but that there had been no response. Hence the letter was aimed at avoiding large expense with lawyers by getting NRW to agree that CRoW applies to caving.

*Post meeting note: this has not been the outcome, refer to subsequent letter from NRW appended to these minutes.*

In light of this explanation it was commented that the timing from SF was poor as the letter undermined the mediation process.

CBa proposed that the Group follow the policy suggested in the Secretary's report to install a grille and to involve PS with that process.

CS raised concerns with respect to having an escape route. While he understood that not all agreed with his concerns regarding liability in this respect, he felt that the landowner should be informed. It was recognised that the law in this area may not be well known. The concern was that some family could subsequently sue, etc. However, it was counter suggested that any removal of fixed aids from within a cave could be said to be the same thing. The case of Peak Cavern where the show cave had closed an entrance was highlighted. It was suggested that some further research in the area may be warranted first.

AF proposed, seconded PS, that the Group “put in a bat friendly grille on Drws Cefn which includes a lockable gate”. The motion was pasted 10-1. FL to take forward with the landowner.

It was suggested that the CCC now needs to support this agreement and not undermine the compromise position.

It was highlighted that cooperation from all within the caving community must now also be sought, since a grille would be easily removable with a cordless angle-grinder.

#### **6. Applications for membership**

None.

#### **7. Applications to become keyholders**

None.

#### **8. AOB**

a) Survey. BH enquired about the status of the survey. This matter was referred to John Stevens.

b) Motion to support the landowner, proposed by PT: “The PDCMG believe that this letter is unfortunate. PDCMG repeat that we respect the landowner’s rights in law. We thank the landowner for their efforts over many years”. Motion passed 7-1 with 4 abstentions. It was also noted that no PDCMG clubs were involved with the letter to NRW. It was also requested that thanks to NRW be minuted.

c) CIC training in Ogof Draenen. RH to help FL to attempt to obtain permission for BCA approved CIC training to occur in the cave.

d) It was reported that cavers had been observed entering Siambur Ddu. Cavers were reminded that the site is a SSSI due to bat use and they are warned against illegal disturbance. Issues of managing the site and its protection were left to scheduled discussions between the landowner and NRW.

Next meeting: Sunday 12<sup>th</sup> June 2016.

Meeting closed at 13.10

**Attachments:**

**Secretary Report**

**Letter to NRW**

**Letter from NRW**

**Treasurer Report**

**Conservation Officer Report**

**Geological Recorder Report**

**Invertebrate study correspondence**

**Fixed Aids Report**

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### **Secretary Report for meeting 22<sup>nd</sup> November 2015**

A lot has happened since our last meeting under the related topics of the CCC mediation and the Licencing processes for Drws Cefn. With respect to the former the only update since my last email (all email updates copied below for the record and the minutes) is to confirm that a notice was indeed published by Dave Tyson, CCC Secretary, in the latest CCC newsletter which I hope you have all seen. I am sure we will meet again following this PDCMG meeting.

With respect to the licensing and approach for Drws Cefn I can now report on a meeting held between myself, the ecologist, NRW and the landowner on 10<sup>th</sup> November. The meeting discussed a number of issues related to the reasons for the licence rejection. These included:

- Submission of a conservation licence rather than a development licence. Previous advice from the then CCW was to submit a conservation licence. However, it is now preferable from NRW's perspective to submit a development licence since the purpose of the work is not to conserve the protected species.
- Restrictions to airflow. There were concerns about restricting airflow in the passage by construction of a solid wall.
- Concern about subsequent vandalism to anything installed and the disturbance this might cause.

The suggested route through these issues is to install a grille at (or in) the entrance. This will get round any concerns about airflow. It will also offer a compromise to the caving community by installation of a less permanent blockage. This could potentially be changed in the future if the landowner changes his mind about access and the PDCMG desire it. If this compromise could also be supported by the Cambrian Caving Council (as discussed at the mediation meetings) then it would reduce the risks of the grille being vandalised. This approach was agreed by the landowner (who remains adamant that he does not wish to see access) and NRW and I hope it will also be agreeable to this Group and the majority of cavers. I hope it would also dispel concerns some people have about rescue.

If such an approach can be agreed by this Group and the CCC (in the spirit of our recent discussions) will support it then the next actions are to 1) prepare a design for the grille and 2) over the winter prepare and submit the development licence application.

F Loveridge 14/11/2015

Appendix: Copies of recent email updates for the record:

22/10/15

I thought it was time I gave you a quick update on the situation with respect to 1) the bat licence for Drws Cefn and 2) the mediation with the CCC.

With respect to the former, a meeting has now been arranged with NRW to discuss our options and possibly alternative approaches for DC. This will happen early next month, ahead of our next group meeting so I can report in full then.

With respect to the latter, we had another meeting on Sunday at Hidden Earth three weeks ago. Essentially I updated the CCC and BCA that the licence application had been declined/withdrawn and suggested that this potentially offered an opportunity for us to do something different at the entrance, pending landowner and NRW agreement. We also discussed a brief article for the CCC newsletter about the fact that the mediation was on-going to inform the general caving community. This is currently being drafted by Dave Tyson.

Sadly, since the Hidden Earth weekend it has come to my attention that there are some scurrilous suggestions doing the rounds on the caving forum that I may have not acted in good faith over the licence process and the mediation meetings. I would like to take the opportunity to completely dispel these suggestions.

I suspect these rumours are because licence rejection was around the same time as I was updating the group on the mediation meeting. Unfortunately, some people are determined to perceive an exciting Machiavellian motive in such timings ! The truth is far more mundane - I just have a full time job, family caring commitments and other interests which mean I cannot attend to PDCMG business on a 24/7 basis. Hopefully, as the collaboration and mutual support between PDCMG and CCC via the mediation progresses, the excitable cynics will become marginalised.

If there is any more significant news before our next meeting I will update you again, otherwise see you all next month.

24/9/15

A further update is overdue on the situation with respect to licencing, Drws Cefn and the CCC.

Firstly thanks to those who replied to my previous email below. Just to say that if you have any further points please let me know today or tomorrow as we are due to meet again at Hidden Earth this weekend.

Secondly, I must report that our licence application to NRW has not been successful. This is for two reasons. First there had been some miscommunication about the exact solution to be implemented that meant licensing were not assessing the correct concept. But additionally there also seems to have been a change of stance from NRW and ideas which

previously were agreed as acceptable are now disputed. In particular it was suggested that we should be applying for a development licence not a conservation licence as previously recommended.

To take this matter forward we are proposing a meeting with NRW and the relevant stakeholders to understand better what needs to be done and what would be acceptable. To some extent this could be said to offer us an "opportunity" to change our proposals a little in light of the recent CCC discussions (see my email below). However, I must temper this by saying that what we propose needs to be acceptable not just to NRW but also to our landowner who has been pretty firm on this subject of late.

I do not have a date for this meeting as yet, but I would hope it would be ahead of our next group meeting and I can report back further then.

Any questions or feedback let me know. I may well see some of you at the weekend in any case.

07/9/15

My apologies for taking a couple of weeks to get back to you all regarding the recent meeting with the CCC and the BCA. Given the meeting was at least in part about working towards greater trust we wanted to make sure that any report was an appropriate reflection of the discussion and not immediately the cause of further dispute.

In summary, on the 23rd August Charles and I had a useful meeting with Andrew Hinde (BCA), Stuart France (CCC) and Dave Tyson (CCC). We attempted to not spend too much time raking over the past and instead think about how we might all tackle the future. Andrew had spoken to our landowner in the preceding week and it was clear that he wished Drws Cefn to be closed as soon as possible and that his patience was running out. Consequently it was felt that it was essential that we promptly moved to act on the landowners wishes.

However, recognising that permanent closure could be seen negatively by a proportion of the caving community ( both those knowledgeable of the background, and those that would simply read about it ) we also needed to consider whether something that is seen as less permanent within the eyes of the caving community could be implemented. Whether and to what extent this can be achieved in the immediate future will depend on the licencing process. However, we felt that what we could offer was to review to situation after implementing the landowner's wishes.

All at the meeting agreed that key to moving forward, on this matter initially, but more generally, was better relations between CCC and PDCMG. If we are genuinely pragmatic in this closure process then we are more likely to bring the majority of the caving community with us. In exchange we expressed a wish for a commitment from the CCC to cease to undermine the PDCMG and overtly work with us.

We agreed tentatively to meet again next month to discuss matter further.

17/8/15

A number of things were discussed at our last meeting, and now I am back from expedition I wanted to bring the Group up to date on subsequent events in a couple of areas.

Just before I went away the Licence application was submitted with respect to the works at Drws Cefn. This has been reviewed by NRW who have returned some comments which are currently being addressed. Assuming there are no problems with the responses to be submitted then theoretically we should be able to complete the works ahead of roosting later this year.

Meanwhile, as agreed at the last meeting I contacted Andrew Hinde of the BCA regarding the proposed mediation. Thanks to all who replied to my previous inquiries on this subject. An initial meeting is now planned to go ahead this weekend in the Yorkshire Dales. I will keep you posted, but following pre-meeting discussions with Andrew, I expect I will need to bring back some proposals for your consideration.

Finally, Josh and I have been reviewing the conservation plan for the cave and both agree that some form of monitoring programme would be beneficial. We will try and do some more work on this over the remainder of the summer so as to bring some proposals to the next meeting.

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# RICHARD BUXTON

ENVIRONMENTAL & PUBLIC LAW

19B Victoria Street  
Cambridge CB1 1JP

Tel: (01223) 328933

Fax: (01223) 301308

www.richardbuxton.co.uk

law@richardbuxton.co.uk

Natural Resources Wales  
Unit 19 Mold Business Park  
Wrexham Road  
Mold CH7 1XP

Attn: Tim Jones, Executive Director Operations North and Mid Wales

20 November 2015

Dear Sirs

## **Drws Cefn access to Ogof Draenen cave system**

We are instructed by Stuart France and Nigel Rogers, who are active cavers and members of the Grwp Ogofeydd Garimpeiros, a caving club. They have explored the Drws Cefn entrance to Ogof Draenen cave system many times and are concerned as, we understand, are many others, at proposals to restrict access to the cave at this entrance by installation of a grille or similar structure.

To get to the point, this entrance is in an area of open country with access permitted under the terms of the Countryside and Rights of Way Act 2000 ("CROW"). The legal question, we are aware, is whether caves are covered under this legislation. We have taken leading counsel's advice on the matter and, in the light of that, are confident that they are so covered.

In these circumstances if NRW or any other body takes any steps to restrict the access in question or to authorise or condone same, take notice that judicial review proceedings are likely to be instituted in relation thereto, including if necessary seeking an injunctive remedy against the landowner.

Obviously our clients would rather avoid legal proceedings and the great worry that the threat of closure of this access causes them and other cavers. Accordingly we would be grateful for your prompt acknowledgment of this letter we trust confirming that no steps will be taken to restrict access; and if any application is made by the landowner to such effect, you will immediately notify us.

As well as the landowner, we are also copying this to the secretary of the Pwll Du Cave Management Group. We understand that it (for some reason) favours restriction of access. We are unsure why and/or what status it has, but in any event it may assist for it to be aware of our client's position and our instruction.

Yours faithfully

  
Richard Buxton

cc. Pwlldu Conservation Ltd. Reg. no. 03494984 (attn: Peter Jones)  
by email: peter.jones@lineone.net  
Pwll Du Cave Management Group (attn: Fleur Loveridge)  
by email: fleurloveridge@hotmail.co.uk

Partners: Richard Buxton\* MA (Cantab) MES (Yale), Susan Ring\* LLM Env (London), Adrienne Copithorne\* BA (Cantab) MA (UC Berkeley),  
Lisa Foster Juris D MSc (UEA) MA (York) Consultant: Paul Stookes\* PhD MSc LLB

Associates: Caroline Chilvers BA (Hons), Carolyn Beckwith BA (Hons) LLM Practice Manager: Sheryl Taylor

London office: 419 Richmond Road, East Twickenham TW1 2EX Tel: 020 8296 1881

Authorised and regulated by the Solicitors Regulation Authority No.74899

\* Solicitor-advocate

DRAFT



**Cyfoeth  
Naturiol  
Cymru  
Natural  
Resources  
Wales**

Our ref: TJ/SP/ONM273

Your ref:

Llwyn Brain

Ffordd Penlan

Parc Menai

Bangor, Gwynedd LL57 4DE

Ebost/Email: Sharon.Parry@cyfoethnaturiolcymru.gov.uk

Ffôn/Phone: 03000 655264

Richard Buxton  
Environmental & Public Law  
19B Victoria Street  
Cambridge  
CB1 1JP

8<sup>th</sup> December 2015

Dear Mr Buxton,

**DRWS CEFN ACCESS TO OGOF DRAENEN CAVE SYSTEM**

Thank you for your letter of 20<sup>th</sup> November 2015.

In relation to your question about whether caves are accessible as of right under the Countryside and Rights of Way Act 2000 (CROW). Whilst we have had sight of the opinion of Dinah Rose QC, we have also had sight of other opinions and have obtained our own internal legal opinion which concludes that CROW does not provide a right of access to caves and potholes. We understand this is consistent with the interpretation of Natural England and Defra on this matter.

The point and position is plainly summarised in guidance provided initially at the commencement of CROW in 2005 in a 'Frequently Asked Questions' document produced by the Countryside Council for Wales and retained in the updated document provided by NRW:

*Q. Does access on foot include pot holing and caving?*

*A. No. As the CROW Act covers access for the purposes of open-air recreation, pot holing and caving are not included in the right.*

[See: <https://naturalresources.wales/media/1174/change-oafaqtemplated1.pdf> ]



We would hope that the arrangements for access to Ogof Draenen can be agreed between the interested parties. To that end we would be prepared to help with discussions to support such an outcome.

Yours sincerely,

A handwritten signature in black ink, appearing to read "Tim Jones", with a long horizontal flourish extending to the right.

**Tim Jones**  
**Executive Director Operations - North & Mid Wales**

## Treasurer Report

### Pwll Du Cave Management Group

#### Income And Expenditure Account For the Period Ending 31st October 2015

|   | Period 01/06/15<br>to 31/10/15 |                 | Period ending<br>31/05/15 |                | Period ending<br>31/05/14 |                 |
|---|--------------------------------|-----------------|---------------------------|----------------|---------------------------|-----------------|
|   | £                              | £               | £                         | £              | £                         | £               |
| <b>Income:</b>                              |                                |                 |                           |                |                           |                 |
| Donations:                                  |                                |                 |                           |                |                           |                 |
| SWCC  |                                | 0.00            |                           | 0.00           |                           | 80.00           |
| F Loveridge                                 |                                | 18.00           |                           | 0.00           |                           | 48.00           |
| Cwmbran CC                                  |                                | 0.00            |                           | 0.00           |                           | 20.00           |
| S Drew                                      |                                | 0.00            |                           | 0.00           |                           | 20.00           |
| Wild Places Publishing                      |                                | 0.00            |                           | 0.00           |                           | 20.00           |
| BEC   |                                | 0.00            |                           | 0.00           |                           | 20.00           |
| Shepton Mallet CC                           |                                | 0.00            |                           | 0.00           |                           | 20.00           |
| OUCC  |                                | 0.00            |                           | 50.00          |                           | 0.00            |
| UBSS  |                                | 0.00            |                           | 30.00          |                           | 0.00            |
| Dudley CC                                   |                                | 0.00            |                           | 20.00          |                           | 0.00            |
| Draenen Diggers                             |                                | 105.00          |                           | 0.00           |                           | 0.00            |
| Refund From CCC (Insurance)                 |                                | 0.00            |                           | 50.00          |                           | 50.00           |
| Refund From CCC (Hall hire)                 |                                | 0.00            |                           | 0.00           |                           | 76.00           |
| Bank Interest:                              |                                | 0.00            |                           | 0.00           |                           | 0.00            |
|   |                                | <u>123.00</u>   |                           | <u>150.00</u>  |                           | <u>354.00</u>   |
| <b>Expenditure:</b>                         |                                |                 |                           |                |                           |                 |
| New lock and Keys                           | 0.00                           |                 | 0.00                      |                | (389.82)                  |                 |
| BCA Insurance                               | 0.00                           |                 | (50.00)                   |                | (50.00)                   |                 |
| Hall Hire                                   | (18.00)                        |                 | 0.00                      |                | (48.00)                   |                 |
| New safety equipment (Draenen)              | (105.00)                       |                 | 0.00                      |                | 0.00                      |                 |
|   |                                | <u>(123.00)</u> |                           | <u>(50.00)</u> |                           | <u>(487.82)</u> |
| <b>(Deficit) of Income Over Expenditure</b> |                                | <u>0.00</u>     |                           | <u>100.00</u>  |                           | <u>(133.82)</u> |

#### Notes to the above for the period ending 31st October 2015

|  | 2015          | 2015          | 2014          |
|--|---------------|---------------|---------------|
| The closing balance actually requests the following: |               |               |               |
| Balance in current A/c                               | 407.61        | 407.61        | 307.61        |
| Balance in Reserve A/c                               | 0.10          | 0.10          | 0.10          |
| Total Funds  | <u>407.71</u> | <u>407.71</u> | <u>307.71</u> |

Many thanks to Draenen Diggers for donating monies to cover the costs of the rope replacement this year.

Spencer Drew ACA DipPFS BSc  
Treasurer  
(Spencer.Drew@Ntlworld.com)

## Conservation Officer Report

June to November 2015

Since the last meeting the main effort has been to create a method to monitor the condition of Ogof Draenen, looking at the degradation of features in the system. We looked at similar programs used by Council of Northern Caving Clubs (CNCC), as inspiration for our program. They have implemented a system to monitor the conditions of features in caves such as in Easegill Caverns. The system is simple and consists of a selective group of features which are regularly rated from one to five, depending on their condition. By monitoring their condition using the rating system over time, the condition of each formation can be analysed to see if there condition is changing and if measures need to be put in place to stop further degradation of the feature.

The process of monitoring the feature is split into three sections. The first two are completed by the individual who is visiting Draenen and monitoring sites. The third section is completed by the conservation officer. The first section involves printing off the monitoring form and completing it underground. The second section involves copying the gathered information from the visit and transferring the data onto an electronic form and submitting it to the conservation officers. The third section involves the officer collecting, analysing and watching for changes in the condition of the features.

To start the project Gilwern Passage was chosen, consisting of many features and also having high footfall compare to other sections of the cave system. However over time, other key features could also be included in the monitoring program.

For the monitoring to work, it requires input from cavers visiting the monitoring sites and we request that such visitors record the condition of each for the selected features. So if you're visiting Gilwern passage it would be much appreciated if you could complete the monitoring form. As well as the form does include extra notes if you spot anything you wish to report, to the conservation officer, anywhere else in the cave. From damaged formations, to broken conservation tape. At the bottom of this document it includes screenshots of the two monitoring forms. Also if you know the correct names of the feature listed, let me know please.

As mentioned at the last meeting I will be travelling all year and will be back for October 2016. Sorry for any inconveniences this may cause, but if you complete the form I will be able to receive and collect the data. Also if you wish to report anything over the next year, let me know and will try to solve it once I am back in the UK.

I look forward to receiving any data and comments about the project.

Finally at the beginning of November I visited Draenen and repaired conservation tape in Gilwern Passage. In total 30 meters of new tape was laid: replacing, repairing and tidying the current tape in that part of the cave.

Many thank,  
Joshua White








## The printable monitoring from:

Step 1:  
Firstly,  
print off  
this

### Monitoring Table

Gilwern Passage

Date visited (DD/MM/YY):

| Feature Number | Feature Name  | Location   | Description  | Rate condition 1-5<br>1=completed<br>broken/destroyed.<br>2= very damaged<br>3=damaged, but largely intact.<br>4=mainly pristine but small amount of degradation.<br>5=pristine condition. | Condition description<br>(e.g. damage, broken, muddy, foot/hand prints or pristine condition) | Photo   |
|----------------|---|--|--|--|---|---|
| 1              | Sediment floor and Bank                                   | The start of Gilwern Passage   | A large sediment bank with a path on the right hand side of the passage. The sediment is mainly sand texture and approximately 20 meters in length. Tape is also held down by large tall thin rock in the centre. It has a thin delicate crust and has signs that it has been crawled across at one stage. Areas are still in pristine condition with fallen gypsum crystals on surface. |  |   |    |
| 2              | Giles' Shirt (large calcite formation)                    | Found just after the last feature, in Gilwern passage  | A large calcite formation that starts from the ceiling with stalactites dripping on to a large stalagmite which flows down on to calcite pools which contains rimstones and dogtooth spar formations.  | Stalactites and Stalagmites:<br><br>Calcite pool:  |   |    |
| 3              | Calcite stalagmite and flow                               | In the middle of the first section of Gilwern Passage  | A large stalagmite on the wall of the passage on the right hand side. It is joined and dripped on by straws from the ceiling and is about 5 meter tall   |  |   |  |
| 4              | Fluvial sediment formation                                | In the middle of the first section of Gilwern Passage, just after the last feature, on the floor on the left hand side. (Monitoring the first example of this type of deposit only). | A 5 meters long fluvial sediment formation in what is now a mainly dry passage. The dunes created by moving water are about 5 inches in size and show once the water flow away from Tea Junction.  |  |   |  |
| 5              | Mud Floor   | Just after the waterfall. Mud floor either side of the taped path/stream   | About 10 meters in length, mud floor on either side of the stream and path. Consist mainly of clay texture and on the surfaces contains many gypsum crystals. The feature also contains many drip holes, but also many foot and hand prints.   |  |   |  |
| 6              | Large calcite formation with stalagmite and calcite floor | Just over a couple of boulders after the last feature, part way down the second section of Gilwern passage.  | A large calcite floor and large stalagmite on the right hand side of the passage. The stalagmite drips onto the calcite floor, which is surrounded and protected by expanding foam.  | Stalagmite:<br><br>Calcite floor:  |   |  |
| 7              | Gypsum crystal formations                                 | Middle of second section of Gilwern passage, on left hand side wall, marked by a bit of hanging tape.  | By the tape hanging down, there is a small cove on the passage wall. Inside a pile of small spikey gypsum crystals, which look like small delicate feathers. The cove is about a foot long.  |  |   |  |

monitoring form (to the left) or note down the selected monitoring sites you are visiting.

Step 2: Visit the Ogof Draenen monitoring sites. Rate the condition of the features from 1-5 and note any damage. Also note any other places with damaged formations or missing/ broken tape in the cave system that you see. (Note that practically it is not possible to include all features within this survey.) Also, if possible, take photos of the monitoring sites, so that we can illustrate any changes in condition that may have occurred. Please include any other comments you wish to add.

Online Monitoring from:

Step 3: Once home, complete the electronic monitoring form found on the PDCMG website. The form will automatically be sent to the Conservation Officer. Any photos taken from the monitoring sites can be sent to the conservation officer by email.

Page 1: Complete your details



**Ogof Draenen Monitoring Form**

Full Name \*    
First Name Last Name

Club Name \*

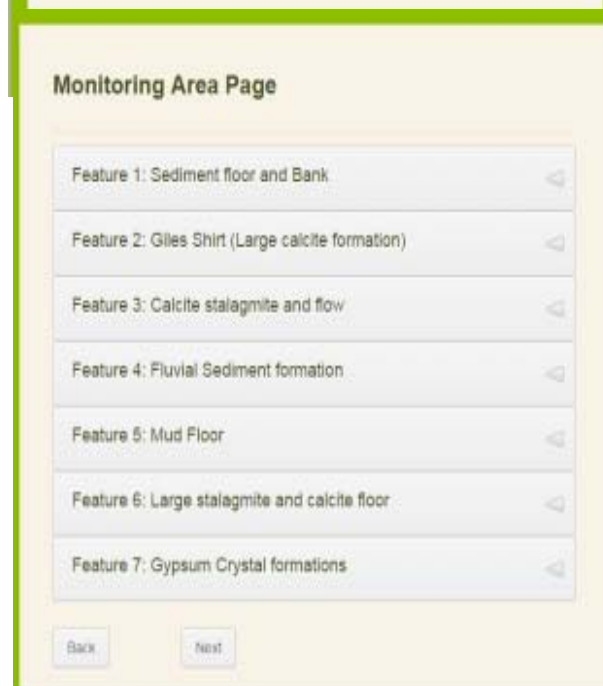
Group Size

Date of trip \*  -  -  Month Day Year

Your E-mail   
ex. myname@example.com

**JotForm**  
A Cloud On Demand Software

Page 2: Fill in the data you collected from the visit, in each feature section. Each section is the same layout with rating and any other details you wish to add about the feature.



**Monitoring Area Page**

Feature 1: Sediment floor and Bank

Feature 2: Giles Shirt (Large calcite formation)

Feature 3: Calcite stalagmite and flow

Feature 4: Fluvial Sediment formation

Feature 5: Mud Floor

Feature 6: Large stalagmite and calcite floor

Feature 7: Gypsum Crystal formations



**Monitoring Area Page**

Feature 1: Sediment floor and Bank

Rate the condition: 1=completed broken/destroyed, 2= very damaged, 3=damaged, but largely intact, 4=mainly pristine but small amount of degradation, 5=pristine condition

Rate the condition (1-      5)

Condition description  
(e.g. damage: broken, muddy, toothand prints or pristine condition)

Condition description

Feature 2: Giles Shirt (Large calcite formation)

Feature 3: Calcite stalagmite and flow

Page 3: This page is for any extra notes you wish to add, with three sections: damaged formation; tape issues and other issues.

Notes: Damaged Formation, Broken Tape, etc

Area and Location of cave your reporting on.

If you found an issue on your trip, complete the part that is appropriate. Part 1 for damaged features not in monitoring program, part 2 for taping issue and part 3 for other issues.

Part 1 for Damaged Formations

Part 2 Tape issue

Part 3 Other issues

Back Next

Part 1 for Damaged Formations

Part 2 Tape issue

Tape status at Location

No tape at location

Tape still intact

Tape Broken/moved/not correctly placed

Any issues have or may occur because of tape issue.

What need to occur to resolve issue

Any details about tape (length)

Part 3 Other issues

Back Next

Page 4: The final page for making sure anyone submitting is in fact a real post. Asking where Ogof Draenen is in the country, with a couple of answers to choose from. Then you click submit and the conservation officers receives the data.

Finally

Any other details raised from your trip that you wish to communicate to PDCMG

Reliability test: Which part of the UK is the location of Ogof Draenen?

Enter the message as it's shown

Thank you for helping to monitor Ogof Draenen. Your help is very much appreciated

Submit

Back

Here is the link to the form:

<https://form.jotformeu.com/52282564697366>

The plan is to have the printable form and link to the electron form on the PDCMG website so that anyone can access and complete it.

Any questions give me an email: [josh.falcon@live.co.uk](mailto:josh.falcon@live.co.uk)

DRAFT

## **Geological Recorder Report**

Andy Farrant. 14/11/2015

Chris Smith at Bristol University has just submitted his PhD thesis on U-Pb dating of speleothems. His thesis included dating some samples from Ogof Draenen, the majority of which were collected back in 1996. The samples proved to be excellent for dating, with high uranium concentrations. Initial dating using standard U-Th methods proved that the samples were older than c. 350 ka, and using refined U-Pb techniques, Chris's data demonstrates that the upper levels of Ogof Draenen are very old, with dates older than a million years from the upper levels. Hopefully the data will be published in the near future. One of the samples has also been used in a study at Bristol University to investigate rapid Uranium-Series age screening of speleothems. This has just been published in *Quaternary Geochronology*.

Spooner, P. T., Chen, T., Robinson, L. F., & Coath, C. D. (2015). Rapid Uranium-Series Age Screening of Carbonates by Laser Ablation Mass Spectrometry. *Quaternary Geochronology*.

Ogof Draenen also featured in a presentation I gave at this years BCRA Cave Science Symposium held in Manchester, on Maze Caves.

DRAFT

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## Re: Draenen fauna

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From: **Lee Knight** (lee.knight01@btinternet.com)

Sent: 05 November 2015 21:58:56

To: Fleur Loveridge (fleurloveridge@hotmail.co.uk)

Cc: Lou Maurice (loma@bgs.ac.uk)

3 attachments

Ogof Draenen full taxa list.xls (80.6 KB) , Ogof Draenen poster text.doc (48.2 KB) , Ogof Draenen site map.pdf (259.4 KB)

Hi Fleur,

Attached a more up to date taxa list. Anton Brancelj in Slovenia has done the Copepoda and ostracods for me. The Copepoda are nothing special but the single ostracod species *Cavernocypris subterranea* is important in a British context, see fragment below the E-mail on this species from the book I'm involved with on the British and Irish subterranean biota. This is only the 6th site for this species although I suspect it is more widespread but overlooked due to the lack of people working on Ostracoda in this country. Francois Edwards at CEH has done some of the Oligochaeta for me but still has to finish off some of the other sites and also will be identifying the chironomid larvae so the taxa list still needs work but once complete Lou and I can start working on a paper.

I created a poster for the project which has been displayed at the International karst groundwater conference at Birmingham in June and at the recent BCRA Science Symposium in Manchester, I've attached the text from this as a summary so far and a pdf showing the distribution of the sampling sites within the cave.

My next proposal is that to complement the sampling done in the streams and the some of the pools it would be good to do a more detailed sampling of some of the dripping avens and smaller pools. These habitats are liable to be filled by representatives of the epikarst fauna above the cave. As I'm sure you're aware the epikarst was not identified as a geological unit until the 1990s and its fauna is even less studied (Slovenia and a few sites in America) and has never been sampled in this country. The only way to sample it is to catch drips in cave ceilings and samples tiny pools where the drips collect or funnel the dripping water into collecting bottles. I will need to put some thought into where exactly in the cave I wish to do this and need to go back through my notes and will likely also need to re-visit the cave and scout out some potential sites. The survey is not likely to be as extensive as the stream survey as the bottles will require regular maintenance so for this reason I'm liable to limit the sites to fairly near the entrance. The method will involve a combination of sampling tiny pools below drips with a pipette or modified jug (drain the pools of

water and pour into a collecting bottle for later concentration and preservation outside of the cave) and setting up some funnels beneath drips,, possibly structures made of mesh or plastic; these funnels will then channel the water into a collecting bottle with mesh sides so that a pool will collect in the bottom but can overflow without losing fauna, then every month I will preserve and collect the contents of the bottle. Like I said I'll need to have a think before I come up with exact locations and number of sites. The samples are liable to be primarily micro-crustacea (copepods and ostracods) which will be sent to Anton in Slovenia for identification. Potentially the faun in the epikarst could be very different to that in the cave and as this habitat has not been studied in Britain potentially there could be new species.

I'm here next week but then away the week after so give me a ring if you need any further information.

All The Best,

LEE

#### ***Cavernocypris subterranea* (Wolf 1920)**

Originally placed in the genus *Cypridopsis* (Marmonier *et al.* 1989). Described originally from Switzerland, this species was first found in Britain by Fox (1967) who records it from five localities:

1. A spring in Lower Greensand, Paines Hill, Surrey (TQ 412513).
2. In a stream flowing from a spring at the base of the chalk, Newtimber Place, Sussex (TQ 272139).
3. In a chalk spring, Dagnall, Buckinghamshire (SP 990175).
4. A spring in carboniferous limestone, east of Malham Tarn, Yorkshire (SD 898670).
5. Ogof Ffynnon Ddu System, Breckonshire, south Wales (SN 848153).

Chapman (1993:156) states that "*Cypridopsis subterranea* is quite numerous in the mesocavernous seepage water running over flowstone slopes in caves such as Ogof Ffynnon Ddu in south Wales and is otherwise known only from springs." However, in a thorough faunistic survey of this cave, Jefferson and Chapman (1979, see also Jefferson *et al.* 2004)) did not record this species.

Fryer (1993:281) indicates that these five sites are still the only known localities. Henderson (1990:212-213) does not mention localities, but provides a map with five points, probably the same five sites indicated by Fryer (1993). The species was recently recorded at several sites during kick sampling of various streams in Ogof Draenen, South Wales, appearing to be widespread within the cave system (Knight and Maurice, 2016). Meisch (2000:386) records that it is widely distributed throughout Europe, excluding Ireland. In Eurasia males are unknown and the species is fully parthenogenetic. It is therefore possible that the British populations are distinct from those on the continent.

This species is apparently also found in Idaho, USA (Kulkoyluoglu and Vinyard 1998, 2000) but it seems most unlikely that the populations in Great Britain and

the USA are remotely related and it is more likely that they are morphospecies. Only a molecular study will determine the relationships of these populations. The records to date suggest that there are no true stygobitic ostracods in Britain. *Cavernocypris subterranea* is certainly a stygophile and may qualify as a local stygobite in places (e.g. Ogof Ffynnon Ddu, South Wales), if isolated from epigeal populations. It is also possible that the individuals collected in streams downstream of springs were washed out of hypogean habitats.

**From:** [Fleur Loveridge](#)

**Sent:** Thursday, October 22, 2015 12:46 AM

**To:** [Lee Knight](#) ; [Lou Maurice](#)

**Subject:** RE: Draenen fauna

Hi Lee,

That all sounds great!

We have a PDCMG meeting on the 22nd November. Perhaps you could write a little note about what you have done (and found) so far plus a proposal for further work and hopefully we can approve it then.

If you do end up having to leave any chemicals in the traps then some kind of notices so that people don't touch them sounds like a good idea. Avoiding them altogether would be even better, but clearly depends on your trip frequency etc.

All the best, Fleur.

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From: lee.knight01@btinternet.com

To: fleurloveridge@hotmail.co.uk; loma@bgs.ac.uk

Subject: Draenen fauna

Date: Tue, 20 Oct 2015 13:24:12 +0100

Hi Both,

Hope all is well. Just to inform you about progress on the Draenen project. Anton Brancelj (University of Lublijana) has done the Copepoda for me, unfortunately nothing unusual just some epigeal species washed in from above but he still needs to pass on the ostracods to a colleague, I'm also still waiting for Francois Edwards at CEH who's volunteered to look at the Oligochaeta and chironomid larvae. When the taxa list is complete then I'll begin preparations for a paper. In the meantime Lou will be aware of a poster I produced about the project which was displayed at the recent groundwater conference in Birmingham (where I also bumped into Rhian) and will also be displayed at the upcoming BCRA conference in Manchester Museum at the end of the month, although I'll not be there myself as will be caving in South Wales; the poster has been passed on to Graham Proudlove to display for me.

To support the sampling of the streams and pools in the system I was thinking about carrying additional work in Draenen sampling dripping water from the cave roof at several locations in order to have a go at sampling the epikarst fauna. This has not been done before in Britain and Ireland and indeed the knowledge we have so far of the epikarst fauna is mostly based on several studies carried out in Slovenian caves by Tanja Pipan and Anton Brancelj. Anton has agreed to look at the samples as most of the specimens are likely to be of copepoda which make up the main element of the epikarst fauna and there is potential to find new species? The epikarst is essentially a perched aquifer overlying the cave and (from the Slovenian work) appears to harbour a biota separate to that of underlying cave systems. The main way of sampling this fauna is to set up a system of collecting bottles and / or suspended nets and funnels (which channel the water and specimens into the bottle(s)) beneath active roof drips and leave them in place for a few months or so with periodic collection of the contents. This will obviously involve the placement of such equipment at locations throughout the cave, possibly including bottles containing a certain amount of preservative; although this is going to be something far less noxious than formaldehyde!! a diluted solution of anti-freeze or salt often works well in pitfall traps but I'll be looking into options that do not involve noxious fumes believe me!! If the collecting is done on a regular enough basis then larger bottles might not require preservative as the animals could live in the pool of water at the bottom of the bottle between collecting visits. I have yet to sit down and come up with the exact design of both the collecting equipment (which will however be closely based on that used in the Slovenian studies) and where in the cave to sample, although for convenience I'm likely to limit the sampling to parts of the cave that are relatively easy to reach for regular examination; some of the dripping sites in Gilwern passage spring to mind as well as some of the avens not too far in, basically sites I could easily reach myself without too much hassle.

At this stage this is all just an idea so I thought I'd float it past you two first and obviously we'll have to approach the management committee to gain permission, if this is granted then I can think about it in more detail. Ideally this is something I would think about trying to get started over the winter when the wet weather is liable to encourage more water movement and could produce some interesting results?

All The Best,

LEE

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## Draenen sampling

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From: **Lee Knight** (lee.knight01@btinternet.com)  
Sent: 10 November 2015 19:57:30  
To: Fleur Loveridge (fleurloveridge@hotmail.co.uk)  
Cc: Lou Maurice (loma@bgs.ac.uk)

Hi Fleur,

I have one other item to approach the committee about. I have a colleague who is very interested in cave Collembola (springtails), Dr. Peter Shaw at Roehampton University, he's a contemporary of Anne Robertson's so Lou should know him too. Anyway I've been sending him specimens for the last couple of years and also took him down a few caves here in Devon last year. As per usual with these obscure groups you get someone with enough expertise and interest in them and all sorts of new records come to light, thus between the two of us and Andy Lewington, us two sending him specimens and him identifying them, several interesting records have come to light in the last year or so. Last year we trialled putting artificial substrates in caves, in the form of kitchen wire scouring pads, some baited with cheese and some without. These worked remarkably well, much better than comparative manual searching and sorting of debris samples collected from the same cave. The presence of bait did not seem to make a big difference in presence / absence of species and we think it is primarily the high surface area of the pads that offer a place of shelter. I will be placing some more pads around various caves down here and also suggested to Pete that if I get permission to do so I'll be carrying out some further work in Draenen and could also place some of his pads in the cave whilst I place the funnels and drip collectors for sampling the epikarst. As I was intending on setting these up maybe in January to possibly leave in situ for two or three months with monthly maintenance then I could maybe place Pete's pads at the beginning and collect at the end of this period, which should be sufficient for Pete's aims. There has not been much active Collembola recording from caves since the days of Hazelton (i.e the early 1970s) and thus Pete's work could potentially provide quite a comprehensive species list for Draenen. Thus I'd be grateful if you could also put his forward to the committee in conjunction with my earlier proposal about sampling the drips at the next management meeting.

All The Best,

LEE

# The Aquatic Invertebrate Fauna of the Ogof Draenen Cave System in South Wales

<sup>1</sup>Knight, L.R.F.D. and <sup>2</sup>Maurice, L.

<sup>1</sup>[lee.knight01@btinternet.com](mailto:lee.knight01@btinternet.com), Hypogean Crustacea Recording Scheme, England

<sup>2</sup>[loma@bgs.ac.uk](mailto:loma@bgs.ac.uk), British Geological Survey, England

Whilst biological recording has been carried out in many British caves in the past, there have been few systematic studies of their aquatic fauna, with those of the Peak-Speedwell system of Derbyshire (Gunn et al. 2000; Wood et al 2002; Wood et al. 2008) and Swildon's Hole (Knight, 2011) in the Mendips Hills being the only extant examples published so far.

Ogof Draenen is a vast, complex cave system that lies beneath the southern edge of the Brecon Beacons National Park in South Wales. The system includes over 70km (modern estimates are continually being revised upwards with new discoveries) of discovered passage making it the second largest in Britain, behind the recently linked Three Counties system of the Yorkshire, Cumbria and Lancashire borders and one of the 30 longest caves in the world. The cave system contains many areas of fine calcite and gypsum formations, unusual fossils, some of the largest passages in the UK and a number of subterranean, autogenic catchments fed by water percolating down through the epikarst or by seepages and minor streams feeding into dolines on the moorland above. There are no permanent surface sinking streams, although the small streams flowing into the larger of the two dolines on Gilwern Hill are likely to retain their flow for much of the year. The drainage of the karst is extensive and complicated, with various watersheds having been identified within the system, along with a number of resurgences in the surrounding valleys by dye tracing studies (Maurice & Guildford, 2011). The pattern of drainage has changed dramatically over the millennia during four distinct phases (Farrant & Simms, 2011) but today there are roughly two flow paths. The water in the northern part of the cave under Gilwern Hill flows northwards and drains into the Cwm Dyar valley via four springs. By far the majority of the cave streams flow to the south where various catchments coalesce into either the Big Country, Dolimore or Beyond a Choke streams which then unite somewhere south of the cave and all resurge either in the bed of the river Afon Lwyd at Snatchwood or on its banks at Pontnewynydd some 8km beyond the cave in a different topographical catchment (Maurice & Guildford, 2011).

From 2012 to 2015 an extensive investigation was undertaken of the invertebrate fauna of the various aquatic habitats present in the cave, ranging from small pools and avens to the extensive number of active stream-ways present. The main method employed was a timed period of net sampling in order to provide comparison between the lotic sites. Pools and smaller flows of water were sampled using a combination of netting and manual searching. Sampling was also carried out at known resurgences and on several small surface seepages feeding into dolines, which are known to connect to the cave system below and.

The majority of the samples were dominated by populations of stygobitic Crustacea including the amphipods *Niphargus fontanus* Bate 1859 and *Microniphargus leruthi* Schellenberg 1934, the isopod *Proasellus cavaticus* Leydig 1871 *sensu* Henry 1970 and the syncarid *Antrobathynella stammeri* (Jakobi, 1954). *Niphargus fontanus* and *P. cavaticus* were already known from the cave and are common inhabitants of many of the caves of South Wales and the Mendip Hills. The records of *M. leruthi*, a species only recently discovered in Britain in 2010 (Knight 2011; Knight & Gledhill, 2010) are the first from a Welsh cave system and the records of *A. stammeri* are the first for this species from Wales. Some streams were

particularly diverse and populations of over 100 *P. cavaticus* were not uncommon in some of the samples, suggesting high potential populations in certain stream reaches within the cave.

Epigeal benthic fauna were present in the cave close to surface inlets, and within the surface seepages and resurgences although the latter were also characterized by stygobitic Crustacea, including a second *Niphargus* species, *N. aquilex* Schiödte, 1855. The presence of five stygobitic Crustacea from the system makes this the most diverse stygobitic fauna recorded so far from a British cave.

Further determination of various other taxonomic groups are still in progress, most notably the Oligochaeta, Cyclopoida and the Acari so further stygophilic and stygobitic species might yet be recorded. Physical data such as width, depth and substrate composition was collected at all the lotic sampling sites and initial appraisal of the data appears to suggest some links between the coarseness of the substrate and the composition of the community, a relationship that requires further study and which will be included in a more detailed paper in the near future.

## References

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Gunn, J., Hardwick, P. and Wood, P.J. 2000. The invertebrate community of the Peak-Speedwell system, Derbyshire, England - pressures and considerations for conservation management. *Aquatic Conservation: Marine and Freshwater Ecosystems* **10**: 353-369.

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Wood, P.J., Gunn, J. and Perkins, J. 2002. The impact of pollution on aquatic invertebrates within a subterranean ecosystem - out of sight out of mind. *Archiv. Für Hydrobiologie* **155**: 223-237.

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## Fixed Aids

| Ogof Draenen Fixed Aids - 25/07/2015 |                 |  |                                 |     |              |                   |                |                                    |  |  |   |  |  |
|--------------------------------------|-----------------|--|---------------------------------|-----|--------------|-------------------|----------------|------------------------------------|--|--|---|--|--|
| Pwll Du Cave Management Group        |                 |  |                                 |     |              |                   |                |                                    |  |  |   |  |  |
| No.                                  | Location        | Identification                                 | Specification                   | PPE | Installed By | Installation Date | Inspection Due | Rigging Comments                   | Inspection Comments  | Inspection 25/07/15 - AG                                       | Inspection 21/06/14 - FL & CD   | Inspection 08/06/13 - FL & CD                                    | Inspection 09/06/12 - AG   |
| 1                                    | Entrance Climb  | 1st backup Eco hanger furthest from pitch head | DMM Eco hanger                  | Yes | CCC          | ??                | 25/07/2015     | Un-used                            | OK   | OK   | OK  | OK   | OK   |
| 2                                    |                 | Middle Eco hanger                              | DMM Eco hanger                  | Yes | CCC          | ??                | 25/07/2015     | Rope tied directly into Eco hanger | Hanger rotates slight. Loaded perpendicularly so not a concern | Hanger rotates slight. Loaded perpendicularly so not a concern | Hanger rotates very slightly. Loaded perpendicularly so not a concern | Hanger rotates slightly. Loaded perpendicularly so not a concern | Hanger rotates slightly. Loaded perpendicularly so not a concern |
| 3                                    |                 | Main hang Eco hanger                           | DMM Eco hanger                  | Yes | CCC          | ??                | 25/07/2015     |                                    | Resin does not completely fill the hole flush to the surface   | Resin does not completely fill the hole flush to the surface   | Resin does not completely fill the hole flush to the surface          | Resin does not completely fill the hole flush to the surface     | Resin does not completely fill the hole flush to the surface     |
| 4                                    |                 | MR for 3rd Eco hanger                          | 10mm Long Open MR               | Yes | AG & JC      | 24/04/2010        | 25/07/2015     |                                    | Consider replacement with Stainless Steel MR                   | Some surface corrosion   | Some minimal surface corrosion  | Some minimal surface corrosion                                   | Some minimal surface corrosion                                   |
| 5                                    |                 | Traverse and knotted handline                  | 11mm Edelrid Performance Static | Yes | AG           | 25/07/2015        | 25/07/2015     |                                    | New  | OK   | OK  | OK   | OK   |
| 6                                    | Indiana Highway | 1st Eco hanger from Indian Highway end         | DMM Eco hanger                  | Yes | CCC          | ??                | 25/07/2015     | Tied directly into Eco hanger      | OK   | OK   | OK  | OK   | OK   |
| 7                                    |                 | 2nd Eco hanger                                 | DMM Eco hanger                  | Yes | CCC          | ??                | 25/07/2015     |                                    | OK   | OK   | OK  | OK   | OK   |
| 8                                    |                 | MR for 2nd Eco hanger                          | 10mm Long Open MR               | Yes | AG & JC      | 24/04/2010        | 25/07/2015     |                                    | OK - some surface corrosion                                    | OK - some surface corrosion                                    | OK - slight surface corrosion   | OK   | OK   |
| 9                                    |                 | 3rd Eco hanger                                 | DMM Eco hanger                  | Yes | CCC          | ??                | 25/07/2015     |                                    | OK   | OK   | OK  | OK   | OK   |
| 10                                   |                 | MR for 3rd Eco hanger                          | 10mm Long Open MR               | Yes | AG & JC      | 24/04/2010        | 25/07/2015     |                                    | OK - some surface corrosion                                    | OK - some surface corrosion                                    | OK - slight surface corrosion   | OK   | OK   |
| 11                                   |                 | 4th Eco hanger                                 | DMM Eco hanger                  | Yes | CCC          | ??                | 25/07/2015     | Tied directly to Eco hanger        | OK   | OK   | OK  | OK   | OK   |
| 12                                   |                 | Traverse line                                  | 11mm Edelrid Performance Static | Yes | AG           | 25/07/2015        | 25/07/2015     |                                    | New  | OK   | OK  | OK   | OK   |
| 13                                   | Balcony Pitch   | Left hand Eco hanger                           | DMM Eco hanger                  | Yes | CCC          | ??                | 25/07/2015     |                                    | OK   | OK   | OK  | OK   | OK   |
| 14                                   |                 | MR for Left Eco hanger                         | 12mm Long Open MR               | Yes | AG & MS      | 22/05/2011        | 25/07/2015     |                                    | OK   | OK   | OK - slight surface corrosion   | OK   | OK   |
| 15                                   |                 | Right hand Eco hanger                          | DMM Eco hanger                  | Yes | CCC          | ??                | 25/07/2015     |                                    | OK   | OK   | OK  | OK   | OK   |
| 16                                   |                 | MR for Right Eco hanger                        | 10mm Delta MR                   | Yes | AG & MS      | 22/05/2011        | 25/07/2015     |                                    | OK - slight surface corrosion                                  | OK - slight surface corrosion                                  | OK - slight surface corrosion   | OK   | OK   |
| 17                                   |                 | MR for Left of ladder                          | 10mm Long Open MR               | No  | AG & MS      | 22/05/2011        | 25/07/2015     |                                    | OK - very slight surface corrosion                             | OK - very slight surface corrosion                             | OK - slight surface corrosion   | OK   | OK   |
| 18                                   |                 | MR for Right of ladder                         | 10mm Long Open MR               | No  | AG & MS      | 22/05/2011        | 25/07/2015     |                                    | OK   | OK   | OK - slight surface corrosion   | OK   | OK   |
| 19                                   |                 | MR for lifeline                                | 10mm Long Open MR               | Yes | AG & MS      | 22/05/2011        | 25/07/2015     | Linked into Delta MR               | OK - some surface corrosion                                    | OK - some surface corrosion                                    | OK - slight surface corrosion   | OK   | OK   |
| 20                                   |                 | Looped ladder lifeline                         | 11mm Edelrid Performance Static | Yes | AG           | 25/07/2015        | 25/07/2015     | Runs through 10mm MR               | New  | OK   | OK  | OK   | OK   |
| 21                                   |                 | Stainless Steel Ladder                         | Daren style ladder              | No  | AG & MS      | 22/05/2011        | 25/07/2015     | Lifeline is the PPE                | OK   | OK   | OK  | OK   | OK   |
| 22                                   |                 | Chain for rigging ladder                       | 10mm Zinc Plated chain          | No  | AG & MS      | 22/05/2011        | 25/07/2015     |                                    | OK   | OK   | OK - slight surface corrosion   | OK   | OK   |